SECTION H

ELECTRICAL SYSTEM

ELECTRICAL SYSTEM

INTRODUCTION

The electrical system is supplied from a 220 w alternating current generator situated on the left hand engine end plate and is driven directly from the end of the rotor shaft. The current is converted to DC power by an electronic voltage regulator, with direct current being supplied to a 12 v 14 amp/hr battery.

Power is supplied to an electronic ignition unit with internal distributor switching controlled by a variable reluctance electro-magnetic pulse generator, which senses a change in magnetic field strength caused by a recess in the flywheel providing a signal for the ignition system to operate. The battery supplies current for the lights, ignition system, single rotor idle system and twin horns operated by a relay unit.

The routine maintenance required by the various components is set out in the following sections. All electrical components and connections, including the earthing points to the frame of the machine must be clean.

No emergency start facility is incorporated. There is, however, sufficient voltage available to start the machine by pushing if the engine will not turn over on the starter motor.

NOTE:
Great care must be taken when push starting this machine. The machine is light, the engine starts easily, and throttle response is rapid. When attempting a push-start, keep one hand on the clutch lever and the throttle twist grip ready for immediate closure at first sign of engine response.

1. Before commencing any inspection or fault rectification on the electrical circuits, check fuse box for any defective fuses and check the battery connections are clean and secure.

2. When working on electrical plugs and connectors we advise the use of Wynns 'Viscotene' on all plugs and connectors prior to re-assembly in order to reduce the chance of corrosion.

3. The voltage generated by capacitor discharge ignition systems (particularly primary circuits) can be dangerous. Investigatory work should only be undertaken by trained personnel. Ensure the ignition switch is 'off' before working on any part of the ignition system.

SECTION H1

BATTERY PREPARATION AND INSTALLATION

BATTERY – INITIAL FILL AND MAINTENANCE

The battery containers are moulded in a translucent plastic material through which the acid level can be seen. Screwed filler plugs seal the top against accidental spillage with gases being vented through a single pipe at the side of the battery which is long enough to carry any potentially corrosive fumes well clear of the parts which may be affected.

WARNING

1. DO NOT ALLOW NAKED LIGHTS OR SPARKS NEAR THE BATTERY AS IT GIVES OFF HYDROGEN & OXYGEN GASES WHICH CAN BE EXPLOSIVE.

2. DO NOT CONNECT THE BATTERY TERMINALS 'BACK TO FRONT'. NEGATIVE IS EARTH ON THIS MACHINE.

TABLE A

SPECIFIC GRAVITY OF ELECTROLYTE FOR FILLING THE BATTERY

UK & CLIMATES NORMALLY BELOW 77° F (25° C)		CLIMATES BETWEEN 77–100° (25–38° C)		TROPICAL CLIMATES OVER 100° F (38° C)	
FILLING	FULLY CHARGED	FILLING	FULLY CHARGED	FILLING	FULLY CHARGED
1.260	1.280/1.300	1.240	1.260	1.210	1.220/1.240
The electrolyte should be cooled below 30° C (86° F) before filling.					

To prepare a dry-charged battery for service first remove the short blanking pipe seal attached to the vent and fit the long vent pipe. Remove the filler caps and fill each cell with dilute sulphuric acid (Electrolyte–S.G. 1.260 at 60° F) to the UPPER LEVEL indicator line. Allow the battery to stand for at least one hour, and then top up to the UPPER LEVEL with dilute sulphuric acid. The battery should then receive a charge of 1.4 amperes for fifteen to twenty hours before being allowed to stand for at least one hour. If the electrolyte level has fallen during charging, top up with distilled water to the UPPER LEVEL. Do not install the battery into the machine until charging and filling is complete and the battery cleaned of any acid spillage and wiped clean. The specific gravity of the electrolyte should now have reached 1.280/1.300.

NOTE:
In tropical climates (over 100° F), initial fill specific gravity should be 1.210 and fully charged become 1.220/1.240.

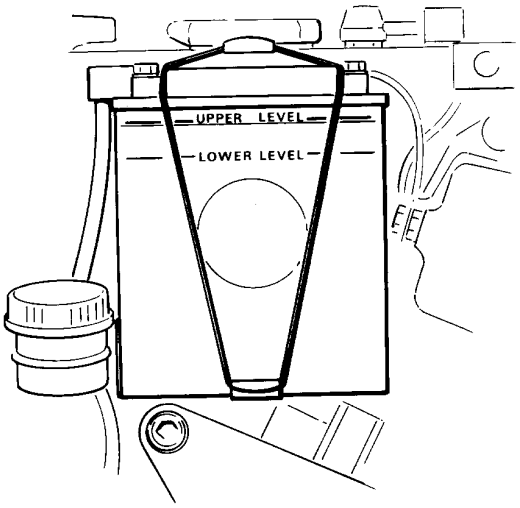


Fig. H1. Battery Location and Installation

TABLE B

MAXIMUM PERMISSIBLE ELECTROLYTE TEMPERATURE DURING CHARGING

Climates Below	Climates Between	Climates Above
77° F (25° C)	77–100° F (27–38° C)	100° F (38° C)
100° F (38° C)	110° F (43° C)	120° F (49° C)

NOTE:
The specific gravity of the electrolyte varies with the temperature. For convenience in comparing specific gravities, they are always corrected to 60° F, which is adopted as a reference temperature. The method of correction is as follows:

For every 5° F below 60° F deduct 0.020 from the observed reading to obtain the true specific gravity at 60° F. For every 5° F above 60° F add 0.020 to the observed reading to obtain the true specific gravity at 60° F.

The temperature must be indicated by a thermometer having its bulb actually immersed in the electrolyte and not the ambient temperature.

INITIAL INSTALLATION OF THE BATTERY

When charging and filling of the battery has been completed, and the case, filler plugs and terminals dried and wiped clean, grease (or use petroleum jelly-vaselene) liberally applied to the two terminals prior to offering the battery on to the machine, place the battery on the tray (upon the rubber mat) with the terminals outboard, POSITIVE terminal forward. Connect the RED lead to the positive (+ve) terminal, and the black earth (ground) lead to the rearmost negative (–ve) terminal. Ensure the plastic vent pipe is threaded downward and rearward, and that the exit lies below the effective lowest point of the frame to ensure acid fumes escaping from the battery do not initiate corrosion anywhere on the machine itself. Clip the end of the pipe in this position.

ROUTINE MAINTENANCE

Every month or weekly in hot climates, the battery should be cleaned as follows:-

Remove the battery from the machine, examine the terminals. If they are corroded, scrape them clean. Remove the vent pipe and ensure it is not blocked. Check the vent hole is free, wash the battery with warm water and grease the terminals with petroleum jelly. Replace the vent pipe securely and replace the battery on the machine negative terminal to earth (ground).

Every month preferably whilst the battery has been removed for examination and cleaning, examine the level of electrolyte in each cell, add DISTILLED WATER until the electrolyte level is between the two lines. In very hot climates examine electrolyte level weekly.

WARNING
Do not allow the electrolyte level to go above the top level indicator line.

With this type of battery the acid can only be reached using a small hydrometer which indicates the level of charge. Great care should be exercised when carrying out these operations not to spill any acid or to allow a naked flame near the electrolyte. The mixture of hydrogen gas given off during charging and, to a lesser extent when standing, can be dangerously explosive.

The reading obtained from the battery electrolyte should be compared with those given in Table A. If a battery is suspected of being faulty it is advisable to have it examined by a Yuasa service centre or agent.

Storing the Machine for Long Periods
Should the machine be left for any length of time (e.g. over two weeks at a time) the battery should be disconnected, as there is a continual small current drain imposed on the battery by the voltage regulator. (And clock – Police Machines). If the vehicle is to be left for more than two weeks, remove the battery and trickle charge every two weeks to keep the battery in peak condition.

When re-fitting the battery clean the terminals and lead ends to ensure a good contact.

SECTION H2

THE ELECTRONIC COIL IGNITION SYSTEM

The electronic capacitor discharge coil ignition system comprises a variable reluctance electromagnetic pulse generator (Fig. H3) which is usually referred to as an 'ignition trigger unit', and electronic ignition unit and two 12 volt ignition coils. The ignition trigger unit and electronic ignition unit are designed specifically for this machine and are not replaceable with components from other sources, the specified system incorporating an engine revolution limited designated to operate at 9250 ± 150 r.p.m.

The ignition trigger unit initiates the required pulse when a step in the flywheel traverses the pole piece of the trigger unit. At this moment, the magnetic flux density is changing rapidly, and this generates a voltage in the trigger unit windings. The polarity of this voltage is reversed when the opposite step in the flywheel traverses the pole piece; it is the polarity of the trigger signal which determines which of the ignition coils is fired by the electronic ignition unit

The trigger unit is located between the flywheel and the left engine end plate, behind the generator/flywheel cover. Two small bolts secure both the trigger unit and air by-pass microswitch to each side of the left end plate.

The electronic ignition unit, is of the capacitor discharge type. High voltage pulses are distributed to the low-tension windings of each coil alternately. It is for this reason that care should be taken when dealing with the ignition system. Fault diagnosis is best performed by substituting with units known to function correctly, after checking that correct supply voltage exists between the white/yellow (positive) and black (negative) leads when the ignition is switched on. (See Section H3 Part A).

The electronic ignition unit is situated behind the left electrical side cover which is removed by releasing the 'Dzus' fastener at the forward end of the panel (Section E1). The ignition unit is fastened in place to the frame by two clips at the top and bottom of the unit which secure both the ignition unit and the voltage regulator to the frame. Withdrawing the clips respectively upwards or downwards will release both the ignition unit and voltage regulator unit (Fig. H16).

The best method of locating a low tension circuit fault is dealt with in the next section. Failure to locate a fault in the low tension circuit would indicate that the spark plugs are faulty or a fault in the high tension side of the system, and the procedures given in Section H3 should be followed.. However, before commencing any of the following procedures the air gap setting between the ignition trigger unit and the flywheel (Fig. H3), should be checked.

SECTION H3 PART A

CHECKING THE LOW TENSION CIRCUIT FOR CONTINUITY

A standard 'AVO' meter or 'multimeter' should be sufficient to test the circuits on this machine and the tests described have been compiled with this in mind.

NOTE:
Before commencing with ignition circuit fault finding, it is advisable to first examine the single rotor idle valve and micro switch for correct operation. Section B11.

Refer to the electrical circuit wiring diagram (Figs. H19 & 20). The following details the continuity of the low tension ignition circuit working back from Electronic Ignition Unit, through the fuse box, ignition switch, binnacle plugs etc to the source of power supply, in order to establish a point of failure or breakdown.

1. Disconnect the Electronic Ignition Unit feed plug.
2. Switch on the ignition, and check the 12 volt (white/yellow) pin at the plug.
3. Switch off ignition.
4. Check continuity between the slate and slate/black leads at the feed plug from the Electronic Ignition Unit to the trigger unit (See Section H3 Part B).
5. Check earth (Black) continuity at connector pin to main frame earth (ground). If a 12 volt supply is not available at the White/Yellow lead feeding the ignition unit trace back to source as follows, using the multi-tester.
6. Again switch on ignition.
7. Follow White/Yellow lead to right handlebar switch (ENGINE STOP SWITCH).
8. Ensure switch is in 'Run' position.
9. Trace wire continuity back to White/Black lead at fuse box (Fig. H20) (8 amp fuse).
10. Check fuse and fuse box terminal connections for continuity.
11. Follow back through white lead from fuse box (12 volt secondary supply) to the white binnacle plug (terminal 2). This is fed from the ignition switch on the 'ON' position.
12. The ignition switch is fed from the red binnacle socket through the brown/blue lead, which continues back to the main 25 amp fuse in the fuse box. Check fuse and terminal connections.
13. This fuse is fed by the brown/white wire from the start relay battery connection. The start relay is fed direct from the battery positive terminal by the heavy duty red wire.

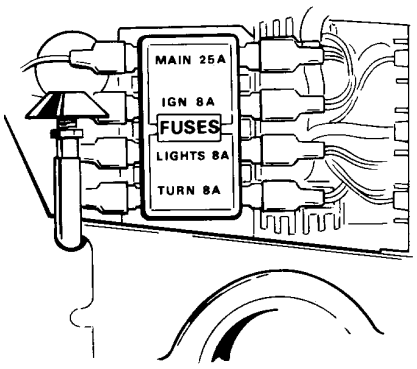


Fig. H2. The Fuse Box

Main fuse 25A (Blue)
Ignition Circuit 8A (White)
Flasher Circuit 8A (White)
Lights Circuit 8A (White)

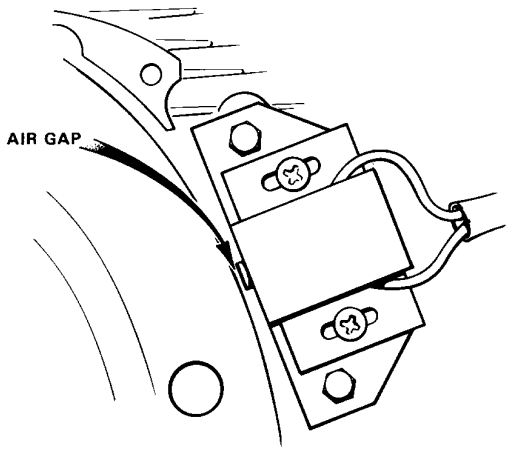
NOTE:
In the wiring harness, all colour coded wires entering the harness leave identically coded.

SECTION H3 PART B

TESTING THE IGNITION TRIGGER UNIT

First check the air gap (Fig. H3). Having ascertained the air gap is correct, check the continuity by removing the leads at the two in-line connectors and connecting the tester across the slate and slate/black leads.

Having checked for continuity, the next stage is to measure the resistance across the same



slate and slate/black leads. A reading of between 150-210 Ohms is normal. Any reading outside these limits indicates a faulty trigger unit and replacement will be necessary. Finally check the trigger unit slate and slate/black leads for short to earth. A short to earth would indicate an insulation fault in the trigger unit and replacement being necessary.

Other than the above, no other checks are possible on the trigger unit without access to the manufacturer's test equipment.

Fig. H3. Ignition Pick-Up Trigger Unit – Location and Air Gap.

SECTION H3 PART C

TESTING THE ELECTRONIC IGNITION UNIT

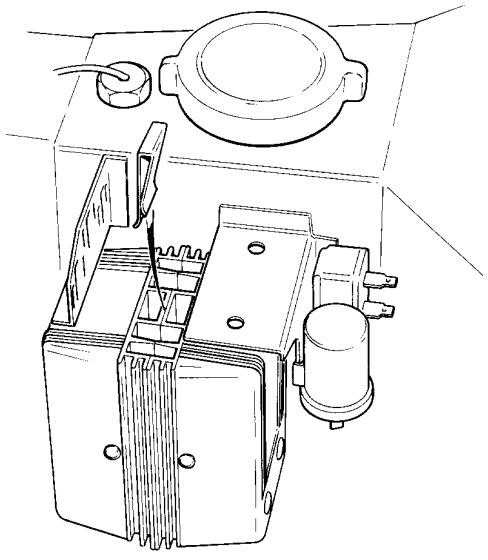


Fig. H4. Electronic Ignition and Voltage Regulator Units

WARNING
Electronic ignition units can be dangerous. Great care must be taken when handling this equipment. Wherever possible when working on the ignition system, disconnect the battery at the negative and positive terminals.

Due to the design of the electronic capacitor discharge ignition unit the only tests possible are:-

a. Check 12 volt supply to the ignition unit at the multi pin connector white/yellow lead.

b. Assuming there is a 12 volt supply at the white/yellow lead with the ignition 'on', and that the ignition trigger unit has been checked as detailed in H3 Part B, the only other test is to substitute the ignition unit assembly for a known serviceable replacement. Should the ignition unit require replacement, a Factory Exchange replacement unit can be obtained at minimal cost.

SECTION H3 PART D

TESTING THE IGNITION COIL LOW TENSION CIRCUIT

Disconnect the red multi pin plug at the ignition unit and check for continuity along the black/white lead to the right coil, and along the black/yellow lead to the left coil. To gain access to the coils, refer to Section E3. Check both the black/white leads and black/yellow leads for shorting to earth. If the above test does not uncover a fault check the coils for resistance. A normal reading of 2.8 Ohms should be obtained. Any reading outside these limits would indicate a faulty coil and necessary replacement. Check the coil earth lead (Black) for continuity to earth. (See below).

No further testing of the low tension side of the ignition circuity is possible without access to manufacturers test equipment.

SECTION H3 PART E

TESTING THE IGNITION COIL HT OUTPUT

i) Testing the ignition coil

Low tension winding resistance	2.8 ohms (nominal)
High tension winding resistance	10K ohms (max.)

ii) Testing the ignition coil H.T. Output

A spark gap of 10mm. should be arranged. Each ignition coil should be capable of producing a spark sufficient to jump this gap. Observe the H.T. "chimney" of the cable while the engine is rotated using the starter motor and check that there is no sparking or "tracking" to the L.T. terminals. If the coil cannot produce a 10mm. long spark, or if it is tracking,then it must be replaced.

iii) Testing the ignition H.T. Leads

The designed internal resistance of each lead is 600 ohms to 1.2K ohms maximum. Readings outside this range affect the legal radio suppression Type Approval performance, and readings above 1.2K towards open circuit values can create internal sparking within the leads resulting in ultimate lead and coil breakdown.

SECTION H4

THE SPARK PLUGS

The spark plugs are Champion 10 mm surface discharge type. We recommend the plugs be removed and inspected at every service (every 6000 miles) when the outer or earth ring of the spark plug should be scraped clear of carbon nodules.

DO NOT ATTEMPT TO CLEAN THE SPARK PLUGS IN A CONVENTIONAL GRIT OR SAND BLASTING MACHINE. GRIT PARTICLES COULD LODGE INSIDE THE PLUG AND BE RELEASED LATER WHEN THE ENGINE IS RUNNING POSSIBLY CAUSING RESULTANT DAMAGE TO THE ENGINE.

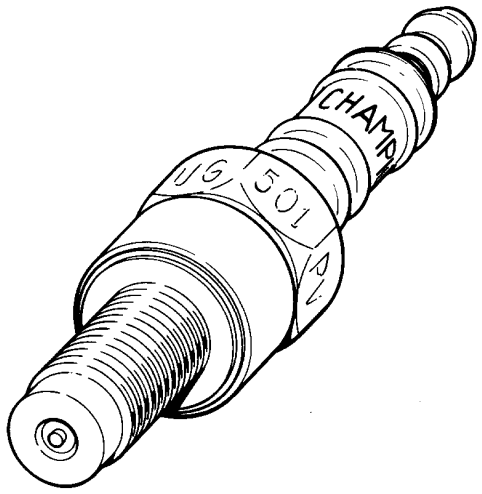


Fig. H.5. Surface Discharge Type Spark Plug
Under no circumstances should this type of spark plug be cleaned using a sand or grit blasting process.

The spark plugs are designed to be partially self cleaning in use and, with the platinum centre electrode, long lived. Normal life expectancy should be in the region of 15000 + miles, the only servicing necessary being as described above.

As the spark plugs are of the surface discharge type, adjustment of the spark gap is neither possible nor necessary.

In contrast to normally accepted practice, the mixture strength cannot be judged by the appearance of the spark plugs as this design provide no positive indication and should not be used as a mixture indicator. We stress the necessity of cleaning the outer ring of the spark plugs as failure to clean the carbon nodules from the surface can lead to a build up of carbon deposit initiating incandescence at high engine r.p.m. thereby causing pre-ignition and consequent high running temperatures. A deposit of white particles on the spark plug outer ring indicates pre-ignition has taken place and the plugs should be scraped clean or replaced immediately.

SECTION H5

THE CHARGING SYSTEM

The charging system consists of a 220 watt Kokusan alternator feeding a 12 volt 14 amp/hour battery via an electronically controlled voltage regulator.

The voltage regulator has been designed specifically for this machine and, like the ignition unit, no replacement is available from alternative sources. A Factory Exchange replacement service is available at minimal cost.

BEFORE COMMENCING ANY TEST PROCEDURES ENSURE THE BATTERY IS IN GOOD CONDITION AND FULLY CHARGED.

To locate a fault in the charging system, first test the alternator as described in Section H5 Part B. If the alternator is satisfactory the fault must lie in the charging circuit and the electronic voltage regulator. However, it is advisable to check the continuity of the wiring and connectors prior to testing individual units.

SECTION H5 PART A

ALTERNATOR

The alternator fitted to this machine is a KOKUSAN GP 9121 three phase unit.

Speed range	300 to 10,000 rpm
Direction of rotation ..	Anticlockwise (from stator side)
Static balance	2 grammes max' on external circumference
Flywheel inertia	26.6 Kg/cm2
Weight	1.8 Kg

FLYWHEEL
The flywheel is an iron sheet pressing with three ferrite permanent magnets fixed to the inner face by means of a powerful adhesive. As adhesive is used to locate the magnets in place it is important to avoid damage to the unit. Do not strike the flywheel in order to remove it from the rotor shaft. Always use the extractor part No 50-0408. Should the alternator flywheel be dropped onto a hard surface it must be replaced as the permanent magnets may become detached from their adhesive fixing and cause considerable mechanical damage should they come adrift when the engine is running.

STATOR
The stator is fabricated from iron laminations, rivetted to form 18 poles with each pole being wired as a charging coil. The coils are in three phase 'star' wiring to supply a three phase output.

NOTE:
Never carry or lift the stator by the leads as this may damage the unit.

INSPECTION & MAINTENANCE
As there are no wearing parts the alternator should require no attention during normal use.

SECTION H5 PART B

CHECKING THE ALTERNATOR OUTPUT

FAULT FINDING
Should the machine show signs of low charging, flat battery etc., the following tests should be carried out after first checking the battery, earth (negative) and positive leads to the battery and the fuses.

TESTING THE STATOR
Disconnect the three alternator leads at the in-line connectors and connect a rectified type A.C. voltmeter between the white/green and white/blue alternator leads.

In normal ambient temperatures the voltmeter should read as follows:-

R.P.M.	1000	1500	2000
VOLTAGE (A.C.)	14.4	21.6	28.8

Having examined the A.C. voltage output, the stator coil resistance should be examined with a resistance meter (Wheatstone Bridge). The meter should be connected to the white/green and white/blue leads, at normal ambient temperatures a reading of 0.48 Ohms to 0.72 Ohms should be obtained.

The insulation should now be examined by connecting a 500 volt insulation tester ('Megger') between the bare metal parts of the stator and any of the alternator leads. A figure of 5 megohms or greater should be obtained.

SECTION H5 PART C

CHECKING THE ELECTRONIC VOLTAGE REGULATOR

As the voltage regulator is of the sealed type, extensive testing of this component is not possible. There are however sufficient 'on the machine' tests possible to arrive at a conclusion whether or not the voltage regulator is faulty.

1. Run the engine at 3000 rpm with only ignition on. Connect a D.C. volt meter across the battery positive and negative terminals and measure the reading. A reading of 14-15 volts should be obtained.

2. Increase engine revs to 4000 rpm and switch on all electrical services. At full load a reading of 14-15 volts should be maintained.

3. Switch off all services including the ignition (Disconnect the clock on Police machines).

Finally disconnect the battery positive lead and connect an 'AVO' meter or 'multimeter' in series with the battery. A current drain of not more than 12 milliamps should be indicated. A higher reading than this indicates either a faulty voltage regulator unit or an unauthorised service is operating eg. faulty switch etc, causing unwanted current drain on the system.

CAUTION
DO NOT RUN THE ENGINE WITH THE BATTERY DISCONNECTED OR SHORT CIRCUIT THE BROWN/BLUE REGULATOR FEED LINE TO EARTH AS BOTH OR EITHER ACTION WOULD CAUSE DAMAGE TO THE REGULATOR UNIT.

SECTION H6

THE STARTER MOTOR

The Lucas M3 starter is fitted to the right side engine end plate, above and to the rear to the gearbox. Removal can only be achieved with the engine unit removed from the frame/gearbox assembly.

Remove the engine unit as described in Section B1, and when access to the starter motor is gained, unscrew the hexagon headed screws and washers from the mounting flange, and lift clear the starter motor assembly. Retain the sealing 'O' ring for further use.

Holding the motor body firmly in a vice, unscrew the two long screws retaining the alloy end cap and the mounting flange in position, effectively holding the complete motor assembly together.

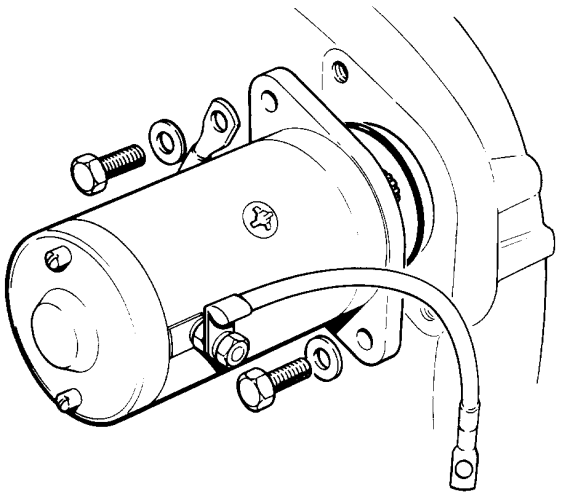


Fig. H6. The Starter Motor – Installation

At this point the operator should be warned that although replacement brushes are available, suitable equipment is needed to spot weld the brush tail to the field windings and outer shell. Replacement bearing bushes are also available for both end plates complete with thrust pad (commutator end) and oil seal for the mounting flange end. Fit the seal 'open' end inwards towards the starter motor.

Replacement is the reverse. Examine the 'O' ring, and if satisfactory, apply the recommended sealant (General Data) to the 'O' ring and its seating, and replace the motor using the two hexagon headed screws and plain washers. Continue rebuild as detailed in Section B10 (Refitting the engine unit).

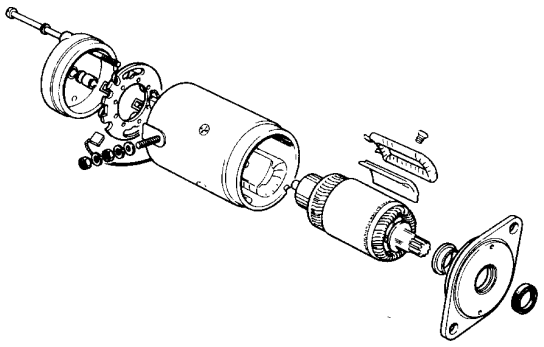


Fig. H.7. Exploded View of the Starter Motor

SECTION H7

STARTER RELAY

The starter relay is located immediately below the battery tray, in a sealed unit and if found to be faulty must be replaced. Before assuming the starter relay is at fault, first ensure the battery is in charged condition and that the start button is functioning correctly. To check this, short the white/red lead connection on the relay to earth, using a jumper lead. Provided voltage/current is available at the white/yellow lead from the engine, the 'stop' lever on the right handlebar is operating correctly (ie. That it is not in either 'off' position, and that the ign. fuse has not blown) then the relay is at fault, and if not operative, must be replaced.

SECTION H8

BINNACLE WARNING AND ILLUMINATION LIGHTS

Remove the binnacle as described in the Telescopic front fork Section G6. To gain access to the instruments, ignition switch and bulbs, remove the four nuts and the small 'posidriv' headed screw visible beneath the lower housing. The lower section of the binnacle can now be detached from the fascia section.

The instruments and, or bulbs may now be removed and replaced as required. All the bulbs are 1.2 watt wedge base (capless) and can be changed after pulling the bulb holder from its location and drawing out the chosen bulb. Replacement is the reverse procedure. Continue reassembly of the binnacle in reverse order from that

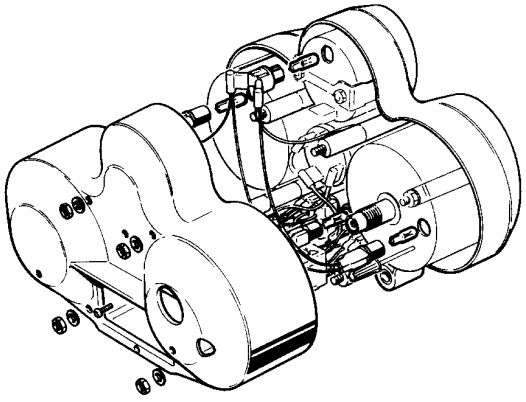


Fig. H8. Access to the Binnacle

of dismantling, but ensure the spacers between the two halves of the binnacle casing are properly located. (Long-upper, short-lower), and that the internal connections and fasteners are tight. Give a light application of silicone anti-corrosion spray, and replace the lower casing. Re-fit the four nuts and washers, and replace the small 'posidriv' screw.

The binnacle is now ready for re-assembly onto the front forks as described in Section G6 in Fig. H11. The wiring diagrams (Figs. H19 & 20) clearly indicate the colour coded wire connections and individual switch functions. The switch assembly is supplied complete with lead and junction.

SECTION H9

OIL LEVEL TEST BUTTON

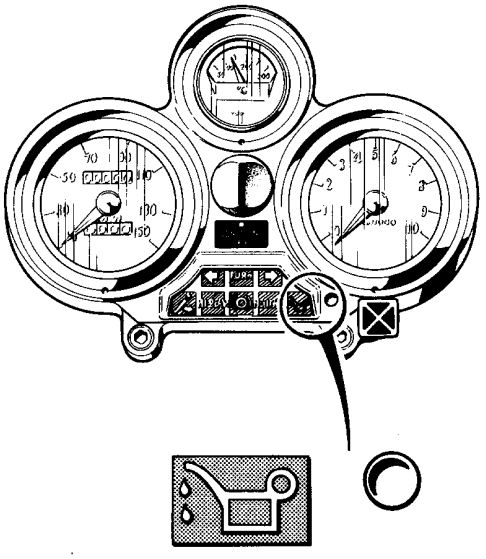


Fig. H9. Oil Level Warning Light – Test Button

The test button is part of the binnacle wiring harness and is fitted to provide an oil warning light bulb facility. Bulb illumination when testing with the ignition switched 'ON'. and pressing the oil level test button does not indicate correct functioning of the oil level warning switch incorporated within the oil reservoir. A separate test procedure for this equipment is described in Section H15 'warning switches'.

The test button body is assembled from beneath the instrument panel fascia, and retained in position with a hexagon nut. The operating knob is finally pressed into position onto the button stem. Replacement requires gaining access to the binnacle as described in Section H8 cutting the existing red and black feed wires, re-soldering the new connections into the circuit and re-insulating. Re-assemble the binnacle and replace in position on the top yoke as described in section H8 and G6.

SECTION H10

BY-PASS MICRO-SWITCH

The fitting and setting of the by-pass micro-switch is quite critical to the function and response of the complete motorcycle. Located on a mounting plate fixed in-board of the left side engine end plate, the switch is positioned so that a lever fitted to the left rotor housing throttle spindle bears onto the micro-switch operating arm via a spring retained adjusting screw. Replacement is achieved following removal of the generator cover (4 screws), and the two screws holding the ignition trigger unit and mounting pad in position. The two screws are extended through the left side engine plate, the two associated captive nuts retaining the micro-switch mounting plate.

Replace the micro' switch onto the mounting plate, re-locate the trigger unit and placing the micro-switch mounting plate in its proper position, tighten up the two screws.

Before replacing the generator cover, re-adjust and set the ignition trigger unit air gap as shown (Fig. H3) to 0.3 mm – 0.05 (0.010" – 0.014") Re-set the by-pass micro-switch adjustment in accordance with the instructions given in engine Section B11 'Adjusting the micro-switch'.

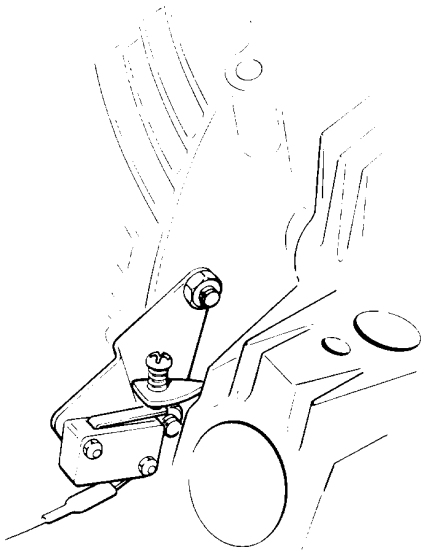


Fig. H10. By-Pass Micro-Switch

SECTION H11

LEFT HANDLEBAR SWITCH

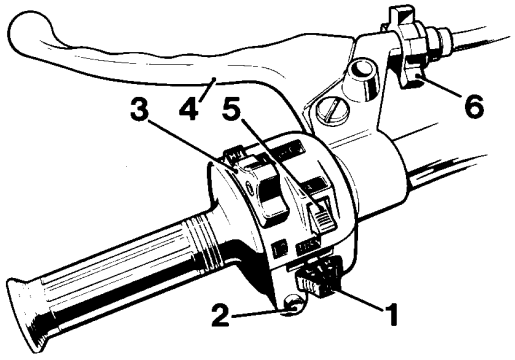


Fig. H.11. Left Handlebar Switch

1 Direction Indicator Switch
2 Horn
3 Hi-Lo Main Beam Switch
4 Clutch Operating Lever
5 Headlamp Flasher Switch
6 Clutch Lever Cable Adjuster

Functions controlled by the left handlebar switch are as shown in Fig. H11. The wiring diagram (Figs. H19 & 20) clearly indicates the colour coded wire connections and individual switch functions. The switch assembly is supplied complete with lead and junction terminal block, and is detached from the handlebar by removal two pan head 'posidriv' screws on the underside of the lower switch half.

Care should be taken during replacement to protect the switch internal functions from damage during re-assembly, and care exercised to allow the cable to exit cleanly from the switch without being trapped as the switch halves are finally tightened together.

SECTION H12

RIGHT HANDLEBAR SWITCH

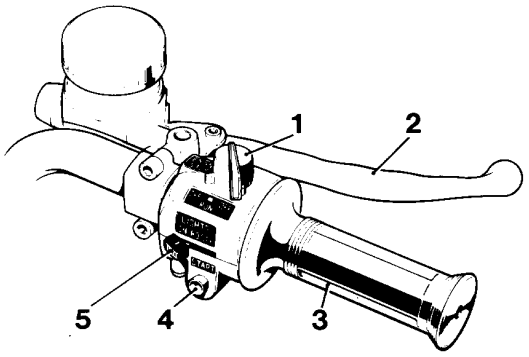


Fig. H12. Right Handlebar Switch
1 Engine Kill Switch (showing 'Run' and 'Stop' positions).
2 Front Brake Lever
3 Throttle Twist Grip
4 Start Push button
5 Lights on/off Selector Switch

Fig. H12 illustrates the right handlebar switch controls which also incorporate the throttle twist-grip assembly. To dismantle and remove the switch section, slacken and remove the two 'posidriv' pan head screws from the underside of the switch lower half, taking note that the forward of the two screws also functions as the throttle cable retaining clamp screw. Collect the two screws, clamp, spacer washer and lift the two switch halves apart, at the same time disengaging the throttle cable from twist-grip drum abutment. Replacement is the reverse of removal, but care must be taken during re-assembly to protect from damage the upper switch half internal functions, and to ensure the electric cable exit is unobstructed, and the cable is not trapped as the fixing screws are tightened. Whilst re-assembling the switch halves, ensure the throttle cable is snugly seated into the twist grip drum abutment (after having greased the handlebar end and drum internal bore), and that the throttle cable retaining clamp and spacing washers have located the throttle cable abutment securely in position. (See Fig. G4).

SECTION H13

DIRECTION INDICATORS

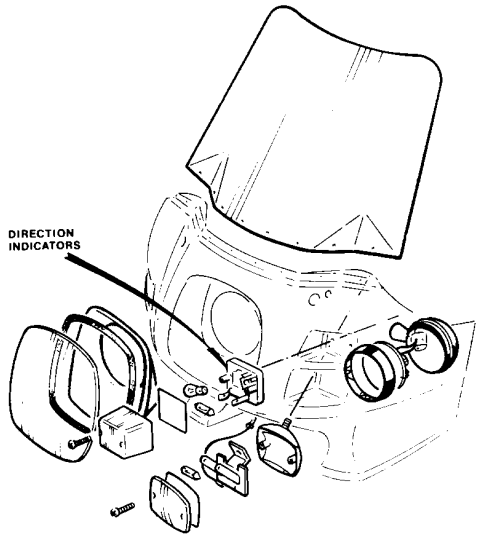


Fig. H14. Front Direction Indicators
– illustrates also the foward parking, driving and optional Police type flashing blue lights

Machines with fairing and pannier equipment specify direction indicator and parking lights to the front (Fig. H14). To obtain access to the direction indicator and parking light bulbs, remove the two lens screws carefully retaining the gasket. Check the tension of the pilot festoon bulb mounting arms is adequate, and then carefully replace the lens, ensuring correct seating of the sealing gasket.

Three light units are mounted onto a single plinth on rear pannier equipped machines (Fig. H15). Access to the bulbs is removal of the two screws in each lens. Note that there are three rubber 'O' rings gaskets under the head of each screw, and one fibre washer between the lens and the lamp body mounting point on each lens screw. Carefully replace the lens ensuring the sealing gasket is seating correctly, and providing a perfectly water tight seal.

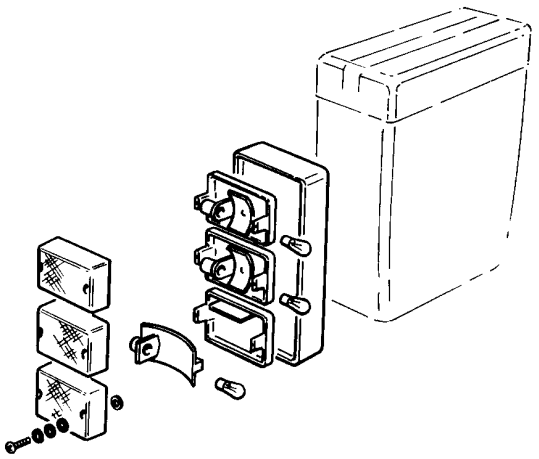


Fig. H15. Rear Direction Indicator. Stop/Tail and Fog Lights fitted on Pannier Equipped Machines

SECTION H14

DIRECTION INDICATOR FLASHER UNIT

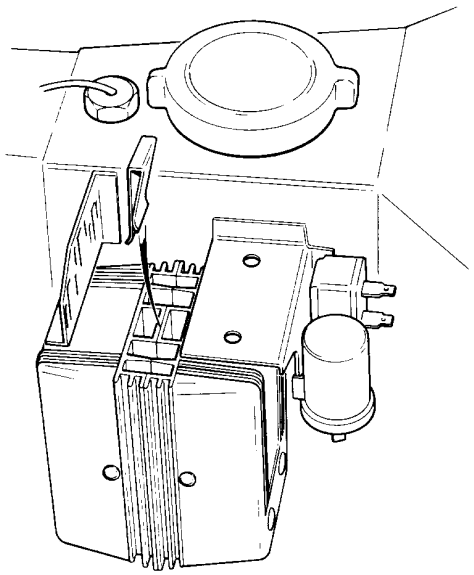


Fig. H16. Location of Direction Indicator Flasher Unit and horn relay to the rear of the Electronic Ignition units

The flasher unit is contained behind the left side panel. To replace the unit, lift the seat and remove the side cover. This will give access to the electrical units. The flasher unit is positioned to the rear and below the fuse box behind the horn relay unit. To replace, unclip the flasher unit from its mounting and disconnect the two electrical leads. Refitting is the reverse of the above procedure.

SECTION H15

WARNING LAMP SWITCHES

SIDE STAND SWITCH

The side stand switch is of the press-'off' type, and therefore functions when the side stand is not secured in the fully retracted position.

To remove the side stand switch, pull off the two wires from the connector spades at the rear of the switch, and unscrew the switch from the side stand support bracket, carefully retaining the spacer washer. On later models the switch is part of a sub-harness.

Replace the new switch, assembling the spacer washer over the threaded portion and between the switch body and the side stand support bracket. Tighten into position and re-connect the feed wires. (Wires to either terminal).

To adjust the operating screw, slacken off the locknut and enter the operating screw further into the side stand bracket. This will ensure that the first time the side stand is released against its spring tension, it will not flip back and crush the switch plunger.

Slowly swing the stand back into the retracted position, and gradually screw out the operating screw until the point where with the ignition switched 'ON', the warning light just operates. Pull out the side stand to the fully extended position, unscrew one further half turn, and apply the locknut. Check the operation and re-adjust if necessary.

NEUTRAL INDICATOR SWITCH

Identifiable as a black plastic hexagonal headed bolt, with a single wire exit from the centre, located at the top of the gear-box casing, on the right side. The switch is a 'Press-for-on' type.

Access is gained for replacement in service by first removing the right carburettor complete with its inlet and outlet manifold (See Section B6 'Removal'Item 5'). Remove the inlet pipe from the right rotor housing, followed by the idle pipe.

Using a box spanner, having disconnected the switch lead at the snap connector junction, unscrew and remove the neutral indicator switch.

To replace, first engage neutral (ensuring this is neutral between first and second gear – not a false neutral between another combinations of gears). Engage and screw in neutral indicator switch, having temporarily reconnected the lead at the snap connector (or even more easily using a 'jump' lead through a hollow box spanner).

Switch on the ignition and continue to screw in the neutral indicator switch until the warning light just comes 'on'. Screw in the switch one further 1/4 turn.

Check the operation of the switch by changing gear. If satisfactory, and the neutral location is positive, switch off the ignition, replace the idle pipe, inlet pipe and right carburettor complete with inlet and outlet manifolds in accordance with the instructions given in Section B6 'Refitting'.

OIL LEVEL SWITCH

As described Section H9, the oil level test button on the instrument binnacle only checks that the oil level warning light bulb functions satisfactorily. The actual operation of the warning light function is controlled by a float within the reservoir which operates an internal reed switch causing the oil level warning light to illuminate when the oil level falls below the recommended minimum.

The approved test for this function (following having checked the warning light bulb function with the ignition 'on', by depressing the test button) is to continue with ignition 'on'. and using the oil reservoir filler cap dipstick, press the switch float down to the limit of its travel (Fig. H17). The instrument panel oil warning light should have illuminated just before this point is reached.

If not, the fault must be located and corrected. It is vital to the correct functioning of this machine that the rider is provided with the designed oil level safety warning system. If the bulb test is satisfactory, and the 'dip-stick' test not positive, disconnect the float switch lead at the snap connector, and earth (ground) the red/white wiring harness end of the lead. If the float switch is faulty, the warning light will now illuminate. Replace the switch. (See below).

If the warning light does not illuminate, trace the red/white lead back to red plug terminal 3 on the underside of the binnacle. The remainder of this circuit within the binnacle follows from terminal 3 in the binnacle socket via a red wire to the red wire from the test button at the warning light bulb holder. (Section H8 and Fig. H20).

REPLACING THE OIL LEVEL FLOAT SWITCH

Disconnect the switch lead at the snap connector. Unscrew the hexagon top nut from the frame threaded boss. Fit the replacement switch, taking care not to damage or bend the thin shaft, and ensuring the float action is perfectly free.

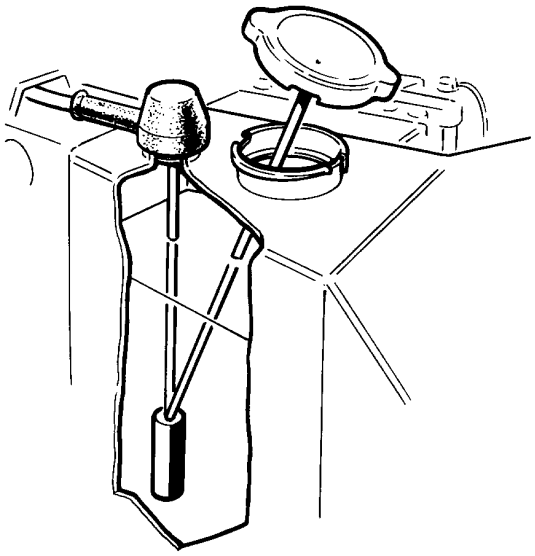


Fig. H17. Oil Level Switch – Location and Test Procedure

Tighten up, re-connect the snap connector, and test the switch function (with the ignition switched 'on').

SECTION H16

HEADLAMP

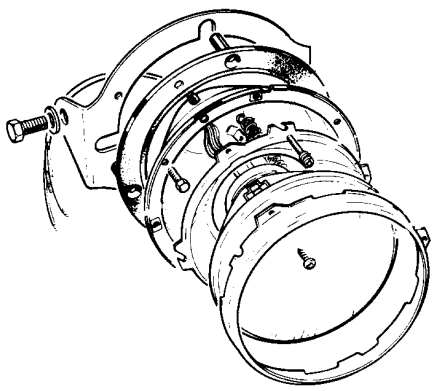


Fig. H18. The Headlamp Unit – illustrating the method of mounting the light unit

Where a fairing is used, the headlight is fixed to the fairing upper mounting bracket using an alternative headlamp cowl mounting. The light unit is recessed within the fairing front, and is enclosed by a forward shroud and protective sealed window.

TO CHANGE A LIGHT UNIT OR BULB

Prise back the sealing rubber gasket flange and remove the headlight window. Unscrew the four black plastic pan headed screws and withdraw the black plastic shroud. This allows access to the light unit.

REMOVING THE LIGHT UNIT

Remove the three 'posidriv' pan headed screws from the flanged retainer rim and remove it. Pull the glass light unit forward and detach the wiring harness plug connector from the main/dip and pilot bulbs. Withdraw the light unit.

Replace the bulbs as necessary, taking particular care not to handle the glass in the case of the quartz halogen headlamp/dip beam bulb. (If inadvertantly smeared with oil or grease, the bulb should be cleaned with methylated spirit and allowed to dry prior to fitting).

Refit the harness connector, ensuring the pilot (parking) bulb is correctly located. Replace the Light Unit to fit correctly locating the fitting lugs into the associated shouldered recesses in the housing. Clamp the light unit firmly in place with flanged retainer rim held in position with the three 'posidriv' pan headed screws.

Completion is the reverse of the dismantling procedure although in the case of the models with front fairing it is advisable to check and adjust the main beam setting prior to refitting the headlamp shroud, seal and window.

SECTION H17

REMOVING & REPLACING THE REAR LIGHT UNIT

For machines fitted with pannier equipment, refer to Section H13 (Fig. H15) for details of pannier mounted warning and tail lights.

SECTION H18

REMOVING AND REPLACING THE FRONT & REAR STOP LIGHT SWITCHES

FRONT STOP LIGHT SWITCH

The front stop light switch is a pressure sensitive unit situated in the front brake hydraulic circuit four way junction block below the front fork bottom yoke. To remove, disconnect the two electrical leads at the connectors on the switch and unscrew the switch. When refitting the switch use a new copper sealing washer and 'bleed' the system as described in section F3.

NOTE:

When replacing the stop light switch it is advisable first to drain the system (as described in Section F4) and to protect the tyres and cycle parts from contamination by brake fluid.

REAR STOP LIGHT SWITCH

The rear brake light operating switch is located in the rear of the master cylinder assembly behind the right footrest mounting plate and is visible between the mouting plate and the rear brake fluid reservoir with the right side cover removed. To replace the switch disconnect the two electrical leads at the switch and remove the protective rubber boot. This will allow the switch to be unscrewed. When refitting the switch it is important to replace the copper sealing washer. Replacement is the reverse of the above procedure and the previous note applies recommending prior draining of the hydraulic system. When the switch has been replaced it will be necessary to bleed the system as described in Section F3 "Bleeding the Hydraulic System"

SECTION H19

REMOVING & REPLACING THE HORNS

Twin driving horns
The horns, which are non adjustable are located below the fuel tank on the left and right sides of the frame. To remove and replace the horns it is necessary to remove the fuel tank (Section E2). Once the fuel tank has been removed the horns can be detached from their mounting brackets by releasing the nut at the back of the horns and disconnecting the two electrical leads.

Replacement is the reverse of the above procedure.

Two tone Police Air Horns
The two tone Police air horn is mounted within the fairing, attached by a bracket clamped to the R.H. side of the headlamp mounting.

The Fiamm "GEMINI" trumpet outlet aligns with a aperture formed within the right side of the fairing shell.

Located within the right side stowage compartment is the air horn compressor, the only maintenance required being the occasional application of light lubricating oil provided with the equipment in accordance with the manufacturers instructions (e.g. two drops of oil every 3 months applied through the oil nipple (red plastic cup) in the upper end of the compressor motor.

SECTION H20

WIRING DIAGRAMS

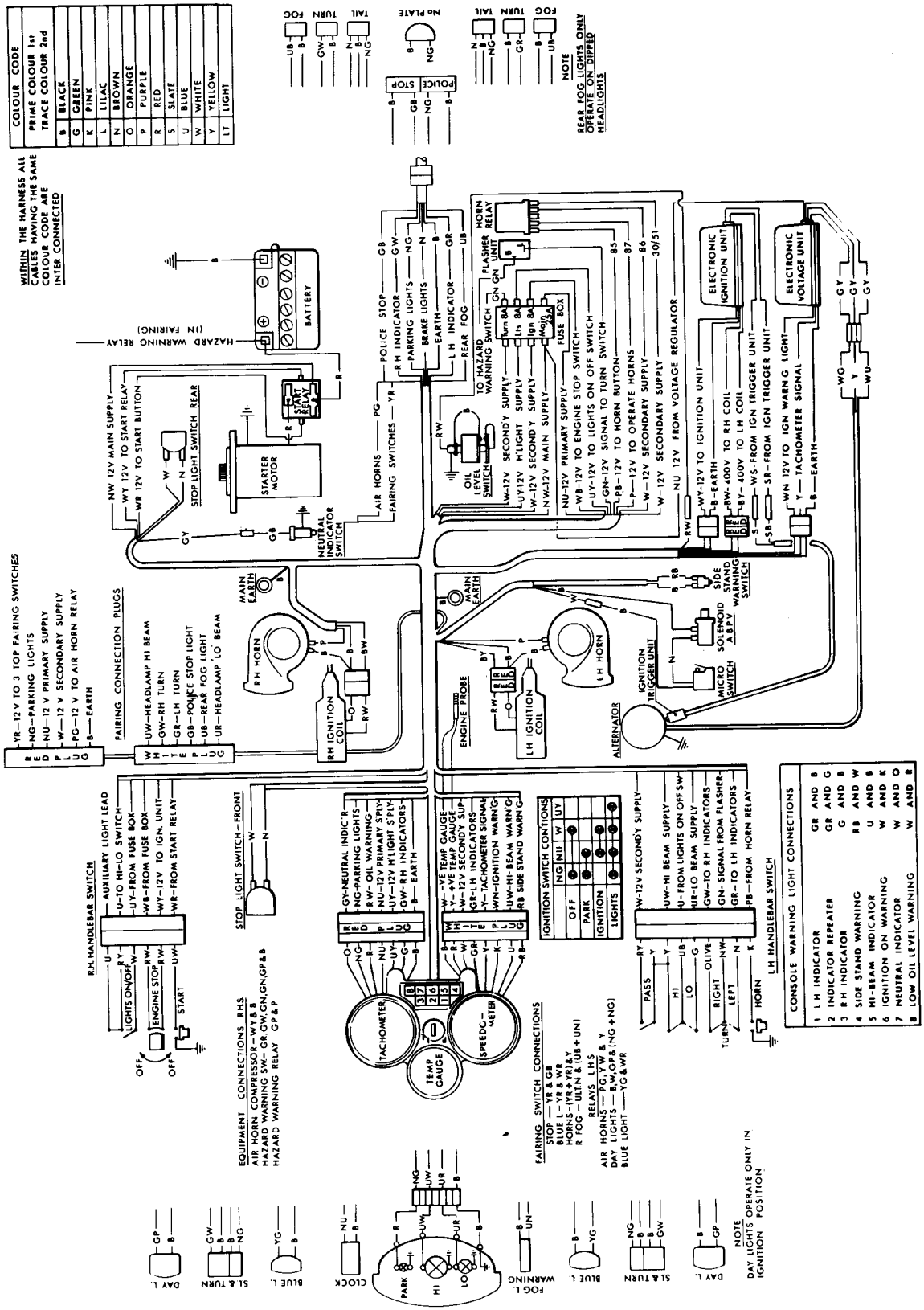


Fig. H19. Main Wiring Harness

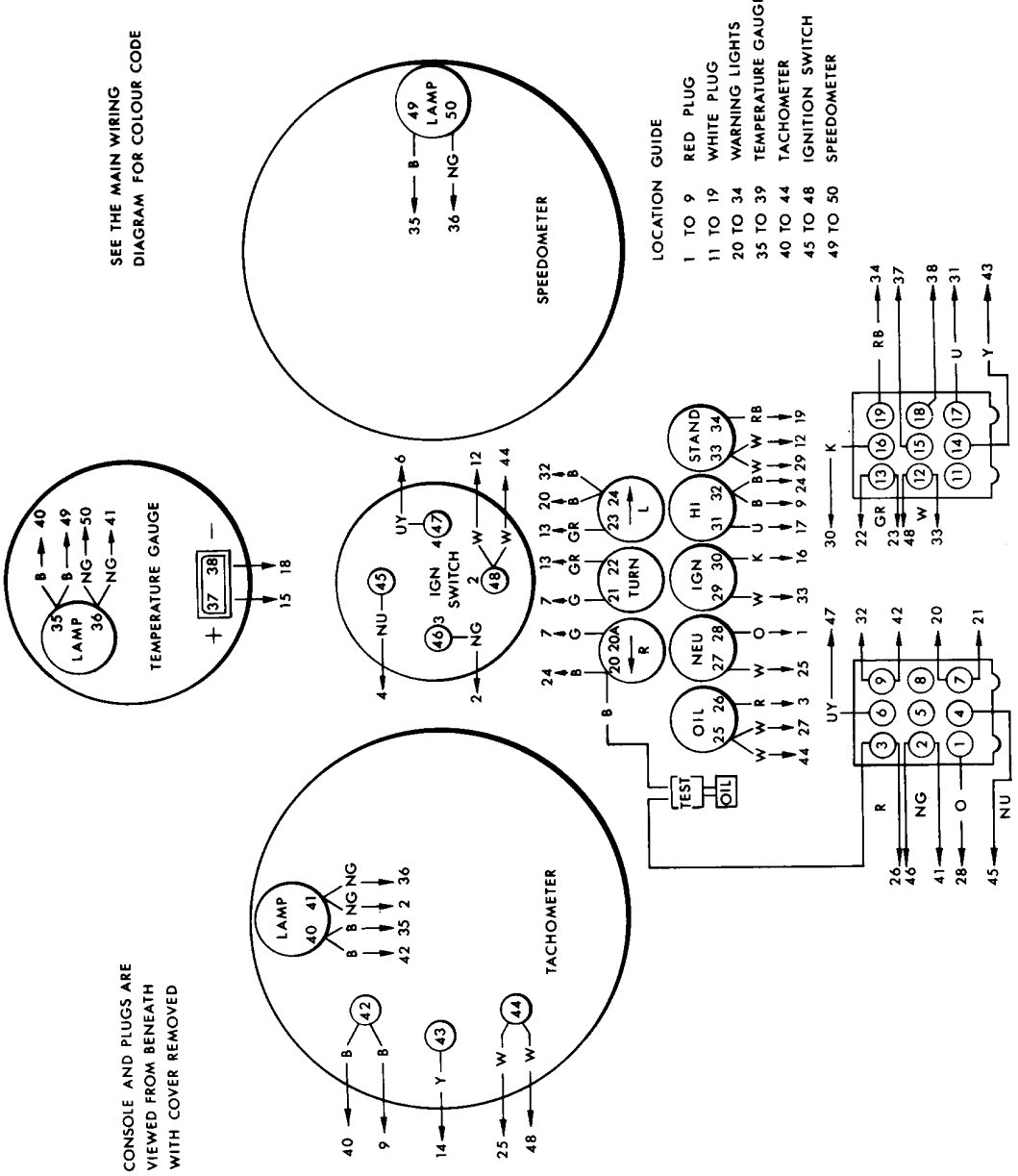


Fig. H20. Binnacle Wiring Diagram

SECTION H20

WIRING DIAGRAMS

Fig. H19. On later machines, the Electronic Ignition Unit cable to the Ignition Trigger Unit has a revised colour coding.
Slate/Red (SR) now becomes Slate/Black (SB).
White/Slate (WS) now becomes Slate (S).

Fig. H20. Thermocouple connections
Thermocouple Brown to White plug centre terminal (15)
Thermocouple Blue to White plug outer terminal (18)

Temperature Gauge +ve (Red) to White socket centre terminal (15)
Temperature Gauge +ve (Black) to White socket outer terminal (18)

Red socket – terminals 1–9
White Socket – terminals 11–19

SECTION H20

WIRING DIAGRAMS

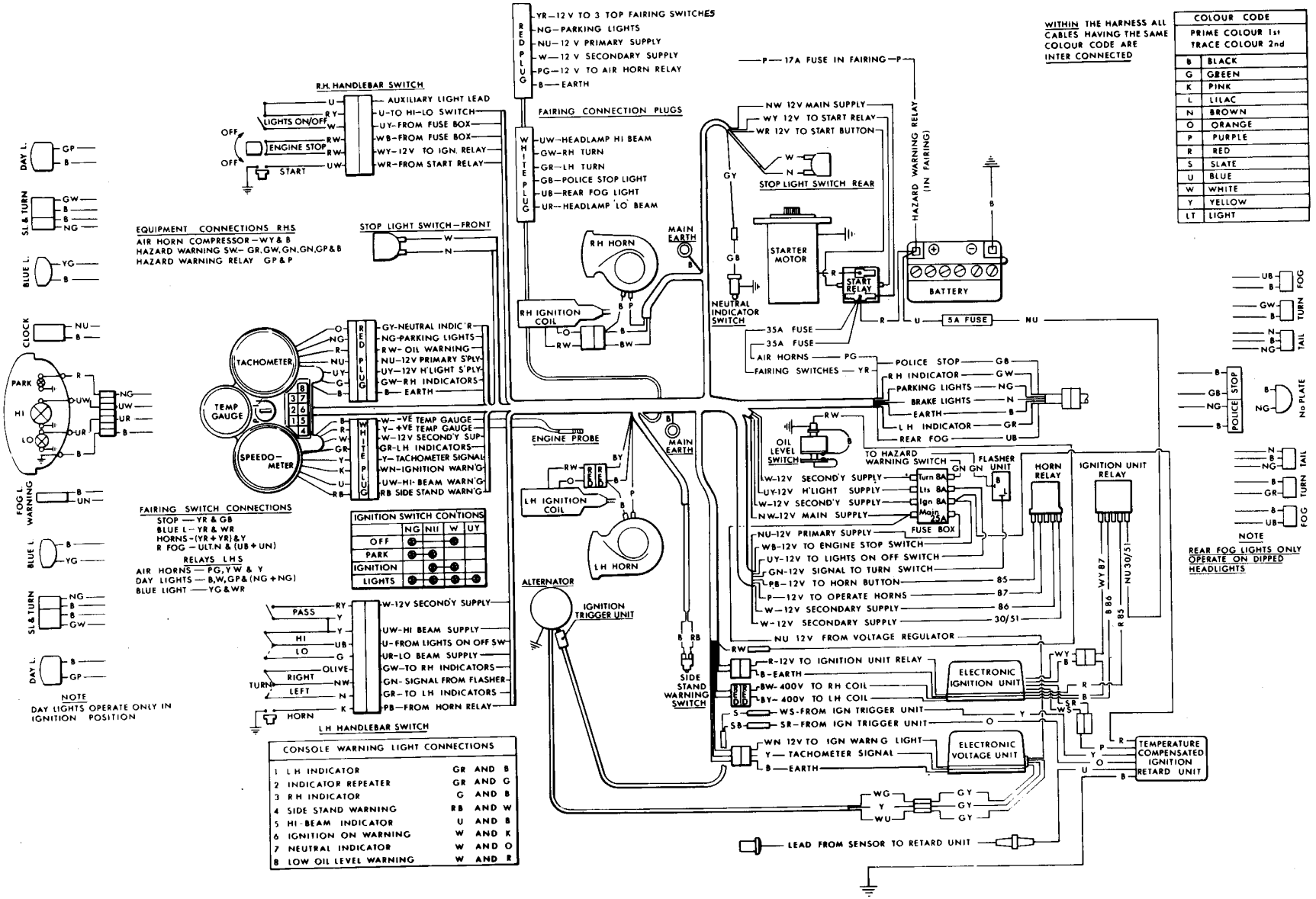


Fig. H21. Main Wiring Harness – Twin Rotor Idle