IntesisBox® Modbus Server
Fidelio IP

User Manual

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Gateway for the integration of Fidelio Hotel management system in Modbus enabled monitoring systems through Cylon UnitronUC32 – Intesis Box FIAS interface.

Order code:

IBOX-MBS-FILEDIO_IP

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1. Description

1.1 Introduction

Integration of Micros Fidelio Hotel management system into a Modbus master device or system, using *IntesisBox Modbus Server – FIDELIO IP* gateway.

The aim of this integration is to make available the Check-in and Check-out information from individual rooms from a Modbus master device. For this, *IntesisBox Modbus Server - FIDELIO IP* gateway works, from the Modbus system point of view, acting as a Modbus slave device responding to data polls coming from the Modbus master. From the Fidelio system point of view, it connects using TCP/IP to the FIAS interface (Cylon UnitronUC32 – Intesis Box) to get the updates of the room status. Also it can re-synchronize with the current status of all the rooms.
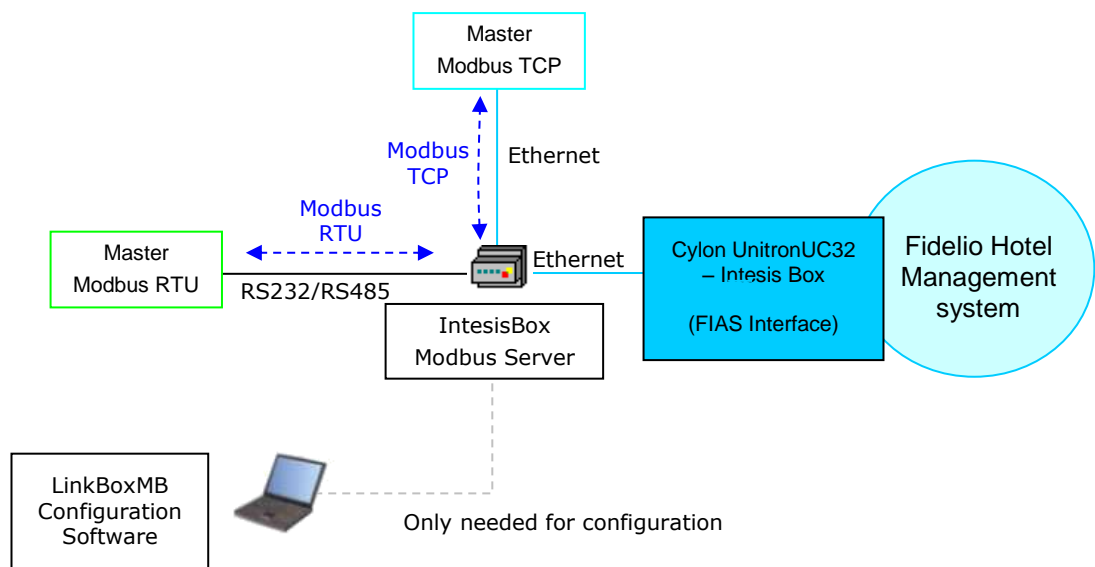
**Integration of Fidelio Hotel management system
using *IntesisBox Modbus Server***

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1.2 Functionality

General overview

The communication protocol of the Fidelio system is based on events, the states of the rooms are transmitted through the protocol in the form of events whenever they occur.

The role of IntesisBox consists in associating the status of the hotel rooms with Modbus register addresses.

The procedure of configuration of IntesisBox consists basically in the following:

- Introduction of the communication parameters for Modbus side and Fidelio side.

- Assign the rooms to integrate to Modbus registers.

- Once this configuration has been done with the configuration software tool LinkBoxMB, you have to download this configuration to IntesisBox via a serial connection and IntesisBox will reboot with the new configuration working.

The integration operation is as follow:

Once IntesisBox is configured and connected to both systems (Fidelio and Modbus), it maintains a "keep alive" message with the Fidelio system, being this message the request/response of panel status, also it listens continuously for new events coming from the hotel management system. With every event, the new state received is updated in the Intesisbox's memory and become available to be read by the Modbus master device through the corresponding Modbus register address.

As mentioned before, the protocol of the Fidelio system is based in spontaneous messages, that is, only changes of states are sent through the protocol whenever they occur. When IntesisBox starts up, a message is sent to the panel to force a response of current state of all elements to update IntesisBox Modbus registers with correct value.

1.3   Capacity of IntesisBox

Element	Max.	Notes
Number of Rooms	1500	Room number can be higher than the allowed rooms.
Modbus registers	1500	From 1 to 1500

Ref.: IBOX-MBS-FIDELIO_IP

2. Modbus interface of IntesisBox

2.1 Description

IntesisBox acts as a slave device in its Modbus interface, this interface can be the Ethernet port (if using Modbus TCP), or the RS232 port or the RS485 port (if using Modbus RTU). To access the points of the IntesisBox from Modbus system, you must specify as the Modbus register addresses those configured in the LinkboxMB. See details in section 3.4

2.2 Register's addresses and values

The Modbus registers to be used with the *IntesisBox Modbus Server – FIDELIO IP* gateway are all Unsigned Int, read only and the values from 1 to 1500 can be used.

The allowed values of the Modbus registers are:

- 0: room in check-out status

- 1: room in check-in status

There is a communication error register showing the communication status of the IntesisBox with the Fidelio system with the values:

- 0: Communication OK

- 1: Error in the communication

2.3 Functions supported

Modbus functions 03 and 04 (*read holding registers* and *read input registers*) can be used to read Modbus registers.

If *poll records* are used to read 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.

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3. LinkBoxMB. Configuration & monitoring tool for IntesisBox Modbus Server series

3.1 Introduction

LinkBoxMB is a Windows® compatible software developed specifically to monitor and configure IntesisBox Modbus Server series. It is possible to configure all external protocols available for IntesisBox Modbus Server and to maintain different customer's configurations based on a LinkBoxMB project for every different installation. Maintaining always on hard disk a copy of the last configuration files for every external protocol and customer, that is to say for every project.

From LinkBoxMB, as well as configure the integration signals list and connection parameters for every external protocol, it is permitted to select the serial port to use to connect to IntesisBox Modbus Server and the use of some tools for monitoring and debugging de device. Some of these tools will be explained in this document but only some of them, the rest of available debugging tools and commands will not be explained here because they are for exclusive use under the recommendations of Intesis Software technical support.

LinkBoxMB allows configuring all IntesisBox Modbus Server series independently of the external system used. For every external system, LinkBoxMB has a specific configuration window. Periodically, new free versions of LinkBoxMB are released incorporating the latest developed integrations for external systems.

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3.2 Project definition

The first step to do in LinkBoxMB for a new installation is to create the installation's project giving a descriptive name to it. When you create a project, a new folder is created with the name of the project containing the configuration files needed depending on the external protocol selected for the project. It is strongly recommended that you create a new project for every installation, if not, overwriting of configuration files of previous installations using the same external protocol may occur, loosing the configuration data for those previous installations. The projects folder is located in AppFolder\ProjectsMB, where AppFolder is the installation folder of LinkBoxMB (by default C:\Program Files\Intesis\LinkBoxMB). Inside the projects folder, a new folder will be created for every project defined in LinkBoxMB with the files needed for the project.

When you open LinkBoxMB, the project selection window will appear inviting you to select a project or create a new one. A demo project for every external protocol supported is provided with the standard installation of LinkBoxMB. You can create a new project or select a demo project based on the external protocol desired, and create a new one from the demo one selected.
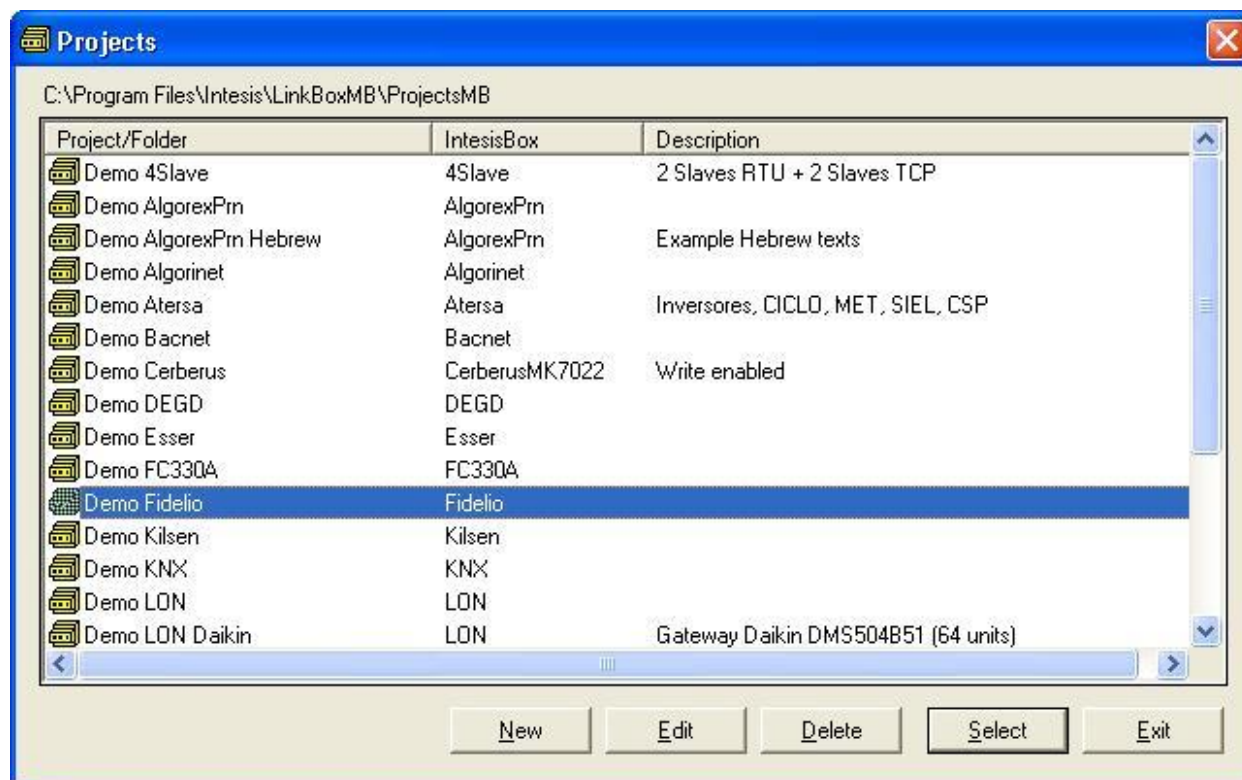
Project selection window

To create a new project, select a project using the same external protocol you want to use in the new project and click on *New* button. You will be prompted to create a copy of the selected project (useful for similar installations) or create a brand new one.

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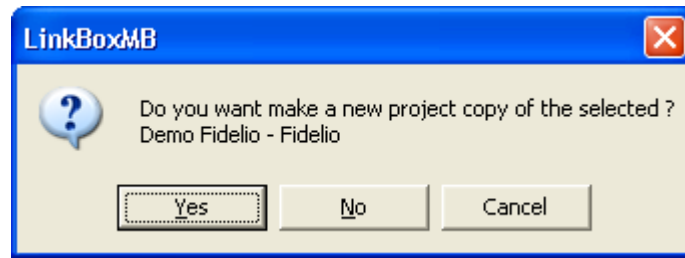
If you select *Yes* you will be prompted to specify a name and a description for the new project that will be based on the same external protocol than the selected one. If you select *No* you can specify a name, a description and an external protocol to use from the list of available external protocols.

On *Accept*, a new folder will be created inside the projects folder with the name given to the project, this folder will contain the template configuration files if the project is a brand new one, or a copy of the configuration files if it is a copy of a selected one.

A description of the files created for a Fidelio protocol based project can be found in section *Files* in this document.

From all the possibilities of LinkBoxMB, only changes in configuration for the integration and configuration file generation can be performed while disconnected from IntesisBox (working off-line), allowing you to do these tasks in the office more comfortably. Before any monitoring or downloading action to IntesisBox can be performed, the connection between IntesisBox and the PC running LinkBoxMB must be established (working on-line). To do so follow these steps:

1. Make sure IntesisBox is powered-up a correctly connected to the Modbus system via the Ethernet connection (Modbus TCP) or serial connection (Modbus RTU) and to the Fidelio system (connected using Ethernet). Consult details for connection and pin assignments in section *Connection*s of this document.

2. Connect a free PC serial port to the IntesisBox serial port marked as *PC Console*. (Use the standard serial cable supplied with the device or a customer's cable following the pin assignments specified in section *Connections* in this document).

3. Select in LinkBoxMB the PC serial port used for the connection to IntesisBox. Use menu Configuration -> Connection.

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4. Check the checkbox *off-line* under the menu bar (it will change automatically to *on-line*) and LinkBoxMB will ask for INFO about the IntesisBox connected to it via the serial connection, if the connection is ok then IntesisBox will respond with its identification (this can be monitored in the *IntesisBox Communication Console* window, as showed below).
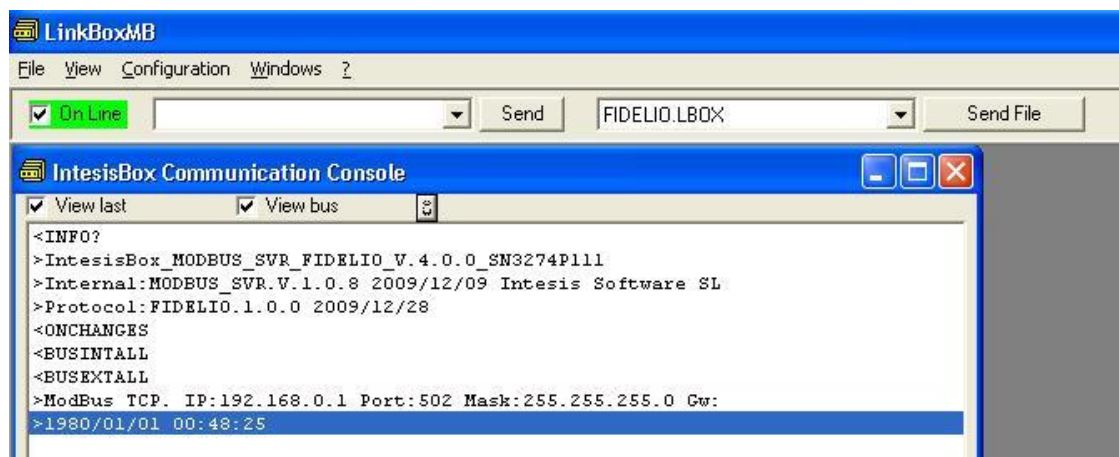
Once connected to IntesisBox, all the options of LinkBoxMB are fully operative.

To monitor the communication between IntesisBox and the Modbus master device, select the menu *View -> Bus -> Modbus*. The *Modbus communication Viewer* window will be opened. This window show in real time all the communication frames between IntesisBox and the Modbus master device as well as debugging messages referent to internal protocol (Modbus) sent by IntesisBox.

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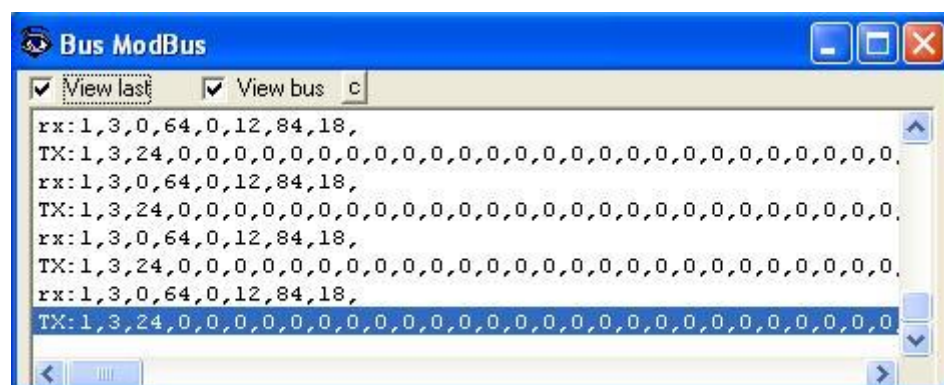
To monitor the communication between IntesisBox and the external system, open the *External Protocol Communication Viewer* window (menu View -> Bus Fidelio). The *External protocol communication viewer* window will be opened. This window show in real time all the communication frames between IntesisBox and the Fidelio Software.
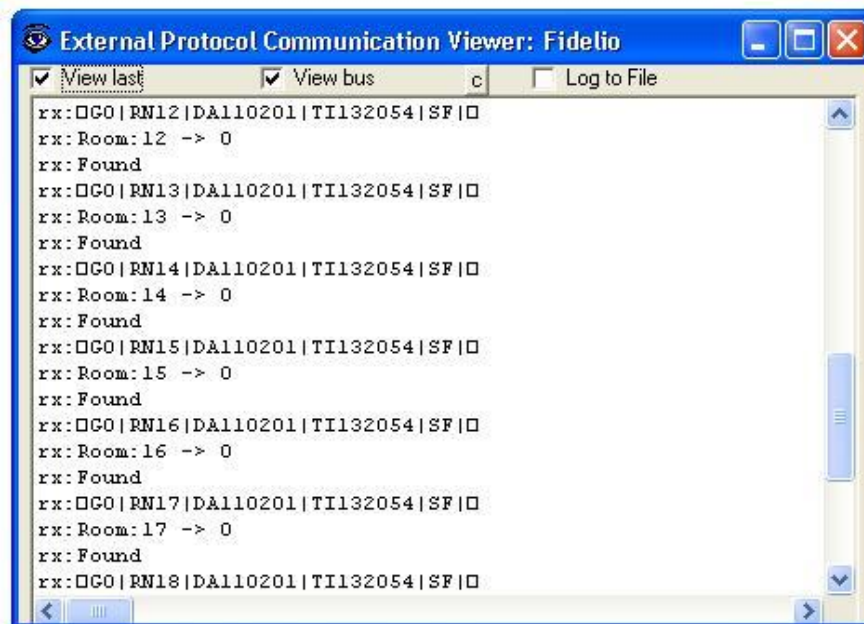
3.3   Connections configuration

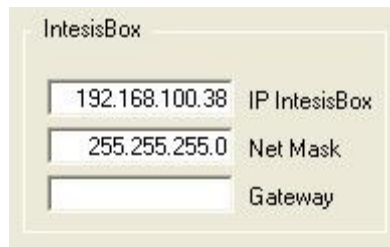To configure the IntesisBox's connection parameters and the Modbus values for each possible state, select menu *Configuration -> IntesisBox*. The *Fidelio Configuration* window will be opened.
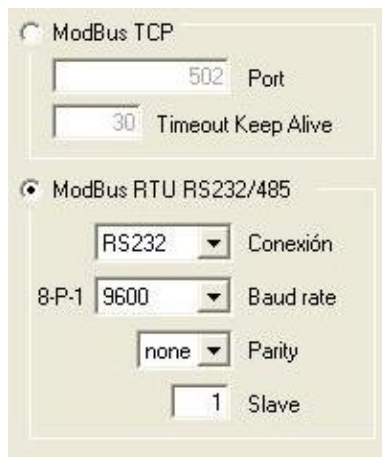
Select the Connection tab to configure the connection parameters.

Three different sections can be found: the IP configuration of the IntesisBox, the Modbus configuration and the Fidelio connection parameters.

- **IP IntesisBox:** IntesisBox IP address.

- **Net Mask:** IntesisBox Net mask.

- **Gateway:** Router address. Only needed when there is a router. Otherwise leave it blank.

Modbus side configuration parameters:

Modbus interface configuration.

Select the type of connection desired (TCP or RTU).
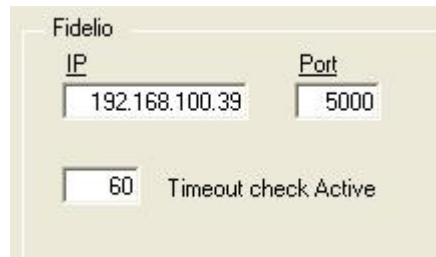
If Modbus TCP is selected, then:

- **Port:** Enter the TCP port to use, by default 502.

- **Timeout Keep Alive:** Enter the Keep Alive Timeout (in seconds). This is the time without Modbus TCP traffic after which IntesisBox will send a Keep Alive packet to the master(s) connected to it, this is to maintain alive the TCP connection.

If Modbus RTU is selected, then:

- **Connection:** Select the port to use (RS232 or RS485).

- **Baud rate:** Select the baud rate to use.

- **Parity:** Select the parity.

- **Slave:** Enter the Modbus slave number for IntesisBox.

Fidelio side configuration parameters:

Fidelio interface Parameters.

- **IP:** IP of the FIAS interface in the Fidelio Software

- **Port:** Port of the FIAS interface in the Fidelio Software

- **Timeout Check Active:** Time that the IntesisBox will wait to check the connectivity with the Fidelio 's system.

3.4 Signals

Select the *Points* tab for a description of the IntesisBox's signals.

Points list

- **Type:** IP of the FIAS interface in the Fidelio Software

- **Name:** Description of the room (optional)

- **Room:** Room number. This number must match the one in the Fidelio system.

- **Format:** Format of the Modbus registers. It can't be edited.
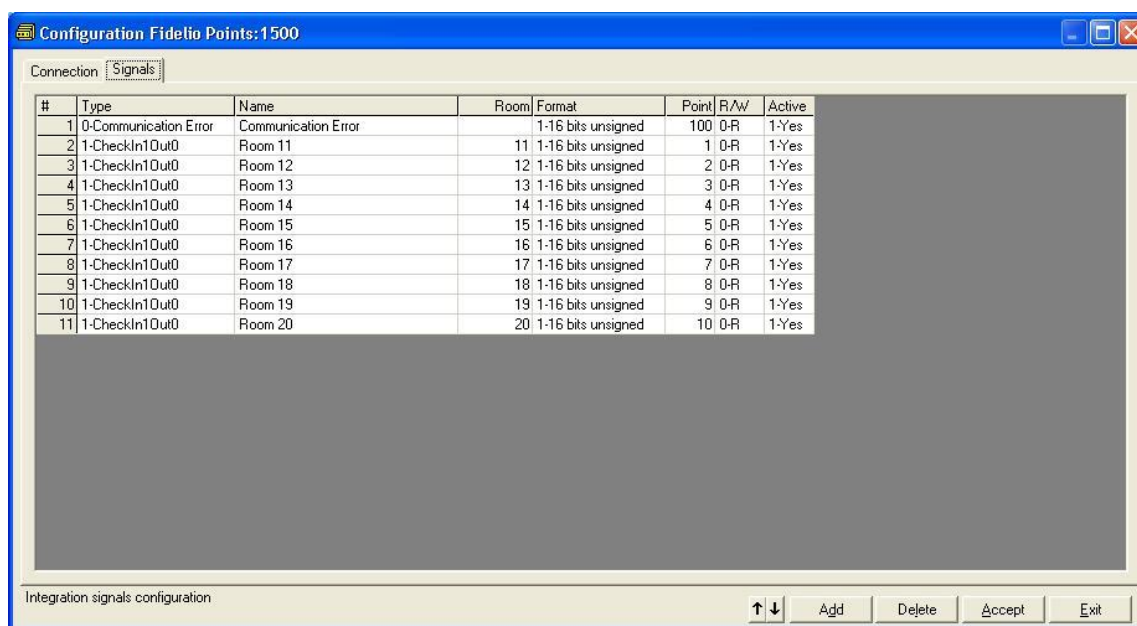
- **Point:** Modbus register number. Allowed values from 1 to 1500.

- **R/W:** Sets if the register can be read/written. It can't be edited.

- **Active:** Indicates if the signal is active or not for the integration

- **↑↓:** Buttons to move the selected row (or rows) up or down inside the grid. To move up or down inside the grid a single row or a group of consecutive rows, just select the row or rows using the left button of the mouse and push the desired up or down button. This can be done also using the key combinations *ALT+arrow up* or *ALT+arrow down* instead of up or down buttons

- **Add:** Button that adds a row under the selected one.

- **Delete:** Buttons to delete the selected row (or rows).

- **Accept:** Save the configuration.

- **Exit:** Exits the configuration window.

3.5   Sending the configuration to IntesisBox

When the configuration has been saved (button *Accept*) and the IntesisBox configuration binary file has been generated (remember to select yes when asked if you want to generate the IntesisBox file), to send the configuration file to IntesisBox click on the button ***Send File***. The process of file transmission can be monitored in the *IntesisBox Communication Console* window. If the file transmission is ok, IntesisBox will reboot automatically with the new configuration loaded.

```
IntesisBox Communication Console
☑ View last        ☑ View bus        c
>Init IntesisBox
>Init external data
>Reading secure configuration
>Max. size file available: 257024
>File bytes:321
>Reading configuration
>File id:INTESISBOX-MBS-FIDELIO-V.1.0 2011/02/01 15:27:41
>Wait...
>Points ModBus:0 Rooms:10
>Fidelio: 192.168.100.39:5000
>Read file OK
>Initiating IP system
>Ethernet detected
>Initiating external data
>Opening ModBus port
>IntesisBox running...
>IntesisBox_MODBUS_SVR_FIDELIO_V.4.0.0_SN3274P111
<BUSINTALL
```

Remember that saving the configuration and generating the IntesisBox bin file only saves to the hard disk on the PC the configuration files. **Do not forget to send the configuration binary file to the IntesisBox (using button *Send File)* after saving the configuration.**

3.6 Signals viewer

Once IntesisBox is running with the correct configuration, to supervise the status of the configured signals, select menu *View -> Signals*. The Signals Viewer window will be opened. This window shows all the active IntesisBox's signals with its main configuration parameters and its real time value in the column Value. After a reset of IntesisBox or after sending a configuration file to the IntesisBox, all the signal's values will be updated automatically in the signals viewer, in case you connect to the IntesisBox when it is already running, you should press the *Update* button to get updated values, press just once the button to update all the signal values, from this moment the signal values will be maintained updated until the connection is closed.

#	Type	Name	Room	Format	Point	R/W	Value
1	0-Communication Error	Communication Error		1-16 bits unsigned	100	0-R	0
2	1-CheckIn1Out0	Room 11	11	1-16 bits unsigned	1	0-R	0
3	1-CheckIn1Out0	Room 12	12	1-16 bits unsigned	2	0-R	0
4	1-CheckIn1Out0	Room 13	13	1-16 bits unsigned	3	0-R	0
5	1-CheckIn1Out0	Room 14	14	1-16 bits unsigned	4	0-R	0
6	1-CheckIn1Out0	Room 15	15	1-16 bits unsigned	5	0-R	0
7	1-CheckIn1Out0	Room 16	16	1-16 bits unsigned	6	0-R	0
8	1-CheckIn1Out0	Room 17	17	1-16 bits unsigned	7	0-R	0
9	1-CheckIn1Out0	Room 18	18	1-16 bits unsigned	8	0-R	0
10	1-CheckIn1Out0	Room 19	19	1-16 bits unsigned	9	0-R	0
11	1-CheckIn1Out0	Room 20	20	1-16 bits unsigned	10	0-R	0

The signals viewer can be used only when at least one system is connected to the IntesisBox, *Fidelio* or *Modbus*, and is very useful for supervision and test.

It is possible to force a specific value to any signal for test purposes, to do so just double click on the row and select the desired value and Accept in the Data Test window. The new value entered will be available through the *Modbus* interface, the same way as if it has been received from the Fidelio system. The valid values are only 0 (check out) or 1 (check-in)
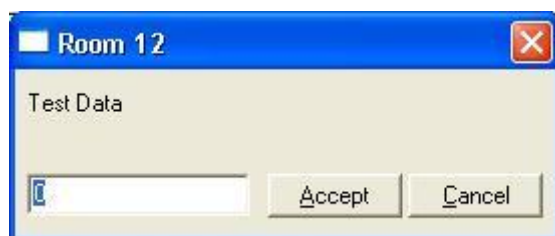
This tool is very useful to test the communication in the Modbus side from the Modbus master device for example, without the need to have the Fidelio system connected and running.

The signals viewer window has a button to copy to the Windows Clipboard all the contents of the window (in tab separated text format).

3.7   System commands

LinkBoxMB includes an option to send to IntesisBox a set of system commands for debugging and control purposes; this list is available in the commands list as shown in the figure below. To send a command to IntesisBox just select it from the list, or type it with the correct format, and press *Enter* or click on button *Send*. IntesisBox will act accordingly with the command received; the process can be monitored in the IntesisBox Communication Console window. The use of some of these commands can be critical for IntesisBox normal functioning, having this in mind use only these commands following the recommendations of Intesis Software technical support. A list of the more commonly used commands and the way to use them will be returned by IntesisBox after sending the HELP command.
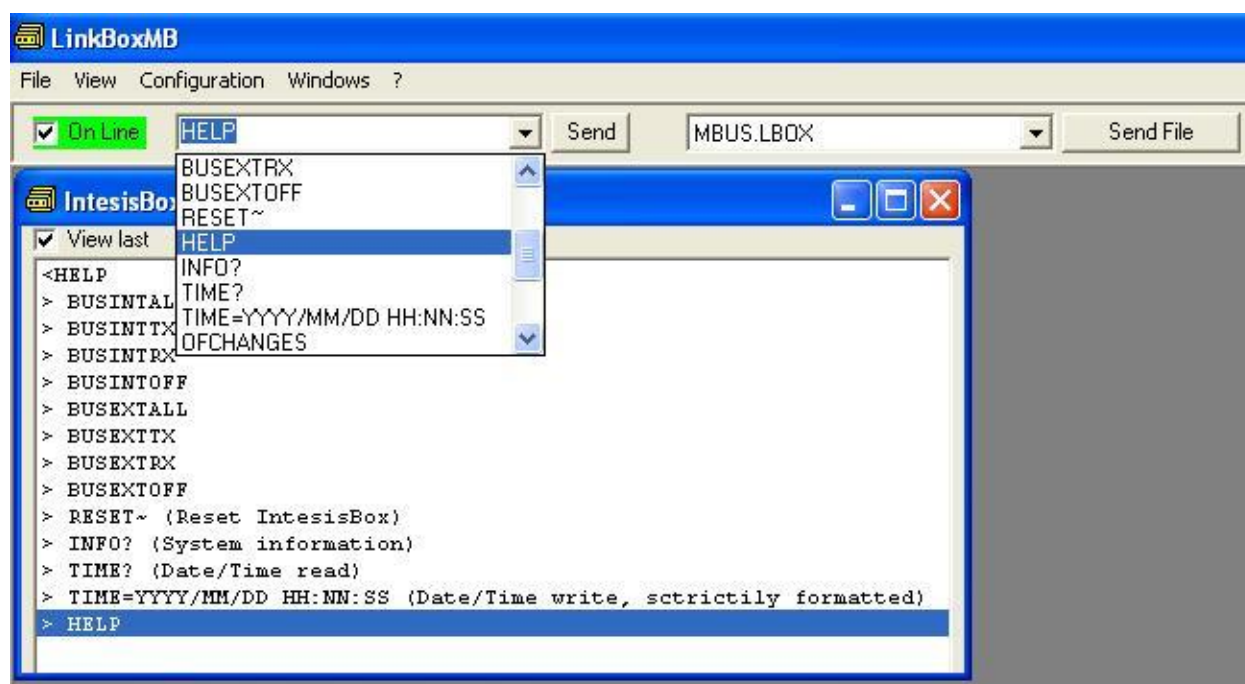
3.8   Files

LinkBoxMB saves the integration configuration in the following files inside the project folder:

PROJECT.ini	.ini file containing general information referent to the project
Fidelio.ini	.ini file containing the information referent to the connection window and other special adjustments
Fidelio.dat	File containing the signal information from the IntesisBox
Fidelio.lbox	Binary file created from the information in the two files described above. This is the file downloaded to the IntesisBox.

It is strongly recommended to back up the project folder containing these files in external media, once the installation process is finished. This way you will be able to do future configuration changes in case of reinstallation of LinkBoxMB due, for example, to a failure of the hard disk in the PC where LinkBoxMB was installed.

The configuration cannot be uploaded from IntesisBox to LinkBoxMB, only can be downloaded.

4. Set-up process and troubleshooting

4.1 Pre-requisites

It is necessary to have the Modbus master device operative and well connected to the Modbus port of IntesisBox, remember to respect the maximum of 15 meters cable distance if using RS232 communication.

It is necessary to have the FIDELIO software running and with the FIAS interface active. To do so contact the software supplier.

Connectors, connection cables, PC for LinkBoxMB, and other auxiliary material, if needed, are not supplied by Intesis Software for this standard integration. The items supplied by Intesis Software for this integration are:

- IntesisBox Modbus Server device with FIDELIO_IP external protocol firmware loaded.
- LinkBoxMB software to configure IntesisBox.
- Console cable needed to download the configuration to IntesisBox.
- Product documentation.

4.2 Set-up procedure

1. Install LinkBoxMB on your laptop, use the setup program supplied for this and follow the instructions given by the Installation wizard.

2. Install IntesisBox in the desired installation site. The mounting can be on DIN rail or on a stable not vibrating surface (DIN rail mounted inside a metallic industrial cabinet connected to ground beside the Panel is recommended).

3. Connect the communication cable coming from the Modbus master device to the port marked as **Modbus** of IntesisBox (used either RS232, RS485 or Ethernet port depending on the type of Modbus communication to use). (See details for this communication cable in section *Connections* of this document).

4. Connect the Ethernet cable to the Ethernet port to communicate with the FIDELIO software. (See details for this communication cable in section *Connections* of this document).

5. Power up IntesisBox. The supply voltage can be 9 to 30 Vdc or just 24 Vac. Take care of the polarity of the supply voltage applied.

   WARNING! In order to avoid earth loops that can damage IntesisBox and/or any other equipment connected to it, we strongly recommend:

   - The use of DC power supplies, floating or with the negative terminal connected to earth. **Never use a DC power supply with the positive terminal connected to earth**.
   - The use of AC power supplies only if they are floating and not powering any other device.

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6. Connect the communication cable coming from the serial port of your laptop PC to the port marked as **PC Console** of IntesisBox. (See details for this communication cable in section *Connections* of this document).
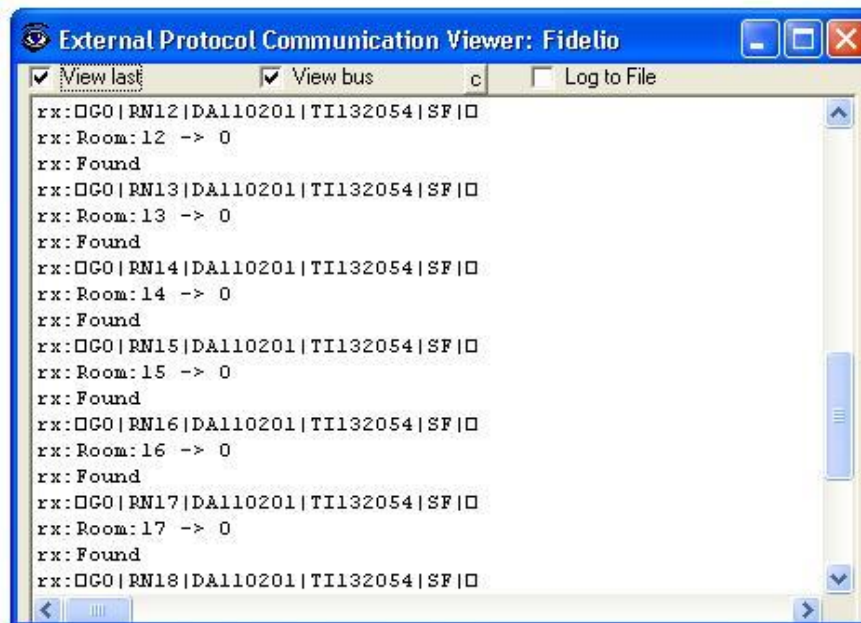
7. Open LinkBoxMB, create a new project selecting a copy of the one named **DEMO Fidelio** and give it the name desired, select the serial port used to connect to IntesisBox (menu Configuration -> Connection) and switch working mode to *on-line* (checkbox *off-line/on-line*). The IntesisBox identification must appear in the *IntesisBox communication console* window as showed below.
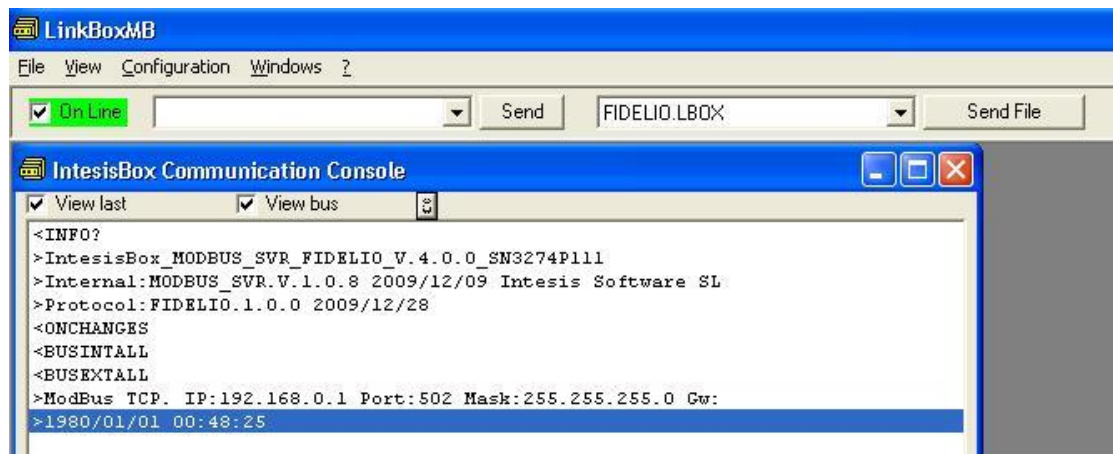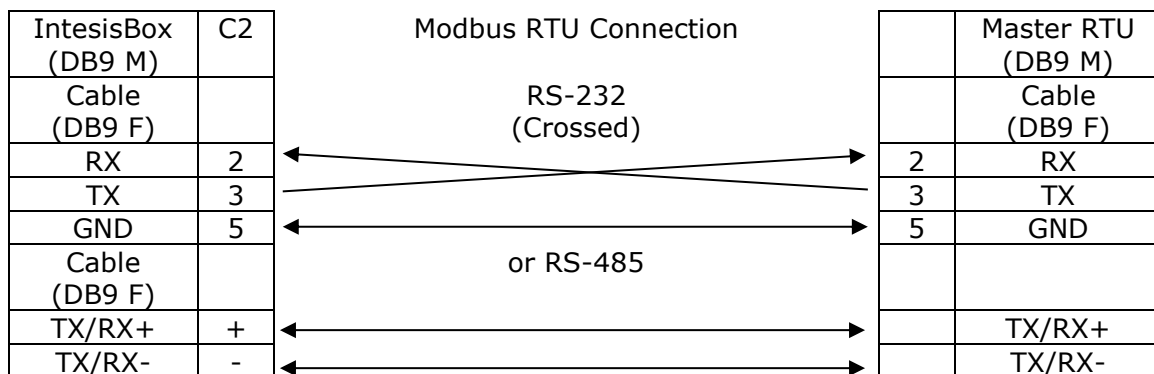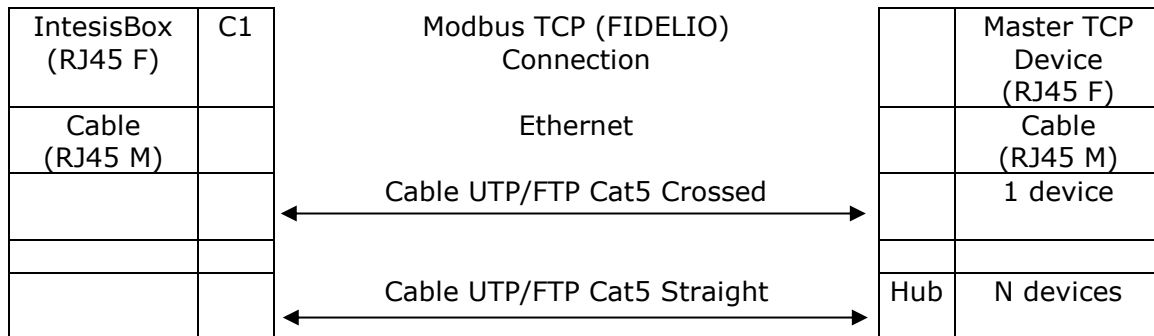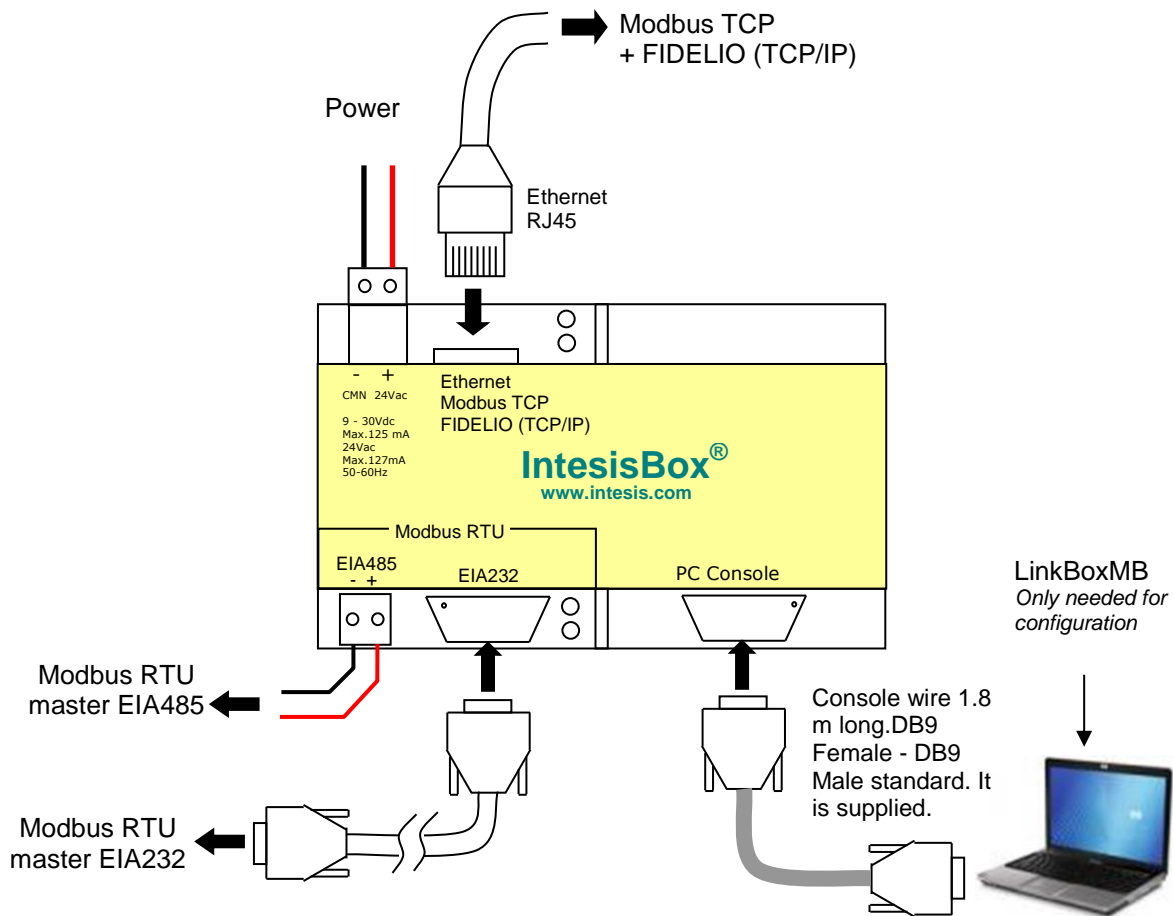

8. Modify the configuration as desired, save it and download the configuration file to IntesisBox as explained before.

9. Open the *Modbus Communication Viewer* window (menu View -> Bus -> Modbus) and check that there is communication activity, some TX frames and some other rx frames. This means that the communication with the Modbus master device is ok. In case there is no communication activity between IntesisBox and the Modbus master device check that it is operative, check the baud rate, and check also the communication cable used to connect both devices. (See details for this communication cable in section *Connections* of this document).
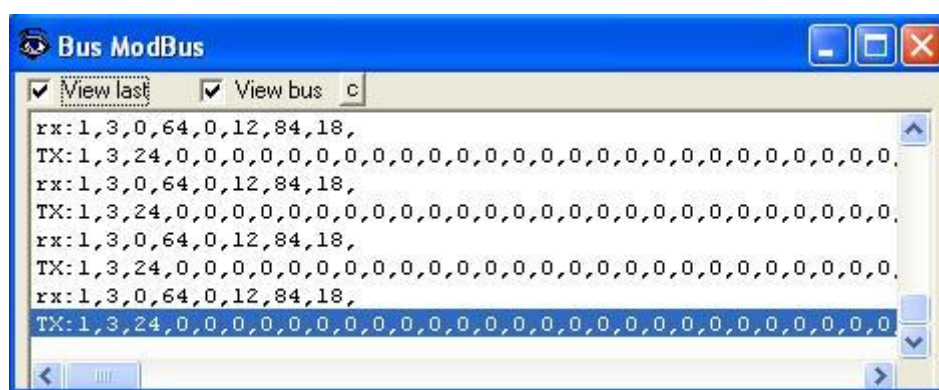
10. Open the *External Protocol Communication Viewer* window (menu View -> Bus Fidelio) and check that there is communication activity, some RX frames as showed in the figure below. This means that the communication with the Fidelio Sofrware is ok. In case of no communication activity between IntesisBox and the software, if the IP is correct and that the fidelio software has the FIAS interface enabled

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5. Connections

IntesisBox (RJ45 F)	C1	Modbus TCP (FIDELIO) Connection		Master TCP Device (RJ45 F)
Cable (RJ45 M)		Ethernet		Cable (RJ45 M)
		Cable UTP/FTP Cat5 Crossed		1 device
		Cable UTP/FTP Cat5 Straight	Hub	N devices

IntesisBox (DB9 M)	C2	Modbus RTU Connection		Master RTU (DB9 M)
Cable (DB9 F)		RS-232 (Crossed)		Cable (DB9 F)
RX	2		2	RX
TX	3		3	TX
GND	5		5	GND
Cable (DB9 F)		or RS-485		
TX/RX+	+			TX/RX+
TX/RX-	-			TX/RX-

IntesisBox (DB9 F)	C3	PC Connection (LinkBoxMB)		PC (DB9 M)
Cable (DB9 M)		RS-232 (Straight)		Cable (DB9 F)
TX	2	→	2	RX
RX	3	←	3	TX
GND	5	↔	5	GND

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6. Mechanical & electrical characteristics

|	
Enclosure	Plastic, type PC (UL 94 V-0). Dimensions: 107mm x 105mm x 58mm.
Colour	Light Grey. RAL 7035.
Power	9 to 30Vdc +/-10%, Max.: 125mA. 24Vac +/-10% 50-60Hz, Max.: 127mA Must use a NEC Class 2 or Limited Power Source (LPS) and SELV rated power supply. Plug-in terminal block for power connection (2 poles).
Terminal wiring (for power supply and low-voltage signals)	Per terminal: solid wires or stranded wires (twisted or with ferrule) 1 core: 0.5mm^2… 2.5mm^2 2 cores: 0.5mm^2… 1.5mm^2 3 cores: not permitted
Mounting	Wall. DIN rail EN60715 TH35.
Modbus RTU ports	1 x Serial EIA232 (DB9 male DTE). SELV 1 x Serial EIA485 (Plug-in screw terminal block 2 poles). SELV
Modbus TCP and FIDELIO (TCP/IP)	1 x Ethernet 10Base-T RJ45.
LED indicators	1 x Power. 2 x Modbus RTU serial port activity (Tx, Rx). 2 x Ethernet port link and activity (LNK, ACT).
Console port	EIA232. (DB9 female connector, DCE). SELV
Configuration	Via console port.[1]
Firmware	Allows upgrades via console port.
Operational temperature	0°C to +70°C
Operational humidity	5 to 95%, non condensing
Protection	IP20 (IEC60529).
RoHS conformity	Compliant with RoHS directive (2002/95/CE).
Norms and standards	CE conformity to EMC directive (2004/108/EC) and Low-voltage directive (2006/95/EC) EN 61000-6-2, EN 61000-6-3, EN 60950-1, EN 50491-3

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[1]   Standard cable DB9male-DB9female 1,8 meters long is supplied with the device for connection to a PC COM port for configuring and monitoring the device. The configuration software, compatible with Windows® operating systems, is also supplied.

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7. Functional characteristics

Fidelio interface	
Type	TCP/IP (needs the FIAS interface)
Configuration parameters	• IP address • TCP port
Interactivity with Fidelio system	• Fidelio check in/out status can be read from the gateway.
Modbus interface	
Device type	Slave.
Modbus modes supported	TCP, RS232, RS485
Modbus TCP configuration parameters	• IP address. • Subnet mask. • Default gateway. • TCP port.
Modbus RTU configuration parameters	• RS232/RS485. • Baud rate. • Slave number.
Points	
Modbus data types	All the points are of data type UNSIGNED INT in the Modbus interface.

8. Dimensions

Power
+
Ethernet port

Modbus RTU
ports

Console
port

58 mm

107 mm

105 mm
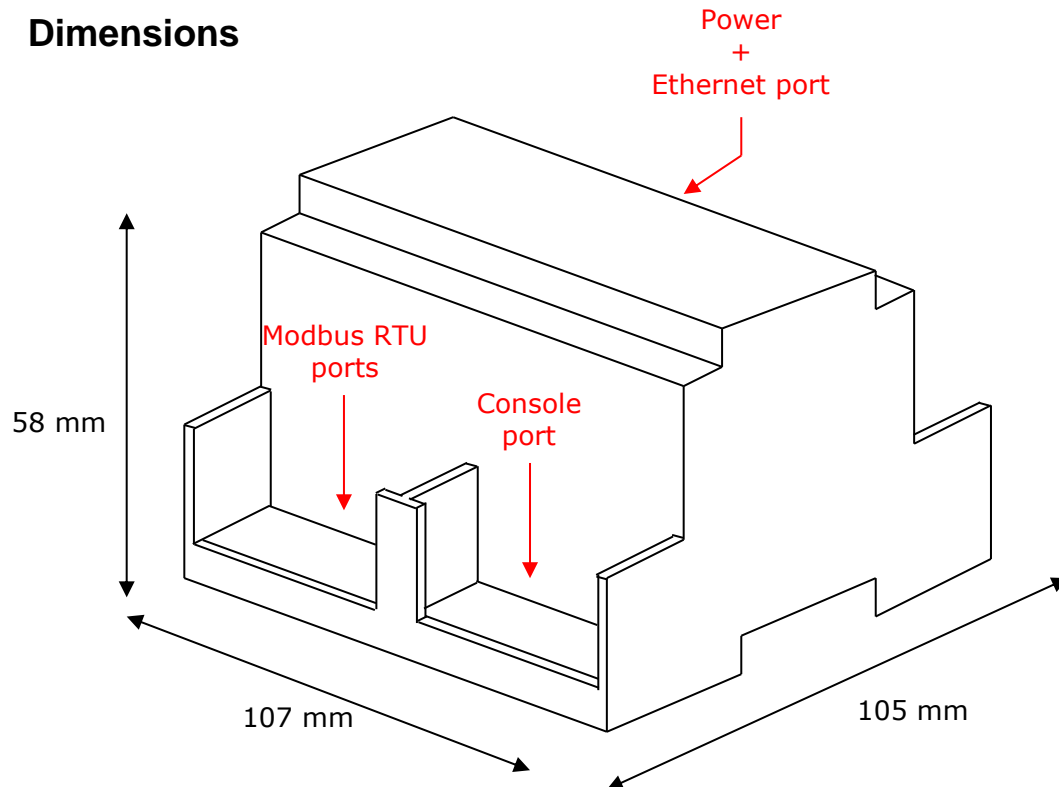
Recommended available space for its installation into a cabinet (wall or DIN rail mounting), with space enough for external connections

100 mm

115 mm

130 mm

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