

**Three Phase Brushless  
Synsynchronous Generator**



**Service And Maintenance Manual**

## Preface

The manual is for users to know how to install, operate, maintain, and repair generators correctly. Lack of protection or incorrect operation may damage equipment and/or hurt human body. Warning plate/caution plate will be stuck on special position for notable mark. Please make sure to read and understand all the contents in the manual before operating.

After-sale service staff, salesman, engineer from our Co. will serve you at any time. Any enquiry from your side will be highly welcomed.

**Warning!** Incorrect installation, operation, maintenance and parts replacement may cause personal casualty and/or equipment damage. Maintenance staff should meet the qualification for electrical and mechanical service.

**The manual is suitable for AC Generator  
which installed on Diesel Generating sets**

The A.C. Generator is newly-designed products, which benefits from succeeding experience of the other prestigious generator manufacturer in the world, Adopting advanced technology combining with strict quality management.

We would like to draw your attention to the contents of this manual. By following special important instructions during installation, usage and maintenance of your alternator, you can award many years of trouble-free operation.

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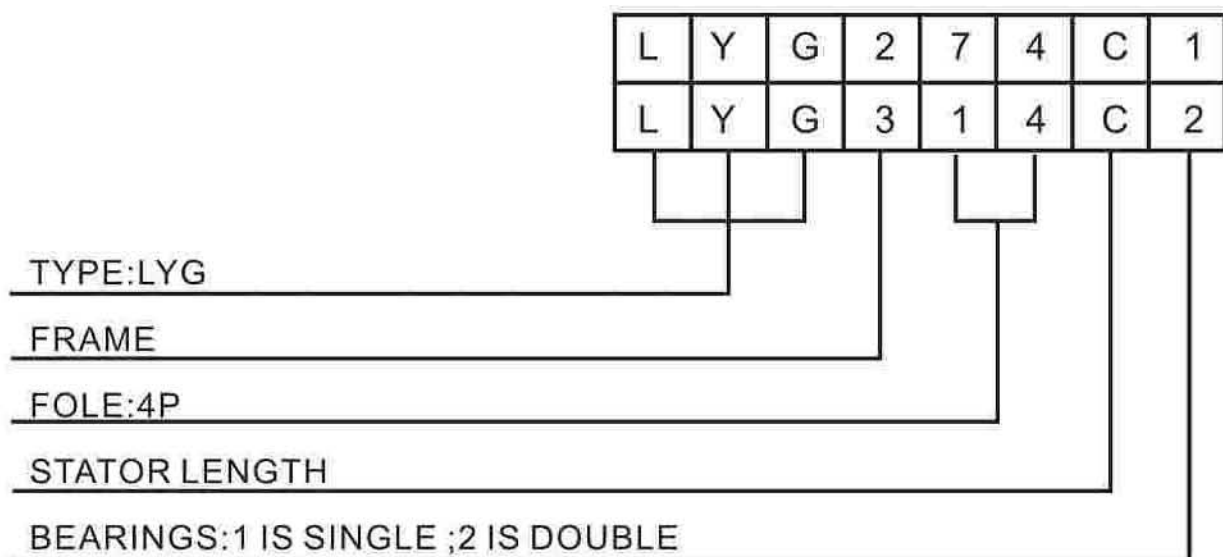
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## Chapter one Brief Introduction

### 1.1 Brief Introduction

Generator is three phase brushless synchronous Generator rotating magnetism construction Standard Voltage is 400V, 50HZ,(1500RPM) OR 480V, 60HZ(1800RPM).

### 1.2 Type Explanation



### 1.3 Check

First please check if the generator is damaged or not during transportation when you receive the our brushless generator, if you find evident mark of impact, you should contact transportation company, After appearance checking you can judge fault by rotating shaft with hand(for double-bearing generator).

### 1.4 Nameplate

You can distinguish generator by nameplate data on the frame. Please confirm the nameplate data of generator is same as ordered one

#### 1.4.1 Dimension

The mounting dimension of generator see catalogue.

### 1.5 Storage

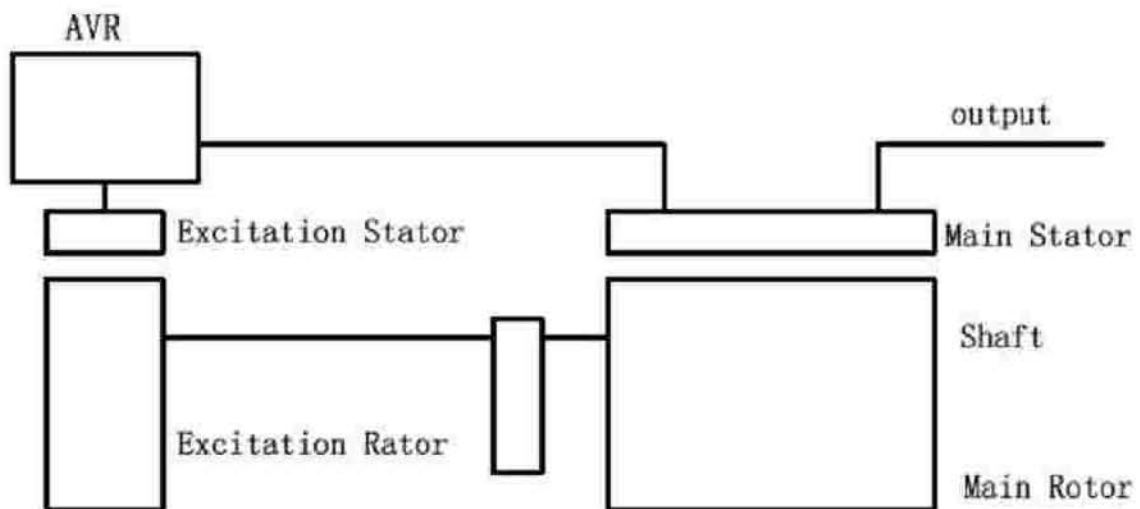
Please store the generator properly during generator stop or before installation, place should be clean, dry and temperature and humidity change small.

## Chapter 2 Technical Features

### 2.1 Working Principal:

Our company's three phase brushless synchronous generator is AVR self exciting or PMG with AVR controlled system generator.(only for Ship and customer who have special request)

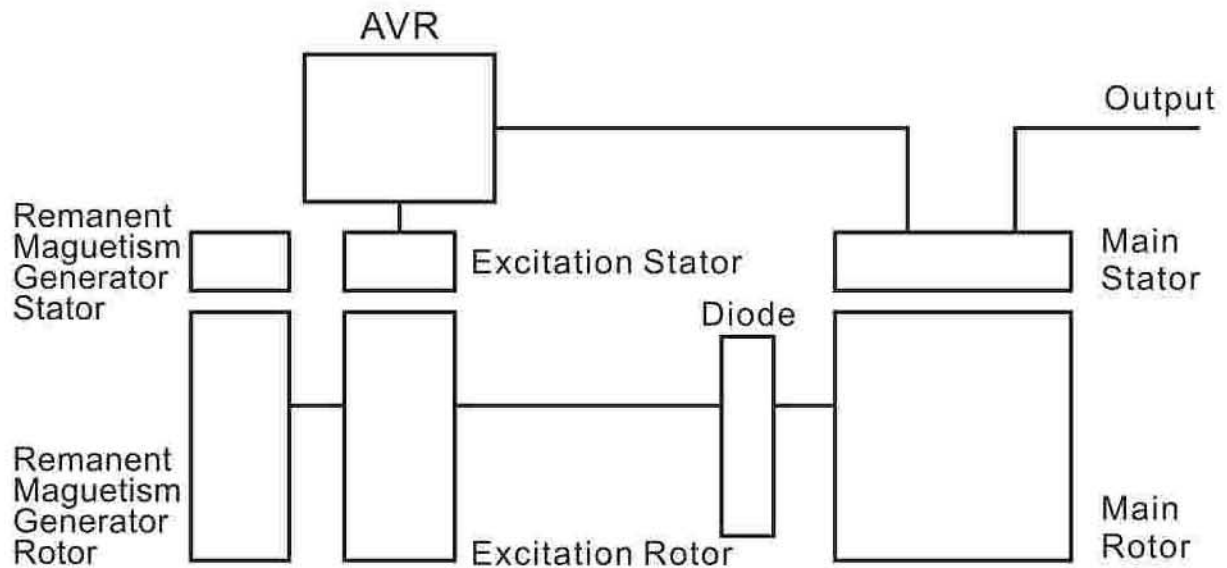
#### 2.1.1 Self-excitation generator principal



The output Voltage of generator is auto adjusted by AVR control exciting current, The LYG series with AVR has EA05A、EA04、SX460 and SX440 etc., Its Power is supplied by output voltage of generator, moreover, the AVR has protection features on low frequency, It can decrease output voltage of generator while working under frequency is lower than rated one, So it assure generator and AVR not to be damaged by Over-current which produced in low frequency.

#### 2.1.2 PMG –Generator with AVR control working principal:

The PMG get the exciting power through AVR (MAX321),AVR is Adjust-equipment for control, The advantage of the PMG system is that it could supply the unchangeable exciting power which be nothing to do with stator load and also could supply more endure power and it has the anti-jamming against the wave aberration rate of voltage for stator.



## 2.2 Technical Features:

### 2.2.1 Electrical Features:

All of generator stator use the good magnetism cold silicon steel, the newly double-layer winding, structure firmly and good insulation, A continuous damp windings abates surges. The poles and tooth of the windings are carefully chosen this to help to check the wave distortion of output voltage.

Stator insulation: H

### 2.2.2 Mechanical Features:

Steel Frame

Cast iron End-shield

Ball Bearing

Mounting Style

Single Bearing :With Standard SAE Adaptor and SAW Coupling Disc.

Double Bearing:With Standard Shaft and Flange

Drip proof Fan-cooled Generator

Protection:IP22

#### 2.2.2.1-Optional

IP23

Space Heater

Thermistor

Single Phase

## Chapter 3

### Application of The Generator

The generator as part of the generator set is supplied for supplier, so stick all of the dangerous and warn sign is impractical, we supply the draw with additional label and direction of mark, beside the manual.

It's our responsibility for offering correct direction and the clear instruction.

The Generator operating conditions:

Ambient temperature: 40 degree(ship for 45 degree)

Altitude: not exceed 1000M

But over this two conditions it also could be use, only the rate value will be down-for the detail information please read generator's nameplate.

The structure of the generator is drip proof and not adapt to use in outdoors if don't use the enough tools which against wet; it's kindly suggested that you use the heater against cooling when your generator is storage to make sure your generator is in the insulation; please guarantee the cooling-air's temperature is not exceed the nameplate's temperature, when you place your generator in the close space

**Important!** The reduced of cooling air or bad protection for generator will cause the generator to winging damage or failure.

When we produce the generator's rator we have passed the balance test to make sure the vibration's value is according with the stand rd of JB3320-83

The generator's vibration frequency:

4-pole 1500rpm 25HZ

4-pole 1800rpm 30HZ

However the generator's vibration is complicated, it includes the base frequency:1.5 times,3 times, 5 times and even more and these induction's frequency could cause the level of vibration higher than the generator's rate frequency.

Double pivot need one firmly foot plate with engine/generator to make sure the center place is precision, Use the close engine adaptor could increase the generator set's flexibility, during the engine adaptor and the s of wheel, the interface should less than 140Kgm, recommend the flexibility coupling(designed for mounting the motor/generator) to make the vibration down to least. the center test is very important for single pivot generator, as the generator and motor will make the flexibility vibration, this point of generator's interface is not exceed 140Kgm, so the whole set needs one firmly foot plate with engine/generator.

The terminal box could be disassembly. Easy to fill m rial, There is connection in the terminal box used for connecting the ground and connect between the phase line and center line. The additional ground point is on the foot plate.

**Warning!** the generator can't connect the ground, before connecting the ground please refer to the regulation, the incorrect ground and incorrect protection could cause person wound

**Warning!** The incorrect installation, maintaining, replacing parts will cause the personal severity wounded/equipment damage.

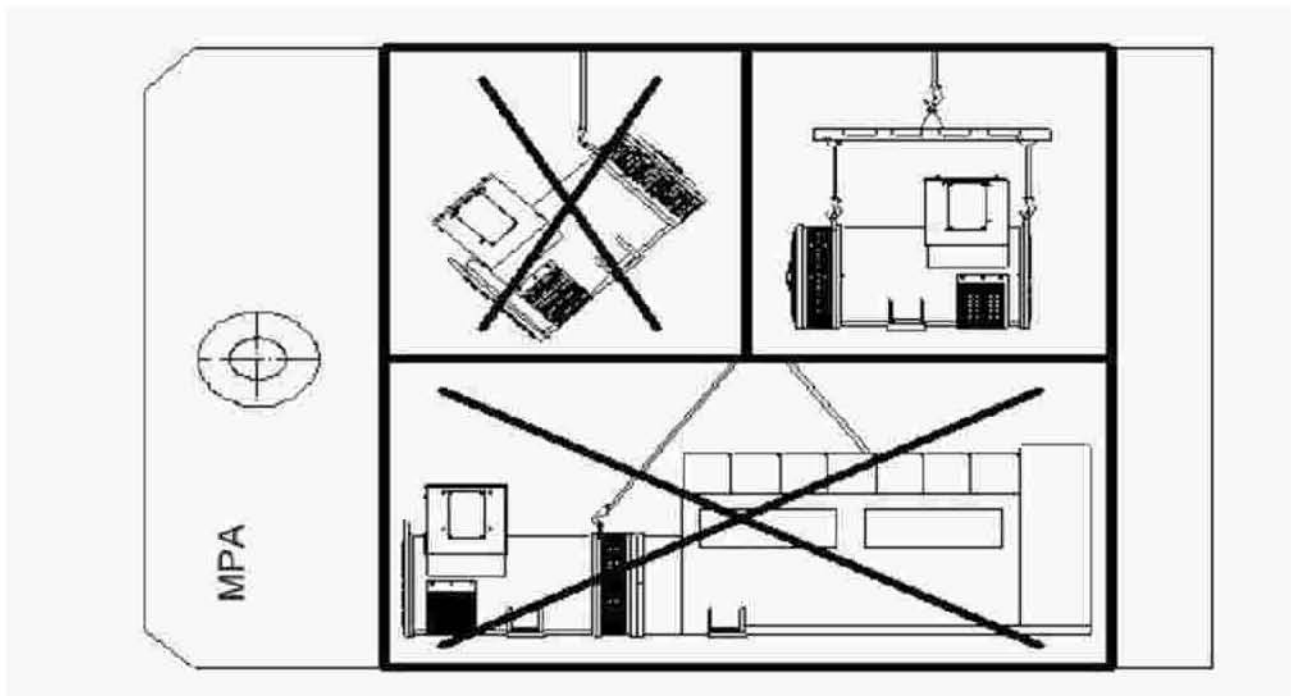
## Chapter 4 Mountings

**Warning!** Incorrect lift or insufficient lifting capacitor may cause serious casualty equipment damage lifting capacity must be more than weight of generator sets the eyebolt of generator can't be used to lift whole generator sets

### 4.1 Lift

Two hangers on generator for lifting, lifting hook may be jointed by a semicircle and a bolt. For lifting, steel wire should have proper length and lifting capacity, Although designed lifting position is near to center of gravity of generator, but due to limit of construction, it may led to generator incline, while lifting carefully for avoiding to hurt human body or damage equipment, right lifting way see instruction on lifting plate near hanger(see below drawing)

**Important!** Please read Maintenance Manual first, before remove Maintenance Cover, it is complement co's. responsible to stick warning labels. which supplied by generator factory, the label is in catalogues.





The generator should be installed in clean, dry, well ventilation place when couple generator to engine.

Please pay attention to arrange exhaust and heating parts of engine carefully for affection on Generator and AVR to be the lowest level when display generator sets and design workshop

## 4.2 Installation

### 4.2.1 Double Bearing Generator

Double bearing generator couple with engine by connecting between a elastic coupling and fly wheel cover and between adaptor and fly wheel elastic coupling and adaptor will not be supplied with double bearing generator, except requested by customer separately(detailed installation dimension of engine should be supplied to generator factory)/the assembly procedure is as follow:

- 1 Please Check the centre of generator and engine to be conformity with technic requirements. Not exceeding 0.1 mm
- 2 fitting elastic coupling on fly wheel of engine and adaptor on flywheel cover of engine by suitable lifting appliance.
- 3 fastening adaptor to fly wheel cover with bolts:
- 4 fixing generator to frame base of generating sets through hole

**Warning!** Incorrect concentricity between generator and engine will cause severe personal casualty and/or equipment damage

### 4.2.2 Single bearing generator:

Single bearing generator coupled engine by adaptor and connecting disc of generator with flywheel cover and flywheel of engine. The assembly procedure is as follows:

1. Checking dimensions of SAE adaptor of generator and flywheel SAE connection disc and flywheel
2. Installing locating dowel on the flywheel of generator. fitting connecting disc of generator and fly wheel of engine by suitable lifting appliance.
3. Removing locating dowel. fastening connecting disc of generator to fly wheel of engine with bolts.
4. Fastening adaptor to flywheel cover of generator with bolts;
5. fixing generator to frame base of generating sets through hole

### 4.3 Ground

The natural line doesn't connect to frame while generator is sold, there is a grounding terminals near main terminals in the terminal box. End user can connect natural line terminals and grounding terminals with a conductor if natural line connecting grounding line is necessary,(the section area is half of cable leads area).

**CAUTION!** Please reference of local regulations of electricity and assure safety for correct grounding

## 4.4 Pre-running Checks

### 4.4.1 Electricity Check



Please check insulation resistance of winding before start generator sets up  
Please disconnect AVR while checking.

Checking winding resistance with 500V megameter or other similar testing instruments. please disconnect all conductors between natural line and groundings firstly, then measure windings resistance of UVW phase to ground, it should be more than  $5M \Omega$ . if it is not more than  $5M \Omega$ , it means windings is damp, dirty, generator coils has been tested by high voltage, repeat test will decrease insulation lifetime, test voltage must be decreased to  $0.8(2 \times \text{Rated voltage} + 1000)$  if high voltage test is required by customer.

There are three methods may make insulation resistance to exceed regulation date

1 Please dry generator 110 degree 24 Hr. in the oven (without AVR)

2 Blowing heat air into intake of generator, and make generator rotating while generator doesn't connect with exciter

3 Main stator is short circuit (without AVR):

First, disconnect AVR with F+ and F- terminals of exciter, and connect a 12DC power between two terminals

Output leads of main stator are short circuit. Start the generator up at its rated speed, and adjust voltage of DC power, control short circuit current of main stator to be 80% of rated current Measure winding insulation resistance every a hour until it is ok

### 4.4.2 Mechanical Check

Before starting the generator up first time, please check All fixing bolts and screws are tight Cooling air is freely influx

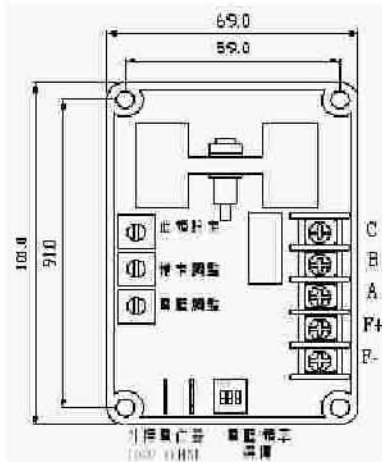
The protecting cover and frame are positioned correctly

The standard rotation direction is clockwise as seeing from the de(phase sequence is 1-2-3) for anti clockwise rotation, please swap 2 and 3

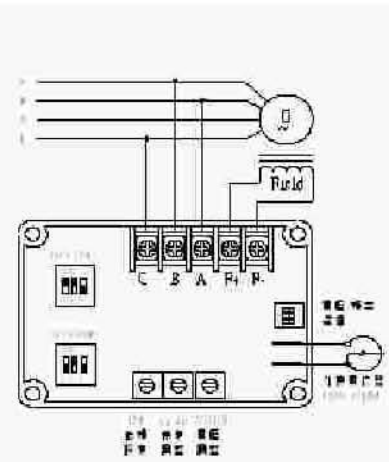
The winding connection corresponds to the operating voltage

## 4.5 Electrical check on the AVR

### 4.5.1 EA05A-3



Overall dimension



380V connecting and setting

Input Current(B.C) 100~300VAC 50/60Hz.

Check Power(A.C) 220/380/440VAC

Adjust Rate: <0.5%

Voltage Create: When left voltage >5V 25HZ, it will create the voltage,

And the voltage curve(see pic 8, start smoothness curve)

Max output: 7ADC 90V,(input 240VAC 630W)

The generator magnet resistance: Min 15

Max 100

The range of adjustment for voltage:1000 the potentiometer's value is 7%

potentiometer's rate power is 1/2W.

EMI: It has the magnetism disturb filter in the internal;

Frequency expiate: if the 60HZ frequency of generator less than 55HZ,The adjustment will auto close.

If the 50HZ generator's frequency less than 45HZ,the adjustment will auto close.

Operating temperature: - 0 °C~60 °C.

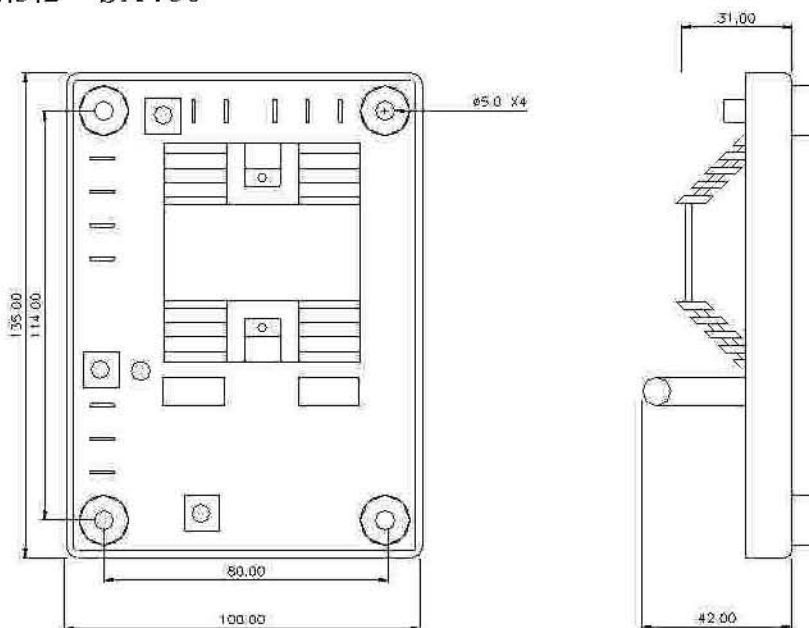
Storage temperature: -20 °C~85 °C

The power consume: Max 8VA;

Dimension: 100mm L \* 67mm W \* 50mm H.

Weight: 182 ± 5g.

#### 4.5.2 SX460



Overall Dimension

**NOTE:**1 If without connecting VR,1,2 must be short.

2 When red LED light, that means Frequency is low and the output voltage will down as the low frequency protection equipment protect the circuit to avoid the

magnet field stator winding damage.

- 3 Magnet and input voltage: 85~140 / 170~265VAC 50/60Hz
- 4 S1 output 4A 43VDC (110VAC input); 90VDC (220VACinput)
- 5 Max output: 6A 10 sec
- 6 Voltage adjustment rate: 0.5% 0~60 °C
- 7 Generator magnet field resistance: Min 9
- 8 Potentiometer: As 1KΩ 1/2W The Potentiometer is ± 7 %.
- 9 Voltage Create: When the left Voltage more than 5V 25Hz It will auto-create Voltage.
- 10 Low frequency: If 60Hz generator's frequency is less than 55HZ,the adjustment will export the digression voltage.

If 50Hz generator's frequency is less than 45HZ,the adjustment will export the digression voltage.

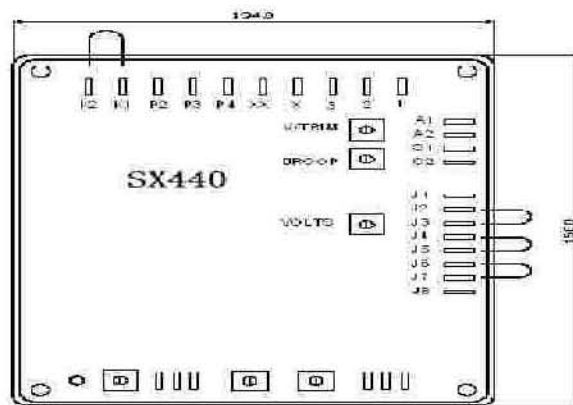
Operating temperature: -40 °C~60 °C

Storage temperature: -60 °C~85 °C.

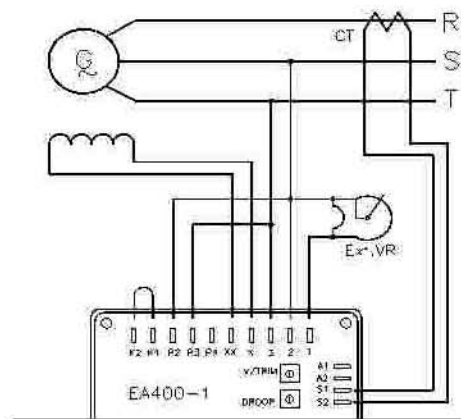
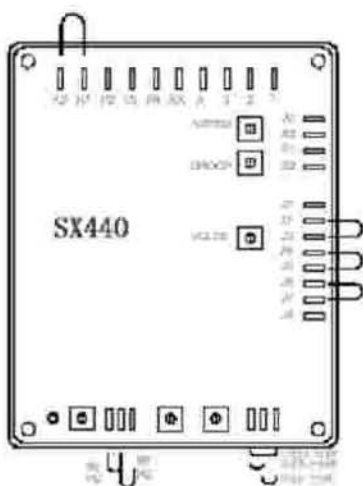
Dimension: 135mmL \* 100mmW \* 42mmD.

Weight: 246g

4.5.3 SX440



Overall



Picture 9 connections

170~250VAC 50/60Hz

± 1%

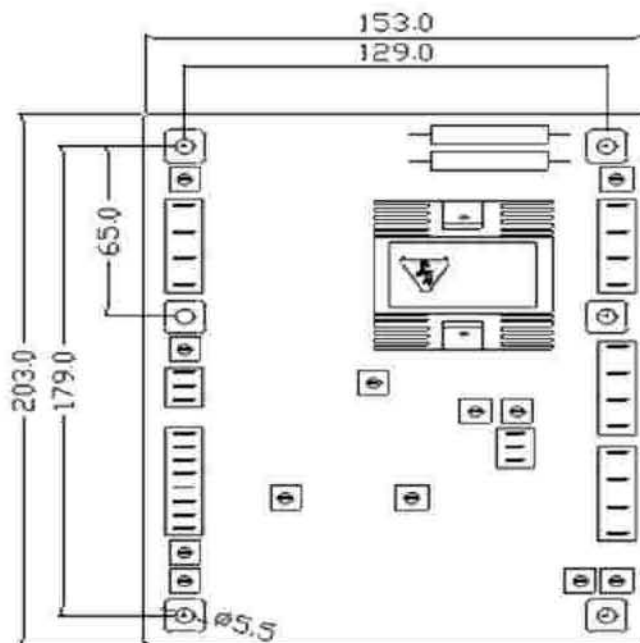
when permanence voltage is more than 5v 25HZ , it found automatic

input power  
Regulation rate  
voltage supply

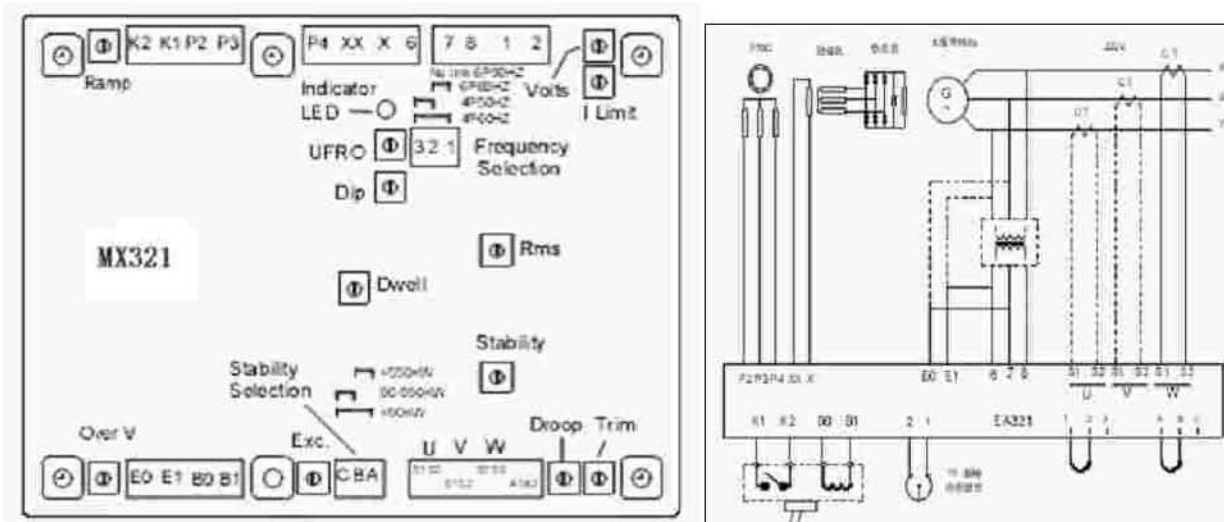
max output	4ADC 90VDC (207VAC impute) .
Minimum resistance	minimum 15 ohm
Voltage regulation raga	$\pm 8\%$
low frequency protection	.when 60HZ generator is lower than 55HZ, low frequency protection output digression voltage .when 50HZ generator is lower than 45HZ, low frequency protection output digression voltage
EMI	.electromagnetism interfere filter inside
working temperature	- 4 °C~60 °C.
storage temperature	-20 °C~80 °C.
Power consume	max 12W
Size	150mmL * 134mmW * 45mmH.
Weight	400kg

#### 4.5.4 MX321

MX321 AVR is special for the generator with remaining magnetism , the specification details must relate to the sample an instruction.



Picture 10 shape



Picture 11 connections

Check all connections , settings and function optional to be correct.

#### 4. 6 -Running



The Generator can be started up and put into use after being adjusted and installed according to the manual.

The generator has been tested and set in factory. Please ensure that drive speed is correct and stable at the first No-Load Run. Otherwise, the generator settings may be altered in the event of abnormal operation (Resetting should follow adjustment procedure in section 4.7) . The malfunction must exist if the generator still runs abnormally ( see section 5.4).

#### 4. 7 - Settings



The various adjustment during the test must be made by a qualified engineer.



Check to find out whether the drive speed specified on the nameplate is achieved or not before adjustment: 1500RPM/50Hz or 1800RPM/60Hz. Do not try to set voltage if the frequency or speed isn't correct (Otherwise irreparable rotor damage may occur as a result) .



Replace all operation panel or cover after operation test is finished.  
AVR should be used for any adjustment to the generator.

#### 4. 7. 1 – AVR settings

##### 4.7.1.1 EA05A-3

VOLT Voltage Level Regulator : VOLT has been adjusted to be the best while leaving factory. Please increase voltage by rotating knob in clockwise and decrease it in counterclockwise if necessary.

STAB Voltage Stability Regulator: STAB has been adjusted to be the best condition while leaving factory. Please adjust it in the following way if necessary: adjust voltage to be unstable in clockwise , then adjust voltage to be stable in counterclockwise.

##### 4.7.1.2 SX460

VOLT Voltage Level Regulator : VOLT has been adjusted to be the best while leaving factory. Please increase voltage by rotating knob in clockwise and decrease it in counterclockwise if necessary.

STAB Voltage Stability Regulator: STAB has been adjusted to be the best condition while leaving factory. Please adjust it in the following way if necessary: adjust voltage to be unstable in clockwise , then adjust voltage to be stable in counterclockwise.

##### 4.7.1.3 SX440

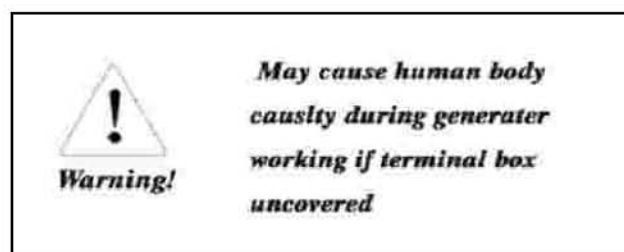
VOLT Voltage Level Regulator: VOLT has been adjusted to be the best while leaving factory. Please increase voltage by rotating knob in clockwise and decrease it in counterclockwise if necessary.

STAB Voltage Stability Regulator: STAB has been adjusted to be the best condition while leaving factory. Please adjust it in the following way if necessary: adjust voltage to be unstable in clockwise , then adjust voltage to be stable in counterclockwise.

DROOP Voltage Drop Regulator: The maximum voltage drop is 5% of the rated voltage in clockwise, while the minimum is 0% in counterclockwise.

V/TRIM Voltage Trim Regulator: Clockwise tuning is for maximum adjustment, while counterclockwise for minimum.

Please cover operation panel after adjustment is finished.



#### 4. 7. 2 Option of AVR

##### 4.7.2.1 EA05A-3

EXT. VR is outer voltage regulator (1000W, 1/2 W). The two ends should be short-circuited while the regulator is not in use.

##### 4.7.2.2 SX460



When using the external adjustment (see Picture 11), please connect a regulator (1000V, 1/2 W) between “1” and “2”.

#### 4.7.2.3 SX440

When using the external adjustment (see Picture 13), please connect a regulator (1000V, 1/2 W) between “1” and “2”.

#### 4.7.3 Parallel Operation of generators

It is very important to know following notes of parallel operations before installing and setting regulators. The basic requirement is that the generator and other generators or electricity network should have the same phase sequence for parallel operation of generators or incorporation of the generator into the network. Meanwhile, it must also meet the following requirements:

- 1、 Same frequency (Minimal tolerance is permitted) .
- 2、 Same Voltage (Minimal tolerance is permitted) .
- 3、 Same phase angle (Minimal tolerance is permitted) .

To meet these requirements, such methods as a simple brush synchronous test or test by automatic synchronous indicator may be used.

**IMPORTANT!** when generator is on parallel operation and the switch is turned on, excessive mechanical impact and electric current will be suffered by the generator and the equipment may be damaged if the three requirements are not met.

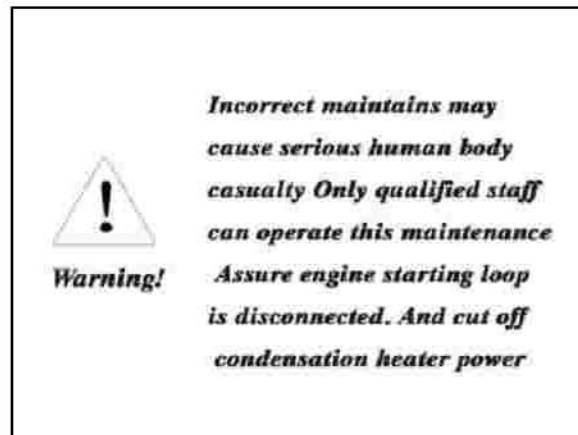
Once parallel operation is on, each generator should be equipped, at least, with Voltmeter, ampere-meter, power meter (used to check the total power of every generator) and frequency meter, instruments used to adjust the generator and modify generator control to make the load power distributed by generator power.

#### Special attention:

- 1、 Active power is supplied by the Engine. Its speed-adjustment features determine the distribution of active power among parallel generator sets. Please read Manual for generator-set users for control setting of speed adjuster.
- 2、 Reactive power is supplied by the generator. Its exciting-control features determine the distribution of reactive power. It can be adjusted by DP4.



## Chapter 5 Maintenance and service



A regular check of windings (especially when the generator is not used for a long time) and bearings (See Section 5.1 and 5.2) is suggested as a part of routine maintenance.

### 5.1 Winding Conditions

Winding conditions can be checked by measuring its insulation resistance to ground.

Special attention is required if windings are too humid or dirty. The insulation resistance can be measured with a 500V mega ohmmeter. For manual check, it is suggested to rotate the handle slowly when it starts up. Refer to Section 5.5.1 (Electrical Check) for specific measures of check and maintenance.

### 5.2 Bearing

All bearings supplied are sealed. It is our suggestion to check bearing noise and overheat regularly during its lifetime. If excessive vibration occurs after a certain time, it is probably caused by bearing abrasion, where a check of bearing condition is necessary, or by lack of grease. The bearing could be replaced when necessary.

In any case, bearing should be replaced after running for 40,000 hours.

**Important!** The lifetime of bearing is closely related to working conditions and working environment.

**Important!** Long-term exposure to a vibration environment may cause bearing abrasion, where bearing balls will deform and indentation may appear. Exposure to a humid climate or environment may emulsify grease and the bearing may be eroded as a result.

### 5.3 — Mechanical faults

	Fault	Actions
Bearing	Overheating of one or both bearings (Bearing temperature is 50°C higher than surrounding)	-- Change the bearing if the bearing has turned blue or the grease has turned black. -- Bearing not fully locked

	temperature ) .With or without abnormal noise.	(abnormally installed in the bearing housing). The two ends is incorrectly aligned.
Abnormal Temperature	Overheating of generator frame	-- Block of air flow (inlet-outlet) or cycling of hot air from the generator or engine. Remove the block. --Generator is running at a too high temperature (>105% of rated voltage) . -- Generator overloaded.
Vibration	Too much vibration	-- Misalignment (Coupling). -- Unqualified mounting or assembly with engine. -- Rotor balancing fault (engine— generator).
	Excessive vibration and humming noise coming from the machine	-- Phase voltage imbalance . -- Stator short-circuit.
Noise	Generator damaged by a significant impact, followed by humming and vibration.	-- System short-circuit -- Parallel Fault Possible consequences: -- Coupling broken or damaged -- Shaft end broken or bent -- Deformation or short-circuit of rotor -- crack on fans or loose on shaft -- Irreparable damage to rotating diodes or AVR

#### 5. 4— Electrical faults

Fault	Actions	Effect	Check/Cause
No Voltage at No-load when Start Up	Connect a new battery of 4-12V	Voltage is created and is correct when the battery is removed	-- Lack of residual magnetism .

	to Terminals F+ and F-. Keep the connection for 2-3seconds. Mind the polarity.	Voltage is created but does not reach the rated value when the battery is removed	-- Check the connection of the voltage signal line to the AVR -- Fault of diode -- Short circuit of armature
		Voltage is not created when the battery is removed	-- Fault of AVR -- Open circuit of exciter windings (check winding) -- Open circuit of main rotor winding (check the resistance)
Voltage is too low	Check the drive speed	Correct speed	--Check AVR connections (possible AVR failure) -- Field windings short-circuited -- Rotating diodes burnt out -- Main rotor winding short-circuited (check the resistance)
		Speed is too low	--Increase the drive speed ( do not adjust the AVR VOLT Regulator before running at the correct speed)
Voltage is too high	Adjust AVR Voltage Level Regulator	Adjustment ineffective	Fault of AVR
Voltage Fluctuation	Adjust STAB Voltage Stability Regulator	If ineffective	--Check the speed : possibility of non-periodic fluctuation -- Loose connections -- Fault of AVR -- Speed is too low on Load
Voltage is correct at No-Load and	Run at No-Load and check the	DC Voltage between F+ and F-: <10V	-- Check the speed

too low at on-Load	voltage between F+ and F- on AVR	DC Voltage between F+ and F-: >15V	-- Fault of rotating diodes -- Short-circuit in the main rotor windings; check the resistance -- Fault of exciter armature; check the resistance
Voltage disappears during running	Check AVR, piezo-resistance, Rotating diodes, and replace any defective parts	The voltage doesn't return to the rated value	--Exciter winding open circuited -- Fault of exciter rotor -- Fault of AVR -- Main rotor open circuited or short circuited

### 5.5 Check voltage of remaining magnetism

Remove the cover of AVR and disconnect wires between F+ and F- when the generator set is stopped.

Start up the generator and measure voltage between AC200V terminals

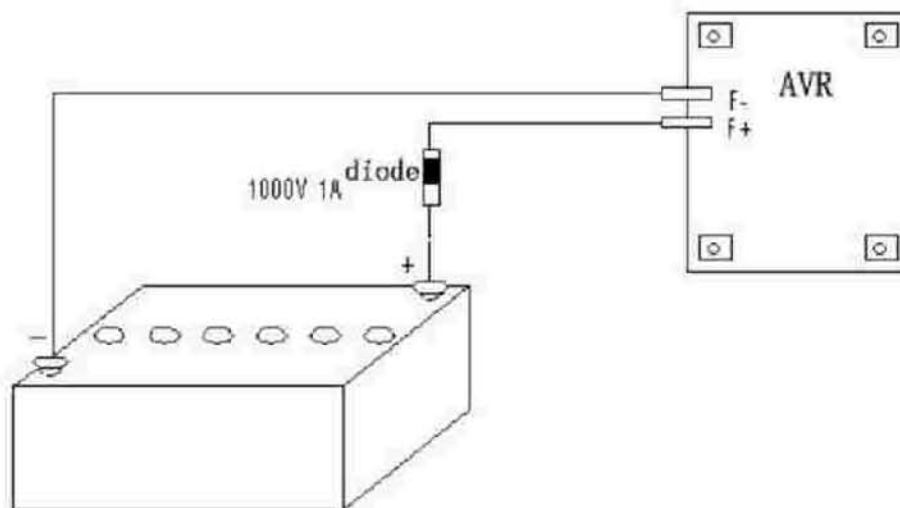
Stop the generator; reconnect wires between F+ and F- in the terminal box of AVR

The generator can work well if measured voltage is more than 5V

If the voltage is under 5V, please operate as follows:

Use DC 12V Battery. Connect the negative pole with F- terminal of AVR and positive pole with F+ terminal by a diodes (see the below picture).

**Important!** To avoid AVR damage, diode used must be the same as shown in the following picture.



Please dismantle the connections leads between F+, F- of AVR while the generating sets is stopped, two terminals between AC200V should be 5-15V while starting generator up. Then reconnect leads between F+, F-. If the voltage is more than 5V while stopped Generator-sets, the generator is ok. If measured voltage is lower than 5V, please use DC battery connect F+, F- terminals of AVR. See above drawing for Reference.

Important! The generator midline of main stator can't grounded if recharge it with storage battery.

Re-starting the generator up and make note of the output voltage of main stator, and the voltage is near to rating voltage or the voltage of AVR AC200V terminals is between 170V and 250V; Stop the generator, switch off battery power between F+, F-. Re-starting the generator, the generator will run normal. The generator or AVR lines may have some problem if no voltage is built up. Please check winding, rotating diodes and AVR according to Disconnect Test of excite and winding.

### 5.6 Check windings and rotating diodes.(module)

The procedure can carry out under the following conditions: disconnect the wire

between F+, F- from AVR, supplying power to the wire of F+ and F- by DC 12V Battery.

Start generator up and run on a rated speed.

The measured voltage of U,V,W is among  $\pm 10\%$  of rated voltage.

The voltage of AVR AC200V terminals is between 170V and 250V.

Main exciting windings or diodes assembly may have some problem if voltage is balanced but too low. Please check accord to following steps one by one:

Rotating diode:

You can measure diodes on main rectifier assembly by multi-meter. Disconnect all leads to terminals of diodes and measure backward and forward resistance. A good diode have a very high backward resistance and very low forward resistance. Fault diodes is 100000+ when measured by multi-meter at 100000 scale. A good diode measured on two ends has a very low data and a very high at forward and backward data by digital meter.

Replace damaged diodes:

Rectifier assembly is equipped on two boards, it has positive pole and negative pole. Two boards of main rotor two terminals connect to Rectifier assembly, three diodes is located in each board. Negative pole board has negative offset diodes, positive pole board has positive offset diodes, pay attention to diodes polarity is correct on board/ and assure it has good mechanical and electrical features and fixed firmly. Recommended fastening torque is 4.06-4.74Nm(36—42lb in).

Surge suppresser

Surge suppresser is a metal oxide resistance which connects to diode through two commutated boards for avoiding damage by instant backward voltage coming from windings. The unit hasn't polarity. +8 will be indicated on two directions when tested by common ohmmeter. You can realize from mark checked by short circuit if it is a fault one. Replace the bad surge suppresser, after adjusting and replacing the commutated assembly.

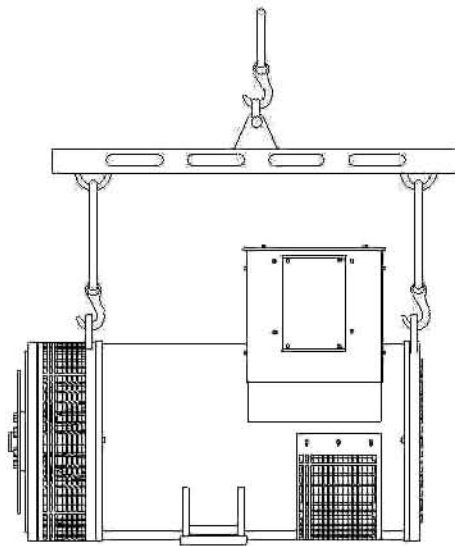
please check main rotor, main exciter, stator (resistance data), if the voltage is still too low. One set of them is bond to problem. Resistance of exciter stator can measured from terminals of F+ and F-. The resistance of exciter rotor connects with six bolts also terminals of diode. Resistance should be  $\pm 10\%$  of following mentioned data.

**Warning**

### 5.7 Dismantlement, Reassembly

During the warranty period, this operation should only be carried out by our Co., otherwise the warranty may be invalidated.

While being handled, the generator should remain horizontal. (the rotor should not be locked while being moved)



Pic 13

#### 5. 7. 1 Tools required

To fully dismantle generator, tools listed are recommended as follows:

1 Ratchet spanner + extension handle.

1 Torque wrench.

1 Set of flat spanner: 8mm, 10mm, 13mm, 16mm, 18mm

1 Socket set: 8, 10, 13, 16, 18mm

1 Screw driver

1 Puller.

#### 5. 7. 2 Replacing the NDE bearing on single bearing generator

Open the terminal box cover

Disconnect the exciter wires

Dismantle the bolts of NDE end-shield

Remove the NDE end-shield

Pull the ball bearing using a puller with a central screw (see drawing 14)



Pic 14

Heating the new bearing by Induction method to approximately 80°C, then equip it.

### 5. 7. 3 Replacing DE bearing on double bearings generator

Open the air outlet cover

Remove the DE flange.

Pull the ball bearing using a puller with a central screw (see drawing)

Heating the new bearing by Induction method to approximately 80 °C, then equip it.

**WARNING**

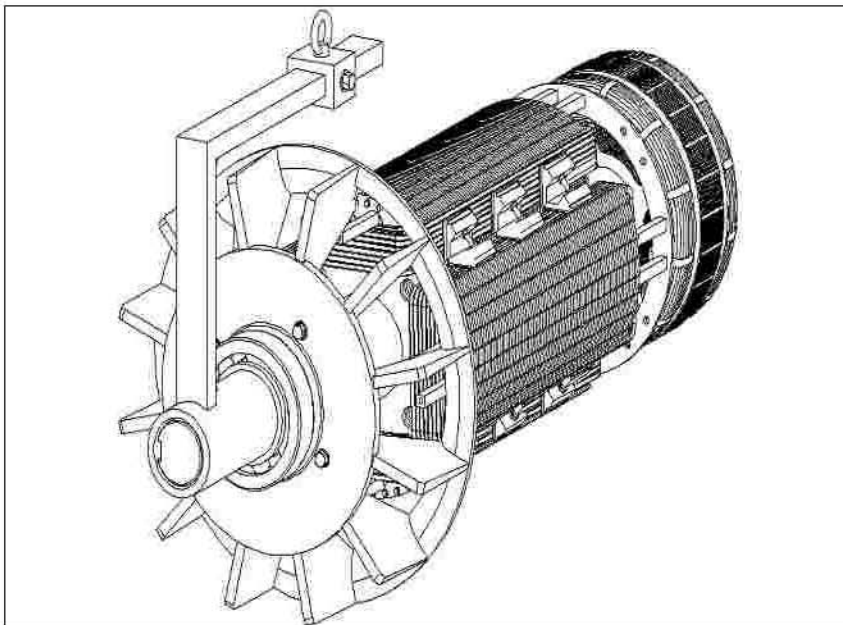
while dismantling generator, Ordinarily need to change bearing

### 5. 7. 4 Complete Dismantlement

Remove the DE flange

Remove the NDE end-shield

Lifting the rotor by a strap or a support constructed as shown in the drawing below:



Pic 15

### 5. 7. 5 Reassembling the end-shield

Positing the DE flange and NDE end-shield on the stator

Fastening screws of DE flange and NDE end-shield

Reconnect all the exciter wires.



### 5. 7. 6 Reassembling the rotor

For single bearing generator

Put the rotor into stator

Check if the generator is correctly assembled and **all** the screws are tightened.

For double bearings generator

Put the rotor into stator

Positing the DE flange on the stator

Fasten screws

Check if the generator is correctly assembled and **all** the screws are tightened.

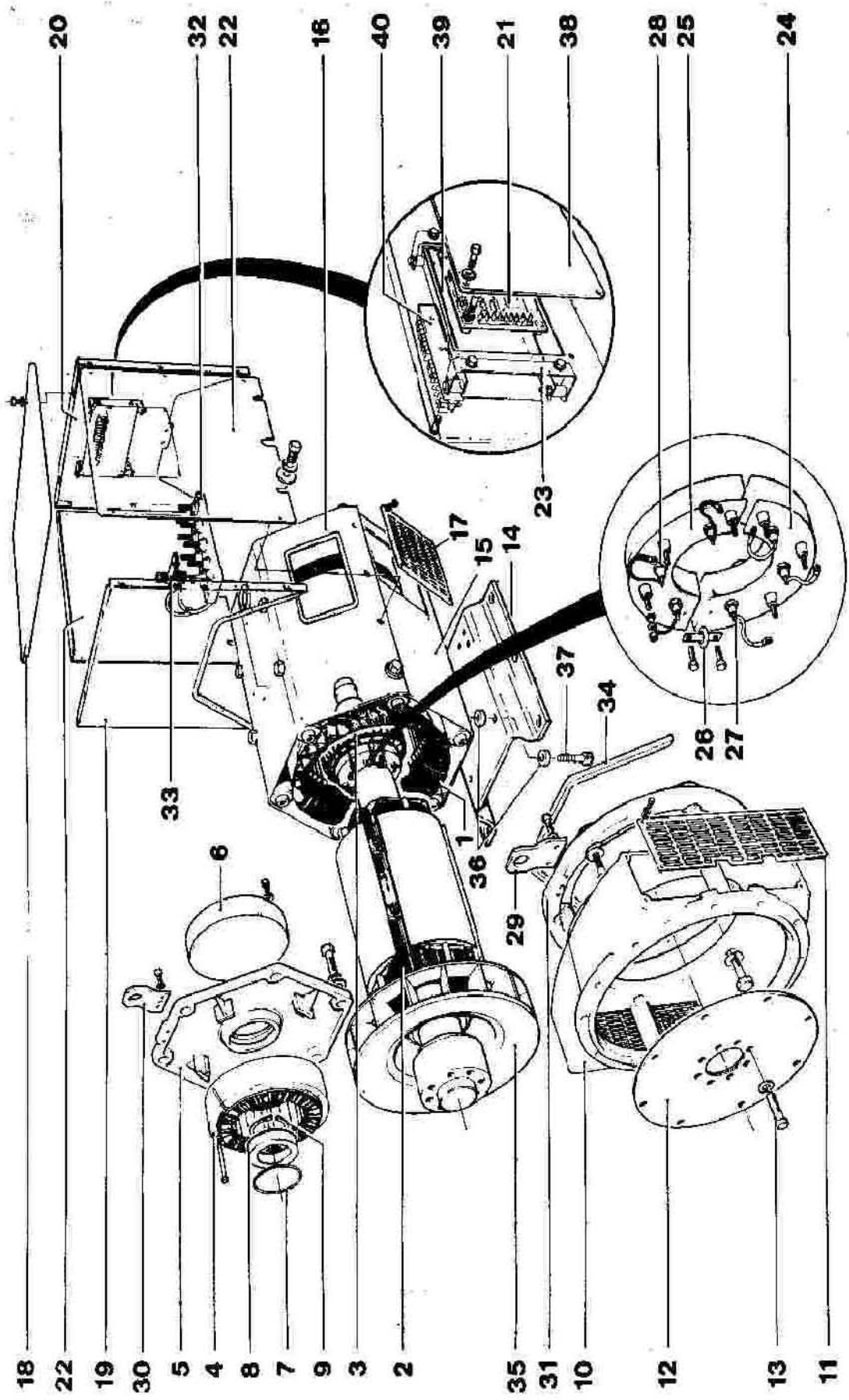
**WARNING**

The rotor must be rebalanced while rotor dismantling including changing spare parts and rewinding.



**Replace all the covers and shields after testing.**

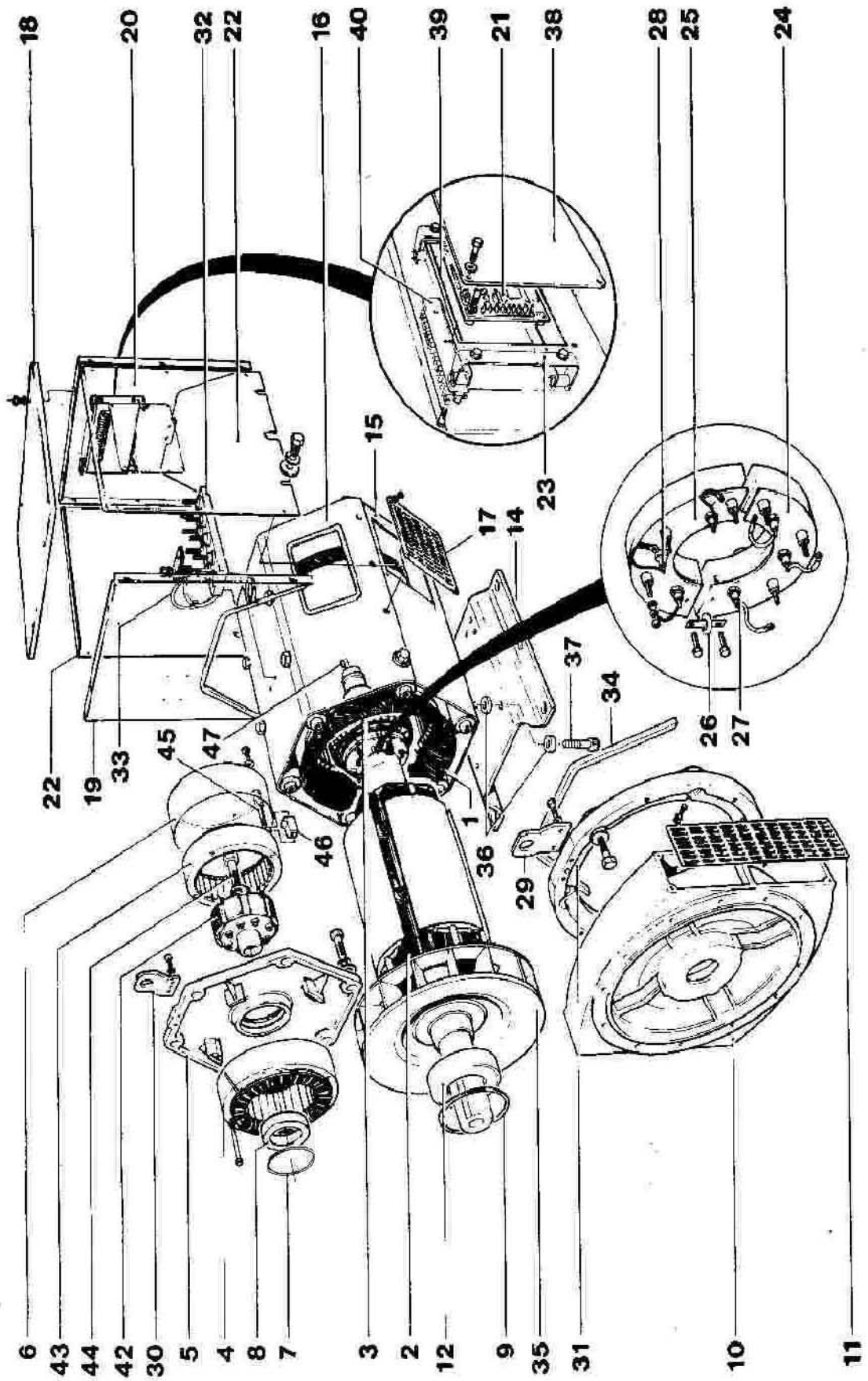
### 5. 8 Exploding drawing, Spare parts



List of Spare parts for typical LYG single bearing generator

No.	Name	No.	Name
1	stator	25	main rectifier assembly-reverse
2	rotor	26	Surge suppresser
3	Exciter rotor	27	Diode-positive
4	Exciter stator	28	Diode—reverse
5	NDE end-shield	29	Eyebolt-DE flange
6	NDE cover panel	30	Eyebolt-NDE shield
7	O ring NDE	31	shield ring
8	NDE bearing	32	Terminal Board
9	NDE shield bearing spring blocker	33	terminal pole Terminal board
10	DE flange adapter	34	Sealed embed bar
11	DE flange window panel	35	Fan
12	connector	36	Foot fixing gasket
13	Coupling Bolt	37	Inner six angles screw
14	foot	38	AVR operation cover panel
15	Frame bottom cover panel	39	AVR damping installation
16	Frame top cover panel	40	Auxiliary terminal end
17	Air outlet window panel		

18	Terminal box cover		
19	DE flange distributor panel		
20	NDE shield distributor panel		
21	AVR		
22	Side panel		
23	Bracket of AVR		
24	Main rectifier assembly-positive		



List of Spare parts for typical LYG double bearings generator

No.	Name	No.	Name
1	Stator	25	main rectifier assembly-reverse
2	rotor	26	Surge suppresser
3	Exciter rotor	27	Diode--positive
4	Exciter stator	28	Diode—reverse
5	NDE end-shield	29	eyebolt—DE flange
6	NDE cover panel	30	eyebolt—NDE shield
7	O ring NDE	31	shield ring
8	NDE bearing	32	distributor board
9	DE bearing wave-shape spring pad	33	Terminal connection
10	DE flange	34	Sealed embed bar
11	NDE window panel	35	fan
12	connector	36	Foot fixing gasket
13	Coupling bolts	37	Inner six angles screw
14	foot	38	AVR operation panel
15	Frame bottom cover panel	39	AVR damping device
16	Frame top cover panel	40	Auxiliary terminal assembly

17	Air outlet window panel	41	Magnet generator exciter rotor
18	Distributor cover	42	Magnet generator clap
19	DE end outlet box board	43	Magnet generator fixing bolt
20	NDE end outlet box board	44	Magnet generator pole
21	AVR	45	Magnet generator clap
22	Side panel	46	Magnet generator pressed pin
23	The bracket of AVR		
24	main rectifier assembly-positive		

## Chapter 6

### Spare parts

#### 6. 1 Recommended spare parts

Spare parts as follows are recommended for service and maintenance, should prepare for a set of below-mentioned parts in the key lines.

1. Rectifier Module Assembly MXY40、MXG40、MXY70、MXG70、MY31-390/3I 、MY31-620/5I  
(6 Diodes with Surge suppresser)
2. Matched AVR
3. NDE bearing
4. DE bearing

LYG 164/184	DE bearing	6210
	NDE bearing	6207
LYG 224	DE bearing	6312
	NDE bearing	6308
LYG 274	DE bearing	6315
	NDE bearing	6310
LYG 314	DE bearing	6317
	NDE bearing	6314
LYG 354	DE bearing	6220
	NDE bearing	6314
LYG 404	DE bearing	6224 (6228)
	NDE bearing	6317



## Generator Warranty

### Warranty Period:

All generators are warranted for 18 months from the notify date of awaiting transportation. Or 12 months from the first t al-use (subject to the shortest time):

### Fault after delivery:

If products is defective in normal run conditions due manufacturing process or materials which confirmed by our Co. and in the premise it occurs during the warranty period. Then we will either repair the products or replace it with a new one. Customer should take or ip prepaid defective parts to our authorized service center or our factory, and product's No. and label should be kept intact.

All replaced parts in the warranty period, our company will send free of charge. (we will choose sea transportation for abro d).

The responsibility of the cost due to lifting and repl cing parts for our check and installation of replacing parts which sent by us isn't burden on our side. We have no obligation to bear any cost caused by incorrect installation or storage un-according to "Mounting and Maintenance Manual", or any loss occurred by unauthorized staff fo repairing, maintenance and replacement. As to some products manuf ctured by the third side or patented products which aren't manufactured by our factories, even though supplied by us , the quality wa rant should be bear

on separate manufacturers. ( If exists)

Any claim should provide detailed defective description products description; purchase data, Sales Co. Name and address, products series No. (On Nameplate). Referring to the spare parts, the end user should offer the order number.

Our arbitration for all claim is final and conclusive, and the end user should accept our decision on fault and replacement of parts.

Our side have fully taken on all the responsibility though above-mentioned maintenance and replacement. In any case, our compensation don't exceed the current price of the defective ones.

This clause will be treated as supplement to the related provisions of present law for special warranty of quality and conditions. Apart from it, we don't have responsibility, neither for any fault and loss (including loss occurred during direct defective cost or other relative things), nor for contract, pirate or other reason.

<b>Serial No.</b>	
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# Legend Power Equipment (Jiangyin) Co., Ltd

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