

NetSure 731 A91

Subrack Power System Installation And Commissioning Manual

1 Technical And Engineering Data

See Table 1-1 for the technical data.

Table 1-1 Technical Data

Parameter category	Parameter	Description
Environmental	Operating temperature	-5°C ~ +40°C
	Relative humidity	5%RH ~ 95%RH (none condensing)
	Altitude	≤2000m
AC input	System Input	Three-phase four wire ; Three-phase five wire
	Rated input voltage	220Vac
	Input voltage range	85Vac ~ 305Vac (output derating below 176Vac)
	Input frequency range	45Hz ~ 65Hz
	Rated input frequency	50Hz
	Maximum input current	64A (With 3500e3 module) 55A (With 3000e3 module)
DC output	Rated output voltage	-53.5Vdc
	Standard configuration output current	543A (With 3500e3 module) /466A (With 3000e3 module)
Mechanical	Dimension(mm)	≤483 × 400 × 352 mm
	Weight(kg)	≤43kg (subrack with rectifiers, controller and package) ≤24.8kg (subrack without rectifiers, controller and package) ;

2 Installation

2.1 Safety regulations

Certain components in this power system have hazardous voltage and current. Always follow the instructions below:

1. Only the adequately trained personnel with satisfactory knowledge of the power system can carry out the installation. The most recent revision of these safety rules and local safety rules in force shall be adhered to during the installation.
2. All external circuits that are below 48V and connected to the power system must comply with the requirements of SELV as defined in IEC 60950.
3. Make sure that the power (mains and battery) to the system is cut off before any operations can be carried out within the system subrack.
4. The wiring of the power distribution cables should be arranged carefully so that the cables are kept away from the maintenance personnel.

2.2 Preparation

Unpacking inspection

The equipment should be unpacked and inspected after it arrives at the installation site. The inspection shall be done by representatives of both the user and Vertiv Tech Co., Ltd. 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.

Cables

The cable design should meet relevant industry standards.

It is recommended to use the RVVZ cables as AC cables. The cable should reach at least +70°C temperature durability. With cable length shorter than 30 meters, the Cross-Sectional Area (CSA) calculation should be based on the current density of 3.5A/mm². The suggested CSA value is no less than the Table 2-1.

Table 2-1 AC cable CSA selection

AC MCB rated current	Max. AC input current	Min cable CSA	Max cable CSA
100A	64A	25mm ²	50mm ²

The CSA of DC cable depends on the current flowing through the cable and the allowable voltage drop. To select the battery cable CSA, see Table 2-2, select the DC load cable CSA according to the table 2-3.

Table 2-2 Battery cable CSA selection

Battery MCB rated current	Max. battery current	Min cable CSA	Max cable length(volt drop: 0.35V with max. CSA)
125A	100A	35mm ²	7m

Note:

1. The specs are applicable at ambient temperature of 25°C.
2. The battery cable should reach at least +90°C heat durability. It is recommended to use double-insulated copper-core flame retardant cable as battery cable.

Table 2-3 DC load cable CSA selection

Load route rated current	Max. output current	Min. cable CSA	Max cable length (volt drop: 0.35V with min. CSA)	Max. cable CSA	Max cable length (volt drop: 0.35V with max. CSA)
63A	50A	16mm ²	5m	25mm ²	8m
32A	25A	10mm ²	6m	25mm ²	15m
16A	12A	6mm ²	8m	25mm ²	31m

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.

To prevent the air switching capacity is too large, the load doesn't work when overload. Recommended the capacity of the air switching is up to 1.5~2 times of the load peak.

The CSA of the system grounding cables should be consistent with the largest power distribution cables. The CSA value is no less than 25mm².

2.3 Mechanical Installation

Note

1. The cabinet or rack the subrack power system installed in must provide fireproof and electric protection casing, or install in cement or other difficult to burn, at the same time and other combustible materials to keep enough distance.
2. For the convenience of maintenance, users should maintain a clearance of 800mm at the front of the power system.
3. Subrack cannot be installed against the wall, it must leave enough space for heat dissipation.

Installed on battery rack

1. Fix the subrack power system to the battery rack through the connectors with M6 bolts, as shown in Figure 2-1.

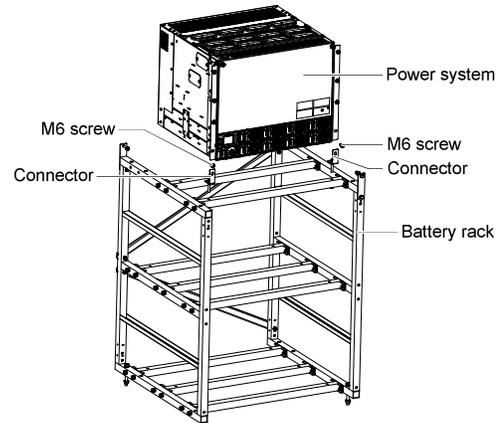


Figure 2-1 Cabinet and rack installation

Installed in cabinet

Insert the power supply system into the cabinet and fixed with M6 screws, as shown in Figure 2-2.

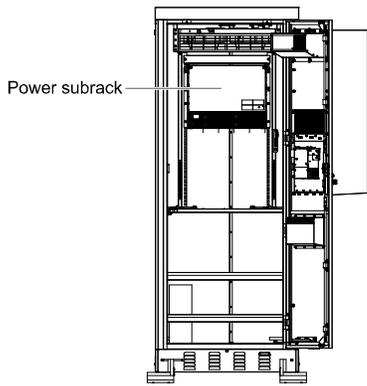


Figure 2-2 Installed in the cabinet system

The engineering graphics of the subrack power system as shown in Figure 2-3.

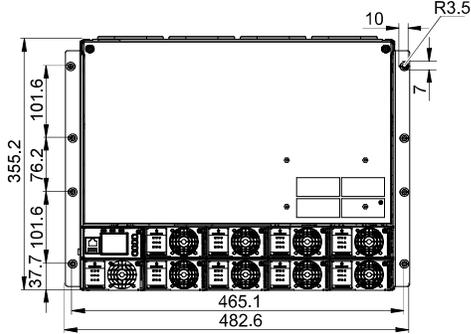


Figure 2-3 Installation size of NetSure 731 A91

Note

1. Tighten the captive screw of the MFU Panel by the cross head screwdriver when there is no operation.
2. Also tighten the handle by the cross head screwdriver.

2.4 Electrical Installation

2.4.1 Power System Cabling Method

Cabling from the top of the power system

The top cover is rubber ring top cover.

Rubber ring top cover for MFU unit cabling :

Use the electrician knife incise the "+" mark on the rubber unit. As shown in Figure 2-4. Cabling from the cable outlet area and then fixed to the cable-bundling plate and the top edge by using cable ties.

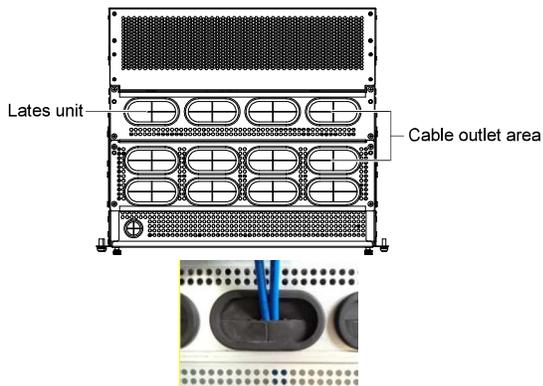


Figure 2-4 Cable entry illustration of the MFU unit

Cabling from the side of the power system

Warning

When the subrack is installed independently on the outside (not installed in the rack). Using system side outlet. The clearance of the outlet hole must be sealed after connecting the cable to prevent it from touching the live part of the frame.

Use a cross head screwdriver to remove two screws which fix the cabling panel at side of cabling area, then the cable can be led out from the cabling area, as shown in Figure 2-5.

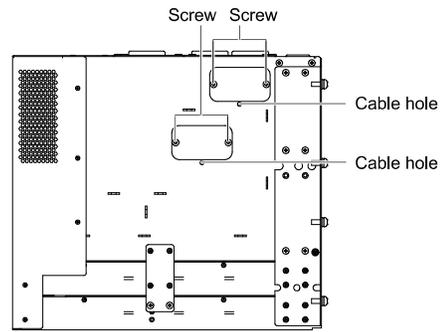


Figure 2-5 Side cabling

2.4.2 Connecting AC Input Cables

Danger

1. Switch off all MCBs before the electrical connection.
2. Only the qualified personnel can do the mains cable connection.

For NetSure 731 A91-S1 power system, the position of the connection terminals are shown in Figure 2-6. After connecting AC cables, fixing cables on top or side cable banding area by using cable ties.

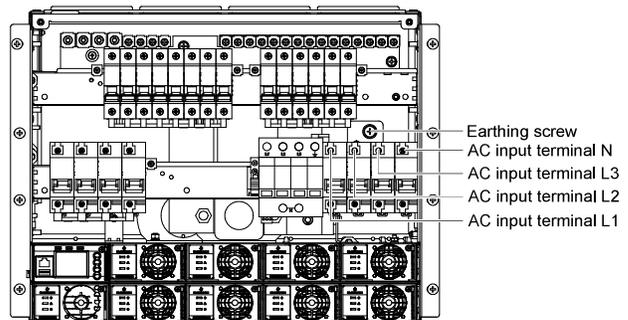


Figure 2-6 Illustration of NetSure 731 A91-S1 connection terminal

Note

Recommended tightening torque of user grounding screw is 10.78N*M.

2.4.3 Connecting Load Cables

Connect the negative load cable to the upper terminal of load MCB and then connect the positive load cable to positive terminal. As shown in Figure 2-7.

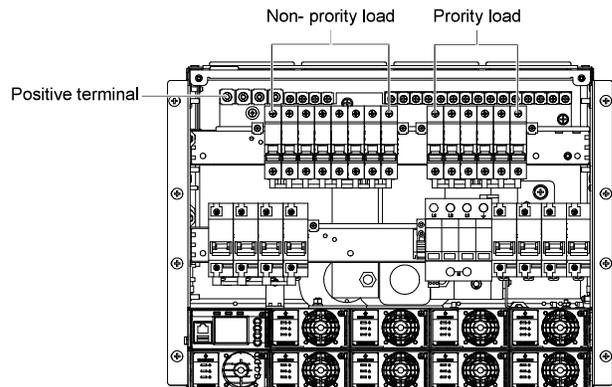


Figure 2-7 Illustration of the load cable connection terminal

2.4.4 Connecting Battery Cable

Note

1. The batteries may have dangerous current. Before connecting the battery cables, the corresponding battery input MCBs or the battery cell connector must be disconnected to avoid live state of the power system after installation.
2. Be careful not to reverse connect the battery. Otherwise, both the battery and the power system will be damaged!

1. Connect one end of the negative battery cable to the upper terminal of battery MCBs. Connect one end of the positive battery cable to the DC positive bus bar.

2. Connect copper lugs to the other end of the battery cables. Bind the connecting parts with insulating tape, and put them beside the battery. Connect the cables to the battery when the DC distribution unit is to be tested. As shown in Figure 2-8.

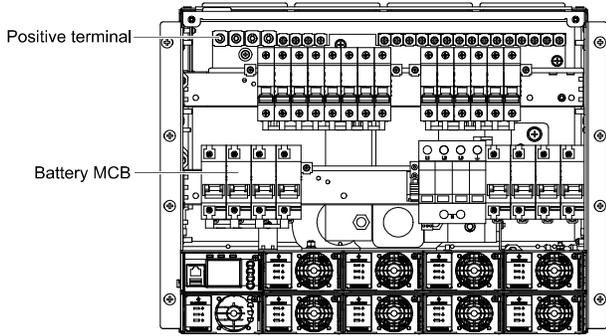


Figure 2-8 Illustration of the battery connection terminal

2.4.5 Connecting Signal Cables

There is an optional user interface board for NetSure 731 A91-S1/S3. The MA4C5U31 user interface board is used for M830B controller, as shown in Figure 2-9. The Netsure 731 A91-S2 is equipped with user interface terminals is shown in Figure 2-10.

Connecting dry contact signal cable

M225S controller and M225S1X1 user interface board cable connection as shown in Figure 2-9.

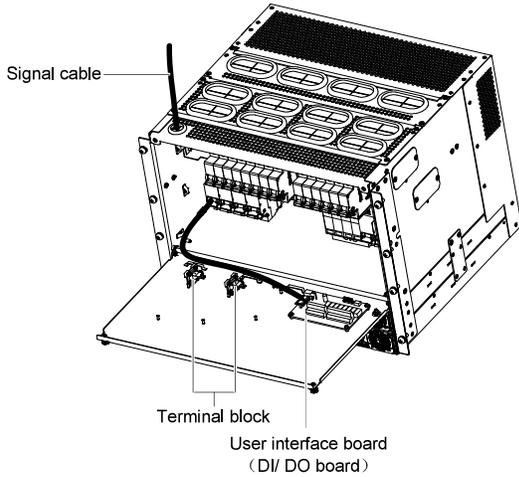


Figure 2-9 Netsure 731A91-S1/S3 user interface board illustration

MA4C5U31 User Interface Board can provide 8 DI and 8 DO. For alarm type and corresponding relay, users can set it by background software according to the actual situation. Netsure 731 A91-S2 user interface board position as shown in Figure 2-10.

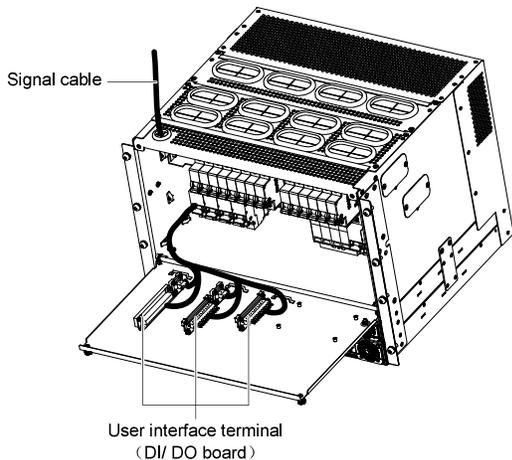


Figure 2-10 Netsure 731A91-S2 user interface board illustration

Digital output: relay isolation, Max.:30Vdc/1A, 125Vac/0.5A, 60W; Min.: 10uA@10Vdc.

Connecting Communication Signal Cable

The communication port of M830B controller is shown in Figure 2-11.



Figure 2-11 M830B controller communication port

The communication port of M530B controller is shown in Figure 2-12.



Figure 2-12 M530B controller communication port

3 Commissioning

During installation test, the corresponding safety rules should be adhered to. The system has been tested before out of the factory, user doesn't need to test on site

3.1 Installation Check And Startup

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 earthing. Installation check must be done before testing. Then the batteries can be charged for the first time.

Make sure that the AC input MCBs, battery MCBs and load MCBs are switched off. Make sure that all the devices are properly installed.

Startup preparations

	OK	Remark
Make sure that all the MCB 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
Check that the communication and alarm cables are connected to the signal transfer board.	<input type="checkbox"/>	
Check that the temperature sensor, if any, has been installed.	<input type="checkbox"/>	
Measure with a voltmeter across the connection points of each battery and make sure that the polarity is right. If the voltage of certain cell is lower than 12.0V, that cell must be replaced.	<input type="checkbox"/>	Umin= V
Check with an ohmmeter that there is no short circuit between the positive & negative distribution bus bars, or between the positive & negative battery poles (Note: Pull out all modules before the check and restore them after the check)	<input type="checkbox"/>	

Startup

	OK	Remark
Switch on the system AC input MCB. The green LED on the rectifier will be on and the fan will start running after a certain delay.	<input type="checkbox"/>	
Switch on the load MCB. Check the system voltage and busbar polarity with a voltmeter. If the voltage is 53.5V ± 0.5V, it's OK.	<input type="checkbox"/>	
Switch on the battery MCB.	<input type="checkbox"/>	

3.2 Basic Settings

The system parameters have been set when out of the factory. The default settings are able to satisfy the normal requirements. User should enter correct password to change settings.

M830B controller password is 640275. System settings see Table 3-3.

Table 3-3 M830B controller parameter settings

Parameter	Path	Default settings
Capacity	NCU home page—Settings—Battery charge—Battery 1 capacity	300Ah
LVD1 enabled	LCD—Settings—LVD Settings—LVD1 enabled	Enabled
LVD2 enabled	LCD—Settings—LVD Settings—LVD2 enabled	Enabled
LVD1	LCD—Settings—LVD Settings—LVD1 Volt	44.0V
LVD2	LCD—Settings—LVD Settings—LVD2 Volt	43.2V
AC Fail Required	Web—Advanced Settings—System—LVD Group—AC Fail Required	Y
Num Batt Shunts	LCD—Settings—Bat. Settings—Basic Settings—Num Batt Shunts	1
Batt shunts settings	LCD—Settings—Bat. Settings—Basic Settings—Battery 1—Shunt Current/Shunt Voltage	600A/25mV
Contactor type	Web—Settings—LVD—Contactor type	Monstability
Walk-in	LCD→Settings→Rect Settings→Walk-in on	Y
Walk-in T	LCD→Settings→Rect Settings→Walk-in T	128S
Note: The above battery protection voltage should be set according to the battery manufacturer's requirements. The battery capacity should be set according to the actual configuration.		

M530B controller password is 640275. System settings see Table 3-4.

Table 3-4 M530B controller main parameter settings

Parameter	Path	Default settings
System Type	Quick Settings →System Type	48V/SET
Capacity	Quick Settings →Capacity	150Ah
LVD2	Settings→Bat. Settings→LVD Settings →LVD2 Volt	43.2V
LVD1	Settings→Bat. Settings→LVD Settings →LVD1 Volt	44.0V
Batt shunts settings	Settings → Basic Settings → Batt Shunts 1	N
Batt shunts settings	Settings → Basic Settings → Batt Shunts 2	Y
BLVD contactor	Bat. Settings → LVD Settings → BLVD Volt	43.2V
AC Phase	Settings→Input Settings→AC PH	3-PH
Walk-in	Settings→Rect Settings→Walk-in on	N
Walk-in T	Settings→Rect Settings→Walk-in T	8S
Note: The above parameters need to be adjusted according to the actual situation.		

Vertiv Tech Co., Ltd.

Address: Block B2, Nanshan I Park, No.1001 Xueyuan Road, Nanshan District, Shenzhen, 518055, P.R.China

Homepage: www.vertiv.com

E-mail: overseas.support@vertiv.com

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