

USER MANUAL  
**EasyNET**

UNIVERSAL MODBUS DATALOGGER



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### OWNERSHIP AND CONDITIONS

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# 1. General description

**EasyNET is a data logger that allows interfacing with all ModBus RTU and TCP devices in a simple way without programming skills.**

Thanks to the stored device profiles, the choice of registers and variables is immediate and consequently saves installation time without the risk of compatibility problems.

The **WEB configuration interface** allows quick access to all system parameters, ModBus registers and variables to be stored.

The data is stored in a removable SD memory and is in CSV format that can be easily imported by any software. It is possible to send data automatically via the **FTP MQTT** and http REST protocols.

Thanks to the integrated modem EasyNET can send data autonomously using the cellular network.

In the presence of user-configurable alarms, EasyNET sends alarm messages/emails to the operators concerned.

EasyNET is dedicated to real-time recording and data analysis.

Using the 4G modem or Ethernet connection, EasyNET sends the data to users (e-Mail and FTP) or to remote servers for management via a WEB portal.

## Content of the package

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EasyNET is available in the following versions:

Single product:

P/N: EASYNET

- n. 1 EasyNET Basic
- n. 1 Quick start

Starter Kit:

P/N: EASYNETKIT

- n. 1 EasyNET Basic
- n. 1 SD Card
- n. 1 Ethernet cable
- n. 1 Current meter Modbus
- n. 1 Power supply
- n. 1 Quick start

## 2. Technical features

CPU	I/O
32b Arm® Cortex®-M4 MCU+FPU	Signalling LEDs
2MBytes Flash ROM	N. 1 Ethernet 10/100 Mb/s port
1 MBytes RAM	N. 1 galvanically isolated RS485 serial port (on terminal)
Internal buffered RTC	N.1 digital input
MECHANICAL	ENVIRONMENTAL
Plastic case IP21 for DIN rail	Operating temperature: -20°C ÷ 60°C
Dimensions: 70 x 90 x 60 mm, 4 DIN modules	Relative humidity: from 0 to 80% without condensation
SD card insert connector	
POWER SUPPLY AND CONSUMPTION	MODEM
Power supply: 10-32VDC	LTE Cat M1 (2G, 4G) Fallback GSM/GPRS
Average consumption: < 3W	Integrated SIM card module
	Emails and Telegram messages of alerts
SOFTWARE	
Modem RTU/TCP Master/Slave	
Data mirroring to remote Modbus servers	
Configurable data logger	

### SAFETY INFORMATION

- **The use of radio devices may be inappropriate near electronic equipment.**
- **Do not install the EasyNET near medical devices such as pacemakers or hearing aids. EasyNET can interfere with the proper functioning of these devices.**
- **EasyNET must not be used on board aircraft.**
- **Do not install EasyNET near oil stations, fuel depots, chemical plants, explosion sites as EasyNET can disturb the operation of technical equipment.**
- **EasyNET can generate interference if used near television, radio or personal computers.**
- **In order to avoid possible damage, we recommend the use of accessories tested and specified as compatible with EasyNET.**

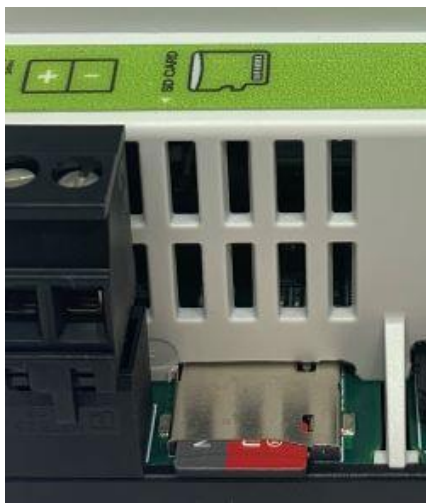
## 3. Quick Start

### 3.1 Cabling and connection

Wiring and installation of EasyNET are very simple.

This guide briefly illustrates how to make electrical connections and settings for initial access.

### 3.2 SD Card



EasyNET stores the data in a standard "SD card". Insert the SD card with the connectors face toward the silk-screen printed part, as shown in Fig.1.

The connector is a push-push type: to insert the card, press it until a click is felt. To remove the SD card, press lightly; by clicking, the card will lift a bit and it can be withdrawn. We always recommend the use of industrial-grade SD.

### 3.3 Serial

If you use the serial port to read data from ModBus RTU devices, connect the RS485 wires as shown in Fig.2.



### 3.4 Ethernet

If you are using an Ethernet connection to read data from ModBus TCP devices, insert the jack of the Ethernet cable into the appropriate RJ connector of the EasyNET, as shown in Fig.3.

### 3.5 Power supply

Connect EasyNET to a 10–32Vdc power supply as in Fig.4. There is no polarity to be respected.



Fig. 4 Power connection

## 4. Access and configuration

EasyNET has an integrated WEB server, therefore it is configured using a standard browser. To access the configuration pages, enter the EasyNET IP address from the browser of your PC, tablet or smart phone.

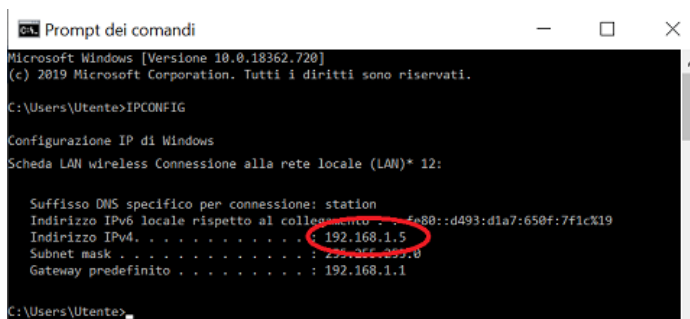
The device you connect from must be within the same network as EasyNET (Par 4.1).

### 4.1 Network IP address

The default IP address of EasyNET is **192.168.1.100**.

If your network is of the same IP class: 192.168.1 ..., go to paragraph 4.3, otherwise follow the instructions from point 4.2 to set the correct IP address.

To identify the IP class of your network, run the IPCONFIG command from the command prompt. In Fig.5, the IP address of the PC is 192.168.1.5. It belongs to the same class / network as EasyNET, since the firsts 3 numbers (192, 168 and 1) are the same. It is therefore



possible to reach EasyNET from the PC browser.

If the network is NOT in the 192.168.1 class, you can proceed in 2 ways:

DHCP (see paragraph 4.2);

2. Set a valid IP on EasyNET (see chapter 5).

1. Set up EasyNET to work in

## 4.2 DHCP settings

To set up DHCP set DIP SWITCH in the following way:

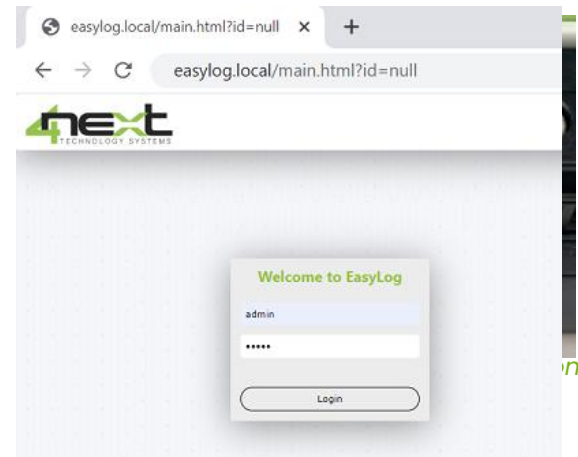
1 =ON    2 =OFF

Possible configuration set up:

DIP-SWITCH 1	DIP-SWITCH 2	Meaning
OFF	OFF	<i>It uses the previously saved configuration. Original configuration is 192.168.1.100</i>
ON	OFF	<i>It activates DHCP and ignores saved configuration</i>
OFF	ON	<i>It uses IP 192.168.1.100 and ignores saved configuration</i>

Connect EasyNET to the LAN via an Ethernet cable (Par. 3.3) and power it (Par. 3.4). When the Status LED flashes at regular intervals, EasyNET is ready for using. At this point you can proceed in 2 ways:

- A. by determining the IP address via a network discovery software (e.g. Advanced IP Scanner or Free IP Scanner). Then enter the address found on the browser.
- B. type <http://easylog.local> in the browser. Thanks to the dDNS protocol, EasyNET will respond to the request allowing the user to access the configuration pages without knowing the exact IP. This option is available if the Bonjour service or other dDNS service (generally present) are available on the PC from which you access. *N.B.* Use this option by connecting one EasyNET at most in the same LAN.



## 4.3 Login and authentication

Once the IP address has been defined, type it in the browser. This will allow you to access

the EasyNET configuration and consultation pages.

The first screen (Fig.7) is the authentication page with username and password.

The default values are:

**Username: admin**

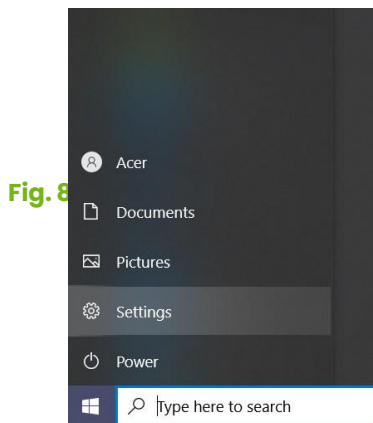
**Password: admin**

**Fig. 7 Login**

## 5. IP settings

Assigning a defined IP address to EasyNET

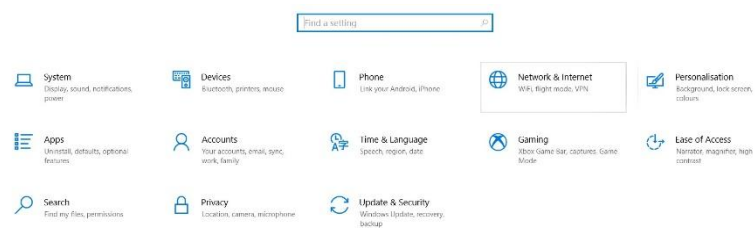
1. Connect EasyNET to the PC.
2. From the Windows menu select Settings (Fig.8).
3. Choose Network and Internet (Fig.9).



**Fig. 8**

4. Choose Ethernet again (Fig.10) and the menu will open (Fig. 11).

**Fig.**



5. Click on "Edit tab options". A tab with all the network resources will appear (Fig.12)

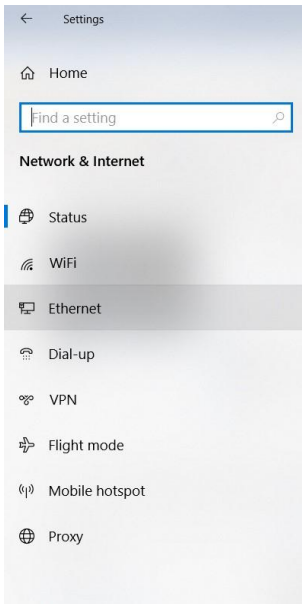


Fig. 10

Ethernet

Ethernet  
Not connected

Related settings  
[Change adapter options](#)  
[Change advanced sharing options](#)  
[Network and Sharing Centre](#)  
[Windows Firewall](#)

Help from the web  
[Troubleshooting network connection issues](#)

[Get help](#)  
[Give feedback](#)

Fig. 11

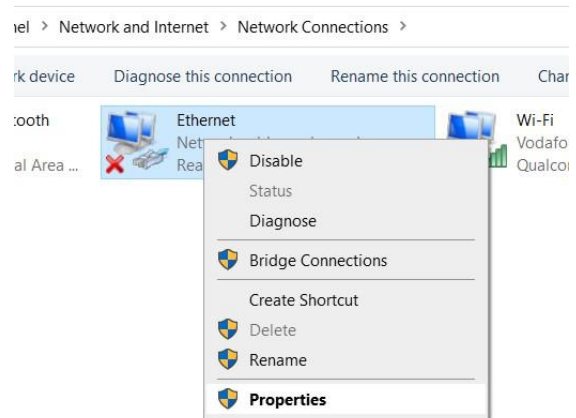


Fig. 12

6. Place the mouse over Ethernet, press the right button and choose "Properties".
7. From the Ethernet properties menu (Fig.13), select "Internet Protocol version 4 (TCP/IPv4)" and press the properties button. The following screen will open (Fig.14).

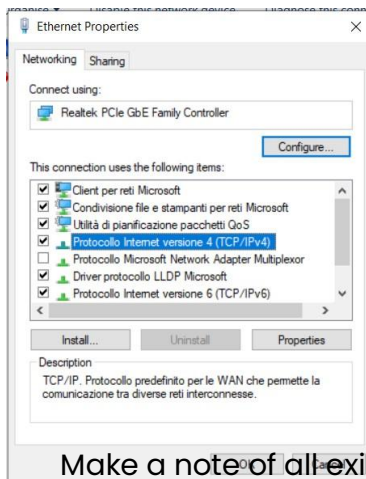


Fig. 13

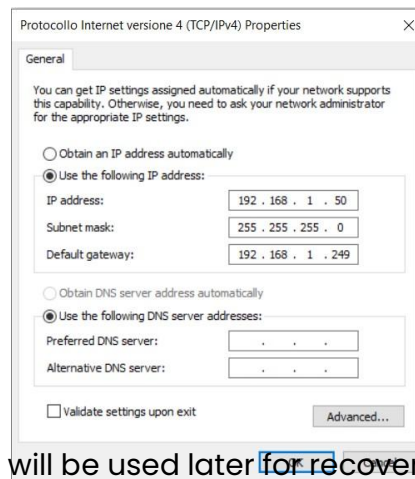


Fig. 14

8. Make a note of all existing settings that will be used later for recovery.
9. Set the IP address to 192.168.1.1.
10. Set the Subnet mask to 255.255.255.0 and confirm with OK.
11. You can now open the web browser and type in 192.158.1.100 to configure EasyNET.
12. Login with username and password.  
 The default values are **Username:** admin **Password:** admin (Fig. 7)
13. Select "Network" from the Configurations menu to set the EasyNET network parameters to match those of your Ethernet network. For example, if in the original screen in Fig.7 the IP address was 192.168.10.1, set EasyNET to 192.168.10.100 (example in Fig. 15).

14. Save the new EasyNET configuration.
15. Restore values on the PC.
16. EasyNET is ready to be used in the same network as your PC.



**Network.**

DHCP  
Disabled

IP address  
192.168.10.100

IP network mask  
255.255.255.0

IP gateway  
192.168.1.1

HTTP server port  
80

**Fig. 15**

## 6. Programming

### 6.1 Main menu

After logging in, EasyNET publishes the variable display page which is the default page or Home page. If EasyNET has never been configured, the page displayed will be as follows.

[VARIABLES](#)[FILES](#)[CONFIGURATIONS](#)[MAINTENANCE](#)[INFO](#)

#### Variables status.

Name	U.M.	Value	Status
------	------	-------	--------

On all pages of the application, the menu bar will be visible at the top, which includes:

- Variables: For displaying and configuring the variables read by ModBus devices.
- Files: The list of files created on SD containing logged data.
- Configurations: For setting all system parameters.
- Maintenance: For maintenance operations such as Firmware update, factory reset ...
- Info: Displays firmware, bootloader and MAC address version.

At the bottom there is a menu bar whose "buttons" have the following functions. In order from left to right, the possible operations are:

- **"NEW DEVICE"**: Creates a new device (ModBus Slave) ModBus RTU or ModBus TCP. If you already have the ModBus libraries for the Slave in use, you can import the variables with a few clicks and save a lot of time in configuration.
- **"NEW VARIABLE"**: Allows a new variable to be added to a given device.
- **"EDIT"**: This function allows a variable or device to be modified depending on whether the cursor is positioned over one of the two elements.
- **"SAVE PROJECT"**: This function saves the entire EasyNET configuration (variables and system settings) to a JSON file.
- **"LOAD PROJECT"**: Allows you to program an EasyNET from a previously saved configuration file.
- **"REMOVE SD"**: Suspends writing to the SD to enable safe extraction.
- **"REBOOT"**: Performs a reset and subsequent restart of the EasyNET.



VARIABLES FILES CONFIGURATIONS MAINTENANCE INFO

#### Variables status.

Name	U.M.	Value	Log
▲ [TCP:192.168.1.150:502:1] QE-POWER-T			
V	V	233,49	[60s]
I	A	2,37	[60s]
Active Power	W	535	[60s]
Reactive Power	VAR	148	[60s]
Apparent Power	VA	559,07	
Cos Fi		0,96	[60s]
Frequenza	Hz	50,10	
Energy	kWh	6645025	[60s]
CT ratio		90,09	
Write		0	[WRITE]

NEW DEVICE NEW VARIABLE EDIT SAVE PROJECT LOAD PROJECT REMOVE SD REBOOT

## 6.2 Adding a new device

By pressing the function key "**NEW DEVICE**": a new device can be added. The following screen is used to enter information about the new device.

- **Device name:** name of the device
- **Read variables period:** reading interval of all device variables.
- **Source:** for choosing ModBus RTU or ModBus TCP.
- **Modbus Parameters:** Modbus parameters at device level (slave)

If the device is **ModBus RTU**, the parameters are:

- Slave ID ("slave address"): address of the slave device ( $1 \div 255$ ).
- Answer timeout: the timeout for waiting for a response from the master (EasyNET).
- Delay between request: the waiting time between one request and the next.

If the device is **ModBus TCP**:

- In addition to Slave ID, Answer timeout and delay between requests, the IP address and port of the Slave device are also added.

The last parameter is **MQTT publish topic**: this is the identifier (digital signature) of the device for sending via MQTT protocol. It is used to differentiate MQTT publish topics for each device. The parameter "Separate publish for each device" must be active. In this way the topic on which the device will publish its log data will be given by the concatenation of the publish topic (configuration parameter) and the string defined here.

### Device setup.

Device name

Read variables period:  
1s

Source  
Modbus RTU

Slave ID  
1

Answer timeout:  
500ms

Delay between requests:  
No delay

Others  
String to add to MQTT publish topic (leave empty if not used):

## 6.3 Variables configuration

From the variables screen press the "NEW VARIABLE" button at the bottom left. The browser displays the following screen:

These are the information you need to enter for a correct configuration of a variable:

### “GENERIC INFORMATION”

- **“Device”**: the device to which the variable refers. If the "NEW VARIABLE" button is pressed when the cursor is over a device, this field is already set.
- **“Variable name”**: inserting the name of the variable, any text that will also be used as a label on the display page.
- **“Measure unit”**: the unit of measurement of the variable.

- **“Type”**: the data type of the variable. A combo box allows you to easily select from all supported data types without the possibility of making mistakes.

### “MODBUS PARAMETERS”

Section used to set the identification data for accessing the variable, namely:

- **Register address**: the address of the variable identifiable by the register mapping provided by the constructor.
- **Register Type**: the type of register: Coil, Input register, Holding Register.
- **MSW first**: literally “Most Significant Word first”, is used for variables of type Int, Long or Float which may have Big-Endian or Little-Endian format. The constructor specifies the format used.
- **Little Endian**: for 4-byte variables, represents the Big-Endian or Little-endian order in each WORD.

N.B. The ModBus device manual should indicate whether or not to select these latter parameters.

### “VALUE TYPE”

- **“Type”**: the data type of the variable. A combo box allows you to easily select from all supported data types without the possibility of making mistakes.
- **“Decimal digit”**: number of decimal numbers in display and file storage.
- **“Writable”**: If a variable is writable and you want to be able to change its value, activate this check-box to enable the write button to appear.
- **“Multiplication factor”**: the factor by which the raw data will be multiplied to obtain the correctly engineered variable. Many devices export information in a non-standard format, for example temperature in tenths of a degree. To display it in degrees you will need to set this value to 0.1.
- **Offset**: allow a fixed value to be added to the value of the variable being read.

The screenshot shows a 'Value type' configuration window with the following fields and values:

Type	Decimal digits	<input type="checkbox"/> Writable
Float (32bit)	.00	
Linear conversion:	Multiplication (m)	Offset (q)
<input type="button" value="Calculate"/>	1	0

### “DATA LOG”

- **“Enable log”**: this check-box enables writing to files or not.  
**N.B.** It absolutely **MUST** be selected in order to store files on the SD card.
- **Enabled only on timeslot**: if selected, it allows you to define the time interval within which data is stored. This is used to limit the sending of unnecessary data. E.g. from 8:00 a.m. to 8:00 p.m.
- **“Periodic log time”**: variable sampling time, defines every time the ModBus network master (EasyNET) reads the variable from the Slave and saves it on file if the log option is enabled.
- **Log on event**: EasyNET makes it possible to store a piece of data on the occurrence of a certain event which can be:

- **Any event**
- **Value changed:** the value of the variable changes.
- **Value changed at least of:** the variable changes by the minimum value specified in the field below.
- **Value changed at least of %:** the variable changes by a minimum value in percentage specified in the field below.
- **Operation on log value:** performs an operation on the data read:
  - **Any event:** the read data is stored in any condition.
  - **Cut-off (“Value cut-off to 0 if lower than”):** if the value read is less than the set threshold, it is not taken into the account and it will be considered as 0.
  - **Filtro (Discard value that differs from last one more than %):** it does not store the data if it differs by x% from the previous value in the field.

The menu at the bottom of the page allows the following operations:

- **Cancel:** reset the variable's edit or insert operation.
- **Save:** stores the inserted variable or the changes made.
- **Delete:** delete the variable.  
**N.B.** Once the variable deletion operation has been executed, it will not be possible to cancel the operation and the variable will be deleted permanently.
- **Test:** executes the ModBus test command by tracing the various packets.

## 6.4 File System

EasyNET stores the files on the internal SD card. You can view the file list via the Files menu. This page allows you to view the stored and sent files and to write them locally from the connected PC.



VARIABLES FILES CONFIGURATIONS MAINTENANCE INFO

### Log files.

Download	Time	Name	Size	Status
<b>Operations in progress</b>				
		20211115/Ufficio_20211116_120000.csv		LOGGING
<b>Stored files</b>				
15/11/2021, 09:43:16		[20211115]		ARCHIVE

## 6.5 System configuration

### **Network**

This is used to enter the parameters of the Ethernet network to which EasyNET is connected in order to make it communicate with the servers for sending data. These are the parameters to be configured in detail:

- **DHCP:** it allows you to determine whether the network DHCP server should be used to assign the IP address or not;
- **IP address:** the static IP address assigned to EasyLogXL. If DHCP is enabled or Dip-Switch 2 is set to ON, the IP is not the one displayed;
- **IP network mask:** the subnet mask or netmask is used to determine the range of IP addresses within a subnet;
- **IP gateway:** IP address of the gateway;
- **HTTP server port:** http server port when different from standard 80 or 8080.

The screenshot displays the 'Network' configuration page in the EasyNET web interface. The interface includes a top navigation bar with 'VARIABLES', 'FILES', 'CONFIGURATIONS', 'MAINTENANCE', and 'INFO' tabs. A left sidebar contains a menu with options: Network, Modbus, File logger, IoT service, Modbus mirroring, Password, and Clock. The main content area is titled 'Network.' and contains the following configuration fields:

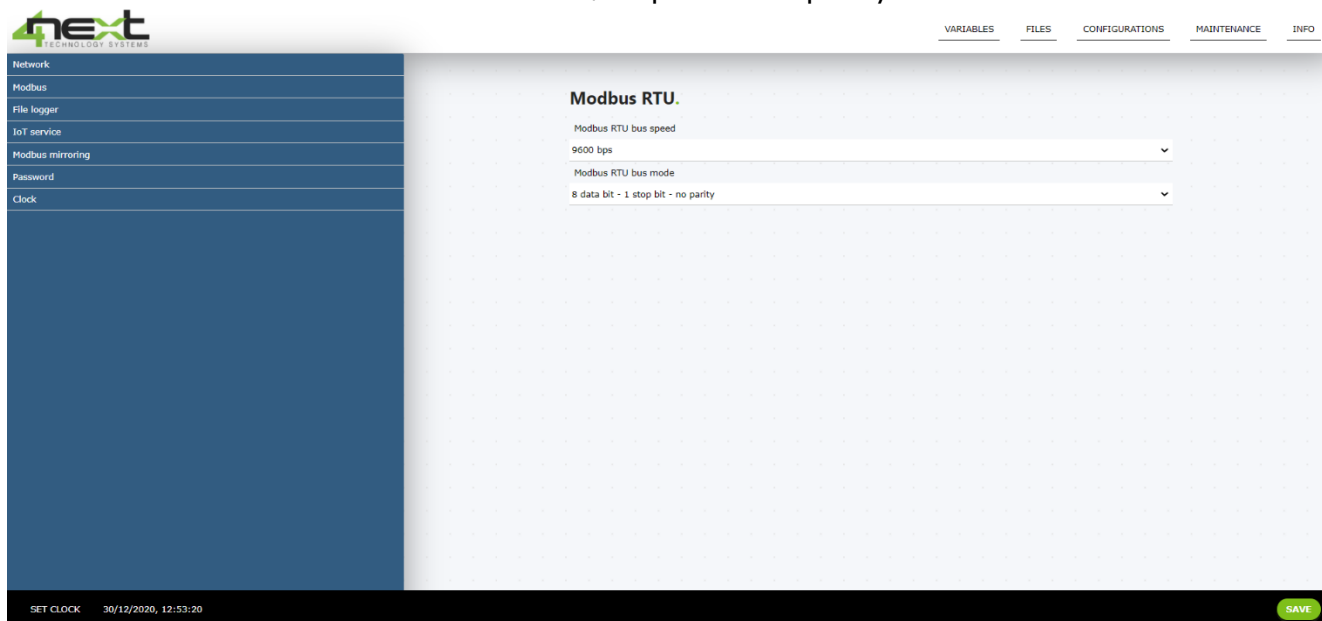
- DHCP: Disabled (dropdown menu)
- IP address: 192.168.1.100
- IP network mask: 255.255.255.0
- IP gateway: 192.168.1.1
- HTTP server port: 80

At the bottom left, there is a 'SET CLOCK' button and a timestamp '30/12/2020, 12:51:42'. At the bottom right, there is a green 'SAVE' button.

## ModBus

It defines the configuration parameters of the RS485 bus for ModBus communication with the Slaves:

- **ModBus RTU speed:** communication speed
- **ModBus RTU mode:** Number of bits, stop bits and parity of serial communication.

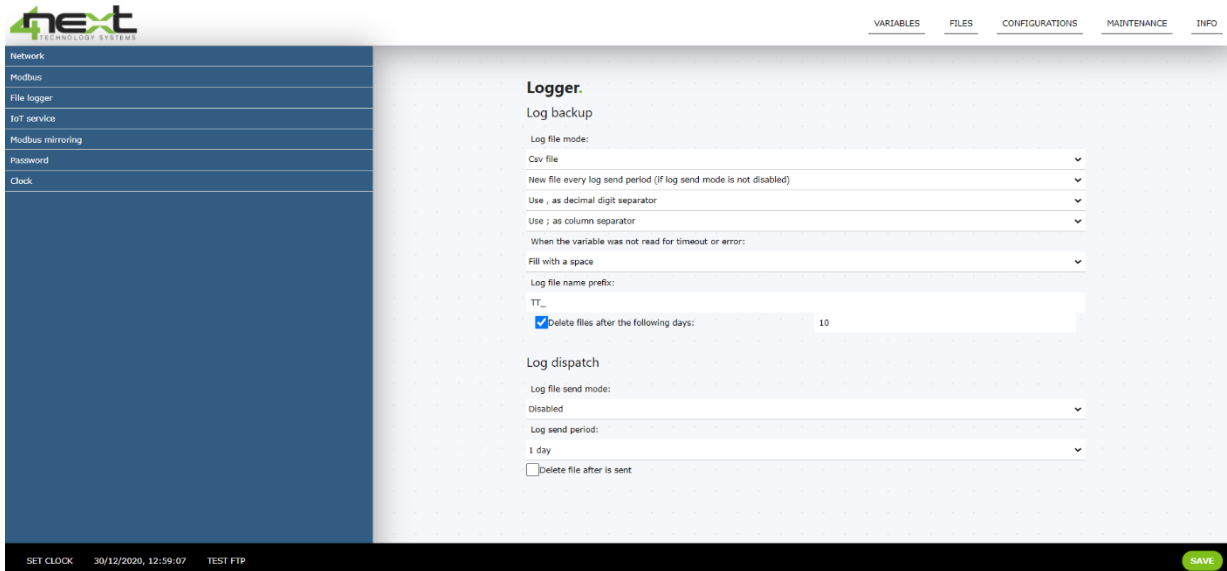


## Logger

The logger menu allows you to choose how files will be saved on the SD card:

- **Log File Mode:**
  - File type: none, CSV file, JSON file.
  - How often to create a new file: every hour, every day, or always write in the same file.
  - Decimal separator: , (comma) or . (dot).
  - Separator between fields: ; (semicolon), | (Pipe), # (diesis or sharp).
  - **Log file name prefix:** the prefix of the file name in the SD.
  - **Delete files after the following days:** it represents the maximum number of days the file can remain on the SD card. If set to 0, files are never deleted. Otherwise, they are deleted after n. days since their creation. E.g. 8 keeps the files of the last 8 days.
- **Log Dispatch:** it is used to define how often and how to send the file remotely.
  - **Log Send Mode:** the mode of dispatch, which may be:
    - Disabled
    - FTP
    - E-Mail (Option under development)

- http REST (Option under development)
- **Log Send Period:** indicates how often to send the file.
  - **Delete file after sent:** if selected the file will be deleted after sending.



## IoT Service

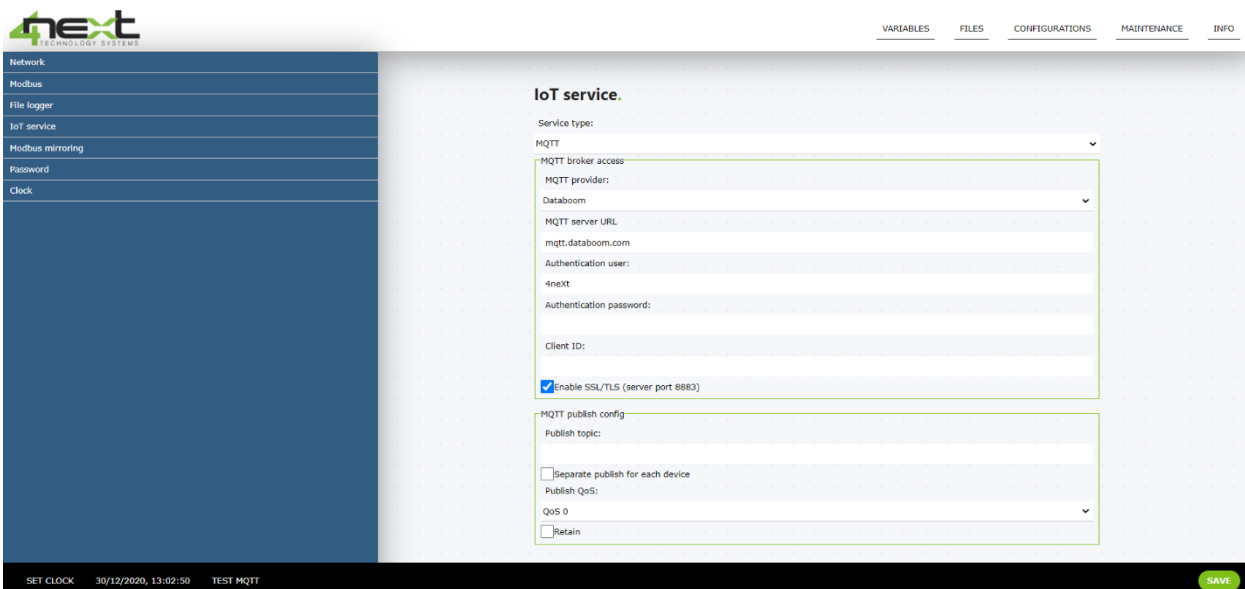
This configuration menu is used to set the parameters for sending data via the MQTT protocol.

- **Service type:** it enables or disables sending in MQTT.
- **MQTT Provider:** it is the type of MQTT broker available by default. At the moment EasyNET provides a connection to a generic MQTT broker and Databoom.
- **MQTT server URL:** the address (URL) of the server.
- **Authentication user:** username for access to the server.
- **Authentication password:** server access password.
- **Client ID:** it is the identifier of the EasyNET client that connects to the MQTT broker. It is a unique ID for a particular broker. The broker uses it to identify the client and the current status of the client.
- **Enable SSL/TLS (server port 8883):** to be activated if the remote broker uses SSL/TLS encryption for data transfer.
- **Publish topic:** topic of the MQTT broker on which to send log data publications. It is a string representing a path in the broker, for example "EasyNET /location /location1".
- **Separate publish for each device:** it indicates whether you want to use a different topic in the broker for each device configured in EasyNET. In this case, the topic on which a device will publish its log data will be given by the concatenation of the publish topic (previous parameter) and the topic defined on the configuration of each individual device.
- **Publish QoS:** defined by the MQTT standard, it indicates the level of guarantee that a message is actually received by the broker:

- 0 = the guarantee is left to the TCP protocol.
- 1 = the guarantee is managed by an acknowledge by the broker. The risk is the duplication of a publication.
- 2 = the guarantee is managed by a double acknowledge between device and broker. There is no risk of duplication but there are 2 extra messages per publication.

The choice should be made according to how much traffic is allowed for the publications.

- **Retain:** to be activated if a subscriber to the topic used by EasyNET for publication wishes to receive the last published data immediately upon connection.



## **Modbus Mirroring**

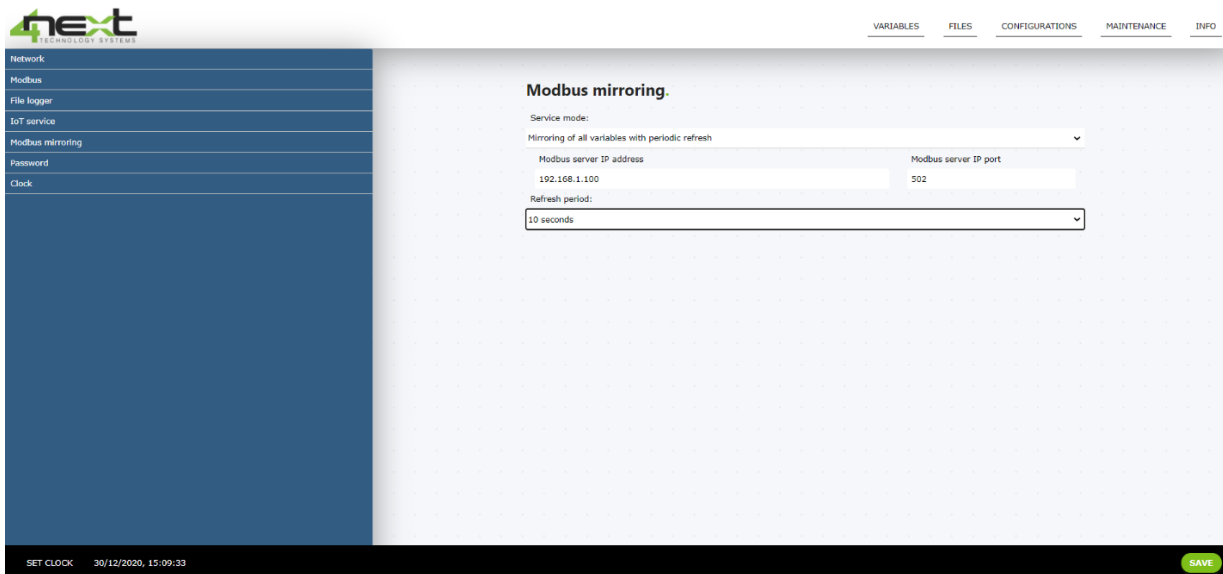
This function makes it possible to act as a bridge between slave devices on the RS485 and a ModBus TCP Master (Client). The variables read and logged by the RS485 are written to their respective Modbus TCP addresses.

The Service Mode combo allows you to:

- Disable the service
- Copy event-logged variables
- Copy all variables or defined intervals

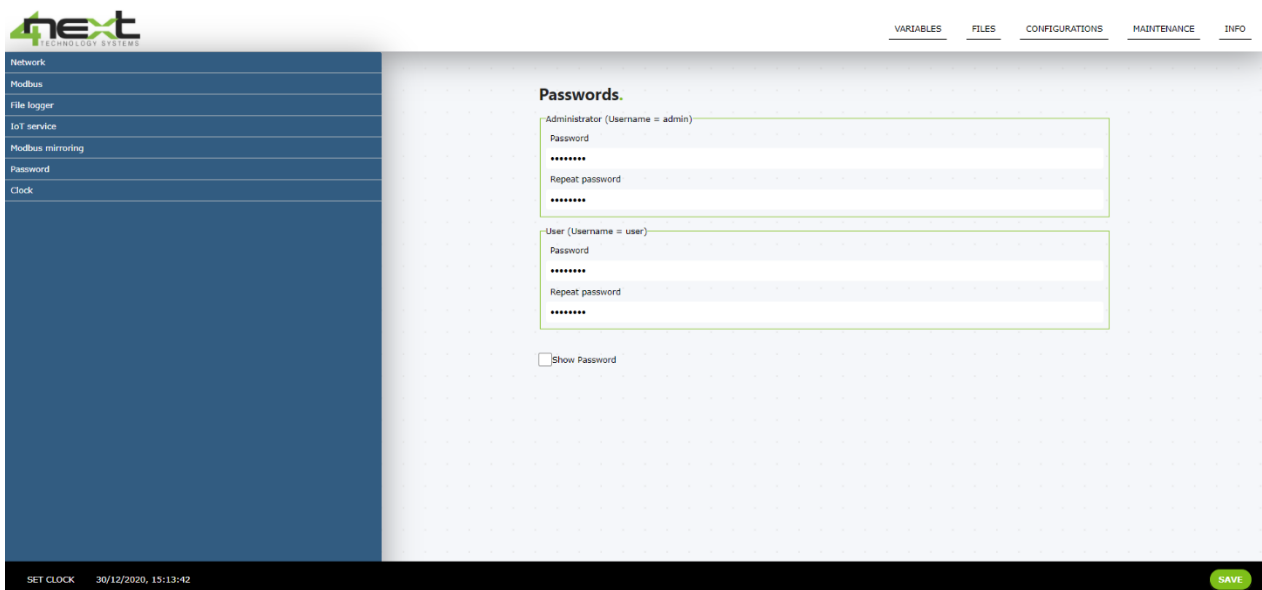
The Modbus Server IP address and Modbus server IP port parameters are used to address the Modbus TCP client.

Refresh period is the refresh time of the variables on the Modbus TCP client.



## **Password**

Set passwords for access to the EasyNET configuration page.

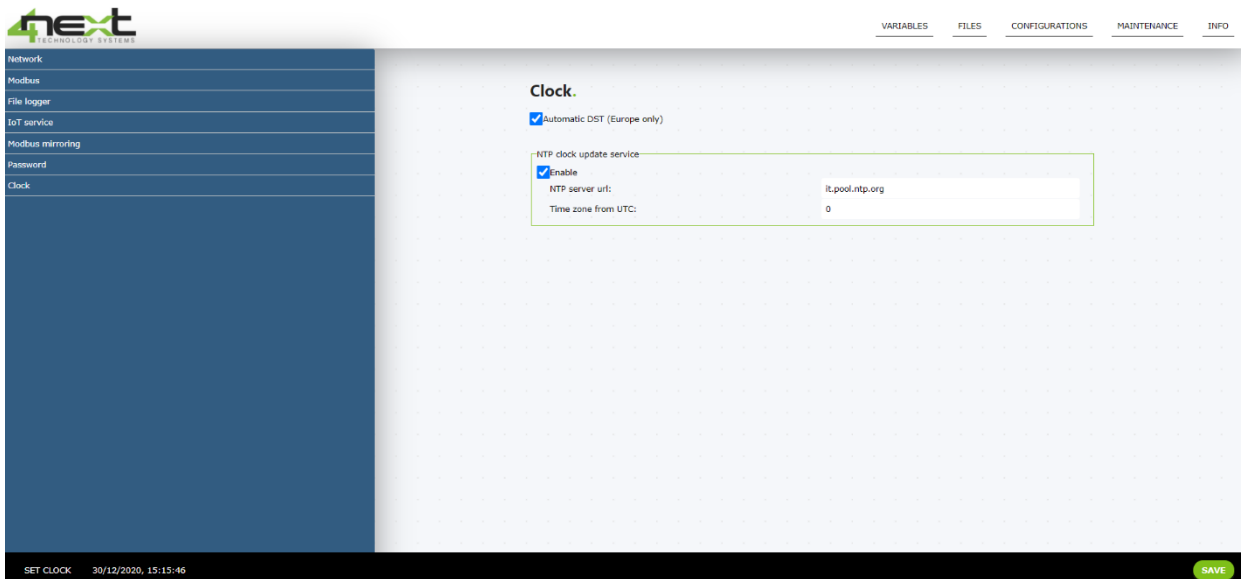


## **Clock**

It allows you to set whether the update between standard time and daylight saving time is done automatically. When the Automatic DST check box is checked, the update is done automatically.

Clock alignment is always possible from the configuration page by clicking on the SET CLOCK button at the bottom left of the page.

By selecting the Check box NTP clock update service, if connected to the Internet, EasyNET performs the alignment of the clock with the NTP server.

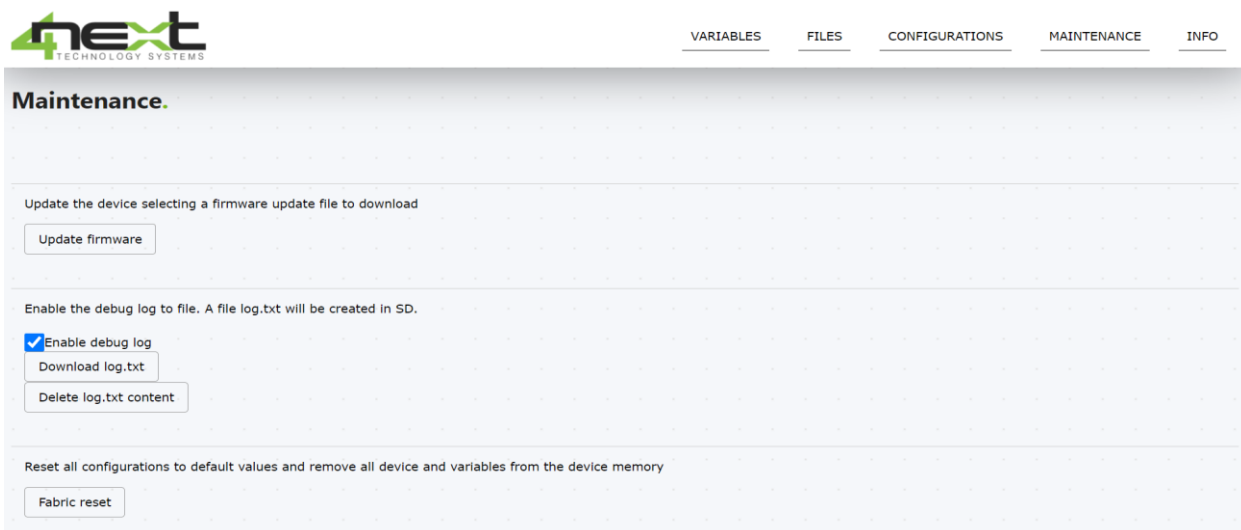


## 6.6 Maintenance

The maintenance menu is used to update the device's firmware. Click on "Update firmware" to carry out the update.

By activating the "Enable debug log" checkbox, you can store data on the SD card. You can then decide whether to download or delete the data.

With the "Fabric reset" button you will reset every configuration to the default values and remove all devices and variables from the device memory.



## 6.7 Info

The info menu displays hardware and software information about the device. Always check on [4next.eu/easynet](http://4next.eu/easynet) if the firmware is up to date with the latest version.



Info.	
Product ID:	EasyLog [1]
FW Version:	1.6.2
IP address:	192.168.1.100
MAC address:	70:B3:D5:C1:C3:02
Serial number:	002100296
Bootloader version:	1.0

## 7. Return and repair

**Return for repair or replacement must be authorised in advance by requesting an RMA number.**

Then send an email to 4neXt ([support@4next.eu](mailto:support@4next.eu)) or to your dealer/reseller with the following information:

- Company name and customer details (address, tel, fax, email)
- Contact person
- Point of purchase
- Product data P/N and S/N located on the back of each product or on the original box
- Detailed description of the fault or anomaly detected

4neXt will send the RMA number with which the customer can send the material for repair. The products must be sent carriage paid.

If the material arrives without the factory seals, it will automatically be considered "out of warranty".

# Technology systems **FOR YOUR BUSINESS**

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