

Troubleshooting for Growatt TL&MTL

(Ver1.3)

2013-8-25

Version	Date	Note
Ver1.1	2013.7.15	First draft
Ver1.2	2013.7.29	Remove Hungary in Country code list table, Hungary choose VDE 0126
Ver1.3	2013.8.21	Error:100 replace control board first, if it doesn't work, then raplace inverter

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General

This document is applicable for Growatt 1000-5000 TL, Growatt 2500/3000MTL and Growatt 3600-5000 MTL.

The inverter will display a fault message with red indicator light in case there is any system abnormal or inverter abnormal situation. All faults will shut down the inverter immediately and wait until the fault is cleared.

In general, the operator should respond to the fault as follows:

1. The cause of the fault should be sought by referring to appropriate chart below.
2. If the problem cannot be rectified, contact Growatt for assistance or service.

Fault condition and Troubleshooting

Part I. System fault

1. Auto Test Failed

The auto test cannot pass. Auto test function is only activated in model for Italy.

Please make sure the grid (voltage and frequency) is normal. Restart the inverter and redo it.

2. AC V Outrange

The grid voltage is out of range, or the inverter's voltage limits is incorrect.

If there are several inverters in parallel, and the inverter shows "AC V Outrange" after the inverter feed to grid working for a while, perhaps the grid impedance is too high, please record the AC cables wiring condition and record the phenomenon, then contact Growatt service.

If the inverter shows "AC V Outrange" when turn on AC breaker, check as following steps:

- a. Turn off AC breaker and DC switch, check whether the AC cables are well connected.



Fig.1 AC cables wiring

- b. Turn on AC breaker, measure the real grid voltage (L to N) by multi-meter.
- c. Check whether the grid voltage is complied with the local standards, check whether the grid voltage is stable with multi-meter. If both not, please contact the local electricity company.

- d. Turn on DC switch, compare the measured grid voltage with the AC voltage displayed on LCD. If the tolerance is more than 3V, please calibrate AC voltage of the inverter as following steps:

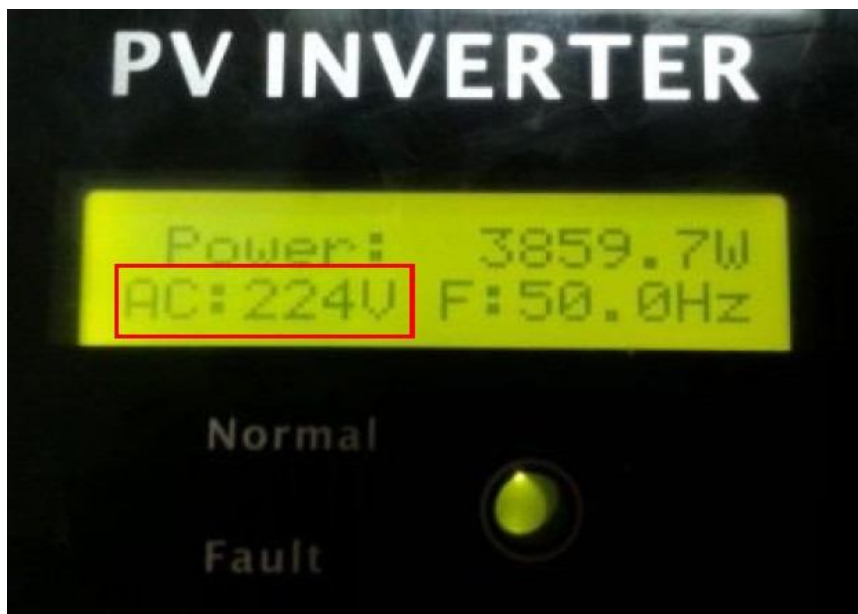


Fig.2 AC voltage on LCD

- ✧ Connect the inverter with PC via RS232 to USB cable.
- ✧ Use a tool named ShineCHKVac to calibrate AC voltage as following picture.
- ✧ Before inverter connects to grid, Please input the actual AC voltage with no decimal. For example, if the grid voltage is 230.2V, you may input 230, if the grid voltage is 230.6V, you may input 231V. Please make sure to input the right com port number of your PC.



Fig.3 ShineCHKVac calibrate Vac

- e. Check the AC voltage limits via ShineBus
- ✧ Choose "4 Parameter" tab, select "Read" option as following figure.

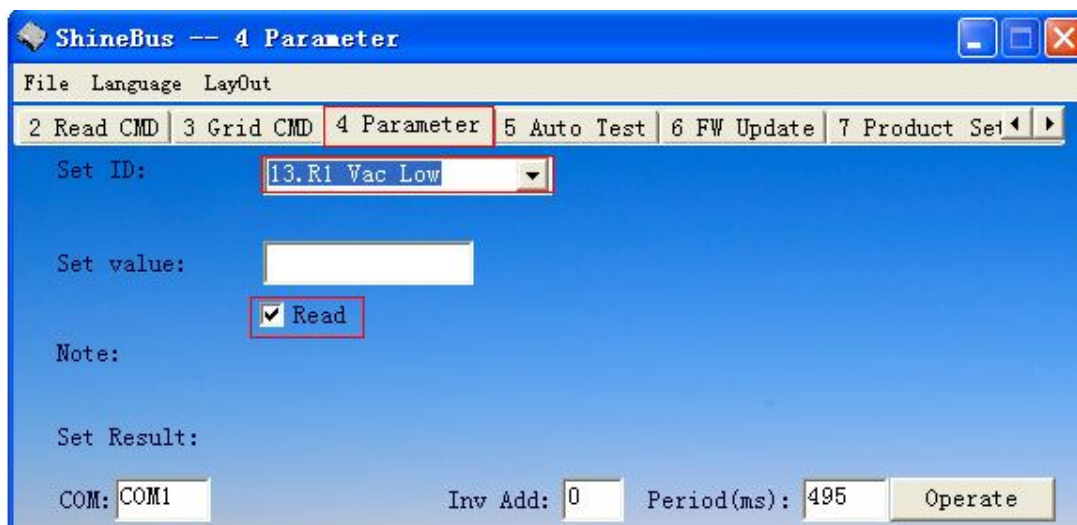


Fig.4 ShineBus read Vac rang

- ✧ Select 13, 14, 17 and 18 option in “Set ID” drop-down list, and click “Operate” button to read the AC voltage limits in “Set value” field one by one.

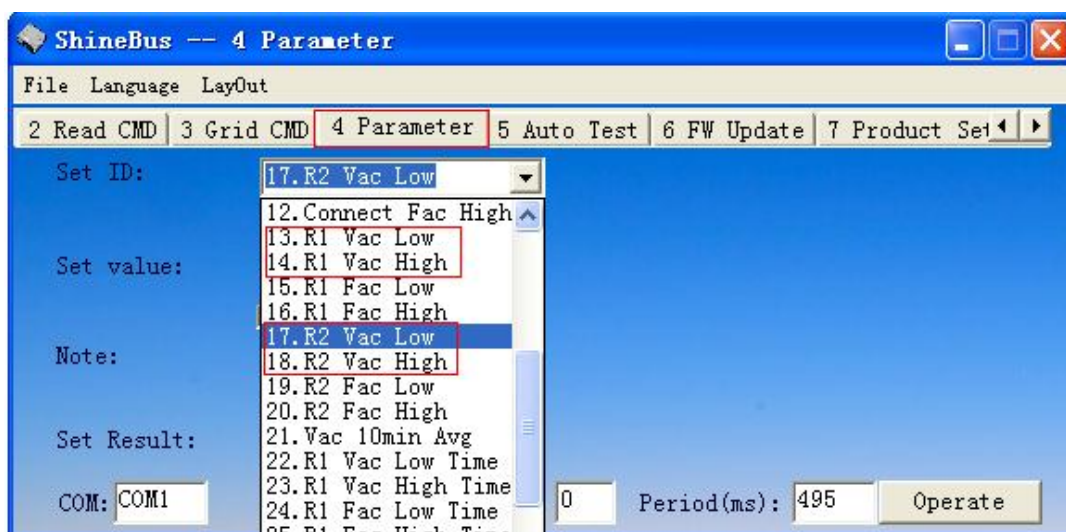


Fig.5 ShineBus Vac list

- ✧ Check whether the limits are complied with local grid standard. If not, please reset the limits by ShineBus. Fill Corresponding value in “Set value” field, not selected “Read” option, and click the “Operate” button to set AC voltage limits one by one. Example as follow figure, related values refer to following table.

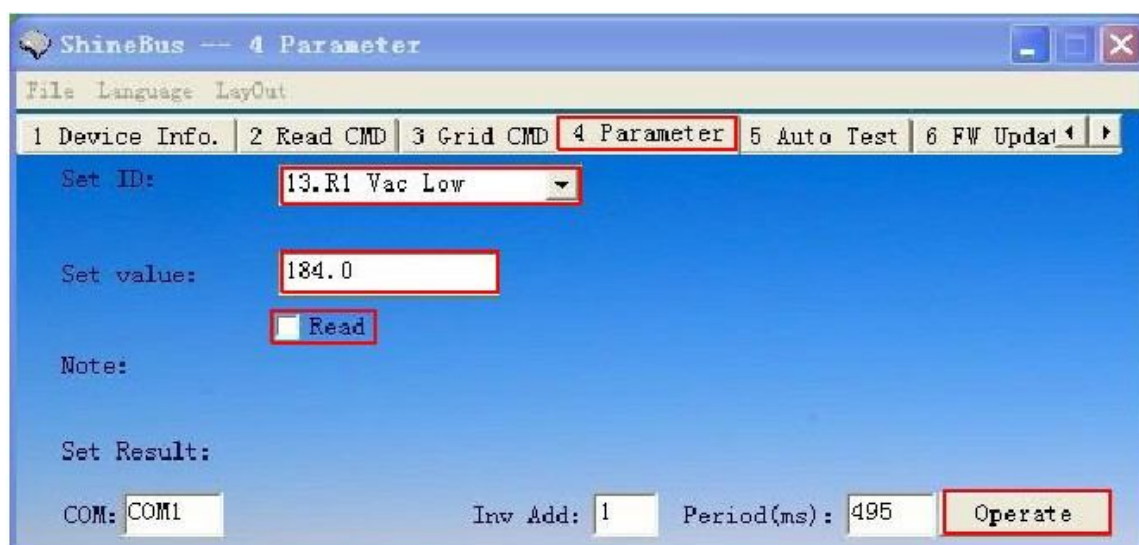


Fig.6 ShineBus set Vac range

Table 1 Vac set values

Country	Safty	R1 Vac low	R1 Vac high	R2 Vac low	R2 Vac high	V10minAvg
Netherlands, Swiss, France	VDE 0126	185.0	264.0	/	/	253.0
Germany	N4105	186.0	262.0	/	/	253.0
UK	G83-2	200.0	262.0	184.0	273.7	/
	G59-2	200.0	253.0	184.0	264.5	/
Italy	CEI 0-21	195.5	253.0	92.0	264.0	/

f. If all conditions are OK and this fault still exists, please contact Growatt service.

3. AC F Outrange

The grid frequency is out of range, or the inverter's frequency limits is incorrect.

If there are several inverters in parallel, and the inverter shows "AC F Outrange" after the inverter feed to grid working for a while, perhaps the grid impedance is too high, please record the AC cables wiring condition and record the phenomenon, then contact Growatt service.

If the inverter shows "AC F Outrange" when turn on AC breaker, check as following steps:

- Check whether the frequency on the LCD is within the local grid standards, if not, please contact local electricity company.

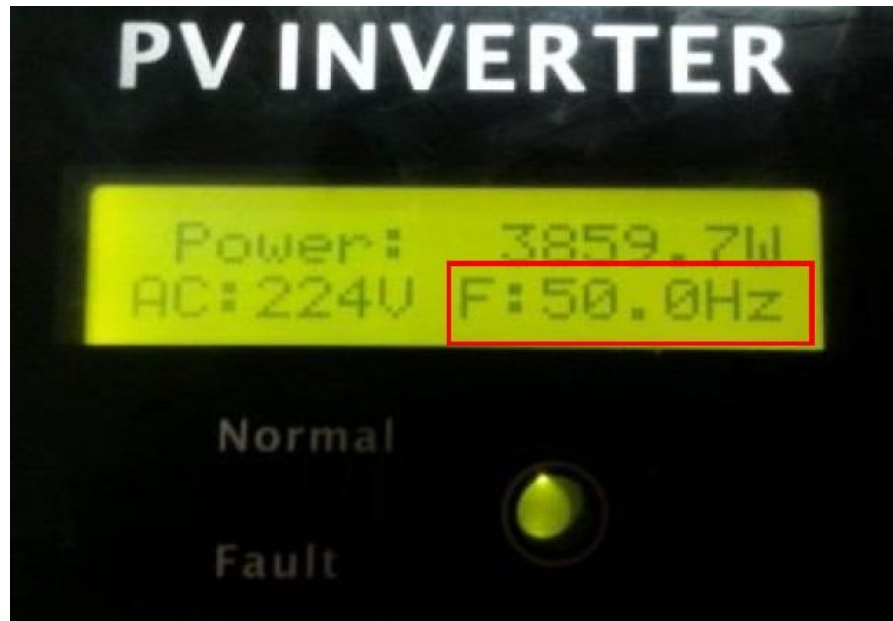


Fig.7 AC frequency on LCD

- b. Check the grid frequency limits by ShineBus
- c. Select layout "4 Parameter", select option "Read" as following figure.

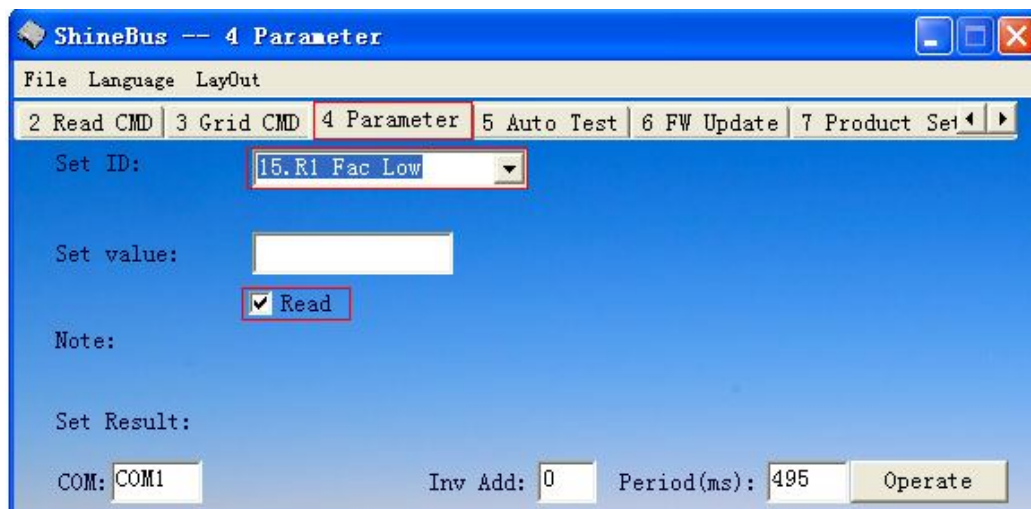


Fig.8 ShineBus read Fac rang

- d. Select 15, 16, 19 and 20 option in "Set ID" drop-down list. And click button "Operate" to read the frequency limits one by one

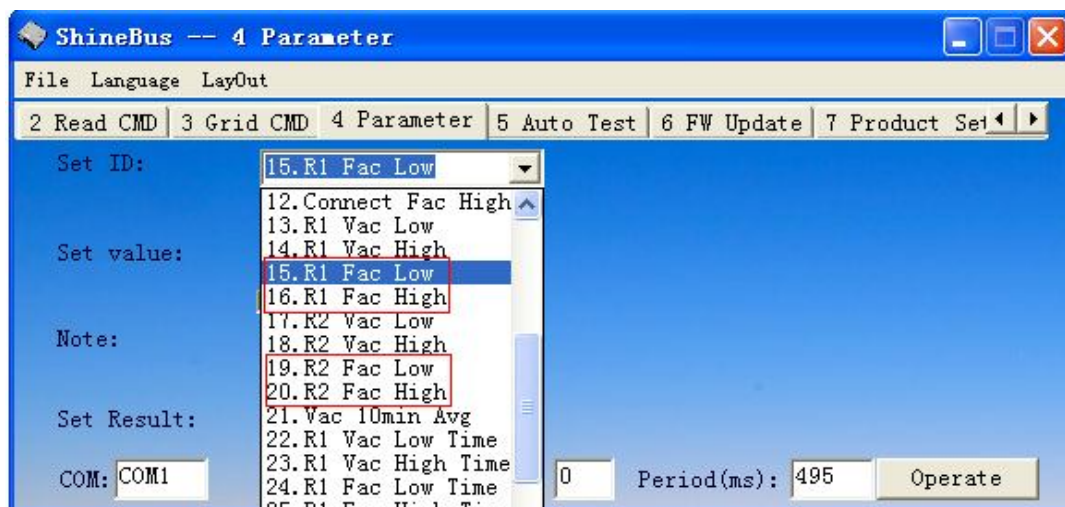


Fig. 9 ShineBus Fac list

- e. Check whether the limits are complied with local grid standards. If not, please reset the limits by ShineBus. Fill Corresponding values in “Set value” field, not selected option “Read”, and click button “Operate” to set AC frequency limits one by one. Example as follow figure, related values refer to following table.

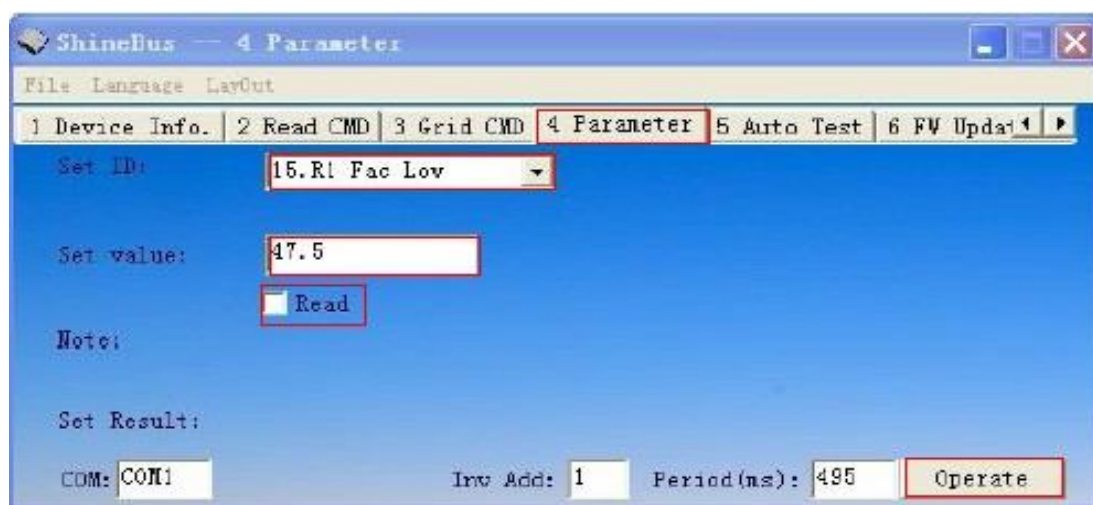


Fig.10 ShineBus set Fac range

Table 2 Fac set values

Country	Safty	R1 Fac low	R1 Fac high	R2 Fac low	R2 Fac high
Netherlands, Swiss, France	VDE 0126	47.5	50.2	/	/
Germany	N4105	47.5	51.5	/	/
UK	G83-2	47.7	51.5	47.0	52.0
	G59-2	47.5	51.5	47.0	52.0
Italy	CEI 0-21	47.5	51.5	49.5	50.5

4. No AC Connection

There is something wrong with the connection between grid and the inverter.

- Check whether AC circuit breaker is off.
- Check whether AC cables are all firmly and correctly connected.



Fig.11 AC cables wiring

- Measure the voltage across the “L” and “N” terminal to check whether public grid is cut off.
- If the fault is sustained, please open the inverter to check inside.
- Turn off the DC and AC breaker, wait about 1 minute to ensure the capacitors discharge completely, then open the inverter and remove the front cover.
- Use multimeter to check whether the fuse is in good and usable condition, if burnt out, please replace a new one, the fuse model is in Table 3. Before replace the fuse, please refer to Appendix A to remove the control board and metal panel, the fuse is under the metal panel as shown in Fig.14.

Table 3 Fuse model

Model	Fuse Model
Growatt 1500TL/Sungold 1500TL	0314015/250V/MXP
Growatt 2000TL/Sungold 2000TL	0314015/250V/MXP
Growatt 3000TL/Sungold 3000TL	0314020/250V/MXP
Growatt 4000TL	0314030/250V/MXP
Growatt 5000TL/Sungold 4600TL	0314030/250V/MXP
Growatt 2500MTL	0314020/250V/MXP
Growatt 3000MTL	0314020/250V/MXP
Growatt 3600MTL	0314020/250V/MXP
Growatt 4200MTL	0314030/250V/MXP
Grwoatt 4600MTL	0314030/250V/MXP
Growatt 5000MTL	0314030/250V/MXP



Fig.12 Layout of inverter

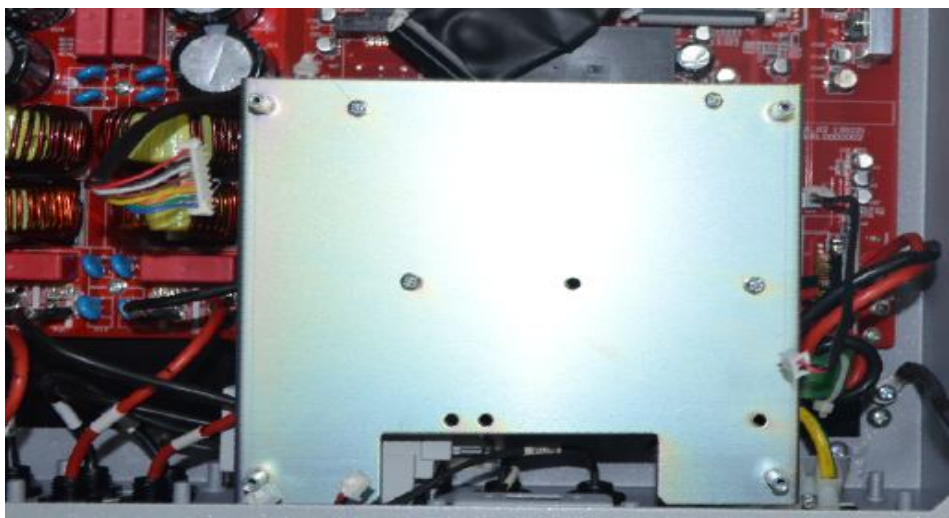


Fig.13 Metal panel

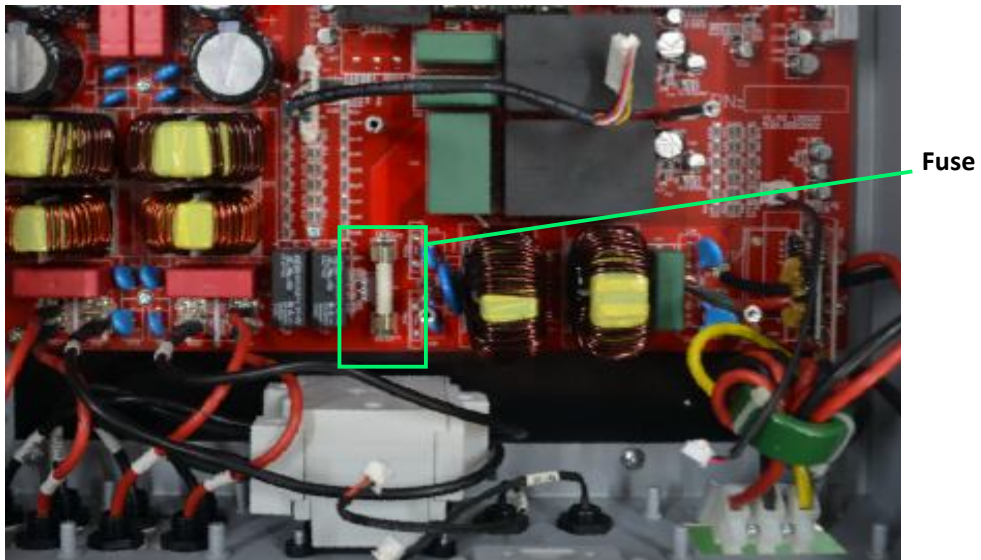


Fig.14 Replace Fuse

- g. If all conditions are OK and this fault still exists, please contact Growatt service.

5. Residual I High

The residual current of the inverter is detected too high.

- a. When inverter showing Residual I High, please restart the inverter for 2 or 3 times.
- b. If the error still exists, please examine if the line and neutral (L and N) are connected well.



Fig.15 AC L and N wiring

- c. If the the line and neutral (L and N) are ok but the error still exists, please replace an inverter.

6. PV Isolation Low

The inverter's PV input insulation impedance is too low.

- Check if the PV modules are well grounded.
- Check if the inverter is well grounded.

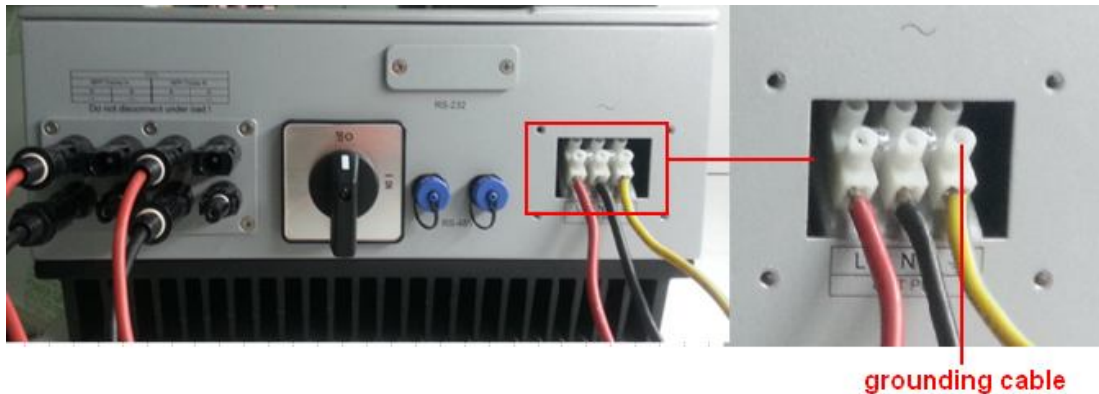


Fig.16 Ground cable wiring

- Open the inverter cover to check if the inside grounding cable is well connected;

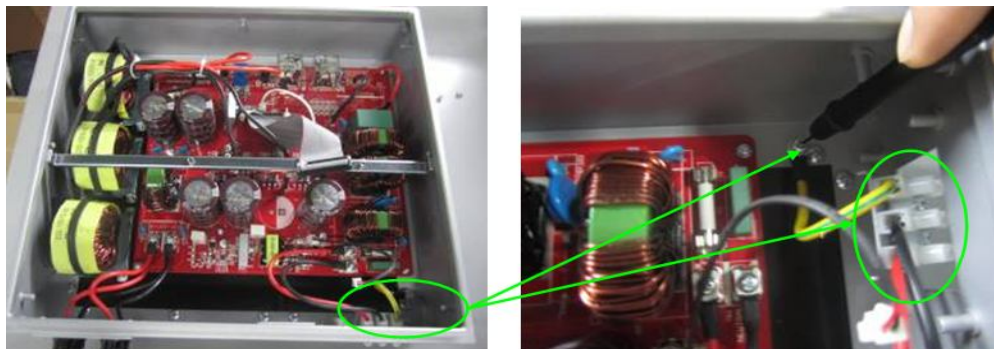


Fig.17 Internal grounding cable checking

- Check if the marked screw is loose or not. If loose, please tighten it.

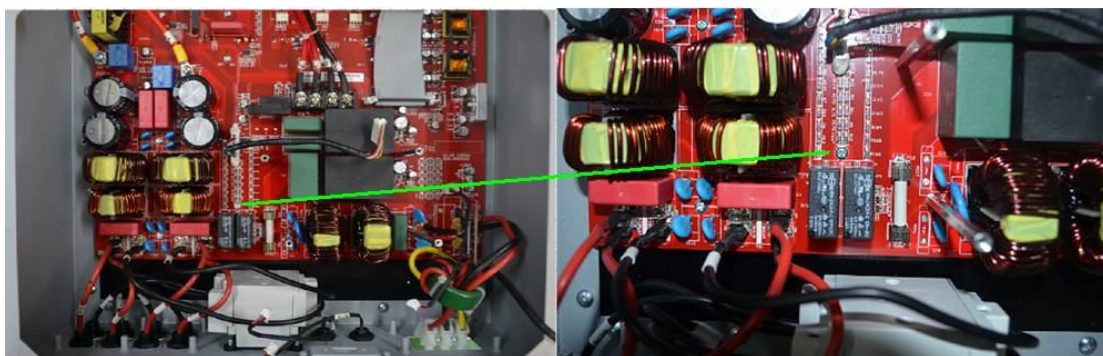


Fig.18 Internal screw checking

- e. If the error still exists as the above checking is ok, please contact Growatt service.

7. Output High DCI

The DC offset in the AC current is detected too high.

- a. Please restart the inverter and check whether the fault still exists or not. If the fault doesn't always appear, please don't care because the inverter will automatically recover and continue working.
- b. If the error always appears, please replace an inverter.

8. Over temperature

The inverter module is overheating.

- a. Check whether the environment temperature is too high, try to lower it.
- b. Something wrong with the thermal resistor, replace it with a new one.



Thermal resistor

Fig.19 Replace the thermal resistor

Part II Inverter fault

1. Error: 100

When inverter displays Error 100, it means the internal reference voltage fault.

- Restart the inverter, check if the error still exists.
- If the error still exists, please refer to Appendix A to replace a new control board.
- If the error still exists, please contact Growatt service to replace an inverter.

2. Error: 101 or Error: 102 or Error: 121

When inverter displays Error 101 or Error 121, it means the two CPU units have something wrong with the communication to each other; when the inverter display Error 102, it means the two CPU sampling data is inconsistent.

- Turn off the DC switch and make the inverter totally shut down, and then turn on DC switch to check if the error still exists.



Fig.20 Turn off DC switch

- If the error still exists, please refer to Appendix A to replace a new control board.

3. Error: 116

When inverter displays Error: 116, it means there is failure in reading or writing EEPROM.

- Check when the error appears, if appears in the morning, please report the PV configuration to Growatt for support. Otherwise go to next step.
- Restart the inverter, check whether the error still exists.

- c. If the fault is sustained, please refer to Appendix A to replace a new control board.

4. Error: 117

There is something wrong with the relay circuit.

Restart the inverter, if the error still exists, please contact Growatt service to replace an inverter.

5. Error: 118

When inverter displays Error: 118, it means the inverter failed to initialize the model.

If a fault is detected during initialization, there will be a model fault displayed in LCD screen.

- a. To clear the fault, you need to reset the values with the parameter setting tool ShineBus.

- ✧ The parameter Model consists of 4 sections:

Model: PF U1 Mx Sx

- ✧ The meaning of Mx and Sx you can refer to table 1 and table 2 in Appendix A.

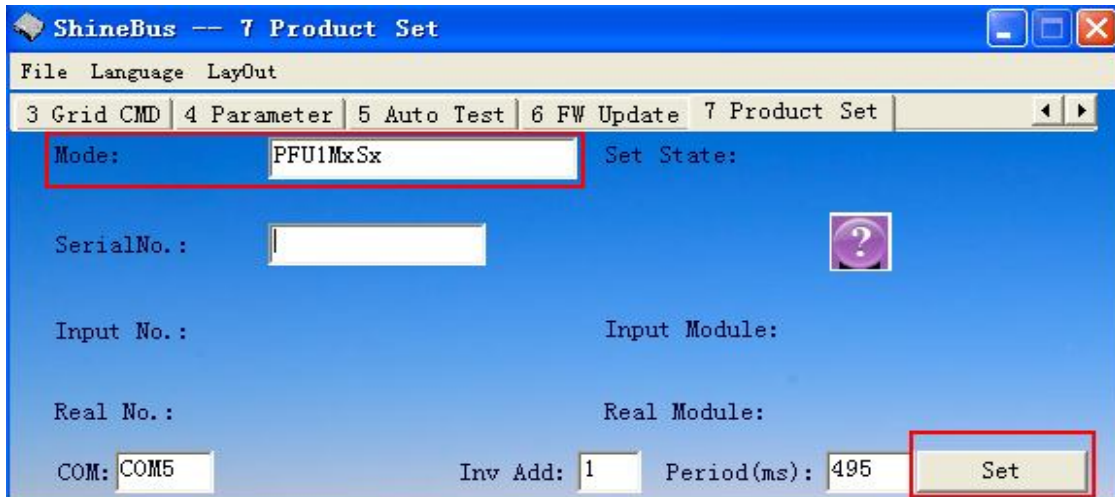


Fig.21 ShineBus set Model

- ✧ Please restart the inverter 2 or 3 times after the mode set successfully. When starting up, please check whether the error remains.

- b. If the error is sustained, please refer to Appendix A to replace a new control board.

6. Error: 119

When the inverter shows Error 119, it means something may be wrong with the GFCI device inside the inverter.

- a. Restart the inverter for 2 or 3 times, check whether the error still exists.

- b. If the error still exists, please contact Growatt service to replace an inverter.

7. Error: 120

When the inverter shows Error 120, it means there is something wrong with the current sensor.

Restart the inverter, if the error still exists, please contact Growatt service to replace an inverter.

8. Error: 122

When the inverter shows Error 122, it means the Bus voltage is out of range.

- Restart the inverter, and check whether the error still exists.
- Turn off AC breaker, measure the voltage between PV+ to PV- and check whether it is within DC voltage range.
If it is higher than the Max allowed DC voltage, you need to reduce the quantity of PV modules.

Input Data	Growatt 1000TL	Growatt 1500TL	Growatt 2000TL	Growatt 3000TL
Max. DC power	1300W	1800W	2300W	3200W
Max. DC voltage	450V	450V	500V	500V
Start voltage	90V	150V	150V	150V
PV voltage range	70V - 450V	100V - 450V	100V - 500V	100V - 500V
MPPT work voltage range/ nominal voltage	70V-450V/180V	120V-450V/360V	120V-500V/360V	120V-500V/360V
Full load dc voltage range	110V - 400V	175V - 450V	195V-450V	250V - 450V
Number of MPP trackers /strings per MPP tracker	1 / 1	1 / 1	1 / 2	1 / 2
Max. input current /per string	10A/10A	10A/10A	12A/12A	15A/15A

Input Data	Growatt 3600MTL	Growatt 4200MTL	Growatt 4600MTL	Growatt 5000MTL
Max. DC power	3800W	4400W	4800W	5200W
Max. DC voltage	600V	600V	600V	600V
Start voltage	150V	150V	150V	150V
PV voltage range	100V-600V	100V-600V	100V-600V	100V-600V
MPPT work voltage range / nominal voltage	120V-600V/360V	120V-600V/360V	120V-600V/360V	120V-600V/360V
Full load dc voltage range	190V-580V	175V-580V	175V-580V	175V-580V
Number of MPP trackers /strings per MPP tracker	2 / 2	2 / 2	2 / 2	2 / 2
Max. input current of tracker A/tracker B	10A / 10A	15A / 15A	15A / 15A	15A / 15A
Max. input current per string of tracker A/tracker B	10A / 10A	15A / 15A	15A / 15A	15A / 15A

Fig.22 PV voltage range

- Turn on AC breaker, and read Bus voltage from LCD (PV: XXX B: XXX), if B: XXX is really too high, please record PV: XXX B: XXX, and contact Growatt service.

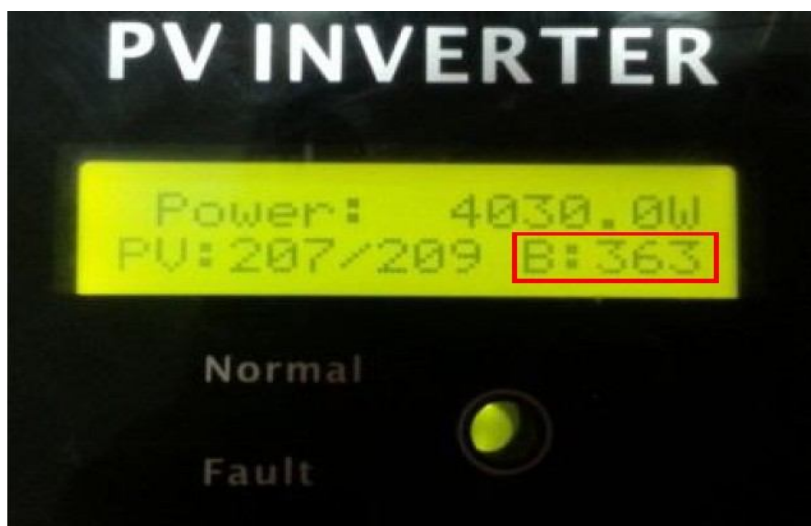


Fig.23 Bus voltage on LCD

Appendix A

How to replace control board

- a. Disconnect DC breaker and AC breaker to power off the inverter.
- b. Remove the cover of RS232 interface with a screwdriver.



Fig.1 RS232 interface

- c. Unscrew the two nuts on RS232 port using a 5mm sleeve screwdriver.



Fig.2 Two nuts on RS232 port

- d. Remove the front cover, and disconnect the connectors shown below.

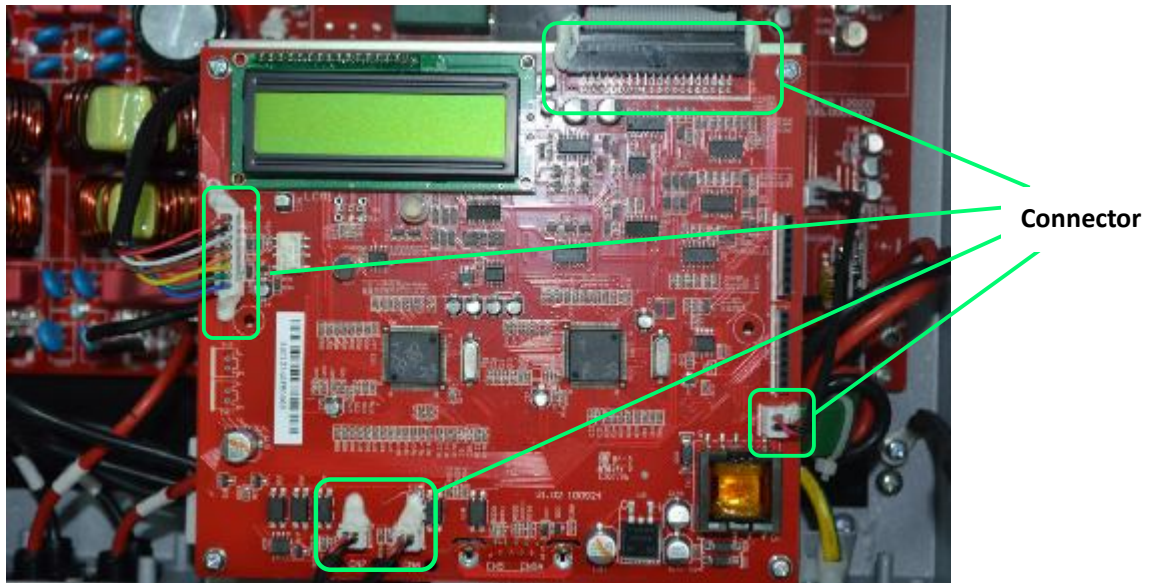


Fig.3 Connectors on control board

- e. Unscrew the four screws connecting the control board to the main board.

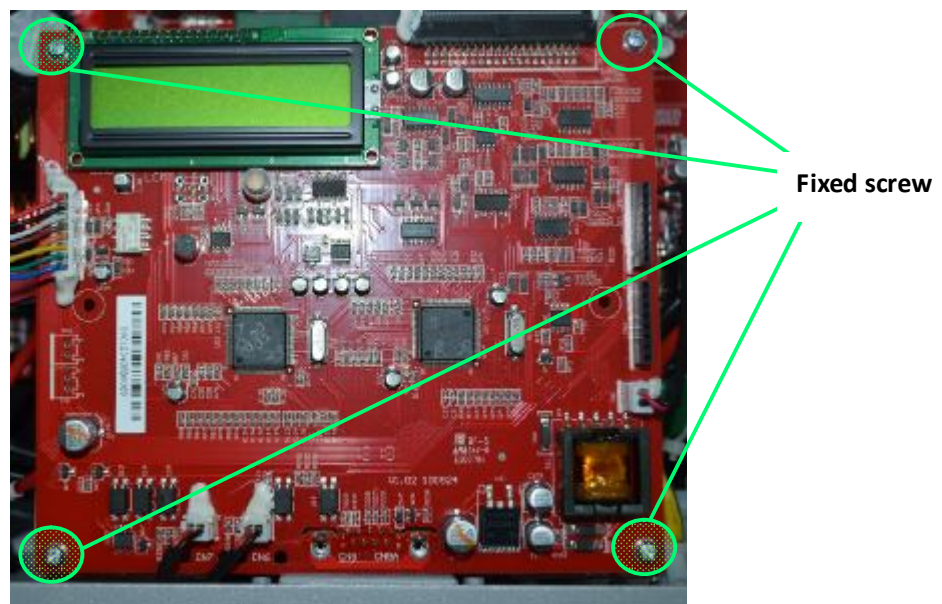


Fig.4 Screws on Control board

- f. Replace the control board with a new one and screw it using the four screws,
- g. Reconnect all the connectors on the board and replace the RS232 port
- h. Assemble remain parts in reverse order of the disassemble procedure.
- i. Turn on the DC switch, and reset the inverter's Model and serial number via ShineBus. Remember to click the "Set" button to save the modification.

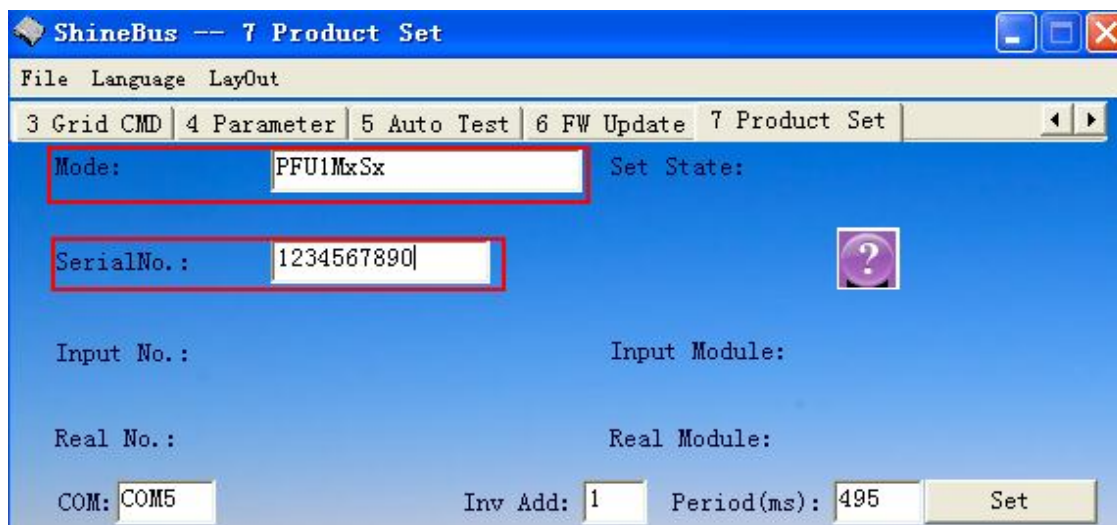


Fig.5 ShineBus set Modle and serial number

- ✧ The inverter's model name is made up of PFU1MxSx four sections, the last two sections should be preset in accordance with the power level and country or grid standards. The meaning of Mx and Sx are shown in below tables.

Table 1 **Mx** stands for the power level of the inverter

Product (Growatt 1000-5000TL)	Mx
Growatt 1500TL/Sungold 1500TL	1
Growatt 2000TL/Sungold 2000TL	2
Growatt 3000TL/Sungold 3000TL	3
Growatt 4400TL	4
Growatt 5000TL/Sungold 4600TL	5
Sungold 5000TL	6
Growatt 1000TL	A
Growatt 4000TL	D

Product (Growatt 2500/3000MTL)	Mx
Growatt 2500MTL	2
Growatt 3000MTL	3

Product(Growatt 3600-5000MTL)	Mx
Growatt 3600MTL	3
Growatt 4200MTL	4
Grwoatt 4600MTL	5
Growatt 5000MTL	6

Table 2 **Sx** stands for the adopted standards or countries

Sx	Code
1	VDE0126 (Netherlands, Hungary)
2	UK_G59
3	Australia (AS4777)
4	Italy (CEI 0-21)
5	Spain (RD1699/RD1663)
6	Greece
7	Germany (N4105)
8	UK_G83
9	Ireland
A	CGC
B	Denmark
D	Belgium
E	Barbados

✧ The serial number can be found in the label attached to the side of the inverter.



Fig.6 Label and S/N location



Fig.7 S/N number is serial number

j. Turn on AC breaker and start the inverter.

Contact information

If you have any question about our product, our hotline will be happy to assist you, please contact Growatt service with information below.

Company:	GROWATT NEW ENERGY TECHNOLOGY CO.,LTD
Website:	www.growatt.com
Email:	service@ginverter.com
Address:	Building B, Jiayu Industrial Zone, #28 Guanghui Road, Longteng Community, Shiyan, Baoan District, Shenzhen, P.R. China
Service hotline:	+86 755 2747 1942
Fax:	+86 755 2747 1460