



SMU01 Controller Module

Version: 4.1G

Contact Information:

ENETEK POWER GROUP PTE LTD

8 Pandan Crescent (Lobby 5)
#04-03
Singapore 128464

Tel: +65 6873 2228
Fax: +65 6873 2229

customercare@enetek-power.com
www.enetek-power.com

**Thank you for choosing Enetek.
For your own safety, please read this manual carefully before
installation and operation.**



All rights reserved: Enetek reserves the right to change the product and the content of this manual without prior WARNING. Users are recommended to visit the company website at www.enetek-power.com for more information about our new products and the latest versions of the user manuals.

Table of Contents

1.	Introduction	5
2.	Technical Specification	5
2.1.	Mechanical Specification	5
2.2.	System Functions	7
2.2.1.	Display and Setting Function	7
2.2.2.	Control Function	8
2.2.3.	Intelligent Battery Management Function	8
2.2.4.	Intelligent Energy-saving Management	8
2.2.5.	Communication Function	8
2.2.6.	Digital Inputs and Digital Outputs	8
2.2.7.	Alarm and Log Function	8
3.	The Controller Module	10
3.1	Description of the Front Panel	10
3.2	Description of the controller terminations	11
3.3	Description of Alarm LEDs	12
3.4	Controller Structure	13
4.	Expansion Modules Option	13
4.1.	Main LCD Screen	14
4.2.	System Information Screen	14
4.3.	Sub Menu Screen	15
4.3.1.	Information Submenu	15
4.3.2.	Configuration Submenu	18
4.3.3.	Control Submenu	24
4.3.4.	Quick Config Submenu	25
5.	Alarm Information	26
6.	PowerView Software	28
7.	Web Interface	28
8.	IO Monitor (IOM01-000)	29
9.	Troubleshooting	29

1. Introduction

SMU01 is an intelligent rectifier system controller suitable for use with Enetek's range of telecom rectifiers. It offers a complete power system management function, including data acquisition and processing, battery management as well as monitoring and control of the system solution.

The user-friendly SMU01 controller unit, coupled with its compact size and simple-to-operate interface, is highly adaptable and can be incorporated into small design spaces.

2. Technical Specification

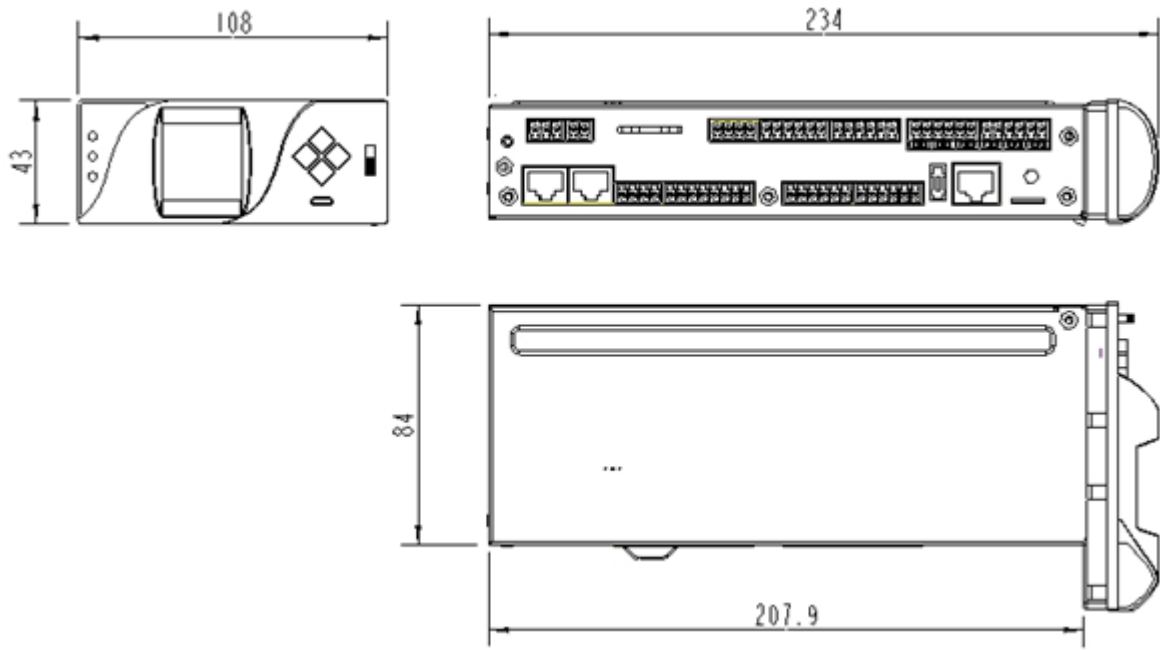
The table below highlights the operating conditions for the SMU01 controller unit.

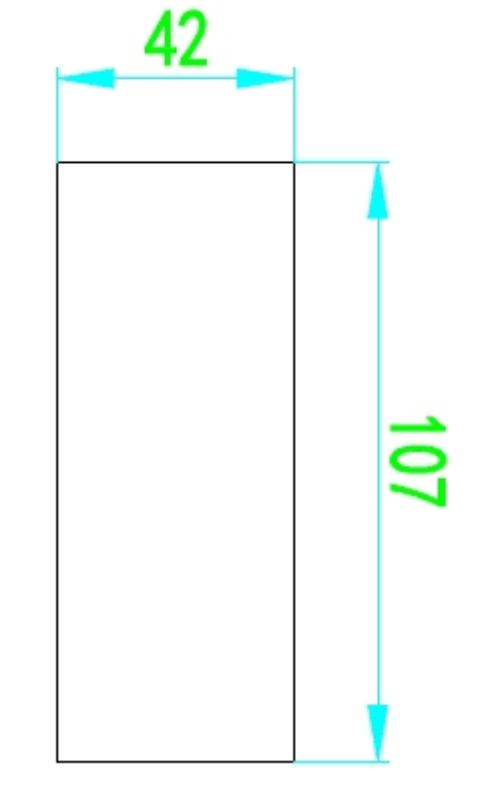
Description	Specifications
Nominal Input Voltage	24Vdc / 48Vdc
Input voltage Range	18V to 60V
Input current / Power	~0.1A @ 48Vdc (5W)
Operating temperature range (ambient temperature)	-40°C to +75°C
Storage temperature	-40°C to +85°C
Relative humidity	≤ 95% RH
Elevation	≤ 2000m

2.1. Mechanical Specification

External dimensions (WxHxD): 108mm x 43mm x 234mm

Installation slot dimension (WxH): 107mm x 42mm





2.2. System Functions

2.2.1. Display and Setting Function

The controller module is equipped with LCD display, three indicators and four function buttons. The interface language can be switched between English and other languages.

It provides a simple and efficient user interface, allowing users to view easily view and access the operating parameters, operating state, alarm state, setup parameters, system configuration data and control parameters of the power system.

2.2.2. Control Function

The controller module can send corresponding commands according to the system operating state. The commands include control of rectifier module on/off switching, battery equalizing/floating charge, change of current-limiting point of rectifier module and adjustment of voltage of rectifier module.

2.2.3. Intelligent Battery Management Function

The controller is designed to provide real-time battery monitoring of the battery temperature, battery voltage and battery charge/discharge current.

Coupled with the data, the controller provides a set of battery management incorporating battery temperature compensation charge, battery charge current limit, automatic/manual float and boost charge function as well as generating alarms based on set limits.

In addition, the low voltage disconnect function (if available) will automatically connect or disconnect the battery system according to the set limits. This helps to ensure that the battery system is not over-discharged during the discharge operation.

The intelligent management battery function is aimed to efficiently prolong the battery service life.

2.2.4. Intelligent Energy-saving Management

The controller module is designed with a set of energy-saving management function with the aim to improve overall operating efficiency. The controller dynamically manages the on/off state of the installed rectifier modules based on the operating conditions and user settings to improve the overall efficiency of the system during operation.

2.2.5. Communication Function

The controller module can communicate with the background host and its secondary devices. The communication with the background host supports serial, RS485, CAN and Ethernet modes, providing flexible networking and remote monitoring. Ethernet-based communication supports web browsing and remote upgrade. The controller module also supports RS485 and CAN modes communication with secondary devices and rectifier modules respectively.

2.2.6. Digital Inputs and Digital Outputs

The standard controller module has 6 sets of digital inputs and 6 sets of digital outputs.

The digital inputs can be set to identify with the different alarm signals and these can be user-defined. Any alarms triggered can be mapped to the 6 sets of digital outputs and these are user-definable.

Expansion I/O modules may be added to increase the number of digital inputs and digital outputs.

2.2.7. Alarm and Log Function

The controller module can provide visible and audible alarms on faults based on system data measured and user-set values. There are three levels of alarms: MAJOR alarm, MINOR alarm and NO alarm. Users are allowed to set the level of each alarm according to specific requirements as well as the status of the corresponding relay output for each alarm type.

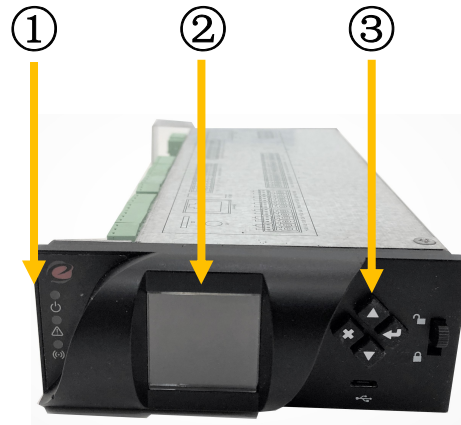
Users have access to history alarm logs and event logs. The history alarm logs include alarm type,

occurrence time, and end time, while the current logs only cover alarm type and occurrence time; the logs are displayed in chronological order of occurrence time. More than 10,000 records of alarm and event logs can be saved cyclically.

Data log function is also included to allow users to log the data periodically, and all logs may be exported.

3. The Controller Module

3.1 Description of the Front Panel



SMU01 controller module is designed to be hot-swappable. See table below regarding the description of the indicators and function buttons

Description of indicators

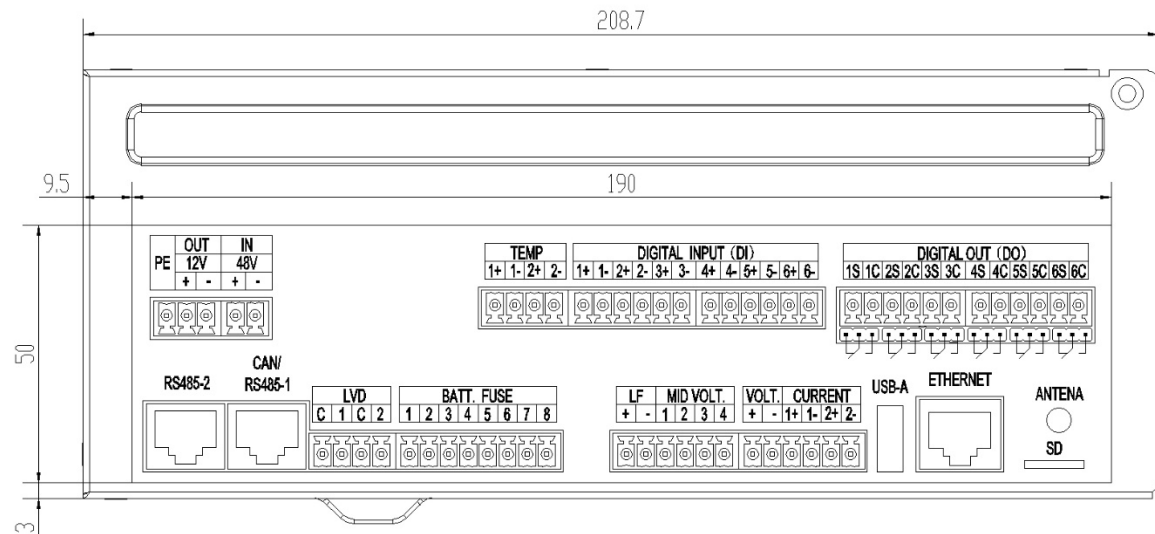
S/No Ref	Indicator	Normal state	Fault state	Fault cause
1	NORMAL (Green)	On	Off	No power supply to the controller module or the controller module is faulty
	MESSAGE (Yellow)	Off	On	Message
	ALARM (Red)	Off	On	Major Alarm
2	LCD Display	-	-	-
3	Navigation Keypads	-	-	-

Description of navigation keypads

Key	Function	
	"Go to next menu" or "confirm" the operation. When any setting is changed, the ENT button should be pressed before the new setting becomes effective.	This button serves as the "Enter" function.
	The cursor can be moved among menu items by pressing the UP or DOWN button; to set a parameter option, the UP or DOWN button can be pressed to change the option value.	When a parameter option value is a string of characters that need to be set separately, the UP or DOWN button can be used to change the option value of each character. After selecting the value, press the ENT button, and the cursor will move to the next character automatically.
		
	The cursor can be moved out of the menu and submenu items by pressing the BACK button.	This button serves as the "Go back" function.

3.2 Description of the controller terminations

Please see below the description of the SMU01 controller terminations.



Connector	Type	Purpose	Pin	Description
P1	Pluggable terminal block 3.81mm, 3-way, screw type	PE and output power connections	1	GND (Ground)
			2	+12Vdc (Output)
	Pluggable terminal block 3.81mm, 2-way, screw type	Input power connections (Note: 18Vdc to 60Vdc)	3	-12Vdc (Output)
			4	+48Vdc (Input)
			5	-48Vdc (Input)
P2	Pluggable terminal block 3.81mm, 4-way, screw type	Temperature Sensing	-	-
			1	Temp1 "-"
			2	Temp1 "+"
			3	Temp2 "-"
	Pluggable terminal block 3.81mm, 6-way, screw type	Digital Input	4	Temp2 "+"
			5	DI1 "-"
			6	DI1 "+"
			7	DI2 "-"
			8	DI2 "+"
			9	DI3 "-"
	Pluggable terminal block 3.81mm, 6-way, screw type	Digital Input	10	DI3 "+"
			11	DI4 "-"
			12	DI4 "+"
			13	DI5 "-"
			14	DI5 "+"
			15	DI6 "-"
P3	Pluggable terminal block 3.81mm, 6-way, screw type	Digital Output (Default: Normally close) (NC or NO is settable)	16	DI6 "+"
			1	DO1 "C" (Common)
			2	DO1 "S"
			3	DO2 "C" (Common)
			4	DO2 "S"
			5	DO3 "C" (Common)
	Pluggable terminal block	Digital Output	6	DO3 "S"
			7	DO4 "C" (Common)

	block 3.81mm, 6-way, screw type	(Default: Normally close) (NC or NO is settable) Relay ratings: 60Vdc/1A	8	DO4 "S"
			9	DO5 "C" (Common)
			10	DO5 "S"
			11	DO6 "C" (Common)
			12	DO6 "S"
NA	RJ45 Crystal Modular Plug	RS485-2 (For communication with expansion modules)	1~3	12V+
			4~6	12V-
			7	RS 485A
			8	RS 485B
	RJ45 Crystal Modular Plug	CAN / RS485-1 (For communication with rectifier modules)	1~3	NA
			4	RS 485A
			5	RS 485B
			6	CAN-H
			7	CAN-L
			8	NA
P4	Pluggable terminal block 3.81mm, 4-way, screw type	Low Voltage Disconnect (LVD)	1	LVD1 "C" (Common)
			2	LVD1 "1"
			3	LVD2 "C" (Common)
			4	LVD2 "2"
	Pluggable terminal block 3.81mm, 8-way, screw type	Battery Fuse Sensing Connection	5	Batt Fuse 1
			6	Batt Fuse 2
			7	Batt Fuse 3
			8	Batt Fuse 4
			9	Batt Fuse 5
			10	Batt Fuse 6
			11	Batt Fuse 7
			12	Batt Fuse 8
P5	Pluggable terminal block 3.81mm, 6-way, screw type	Load Fuse Sensing and battery mid voltage sensing	1	Load Fuse "-"
			2	Load Fuse "+"
			3	Mid Voltage 1
			4	Mid Voltage 2
			5	Mid Voltage 3
			6	Mid Voltage 4
	Pluggable terminal block 3.81mm, 6-way, screw type	Voltage Sensing and Current Sensing	7	Volt "-"
			8	Volt "+"
			9	Current 1 "-"
			10	Current 1 "+"
			11	Current 2 "-"
			12	Current 2 "+"
NA	USB-A	Optional USB-A connection	NA	Optional
	RJ45 Crystal modular Plug	Ethernet Connection, @ 100Mbps	NA	For Web-browsing, Powerview or SNMP
	SD Card Slot	Upload and download data	NA	For uploading ARM firmware
	Micro-USB	@ front panel of controller module	NA	For direct connection to PC

3.3 Description of Alarm LEDs

The controller module and rectifier units are equipped with LEDs that provide relevant information regarding the system condition. The indications/status will guide the service technician to the right module during troubleshooting.

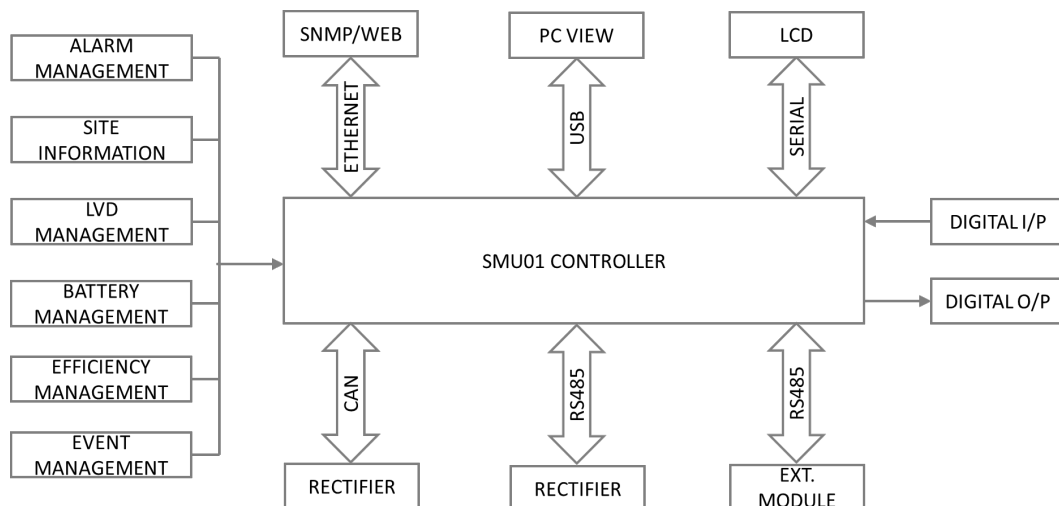
The alarm events are classified into different alarm categories. Different alarm categories have different visual/audible alarms and alarm callback activities.

Alarm Category	Red LED	Yellow LED	Alarm Buzzer
No Alarm	Off	Off	Off
Event/Minor Alarm		On	Off
Major Alarm	On		On

The audible alarm will be muted if (1) the user presses any key on the Front Panel; (2) the fault that triggers the alarm is cleared or (3) after certain user-settable time period. The audible alarm can be disabled from a menu in the LCD display.

The alarm LED will go off if all the faults that trigger the alarm are cleared.

3.4 Controller Structure



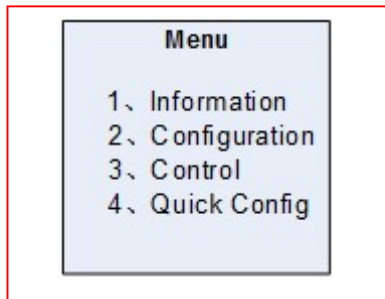
4. Expansion Modules Option

Expansion modules may be added to enhance the functionality of the controller system.

S/No	Expansion Module	Description
1	IO Monitor	Expansion of 6xDI and 6xDO
2	AC Monitor	AC voltage, current and frequency
3	DC Monitor	DC voltage, current
4	Batt. Monitor	Suitable for 2V battery monitoring

4.1. Main LCD Screen

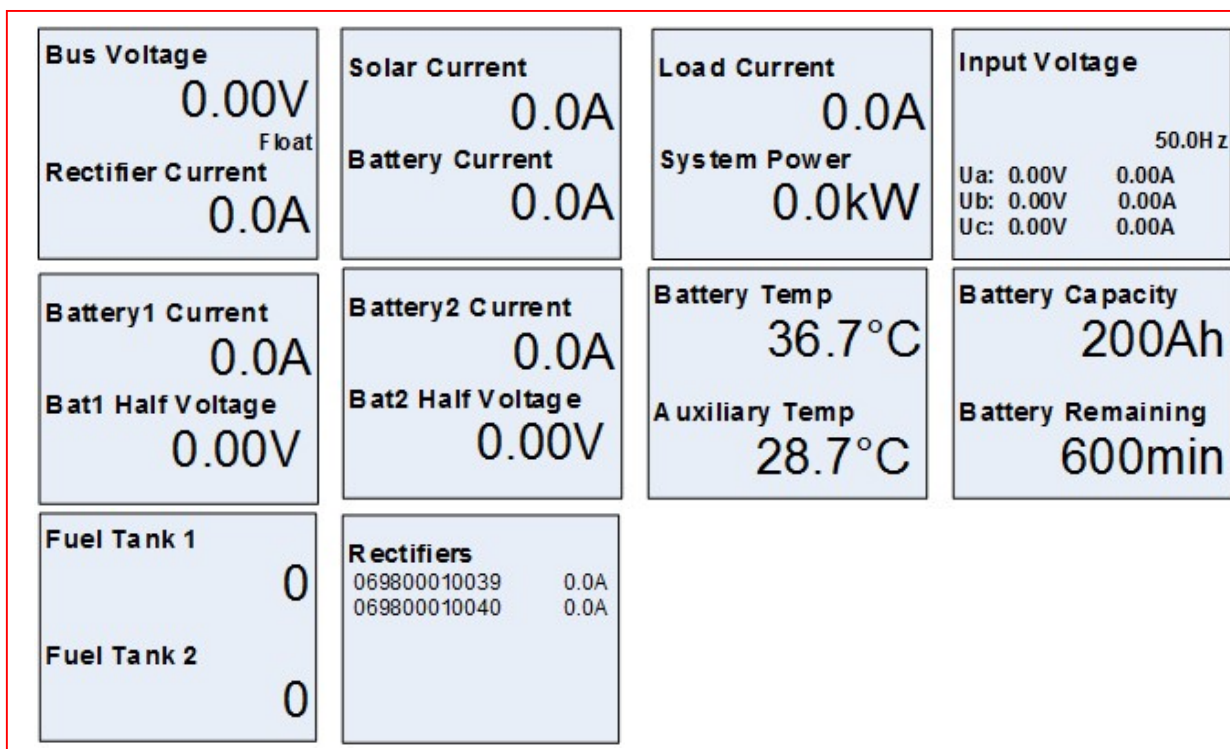
This section briefly introduces the display content and the approach to entering each screen on the main LCD display screen.



4.2. System Information Screen

When the monitoring module is powered on, the system information screen will show the DC voltage and total rectifier current. Pressing the ▼ button will show different information screen in the sequence detailed below:

- Load and Battery Current
- System Power and Rectifier Average Power
- Input Voltage and Current Values
- Battery Current and Mid-point voltage value
- Battery and Auxiliary (Ambient) Temperature Values
- Battery Capacity and its remaining capacity time
- Connected Rectifier Module Serial Numbers and its respective output current
- Energy Usage information



Tot. Energy Info. User1 Energy 0.00% User2 Energy 0.00% User3 Energy 0.00% User4 Energy 0.00% Load1 Energy 0.00% Load2 Energy 0.00%	Tot. Energy Info. Load3 Energy 0.00% Load4 Energy 0.00% Load5 Energy 0.00% Load6 Energy 0.00% Load7 Energy 0.00% Load8 Energy 0.00%	Tot. Energy Info. Load9 Energy 0.00% Load10 Energy 0.00% Load11 Energy 0.00% Load12 Energy 0.00% Load13 Energy 0.00% Load14 Energy 0.00%	Tot. Energy Info. Load15 Energy 0.00% Load16 Energy 0.00%
Energy Info. Monthly User1 Energy 0.00% User2 Energy 0.00% User3 Energy 0.00% User4 Energy 0.00% Load1 Energy 0.00% Load2 Energy 0.00%	Energy Info. Monthly Load3 Energy 0.00% Load4 Energy 0.00% Load5 Energy 0.00% Load6 Energy 0.00% Load7 Energy 0.00% Load8 Energy 0.00%	Energy Info. Monthly Load9 Energy 0.00% Load10 Energy 0.00% Load11 Energy 0.00% Load12 Energy 0.00% Load13 Energy 0.00% Load14 Energy 0.00%	Energy Info. Monthly Load15 Energy 0.00% Load16 Energy 0.00%

4.3.Sub Menu Screen

4.3.1. Information Submenu

For the Information submenu, the user has the option to view specific information on the alarm data, output data, input data, battery data, rectifier module data, system data, and expansion module data.

Information 1、 Alarm 2、 Output 3、 Input 4、 Battery 5、 Rectifier 6、 System 7、 Expand	Information 8、 Peak 9、 BMS 10、 Solar
---	--

Please see below some of the references data that are displayed on each of the submenus for “Alarm”, “Output”, “Input”, “Battery”, “Rectifier”, “System” and “Expand”.

Alarm data Reference

The screen will display the current alarms generated in the system.

Alarm ✖AC Fail ✖Low Load

Output data reference

The user can navigate the screens to view the various output data system.

Output		Output	
Bus Voltage	0.00V	Load Total	0.0A
System Power	0.0kW	Load 1	0.0A
Rectifier Power	0%	Load 2	0.0A
User1 Current	0.0A	Load 3	0.0A
User2 Current	0.0A	Load 4	0.0A
User3 Current	0.0A	Load 5	0.0A
User4 Current	0.0A	Load 6	0.0A

To Load 16

Input data reference

The screen will display the input voltage of the system

Input		
U1a	220.00V	12.00A
U1b	220.00V	12.00A
U1c	220.00V	12.00A
U2a	220.00V	12.00A
U2b	220.00V	12.00A
U2c	220.00V	12.00A

Battery data reference

The user can navigate the screens to view the information of the battery

Voltage Per Cells	Battery Equalize	Battery Test
1Group-01 0.000V	Boost Remaining time 22h	Lockout Remaining 0 min
1Group-02 0.000V	Lockout Remaining 22min	Test Remaining time 22min
1Group-03 0.000V		Next Start Time 22d
1Group-04 0.000V		
1Group-05 0.000V		
1Group-06 0.000V		
1Group-07 0.000V		

To xGroup-24

Rectifier data reference

The user can navigate the screens to view the information of the rectifier modules.

Rectifier	Rectifier 1
Red Curr 0.0A	Serial No. 121313123132
AC Rect Power 0%	Voltage 0.00V
Solar Rect Power 0%	Current 0.0A
Registered Rec Num 0	Temperature 00.0°C
	State Comm Fail
	Mains AC
	Confirmation Cancel

System data reference

The screen will display the system information

Controller Serial No. 00000000000 SW. Ver F--F SW 8007990174 Model SMU01 IP. Add. 192.168.10.20	System User: Customer Sr. No. 00000000000 Model SMU01 Site ID: *****	Maintenance Service Engineer: ADMIN Installation Date: 12 - 12 - 2018 Commissioning Date: 12 - 12 - 2018	Maintenance GPS : S 0° 0 ' W 0° 0 '
---	---	--	---

Maintenance Remark :

Expand data reference

The screen will display the system information

Expand 1.IO 2.DC	IO 1 Fan1 OK Speed: 30% Fan2 ERR Speed: 20% Temp1 OK 100.0°C Temp1 ERR 100.0°C Tank1 OK 0cm Tank2 ERR 0cm
-------------------------------	--

DC Mon 01 DC Voltage 0.0V TEMP 0.0°C DC Curr. 0.0A Batt.1 Curr. 0.0A Batt.2 Curr. 0.0A Batt.3 Curr. 0.0A Batt.4 Curr. 0.0A	<table border="1"> <thead> <tr> <th>NUM</th> <th>I(A)</th> <th>E(kwh)</th> </tr> </thead> <tbody> <tr><td>01</td><td>0.0</td><td>0</td></tr> <tr><td>02</td><td>0.0</td><td>0</td></tr> <tr><td>03</td><td>0.0</td><td>0</td></tr> <tr><td>04</td><td>0.0</td><td>0</td></tr> <tr><td>05</td><td>0.0</td><td>0</td></tr> <tr><td>06</td><td>0.0</td><td>0</td></tr> <tr><td>07</td><td>0.0</td><td>0</td></tr> </tbody> </table>	NUM	I(A)	E(kwh)	01	0.0	0	02	0.0	0	03	0.0	0	04	0.0	0	05	0.0	0	06	0.0	0	07	0.0	0	BAT FUSE Batt.1 Fuse OK Batt.2 Fuse OK Batt.3 Fuse OK Batt.4 Fuse OK	FUSE 01 Fuse OK 02 Fuse OK 03 Fuse OK 04 Fuse OK 05 Fuse OK 06 Fuse OK 07 Fuse OK
NUM	I(A)	E(kwh)																									
01	0.0	0																									
02	0.0	0																									
03	0.0	0																									
04	0.0	0																									
05	0.0	0																									
06	0.0	0																									
07	0.0	0																									

To Num20

To Fuse 30

SYS DI01 OK DI02 OK DC Voltage Normal	BAT SENSOR STATE Batt.1 Curr OK Normal Batt.2 Curr OK Normal Batt.3 Curr OK Normal Batt.4 Curr OK Normal TEMP OK Normal DC Curr. OK Normal	CURR. SENSOR 01 Normal OK 02 Normal OK 03 Normal OK 04 Normal OK 05 Normal OK 06 Normal OK 07 Normal OK
---	---	---

To Normal 20

Peak

The screen will display the system information.

2020.12.07	
16:31:07	
Bus Voltage	0.00V
Batt Curr	0.0A
Sys State	Charg.
Batt Capacity	300
Batt Remaining	600M
Save	-1.51

BMS

The screen will display the lithium batteries BMS information.

BMS 0	
Volt.	0.00V
Curr.	0.00A
Cap	0.0Ah
SOC	0%
CellT	0.0°C
EnvT	0.0°C
State	OK

Solar Converter

The screen will display the solar converters information.

Solar Rectifier	
Rect Curr	0.0A
Solar rect Power	0%
Regist Solar Num	1
Solar Energy	0WH

Solar Rectifier 1	
Serial No.	0
Voltage	0.00V
Current	0.0A
Temperature	00.0°C
State	Comm Fail
Mains	Solar
Confirmation	Cancel

4.3.2. Configuration Submenu

For the Control submenu, the user has the option to view and control/manage the system operations. There are a total of 18 items in this sub-menu. This menu is password protected.

Config 1、DC Alarm Setting 2、AC Alarm Setting 3、DC Shunt Config 4、Current Config 5、Battery Config 6、Float Config 7、Boost Config	Config 8、Battery Test 9、DI Config 10、DO Config 11、LVD Setting 12、LBRS 13、Temp Config 14、Aux. Mon config	Config 15、SysTem Config 16、Fan Config 17、Password 18、RecDevConfig 19、Gen Config 20、Peak Config
--	---	---

DC Alarm Setting

The user can set the various DC voltage alarm, system overload and rectifier current limit settings in this sub-menu.

DC Alarm Setting	
DC Volt High1	57.50V
DC Volt High2	45.00V
DC Volt Low1	45.00V
DC Volt Low2	45.00V
SysOverLoad Rat	90%
RecCurLimit	100.00A

AC Alarm Setting

The user can set the various AC voltage, AC current and AC frequency settings in this sub-menu.

AC Alarm Setting	
AC Volt High	260V
AC Volt Low	260V
AC OverCur	100A
AC Freq High	60Hz
AC Freq Low	40Hz
DC Volt High	100V
DC Over Cur	18A

DC Shunt Config

This sub-menu allows the user to set the parameters of the shunt used in the system operation.

DC Shunt Config	
Type	Load Total
Offset	60Ah
Shunt Current	300A
Shunt Volt	50mV
Polarity	+

Current Config

This sub-menu allows the user to set the parameters of the current configuration for both the battery and load channels, as applicable.

Batt Curr. Config		Load Current Config	
Total Cur	Enabled	Total Cur	Enabled
Batt 1 Cur	Disabled	Load 1 Cur	Disabled
Batt 2 Cur	Disabled	Load 2 Cur	Disabled
Batt 3 Cur	Disabled	Load 3 Cur	Disabled
Batt 4 Cur	Disabled	Load 4 Cur	Disabled
		Load 5 Cur	Disabled
		Load 6 Cur	Disabled

To Load 16

Battery Config

This sub-menu allows the user to set the parameters of the battery configuration implemented in the system solution.

Batt Config		Batt Config	
Banks	1	AVC	Enabled
Packs per Banks	24	Symmetry	Enabled
Cap per Bank	200Ah	Symmetry Voltage	12V
Cell VoltHigh	2.4V	Mode	Continue
Cell VoltLow	1.8V	Discharge Delay	30Min
BCL	Enabled	Alarm HighLimit	***V
Disch. CurLmt	-3%	Alarm LowLimit	***V

Float Config

This sub-menu allows the user to set the float charge parameters for the battery system installed.

Float Config	
Float Vol	** **V
FloatCurLimitRat	***%
FloatToBoost Vol	** **V
ToBoostCurLimit	Enabled
ToBoost CurRat	***%
ToBoostCapLimit	Enabled
ToBoost CapRat	***%

Float Config	
AcErrToBoost	Enabled
ACErr Time	****min

Boost Config

This sub-menu allows the user to set the boost charger parameters for the battery system installed.

Boost Config	
Boost	Enabled
Boost Vol	** **V
CurLimitRat	***%
ToFloat CurRat	***%
Max.Duration	****min
Delay	****min
Lockout	****min

Boost Config	
ToFloat Cap	Disabled
ToFloat CapRat	***%
ProCap	Disabled
ProCapRat	***%
P Boost	Disabled
Interval	****h
Fuse Quit	Disabled

Battery Test Config

This sub-menu allows the user to set the parameters of the current configuration for both the battery and load channels, as applicable.

Batt. Test Config	
Batt Test	Enabled
Test Vol	** **V
TestCurLimitRat	***%
Test TimeLimit	***min
Test Lockout	****min

Batt. Test Config	
ToFloat Cap	Disabled
ToFloat CapRat	***%
ProCap	Disabled
ProCapRat	***%
P Bat Test	Disabled
P Bat Test Intvl	***d

Digital Input Config

This sub-menu allows the user to set the parameters of the individual digital inputs of the system.

DI Config	
01 DI1	PosLogic
DI Self	Function
02 DI2	PosLogic
DI Self	Function
03 DI3	PosLogic
DI Self	Function

To DI 16

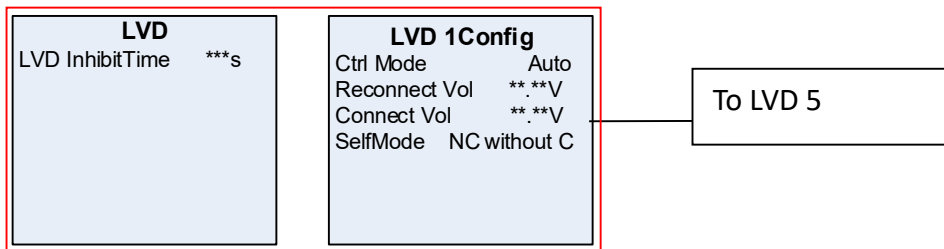
Digital Output Config

This sub-menu allows the user to set the parameters of the individual digital outputs of the system.

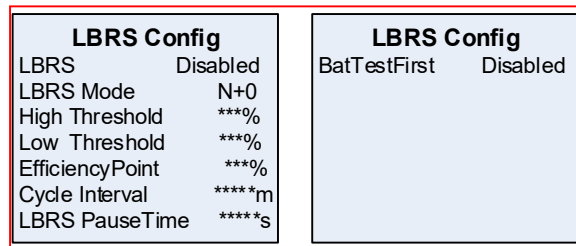
DO Config	
SelfAlarm	DO 1
DO 1	PosLogic
DO 2	PosLogic
DO 3	PosLogic
DO 4	PosLogic
DO 5	PosLogic
DO 6	PosLogic

LVD Config

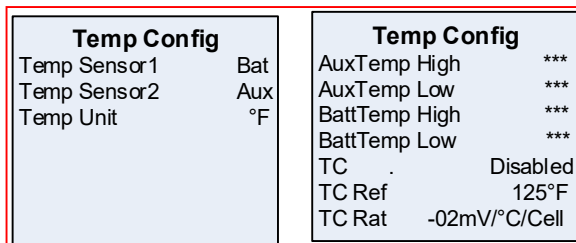
This sub-menu allows the user to set the parameters of the LVD function of the system.

LBRS Config

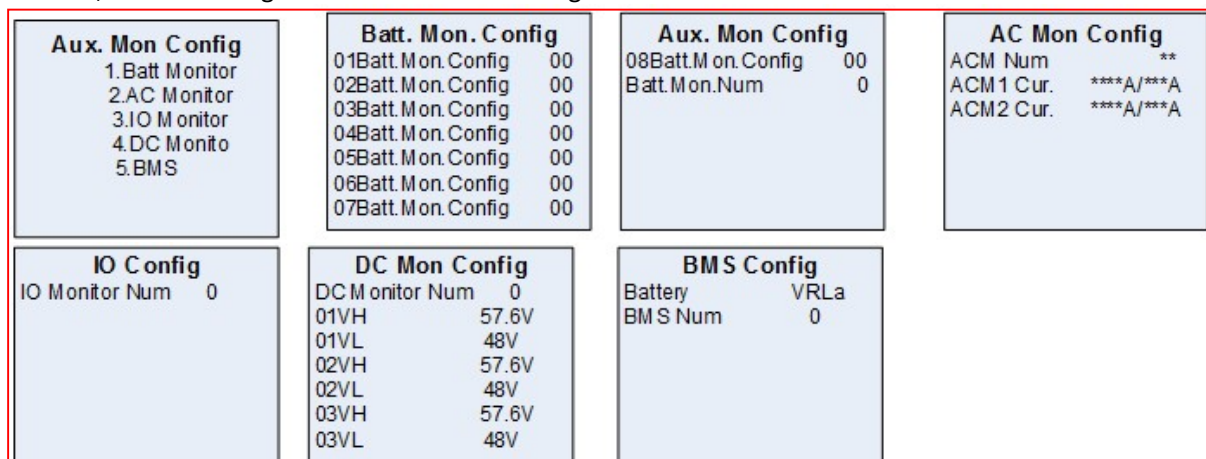
This sub-menu allows the user to set the parameters to manage the energy saving function of the system.

Temperature Config

This sub-menu allows the user to set the battery and auxiliary temperature settings of the system.

Auxiliary Monitoring Config

This sub-menu allows the user to manage the settings of the expansion modules – battery monitoring module, AC monitoring module and IO monitoring module.



SYS Config

This sub-menu allows the user to set the parameters in relation to the system configuration.

System Config		System Config	
Monitor Addr	01	Date:*** / ** / **	
LCD Dire	Level	Time:**h **m **s	
Buzzer	Disabled	Inst. Date:*** / ** / **	
Backlight	**min		
Monitor Baud	19200		
Sys Level	48V		
Battery	VRLA		

FAN Config

This sub-menu allows the user to set the parameters for the fan function that is installed, as applicable.

Fan Config	
Fan	Disabled
LTC	Disabled
LTC Threshold	20°C
Restart DiffTemp	60°C
Minimum Speed	30%
Minimum Time	13s

Password Config

This sub-menu allows the user to set the password parameters for the different level of access.

Password	PassWord Config
00000	Service PassWord 10000
	Factory PassWord XXXXX
	Super PassWord XXXXX

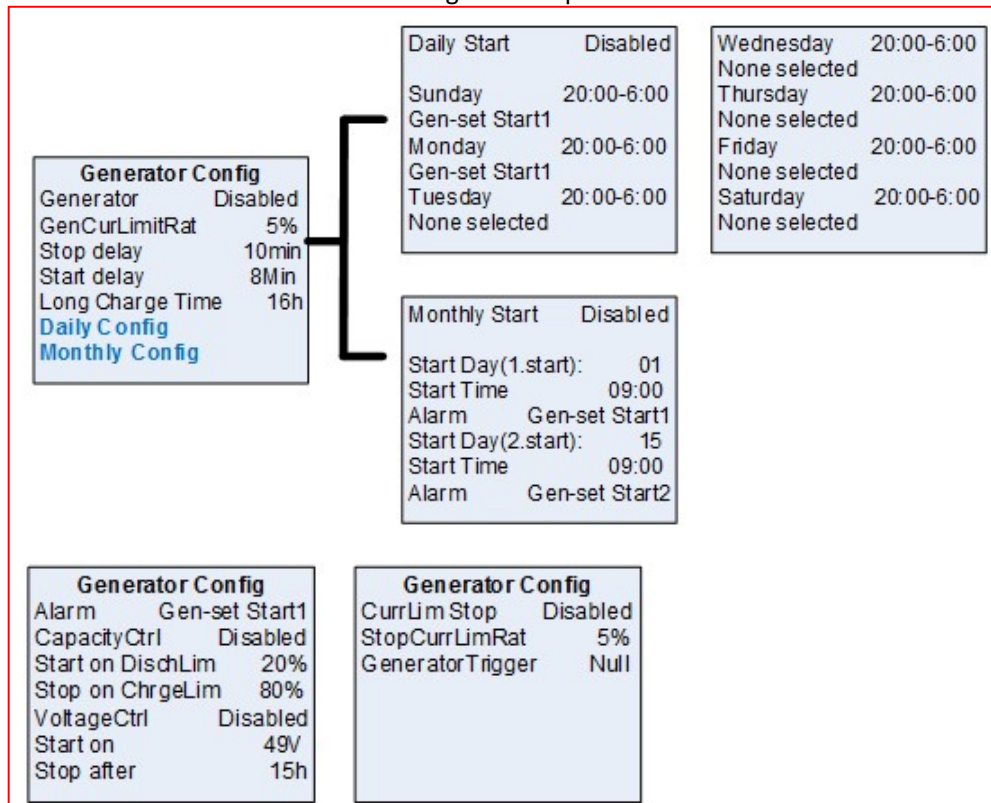
RecDevNum Config

This sub-menu allows the user to set reference rectifier development number.

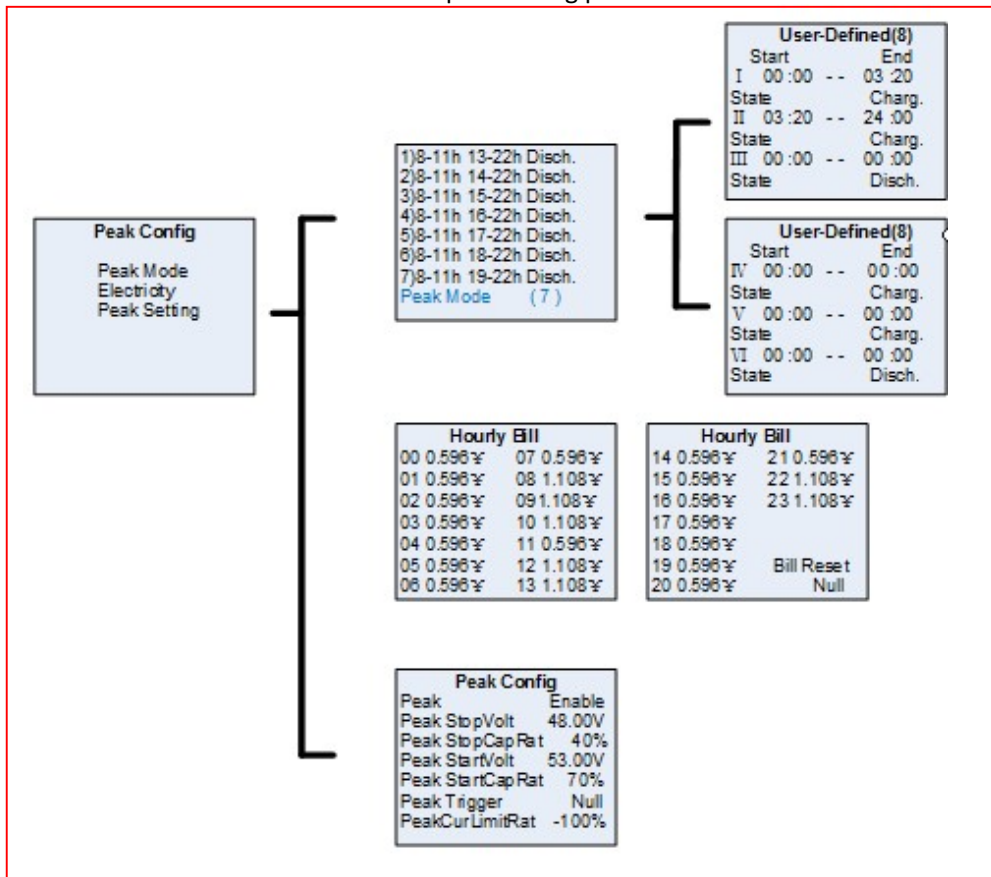
RecDevNumConfig	
01Dev	7000010003
02Dev	7000010004
03Dev	7000010005

Gen Config

This sub-menu allows the user to set generator parameters.

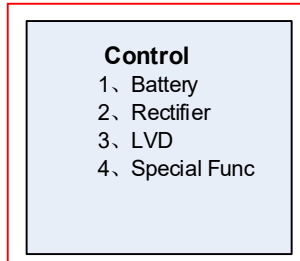
Peak Config

This sub-menu allows the user to set peak saving parameters.



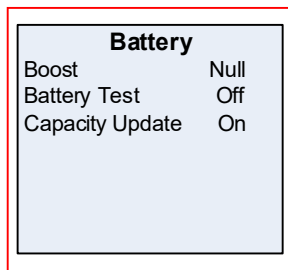
4.3.3. Control Submenu

For the Configuration submenu, the user has the option to view and configure the “Battery”, “Rectifier”, “LVD” and “Special Function” parameters. This menu is normally applicable only to the highest level of access.



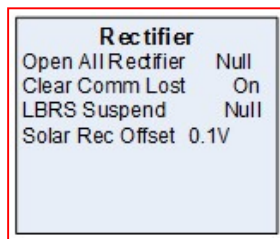
Battery control parameters

This sub-menu allows the user to manually operate the boost, battery test and capacity update when required.



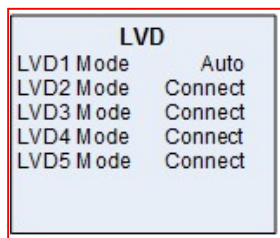
Rectifier control parameters

This sub-menu allows the user to manually turn on all rectifier modules, clear the module communication loss message and disable the LBRS function.



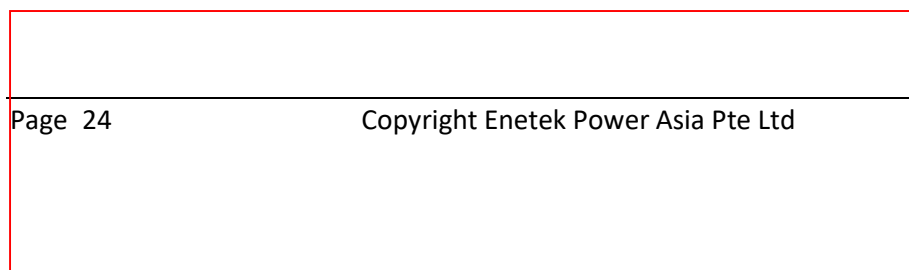
LVD control parameters

This sub-menu allows the user to manually activate the LVD function.



Special function control parameters

This sub-menu is used as special function for certain operations, including deletion of power data and log details, system recovery, resetting communication count data, as well as setting max/min system voltage, failed test recovery, alarm time delay, enabling soft start function and network port function.



Special Func 1、Special Func 2、Rec.Com.Count 3、IOM Com.Count 4、BM Com.Count 5、ACM Com count 6、LOADM Com count 7、BMS Com count	Special Func Energy Clear Null Recover Config Null Log Clear On ComCount Clear On Sys Max Vol 60.00V Sys Min Vol 40.00V Test Fail Clear Null	Special Func Alarm Delay(sec) 10000 Alarm Test Disabled LVD PLUS Disabled Update Trig On
Rectifier Com Count 01Rec Tx 113 01Rec Rx 113 02Rec Tx 113 03Rec Rx 112 04Rec Tx 111 05Rec Rx 111	IOM Com. Count 01IO Mon. Tx 0 01IO Mon. Rx 0 02IO Mon. Tx 0 02IO Mon. Rx 0	BM Com. Count 01Batt.Mon. Tx 0 01Batt.Mon. Rx 0
ACM Com.Count 01AC Mon. Tx 0 01AC Mon. Rx 0	LOADM Com.Count	BMS Com.Count

4.3.4. Quick Config Submenu

For the Quick Config submenu, the user makes a quick review and configuration to the “Battery”, “System”, “LVD” and “Phase” parameters. This menu is password protected. User can select “English” or “Russian” to be the SMU01 Language.

Quick Config 1、 Battery 2、 System 3、 LVD 4、 Phase			
Battery Banks 1 Cap per Bank ****Ah	System LBRS Disabled TC Enabled RedType L SysType AC-DC Language en_US Redifier Num 3 RedNumAlarm Disabled	LVD LVD1 DCN Vol 44.5V LVD2 DCN Vol 44.5V LVD3 DCN Vol 44.5V LVD4 DCN Vol 45.5V LVD5 DCN Vol 45.33V	Phase 7000010003 A 0 NULL 0 NULL 0 NULL 0 NULL 0 NULL 0 NULL

5. Alarm Information

Please see table below detailing the respective alarm information.

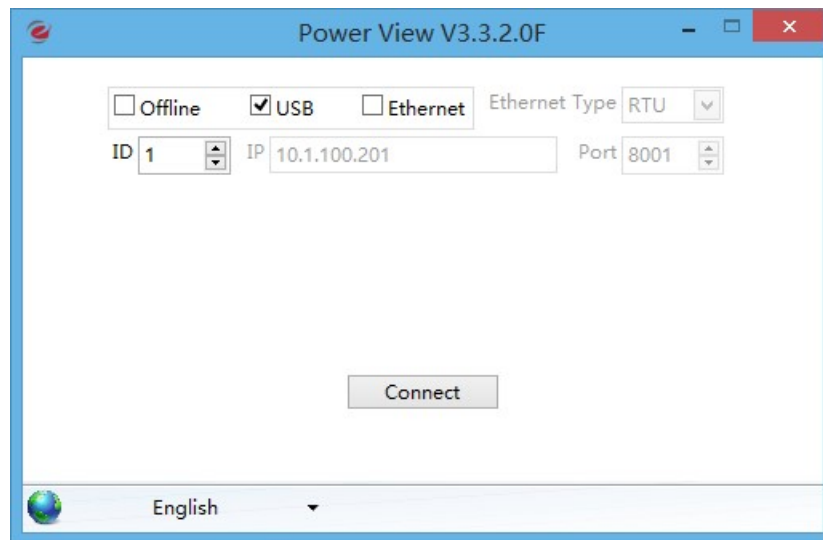
Alarm Reference	Description
AC Fault	All the rectifiers report AC input fault or a digital input defined as “AC Fault” is active
AC Overvoltage	AC voltage is higher than the set value of AC high voltage threshold
AC Undervoltage	AC voltage is lower than the set value of AC low voltage threshold
All Rectifiers Shutdown	All rectifiers are shutdown by the controller module
Ambient Temperature Sensor Fault	Ambient temperature sensor is faulty or interface issue with the I/O board
High Ambient Temperature	Temperature measured exceeds the set value of high temperature threshold
Low Ambient Temperature	Temperature measured is below the set value of the low temperature threshold
Battery Over Current	Battery charging current exceeds the charge current threshold of the battery capacity
Battery Current Limit	Battery charging current exceeds the set value of the battery current limit threshold
Battery Fuse Failure	Battery fuse is blown or battery switch is open (a digital input defined as “battery fuse failure” is active)
High Battery Temperature	Measured battery temperature exceeds the set value of the high battery temperature threshold
Low Battery Temperature	Measured battery temperature is below the set value of the low battery temperature threshold
Battery Test	The battery test function is active
Battery Test Failure	Battery tested using the battery test function has failed to meet the set requirements
Busbar Voltage Sensing Fault	The busbar voltage sensing (terminal P50) exceeds the average output voltage of the rectifier modules by 2.0V. If this fault occurs, the system bus voltage shall depend on the rectifier output voltage
Current Sensor Fault	The signal from the current sensor is out of range
Boost/Equalize Charge	The system is in boost/equalize charge mode
High Float Voltage	System bus voltage exceeds the set value of the high float voltage threshold
High Load Voltage	System bus voltage exceeds the set value of the high load/battery voltage threshold
Battery Discharging	The system is in battery discharge mode
Load Fuse Failure	Load fuse is blown or load switch is open (a digital input defined as “load fuse failure” is active)
Low Float Voltage	System bus voltage is below the set value of the low float voltage threshold
Low Load Voltage	System bus voltage is below the set value of the low load/battery voltage threshold
LVD Disconnect	The LVD contactor is disconnected from the load or battery
LVD Fault	The LVD signal and connect/disconnect status is inconsistent.
MOV Fault	One or more of the installed MOVs are faulty (a digital input defined as “MOV Fault” is active)
AC Fan Fault	AC fan has failed
Multiple Rectifiers Lost	Controller lost communication with more than one rectifier module
Multiple Rectifiers Failure	More than one rectifier has failed, or the module AC input is faulty (but

	not causing loss of phase or overall AC failure)
Single Rectifier Lost	Controller lost communication with only one rectifier module
Rectifier Current Limit	Rectifier output current exceeds the current limit threshold of the rectifier
Single Rectifier Failure	Only one rectifier has failed, or the module AC input is faulty (but not causing loss of phase or overall AC failure)
Rectifier – No Load	Total rectifier current is less than 2% of the maximum system output capacity. The set value is configurable
Rectifier Overtemperature Fault	Rectifier has automatically shut down due to its overtemperature protection function
Sensor Fault	When any one of the sensors (current sensor, voltage sensor or temperature sensor) is faulty
System Overload	The power system is operating near its maximum capacity. The threshold set value is configurable
Temperature Sensor Fault	Temperature sensor is faulty or interface issue with the I/O board
AC Sensing Board Fault	Loss of communication between the AC sensing board and controller module
Battery Interface Board Fault	Loss of communication between the battery interface board and controller module
High Battery Voltage	Battery voltage exceeds the set value of the high battery voltage threshold
Low Battery Voltage	Battery voltage is below the set value of the low battery voltage threshold
AC Input Overcurrent	AC input current exceeds the set value of the high AC input current threshold
High Input AC Frequency Fault	AC input frequency exceeds the set value of the high AC input frequency threshold
Low Input AC Frequency Fault	AC input frequency is below the set value of the low AC input frequency threshold

6. PowerView Software

The graphical user interface used for direct connection between the PC and the controller is established via the Powerview.

Main Window Screen

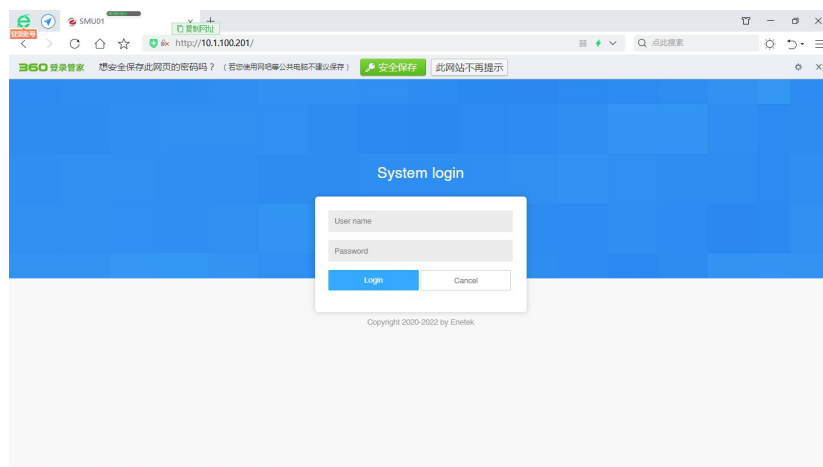


Above picture shows the main login page of PowerView. There are 3 connection modes that can be selected to establish the connection, namely, offline, USB and Ethernet.

To login, select the level of access (factory, service or user) and then type in the respective password. For further details, please refer to the manual of the PowerView Software.

7. Web Interface

Home Page



Web Interface uses the Web browser and the Web Page it downloaded as the User Interface. By using the Web Interface, the User will be able to communicate with the SMU01 Controller to retrieve information or to control the setting of the Controller

For further details, please refer to the Manual of the Web Interface.

8. IO Monitor (IOM01-000)

IO Monitor (IOM01-000) is an optional module use together with SMU01 Controller to provide expansion in Digital input and Digital output. They are useful in outdoor applications for climate control of a fan cooled outdoor cabinet such as Fan speed control, Temperature and Fuel sensing measurement collection etc.

For further details, please refer to the Manual of IO Monitor (IOM01-000).

9. Troubleshooting

During normal operation of the power system with controller module, the user may encounter some abnormal issues, which may be due to wiring or settings/configuration errors. Please refer to the table below for troubleshooting procedures of the common faults which may occur.

Issues Encountered	Possible Cause(s)	Actions that may be taken
Controller LCD has no display and “green” LED is not lighted	There is no input power supply	Check and ensure that cable connection to P1 is ok, and wait for start-up to complete
	AC input failure and battery LVD is disconnected	No action required. When AC input returns, the controller module will operate normally
	Voltage supply board fault or controller module fault	Check and replace the defective module
Controller LCD has no display and “green” LED is lighted	Controller is in start-up process	Wait for start-up to complete
	Controller is faulty	Replace controller module
Controller has either “red” or “yellow” LED lighted	There is an active alarm	Check and verify the alarm on the LCD display. Rectify as necessary
Incorrect battery or load current readings	Busbar voltage sensor connected in reverse polarity	Check and verify the polarity of the busbar voltage sensor connection
	Incorrect current shunt connections or settings	Check and verify the connections and settings of the shunt
	Battery current limit is active	Normal operation, no action required
Controller display configuration error	There may be a missing or invalid profile	An incorrect configuration file may have been accidentally loaded or a setting has been altered through the controller. Check and verify
	Different rectifiers are installed, resulting in incorrect output voltage	Check that the correct rectifier modules are installed. Change, if necessary
Communication issues with RS232	Incorrect cable, faulty cable or disconnected cable	Check and verify. Replace as necessary
	Check USB cable	Use alternative, if necessary
I/O board power and Communication OK LED is not lighted	I/O board does not have power supply or is faulty	Check and verify RS485 connections. Replace I/O board, if necessary

LVD contactor does not operate	LVD settings are incorrect	Check and verify that LVD is enabled and set value is correct. Check LVD manual release setting is set to Auto
	LVD contactor is disconnected	Check and verify that the control signal cable and power supply cable are connected
Rectifiers are turned on, but the system does not have DC voltage at the load output	Load fuse or load switch is in open position	Check whether the fuses are fused or there are issues with the load switches
	LVD contactor is disconnected from the load	Check and verify that LVD is enabled and set value is correct. Check and verify that the control signal cable and power supply cable are connected. Check and verify the LVD connections to the load
Battery is not connected to the system	Battery fuse or battery switch is in open position	Check whether the fuses are fused or there are issues with the load switches
	LVD disconnected due to AC failure and battery fully discharged	No action required. When AC supply is back to normal, the battery will automatically reconnect
	LVD contactor is in open position	Check and verify that LVD is enabled and set value is correct. Check and verify that the control signal cable and power supply cable are connected. Check and verify the LVD connections to the load
PowerView unable to access Controller after firmware upgrade	After firmware upgrade, the baud rate may be changed to 2400	Check the Controller baud rate using the keypad on the front LCD panel under Menu > 2. Configuration > 15. System Config > Monitor Address: set to 1 > Monitor Baud: set to 19200