



RBC REV-010122



**RBC SERIES (RBC-6P, RBC-2P, RBC-12P)
BATTERY CHARGER
USER MANUAL**

OCTOBER 2022

This manual contains the information necessary for the correct use of the PESS Rectifier / Battery Charger. The following instructions are extremely important for the good performance of the Charger and must be fully observed during the system transportation, installation, commissioning, operation, maintenance, etc. procedures for chargers. Failure to comply with the product instructions may cause operating accidents and damage to the environment, to the Rectifier and to the equipment connected to it, in addition to voiding the warranty.

After reading the user manual, keep it in a place with easy access for the users.

When faced with any other problems that can not be solved with this manual, please contact with our technical service department.

All rights of this sheet reserved to PESS company. This user manual can not be copied or reproduced without permission of PESS company.

SAFETY WARNINGS IN THE MANUAL:

The following safety notices are used in this manual:



DANGER!

Failure to comply with the procedures recommended in this warning may lead to death, serious injuries and considerable material damage.



ATTENTION!

Not following the procedures recommended in this warning may cause material damage.

PRELIMINARY RECOMMENDATIONS:



- 1) Make sure the power is disconnected before installation. (Otherwise, electric shock may cause serious injury or death).
- 2) Always work with the equipment disconnected from the power supply. (Otherwise, electric shocks or short circuits may occur).
- 3) When performing any tests, maintenance or repairs, first disconnect the power supply and then disassemble the equipment.

- 4) Do not install the product, unless you hold a national certification and have received relevant information on the product. (Otherwise, electric shocks or short circuits may occur).
- 5) When in operation, electric energy systems such as transformers, converters, motors and cables generate electromagnetic fields (EMF). Therefore, there is risk for people with pacemakers or implants that stay in close proximity to those systems. Thus, such people must stay at least 2 meters away from those devices.



- 1) Before installation, make sure the used voltage matches the rated voltage.
- 2) When you are installing or testing this product, check the ratings and specifications.
- 3) Do not disassemble the product when it is energized or running.
- 4) Dispose of the product as industrial waste.

1. SAFETY INSTRUCTIONS:

Please start the rectifier by checking the safety and usage instructions in the manual. Please follow all safety and warnings for electrical connections as described below. Installation, commissioning, service and maintenance must be done by technical service personnel or authorized personnel.

1.1 General

- 1) Please carefully review the quantity and material integrity specified in the shipping document. Any defect, damage etc. cases, contact our technical service or your supplier. In case of any defects, damage etc., please contact our technical service or your supplier.
- 2) Do not open the product door without technical service assistant.
- 3) The AC/DC electrolytic capacitors in the rectifier have high voltages that will cause serious injury. This voltage will be discharged after a while (2-3 minutes) after the circuit breakers are turned to the "OFF" position.
- 4) The circuit contains a high voltage battery pack that causes serious injury. Even the circuit breaker must be set to "OFF"; Potentially dangerous voltage is still present at the input terminal of the battery.

1.2 Transportation and Shipping

- 1) Please ship the rectifier in original packing against shock, damage etc. during transportation.
- 2) Please do not forget to take the necessary precautions to prevent damage to the rectifier cabinet during lifting.
- 3) Please move the rectifier in an upright position with respect to the center of gravity. Sideways movement may damage the rectifier due to heavy materials inside.
- 4) Excessive vibration and splash may damage the charger during transportation.
- 5) Please do not move the Charger by pulling or pushing it from its packaging. Always use forklift, crane or pallet truck to transport.
- 6) If the rectifier is to be lifted by crane, use the appropriate distribution bar or lifting strap.

- 7) Never expose the rectifier directly to water, even if it is packaged during shipping.
- 8) Do not bend the rectifier more than +/-10° during transportation, otherwise it may fall and cause injury.
- 9) Do not put other packages on the rectifier package during transportation. Otherwise, the rectifier may be damaged.



Please check capacity of sufficient floor and elevator / crane to avoid causing serious injury in case falling tipping etc.



1.3 Storage

Store the rectifier in a dry place. The environment temperature should be in ideal storage temperature range (-25°C/+55°C).

Optimum storage temperature range for battery is -20°C/+25°C and the battery will be damaged beyond -20°C/+40°C range.

If the rectifier will be stored for a period more than 3 months, then the batteries (over time depending on storage temperature) must be recharged periodically.

1.4 Installation Location

- 1) There may be condensation in the battery charger due to the humidity caused by the temperature difference. In this case, wait 2 hours before installation to adapt the battery charger to the environment.
- 2) Do not keep explosives and materials that may be affected by heat in the same area as the battery charger.
- 3) Objects that may be affected by the magnetic field should be kept at least 1m away from the battery charger.
- 4) The area that battery charger placed should be open and have free space (min 100mm). Do not install the battery charger to the places that receive direct sunlight, next to the radiators, humid/damp areas and close with conductive materials.
- 5) Do not block the ventilation fans and other openings.
- 6) Foreign objects should never be inserted into the battery charger.
- 7) The battery charger must be protected against ingress of water or other liquids.

- 8) The battery charger should be protected from rodents or insects that may enter the battery charging cell.

1.5 Installation



All the connections must be done by the technical personnel. Ground line connection must be done before the other connections.

- ✦ Open the rectifier package carefully and avoid any impact, scratch, breakage, damage etc. that may occur during transportation. Check for conditions.
- ✦ There is no equipment on the rectifier that provides protection against leakage current. For this reason, the technical person or the user should put warning labels on the circuit breakers on the line while working on the rectifier. Warning labels will remind the technical person working on the system to intervene on the line.



MAINTENANCE / EXCAVATION IS DONE ON THIS LINE.

Do not interfere.

- ✦ For safe operation; please use suitable cross-sections for connection proper to rectifier capacity. Thin wires or loose connections will cause dangerous overheating in the cable connection and terminals.
- ✦ Please use original accessories and insulated service tools while doing rectifier connections.

1.6 Battery



Please pay attention to the following warnings when working with batteries. Batteries pose a great risk for electrical shock. Fire or life-threatening may occur due to short circuit, spark etc. during working.

- ✦ Please take off the conductive metal objects such as ring, tag, wristwatch etc. before starting maintenance or replacement processes on the batteries.
- ✦ Please use original accessories and insulated service tools while doing battery connections.
- ✦ Please do not leave the service tools and/or conductive metal objects on the battery.
- ✦ Please do not throw never the batteries in the fire to destroy them. The battery exposed to high temperature may cause serious injury.

- ✦ Please do not pierce the battery casing and do not absolutely open inside the battery. The battery contains toxic gases and electrolytes that are extremely harmful for skin and eyes.
- ✦ Please do not make short circuit the battery negative (-) and positive (+) terminals. Otherwise, the battery may be damaged and there may occur electrical shock or burn in your body due to short circuit.
- ✦ Even the Mains Input MCCB/MCB is “OFF”, the hardware in the rectifier is still connected to the battery and there is still battery total voltage on this hardware. Therefore, the Battery MCCB/MCB should be turned OFF and the connection cables between batteries should be removed before doing any maintenance or replacement for the battery.
- ✦ Please make sure that there is not any voltage on the battery connection terminals before making intervention to the battery. Battery circuit has not been isolated from the input voltage circuit. A voltage that may lead to life threatening, can occur between battery terminals and ground (chassis)
- ✦ The direction of the (-) and (+) terminals in battery connections is important. Reverse connection may damage the rectifier. Please make connections to the related terminals as per labels on the rectifier and wiring diagrams.
- ✦ Please replace the battery with a new with same voltage, capacity and cells number as per the one on the rectifier. Please pay attention to the same battery manufacturer and production time of the new battery.
- ✦ There is life-threatening current and voltage on the battery. Therefore, battery maintenance and replacement should be done by trained technical service personnel.
- ✦ To replace a higher capacity battery, please contact technical service. For this, it is necessary to know the technical details of the rectifier and connection. Operations done without knowledge may damage the rectifier.
- ✦ Please leave space between batteries. There should be a distance of at least 1 cm between the batteries so that they can dissipate their heat and breathe.



Batteries contain toxic substances such as lead- acid etc. If they are not disposed of properly, they are harmful for the environment and human health. Recycling / reuse or hazardous waste process must be carried out as per prescribed by local laws.

2. Commissioning/Operation

2.1 Preliminary Checks

- ✓ Please measure the Mains voltage over the Mains Input MCCB/MCB terminal by an AC voltage measurement device (Phase – Phase voltage for 3 phase rectifier) and check if the voltage is same with “Input Voltage” as written on the rectifier label.
- ✓ Please measure the Mains voltage over the Mains Input Fuse / terminal by a measurement device at Hertz level (Phase – Phase frequency for 3 phase rectifier) and check if the frequency is same with “Input Frequency” as written on the rectifier label.
- ✓ Please measure the ground voltage over the neutral and ground connection terminal with a measurement device at AC voltage level and check it. The neutral to ground voltage should be less than 3VAC. If it is greater than 3VAC, please strengthen the ground line.

Note: Please check the neutral to ground voltage of the installation place for the 3 Phase rectifier without neutral.

2.2 Startup with Mains/Input Voltage

- ✓ Please turn ON Input MCB.
- ✓ After applying the Mains voltage to the rectifier, the rectifier will generate DC bus voltage with help of soft start feature and LCD front panel will be energized.
- ✓ Please turn ON Battery MCCB.

Note: Please check battery charge voltage and current from the LCD front panel.

- ✓ Please turn ON Load MCCB.

Note: Please check output voltage from the LCD front panel.

- ✓ Please check load current from the LCD front panel.

3. GENERAL INFORMATION

The topology of Rectifier / Battery Charger is galvanically-isolated / thyristor-bridge / microprocessor-controlled rectifier.

12 pulse option are available according to the different application requirements. The most important advantage of the 12-pulse rectifier / battery charger is lower input current harmonic (THDi < 10%).

PESS Charger is completely isolated from the input thanks to usage of input isolation transformer and DC current control by hall-effect DC current module. Thus, the surge voltage at the input and even in systems with high-frequency noise, the charger and load are under safety. The standard LC filters at output allows to charger the battery safely.

Thanks to technological innovations, the PESS battery charger presents significant improvement in performance, efficiency, operation and reliability in comparison to conventional rectifiers.

3.1 ABOUT THE MANUAL

This manual briefly describes the operation and technical characteristics of the PESS rectifier / battery charger.

This manual is available for download at PESS website: www.pess-energy.com.

3.2 TERMS AND DEFINITIONS USED IN THE MANUAL

V:	Volts.
Amp, A:	Ampere.
mA:	Milliampere = 0.001 ampere.
Hz:	Hertz.
AC:	Alternating current.
DC:	Direct current.
Rms:	Root mean square; effective value.
mm:	Millimeter.
cm:	Centimeter.
m:	Meter.
kg:	Kilogram = 1000 grams.
°C:	Degrees Celsius.
°F:	Fahrenheit degree.
min:	Minute.

4. TECHNICAL SPECIFICATIONS:

AC INPUT:

Power Supply	110/220/240/380/400/415/440 VAC +/- 15 %
Frequency	50 Hz +/- 5 % or 60 Hz +/- 5 % (or special)
Power Supply System	Single phase 2-pulse or Three-phase 6-pulse / 12-pulse thyristor rectifier
Power Factor	>0,75 (2-pulse), > 0.85 (6-pulse), > 0.95 (12-pulse) at full-load
Protection/Disconnection	Circuit breaker (MCB or MCCB)

RECTIFIER OUTPUT for 110VDC /60A SYSTEM (scale for others 24VDC/48VDC/220VDC/360VDC & 0-600A):

Voltage in Float	122 V (Adjustable, 110V-150V)
Thermal Compensation	0.36 V / 1 °C, above and below 25 °C
Ripple	≤ 1 % without battery
Dynamic Regulation	< 150 ms @ ±10 % overshoot with load step from 20 % to 100 % In
Voltage in Boost	128 V (Adjustable, 110V-150V)
Voltage in Equalize	133 V (Adjustable, 110V-150V)
Low Battery Voltage	96.5 V (Adjustable, 0V-150V)

LOAD OUTPUT for 110 VDC / 60A SYSTEM (scale for others 24VDC/48VDC/220VDC/360VDC & 0-600A):

Rated Voltage	122 V (optional diode dropper or DC/DC converter)
Rated Current	60 A
Output Current Limit	Adjustable between 5 % to 100 % of In
Static Regulation	≤ ±1 % for variations from 10 % to 100 % In
Dynamic Regulation	< 150 ms (Three phase) & < 300 ms (single phase) @ ±10 % overshoot with load step from 20 % to 100 % In
Ripple	< 1 % (without battery)
Efficiency	85-95% depends on ratings
Insulation	> 5 Mega Ohms
Paralel Working	Active load sharing with true wiring, using wireless voltage drop algorithm

OPERATING CONDITIONS:

Operating Duty	Continuous
Electrical Standards	IEC 60146-1-1 / EN 50091 -1 (Security) / EN 50091 -2 (EMC)
Electrical Isolation	1500VAC input/chassis and output/chassis
Temperature Range	-10 °C to 40 °C (14 °F to 104 °F)
Relative humidity	0 to 95% non-condensing
Altitude	Up to 1000 m above sea level
Ventilation	Forced with fan
Noise Level	> 60 dB

PROTECTIONS:

Circuit breaker	AC input, battery output, load output
Current Limitations	Battery charge current, Rectifier output current
Filters	Against AC surges (Varistors), AC reactive power filter

FRONT USER PANEL:

Measured Values on 4x20 LCD	Output Voltage / Current, Battery Voltage / Current and Line Voltages / Line Currents / Frequency / Internal Temperature / Battery Room Temperature (if preferred)
LED Indicators	Float mode, Boost mode, Current mode, Battery ending, Low battery, Battery test failure, Line failure, Fan failure, Over voltage, Under voltage, Over temperature, Rectifier failure, Line / Load / Battery MCB, Power supply ok, No critical indications (thick led), Common failure (red led)
Adjustable parameters	Float charge voltage, Boost charge voltage, Equalize charge voltage, Low battery voltage, Auto & Manual battery test selection, Battery test duration and current parameters, Charger output current, Battery charge current, Auto & Manual boost selection, Manual boost time, LED test, Rectifier ON-OFF, Time & Date settings, Event history readings last 1000 events

REMOTE COMMUNICATION

Default	-RS485 interface with Modbus-RTU protocol, -NO and NC dry contacts with capacity of 2 A at 250 Vac x8, Each dry contact can be addressed to any led indications or common of any four led indications through PC HMI
Optional	RS485 interface with Modbus TCP/IP protocol SNMP version1, DNP3 class2, IEC61850

5. CONTROL PANEL:

The control panel contains:

- LED-backlight LCD with 4 lines x 20 columns.
- 6 Buttons to navigate LCD menus.
- 24 Indication LED to get any status, critical or failure information of system.

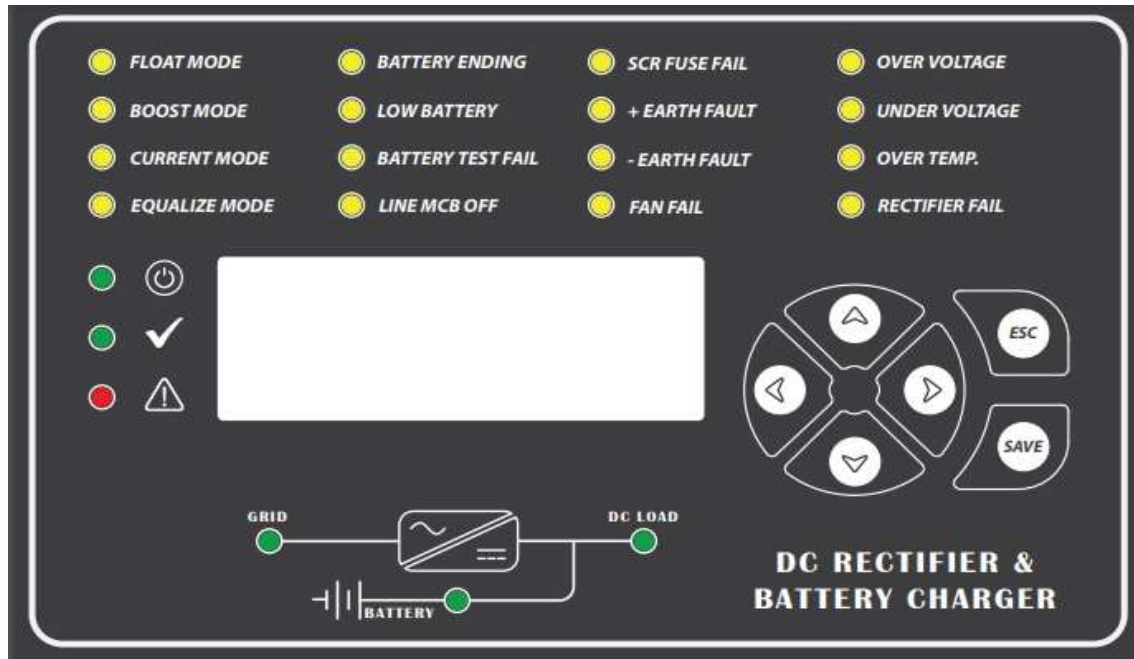
























Figure 5.1. The control panel of battery charger.

Easy to navigate between LCD menus, and easy to set any values thanks to 6 button Navigation-Bar. Section 5.2 describes how to

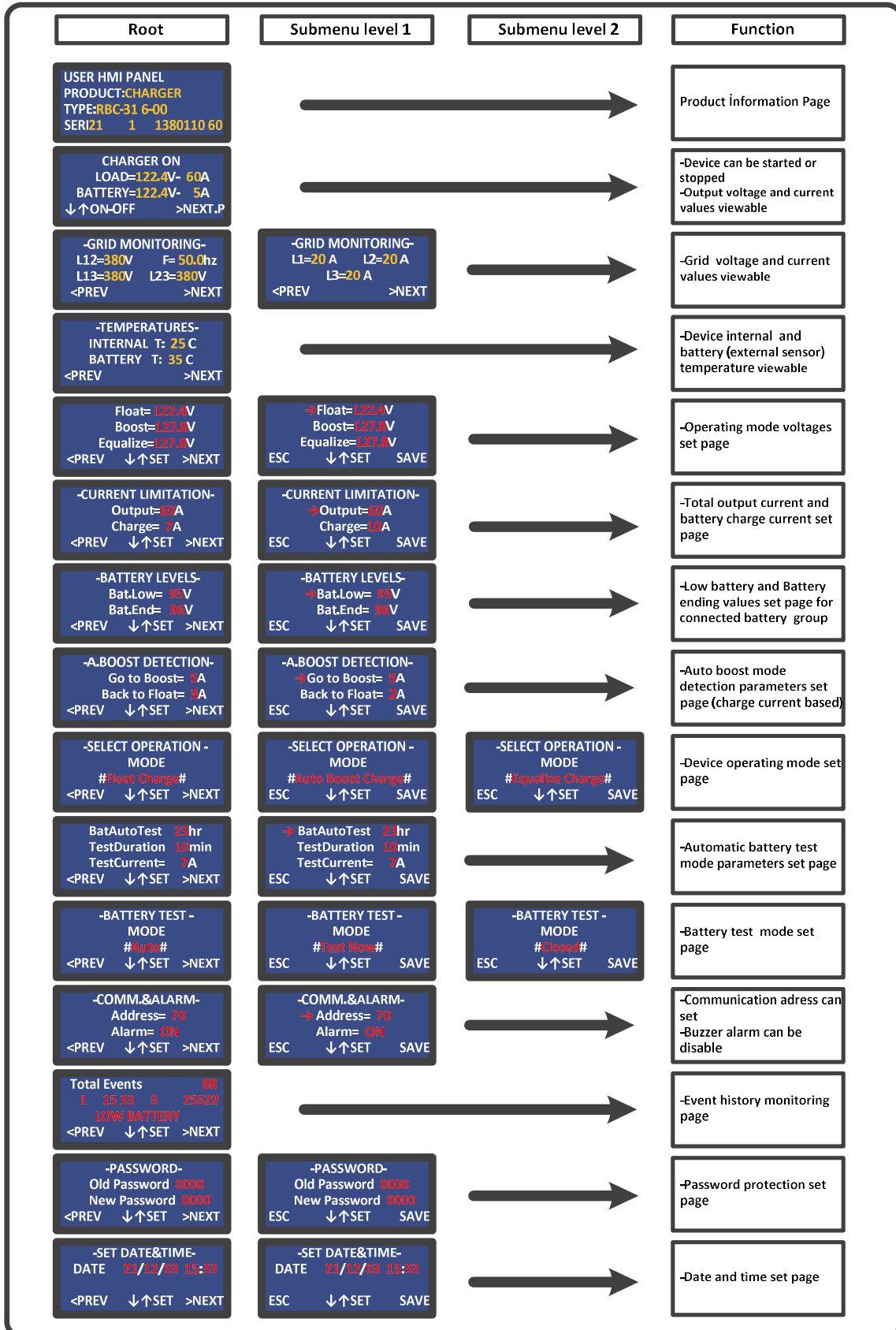
5.1 Indication LEDs:

The LEDs on the control panel warn the operator of the current state of the equipment as follows:

LED	NORMAL STATE	INDICATION
	ON	If supply of electronic circuits is acceptable.
	ON	If there is no critical alarm and system works properly.
	OFF	If there is a critical failure and system shut down.
 DC LOAD	ON	Provide information about the position of the Load MCB.
 GRID	ON	If the Grid Voltage is in the input voltage tolerance limit of the system.
 BATTERY	ON	Provide information about the position of the Battery MCB.
 FLOAT MODE	ON	The rectifier output voltage will be equal to the adjusted (through front panel) FLOAT V value in this mode.
 BOOST MODE	OFF	The rectifier output voltage will be equal to the adjusted (through front panel) BOOST V value in this mode.
 CURRENT MODE	OFF	either the battery charging current or the total output current has reached to its adjusted (through front panel) maximum value.
 EQUALIZE MODE	OFF	The rectifier output voltage will be equal to the adjusted (through front panel) EQUALIZE V value in this mode.
 BATTERY ENDING	OFF	If the battery voltage is lower than the adjusted (through front panel) "Battery Ending" value.
 LOW BATTERY	OFF	If the battery voltage decreases to the adjusted (through front panel) "Low Battery".
 BATTERY TEST FAIL	OFF	The battery capacity can be tested by battery test feature and if the test fails.
 LINE MCB OFF	OFF	Provide information about the position of the Line MCB. If the Line MCB is "OFF".
 SCR FUSE FAIL	OFF	If any of the SCR Fuses for protecting thyristors is open circuit.
 + EARTH FAULT	OFF	If there is (+) earth fault from DC bus to ground.
 - EARTH FAULT	OFF	If there is (-) earth fault from DC bus to ground.
 FAN FAIL	OFF	If the thyristor cooler temperature exceeds 70 degrees due to fan failure and system is going to shut down.
 OVER VOLTAGE	OFF	If the Output Voltage increases above 10% of the adjusted value due to any reason and system is going to shut down.
 UNDER VOLTAGE	OFF	If the Output Voltage decreases below 10% of the adjusted value due to any reason and system is going to shut down.
 OVER TEMP.	OFF	If the thyristor cooler temperature exceeds 70 degrees, after 1,5 minutes system is going to shut down.
 RECTIFIER FAIL	OFF	If there is a problem with rectifier and system is going to shut down.

5.2 LCD MENUS:

Lettering	
Text in white font	Fixed text
Text in yellow font	Dynamic text
Text in red font	Values that can be modified by navigation keys



6. Event Logger & Event Codes:

Events recorded in the memory can be monitored from “Event History Monitoring Page of LCD” up to 1000 events are recorded. There is total 41 event codes. All events can be viewed by using UP-DOWN buttons. Event code format is shown as:

“Event no : Event code : Event Value : Day : Month : Hour : Minute : Second”

The all-recorded event can be deleted by pressing ESC & SAVE buttons in the same time, and the rectifier will reset to factory settings. Description of event codes is given in the following table.

Level	Code	Event Description	Event Value
Critical	1	Earth Leakage (+)	1
Critical	2	Earth Leakage (-)	1
Normal	3	Earth OK	0
Normal	4	Line circuit breaker closed	0
Critical	5	Line circuit breaker open	1
Normal	6	Battery circuit breaker closed	0
Critical	7	Battery circuit breaker open	1
Normal	8	Load circuit breaker closed	0
Critical	9	Load circuit breaker open	1
Critical	10	Line out of limits	Vline/2
Normal	11	Line normal	Vline/2
Critical	12	Battery level low	Vdc/2
Normal	13	Battery level OK	Vdc/2
Critical	14	DC over voltage	Vdc/2
Normal	15	Rectifier output OK	Vdc/2
Critical	16	DC under voltage	Vdc/2
Normal	17	Rectifier output OK	Vdc/2
Critical	18	Overtemperature	1
Normal	19	Temperature normal	0
Critical	20	Battery level end	Vdc/2
Normal	21	Battery level OK	Vdc/2
Critical	22	SCR fuse tripped	1
Normal	23	SCR fuse OK	0
Critical	24	Boost inhibit activated	1
Normal	25	Boost inhibit deactivated	0
Critical	26	Fan failure	1
Normal	27	Fan OK	0
Critical	28	Rectifier failure	1
Normal	29	Rectifier output OK	0
Normal	30	Manuel boost started	1
Normal	31	Auto boost started	1
Normal	32	Battery test started	1
Critical	33	Battery test failure	1
Normal	34	Battery test OK	0
Normal	35	Battery test skipped	0
Normal	36	Auto boost end	0
Normal	37	Manual boost end	0
Normal	38	Boost skipped	0
Normal	40	Rectifier turned ON	0
Normal	41	Rectifier turned OFF	1

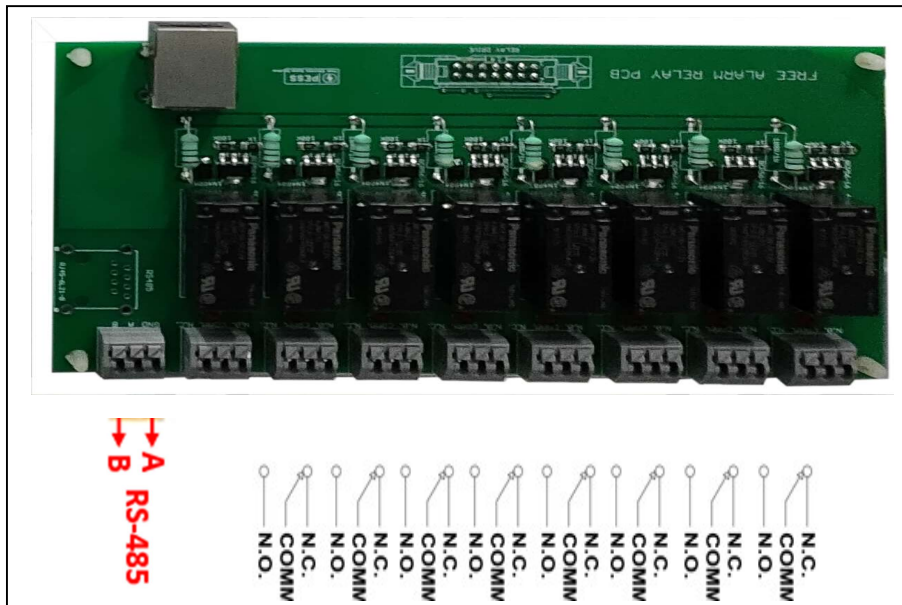
7. RELAY PCB & DRY CONTACTS:

Product has a relay-PCB that is including 8 relays output terminals and RS485 communication output terminal. There are 8 units free alarm contacts with automation type products. The warning LEDs' situations, that are on the communication PCB, LCD panel and communication interface, can be monitored via these free contacts. Each free contact has two outputs; one is normally open, other is normally closed. Each free contact can be programmed to any LED indication on front LCD panel or common of any three LEDs through communication interface via Modbus-RS485. Technical data's, default relay alarms and relay PCB layout are shown below.

TECHNICAL FEATURES OF FREE ALARM CONTACT

Nominal Switching Capacity (Resistive Load)	10A/250VAC, 10A/30VDC
Max. Switching Power (Resistive load)	2.500VA, 300W
Max. Switching Voltage	250VAC, 30VDC
Max. Switching Current	10A

Relay1	Circuit breakers open. (AC input, battery or load)
Relay2	Line failure or out of acceptable limits.
Relay3	Low battery
Relay4	Current limitation
Relay5	Earth leakage + or -
Relay6	Ventilation fault (Fan failure), overtemperature
Relay7	Rectifier failure, DC over voltage
Relay8	Thick LED off (there is a critical alarm)



8. Remote Communication:

Users can access to all information related to the product via serial communication. All measurements, indications, alarms and the status of the product at that moment can be monitored. Since the communication system is interactive, the user can turn OFF / ON the product and make adjustments.

The product can communicate with computers or SCADA systems over RS-485 through Modbus protocol. Using PESS protocol converter; product can communicate over TCP/IP through Modbus-TCP, SNMP, DNP3 or IEC61850 protocol.

RS-485 cable length and quality will affect the communication quality. Please consider the following notes regarding the wiring to ensure quality communication.

- Cross-section: min. 2 x 0.22 mm² or min. 2 x AWG 2
- CAT 5 (shielded)
- Twisted-pair
- UV resistant (only for outdoor use)

To perform the communication between the computer and the product, you need to make the connection as noted above. The user can use RS-485/USB converter for devices without RS-485 port such as laptops.

To Communicate product over RS485, TCP, SNMP or DNP3 with user defined program, users should reference the Modbus list that shown below.

8.1 Modbus list:

DATA ADDRESS	READABLE / WRITABLE	DATA	COEFF.	DEFINITION
0x00	R / WR	set_V_FLOAT	10x	battery float charge voltage
0x01	R / WR	set_V_BOOST	10x	battery float charge voltage
0x02	R / WR	set_V_LOWBAT	10x	low battery voltage level
0x03	R / WR	set_EQ_BOOST	10x	battery equalize boost charge voltage
0x04	R / WR	set_END_BATTERY_LEVEL	10x	battery ending voltage level
0x05	R / WR	set_I_FLOAT	10x	return to float from auto boost current level
0x06	R / WR	set_I_BOOST	10x	current level to go auto boost
0x07	R / WR	set_I_BAT	10x	battery current limit
0x08	R / WR	set_I_OUT	10x	rectifier output current limit
0x09	R / WR	set_MODE_SWITCH (1,2,3,4,5)	1x	1=auto boost, 2=float, 3>manual, 4=equalize, 5=slave
0x0a	R / WR	set_MAN_BOOST_TIME_HR	10x	manual boost duration in hours
0x0b	R / WR	set_BAT_TEST_SWITCH (1,2,3)	1x	batt. test condition 1=auto, 2=closed,3>manual
0x0c	R / WR	set_DISCHARGE CURRENT	1x	discharge current during battery test
0x0d	R / WR	set_AUTO_BAT_TEST_TIME_HR	x10	auto battery test period in hours
0x0e	R / WR	set_DISCHARGE TIME MINUTE	1x	min. discharge time in hours during battery test
0x0f	R / WR	set_RECTIFIER (ON / OFF) (0-1)	1x	rectifier on/off switch 0=off, 1=on
0x10	R / WR	set_EVENT NUMBER	1x	reading event number from event history
0x11	R / WR		10x	
0x12	R / WR		10x	
0x13	R / WR			
0x14	R / WR	set_DAY / DATE	1x	day of DATE
0x15	R / WR	set_MONTH / DATE	1x	month of DATE
0x16	R / WR	set_YEAR / DATE	1x	year of DATE

0x17	R / WR	set_HOUR / DATE	1x	hour of TIME
0x18	R / WR	set_MINUTE / DATE	1x	minute of TIME
0x19	R	FREQ.	10x	line frequency
0x1a	R	V_LINE1	10x	line voltage 1
0x1b	R	V_LINE2	10x	line voltage 2
0x1c	R	V_LINE3	10x	line voltage 3
0x1d	R	I_LINE1	10x	line current 1
0x1e	R	I_LINE2	10x	line current 2
0x1f	R	I_LINE3	10x	line current 3
0x20	R	V_BAT	10x	battery output voltage
0x21	R	I_BAT (signed int16)	10x	battery output current (signed int16)
0x22	R	V_LOAD	10x	load output voltage
0x23	R	I_LOAD	10x	load output current
0x24	R	d	1x	
0x25	R	RELAY OUTPUTS	1x	programmed 8 dry contacts positions
0x26	R	LED_high16	1x	MONITORING LEDES BIT_0= Rectifier operation fail BIT_1= There is no critical alarm BIT_2= Power supply is ok BIT_3= Charger in equalize mode BIT_4= Charger in current mode BIT_5= Charger in boost mode BIT_6= Charger in float mode BIT_7= Line is out of limit BIT_8= No data BIT_9= No data BIT_10= No data BIT_11= No data BIT_12= No data BIT_13= No data BIT_14= No data BIT_15= No data
0x27	R	LEDS_low16	1x	MONITORING LEDES BIT_0= Battery circuit breaker open BIT_1= Load circuit breaker open BIT_2= No data BIT_3= No data BIT_4= Line circuit breaker open BIT_5= Battery test fail BIT_6= Low battery BIT_7= Battery ending BIT_8= Fan failure BIT_9= Earth Leakage (+) BIT_10= Earth Leakage (-) BIT_11= No data BIT_12= Common Failure BIT_13= Over temperature BIT_14= Rectifier output under voltage BIT_15= Rectifier output over voltage
0x28	R	Internal Temperature	10x	Internal Temperature degree in celsius
0x29				
0x2a				
0x2b				
0x2c				
0x2d				
0x2e				
0x2f				
0x30				
0x31				
0x32	R	TOTAL EVENT NUMBER	1x	event history total event number
0x33	R	EVENT NUMBER to READ	1x	reading event number from event

				history
0x34	R	EVENT CODE of EVENT	1x	event code, check from event code table
0x35	R	EVENT VALUE of EVENT	1x	event value, check from event code table
0x36	R	DAY of EVENT	1x	reading event's DAY
0x37	R	MONTH of EVENT	1x	reading event's MONTH
0x38	R	HOUR of EVENT	1x	reading event's HOUR
0x39	R	MINUTE of EVENT	1x	reading event's MINUTE
0x3a	R	SECOND of EVENT	1x	reading event's SECOND
0x3b				
0x3c	R / WR	set_Vac_parameter	10x	Line voltage calibration parameter
0x3d	R / WR	set_lac_parameter	10x	Line current calibration parameter
0x3e	R / WR	set_Vdc_parameter	10x	DC voltage calibration parameter
0x3f	R / WR	set_T_parameter	10x	Internal temperature calibration parameter
0x40				
0x41				
0x42				
0x43				
0x44				
0x45				
0x46	R / WR	set_Relay1_high16	1x	dry contact selection code upper word
0x47	R / WR	set_Relay1_low16	1x	dry contact selection code lower word
0x48	R / WR	set_Relay2_high16	1x	dry contact selection code upper word
0x49	R / WR	set_Relay2_low16	1x	dry contact selection code lower word
0x4a	R / WR	set_Relay3_high16	1x	dry contact selection code upper word
0x4b	R / WR	set_Relay3_low16	1x	dry contact selection code lower word
0x4c	R / WR	set_Relay4_high16	1x	dry contact selection code upper word
0x4d	R / WR	set_Relay4_low16	1x	dry contact selection code lower word
0x4e	R / WR	set_Relay5_high16	1x	dry contact selection code upper word
0x4f	R / WR	set_Relay5_low16	1x	dry contact selection code lower word
0x50	R / WR	set_Relay6_high16	1x	dry contact selection code upper word
0x51	R / WR	set_Relay6_low16	1x	dry contact selection code lower word
0x52	R / WR	set_Relay7_high16	1x	dry contact selection code upper word
0x53	R / WR	set_Relay7_low16	1x	dry contact selection code lower word
0x54	R / WR	set_Relay8_high16	1x	dry contact selection code upper word
0x55	R / WR	set_Relay8_low16	1x	dry contact selection code lower word

8.2 Relay Programming through communication:

Each of Relay contacts can be programmed as to give alarm any LED(0x26,0x27) indication or any common of three LEDs indication.

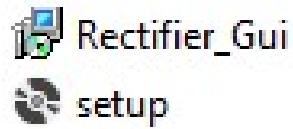
For example; if Relay1 programmed as binary "0000 0000 0000 0000 0000 0000 0001 0011", it means that LEDs binary "0000 0000 0000 0000 0000 0000 0001 0011" bit0, bit1 and bit4 of LEDs will attached to give alarm in Relay1 commonly. So that, bit0=Battery MCB, bit1=Load MCB and bit4=Line MCB will attached to give alarm in Relay1 commonly.

For example; if Relay2 programmed as binary "0000 0000 1000 0000 0000 0000 0000 0000", it means that LEDs binary "0000 0000 1000 0000 0000 0000 0000 0000" bit23 of LEDs will attached to give alarm in Relay2 commonly. So that, bit23=Line is out of limit will attached to give alarm in Relay2.

8.3 HMI SETUP INSTALLATION STEPS:

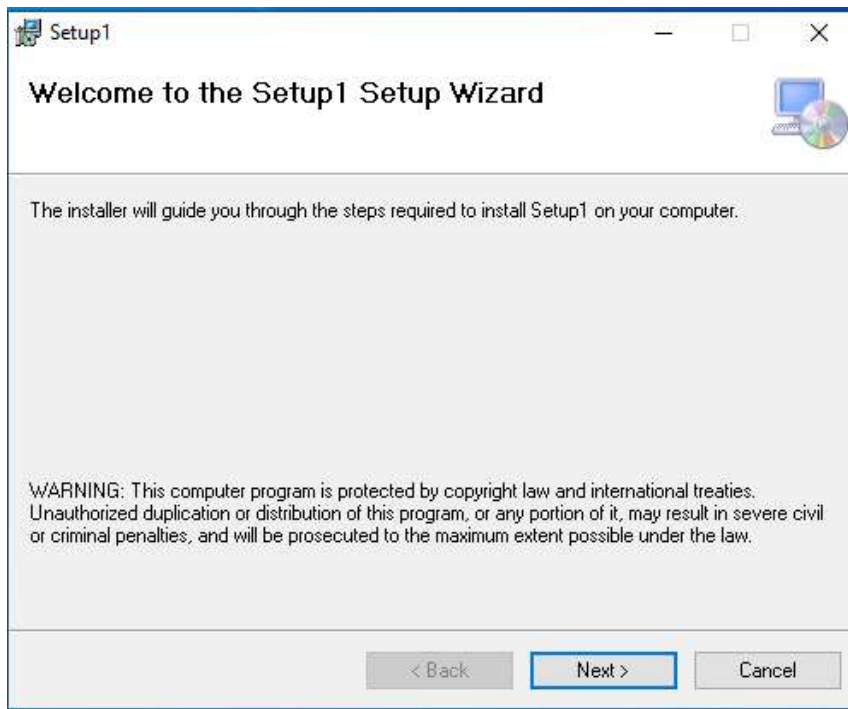
- Download suitable software from this web page to the computer.

<https://www.pess-energy.com/downloads>

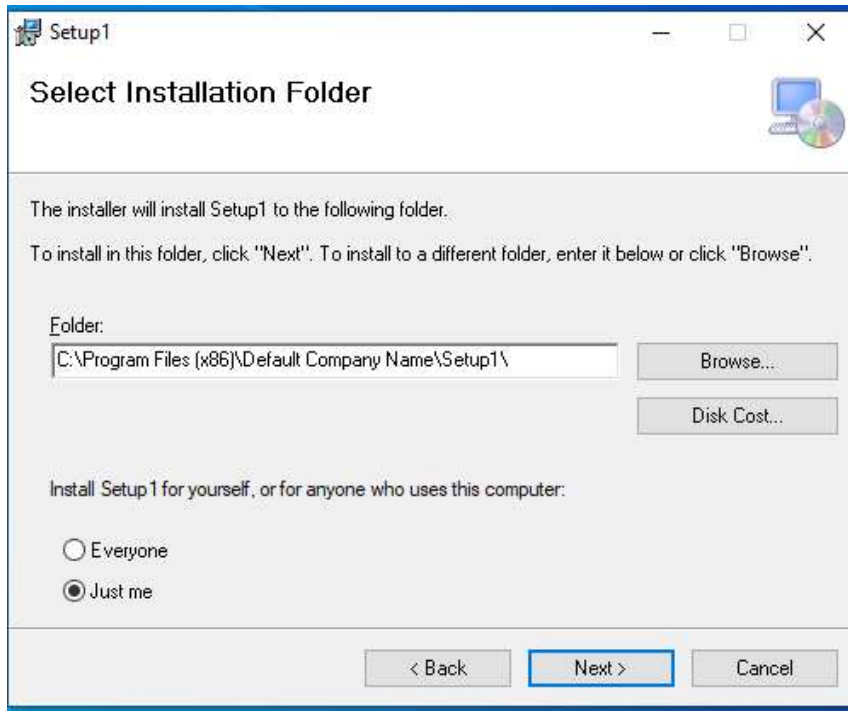


Open the “Setup” application file located in the Setup folder.

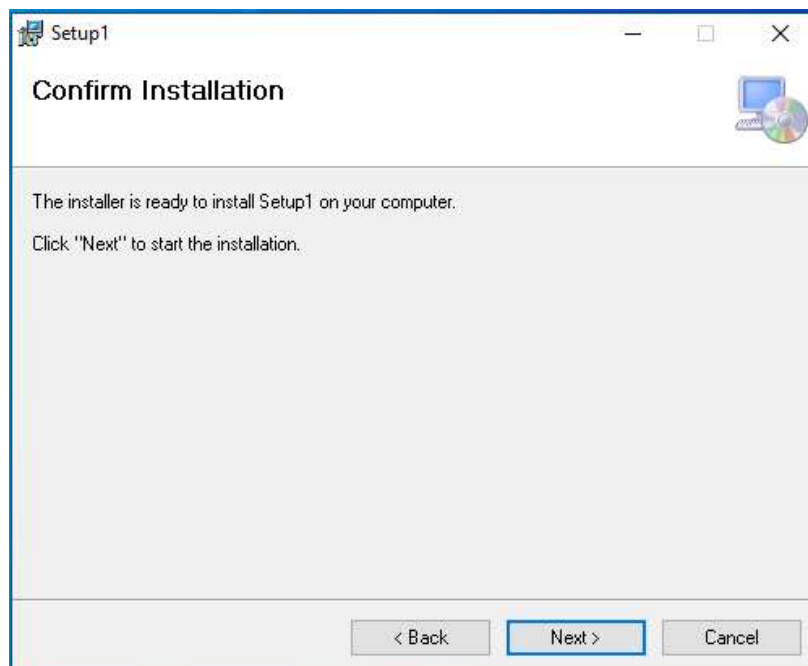
- After the installation menu is opened, you will see the menu shown in the figure below.



- click forward to proceed



- click forward to proceed

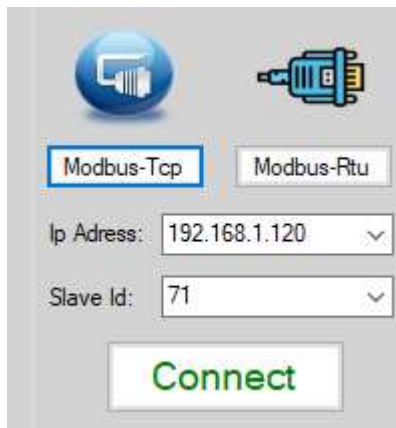


- Clicking next on this screen will start the installation. Also Say yes to the warning on the screen



Thus, our Rectifier Gui program will be installed on the desktop.

8.4 PC HMI Software



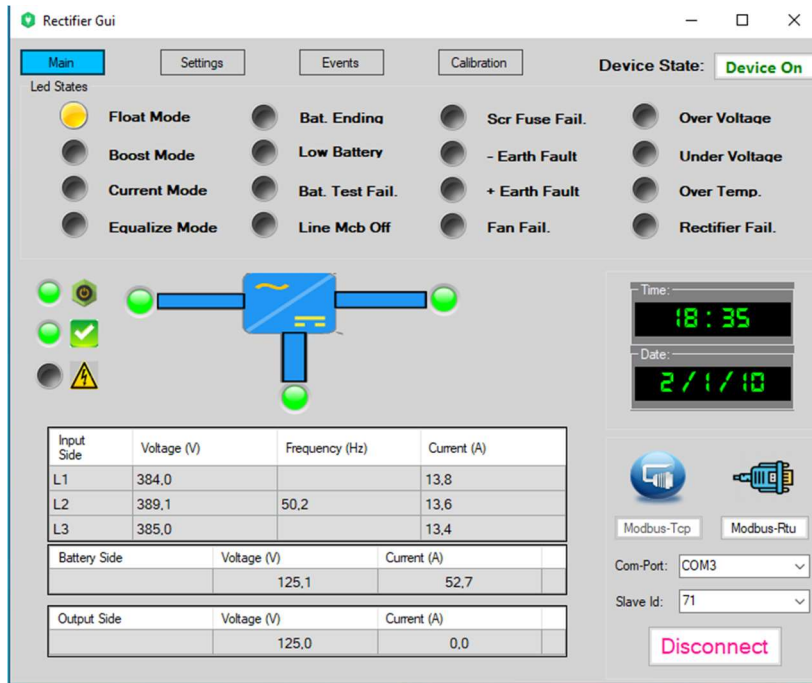
The following figure shows the initial protocol selection screen of the interface. One of the Modbus TCP or Modbus RTU options is selected from this menu. Then the communication slave number is entered by selecting the IP address or com-port. (71 for Rectifiers, 33 for Inverters as standart) For the Com Port value; please check Device Manager \ Connection Ports (COM & LPT) on your computer. For TCP/IP, DNP3 and SNMP type communication; please enter the slave ID value that is defined in the front panel of the product and the IP value assigned to your converter. For TCP/IP, DNP3 and SNMP type communication; please enter the slave ID value that is defined in the front panel of the product and the IP value assigned to your converter.

The rectifier interface consists of 4 main parts. These are "main", generally device diagram, Led information, Input, Output Voltage and currents, Frequency values. "Settings", in this menu, there are settings for the rectifier. "Device Events", this section contains the error states of the device. In the "Calibration" section, Input Ac voltage, current, Dc voltage, and Heat calibrations of the device are made and relay selections are made at the same time.

These sections;

Main Menu:

In this menu, device LED information, voltage, current and frequency information, device operation information, Error control LEDs and device time and date information are included.



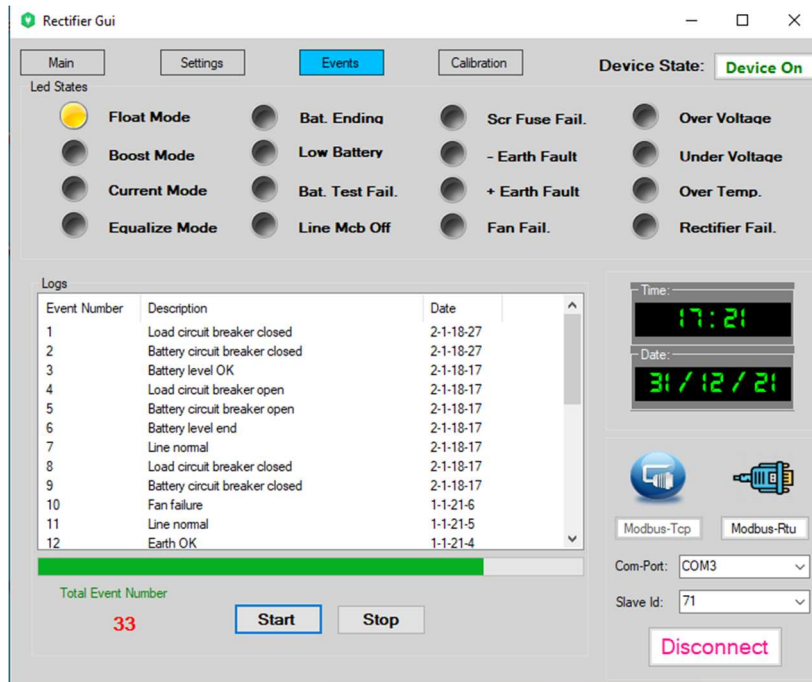
Settings Menu:

In this menu, many settings such as voltage, current, low battery, battery test functions, relay settings, time and date settings are made. At the same time, the LED information of the 8-relay card is displayed.



Events Menu:

In this menu, error information of the device can be obtained. At the same time, this information read can be saved to the computer as a text file or to a desired disk.



Calibration Menu:

This menu is the menu where calibration adjustments are made. Voltage, current and temperature calibrations are made in this menu. Relay adjustments are made. The program is compatible with Windows 10, 7 and XP. The PC connection is done via USB port through RS485 protocols or via ETHERNET-TCP port through TCP/IP protocols.

