

Shenzhen Kaiyuan New Energy Technology Co.,Ltd.

NXR100030 Charger Module

User Manual

Version V1.0

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1 NXR100030 Charger Module Overview

1.1 Specifications

Table1-1 Charger Module Parameters

Item	Specifications
Basic Specifications	
Dimensions	85mm(H)×360mm(W)×459mm(D)
Weight	≤19kg
Efficiency(full load)	>95.5%
Standby Power Consumption	12W+/-0.5W
Cooling Mode	Forced air cooling
Communications Bus Protocol	CAN bus
No. of Parallel Modules	≤60pcs
Indicator	Green: normal operation Yellow: alarm Red: fault
Input Characteristics	
Input Voltage	285Vac~475Vac, three phase + protective earth
Input Current	<60A
Grid Frequency	45Hz~65Hz
Power Factor	≥0.95(6kw≤output power≤15kw); ≥0.98(15kw≤ output power≤30kw)
ITHD	≤5 % (15kw≤ output power≤30kw)
Output Characteristic	
Voltage Range	100Vdc~1000Vdc
Current Range	0A~100A (continuously regulated)
Rated Current	30A
Voltage Tolerance	≤±0.5% (voltage stabilization status, input voltage 323Vac~456Vac, output voltage 200Vdc~1000Vdc,output current 0~rated current)
Current Tolerance	≤±1 % (current stabilization status, input voltage 323Vac~456Vac, output voltage 200Vdc~1000Vdc,output current 20% ~100% load)
Current Sharing Imbalance	≤±3 %
Ripple Voltage Peak Value Coefficient	≤1%(voltage stabilization status ,input voltage 323Vac~456Vac, output voltage 200Vdc~1000Vdc,output current 0~rated current)
Environmental Specifications	
Operating Temperature	−40℃ ~ +75℃, output derating at above 60℃

Storage Temperature	−40℃ ~ +75℃
Relative Humidity	≤95%RH, non-condensing
Altitude	No derating below 2000m, When the altitude is above 2000 m, the operating temperature decreases by 1℃ for each additional 100 m
MTBF	>500,000 hours
EMC	
Surge	Line-line: ±2kV, Line-ground: ±4kV Level: 4References GB/T 17626.5-2008; GB/T18487.2-2017
EFT	±4kV Level : 4References GB/T 17626.4-2018; GB/T18487.2-2017
ESD	±6kV/±8kV Level: 3 ReferencesGB/T 17626.2-2018; GB/T18487.2-2017
PQF	Voltage dips meets GB18487.2-2017 criterionB
PFMF	100A/m Level: 5 References GB/T 17626.8-2006; GB/T18487.2-2017
RF-EMS	10V/m Level: 3 ReferencesGB/T 17626.3-2016; GB/T18487.2-2017
Conducted Susceptibility	Meets requirements @0.15~80MHz References GB/T 17626.6-2017 ; GB/T18487.2-2017
Harmonic Current Emission	Meets GB/T18487.2-2017 requirements References GB/T17625.8-2015; GB/T18487.2-2017
Voltage Fluctuation and Flicker	Meets GB/T18487.2-2017 requirements References GB/T17625.8-2015; GB/T18487.2-2017
Conducted Emission	Class A, meets GB/T18487.2-2017 requirements References GB/T18487.2-2017;
Radiation Emission	Class A, meets GB/T18487.2-2017 requirements References GB/T18487.2-2017;
Others	
Emergency Stop Protection	External input 12V, low level operation, high level shutdown (high level range: 9V ~ 15V)
Safety Requirements	Meets general specifications for electric vehicle off-board DC charger, NB/T 33001-2018, NB/T 33008.1-2018
Startup Time	Output startup time 3~8s
Insulation Resistance	DC/AC to enclosure, DC to AC ≥10MΩ
Dielectric Strength	AC input terminal to enclosure, 3500V DC voltage, 1min, no breakdown or flashover, steady state leakage current <10mA;

	AC input terminal to DC output terminal, 3500V DC voltage, 1min, no breakdown or flashover, steady state leakage current <10mA; DC output terminal to enclosure, 3500V DC voltage, 1min, no breakdown or flashover, steady state leakage current <10mA;
ROHS	R5

1.2 Function Details

1. Hot-plugging

Hot-plugging charger modules, easy installation and maintenance.

2. Current sharing

Auto current sharing between modules, current imbalance less than 3%。

3. AC input Power limiting

The relationship between output power and input voltage is shown in Chart 1-1. When input voltage is between 323Vac~475Vac (hysteresis less than 15V), module can output maximum power.

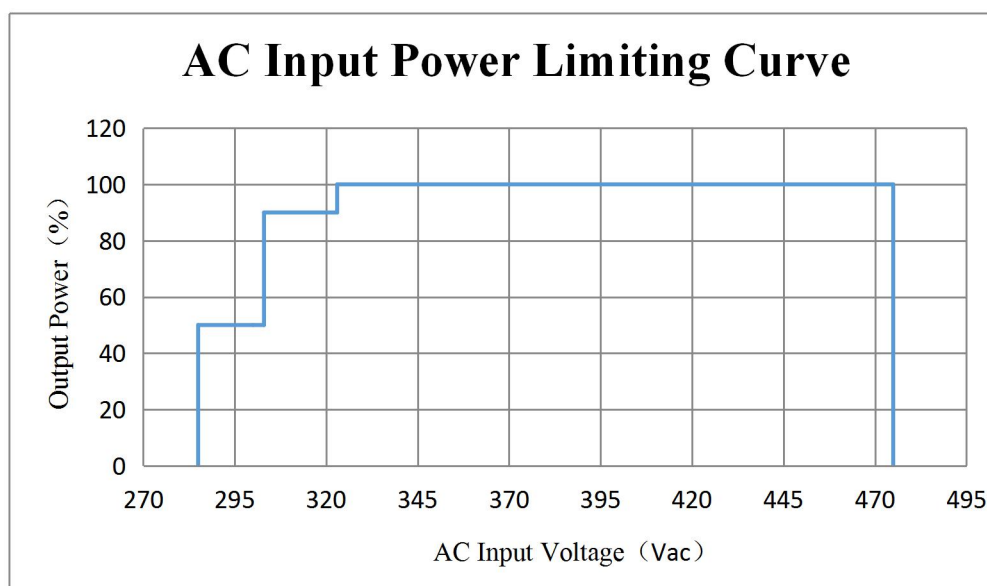


Chart 1-1 AC Input Power Limiting Curve

4. Output constant power control

NXR100030 is at rated input voltage, allowed output power is 30kw, relationship between output voltage and output current is shown in Chart 1-2.

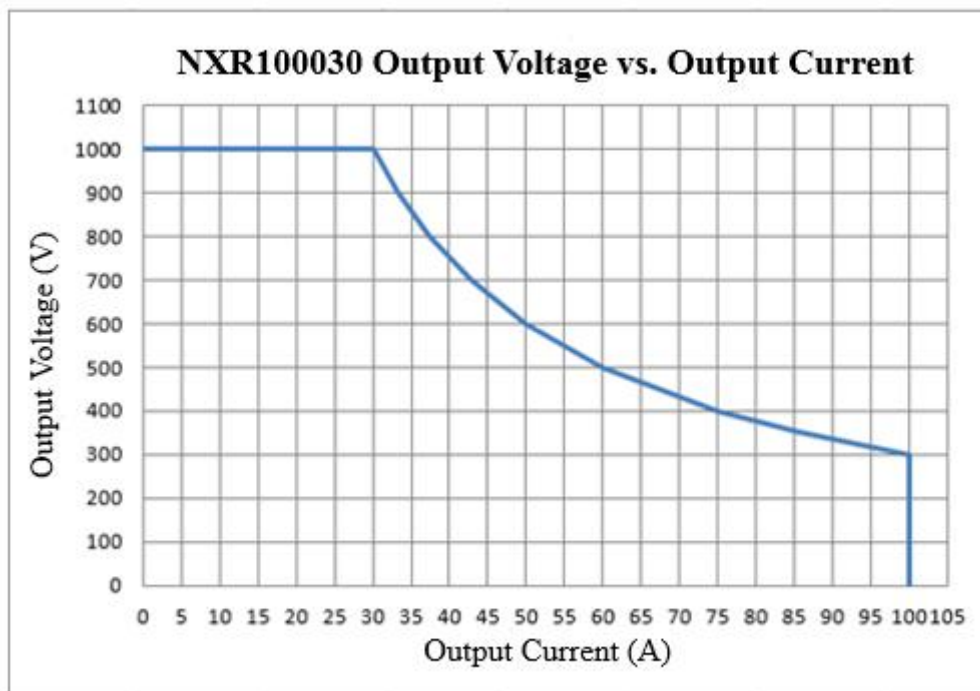


Chart 1-2 NXR100030 Output Voltage vs. Output Current

5. Temperature derating

No derating under 60°C ambient temperature;

Output derating at above 60°C ambient temperature, piece-wise linear power limiting;

When ambient temperature is above 75°C, output power becomes 0.

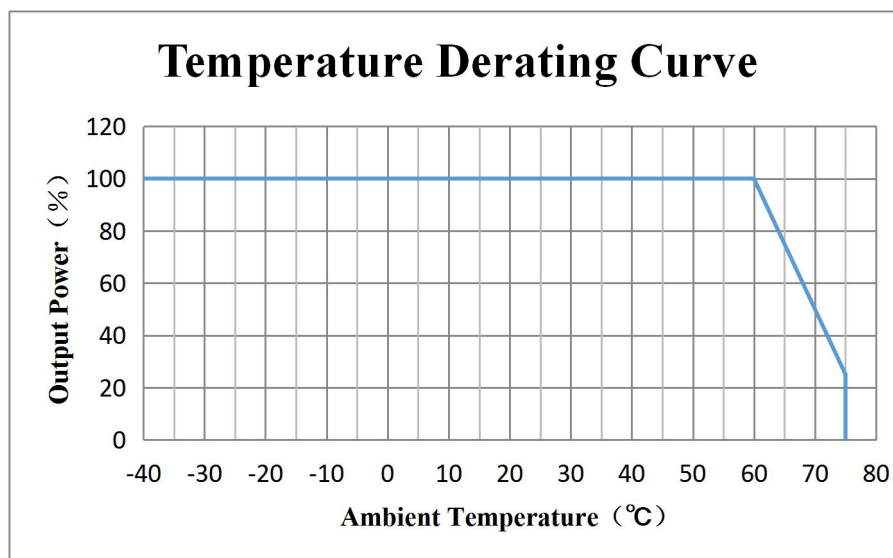


Chart 1-3 Temperature Derating Curve

6. Output current configuration

Through external monitor module, current of module can be configured continuously between 0A to 100A.

7. Output voltage adjustment

Through external monitor module, output voltage of modules can be adjusted continuously, minimum adjustable pace is 0.1Vdc.

8. Input over/under voltage protection

When input voltage is less than 270Vac or greater than 490Vac, protection alarm indicator goes on, the module will stop working, no output.

When overvoltage or undervoltage alarm occurs, module will report it to the monitor; LED digital tube shows fault code E33. When input voltage returns to normal range, the module keeps power-off, and output is controlled by upper system.

9. Output overvoltage protection

Hardware overvoltage protection voltage for NXR100030 is 1025Vdc. Software overvoltage protection voltage can be configured by a monitor module, configurable range is 200Vdc~1025Vdc, default setting is 1025Vdc.

The fault indicator goes on, LED digital tube shows fault code E36, the module need to be reset by removing from the system to start.

10. Over temperature protection

Over temperature protection point is 75°C. When over temperature is above 75°C, the module will power-off automatically. The alarm indicator goes on, LED digital tube shows fault code E32.

When environmental temperature returns to normal range, the module keeps power-off, and output is controlled by upper system.

11. Internal bus fault protection

When the internal bus voltage exceeds the over/under voltage protection voltage or is unbalanced. The module will shut down automatically. At this point, the module will have no output, and the alarm indicator goes on.

12. Short circuit protection

The module will shut down when a short circuit situation occurs, red indicator goes on and module will report "module failure" to the monitor. LED digital tube shows fault code E35

13. Background communication failure

The factory default of NXR100030 communication overtime is 5s. The communication overtime can be set through the monitor, and can be set in the range of 5s-120s. When a communication failure occurs, module will shut down, no voltage output. At the same time, protection indicator will blinking. When communication is

restored, the indicator will return to normal and module will return to normal working state.

2 Structure and Installation

2.1 Structure

1) Front Panel

Indicators, LED digital tubes and buttons on the front panel of the charger module are shown in Figure 2-1 and 2-2.



Figure 2-1 Front Panel

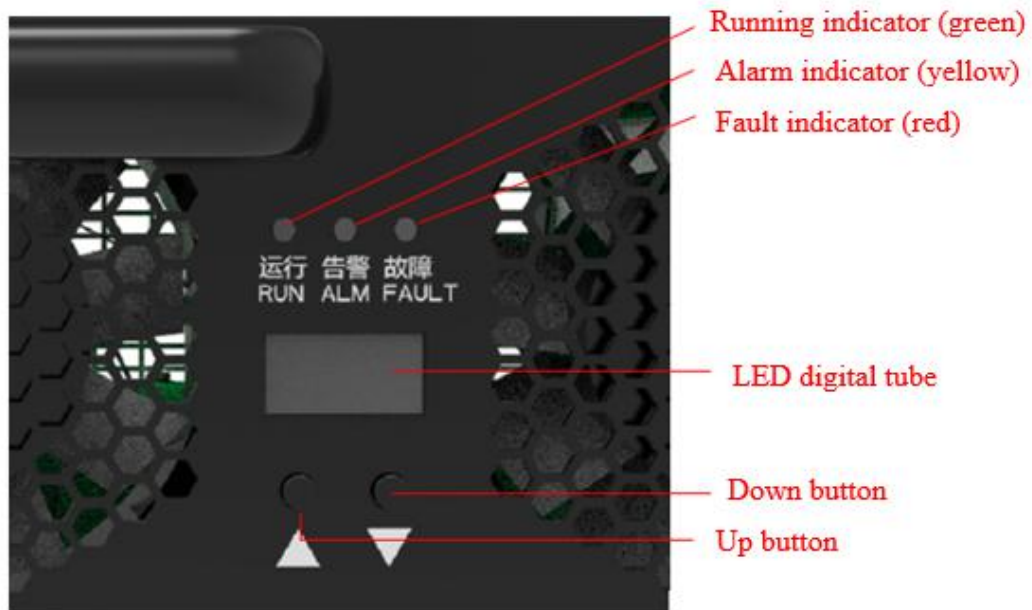


Figure 2-2 Front Panel Information

Front panel has three indicators, Indicator descriptions see Table 2-1.

Table 2-1 Indicator Descriptions

Indicator	Normal State	Abnormal State	Description
Running Indicator (green)	Steady On	Off	Charger has no input power
Alarm Indicator (yellow)	Off	Steady on	AC input fault, over temperature, bus voltage fault, output under voltage, severe current imbalance
Fault Indicator (red)	Off	Steady on	Output over voltage, output short circuit, internal address conflict

LED digital tube can display module output voltage, output current, address, group number, fault code, module version and other information.

Module has two button, up button(▲) and down button (▼). The module information can be viewed by pressing the button. For example, module output voltage, output current, fault code, address, group number, module version. Press (▲) or (▼) to display in sequence as shown in Figure 2-3, the first page is the output voltage by default.

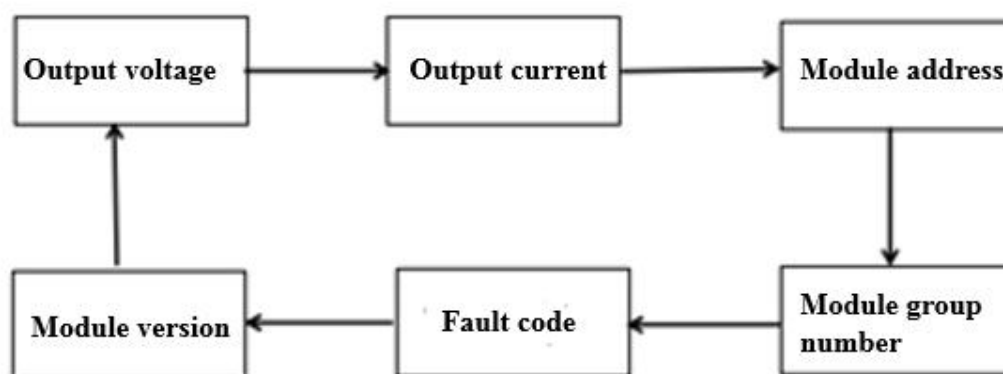


Figure 2-3 Module information display sequence

Through button, it can set module parameters: module address and module group number. The group number can only be changed by button when the module is in standby mode and the group mode is dynamic. The steps of setting module parameters are as follows:

1. Press (▲) or (▼) to switch the display to the information interface.
2. Press (▲) or (▼) for about 2.5 seconds, then release, and the display will blinking.
3. Press (▲) or (▼) to change setting.

4. Press (▲) or (▼) for about 2.5 seconds and release to save the data.

The allocation method of default address is fixed when module leaves the factory, it can set module address by button, the address range is 0x00~0x3E. It can also set the address allocation method to dynamic allocation by monitoring. At this time, the setting range of module group number is 0x00~0x07, it is displayed on the digital tube.

Modify the module address as follows: take 0x00 to 0x04 as an example to explain.

Firstly, press (▼) to turn to page 3, the interface of 00 will appear, press (▲) or (▼) for about 2.5 seconds to release, the interface will blinking, then press (▲) for a short time continuously. Press (▲) or (▼) for about 2.5s to save after interface 04 appears.

Modify the module group number as follows: take 0x00 to 0x04 as an example to explain. Firstly, press (▼) to turn to page 4, the interface of 000 will appear, press (▲) or (▼) for about 2.5 seconds to release, the interface will blinking, then press (▲) for a short time continuously. Press (▲) or (▼) for about 2.5s to save after interface 004 appears.

When module appears faults, it can adjust to the interface of fault code by button. The module alarm information is displayed on the LED digital tube in the form of fault code, the fault codes are shown in table 2-3

Fault code	Meaning
E31	Output undervoltage
E32	Overtemperature (Including environment over temperature of ambient temperature and internal over temperature of module because of air duct blocked)
E33	AC over/under voltage
E34	AC no-full-phase
E35	Output short circuit
E36	Output overvoltage
E37	Address confliction
E38	Fan fault
E39	Current sharing alarm

2) Terminal Definitions

The rear end of the charger module has AC input terminal and DC output terminal. As show in figure 2-4

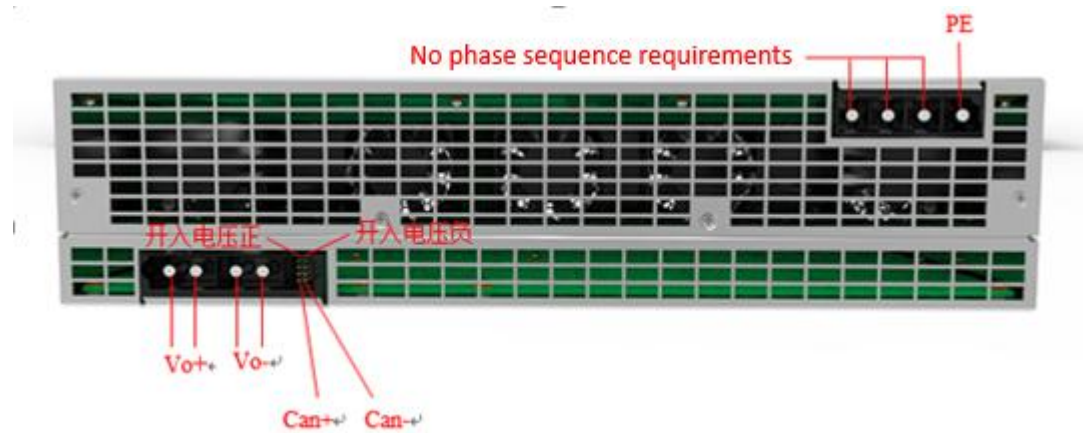


Figure 2-4 Input and Output Terminal Appearance

3) Label

Label is attached to the top cover of charger module, see figure 2-5.

Charger Module	
型号MODEL:	NXR100030
交流输入AC Input:	285-475V/56A
直流输出DC Output:	20-1000V/0-100A
额定功率Power:	30kW
恒功率电压范围Constant Power Voltage Range:	300-1000V
Made in China	

Figure 2-5 Label

2.2 Dimensions

2.2.1 The dimension of NXR100030 is shown in figure 2-6

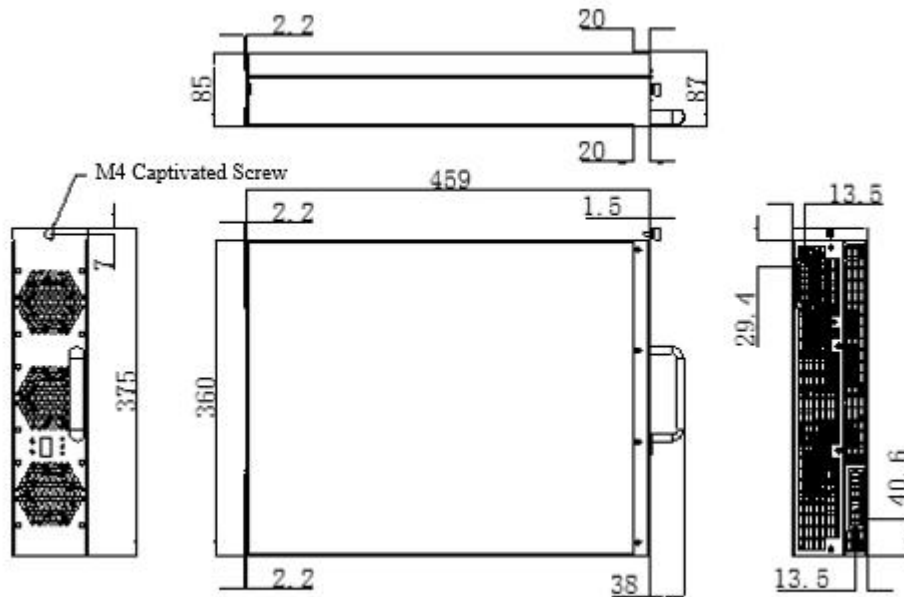


Figure 2-6 Module Dimensions (mm)

2.2.2 NXR100030 module system terminals installation standard:

1) System terminals (input cable terminal, output cable terminal) are installed on the terminal installation panel, see Figure 2-7

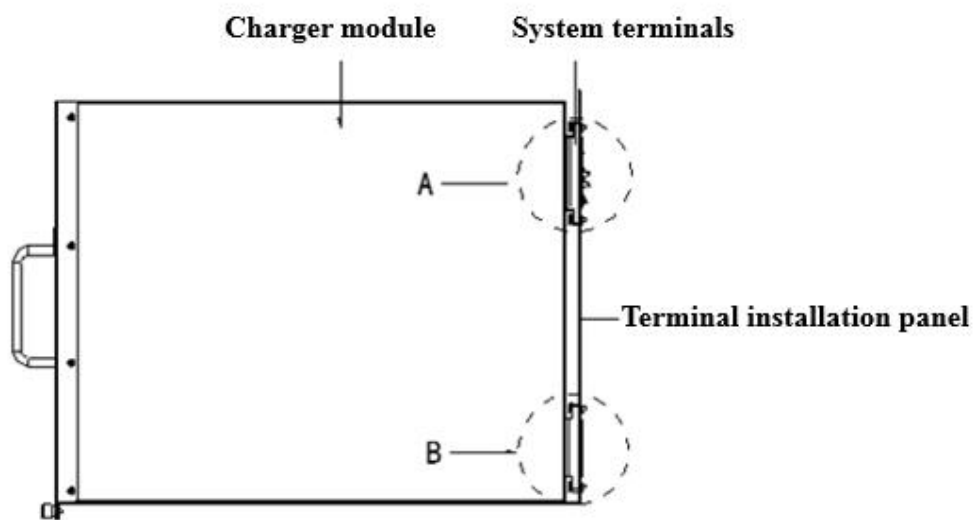


Figure 2-7 System Terminal Installation

2) After the module is mounted on the pile, it is required that module terminals and system terminals are tightly connected, no gaps allowed. Ensure module terminals and system terminals are connected reliably, see Figure 2-8.

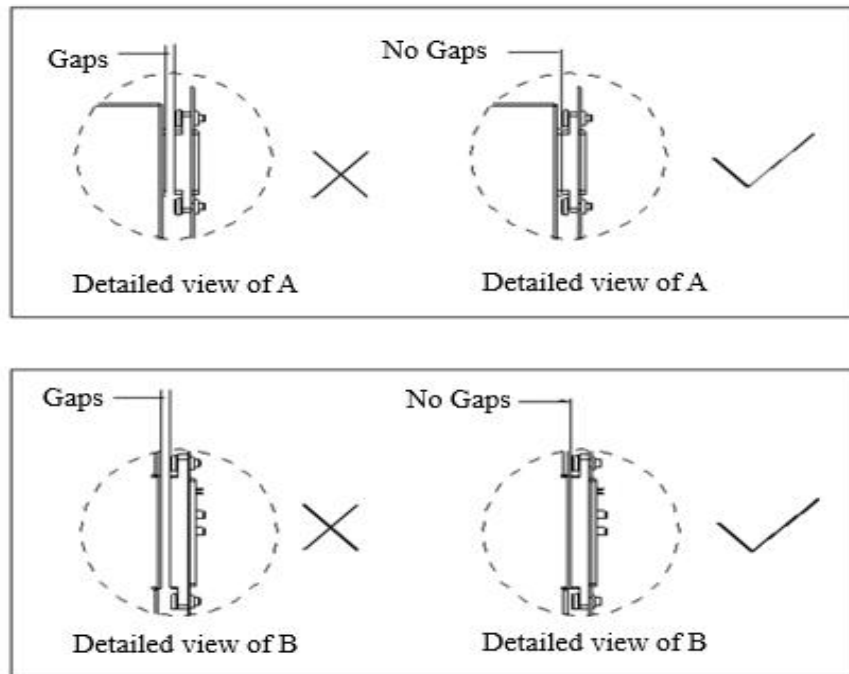


Figure 2-8 Module Terminals and System Terminals Installation

2.3 Installation

Installation steps of charger module are as follows,

1. Grab handle of charger module with one hand, and hold charger module with the other. Insert charger module into the corresponding position of the cabinet.
2. Slowly push the charger module into slot completely.
3. Tighten fixing screws on the charger module panel and fix it on the cabinet.
4. Charger modules should installed into the cabinet from left to right.

2.4 Use

After the charger module is installed in the system cabinet, the system can operate after power up.

Operating environment:

1. Overvoltage/installation category: Overvoltage category II.
2. Pollution level: Pollution level III.
3. Altitude: No derating ≤ 2000 m. When the altitude is above 2000 m, operating temperature decreases by 1°C for each additional 100 m.
4. Ac input distribution system: TN or TT System
5. System exhaust air rate requirement:

System required exhaust wind volume is calculated according to thermology equations. According to equation $V=Q/(C_p \cdot \rho \cdot \Delta T)$, where C_p is heat capacity (kJ/(kg·K)) under current temperature, ρ is air density (kg/m³) under current temperature, current temperature is average temperature of inlet and outlet air temperature, ΔT is the temperature difference of system inlet and outlet (usually a 12 degree difference is chosen for outdoors cabinet), Q is system total losses (kW. Sun radiation needed to be considered in strong sunlight areas. Intensity of sun illumination is generally 0.85kW/ m². Specific radiation heat is related to cabinet surface characteristics), wind volume V (m³ / s) can be calculated. This calculated value is the wind volume that system actually required. Max wind volume of fan should be chosen according to 2 times of this value.(Actual work efficiency point of fan is approximately at half of its max wind volume, fan wind pressure related). Actually wind volume V need to be greater than $N \cdot v$, **which means max wind volume of fan need to be greater than $2N \cdot v$ (v is wind volume of a single module, N is module number).**

Wind volume of a single module is shown as follows.

NXR100030 module max exhaust wind volume 215CFM (0.10105 m³ / s)

3 Maintenance Guide

3.1 Troubleshooting

Chart 3-1 Troubleshooting Instructions (Standard Protocol)

Indicator	Description	Analysis	Solution
Run Indicator (Green) off	Module communication fail	No input voltage	Ensure there is input voltage
		Charger module is not fully plugged in the slot	Re-plug the module
Alarm Indicator (Yellow) Steady On	Module overheat Fault code:E32	Fan blocked	Remove the object that prevents the fan from
		Air duct blocked	Remove the object that blocks air duct or clear dust
	Module current imbalance Fault code:E39	The difference between the module current and average current is too large	Check charger module communication, check communication cable connection; If the communication is good and alarm persists, replace charger module.
	PFC voltage abnormal	PFC output over/under voltage protection	Swap charger module with alarm with a normal charger module, if alarm persists, replace charger module.
	AC over/under voltage Fault code:E33	AC input voltage is not in the normal range	Ensure AC input voltage is in the normal range
	Module communication fail	Module communication fail	Check communication cable connection
	Module short circuit Fault code:E35	Module positive and negative pole short circuit	Power off the charger module, check whether the positive and negative poles on the output circuit are short circuited, and reboot after confirming that there is no short circuit. If alarm persists, replace charger module.

Fault Indicator (Red) Steady On	Module overvoltage Fault code:E36	Module output voltage exceeds the set output overvoltage value	Power off the charger module, check whether the module output voltage has been changed, and check that the module output voltage is less than the set module output overvoltage value. And then, reboot after pulling out the charger module, if alarm persists, replace charger module.
	Address confliction Fault code:E37	Address confliction	Check if module operates in DIP switch mode. If so, check if there is a confliction in DIP switch address.
	Fan fault	Fan fault	Change fan

3.2 Replace Charger Module

In case of module fault, please follow the steps below to replace charger module,

1. Surface temperature of charger module maybe high, be careful when pulling a module out;
2. Check whether the appearance of new charger module is intact; set DIP switch address the same as the replaced module;
3. Disconnect the ac input circuit breaker of the fault charger module, loosen the fixing screws on the panel;
4. Grab the handle of the failed charge module, pull it out of the cabinet slowly;
5. Slowly push the new charger module into the cabinet;
6. Tighten the fixing screws on the panel;
7. Close the charger module ac input circuit breaker;
8. Check whether the monitor module can identify the newly replaced charging module, and check current sharing between newly replaced charger module and. If all items are normal, it indicates that newly replaced module is in normal operation

Appendix I Identification Chart of Toxic and Harmful Substance

Component	Toxic or harmful substances or elements					
	Lead	Mercury	Cadmium	Hexavalent Chromium	Polybrominated Biphenyl	Polybrominated Diphenyl Ethers
	Pb	Hg	Cd	Cr6+	PBB	PBDE
Fan	X	O	O	O	O	O
Manufactured board	X	O	O	O	O	O
Metals	X	O	O	O	O	O
<p>○ : The content of the toxic and harmful substance in all homogeneous materials of the component is below the limit specified in SJ/ t-11363-2006</p> <p>×: The content of the toxic and hazardous substance in at least one homogeneous material of the component</p> <p>Toxic and hazardous substances contained in the following components and applications are limited to the current technical level and cannot be replaced reliably or there is no mature technical solution:</p> <p>1. The solder contains lead</p> <p>2. Lead in copper</p>						
<p>Remarks about environmental protection period of use: The environmental protection period of use of the this product (marked on the product) refers to the period, from the production date, under normal conditions of use, complying with the safety precautions, during which product contained toxic and harmful substances or elements will not have serious impact on the environment, personal and property.</p>						
Scope of application: NXR series charger module						