Section 1　Brushless AVR

AVR Manual for Brushless Generator Set（11—100KVA）

General information:

AVR for brushless generator set adopts sealed electronic control unit,it adjusts exciting current of the excitor to control the output voltage of the brushless AC alternator.

Feature	（25KW）AVR for brushless generator set
Detecting and input voltage	190~240Vac
Output	500VA
Output(continous)	73Vdc, 3.5A(255W)
Output（strong magnetic field）（240VAC input voltage）	105Vdc, 5A(525W)
Adjust range	1%(related to full load wave of the generator)
Adjust range by control panel	2KΩ resistor ±10%
	1KΩresistor ±5%
Frequency compensation	Adjustable
Protective frequency	56Hz at rated frequency 60Hz
	46Hz at rated frequency 50Hz
Running temperature	-40℃ ~ +60℃
Storage temperature	-65℃ ~ +85℃
Voltage build	When residual managetic voltage ove 10Vac
	AVR self-build voltage
EMI restraint	Internal EMI filter（EMT filter）

Warn

Installation, operation and repair must be conducted by professional staff to avoid personnel injury or equipment damage.

Notice

Do not use megameter to measure at high voltage when AVR is connected with alternator. Also do not use megameter to measure AVR itself .

Installation

AVR should be vertically installed in ventilating position for well heat radiation.

Exitor electric circuit

AVR F+ terminal to be connected to positive electrode （anode ）of excitor 负极 F+ terminal，AVR F- terminal to be connected to negative electrode of excitor F- terminal.

Detecting power input circuit

Input power and detection are achieved from terminal 3 and 4. AVR needs input power190~240Vac.

Fuse

AVR has a 4A/250 V 25 mm glass tube and with delay of fuse.

Voltage regulation

Use a slot screwdriver to adjust voltage potentiometer to adjust alternator output voltage. Increase output voltage at clockwise direction. When adjustment by the panel, disassemble the cable between terminal 6 and 7, install a 2KΩ-1/2W potentiometer(smallest) (refer to fig 2). ±10% voltage fluctuation on nominal value is allowed. (make ±5% voltage deviation to 1KΩ-1/2W potentiometer).

Stability regulation

Use a slot screwdriver to adjust and stabilize potentiometer adjustment stability. Adjust at clockwise direction to increase stability. Increase stability to increase alternator response time and decrease stability to decrease alternator response time.

Protective frequency select（V/HZ）

Using frequency transition wire to select 50HZ or 60HZ, use screw driver to adjust the potential meter to make sure the frequency is 56-60HZ for 60HZ generator and 46-50HZ for 50HZ generator.

Set protective frequency at 57Hz for 60Hz type and 47Hz for 50Hz type. To change protective frequency, adjust engine rpm to rated rpm, adjust to get desired voltage at rated rpm. Then, adjust the potentiometer at clockwise direction until alternator output voltage decrease, now deficient frequency indicator is on. Adjust the potentiometer at anticlockwise direction until the output voltage restores to rated output (now deficient frequency indicator is off). Adjust engine rpm to rated.

Adjustment

Make sure AVR is properly connected to alternator, refer to wiring diagram provided in generator package.

Turn AVR voltage potentiometer to the very end position at anticlockwise direction.(min output voltage)

Adjust potentiometer in the panel (if applicable) to middle position.

Connect positive pole of the 100V DC meter to F1 and negative pole to F2. Or connect to extension terminal of the alternator with a suitable AC meter.

Start engine at zero load to rated rpm, alternator should build a min voltage(the actual value depends on connection condition). If no voltage is built, please refer to AVR troubleshooting.

Adjust voltage potentiometer little by little until alternator output voltage reaches the rated value. If adjustment on panel is necessary, adjust the rheostat until alternator output voltage comes to a precisely desired voltage.

Adjust potentiometer at anticlockwise direction until voltage meter display voltage unstable, then adjust potentiometer at clockwise direction until alternator output voltage comes stable.

Disconnect AVR power about 1-2s，check if alternator output voltage is stable. If not stable, further adjustment is needed with AVR power disconnected.

Repeat this adjustment until the system becomes and keeps stable.

AVR troubleshooting guide

fault	Cause	troubleshooting
No voltage output	The remanence voltage on the 3 & 4 terminal is less than 10V.	Checking the wiring
		Referring to the operation manual to Improve the magnetic filed
	Rated speed up time is too long	reduce the speed up time
		To cut the input when generator reaches rated speed.
	Excitation down-leadF1 、F2not connected	Connecting excitation down-lead F1、F2
	Power supply down-lead failed to connect.	Connecting Power supply down-lead
	Fuse break or no fuse.	Replace fuse
	AVR fault	Replace AVR
	Generator fault	Referring to the operation manual
Output is low	Wiring mistake	Checking the wiring according to the wiring diagram.

	Output voltage is adjusted too low.	Adjust the potential meter clockwise to reach the voltage needed.
	Remote control output voltage is adjusted too low	Adjust the remote control voltage potential meter clockwise to reach the voltage needed.
	AVR fault	Replace AVR
Output voltage too high	Output voltage is adjusted too high	Adjust the potential meter anticlockwise to reach the voltage needed.
	Remote control output voltage is adjusted too high	Adjust the remote control voltage potential meter anticlockwise to reach the voltage needed.
Output voltage too high and can not be adjusted.	AVR fault	Replace AVR

The relationship between maximum excitation current and excitation winding resistance

Max excitation current= 0.45A power supply voltage/excitation winding resistance（power supply voltage is the same as the voltage detected）.

Excitation current can not exceed the current that AVR can supply, or the AVR will be damaged.

Voltage potential meter stabilization potential meter frequency transition potential meter

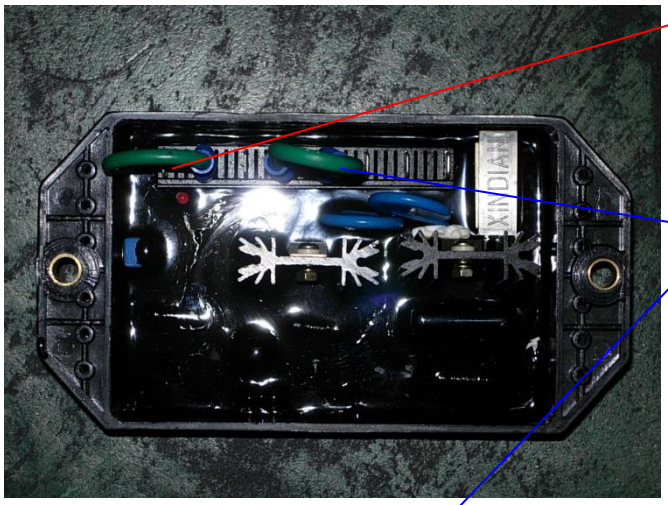
3 F+ F- 7 6 4 50 60

3&4 detect and power supply F1&F2 接发电机励磁端子，6&7connecting the long-distancee potential meter。

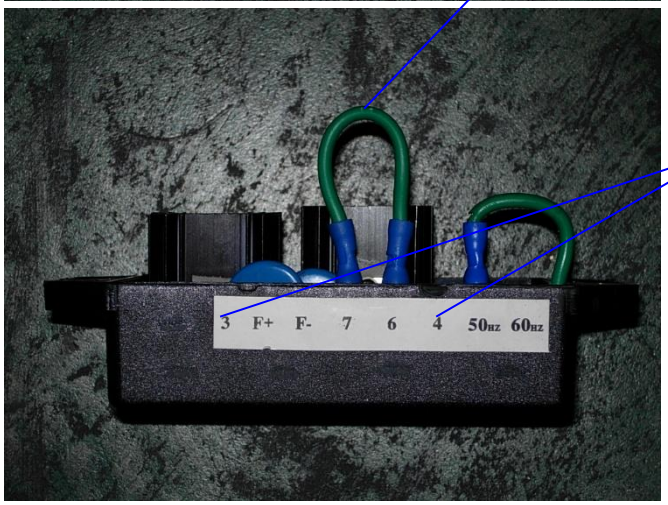
pictures : wirings and potential meter

AVR modal：PLY-DAVR-95SW
Single phase brushless alternator.

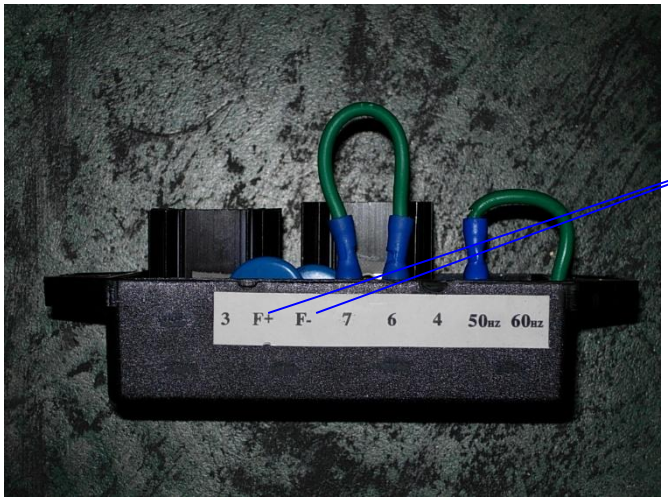
AVR output connecting the output terminal using the jumper to choose 50HZ or 60HZ, picture is for 50HZ.



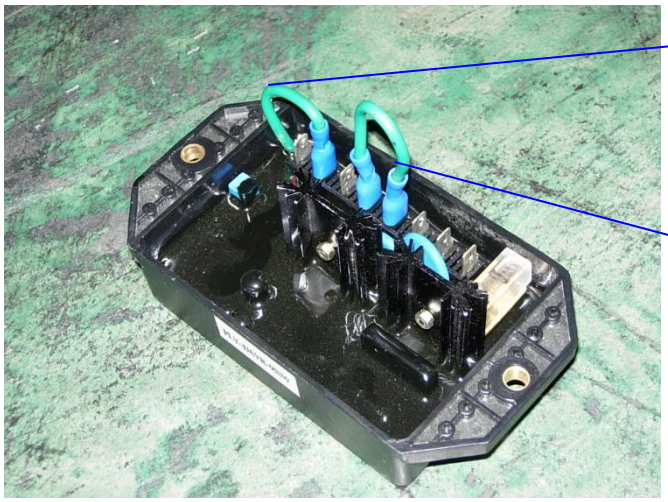
Using long-distance adjusting potential meter, remove the wiring between terminal 6&7，install a 2K Ω -1/2W （min） potential meter。The picture shows the one with potential meter, 6& 7 is shorted..



3&4 testing and power supply

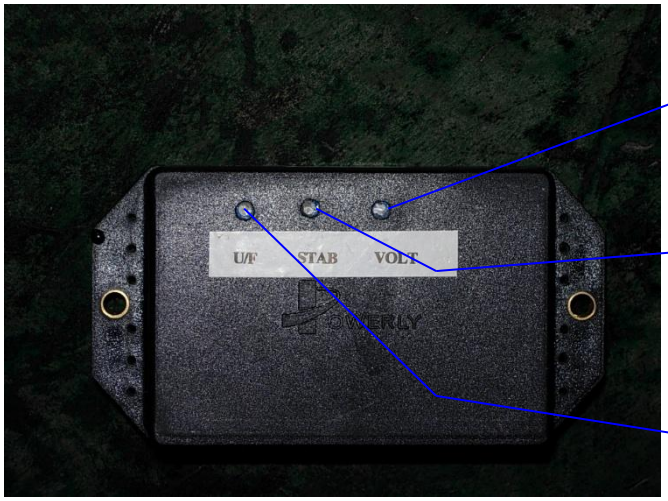


F1& F2
connecting generator excitation terminal.



AVR output connecting to the connection terminal.

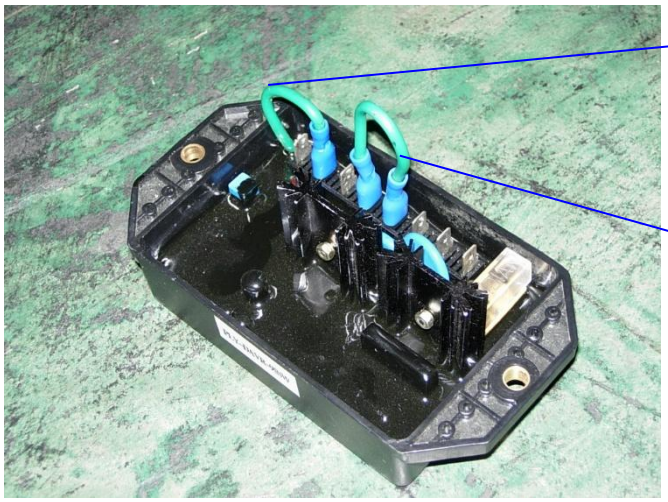
3 F+ F- 7 6 4 50 60



Voltage potential meter

Stabilization potential meter

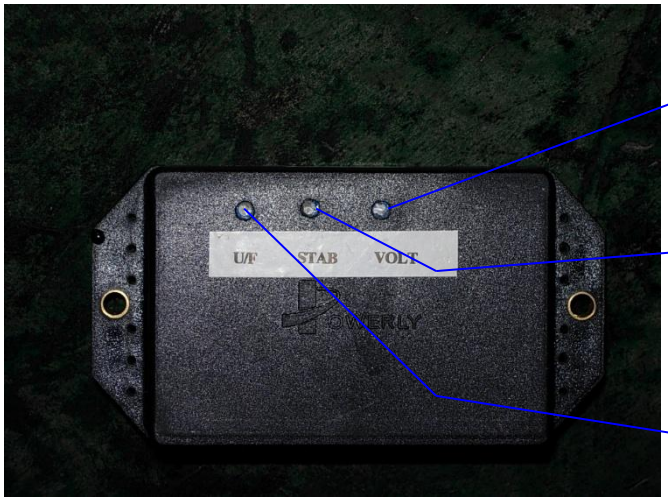
Frequency transition potential meter.



Wire connecting terminal of AVR output connection

3 F+ F- 7 6 4 50 60

3 F+ F- 7 6 4 50 60



Voltage regulation resistance

Stabilizing regulation resistance

Protective frequency regulation resistance

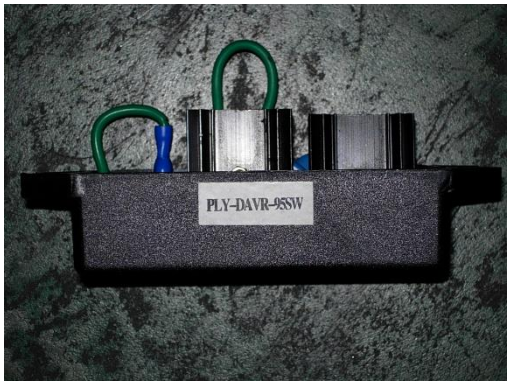
Comparison Table of Brushless Genset Model No. & AVR Matching

AVR Mating for Genset from 11KVA-100KVA

AVR Model No.	Genset Model No.	Remarks
PLY-DAVR-95SW KI-DAVR-95SW（Single Phase AVR）	KDE12EA F	open frame,double cylinder,water cooled,single phase,digital panel
	KDE12STAF	silent, double cylinder,water cooled,single phase,digital panel
PLY-DAVR-95S3W KI-DAVR-95S3W（Three Phase AVR）	KDE12EAF3	open frame,double cylinder,water cooled,three phase,digital panel
	KDE12STAF3	silent, double cylinder,water cooled,three phase,digital panel
PLY-DAVR-95SW KI-DAVR-95SW（Single Phase AVR ）	KDE11000EF（NEW）	open frame,double cylinder,water cooled,single phase,general panel
	KDE11000EAF（NEW）	open frame,double cylinder,water cooled,single phase,digital panel
	KDE11000TF（NEW）	silent,double cylinder,water cooled,single phase,general panel
	KDE11000TAF（NEW）	silent,double cylinder,water cooled,single phase,digital panel
PLY-DAVR-95S3W KI-DAVR-95S3W（Three Phase AVR ）	KDE12000EF3（NEW）	open frame, double cylinder,air cooled,three phase, general panel
	KDE12000EAF3（NEW）	open frame, double cylinder,air cooled,three phase, digital panel
	KDE12000TF3（NEW）	silent, double cylinder,air cooled,three phase, general panel
	KDE12000TAF3（NEW）	silent, double cylinder,air cooled,three phase,digital panel
PLY-DAVR-95SW KI-DAVR-95SW（Single Phase AVR ）	KDE9000SS （NEW）	silent, three cylinder,water cooled,single phase,digital panel
	KDE11SS	silent, three cylinder,water cooled,single phase,digital panel
	KDE13SS	silent, three cylinder,water cooled,single phase,digital panel
	KDE16SS	silent, four cylinder,water cooled,single phase,digital panel
	KDE25SS	silent, four cylinder,water cooled,single phase,digital panel
	KDE30SS	silent, four cylinder,water cooled,single phase,digital panel

	KDE35SS	silent, four cylinder,water cooled,single phase,digital panel
PLY-DAVR-95S3W KI-DAVR-95S3W （Three Phase AVR ）	KDE9000SS3（NEW）	silent, three cylinder,water cooled,three phase,digital panel
	KDE13SS3	silent, three cylinder,water cooled,three phase,digital panel
	KDE15SS3	silent, three cylinder,water cooled,three phase,digital panel
	KDE20SS3	silent, four cylinder,water cooled,three phase,digital panel
	KDE30SS3	silent, four cylinder,water cooled,three phase,digital panel
	KDE35SS3	silent, four cylinder,water cooled,three phase,digital panel
	KDE45SS3	silent, four cylinder,water cooled,three phase,digital panel
	KDE60SS3	silent, four cylinder,water cooled,three phase,digital panel
	KDE75SS3	silent, six cylinder,water cooled,three phase,digital panel
	KDE100SS3	silent, six cylinder,water cooled,three phase,digital panel

Same design for single phase and three phase genset,but different model description

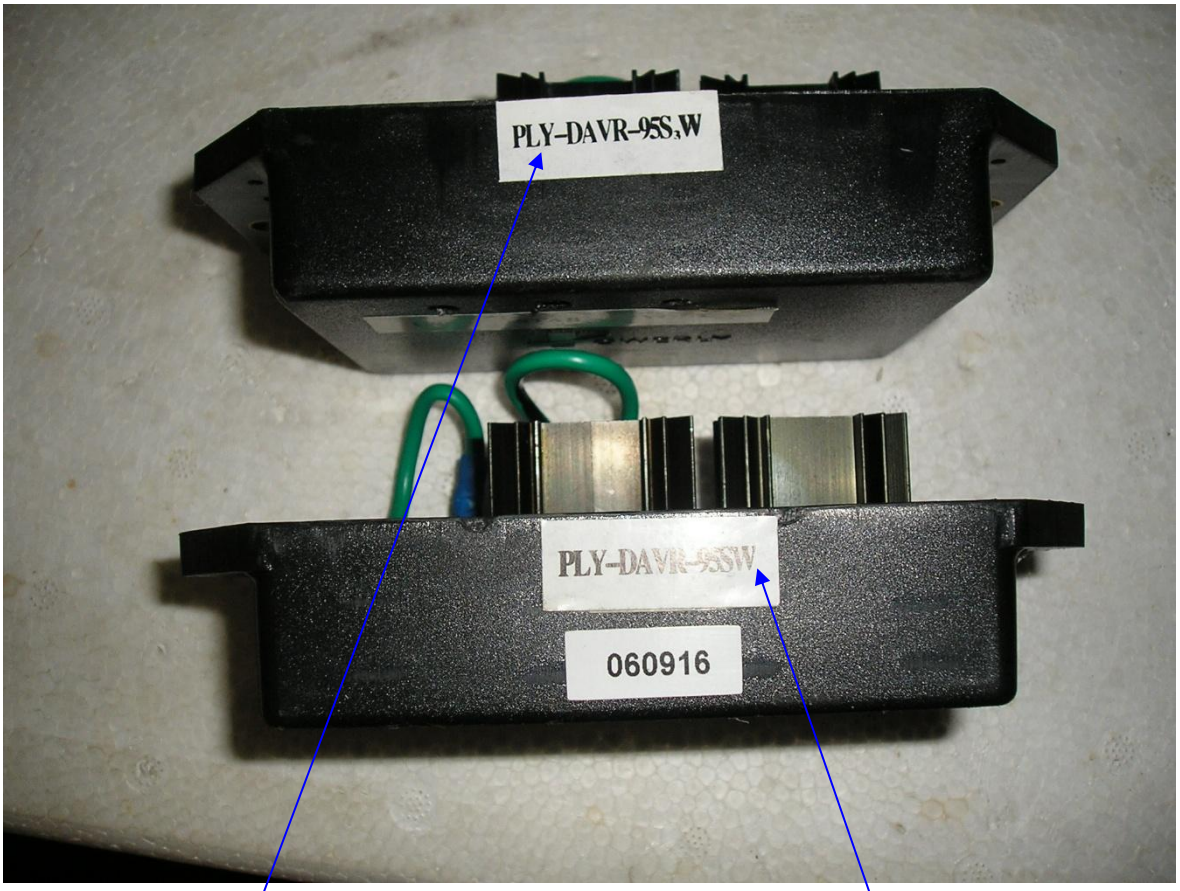


Single Phase： PLY-DAVR-95SW

KI-DAVR-95SW

Three Phase： PLY-DAVR-95S3W

KI-DAVR-95S3W



PLY-DAVR-95S3W

KI-DAVR-95S3W

Three Phase AVR

PLY-DAVR-95SW

KI-DAVR-95SW

Single Phase AVR

Part 2 The brush of generators for use AVR

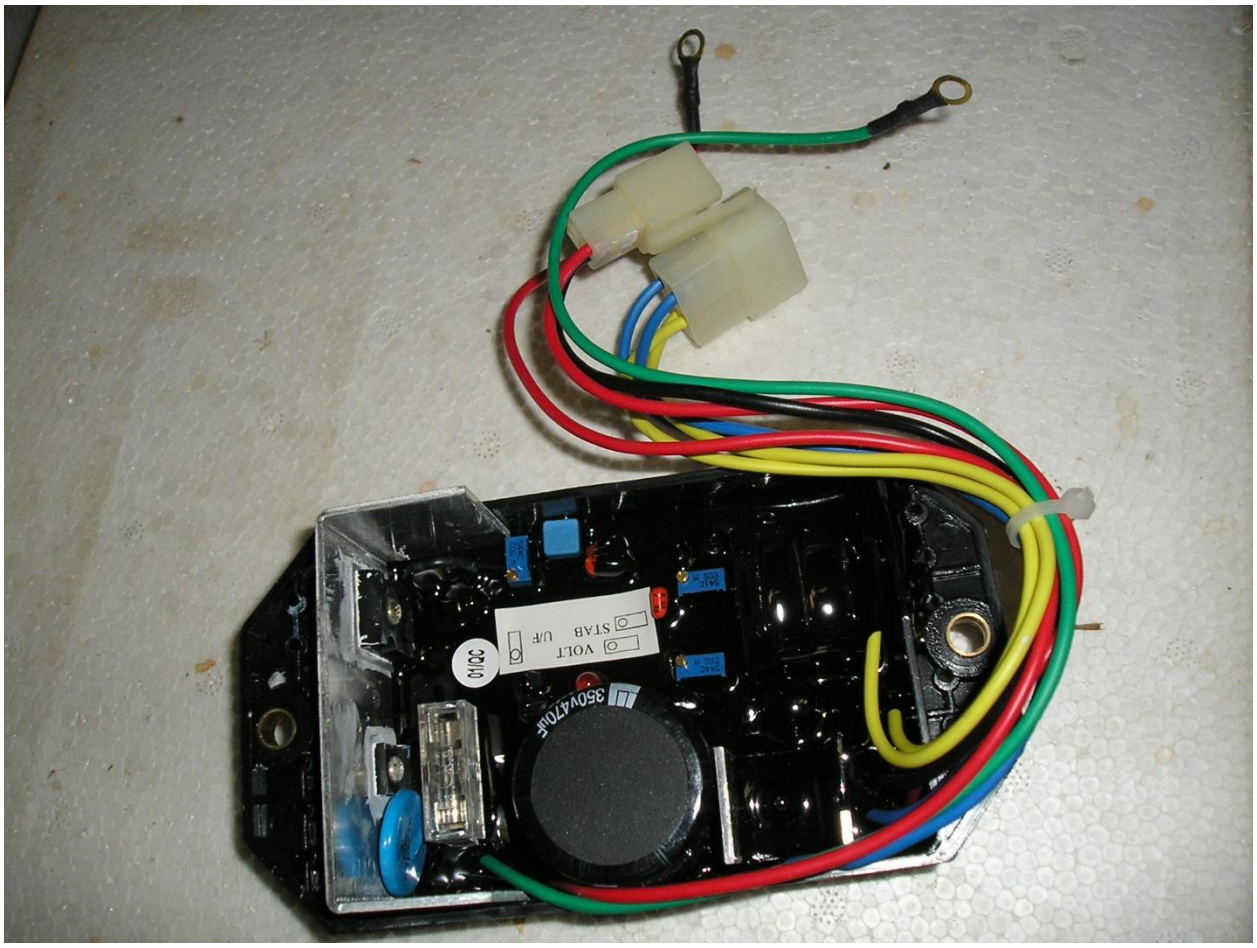
二、AVR 具体出线简解

Explanation for specific of terminal simple functions

1、单相 Single-phase PLY-DAVR-150S KI-DAVR-150S

各电位器功能描述

And Each potentiometer Description



输出电压的频闪，用于调整 AVR 控
间。一般用户不需调节， 出厂时已

ut voltage regulation: Regulate the
rolling feedback time. It has already
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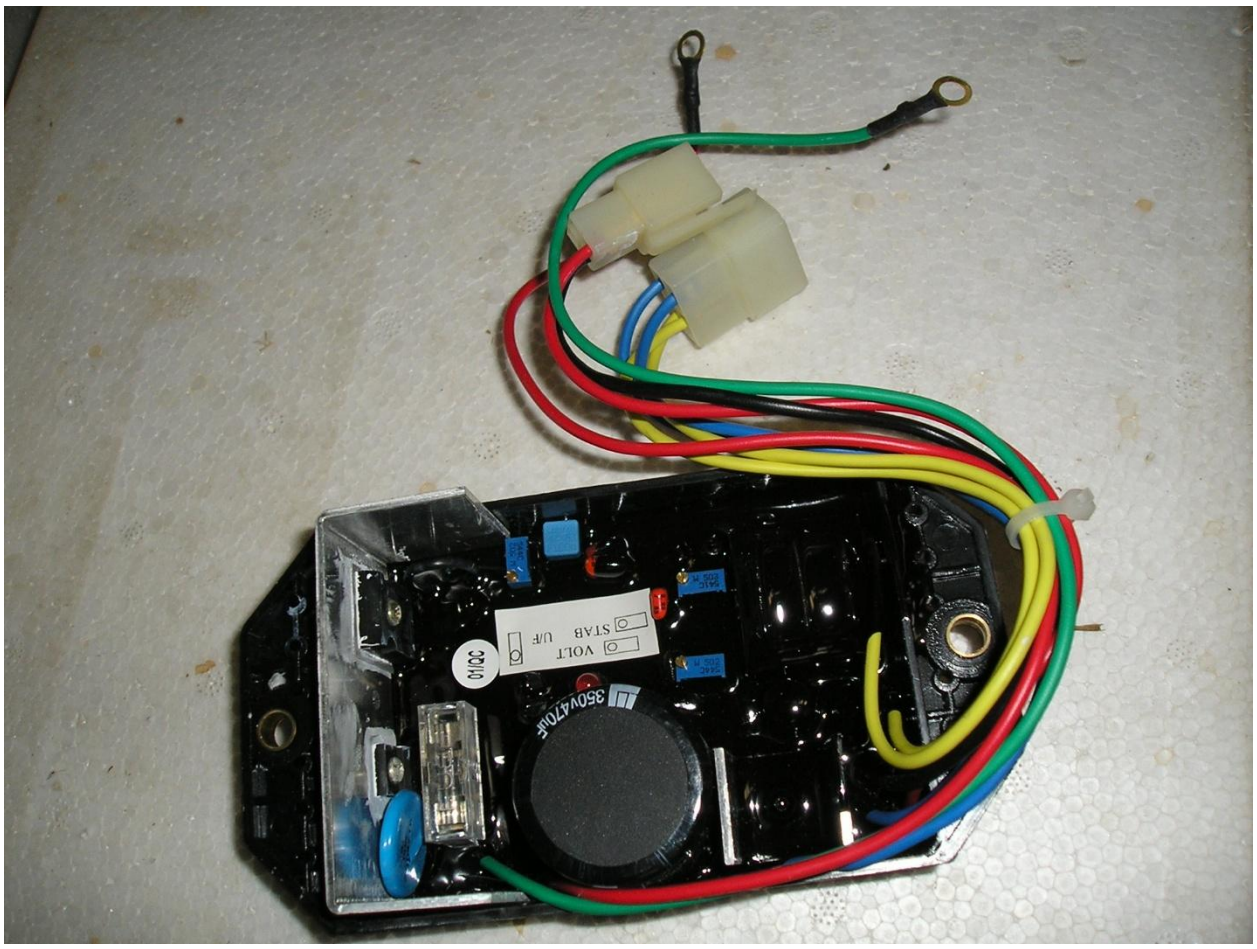
子输出电压， 用于发电机组输出
正弦波峰值）下降或升高时可以调
位来达到输出额定电压值，用户
变它。
ate output voltage of
r. when The output rated voltage
wave crest）is fluctuating up and
the user can adjust the potential
to get the rated voltage needed.

se PLY-DAVR-150S KI-DAVR-150S

single-phase PLY-DAVR-150S KI-DAVR-150S

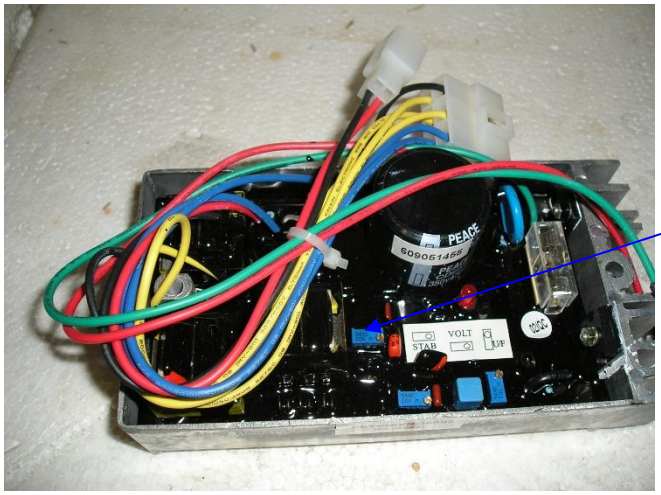
Red wire output （+）
Green wire output （—）
红输出+ 绿输出—
连接转子碳刷
connect to rotor brush

Connect to stator （The blue wires are connected to the secondary winding, which will supply power to AVR. While the yellow wires are connected to the sampling winding, which will control the excitation current by checking the stator output. ）
连接定子（蓝线连接副绕组，作用是由定子副绕组提供电力给 AVR，黄线


VOLT
STAB
U/F
350V470uF

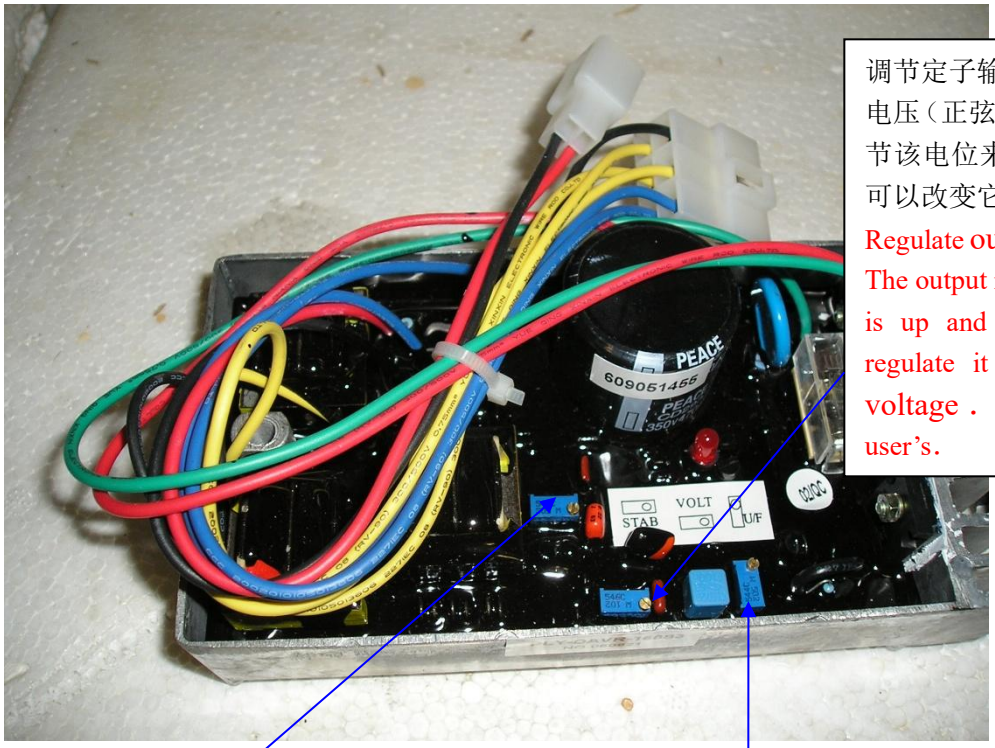
2、三相 Three-phase PLY-DAVR-150S3　KI-DAVR-150S3

And　Each potentiometer Description



AVR 调节输出电压的频闪，用于调整 AVR 控制反馈时间。一般用户不需调节， 出厂时已经调节好。

AVR output voltage regulation: Regulate the AVR controlling feedback time. It has already been set when leaving factory, so you don't need to regulate it any more.



调节定子输出电压， 用于发电机组输出电压（正弦波峰值）下降或升高时可以调节该电位来达到输出额定电压值，用户可以改变它。

Regulate output voltage of stator. when The output rated voltage（sine wave crest）is up and down undulation and then regulate it . It was able to get rated voltage . It is used change by user's.

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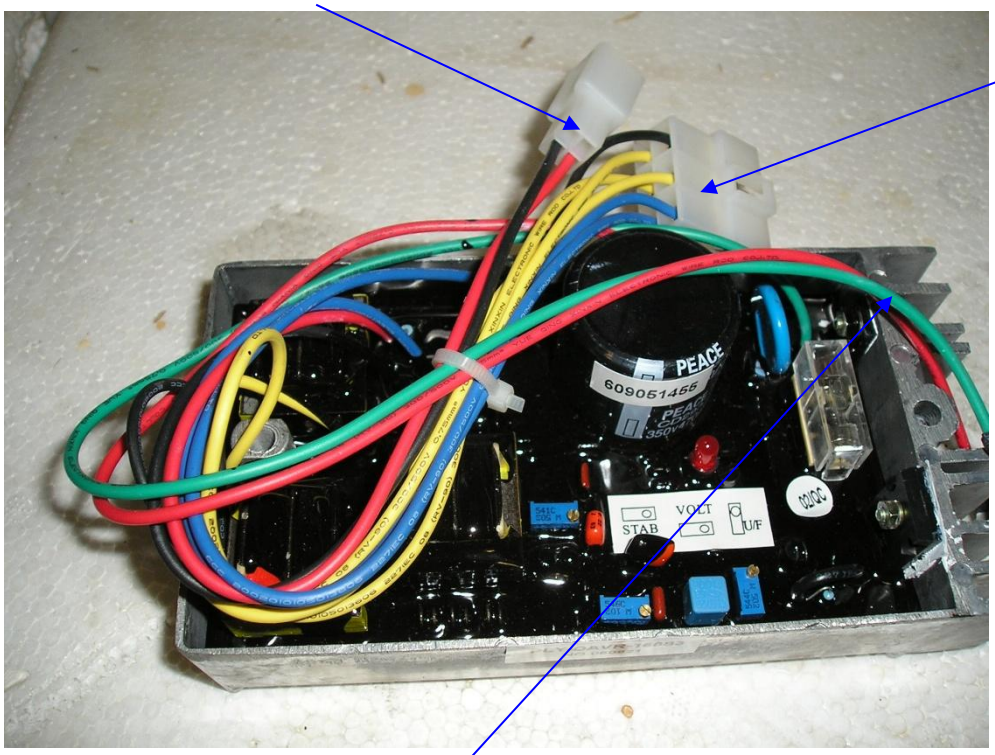
AVR frequency regulation: AVR will enter into protection function if the frequency changes too much. It has already been set when leaving factory, so you don't need to regulate it any more.

三相 PLY-DAVR-150S3 KI-DAVR-150S3

And Each potentiometer Description

Connect to 12V DC
（连接 12V DC）

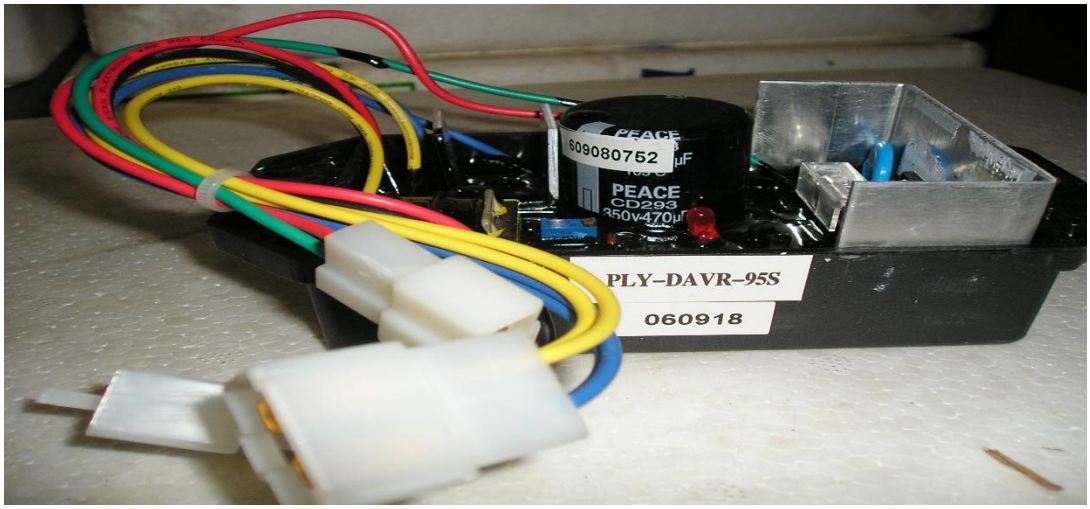
Connect to stator （The blue wires are connected to the secondary winding, which will supply power to AVR. While the yellow wires are connected to the sampling winding, which will control the excitation current by checking the stator

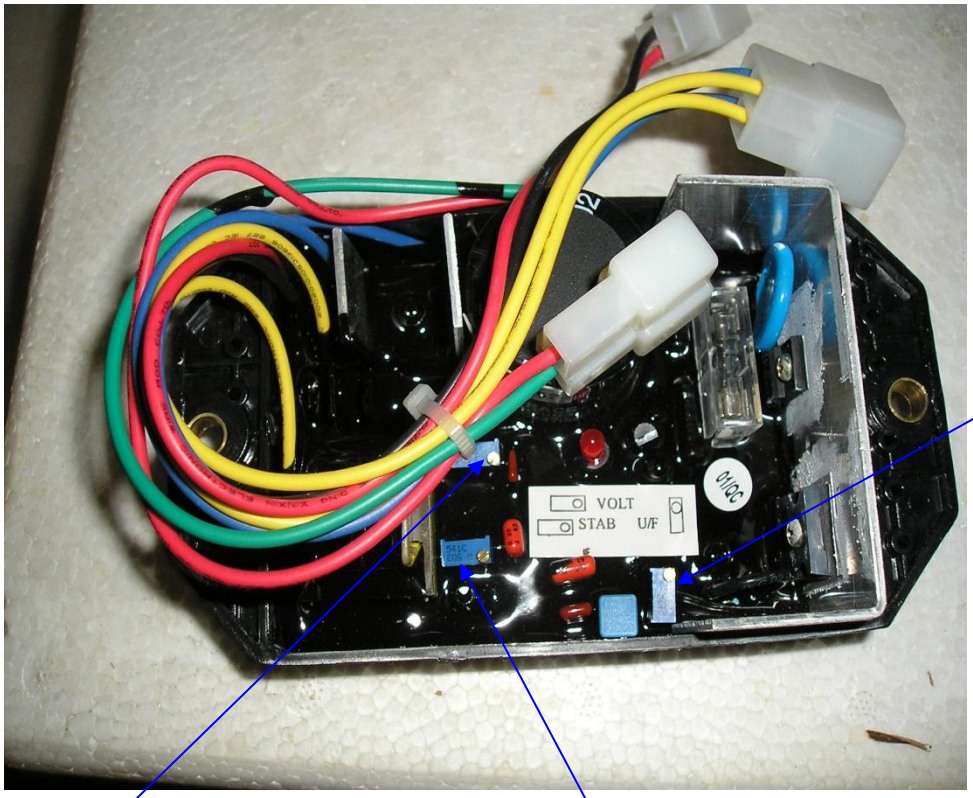


Red wire output （+）
Green wire output （—）
红输出+ 绿输出—
连接转子碳刷
connect to rotor brush

3、单相 AVR PLY-DAVR-95S KI-DAVR-95S

And Each potentiometer Description





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调节定子输出电压， 用于发电机组输出电压（正弦波峰值）下降或升高时可以调节该电位来达到输出额定电压值，用户可以改变它。

Regulate output voltage of stator. when The output rated voltage（sine wave crest）is up and down undulation and then regulate it . It was able to get rated voltage . It is used change by user's.

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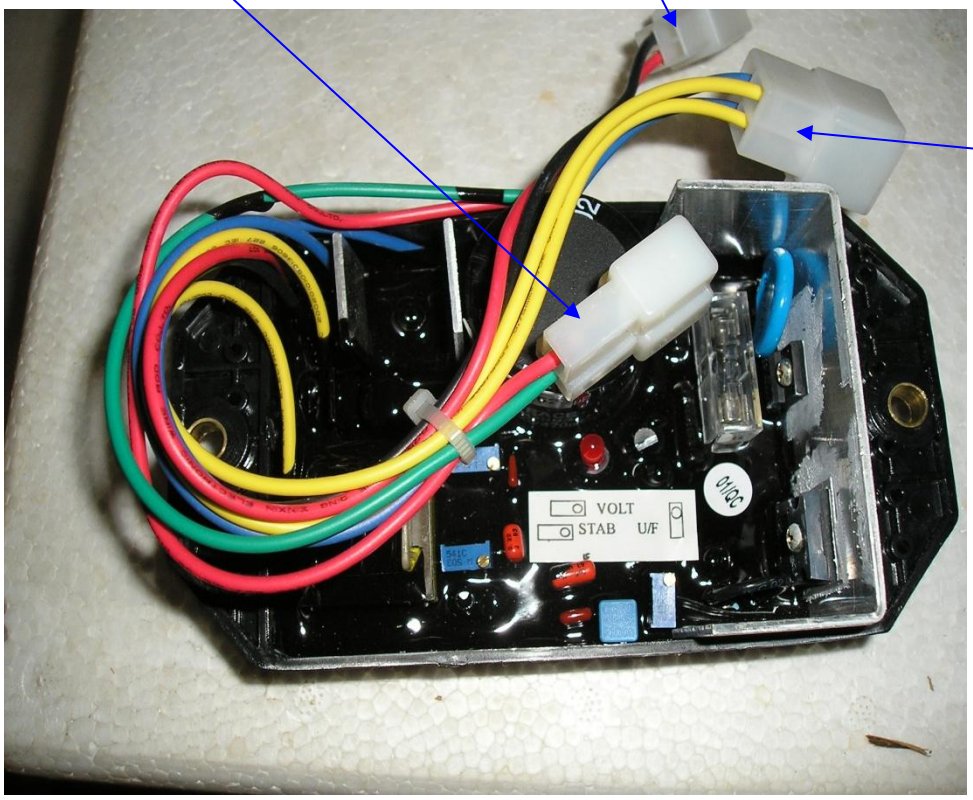
AVR output voltage regulation: Regulate the AVR controlling feedback time. It has already been set when leaving factory, so you don't need to regulate it any more.

单相 AVR PLY-DAVR-95S KI-DAVR-95S

Each potentiometer Description

Red wire output （+）
Green wire output （—）
红输出+ 绿输出—
连接转子碳刷
connect to rotor brush

Connect to 12V DC
（连接 12V DC）



Connect to stator
（The blue wires are connected to the secondary winding, which will supply power to AVR. While the yellow wires are connected to the sampling winding, which will control the excitation current by checking the stator output. ）
连接定子（蓝线连接副绕组，作用是由定子副绕组提供电力给 AVR，黄线是连接取样绕组，用来检测定子输出电压然后去控制励磁电流。达到稳定输出电压。）

4、三相 AVR PLY-DAVR-95S3 KI-DAVR-95S3

Each potentiometer Description

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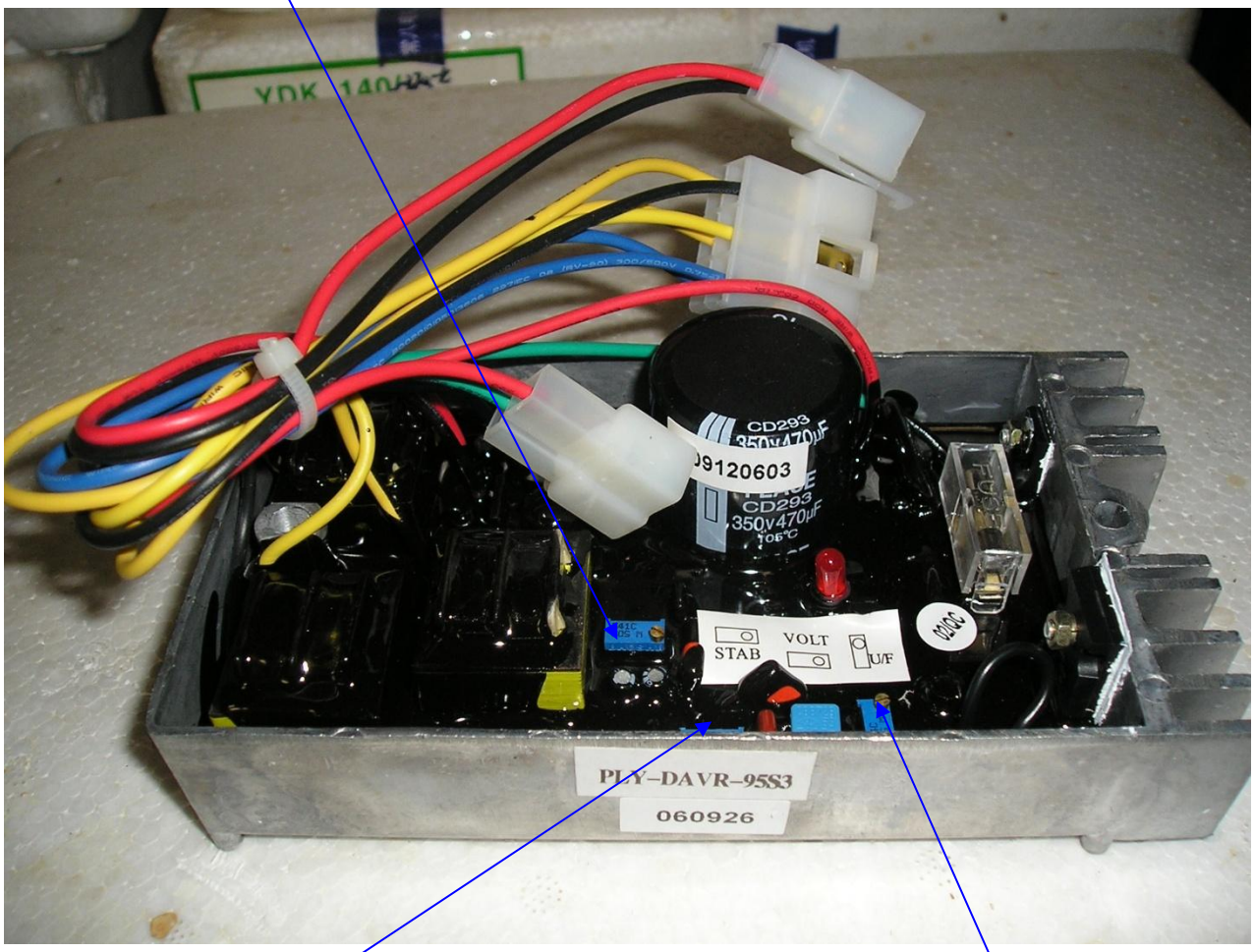

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AVR frequency regulation: AVR will enter into protection function if the frequency changes too much. It has already been set when leaving factory, so you don't need to regulate it any more.

三相 AVR PLY-DAVR-95S3 KI-DAVR-95S3

Each potentiometer Description

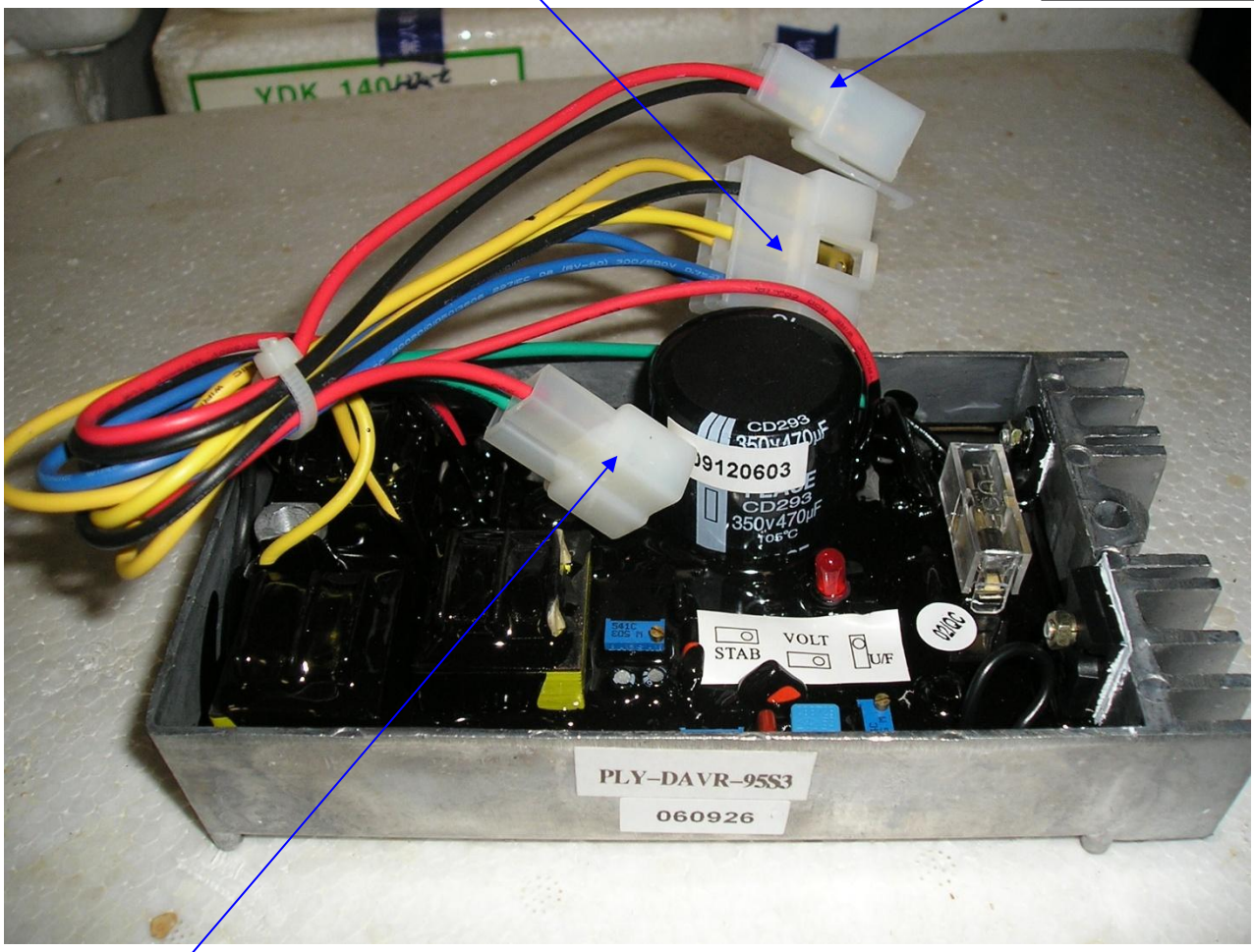
Connect to stator

（The blue wires are connected to the secondary winding, which will supply power to AVR. While the yellow wires are connected to the sampling winding, which will control the excitation current by checking the stator output. ）

连接定子（蓝线连接副绕组，作用是由定子副绕组提供电力给 AVR，黄线是连接取样绕组，用来检测定子输出电压然后去控制励磁电流。达到稳定输出电压。）

Connect to 12V DC

（连接 12V DC）



Red wire output （+）

Green wire output （—）

红输出+ 绿输出—

连接转子碳刷

connect to rotor brush

第三部分 5KW 以下的机组 AVR （有刷电机）

5KW 以下的机组 AVR 的选配

AVR 型号	发电机组型号	备注
PLY-DAVR-50S KI-DAVR-50S （单相 AVR）	KDE7000T （ 新品）	静音双缸风冷单相发电机组
	KDE7000TA （新品）	静音双缸风冷单相发电机智能化面板
	KDE7000E （新品）	开架双缸风冷单相发电机组
	KDE7000EA （新品）	开架双缸风冷单相发电机组智能化面板
PLY-DAVR-50S KI-DAVR-50S （单相 AVR）	KDE6700T	静音单相发电机组
	KDE6700TA	静音单相发电机组配智能化面板
	KDE5000TA	COAST 型号
	KDE6500T	静音单相发电机组
	KDE6500E	开架单相发电机组电启动
	KDE6500X	开架单相发电机组手拉启动
	KDE3500T	静音单相发电机组
	KDE3500E	开架单相发电机组电启动
	KDE3500X	开架单相发电机组手拉启动
PLY-DAVR-50S3 KI-DAVR-50S3 （三相 AVR）	KDE6700T3	静音三相发电机组
	KDE6700TA3	静音三相发电机组配智能化面板
	KDE6500T3	静音三相发电机组
	KDE6500E3	开架三相发电机组电启动
	KDE6500X3	开架三相发电机组手拉启动
PLY-DAVR-50S3 KI-DAVR-50S3 （单相 AVR）	KDE8000T3 （ 新品）	静音双缸风冷三相发电机组
	KDE8000TA 3（新品）	静音双缸风冷三相发电机智能化面板
	KDE8000E3 （新品）	开架双缸风冷三相发电机组
	KDE8000EA3 （新品）	开架双缸风冷三相发电机组智能化面板
PLY-DAVR-50S	KDE180TW	静音电焊、发电机组
	KDE180TAW	静音电焊、发电机组配智能化面板
	KDE180EW	开架电焊、发电、电启动
	KDE180XW	开架电焊、发电、手拉启动
AVR2-1F1E	KDE2200E	开架单相电启动
	KDE2200X	开架单相手拉启动

有刷发电机 AVR 自动电压调节器说明书

AVR (automatic voltage regulate) explanation For five kilowatt alternating current synchronous generator（brush）

概述

有刷发电机 AVR 自动电压调节器是部分密封的电子调节器，通过调节发电机励磁电流来控制交流有刷发电机的输出电压。

警告

为防止人员伤害或损坏设备，应有专业人员安装，操作或维修。

注意

发电机与调节器相连时，不要用兆欧表测量或打高压，对调节器也不要用兆欧表测量或打高压。

安装

调节器应垂直安装在通风的位置，以便调节器散热。

电压调整

确保调节器与发电机正确连接，参照随机提供的连线图。

空载起动发电机到额定转速，发电机电压建立到最小值（实际水平取决与连接情况）。假如不建压，参见调节器故障处理方法。

慢慢调节电压电位器控制直到发电机输出电压到达额定值，顺时针方向调节增大发电机的输出电压，逆时针方向调节减小发电机的输出电压。

保护电流调节

给发电机带载，使电流达到保护点电流时，用一字起子调节电流电位器，调到过载指示灯从暗变为亮时刻。

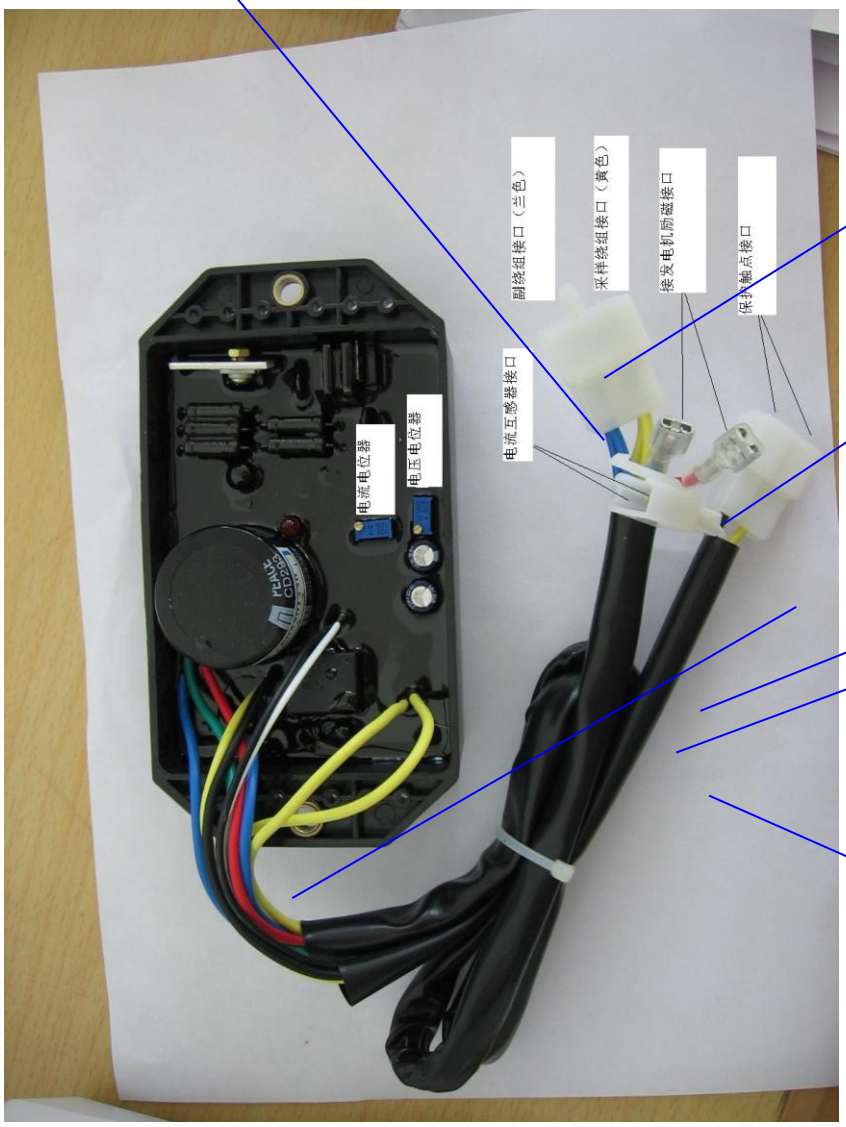
调节器故障处理方法

故障现象	原因	处理方法
无输出输出电压	ARV 电源输入端上剩磁	按接线图检查接线
	电压低于 5V	参照发电机说明书、给磁场充磁
	励磁引线没有连接	连接励磁引线
	电源输入引线没有接	连接电源输入引线
	AVR 故障	更换 AVR
	发电机故障	参照发电机说明书
输出电压低	接线错误	按接线图检查接线
	输出电压调节太低	顺时针调节电压电位器直到所要求电压
	AVR 故障	更换 AVR
输出电压高	输出电压调节太高	逆时针转动调节电位器直到所需电压
输出电压高不能调节	AVR 故障	更换 AVR
调节率差	AVR 故障	更换 AVR

单相 AVR　　型号：PLY-DAVR-50S　各接线与电位器功能描述

调节定子输出电压，用于发电机组输出电压（正弦波峰值）下降或升高时可以调节该电位来达到输出额定电压值，用户可以改变它。

Regulate output voltage of stator. when The output rated voltage（sine wave crest）is up and down undulation and then regulate it . It was able to get rated voltage. It is used change



调节发电机组输出电流保护
Regulate the current output of overload safeguard

连接电流互感器，用于判断输出电流的大小，是否过载，有就停止发电机组运行。见 A
(See A)

连接转子（连接转子碳刷）
To connect rotor （ to connect brush）
红输出+ 绿输出—
Red wire output （+）

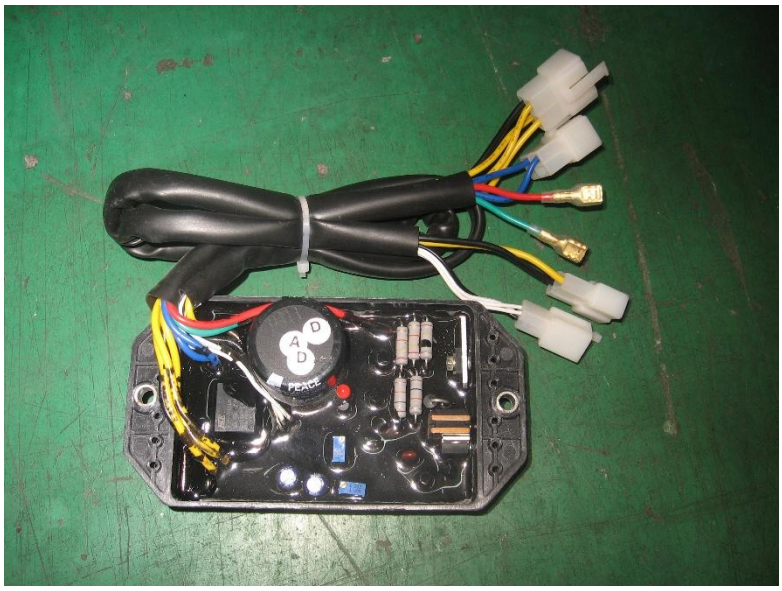
to connect stator
（The blue wire by connected secondly loop. It is function that stator supply AVR power with secondly loop . The yellow wire by connected sampling loop for checking output voltage of stator and then to control current of excitation attain to voltage leveled off.）
连接定子（蓝线连接副绕组，作用是由定子副绕组提供电力给 AVR，黄线是连接取样绕组，用来检测定子输出电压然后去控制励磁电流。达到稳定输出电压。）

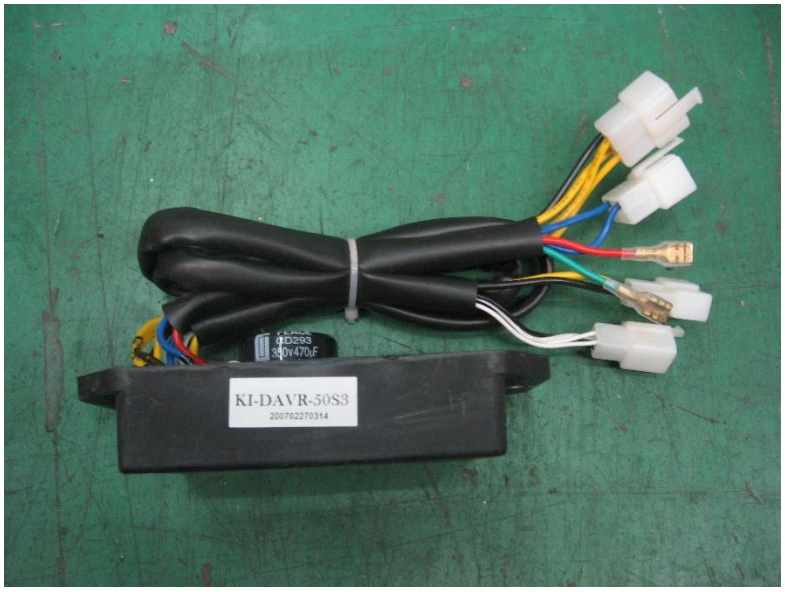
保护触点输出，用于停止发电机组。
Overload safeguard contact points, It is used to stop engine.

见 A
See A

连接电流互感器，用于判断输出电流的大小，是否过载，有就停止发电机组运行。
To connect AC coil inductance (mutual inductance) by galvanometry to determine overload current , if truer to stop generator set.

三相 AVR　　型号：PLY-DAVR-50S3 各接线与电位器功能描述



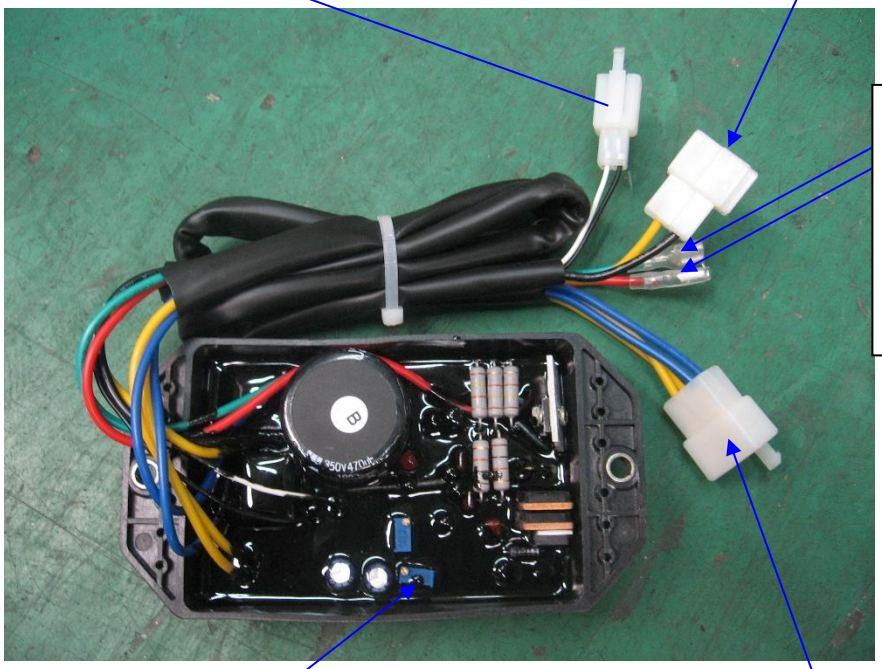


连接电流互感器，用于判断输出电流的大小，是否过载，有就停止发电机组运行。

To connect AC coil inductance (mutual inductance) by galvanometry to determine overload current , if truer to stop generator set.

保护触点输出，用于停止发电机组。

Overload safeguard contact points, It is used to stop engine.



连接转子（连接转子碳刷）

To connect rotor （ to connect brush）

红输出+ 绿输出—

Red wire output （+）

调节定子输出电压，用于发电机组输出电压（正弦波峰值）下降或升高时可以调节该电位来达到输出额定电压值，用户可以改变它。

Regulate output voltage of stator． when The output rated voltage（sine wave crest）is up and down undulation and then regulate it ． It was able to get rated voltage． It is used change by user's.

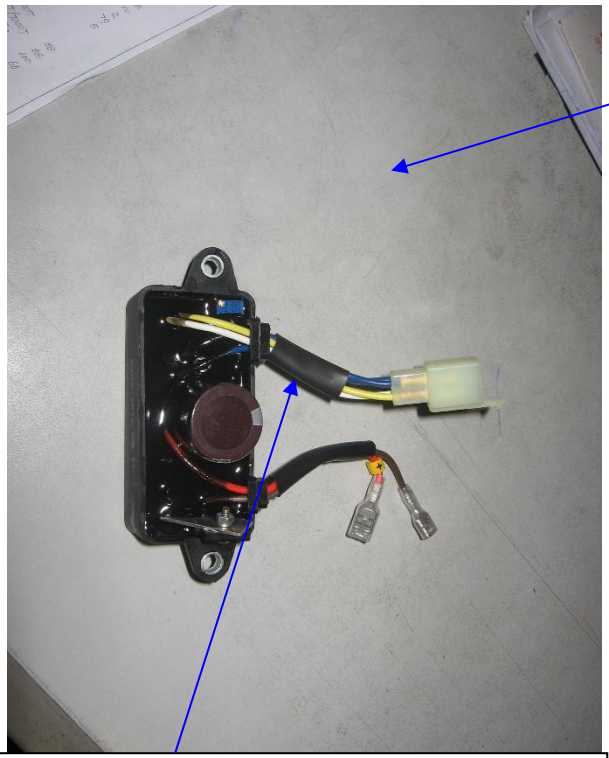
to connect stator

（The blue wire by connected secondly loop. It is function that stator supply AVR power with secondly loop . The yellow wire by connected sampling loop for checking output voltage of stator and then to control current of excitation attain to voltage leveled off.）

连接定子（蓝线连接副绕组，作用是由定子副绕组提供电力给 AVR，黄线是连接取样绕组，用来检测定子输出电压然后去控制励磁电流。达到稳定输出电压。）

单相 AVR　　型号：AVR2-1F1E 各接线与电位器功能描述

连接转子（连接转子碳刷）
To connect rotor （ to connect brush）
红输出+　棕输出—
Red wire output （+）
Brown wire output（—）



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调节定子输出电压，用于发电机组输出电压（正弦波峰值）下降或升高时可以调节该电位来达到输出额定电压值，用户可以改变它。
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