



**ELSETA**

**IOMOD HT**

User manual



Elseta  
12/17/2015  
V0.6

## COPYRIGHTS AND TRADEMARKS

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## DECLARATION OF CONFORMITY

(in accordance with ISO / IEC Guide 22 and EN Section 45014)  
Manufacturer: UAB Aedilis  
Address of the manufacturer L. Zamenhofo st. 5 LT Vilnius, Lithuania

We claim that:  
The device IOMOD HT

Conforms to the following standards:

EMC:  
Radiation EN 55022 (Class A)  
1 emitted radiation (30-1000MHz)  
Second radiation conductors (0.15-30MHz)  
EN 50082-1 immunity test  
1 IEC 801-3: Radio-frequency electromagnetic field  
2 IEC 801-2: Electrostatic discharge.  
3 IEC 801-4: Quick periodic electrostatic discharges

Additional information:

"The device complies with the Low Voltage Directive 73/23 / EEC and EMC Directive 89/336 / EEC.  
Device assembly complies with the RoHS ROHS Directive.

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## SAFETY REQUIREMENTS

This equipment Operating notes, which must be met for your personal safety, as well as to avoid damage to the equipment. These notes are marked with a warning triangle symbol and the various degrees of risk of falling within signs. All work related to electronic systems design, installation, commissioning, adjustment and maintenance should be carried out in accordance with the safety requirements.

## EQUIPMENT'S MANUAL USES SYMBOLS



Danger - important notice, which may affect the safety of the user or device.



Attention - notice on possible problems that may arise in individual cases.



Information Notice - the information that is useful advice or special places.



Warning of the danger. The work may be performed only by a qualified professional. Equipment installation, commissioning and maintenance may only be performed by a qualified professional. If the safety notes in this manual, the term refers to persons qualified specialists authorized to perform commissioning, grounding and labeling devices, systems and circuits. The person must: Be aware of occupational safety in the workplace. Need to understand the equipment components. Electrical equipment. Have the knowledge and skills to identify a component beneath the voltage.



To maintain the equipment necessary to always turn off the power supply before installing or dismantling works. It must be in mind that even though alone equipment, but can have a common ground connection. Always before connecting the power supply, cables and interconnect components must be inspected.



This product can not be implemented, or resold to install in areas that are high-security as nuclear power plants, aircraft navigation, military equipment, transport traffic in management. In areas where equipment failure can result in of nature and human injury.



Do not operate the equipment in extreme weather conditions, as they may affect the operation of the equipment.

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## 1. Introduction

IOMOD HT is used for temperature and humidity data monitoring and relay control over Modbus. Device is also capable of switching relays automatically (thermostat function) as configured.

## 2. Features

- Temperature and humidity sense with  $\pm 0,1$  % and  $\pm 0,1$  °C accuracy;
- Temperature sensing range from -10 up to 60 °C;
- Humidity sensing range from 0 to 100%;
- Two Relays which can be configured to turn on automatically on humidity or temperature triggers (only Advanced version);
- Relays automation configuration over USB or Modbus;
- Configurable Modbus settings, such as Slave ID, Baudrate, Parity and stop bits, RS485 terminating resistor, etc.
- Firmware Upgrade over USB;
- Two connectors for power supply and for RS485, for easier device connection on one line;

## 3. Device working information

IOMOD uses Modbus (RTU) protocol over RS485 connection, which can be used with cable length up to 1500 meters and connect up to 30 devices on one line. Default Modbus settings are: 9600 baudrate, 8N1, Slave address - 1.

To read temperature and humidity, user can use device with default settings without configuring it. To read humidity, send 04 Modbus command (Read Input Registers) with resolution of first register (0). Returned value will be measured in % and will be multiplied by 10, to show one decimal place. To read temperature, send 04 (Read Input Registers) with resolution of second register (1). Returned value will be measured in °C and will be multiplied by 10. To enable thermostat function, user can configure device over USB or over MODBUS. Configurable options shown in table below.

CONFIGURABLE OPTIONS	OVER USB	OVER MODBUS
Slave Address	Yes	No
Baudrate	Yes	No
Data, Stop and Parity bits	Yes	No
RS485 Terminating Resistor	Yes	No
1 <sup>st</sup> Relay active mode	Yes	Yes
1 <sup>st</sup> Relay active range	Yes	Yes
2 <sup>nd</sup> Relay active mode	Yes	Yes
2 <sup>nd</sup> Relay active range	Yes	Yes
Default Settings	Yes	No

## Supported MODBUS functions

### 01 (0x01) Read Coils Status

Reads status of relays (Off or On). IOMOD HT has 2 relays on addresses 6 and 7 (Only for IOMOD HT Advanced).

### 03 (0x03) Read Holding Registers

Reads current configuration of relays.

Address 2 – Active Mode for 1<sup>st</sup> relay ( 0 – disabled, 1 - humidity or 2 - temperature);

Address 3 – Lower Active value (minimal value for relays to turn on) for 1<sup>st</sup> relay;

Address 4 – Upper Active value (maximum value for relays to keep turned on. If parameter reaches threshold bigger than this value, relay is turned off) for 1<sup>st</sup> relay.

Address 5 – Active Mode for 2<sup>nd</sup> relay (humidity or temperature);

Address 6 – Lower Active value (minimal value for relays to turn on) for 2<sup>nd</sup> relay;

Address 7 – Upper Active value (maximum value for relays to keep turned on. If parameter reaches threshold bigger than this value, relay is turned off) for 2<sup>nd</sup> relay.

### 04 (0x04) Read Input Registers

Reads current Humidity and Temperature status. Address 0 – Humidity; Value is multiplied by 10 to show one decimal place. For example: 23.3 °C will be shown as 233; 50.0 % will be shown as 500 in the Registers.

### 05 (0x05) Write Single Coil

(Only for IOMOD HT Advanced).

Sets single relay On or Off. 1 Relay address – 6<sup>th</sup> register; 2 relay – 7<sup>th</sup> register.

### 06 (0x06) Preset Single Register

Sets single configuration (Only for IOMOD HT Advanced).

Address 2 – Active Mode for 1 relay: 0- disabled; 1 - humidity or 2 - temperature;

Address 3 – Lower Active value (minimal value for relays to turn on) for 1 relay;

Address 4 – Upper Active value (maximum value for relays to keep turned on. If parameter reaches threshold bigger than this value, relay is turned off) for 1 relay. Integer;

Address 5 – Active Mode for 2 relay: 0- disabled; 1 - humidity or 2 - temperature;

Address 6 – Lower Active value (minimal value for relays to turn on) for 2 relay;

Address 7 – Upper Active value (maximum value for relays to keep turned on. If parameter reaches threshold bigger than this value, relay is turned off) for 2 relay.

### 4. Technical information

System			
1.	Dimensions	26 (H) x 71 (W) x 71 (L), mm	
2.	Case	ABS, white	
3.	Working environment	Indoors	
4.	Working temperature	-20 ÷ +70°C	
5.	Recommended operating conditions	5 – 60°C and 20 – 80%RH;	
6.	Configuration	USB or Modbus	
7.	Firmware upgrade	USB – mass storage device	
Electrical Characteristics			
	Basic	Advanced	
8.	Termination Resistor	Selectable 120Ω	Selectable 120Ω
8.	Power supply	12-24VDC, 8mA (nominal); 5-33VDC (full range)	24VDC, 25mA (nominal); 18-27VDC (full range)
9.	Relays	-	2 (Normally Open);
Relay specifications			
	Basic	Advanced	
10.	Resistive load (cosφ=1)	-	5 A at 250 VAC, 5 A at 30 VDC
11.	Inductive load (cosφ=0.4, L/R=7ms)	-	2 A at 250 VAC, 2 A at 30 VDC
12.	Max. switching power	-	1,250 VA, 150 W

### 5. Device Connection

IOMOD HT has integrated 120Ω termination resistor which can be enabled or disabled over USB configuration. It is recommended to use termination at each end of the RS485 cable. See typical connection diagram on Fig. 5.1.

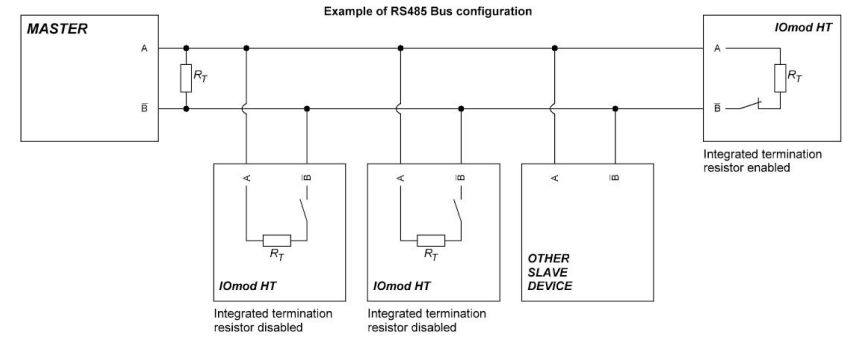


Fig. 5.1

IOMOD 8DI8DO has 1/8 Unit load receiver which allows to have up to 256 units on line (compared to standard 32 units). To reduce reflections, keep the stubs (cable distance from main RS485 bus line) as short as possible when connecting device. Figure 5.2 shows explanation on device connection

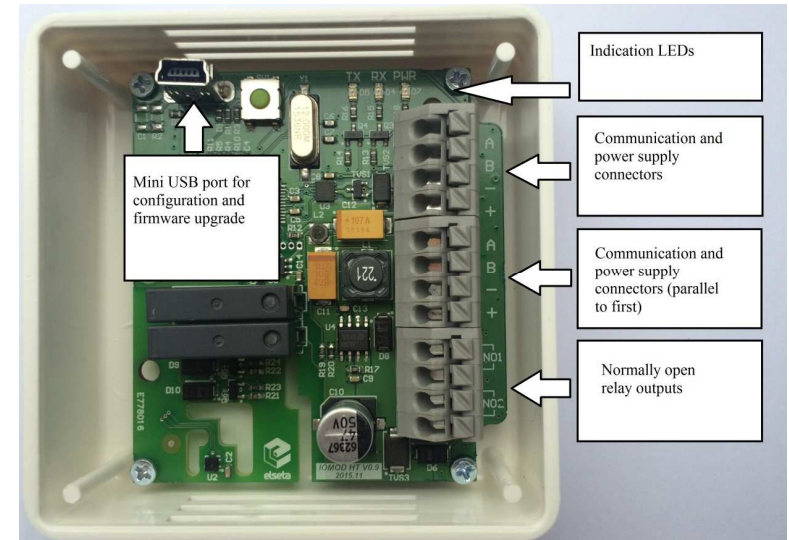


Fig. 5.2

## 6. Configuration over USB

### a. Driver installation

Device requires USB drivers to work as virtual com port. First-time connection between device and computer could result in “Device driver software was not successfully installed” error.

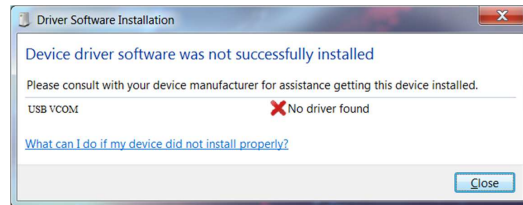


Fig. 6.1

User then manually installs drivers by selecting downloaded driver folder:  
Go to Control Panel -> Device Manager;  
Select failed device;  
Press “Update driver software”; following screen should appear:

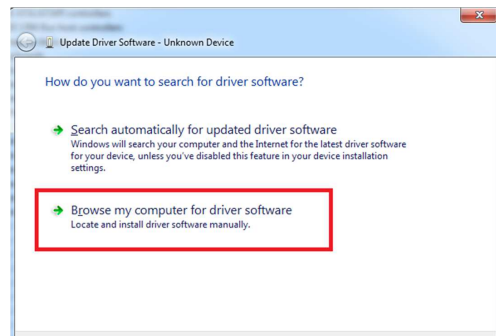


Fig. 6.2

Select “x86” driver for 32bit machine, or x64 for 64bit machine. If not sure, select root folder (folder in which x64 and x86 lays inside).

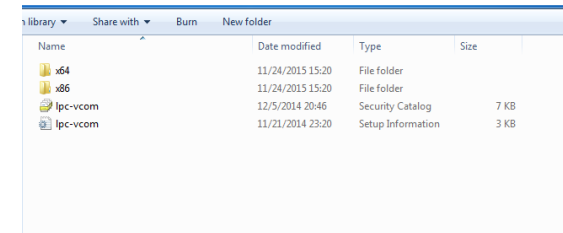


Fig. 6.3

**b. IOMOD HT configuration with PuTTY terminal**

Configuration of IOMOD device is done through CLI (Command Line Interface) on virtual COM port. Drivers needed for MS Windows to install VCOM will be provided. To open up CLI simply connect to specific V-COM port with terminal software (advised to use PuTTY terminal software. If other software is being used, user might need to send <return> symbol after each command). When connected user should immediately see main screen:

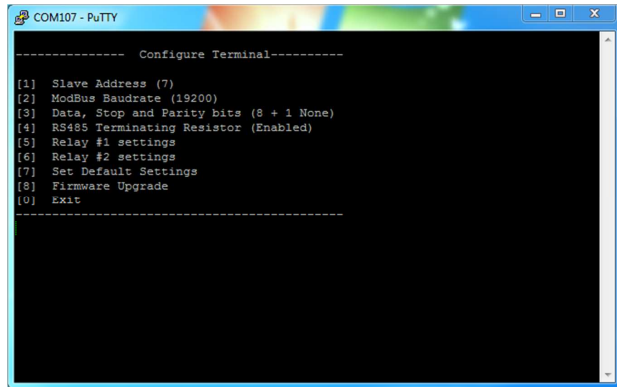


Fig. 6.4

Navigation is performed by sending number to terminal. User then proceeds by following further on-screen instructions. For example, to set Baudrate, press [2] to enter Baudrate screen; press [1] to edit; enter new configuration; press [RETURN] to save, or [ESC] to cancel changes. When done, press [0] (exit) before disconnecting device. Default values is set by pressing [7] on main screen, and confirming changes [1]. If accidentally closed the terminal window, user can connect terminal program again, and press any key on keyboard to show up main menu.

**c. Main Menu**

	Menu Name	Function	Values	Default Values
1.	Slave Address	Modbus Slave address / ID	1-247	(default: 1)
2.	Modbus Baudrate	Modbus Baudrate	100 - 256000	(default: 9600)
3.	Data, Stop and Parity bits	Chooses Stop and parity bits to use		(default: 8N1)
4.	RS485 Terminating Resistor	RS485 120 Ohms Terminating Resistor	0 - 1 (off/on)	(default: 0)
5.	Relay #1 settings	Active mode and active range	Active mode: 1 –Relay disabled; 2- Temperature active 3- Humidity active; active range: -10 to 60 (temperature) and 0 to 100 (humidity)	(default: 0)
6.	Relay #2 settings	Active mode and active range	Active mode: 1 –Relay disabled; 2- Temperature active 3- Humidity active; active range: -10 to 60 (temperature) and 0 to 100 (humidity)	(default: 0)
7.	Set Default Settings	Sets Default Settings	(1 to confirm, 0 to cancel)	-
8.	Firmware Upgrade	Mass Storage Device Firmware Upgrade	(1 to confirm, 0 to cancel)	-
0.	Exit	Exit and disconnect	-	-

**d. Firmware upgrade over USB**

To update device firmware user must enter main configuration menu.  
 Enter Firmware update screen by pressing [4];  
 Confirm update by pressing [1];  
 Device now enters Firmware Upgrade mode.



It is recommended to close terminal window when entered firmware upgrade mode.

Device reconnects as mass storage device:



Fig. 6.5

User then must delete existing file “firmware.bin”, and simply upload new firmware file by drag and drop.

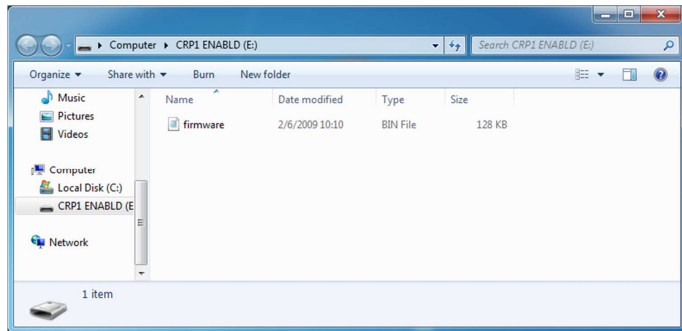


Fig. 6.6

Reconnect device, and check firmware version.

**e. Testing With “THE VINCI” software**

To test IOMOD HT with default settings, user connects device through RS485 to Modbus master. Example will show “The Vinci Expert” as serial interface converter and adapter to PC with “The Vinci” software. Default settings for Modbus – 9600 baudrate; 8 data, no parity, 1 stop bit. When opening “The Vinci” software, choose Modbus serial – Master mode. In settings tab, choose station number (default – 1); configure tags (as described in section 2. Device working information); Press start and go to “Statistic” tab:

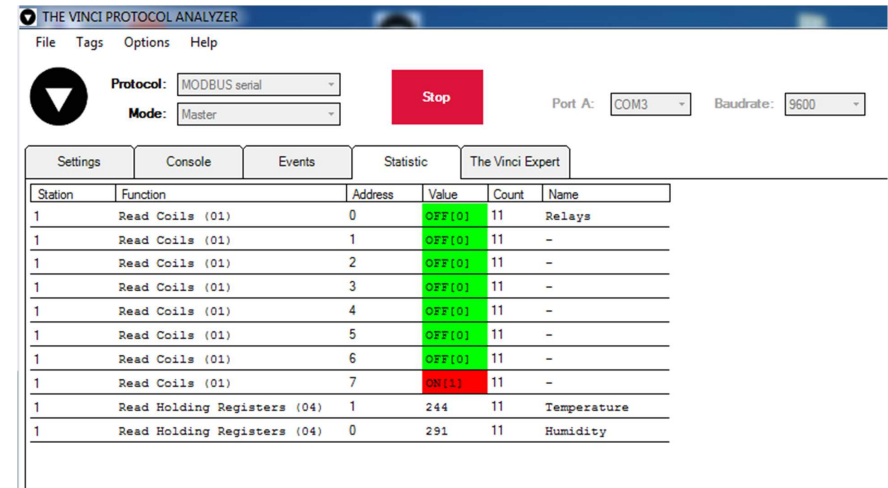


Fig. 6.8

Fig. 6.8

## 7. Information of the equipment manufacturer



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