WIPAC

dealing with the servicing
and maintenance of

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THE WIPAC GROUP

BLETCHLEY ENGLAND

W02075

WIPAC TECHNICAL DATA

ALTERNATOR ELECTRICAL EQUIPMENT

(WIPAC SERIES 114)

AS FITTED TO STANDARD ROAD MACHINES

FROM AUGUST 1955

General Description

The lighting and ignition system of Wipac Alternator equipped motor cycles consists of a simple six pole Alternator generating set which supplies current through a metal plate rectifier to the battery, which then feeds the ignition system, lights, horns, etc. The Alternator ring carries six coils which are connected in two sets of three in series. By using one set of three shunted via a resister a certain output is obtained for daylight running. When the pilot or parking lights are switched on the resister is disconnected in order to provide a slightly higher charge rate to compensate for the drain of the smaller bulbs. When the headlights are switched on all six coils are connected with the resister still out of circuit, thus giving maximum output, most of which is absorbed by the headlamp bulb, but still leaving a couple of amperes for maintaining the state of charge of the battery.

The alternating current supplied by the generator is converted to direct current by means of the rectifier which is of the very efficient full wave bridge connected type.

The Wipac Alternator equipment provides an emergency starting system which, when the ignition switch is put into the emergency position connects all the six coils together, and provided the lighting switch is in the 'off' position, gives full output in order to rapidly bring up the voltage of a discharged battery and is effective in obtaining an immediate start under these conditions. *The maximum charging current in the emergency position is very high as there is no drain against it by the lighting system, and the engine should not be run in this position for more than 10—15 minutes.* This type of emergency starting being entirely DC enables the machine to be run through the complete operational range of the engine.

The headlamp has a reflector with an extremely efficient reflecting surface provided by vacuum electronic deposition of aluminium. This reflecting surface should not be touched or cleaned in any way and it will retain its brilliance indefinitely. The bulb is a pre-focus twin filament type giving correct beam length and spread in main and dip positions.

The main connections in the Wipac system are made by rubber socket connectors to the lighting and ignition switches and by individual rubber covered bullet type push-in connectors which are handy for wiring checks or the re-installation of new wiring. These connectors are not intended as plugs and sockets for frequent manipulation and are only used when testing or fault finding, and it is extremely important that they should be making perfect contact as should all other connection points throughout the system.

Fault Finding

Equipment required:—

1. Wilkson Test Set.
2. 6v. 3w. bulb with holder and two test leads about 24″ long.
3. A well-charged 6 volt battery.

OR

A. A good quality moving coil AC volt meter to be used in conjunction with a one ohm resistive load.
B. 10-0-10 DC Ammeter.
C. 0-12 DC volt meter.
D 6v. 3w. Bulb with holder and two test leads about 24″ long.
E. A well charged 6 volt battery.

Accurate high grade moving coil instruments must be used, and the one ohm resister must also be accurate otherwise correct readings cannot be obtained.

Low or no charge

1. Before commencing any tests check the voltage of the battery and if completely exhausted substitute one which is known to be capable of accepting a charge.
2. Connect in series with the battery, (easily done by disconnecting the brown negative lead from the double connector), the DC Ammeter and check off the charge rates as detailed below:—

Ignition Switch	Lights Switch	Minimum Charge Rate
Ignition	Off	1.0 a.
Ignition	Low	1.3 a.
Ignition	High	1.0 a.
Emergency	Off	6.0 a.

These figures should be checked at approximately **3,000** r.p.m. and are the *minimum* permissible readings. Charge rates will, of course, vary with engine speed, the state of charge and condition of the battery, but the above figures will give a fair indication as to the correct functioning of the system.

N.B.—*It is essential that the correct wattage bulbs be used throughout the lighting system, as any deviation will seriously upset the charge rates. Their values may be obtained from the appropriate wiring diagram or owners handbook.*

If the meter readings are unsatisfactory then

3. Check the alternator output by disconnecting the white, orange and light green leads from the four-way connector. The maroon lead, where fitted, must be left in place in order to run the engine.

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Connect one side of the Wilkson Test Meter (AC volts with one ohm load) or the AC volt meter with the one ohm load paralleled across it, to the white lead, and the other side of the meter to the orange and light green leads in turn. With the engine running at a speed comparable to 30 m.p.h. in top gear, the meter should show a reading of 6.2—6.8 volts between white and light green, likewise white and orange. A low reading on one group of coils would indicate coil failure, and a low reading on both groups of coils will in all probability be due to a low flux density in the six pole rotor. No reading from both groups of coils is indicative of complete alternator failure.

N.B.—THE IMPORTANCE OF THE CORRECT BATTERY CONNECTIONS CANNOT BE OVER-EMPHASIZED. THE BATTERY POSITIVE SHOULD ALWAYS BE CONNECTED TO THE TRANSLUCENT LEAD AND BATTERY NEGATIVE TO THE BROWN LEAD. REVERSAL OF THESE CONNECTIONS WILL INVARIABLY BURN OUT THE RECTIFIER, AND IF THE ENGINE IS RUN UNDER THESE CONDITIONS THE MAGNETIC ROTOR WILL BECOME DEMAGNETISED.

4. Yet another cause of low or no charge rate stemming from the alternator is a short circuit to earth.

In order to check this it is essential to construct a very simple continuity check circuit, viz.: a 6 volt battery introduced in series with the DC volt meter will amply suffice for the purpose. Connect one end of the circuit to the white lead (common to all coils) and the other end to the machine frame earth. If a reading is obtained on the volt meter then one or both groups of coils is earthing out.

It is most desirable to carry out this check with both the stator and rotor left in position on the machine, the reason being that in isolated cases careless handling of the stator may have caused one or more of the soldered coil link connections to have become displaced, thus rubbing on the circumference of the rotor, hence shorting out the coils. Therefore, before condemning the alternator it is essential to check that all connections are well clear of the rotor, gently easing back any which look possible causes of future trouble.

This concludes alternator checks, and if the cause of the trouble has been located, revert to table and recheck the charge rates.

Rectifier Testing

Before attempting to carry out any tests on this unit it is essential that the white, green and brown wires are disconnected from the rectifier at the rectifier plug sockets.

Procedure	Battery Connections	Bulb Connections	Conclusions
Rectifier Check Connect a 6 volt battery in series with a 6v. 3w. bulb across the rectifier terminals (See diagram 1)	Positive—Light Green	Earthed	Bulb lights Rectifier O.K.
	Positive—White	Earthed	
	Positive—Brown	Green	Bulb does not light. Rectifier faulty replace.
	Positive—Brown	White	
Reverse battery connections. (See diagram 1)	Negative—Light Green	Earthed	Bulb does not light. Rectifier O.K.
	Negative—White	Earthed	
	Negative—Brown	Green	
	Negative—Brown	White	Bulb lights Rectifier faulty replace.

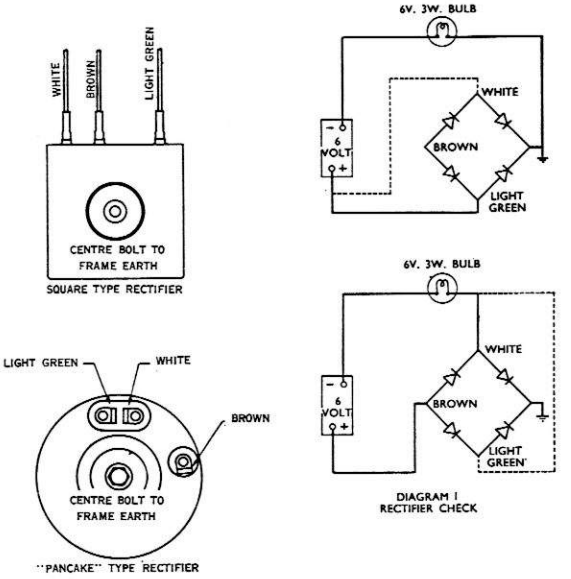

DIAGRAM 1
RECTIFIER CHECK

If it is found necessary to replace this component or to refit a proven good rectifier, ensure that it is rebolted tightly on to a scrupulously clean part of the frame, remembering that the case of the rectifier is DC positive.

The snap connectors should also be a tight fit. Insecurity of any one of the connectors results in arc burning of the terminal, damage internally to the plates and consequential premature rectifier failure.

N.B.—A RAPIDLY FLATTENING BATTERY NECESSITATES AN IMMEDIATE CHECK ON THE RECTIFIER.

Switches

On touring models the two switches are mechanically identical. A faulty switch will invariably give itself away if the procedure outlined below is adopted.

Remove the lamp front and substitute the cable plugs from the ignition switch to the light switch and vice versa. If the switch is faulty then the fault will be transferred from one circuit to the other. Replace the faulty switch with a new one.

Premature Bulb Failure

The premature bulb failure involving all or many of the light bulbs at one time on a full DC battery system is caused by a defective connection in the battery " line '.

This " line starts at—

1. The frame end of the translucent lead from the positive battery terminal and proceeds
2. Positive battery terminal
3. Negative battery terminal
4. Brown wire from battery negative to four-hole connector (bullet terminal)
5. Brown wire from four-hole connector to Ammeter (bullet terminal)
6. Ammeter terminal with brown wire
7. Ammeter terminal with blue wire and
8. Both ends of short insulated link wire in the ignition switch plug which joins blue Ammeter wire to brown wire going to light switch.

It must also be known that should the Ammeter develop an internal open circuit, the bulbs will blow. Also, should the battery have little or no electrolyte, this is partial or complete open circuit with the same results. There is, finally, the remote possibility of one of the actual wires in the battery line being broken. Again bulbs will blow.

No Spark

Check the contact breaker points gap and adjust to the recommended setting where necessary. Check cleanliness of contact faces, these, if in good order should have a light grey frosted appearance. Where fine matter, e.g., oil and grease have been present, the contacts may have a blackened burnt appearance. Should the condition not appear serious, then a light application of fine grade emery cloth will restore them. If in doubt replace the whole breaker group. Check the free action of the breaker arm on the pivot, as any sticking of this arm can cause intermittent difficulty.

N.B.—ON NO ACCOUNT SHOULD THE STAR SHAPED RETAINING WASHER AND THE BREAKER ARM BE REMOVED FROM THE PIVOT AS THE AMOUNT OF END FLOAT IS STRICTLY CONTROLLED, WHICH IS ESSENTIAL TO THE CORRECT FUNCTIONING OF THE CONTACT BREAKERS.

Condensers

Should the capacity be suspect, first check for good contact to earth. Secondly, the condenser may be short circuiting to earth (the battery and bulb is a simple quick test). Third, check by replacement. Visual recognition of a defective condenser or condenser connections is a vivid blue arcing at the contacts.

Circuit Tracing

If the machine is fitted with an Ammeter, switch on the ignition and turn the engine over very slowly, and when the contacts close, a discharge of approximately 3-4 amps should be evident on the Ammeter. Here again, a more accurate measurement can be obtained by putting the DC Ammeter in circuit with the battery.

If the machine is not fitted with an Ammeter then the latter will, of course, be essential. The showing of discharge on the Ammeter is an indication that the current is reaching the contacts by way of the ignition coil primary windings. Should this discharge not show, disconnect the maroon lead from the four-way connector at the alternator and put in series the DC volt meter when a reading should be obtained (one side of the meter being to earth). No reading at this point necessitates a check of the dark green lead to the switch side of the coil.

Remove the terminal from the coil and again connect in the meter as above, where a reading of 6 volts should be obtained providing the battery is well up and the ignition is still switched on. If current is not reaching the coil through the dark green lead, then one must check the ignition plug (black) on the harness.

The wire bridge across two of the terminals inside the plug may be fractured, in which case the engine still starts on either ignition or emergency, but not on both. Provided there is current in the dark green and no current in the maroon lead, then in all probability the primary windings of the ignition coil are defective necessitating coil replacement.

Ignition Coil Check

With the coil out of circuit and the DC volt meter connected up to a battery for continuity check, each end of the circuit across the two terminals should show continuity to prove that the primary winding is intact. Likewise, one lead on to either one of the terminals and the other on to the H.T. Pick-up point will show continuity, but a lower reading on account of the higher resistance in the secondary windings.

Third and last check is to ensure that the coil is not earthing out. To do this leave one lead on one of the terminals and connect the other with the coil case. No readings should show. Similarly with the H.T. Pick-up point.

A defective primary winding may continue to produce a weak spark whereas intermittent performance is invariably caused by a suspect secondary. Should there be any possible doubt about the ignition coil, however, a final check should be made by substitution.

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The alternating current supplied by the generator is converted to direct current by means of the rectifier which is of the very efficient full wave bridge connected type.

The Wipac Alternator equipment provides an emergency starting system which, when the ignition switch is put into the emergency position connects all the six coils together, and provided the lighting switch is in the 'off' position, gives full output in order to rapidly bring up the voltage of a discharged battery and is effective in obtaining an immediate start under these conditions. *The maximum charging current in the emergency position is very high as there is no drain against it by the lighting system, and the engine should not be run in this position for more than 10—15 minutes.* This type of emergency starting being entirely DC enables the machine to be run through the complete operational range of the engine.

The headlamp has a reflector with an extremely efficient reflecting surface provided by vacuum electronic deposition of aluminium. This reflecting surface should not be touched or cleaned in any way and it will retain its brilliance indefinitely. The bulb is a pre-focus twin filament type giving correct beam length and spread in main and dip positions.

The main connections in the Wipac system are made by rubber socket connectors to the lighting and ignition switches and by individual rubber covered bullet type push-in connectors which are handy for wiring checks or the re-installation of new wiring. These connectors are not intended as plugs and sockets for frequent manipulation and are only used when testing or fault finding, and it is extremely important that they should be making perfect contact as should all other connection points throughout the system.

Fault Finding

Equipment required:—

1. Wilkson Test Set.
2. 6v. 3w. bulb with holder and two test leads about 24″ long.
3. A well-charged 6 volt battery.

OR

A. A good quality moving coil AC volt meter to be used in conjunction with a one ohm resistive load.
B. 10-0-10 DC Ammeter.
C. 0-12 DC volt meter.
D 6v. 3w. Bulb with holder and two test leads about 24″ long.
E. A well charged 6 volt battery.

Accurate high grade moving coil instruments must be used, and the one ohm resister must also be accurate otherwise correct readings cannot be obtained.

Low or no charge

1. Before commencing any tests check the voltage of the battery and if completely exhausted substitute one which is known to be capable of accepting a charge.
2. Connect in series with the battery, (easily done by disconnecting the brown negative lead from the double connector), the DC Ammeter and check off the charge rates as detailed below:—

Ignition Switch	Lights Switch	Minimum Charge Rate
Ignition	Off	1.0 a.
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These figures should be checked at approximately **3,000** r.p.m. and are the *minimum* permissible readings. Charge rates will, of course, vary with engine speed, the state of charge and condition of the battery, but the above figures will give a fair indication as to the correct functioning of the system.

N.B.—*It is essential that the correct wattage bulbs be used throughout the lighting system, as any deviation will seriously upset the charge rates. Their values may be obtained from the appropriate wiring diagram or owners handbook.*

If the meter readings are unsatisfactory then

3. Check the alternator output by disconnecting the white, orange and light green leads from the four-way connector. The maroon lead, where fitted, must be left in place in order to run the engine.

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   In order to check this it is essential to construct a very simple continuity check circuit, viz.: a 6 volt battery introduced in series with the DC volt meter will amply suffice for the purpose. Connect one end of the circuit to the white lead (common to all coils) and the other end to the machine frame earth. If a reading is obtained on the volt meter then one or both groups of coils is earthing out.

   It is most desirable to carry out this check with both the stator and rotor left in position on the machine, the reason being that in isolated cases careless handling of the stator may have caused one or more of the soldered coil link connections to have become displaced, thus rubbing on the circumference of the rotor, hence shorting out the coils. Therefore, before condemning the alternator it is essential to check that all connections are well clear of the rotor, gently easing back any which look possible causes of future trouble.

   This concludes alternator checks, and if the cause of the trouble has been located, revert to table and recheck the charge rates.

Procedure	Battery Connections	Bulb Connections	Conclusions
Rectifier Check Connect a 6 volt battery in series with a 6v. 3w. bulb across the rectifier terminals (See diagram 1)	Positive—Light Green	Earthed	Bulb lights Rectifier O.K.
	Positive—White	Earthed	
	Positive—Brown	Green	Bulb does not light. Rectifier faulty replace.
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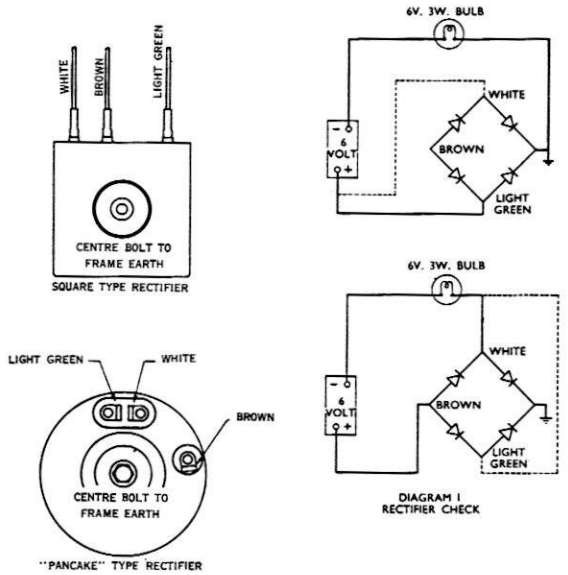
Reverse battery connections. (See diagram 1)	Negative—Light Green	Earthed	Bulb does not light. Rectifier O.K.
	Negative—White	Earthed	
	Negative—Brown	Green	
	Negative—Brown	White	Bulb lights Rectifier faulty replace.



If it is found necessary to replace this component or to refit a proven good rectifier, ensure that it is rebolted tightly on to a scrupulously clean part of the frame, remembering that the case of the rectifier is DC positive.

The snap connectors should also be a tight fit. Insecurity of any one of the connectors results in arc burning of the terminal, damage internally to the plates and consequential premature rectifier failure.

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On touring models the two switches are mechanically identical. A faulty switch will invariably give itself away if the procedure outlined below is adopted.

Remove the lamp front and substitute the cable plugs from the ignition switch to the light switch and vice versa. If the switch is faulty then the fault will be transferred from one circuit to the other. Replace the faulty switch with a new one.

Rectifier Testing

Before attempting to carry out any tests on this unit it is essential that the white, green and brown wires are disconnected from the rectifier at the rectifier plug sockets.

Premature Bulb Failure

The premature bulb failure involving all or many of the light bulbs at one time on a full DC battery system is caused by a defective connection in the battery " line '.

This " line starts at—

1. The frame end of the translucent lead from the positive battery terminal and proceeds
2. Positive battery terminal
3. Negative battery terminal
4. Brown wire from battery negative to four-hole connector (bullet terminal)
5. Brown wire from four-hole connector to Ammeter (bullet terminal)
6. Ammeter terminal with brown wire
7. Ammeter terminal with blue wire and
8. Both ends of short insulated link wire in the ignition switch plug which joins blue Ammeter wire to brown wire going to light switch.

It must also be known that should the Ammeter develop an internal open circuit, the bulbs will blow. Also, should the battery have little or no electrolyte, this is partial or complete open circuit with the same results. There is, finally, the remote possibility of one of the actual wires in the battery line being broken. Again bulbs will blow.

No Spark

Check the contact breaker points gap and adjust to the recommended setting where necessary. Check cleanliness of contact faces, these, if in good order should have a light grey frosted appearance. Where fine matter, e.g., oil and grease have been present, the contacts may have a blackened burnt appearance. Should the condition not appear serious, then a light application of fine grade emery cloth will restore them. If in doubt replace the whole breaker group. Check the free action of the breaker arm on the pivot, as any sticking of this arm can cause intermittent difficulty.

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Condensers

Should the capacity be suspect, first check for good contact to earth. Secondly, the condenser may be short circuiting to earth (the battery and bulb is a simple quick test). Third, check by replacement. Visual recognition of a defective condenser or condenser connections is a vivid blue arcing at the contacts.

Circuit Tracing

If the machine is fitted with an Ammeter, switch on the ignition and turn the engine over very slowly, and when the contacts close, a discharge of approximately 3-4 amps should be evident on the Ammeter. Here again, a more accurate measurement can be obtained by putting the DC Ammeter in circuit with the battery.

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Remove the terminal from the coil and again connect in the meter as above, where a reading of 6 volts should be obtained providing the battery is well up and the ignition is still switched on. If current is not reaching the coil through the dark green lead, then one must check the ignition plug (black) on the harness.

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N.B.—*It is essential that the correct wattage bulbs be used throughout the lighting system, as any deviation will seriously upset the charge rates. Their values may be obtained from the appropriate wiring diagram or owners handbook.*

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4. Yet another cause of low or no charge rate stemming from the alternator is a short circuit to earth.

In order to check this it is essential to construct a very simple continuity check circuit, viz.: a 6 volt battery introduced in series with the DC volt meter will amply suffice for the purpose. Connect one end of the circuit to the white lead (common to all coils) and the other end to the machine frame earth. If a reading is obtained on the volt meter then one or both groups of coils is earthing out.

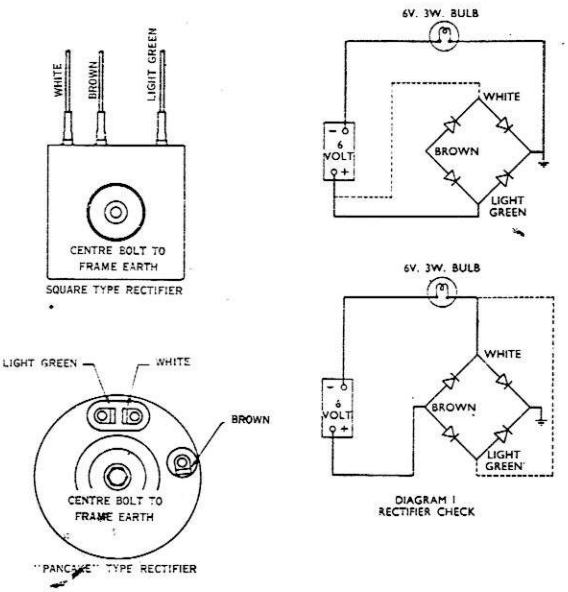
It is most desirable to carry out this check with both the stator and rotor left in position on the machine, the reason being that in isolated cases careless handling of the stator may have caused one or more of the soldered coil link connections to have become displaced, thus rubbing on the circumference of the rotor, hence shorting out the coils. Therefore, before condemning the alternator it is essential to check that all connections are well clear of the rotor, gently easing back any which look possible causes of future trouble.

This concludes alternator checks, and if the cause of the trouble has been located, revert to table and recheck the charge rates.

Rectifier Testing

Before attempting to carry out any tests on this unit it is essential that the white, green and brown wires are disconnected from the rectifier at the rectifier plug sockets.

Procedure	Battery Connections	Bulb Connections	Conclusions
Rectifier Check Connect a 6 volt battery in series with a 6v. 3w. bulb across the rectifier terminals (See diagram 1)	Positive—Light Green Positive—White Positive—Brown Positive—Brown	Earthed Earthed Green White	Bulb lights Rectifier O.K. Bulb does not light. Rectifier faulty replace.
Reverse battery connections. (See diagram 1)	Negative—Light Green Negative—White Negative—Brown Negative—Brown	Earthed Earthed Green White	Bulb does not light. Rectifier O.K. Bulb lights Rectifier faulty replace.



If it is found necessary to replace this component or to refit a proven good rectifier, ensure that it is rebolted tightly on to a scrupulously clean part of the frame, remembering that the case of the rectifier is DC positive.

The snap connectors should also be a tight fit. Insecurity of any one of the connectors results in arc burning of the terminal, damage internally to the plates and consequential premature rectifier failure.

N.B.—A RAPIDLY FLATTENING BATTERY NECESSITATES AN IMMEDIATE CHECK ON THE RECTIFIER.

Switches

On touring models the two switches are mechanically identical. A faulty switch will invariably give itself away if the procedure outlined below is adopted.

Remove the lamp front and substitute the cable plugs from the ignition switch to the light switch and vice versa. If the switch is faulty then the fault will be transferred from one circuit to the other. Replace the faulty switch with a new one.

Premature Bulb Failure

The premature bulb failure involving all or many of the light bulbs at one time on a full DC battery system is caused by a defective connection in the battery " line '.

This " line starts at—

1. The frame end of the translucent lead from the positive battery terminal and proceeds
2. Positive battery terminal
3. Negative battery terminal
4. Brown wire from battery negative to four-hole connector (bullet terminal)
5. Brown wire from four-hole connector to Ammeter (bullet terminal)
6. Ammeter terminal with brown wire
7. Ammeter terminal with blue wire and
8. Both ends of short insulated link wire in the ignition switch plug which joins blue Ammeter wire to brown wire going to light switch.

It must also be known that should the Ammeter develop an internal open circuit, the bulbs will blow. Also, should the battery have little or no electrolyte, this is partial or complete open circuit with the same results. There is, finally, the remote possibility of one of the actual wires in the battery line being broken. Again bulbs will blow.

No Spark

Check the contact breaker points gap and adjust to the recommended setting where necessary. Check cleanliness of contact faces, these, if in good order should have a light grey frosted appearance. Where fine matter, e.g., oil and grease have been present, the contacts may have a blackened burnt appearance. Should the condition not appear serious, then a light application of fine grade emery cloth will restore them. If in doubt replace the whole breaker group. Check the free action of the breaker arm on the pivot, as any sticking of this arm can cause intermittent difficulty.

N.B.—ON NO ACCOUNT SHOULD THE STAR SHAPED RETAINING WASHER AND THE BREAKER ARM BE REMOVED FROM THE PIVOT AS THE AMOUNT OF END FLOAT IS STRICTLY CONTROLLED, WHICH IS ESSENTIAL TO THE CORRECT FUNCTIONING OF THE CONTACT BREAKERS.

Condensers

Should the capacity be suspect, first check for good contact to earth. Secondly, the condenser may be short circuiting to earth (the battery and bulb is a simple quick test). Third, check by replacement. Visual recognition of a defective condenser or condenser connections is a vivid blue arcing at the contacts.

Circuit Tracing

If the machine is fitted with an Ammeter, switch on the ignition and turn the engine over very slowly, and when the contacts close, a discharge of approximately 3-4 amps should be evident on the Ammeter. Here again, a more accurate measurement can be obtained by putting the DC Ammeter in circuit with the battery.

If the machine is not fitted with an Ammeter then the latter will, of course, be essential. The showing of discharge on the Ammeter is an indication that the current is reaching the contacts by way of the ignition coil primary windings. Should this discharge not show, disconnect the maroon lead from the four-way connector at the alternator and put in series the DC volt meter when a reading should be obtained (one side of the meter being to earth). No reading at this point necessitates a check of the dark green lead to the switch side of the coil.

Remove the terminal from the coil and again connect in the meter as above, where a reading of 6 volts should be obtained providing the battery is well up and the ignition is still switched on. If current is not reaching the coil through the dark green lead, then one must check the ignition plug (black) on the harness.

The wire bridge across two of the terminals inside the plug may be fractured, in which case the engine still starts on either ignition or emergency, but not on both. Provided there is current in the dark green and no current in the maroon lead, then in all probability the primary windings of the ignition coil are defective necessitating coil replacement.

Ignition Coil Check

With the coil out of circuit and the DC volt meter connected up to a battery for continuity check, each end of the circuit across the two terminals should show continuity to prove that the primary winding is intact. Likewise, one lead on to either one of the terminals and the other on to the H.T. Pick-up point will show continuity, but a lower reading on account of the higher resistance in the secondary windings.

Third and last check is to ensure that the coil is not earthing out. To do this leave one lead on one of the terminals and connect the other with the coil case. No readings should show. Similarly with the H.T. Pick-up point.

A defective primary winding may continue to produce a weak spark whereas intermittent performance is invariably caused by a suspect secondary. Should there be any possible doubt about the ignition coil, however, a final check should be made by substitution.

WIPAC

MARK I

ALTERNATOR

EQUIPMENT

TESTING INSTRUCTIONS

TEST 1

Connections	Switch Position	Meter Reading
D.C. Output Check. Engine speed over 2,000 r.p.m. Connect ammeter 10-0-10 amps. in series with battery. If battery voltage reading is less than 5.5 volts connect to a fully charged battery.	Off	½—2 amps.
	L	½—1 amp.
	H	½—1 amp.

THIS EQUIPMENT IS FITTED TO THE 1954-55 MODELS OF THE ARIEL "COLT" L.H. AND B.S.A. C.10.L.

FAULT LOCATION

SYMPTOMS	CHECK
All bulbs burning out when engine is accelerated	1. Battery connections faulty. 2. Battery EARTH to machine faulty. 3. Rectifier connections faulty. 4. Snap connectors faulty between Rectifier and Battery. 5. Battery in bad condition.
No charge reading	1. Carry out TEST 1. 2. If still no charge reading after Test 1, carry out TEST 2 with *chaincase in position.* Should a voltage reading be obtained at C2, D2, E2, or F2, in TEST 2 it indicates that one or more of the ALTERNATOR coils are shorting to EARTH and the chaincase may be the cause of this. Retest with *chaincase removed.* 3. If above tests show no faults check Rectifier. See TEST 3.
Will not start on " EMG " nor " IGN "	1. Connect Ammeter in the Dark Green lead from Battery to Ignition Coil—Switch to " IGN "—With contact breaker points closed the reading should be 3.5 AMPS. if Battery voltage is not less than 6 volts. If this test is in order proceed to check:— 2. Contact breaker setting. (Should be .015"). 3. Contacts for dirt. 4. Condenser. 5. Connections and wiring.
Will not start on " EMG " O.K. on " IGN "	1. Voltage across YELLOW & ORANGE (SEE TEST 2). 2. Connections and wiring. 3. Engine timing.
Will not start on " IGN " O.K. on " EMG "	1. Battery. 2. Connectors and wiring.

TEST 2

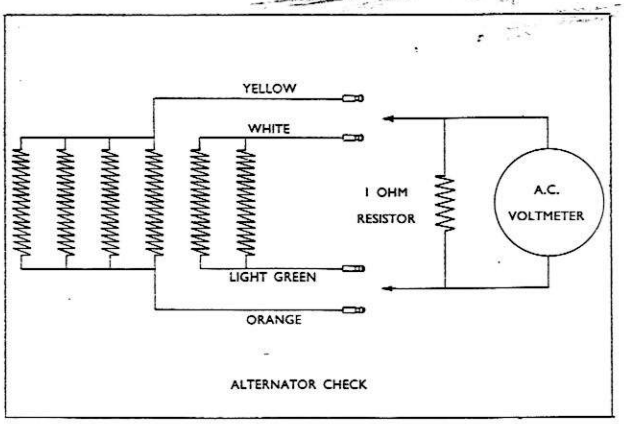
Procedure	Connections	Meter Reading	Conclusions
Alternator Check Engine Speed over 2,000 r.p.m. Connect A.C. volt-meter in parallel with 1 ohm resistor across corresponding pairs of alternator leads.	(A) Yellow—Orange (B) White—Light Green (C) Yellow—Machine Earth (D) Orange—Machine Earth (E) White—Machine Earth (F) Light Green—Machine Earth	5·5 to 6·5 3·8 to 4·8 Nil Nil Nil Nil	Alternator O.K.
	(A2) Yellow—Orange or (B2) White—Light Green	Nil	Check Soldered connections to coils.
	(C2) Yellow—Machine (Earth) (D2) Orange—Machine (Earth) (E2) White—Machine (Earth) (F2) Light Green—Machine (Earth)	Any Reading Here	One or more coils shorted to earth. Stator and coil group faulty. Replace.
	(A3) Yellow—Orange and (B3) White—Light Green	Under 5·5 Under 3·8	Rotor faulty. Replace.
	(A4) Yellow—Orange and (B4) White—Light Green	5·5 to 6·5 Under 3·8	One or more coils open circuit.
	or (A5) Yellow—Orange and (B5) White—Light Green	Under 5·5 3·8 to 4·8	Stator & coil group faulty. Replace.

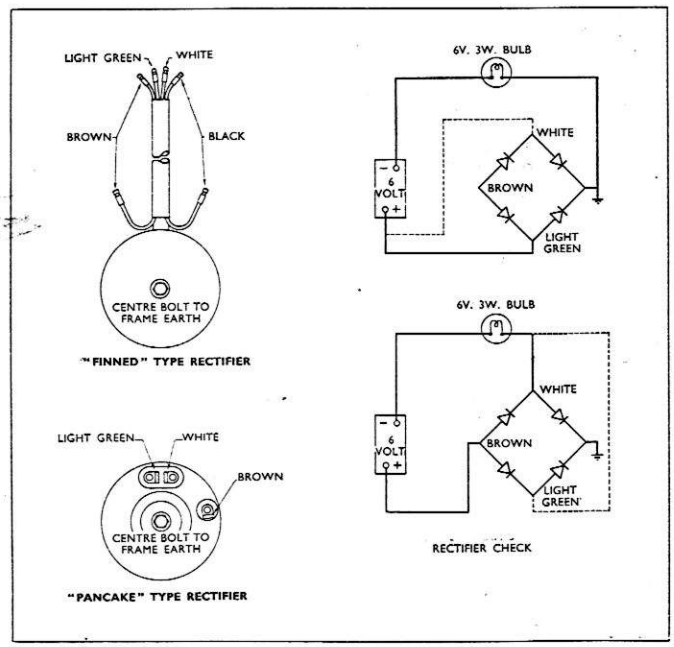
TEST 3

Procedure	Battery Connections	Bulb Connections	Conclusions
Rectifier Check. Connect a 6 volt battery in series with a 6v. 3w. bulb across the rectifier terminals (See diagram 3)	Positive—Light Green Positive—White Positive—Brown Positive—Brown	Earthed Earthed Green White	Bulb lights Rectifier O.K. Bulb does not light. Rectifier faulty replace.
Reverse battery connections. (See diagram 3)	Negative—Light Green Negative—White Negative—Brown Negative—Brown	Earthed Earthed Green White	Bulb does not light. Rectifier O.K. Bulb lights Rectifier faulty replace.

Diagram 3

Diagram 2





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Ref. A.E.1.

WIPAC MARK II ALTERNATOR EQUIPMENT

TESTING INSTRUCTIONS

The Series 114 Alternator consists of a six pole Stator ring 5" in diameter with six coils and a six pole permanent magnet Rotor. There are three main leads coloured White, Light Green, and Orange. Three coils on adjacent poles are connected in series to White and Light Green, the other three coils are connected in series to White and Orange. The output from these coils is A.C. converted to D.C. by means of a bridge-connected metal rectifier. The output of the alternator is controlled through the switch on the headlamp and connects three or six coils according to its position.

EMERGENCY STARTING

The Emergency Position is intended for starting when the battery is flat. This position is marked " EMG " on the Ignition switch.

In this position the two groups of Alternator coils are connected in parallel, and if the lights switch is in the " OFF " position the full output of the Alternator goes into the battery. This will raise the voltage of a flat battery to a level sufficient to start the engine. In the EMG position the charge rate is high—the engine should not be run in EMG too long. The boost charge thus provided may be used to restore a discharged battery. Switch over to IGN after 10 minutes.

OPEN CIRCUIT VOLTAGE READINGS

2,000 R.P.M. 17.5 Volts. MIN.
3,000 R.P.M. 26.0 Volts. MIN.

TESTING

Testing of component parts can be carried out if the following instruments are available:

0-12 D.C. Volt Meter
0-15 A.C. Volt Meter
1 ohm resistor (capable of carrying 8 amps.)
10-0-10 D.C. ammeter.

High grade moving coil instruments must be used and accurate. The 1 ohm resistor must also be accurate otherwise correct readings cannot be obtained. ENGINE SPEED when testing should be in the region of 2,500 r.p.m. Tests should not be attempted at speeds below 2,000 r.p.m. A few revs. above or below 2,500 will not affect the readings of an alternator in good condition.

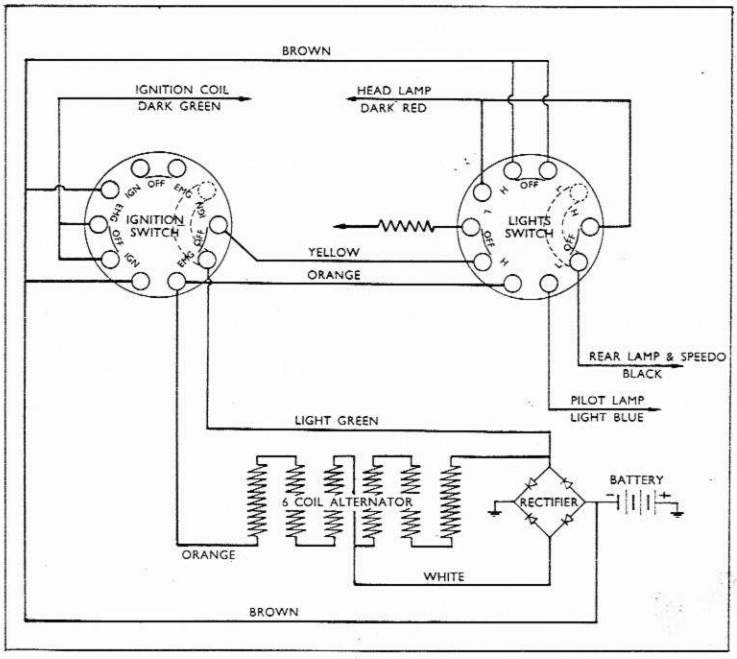
ROTOR DEMAGNETISED

Although the WIPAC Rotor is robustly built and holding a very high magnetic charge it can become demagnetized if the machine is run with battery connections reversed or if the Rectifier breaks down. A demagnetized rotor should be returned to WIPAC for satisfactory remagnetization.

TEST 1

Connections	Switch Position		Minimum Meter Reading
D.C. Output Check. Engine speed over 2,000 r.p.m. Connect ammeter 10-0-10 amps. in series with battery. If battery voltage reading is less than 5.5 volts connect to a fully charged battery.	Off		1 amp.
	L		1 amp.
	H	24W.	1 amp.
		30W.	0 amp.

Diagram 1



THIS EQUIPMENT IS FITTED TO THE 1955-56 MODELS OF THE ARIEL "COLT" L.H. AND B.S.A. C.10.L.

FAULT LOCATION

SYMPTOMS	CHECK
All bulbs burning out when engine is accelerated	1. Battery connections faulty. 2. Battery EARTH to machine faulty. 3. Rectifier connections faulty. 4. Snap connectors faulty between Rectifier and Battery. 5. Battery in bad condition.
No charge reading	1. Carry out TEST 1. 2. If still no charge reading after Test 1, carry out TEST 2 with *chaincase in position.* Should a voltage reading be obtained at C2, D2, E2, in TEST 2 it indicates that one or more of the ALTERNATOR coils are shorting to EARTH and the chaincase may be the cause of this. Retest with *chaincase removed.* 3. If above tests show no faults check Rectifier. See TEST 3.
Will not start on " EMG " nor " IGN "	1. Connect Ammeter in the Dark Green lead from Battery to Ignition Coil—Switch to " IGN "—With contact breaker points closed the reading should be 3.5 AMPS. if Battery voltage is not less than 6 volts. If this test is in order proceed to check:— 2. Contact breaker setting. (Should be .015″). 3. Contacts for dirt. 4. Condenser. 5. Connections and wiring.
Will not start on " EMG " O.K. on " IGN "	1. Connections and wiring.
Will not start on " IGN " O.K. on " EMG "	1. Battery. 2. Connectors and wiring.

TEST 2

Procedure	Connections	Meter Reading	Conclusions
Alternator Check Engine Speed over 2,000 r.p.m. Connect A.C. voltmeter in parallel with 1 ohm resistor across corresponding pairs of alternator leads.	(A) White—Orange (B) White—Light Green (C) Orange—Machine Earth (D) White—Machine Earth (E) Light Green—Machine Earth	5 min. 5 min. Nil Nil Nil Nil	Alternator O.K.
	(A2) White—Orange or (B2) White—Light Green	Nil	Check Soldered connections to coils.
	(C2) Orange—Machine (Earth) (D2) White—Machine (Earth) (E2) Light Green—Machine (Earth)	Any Reading Here	One or more coils shorted to earth. Stator and coil group faulty. Replace.
	(A3) White—Orange and (B3) White—Light Green	Under 5 Under 5	Rotor faulty. Replace.
	(A4) White—Orange and (B4) White—Light Green	5 min. Under 5	Stator & coil group faulty. Replace.
	or (A5) White—Orange and (B5) White—Light Green	Under 5·5 3·8 to 4·8	

Diagram 2

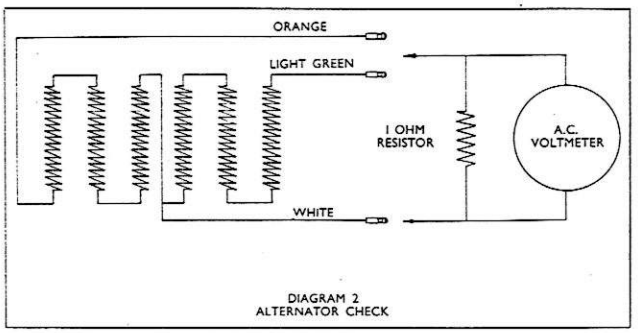


DIAGRAM 2
ALTERNATOR CHECK

TEST 3

Procedure	Battery Connections	Bulb Connections	Conclusions
Rectifier Check. Connect a 6 volt battery in series with a 6v. 3w. bulb across the rectifier terminals (See diagram 3)	Positive—Light Green Positive—White Positive—Brown Positive—Brown	Earthed Earthed Green White	Bulb lights Rectifier O.K. Bulb does not light. Rectifier faulty replace.
Reverse battery connections. (See diagram 3)	Negative—Light Green Negative—White Negative—Brown Negative—Brown	Earthed Earthed Green White	Bulb does not light. Rectifier O.K. Bulb lights Rectifier faulty replace.

Diagram 3

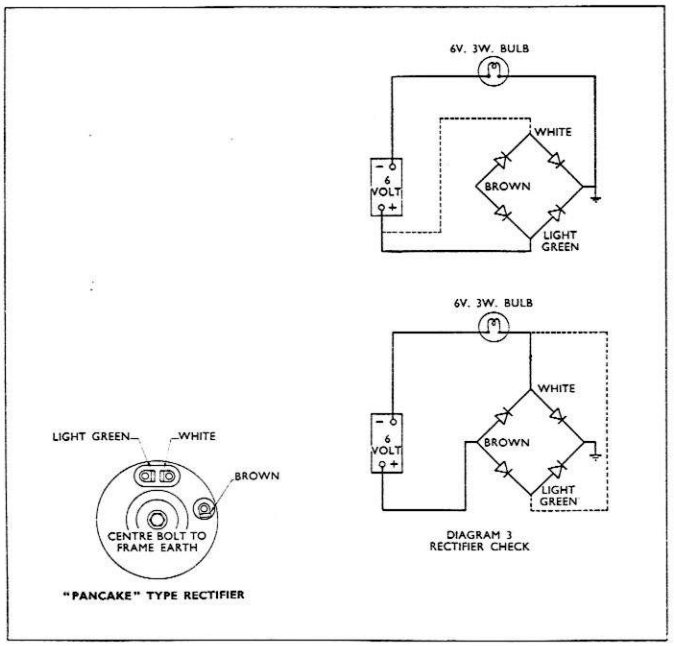


DIAGRAM 3
RECTIFIER CHECK

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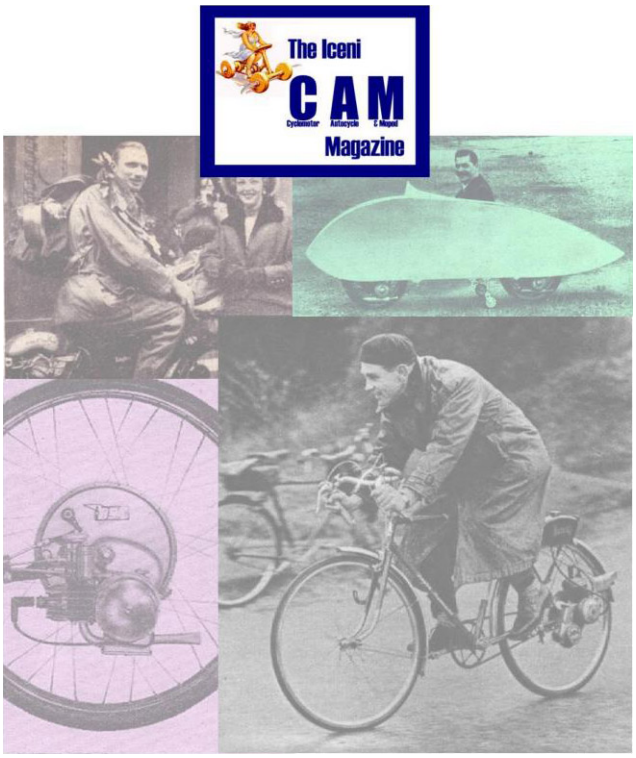

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