

NetSure 2100 A31-S2/S3 Subrack Power System User Manual

1 Technical Parameters

See Table 1-1 for the technical data of NetSure 2100 A31-S2/S3 subrack power system (power system for short).

Table 1-1 Technical data

Parameter category	Parameter	Description
AC input	System Input	TN or TT, single-phase (L+N+PE)
	Rated input voltage	220Vac
	Input voltage range	85Vac ~ 300Vac (output derating below 176Vac)
	Input frequency range	45Hz ~ 65Hz
	Rated input frequency	50Hz
	Maximum input current	18.4A
DC output	Default output DC voltage	-53.5Vdc
	Standard configuration output current	0 ~ 52A
Mechanical	Dimension(W × D × H)	43.6mm × 482mm × 240mm
	Subrack power system weight(kg)	≤ 4kg (excluding rectifiers)
	Rectifier weight (kg)	≤ 0.6kg
Environmental	Operating temperature	-5°C ~ +45°C, 45°C ~ 65°C derating output
	Relative humidity	≤ 90%RH (30°C)
	Altitude	≤ 3000m (derating is necessary above 2000m, the max. working temperature is lowered by 1°C for every 200m increase in altitude)
	Over-voltage/pollution degree	Over-voltage: II; Pollution degree: 2

2 Installation

2.1 Safety Regulations

- Only the adequately trained personnel with satisfactory knowledge of the power system can carry out the installation and maintenance.
- Prevent fire disaster and personnel injury.
- Provide AC power supply that meets the requirement to equipment.
- Make sure the equipment is well grounding.
- Keep the equipment clean and dry.
- Avoid of touching the bare parts of the circuit.
- In case of suspicious failure, only can carry out 'Off' operation, shall not carry out 'On' operation.
- It is strictly forbidden to stand or place objects on the equipment body and accessories.

2.2 Preparation

Unpacking inspection

To inspect the equipment, you should open the packing case, take out the packing list and check against the packing list that the equipment is correct and complete. Make sure that the equipment is delivered intact.



Note

The rectifiers were installed in the subrack power system before delivery. If there are rectifiers configured in the order, the rectifiers will be installed in the subrack power system before delivery; if there is no rectifier configured in the order, then the subrack power system will not be installed with rectifier at factory. Customers need to install the rectifiers by themselves.

Preparing cables

The AC cable CSA should take into account the requirements like temperature rise, voltage drop, mechanical strength and the cable design should meet relevant industry standards. With cable length shorter than 30m, the CSA calculation should be based on the current density of 2.5A/mm². The suggested CSA value is not more than 10mm².

Select the DC load cable CSA according to the Table 2-1.

Table 2-1 DC load cable CSA selection

Load route rated current	Max. output current	Min. cable CSA	Max cable length (voltage drop: 0.5V with min. CSA)
50A	50A	6mm ²	3.5m
30A	24A	4mm ²	4.8m
10A	8A	1.5mm ²	5.5m
3A	2.4A	1.5mm ²	18.2m

Note: The specs are applicable at ambient temperature of 40°C. If the temperature is higher than this, the CSA of the cable should be increased. The maximal cable CSA should not larger than 10mm²

The CSA of DC cable depends on the current flowing through the cable, the allowable voltage drop and the load peak capacity. The recommended load peak capacity is 1/2 to 2/3 of the MCB/fuse capacity.

The CSA of grounding cable should not less than 2.5mm², and yellow-green double color cable is recommended.

Determining subrack configuration

NetSure 2100 A31-S2/S3 subrack can be accommodated with 1 ~ 3 rectifies, the actual configured rectifies are based on the order requirement. If the rectifier number is one, you need to select two dummy plate. If the rectifier number is two, you need to select one dummy plate. If the rectifier number is three, there is no need to select a dummy plate. The appearance of the rectifier is shown in Figure 2-1, the layout of the subrack panel is shown in Figure 2-2.



Figure 2-1 Appearance of the dummy plate

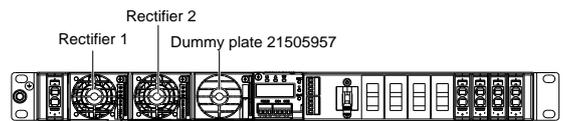


Figure 2-2 Layout of subrack panel

2.3 Installing Power System

The power system can be installed in 19 inch rack.

If rack mounting installation is used, firstly remove the two brackets, turn the bracket with the grounding screw to make the grounding screw facing forward, and then fasten the bracket to the front of the subrack left side wall, meanwhile, fix the other bracket after rotation to the front of the subrack right side wall. The position of the bracket is shown in Figure 2-3. Use the fixing screws to fasten the subrack power system to the rack through brackets. Strictly follow the direction shown in Figure 2-4 when installing the subrack power system. When carrying or installing the power system, it is prohibited to bottom up or turn over the power system.

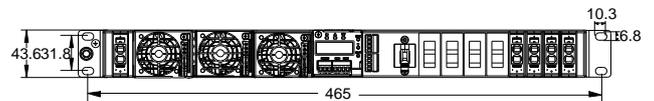


Figure 2-3 Installation dimension of subrack and brackets

Correct installing and carrying direction:

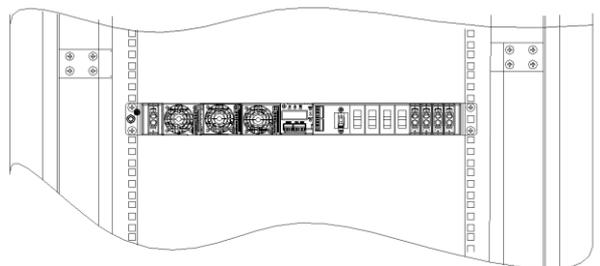


Figure 2-4 19'' rack installation

Wrong installing and carrying direction:

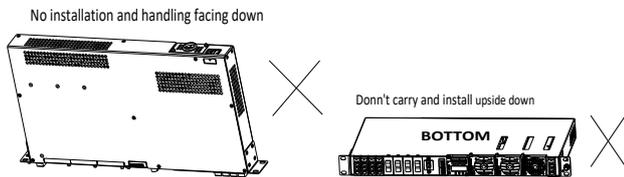


Figure 2-5 Wrong installing and carrying direction

2.4 Cable Connection



1. Switch off all MCBs before the electrical connection.
2. Only the qualified personnel can do the mains cable connection.
3. Before electrical connection, make sure all the AC MCBs of the power system are switched off, the AC 230/400V 20A double pole C type MCB is recommended.
4. There is a dangerous voltage in the primary circuit, disconnect the power supply before maintenance.

The configuration and connection position of NetSure 2100 A31-S2 are shown in Figure 2-6.

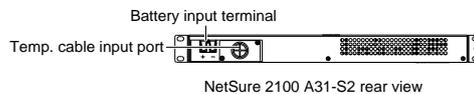
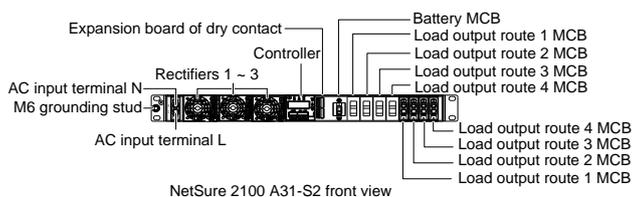


Figure 2-6 NetSure 2100 A31-S2 layout

The configuration and connection position of NetSure 2100 A31-S3 are shown in Figure 2-7.

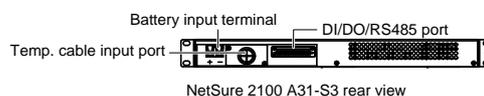
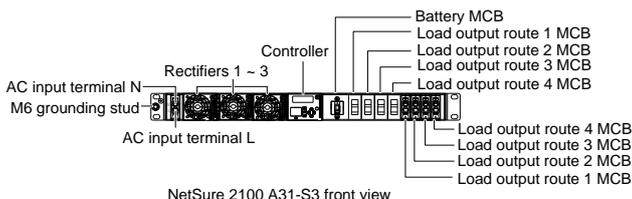


Figure 2-7 NetSure 2100 A31-S3 layout

2.4.1 Connecting Earth Cable

A M6 grounding stud is reserved on the mounting bracket. The grounding cable is yellow-green double-color cable, with cable specification up to 10mm². The cable ends are crimped to the OT terminals. The maximum OT10-6 terminals are used. Connect one end of the grounding cable to the M6 ground stud (see Figure 2-6, Figure 2-7) and the other end to the grounding bar of the 19-inch rack system.

2.4.2 Connecting AC Input Cables

1. The routing method of the AC input cables is same as that of the earth cables. Connect the live line (L) and neutral line (N) of the AC input cables respectively to the lower terminals of the power system AC input terminal L and AC input terminal N, as shown in Figure 2-8. Terminal connection method: Using a flat-blade screwdriver, press the terminal clamp as shown in Figure 2-8, insert the cable end into the corresponding port, and loosen the screwdriver to press the cable end.

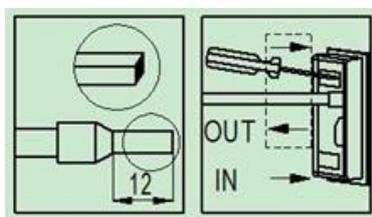
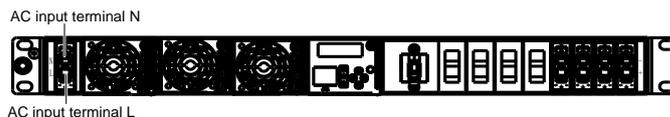


Figure 2-8 Illustration of connection terminal

2.4.3 Connecting Load Cables

The power system can be connected with four routes of load respectively controlled by four MCBs, as shown in Figure 2-6, Figure 2-7. Connect the negative load cable to the corresponding load '-' and then connect the positive load cable to the corresponding load '+' (see Figure 2-9). For the terminal connection method, please refer to 2.4.2 Connecting AC Input Cables.

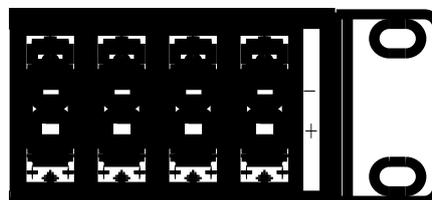


Figure 2-9 Illustration of load connection terminal

2.4.4 Connecting Battery Cable

The power system can be accessed in one group of batteries controlled by a battery MCB. The battery MCB is located on the front panel of the power system and the battery connection terminal is at the rear right side of the subrack. During connection, connect the negative battery cable to the battery terminal '-' and then connect the positive battery cable to the battery terminal '+'. Terminal connection method: As shown in Figure 2-10, use a flat-blade screwdriver, gently pull out the insulation film to prevent short circuit, loosen the screw, insert the corresponding cable end into the corresponding positive and negative terminals, and then tighten both screws. After that cover the terminal screw with the insulation film to avoid accidental short circuit.

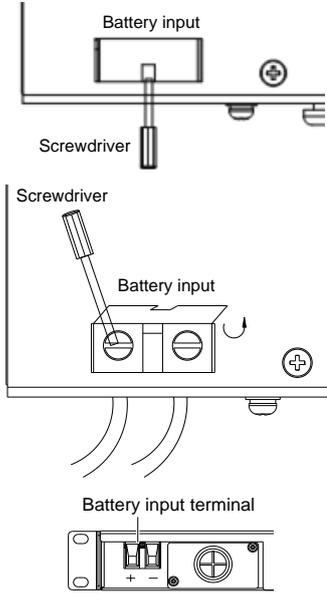


Figure 2-10 Illustration of battery connection terminal

2.4.5 Connecting Communication Cable

Connecting M225S dry contact output port

The controller is configured with two pairs of alarm dry contact output (DO1 ~ DO2) as standard configuration and four expanded outputs (DO3 ~ DO6) as optional. The dry contact that generating corresponding alarm is normally closed, users can connect according to actual needs. When wiring, connect the multi-core communication cable with the pipe terminal to the corresponding dry contact according to the dry contact silkprint on the controller, and then insert the terminal into the controller front panel. The position of communication terminal and port definition are shown in Figure 2-11 (Users need to prepare signal cable themselves).

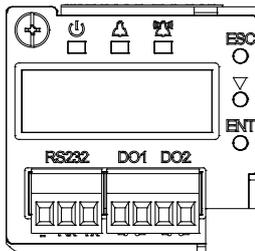


Figure 2-11 Illustration of controller front panel

Connecting RS232 port of M225S controller

The RS232 port is used for communication with the host. The correlation of the RS232 and DB9 port on the host is shown in Table 2-2. When wiring, connect the multi-core communication cable with the pipe terminal to the corresponding terminal according to the RS232 port silkprint on the controller, and then insert the terminal into the controller front panel, as shown in Figure 2-11 (Users need to prepare signal cable themselves).

Table 2-2 Correlation of ports

RS232 port	DB9 port
1 (Tx)	2
2 (Rx)	3
3 (GND)	5

Connecting M831A dry contact output port

The controller is configured with four pairs of alarm dry contact output (DO1 ~ DO4) as standard configuration and two routes of DI input and one route of RS485 output. The dry contact that generating corresponding alarm is normally closed, users can connect according to actual needs. The two routes of DI input only need to input DI dry contact and do not need to input external power. When wiring, connect the multi-core communication

cable with the pipe terminal to the corresponding dry contact according to the dry contact silkprint on the controller, and then insert the terminal into the controller front panel. The position of communication terminal and port definition are shown in Figure 2-12 (Users need to prepare signal cable themselves).

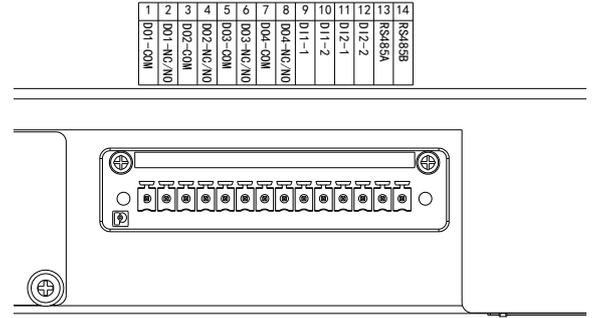


Figure 2-12 Illustration of NetSure 2100 A31-S3 rear signal output

Connecting Ethernet port of M831A controller

The front panel of M831A is configured with an Ethernet port. When wiring, just insert the network cable into the Ethernet port, as shown in Figure 2-13 (Users need to prepare network cable themselves).



Figure 2-13 Illustration of M831A controller front panel

2.4.6 Connecting Temperature Compensation Cable

For NetSure 2100 A31-S2 configuration, the corresponding controller is M225S, and a battery temperature compensation cable (Temp. cable for short) is configured. Take out the Temp. cable from the accessory at the site and connect the cable as follows.

1. Loosen the two screws fixing the panel at the rear of the subrack, and use a knife to cut along the cross center of the rubber ring, as shown in Figure 2-14.



Figure 2-14 Loosening the fixing screw

2. Lead the white terminal of Temp. cable through the rubber ring, as shown in Figure 2-15.



Figure 2-15 Leading the cable through rubber ring

3. Pull out the terminal labeled 'Temp' from the subrack power supply, as shown in Figure 2-16.



Figure 2-16 Position of white terminal

4. Plug the end of Temp. cable into the whitel terminal, and put the inserted terminal into the inside of the subrack, as shown in Figure 2-17.



Figure 2-17 Connecting the terminal

5. Fix the two screws of the cover plate, and attach the Temp. cable onto the battery pack, as shown in Figure 2-18.



Figure 2-18 Fixing the screws

For NetSure 2100 A31-S3 configuration, the corresponding controller is M831A, and a battery temperature compensation cable is configured. Take out the Temp. cable from the accessory at the site and connect the cable as above. When configuring one Temp. cable, one end of the Temp. cable is connected to the 'Temp.1' terminal, and the other end is attached to the battery pack. When configuring two Temp. cables, connect one end of the Temp. cables to the 'Temp1' and 'Temp2' terminals respectively. The other end of Temp1 is attached to the battery pack, and the other end of Temp2 cable is pasted in the corresponding position according to actual order requirements.

2.5 Installation Check

After the installation, you should carry out the inspection procedures given in Table 2-3.

Table 2-3 Installation check list

No.	Check content
1	Check that the power system is horizontally, vertically and steadily fixed
2	Check that all the bolts are tightened, especially those in electrical connections. Check that the bolts have plain washers and spring washers and are not reversed
3	Check that there are no unwanted materials inside the cabinet and clear up the unwanted materials
4	Check that the power system is intact. If there are scratches, paint them immediately with antirust paint to prevent corrosion
5	Check the correctness of all MCBs and cables specifications
6	Check the correctness of input and output cable connection, and communication between the power system and the system grounding. Make sure that all the cable connections are firm and reliable and the cable binding is tidy and normative
7	Check the correctness of the battery strings polarities
8	Measure the resistance value between the positive terminal and negative terminal and phase- to - phase resistance value in the AC loop. Make sure that there is no short-circuit
9	Check the AC input and distribution. Check that the color of the AC cables is normative, the cables are laid stably, and the safety labels are complete
10	Check that the rectifiers are clipped tightly
11	Check that all the MCBs are switched off

3 Testing

During testing, the corresponding safety regulations must be observed, and the testing procedures should be followed strictly. The system has been tested before delivery, the user does not need to carry on the field testing.

3.1 Testing Distribution Unit And Rectifiers

Note

Before the test, inform the chief manufacturer representative. Only trained electrical engineer can maintain and operate this equipment. In operation, the installation personnel are not allowed to wear conductive objects such as watches, bracelets, bangles and rings.

During operation, parts of this equipment carry hazardous voltage. Wrong operation may result in severe or fatal injuries and property damage. Before the test, Installation check must be done before testing. Then the batteries can be charged for the first time.

Make sure that the upstream AC output MCBs and load MCBs inside the subrack are switched off. Make sure that all the devices are properly installed.

Please check the power system according to below listed items.

Startup preparations

Check item	OK	Remark
Make sure that all the MCBs are switched off.	<input type="checkbox"/>	
Measure the AC input voltage. Make sure the input voltage is within the allowable range.	<input type="checkbox"/>	Umin= V
Make sure that the communication and dry contact alarm output cable are connected to the monitoring board	<input type="checkbox"/>	
Make sure that the temperature sensor is installed correctly	<input type="checkbox"/>	
Use a voltmeter to measure the battery string voltage and make sure the battery polarities are correct	<input type="checkbox"/>	Umin= V
Check with an ohmmeter that there is no short circuit between the positive & negative terminal of DC output, between the positive & negative battery poles or AC input terminals (Note: Pull out all modules before the check and restore them after the check)	<input type="checkbox"/>	

Startup

Check item	OK	Remark
Switch on the system AC output MCB, the green LED on the rectifier will be on after a certain delay	<input type="checkbox"/>	
Switch on the load MCB. Use a multimeter to check the voltage of both ends of load, if it shows 53.5V ± 0.5V, the voltage is normal	<input type="checkbox"/>	
Switch on the battery MCB	<input type="checkbox"/>	

3.2 Basic Settings

The parameters of the power system are set at the factory, and the factory default setting can meet the normal use of the power system. Users can modify the parameters (like AC over/under-voltage point, DC over/under-voltage point and so on) of the power system through background software. Users can also reset the commonly used parameters based on actual needs through LCD screen of the controller. When setting the system parameters, the user must enter the correct password before setting the parameters for the controller. For NetSure 2100 A31-S2 configuration, the password of M225S controller is 1.

The parameters that users can check and set are listed in Table 3-1.

Table 3-1 Settable parameters of power system

Parameter	Setting range	Default setting
Battery capacity	20Ah ~ 600Ah	100Ah
Battery protection	40V ~ 60V	43.2V
Float voltage	42V ~ 58V (lower than boost voltage)	53.5V
Boost voltage	42V ~ 58V (higher than float voltage)	56.4V
Shunt current	1 ~ 500A	75A
Shunt voltage	1 ~ 150mV	25mV
ECO enable	Enable/disable	Disable
Rely2	Load disconnect or alarm output	Alarm output
Walk in Time	1 ~ 128s	0s
Note:		
1. The battery protection voltage should be set according to battery manufacturer requirement.		
2. If iron lithium battery is configured by user, set relevant charging parameters according to the requirements of the battery manufacturers		

The layout of the indicators and keys on the controller front panel are shown in Figure 2-10. The definition of the indicator and key function are respectively listed in Table 3-2 and Table 3-3.

Table 3-2 Function of indicators

Indicator	Normal state	Fault state	Fault cause
Run indicator (green)	On	Off	The indicator 'ON' represents the system operating normally
Alarm indicator (yellow)	Off	On	There is one or multiple observation alarms
Critical alarm indicator (red)	Off	On	There is one or multiple major alarms

Table 3-3 Function of keys

Key	Name	Function
ENT	ENT	Confirm or execute the menu operation
▼	Down	Move the cursor to the next or shift to the next menu
ESC	Escape	Return or cancel

For NetSure 2100 A31-S3 configuration, the password of M831A controller is 640275. Users can log into the M831A controller webpage and set relevant parameters. When the controller is powered on, you can find the IP address, subnet mask, default gateway in 'Settings'-'Communication parameters' through the LCD screen, and note down them. Then set the IP address of the local computer to the same LAN segment. For example, if the controller IP address is 192.168.100.100, the IP address of the local computer can be set to 192.168.100.101. Both the subnet mask and the default gateway are kept the same as that of the controller. After that, log into the controller webpage by inputting the controller IP address through a web browser. Login user name: admin; password: 640275. After logging in, you can set the relevant parameters in the parameter setting page.

The parameters that users can check and set are listed in Table 3-4.

Table 3-4 Parameter setting of M831A controller

Parameter	Setting path	Default setting
Shunt Number	Batt. Charge-Shunt Number	1
String1 nominal capacity	Batt. Charge- String1 nominal capacity	100Ah
String1 rated current	Batt. Charge- String1 rated current	75A
String1 rated voltage	Batt. Charge- String1 rated voltage	25mV
Float voltage	Batt. Charge- Float voltage	53.5V
Boost voltage	Batt. Charge- Boost voltage	56.4V
LVD2 Enable	LVD- LVD2 Enable	Enable
LVD2 voltage	LVD- LVD2 voltage	43.2V
Contact type	LVD- Contactor type	Monostable
Temp.1 Enable	Temp- Temp.1 Enable	Batt.
Comp. Temp	Temp- Comp. Temp	Temp.1
ECO enable	ECO-ECO enable	Disable
AC failure	Settings -LVD -AC failure	Yes
Note:		
1. The battery protection voltage should be set according to battery manufacturer requirement.		
2. If iron lithium battery is configured by user, set relevant charging parameters according to the requirements of the battery manufacturers		

The layout of the indicators and keys on the controller front panel are shown in Figure 2-12. The definition of the indicator and key function are respectively listed in Table 3-5 and Table 3-6.

Table 3-5 Function of indicators

Indicator	Normal state	Fault state	Fault cause
Run indicator (green)	On	Off	The indicator 'ON' represents the system operating normally
Alarm indicator (yellow)	Off	On	There is one or multiple observation alarms
Critical alarm indicator (red)	Off	On	There is one or multiple major alarms

Table 3-6 Function of keys

Key	Name	Function
ENT	ENT	Confirm or execute the menu operation
▲	Up	Move the cursor up or shift to the previous screen
▼	Down	Move the cursor to the next or shift to the next menu
ESC	Escape	Return or cancel

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