BB1476 G-2500w BE

INSTALLATION AND OPERATION

DIRECT DRIVEN GENERATORS - 1800 & 3600 R.P.M.

60 CYCLE - 50 CYCLE

Newton, Iowa WIN POWER Manufacturing Co.

INSTRUCTIONS

GENERATOR AND ELECTRICAL INFORMATION

An electrical generator is a machine so constructed that when its rotor is revolved a voltage is built up, which causes current to flow. Generators are divided into two classes: Direct current, in which the current always flows in the same direction, and Alternating Current, in which the current reverses its direction 60 times a second in a 60 cycle generator or 50 times a second in a 50 cycle generator, etc.

Voltage is the force or pressure which causes a flow of current through the conductor. Voltage can be compared to pressure in a pipe of water system.

Amperage is a measure of the rate of current flow through the conductor. It can be compared to the number of gallons per minute in a water system.

An ohm is a measure of the resistance in a conductor to the flow of current. If one volt can cause one ampere to flow through a conductor the resistance of the conductor is one ohm. This can be compared to the manner in which the resistance of a water pipe limits the flow of water at a given pressure.

CHANGING ROTATION OF GENERATORS

To change the rotation of Belt-Drive Generators, interchange the leads to the DC brushes. In other words, there are two DC Brushes or two pairs of DC Brushes. Take the lead or leads from the first brush and fasten them to the second brush and take the lead or leads from the second brush and fasten them to the first brush.

DIRECT CURRENT GENERATORS

In a direct current generator the current always flows in the same direction. This is accomplished by means of the commutator and brushes which act to keep the current flowing in a constant direction. The commutator and brushes act as a group of double throw switches, reversing a coil's connection to the line just as it is starting to pass under a field pole of opposite polarity.

The commutator and brushes of a D.C. machine carry all of the current generated within the machine. These are subject, therefore, to all overloads. If overload continues to exist, the generator may become damaged. The commutator becomes hot and then arcing develops, which, in turn, continues to ruin the commutator. Therefore, never subject a D.C. generator to overload as it shortens the life of the unit.

D.C. Generators are also divided into two types, namely, shunt and compound wound. The shunt wound type has only the shunt field coils. Therefore, the voltage of this type of machine will drop as load is increased. The shunt wound generator is used most often for battery charging plants. The compound wound machine, in addition to shunt field coils, also has the series field coils. These coils are in series with the load. As the load increases, so does the current through the series coils, automatically supplying excitation and either boosting the voltage slightly or maintaining it more or less constant.

Therefore, with a compound D.C. machine you can overload excessively without causing voltage to drop. This characteristic of the compound wound D.C. generator makes it easier to unknowingly overload the engine. It is, therefore, advisable to carefully check the load at regular intervals to gather assurance that overload does not exist.

GENERATOR TROUBLES - D.C.

The most common source of D.C. generator trouble is overloading. Overloading, in turn, causes commutator and brush troubles which can be very bothersome and costly. Overloading a machine beyond its rated capacity results in sparking or arcing brushes, accompanied possibly by heating and discoloration of the commutator due to the excessive current which they are carrying. This sparking is of such a nature as to damage both the brushes and commutator whose surface will be burned and discolored due to overheating, especially if the overload is allowed to continue. A healthy commutator will acquire a good polish and chocolate brown color. Black deposits on the commutator often indicate bad commutation.

Another source of commutator trouble is oil and grease. If oil or grease gets on the commutator, the mica insulation of the commutator will become oil soaked resulting eventually in ruined commutator. Ring fire is a visible sympton of this condition; therefore, never lubricate the commutator.

Arcing brushes may also be caused by improper adjustment of the brush ring, thus placing all the brushes in wrong position with respect to the field poles. Brush rings are adjustable. It is, of course, first necessary to loosen the set screw. Then adjust the brush ring to a position where least sparking exists. In the case of some D.C. generators, individual adjustment of each brush may reduce arcing. Brushes should be equally spaced around the commutator. This spacing should not vary more than 1/32 inch.

Brush troubles which continually persist due to atmospheric conditions can usually be solved by some local electrical expert. However, should the services of such an expert not be available, it is possible that the dealer, through suggestions received from the factory, can correct the trouble.

Consistent overload, which overheats the insulation, exposure to oily or moist atmosphere, and a number of other causes will eventually ruin the insulation of the machine's windings. This will cause short circuits and grounds to appear. These conditions must be eliminated as faults of this type in an electrical machine are accumulative.

When the commutator of a generator shows bad condition from wear and improper operation, it should immediately be repaired. It never pays to wait. By having the commutator machined and brushes replaced at the first signs of improper condition, considerable service costs can be avoided.

Sanding the commutator with a fine grade of sandpaper (never use emery cloth) will often stop sparking and ring fire, if the damage is not already too great. Sometimes a dirty commutator is the primary source of sparking, and

the removal of the blackening by sandpaper will cure the trouble. Therefore, inspect the generator about once or twice a week and considerable trouble and expense will be avoided.

An exceptional hot commutator will throw solder, and therefore connection between commutator bar and coil is broken. Should such a condition ever develop within the machine, it could be a direct result of overload. Therefore, never overload a D.C. generator. It may ruin the generator and also shorten the life of the engine.

ALTERNATING CURRENT GENERATORS

A.C. generators, commonly called alternators, are built to generate a voltage which periodically varies from a given positive to the same negative value. This in turn will cause the current to reverse its direction at the same frequency as the voltage change. The number of these alternations or cycles depends upon the speed of the machine and the number of poles. A sixty cycle alternator, having a speed of the 1800 R.P.M. is a 4-pole machine, while an alternator of the same frequency operating at 1200 R.P.M. is a 6-pole machine.

A self-excited generator has the D.C. exciter winding on the same armature with the A.C. winding. The D.C. and A.C. windings are, of course, fully insulated from each other. The D.C. current generated in the exciter windings supplies the current for the field poles. This current in the field poles builds up a magnetic flux, which causes voltage to be generated by the A.C. winding. The amount of current flowing through the field may be controlled by a rheostat. More or less current in the field circuit causes the A.C. voltage to rise or drop. Variation in either the field resistance (rheostat) or speed of the machine will cause a voltage drop. Reactance in the load circuit causes a lagging current. This current must come from the generator but this lagging current tends to oppose the magnetic field thus reducing the output voltage of the generator.

Lagging current is a subject that is rather difficult to conceive by the average user of small power plants. It is, however, something that must be considered. It should be remembered that lagging current is due entirely to electrical equipment of the induction type, such as induction motors, transformers, neon sign transformers, radio equipment, etc.

The most common sign of a lagging current in generator sets is a condition where the engine does not seem to be overloaded (engine does not smoke or slow down, but the ammeter shows a high current reading and the voltmeter shows less than rated voltage.

Another point to be considered is that of starting an electric motor. The reactance of an electric motor is bad while starting and if the motor is of old construction, it may stall, due to the voltage drop caused by excessive starting current of the motor.

The user should carefully read the above paragraphs and should he have any reason to believe that the capacity of his plant is being reduced by the

reactance of his motors, should immediately communicate with the dealer. Correcting capacitors are available at reasonable cost and this installation will in many cases prove to be an ideal solution. Prices on capacitors may be obtained through your dealer.

A capacitor affects an alternating current circuit in just the opposite manner that reactance does. A capacitor tends to make the current "lead" the voltage rather than make it "lag". Therefore, if enough capacitors are installed they will neutrailize the bad effects of lagging current. Remember, it is the reactance of the load (not the alternator, which has its own exciter) that is being corrected. Old and underloaded motors and transformers are the main cause of reactance.

GENERATOR TROUBLES - A.C.

Most A.C. generator troubles are confined to the exciter, which, as stated previously, is a direct current generator with commutator and brushes. Brush and commutator troubles are caused by any number of conditions, such as dusty and sandy air, oily or moist atmosphere, grease getting on commutator, improper brush spring tension, brushes of improper composition, excessive vibration of the machine, running the machine too fast, etc.

Brush troubles which continually persist due to atmospheric conditions can usually be solved by some local electrical expert. However, should the services of such an expert not be available, it is possible that the dealer, through suggestions received from the factory, can correct the trouble.

Consistent overload, which overheats the insulation, exposure to oily or moist atmosphere, and a number of other causes, will eventually ruin the insulation of the machine's windings. This will cause short circuits and grounds to appear. These conditions must be eliminated as faults of this type an electrical machine are accumulative.

GENERATOR SERVICE

The most common cause of a generator failing to produce current is an external short somewhere on the main line. If it is suspected that this is the cause of failure, the main line circuit should be disconnected by throwing the main line switch, and a test lamp placed across the output of the generator. If the plant fails to generate with the A.C. main line disconnected from the plant, then the trouble lies in the generator. With the trouble traced to the generator, the following tests will indicate whether or not the difficulty is due to a short or a grounded field or armature.

COMMUTATOR: Mica is used for insulation between the commutator bars. After the armature is machined, the mica is cut away from 1/32" below the surface of the bars. The surface of the bars will wear down to the level of the mica eventually. Mica is harder than copper and it forms ridges which cause the brushes to jump and make poor contact. High mica should be under-cut carefully, and the commutator turned and cleaned. Loose brush wires can cause failure of the generator to produce current. Brushes in which the leads have become loosened should be replaced.

TESTING D.C. WINDING OR ARMATURE FOR GROUNDS: First, disconnect battery and A.C. line wires from plant. RAISE ALL BRUSHES FROM COMMUTATOR AND COLLECTOR RINGS. Place one end of test lamp wire on commutator. Touch other end of test lamp wire on clean surface of armature shaft. If test lamp burns, the commutator or D.C. winding is grounded. NOTE: A shorted or grounded D.C. armature circuit will generally be indicated by overheating of the armature or burned windings. The plant will run, but no current will be generated.

TESTING A.C. WINDING OR ARMATURE FOR OPEN CIRCUITS: First, disconnect battery and A.C. line wires from plant. RAISE ALL BRUSHES FROM COMMUTATOR AND COLLECTOR RINGS. If the generator is single phase, 2 or 3 ring, place one test lamp wire on the center ring then touch the other wire to each other ring. The lamp should burn when any two rings are touched. If test lamp does not burn an open circuit is indicated.

On a 4-ring single phase generator the lamp should burn when ring No. 1 and Ring No. 2, or when ring No. 3 and No. 4 are touched. With any other combination, the lamp should not burn.

On a 3-phase, 4-ring generator with one test lamp wire on ring N, lamp should burn when touching any other ring. Check all rings.

On a 3-phase, 3-ring generator touching any combination of two rings should cause the lamp to burn. If lamp fails to burn in any of these cases an open circuit has developed. Check all combinations. Note: An open circuit in the A.C. armature winding will result in the plant failing to generate voltage.

Placing one end of test lamp wire on shaft, the lamp should not burn when other end of test lamp wire is placed on any collector ring. If light burns, it indicates a ground in A.C. winding. Any short or ground in the armature means that it must be rewound.

TESTING FIELDS FOR OPEN CIRCUITS: Disconnect battery and A.C. line wires from plant. Raise all brushes from commutator and collector rings. Disconnect D.C. field wires. Connect one test lamp wire to field wire leading to brush holder. Connect other test lamp wire to wire in outlet box leading direct to field coil. If test lamp does not burn, D.C. field circuit is open. NOTE: Broken wires or loose connections between generator field and control panel should be checked first. An open circuit in the field winding would prevent the plant from generating.

SERVICE DIAGNOSIS

POOR COMMUTATION: Indication of poor commutation is excessive sparking and/or overheating of commutator, blackened or pitted commutator bars.

CAUSES OF POOR COMMUTATION:

1. The brushes not set correctly in respect to the field poles.
2. Brushes may not be fitted to the surface of the commutator.
3. Brushes binding in the holders.

4. Brushes may not be equally spaced around the commutator.
5. Brushes may have reached their limit of wear, with the result that there will be an insufficient amount of brush spring tension.
6. Some brushes may have excessive pressure, thereby taking more than their share of the current.
7. The carbon brushes, if replaced, may be of an unsuitable grade. Metal graphite brushes generally are not used on D.C. voltages higher than 30 to 40 volts. Great care must be taken to be sure that the proper grade is being used on the generator when replacements are made.
8. Some commutator bars may be loose or projecting above the other.
9. High mica, this prevents a proper contacting surface between the brush and the commutator.
10. A variation in the air gap of the machine or strength of the field poles. This will also cause severe sparking at the commutator.

FAILURE OF GENERATOR TO BUILD UP VOLTAGE:

1. The speed of the set may be below normal.
2. Field coils not connected in proper sequence. This could only occur if the wiring has been changed since leaving the factory.
3. A reversed shunt field. Switch wires leading to D.C. brush holders.
4. Brushes incorrectly spaced, and not located on a neutral position.
5. An external short circuit.
6. An open circuit in the shunt field.
7. Loss of residual magnetism. The process of building up voltage in all types of generators requires that there be a small amount of residual magnetism in the iron parts of the field exciter structure when the machine is standing still. This residual magnetism produces the initial voltages in the armature coils as soon as the armature is rotated, which are built up until the full magnetic field is developed, and the machine delivers full voltage. All generators leave the factory with sufficient residual magnetism to build up when started. However, through long periods of storage, and sometimes due to rough handling in transit, an occasional generator will lose all or part of its residual magnetism, and so fail to build up voltage. The following procedures will usually correct the trouble:

   (a) Carefully check that all brushes are free in the brush holders, and are seated on the commutator, and that no objectionable film has collected on the commutator. See that brush shunts are not binding on adjacent parts or shorted to ground.

   (b) With the generator running, apply light pressure to the top of one or two D.C. brushes with a wooden stick, to polish the commutator and break through commutator film. Often this will permit the generator to build up when the residual field is weak.

   (c) If the machine still refuses to build up, the residual magnetism can be restored by applying direct current to the fields. Lift all the brushes clear of the commutator. With the generator at standstill, connect the positive terminal of a 6-volt storage battery or "Hot Shot" dry battery to a positive brush holder. In generators

where one brush holder is grounded this will be the grounded commutator brush. Touch the negative connection from the battery to the adjacent commutator brush holder. This will be a negative brush. Hold the connection a few seconds. Remove battery connections, lower brushes and start generator.

(d) Should the generator build up with reversed polarity, that is, should the positive connection become negative, or in an A.C. machine still fail to produce current, this can be overcome by reversing the connections between the battery used to build up the residual magnetism and repeating the process described above.

In electrically cranked plants, where the generator serves as the starting motor, residual magnetism is automatically restored when the starting winding is energized.

NOISES IN THE BRUSHES: Noise in brushes is generally due to a rough or out-of-round commutator, caused by high and low bars. This difficulty may only be corrected by machining the commutator in a lathe.

COMMUTATOR: Mica is used for insulation between the commutator bars. After the armature is machined, the mica is cut away about 1/32" below the surface of the bars. The surface of the bars will wear down to the level of the mica eventually. The mica is harder than the copper, and it forms ridges which cause the brushes to jump and make poor contact. High mica should be under cut carefully, and the commutator re-machined and polished.

The commutator should maintain a polished surface. Blackening of all the bars indicates incorrect brush positions. Blackening of groups of bars at regular intervals indicates rough, eccentric commutator. A slight, even discoloration of the commutator is a normal condition.

A severely burned bar or number of bars, indicates an open circuit in the armature, which will also be noted by excessive flashing when the machine is operating with load. This type of difficulty can only be corrected by competent armature repair service men.

Ordinarily the commutator will require only an occasional wiping with a non-linting cloth, but if blackening appears and grows worse, the cause must be determined and corrected.

Use no lubricant on the commutator. The use of any lubricant will only cause sparking and increase the commutation difficulties.

BRUSHES: See that the brushes move freely in the holders and at the same time make firm even contact with the commutator. The brushes should all have the same spring tension to prevent one from carrying more than its share of the load. An extra set of brushes should always be kept on hand.

See that both the interior and the exterior of the machine are kept free from metal dust, dirt of any description, or water.

GENERATOR HEATING: May be due to one of the following causes:

1. Overload on the line.
2. Short circuit of a coil or number of coils in the winding.
3. Grounds in the armature winding or commutator.
4. Poor commutation.
5. Overheating of the entire unit, may be caused by:
   (a) Unequal air gap.
   (b) A shorted out or grounded field winding.
   (c) A reversed field coil winding.

NOTE: Any of these troubles cause a large circulating current in the exciter armature windings of the commutator, the brushes and brush connections, which will cause artificial overloading of the armature. The air gap should not vary over a few percent either way from the average value. All field coils of the shunt type should have within 10% of the same resistance, a higher value than this indicates shorted turns in the winding.

FIELD COIL HEATING:

1. Too high an operating speed of the plant, with a resultant high output voltage.
2. A partial short circuit of one coil.

MAINTENANCE

All Generators are equipped with ball bearings. These bearings will last for many years. It is very important to keep the generator clean and free from accumulations of dirt and grease. It is not necessary to take the generator apart to clean it, as in most cases the dust accumulations can be readily blown out with an air hose and the rings and commutator be wiped with a clean cloth. The grooves between the commutator bars should be occasionally cleaned out and kept free from accumulations of carbon, dust or other foreign matter. This can best be done with a very thin hack saw blade ground to a hook shape or a large needle or hat pin.

MAINTENANCE SERVICE INSTRUCTIONS
For DC Generators and Exciters
AC Alternators

Trouble	Cause	Remedy
Generator fails to build up rated voltage	Voltmeter inoperative	Replace Voltmeter
	Open field circuit. (Field coils, field rheostat, field resistor.)	Check continuity with DC. (AC test lamps will not usually light up on field coils with many turns; consequently, DC should be used for testing.) A bank of batteries connected in series to give 12 to 24 volts will usually suffice. If open circuit is indicated, repair or replace defective part. (See Note 1.)
	Loss of residual magnetism, either by short circuit, lightening striking system, or long inactivity.	Raise DC brushes and contact positive and negative brush-holders to a 6- or 12-volt storage battery for just an instant to produce the desired polarity.
	Poor Brush Contact	1. Brushes and holders should be kept free from excessive dirt and grease. 2. See that brushes move freely in holders. Sticking may cause undue sparking. 3. Check Brush tension. Brush holder tension springs which actuate the brush holder tension arms have been adjusted at the factory for proper tension. However, after the brushes have been worn down to half of their original length, the spring tension may be increased one notch. Brushes should be checked periodically so when brushes have worn to the point where brush holder tension arm is almost at the end of travel, the brush may be replaced. On small machines using fixed brush holders and fiber caps, the brush spring tension is not adjustable, and when the brush has worn to about 1/2 its original length it should be replaced. Care should be taken, however, to see that the shunt does not get twisted too tightly and become pinched between turns of the brush spring. Tighten caps well to assure good contact.

MAINTENANCE SERVICE INSTRUCTIONS
For DC Generators and Exciters
AC Alternators

Trouble	Cause	Remedy
Generator fails to build up rated voltage (cont'd)	Poor Brush contact (cont'd)	4. Replacing brushes. It is important that all brushes be of the same grade, preferably, the same kind and type as supplied with the original unit. After brushes have been installed in the holders, it is necessary that the brushes be fitted to the commutator or collector ring. (See note 2.)
	Armature shorted or grounded.	Remove armature and test on growler. If test shows short, or open, armature will have to be repaired or rewound.
	Field coils shorted or grounded	Disconnect field leads (F_1 and F_2) from brushes and armature leads and check for continuity and resistance to ground with ohm meter or lamp and batteries. (See note 1.)
	Short circuit on line	Locate short in system before connecting generator to line. Check for shorted filter condensers on output of generator.
	Too Much Field Resistance	Reduce resistance of field resistor or rheostat.
	Open ammeter shunt or filter inductor.	Check continuity and replace.
	Open armature winding due to commutator throwing solder from riser. Due to excessive heat and load.	Commutator must be resoldered, turned, and undercut.
	Brushes not in commutating plane.	This trouble will only be encountered in larger plants having adjustable brush rings or spiders. In the smaller plants the position of the brushes is fixed by design. On the 12 and 14" field frames the adjustable ring may be repositioned so that the brushes are under the poles. The optimum point is the one in which the D.C. armature voltage is maximum
	Wrong rotation.	The machine must be run in the correct direction. (Looking at the unit from the commutator end, belt drive plants usually

MAINTENANCE SERVICE INSTRUCTIONS
For DC Generators and Exciters
AC Alternators

Trouble	Cause	Remedy
Generator fails to build up rated voltage (cont'd)	Wrong rotation (cont'd)	rotate clockwise; engine driven plants rotate counter-clockwise. If it is desired to run the machine in the opposite direction to the way it was adjusted at the factory, the internal connections of the generator will have to be changed, and the commutating plane of the brushes readjusted. The sure way is to take all the wires off the positive brushholder and place them on the negative brushholder and place all the wires which originally connected to the negative brushholder on the positive brushholder. On a straight shunt-wound machine, rotation can be changed simply by interchanging the field leads. To adjust the commutating plane of the brushes, shift the brush spider or ring in the direction which results in the highest D.C. armature voltage with minimum sparking at the brushes when the field rheostat or resistor is at minimum resistance setting.
	Faulty voltage regulator operation.	Try operating the plant without voltage regulator. See the instruction manual for the particular voltage regulator used.
Low output voltage	Excessive load	Reduce load
	Insufficient excitation due to too much resistance in the field.	Reduce the amount of field resistance.
	High resistance connections.	Connections will be warm or hot to the touch. Make better electrical and mechanical joints and connections.
	High Line Losses	Increase size of line wires
	Low speed 1. Belt slipping 2. Defective governor 3. Defective bearing 4. Excessive load	 1. Tighten Belt. 2. Adjust, repair, or replace governor. 3. Replace bearings. 4. Reduce load.

MAINTENANCE SERVICE INSTRUCTIONS
For DC Generators and Exciters
AC Alternators

Trouble	Cause	Remedy
Low output voltage (cont'd)	Brushes not seated properly or dirty.	Clean or replace brushes and reseat. (See Note 2.)
	Dirty Commutator	Sand commutator lightly with sandpaper or crocus-cloth. DO NOT USE EMERY PAPER. If commutator is greasy, wipe with non-inflammable liquid.
	Shorted field coil	Test field coils for possible shorts. Replace bad coil.
	Reversed field coil connection.	Check as in Note 1, reconnect coil properly.
High output voltage	Improper field resistance setting.	Increase resistance of field resistor or rheostat.
	Excessive speed.	Reduce engine speed to rated value
	Improper governor adjustment.	Reset governor.
	Faulty voltage regulator operation.	Try operating without voltage regulator.(See voltage regulator instruction manual)
	Operating in sub-zero temperatures.	Add in more field resistance until plant reaches operating temperature.
Excessive heating. Most machines are designed to withstand a temperature rise of 40°C. (See nameplate data for specific plant)	Overload	Reduce load. (Check ammeter readings against nameplate rating.) Allow proper correction value for power-factors less than unity.
	Clogged ventilating screens.	Remove and clean air passages in screens. Make sure passages within machine are open.
	High Room Temperature	Improve ventilation to operating area.
	Insufficient air circulator	Provide cross ventilation, additional openings to room housing plant.
	Operating with excessive voltage.	Check voltage drop in distribution lines and connections. Provide service lines large enough to overcome excessive line drops.
	Armature or field coils shorted or grounded.	Repair or replace.
	Excessive brush pressure.	Adjust pressure or replace tension springs or brushes and springs.
	Flexible coupling not in line or belt too tight.	Align coupling or sheeves and adjust belt tension.

MAINTENANCE SERVICE INSTRUCTIONS
For DC Generators and Exciters
AC Alternators

Trouble	Cause	Remedy
Excessive Heating (Cont'd)	End Bells out of position	Realign
	Bent Shaft	Straighten or replace
Excessive Sparking at the brushes	Brushes dirty or not seated properly	Clean or replace and reseat. (See Note 2)
	Improper brush grade	Use only brushes recommended, or duplicate of original brushes
	High Mica	Commutator should be turned on lathe and undercut. (See Note 3.) All micas should be carefully undercut below commutator surface.
	High commutator bar or rough commutator	1. It may be necessary to machine the commutator on a lathe; however, when doing so a competent machinist must be employed. Make absolutely sure that the armature shaft is centered concentric with the bearing surface. Don't machine commutator until you have checked to see that shaft center is concentric with bearing. The surface of the commutator should be machined as little as possible and polished with fine grit, high grade sandpaper after undercutting. 2. A very effective polisher may be constructed by folding several layers of canvas or duck over the end of a strong piece of wood and tacking it in place. The canvas pad may be held on the commutator or collector rings. This will give a high polish without cutting the surface, however, if the commutator is pitted, it will be necessary to first polish with a fine grade of sandpaper, (00), following it with the canvas polisher. NEVER USE EMERY CLOTH TO POLISH, since it contains metallic particles which will short out the commutator.
	Lack of brush pressure.	Adjust or replace tension springs.

MAINTENANCE SERVICE INSTRUCTIONS
For DC Generators and Exciters
AC Alternators

Trouble	Cause	Remedy
Excessive sparking (cont'd)	Brushes not in commutating plane	(See Page 20)
	Brushes sticking in brushholders	Clean brushes and brushholders and adjust brushes.
	Overload	Check ammeter readings with nameplate rating. Reduce load.
	Grounded, open, or shorted field coil windings.	Replace or repair defective coil.
	Open Armature	Repair or replace armature.
	Loose brushholder	Re-align and tighten holder.
Fluctuating DC voltage	Irregular speed of engine.	Adjust governing device.
	Unstable voltage regulator.	Try operating without voltage regulator. See voltage regulator instruction manual.
	Fluctuating load	Stabilize load.
	Poor brush contact	(See Pages 19 & 20)
	Loose terminal connections	Make better connections mechanically & electrically.
	Generator overloading	Reduce load
	Defective bearing	Replace worn bearings
Polarity of generator reversed	Long inactivity, short circuit, lightening striking system, etc.	Raise DC brushes and contact positive and negative terminals with 6 to 12 volts to produce correct polarity.
Radio Interference	Radio Frequency interference due to sparking of brushes	Connect .5 mfd condensers from all brushes to frame. Voltage rating should be at least double the rated voltage on the circuit to which they are connected. If condensers are already connected to these points, replace with new condensers.
	Radio frequency interference caused by leakage of static charge from generator shaft.	Install shaft grounding brush assembly.
	Radio interference caused by electrical system of engine	Suppress radio interference in usual manner. It is suggested that competent radio man or electrician be consulted.

PARTS LIST
(G-2500WB)

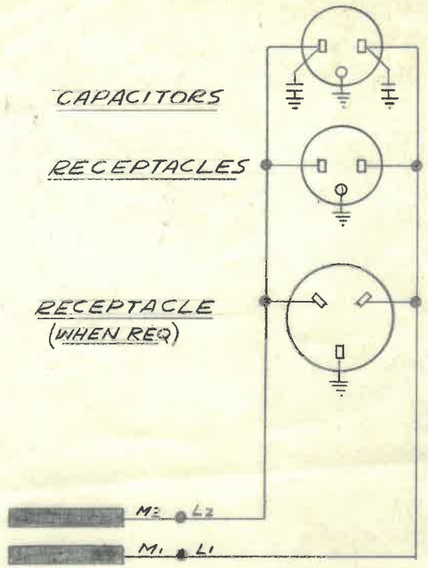
PART NO.	DESCRIPTION	QUANTITY
0023-AGM-3032	Wisc. Engine AENLD	1
I-776	Drive End Bell	1
G-3768	Field Frame Assembly	1
G-3769-1	Armature Assembly	1
D-8	Bearing	1
G-3767	End Bell Assembly (W/Brush Ring)	1
A-606-A1	Fan	1
Y-96	A. C. Brushes	2
Y-95	D. C. Brushes	2
G-3422	Brush Spring	4
G-3311-7	Panel Assembly	1
V-1040	Outlet Box	1
EE-323	Receptacle-Duplex	1
EE-369	Receptacle - Twistlock	1
EE-530	Condensers	2
S-3293	Generator Support	1
W-154	Bushing Shockmount	4
G-4866	End Hood	1
S-3921	Field Frame	1
G-102	Field Pole Assembly	4
H-368	Field Coils	4
I-773	End Casting	1
G-4270-2	Brush Ring Assembly	1

WIRING DIAGRAM Z-1278-1 C-4045

STOP SWITCH

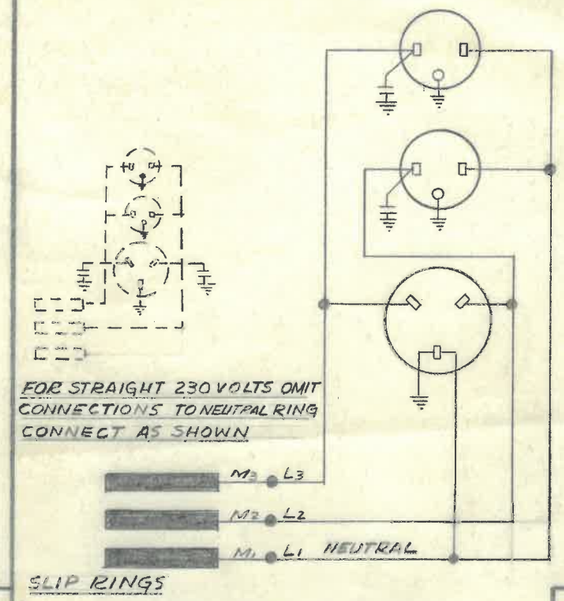
TO ENGINE MAG

STOP SWITCH CONNECTIONS
(WHEN REQ'D)



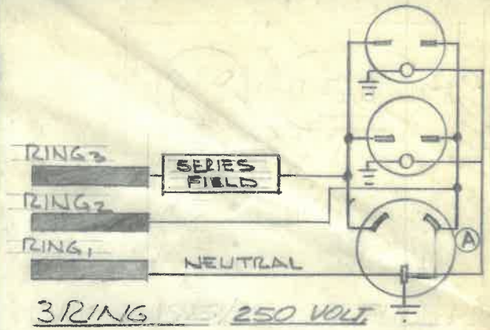
2-RING 115 VOLT OR 230 VOLT

1

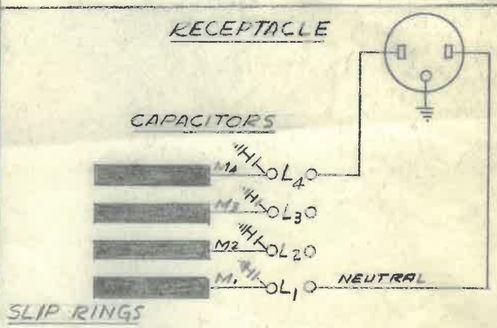


3-RING 115/230 VOLT

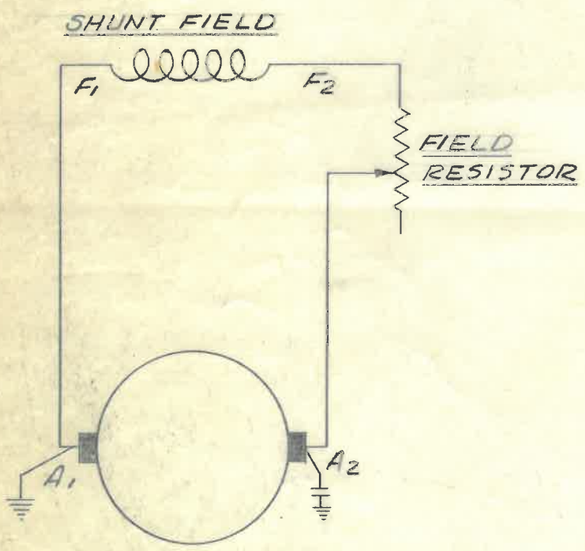
2



3 RING 250 VOLT



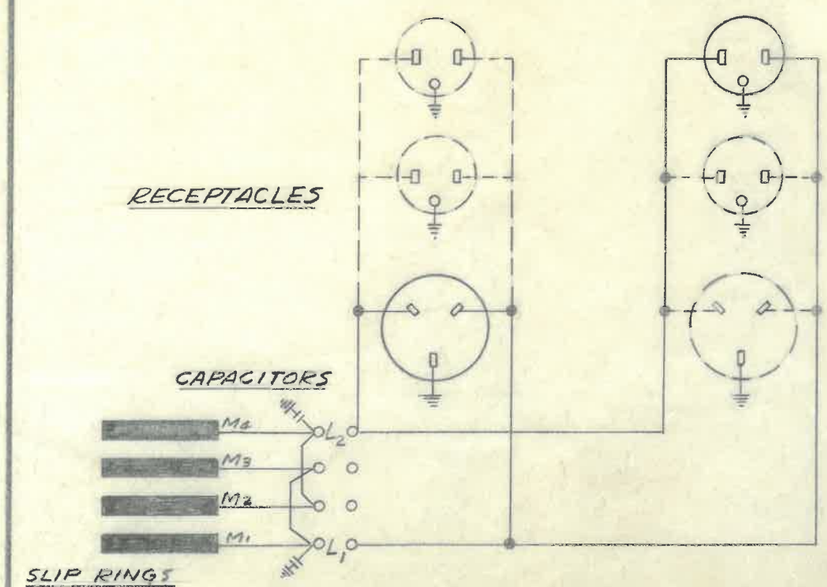
4-RING 120/208 VOLT 3-PHASE



4-POLE W.A.F. REFERENCE Z-1255

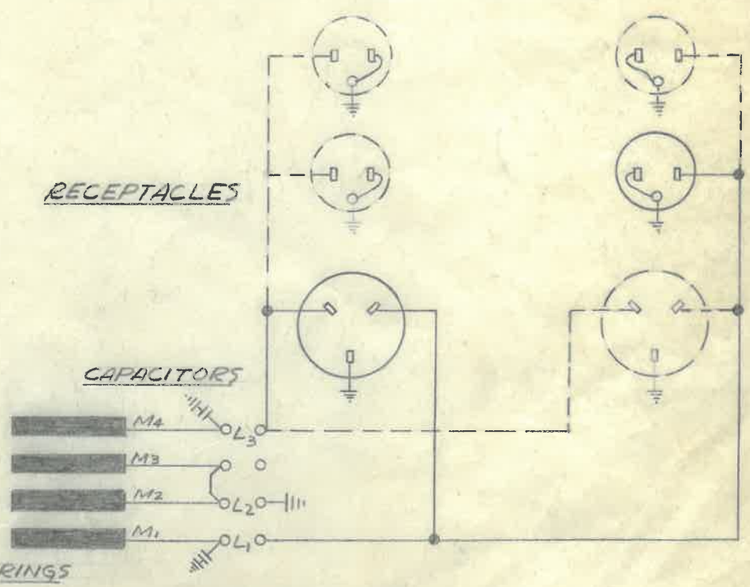
2-POLE W.A.F. REFERENCE Z-1273

D.C. CONNECTIONS



4-RING 115 VOLT

4



4-RING 115/230 VOLT Z-1278

CHANGE	WAS ORIGINALLY	DATE	CHK'D	CHG. REQUEST
D	ADDED NOTE	10-14-66	R.L.T.	
C	ADDED	12-7-65	R.L.T.	
B	ADDED Z-1278-6	10-11-65	M.E.	
A	DOTTED LINES IN 3 & 5 WIRE SOLID	5-4-62	T.C.G.	R.L.S. & A.B.

NOTE: ALL MACHINED DIMENSIONS

MANUAL START

WIRING DIAGRAM

SCALE --
DATE 6-28-61
DWN T.C.G.
MODEL NO.
PART NO 1C-40
CHK'D

NO

REFERENCE DRWG Z-1257