inverter.com

3-Phase Grid Tie Inverter

Product / User Manual

Contact us:

Web: www.inverter.com
Tel: +1 800-585-1519
Email: sales@inverter.com

CONTENT

1. Safety Instruction.....1

1.1 Installation Preparationon.....2

1.2 Warning Tips.....2

1.3 Guide.....3

1.4 Installation Tips.....4

1.5 Wiring.....5

1.6 Operation Adjustment.....5

2. Product Introduction.....6

2.1 Product Confirmation.....6

2.2 Prepare Installation Equipement.....6

2.3 Installation Environment.....6

2.4 Circuit.....6

2.5 Product Feature.....6

3. Installation.....10

3.1 Installation Condition Following Conditions Need to be Met.....10

3.2 Connection and Installation.....10

3.3 Explanation of Input, Output and Terminals on Inverters.....11

4. Operation and Using Condition.....12

4.1 Inverter Display Table.....12

4.2 Operation and Test（Stop）.....13

4.3. Keyboard and LCD Display.....13

4.4 Basic Condition Display Mode (4 Lines).....15

5. Maintenance and Repair.....15

5.1 Initialization and Error.....16

5.2 Buzzer and Fault.....16

5.3 Fault.....17

6. Data Setting.....18

7. Appendix：Specification Setting.....20

1. Safety Instruction

This user manual contains very important safety instruction and operation guide, please read it, understand it, follow it along installation and maintenance and keep it well for any time check.

Before installation：

Double check the inverter without damage, any question contact the dealer freely without hesitation

Installation：

To keep the safety, please follow the manual steps. And please keep attention that both ends of the inverter with electricity, DC input and AC output

Switch off state grid：

Switch off the state grid and PV DC input before operating the inverter, to make sure that the inverter is switched off, and using the multimeter to double check the equipment is without voltage, and the equipment can be work again till waiting for minimum 5 minutes.

Maintain and revise：

Only the authorized staff can repair and revised the inverter. To keep the safety, please use equipment from the original manufacture. If the equipment not comes from the original, it should be have the certification of EMC and so on

Function and safety date:

Without the permission of the state grid and original manufacture, change inverter data is not allowed

When you use this product, please keep in mind the safety method to avoid the fire, electricity or shock or the equipment damage.

Warning: Ensure solar PV string output voltage is lower than inverter maximum DC input range, DC voltage from PV string higher than inverter DC input range will result in serious damage on inverter or other loss, and this damage will not be in warranty condition, also inverter supplier is not responsible to it.

Warning: Only inverter professional staff can open the inverter case for maintenance! And this job must be under processed only when state grid and DC input are completely disconnected with inverter.

1.1 Installation Preparation

The installation, maintenance or check of this inverter, can be only finished by qualified technicians who must be qualified as below:

1) Authorized and well trained technician.

2) Must wear safety suit, insulating gloves, safety hat, protective glasses and face mask etc.

3) Emergency measures can be done if needed.

1.2 Warning Tips

1) **Do not touch inverter outside interfaces along installation or operation to avoid contacted with current which may result in serious damages or death.**

2) **Do not operate this inverter when the case is open to avoid electric shock or electricity charging outside the inverter.**

3) **Do not operate this inverter if wet hand to avoid short circuit.**

4) **Do not open this inverter case when switch on / off the inverter, please stop operation or wait for the inverter completely powered off if you must need to open this inverter case.**

5) **Do not open this inverter case unless you have to or you need to do product routine check. Please wait for at least10 minutes after inverter to ensure it is powered off if you do connection or routine check.**

6) **Do not put any heavy item on inverter wirings, which may result in wiring insulation failed.**

7) **Stay inverters away from inflammables which leads to fires if it is too close to inverters and power off inverters and contact us immediately if gets fire.**

8) **Cut off power from solar panel strings and stop inverter AC output immediately if inverter encounters fault to avoid getting fire.**

9) **Do not touch inverter in 10 minutes since inverter is powered off as it is still hot**

10) **Stop power input when inverter or components get damaged which may result it electric shock.**

11) **Avoid any screws, metals, water or oil stay in inverter which may result in fire.**

1.3 Guide

1) **Logistic**

- **Please choose proper logistic based on inverter weight**
- **Please confirm inverter proper outlook**
- **Please do not open inverter case along shipment, and do not drop, shake or beat inverter as its inside structure is very complicated**

2) Usage

- **Inverter auto operation function is based on inverter basic set, inverter will be auto operated if operation voltage is higher than its rated voltage.**
- **Please press off key on inverter to let inverter stop working**
- **Please manually switch on inverter after damaged components is replaced**
- **Please do not change inverter inside structure**
- **Please set necessary data again before doing initialization, once inverter is initialized, all data will be changed accordingly**

3) Troubleshooting

Install emergency brake to avoid inverter damage or out of control

4) Maintenance and Repair

Inverter does not execute large scale test control circuit which may result in damage or loss, to check inverter, please follow below guide in this user manual

5) Disposal

Treat as normal industry waste

1.4 Installation Tips

1) Please follow this user manual along installation process

2) This inverter can be installed either inside or outside

3) Keep this inverter away from humidity, powder, high temperature or direct solar radiation

4) **If inverter is installed inside, the inverter safety space from up to down should be minimum 20CM.**

5) **If inverter is installed outside, the inverter safety space from bottom should be minimum 1M.**

6) **Installation direction must follow the standard showed in this user manual**

7) **This inverter requires 3 level grounding (220V，grounding resistance should be lower than100Ω）and special 3kinds (400V，grounding resistance is lower than 10Ω）。**

8) **Avoid putting any other electric appliances near to inverters which may result in product abnormal and noise.**

9) **Please cut off power and be careful of the wirings before installing the inverter**

10) **Before installing inverter, please install a solar panel (DC) breaker, and keep solar panel power off to avoid fault happens to inverter**

1.5 Wiring

1) **Must have professional staff to do wirings and check**

2) **Do wiring after inverter is installed**

3) **Wrong wiring will result in inverter failure**

4) **Wrong power polarity (+/-) will lead damage or accident to inverter**

1.6 Operation Adjustment

1) **Please follow this user manual guide along operation test**

2) Ensure inverter has proper display from LCD

2. Product Introduction

2.1 Product Confirmation

Please ensure this inverter matches your requirement from the specification stick on inverter side or specification from inverter carton.

2.2 Prepare Installation Equipment

Make sure all needed installation materials or tools are ready.

2.3 Installation Environment

Please ensure inverter has got right installation direction, proper environment before installation

2.4 Circuit

Connect power sensor into circuit board, wrong connection will result in damages on inverter, please pay attention to polarity "+ -".

2.5 Product Feature

1) High Efficiency

Inverter has high efficient power invert ability, IGBT semi conduct and 96% high efficient motor.

2) Digital Control

Digital control can reach convenient, high speed and high efficient control through

inverter LCD display, keyboard and dynamic icons including Input, Output, Back or Stop etc and inverter can automatically power on or off based on high sensitivity to solar panels.

3) MPPT Maximum Power Point Tracking

When un-balanced current happens, inverter will have MPPT to track solar panel maximum power efficiency under different temperature, humidity or other ambient condition.

4) Easy Parallel

Inverters can be connected in parallel when solar panels quantity is increased

5) Easy Installation and Operation

You can connect the inverter with solar panels by following inverter LCD guide, and also check solar power system working status through inverter LCD display

6) Low Noise

This inverter has the best components which reach lowest noise under the worst condition

7) Remote Monitoring System

We can success in monitoring inverter output power, working status, temperature and ambient conditions through internet communication and data collector

8) Inverter Specification

Model	GrandSolar TLC5000	GrandSolar TLC10000	GrandSolar TLC15000	GrandSolar TLC20000	GrandSolar TLC25000	GrandSolar TLC30000	GrandSolar TLC40000	GrandSolar TLC50000
DC Input								
Max.DC Input Power	5500	10500	15600	21000	25000	32000	43000	52000

（KW)								
Max. DC Input Voltage (V)	850VDC							
Max. DC Input Current	15A	30A	35A	60A	65A	90A	120A	150A
MPPT Voltage Range（Under Rated Power）	200-820VDC							
MPPT #	1							
Power On/Off Voltage	180V/250V							
AC Output								
Power	5000W	10000W	15000W	20000W	25000W	30000W	40000W	50000W
Voltage Range	±40V							
Rated Voltage	AC230V / 400V 3Phase+N+PE							
Frequency	50HZ / 60HZ							
Phase	Three Phase							
Power Factor	0.99							
Max. Current	7.5	15A	22A	30A	38A	45A	60A	75A
THD	@ Rated Power and Pure Since Wave< 3.5%							
Max.	98.5%	98.5%	98.6%	98.6%	98.6%	98.6%	98.60%	98.60%

Efficiency								
EU Efficiency	**98%**	**98%**	**98.3%**	**98.3%**	**98.3%**	**98.30%**	**98.30%**	**98.30%**
MPPT Efficiency	**99.90%**							
Structure								
Waterproof	**IP20**							
Cooling Method	**Forced Fan**							
Noice	**<50db**							
Communi-cation	**RS232C/WIFI（Optional）**							
Insulation	**Non-insulated**							
Standby Power	**<5W**							
Protection								
Inverter	**Over Input Voltage, Output Short Circuit, Over-heat, Over-load**							
State Grid	**Anti-island(IEEE1547), State Grid Over/Low Voltage, High/Low Frequency**							
General								
Interface	**MC4**							
Working Amb. Temp.	**Flow Air, -10℃~40℃（50℃）**							
Storage Temp.	**-25℃~60℃**							
Relative Humidity	**0~100%**							
Environment	**No flammable Gas, Corrosive Gas, Oil, Dust, etc**							
Altitude	**3000M**							

3. Installation

3.1 Installation Conditions Need to be Met

- ◆ **Inverter is indoor product, please do not install outside, as inverter life mostly depends on the surrounding environment .the surrounding temperature please do not more than or below (10～40 ℃)**
- ◆ **Please avoid high temperature and humidity environment .（Relatively humidity below 90%，and do not cling drew）.**
- ◆ **Inverter is installed in place where there is no vibration.**
- ◆ **Inverter is a high temperature heating device; the non combustible material is used.**
- ◆ **Enough space is required for the installation, to make sure that the inverter can be fully heat dissipated**
- ◆ **Please store it without oil mist, flammable gas, fiber particles, dust, water, etc, with the specified size to installation to fix the button.**
- ◆ **Inverter should be installed in a well-ventilated location**

3.2 Connection and Installation

If you open the bottom cover of the inverter, connection mode is as follow: according to the difference of the patch panel capacity, please install it according to the manual and invert er needs to be installed in the ground firmly

- ◆ **When input power is ready, connect the positive terminal (PV) [+] and negative terminal (PV [-]) on inverter, and then get input power connected, wrong connection will damage the inverter**
- ◆ **Use crimping terminal and insulation cap when connecting inverter input and output wrong connection will damage the inverter**

- ◆ **Do not open the box, the interior of the inverter is with high voltage, it is dangerous to touch**
- ◆ **To prevent electric shock, ensure that the running resistance of the inverter less than 10Ω**
- ◆ **Please use inverter-special terminals**
- ◆ **Please use qualified grounding wirings**
- ◆ **Use specified torque bolt, loosing bolt can lead to poor contact and cause failure**
- ◆ **Please use copper wire > 600 v, 75 ℃**
- ◆ **Please follow requirement from wire supplier or the specific standard of electrical safety codes to contact wirings**

3.3 Explanation of Input, Output and Terminals on Inverters

(+)

Input terminal to connect positive wiring from solar panel

(-)

Input terminal to connect negative wiring from solar panel

Connection

Grounding wiring

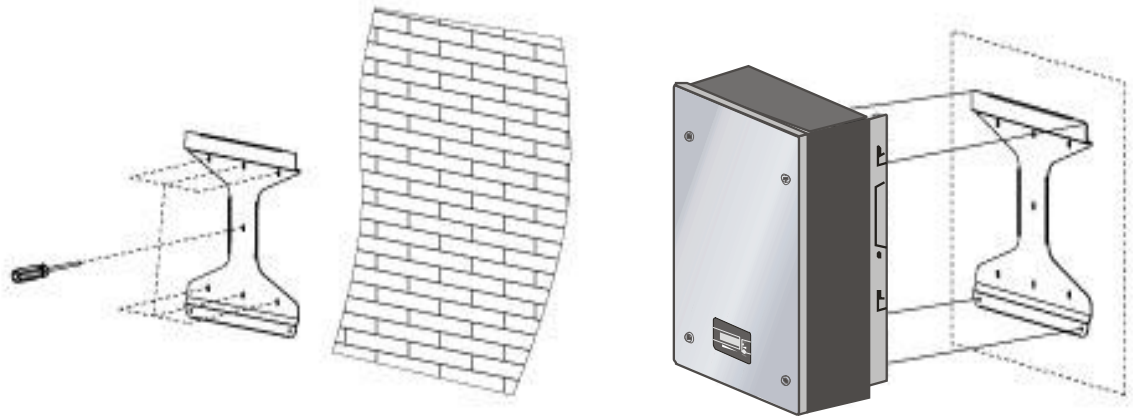
(3Φ3W 400V) Output power terminals 400V；

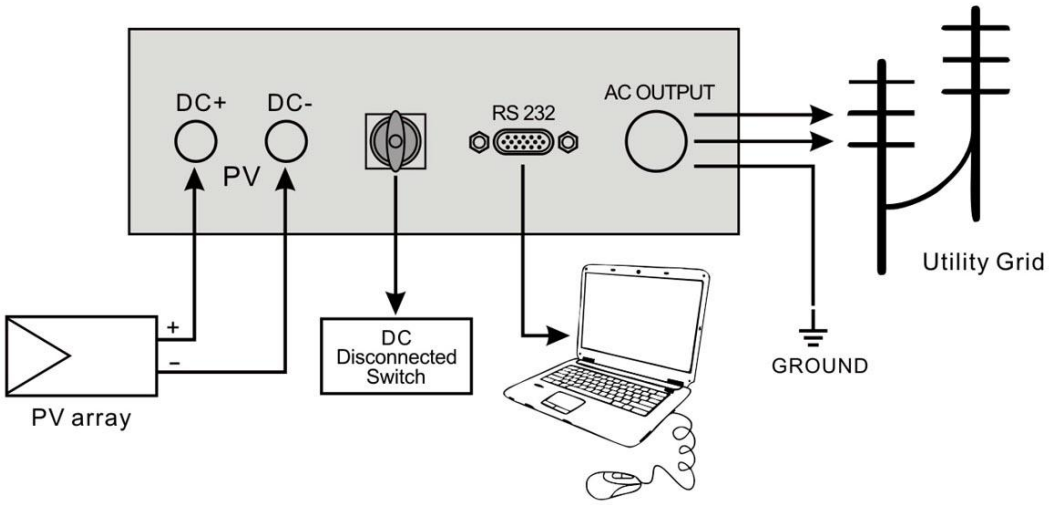
Inverter output wiring to state grid R

Inverter output wiring to state grid S

Inverter output wiring to state grid T

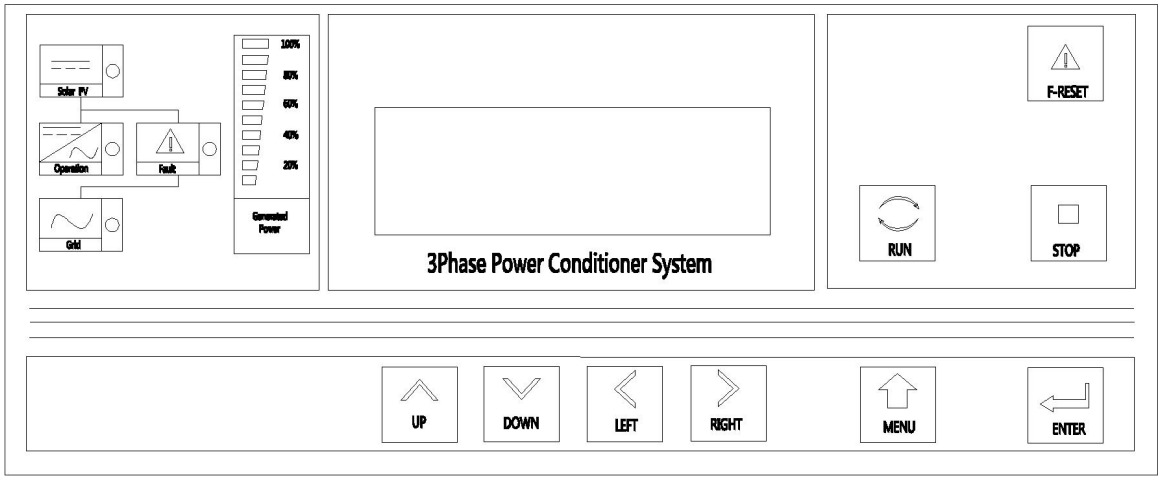
Inverter installation diagram





4. Operation and Using Condition

4.1 Inverter Display Table



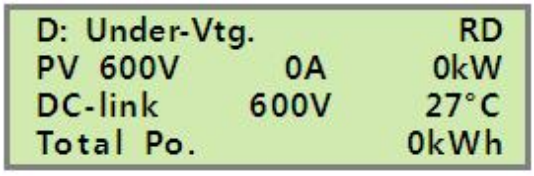
Solar inverter is automatic numerical control. And for three-phase inverter, when the PV voltage is more than 400 V, inverter will automatically start and produce power

When the PV voltage is lower 200V, the inverter will be close automatically.

4.2 Operation and Test（Stop）

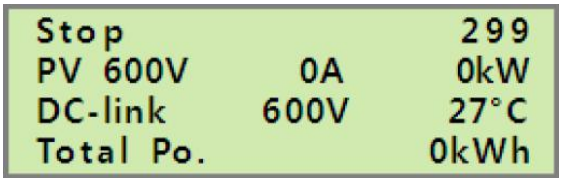
1) **Wrong operation will damage this inverter, please follow below instruction to operate or stop the inverter:**

- **Confirm displayed information**
- **LCD display shows: current PV input voltage, interior temperature and standby status**



2) **Open AC (Output Breaker)**

Once AC breaker is open, LED light for 300S, 5minutes, and please press RUN if want inverter running in this period.



3) **Input /output voltage / current and total power generated**

4.3. Keyboard and LCD Display

1) **Keyboard Function Explanation**

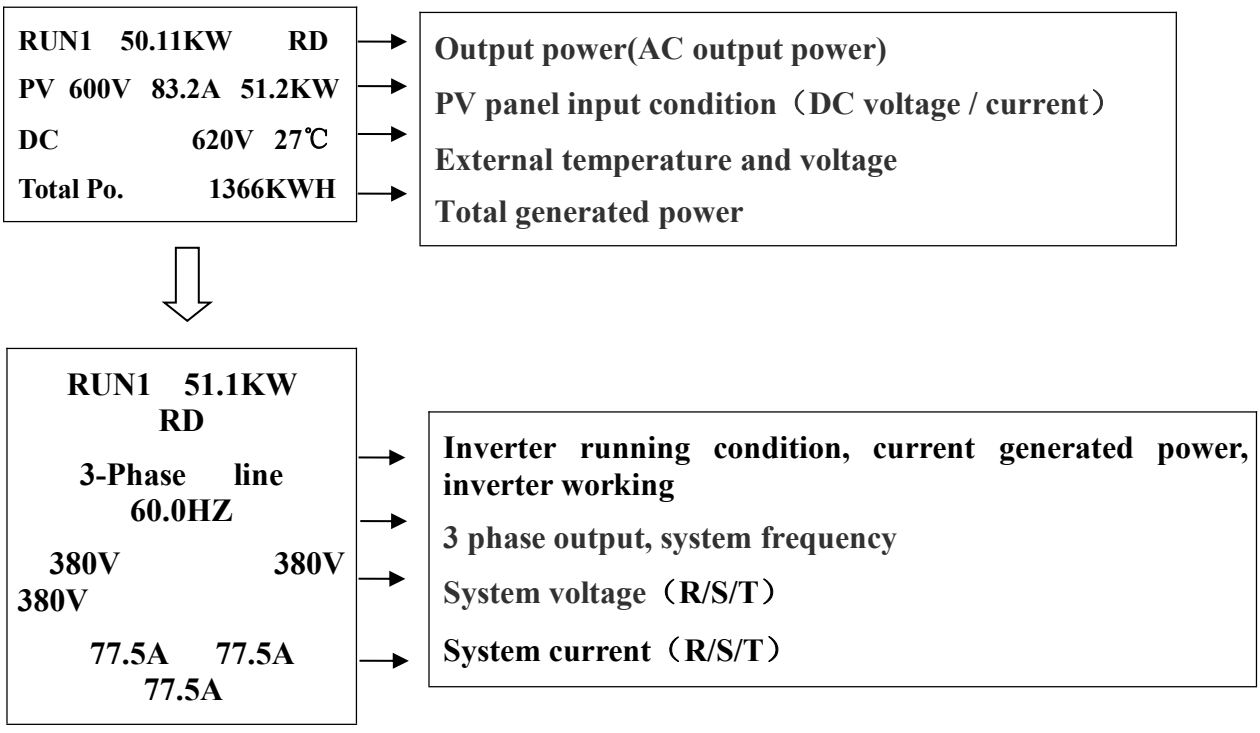
Keyboard	Explanation
Manual	Can enter or set the form of the menu Can swift to the submenu Can swift to the previous form to the submenu Can use the “-”to set the parameter
Enter	Set the menu Chose the low to set the menu Can save the set parameter
﹀﹀〈〉	Direction key You can change content of the menu and condition Set the parameter can use“-”
Swift	You can change state instruction mode
BZ Close	If there is something wrong， please close the alarm button and the display “Fault”
F Reset	When there is something wrong , please enter F , the inverter will star to reset
Run	Press this button and wait for 300 seconds , the inverter will star to work
Stop	Stop the inverter

2) LED Display Status Explanation

LED Condition	Explanation
Solar PV	Input voltage indicator light (green LED display: over 400V)
Operation	Operation display (green LED display : inverter is running)
State Grid	The system shows yellow（the yellow LED shows it is working）
Fault	Operation error（red LED show there is the error）

LED Indict Total Harvest Power	Explanation
100%LED	When rated 81-100%，100% display，when below rated 90%，100% LED glitter
80%LED	When rated 61-80%，80% display，when below rated 70%，80% LED glitter
60%LED	When rated 41-60%，60% display，when below 50%，60% LED glitter
40%LED	When rated 21-40%，40%display ,when below 30%，40%LED glitter
20%LED	When rated 5-20%，20% display，when below 10%，20%LED glitter

4.4 Basic Condition Display Mode (4 Lines)



5. Maintenance and Repair

5.1 Initialization and Error

To prevent inverter stopped by accident caused by any error including buzzer ring or wrong instruction display, please press "F-RESET" to stop the buzzer ring, and examine and solve the fault, then rerun the inverter. You can confirm the faults scan, which stores 500 failure reasons from 0～499, the nearest one is the 0, and you can use top and bottom key (△,▽) on keyboard to check whether the specification or other part is wrong.

5.2 Buzzer and Fault

1) Buzzer

Buzzer will ring continuous in any abnormal conditions like instantaneous overload, if you cancel the overload, the buzzer will not ring. If you press the [BZ-off], the buzzer will also stop ring and you press the key again, it will ring again, if the alarm doesn`t ring when it has error, the buzzer will ring usually.

2) Over-voltage Fault

Please close the inverter to protect the system once the voltage of the solar array is over the predetermined voltage.

3) Cancel Fault Warning

The error information will display from the screen and the buzzer will ring at the same time if inverter is serious damaged. Press [F-RESET] and [BZ-off] can cancel the warning and the error information, the transformer starts to count (300s, 5min). If the alarm rings again, stop inverter; contact our company to fix the transformer.

5.3 Fault

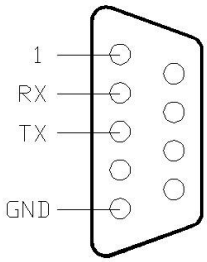
Inverter will display fault and stop running if it occurs abnormally.

Alarm and abnormal content will display in keyboard LCD if it occurs abnormally

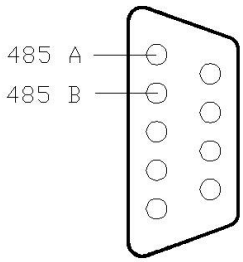
Fault and Solution

Input Over-voltage	**Input Over-voltage**	**If PV voltage is higher than rated voltage**	**Examine solar panels before operate inverter**
Output Over-voltage	**Over-voltage**	**If system voltage is higher than rated voltage**	**Examine system voltage before operate inverter**
Output Over-current	**Over-current**	**When inverter output is over current**	**Eliminate short-circuit and improper operation**
Transducer over-heat	**Over-heat**	**Inverter inside temperature is over85℃**	**Check temp. sensor and connector**
Grounding Fault	**Fault**	**Electric leakage**	**Check grounding and insulation status**
Raw Material Fault	**Fault**	**If fault from switch or control panel**	**Check IGBT and control, then restart inverter**
RST No Match	**Reverse**	**No match**	**Check order, change wiring from R to S**
Others			**Check MC4 and cable**

Communication Signal Connection (If need RS485, please use converter RS485/RS232):



RS232
Connector



RS485
Connector

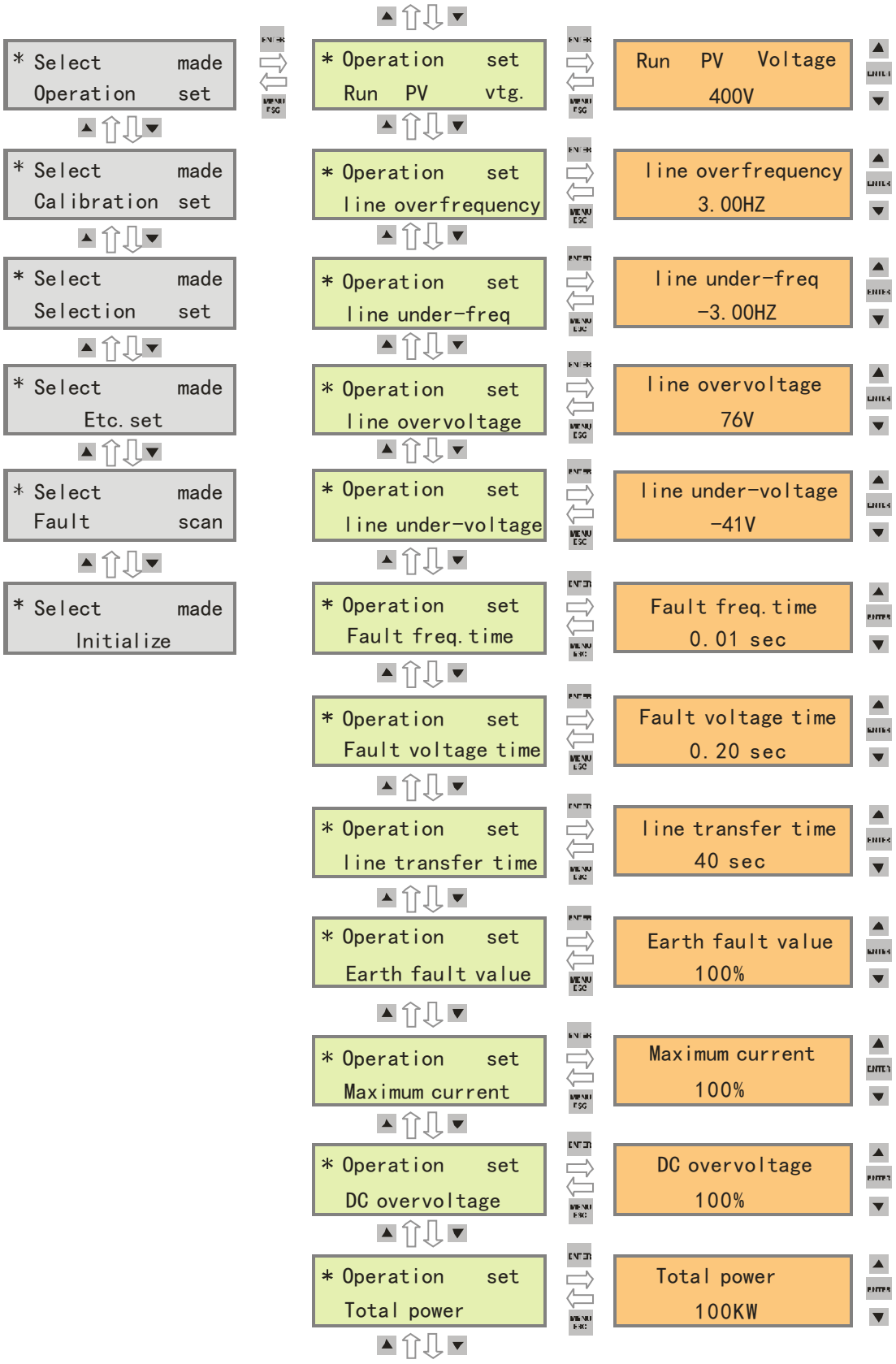
RS485/RS232 CONVERTER

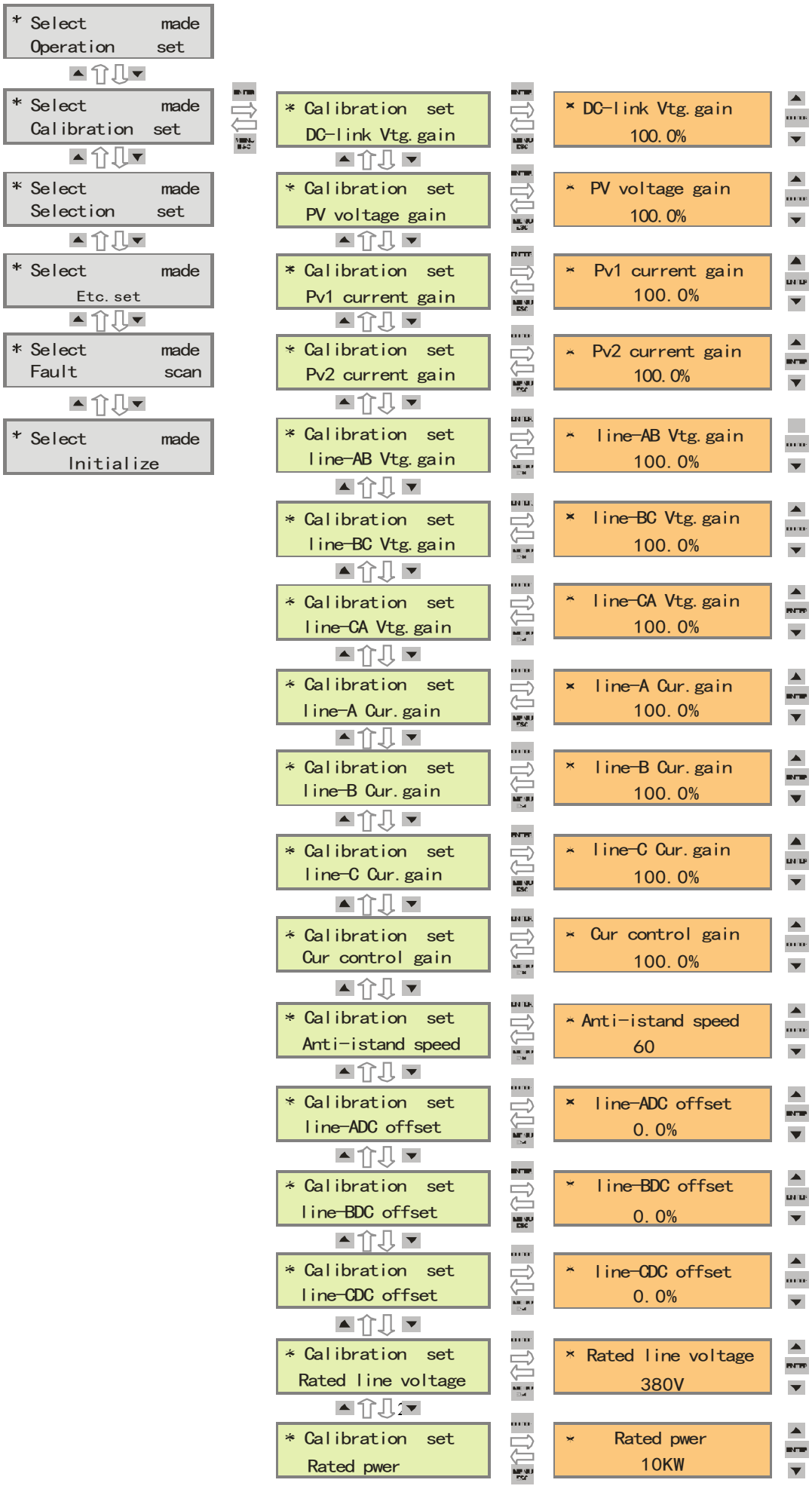
6. Data Setting

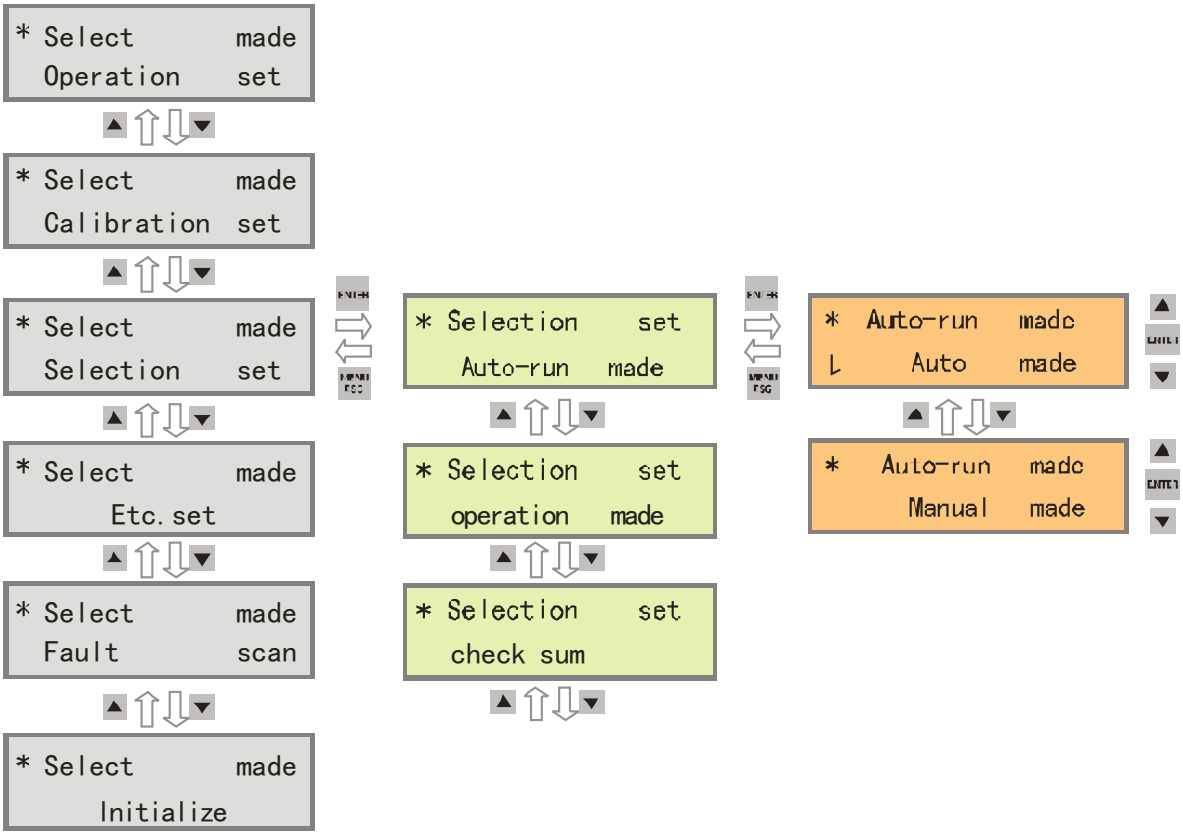
Mode	Specification	Range	Transmit Data
Operation set Operation parameter	Run PV vtg	300～700	400[V]
	Line Over frequency	0.15～3	3.00[Hz]
	Line Under-freq	-0.15～-3	-3.00[Hz]
	Line Overvoltage	19～76	46[V]
	Line Under-voltage	-19～-76	-41[V]
	Fault freq. time	0.01～1	0.01[sec]
	Fault Voltage time	0.01～1	0.20[sec]
	Line transfer time	10～500	40[sec]
	Earth fault Value	100%～300%	100%
	Maximum Current	10%～120%	100%
	DC Overvoltage	750～900	820[V]
	Total Power	0～999999	100[KW]
	DC-line Vtg.gain	90～110	100%
	PV Voltage.gain	90～110	100%

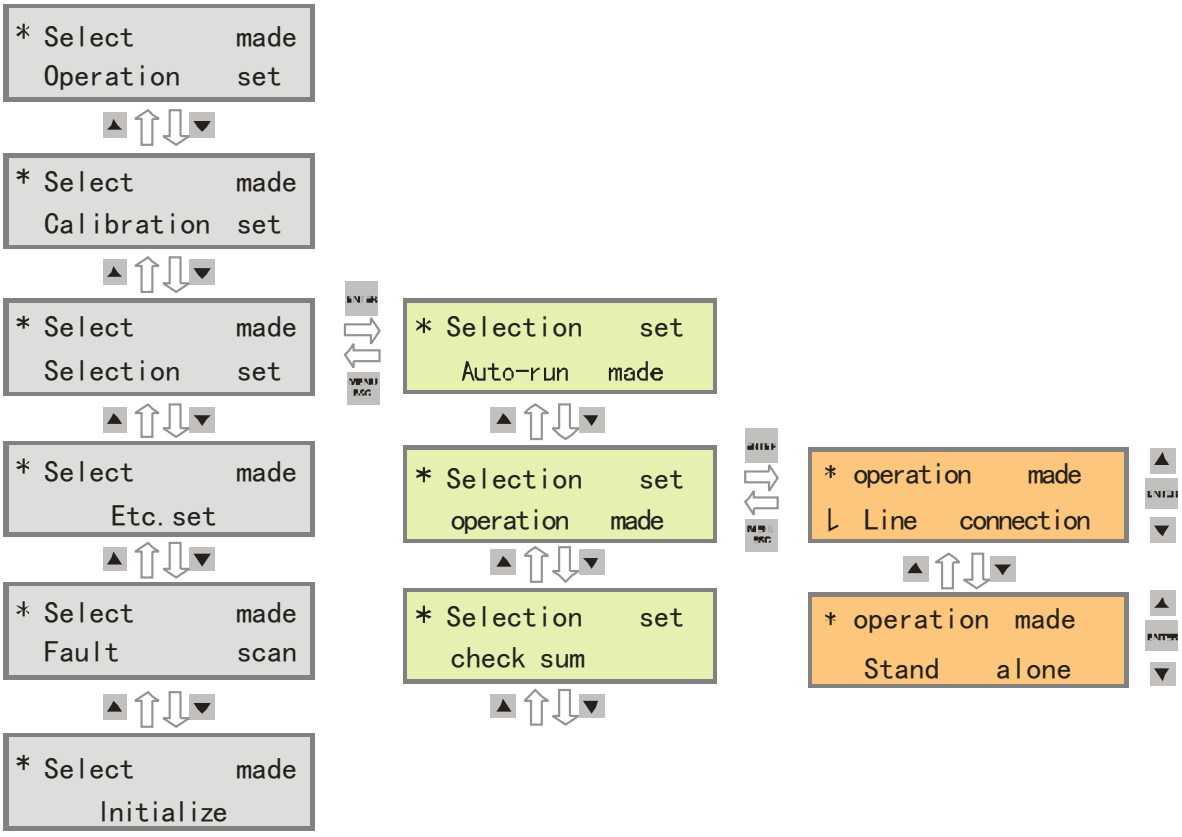
	PV1 Current.gain	**90～110**	**100%**
	PV2 Current.gain	**90～110**	**100%**
	Line-AB Vtg.gain	**90～110**	**100%**
	Line-BC Vtg.gain	**90～110**	**100%**
	Line-CA Vtg.gain	**90～110**	**100%**
	Line-A Cur.gain	**90～110**	**100%**
	Line-B Cur.gain	**90～110**	**100%**
	Line-C Cur.gain	**90～110**	**100%**
	Cur Control.gain	**20～500**	**100%**
	Anti-island speed	**10～100**	**60**
	Line-A DC Offset	**-2.5～+2.5**	**0.00%**
	Line-B DC Offset	**-2.5～+2.5**	**0.00%**
	Line-C DC Offset	**-2.5～+2.5**	**0.00%**
	Rated line Voltage	**200V～420V**	**380[V]**
	Rated Power	**5KW～250KW**	**10[KW]**
Selection set Operation condition	**Auto-run mode**	**Manual mode/Auto mode**	**Auto mode**
	Operation mode	**Line connection/ Stand alone**	**Line connection**
	Checksum	**Disabled/ Enabled**	**Disabled**
Etc. set	**System ID number**	**0～999**	**0**
	Switching freq.	**5～15**	**10.0[kHz]**
	Fault count number	**1～10**	**2**
Initialize (Initialized)	**Parameter initialize**	**It initialized all parameter by factory delivered value**	
	Fault initialize	**Past, information of fault states is all is deleted.**	
Fault scan	**It can get information of fault state of 100 kinds.**		

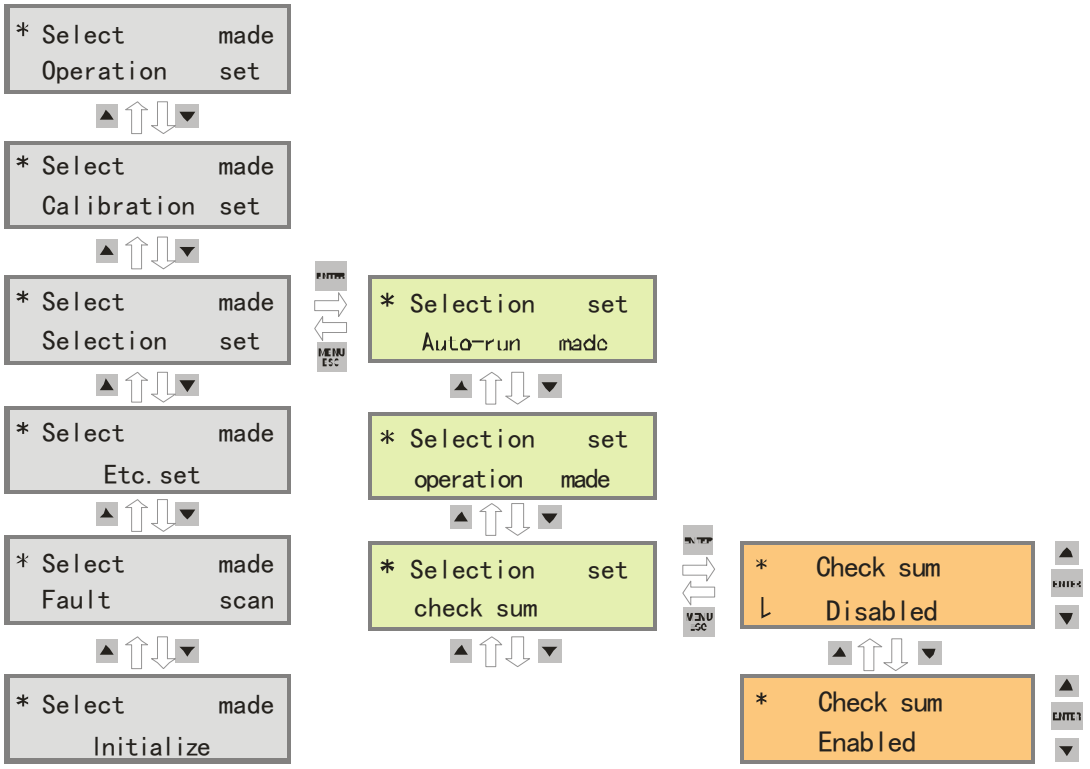
7. Appendix： Specification Setting

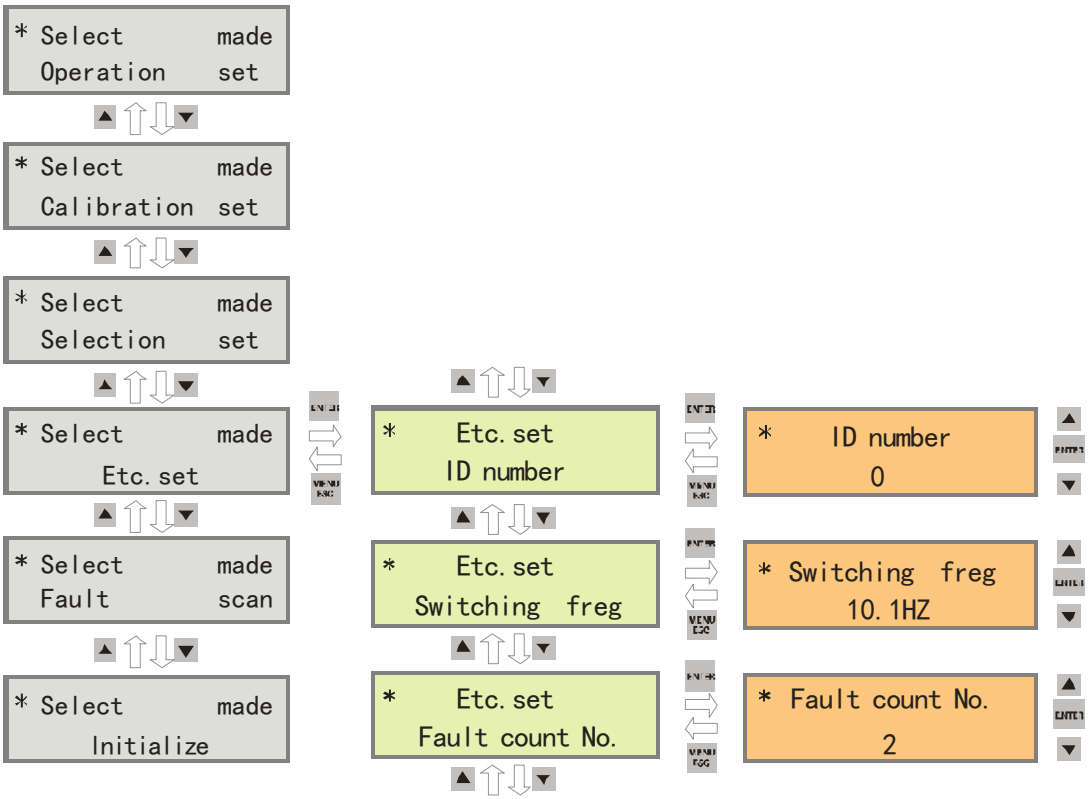


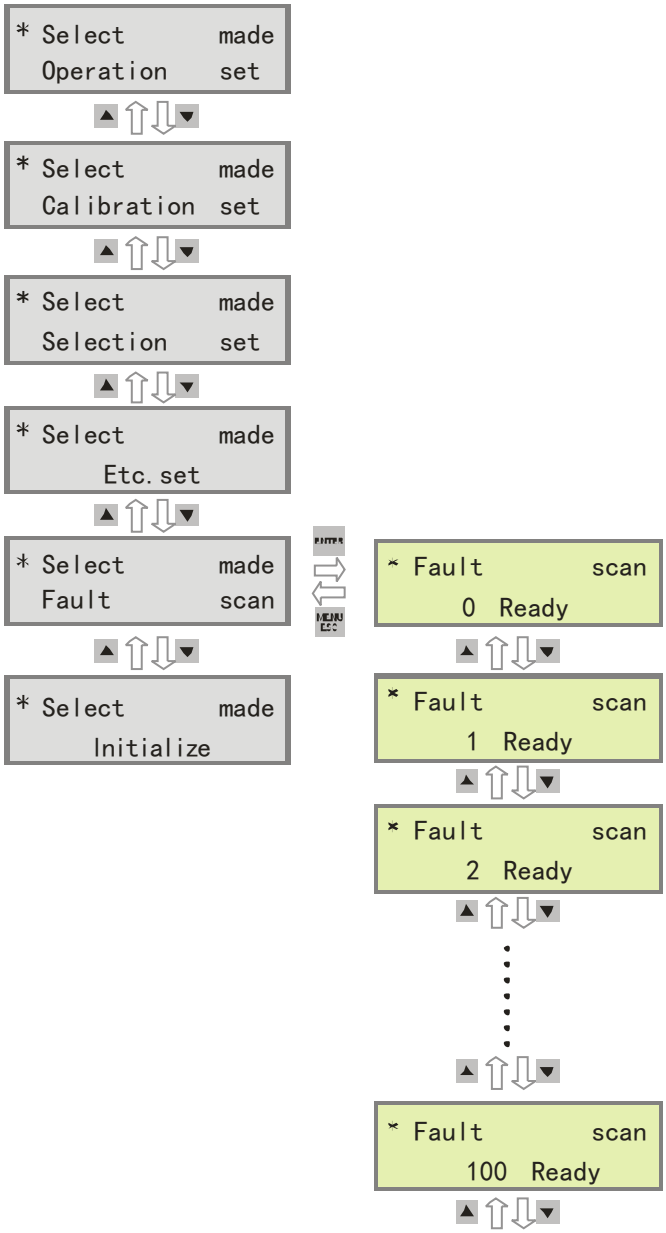

* Select made
Operation set
* Select made
Calibration set
* Select made
Selection set
* Select made
Etc. set
* Select made
Fault scan
* Select made
Initialize
* Calibration set
DC-link Vtg. gain
* Calibration set
PV voltage gain
* Calibration set
Pv1 current gain
* Calibration set
Pv2 current gain
* Calibration set
line-AB Vtg. gain
* Calibration set
line-BC Vtg. gain
* Calibration set
line-CA Vtg. gain
* Calibration set
line-A Cur. gain
* Calibration set
line-B Cur. gain
* Calibration set
line-C Cur. gain
* Calibration set
Cur control gain
* Calibration set
Anti-istand speed
* Calibration set
line-ADC offset
* Calibration set
line-BDC offset
* Calibration set
line-CDC offset
* Calibration set
Rated line voltage
* Calibration set
Rated pwer
* DC-link Vtg. gain
100.0%
* PV voltage gain
100.0%
* Pv1 current gain
100.0%
* Pv2 current gain
100.0%
* line-AB Vtg. gain
100.0%
* line-BC Vtg. gain
100.0%
* line-CA Vtg. gain
100.0%
* line-A Cur. gain
100.0%
* line-B Cur. gain
100.0%
* line-C Cur. gain
100.0%
* Cur control gain
100.0%
* Anti-istand speed
60
* line-ADC offset
0.0%
* line-BDC offset
0.0%
* line-CDC offset
0.0%
* Rated line voltage
380V
* Rated pwer
10KW

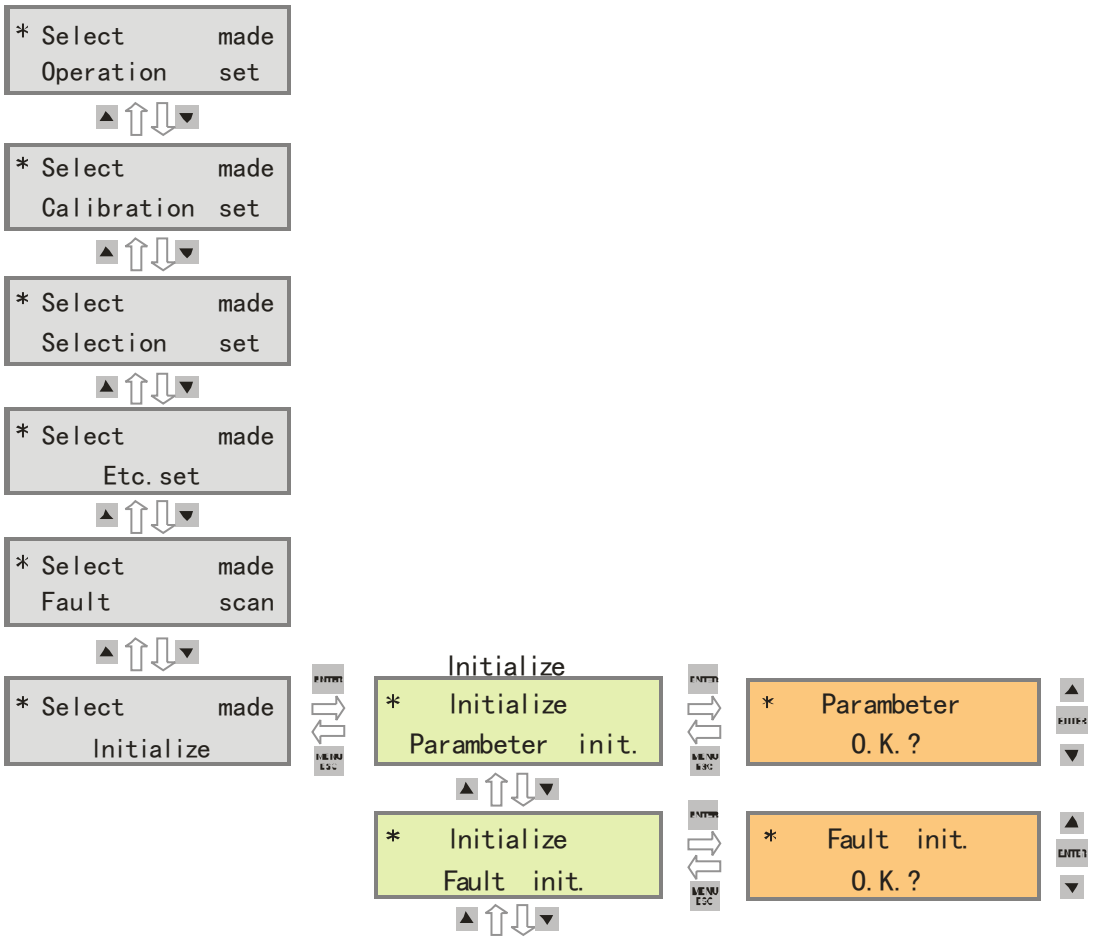

* Select made
Operation set
* Select made
Calibration set
* Select made
Selection set
* Select made
Etc. set
* Select made
Fault scan
* Select made
Initialize
* Selection set
Auto-run made
* Selection set
operation made
* Selection set
check sum
* Auto-run made
Auto made
* Auto-run made
Manual made


* Select made
Operation set
* Select made
Calibration set
* Select made
Selection set
* Select made
Etc. set
* Select made
Fault scan
* Select made
Initialize
* Selection set
Auto-run made
* Selection set
operation made
* Selection set
check sum
* operation made
Line connection
* operation made
Stand alone


* Select made
Operation set
* Select made
Calibration set
* Select made
Selection set
* Select made
Etc. set
* Select made
Fault scan
* Select made
Initialize
* Selection set
Auto-run mode
* Selection set
operation mode
* Selection set
check sum
* Check sum
Disabled
* Check sum
Enabled


* Select made
Operation set
* Select made
Calibration set
* Select made
Selection set
* Select made
Etc. set
* Select made
Fault scan
* Select made
Initialize
* Etc. set
ID number
* Etc. set
Switching freg
* Etc. set
Fault count No.
* ID number
0
* Switching freg
10.1HZ
* Fault count No.
2


* Select made
Operation set
* Select made
Calibration set
* Select made
Selection set
* Select made
Etc. set
* Select made
Fault scan
* Select made
Initialize
ENTER
MENU ESC
* Fault scan
0 Ready
* Fault scan
1 Ready
* Fault scan
2 Ready
* Fault scan
100 Ready


* Select made
Operation set
* Select made
Calibration set
* Select made
Selection set
* Select made
Etc.set
* Select made
Fault scan
* Select made
Initialize
Initialize
* Initialize
Parambeter init.
* Initialize
Fault init.
* Parambeter
O.K.?
* Fault init.
O.K.?