

INSTRUCTION BOOK

for

SOUTHERN CROSS GENERATING SETS

*Pulley - Single "B"
8 1/2" O.S. DIA. 8" P.S.D.*

*Shaft 2 1/2" Long. 7/8" Dia.
Keyway 5/16" wide x 3/16" deep.*

Fig. No. 2637
1 KW 32, 50 Volt Battery Charging Generating Set

Fig. No. 2741, 2742
1-5 KW 32, 50 Volt Battery Charging Generating Set

Fig. No. 2743, 2744
1-5 KW, 110, 240 Volt Direct Lighting Generating Set
From Generator No. 2000



THE SOUTHERN CROSS ORGANISATION

TOOWOOMBA FOUNDRY PTY., LTD.,

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Box 393, P.O., Rockhampton, C.Q.
Box 304, P.O., Townsville, N.Q.
Box 115, P.O., Charleville.

SOUTHERN CROSS ENGINE AND WINDMILL CO. PTY., LIMITED,

22 Young Street, Sydney, N.S.W.
32-34 Fitzroy Street, Tamworth,
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50 Henry Street, Bloemfontein,
South Africa.

Fig. 2637—1000 W. 32.40 or 50.62 Volt Semi-Automatic Lighting Plant

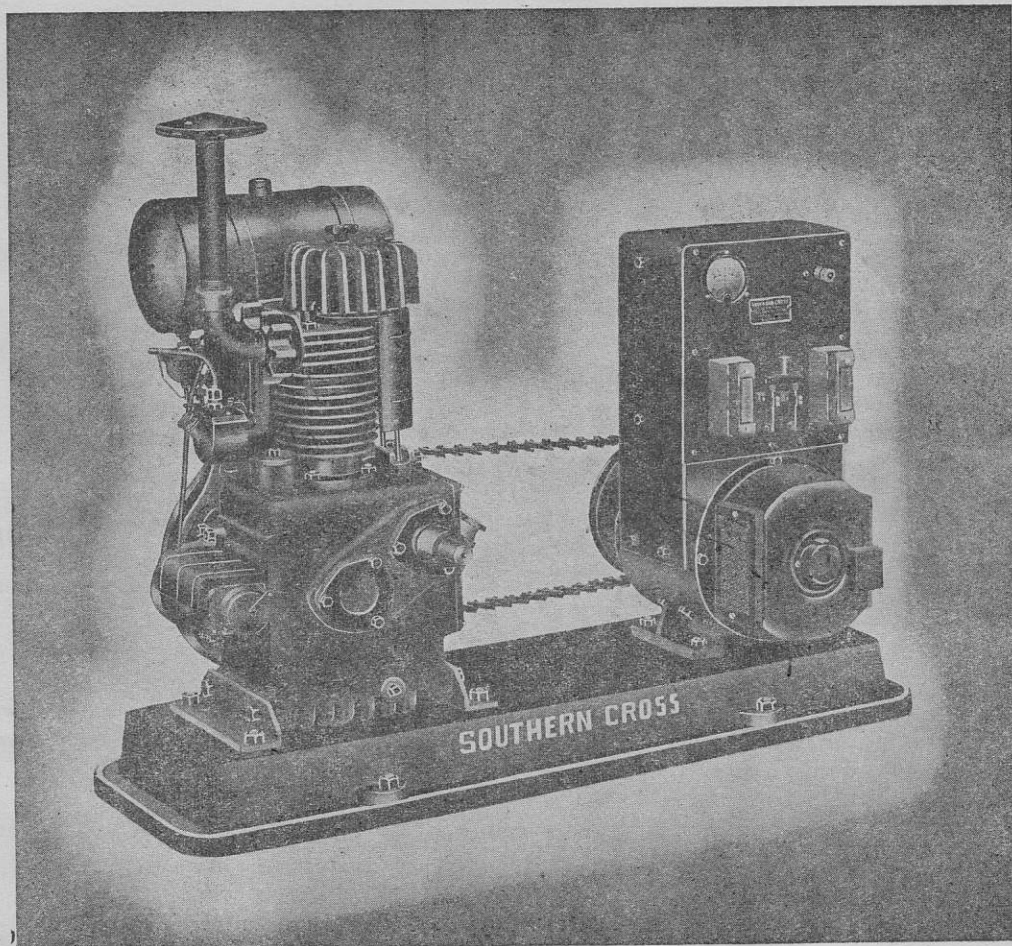


Fig. 2637—1 K.W. 32, 50 Volt Battery Charging Generating Set.

UNPACKING.

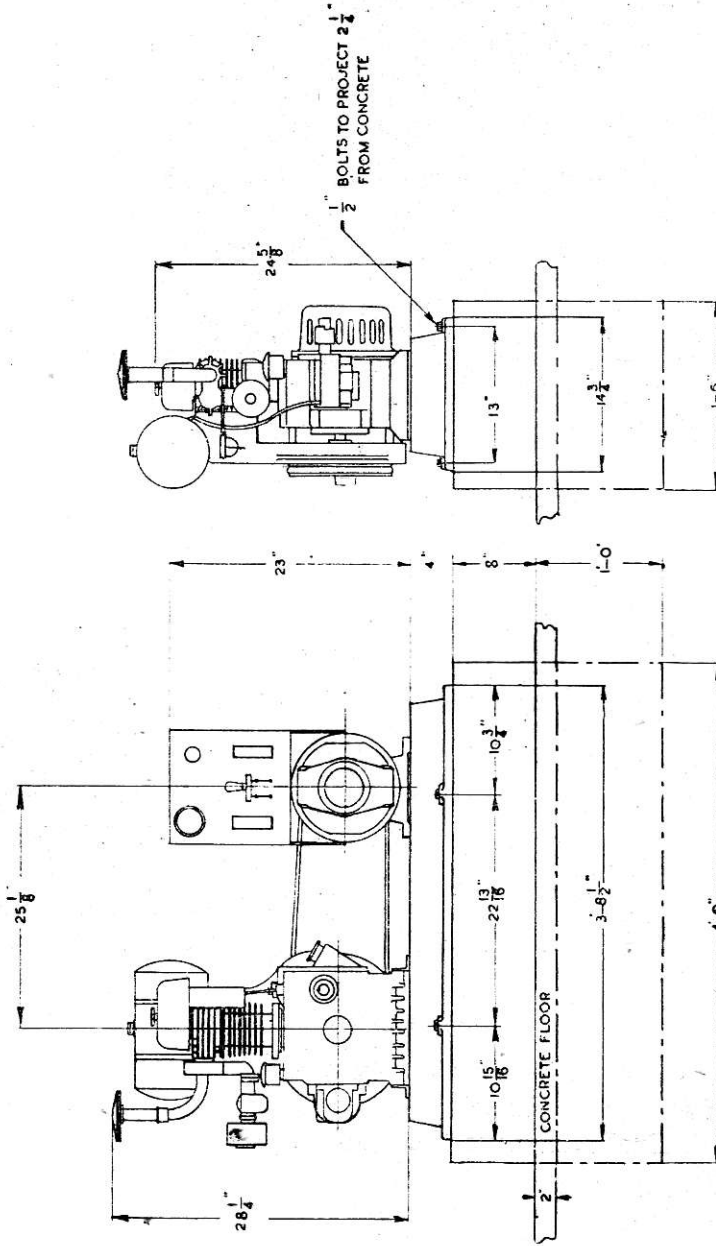
After removing the top of the generator case, this instruction book will be found in an envelope tacked inside the case. Then, with the check list in the same envelope, check off the items in the box and, finally, remove the generator.

The engine is packed separately in another box and is checked to the list in the back of the engine instruction book.

The base is not boxed, and has wired to it the engine studs, exhaust pipe extension and socket.

FOUNDATION.

The plant will give the best results if it is set up on a firm foundation—a block of concrete is the best.



General Arrangement of Fig. 2637—1 K.W. 32, 50 Volt Battery Charging Generating Set.

The plant can also be bolted to an existing concrete floor, and in this case four holes are punched into the floor with a cold chisel to correspond with the foundation holes in the base.

The foundation bolts supplied are set in position in the holes and the base fitted over them. Put nuts on bolts and, after levelling the base, fill the holes with a mixture of 50-50 sand and cement.

Allow the mixture to set for 24 hours and then fit the engine and generator as set out under "Assembling Plant."

TO MAKE A CONCRETE BASE.

If a new base is to be made, construct a rectangular wooden form from the timber of the case, the inside dimensions to be 4ft. 0in. x 1ft. 6in. x 8in. high.

Decide on the most convenient position for the unit, making allowance for the batteries to be erected as near as possible to the Generator.

Sink a hole 12in. deep in the ground to the same dimensions as the inside of the mould.

Set two pieces of 2 x 1 into the top of the mould to support the engine base.

Put foundation bolts in position in base and set base over mould.

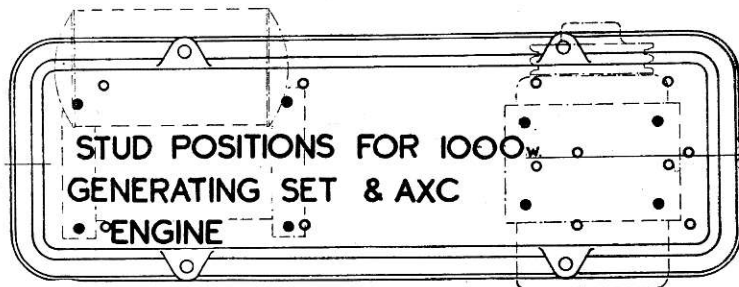
Now mix a batch of concrete, using four parts stone, three parts sand, and two parts cement, and pour enough of the mixture into the mould to support the foundation bolts temporarily, then remove base and fill the mould level with the top. Replace base, moving bolts to suit if they have been shifted.

Smooth off the block and allow the concrete to set for 24 hours.

After base has been standing for approximately 24 hours, remove the supporting strips from under the cast iron base and allow base to sit on concrete. Again check base for level, packing it up with shims, if required.

Remove wooden mould, and surface block with a 50-50 mixture of sand and cement. Allow base to stand for at least another day.

ASSEMBLING PLANT.



Screw the studs provided in the holes, the position of which are shown in black in the illustration above.

Lift both the engine and the generator, with the switchboard attached, on to the base and tighten the nuts on the studs.

With a piece of string or a straight edge test the two pulleys for alignment, and, if necessary, shift the generator pulley until they line up. Further adjustment can be made by swivelling the generator or engine with the bolts partly loosened.

When in line tighten down both engine and generator to the base. The belt may now be put on. It is important that the large end of the outer link faces the direction of rotation. If the belt is slack it may be tightened by removing a link. See page fifteen.

SETTING UP THE BATTERIES.

Assemble battery stand and set in position previously decided upon. Unpack the batteries and place them in position on the stand, about 1½in. apart.

Connect cells together, making sure that they are connected correctly; that is, positive terminal to negative terminal. Use the flexible connection on the end cells of the two rows.

Tack the battery instruction chart on the wall behind the batteries. Also drive two nails into the wall to support the bulb of the hydrometer and allow it to hang free without any risk of breaking.

ELECTRICAL CONNECTIONS.

Using 7/.064 for 32 Volt and 7/.044 for 50 Volt, connect the battery positive terminal on the back of the switchboard to the positive terminal of the battery and the negative terminal to the negative terminal of the battery.

Also connect wires from the positive and negative line terminals out to the point where the overhead line goes across to the house.

The wiring must be installed to conform with the S.A.A. rules, and by a qualified electrician.

If our electrician is installing the plant he is a qualified man, but if a local man is installing the plant, see that he is registered, otherwise the Insurance Coy. may refuse to accept the installation.

note
It is recommended
that the
installation
On 32 and 50 Volt Plants 7/.036 wiring is to be used in the house and 3/.036 switch leads. No more than 5 lights are to be connected to one circuit. A separate circuit is to be made of 7/.036 wire for each power point on 32 Volt Plants.

TO START PLANT.

See that lubricating oil is in the crankcase. Refer to page three of the engine instruction book.

Using a clean funnel, fill the fuel tank with petrol.

1. Turn on fuel cock, No. 123, on filter, allowing fuel to flow to the carburettor.
2. Remove cowl side plate, No. 173, and then the spark plug, No. 210, from cylinder head, No. 3. Pour in about one teaspoonful of lubricating oil and screw in spark plug with box spanner, supplied, and replace cowl.
3. Oil rockers through oil holes in cylinder head cover, first removing packing plugs.
4. Open needle valve, No. 96, about one turn.
5. Turn flywheel, No. 4, in the opposite direction to the arrow on the flywheel until compression is felt.
6. Press starter switch on switchboard and momentarily choke the engine when starting, but do not overchoke the engine or it will be hard to start.

Occasionally the engine may stop on the compression stroke and the generator will not develop sufficient power to turn it over when the starter switch is pressed.

If this occurs, release button and turn the engine flywheel backwards until compression is felt and then press starter switch again.

As the engine warms up, gradually close the needle valve, No. 96, to the running position, the final setting being made about ten minutes after the engine has started.

A little care spent in adjusting the needle valve will result in a great saving in fuel. The exhaust should be smokeless.

To stop engine, screw needle valve down on seat. Do not use undue pressure as it will damage the seat.

ADJUST SPEED.

The engine, as supplied, is set to run at 1800 r.p.m., and at this speed the charging rate will be too high.

Loosen governor spring tension screw to reduce speed to approximately 1400 r.p.m., which will give a generator speed of 1660 r.p.m.

The rated output of the Plant in amperes is 25 amps for 32-40 Volt Plants, and 16 amps for 50-62 Volt Plants. (Note that the output is based on the charging voltage when the batteries are fully charged.)

Now check the specific gravity of the batteries to the reading given on the chart supplied with them. If they are fully charged the plant should charge at 10-15 Amps for the 32-40 Volt plant and 8-10 Amps for the 50-62 Volt plant. However, in about 20 minutes time the charging rate should drop to about 4 Amps and 3 Amps, respectively.

Later on, when the batteries are partly discharged, it will be found that the charging rate will increase automatically, due to the voltage of the battery reducing as it discharges.

With the battery discharged to about $\frac{1}{4}$ charge, the charging rate should then be about the maximum: 20-25 Amps for the 32-40 Volt plant and 14-16 Amps for the 50-62 Volt plant.

In both settings check with Battery charge to make sure that the rates do not exceed those recommended for the size of battery being used. If it is desired to reduce the charge, move the clips on the Field Resistance on the back of the Switchboard further apart. To increase the charge, move them closer together.

General Running Instructions

Engine.—Refer to engine instruction book.

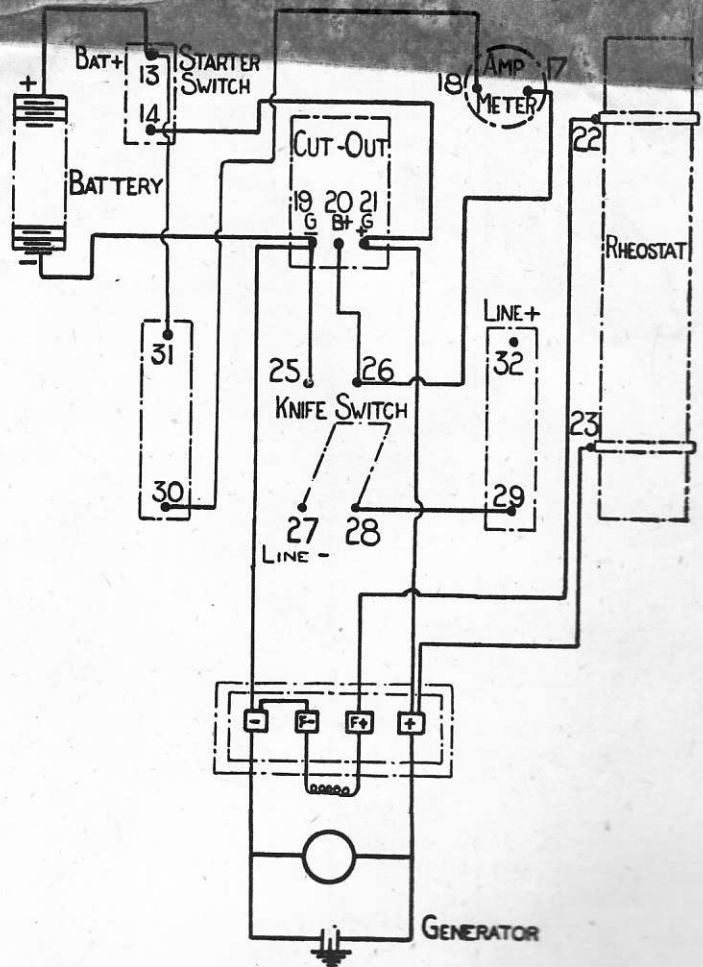
Generator.—Refer to pages 14 and 15.

Cutout.—Refer to page 14.

Batteries.—Refer to pages 12 and 13.

Brammer Belts.—Refer to page 15.

NOTE.—If battery is not located in Engine Room, and house lighting leads are taken direct from battery, then overhead line leads to battery from generator switchboard are connected to terminals 13 and 19 and line lighting connection 31 and 32 are not used.



Layout Diagram for Fig. 2637 1 K.W. 32V. or 50V. Battery Charging Generating Set.

The fuse on the right-hand side of the switchboard, looking at the front, is connected in series in the charging circuit of the generator. If at any time the cutout should be accidentally closed while the generator is stationary, the fuse will blow thus protecting the generator. If this fuse is blown, the generator will not charge, so it should be examined if the generator ever fails to charge.

This Wiring Diagram used on Generator
Nos. 4911 onwards.

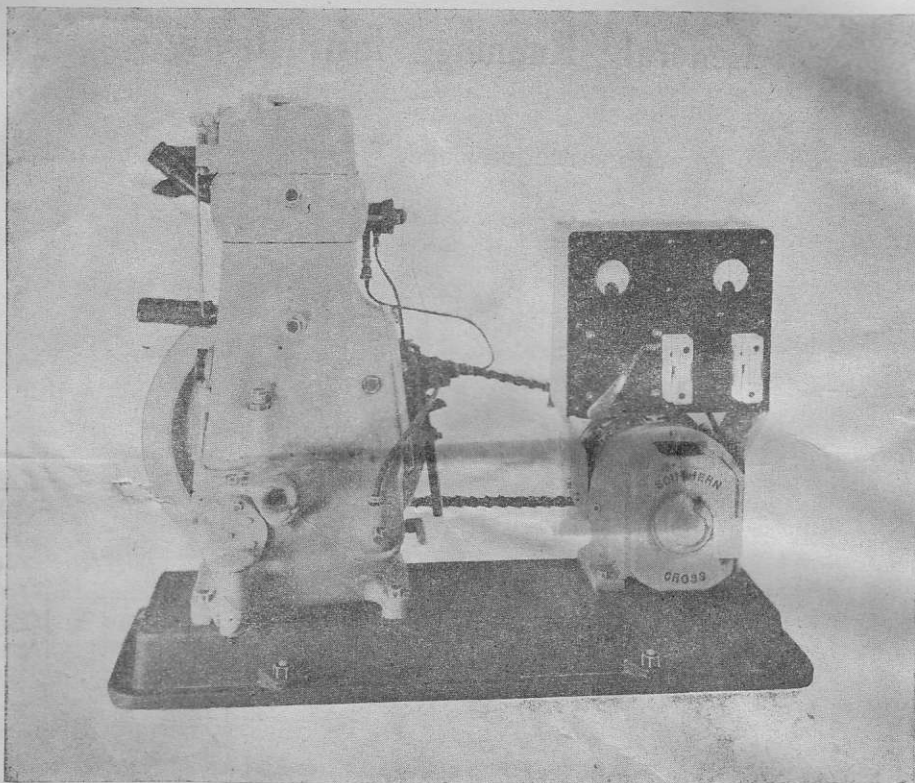


Fig. 2741—1.5 K.W. 32, 50 Volt Battery Charging and Direct Lighting Generating Set

UNPACKING.

For instructions for:—

Unpacking.—Refer to Page 1.

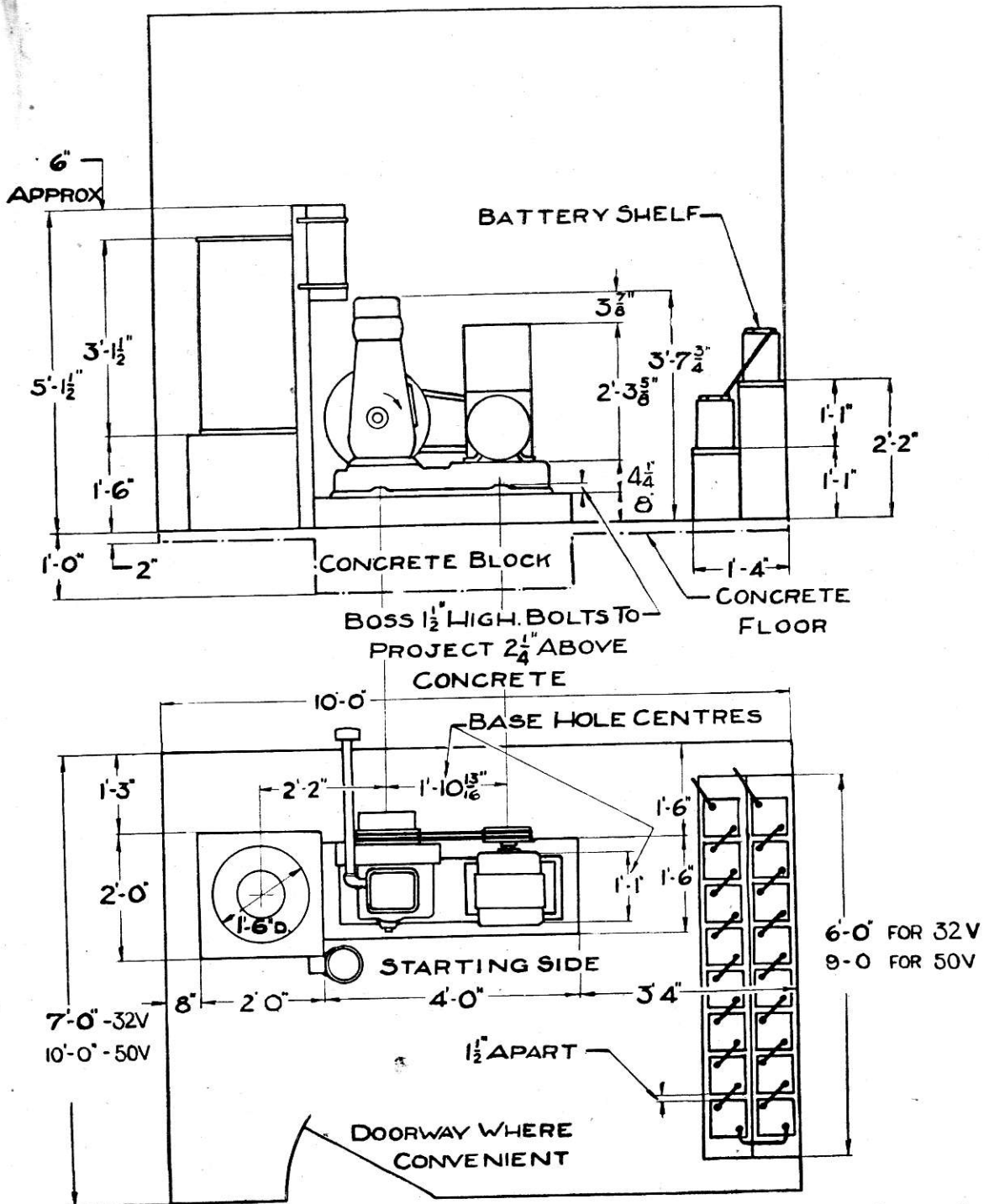
Foundation.—Refer to Page 1.

Concrete Base.—Refer to Page 3.

Batteries.—Refer to Page 3.

Electrical Connections.—Refer to Page 4.

The above instructions are similar to those for Fig. 2637 1 K.W. 32.50 Volt Battery Charging Generating Set.

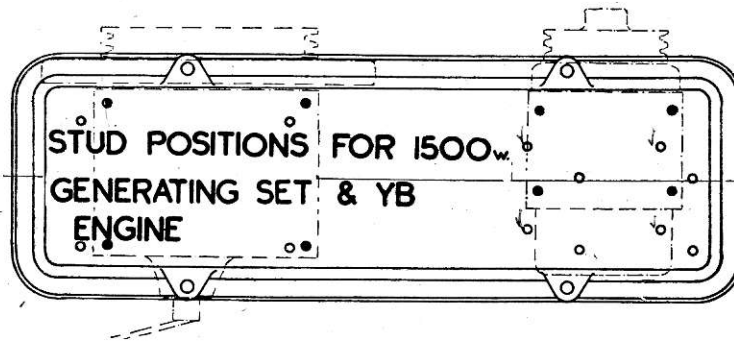


General Arrangement of Fig. 2741 1.5 K.W. 32V. or 50V. Battery Charging Generating Set.

TO MAKE A CONCRETE BASE.

Refer to Page 3.

Either a wooden stand or a concrete block is then made to take the cooling tank.

ASSEMBLING PLANT.

Screw the studs provided in the holes, the position of which are shown in black in the illustration.

Lift the engine and place it in position on the studs; tighten the nuts.

Now install cooling tank as set out in the engine instruction book. Use the extra exhaust pipe supplied to carry the exhaust through the side wall.

Fit the pulley to the engine flywheel.

Set generator with switchboard attached in position on base. With a piece of string or a straight edge, test the two pulleys for alignment and, if necessary, shift the generator pulley until they line up. Further adjustment can also be obtained by swivelling the generator with the bolts partly loosened.

When in line, tighten up the generator. Then tighten belts, if necessary, by removing a link. See page 15. Fit belts with the large end of the outer link in the direction of rotation.

SETTING UP THE BATTERIES.

Refer to Page 3.

ELECTRICAL CONNECTIONS FOR 110V. AND 240V. SETS.

Using 7/.036 VIR Cable for 110 Volt and 3/.036 VIR Cable for 240 Volt Generating Sets, connect wires from the positive and negative line terminals to the point where the overhead line goes to the house.

House wiring to be installed to conform with the S.A.A. Rules and by a qualified electrician.

TO START PLANT.**Mark YB Diesel Engine.**

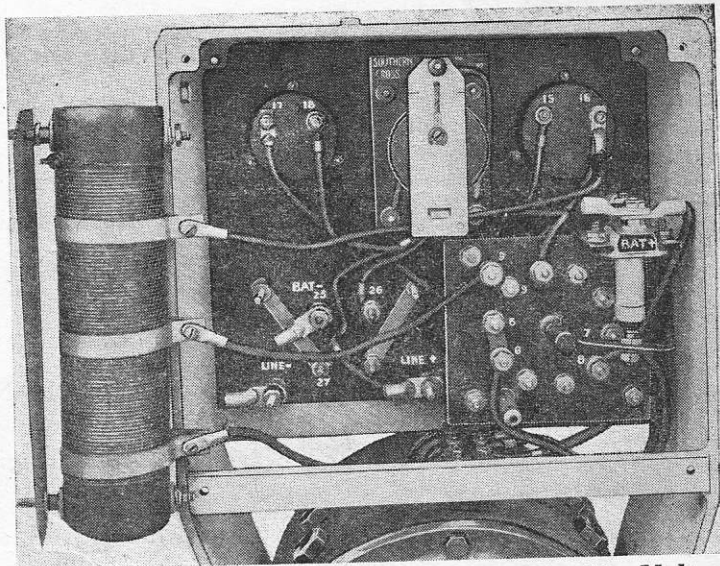
See that the fuel tank is full and lubricating oil is in the crankcase. Refer to pages 8 and 9 of the engine instruction book.

1. See that the fuel cock is on.
2. Lift automatic overload stop on pump so that control rod moves to full open position.
3. Push valve lift plunger (D Fig. 2252) in and at the same time rotate the engine and the plunger will slide in and release the compression.
4. Pour sufficient lubricating oil into the oil starter plug (K Fig. 2252, Engine Instruction Book) to nearly fill it, then put into head and tighten. **(DO NOT POUR OIL IN WHILE ENGINE IS RUNNING.)**
5. Pull starting lever on switchboard up to starting position and the generator will rotate the engine.
6. As soon as the engine has run a couple of revolutions release the valve lift plunger by rotating the twist grip (J Fig. 2252, Engine Instruction Book) and the engine will start.
7. Hold starting lever up until engine gains speed and then release it and the generator will charge the battery.

ENGINE SPEED.

The Diesel Engine, when supplied, is set to run at 1200 r.p.m. This speed is too high and must be reduced to 1000 r.p.m. Refer to page 15 of the Engine Instruction Book for adjustment of Engine Speed.

With the main switch off, the engine running, with the change over switch in "Direct," the voltage should read between 32 and 36 Volts or 50 and 55 volts. If this is correct switch to "Charge." The ammeter should show charge of about 17-20 Amps. for the 32 Volt Set and 12-14 Amps. for the 50 Volt Set if the batteries are not fully charged. With a fully charged battery the charge will be about 12-15 Amps. for 32 Volt and 8-10 Amps. for 50 Volt, dropping to about 3 or 4 Amps. after about 20 minutes' running.



Switchboard, Figs. 2741, 2742—32, 50 Volt Battery Charging and Direct Lighting Generating Set.

When running the plant on "Direct," without the batteries, the ammeter will indicate on the discharge side.

If a revolution counter is available, check the speed on full load. It should be 1000 r.p.m. Adjustment to the charging rate is made by moving the middle clip on the field resistance downwards to increase the charge, and upwards to decrease it.

For direct lighting the voltage should remain between 30 and 36 volts, and any variation to the voltage can be made by moving the top clip.

ENGINE SPEED, FIG. 2743, 2744, 110 OR 240 VOLT PLANTS. (Direct Lighting.)

As the Diesel Engine, when supplied, is set to run at 1200 r.p.m., the voltage at first will be too high, as the correct engine speed on FULL LOAD is 1000 r.p.m.

Reduce the engine speed by altering the governor spring adjustment until no load voltage is 110-115 Volts or 220-230 Volts.

Then switch on load until the plant is fully loaded. The full load current is:—

13.6 amps for 110 Volt Plants.

6.8 amps for 220 Volt Plants.

Check voltage and adjust engine speed, if necessary, then check at no load again. The voltage should remain approximately constant at all loads except for a momentary surge when sudden changes of load occur.

GENERAL INSTRUCTIONS.

Engine.—Refer to engine instruction book.

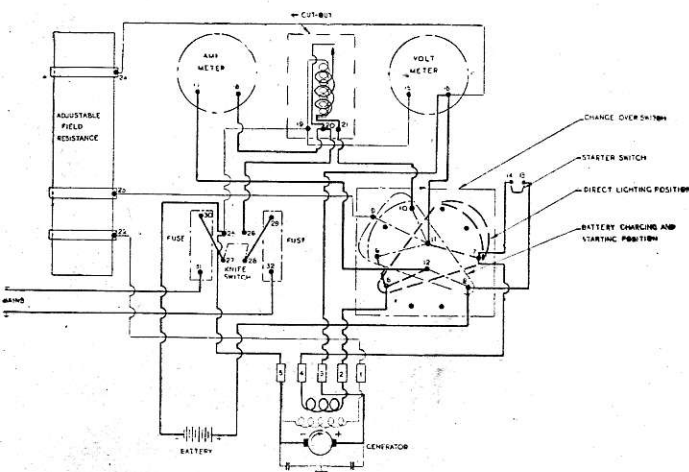
Switchboard.—If at any time one of the wires is disconnected by mistake it can be replaced by referring to the number on the wire and attaching the wire to the terminal of the same number.

From time to time some adjustment may be necessary to the contacts of the change-over switch.

Procedure to be adopted is as follows:

1. Disconnect one wire from battery.
2. Remove the wires from the back of the switch.
3. Take off the insulated base of the change-over switch.
4. Examine the contacts, and, if they show signs of burning, it will be necessary to redress them to get a good flat surface.

Layout Diagram for Figs. 2741, 2742—32, 50 Volt Battery Charging and Direct Lighting Generating Set.



5. Get a new sheet of emery cloth, spread it on a flat machined surface or a sheet of glass, then rub the contacts on the emery cloth until all various points brighten up.

Then reassemble, making sure that the moving contact is pressed firmly to the fixed contacts and that the numbered wires are attached to the correct terminals.

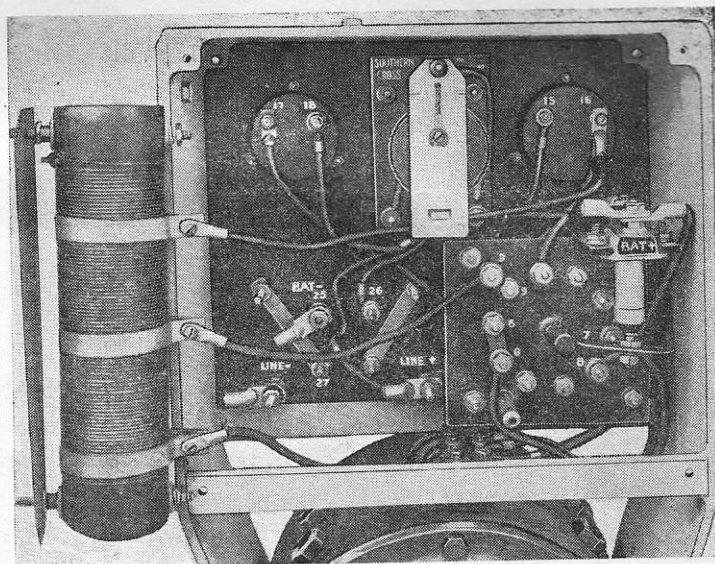
BELTS.—Occasionally it will be necessary to adjust them and take up stretch. Refer to page 15.

CUTOUT.—Refer to page 14.

ENGINE SPEED.

The Diesel Engine, when supplied, is set to run at 1200 r.p.m. This speed is too high and must be reduced to 1000 r.p.m. Refer to page 15 of the Engine Instruction Book for adjustment of Engine Speed.

With the main switch off, the engine running, with the change over switch in "Direct," the voltage should read between 32 and 36 Volts or 50 and 55 volts. If this is correct switch to "Charge." The ammeter should show charge of about 17-20 Amps. for the 32 Volt Set and 12-14 Amps. for the 50 Volt Set if the batteries are not fully charged. With a fully charged battery the charge will be about 12-15 Amps. for 32 Volt and 8-10 Amps. for 50 Volt, dropping to about 3 or 4 Amps. after about 20 minutes' running.



Switchbord, Figs. 2741, 2742—32, 50 Volt Battery Charging and Direct Lighting Generating Set.

When running the plant on "Direct," without the batteries, the ammeter will indicate on the discharge side.

If a revolution counter is available, check the speed on full load. It should be 1000 r.p.m. Adjustment to the charging rate is made by moving the middle clip on the field resistance downwards to increase the charge, and upwards to decrease it.

For direct lighting the voltage should remain between 30 and 36 volts, and any variation to the voltage can be made by moving the top clip.

ENGINE SPEED, FIG. 2743, 2744, 110 OR 240 VOLT PLANTS. (Direct Lighting.)

As the Diesel Engine, when supplied, is set to run at 1200 r.p.m., the voltage at first will be too high, as the correct engine speed on FULL LOAD is 1000 r.p.m.

Reduce the engine speed by altering the governor spring adjustment until no load voltage is 110-115 Volts or 220-230 Volts.

Then switch on load until the plant is fully loaded. The full load current is:—

13.6 amps for 110 Volt Plants.

6.8 amps for 220 Volt Plants.

Check voltage and adjust engine speed, if necessary, then check at no load again. The voltage should remain approximately constant at all loads except for a momentary surge when sudden changes of load occur.

GENERAL INSTRUCTIONS.

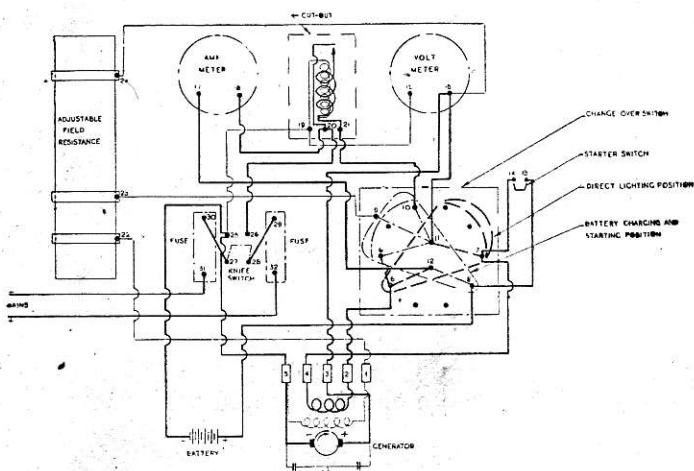
Engine.—Refer to engine instruction book.

Switchboard.—If at any time one of the wires is disconnected by mistake it can be replaced by referring to the number on the wire and attaching the wire to the terminal of the same number.

From time to time some adjustment may be necessary to the contacts of the change-over switch.

Procedure to be adopted is as follows:

1. Disconnect one wire from battery.
2. Remove the wires from the back of the switch.
3. Take off the insulated base of the change-over switch.
4. Examine the contacts, and, if they show signs of burning, it will be necessary to re-dress them to get a good flat surface.



Layout Diagram for Figs. 2741, 2742—32, 50 Volt Battery Charging and Direct Lighting Generating Set.

5. Get a new sheet of emery cloth, spread it on a flat machined surface or a sheet of glass, then rub the contacts on the emery cloth until all various points brighten up.

Then reassemble, making sure that the moving contact is pressed firmly to the fixed contacts and that the numbered wires are attached to the correct terminals.

BELTS.—Occasionally it will be necessary to adjust them and take up stretch. Refer to page 15.

CUTOUT.—Refer to page 14.

RUNNING INSTRUCTIONS. (Fig. 2298 Plants Only.)

Use the plant direct without batteries whenever possible, for ironing and whenever a number of lights are used.

The battery should only be used as a standby, and if this procedure is adopted very much longer life will be obtained from them.

The Diesel Engine is very economical and should be run as often as possible.

The battery should be given a regular discharge to $\frac{1}{4}$ charge and recharge cycle by its use for lighting when the engine is not running and then recharge over periods of not more than one month. Refer also to Batteries.

General Instructions For All Plants**BATTERIES.**

If a battery is to give its maximum life and complete satisfaction, then it must be regularly charged and discharged to about $\frac{1}{4}$ charge and not kept in a fully charged condition all the time.

When a set of batteries is installed, they should be charged immediately at the specified rate until the gravity reading on the hydrometer ceases to rise after three consecutive hourly readings and the cells are gassing freely.

The capacity of the batteries should be such that the load can be carried from 5 to 7 days without recharging. If the load is greater than $\frac{1}{2}$ the normal discharge rate at any time during the week, the batteries should be assisted by operating the engine over this period.

Once every 60 days the batteries should be given an equalising charge. Continue charging for approximately 2 hours after the battery has reached a fully charged condition.

VOLTAGE AND SPECIFIC GRAVITY.

When a battery is fully charged its specific gravity is approximately 1250; the correct fully charged specific gravity for the batteries is given on the chart supplied with them.

As the battery discharges, the specific gravity reduces to 1150, which is the equivalent of a fully discharged battery.

However, do not allow the batteries to discharge to below $\frac{1}{4}$ charge (about 1175 specified gravity).

When a battery is put on charge a voltage greater than the battery voltage is required to push the current through the battery and to charge it. For this reason the voltmeter, which indicates generator voltage, will show a higher reading in the "Charge" position than in the "Direct" position.

DO.

1. Do check the battery every second day with the hydrometer.
2. Do charge and discharge to $\frac{1}{2}$ or $\frac{1}{4}$ charge regularly, as specified.
3. Do wipe down battery after checking.
4. Do overcharge battery every 60 days.
5. Do keep batteries charged when not in use.

DON'T.

1. Don't maintain a practically fully charged battery at all times. This reduces the life of the battery by approximately 30 to 38 per cent.
2. Don't maintain a practically fully charged battery at all times and considerably over-charge on each recharge. This will shorten the life of the battery by approximately 70 to 80 per cent.
3. Don't allow battery to stand in a discharged condition and idle for monthly or two monthly periods and then charge and use. This will shorten their life by 30 to 40 per cent.
4. Don't exceed maker's recommendation for rate of charge.
5. Don't bring a naked light near the batteries.

CHARGING A RADIO BATTERY FROM A STANDARD SOUTHERN CROSS PLANT.

A radio battery has a low discharge and charging rate. The charging rate should rarely exceed 6 amps.

This rate is therefore much below the charging rate of the plant and could not be connected up with the other batteries which are charged at approximately 15 to 20 amps. This rate would ruin a radio battery.

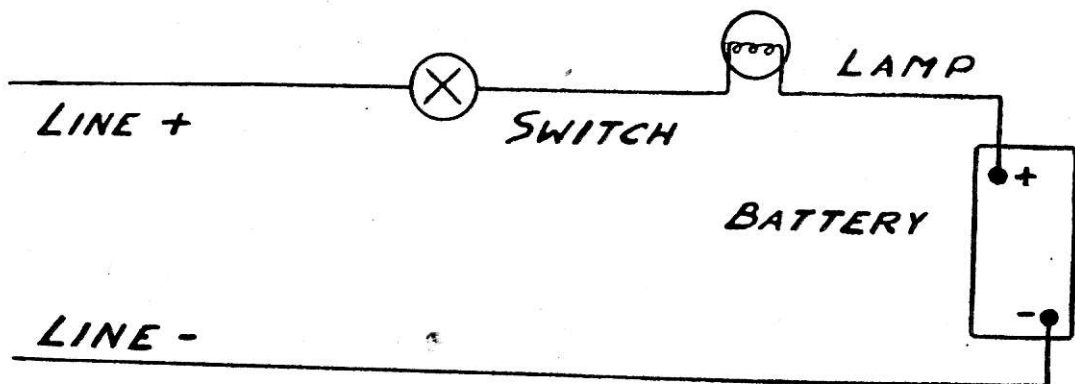
The following method can be adapted to the Southern Cross Plant for the ordinary radio battery. We can supply a suitable charging board on request.

Connect a lamp in series with radio battery and then connect to the source of supply. An ordinary tumbler switch is wired in the circuit to shut off the supply when there is no battery in the circuit.

The lamp acts as a resistance in the line and allows the current to pass into the battery and thus charge it. A 60 watt lamp at 32 volts will allow a charging rate of 2 amps.

The above circuit is as follows:—

Below is the circuit for radio battery charging with a lamp resistance.

**CHARGING CAR BATTERIES.**

Exactly the same procedure as for charging a radio battery can be adopted for a car battery. The car battery can stand a higher charging rate, and so the size of the lamp is increased, or extra lamps can be placed in parallel with the present one and so increase the charging rate. A standard Southern Cross battery charging board can be purchased for this purpose.

CUTOUT.

The cutout is adjusted correctly before leaving the factory and should not require any further adjustment when installing the plant.

However, after the plant has been in use for some time the cutout points may become burnt and require cleaning.

To clean the points proceed as follows:—

1. Remove one of the battery wires.
2. With a magneto file carefully file the contacts so that they are quite clean. Do not file away more than necessary, and see that the contacts, when closed, press firmly and evenly over the both faces.
3. Replace the battery wire.
4. Start the engine and observe the action of the cutout and see that the contacts open and close properly, and tighten spring on moving contact if contacts do not open promptly when engine is stopping. The ammeter should not show more than 5 amps discharge before the contacts open.

LUBRICATION OF GENERATORS.

When the generator leaves the works the bearings are packed with grease and do not require further attention before the plant is put into operation.

However, it is advisable to remove the end caps from the bearings at least once a year to examine them. The balls and races should be clean and show no signs of rusting. There need only be a smear of grease on the bearing. If necessary, grease should be added to the bearing. Only fill the bearing cage, don't fill the cap with grease.

The faults arising from over lubrication are far greater than those occurring from under lubrication. Under no condition must oil or grease containing graphite be used.

Recommended Greases are:—

- SKF No. 28 Grease.
- Shell RB Grease.
- Shell F2 A Grease.
- Gargoyle No. 3 Grease.

COMMUTATOR AND BRUSHES.

It is important that the commutator be kept free from dust and dirt. Check the commutator while the engine is running. It should be practically sparkless at all times.

Periodically clean the commutator with SAND PAPER, not emery paper.

If sparking does occur at the brushes, steps should be taken immediately to cure it or serious trouble will quickly occur. First see that the brushes are free in the holders. If taken out they must be replaced in exactly the same position after cleaning.

Next check the brushes for wear. If they are worn down so that the pressure finger is not holding them firmly on the commutator, or they are less than $\frac{3}{8}$ in. long, fit new brushes of the size and grade stamped on the generator name plate.

TO FIT NEW BRUSHES.

The position of the brush rocker has been marked with white paint. After checking this position, loosen the Brush Rocker by slacking off the clamp screw and the Commutator End Bearing Cap Screws. This permits the Brush Rocker to be swivelled around to expose each brush holder.

Remove old brushes and try new brushes in brush holder. They should slide freely without sticking. If they are tight, ease them down carefully by rubbing the tight side lightly on a flat sheet of fine sand paper until they will just slide in the holder.

With new brushes in position bed them on to the commutator with a piece of abrasive cloth between the brush and the commutator.

Draw the cloth backwards and forwards until the brushes assume the correct curvature, and be careful to keep the cloth around the commutator so that a flat is not formed on the brush. When the process is nearly completed, fine glass paper should be used to obtain a very smooth finish.

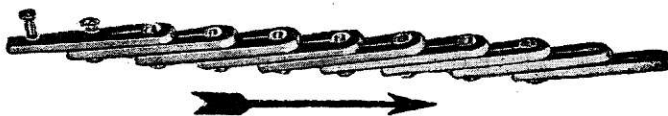
After bedding, remove each bush from its holder and carefully clean away every trace of dust from the commutator, brushes, and holders. Make sure also that no specks of abrasive material are embedded in the brush face.

Now reassemble and shift brush rocker to correct position and retighten screws.

Test generator again, but allow it to run for a few hours on light load before putting on full load, to allow the brushes to settle down properly.

If the above does not cure the trouble, obtain the services of a reliable electrician to check the machine over.

BRAMMER BELTS.



The belts must always be installed with the large end of the outer links in the direction of rotation.

Brammer Belting should always be installed one link short in every 12 inches of length. Each belt in a set should have exactly the same number of links. No further attention is necessary unless slippage is occurring.

To remove a length of belting from the coil, first ascertain length required and note where links have to be released. Hold the belting in both hands with thumbs on top of the studs in front of and behind the link which is to be loosened, the studs to be in a vertical position with the heads marked "B" at the top.

Still holding the belt firmly, bring the thumbs towards each other, in which case the link between the thumbs will move forward and the stud will slip into the large hole in the centre of the link. A light wriggling motion will help if the stud is stubborn. Immediately the stud slides into the large hole the link can be lifted off.

Repeat the process with the next link and the belt will come apart. Five minutes practice will enable anybody to completely master the manipulation of this Belting.

To link up, pass the stud at the end of the link through the centre large hole of the link at the other end of the belt. Ease the stud **back** into the small hole at the **narrow** end of the link. Pass the next stud through the large hole in the **same** link but pull into the small hole at the round end of the link. Repeat with the link that is left and the belt is complete.

See that the belt is **TIGHT IN THE FIRST INSTANCE** so as to remove the dormant elasticity and then the only adjustment necessary should be by reason of wear after a considerable period.

SLIPPING BELTS.

Slipping belts are usually indicated by a drop in voltage or output on load, and are recognised by the bulge which appears in the path of the slack side of the belt near the generator pulley. This indicates slippage which should be immediately corrected by removal of one or more links to prevent wear of the belts.

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