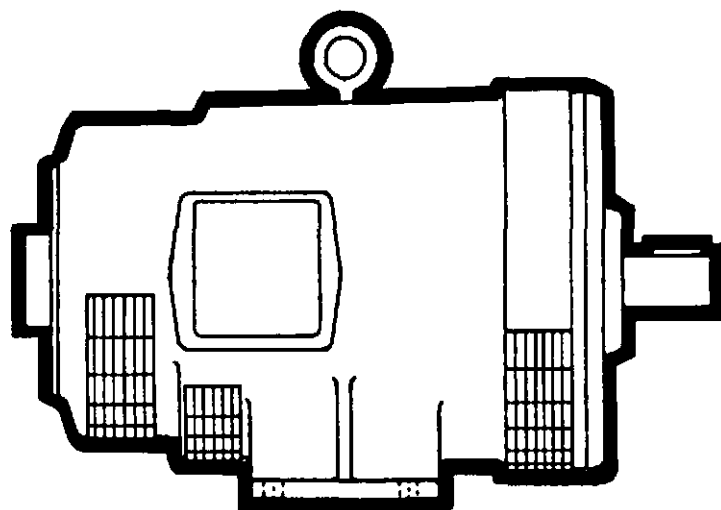




2800S

INSTALLATION, OPERATION AND MAINTANENCE MANUAL

TYPE SER Brushless AC Synchronous, Externally Regulated Alternator Frame 280



The Lima Electric Co., Inc.
P.O. Box 918
Lima, Ohio 45802
(419) 227-7327
TELEX 242433

Making Energy Work for You

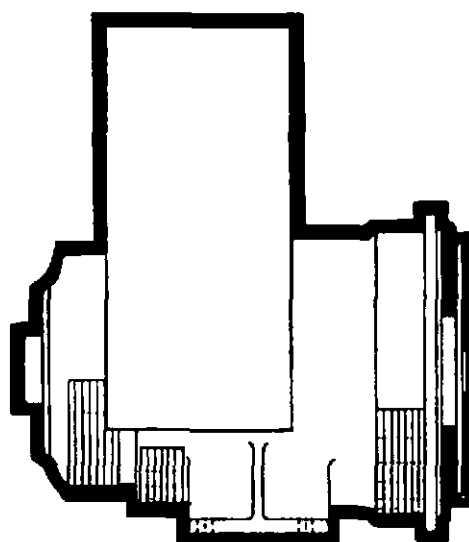


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PRINCIPLE OF OPERATION

The exciter pole pieces contain residual magnetism, setting up lines of force across the air gap to the exciter armature. When the exciter armature begins to rotate a voltage is induced and current flow is initiated in the exciter armature AC windings. This voltage is fed to the rotating rectifier assembly, rectified and fed to the alternator field coils. This DC voltage is sufficient to magnetize the laminated alternator field which will set up lines of force across the air gap to the alternator stator. As the generator rotor rotates a voltage will be induced and current will flow in the alternator stator windings and to the output circuit.

A static type voltage regulator is connected to the generator output. The regulator will rectify part of the output voltage to provide a DC voltage to the exciter field coils. This will increase the density of the lines of force in the exciter increasing the voltage induced into the exciter armature windings, and therefore, to the rotating rectifiers.

The rotating rectifier output will be increased which will increase the alternator field strength and the generator output will build up to its rated voltage.

Adjustment of the generator output to the rated voltage level is accomplished by controlling the current fed to the exciter field coils.

Regulation is automatic with the static type voltage regulator. An additional voltage adjustment range is provided if desired by operating the voltage adjust rheostat.

ROTATING FIELD ASSEMBLY (ROTOR)

The rotating field assembly consists basically of four members; the shaft assembly, the core assembly, field coil, damper windings, and balance lugs to provide a high degree of static and dynamic balance. The exciter rotor and rotating rectifier-hub assembly are separate units which are heat shrunk onto the generator shaft.

CORE ASSEMBLY

The core assembly consists of one piece electrical steel laminations which are stacked on the shaft assembly.

FIELD COIL

Field coils of heavily insulated wire are "wet" wound directly onto the poles. Field coil leads are brought out to the rectifier assembly for connection to the source of DC excitation voltage.

SHAFT

Shaft is made of forged high strength steel, which is turned to close tolerance and then ground to a close tolerance.

SECTION I

GENERAL DESCRIPTION

The revolving field type generators have a DC field revolving within a stationary AC winding called the stator. AC power is distributed from the generator through leads connected to the stator windings. There are no sliding contacts between the AC winding and the load, therefore, great amounts of power may be drawn from this generator.

To energize the field, DC excitation must be applied to the generator field coils. The excitation current is supplied from a brushless exciter mounted on the generator shaft.

The brushless exciters are actually AC generators with their output rectified through a full wave bridge circuit. This type of brushless exciter will provide the necessary excitation current. Residual magnetism in the exciter field poles will induce a voltage into the exciter armature and, thus to the alternator field as soon as the exciter armature begins to rotate, eliminating the need for flashing. The exciter field is strengthened by applying a voltage to the exciter field coils. The generator output voltage is controlled by controlling the alternator field current. This is accomplished by regulating the exciter field coil voltage. The exciter field coil voltage is regulated with a solid state static type voltage regulator.

DAMPER BARS

Damper bars are inserted through the field laminations and welded at the end to a solid copper plate. The purposes of the damper windings are to provide stable parallel operation, reduce damping current losses, and limit the increase of third harmonic voltage with increase in load.

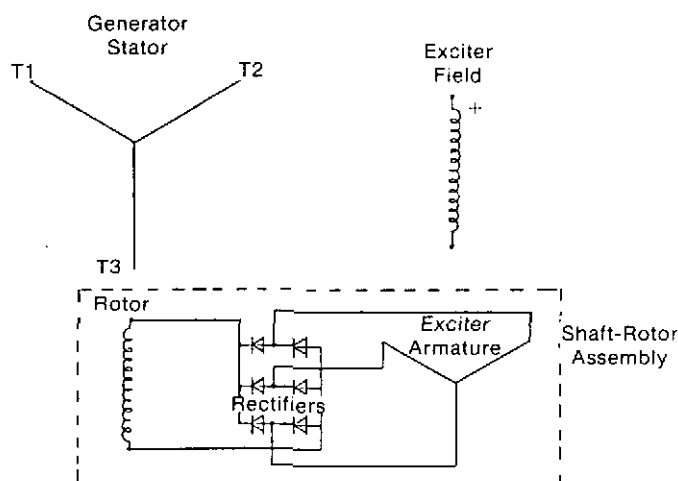


Figure 1 - Brushless Generator Schematic

BRUSHLESS EXCITER

The brushless exciter consists of an armature with a three phase AC winding and rotating rectifier assembly within a stationary field.

The stationary exciter field assembly is contained in the main generator frame. The exciter armature is a press fit and keyed onto the shaft assembly. The rotating rectifier assembly slides over the bearing end of the generator rotor shaft. The retaining rectifier assembly is secured to the alternator shaft with bolts and washers to an adaptor hub which is shrunk on the generator shaft.

ROTATING RECTIFIER BRIDGE

The rotating rectifier bridge consists basically of rectifying diodes mounted on a brass heat sink which is in turn mounted on an insulating ring. The entire assembly bolts to the adaptor on the generator shaft. Therefore, the rotating rectifier assembly will rotate with the exciter armature eliminating the need for any sliding contacts between the exciter output and the alternator field. (See figure 2).

EXCITER FIELD

The exciter field on the high frequency exciter consists of laminated segments of high carbon steel which are fitted together to make up the field poles. The field coils are placed into the slots of the field poles.

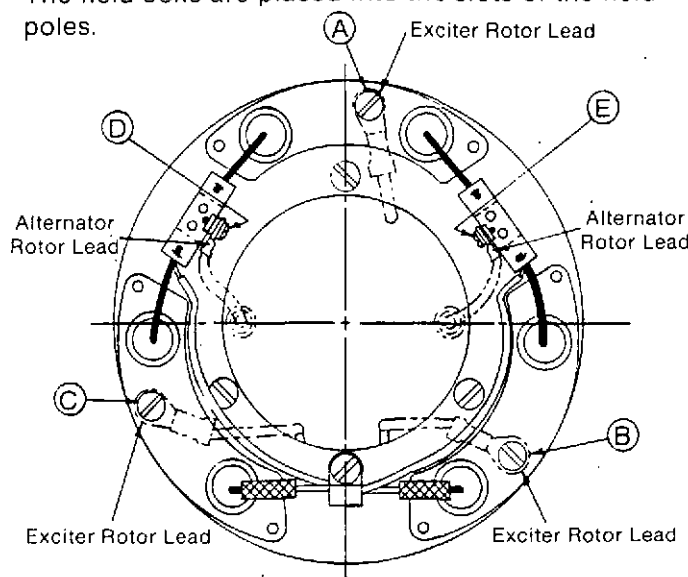


Figure 2 - Rectifier Assembly 778600

EXCITER FIELD COIL VOLTAGE SOURCE

Field coil DC voltage is obtained by rectifying the voltage from a phase to neutral line of the generator output, or other appropriate terminal to provide the needed voltage reference.

The rectifier bridge is an integral part of the static regulator. The static regulator senses a change in the generator output and automatically regulates

current flow in the exciter field coil circuit to increase or decrease the exciter field strength. An external adjust rheostat sized to be compatible with the regulator is used to provide adjustment to the regulator sensing circuit.

BALANCE

The rotor assembly is precision balanced to a high degree of static and dynamic balance. Balance is achieved with the balance lugs on the field pole tips. Although the balance will remain dynamically stable at speed in excess of the design frequencies, the prime mover should be adequately governed to prevent excessive overspeed. High centrifugal forces at excessive overspeed can damage the damper windings and field coils.

BEARING

The generator rotor assembly is suspended on shielded, factory lubricated ball bearings. They are greased for life and should not require regreasing.

STATOR ASSEMBLY

The stator assembly consists of laminations of steel mounted in a rolled steel frame. Random wound stator coils are fitted into the insulated slots.

STANDBY UNITS

Generators used as an auxiliary power source in case of commercial power failure must be isolated from the commercial line before being placed in operation.

CAUTION: MAKE SURE UNIT IS COMPLETELY SHUT DOWN AND FREE OF ANY POWER SOURCE BEFORE ATTEMPTING ANY REPAIR OR MAINTENANCE ON THE UNIT.

PARALLEL OPERATION

For parallel operation, both units must be of the same voltage, frequency, and phase. Phase voltages of paralleled units must be synchronized. This generator set utilizes the "dark lamp" method of paralleling.

SECTION II SERVICE AND MAINTENANCE

PREVENTATIVE MAINTENANCE AND OPERATING PRECAUTIONS

Costly repairs and down time can usually be prevented by operating electrical equipment under conditions which are compatible with those at which the equipment was designed to operate. Follow the instructions outlined below to insure maximum efficiency of the electrical equipment.

COOLING

Keep all cooling parts clean and make certain sufficient room is left on all sides for a plentiful supply of fresh coolant air flow. **DO NOT EXCEED AIR TEMPERATURE RISE AS SHOWN FOR 50°C ABOVE A 40°C AMBIENT.** This insures that the insulation NEMA Class "F" will not be damaged. **DO NOT EXCEED RATED VOLTAGE OR LOAD,** except as specified for the equipment. **OPERATE GENERATOR AT RATED SPEED. KEEP REGULATING EQUIPMENT IN PROPER ADJUSTMENT.** Failure to operate generators at rated voltages, load or speed will cause overheating and possibly damage to windings due to over voltage or current.

REGULATING EQUIPMENT

Regulating equipment should be kept in proper adjustment at all times. **READ ALL INSTRUCTIONS CAREFULLY BEFORE ADJUSTING OR REPAIRING REGULATING EQUIPMENT.**

BEARING REPLACEMENT

Factory lubricated shielded bearings will normally provide several years of trouble free service with operated under normal conditions. Excessive bearing load and adverse environment conditions will greatly shorten bearing life. Should bearing failure occur, bearings can be replaced. **ALWAYS REPLACE WITH THE SAME TYPE BEARING AS INSTALLED AT THE FACTORY, CHECK PARTS LIST FOR PART NUMBER.** Include generator serial number when ordering bearings.

ROTATING DIODE BRIDGE

The rotating diode bridge can be removed and replaced. Excessive overcurrent, overvoltage, overspeed, or reverse currents can cause damage to the assembly or any of the component parts.

ROTOR DAMAGE

The damper bars of the generator prevent excessive hunting when AC generators are operated in parallel. Damper bars, because they must have a low electrical resistance and are subjected to extreme centrifugal forces, must be mechanically secure and permanent. Consequently, they are welded to end plates completely covering the field.

All rotors are static and dynamically balanced to a high degree on precision machines to assure minimum vibration. They will, therefore, remain dynamically stable at speed well beyond the synchronous

speed of the generator. The rotors on generators are, however, subjected to extreme centrifugal forces which can increase beyond safe operating limits at excessive overspeed. Therefore, the prime mover should be adequately governed to prevent overspeed.

Damage to the rotor can also occur due to overheating which can be caused by:

1. Excessive field current due to failure of the regulator
2. Exciter being operated below the rated speed which can result in excessive field current due to the regulator trying to maintain rated voltage.
3. The air flow is restricted from dust or other foreign objects collecting in the air passage.

If a rotor becomes defective, it should be returned to the factory with full nameplate data, because the rotor coils are enclosed in welded squirrel cage winding. To repair a rotor the special tooling and technique of the factory is necessary and essential. The Lima Electric Company, Incorporated, facilities can perform a complete rebuild, or rewind job with greater skill and craftsmanship than can be found in the average motor rewind shop. Should a failure occur, the factory should be notified immediately and steps will be taken to get the generator back into service with the least expense; and more important, to determine the cause of the failure and take steps to prevent a recurrence.

PRECAUTIONS

GENERATOR WINDINGS (DRYING)

Generators that have been in transit or storage for long periods may be subjected to extreme temperature and moisture changes. This can cause excessive condensation, and the generator windings should be thoroughly dried out before bringing the generator up to full nameplate voltage. If this precaution is not taken, serious damage to the generator can result. The following steps should be taken to effectively dry the generator windings:

- A. 1. Short circuit the generator lead wires. Start the generator and separately excite the exciter with DC battery power of approximately 50 volts to produce rated AC nameplate current. To accomplish this excitation, the leads (F+ and F—) must be disconnected from the voltage regulator. Nameplate current can be measured with a clip-on ammeter at the generator leads. Make sure the AC current does not exceed the nameplate rating. Be sure to reconnect the leads F+ and F— to the proper terminals on voltage regulator after drying exercise.

2. Another procedure would be to put the generator in a hot room or to moderately heat with a heat source.

- B. 1. If the generator has been operated and then put into storage for any period of time a P.D. George #11137 type air-dry fungus resistant varnish should be reapplied.

Experience has shown that it is necessary to take these precautions in locations such as seaboard installations and other highly humid areas. Some installations will be in atmospheres that are much more corrosive than others. A little precaution along the lines outlined here could eliminate an unnecessary repair job.

Each generator was subjected to a standard NEMA insulation test, which means 1000 volts plus twice the highest voltage for which the generator is rated was impressed between the windings and frame. All machines are insulated with a high safety factor for the class of insulation used. The latest and newest in insulation and baking techniques are used.

The finest insulation job can be very quickly broken down by carelessly applying high voltage to windings in a moisture saturated condition. Mishandling in this respect can easily cause a break-down, making it necessary to return the generator to the factory for repair, and consequent expense and loss of time.

WARNING: HIGH VOLTAGE (DIELECTRIC) TESTING MUST NOT BE PERFORMED TO THE MACHINE WITHOUT FIRST OBSERVING NEMA RULES. THE INSULATION OF THIS GENERATOR WINDING MAY BE SAFELY CHECKED BY USING A MEGGER. A HIGH MEGGER READING INDICATES LOW INSULATION LEAKAGE.

RESTORING RESIDUAL MAGNETISM

The direct current (DC) necessary to magnetize the alternator field is obtained from the exciter. Initially, upon starting the generator, current flow and voltage are induced into the exciter armature by the magnetic lines of force set up by the residual magnetism of the exciter field poles.

Residual magnetism of the exciter field poles may be lost or weakened by a momentary reversal of the field connection, a strong neutralizing magnetic field from any source, or if the generator is not operated for a long period of time.

To restore the small amount of residual magnetism necessary to begin the voltage build-up, connect a battery from 6 to 32 volts to the exciter field coil circuit. Normally, a battery of 6 or 12 volts is large enough.

PROCEDURE FOR FIELD FLASHING TO RESTORE RESIDUAL MAGNETISM

1. Disconnect exciter field coil wire F+ at terminal F+.
2. Connect battery positive lead to field coil lead F+. Use 12 volt battery.
3. Connect battery negative lead to field coil circuit terminal F—.
4. Disconnect battery leads after approximately 3 to 5 seconds. If battery is connected for too long, overheating and subsequent damage to the exciter can occur.
5. Reconnect field coil lead F+ to terminal F+.
6. Start unit and observe generator build-up. Reflash field (Steps 1 through 5 above) if generator output voltage does not build up.

NOTE: If the polarity of the exciter is reversed by flashing the field, it may be corrected by interchanging the battery leads.

TESTING DIODES WITH AN OHMMETER

Isolate the rectifier assembly by disconnecting the two leads from the main rotor and three leads from the exciter rotor. Do not unsolder diodes. Test each diode by applying the probes of an ohmmeter to the anode and cathode.

A good diode will produce a meter reading of only a few ohms when the probes are applied in one direction, and a reading of near infinity when the probes are reversed. If both readings are high, or both are low, the diode is defective and must be replaced.

Diode failure after a 25 hour "run-in" period is generally traceable to external causes such as lightning strike, overheating or a reverse current fed into the alternator. To save excessive service time and call-backs, it is a generally accepted practice to replace the entire rectifier assembly where failure can be traced to external causes **AFTER THE CAUSE OF THE DIODE FAILURE IS IDENTIFIED AND CORRECTED.**

RECTIFIER REMOVAL PROCEDURE

Rectifiers may be removed through the bearing cap on the rear of the generator (See Figure 4, Item B). First, remove the bearing cap by removing four bolts shown in Figure 4 as item A. You can now see both the bearing (Item C) and rectifier assembly (Item D). Use a bearing puller to remove the bearing from main shaft being careful to locate the puller on the inner race of the bearing to avoid bearing damage. Once the bearing is free it is then necessary to disconnect leads A, B, C and D as shown on Figure 2 assembly drawing. Then remove the three hold-down cap screws which secure the rectifier assembly

to its adaptor. Once this procedure is complete the rectifier assembly is free for removal.

Follow the testing procedures outlined in Figure 3.

After the rectifier assembly has been repaired or replaced, reverse the procedure as stated above, being careful that all lead connections are tight and that set screws are locked with a lock-tite compound.

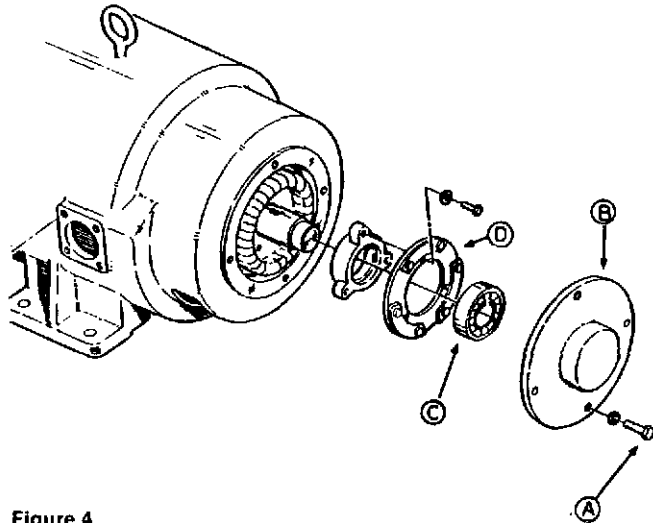


Figure 4

TROUBLESHOOTING PROCEDURES AC BRUSHLESS GENERATOR

As with any machine, trouble may develop in electrical generators. It may be due to long service or neglect of regulator maintenance, servicing, and checking. Should trouble develop, the following instructions will be helpful in tracing the cause and making repairs.

Brushless generators are not complete units without added control equipment; therefore, reference will be made to control components.

VOLTAGE DEVIATIONS

The generator output voltage should be kept as close as possible to the rated voltage shown on the generator nameplate. High voltage, low voltage, and fluctuating voltage (hunting) may cause serious damage to the generator and its control equipment. A high voltage could damage sensitive equipment and low voltage could cause motors to burn out.

SPEED DEVIATIONS

The generator speed should be maintained at rated nameplate speed. The frequency of the generator output depends on speed. If the generator runs slower than rated speed, the voltage may drop off. Automatic control equipment may burn out trying to maintain voltage by forcing the field.

NO VOLTAGE

CAUSE	CHECK AND REMEDY
Open circuit in exciter field.	Check out continuity of shunt field and leads to voltage control. (Use ohmmeter or wheatstone bridge.) If open in field coils, remove field assembly and return assembly to factory for repair.
Loss of residual magnetism in exciter field poles.	Flash field by making a flash connection of DC across terminals F— to F+. Connect F+ to positive lead of DC source. (See previous instructions).
Open in stator windings.	Check for continuity in windings. Return to factory for repair of open.
* Open in rotating rectifiers.	Check rectifiers per previous instructions, replace if faulty.
Malfunction of automatic voltage regulator.	See troubleshooting of voltage regulator, replace if faulty.
Short circuited.	Clear lead to restore build-up.
* Open in generator field.	Check for continuity and return rotor to factory for repair if field coils are open.
* Shorted rotating rectifiers.	Check for shorts and replace if faulty.
* Shorted exciter armature.	Check for short and replace if faulty. Use a "Kelvin" type bridge to measure this resistance.
* Shorted leads between exciter armature and generator field.	Test and repair.

NOTE: *Designate rotating parts. Generator must be open to test.

LOW VOLTAGE

CAUSE	CHECK AND REMEDY
Excessive load.	Reduce load. With 3 phase generators, the load on each leg should be as evenly balanced as possible and should not exceed the rated current on any leg.
Low speed.	Check engine for malfunction or system for overload.
Automatic voltage regulator defective.	See troubleshooting for automatic regulator. Replace if faulty.
Insufficient excitation.	Check regulator. Replace if faulty.
Line loss.	Increase size of line lead wire.
High resistance connections — connection will be warm or hot.	Make better connection electrically and mechanically.
Shorted field.	Test field coils for possible short by checking resistance with an ohmmeter or resistance bridge. Return rotor assembly to factory for repair if alternator field coils are shorted.
Low power factor.	Reduce inductive (motor) load. Some AC motors draw approximately the same current regardless of load. Do not use motors of larger horsepower rating than is necessary to carry the mechanical load.

FLUCTUATING VOLTAGE

(May be indicated by flickering lights)

CAUSE**CHECK AND REMEDY**

Irregular speed of engine.

Check engine for malfunction or load for fluctuation.

Fluctuating speed.

Stabilize load. The addition of a lamp load (resistance load) may compensate partially for load changes caused by intermittent motor operation. Do not overload.

Loose terminal or load connections.

Make better connection mechanically and electrically.

Voltage regulator unstable.

Check regulator. Replace if faulty.

Intermittent short in generator exciter field.

Test field coils for possible short by checking resistance with an ohmmeter or resistance bridge. Return assembly to factory for repair if field coil is shorted.

Defective bearing causing uneven air gap.

Replace worn bearing.

CAUSE**HIGH VOLTAGE****CHECK AND REMEDY**

Excessive speed.

Check engine for malfunction.

Voltage regulator defective.

See troubleshooting for voltage regulator. Replace if necessary.

CAUSE**OVERHEATING****CHECK AND REMEDY**

Generator overloaded.

Reduce load. (Check with ammeter and compare with nameplate rating.)

Clogging ventilating screens.

Clean air passages.

High room temperature.

Improve ventilation.

Insufficient circulation.

Provide cross-ventilation.

Operating with excessive voltage.

Check voltage drop in distribution lines and connections and adjust as described in voltage deviation instruction.

Low power factor.

Reduce inductive loads or install power factor improvement capacitors.

Unbalanced load.

The load on each leg should be as evenly balanced as possible and should not exceed the rated current on any leg.

Dry bearing.

Replace bearing.

CAUSE**MECHANICAL NOISE****CHECK AND REMEDY**

Defective bearing.

Replace bearing.

Rotor scrubbing on stator.

Bad bearing, replace. Bent shaft, return to factory. Loose endbell, tighten; loose drive discs, tighten.

Loose laminations.

Return to factory for repair.

Loose or misaligned coupling.

Tighten or align.

GENERATOR FRAME PRODUCES SHOCK WHEN TOUCHED**CAUSE****CHECK AND REMEDY**

Static charge.

Ground generator frame.

Grounded armature or field coil.

Return to factory for repair.

ELECTRICAL WIRING PROCEDURES — WIRING DIAGRAMS

CAUTION

Wiring of the alternator should be done in accordance with good electrical practices. Follow government, association and industry standards. In some wiring arrangements, groups of terminals are connected together with no further termination. These terminals must be properly insulated to avoid a hazard to personnel and potential equipment damage.

Lima SER alternators are supplied in 4-lead or 12-lead configurations. From the nameplate information and system voltage requirements, select the appropriate wiring diagram from the information that follows.

Note C-1: Some models intended for 4-wire WYE connection may be equipped with bus bar termination. Diagram "A" applies to these units.

***Note C-2:** Certain 480V, 4-lead units are supplied with two winding legs certertapped (t-14, T-16) to provided 240V, 1-phase input power to the automatic voltage regulator. All other 4-lead, WYE connected units will require the addition of a power isolation transformer to obtain 240V, 1-phase power for AVR operation.

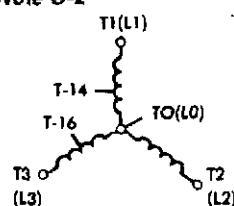
WIRING REFERENCE CHART

	Configuration	SER Type Adjustable Voltage Range (60 HZ)	Ref. Diag.
3 Phase	4-Lead Unit, Wye Connected	416-480V	A
	4-Lead Unit, Wye Connected	575-600V	A
	4-Lead Unit, 480 Volt Delta Connected	440-480V	B
	12-Lead Unit, 4-Wire 240 Volt Delta Connected	220-240V	C
	12-Lead Unit, High Voltage Wye Connected	416-480V	D
	12-Lead Unit, Low Voltage Wye Connected	208-240V	E
1 Phase	12-Lead Unit, Low Voltage Delta	110-120V	F
	12-Lead Unit, 240 Volt Zigzag	220-240V	G
	12-Lead Unit, 480 Volt Zigzag	416-480V	H

DIAGRAM A

4-Lead Unit, 480 or 600 Volt, Wye Connected, 3 Phase

Note C-1
*Note C-2

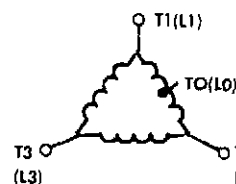


OUTPUTS:	480V	600V
L1 to L2	480V, 3Ø	600V, 3Ø
L2 to L3	480V, 3Ø	600V, 3Ø
L1 to L3	480V, 3Ø	600V, 3Ø
L1 to L0	277V, 1Ø	346V, 1Ø
L2 to L0	277V, 1Ø	346V, 1Ø
L3 to L0	277V, 1Ø	346V, 1Ø

CAUTION: Properly insulate all unused terminations.

DIAGRAM B

4-Lead Unit, 480 Volt, Delta Connected 3 Phase



OUTPUTS:	240V, 1Ø	480V, 3Ø
L1 to L0	240V, 1Ø	480V, 3Ø
L2 to L0	240V, 1Ø	480V, 3Ø
L3 to L0	240V, 1Ø	480V, 3Ø

CAUTION: Properly insulate all unused terminations.

DIAGRAM D

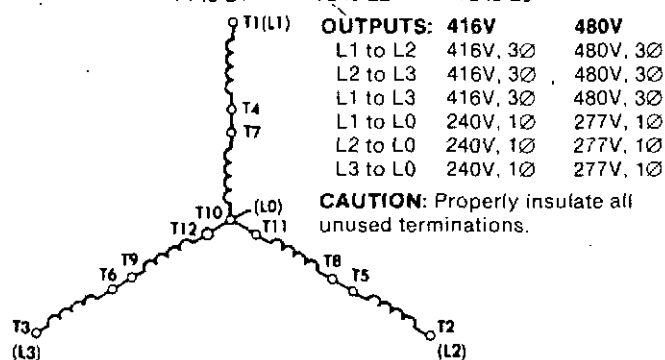
12-Lead Unit, High Voltage, Wye Connected, 3 Phase

Connect together the following four sets of terminations:

T4 and T7 T5 and T8 T6 and T9

T10, T11 and T12 to form L0

T1 is L1 T2 is L2 T3 is L3



OUTPUTS:	416V	480V
L1 to L2	416V, 3Ø	480V, 3Ø
L2 to L3	416V, 3Ø	480V, 3Ø
L1 to L3	416V, 3Ø	480V, 3Ø
L1 to L0	240V, 1Ø	277V, 1Ø
L2 to L0	240V, 1Ø	277V, 1Ø
L3 to L0	240V, 1Ø	277V, 1Ø

CAUTION: Properly insulate all unused terminations.

DIAGRAM C

12-Lead Unit, 240 Volt, Delta Connected, 3 Phase

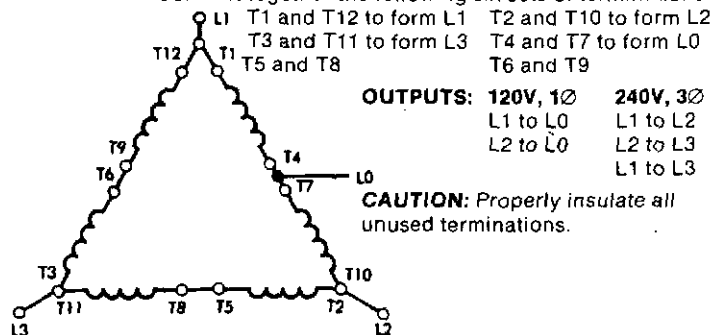
Connect together the following six sets of terminations:

T1 and T12 to form L1 T2 and T10 to form L2

T3 and T11 to form L3 T4 and T7 to form L0

T5 and T8

T6 and T9



OUTPUTS:	120V, 1Ø	240V, 3Ø
L1 to L0	120V, 1Ø	240V, 3Ø
L2 to L0	120V, 1Ø	240V, 3Ø
L3 to L0	120V, 1Ø	240V, 3Ø

CAUTION: Properly insulate all unused terminations.

DIAGRAM E**12-Lead Unit, Low Voltage, Wye Connected, 3 Phase**

Connect together the following four sets of terminations:

T1 and T7 for form L1 T2 and T8 to form L2

T3 and T9 to form L3

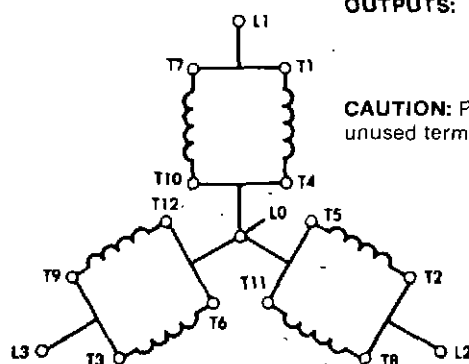
T4, T5, T6, T10, T11 and T12 to form L0

OUTPUTS: 120V, 1Ø 208V, 3Ø

L1 to L0 L1 to L2

L2 to L0 L2 to L3

L3 to L0 L1 to L3

CAUTION: Properly insulate all unused terminations.**DIAGRAM F****12-Lead Unit, Low Voltage, Delta Connected, 1 Phase**

Connect together the following three sets of terminations:

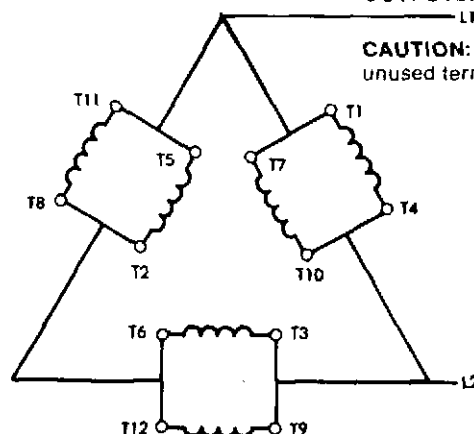
T2, T8, T6, T12 and Insulate

T1, T5, T7, T11 to form L1

T3, T4, T9, T10 to form L2

OUTPUTS: 120V, 1Ø

L1 to L2

CAUTION: Properly insulate all unused terminations.**DIAGRAM G****12-Lead Unit, 240 Volt, Zigzag, 1 Phase**

Connect together the following four sets of terminations:

T2, T8, T6, T12 and Insulate

T1, T7, to form L1

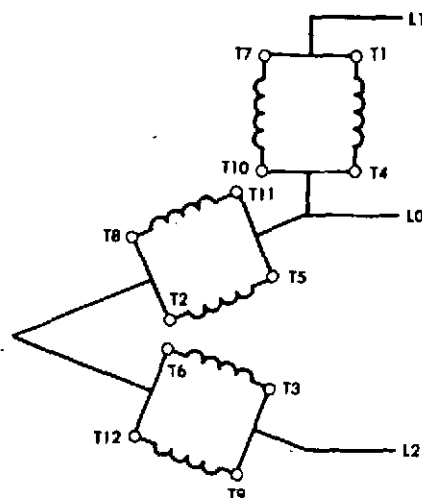
T3, T9, to form L2

T4, T10; T5, T11 to form L0

OUTPUTS: 120V, 1Ø 240V, 1Ø

L1 to L0 L1 to L2

L2 to L0

CAUTION: Properly insulate all unused terminations.**DIAGRAM H****12-Lead Unit, 480 Volt, Zigzag, 1 Phase**

Connect together the following five sets of terminations:

T4 and T7 T2 and T12 T6 and T9 T5 and T8

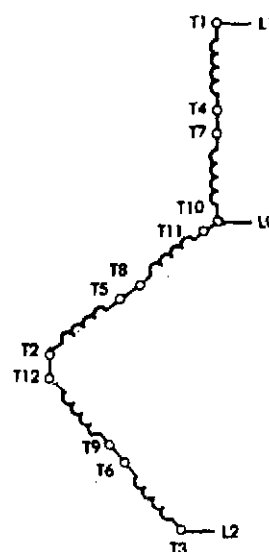
T10, T11 to form L0

T1 is L1 T3 is L2

OUTPUTS: 240V, 1Ø 480V, 1Ø

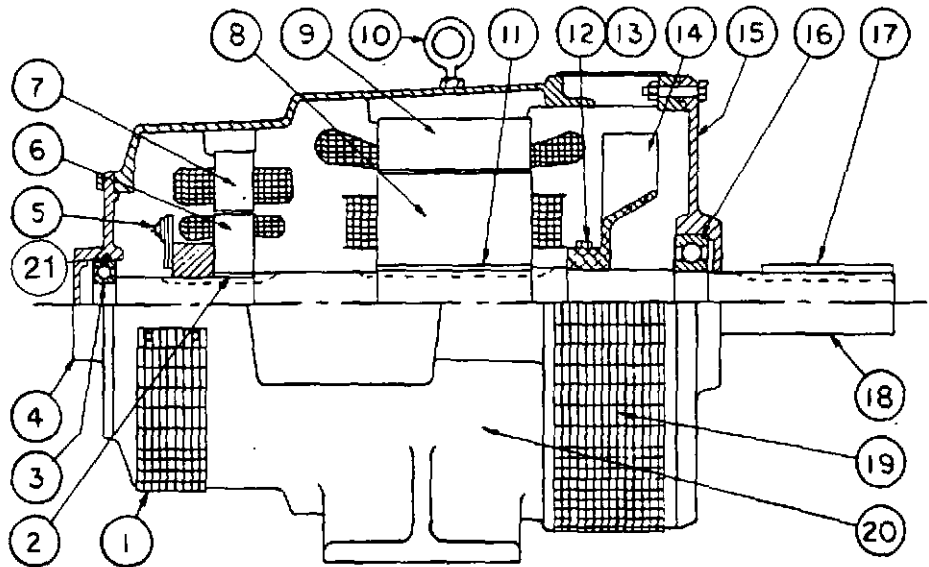
L1 to L0 L1 to L2

L2 to L0

CAUTION: Properly insulate all unused terminations.

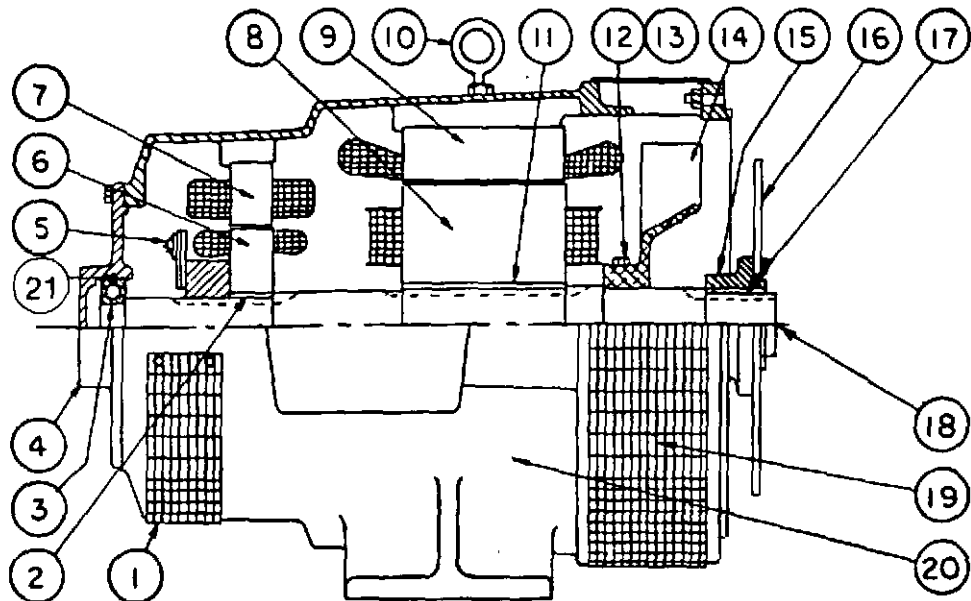
DRIPPROOF GENERATOR PARTS LIST 280 FRAME TWO BEARING

Part No.	Part Name
1	Screen, Intake
2	Key, Rectifier
3	Bearing
4	Bearing, Cap
5	Rectifier Assembly
6	Exciter Rotor
7	Exciter Stator
8	Generator Rotor
9	Generator Stator
10	Eyebolt
11	Key, Rotor
12	Screw, Hex Hd.
13	Nut, Hex
14	Fan
15	Endplate, Sheave End
16	Bearing
17	Key, Output
18	Shaft
19	Screen
20	Generator Frame
21	O-Ring



DRIPPROOF GENERATOR PARTS LIST 280 FRAME SINGLE BEARING

Part No.	Part Name
1	Screen, Intake
2	Key, Rectifier
3	Bearing
4	Bearing Cap
5	Rectifier Assembly
6	Exciter Rotor
7	Exciter Stator
8	Generator Rotor
9	Generator Stator
10	Eyebolt
11	Key, Rotor
12	Screw, Hex Hd.
13	Nut, Hex
14	Fan
15	Hub
16	Drive Discs
17	Key, Output
18	Shaft
19	Screen
20	Generator Frame
21	O-Ring



Marathon Electric Mfg. Corp.
100 East Randolph Street
Wausau, Wisconsin 54401
Phone: (715) 675-3311
Fax: (715) 675-6361
Telex: 260175 ME WAS

