ASC 3000 MutliMax stabilized rectifiers suitable for three-phase 4-wire connection are designed as microprocessor control and large graphic LCD to provide the DC supply needed in electrical networks, telephone exchanges and similar places, to keep the battery system connected to the circuit under full charge.

• Leakage (+, -) Alarm • High
and Low Temperature • DC
Output Voltage High and Low • AC Input Voltage
High and Low • L1, L2, L3 Phase Monitoring •
Overload • Current Limiting

• Battery Error

• Battery Disconnect

• Change Clock Battery

Specified signals can be followed by Graphic LCD screen or LEDs
and also transferred to SCADA.

Thanks to the LC filter at the output of the thyristor controlled rectifier, the ripple factor is less than 5%, so a smooth and high quality DC voltage is obtained at the output. In addition, the output voltages are not affected by the mains and load current changes, providing a complete stabilization in the output voltage.

Output currents of ASC 3000 series rectifiers can be produced in the range of 5A – 600A and accumulators of any capacity can be connected.

110VDC rectifiers can be adjusted within the range of 105-129V with 1V sensitivity.
48VDC rectifiers can be adjusted within the 48-58V range with 1V sensitivity.
24VDC rectifiers can be adjusted within the range of 22-29V with 1V precision.

Key Features

• Easy-to-Use Interface • Scada
Communication Modbus (RS232/ RS485) • Event Log (20 FIFO) •
SCR Based Microprocessor, Large Graphic LCD Control Panel •
Low Ripple Voltage • Automatic Battery Maintenance

•   Stable Output Voltage •
Automatic / Manual Fast Charge Modes

Output Current (A) – Output Voltage (Vdc)			
	24Vdc	**48Vdc**	**110Vdc**
	10A – 600A		
	Cabin Dimensions May Vary According to Rectifier Output Current		

Rectifier Technical Specifications	
Input Voltage	3 x 380 VAC ± 20%
Power Factor	0.7
Operating Frequency	50 Hz ± 5%
Rated Output Voltage	24 – 48 – 110 – 220 VDC (must be specified in order)
Rated Output Current	10A – 600A (must be specified in order)
Normal Charge Voltage Setting	90% -120%
Voltage Regulation	< 2.0%
Ripple Stretched	Battery < 5.0% / Battery < 1.0%
Current Limiting	110% In
Dielectric Withstand Voltage	2 kV
Productivity	80%
Operating temperature	-20ÿC / +55ÿC
Noise Level	< 45db

Cabin Features	
Dimensions	600 x 600 x 1000 (mm) May Vary According to Charge Current and Battery Capacity
Protection Class	IP22 – Optional IP54
Colour	RAL 7035
Outer Case	Main Body 2mm DKP Sheet
Weight	It May Vary According to 135kg Charging Current
Cooling	Air Duct / Natural Circulation Forced Fan
Shipping Type	With Hook and Crawler

Usage and Menu Descriptions
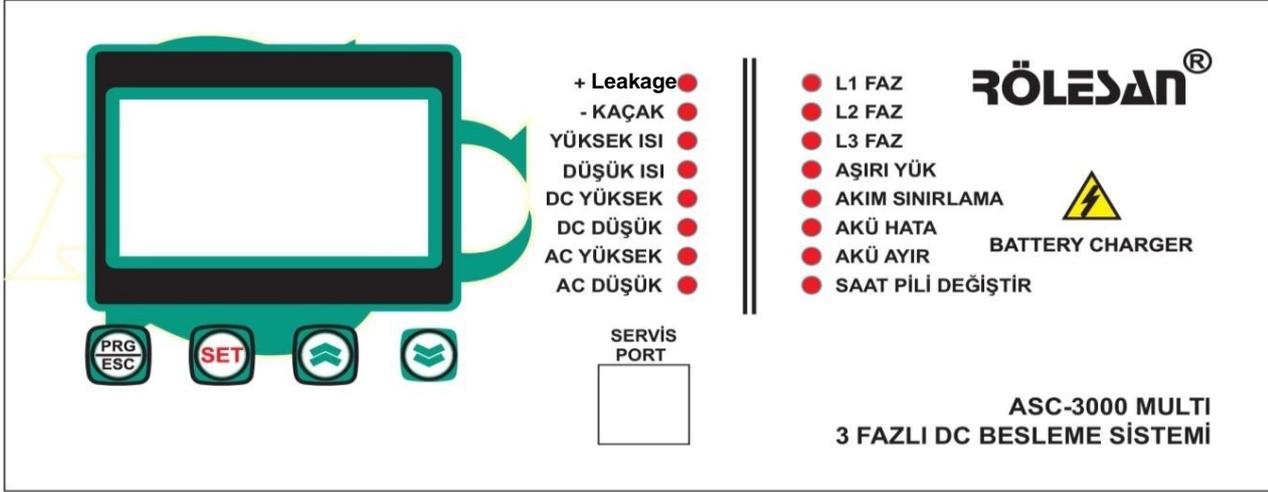
Notification LEDs

+ Leakage : In case of any contact between (+) polarity-ground in DC supply, the LED becomes active.

- Leakage : In case of any contact between (-) polarity-ground in DC supply, the LED becomes active.

High Temperature: When the internal temperature of the rectifier reaches the heat value in the settings, the LED becomes active.

Low : When the internal temperature of the rectifier reaches the factory-set (5 oC) value, the LED becomes active.

Temperature DC High : When the output of the rectifier reaches the DC High value in the settings, the LED becomes active.

DC Low : When the output of the rectifier reaches the DC Low value in the settings, the LED becomes active.

AC High : When the rectifier reaches the AC High value in the settings, the LED becomes active.

AC Low : When the system output reaches the AC Low value in the settings, the LED becomes active.

L1 Phase : When there is AC supply in the first phase of the rectifier, the LED is active.

L2 Phase : The LED is active when there is AC supply in the second phase of the rectifier.

L3 Phase : When there is AC supply in the third phase of the rectifier, the LED is active.

Overload: When the DC output on the rectifier exceeds the total current value, the LED becomes active.

In addition, when any phase is gone, the total current value decreases to the total current value of the two transformers. For example; There are 3 20A transformers on the rectifier. While there is L1,L2,L3 phase, 60A can be drawn from the device. When either or both of the L1, L2 or L3 phases are gone, the working transformer current can be drawn from the rectifier. For example, 40A when L1 phase is gone, 20A when L1,L3 is gone.

Current Limiting: When the battery output on the rectifier reaches the battery charging current value in the settings section, the led becomes active and the rectifier starts to work in current limiting mode.

Battery Fault: If E is selected in the Battery Fault E/H section in the rectifier setup menu, the battery voltages are If it falls below the DC voltage set in the alarm section, the LED becomes active.

Controlled : It is an optional feature of the rectifier. Battery Disconnect E/N and Deep Discharge (V) in Settings by **Battery Disconnect .**

Change Clock Battery: There is RTC on the rectifier. When the device is de-energized, the RTC works with the battery it is connected to. When the voltage of the battery drops below the factory set value, the LED becomes active.

Buttons

PRG/ESC Button : It is used to enter the setting menu of the rectifier and exit the communication, event records, clock settings and warning section.

SET Button : It is used to change the value by pressing the up or down buttons together with the set button, if any change is desired in the setting menu of the rectifier.

Up Button : It is used for page transitions of the rectifier, navigating the event logs and changing the values in the setting section.

It is used to change : Rectifier's page transitions, navigating event logs and values in setting section the **Down Button .**

3

Rectifier Connection
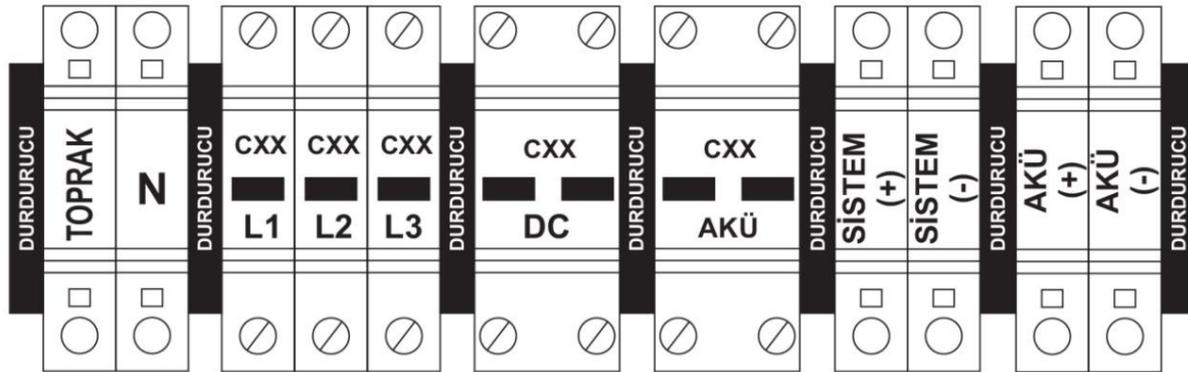
Rectifier is designed as 3 Phase, 4 Wire.

Neutral terminal and L1, L2 and L3 phase fuses must be connected to 3 x 380 VAC + N.

DC Output Fuse is connected to terminals with System (+) and System (-) signs.
Kiosk lighting, feeding of protection relays, etc. connections can be made via this terminal group.

Battery Output Fuse is connected to the terminal group with Battery (+) and Battery (-) signs.
You can make battery connections on this terminal.

Phase connections must be attached to the connection points located at the bottom of the fuses. Battery cables, on the other hand, must be connected to the Battery (+) and Battery (-) terminals, taking into account the (+) and (-) ends.

After these connections are made, measurements should be taken again with the help of a multimeter. There should be a voltage between 220VAC~240VaC between LN and 380VAC~400vAc between LL. A measurement should be made over the battery terminals, taking into account their (+) and (-) terminals, from the two connection points immediately afterwards, labeled BATTERY and a correct connection should be confirmed.

After these processes, L1, L2, L3 phases can be opened. There are 3 fuses on the rack panel for safety purposes. Each of these fuses controls the phases written next to them. After the fuses in the connection point are activated, these fuses must be activated.

When the device reaches the nominal output voltage, the battery fuse is activated and the battery charging process can be started. If the voltages are at normal level, DC line can be fed by activating the DC output fuse.

Rectifier Screenshots

| Çıkış Gerilimi (V) | VO | 121 | VA | 224 | L1 Faz Gerilimi (V) |

Çıkış Gerilimi (V) → VO 121 — VA 224 ← L1 Faz Gerilimi (V)

VB 225 ← L2 Faz Gerilimi (V)

Akü Akımı (A) → I AKU 01.5 — VC 228 ← L3 Faz Gerilimi (V)

Çıkış Akımı (A) → I OUT 08.9 — ISI 31.8 ← Redresör İç Sıcaklığı (C)

Hata Bildirimi → MESAJ VAR | NORMAL SARJ ← Akü Şarj Modu

Akü Doluluk Yüzdesi → %99 | 10:12 ← Saat ve Dakika Değerleri

This is the screenshot that comes when the rectifier is first turned on. No changes can be made to the values on this screen. They are informational values for users.

Çıkış Gerilimi (V) → VO 121 — VAB 385 ← Faz-Faz Gerilimi (V)

VBC 390 ← Faz-Faz Gerilimi (V)

Akü Akımı (A) → I AKU 00.5 — VCA 381 ← Faz-Faz Gerilimi (V)

Çıkış Akımı (A) → I OUT 00.5 — IA 01.2 ← L1 Faz Akımı (A)

IB 01.1 ← L2 Faz Akımı (A)

Frekans (Hz) → A HZ 50.0 | B HZ 50.0 | C HZ 50.0 — IC 01.5 ← L3 Faz Akımı (A)

Another screenshot for informational purposes for users. No changes can be made to the values on this screen.

RS232/RS485 AYARLARI	
BAUD RATE	38400
PARITY	N
DATA BIT	8
STOP BIT	1
MODBUS ID	1

This is the screen display of the rectifier RS232/RS485 communication setting. Only Baud Rate and Modbus ID values can be changed in the setting menu. When you want to make changes, press the set button while this page is open. Immediately after pressing, a phrase will appear on the right of the first line. The value can be changed with the up and down keys. In order to move on to the next statement, the set button must be pressed again. The setting menu can be exited by pressing the PRG/ESC button.

BaudRate: 19200-38400
Modbus ID: 1 - 247

SAAT AYARLARI	
SAAT	10
DAKIKA	22
GUN	14
AY	08
YIL	18

This is the screenshot with the rectifier clock setting. If you want to make any changes on the time and date, press the set button. Immediately after pressing, a phrase will appear on the right of the first line. The value can be changed with the up and down keys. In order to move on to the next statement, the set key must be pressed again. It is enough to press the PRG/eSc button to exit any line of the setting section.

```
    OLAY KAYDI    (VOLT)
         A  |  B  |  C  |  AKU
 0:  225 | 220 | 219 |  121
           18:07  12.07.18
 1:  001 | 001 | 001 |  119
           10:09  08.07.18
```

When the rectifier is first turned on or when any of its phases are de-energized, it records the 3-phase and battery voltage, hour, minute, day, month and year values. If the rectifier continues to work in this way, it will continue to take values in 10-minute periods. The most recent event record is assigned to the zero (0) number and it takes 10 records in total. After pressing the SET button once, we can see all of these values on this screen with the help of the up and down keys.

```
   AKU OLAY KAYDI   (VOLT)
        AKU
 0:  119
           15:07  08.07.18
 1:  120
           01:21  07.07.18
```

If the rectifier is turned on only with battery supply, it will give a warning after 10 seconds. Meanwhile, it records the battery voltage by taking the hour, minute, day, month and year values. The most recent event record is assigned to the zero (0) number and it takes 10 records in total. After pressing the SET button once, we can see all of these values on this screen with the help of the up and down keys.

6

Rectifier Warning Messages

```
┌─────────────────────────────────┐
│        MESAJLAR        1/4       │
├─────────────────────────────────┤
│ 1 - DC ARTI KACAK               │
│ 2 - DC EKSI KACAK               │
│ 3 - ASIRI ISI                   │
│ 4 - DUSUK ISI - BAKIMIPT        │
│ 5 - DC YUKSEK GERILIM           │
│ 6 - DC DUSUK GERILIM            │
└─────────────────────────────────┘
```

```
┌─────────────────────────────────┐
│        MESAJLAR        2/4       │
├─────────────────────────────────┤
│ 1 - AC ASIRI GERILIM            │
│ 2 - AC DUSUK GERILIM            │
│ 3 - A FAZI YOK                  │
│ 4 - B FAZI YOK                  │
│ 5 - C FAZI YOK                  │
│ 6 - AKU KRITIK                  │
└─────────────────────────────────┘
```

```
┌─────────────────────────────────┐
│        MESAJLAR        3/4       │
├─────────────────────────────────┤
│ 1 - ASIRI YUK                   │
│ 2 - AKIM SINIRLAMA              │
│ 3 - SAAT PILI DEGISTIR          │
│ 4 - HZ DUSUK                    │
│ 5 - HZ YUKSEK                   │
│ 6 - AKU DUSUK GERILIM           │
└─────────────────────────────────┘
```

```
┌─────────────────────────────────┐
│        MESAJLAR        4/4       │
├─────────────────────────────────┤
│ 1 - AKU BAKIM YAPILDI - 2       │
│ 2 - AKU BAKIM YAPILMADI - 1     │
│ 3 - FAN ARIZA                   │
│                                 │
│                                 │
│                                 │
└─────────────────────────────────┘
```

All errors that occur on the rectifier are shown in the 4 page Messages section.

7

Rectifier Settings

This is the screenshot where the general settings of the rectifier are started. In order to enter this screen, the PRG/ESC button must be pressed. In order to understand which expression is selected, the background color is white. When the value of the selected expression is desired to be changed, any of the up or down buttons must be pressed together with the SET button. In order to move on to the next statement, the SET button must be pressed.

```
DC GERILIM          121
AKU SARJ AKIMI      50.0
DC YUKSEK           145
DC DUSUK            90
AC YUKSEK           250
AC DUSUK            180
AKU HATA E/H        H
```

DC Voltage	: Battery Charge Voltage (V)
Battery Charge Voltage :	Battery Charge Current (A)
DC High	: DC High Warning Voltage (V)
DC Low	: DC Low Warning Voltage (V)
AC High	: AC High Warning Voltage (V)
AC Low	: AC Low Warning Voltage (V)
Battery Fault Y/N	: Battery Error Check Active or Passive

```
AKU ALARM           095
AKU AYIR E/H        E
DERIN DESARJ(V)     085
AKU AYIR SN         05
AKU BAKIM TARIH     <-1
BAKIM E/H           H
AKU BAK.BEK.GUNU    07
```

Battery Alarm : Battery Critical Level Adjustment (V) - Battery Fault Check "E" on the previous page will give a warning when the battery voltage drops below the adjusted level.

Battery Disconnect Y/N : If the battery level drops below the voltage specified in deep discharge while there is no AC supply, DC output is turned off. (Optional)

Deep Discharge (V) : Voltage level determined to prevent deep discharge when there is no AC supply. (Optional)

Battery Disconnect Sec : Battery Voltage may remain below the deep discharge voltage for the set time (seconds). Our aim is on the continuity of DC output in instantaneous loads. However, if the battery voltage remains below the set voltage at the end of this period, the DC output is turned off. (Optional)

Battery Maintenance Date : Under this setting title, the time and date values for the maintenance of the battery are entered.

Maintenance : Battery maintenance Yes / No

Y/N Battery Maintenance Wait. Day : When the rectifier enters the battery maintenance mode, it should drop to the DC Low level within the set time. If the battery voltage cannot go down to the DC Low level after the set time, the rectifier automatically exits the battery maintenance mode.

8

```
AKU BAK. ARA.(AY)        06
HZ YUKSEK                55
HZ DUSUK                 40
ISI                      45
BUZ E/H                  H
OTO.HZLI SRJ E/H         H
MAN.HZLI SRJ E/H         H
```

Battery Maintenance Interval (Month) : Battery maintenance period. If the next maintenance is desired after a few months, this setting should be done under it. (1 - 12)

Hz High Hz	: Phase frequency high warning :
Low	Phase frequency low warning :
Temperature	Rectifier Internal Temperature High Warning :
Ice E/H	Buzzer Yes / No. If Yes is selected, any error occurs.

buzzer will give an audible warning.

Auto Fast Charge Y/N : Automatic fast charge. If Yes is selected, it will work in partnership with HZL SRJ BEK.AC-DK on the next page. It will start working when the AC supply on the device is gone. If the AC supply comes later than the set time in this part, the device will automatically start working in fast charging mode. The duration of fast charging can also be determined in the FAST CHARGING SRE(MIN) menu.

Man.Fast Charge Y/N : If you want to start fast charge manually, yes must be selected. The duration of fast charging can also be determined in the FAST CHARGING SRE(MIN) menu.

```
HZLI SRJ GER.(V)         131
HZLI SARJ SRE(DK)        010
HZL SRJ BEK.AC-DK        005
FABRIKA AYARLARI         <-I
KONTAKTOR TEST           H
```

Quick Charge Voltage (V)	: Voltage level when the rectifier switches to fast charging mode
Fast Charge Time (Min)	: Fast charging time

Fast Charge Standby AC-DK : If Automatic Fast Charge is Yes and there are no 3 phases, the rectifier will be turned on in Fast Charge Mode after any phase comes back at the end of the set time.

Factory Settings	: Restores device settings to factory settings.
Contactor Test	: It is placed to check the strength of the contactor. (Optional)

```
>INPUT AYARLARI

INPUT - 1          INPUT - 4
INPUT - 2          INPUT - 5
INPUT - 3
```

Optional Input Card settings. Any input of this card, which is presented as an isolated input, can be transferred to the last five relays of the relays on the output card. When you press the set button on the input you have specified for these operations, you will see a screen like the one below.

```
>INPUT AYARLARI
>>INPUT-2-

   INPUT SIL

 *

3. S03
```

With the help of the up and down keys, we determine which output we will direct. Right after that, you can make an assignment by pressing the set button. You can route an input to an output.

```
>INPUT AYARLARI
>>INPUT-2-

   INPUT SIL

 * S02

3. S03
```

MultiMax Interface

After installation on your computer, when you click on the icon on the desktop, the following window will appear.
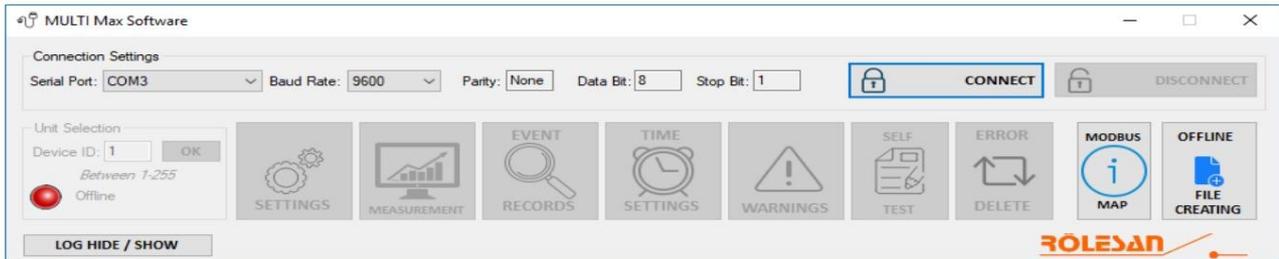
After the connection between the MultiMax series rectifier and the PC is made appropriately, the correct port is selected and the "Connect" tab is clicked. After successful connection, the following window will appear.
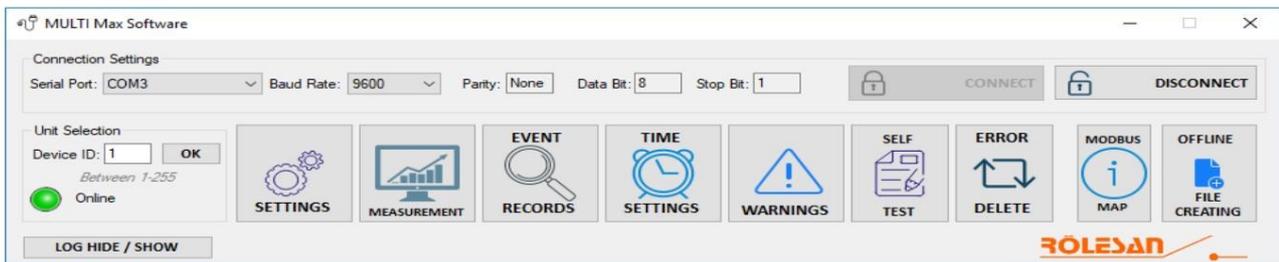
Settings:

    Click on the relevant settings tab. In the window that comes up, the settings on the connected rectifier Click on the "Read Values" tab to watch it.

#	VARIABLE	VALUE	UNIT
0	VDC Set	36,7	V
1	DC High	42	V
2	DC Low	33	V
3	AC High	280	V
4	AC Low	185	V
5	Battery Alert	29	V
6	Deep Discharge Protect	30	V
7	Deep Discharge Second	20	Sec
8	Temperature	50	C
9	Boost Charge	39,8	V
10	Boost Charge Minute	500	Min
11	Boost Charge Delay (AC Off)	2	Min
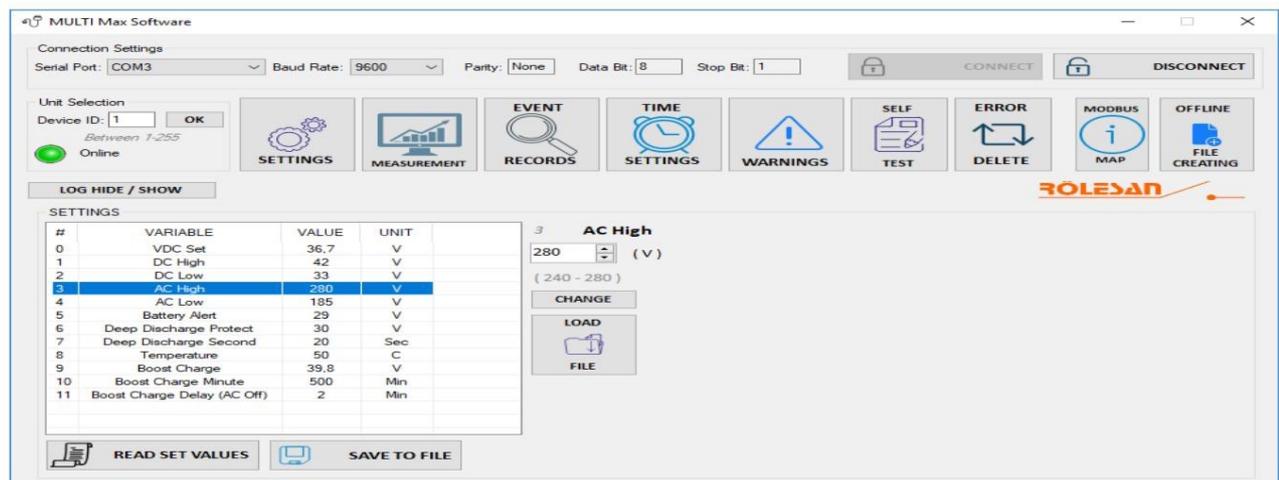
    After clicking on the parameter you want to change, the appropriate value is entered and the "Change" tab is clicked. The maximum and minimum values that can be entered for the relevant parameter setting are shown in parentheses. By clicking the "Save to File" tab, all changed settings can be saved and loaded into a different MultiMax series rectifier.

11th

Measurements:

By clicking on the "Measurements" tab, the measurements window is displayed. Connected rectifier Click on the "Read Values" tab to monitor the settings on it.
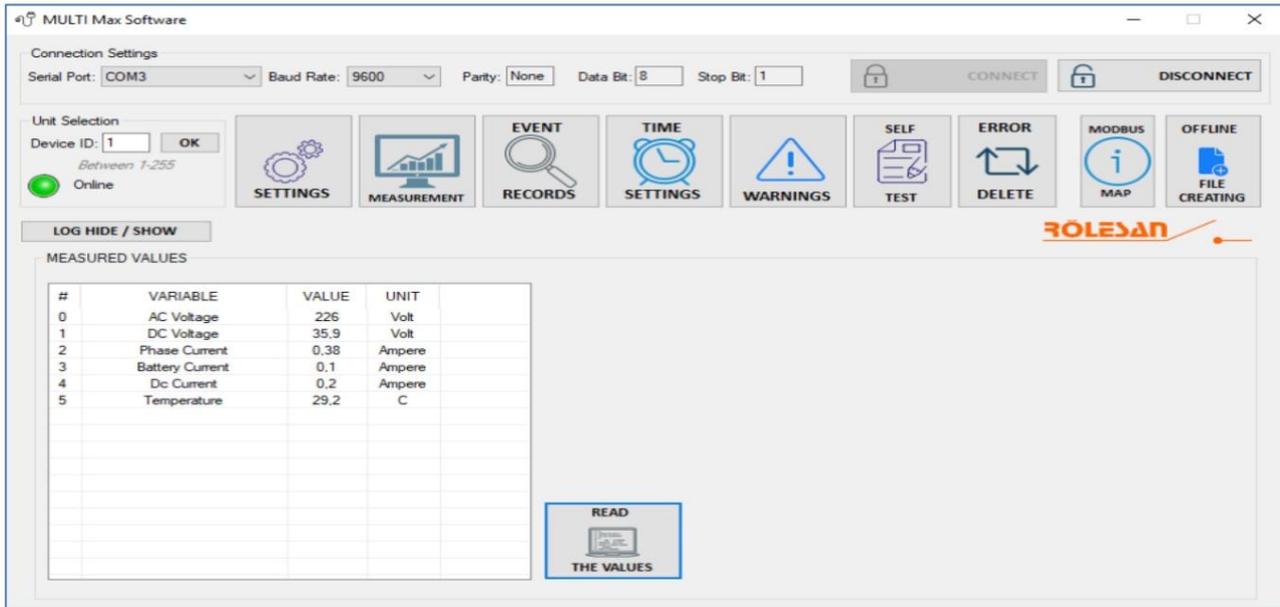
Event Logs:

By clicking on the "Event Logs" tab, the events window is displayed. In order to view the records on the connected rectifier, the "Read Events" tab is clicked.

The last 20 events are recorded. It works according to the FIFO rule.

Time Settings:

By clicking on the "Time Setting" tab, the time setting page is displayed. Enter the time and date you want to change and click the "Set Time" tab.
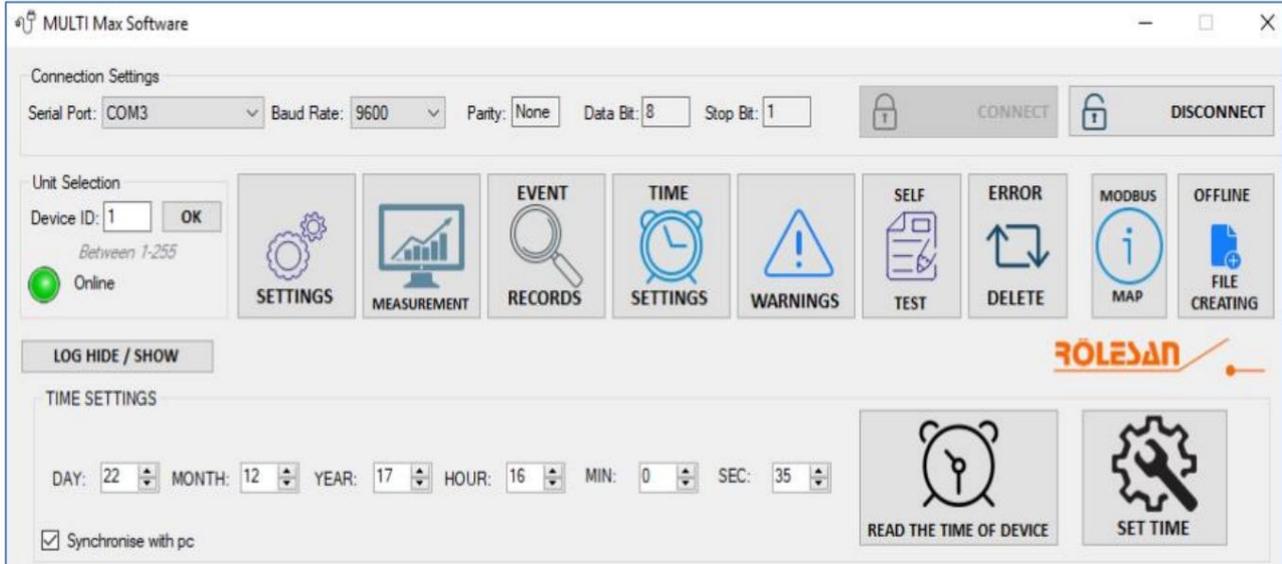
The time and date on the PC can be automatically loaded into the MultiMax series by using the Sync with PC tab in the lower left corner of the screen.

Warnings:

By clicking the "Alerts" tab, the alerts page is displayed. Click on the "Read" tab to view the warnings on the connected MultiMax series.
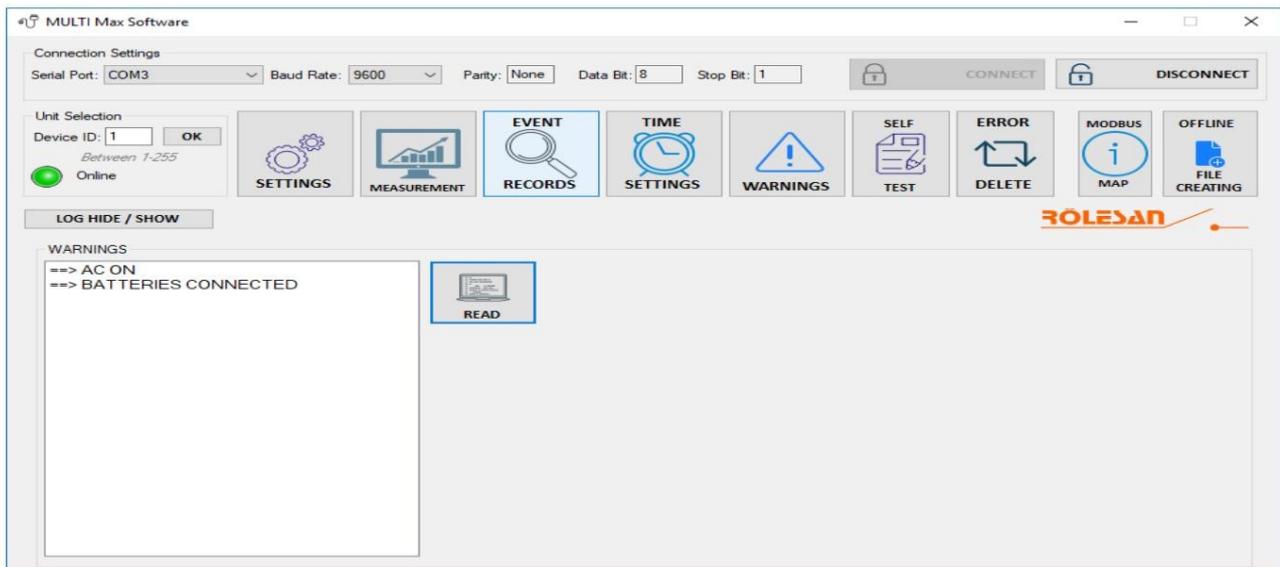
Test:

By clicking the "Test" tab, test whether the LEDs and contacts are working properly.
is performed.

Delete Errors:

Errors are deleted by clicking the "Delete Lines" tab.

Modbus Map:

The MODBUS address list is displayed by clicking the "Modbus Map" tab.

Offline File Creation:

By clicking on the "Create Offline File" tab, the file preparation window in offline mode is displayed. After the desired parameter settings are entered, the "Save to File" tab is clicked and the relevant file is saved to your computer. This file can then be loaded into any MultiMax series rectifier.

Create File				
VDC Set (V)	32,0		(32-40) (Scaling 1/10)
DC High (V)	31		(31-42) (Scaling 1/10)
DC Low (V)	25		(25-34) (Scaling 1/10)
AC High (V)	240		(240-280)
AC Low (V)	170		(170-210)
Battery Alert (V)	29		(29-33) (Scaling 1/10)
Deep Discharge Protect (V)	27		(27-31) (Scaling 1/10)
Deep Discharge Second (Sec)	2		(2-20)
Temperature (C)	10		(10-60)
Boost Charge (V)	37,0		(37-41)
Boost Charge Minute (Min)	2		(2-720)
Boost Charge Delay (AC Off) (Min)	2		(2-720) (Scaling 1/10)

SAVE TO FILE

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