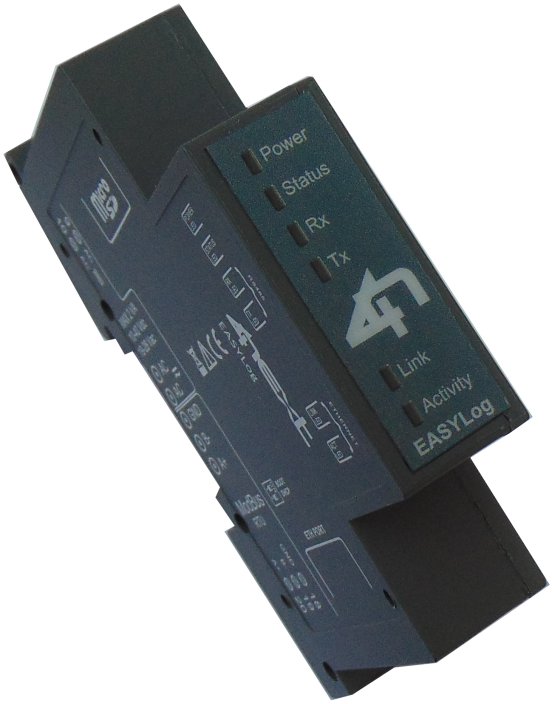
EasyLog

Universal ModBus datalogger

USER MANUAL



EL00010.11.18

www.4next.eu

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1. General description

EasyLog is a datalogger for all ModBus RTU communication protocol or ModBus TCP equipped systems. It is set up through a Web interface, connecting it to a computer or to a mobile device. Its configuration is very easy and intuitive and it doesn't need any coding language knowledge. It's configured through any web browser, so without the installation of any software application. EasyLog has an extended library of already configured tools, once the tool is chosen variable set up is automatic.
User can easily choose which one of the variables he wants to memorise and which one he doesn't want to, specifying the sampling time.
Memorised data is saved in an extractable SD card, in a text file easily importable into any software
If connected to a network, EasyLog can automatically send data to an internet access/remote server through an email, FTP connection or directly to a web portal through MQTT/JSON protocols.

1.1. Content of the package

EasyLog is available in the following versions

Single product: P/N: EL00010PU

- N.1 EasyLog Basic
- N.1 Installation guide

Starter Kit: P/N: EL00010EK

- N.1 EasyLog Basic
- N.1 2GB SD Card
- N.1 Ethernet Cable
- N.1 Current meter Modbus
- N.1 Power supply
- N.1 Installation guide

2. Technical characteristicss

CPU

- 32b Arm® Cortex®-M4 MCU+FPU
- 2MBytes Flash ROM
- 256 KBytes RAM
- Internal RTC clock, battery backed up

I/O

- Warning LEDs
- N. 1 Ethernet port 10/100 Mb/s
- N. 1 RS485 serial port ModBus

MECHANICS

- Plastic enclosure IP21 for DIN rail
- Dimensions: 94 x 80 x 17 mm, 1 DIN module
- SD card input connector

ENVIRONMENTAL

- Working temperature: -25°C ÷ 55°C
- Relative humidity: from 0 to 80% without condensation

POWER SUPPLY E USAGES

- Power supply 10-40VDC/19-28VAC
- Average usage < 1,5W

SAFETY INFORMATION

- ***Radio device could be inappropriate near electronic devices.***
- ***Do not install EASYLOG close to medical devices like pacemakers or hearing aid. EASYLOG could interfere with the regular functioning of these devices.***
- ***Do not use EASYLOG inside aircrafts.***
- ***Do not install EASYLOG close to oil station, fuel storages, chemical plants, explosion sites as EASYLOG could disturb the functioning of technical structures.***
- ***EASLOG can cause interferences if used close to television sets, radios, or personal computers.***
- ***It is recommended to only use tested and specific accessories compatible with EASYLOG to avoid every possible damage.***

3. Quick start

3.1 Cabling and connection

The wiring and installation of EasyLogs are very simple.
This guide briefly illustrates how to make electrical connections and settings for initial access.

3.2 SD Card

EasyLog 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; on click the card will lift a bit and can be withdrawn. **N.B. We always recommend the use of industrial-grade SD cards.**

Fig.1 SD Card insertion

3.3 Serial

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

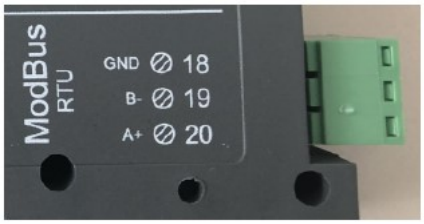


Fig.2 RS485 Connetor

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 EasyLog, as shown in Fig.3.

Fig.3 Ethernet connector

3.5 Power Supply

Connect EasyLog to a 10-40Vdc / power supply 19-28Vac as in Fig. 4.
There is no polarity to be respected.

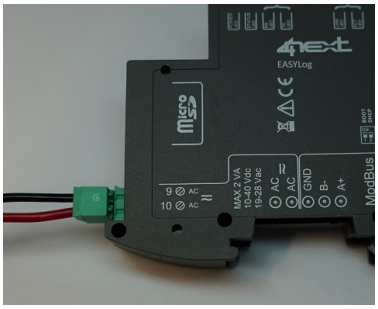


Fig.4 Power supply terminal

4. Access and configuration

EasyLog has an integrated WEB server, therefore it is configured using a standard browser. To access the configuration pages, enter the EasyLog IP address from the browser of your PC, tablet or smart phone.
Il dispositivo dal quale ci si connette deve essere all'interno della stessa rete di EasyLog (Par. 4.1).

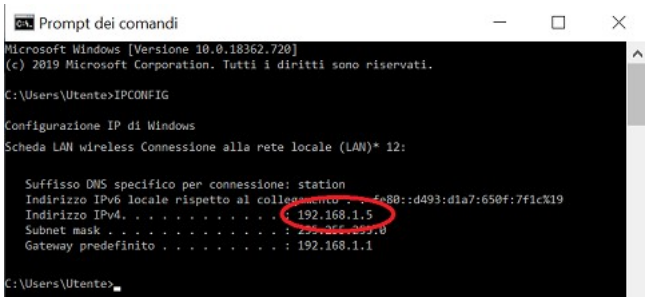


Fig.5 IP address verification on your PC

4.1 Networ IP address

The default IP address of EasyLog 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 EasyLog, since the firsts 3 numbers (192, 168 and 1) are the same. It is therefore possible to reach EasyLog from the PC browser.

If the network is NOT in the 192.168.1 class, you can proceed in 2 ways:
1. Set up EasyLog to work in DHCP (see paragraph 4.2);
2. Set a valid IP on EasyLog (see chapter 5 EasyLog manual available on the website www.4next.eu)

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*	*Use the previously saved configuration* *Original configuration is 192.168.1.100*
ON	*OFF*	*Activates DHCP and ignores saved configuration*
OFF	*ON*	*Uses fixed IP 192.168.1.100 and ignores saved configuration*

Fig. 6 DIP Switch postion for DHCP

Connect EasyLog to the LAN via an Ethernet cable (Par. 4.3) and power it (Par. 4.4). When the Status LED flashes at regular intervals, EasyLog is ready for use.
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 in the browser http: //easylog.local. Thanks to the dDNS protocol, EasyLog will respond to the request allowing the user to access the configuration pages without knowing the exact IP. This option it is available if the Bonjour service or other dDNS service (generally present) is available on the PC from which it is accessed.

N.B. Use this option by connecting at most one EasyLog in the same LAN.

4.3 Login e autenticazione

Once the IP address has been defined, type it in the browser. This will allow you to access the EasyLog configuration and consultation pages.
The first screen (Fig. 8) is the authentication page with username and password.

The default values are:
User name: **admin**
Password: **admin**

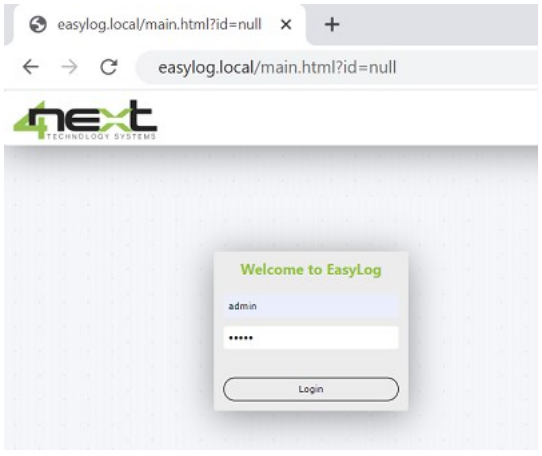
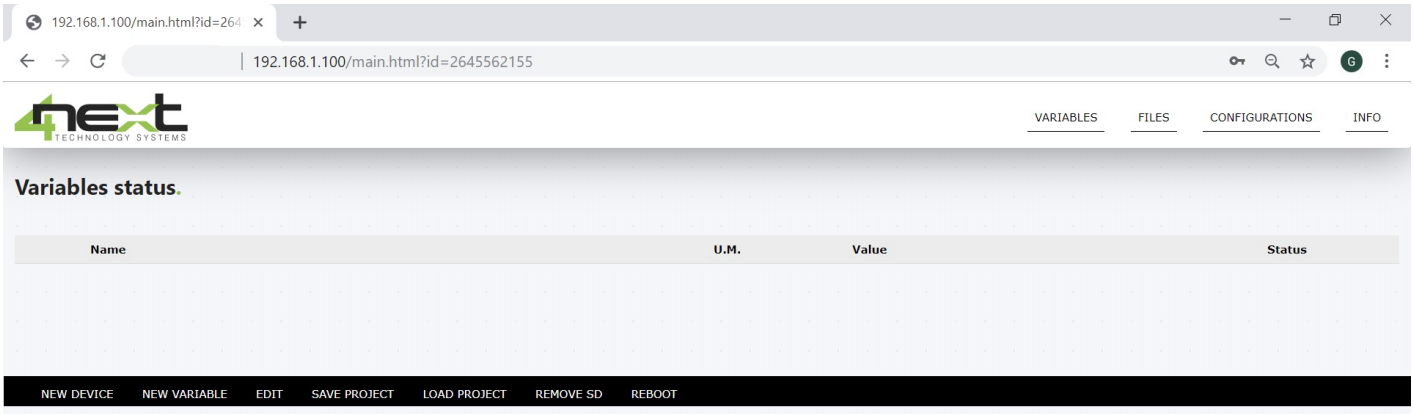


Fig.8 Loging mask from PC browser

5. Programming

5.1 Main menu

After the login, Easylog shows variable visualisation page, it represents default page or home page. If Easylog has never been set up the page shown will be the following.

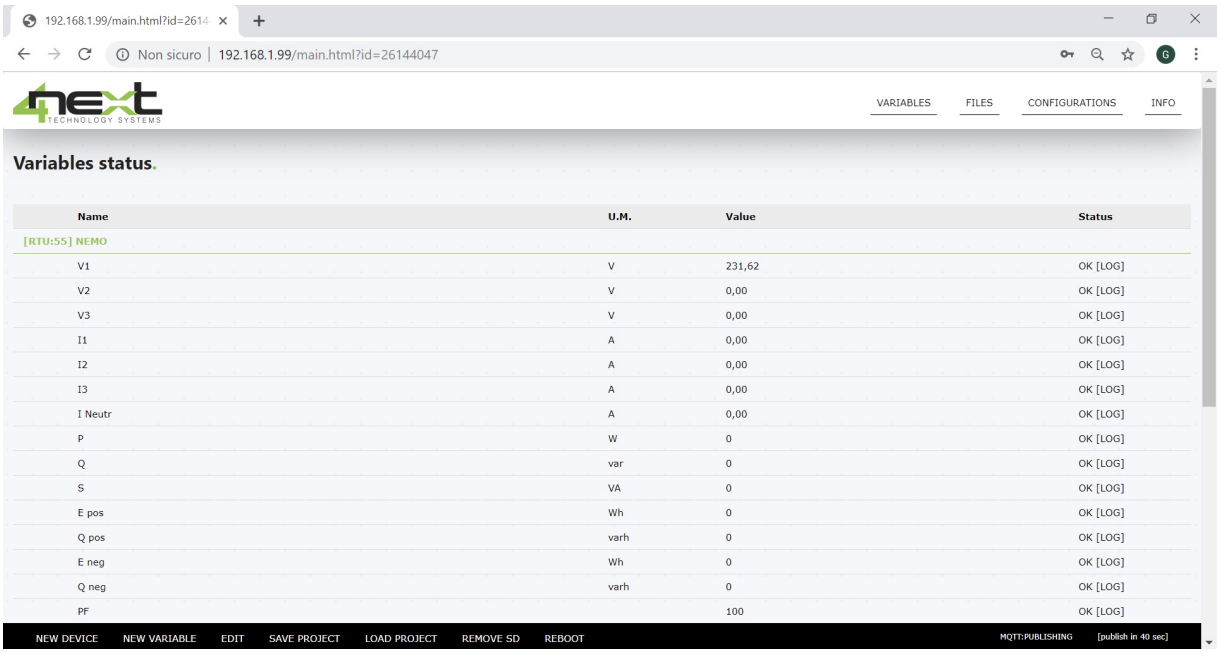


On the top all pages menu bar will be visible. It comprehends:

- ***Variables***: to visualise and set up variables read from ModBus devices
- ***Files***: List of files containing logged data created on SD card
- ***Configurations***: To set up all the system parameters
- ***Info***: to visualise Firmware, bootloader and MAC address versions.

On the bottom of the page there are different “buttons” that perform operations. From left to right the possible operations are:

- ***NEW DEVICE***: From version 1.2.x Easylog allows to group variables according to the device. This method allows to use already existing libraries created for a specific device, it avoids the re-editing of all the variables and it saves time to the configuration.
- ***NEW VARIABLE***: It allows to add a new variable to a specific device
- ***EDIT***: This function allows to edit a variable or a device according on the cursor positioning.
- ***SAVE PROJECT***: This function saves the complete Easylog configuration (variables and system settings)
- ***LOAD PROJECT***: It allows to configure completely an Easylog from a configuration file previously saved
- ***REMOVE SD***: It pauses the SD writing to allow its secure removal
- ***REBOOT***: It resets and then it restarts the Easylog



5.2 New device input

Pushing on function key (***"NEW DEVICE"***): it is possible to add a new device (ModBus product).
The following screen helps for adding information regarding the new device
- **Device name**: name of the device
- **Source**: To choose between ModBus RTU or ModBus TCP
- **Modbus Parameters**: If the device is set on ModBus RTU the only parameter is Slave ID.

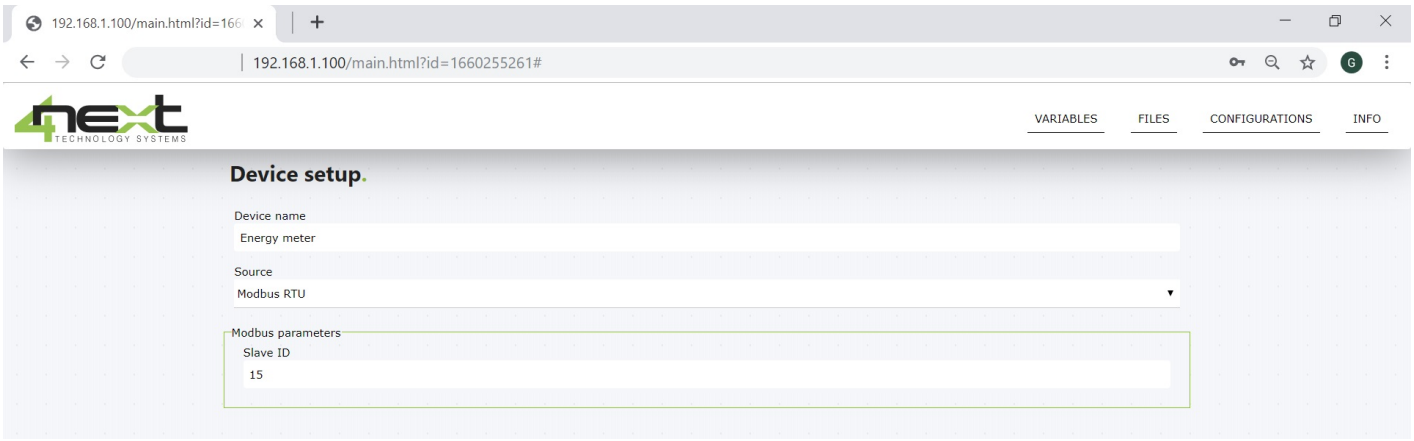
If the device is set on Modbus RTU, the parameters are:

- Slave ID: address of the slave device (1 ÷ 255)
- Answer timeout: the answer waiting timeout from master (Easylog)
- Delay between request: the waiting time between a request and the following one

If the device is set on **ModBus TCP**:

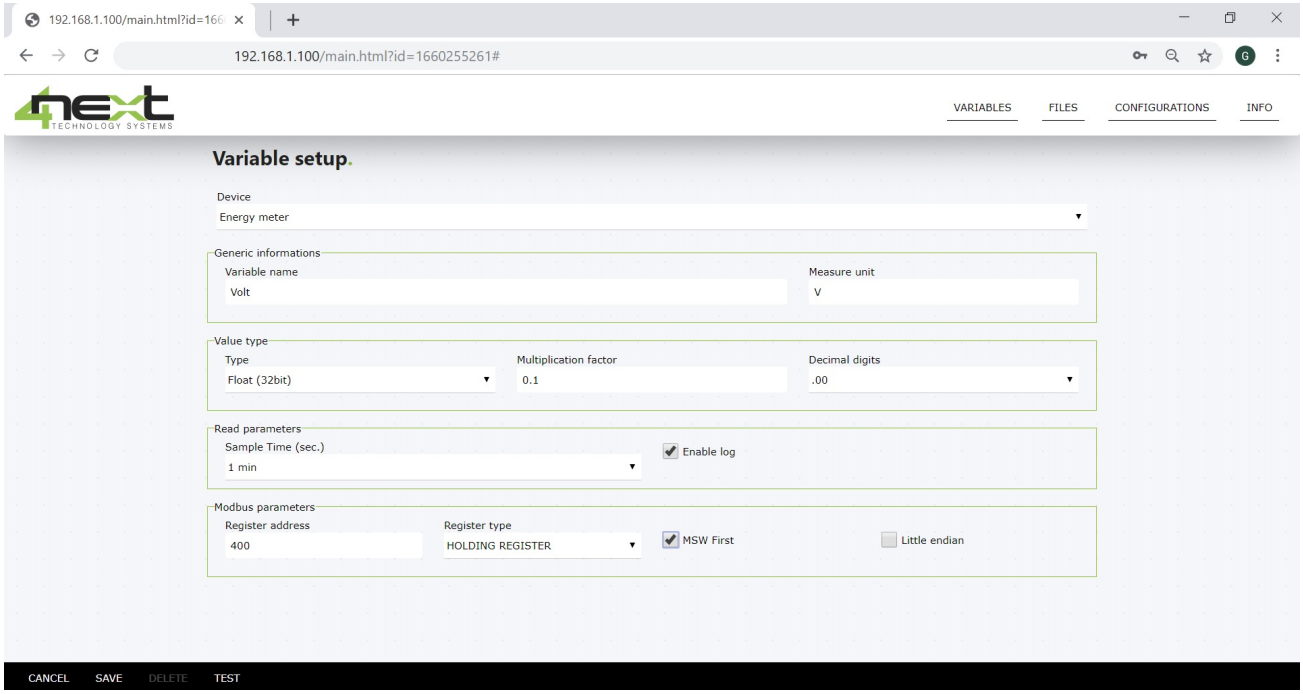
- Other than Slave ID, Answer timeout and delay between request, the parameters will be also IP address and Port

The last parameter is **MQTT publish topic:** it's the identifier (digital signature) of the device for transmissions via MQTT protocol. It's needed for differentiating MQTT topics of publication for every device. The "Separate publish for each device" parameter must be active. In this way the topic where the device will publish its log data will be obtained from the publish topic (configuration parameter) and the string concatenation defined below.



5.3 Variable configuration

Click "**NEW VARIABLE**" button in the bottom right corner of Variables page. Browser will show the following screen:



Input information for a correct variable set up:

- ***Device***: the device to which the variable refers to. Selecting "new variable" Key when the cursor is on a specific device, this field will be automatically set.
- ***Variable name****:* Input the name of the variable, any text that you like, it will also be used as a label in the visualisation page;
- ***Measure unit****:* measure unit of the variable;
- ***Type****:* data type of the variable. The combo box allows you to easily decide between all the supported data type;
- ***Multiplication factor****:* factor that will multiply the raw data to obtain the correctly engineered variable. Many devices export information in a non-standard format, for example temperature in tenths of grade, to visualise it in grades this value should be set to 0.1.
- ***Decimal digit***: Number of decimal digits for visualization and saving on file.
- ***Modbus parameters****:* Sets up identifying data to access the variable and particularly:
    - ***Slave ID****:* slave device ModBus address.
    - ***Register address****:* address of the variable identifiable from the registers mapping, provided from the developer.
    - **Register Type***:* Register type (coil, input register, holding register).
    - ***MSW first****:* literally Most significant word first, used for Int, Long or float variables that are available in the Big-Endian or Little-Endian formats. The device manufacturer specifies the used format.
    - ***Little endian****:* for 4 bytes variables, it represents Big –Endian or Little-Endian order in every WORD.

Note: Manufacturer manual should mention if this parameter has to be selected or not.

- ***Data Log:***
    - ***Enable log***: this check-box enables file the saving of the current variable on a file into the SD card. **Note:** it **MUST** be selected to save files on SD card.
    - **Enabled only on timeslot**: if selected, it allows you to define the time interval within which the data are stored. It's needed to limit the unnecessary data transmission. E.g. from 8.00 am to 8.00 pm.
    - ***Periodic log time****:* time of the variable, it defines how often Modbus network master (Easylog) reads the variable from the slave (tool used) and saves it if log option is enabled.

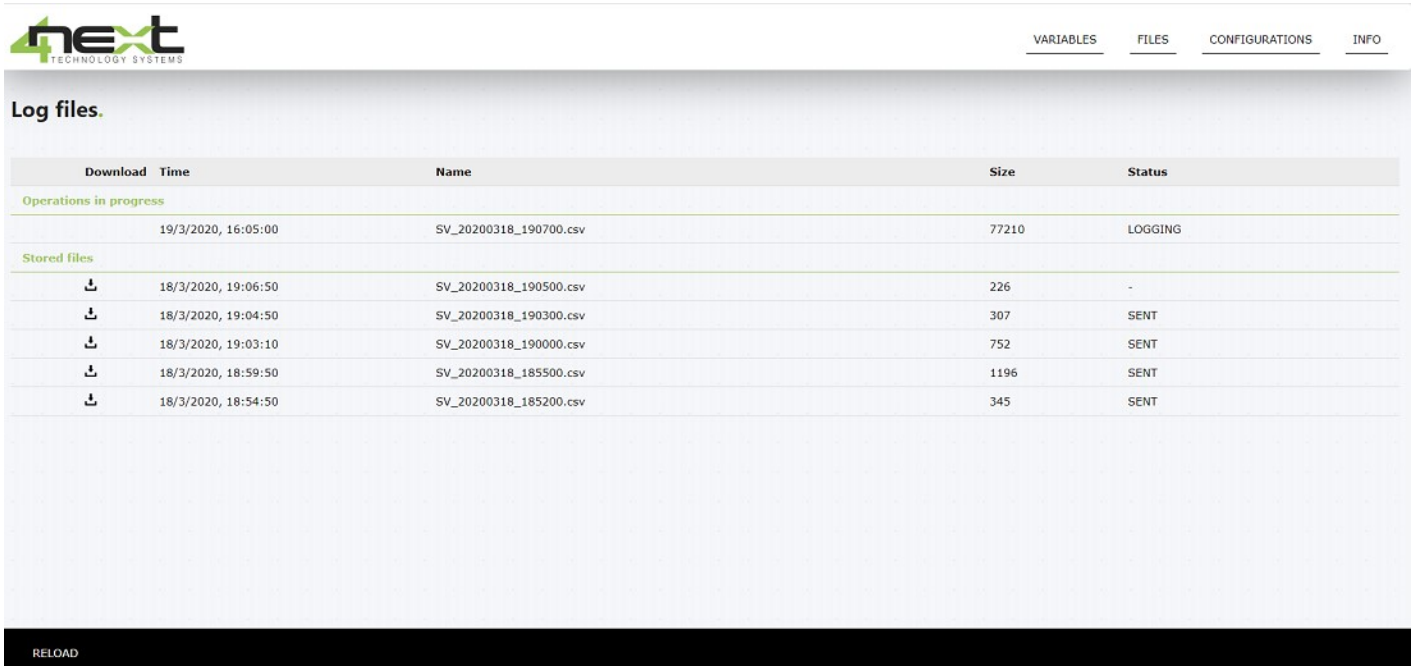
    - ***Log on event:*** Easylog allows you to store a data of a certain event which can be:
- **Any event**
- **Value changed:** the value of the variable changes
- **Value changed at least of:** the variable changes by a minimum value specified in the field below
- **Value changed at least of %:** the variable changes by a minimum percentage value specified in the field below

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

- ***Cancel:*** cancel the variable modification or insertion operation.
- ***Save:*** stores the inserted variable or the changes made.
- ***Delete:*** delete the variable.
  NOTE: Once the variable cancellation operation has been performed, it will not be possible to cancel the operation and the variable will be permanently deleted.
- ***Test:*** sends the test ModBus command by tracking the various packages

5.4 File system

EasyLog stores the files on the internal SD card. It is possible to view the list of files through the Files menu. This page allows you to view the archived and possibly sent files and to write them locally from the connected PC.

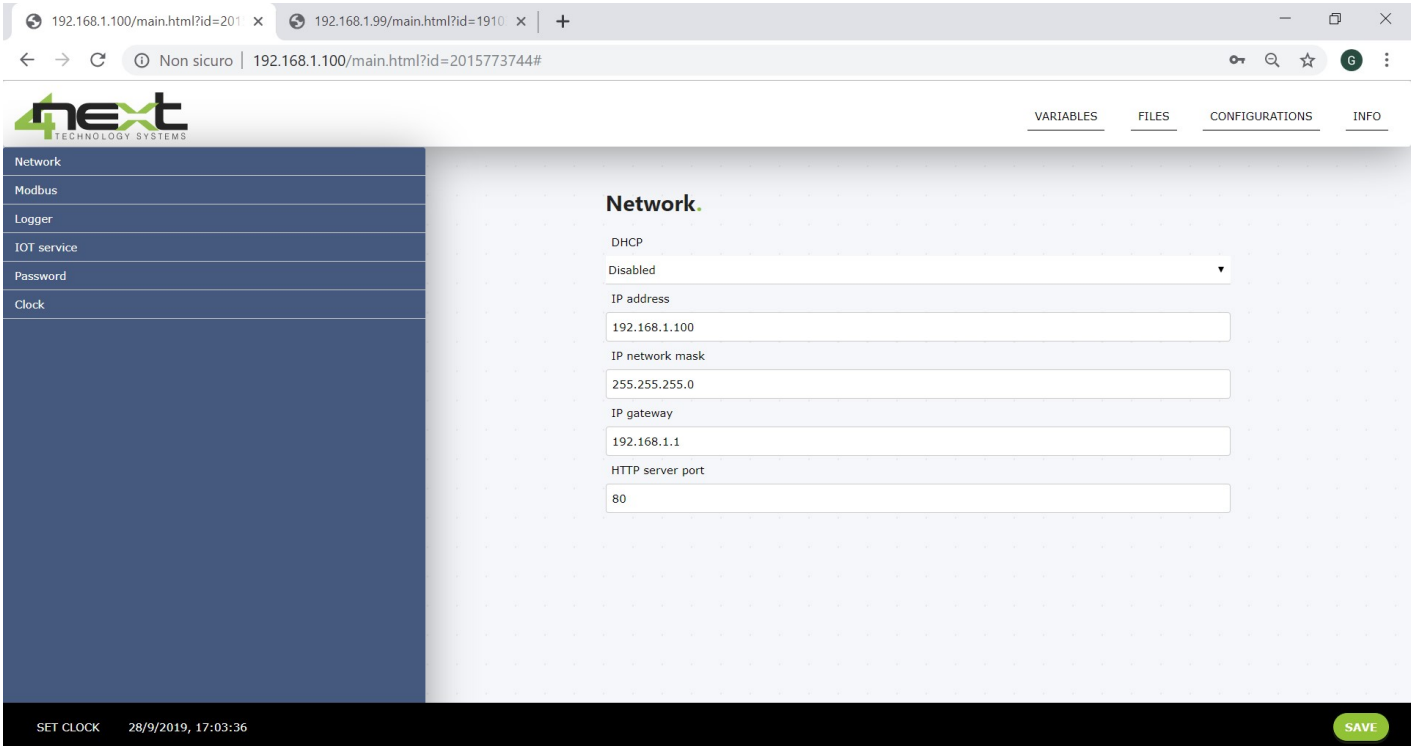


5.5 System set up

Network

Allows to input the parameter of Ethernet network to which Easylog is connected. These details are:

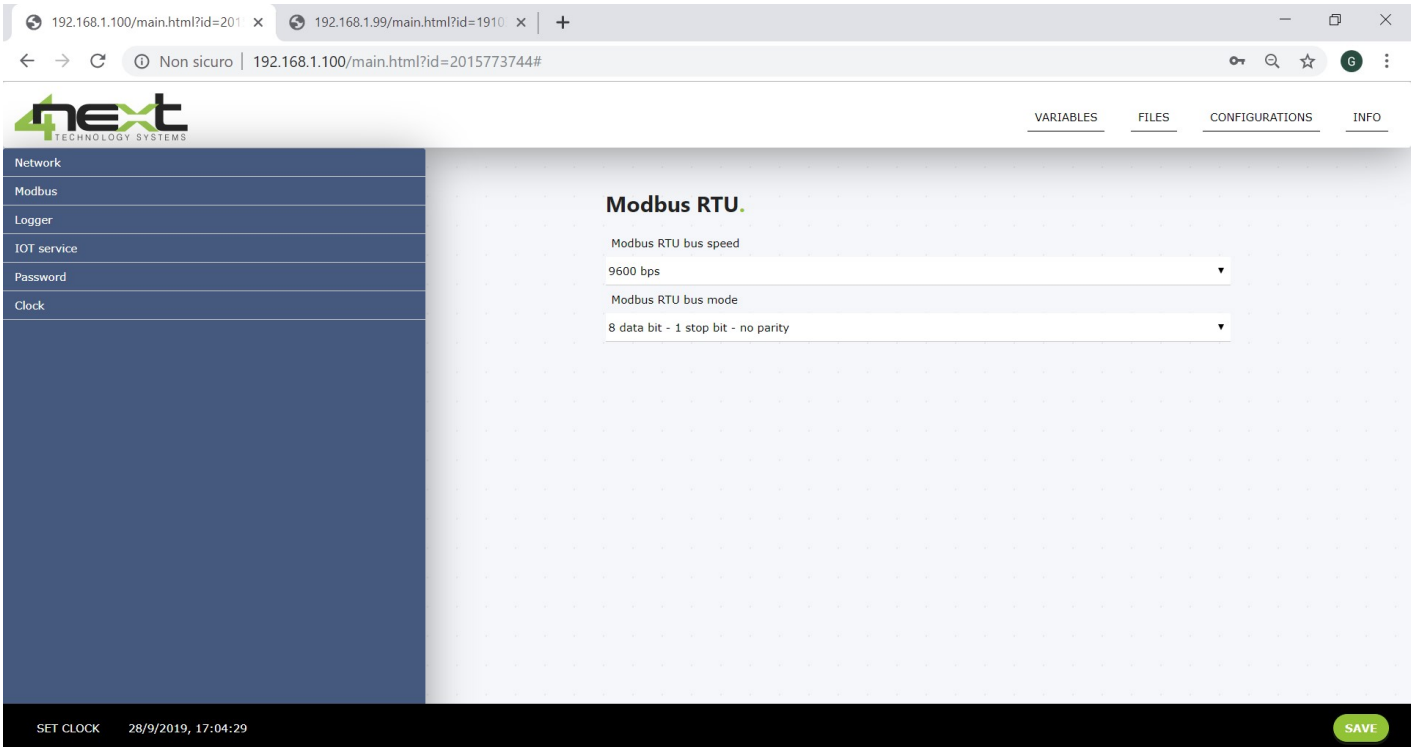
- ***DHCP**:* allows to establish whether to use DHCP server to assign IP address or not.
- ***IP address**:* static IP address assigned to Easylog. If DHCP is enabled or DIP-SWITCH 2 is set to ON, IP address won't be the one shown
- ***Ip network mask**:* Subnet mask allows to establish IP address range used inside a subnet.
- ***IP gateway***: Reference gateway IP address.
- ***HTTP server port***: Port of the HTTP server when different from standard 80 or 8080.



ModBus

Defines configuration parameters of bus RS485 for the Modbus communication with slaves:

- ***ModBus RTU speed**:* Communication speed;
- ***ModBus RTU mode**:* Numbers of bits, stop bits and serial communication parity;

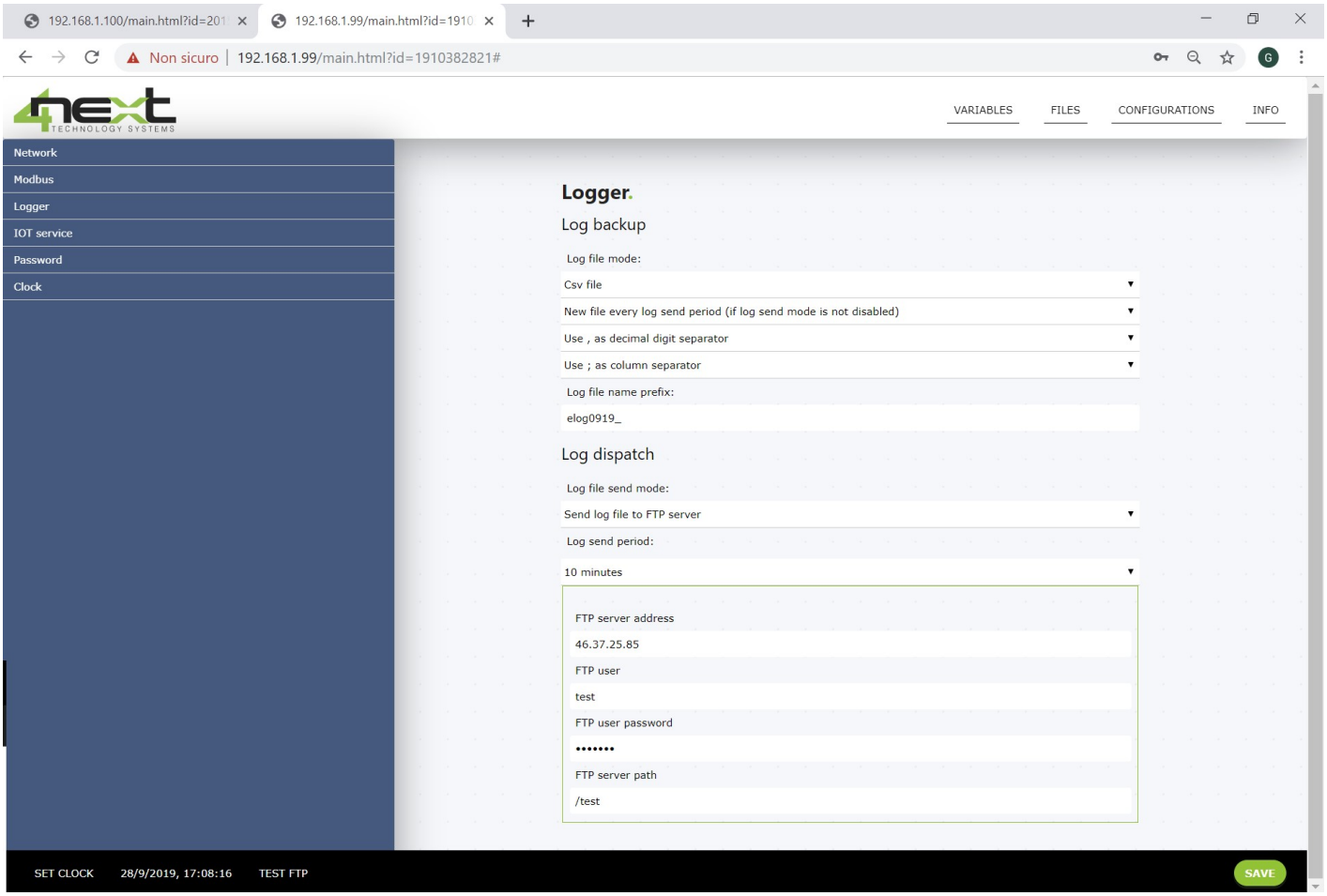


Logger

Logger menu allows to choose how file will be saved on the SD card, particularly:

- *Log File Mode:*
  - File type: none, CSV file, JSON file
  - How often create a new file: every hour, every day, or always use the same file
  - Decimal separator: , (comma) or . (dot)
  - Fields separator: ; (semicolon), | (Pipe), #(sharp)
  - **Log file name prefix:** the file name prefix in the SD
  - **Delete files after the following days:** represents the maximum time of days the file remains on the SD card. By setting 0 the files will never be deleted. Otherwise they are canceled after n. days from their creation. Ex. 8 keeps the last 8 days files.
- *Log Dispatch: defines how often and how send a file remotely*
  - ***Log Send Period****:* Dispatch time
    Delete file after sent: if selected the file will be deleted after sent.
  - ***Log send mode****:* dispatch mode, possible options:

    - *FTP*
    - *E-Mail* (Options under development)
    - *http Rest* (Options under development)
    - Disabled

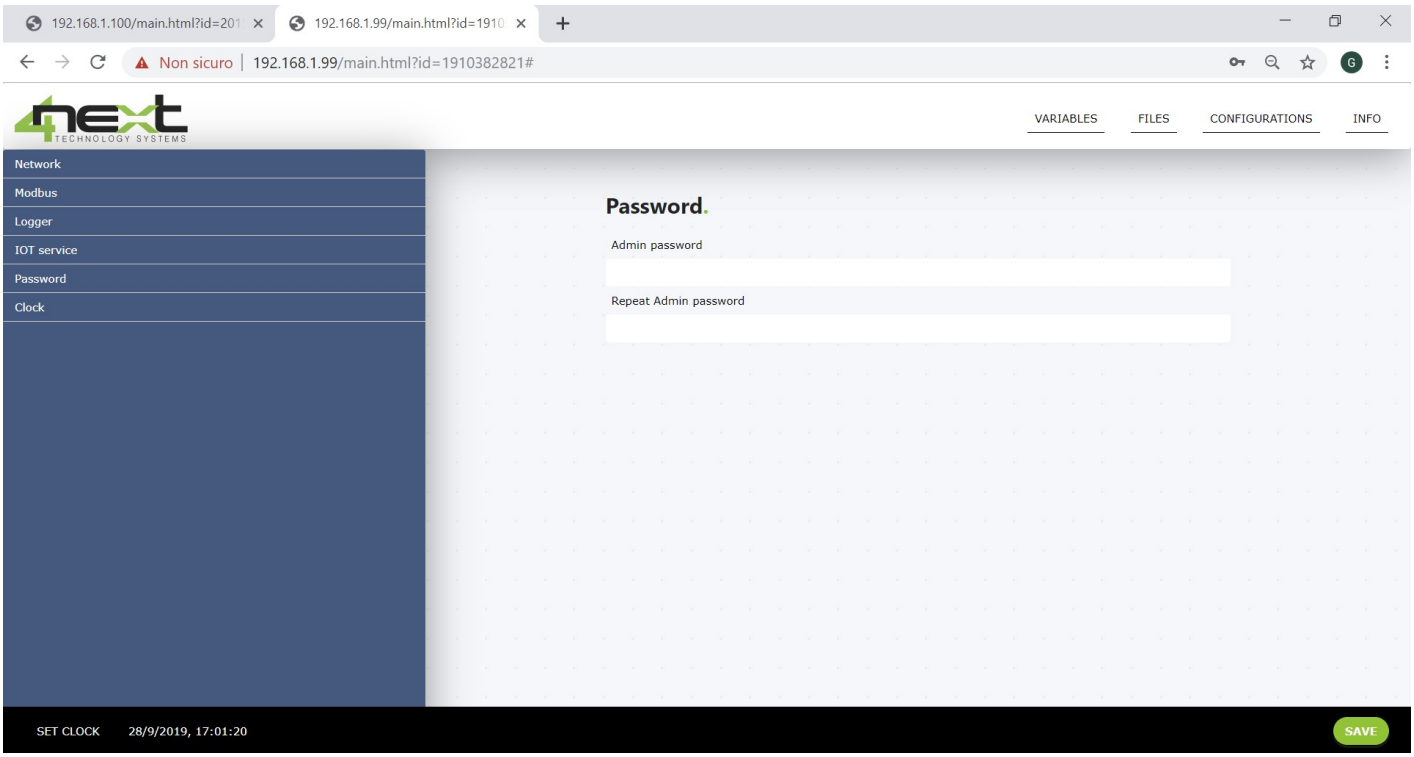


IoT Service

This configuration menu is used to set the parameters for sending data via the MQTT protocol.
Service type: Enable or disable sending in MQTT.
MQTT Provider: it is the type of MQTT broker available by default. At the moment Easylog foresees the connection to a generic MQTT broker and to Databoom.
MQTT server URL: The address (URL) of the server.
Authentication user: Username for accessing the server.
Authentication password: Password to access the server.
Client ID: It is the identifier of the Easylog client that connects to the MQTT broker. It is a unique ID for a specific broker. The broker uses it to identify the client and the current state of the client.
Enable SSL / TLS (server port 8883): Activate if the remote broker uses SSL / TLS encryption for data transfer.
Publish topic: Topic of the MQTT broker on which to post the log data publications. It is a string that represents a path in the broker, for example "easylog / location1".
Separate publish for each device: Indicates if you want to use a different topic in the broker for each device configured in Easylog. 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 entrusted to the TCP protocol.
1 = the guarantee is managed by an acknownledge from the broker. The risk is the duplication of a publication.
2 = the guarantee is managed by a double acknownledge between the device and the broker. There is no risk of duplication but there are 2 more messages with each publication.
The choice must be made based on how much traffic is allowed for pubblications.
Retain: Activate if any subscriber to the topic used by Easylog for publication wants to immediately receive the latest published data on connection.

Password

Set password to access Easylog configuration page

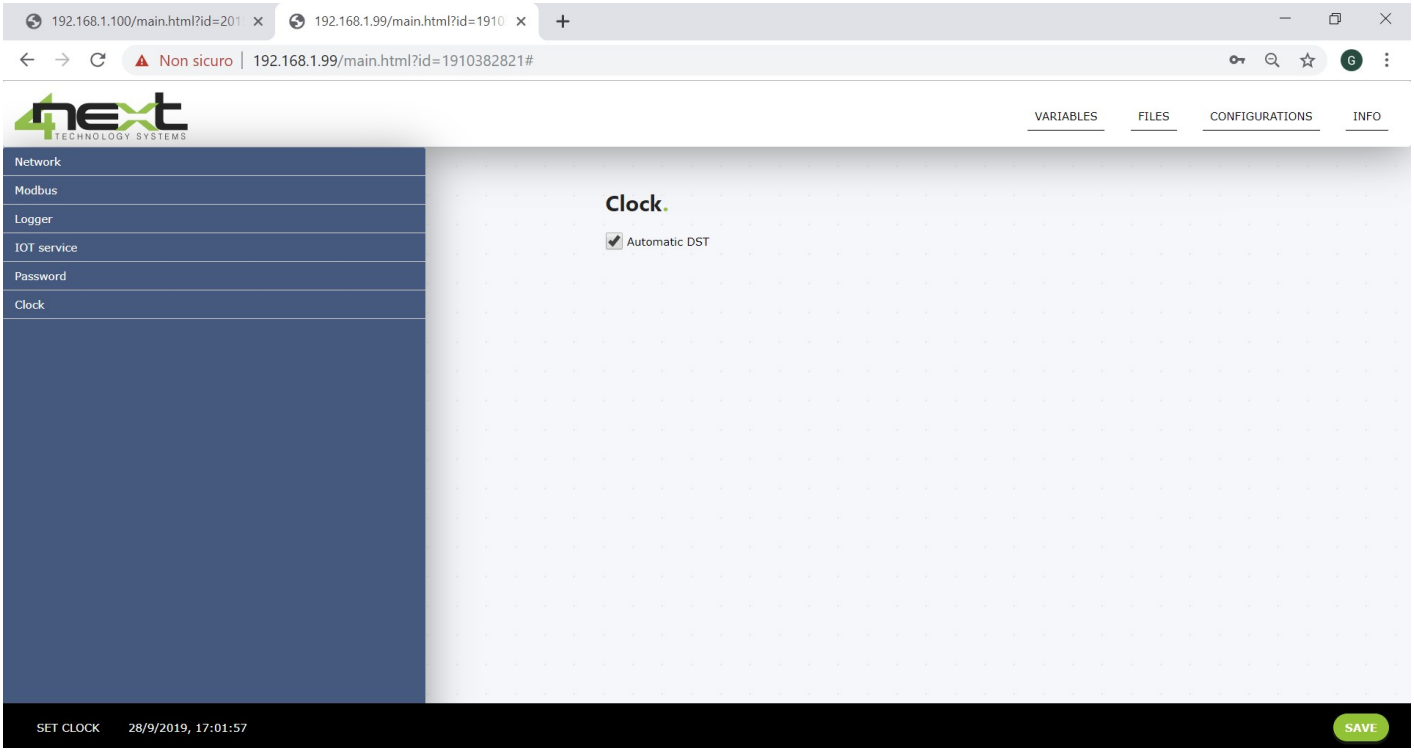


Clock

Allows to set whether the update from winter-time to summer-time is automatic or not. When Automatic DST checkbox is ticked the update is done automatically

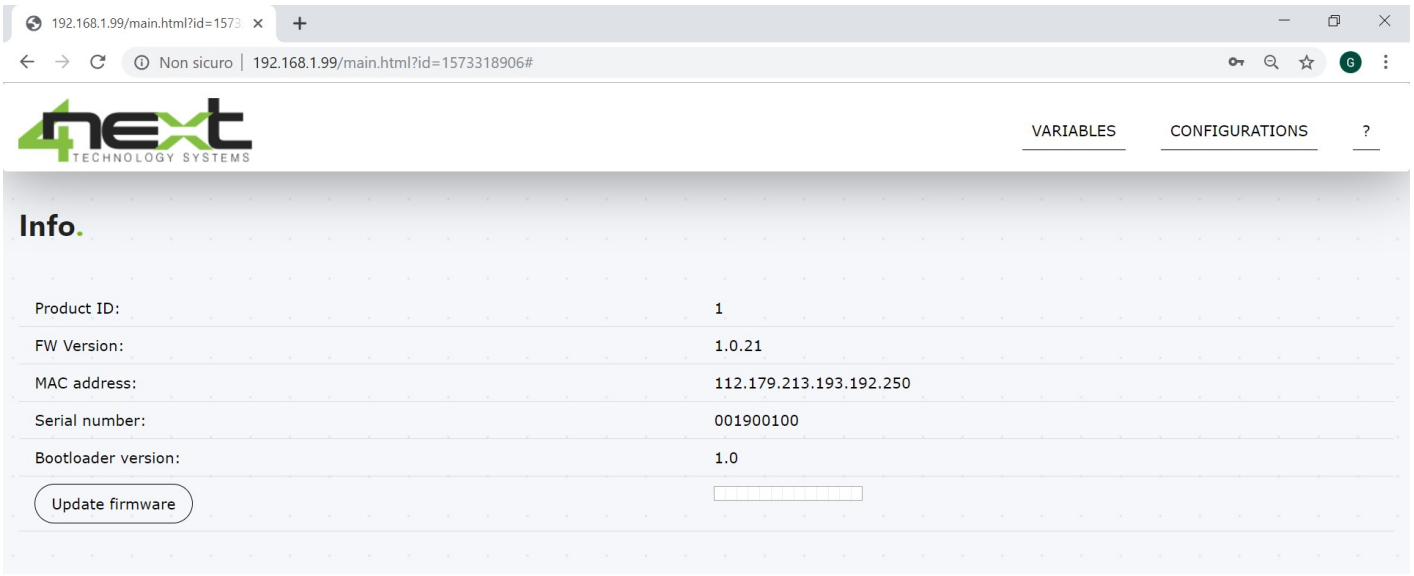
Clock alignment is always possible from configuration page, clicking on SET CLOCK button located in the bottom left corner of the page.

By selecting the Checkbox NTP clock update service Easylog, if connected to the Internet, aligns the clock with the NTP server.



5.6 Info

Info menu visualise device related Hardware and Software information.
Always check on the website 4next.eu/easylog if the firmware is up to date.



6. RETURN AND REPAIRS

Return to repair or substitution has to be authorised in advance through RMA number request.

Send an email to support@4next.eu or to your concessionaire/reseller with the following information:

- Business name and client data(address, telephone, fax, email)
- Handler
- Purchase point
- Product data P/N and S/N are located on the back of every product or on the original box
- Detailed description of the failure or anomaly

4neXt will send the RMA number so the client will send the equipment to repair. Transport charges to be paid by the sender.

If the equipment arrives without factory seals it will automatically considered out of warranty.