2020

MONITORING SOLUTIONS

PMIGESS COMPANY

www.pmigess.com

2020 Communication Manuel

01.01.2020

Contents

1. BASIC INFORMATION

The basic communication topology is the processing and distribution of the information in the basic server networks connected to the communication systems to the users.

Today, existing communication systems are basically divided into two groups. One of these is serial communication groups and the second is Network based communication groups. In addition, there are gsm, satellite communications.

Basic communication systems are used for more convenient use, warning control and remote monitoring of power system devices produced in our company.

2. MONITORING FEATURES

Remote monitoring systems, user oriented computers, operating systems, windows, linux, etc. intended to be used. It is also possible to remotely monitor and control devices with recently developed Android application for mobile phones.

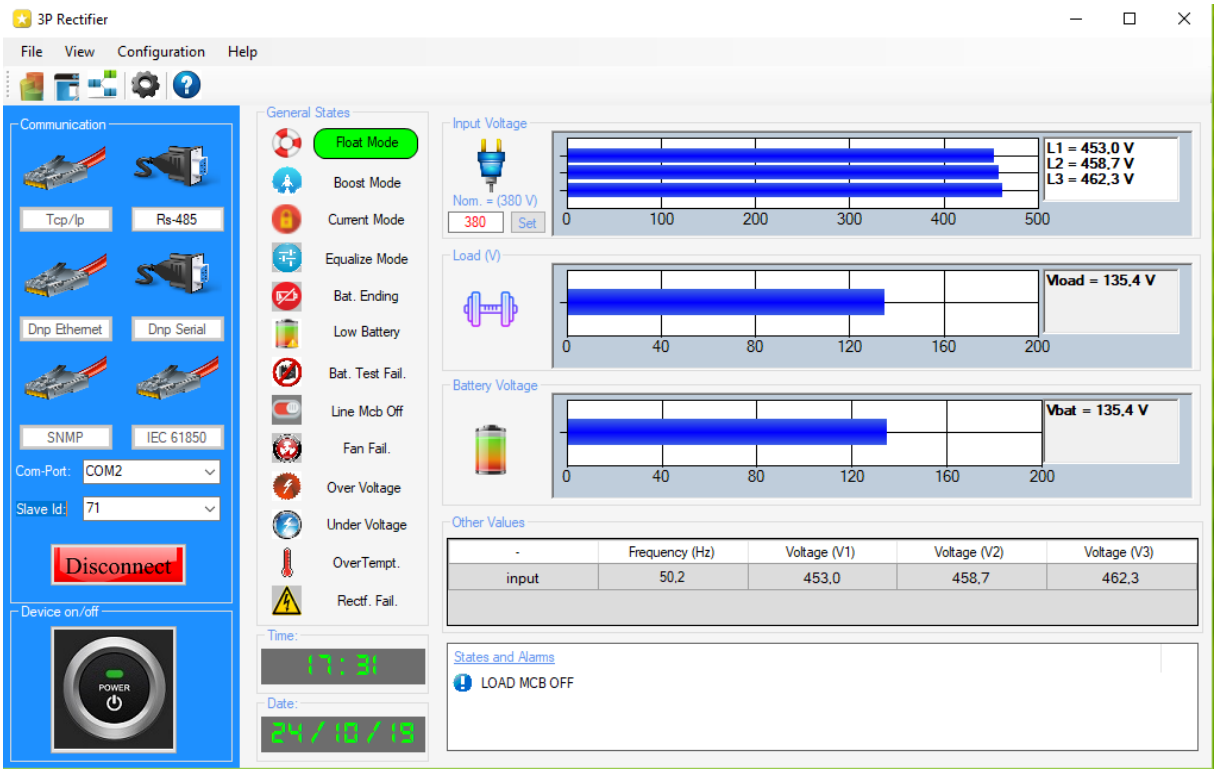
With the interfaces created for computers, instant information of the device can be read graphically. At the same time, not only monitoring, but also remote time control can be done.

3. MAIN CHARACTERISTICS

- Network - based Server - Client applications
- Master - Slave applications in serial communications
- Rs232, Rs485 and USB support
- Android and Wifi support in special applications
- Network and computer interface support on all power electronics devices.
- Simple installation and adjustment structure
- Multi-server support in networks
- Ability to adapt interfaces as desired
- Security measures with password in special applications
- Read and change the settings of the devices by remote monitoring
- Scada based current and voltage control via transducer
- Can increase event memory
- Backward recording and Micro-sd Card support
- Device management with web server without any interface
- Instant e-mail support and control of events on devices
- Device monitoring with 2 different protocols at the same time
- Adaptation of developing communications for new Technologies

4. AVAILABLE COMMUNICATION TYPES

Currently, the communication types in our devices are actively increasing to multiple Serial and Network based communications. We have remote monitoring solutions for UPS, Rectifiers, Converters, Stabilizers and all power electronics devices in our company.



A. These protocols;

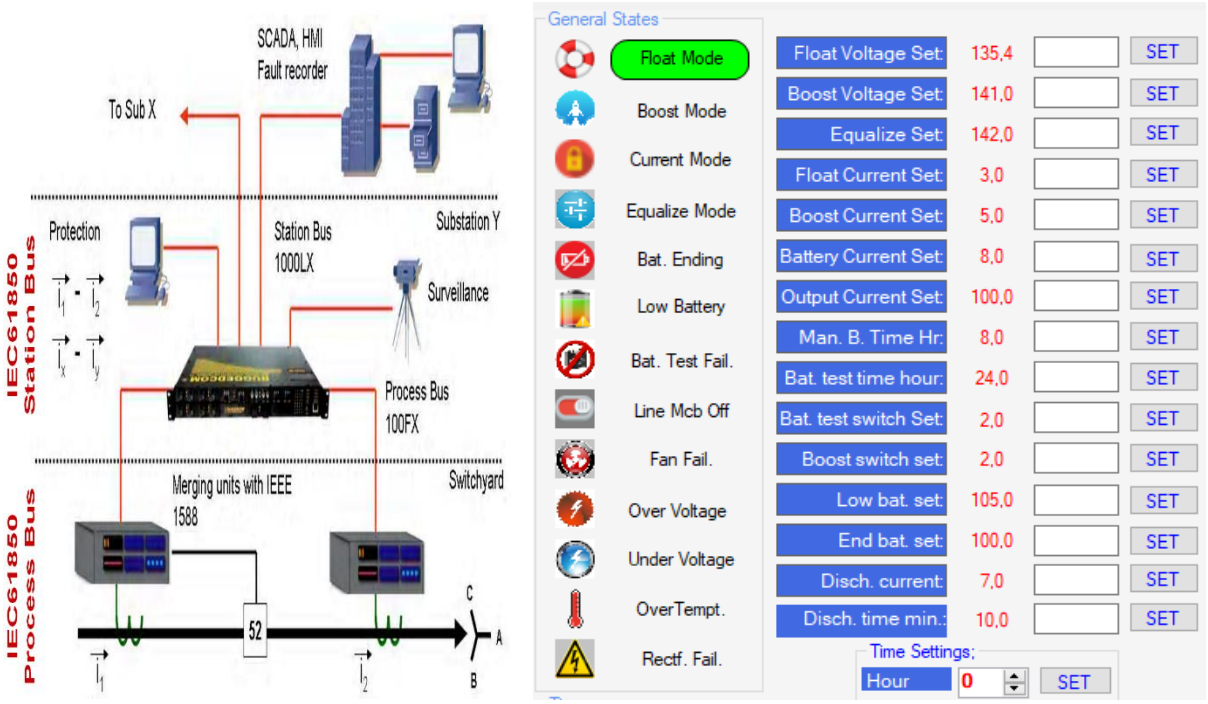
1. **IEC 61850 PROTOCOL**
2. **SNMP PROTOCOL**
3. **DNP3 ETHERNET AND SERIAL PROTOCOL**
4. **MODBUS TCP AND RTU PROTOCOL**
5. **PROFIBUS DP AND PA PROTOCOL**

B. Other Supported Communications;

1. **ANDROID APPLICATIONS**
2. **USB SUPPORT**
3. **WEB-SERVER SUPPORT**
4. **E-MAIL SUPPORT**

5. AVAILABLE COMMUNICATION PROTOCOLS

5.1. IEC 61850 PROTOCOL



IEC 61850 is an international standard defining communication protocols for intelligent electronic devices at electrical substations. It is a part of the International Electrotechnical Commission's Technical Committee 57 reference architecture for electric power systems. it can be used safely in power electronics devices in line with the developing needs.

IEC61850 Features,

- Components available to implement Client, Server, GOOSE, or Sampled Values
- Full IEC 61850 services out of the box (not just MMS)
- Implements Edition 1 and Edition 2 of the IEC 61850 standard based on SCL file
- Developed Special Power electronics systems cid and scl files.
- Fully compatible with Scada systems and relay systems to which it is connected.
- Goose ve Reports Monitoring
- Rectifier and Ups Event recording and monitoring from IEC61850
- Ability to use linearly compatible protocol
- Supports IEC 61850 Ed. 1.0 and Ed. 2.0 and allows mapping IEC 61850 signals from one IED to another
- Links different Intelligent Electronic Devices (IEDs) and their logical functions to substation specifications

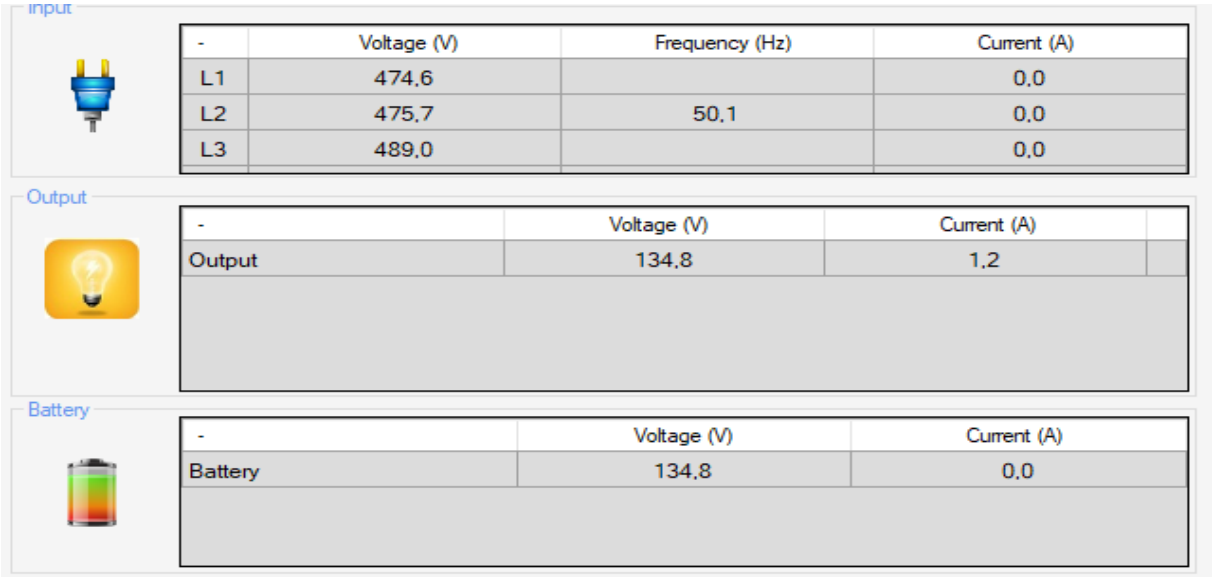
5.2. SNMP PROTOCOL

Simple Network Management Protocol (SNMP) is a set of protocols for network management and monitoring. These protocols are supported by many typical network devices such as routers, hubs, bridges, switches, servers, workstations, printers, modem racks and other network components and devices. SNMP is used to remotely monitor a system. It can also be used to remotely configure a system.

What distinguishes SNMP remote monitoring from other types of remote monitoring is the use of SNMP ("Simple Network Management Protocol") to transmit messages between central alarm master (an SNMP manager, by definition, in this case) and the SNMP remotes at each network site.

- Widely Accepted and works good for device monitoring
- basic monitoring MIBs are (like IF-MIB) are well defined and implemented in most of the devices
- Vendor specific MIBs also defined , provides additional support
- Very good for Fault management
- UPS, Rectifiers and etc. Devices remotely control and monitoring.
- Module structure is reliable for multi server
- UDP basic structure.

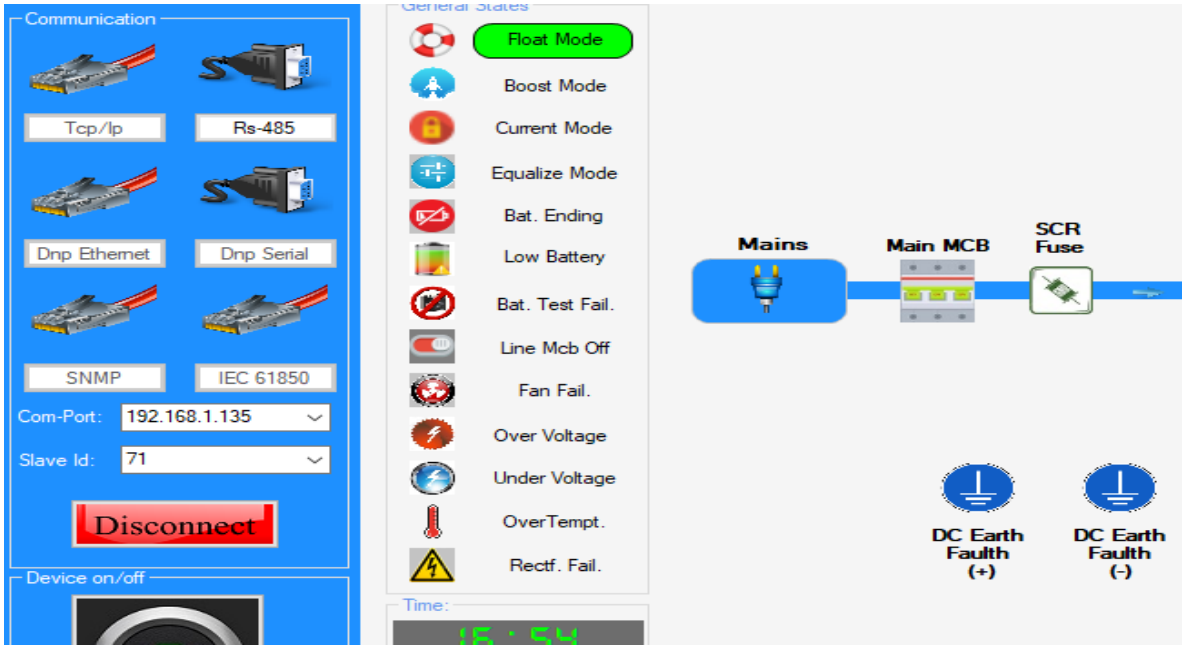
5.3. DNP3 ETHERNET AND SERIAL



Distributed Network Protocol 3 (DNP3) is a set of communications protocols used between components in process automation systems. Its main use is in utilities such as electric and water companies. Usage in other industries is not common. It was developed for communications between various types of data acquisition and control equipment. It plays a crucial role in SCADA systems, where it is used by SCADA Master Stations (a.k.a. Control Centers), Remote Terminal Units (RTUs), and Intelligent Electronic Devices (IEDs). It is primarily used for communications between a master station and RTUs or IEDs. ICCP, the Inter-Control Center Communications Protocol (a part of IEC 60870-6), is used for inter-master station communications. Competing standarts include the older Modbus Protocol and newer IEC 61850 protocol.

- Easy system expansion
- Long product life
- More value-added products from vendors
- Faster adoption of new technology
- Major operations savings
- Interoperability between multi-vendor devices
- Fewer protocols to support in the field
- Reduced software costs
- No protocol translators needed
- Shorter delivery schedules
- Less testing, maintenance and training
- Improved documentation

5.4. MODBUS TCP AND RTU

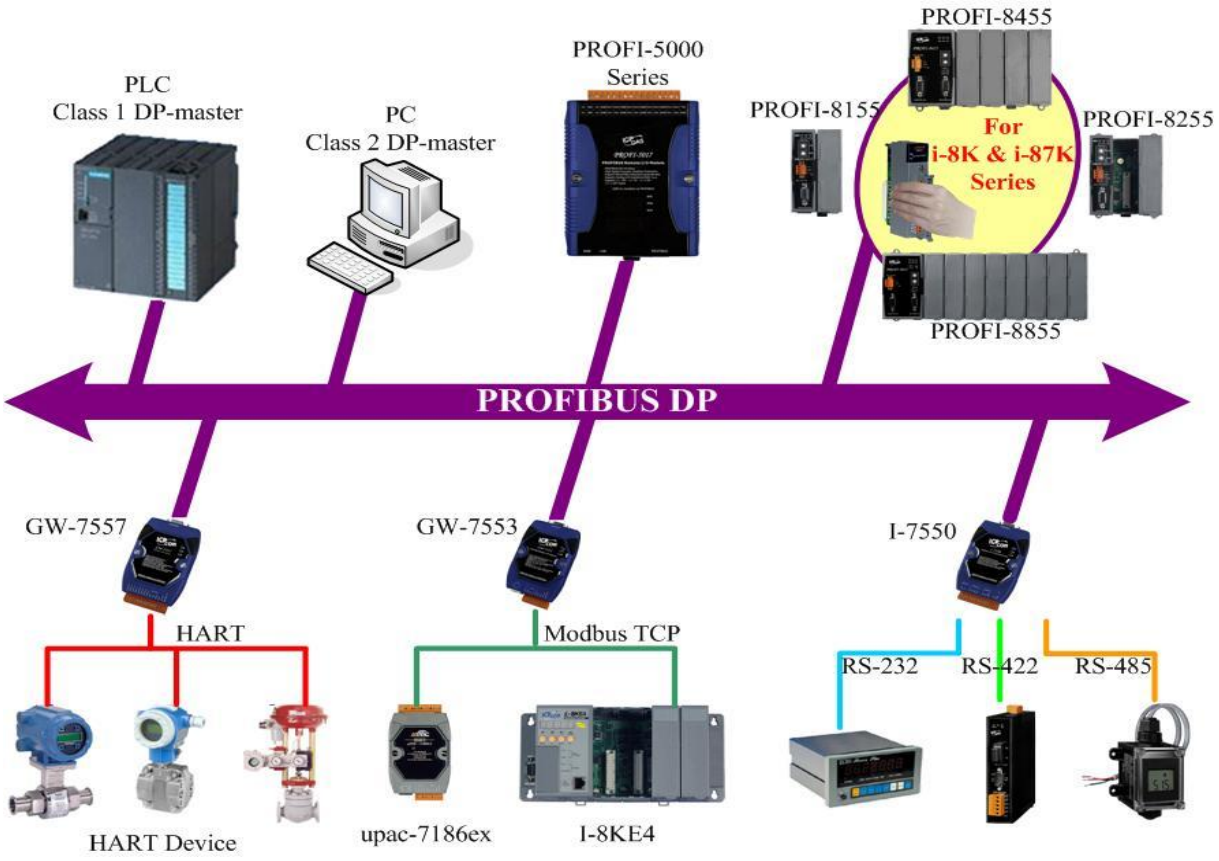


Modbus is a communication protocol developed by Modicon systems. In simple terms, it is a method used for transmitting information over serial lines between electronic devices. The device requesting the information is called the Modbus Master and the devices supplying information are Modbus Slaves. In a standard Modbus network, there is one Master and up to 247 Slaves, each with a unique Slave Address from 1 to 247. The Master can also write information to the Slaves.

Modbus is an open protocol, meaning that it's free for manufacturers to build into their equipment without having to pay royalties. It has become a very common protocol used widely by many manufacturers throughout many industries. Modbus is typically used to transmit signals from instrumentation and control devices back to a main controller or data gathering system.

- Modbus is simple to implement for device vendors.
- Modbus is open protocol so It doesn’t require a specific Media or Physical Layer, unlike many proprietary protocols, so Modbus networks are built on cheap and common infrastructure such as RS485, RS422, RS232, Ethernet links.
- The specification is available for free. and there are licensing fees. You are no depending on one vendor for support. also provide Additional sample code, implementation examples, and diagnostics are available on the Modbus toolkit
- Suitable for small-to-medium volumes of data (<= 255 bytes)
- Easy connection, Acknowledged data transfer
- If you choosing Modbus you have a good chance of avoiding compatibility problems and future upgrade problems.

5.5. PROFIBUS DP AND PA

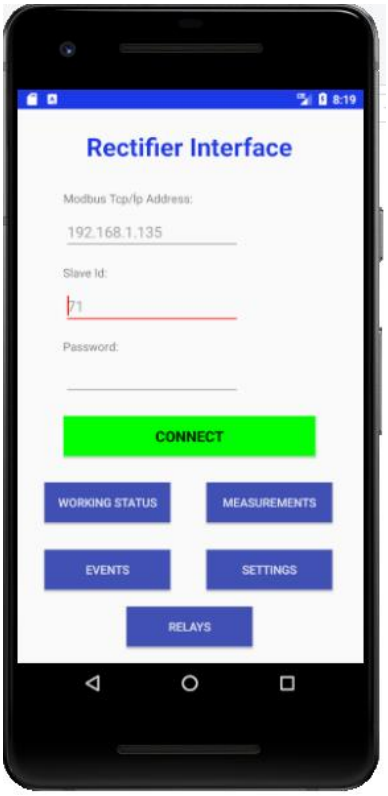


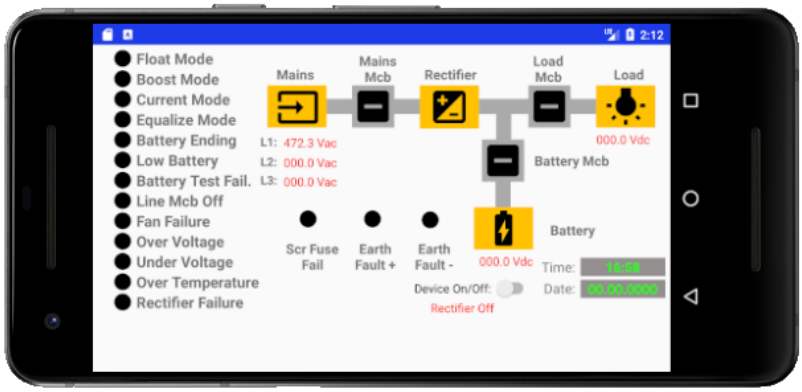
PROFIBUS (Process Field Bus) is a standard for fieldbus communication in automation technology and was first promoted in 1989 by BMBF (German department of education and research) and then used by Siemens. It should not be confused with the PROFINET standard for Industrial Ethernet. PROFIBUS is openly published as part of IEC 61158.

- Efficient industrial processes require high machine and plant availability. The integrated redundancy of PROFIBUS is unreached when it comes to uninterrupted operation.
- As important are the extensive diagnostic messages sent from bus, field devices and process to inform about the current status and to enable timely, status-based intervention.
- The result is higher availability combined with reduced maintenance costs.
- PROFIBUS is optimized for distributed I/O applications. Up to 126 I/O devices can be connected to a PROFIBUS DP cable. Since each I/O device can handle hundreds of connection points, this provides a very large number of connection possibilities for a single controller.

6. OTHER SUPPORTED COMMUNICATIONS

6.1. ANDROID APPLICATION





Thanks to the android application, it is now very easy to remotely monitor and control ups, rectifiers. In addition to the Modbus tcp protocol, the service can be used in different protocols. You can install apk file on any phone with Android operating system and do everything functional like battery status, voltage information and power on and off of your UPS.you can even monitor the device from outside the city if you want.

- Supported on Android 4.3 and above.
- Monitoring and control of devices over TCP.
- Simple to install you just need the apk file.

6.2. USB SUPPORT

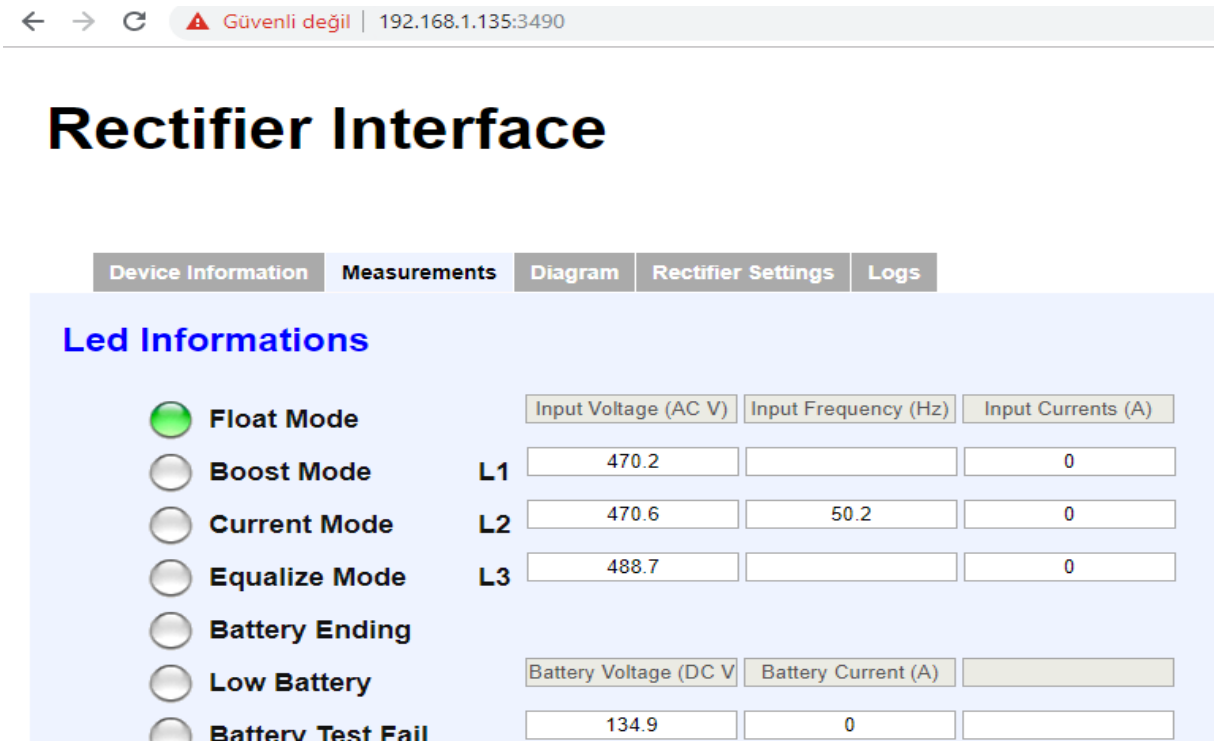
For serial communication via USB, control and monitoring is done directly from the computer. Modbus and DNP3 serial management is possible as the management area of the device.

Thanks to computer interfaces, the required setup should be installed in windows 7 and above operating systems. You also need to have GUI "Graphical User Interface" installed. Latest version interfaces can be downloaded from the website.

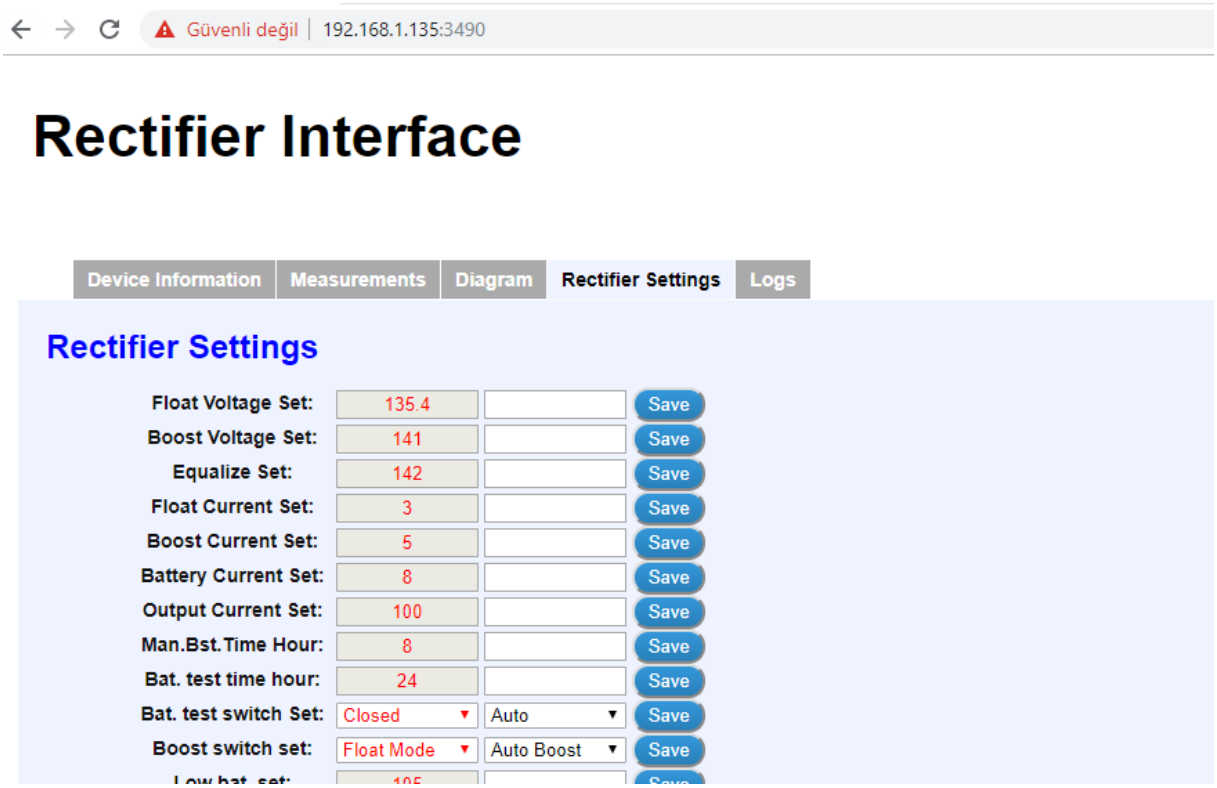
When using a usb converter, the communication units used must be one of the serial communications. Modbus RTU should be used via RS-485 or DNP3 Serial.

- The universal serial bus is easy to use.
- It has robust connector system.
- It has low cost.
- It has variety of connector types and size available.
- It has true plug and play nature.
- It has **Low power consumption.**
- Daisy chain up to 127 USB components / peripherals at the same time to one PC.
- Fits almost all devices that have a USB port.

6.3. WEB SERVER SUPPORT



Remote monitoring and control of devices such as UPS, Rectifier, Stabilizer via web server can be done through web browser without any interface. The TCP network is used in these controls and only the IP address of the device to be connected is known and can connect to any number of client web servers and control and monitor the process easily.



- Automatic State Management – The values of controls are retained across round trips to the server.
- Simple Object Value Access – Accessing the object value is fairly simple through controls rather than the conventional method of using Request object.
- Events – The controls react to events in the server-side code, which helps in handling specific user actions in a structured manner.
- Complexity Simplified – Complex user interfaces are created with simple controls that are pre-configured to perform the most common actions.
- Write Once Render Anywhere – The web pages created through controls are optimized for rendering on any type of device or browser. The layout and mark-up in the output are automatically created based on the capabilities of the browser

6.4. E-MAIL SUPPORT

UPS, Rectifier etc. Thanks to the e-mail module added to the devices, it can send you e-mail in case of any situation and malfunction.

However, it is possible to make precise settings. For example, you have the opportunity to add the warnings you want in case of a break in the voltage of the devices or in the event of a malfunction.

- Full control over both the server and your email
- Pick the applications you want to use, and tune them for your needs
- View logs for incoming and outgoing messages
- View logs for connection and authorization attempts from local mail clients for IMAP, POP3, and SMTP
- Mail will cost no more than the price of your Linode