



INSTALLATION & OPERATING MANUAL FOR KIT 2KW~20KW

THE POWER OF ASTRONERGY



ASTRONERGY

A **CHNT** COMPANY

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1 Introduction

1.1 Purpose

This manual describes the assembly, installation, commissioning and maintenance of the following Astronergy KITs:

KIT-EU (Europe)		
CHPS-R1-2-EU	CHPS-R1-3-EU	CHPS-R1-5-EU
CHPS-R1-10-EU	CHPS-R1-20-EU	
CHPS-R2-2-EU	CHPS-R2-3-EU	CHPS-R2-5-EU
CHPS-R2-10-EU	CHPS-R2-20-EU	
KIT-AS(Australia)		
CHPS-R1-2-AS	CHPS-R1-3-AS	CHPS-R1-5-AS
CHPS-R2-2-AS	CHPS-R2-3-AS	CHPS-R2-5-AS

1.2 Target group

This manual is for qualified personnel. Qualified personnel have received training and have demonstrated skills and knowledge in the construction and operation of this device. Qualified Personnel are trained to deal with the dangers and hazards involved in installing electric devices.

Notes: The manual and other documents must be stored in a convenient place and be available at all times.

Qualification of Skilled Workers

- Knowledge of how an PV KIT system works and is operated.
- Instruction in how to deal with the dangers and risks associated with installing and using electrical devices and plants.
- Training in the installation and commissioning of electrical devices and plants.
- Knowledge of all applicable standards and guidelines.
- Knowledge and observance of this manual and all safety instructions.

1.3 Safety

- Consult and follow local codes and other applicable laws concerning required permitting as well as installation & inspection requirements, rules, and regulations. • KIT system should be installed and maintained by qualified personnel.
- Follow all safety precautions of all components used in the system.
- Children are forbidden to play with the Astronergy PV KIT system, keep the Astronergy PV KIT system away from children.

1.4 Limitation of liability

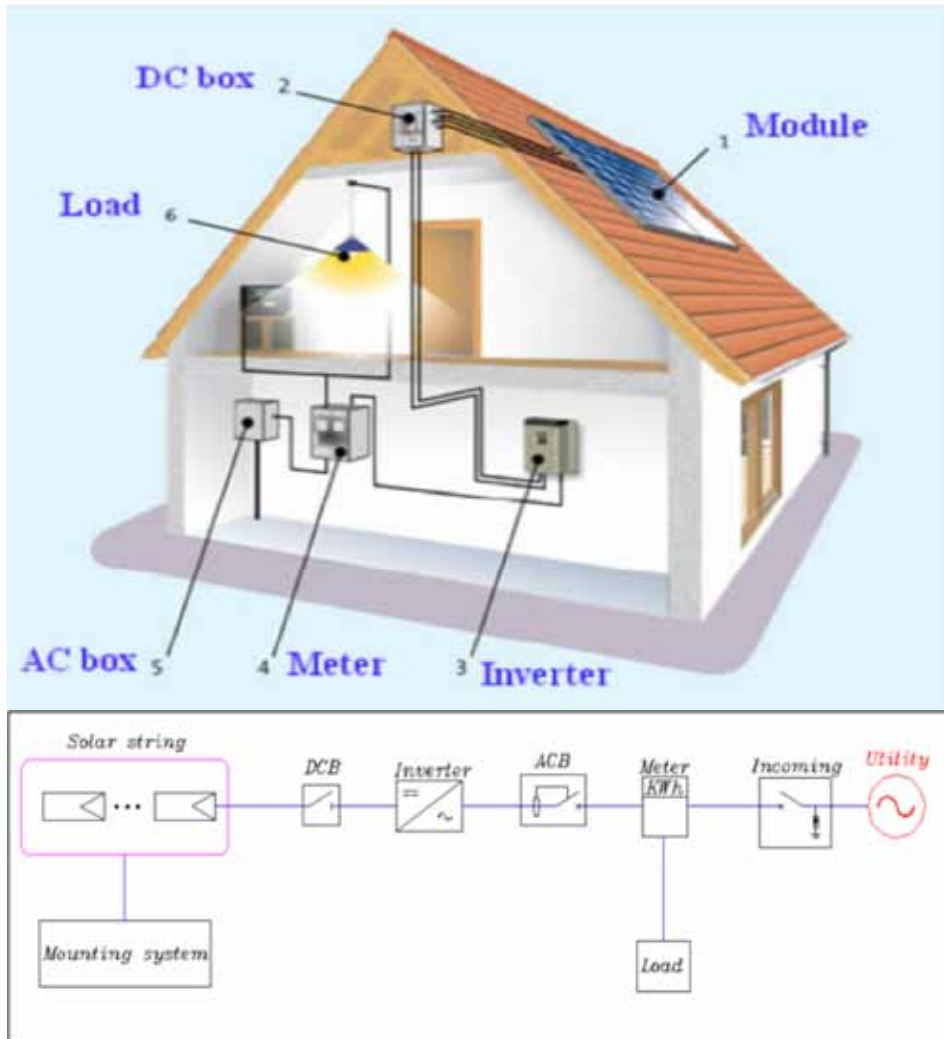
Because the use of this manual and the conditions or methods of installation, operation, use and maintenance of photovoltaic (PV) products are beyond Astronergy's control, Astronergy does not accept responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with such installation, operation, use or maintenance. Astronergy reserves the right to change the manual without prior notice. Since the design is based on certain conditions, whether can be used should be confirmed by the customers own.

2 Astronergy KIT

2.1 Overview



2.2 PV system schematic diagram



2.3 Applicable condition

- (1) Ambient temperature: $-25^{\circ}\text{C} \sim +50^{\circ}\text{C}$
- (2) Ambient relative humidity: $\leq 95\%$
- (3) Altitude: $< 2000\text{m}$
- (4) Max. snow load(mounting system): $0.3\text{KN}/\text{m}^2$, Max. wind load(mounting system): $26\text{m}/\text{s}$
- (5) Roof top load capacity: $\geq 20\text{Kg}/\text{m}^2$
- (6) Roof top area(the side face to south): $\geq 9\text{m}^2/1\text{KW}$
- (7) Roof top Shape: agree to the fixed and supported components of mounting system
- (8) Cabling length: $< 20\text{m}$ Some technical specifications can be designed on the owner's requirement.

2.4 Unpacking and inspection

After opening the package, please check the contents of the box. It should contain the following:

Item	Type				
	2KW	3KW	5KW	10KW	20KW
Module	8pcs	12pcs	20pcs	40pcs	80pcs
Mounting system	1set	1set	1set	1set	1set
Inverter	1set	1set	1set	1set	1set
DC box (optional)	1set	1set	1set	1set	1set
AC box	1set	1set	1set	1set	1set
PV cable	50m	50m	100m	100m	200m
MC4 connector	4sets	4sets	8sets	8sets	16sets
KIT manual	1	1	1	1	1

Mounting system(tile on-roof):

Item	KIT model				
	2KW	3KW	5KW	10KW	20KW
Aluminum rail	12	18	30	60	120
Roof hook	12	18	30	60	120
End clamp	8	12	20	40	80
Middle clamp	12	18	30	60	120
T-splice bar	16	24	40	80	160
Flange hex bolt	32	48	80	160	320
T-head bolt	12	18	30	60	120
Flange nut	12	18	30	60	120
T-nut(for end clamp)	8	12	20	40	80
T-nut(for middle clamp)	12	18	30	60	120
Inner hex bolt(for end clamp)	8	12	20	40	80
Inner hex bolt(for middle clamp)	12	18	30	60	120
Wood screw	48	72	120	240	480

Mounting system(Corrugated metal sheet roof):

Item	KIT model				
	2KW	3KW	5KW	10KW	20KW
Aluminum rail	12	18	30	60	120
Hanger bolt	20	30	50	100	200
End clamp	8	12	20	40	80
Middle clamp	12	18	30	60	120
T-splice bar	16	24	40	80	160
Flange hex bolt	32	48	80	160	320
T-head bolt	20	30	50	100	200
Flange nut	20	30	50	100	200
T-nut(for end clamp)	8	12	20	40	80
T-nut(for middle clamp)	12	18	30	60	120
Inner hex bolt(for end clamp)	8	12	20	40	80
Inner hex bolt(for middle clamp)	12	18	30	60	120

MC4 connector:

Item	Type				
	2KW	3KW	5KW	10KW	20KW
Positive plug	4	4	8	8	16
Negative plug	4	4	8	8	16
Positive Copper core	4	4	8	8	16
Negative Copper core	4	4	8	8	16

Notes: Please check all of the accessories carefully in the carton. If anything missing, contact your dealer at once. Thoroughly inspect the packaging upon delivery, if you detect any damage to the packaging which indicates the inverter may be damaged, inform the responsible transport company immediately. We will be glad to assist you if required.

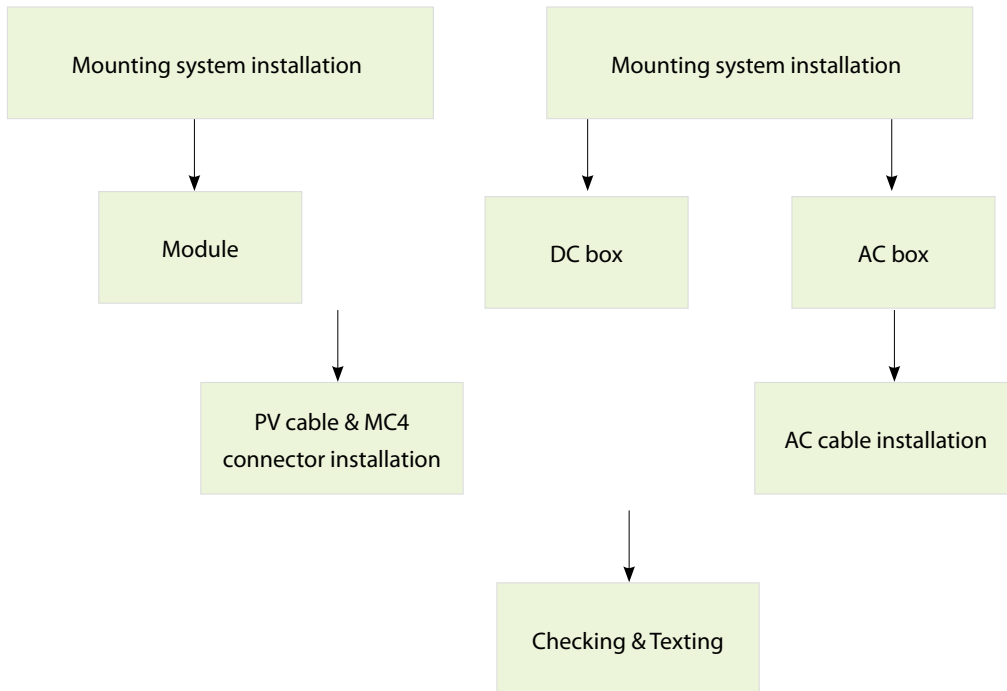
3 Installation

3.1 Safety instruction

- Wearing a helmet, gloves, fasten your seat belt, wear non-slip shoes and other protective measures before installation;

- Please confirm whether the load capability of the roof top is enough firstly;
- At least 2 persons for installation;
- Don't put the materials on the roof top together to avoid the roof collapsed;
- Try not to install the module/mounting system/PV cable on the roof while rainy/snow/high temperature/windy days;
- Ensure that all electrical switches are effectively disconnected before testing.

3.2 Installation order



3.3 Mounting system installation

Make sure the location of the Mounting system installed, then please follow the documentation of Mounting system installation manual, please download it on the website: <http://www.astronergy.com>

3.4 Module installation

Make sure the location of the Module installed, then please follow the documentation of Module installation, please download it on the website: <http://www.astronergy.com>

3.5 Inverter installation

Make sure the location of the Inverter installed, then please follow the documentation of inverter installation manual, please download it on the website: <http://www.astronergy.com>

3.6 DC&AC box installation

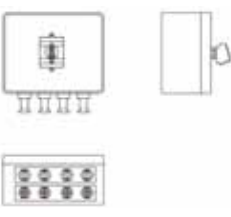
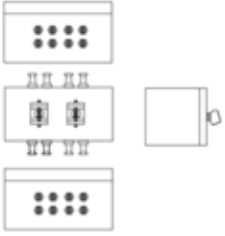
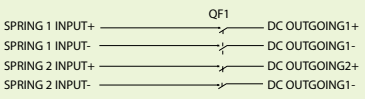
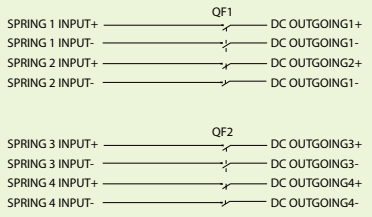
Make sure the location of the DC box and AC box installed, then please follow installation instruction as below:

- 1) The location where mounted the DC&AC box is preferably near the inverter;
- 2) Although the protection grade of DC&AC box is IP65, but it's better to keep them away from direct sunlight/rain/dust etc;
- 3) Mount on a solid surface, the mounting location must be accessible at all times.

DC box(PVBx S11):



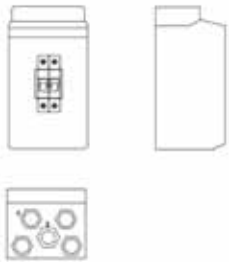
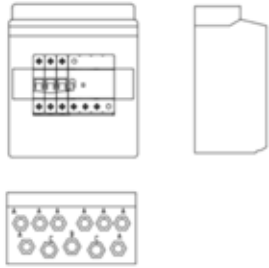
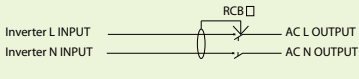
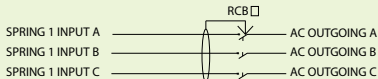
	KIT model	
	2 / 3KW	5KW
Layout		
Drawing		
Spec.	1circuit / DC600V / 16A / IP65 / MC4 terminal / Rotary DC switch	2circuit / DC600V / 16A / IP65 / MC4 terminal / Rotary DC switch

	KIT model	
	10KW	20KW
Layout		
Drawing		
Spec.	2circuit / DC1000V / 16A / IP65 / MC4 terminal / Rotary DC switch	2*2circuit / DC1000V / 16A / IP65 / MC4 terminal / Rotary DC switch

Note: for EU series KIT, because the inverter has DC switch integrated, so the DC box is just for optional.

AC box(PVBx S12):



	KIT model	
	2 / 3 / 5KW	10 / 20KW
Layout		
Drawing		
Spec.	1circuit / AC230V / 16A-40A / IP65 / MCB+LP	1circuit / AC3*230V / 25A-50A / IP65 / MCB+LP

3.7 MC4 connector installation

It's necessary to know the making method of MC4 connector because the type of connection of module-module/module string-DC box/DC box-inverter in the KIT PV system all are MC4 connectors.

Positive connector-(Output is positive)



Positive terminal



Positive Cu-core

Negative connector-(Output is Negative)



Positive terminal



Positive Cu-core

(1) MC4 positive connector



peel the jacket of PV cable with wire stripper for a 2cm length Cu-core



Insert the PV cable into the positive Cu-core and compress with crimping tool



Insert the Cu-core into the positive connector until can't be pulled out gently



Tighten the hat of the connector with special tool

(2) MC4 negative connector



peel the jacket of PV cable with wire stripper for a 2cm length Cu-core



Insert the PV cable into the negative Cu-core and compress with crimping tool



Insert the Cu-core into the negative connector until can't be pulled out gently



Tighten the hat of the connector with special tool

Completed as below:



4 Electrical connection

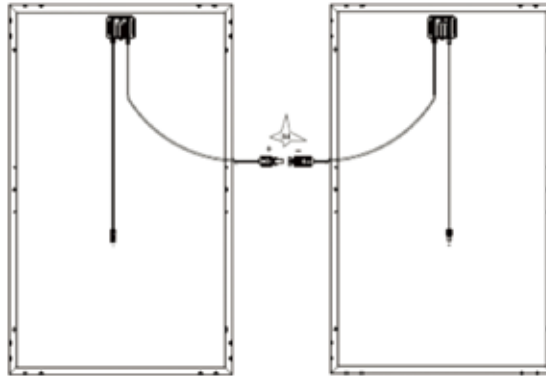
4.1 Safety instruction

- (1) Installed by qualified personnel;
- (2) Disconnect the electrical switch before installation;
- (3) Preparing measures for electrical safety;
- (4) Installed in accordance with the installation instructions.

4.2 Solar string connection

Normally, the output voltage of a single module is about dozens V, but the normal working voltage of the inverter reaches several hundred V, so if we want the inverter working normally, we must connect several modules in a string, and the voltage of a solar string will achieve a normal start-up and operating voltage of the inverter. The connection of a solar string as follows:

- (1) Connect the positive terminal of one module to the negative terminal of another module closely till to hear a "click" gently sound; the number of connected module is just the number of a solar string designed.



Module (black view)

Legend as below(10KW KIT)

PV+
PV-

Series No.: 20pcs
 Rated power of solar sting: 5000Wp
 Rated Vmpp: 606V
 Rated Impp: 8.27A
 Rated Voc: 764V
 Rated Isc: 8.65A

- (2) Make a mark on the final terminal of every solar string, such as:

Mark: 1-1-1+



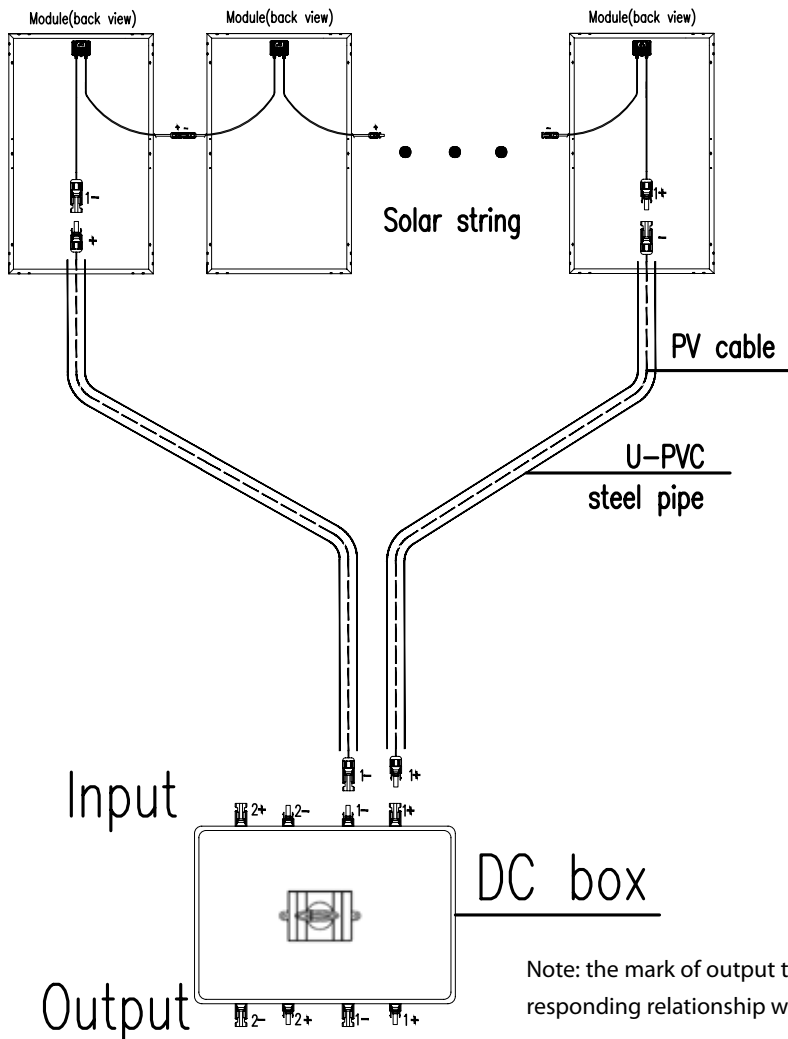
First 1	: No.1 Inverter
Second 1	: No.1 DC combiner
Third 1	: No.1 solar string
+	: Positive

- (3) The connection cable can be concealed laid, or fixed on the bracket with ties, or installed through the U-PVC pipe.
- (4) Note: Try to place the MC4 connector away from the direct sunlight and rain.

4.3 Module to DC box connection

The connection between solar string and DC box is as below:

- (1) Confirm the diameter of the PV cable between solar string and DC box according to the distance and installation conditions, typically the diameter is 2.5mm² to 6mm²;
- (2) Confirm the installation path of the PV cable between solar string and DC box, it should be waterproof, fireproof, anti-stress, anti-pull force, anti-animal bite, anti-corrosion, strong and weak electricity separately, against electric shock, etc.;
- (3) The PV cable can be installed through U-PVC pipe or in the trench;
- (4) Both ends of the cable are made in the form of the MC4 connector after installing the PV cable, and then connect the solar string to DC box, such as:

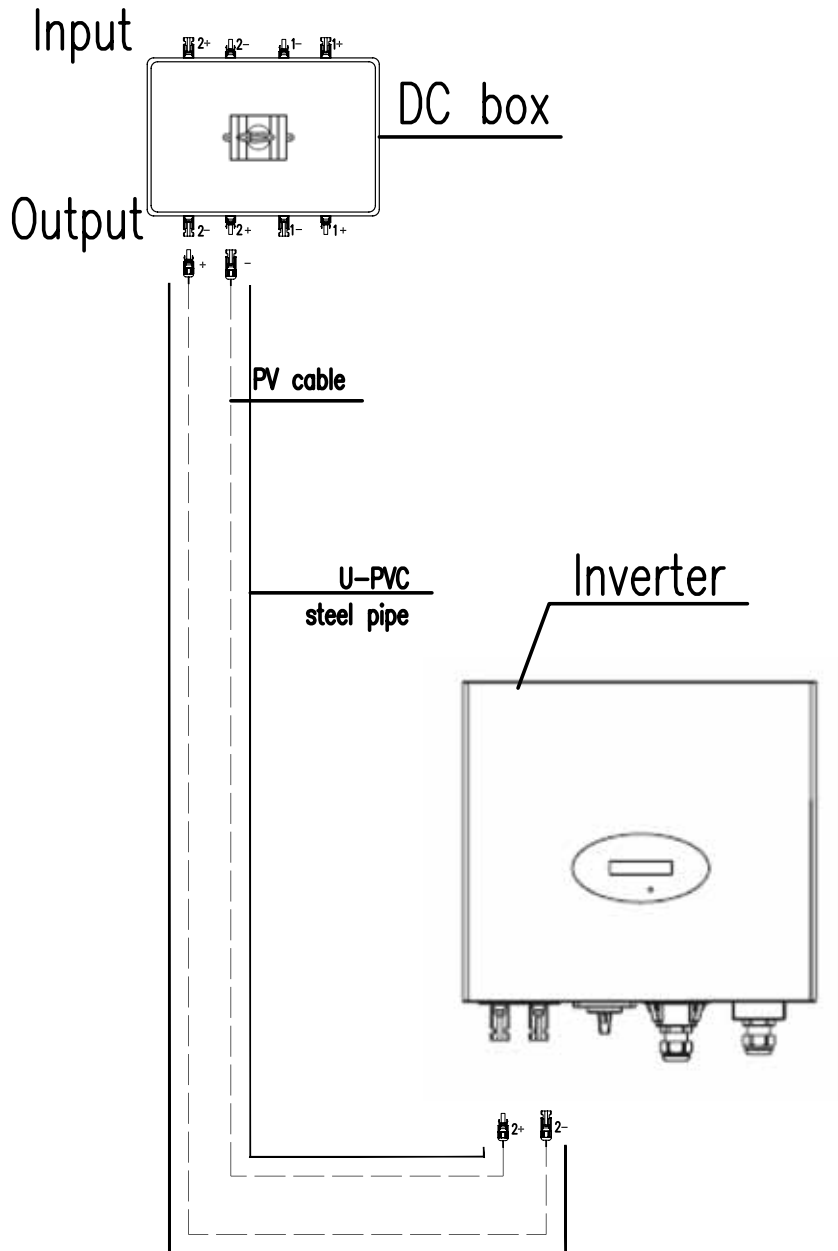


Note: the mark of output terminal should keep a corresponding relationship with the input terminal.

4.4 DC box to inverter connection

Normally the DC box is nearby the inverter, and the electrical connection is as below:

- (1) Confirm the diameter of the PV cable between DC box and inverter according to the distance and installation conditions, typically the diameter is the same as the cable between solar string and DC box;
- (2) The PV cable can be installed through the U-PVC pipe or in the trench;
- (3) Both ends of the cable are made in the form of the MC4 connector after installing the PV cable, and then connect the DC box to inverter, such as:



4.5 Inverter to AC box connection

Normally the AC box is also nearby the inverter, and the electrical connection is as below:

- (1) Confirm the diameter of the AC cable between inverter and AC box according to the distance and installation conditions, the information is introduced in the inverter's manual;
- (2) The details of AC cable connect to the inverter is introduced in the inverter's manual, and for the connection of AC box, first peel the jacket of AC cable for a 1cm length Cu-core, and then through the hole at the bottom of AC box, insert the terminal of AC circuit breaker, screw it firmly last;
- (3) Note: before AC cable connection, the AC circuit breaker should be turn off and DC input of the inverter should be off.

4.6 Grid connection

Grid connection means connect the AC box to the Utility grid, it normally through the watt-hour meter, and the connection of the AC box output is the same as the input, but when connect to the Utility grid, the AC circuit breaker nearby the Utility grid should be turn off.

5 Commissioning and operating

5.1 Commissioning

- (1) Checking
 - Whether the module installed neatly, firmly;
 - Whether the mounting system installed firmly, and whether the screws installed firmly;
 - whether the grounding resistance of the module and mounting system is small enough;
 - Whether the all mark is accurate, firm, clear, waterproof;
 - Whether the DC box, inverter, AC box installed firmly;
 - Whether the cable installed firmly, correctly;
 - Whether the function of electrical components is normal;
 - Whether the function of the solar string is normal by measuring the DC voltage and DC current.
- (2) Commissioning
 - Turn on the DC switch in the DC box, measure the DC output voltage and current with measuring instrument;
 - complete the initial setting after the inverter start, then observe the parameters from the LCD display;
 - Measuring the parameter of the Utility grid with measuring instrument;
 - Turn on the AC circuit breaker in the AC box, the inverter will grid connection, get the AC circuit parameter from LCD display/measuring instrument/watt-hour meter.

5.2 Operating

Please follow the operation instruction of all the main equipment in their manual.

6 Astronergy standard warranty

Module: 10 years

Mounting system: 10 years

Inverter: 5 years

DC box: 2 years

AC box: 2 years

PV cable: 1 year

Connector: 1 year

7 Contact

If you have technical problems concerning our products, contact your installer or Astronergy. During inquiring, please provide below information:

- (1) KIT model
- (2) Communication information
- (3) Error information
- (4) Display of system



CORPORATE HEADQUARTERS

Chint Solar (ZheJiang) Co., Ltd.
 1335 Bin'an Road, Binjiang District
 Hangzhou, Zhejiang Province, 310053
 China
 Tel: + 86 571 5603 1888
 Fax: + 86 571 5603 2383

MANUFACTURING PLANTS

Hangzhou, Shanghai & Jiuquan

SUBSIDIARIES

Spain

Chint Solar Hispania S.L.
 Paseo de Gracia, 78, 2-2A
 08008 Barcelona,
 Spain
 Tel: + 34 9346 73778
 Fax: + 34 9346 73789

Germany

Astronergy GmbH
 Karlstr. 8
 88212 Ravensburg,
 Germany
 Tel: + 49 (0)751 295096-10
 Fax: + 49 (0)751 295096-39

North America

Astronergy Solar, Inc.
 Suite 1125, 795 Folsom Street,
 San Francisco, CA 94107
 USA
 Tel: +1 415 802 7399

Japan

KoyoAstro Co., Ltd.
 1-5-6, Higashi-Nihonbashi, Chuo-ku,
 Tokyo 103-0004,
 Japan
 Tel: + 03 5820 2141
 Fax: + 03 5820 2142

Korea

Astronergy Solar Korea
 5th FL. Cowell Bldg, 66-1,
 Banpo-Dong, Seocho-Gu,
 Korea
 Tel: + 82 (0)2 2226 3911
 Fax: + 82 (0)2 2226 3910

Thailand

Astronergy Solar Thailand Co., Ltd.
 184/88 Forum Tower 18FL
 Ratchadapisek Rd., Huay-Kwang,
 Bangkok 10320
 Thailand
 Tel: + 662 645 4155
 Fax: + 662 245 3185