

NetSure 2100 A31-S1 Subrack Power System Installation And Commissioning Manual

1 Technical Parameters

See Table 1-1 for the technical data of NetSure 2100 A31-S1 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 line voltage	220Vac
	Input phase voltage range	85Vac ~ 300Vac (output derating below 176Vac)
	Input frequency range	45Hz~65Hz
	Rated input frequency	50Hz
	Maximum input current	12.3A
DC output	Default output DC voltage	-53.5Vdc
	Standard configuration output current	0 ~ 34.4A
Mechanical	Dimension(W x D x H)	43.6mm x 482mm x 240mm
	Subrack power system weight(kg)	≤ 4kg (excluding rectifiers)
	Rectifier weight (kg)	≤ 0.6kg
Environmental	Operating temperature	-5°C ~ +40°C
	Relative humidity	≤ 90%RH (30°C)
	Altitude	≤2000m (derating is necessary above 2000m)
	Over-voltage/pollution degree	Over-voltage: II; Pollution degree:2

2 Installation

2.1 Safety Regulations

1. Only the adequately trained personnel with satisfactory knowledge of the power system can carry out the installation and maintenance.
2. Prevent fire disaster and personnel injury.
3. Provide AC power supply that meets the requirement to equipment.
4. Make sure the equipment is well grounding.
5. Keep the equipment clean and dry.
6. Avoid of touching the bare parts of the circuit.
7. In case of suspicious failure, only can carry out 'Off' operation, shall not carry out 'On' operation.
8. 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.

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 30 meters, the CSA calculation should be based on the current density of 2.5A/mm². The suggested CSA value is no less 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 (volt drop: 0.5V with min. CSA)
30A	20A	4mm ²	2.5m
20A	10A	1.5mm ²	1.9m
10A	5A	1.5mm ²	3.8m

Load route rated current	Max. output current	Min. cable CSA	Max cable length (volt drop: 0.5V with min. CSA)
Note: The specs are applicable at ambient temperature of 25°C. If the temperature is higher than this, the CSA of the cable should be increased. The maximal cable CSA should not larger than 10mm ²			

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.

2.3 Installing Power System

The power system can be installed against the wall or installed into 19 inch rack.

Note

1. When installing the power system against the wall, make sure that the wall strength and thickness meet the load-bearing and expansion bolt installation requirements.
2. The three brackets are fixed on both sides of the subrack power system before delivery.

1. If wall-mounting installation is used, firstly remove the three 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, respectively fix the other two brackets after rotation to the middle of the subrack left and right side wall. The position of the bracket is shown in Figure 2-2.

2. By referring to the dimension shown in Figure 2-1, mark the central points of the installation holes on the floor. Use an electric drill (aiguille: Φ8) to dig holes (depth: 45mm) at the marked points. Clean the holes off dust. Put the four expansion pipes (M6 x 65) into the holes and keep 20mm exposed.

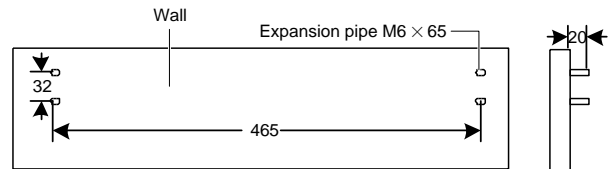


Figure 2-1 Installation dimension of cabinet base

3. As shown in Figure 2-2, use four groups of flat washer Φ6, spring washer Φ6 and nut M6 to fix the power system on the wall.

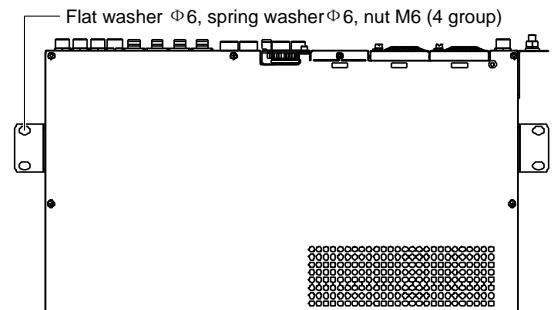


Figure 2-2 Fixing the power system

4. After the installation, the cabinet should stand firmly no matter how it is shaken.
5. If rack mounting installation is used, firstly remove the three 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 any one of the other two brackets after rotation to the front of the subrack right side wall (the rest bracket is no need to be fixed). The position of the bracket is shown in Figure 2-2, use the fixing screws to fasten the subrack power system to the rack through bracket.

2.4 Cable Connection

All the cables entering or outgoing the power system must be put into the metal pipe for protection. The metal pipe should be connected to the PE bar reliably. Plastic coated metal hoses are recommended.

Danger

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.

2.4.1 Connecting Earth Cable

Connect one end of the earth cable to the grounding terminal (see Figure 2-3), and solder the other end to the grounding metal base outside the power system.

2.4.2 Connecting AC Input Cables

1. The routing method of the AC input cables is the 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 2-3.

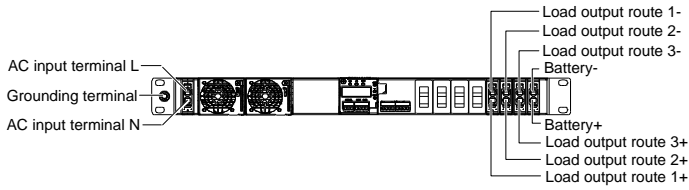


Figure 2-3 Illustration of connection terminal

2.4.3 Connecting DC Cables

The power system can be connected with three route of loads respectively controlled by three MCBs, as shown in Figure 2-3. Connect the negative load cable to the corresponding load '-' and then connect the positive load cable to the corresponding load '+' (see Figure 2-3).

2.4.4 Connecting Battery Cable

The power system can be accessed in one group of batteries controlled by a battery MCB, as shown in Figure 2-3. During connection, connect the negative battery cable to the battery terminal '-' and then connect the positive battery cable to the battery terminal '+' (see Figure 2-3).

2.4.5 Connecting Communication Cable

Connecting 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, take out the female of the 4-pin phoenix terminal bound at the controller handle, connect the multi-core communication cable with the pipe terminal to the corresponding female of the phoenix terminal 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 2-4 (Users need to prepare signal cable themselves).

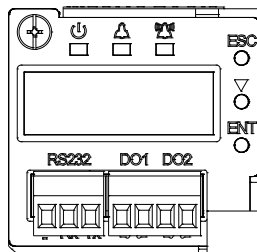


Figure 2-4 Illustration of controller front panel

Connecting RS232 port

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, take out the female of the 3-pin phoenix terminal bound at the controller handle, connect the multi-core communication cable with the pipe terminal to the corresponding female of the phoenix terminal according to the RS232 port silkprint on the controller, and then insert the terminal into the controller front panel, as shown in Figure 2-4 (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

2.4.6 Connecting Temperature Compensation Cable

If the user selects the temperature compensation cable, first loosen the captive screw in the upper left of the controller, and slowly pull the controller out of the power system until the 3pin temperature sensing interface J2 is exposed on the monitoring board. Then table out the temperature compensation cable and insert the cable into the interface, and then slowly push the controller into the power system and fix the captive screw.

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. Misoperation may result in severe or fatal injuries and property damage. Before the test, check the equipment to ensure the proper grounding. Installation check must be done before testing. Then the batteries can be charged for the first time.

Make sure that the AC output MCBs, rectifier MCBs and load MCBs 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. 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
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 2-4. 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

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