Static Voltage Regulator

User's Manual

Index

1 PRODUCT INTRODUCTION 1

1.1 Summary 1

1.2Feature 1

2.SPECIFICATION 3

3. ENVIRONMENT REQUIREMENT 4

3.1 Working environment of this product： 4

3.2 Storage requirement 4

3.3 Transportation environment 5

4. INSTALL CONNECTION WIRES 6

4.1 INSPECTION BEFORE INSTALLATION 6

4.2 INSTALL CONNECTION WIRES 6

4.2.1 Ready： 6

4.2.2 The selection of the cable： 7

4.3 CABLE CONNECTION: 7

4.4 WIRING DIAGRAM： 8

5. OPERATION 8

5.1 CONNECT POWER 9

5.2 Use instructions 9

5.3 THE OPERATION OF THE DISPLAY PANEL 10

5.3.1 LCD display panel. 11

5.3.2 The main features: 11

5.3.3 Operation panel description 11

5.4. THE PARAMETERS SETTINGS 12

6.NOTICES: 14

6.1 OPERATION NOTES: 14

6.2 THE POWER ATTENTION: 15

7.ROUTINE MAINTENANCE WORK 16

7.1 PRODUCT REGULAR INSPECTION: 16

7.2 REGULAR MAINTERNANCE: 16

8.EXCEPTION HANDLING 17

1 Product introduction

1.1 Summary

Static AC Voltage Regulators through our company many years' hard work, develop the compensating power stabilizer to quickly stabilize voltage of the equipment as a new generation .

This products series adopt the newest DSP operation and metering IC control technology, fastest AC sampling technology, effective values calibrating technology, current zero-crossing switching and fast compensating voltage stabilizing technology. They control several available silicon slice by special sequence to control the voltage connections, then to change the main voltage and voltage polar.

It is composed of insulation transformer, SCR modules, CPU control core, fast voltage stabilizing technology and safety protection device so that the voltage regulator accomplish static control, safe, high efficient, energy conservation and environmental protection. It is the perfect match of transformer and SCR on/off switch.

This product is widely used in industry, traffic, Post, defense, rail ways, scientific research, large-scale electromechanical machine , metal processing equipment, production line, elevator, medical equipment, air conditioner, broadcast television, household appliances, building lighting equipment and other equipment which need stabilize voltage.

This product is highly suitable to the equipment which needs high reliable and high stable power supply, or equipment in high amplitude of fluctuation voltage net.

1.2Feature

(1)High efficiency：>99%。

(2) High precision ： ±1%, ±3%, ±5% (adjustable)

Static、anti-interrupt、maintenance free、no mechanical failure and carbon brush attrition.

(3) Intelligent instrument display: intelligent instrument real-time display of voltage, current, power, such as RMS, clear, accurate, high resolution, thin-film button operation, safe and reliable.

(4) Three-phase separately adjustment：Output voltage unbalance is less than 1% so that guarantee the precision of each phase is stable.

(5)Wide application range: Widen voltage stable range, it can meet the need to work in the poor voltage

condition

(6) Quickly response: stabilization response within 40mm, no influence on computerized automation, Machine and Equipment.

(7) Full protection function: fault display and alert in over loaded, over voltage, lack of voltage, lack of phase, short circuit, over heat, confirming appliance running in a safety condition.

(8) Preset function: Protective limit can set freely.

(9) Strong ability for instantaneous overload: The high quality material can confirm excellent performance. This machine can continuously run in 100% rated load. Further more, it can bear the instantaneous overload without any harmfulness.

(10) Well-adapted ability: This stabilizer have high adaptability toward bad and complicated live wire entanglement, so it can work continuously and stably .

(11) No distortion: We use current zero-crossing switching technology. There is no current interruption, no surging current and waveform distortion during the switching processes.

(12) Low loss: least power loss; No-load loss is less than 0.5% , saving money on electricity for customer.

(13) Bypass function, convenience in maintain: It can switch between voltage regulator and bypass power supply ,which make it convenient to be maintained.

2.Specification

(1) Product Mode	
(2) Rated Capacity	10KVA-4000KVA
(3) Phase	single phase □ three phase □
(4) The Range of Input Voltage	±15%□ ±20%☑ ±30%□ other□(±40%)
(5) Input Voltage	220V□ 380V□ 400V☑ other□(V)
(6) Output Voltage	220V□ 380V□ 400V☑ other□(V～ V)
(7) Voltage Regulation Accuracy	±1%□ ±2%☑ ±5%□ other□(V～ V)
(8) Efficiency	99% or higher
(9) Frequency	47Hz / 63Hz
(10) Response Speed	< 40ms
(11) Class of Insulation	E
(12) Insulation Resistance	Machine-to-ground insulation resistance> 5 m Ω
(13)Dielectric Strength	2500 VAC / 1 min without flashover and breakdown
(14)Output Waveform	the output waveform without distortion, no incremental harmonic
(15)Momentary overload Capacity	2 times rated current
(16) Display Mode	LCD /LED display
(17) Work Mode	run continuously for a long time
(18) Protection	Protect the situations: overload, over-voltage, lack of voltage, short circuit ,phase failure ,phase sequence, overheat
(19) Cooling Mode	temperature control and forced air cooling
NOTE:	Note: (1)calculation of the rated capacity : $P=\sqrt{m}I_2U_2 10^{-3}(KVA)$ P-voltage regulator rated（output）capacity(KVA) m-phase single-phase: m = 1 three-phase: m = 3 I_2 - rated output current (A) U_2 - rated output voltage (V) (If it is three phase, U_2 means line voltage) (2) The above technical parameters is for our normal products, not as the basis of product acceptance for customer . Product acceptance should be based on the parameters agreed in the contract. (3) if customers have special requirements, they can negotiate with our relative departments .

3. Environment Requirement

3.1 Working environment of this product：

(1) Stabilizer must be used indoor.

(2) No conductive or explosive powder, no corrosive metal or gas, steam and oil fog that damage insulation.

(3) Well- ventilated situation.

(4) Flat and solid foundation.

(5) Altitude below 1000m.When the altitude is higher than that, please turn down the rated capacity. (Note: When altitude is more than 1000m, the load capacity of stabilizer will decrease with the increase of altitude .)

(6) Ambient air temperature： Lowest temperature -5℃， highest temperature+40℃。Daily average cooling temperature is no allowed to over+35℃; Yearly's is no over+25℃; Working environment temperature change rate not higher than 5K/h.

(7) Relative humidity：≤90%RH（40℃±2℃ No condensation）。

(8)Voltage waveform in power supply is similar to sine wave.（THD≤4%）。

(9) The transient voltage peak in power grid Vp-p≤2000V, No thunder hit

(10)Expose in radioactive radiation is not allowed.

(11) Improper mechanical stress such as shock and vibration should be avoided.

(12) Stabilizers are not allow to work in a parallel connection.

(13) Keep enough space around stabilizer for ventilation and cooling.

3.2 Storage requirement

This product could not put under direct sunshine or rainfall. They should be stored in a place which is clean, no strong mechanical vibration, no hit and strong magnetic field; place in which damage gas, inflammables , explosives, or corrosive chemistry stuff are prohibited.

3.3 Transportation environment

This product should be in wrapped when they are in transportation. Avoiding directly hit by rainfall and snow. Violent vibration , impact and upending is not allowed.

■ Note：

If you can’t meet the above mentioned working environment, Please consult the distributor when you make an order, or consult us at anytime.

4. Install connection wires



Please read the below information before installing connection wires：

● Cut off power before installing connection wires, in case of accident caused by electric shock.

●This product should be tested and installed by professional workers who

4.1 Inspection before installation

(1) Confirm the product's model and size is whether they are in conformity with your order or not, especially the capacity, input/output voltage and so on.

(2) Inspect the factory documents (instruction, certificate of quality and so on) and other files that mentioned in order。

(3) Inspect whether there are any electrical components damaged inside stabilizer box during the transportation

(4) Fastener of the stabilizer must be solid and connection wires are not allowed to be dropped off.

If fastener is loose , it should tight it closely. And the control plug-in board must be solid and have a good contact.

(5) Please inspect and install the stabilizer within one month after receiving, in case quality decline for long term lay aside.

4.2 Install connection wires

4.2.1 Ready：

① After stabilizer pass the inspection, it can install. Be careful to case and component inside when install connection wires

② After the installation of stabilizer, ensuring the chassis of the stabilizer stressed uniformly, cabinet is in a stable position

③ Keep enough space around stabilizer for ventilation, maintenance and cooling.

4.2.2 The selection of the cable：

① When make a connection, please choose suitable cable and solderless terminal to guarantee the reliable connection of input and output terminal

② Load rate of intercepting, heat dissipation conditions, environment, laying mode, transmitting distance and other factors must be considerate when choose cable.

③ The size of input and output wires must follow the capacity of stabilizer. You'd better make some surplus, We highly suggest you choose copper wire ,every length 2.5A/mm^2 as your stabilizer connection wire.

4.3 Cable connection:

①Connect the input power supply wire to input terminal in the stabilizer case （It mark with the word---"input" and phase mark, single phase mark "A" , three phase mark “a”，“b”，“c”）；

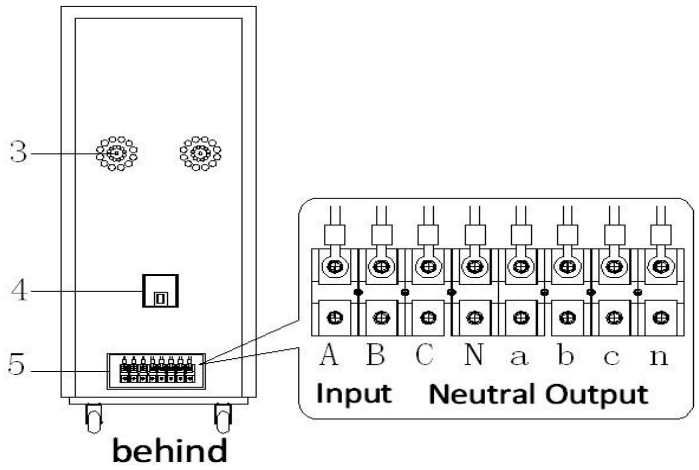
② Connect load line to output terminal in the stabilizer case.（It mark with the word--- "output" and phase mark, single phase mark "A" , Three phase mark “a”，“b”，“c”）。

③ Connect outside Neutral wires to corresponding Neutral terminal inside the stabilizer case（It mark with “N”）。

④ Chassis grounding protection： Earth wire should connect to Earth wire terminal inside the stabilizer case（Earth terminal mark “⏚”）。

4.4 Wiring diagram：

Three phase industrial contactless stabilizer：





● The above-wiring diagram is just for you reference, Please take the real machine as a standard.

● Connection must according to the terminal mark. If there is any mis-connection, this stabilizer will not be run in normal, or be damaged.

5. Operation

5.1 Connect power

(1) Make sure the input and output cables are connected properly and the machine Earthed correctly.

(2)Loading equipment connected by voltage regulator is off.

(3)Turn on the power switch of the voltage

regulator, "bypass" is released on the display panel and the corresponding voltage value of each ph ase showed in the output voltage area.

(4)check whether the each phase of the output voltage from display panel is within the range of input voltage of the stabilizer. if any deviation, reset regulated output values through the display panel.

(5)If the output voltage is within the range and the stabilizer can't work automatically in 5 minutes, please check whether the phase sequence is correct or not. You can arbitrarily exchange two wires and then power-on test .

(6) Under Normal Circumstances, stabilizer will work automatically within 5 minutes. Please confirm the output voltage value conform with the need of your loading equipment.

(7)After everything is normal ,then add load and test run.

(8)Check whether the voltage value, current value on display panel is within a predetermined range or not. If all functions are within a normal value, the stabilizer can be used.

5.2 Use Instructions

1.Stabilizer long term carry maximum loads will short its service life. Overload is not allowed.

2. The stabilizer has perfect protection functions, to ensure the safe operation between stabilizer and the load equipment.

As follows:

(1)Overload Protection:

If the load current exceeds the preset over-current value, "overload" lights on and systems alarm. More than 1 minutes, it will automatically work bypass.

(2)Overvoltage protection:

When the real output voltage is lower than the value of preset overvoltage on the panel,

“overvoltage” lights on and system alarm. More than 4 minutes, it will automatically work bypass.

(3)Undervoltage protection:

When the real output phase voltage is lower than the value of preset overvoltage on the panel, “overvoltage” lights on and system alarm. More than 4 minutes, it will automatically work bypass.

(4) Short circuit protection:

When the stabilizer short -circuit fault, the system will automatically trip.

Note: The delay can be reset protective value.

(5) Input undervoltage protection:

When input voltage is lower than the normal range, the stabilizer will be at a situation of bypass and automatic launch or manual launch is not allowed.

(6)Phase loss protection

When input voltage phase sequence is wrong or phase loss, the stabilizer will be at a situation of bypass and automatic launch or manual launch is not allowed.

(7)Over-temperature protection

When radiator temperature is over 45℃ , the stabilizer will be at a situation of bypass . When the transformer temperature is over 150℃, the stabilizer will be at a situation of bypass .

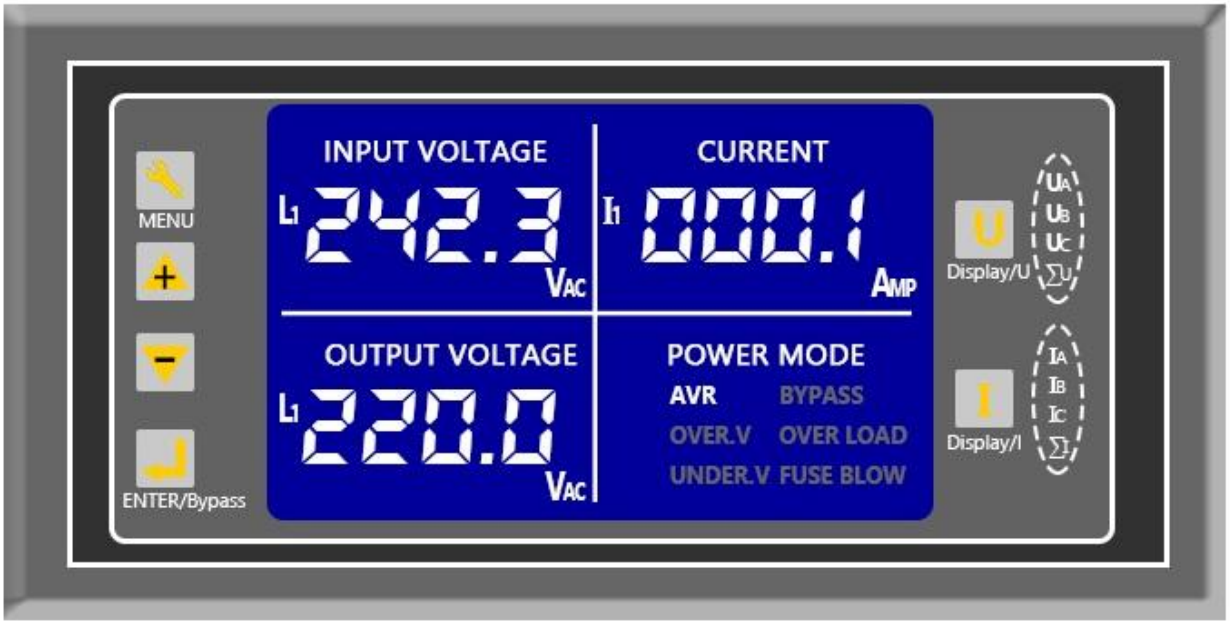
3. If the input voltage is at the range and output voltage is unstable , it should check immediately.
4. The temperature of SCR radiator’s fan will increase as the incensed temperature of radiator .
5. When the internal temperature reaches 55 ° C, the chassis fan will rotate.

5.3 The operation of the display panel

（The following illustration only for reference purpose，please refer to the actual display.）

Through the display panel, we can not only clearly understand the operational status of the stabilizer, but also set parameters. Below are functionality of the display panel and the specific methods of operation.

5.3.1 LCD display panel.



5.3.2 The main features:

1)Real-time display of voltage and current

2) Setting overvoltage, under-voltage, over-current value

3) Setting the value voltage, the precision and the speed.

4)Stabilizer, the bypass and two output state control(Three-phase homology or Three-phase adjust separately.)

5)Showing the values of overload, overvoltage, under-voltage, blown fuse on the panel.

5.3.3 Operation panel description

1) Output voltage: Voltage display window or parameter setting window. The output voltage and setting parameters will be showed through the panel.

2) Current display window: Shows the output current.

3) UA, UB, UC, Σ U: Voltage shows channel light, indicating the currently displayed voltage is which phase of the voltage.

4) UA, UB, UC, Σ I: Current shows channel light, indicating the currently displayed current is which phase of the

current.

5)Display/U: Press this button can cycle display (UA, UB, UC, Σ U) the output voltage values of phase A, B, C and the voltage average value of A, B, C three-phase.

6)Display/I :Press this button can cycle display (IA, IB, IC, Σ I) the output current values of phase A, B, C and the current average value of A, B, C three-phase .

7)MENU: Through the key to set the voltage regulator parameters (The specific methods can refer to parameter settings.)

8) "+" : The key of parameters settings (increase)

9) "-" : The key of parameters settings (decrease)

10) ENTER/Bypass: The composite key of parameters setting between stabilizing and bypass.

11) Voltage regulation: Separately adjustment , when its indicator is light, phase voltage is in stabilized state; synchronous adjustment, when its indicator is light, line voltage is in stabilized state.

12) Over-voltage: When A, B, C three-phase corresponding light is on, it means output phase over-voltage; when the light is flashing, it means corresponding input phase over-voltage.

13) Under voltage: When A, B, C three-phase corresponding light is on, it means output phase under-voltage; when the light is flashing, it means corresponding input phase under-voltage.

14) Overload: When A, B, C three-phase corresponding light is on, it means relevant phase overload.

15) Fuse broken: Fuse indicator light of A, B, C three-phase are on , It means relevant phase compensation circuit is broken.

5.4. The parameters settings

1) Default Factory Settings:

Parameter stage-1. Center Voltage Uo = 220 v (except special requirement with ±5% adjustable voltage range)

Parameter stage-2. Voltage Regulation Accuracy: 1.0=(±1%),/3.0 =(±3%)/,5.0=(±5%)

Parameter stage-3. Under-Voltage Value (Intput): 264V (Depend on rated input voltage)

Parameter stage-4. Over-Voltage Value (Input): 176V (Depend on rated input Voltage)

Parameter stage-5. Voltage adjustment methods （Three phases）: Together=0.1，Separate（Independently）= 0.2，Automatic=0.3

Parameter stage-6. Overload Current settings: Actual rated current protection.

Parameter stage-7. Voltage display：0.1, (0.1=phase voltage，0.2=line voltage）

(2) "MENU" to use:

2.1 Press "MENU" button 1st, parameter setting window displays "1", this is "output voltage setting." Press the "+" or "-" key and set the voltage value you need. Then press "ENTER / Bypass" button to return. Note: The voltage value can not exceed ± 5% of the center voltage value.

2.2 Press "MENU" button 2nd, parameter setting window displays "2", this is "regulator precision setting." According to the actual demand to set the output voltage accuracy. Press the "+" or "-" key to select the precision you need, press "ENTER / Bypass" button to return.

2.3 Press "MENU" button 3rd, parameter setting window displays "3", this is "output under-voltage setting" According to the actual demand to set output under-voltage protection value. And then press the "+" or "-" key to choose the value you need, press "ENTER / Bypass" button to return.

2.4 Press "MENU" button 4th, parameter setting window displays "4", this is "output over-voltage setting". According to the actual demand to set over voltage. Press the "+" or "-" key to select the value you need, press "ENTER / Bypass" button to return.

2.5 Press "MENU" button to 5th, parameter setting window displays "5", this is "voltage adjustment mode setting." You can set "sub-tune" "coherent" mode. Press the "+" or "-" button to select your desired mode. Press "ENTER / Bypass" button to return.

2.6 Press "MENU" button 6th, parameter setting window displays "6", this is "overload current setting." You can set the output current protection. Press the "+" or "-" button to set the current value of what you need, Press "ENTER / Bypass" button to return.

6.Notices:

Following notes are for users who need to pay high attention. In order to ensure the safety of your life , product and the connected equipment, please read the instruction clearly before using and in strict compliance with the instruction.

6.1 Operation Notes:

1)The stabilizer must by the trained and qualified electrician to install ,operate and maintenance. Irrelevant people operating the machine are prohibited.

2)Before doing a installation and an overhaul of the voltage regulator, Please be sure to cut off the input power supply, lest it will cause electric shock or product damage.

3)Wiring must take firm to prevent its loosening and then causing fire. And the contact point oxidation was caused by contact resistance is too hot for the big resistance .

4)Voltage regulator input/output connections must be arranged reasonable, prevent trample torn, caused by leakage accidents.

5)Voltage regulator must be properly grounded. It shall be undertaken by the user that getting an electric shock caused by no ground wire running .

6)Voltage regulator ground wire is absolutely can't linked the heating pipes, water pipes, gas pipes and other public welfare facilities, so as to avoid infringement of third party rights or causing harm.

7)When voltage regulator is running, please do not open case touching the internal or move the input and output wires of the stabilizer, in case causing electric shock or other electrical accident.

8)Wet hand is not allow to operate voltage regulator;

9)Please don't disassemble and modify voltage regulator without authorization, lest causing failure, leakage or fire.

10) People are not allow to stand on Voltage regulator. Neither do heavy objects. Don’t let the clutter stuff especially conductive objects from the cooling holes or other parts into the internal, lest causing failure, leakage or other accidents;

11) It is forbidden to use corrosive cleaner or other fluid which will cause dissolution of the plastic and paint film ;

12) Avoid to pile objects around the voltage regulator, impeding air circulation;

13)When the regulator is not used, please turn off the power switch and disconnect the wiring on the outside connection.

6.2 The power attention:

1) According to the actual power of the electrical equipment with adequate allowance to choose this series of products;

2) Input voltage allowed range is + / - 15% (plus or minus 20% or 30%);

3)The frequency fluctuation of the input voltage should be not more than plus or minus 2%. The frequency of positive (negative) fluctuations and the voltage negative (positive) fluctuations cannot occur at the same time;

4)Relative harmonic content of voltage waveform should be less than 10%.

※ If you can not meet the above-mention working environment, Please consult the distributor when you place an order, or consult us at anytime.

7.Routine maintenance work



Before implementing maintenance, be sure to cut off the input power in order to avoid electric shock or other security incidents.

7.1 Product Regular Inspection

(1) Check whether the stabilizer is operating properly;

(2) Check whether the load is over rated;

(3) Check whether the input voltage exceeds the allowable fluctuation range.

(4) Check whether the LCD / LED display work normal.

During the regularly checking, any abnormal phenomenon should be immediately treated. If you cannot deal with it, please notify the supplier or manufacturer for solution to avoid damage to the equipment.

7.2 Regular Mainternance

(1) Carefully clean each part of the stabilizer, remove dust and dirt.

(2) Check whether the chassis fasteners and connectors is loose thread, for connections which is not strong or poor contact should be timely treatment.

(3) Failure or damaged components should be promptly repaired or replaced.

8.Exception handling



Before implementing inspection, be sure to cut off the input power in order to avoid electric shock or other security incidents.

User may refer to the following content for processing when founding any problem in working:

phenomenon	reason	handling method
The system in bypss mode	① The wrong phase of input voltage	change the locations of any two of Live wires, and then start power-on test.
	②Overvoltage protection: a. output voltage exceeds the setting overvoltage; b. Setting overvoltage is not correct.	a. Re-closing, check whether the output voltage exceeds the setting overvoltage. If exceeds, that is a normal phenomenon. b. Re-closing , press the set key within 5 seconds to enter into the set state, re-set over-voltage value.
	③ Under voltage protection: a.The output voltage is below the setting value of under voltage; b. Setting value of under voltage is incorrect.	a. Re-closing, check whether the output voltage below the setting under voltage. If below, that is a normal phenomenon. b. Re-closing, , press the set key within 5 seconds to enter into the set state, re-set under-voltage value.
	④Over current protection: a. Load current exceeds the setting value of over current; b. Setting value of over current is not correct.	a. Re-closing, check whether the load is over-load. If over-load, that is a normal phenomenon. b. Re-closing, , press the set key within 5 seconds to enter into the set state, re-set over-current value.
Panel output voltage unstable	a. Input loss phase;	a. Check whether input phase is lost. If lost, it is a normal phenomenon.
	b. Input and output terminal is not fasten.	b. Fasten the input and output terminal
	C. The fuse in driver board was burnt	①Check whether the fuse in driver board was burnt, if it is, please replace the fuse in the same mode.
Fan not work	① Inside temperature below 55℃; ② Fan plug loose; ③ Fan burned out.	① Normal ② Fasten the plug ③Change fan
Stabilizer burnt	①Serious damage in internal components	① Immediately stop operation and inform the agent or manufacturer

After taking the the above inspection and measures, if it still can't solve the problem, please contact with the supplier or manufacturer and tell them the problems.