

# DUNLITE

SUPPLY EVERYTHING ELECTRICAL  
FOR THE COUNTRY HOME

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## DUNLITE WIND AND ENGINE DRIVEN LIGHTING PLANTS

### HOME APPLIANCES include

Washing Machines  
Vacuum Cleaners  
Food Mixers  
Liquidisers  
Sewing Machine Motors  
Floor Polishers  
Irons  
Toasters  
Kettles  
Refrigerators

### WORKSHOP APPLIANCES include

Electric Drills  
Electric Grinders  
Electric Saws  
Electric Welders  
Electric Soldering Irons  
Electric Pumping Units  
Battery Chargers

### BATTERIES

### CABLES AND FITTINGS

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**DUNLITE ELECTRICAL CO. LTD.**

TAVISTOCK STREET,  
ADELAIDE,  
SOUTH AUSTRALIA

L. J. FURLONG & CO. (Printers), 128 Payneham Road, St. Peters. F 2245

# DUNLITE

## Wind Lighting Plant

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### Instruction Book

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### 1,000 and 1,500 watt Plants

MODEL L. & M.

For the Instalation and Maintenance  
of DUNLITE Wind-Driven  
Lighting Plants.

**DUNLITE ELECTRICAL CO. LTD.**

TAVISTOCK STREET,  
ADELAIDE, S.A.

## A Personal Message

It is our sincere desire that you obtain from your Plant the service, comfort, enjoyment, and numerous years of long life and trouble-free service that we have earnestly endeavoured to build into it. **Please read the instructions carefully.**

It is necessary only that you treat the Plant with reasonable care and consideration, in order that you and your family or friends may realise these qualities.

In this book we have endeavoured to give much valuable information, without going into intricate details, that you should have in order to give your Plant the careful attention which it merits.

For extensive repairs or adjustments, we recommend and ask that you get in touch with an authorised DUNLITE Dealer or Distributor, who will give the particular attention of an organisation devoted to your interests, with mechanics specially trained in maintenance.

We have a complete range of 32-volt appliances, such as washing machines, irons, fans, radios, electric motors, etc., and are always at your service for advice on any electrical matter.

Communications with reference to your Plant should give the serial number of generator and voltage of batteries

**DUNLITE ELECTRICAL CO. LTD.**

TAVISTOCK STREET, ADELAIDE, PHONE W 1368  
SOUTH AUSTRALIA

## IMPORTANT

### Location of Plant

Examine the proposed site to make sure that the Plant will receive the maximum force of the prevailing winds.

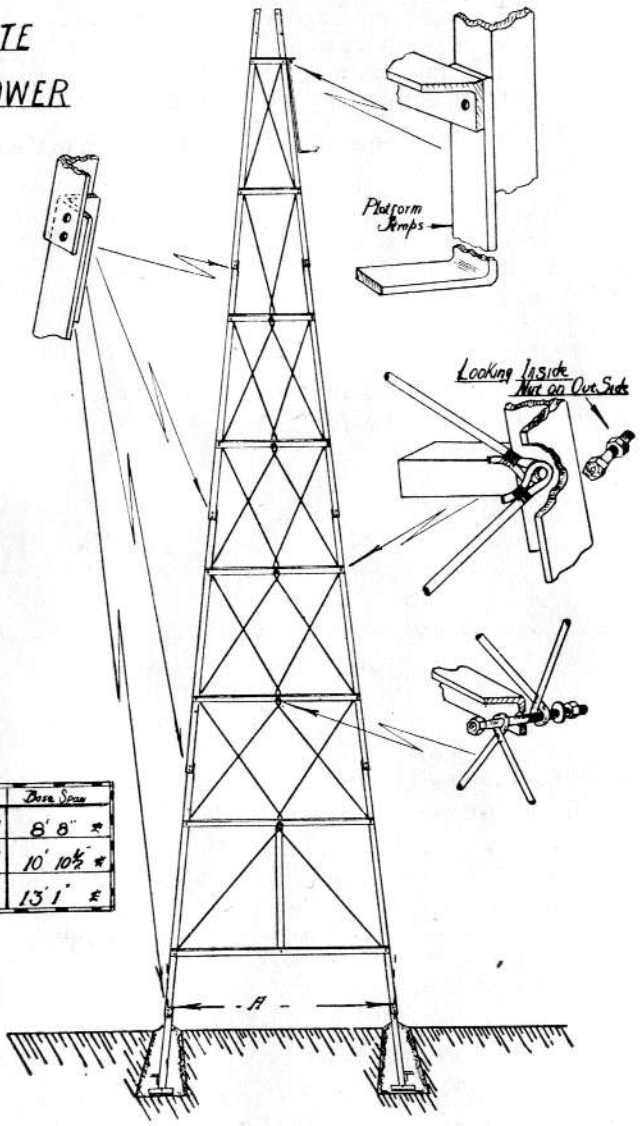
Most of the criticism to the unsatisfactory operation of a wind-driven Plant is due to Plants being installed in unsuitable positions or on low towers. No plant will work unless it is in a clear air-stream, and, if a person is not prepared to have a tower of suitable height, it is better not to install the Plant. Remember, the plant generates electricity free from the wind, therefore **be certain that the Plant clears all obstacles (house roof, trees, etc.) by at least 15-20 feet.** Make sure that the Plant is between the house and the direction of the prevailing winds as the roof will cause an upsweep of wind. **Any object higher than the plant will cause a disturbance for 300 yards if in front of plant, and 50-100 yards if behind the plant.** In hilly districts, it is better to put the Plant 200-300 yards away from the house and batteries if a good wind position can be obtained. **Forty feet is the minimum height of tower recommended,** as the air close to the ground is disturbed, and the charging rate is much steadier and less strain thrown on the plant when up in the clear air-stream.

Where the Plant has to be set amongst trees, a 50-60 ft. tower is well worth the difference in price, as a much greater and steadier charging rate is obtained and less strain put on the plant.

# TOWERS

## DUNLITE 3 POST TOWER

	Height	Base Span
A	40'	8' 8" *
A	50'	10' 10 1/2" *
A	60'	13' 1" *



You would not think of erecting a windmill on a wooden pole, with dangerous and unsightly guy wires all around it. How much more thought and care should be taken then with a Lighting Plant, which is an asset, and will not detract any value from the appearance of the finest home?

DUNLITE Plants are designed and manufactured to fit upon steel towers.

You would not use black iron to roof your house, so why use a black or painted steel tower for your DUNLITE Plant? Galvanizing is the only effective means of rust prevention, and whereas the initial cost is slightly higher, that rise is more than compensated by this permanency, thus saving cost of repainting or the unsightly appearance of a rusty tower.

Our standard installation is designed to fit upon a DUNLITE three-post Galvanized Steel Tower. If desired, a four-post tower cap can be supplied for fitting the Plant upon a four-legged tower.

### INSTRUCTIONS FOR ERECTING 40-FT. DUNLITE THREE-POST TOWER

Open all the bundles of tower and proceed to lay out one side on the ground. All the legs are identical, but the ends with the corners ground off are always fitted towards the top. Undo the bundles of wire braces and sort into lengths.

Commence assembling from the bottom. Take the longest girt and one of the three longest braces and bolt to the tower legs with the bend in the brace pointing upwards and forming a crossed loop at top. **This is most important** as an open loop will not tension tower correctly. The brace is bolted inside the tower leg and the girt outside.

Next take size smaller girt and brace and bolt in a similar manner on next two holes on the leg, the crossed loop again pointing upwards.

Join on two more tower legs and bolt on the third girt. In this case it will be found that there are six braces of equal length in the bundle, therefore two braces are bolted under each bolt, one facing upwards, and one downwards to meet the centre loop of No. 1 wire brace at centre of No. 2 girt.

When bolting these together, use an inch and a half bolt and bolt the bottom brace on the outside of the girt through centre hole, and the top brace on the inside, with the washer between this latter brace and the nut. **All braces must be looped around the centre bolt and not just passed over it.**

The fourth and fifth girts are assembled identically to the third. There will be only three wires in the bundle for the sixth girt. One of these is fitted, and the loop at centre bolt faces downwards to meet the brace from the fourth girt.

Similarly, the seventh girt has only three wires in the bundle, and again one of these is fitted facing downwards. However, there are six single wires left, and one of these is bolted under each bolt of the seventh girt facing upwards. These are crossed over and bolted on to the eighth girt.

The other two sides are assembled on to the first side and in a similar manner.

While assembling the tower, do not tighten any of the bolts further than a full nut. When the tower is completely assembled, always tighten centre bolts first, and then the ones on the legs. The ladder sections can then be assembled, the small section bolting on to the eighth girt, and the others bolting down the tower.

Supplied with the Plant are three pieces of 1 in. x  $\frac{1}{4}$  in. flat mild steel with a right angle bend. These are bolted hanging downwards under alternate bolts on the top girt, and are used for supporting the platform. Also, there are two pieces of 5 ft. galvanized angle with the tower. These are bolted between the centres of the first and second girts on the two sides opposite to the ladder.

The anchor plates are then bolted to the anchor posts and holes dug so that the bolts to tower legs are just above ground level.

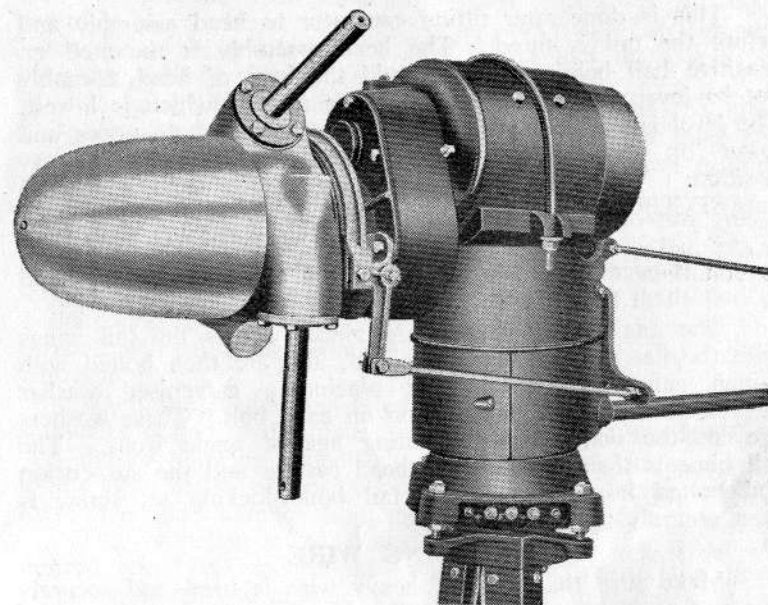
The tower can then be raised by tractor or suitable winch and bolted to anchor posts, care being taken to see that it is carefully guyed during this process. Guy ropes should be left in position until concrete has hardened.

**NOTE.—These anchors are for concrete only and the holes should be made larger at the bottom than the top and completely filled with concrete after the tower is levelled.**

Similar instructions apply to 50 and 60 ft. towers—the method of assembly, centre girts being identical to girts, 3, 4, and 5.

**It is recommended that the services of a qualified windmill man be obtained, if possible, for this work, as the tower will be weakened if not correctly assembled.**

## ERECTION OF PLANT



**TOWER CAP**

This provides a means of levelling the Plant irrespective of the angle of the tower. It is usually fitted before the tower is erected.

### HEAD ASSEMBLY

Remove top nuts from the four studs on tower cap. Place head assembly on these four studs with the terminals in the most convenient positions for running wires down tower. Fit pull-out rod through centre hole of head spindle, making sure the bushing is fitted correctly in the lever arm casting.

### GENERATOR

The generator is fitted to the turntable cradle so that the gearbox hangs vertically. The field pole set screws are engaged in the slots on the head casting and the U-bolt **SECURELY TIGHTENED**. The brake link rod is then fitted, the adjusting lock-nuts being adjusted so that the brake shoe is just clear of the band and not binding. The collector brush cover is then removed and the generator leads connected to the pick-up terminals. The red is positive, black negative, and green field. Refit cover plate.

Plants are sent from the factory with the gearboxes filled with suitable oil. This oil is suitable for 4-5 years' running. When replacing or renewing oil, use Shell Retinax Light or similar grade gear oil.

## LEVELLING HEAD ASSEMBLY

This is done after fitting generator to head assembly and before the tail is fitted. The head assembly is mounted on sensitive ball bearings, and should the base of head assembly not be level, the generator will swing to side which is lowest. The level is adjusted by moving the lock nuts, both upper and lower, on tower cap until the generator will remain in any position. When the correct position is attained, tighten all nuts SECURELY.

## TAIL

It is necessary to first assemble tail wings and angles and to bolt them to tail bone.

The angle irons of tail are placed across the tail wings with the flat side of angle iron out, and are then bolted with  $\frac{1}{4}$ -inch galvanised bolts, after placing a galvanised washer between the wing and angle iron on each bolt. These washers prevent the wings from vibrating against angle irons. The tail bone is then fitted in the head casting and the suspension rod bolted in position. The tail bone locking set screw is then securely tightened.

## FURLING WIRE

Make sure that a good heavy wire is used and securely fastened to the end of the pull-out rod. The lower end is fixed to the furling handle, the castings of which are adjusted by sliding up and down the tower leg until the pin will hold lever with a firm tension. After the Plant has been in operation a few weeks this should be re-adjusted as the brake lining beds in.

## TO ADJUST BRAKE

When the generator is securely mounted in the frame the brake link rod should be fitted. The end with the cotter pin is fitted to the fulcrum lever on the gearbox and the two end nuts are removed and the rod fitted through the end of the fulcrum lever on the head assembly and the nuts replaced and tightened until the brake just starts to bind. The pull-out handle should then be pulled on hard three or four times to take up any play and the nuts then adjusted until the brake is JUST FREE and then locked. The two front nuts that were not removed from the brake rod are then adjusted to within about  $\frac{1}{8}$  inch from the front of the fulcrum lever and locked. These served to push the brake off when the handle at the foot of the tower is released.

AS THE BRAKE WILL BED IN QUICKLY AT THE START, THIS ADJUSTMENT SHOULD BE CHECKED AFTER ABOUT 3-4 WEEKS AND AT SIX-MONTHLY PERIODS.

The tension of the brake is adjusted by sliding the pull-out handle down to the tower leg and locking in position.

## PROPELLER

The variable pitch propeller fitted to the plant has been carefully balanced and aligned at the factory and the hub and blade should be carefully examined to see that they have not been damaged in transit.

The main centre casting of the propeller should be fitted to the brake casting, after making certain that the machined surfaces are perfectly clean. Then tighten the three holding set screws EVENLY and SECURELY.

All the blade arms should be then smeared with grease to prevent corrosion and then the blades can be fitted to the hub. Check that the blades and the hub each have the same serial number and be certain that No. 1 blade is fitted to No. 1 shaft, and so on. Fitting the wrong blade to the wrong hub or shaft will cause the propeller to be out of balance and cause vibration.

When the blades are fitted the governor balance weights should be bolted to the blades and TIGHTENED SECURELY.

Before allowing propeller to run, move governor weights to the fully feathered position and rotate propeller to see that there is ample clearance from the tower in this position.

The propeller is so designed that when the maximum desired speed is reached the centrifugal action of the three governor weights overcome the tension of the centre spring and move the blades to a coarser pitch, thus tending to slow the propeller. As the wind pressure decreases, the speed will tend to slow and thus reducing the centrifugal force on the weights and the spring will return the blade to the maximum speed position. Thus it will be seen that the propeller operates as a fixed unit until the maximum speed is reached.

## ADJUSTMENT AND SERVICE

The speed of the propeller controls the maximum charging rate of the generator, and should it be necessary to adjust or alter the charging rate proceed as follows:—

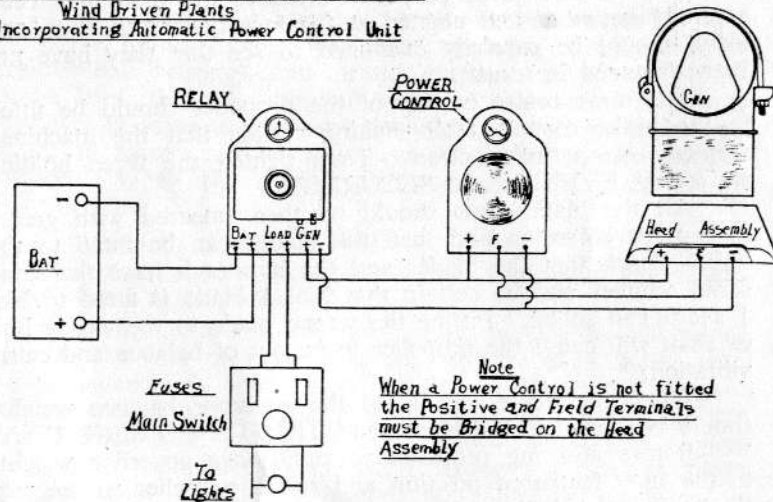
Remove propeller cap and loosen the lock-nut on the spindle carrying the main governor spring. Tighten spring tension to increase charging rate and slacken to reduce rate. After setting make certain lock-nut is tight and cover fitted correctly. In some cases where there is considerable line voltage drop or where additional battery voltage is used, sufficient adjustment cannot be obtained on the spring. In this case it is necessary to fit a lighter set of weights which can be obtained from your nearest distributor.

## SPECIAL NOTE

WHEN ADJUSTING CHARGING RATE MAKE CERTAIN THAT THE AUTOMATIC POWER CONTROL UNIT IS SWITCHED OFF: THAT THERE IS SUFFICIENT WIND TO MAKE THE PLANT GOVERN, AND THE MAXIMUM CHARGING RATE OF THE GENERATOR IS NOT EXCEEDED

(See Chart Page 12.)

**Circuit Wiring Diagram For Dunitite Model L and M  
Wind Driven Plants  
Incorporating Automatic Power Control Unit**



**CONNECTING UP**

Reference to the above diagram will show that when using the Automatic Power Control Unit it is necessary to bring three wires from the plant to the switchboard. The size of the positive and negative cables should not be smaller than 7.036 on the Model "L" plant, and 7.044 on the Model "M." The field wire should be 7.036 on either plant. Where the plant is installed a long distance from the batteries it may be necessary to increase the size of these cables. (A voltage drop reference chart is on the back cover.)

A cross arm should be fitted to the tower to take the wires to the battery room and ample distance allowed between the wires so that they cannot touch or short in a heavy wind. The wires from the cross arm to the head assembly should be run in screw conduit or other suitable manner and arranged that they cannot fray together or on the tower.

The relay and Automatic Power Control Unit should be mounted close to the batteries in a clean, dry position and firmly fixed to a wall free from vibration.

When the plant is used on an existing engine installation the wires from the battery terminal on the relay should be taken directly to the house lighting battery and not connected to the existing switchboard. In this case the load terminals on the relay need not be used. The engine and wind plants can be run either independently or together, but the latter is not recommended as the combined charge rate to the batteries may be too high.

Where it is not intended to use the Automatic Power Control Unit the field lead need not be run to the battery room but the Positive and Field terminals on the head assembly should be joined together.

**RELAY**

Several types of relays are employed, but in each case the connections are plainly marked.

ABBREVIATIONS used on relays are as under:—

- G+Generator Positive.
- G—Generator Negative.
- B+Battery Positive.
- B—Battery Negative.
- L+Lights Positive.
- L—Lights Negative.

Connect the two wires from the Plant to the generator terminals of the Relay, taking care that they are not reversed in any way (that is, do not connect positive lead to negative terminal).

The batteries are connected to the B+ and B— terminals.

The house lights should be connected to the load terminals through a switch and fuse.

**IMPORTANT!** The relay used with this plant is a selenium dry rectifier and has not moving parts or adjustments. The following special points should be carefully observed:—

1. The relay should not be used at maximum charging rate when the temperature is above 108 deg. F.
2. The relay must be mounted in a dry, ventilated position and the space between the ventilating fins kept free from cobwebs, etc.
3. As the plates are alive they must not be touched with any metal object without first stopping the plant and removing the battery leads.
4. Never attempt to dismantle unit or allow it to become damp.
5. Never exceed maximum charging rate.

The selenium rectifier will give long, trouble-free service if the above points are adhered to and is free of all mechanical and electrical interference.

**Before letting the Plant into the wind, check all wiring and connections.**

## Dunlite Power Control Unit

The DUNLITE AUTOMATIC POWER CONTROL UNIT can be used with DUNLITE MODELS "L" & "M" WIND DRIVEN PLANTS or any DUNLITE BELT DRIVEN GENERATOR. Its use is to reduce the charging rate of the generator when the voltage reaches a certain present limit and thus lengthen battery life.

When a battery is almost fully charged its voltage commences to rise until it reaches a voltage of 2.5 volts per cell when fully charged. Thus a 32 volt set of house lighting batteries will reach approximately 40 volts when fully charged. By adjusting the voltage control unit to approximately 38 volts the DUNLITE AUTOMATIC POWER CONTROL UNIT will allow the maximum charge of the generator to go to the batteries until they are almost fully charged, then reduce the charging rate so that no damage can be done to the battery through excessive charging.

### INSTALLATION

The DUNLITE AUTOMATIC POWER CONTROL UNIT should be mounted as near as possible to the relay and batteries. The positive and negative terminals on the unit are then connected to the positive and negative terminals on the relay. The F terminal on the unit is connected to the F terminal on the generator. The field wire from the head assembly should be at least 7/036.

### TO ADJUST DUNLITE AUTOMATIC POWER CONTROL UNIT

When the unit is connected, switch the AUTOMATIC POWER CONTROL UNIT to the off position by means of the small tumbler switch and run generator until batteries are fully charged. Then switch on unit and adjust the small shaft at the bottom right of unit until the generator charge rate drops to about 3 to 4 amps. The voltage on the volt-meter will then read approximately 38 volts depending on the condition of the battery.

Periodically the batteries should be checked with the hydrometer to see that the batteries are almost fully charged before the charging rate starts to decrease.

When necessary to give the batteries an equalising charge the AUTOMATIC POWER CONTROL UNIT can be switched off by means of the tumbler switch at bottom left-hand side of unit.

NOTE. When operating the Automatic Power Control Unit makes a buzzing sound and causes the ammeter needle to flicker slightly. The unit will only operate when the batteries are nearing full charge and has no effect on the charging rate of the plant until it commences to operate.

### SERVICE AND MAINTENANCE

The 32 volt Automatic Power Control Unit uses vibrating points to control the field circuit and periodically the points may need dressing. The adjustable point should be removed and the points cleaned with an ignition file or hone. When replacing the adjustable point the contact gap should be set at .020 in.

Should the points become exceptionally dirty or should dust get between them, the plant will not charge. In this case switch the control to the off position and the plant should operate normally.

If there is not sufficient range on the adjustment knob it can be further varied by the spring tension on the unit.

Should it be necessary to return the unit for repairs, remove the complete unit and join together the positive and field wires. The ends of the wires should then be covered with insulation tape so that the negative wire cannot touch the other two. The plant can then be used as a manual operated plant.

# Operation and Maintenance

## ADJUSTING CHARGING RATE

After carefully checking the assembly of the plant and the wiring connections, the brake can be released and the plant allowed to run in the wind. If there is sufficient wind the Automatic Power Control should be switched to the off position and the maximum charging rate adjusted. (See propeller instructions, Page 7.) **MAKE CERTAIN THAT THE MAXIMUM CHARGE RATE IS NOT EXCEEDED.** (See chart below.)

If there is not sufficient wind to set governing when installed, the plant should be carefully watched and not allowed to run unattended in a high wind until this can be attended to.

### MAXIMUM VOLTAGE AND AMPERAGE TABLE

	Model "L"		Model "M"		
Normal Voltage .....	32	50	32	50	110
Max. Voltage .....	50	66	50	66	145
Max. Amperage .....	20	15	30	23	11

Keep a careful check on the batteries when the plant is first installed and when they are fully charged the Automatic Power Control can be switched on and adjusted. (See Page 10.)

Once the governing and the Automatic Power Control are correctly set the plant can be left running continuously if desired. However, it is recommended to switch the plant off in gale force winds when possible and also when no power is required from the batteries for a long period, such as holidays, etc.

### TO TEST BATTERIES

Use hydrometer supplied. Unscrew caps from batteries, insert the hydrometer, squeeze the bulb, and then, by releasing slowly, the electrolyte will rise in the glass tube and the float will rise in the electrolyte.

Read at the electrolyte level. The specific gravity of a fully charged battery is 12.50 (Yellow); 12.00 (Blue), half charged; and 11.50 (Red), discharged.

### GREASING

The plant is equipped throughout with grease-packed ball and roller races and requires no attention for a period of 4-5 years. They should then be taken down, old grease washed out, and repacked with Mobilgrease No. 5, supplies of which can be obtained from your nearest DUNLITE distributor.

The gear box is filled with Retinax Light or similar grade of gear oil, and should be renewed when the bearings are regreased.

A few drops of oil placed periodically on the brake linkages will keep them free and should be applied when the brake adjustment is checked.

### BRAKE

The adjustment of this should be checked every six months (refer Page 6 for details). Any wear should be taken up on the adjusting lock nuts and not by sliding the furling handle down the tower.

### BRUSHES

These should be inspected periodically (about every 6 months) and replaced when worn to about  $\frac{1}{2}$  inch in length. To change brushes, loosen the screw fixing the brush to holder, slide old brush out and new one into position, and tighten screw.

When inspecting brushes, check brush holders for freedom and tension. When brush is lifted  $\frac{1}{4}$  inch from face of commutator and let go it should go back with a sharp click. Correct brush pressure (measure on brush face) is 6 ozs.

When renewing always use genuine Dunlite brushes.

### COMMUTATOR

This is made from hard drawn copper bar and, provided that the rest of the system is kept in order, should only need refacing at every complete generator overhaul. After any refacing the mica must be undercut .030 inches.

When in use the commutator will develop a dark glaze finish. This is beneficial to the brush life and should not be removed.

Should the commutator show signs of burning or flat spots it would be due to the following:—

- (a) Excessive Charging Rate.  
If the plant exceeds the rated output the governing should be adjusted immediately (refer Page 12).
- (b) Brushes Worn Out.  
The brush holders are fitted with stops that prevent them from damaging the commutator when the brush is worn out. Thus, when the brush is worn out, it will be off the commutator and will cause considerable arcing. This will be noticed by the ammeter needle fluctuating when the plant is charging.
- (c) Faulty Battery Connections.  
These allow the voltage to vary and, if allowed to be unchecked, will cause blown globes or even exploded batteries. Check all connections periodically by feeling each one after the plant has been charging for an hour or so. If any feel warm, it indicates a bad connection and the lugs should be removed and thoroughly cleaned. **MAKE SURE PLANT AND LOAD ARE TURNED OFF BEFORE DOING THIS.**



(d) Faulty Brushes.

Certain types of carbon will cause rapid commutator wear, whilst others will cause burning. Be sure genuine factory approved brushes are fitted.

### BEARINGS

We recommend dismantling the generator every 4-5 years. The bearings and housings should be carefully washed out with clean petrol and the bearings repacked with a good quality bearing grease (Mobilgrease No. 5).

When the propeller is tightened, no end play should be in the generator or lay shaft. Should end play develop, immediate steps should be taken to dismantle generator and find the cause, otherwise the shaft may wear and cause extensive damage to gears and windings.

### WINDINGS

Windings are very heavy and with a big safety factor. Should an armature burn out, the fault will be due to excessive charging rate. After repairing, check governing carefully.

### RADIO INTERFERENCE SUPPRESSION

Two radio interference condensers are fitted inside the generator brush plate, one is connected to each brush holder. In outback areas and where radio interference is found on the short wave radio band it may be necessary to fit a special choke filter to the generator line.

### GENERATOR POLARITY

Under normal circumstances the polarity of these generators cannot alter, but should the wiring be faulty or a short circuit, it is possible to happen. Should the polarity become reversed it can be corrected as follows:—

Have all the wires connected in their correct position. With the brake on lift either generator brush and place a piece of cardboard underneath it so it cannot touch the commutator.

Switch the Automatic Power Control to the off position and then with a screwdriver bridge the generator positive and load positive terminals on the relay for about two seconds. The cardboard can then be removed from under the brush holder and the polarity will then be correct.

**NEVER ATTEMPT TO MAKE THE GENERATOR RUN AS A MOTOR.**

### PROPELLER

The propeller must always be tight on the shaft and should have no end or side play. Should any sign of looseness or vibration develop, the plant should be immediately stopped until the trouble is rectified.

## FAULT TESTING

### TO TEST PLANT WITHOUT USING TEST METERS IF PLANT WILL NOT CHARGE

1. (a) Check all wiring and see that all connections are correct, clean and tight.  
(b) Check battery terminals for corrosion and loose connections.  
(c) If a battery charger is fitted, see that the switch is in normal position.
2. If the above normal appear in good condition, remove the cover from the relay terminals, allow the plant to run in the wind, and, with a piece of wire, short the generator positive and negative terminals on the relay. If a flash occurs, it indicates that the generator is charging and the fault is either that (a) the generator is depolarized or (b) the relay is at fault.
  - (a) To test for depolarization reverse the generator positive and negative leads on the relay and allow the plant to run in the wind. If it now charges OK, reconnect wires in original position and repolarize generator. (See instructions, Page 15.)
  - (b) If the plant will not charge after reversing the leads, the fault will probably be in the relay. A fuse link is fitted at the back of some units and this should be examined. If this is blown it would indicate that (a) the charging rate is too high, or (b) there is a short in the wiring to the generator. (See instructions on relays.)
3. If no flash occurs in test 2, it would appear that no current is coming from the generator, so proceed as follows:—

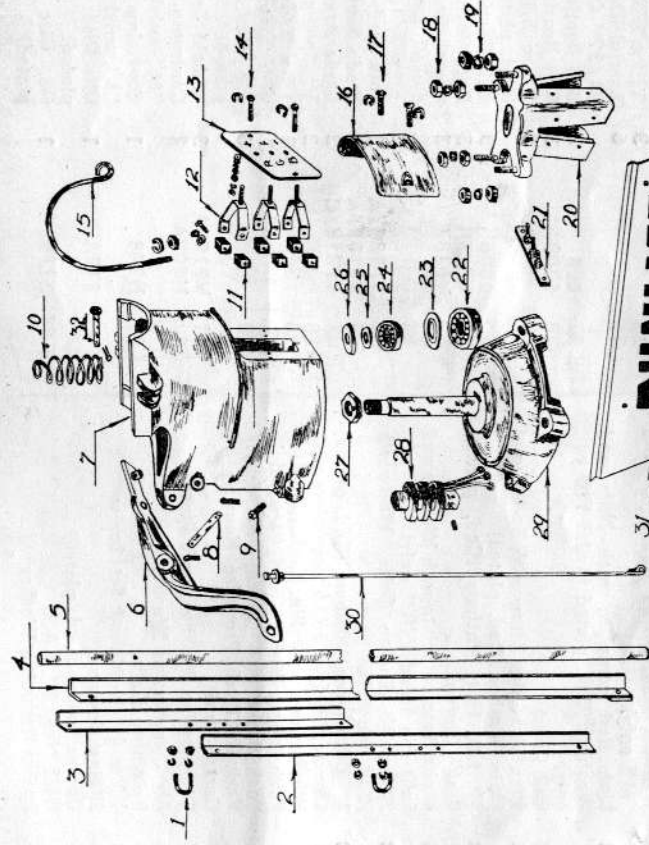
Remove generator cover and see that the brushes are not worn out and are seating correctly on the commutator and that all leads appear in order. Clean commutator with fine sand paper. Check collector brush on head assembly. Then test plant as outlined in Paragraph 2. If still no flash is seen, switch plant out of wind and lift negative (earth) brush from commutator and pack a piece of paper or cardboard under it to prevent it touching the commutator. Then take a small piece of wire and join the load positive and generator positive terminals on the relay and note results.

  - (a) If no flash occurs or no discharge shows on the meter it would indicate a faulty connection in the wiring of generator. Check this by carefully examining all wiring, joints and collector brush. If all these are in order, the fault is probably in the fields and the generator will need dismantling.
  - (b) If a slight flash occurs and a discharge of one amp. ( $\frac{1}{2}$  amp. on 12-volt plants) shows, it will indicate the wiring and field coils are in order and the trouble probably in armature of generator.
  - (c) If a large flash occurs and a heavy discharge shows, it would indicate a short circuit in wiring of generator. This can be ascertained by disconnecting generator lead to main generator terminal and testing again. If all wiring shows clear with suppressor from positive brush, holder re-connect generator lead and test again. If heavy discharge still shows, it will indicate breakdown in generator.

The repairs to generators and relays should only be undertaken by a skilled electrician and in accordance with the data supplied by this Company.

# REFERENCE LIST

Ref No.	Part No.	Quantity	MODEL "L" AND "M" HEAD ASSEMBLY Name
1	H276	2	U Bolts complete with nuts and washers (Cad. plated)
2	H275	1	Rear Tail Support
3	H275	1	Front Tail Support
4	H197/B	1	Tail Suspension Angle complete with Bolts
5	H198	1	Tail Bone
6	H210	1	Rear Pivot Arm
7	H195/A	1	Head Body
8	H211	1	Rear Pivot Pin with Split Pins (Cad. plated)
9		1	1" x 5/16" Hardened Set Screw (Cad. plated)
10	H209	1	Pivot Arm Spring (Cad. plated)
11	286E	6	Copper Morganite Brushes
12	H200	3	Brush Springs complete with Metal Thread Screws
13	H201	1	Brush Plate Bakelite
14		2	5/8" x 3/16" R.H. Brass Metal Threads and Spring Washers
15	H242	1	Generator U Bolt with Nuts and Washer
16	H196	1	Terminal Cover
17		2	1 1/2" x 3/16" R.H. Brass Metal Threads and Spring Washers
18		8	1/2" Whit. Nuts (Cad. plated)
19		4	1/2" Spring Washers (Cad. plated)
20	T1	1	Tower Cap, 3 post
20	T3	1	Tower Cap, 4 post
21	H220	1	Terminal Strip complete with Metal Thread Screws
22	6210	1	Bottom Ball Bearing
23	H194	1	Bottom Grease Retainer
24	RSL8	1	Top Ball Bearing
25	H193	1	Top Grease Retainer
26	H219	1	Top Grease Retainer Cover (Cad. plated)
27	H253	1	Lock Nut complete with Screw
28	H199	1	Slip Rings complete
29	H202	1	Head Base
30	H212	1	Centre Pull-out Rod complete
31	H255	2	Tail Wings complete with Bolts
32	H318	1	Pin for Generator U Bolt (Cad. plated) with Split Pin



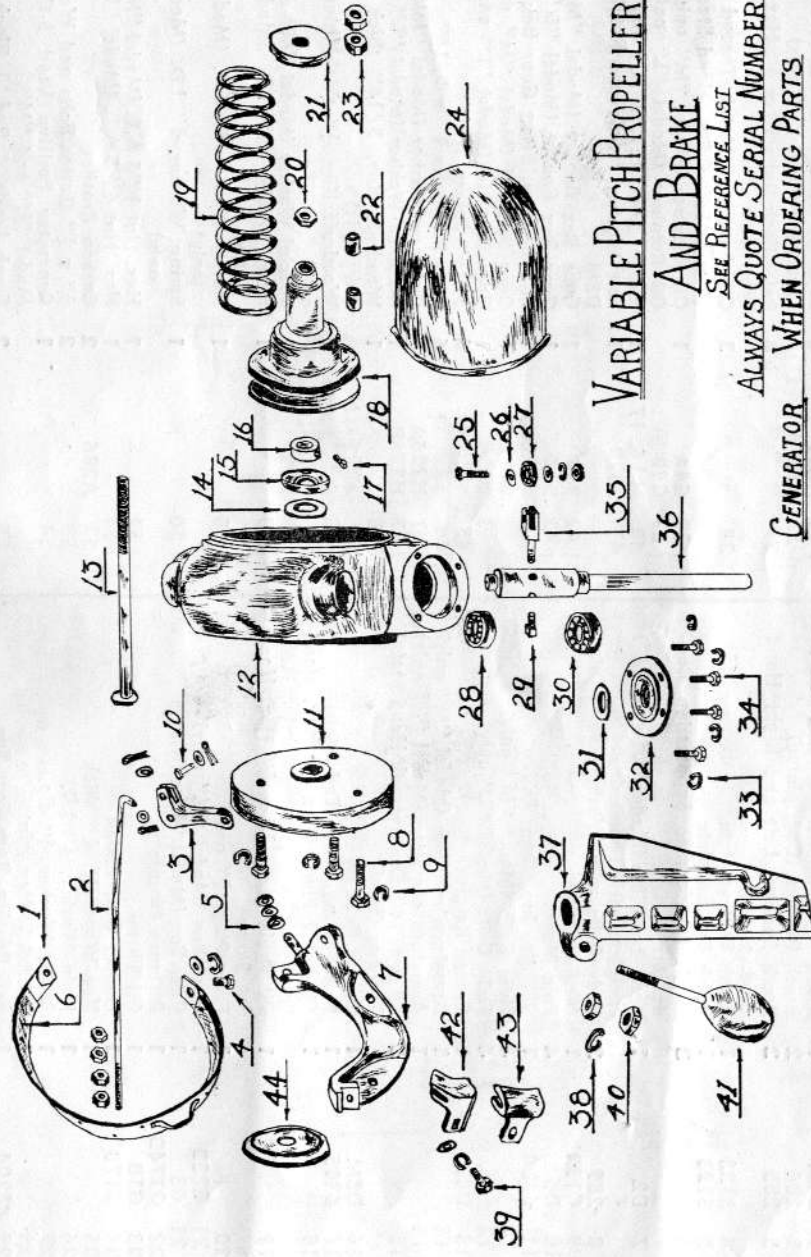
MODEL M AND L  
HEAD ASSEMBLY

SEE REFERENCE LIST  
ALWAYS QUOTE SERIAL NUMBER  
OF GENERATOR WHEN ORDERING PARTS

## REFERENCE LIST

### VARIABLE PITCH PROPELLER AND BRAKE MODEL "L" AND "M"

Ref. No.	Part No.	Quantity	Name	Ref. No.	Part No.	Quantity	Name
1	H206/A	1	Brake Band (Cad plated)	22	VP259	2	Bronze Bushes
2	H208	1	Link Rod complete with Nuts and Washers (Cad. plated Model "L" and "M" only)	23		1	$\frac{3}{8}$ " dia. S.A.E. Hex. Nuts (Cad. plated)
2	H278	1	Link Rod complete with Nuts and Washers (Cad. plated Model 110 volt only)	24	VP257	1	Spun Aluminium Cover
3	H207/B	1	Bell Crank	25		3	$1\frac{1}{4}$ " x $5/16$ " Cad. plated Engine Bolts
4		1	$\frac{3}{4}$ " x $5/16$ " set Screw with Spring and Plain Washer (Cad. plated)	26		6	Special Thin Washers, $5/16$ " I.D., $21/32$ " O.D. 18S.W.D.
5	H216/A	3	$\frac{1}{2}$ " I.D. Flat Washers (Cad. plated)	27	EL8	3	Ball Bearings for Fork Ends
6	H204/B	1	Brake Lining	28	6203	3	Ball Bearings for Blade Shafts
7		1	Brake Base complete with Washer and Split Pin (Model "L" only)	29		3	$\frac{5}{8}$ " x $5/16$ " Hardened Set Screws (Cad. plated)
8		3	$2$ " x $\frac{3}{8}$ " Engine Bolts, Whitworth (Cad. plated)	30	6206	3	Ball Bearings for Blade Shafts
9		3	$\frac{1}{2}$ " I.D. Spring Washers (Cad. plated)	31	VP258	3	Felt Washers
10		1	Clevis Pin $\frac{3}{8}$ " x $5/16$ " complete with Washer and Split Pin (Cad. plated)	32	VP187	3	Grease Retainers
11	H189A	1	Back Brake Hub (Model "L" only)	33		12	$5/16$ " Spring Washers (Cad. plated)
12	H189B	1	Back Brake Hub (Model "L" only)	34		12	$1$ " x $5/16$ " Set Screws (Cad. plated)
13	VP181/A	1	Variable Pitch Propeller Housing	35	VP184/A	3	Fork Ends
14	VP183/B	1	Centre Shaft	36	VP182/A	3	Blade Shafts
15	VP261	1	Compression Washer Back Plate	37	VP218/C	3	Blade Arm Casting
16	VP260/A	1	Air Compression Washer	38		3	$\frac{3}{4}$ " Spring Washers (Cad. plated)
17	VP270	1	Retaining Collar	39		1	$1$ " x $5/16$ " Set Screw (Cad. plated) with Spring and Plain Washer
18	VP185/A	1	Sliding Governor	40		6	$\frac{3}{4}$ " Hex. Nuts, Whitworth (Cad. plated)
19	VP217	1	Centre Governor	41	VP190A	3	Weight Spindle
20		1	Half Nut, $\frac{3}{8}$ " S.A.E.	42	H205A	1	Centreing Clamp Fork End (Model "M" only)
21	VP186	1	Spring Retaining Washer	43	H248	1	Centreing Clamp Fork End (Model "L" only)
				44	317A	1	Oil Disc (Model "M" only—Cad. plated)
				44	317B	1	Oil Disc (Model "L" only—Cad. plated)



**VARIABLE PITCH PROPELLER**

**AND BRAKE**

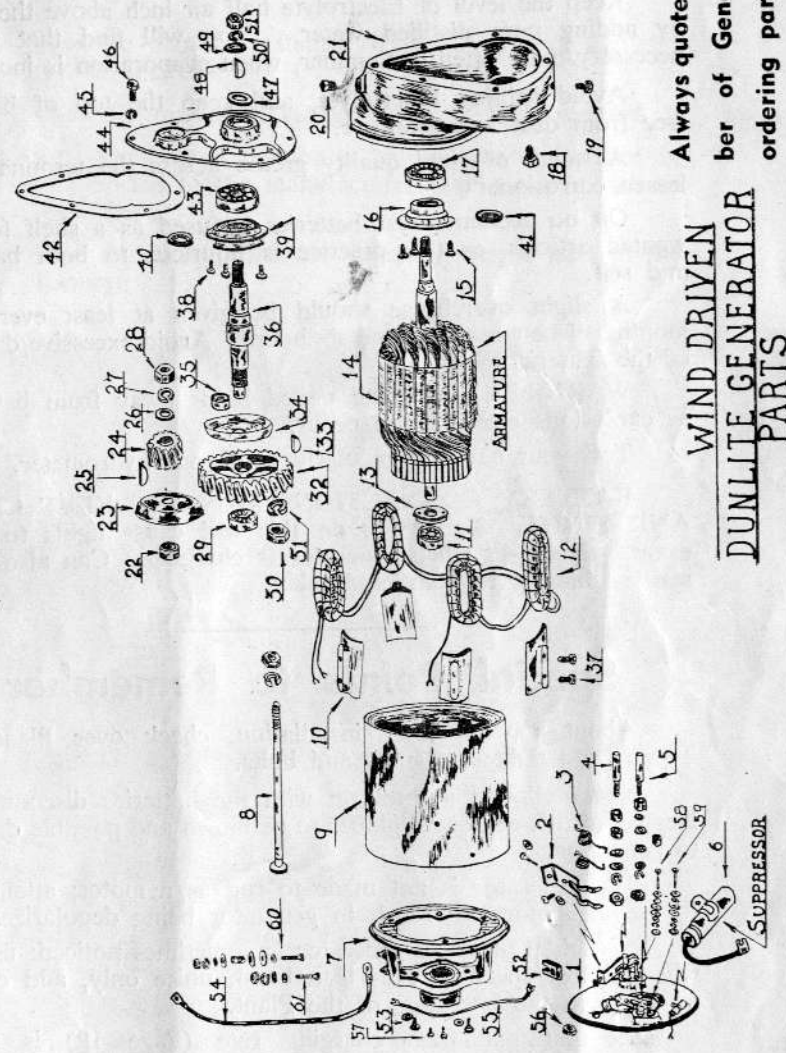
SEE REFERENCE LIST

ALWAYS QUOTE SERIAL NUMBER OF

GENERATOR WHEN ORDERING PARTS

1,000 WATT MODEL "L" AND 1,500 WATT MODEL "M" WIND-DRIVEN DUNLITE GENERATORS

Ref. Part No.	Quantity	Name	Ref. Part No.	Quantity	Name
1 D1A	1	Brush Plate (Model "L" and "M")	36 H223	1	Layshaft (Model "M" only)
2 284	2	Brush Holders (Cad. plated)	36 G127A	1	Layshaft (Model "L" only)
3 285	2	Brush Springs, Left and Right Hand (Cad. plated)	37	8	Pole Block Bolts 1" x $\frac{3}{8}$ " Hex. Head, Whitworth
4 S123	1	Brush Pin complete	38	3	Oil Retainer, Metal Thread Screws $\frac{3}{8}$ " x 3/16" C.S.K. Head Steel
5 S123	1	Brush Pin complete	39 G4A	1	Oil Retainer (Model "M" only)
6	2	Radio Interference Suppression Condensers	39 G4B	1	Oil Retainer (Model "L" only)
7 D2	1	Com. End Plate (Model "L" and "M") complete with Terminals	40 M.I.S. 17	1	Rubber Seal (Model "L" and "M")
8 289	2	Body Bolts with Washers and Nuts	41 282B	1	Felt Washer for Grease Retainer for D5M
9 G132	2	Medium Body	42 315	1	Gear Box Gasket (Model "M" only)
10 D6	4	Pole Blocks	42 307	1	Gear Box Gasket (Model "L" only)
11 6204	1	Ball Bearing, Com. End	43 6206	1	Ball Bearing, Front Gear Box
12	4	Field Coils (Model "M" only)	44 G232B	1	Gear Box Lid (Model "M" only)
12 D4L	4	Field Coils (Model "L" only)	44 G2	1	Gear Box Lid (Model "L" only)
13	1	Grease Retainer	45	6	5/16" Spring Washers
14	1	Armature complete (Model "M" only)	46	6	Gear Box Bolts 1" x 5/16"
14	1	Armature complete (Model "L" only)	47 H226A	1	Distance Washer (Model "M" only)
15	3	$\frac{3}{8}$ " x 3/16" Countersunk Head Metal Threads (Steel)	47 H226B	1	Distance Washer (Model "L" only)
16 D5M	1	Grease Retainer	48	1	Woodruff Key, 5/16" thick (Model "M" only)
17 6205	1	Ball Bearing, Drive End	48	1	Woodruff Key, $\frac{1}{4}$ " thick (Model "L" only)
18	1	Oil Level Plug, $\frac{3}{8}$ " x $\frac{3}{8}$ " Hex. Head	49 H227	1	Special Washer (Model "M" only)
19	1	Oil Drain Plug, $\frac{3}{8}$ " x $\frac{3}{8}$ " Hex. Head	49	1	Plain Washer $\frac{3}{4}$ " I.D. (Model "L" only)
20	1	Set Screw	50	1	Spring Washer 1" I.D. (Model "M" only)
21 G232	1	Filler Plug, $\frac{3}{8}$ " gas	50	1	Spring Washer. $\frac{3}{4}$ " I.D. (Model "L" only)
21 G3	1	Gear Box (Model "M" only)	51	1	Hex. Nut 1" S.A.E. (Model "M" only)
22 G274B	1	Gear Box (Model "L" only)	51	1	Hex. Nut $\frac{3}{4}$ " S.A.E. (Model "L" only)
23 G1B	1	Distance Ferrule	52 A286	2	Carbon Brushes
24 G170	1	Oil Throw	53	2	$\frac{3}{8}$ " x $\frac{3}{4}$ " Gutter Bolts and Washers
25	1	Helical Gear Pinion	54	1	Generator Positive Lead 3-Core for Model "L" and "M"
26	1	Key Woodruff, $\frac{1}{4}$ " thick	55	2	Brush Leads, 1 Red, 1 Black (Model "L" and "M")
27	1	Plain Washer, $\frac{3}{8}$ " I.D.	56	1	Rubber Grommet $\frac{3}{8}$ " I.D.
27	1	Spring Washer, $\frac{5}{8}$ " dia.	57	2	$\frac{3}{8}$ " x 5/32" Brass R.H. Metal Thread
28 6204	1	S.A.E. Hex. Nut	58	1	1 $\frac{1}{2}$ " x 3/16" Brass Insulated Brush Stop complete
29	1	Ball Bearing, Rear Gear Box	59	1	1 $\frac{1}{2}$ " x 3/16" Brass Insulated Brush Stop complete
30	1	S.A.E. Half Nut	60	3	Com. End Plate Terminals (Model "L" and "M")
31	1	Spring Washer	61		Not used on Model "L" or Model "M"
32 D224	1	Helical Gear (Model "M" only)			
33	1	Woodruff Key, 5/16" wide (Model "M" only)			
33	1	Woodruff Key, $\frac{1}{4}$ " wide (Model "L" only)			
34		Not used on Model "L" or Model "M"			
35		Not used on Model "L" or Model "M"			



Always quote Serial Number of Generator when ordering parts.

**WIND DRIVEN  
DUNLITE GENERATOR  
PARTS**

SEE REFERENCE LIST

## Care and Attention of Batteries

The batteries are the reservoir of your electric supply. Treat them well, and they will give you many years of service; abuse them, and their lifetime will be diminished.

Keep the level of Electrolyte half an inch above the plates by adding pure distilled water. You will find that this is necessary more often in Summer, when evaporation is increased.

Avoid spilling Electrolyte, and keep the top of batteries free from dust and moisture.

A smear of good quality grease across the terminals will lessen corrosion.

On no account must batteries be used as a shelf for unwanted articles, as this practice is injurious to both batteries and self.

A slight overcharge should be given at least every two months, of between four and six hours. Avoid excessive draining of the batteries.

**WARNING!** Keep all naked lights away from batteries, as explosions are liable to occur.

Test your batteries regularly with your hydrometer.

**BATTERY CONNECTIONS MUST BE KEPT CLEAN AND TIGHT.** Failure to do this will cause lights to come excessively bright when generator is charging. Can also cause serious damage to plant and relay.

## Special Points to Remember

About a week after installation, check over Plant and Tower, and tighten all nuts and bolts.

Never allow Plant to run with the batteries disconnected. Neglect of this will cause globes to be blown and possible damage to generator.

The generator is not made to run as a motor; attempting to use as motor will result in generator being depolarized.

A slight squeak in generator is sometimes noticed; usually when at low speeds. This is a brush noise only, and causes no harm in the operating of the Plant.

See that maximum charging rate (Page 12) is never exceeded, or damage will be caused to generator and relay. If charging rate is too high, alter governing as on Page 7.

Should trouble develop, always stop Plant immediately until fault rectified.

## GUARANTEE

This Dunlite wind-driven Plant, Serial No. \_\_\_\_\_ is hereby guaranteed against electrical and mechanical defects for a period of twelve months, provided the following conditions are adhered to:—

- That the plant is installed strictly in accordance with the instructions.
- That the maximum charging rate is not exceeded.
- That the bottom portion of this guarantee is filled in and posted to the manufacturer within one month of installation.
- That the faulty parts are returned freight paid to the factory.

Test Motor, 12-in. ....	50	4.2	1.7	.45
Pump Motor—150 gal. per hr. ....	275	23.0	9.2	2.50
Milking Machine ....	300-1600	—	10-50	2.7-14.5
Vacuum Cleaner, medium ....	275	23.0	9.2	2.50
Soldering Iron ....	100-200	8-16	3.3-6.7	.91-1.82
6-lb. Flat Iron ....	550	45.8	18.3	5.00
Toaster ....	550	45.8	18.3	5.00
15-Watt Lamp ....	15	1.2	.5	.135
30-Watt Lamp ....	30	2.5	1.0	.27
60-Watt Lamp ....	60	5.0	2.0	.54
75-Watt Lamp ....	75	6.3	2.5	.7
100-Watt Lamp ....	100	8.3	3.33	.9
Kettle ....	500	—	17.0	5.0
Floor Polisher ....	300-500	—	9-17.0	3-5.0
Food Mixer ....	60	5.0	2.0	.54

## Voltage Drop of Various Bare Cables

Calculated on 100 yds. of Cable (50-yard Double Run).

Weight per 100 yds.	Size of Cable	AMPS														
		1	2	3	4	5	6	7	8	9	10	15	20	25	30	
	1.044	1.5	3.1	4.7	6.3	7.9										
	1.064	.76	1.5	2.2	3	3.7	4.5	5.2	5.9	6.7	7.5					
8.35	7.036	.34	.68	1	1.4	1.7	2.1	2.4	2.7	3.1	3.4	5.4	6.8			
15.0	7.048	.23	.46	.69	.92	1.1	1.4	1.6	1.8	2.1	2.3	3.4	4.6	5.7	6.9	
26.5	7.064	.11	.22	.33	.44	.54	.65	.76	.87	.98	1.1	1.6	2.2	2.7	3.3	
34.	19.044	.08	.17	.25	.34	.42	.51	.59	.68	.76	.84	1.3	1.7	2.1	2.5	