MOTORCYCLE ENGINEERS
Service School

MOTO GUZZI

These notes are not intended to replace existing manuals, merely to give servicing guidelines and information we think may be lacking elsewhere. The factory manuals are well produced, Especially the 5 S book as is the Haynes manual covering the Big-twins. We recommend that both be purchased and used for reference. We should also be grateful for any suggestions as to ways in which these notes or the Wall Charts may be improved, modified or extended, and hope that this short seminar will enable you to derive the maximum pleasure from owning and riding your Moto Guzzi.

Tools and Equipment

The tool kit provided with each bike should consist of:-

5, 6 & 8mm Allen keys
10 x 11 Open Ended Spanner
13 x 14 "
17 x 19 "
Screwdriver/Tommy-bar
Tappet adjusting tool
Main-jet tool/8-10 Box
Plug spanner/19 Box
Suspension adjuster
Pliers - nice ones
22 x 24 Double ring - *DON'T LOSE THIS*!!

Not so useful

USEFUL

This kit is just adequate at best, and apart from the last items could well be improved.

Minimum Workshop tools include:-

Extra tyre lever

8mm	Combination spanner	5mm	Allen key
10mm	" "	6mm	" "
13mm	" "	8mm	" "
17mm	" "	10mm	" "
Tyre pressure gauge		Feeler gauges	
Double ring from tool kit		Flexifile	
Monometer (see below)		Pliers	

Special tool to loosen distributor clamp bolts
Small (No 1) Phillips screwdriver to fit lens screws
Small screwdriver for carb. adjusting screws
Medium screwdriver to remove carb. clamps and manifold plugs
Plug spanner
Old knife
Plastic tube 18" long, to fit caliper nipples (2 might be useful)

Luxury tools include:

Socket set	Torque wrench
Good tyre levers	Battery charger
Compression tester	Circlip pliers
Pry Bars	

Stock materials:

WD40 or equivalent	20/50 Oil
Tube of Wellseal	EP90 Oil
Loctite	EP140 Oil
Brake grease	Silicon grease
Distilled water in dispenser	Insulation tape - store on bike

Oil can filled with 90w gear oil

Small tin of brake fluid (Universal Dot 3)

High Melting-point grease - better still, Filtrate Copper-slip

3-in-1 oil for wiping over frame

Stock spares:

Sump gasket		Exhaust gasket	
2 Rocker cover gaskets		Oil filter	
Brake pads			
Pair of plugs }	*Store on bike*	Set of bulbs }	*Store on bike*
Clutch cable }		Throttle cable }	
Plug cap }			

Minimum Tools & Spares to be carried:-

Basic tool kit uprated to taste plus knife, small Phillips for rear lens, extra tyre lever, feeler gauges, 8mm open ended spanne

Clutch Cable } *Greased up, sealed and taped alongside existing cables, or coiled inside sidepanel*
Throttle cable }

Fuses }	*Glued inside sidepanel*	Plug }	*Glued inside sidepanel*
Plug cap }		Rear Bulbs }	
Indicator Bulb }		Piece of rag	

Touring kit, as above plus:

Headlamp bulb	Extra rear bulb
Inner tube (front)	Puncture repair outfit
Small hand-pump	Small tyre lever
Small lead-light or torch	Fly lead
Points	Pressure gauge

Small tobacco tin full of Swarfega or similar

Construction of a manometer

13ft of ¼ bore clear plastic tubing
7cc of mercury
2 x 3/16" ball bearings
2 x 'valves'
2 manifold adaptors

Don't make the mistake of placing the U-piece containing mercury in the centre of the tubing. One leg of the tube needs to be longer to reach the carb on the farther side of the machine.

Distributor clamp bolts tool

Buy a cheap 13mm ring spanner and heat shank to red heat about 2" from ring and bend at 90°. A nice touch is to weld on a T-handle.

Allen Keys

Ball-ended Allen Keys. 5 and 6mm are particularly useful especially since those provided in the tool kit are not of good quality.

Clip-on Ammeter.

VERY important piece of test equipment. Simply clip onto ignition lead to battery(thin red) and rev engine. Clearly indicates charge (D.C.) flowing through wire.Without one of these beauties charging faults can become a real drag.

Combined Timing light/test light/lead-light

Japanese Suzuki/Honda instrument bulb holders, two-lead type: fit leads with a crocodile clip and use in conjunction with a 5' fly lead with a crocodile clip at one end and soldered point at other end. Nice alternative to using a panel light is to buy a *UNIPART* test-light. Only £2.00, definitely an O.M.E. 'Best Buy'.

SERVICING AND MAINTAINING THE CYCLEPARTS

Replacement of leaking fork oil seals

Manuals are very explicit, no snags. Fork seal replacement merely involves removing wheel and mudguard (tie back calipers and make sure no one operates brakes!), remove 6mm Allen up inside the bottom of each leg, prise out with an old rounded-off screwdriver and replace, preferably with Wassells leakproof seals.

Points to watch:

Oil in legs is for lubrication only, damping is done by internal dampers. Quantities of lubricating oil vary greatly (see below), we don't know why.

ATF is recommended oil- we use 10-30 Castrolite.

Machine	Quantity of oil in each fork leg
750S & 850T	50cc ATF or 10-30
850T3 & Le Mans	60cc "
V50, 750S3 & V1000	70cc " UP TO 120 CC MAXIMUM
Spada & G5	90cc "

No one seems sure of the reason for the different quantities, but we suggest the above table is followed.

Air Forks

850 Le Mans Mark II Oil/Air Shock Absorbers

The new dampers operate on the following pressure:-

Front 3kg per sq. cm. ± 1

Rear 4kg per sq. cm. ± 1

The above tolerances are quoted to enable the suspension performance to be set to satisfy individual requirements, but both dampers on the

front or the rear must have the same pressure setting, i.e., front dampers can be set at 2-4kg per sq. cm. but the left and right dampers must be set equally within this band.

When checking the pressures of these dampers it is advisable to use a gauge with a very short pipe of preferably none at all, as the capacity of the pip from the damper valve to the gauge will affect the reading and accuracy of the setting. This problem can be overcome by calibration of the pressure gauge, and this is performed by taking two consecutive readings so that the difference in these readings will give the pressure reduction that occurs due to the application of the gauge. This correction figure must be allowed for whenever a measure is taken. Pressure gauges for this purpose are generally available, (the Honda one is probably the cheapest and easiest to find), but it may be necessary to fit an additional sealing washer in the gauge fitting so that the damper valve nipple is pressed only when the gasket has made a seal. (see diagram below).

Not True

Measurements must be taken with the machine on the centre stand and with the dampers cold.

Front Fork Lubrication (Applicable both to air and normal hydraulic forks)

To introduce the oil into the front fork legs, proceed as follows:-

1. With the machine on the centre stand, lift the instrument panel* after removing the two rear fixing screws. Loosen the side screws locking the fork yokes to the stanchions. Completely unscrew the hexagonal screw plug fitting the pressure control valve.

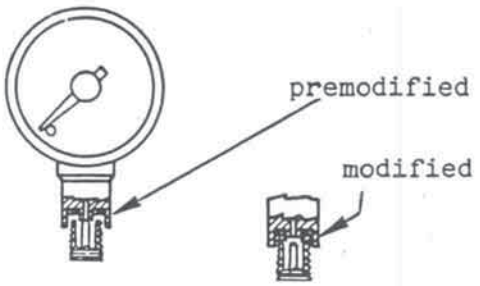
2. Slightly press the front of the bike to force out the plug, which is solid to the shock absorber.

3. Introduce 60cc of ATF per fork leg between the inner diameter of the fork and the shock absorber body.

4. Refit plug, lock side screws in fork yokes, refit instrument panel.

* Spada and MkII Le Mans only.

With *practice* a normal air pressure gauge can be used. Check the pressure a number of times, noting the pressure drop on each occasion. If, for example, pressure drop with each reading is 0.3 Kgms then a reading of 2.3 Kg with end up as 2.0 Kg when gauge is removed.



Japanese Type Pressure Gauge - Suzuki or Honda

Removal of fork inner dampers

Possible cause of poor handling, weaving at speed. Earlier dampers often had differing quantities of oil in each. Quality control is now better. Always replace with 'heavy duty' dampers stamped 9921. Quite expensive, £30+ a pair, may be worth trying to repair old ones by drilling and tapping small filler hole and replacing oil. Operating damping units by hand not very useful unless *really* clapped.

Fork Gaiters worth fitting to protect chrome on leg..

When replacing bottom Allen screws make sure inner assembly has located into slot in bottom of leg.

Steering Head Bearings

Taper roller on big twins, cup and cone on V50s (22 balls). To regrease (20,000 miles), *REMOVE PETROL TANK*, block up sump, chock front wheel and remove top yoke (tedious job on Spadas and MkII Le Mans!). Slowly edge wheel chock forward until bottom yoke drops by an inch or so exposing bearings. Lift off top bearings. If grease has become hardened with age, wash off with petrol, dry and repack with fresh grease (50% Castrol LM and 50% Linklyfe is a lovely sticky blend!). Check races for signs of pitting. Adjust tapers so that handlebars 'flop' when wheel is moved about 1" either side of straight ahead. Ball races much more susceptible to damage through high mileage and

overtightening. If damaged, try to replace with tapers. Adjust *slightly* tighter than can be managed with bare hands.

Loose headbearings can cause knock from yokes under sudden braking or potholes.

Tight or *pitted* bearings cause low speed weaving.

When tightening wheel spindle, use a tommy bar and *not* the clamp nut to prevent spindle rotating.

Bounce the forks once or twice before tightening clamp.

Swinging Arm

Taper rollers should be washed out and repacked with grease every 20,000 miles. Requires removal of swinging arm. Not an easy job without assistanc Make regular checks on swinging arm rubber boot and if split grease rollers at the same time.

V50: adjust so that each pin projects equally from swinging arm and tighten using light finger pressure.

Method of aligning U/J.

Big twins: remove swinging arm, remove U/J, slide mandrel into U/J. Support bearing projecting forward. Replace swinging arm and adjust to left or righ until projecting mandrel aligns with gearbox output shaft. Measure position of swinging arm relative to frame (or pin protrusion) and then replace U/J. N.B. The above is not recommended factory procedure but appears to us to be worth doing since misalignment *may* be a cause of early U/J failure. While the U/J is out, it may be worth carefully stripping it and repacking with grease.

Guzzis not infrequently have wheels that are not perfectly in line. Since this *appears* to have little effect on handling, U/J alignment may be taken as a priority, but check alignment if chasing elusive handling faults.

U/Js are extremely expensive to replace (approximately £60). Oxford Motorcycle Engineers can supply them. They are also able to

rebuild U/Js for about £30.

Wheel Bearings

Normal ball races: play at rim should be perceptible but not more than 2-3mm. Replacement is straightforward. *Don't* forget internal spacer. Use a little Copper-slip on rear wheel drive splines.

Buckled Rims

Recommended run out at rim is 1mm, but tyres themselves frequently vary by 2-3mm! Rear tyre is far less critical than the front tyre.

Wire wheels - rattle spanner against spokes periodically to check tension.

Wheel balancing: worth doing on the front only. Watch for fork bottom 'fluttering' at speed. If none then the wheel is OK. Use stick-on weights for cast wheels, spoke weights for spoked wheels.

Tyres

Tyre pressures: Front 26 p.s.i. (Le Mans 29 p.s.i.)
Rear 33 p.s.i. (+ 3 p.s.i. with pillion).
Try varying tyre pressures ± 3 p.s.i. front and rear to suit individual tastes.
Check cold (not on Motorway service stations!).
Increase by a couple of pounds before continuous high speed use.
Choice of tyres is difficult. A balance must be made between "stickiness" and long life, particularly on rear. Good average combination is Continental ribbed front and Roadrunner rear. New Dunlop TT100s look promising though some early reports hint at weaving if used in pairs on Spadas. Most riders go for too large a section front tyre however. If a Roadrunner is used on the front for example, it ought to be a 360 section with 470 or 425 on rear. Watch out for differential wearing of tread blocks on front tyre. Can cause low speed handling problems. Pirelli Phantoms on rear are great while they last (1200 miles is the figure to beat!).

Front tyres fitted are not really very good, once they start to wear.

We recommend when the first rear tyre is worn out, placing the front on the rear to use it up and fitting a new ribbed tyre to the front.

Make *quite* sure tyre fitting line is parallel to the rim all round the wheel.

Brakes

Made by Brembo and basically identical on all big twins, except for the rear caliper on MkI & MkII Spadas (for some unknown reason). Normal pads can be adapted by drilling larger holes or filing them out (but not really recommended except in emergency).

Front brake operates O/S front disc.

Rear brake operates rear disc and N/S front with a bias of 75% front, 25% rear (roughly). Heavy pad wear can be a problem especially on rear.

Wheels should turn fairly freely and discs should not be too hot to touch after short run.

Points to check:

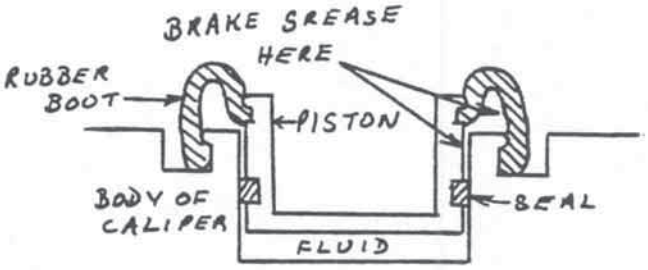
1. Insufficient play in foot lever. Must be 0.005"-0.015" play between lever and cylinder plunger.
2. Blockage in return passages in Master Cylinder. Check by watching for slight turbulence in reservoir as brake is released. Sign of 'exhaust' fluid returning from calipers (*Take care* since fluid can squirt out when brakes are applied and remove paint. *Always* cover tank when working on or topping up front reservoir and wipe screw-top carefully.)
3. Failure of pistons to retract pads from discs on release of brakes. Watch piston action carefully. If any doubt remove caliper and while still attached to line, operate brakes cautiously. Both pads should move and retract together. If one pad only is moving or if pads don't retract then peel off outer rubber boots and pump out pistons *very carefully*. Usually one piston will come out first. *Don't* allow it to pop right out or the other one will prove *very* difficult to remove

When the leading piston protrudes by a fair amount, chock it and then pump out the other one. Holding caliper high remove banjo bolt and replace with nut and bolt fibre washers to prevent fluid leaking out. Tie line up to keep air at end. Observe *SCRUPULOUS* cleanliness during the next stages. Split caliper (note 'O' ring) and carefully clean out caliper bores. Scrape off corrosion near rim, but don't scrape or in any way damage inner bore where piston seal operates. If corrosion is bad then clean up using 600 then 1200 grade wet & dry to get a very smooth surface finish.

Piston can be treated with a little less care, being steel and not a bearing surface.

Reassemble with new seals *bone-dry*. *Do not* lubricate Caliper bores with brake fluid.

Correct grease is Castrol B.N.G. Hard to get. Vaseline is probably better than nothing.



Fill boot with brake grease and apply *very carefully* to piston outboard of seal (*Not* on seal). The seal is all that retracts the piston and if it is lubricated it will slide in the bore and not stick as it should. Reassemble Calipers, remove bleed nipples and carefully fill calipers through feed hole. Screw in nipples finger tight; reconnect line and wipe all fluid off caliper before replacing pods. Reposition on disc and bleed as normal. Front calipers sometimes have shims between leg and caliper body. Replace them on the same caliper and make *quite* sure caliper body join lies on centre of disc.

4. Check that the breather nipple in rear brake master cylinder cap is unblocked

Brake fluid replacement

Probably worth doing annually, certainly every 2-3 years. Since different makes of fluid come in different colours, it's a good idea to change makes when changing fluid because colour change makes successful flushing evident. Place bleed tube over nipple and pump reservoir almost empty then top up with fresh fluid and repeat several times until new fluid comes through.

Pad Types

It really is quite important to use pads of the recommended grades in the different calipers. Front independent and rear calipers have the same pads but front linked has a softer grade to act more rapidly and start weight transfer as dual brakes are applied.

V50

Same theory applies. Try at all costs to avoid getting air into linked system since it can be a sod to bleed. If you have trouble try packing one of the linked pair with shim stock (pieces of Coke can serve well) to hold the pads back and stop that caliper from taking its share of fluid.

Front brake on MkII is never very good due mainly to frictional losses in primary operating cable. Keep well lubricated (Teflon lubricant is excellent but overpriced, otherwise gear oil), and carefully routed, avoiding sharp bends.

ENGINE SERVICING

Distributor Maintenance

The mechanical advance/retard mechanism must be lubricated every 6,000 miles. Remove points backplate and screw in central pillar then withdraw A/R Assembly carefully. *Do not* stretch springs (irreplaceable). Grease lightly bob-weight pivots and spring posts. Also weight stops. If A/R unit is neglected it may seize on full-advance and *any* wear will cause the timing to advance progressively. Oil stem of pillar.

Replace points backplate after cleaning points with a flexi-file, oil points pivots lightly and apply a little copper-slip or grease to the points cam and a little oil to the cam wick.

Points gap 14-17 th.

Timing settings

BOYER ELECTRONIC

Machine	Full retard	Full Advance	R.P.M.
Le Mans	8°	34°	6000
850 T3	2°	33°	6000
Spada, V-1000	0°-2°	31°-33°	6000
V50	13°	34°	5-5000

V50 MkII has electronic ignition. Abandoned in MkIII due to flat spot around 2-2500 rpm caused by non-progressive advance curve. See Supplement

Point Full Advance marks on flywheels with Tippex or Snopake. Count degrees from T.D.C. by the teeth (each tooth equals 3.6° on Big twins, 4° on V50).

If V50 needs adjustment it can be done without a special tool, using great patience. Set the reluctor bar against the pickup and place a feeler gauge between the two before loosening the pickup and moving it slightly in the appropriate direction. N.B. Due to flexing of the pickup as it is tightened and thus varying of the air gap a feeler-gauge blade will have to be selected which will allow an air-gap of 0.2-0.3 when pick up is tight. Very tedious, but possible.

Set points gap first. Strobe right hand cylinder (top set of points) and adjust by rotating distributor body. Next check left hand cylinder (lower set of points) and adjust by rotating points on the back plate. Occasionally slots on left hand points are insufficient to set timing. If more advance is needed close up right hand points (down to 12th if need be) and readjust distributor body accordingly. If more retard is needed open right hand points to 17-18th and readjust distributor. Can be an irritating problem! Strobe timing to 6000-6200 rpm (usually 5000 rpm is sufficient).

Plugs

NGK we have found to be probably the best and NGK waterproof plug-caps undoubtedly so.

V-range plugs will assist poor starting in Le Mans.

Carburettors

Periodic "plug chaps" are worthwhile to check on Carb settings and Air Filter condition. Take bike flat out in top for at least ¼-½ mile, switch off kill button, de-clutch immediately and coast to a halt. Check plug colour: should be mid-brown ideally, but pale brown, or slate grey is acceptable; not paler otherwise engine may overheat. Very pale colour may indicate the need to fit a larger main jet.

A similar check can be made on half throttle and adjustment made, if needed, to the slide needle settings. (Raise needle to richen mixture).

Synchronisation of Carbs

Use the manometer to synchronise the carburettor slides. Firstly set the mixture screws 1½ turns out from fully home and adjust the tickover screws until the mercury levels are together and the engine ticking over at around 1200 rpm. Then run each mixture screw fully home in turn. That cylinder should stop running and restart as the screw is wound out again. Slowly run the screw out further until the revs reach a peak. Another ½-1 turn out from this position aids starting and pick up. Lower the screws evenly until the engine idles again at around 1000 rpm, with the mercury levels together.

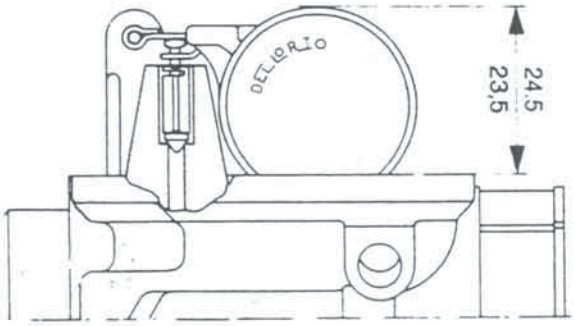
Next slowly open the throttle and as needle passes 3000 rpm (approx) mercury levels should be equal (+ or - 4 mm). Adjust by means of the cable adjusters on the top of each carb. Either cable will do but make *quite* sure that both cables have at least 1-2mm of slack in them at tickover.

Le Mans may suffer from accelerator pumps not working. Remove bell-mouths and watch for the jet of petrol as throttle is opened. If not, then slacken locknut on diaphragm stroke adjuster on top rear of body and

carefully screw it fully home *counting carefully* the number of turns. Next unscrew adjuster fully and work throttle fairly quickly until pump begins to work, next reset diaphragm adjuster to original setting. If lost, then 5½-6½ turns out is average.

Float level settings

Two types of float are used in VHB carbs, marked clearly as either 10gms or 14gms. Hold the carb horizontally and measure carefully from the base of the floats to the float chamber mating surface.



To measure float height, hold carburettor in hand and tilt until floats are just pressing against the float needle.

The settings are 23.5mm and 24.5mm respectively for 10 & 14gm floats.

Le Mans carb levels are: 17.5 – 18.5 mm.

Chokes

Periodically pull up each choke slide in turn at the carb to check for smooth operation and run a little oil into centre of cable adjuster. N.B. If either carb is running rich, a stuck choke slide is the first thing to check. Sometimes also the rubber pad on the bottom of the choke slide can become damaged.

Periodically remove and clean out float chamber securing nut and clean filters under feed pipe banjos.

Tappets - Big Twins

Sometimes the base circle on one of the cam lobes is not ground concentrically which leads to a variation in tappet clearance through the period

of valve closure. Recommended method of tappet adjustment is at T.D.C. on the compression stroke. While both Cam-followers at this point are resting on the base circle, variation in base circle may mean 1-2-15th clearance elsewhere and a rattle. Clearance is 8th cold on both valves (Haynes says 0.00085"!) and if engine runs quietly at these settings then that's fine.

However, there is another way of setting tappets called the I.C.E.O. method. Rotate the engine forwards with the plugs out, either by means of the Rear Wheel in top gear or by using an Allen key in the alternator rotor bolt. Adjust the inlet tappet as the exhaust tappet on that head is *just* opening and the exhaust tappet when the inlet has just closed. This places the cam-follower in the centre of the base circle. Adjust both to 8th and then recheck at T.D.C. If necessary open up to a minimum of 5-6th. Probably better to find noisy tappet and reduce it to 6th usually the R/H exhaust is the one to suspect.

Use Wellseal on tappet cover gaskets.

If replacing head gasket set tappets 2-3th wider, torque head and reset at 500 miles.

V50

If new headgaskets are fitted, torque down in the normal way and set tappets 2-3th wider. Torque V50's down again at 100 miles and again at 1000, and reset tappets each time to avoid possible gasket blowing. (Either factory fit different headgaskets or torque to higher settings when engine is built).

Recommended head bolt torque setting: 30 ft.lbs.

V50 cams seem to be more accurately ground. Clearances at T.D.C.: 4th Inlet, 6th Exhaust.

Compression test

If possible carry out every 6000 miles or so and record on chart. Cylinders may not be identical but should be within 10% of each other. Less than 100 p.s.i. and causes should be found. Le Mans that refuse to

to tick over properly may have slightly bent valves; not infrequent result of minor accident causing brief over-revving.

If fitting new rings make *quite* sure you use *genuine* rings for that model and year. Mixing rings from chrome, cast iron and latest silicon alloy on barrels can result in rapid bore wear.

Lubrication

Engine

Multigrade 20/50 or 10/40. Any brand probably okay but Duckhams does *seem* to cause more condensation.

Oil filters: fit car ones (Unipart, etc.)

Recommended filter change is 9000 miles. Anytime from 8000-10000 is okay. When removing sump to change filter make *very* sure that all Allen screws are out including 4 long ones centre area. If stuck be careful not to break off fins. Lever off at rear against sump drain plug.

Clean up surfaces *scrupulously*, and replace with new gasket unless old one is *perfect*.

Filter may need a spike driven through it to remove. Smear oil on 'O' ring on new filter before fitting.

Lack of oil pressure could be due to dirt under pressure relief ball inside "turret" in sump. but far more likely to be caused by a faulty pressure switch Plug passages with short Allen screws or similar while cleaning gasket face. Spadas and MkII Le Mans keep oil on lowest edge of dipstick flattened area.

Gearbox

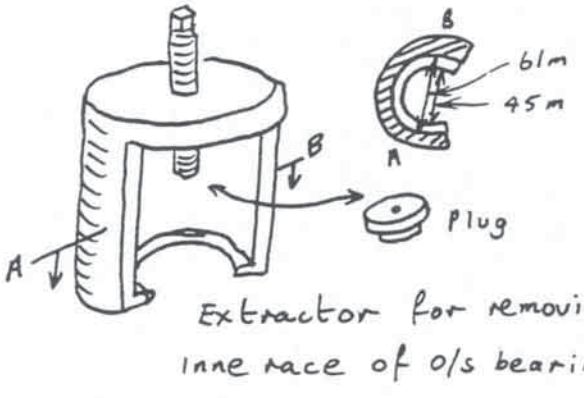
EP-90 on all models, keep a little on the low side especially V50s. Place a ½" block of wood under nearside centre stand leg while allowing level drain. Guzzi gearboxes may take a very long time to run in fully, 10-15000 miles is possible.

Drive Box

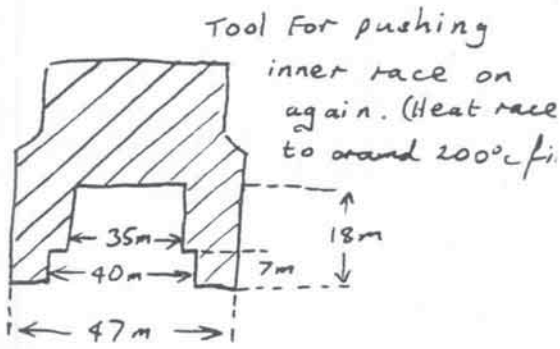
EP-90 for Big-Twins - absolutely trouble free unit. EP140 *absolutely* essential for V50. Fill V50 to level then remove about 2 tablespoons from drain plug or fill with a measured 140-150cc. Prone to oil leaks. Not an easy job to replace seals but possible if a blowtorch is available, and preferably special tool. If done carelessly even more damage can result Special tools are a great help.

First of all lower oil level to 120cc and hope for a cure. If not then:

1. Remove wheel, spindle, right hand shock absorber and caliper
2. Remove complete drive box
3. Place spindle upright in soft-jawed vice and slide box over it with shock base between jaws to prevent turning
4. Remove disc
5. Store loose nuts into which caliper bolts screw
6. Remove seven bolts in disc shield
7. Split case taking care with gaskets
8. Note *very* carefully where oil is coming from; if coming from centre of main shaft then you're in luck; if running down the inside of the disc cover, either take box to dealer or get tools made before proceeding. Tool needed is that on top of page 72 in factory manual. Do *not* try bodging!



Extractor for removing inner race of o/s bearing.



Tool for pushing inner race on again. (Heat race to around 200°C fi

9. If oil is running down the centre main shaft then check carefully for damage to off side end of shaft where oil seal runs (see diagram below). If scratched slightly then clean up with 600 and 1200 grade wet & dry followed by polishing with string and "T" cut.

V50 drive box inner-shaft.

If deeply marked then buy new shaft, or try "stoning" on a lathe. Diameter not critical to within 5-10th undersize.

10. If surface is flawless wash out drive-box with paraffin. Dry carefully and heat up with blow torch until spit sizzles (100-200°C) Tap out central tube then bang case vigorously on wooden bench top until outer race of needle bearing drops out followed by washer. Leave race in iced water.
11. Prise out oil seal - can be tricky (Snap-On pry bars work wonders!) - and then inner loose washer.
12. Replace with new seal while case is hot; follow up with small washer pushed through seal, then large washer, ice cold race and central tube.
13. Reassemble in reverse order remembering the following points:
    a. *Don't* bend up tabs on crown wheel bolts
    b. Use Wellseal on brown paper gaskets
    c. Replace captive nuts for caliper bolts in disc shield
    d. Fit disc the correct way round
    e. Loctite disc bolts

If you want to replace seal in disc shield phone O.M.E. for details and possible snags before going ahead!

Clutch

Oil pivots and cable regularly, including lever on back of gearbox (don't forget gearchange shaft and linkages while you're there!)

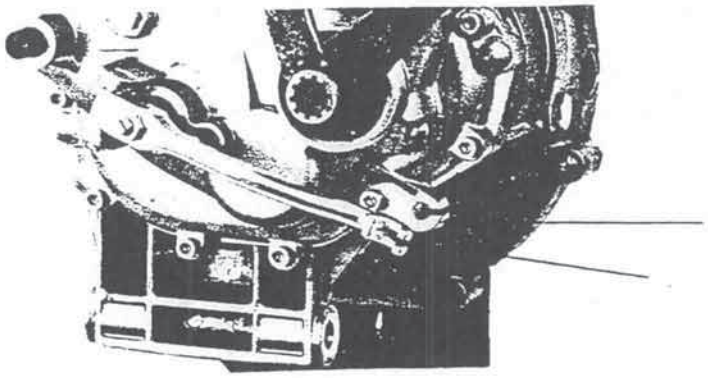
Adjustment in sequence:

a. Slcaken cable right off at handlbar end 45–50 MM

b. Adjust screw in gearbox cover lever to give ~~3mm~~ clearance between cusp for nipple on lever and rear surface of adjuster boss

c. Adjust obttom cable adjuster to give ½-¾" at handlebar lever

d. Adjust to ½" at handlebar adjuster



Check occasionally for oil leak from vent hole at bottom of clutch housing. Oil dripping could be coming from gearbox or engine. Early warning of clutch failure.

If replacing clutch plates originals are probably best. Smear a *little* Copper Slip on clutch plate splines.

Reassemble clutch with *care* (plates can be fitted two ways, one wrong) and check action carefully *before* putting engine unit back in frame. Clutch and flywheel have alignment marks. Always replace rear oil seal on push rod. Always check nuts on clutch - they should be tight

ENGINE NOISES

Tappets loose

Light tapping at half engine speed.
Present at all engine speeds.
Test - adjust tappets (see relevant section)

Piston slap

Engine speed, sharp knocking, worse when cold and disappearing above around 2500-3000 revs unless *very* bad.

Should only occur after very high mileages or after piston seizure. Piston seizure should be obvious, but can range from slight hesitation in power output rather like starting to run out of fuel to full blown rear wheel lock-up. Will only happen on sustained high speed run and never after 5000 miles unless something is wrong (oil shortage, bad timing or wrong carburettor settings). V1000 motors prone to seizing on right hand pot while new (up to 5000 miles).

Although not a serious noise in itself, piston slap should always be investigated early. Compression test first then strip offending cylinder. *Light* seizure can be ignored after cleaning up barrel with 600 grade emery and piston high spot with fine file (check rings carefully). If piston is badly seized don't just rebore and hope. *Find a cause*. (Don't be afraid to rebore one piston only, it doesn't appear to make much difference to engine behaviour!). If piston slap is present in an old engine, rear of skirt (in terms of direction of rotation) can be peened out slightly from the underside, works very well, but *great* care is needed in measuring piston during work!

Clutch rattle

Not uncommon, varies as clutch lever is engaged. Don't worry about it.

Little end

Light tapping noise like a tappet, but at engine speed. *Very* rare.

Big ends

Heavy knocking from bottom end at engine speed, quieter or absent under acceleration or engine braking. Worse when engine running at light throttle opening.

Unless oil supply is restricted shouldn't occure in less than 75-100,000 miles. Easy job - drop sump and slip in new shells.

Main bearings

On Big twins, indestructible, up to 200,000+ miles by the look of them.

except in V50 where mains *may* prove a weakness over high mileages. *Very* much smaller than big-twins. Test by holding alternator rotor and lifting up and down.

REMOVAL OF ENGINE GEARBOX UNIT FROM FRAME

1. Remove rear wheel and swinging arm
2. Remove battery
3. Disconnect all cables, unplug all electrics
4. Chock engine under sump very firmly
5. Remove carbs by unbolting manifolds at heads and tying up (leave cables on)
6. Remove bolts from bottom rails
7. Wheelbarrow frame and front end away. Best done with two assistants! N.B. Haynes is quite comprehensive, but removes the starter motor, carbs and battery plate without needing to, though the latter is worth removing to check for and deal with acid corrosion.

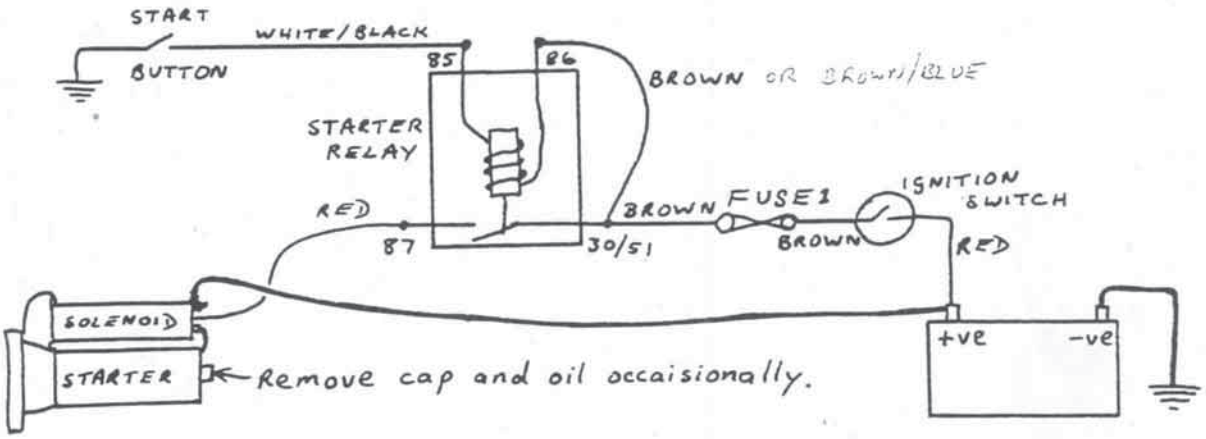
ELECTRICAL SYSTEM

Contrary to popular report, Moto Guzzi electrics are very reliable. Most of the components are Bosch and reasonably priced if purchased from Bosch agents. However, like all electrical systems, salty water will have a disastrous effect if not excluded from junctions especially connector blocks. All connectors should be parted and filled with silicon grease, early on, particularly before the first winter. The wall chart details loom checks, at regular intervals. It will pay you to do these thoroughly, tank, seat and side panels off, battery out. Remember around 80% of breakdowns are electrical of one type or another.

Golden Rules for Electrical Fault Finding

1. Don't Panic - electrics are fun!
2. Always start with a charged battery, test light, flylead and a cool head.
3. Suspect first the cheapest most accessible components.
4. Guessing at faults can be expensive; try to prove things logically, notebook and pencil are a good idea.
5. Keep hoping you haven't got two simultaneous faults.

Starter Circuit



The Starter Circuit must be thought of as quite distinct from the ignition circuit, i.e., if the engine turns over on the starter motor but won't start then the fault does not lie here!

Faults in order of likelihood:

1. Discharged battery: usually makes a loud, rapid clicking noise as solenoid shuttles to and fro. When very flat merely clicks the starter relay.

Assuming then that the battery is fully charged:

2. Poor connection where earth-strap from battery bolts onto frame or poor connections at battery itself or feed connection to solenoid.
3. Faulty ignition switch.
4. Faulty starter motor, often due to ingress of water (more common on V50 for some reason). Strip and clean.
5. Faulty relay.
6. Faulty fuse.
7. Faulty solenoid.

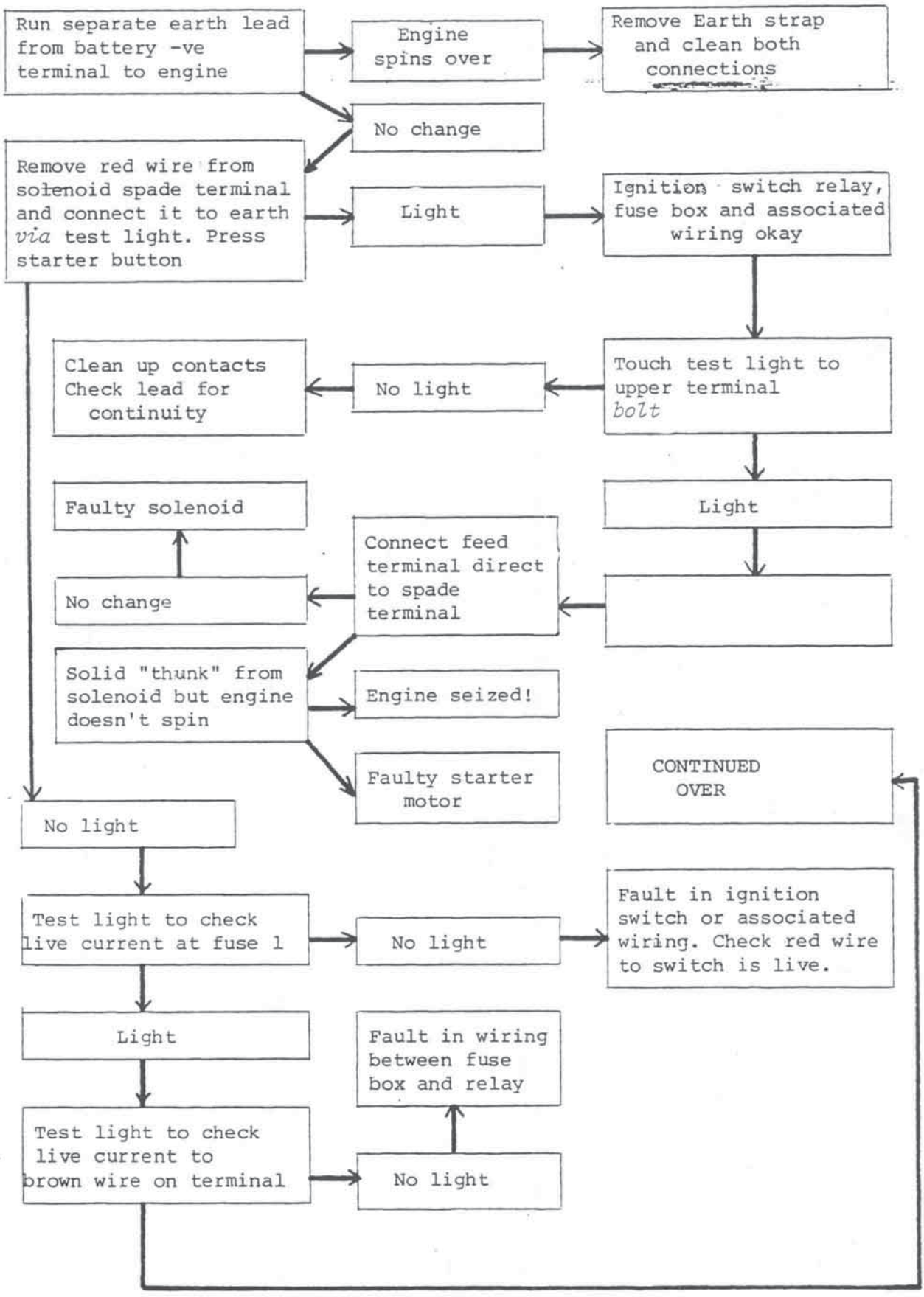
Please turn page for flow diagram on Charging Circuit Faults.

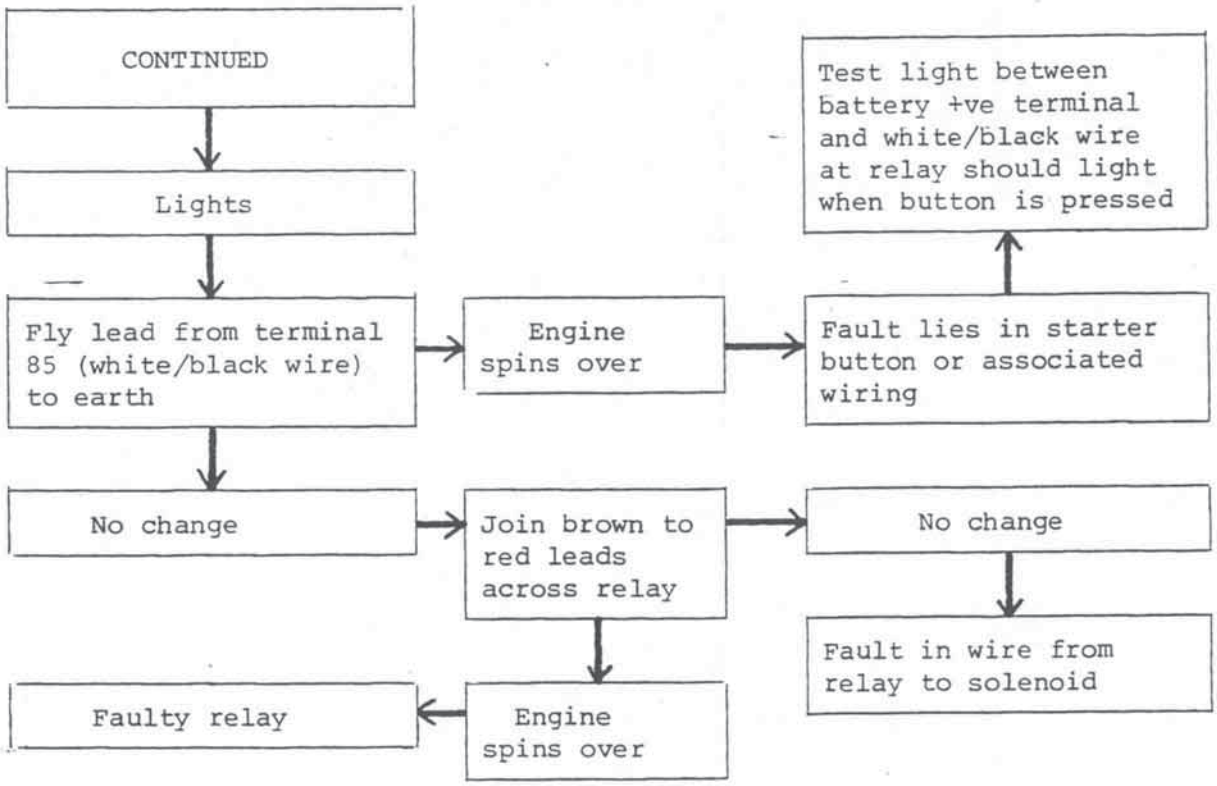
Battery Care

Check the acid levels regularly. More in summer. Top up with distilled water. *Top up with acid if battery is spilt.* Do *not* pull battery out of frame by its terminals. Keep terminals lightly coated with Vaseline or, better still, Holt's "Nocrode" or similar product. Keep Vaseline on rubber buffers that hold battery in position. Wrap two loops of nylon string around battery to assist in its removal and leave in position (Big Twins only). Splits in the top of a battery can be repaired with a soldering iron, cracks in casing with Holt's "Batrepair". Include attention to the frame end of the earth strap in your routine maintenance. Poor connection frequently causesproblems.

Simple Test Routine For Fault Finding In Starter Circuit

Check battery is charged, fuses are okay and holders clean.





V50 MkII Electronic Ignition System

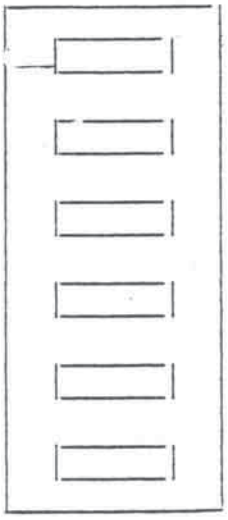
If neither side sparks check feed from ignition switch via kill button in usual way. If one side only sparks, check electronic boxes by substitution of one side to the other. If fault persists, it could be faulty pick-up. Tricky to replace without tool, but *just* possible. Phone O.M.E. for advice! If pickup is faulty, then plug will usually spark when ignition is turned on and off.

Care of Multi-pin connections

Either fill connectors with Castrol B.N.G. grease (difficult to obtain), or alternatively, take a large tub of Vaseline, immerse it in boiling water until molten and dip each half of the multi-pin connection into the liquid. This should give excellent protection for several winters.

Fuses

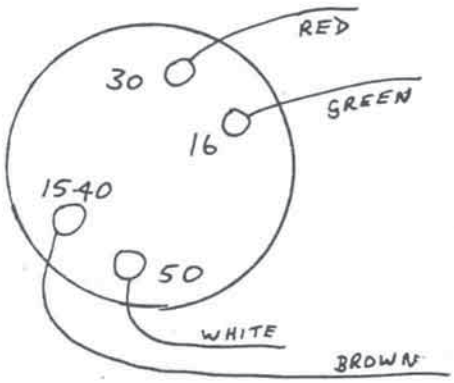
Spin fuses in holders occasionally after spraying with WD40. Fuse positions may vary slightly from model to model, remove your own fuses one at a time and see what components each protects.



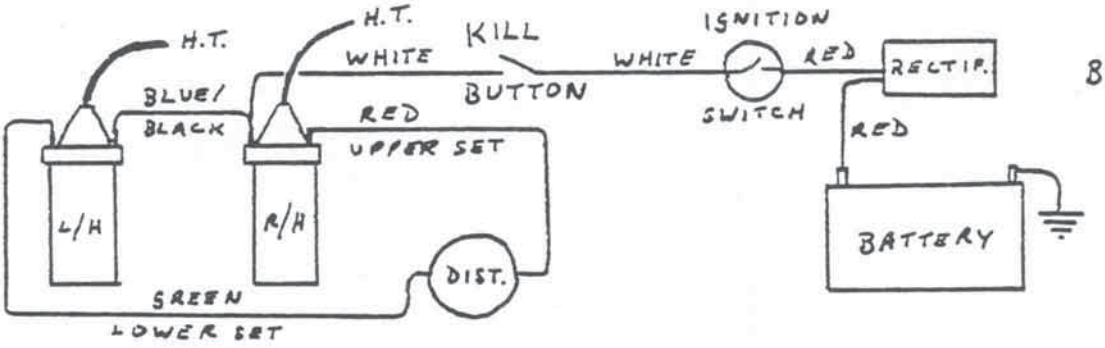
BIG TWINS

1. Starter relay.
2. Headlamp flasher and horn.
3. Panel warning lights.
4. Parking lights.
5. Indicators.
6. Clock (where fitted).

IGNITION SWITCH



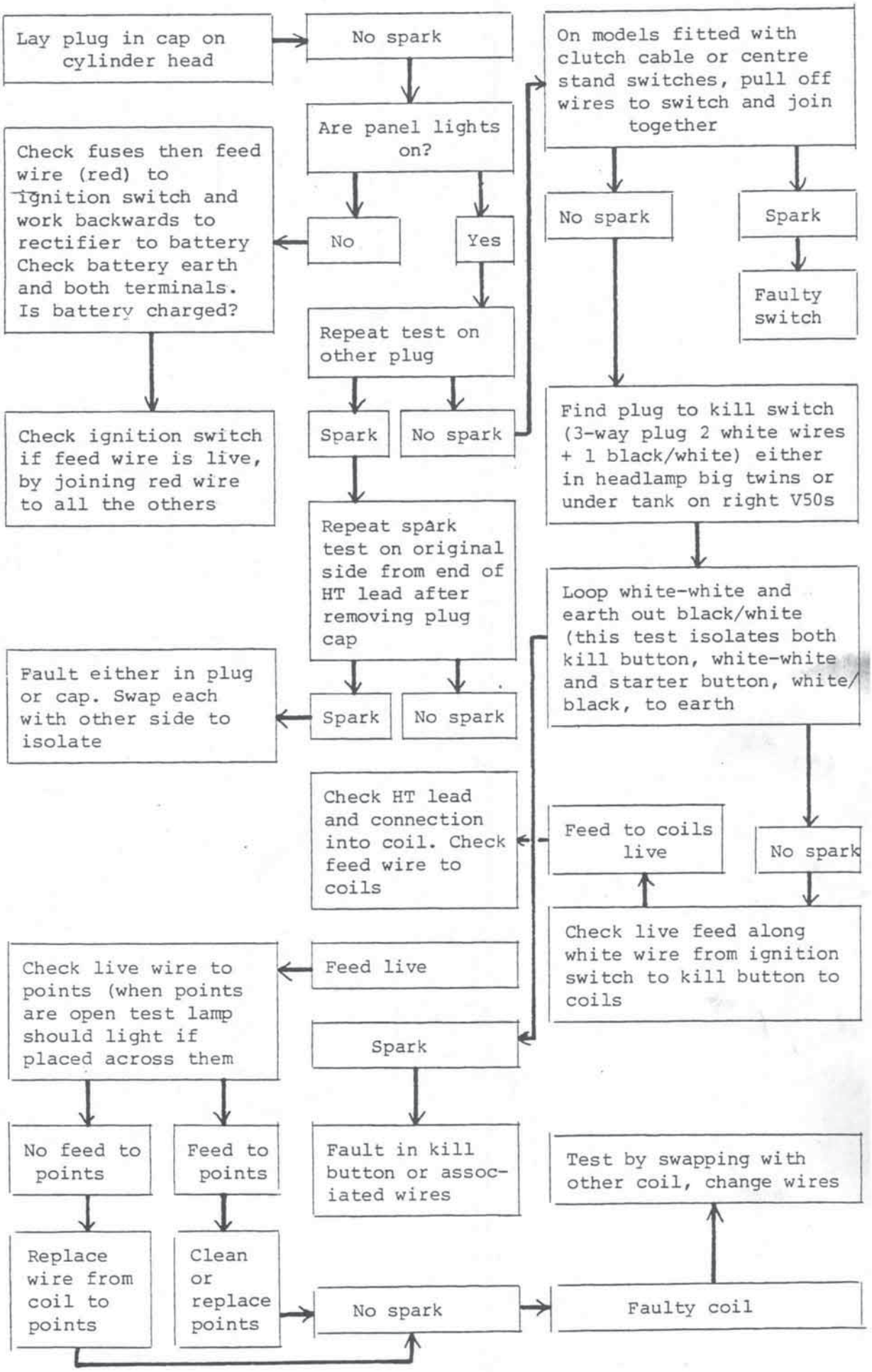
Ignition Circuit.



BIG TWINS ONLY

Live feed passes from the battery to the rectifier and on to the ignition switch (red wire).Then a white wire passes current onto the R/H coil via the kill switch. A blue/black loop wire links power to the L/H coil and each is connected to earth via its respective set of points. The plugs fire at the instant the points open. Diagnosis of ignition failure is usually very straightforward on twins because there is always an identical component to serve as a substitute.

Simple test procedure to test ignition system



Faults in order of likelihood:

1. Discharged battery: usually makes a loud, rapid clicking noise as solenoid shuttles to and fro. When very flat merely clicks the starter relay.

Assuming then that the battery is fully charged:

2. Poor connection where earth-strap from battery bolts onto frame or poor connections at battery itself or feed connection to solenoid.
3. Faulty ignition switch.
4. Faulty starter motor, often due to ingress of water (more common on V50 for some reason). Strip and clean.
5. Faulty relay.
6. Faulty fuse.
7. Faulty solenoid.

Please turn page for flow diagram on Charging Circuit Faults.

Battery Care

Check the acid levels regularly. More in summer. Top up with distilled water. *Top up with acid if battery is spilt.* Do *not* pull battery out of frame by its terminals. Keep terminals lightly coated with Vaseline or, better still, Holt's "Nocrode" or similar product. Keep Vaseline on rubber buffers that hold battery in position. Wrap two loops of nylon string around battery to assist in its removal and leave in position (Big Twins only). Splits in the top of a battery can be repaired with a soldering iron, cracks in casing with Holt's "Batrepair". Include attention to the frame end of the earth strap in your routine maintenance. Poor connection frequently causesproblems.

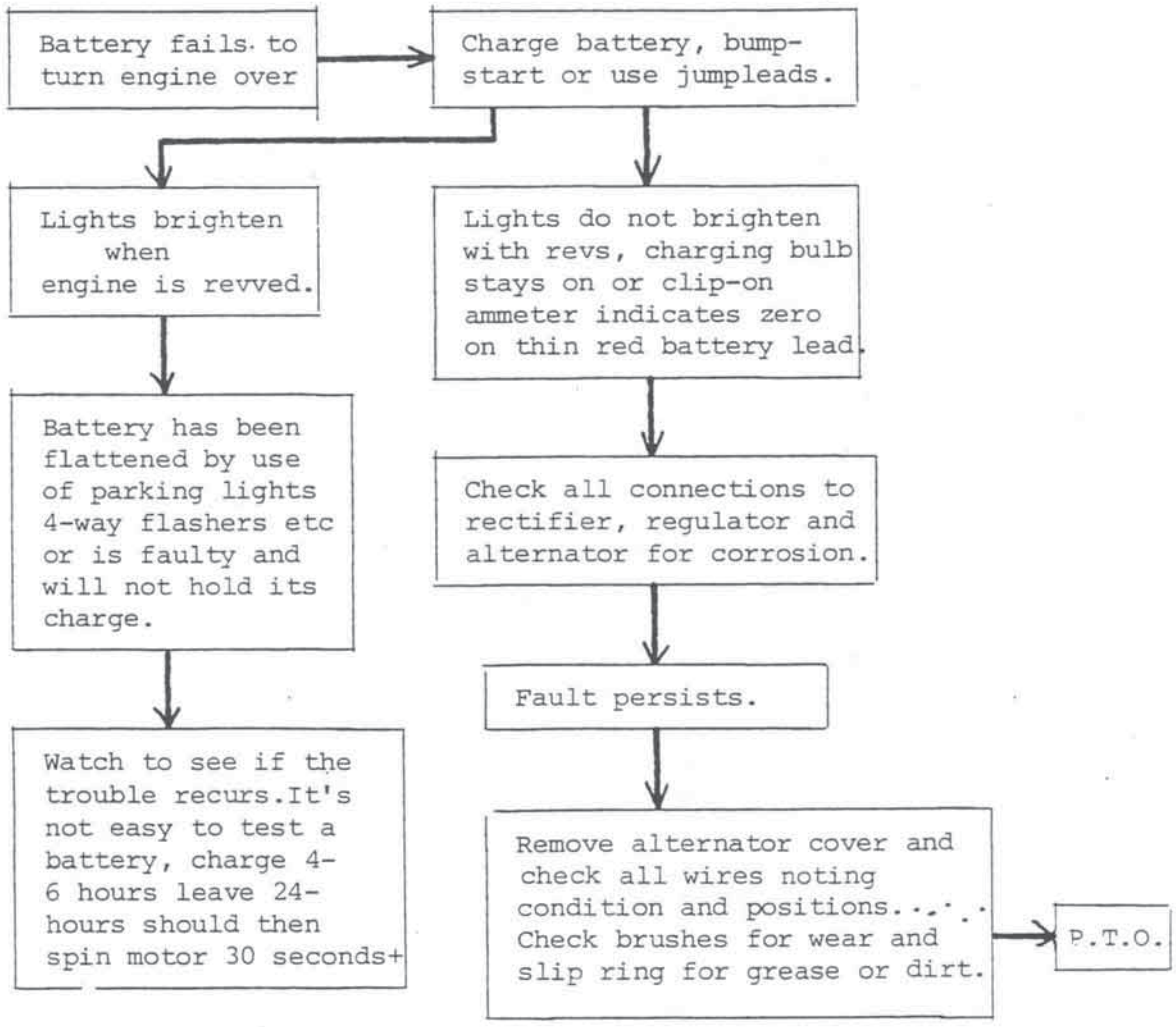
Bulb Failure.

Check bulb first, then earth connection (run a separate earth lead direct to the engine casing) finally use the test light to trace back along feed wire until fault is found.

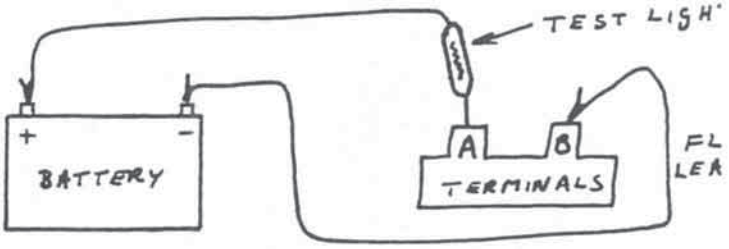
Repeated bulb failure is frequently due to poor or intermittent earth. Especially on V50 where rear mudguard bolts onto frame. Sometimes running a permanent separate earth wire works. Vibration is another possibility, not so easy to cure with-out rubber mounting. Test by taping a lead weight to rear mudguard to alter natural resonance frequency.

Charging System Failure.

If the red ignition light stays lit on the panel then battery is not being charged. Unfortunately it is possible for the light to go out even if the system is not working properly but this is rare.



Continued.....



Remove the leads carefully from the alternator stator and by refering to the opposite diagrams conduct similar tests on the following terminals:

1-2
1-3
2-3
1-Y
2-Y
3-Y
D- -DF

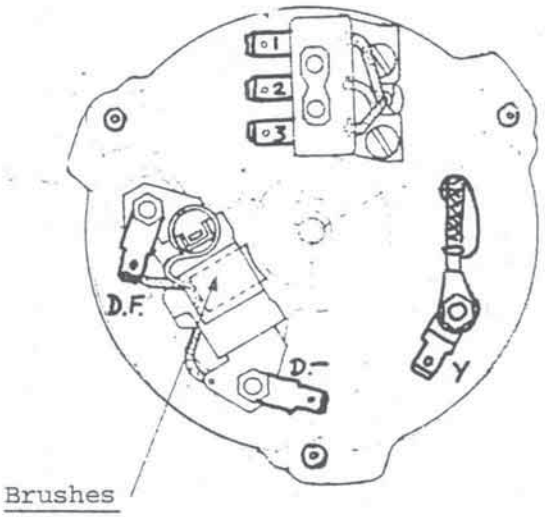
Test Bulb Lights.

Y-D- Test Bulb should not light.

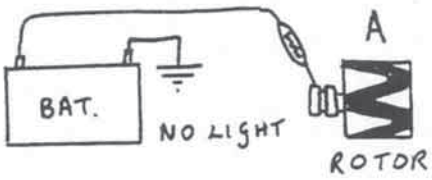
Differing results from the above mean alternator stator may be faulty.

If the above tests appear to be in order remove the stator Allen screws and carefully remove the stator

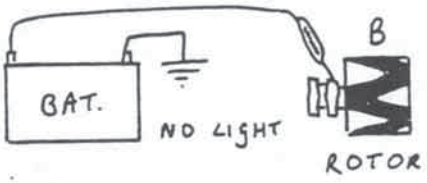
Alternator Showing Spade Terminals.



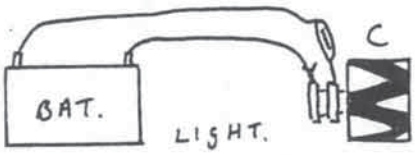
Testing the Rotor 'In Situ'



Leaving the rotor bolted onto the crankshaft carry out the tests illustrated opposite. Any other results suggest a faulty rotor.



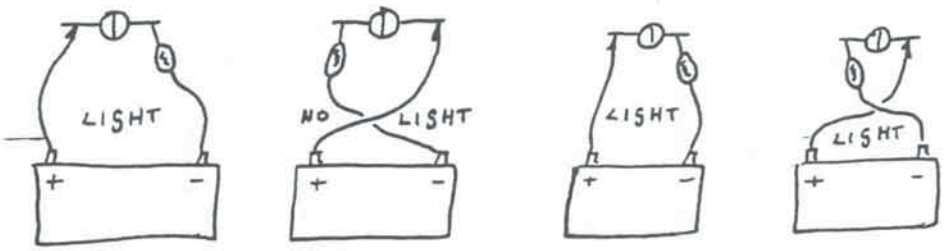
Rectifier is next to be tested. Leave it in position but remove all wires from it. Refer to diagram on next page. Remember that the rectifier is simply a collection of diodes. A diode is



an electronic device which only allows current to flow in one direction.

Simple test for an individual diode (using a test-light)

Normal Diode. Faulty Diode.



Carry out the following tests very carefully. For each pair of terminals you must do two tests, reversing the leads after the first, see above.
See diagram below for labelling of rectifier terminals
N.B. 'S' represents body of rectifier. Check that it is earthed to the bike.

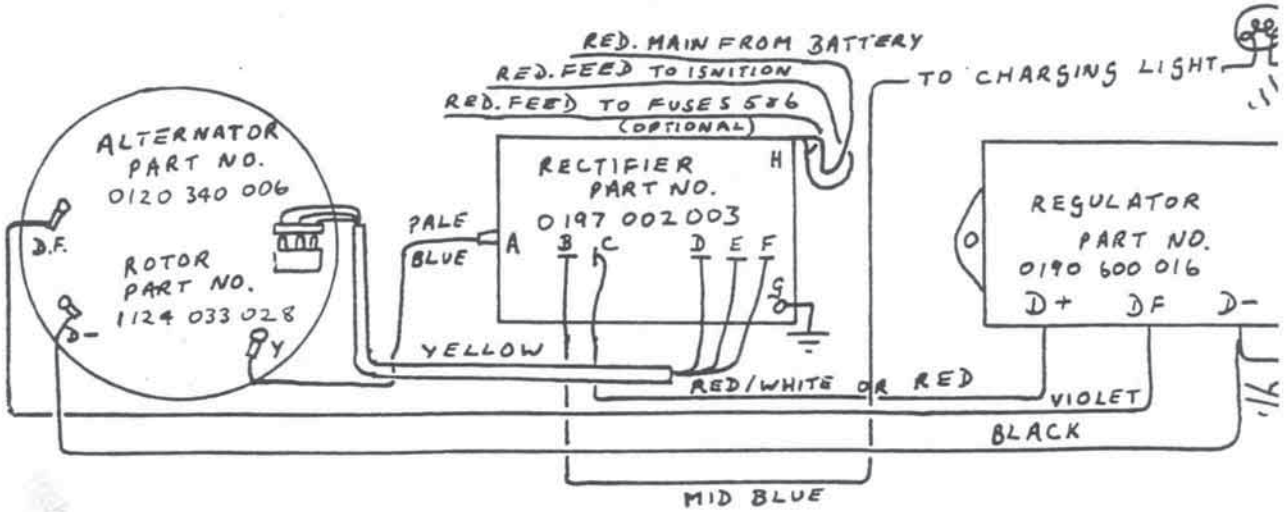
D-S	S-D	D-B	B-D	D-H	H-D	A-S	S-A
E-S	S-E	=	E-B	B-E	=	E-H	H-E	=	A-H	H-A
F-S	S-F	F-B	B-F	F-H	H-F

There are 10 diodes in the rectifier. These tests will check them all.

If, for any pair of terminals, the light remains lit in both directions then that diode is faulty and the rectifier scrap. Continuing to run the bike by charging the battery will most likely destroy the battery.

If all of these tests prove satisfactory then turn your attention to the regulator. Unfortunately this is a difficult unit to test without spesialised equipment so ring O.M.E., ask nicely and we might lend you one to try substitution.

Unfortunately these abovementioned tests may not isolate the problem, electronic components sometimes develope faults which are best solved by substitution.



V50 MkIII and Monza Supplement

The new V50 III and Monza are now arriving and there are some important changes to these models from the old V50 II.

The most important change with respect to service is that the latest models have points ignition as opposed to the previously used Bosch electronic. The move to points was done for economic reasons and does not mean that there has been any specific fault with the Bosch electronic ignition used on the Mark 2.

The basic specification for the point ignition is given below:

Fixed (Static) advance	10°
Automatic advance	25 ± 2
Full advance	35 ± 2
Contact breaker gap	0.35 - 0.45mm (0.0137-0.0157)

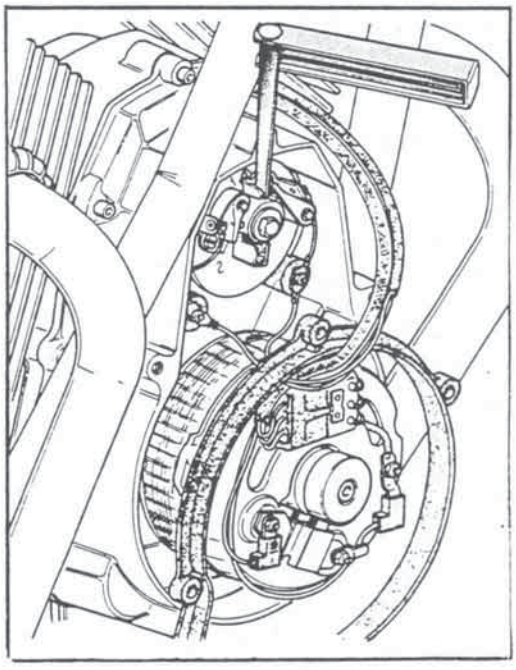


Diagram 1

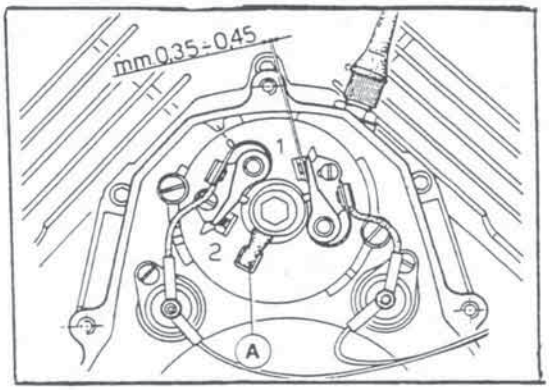


Diagram 2

Referring to diagram 2 above, contact breaker set 1 are for the left hand cylinder, and contact breaker set 2 are for the right hand cylinder. The ignition timing is roughly set (accurately enough for general running) when the 'O' mark on the base plate is in line with the mark on the crank

case, provided that the points are set at 15 th. The points should be accurately timed by using a timing light and the marks on the flywheel. The respective points should just begin to open when either mark 2 or 3 shown in diagram 3 are in the centre of the timing hole in the clutch housing. The timing can be adjusted by rotating the points base (diagram 4) after slackening the two screws E and it may then be necessary to alter the gap on the other set of points to ensure that they are timed correctly.

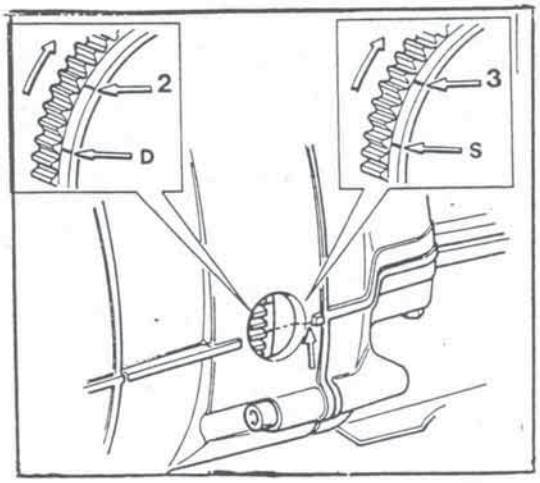


Diagram 3

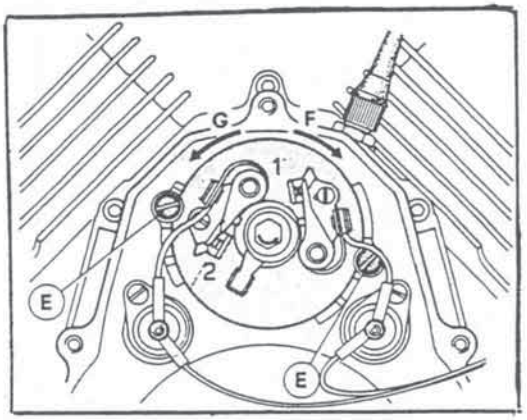


Diagram 4

Suspension Units.

The suspension on the Mk.III V50 and Monza is of the air assisted type, similar to that fitted to the Le Mans Mk.II and the proceedure for pressurising and checking the units are the same as those outlined earlier in the notes.

The pressures for both the Monza and the V50Mk.III are as follows:

Front: 3kg/sq cm $\pm$ 1.

Rear: 4kg/sq cm $\pm$ 1.

GENERAL INFORMATION ON LUCAS RITA IGNITION

1. It is most important to adhere to the colour codes shown on the diagram. The Brown and White-Brown from the amplifier must be connected to the Black and the White on the Pickup as shown. Transposing these connections changes the system from Fixed Ignition to Automatic Advance/Retard, and changes the timing position shown, by approx. 20°. This could cause severe engine damage.
2. The "560" type in-line connectors are supplied for ease of fitting in situ. However, they can be trouble in the long term if vibration gradually wears the contact area between the copper wire and the bridge inside the connector. We recommend crimping on alternative connectors, giving a larger contact area, if you have the facilities.
3. There is currently only one basic amplifier (Part No. 48016), but there are variations made for certain applications and these variations are identified by colour coding on the side of the amplifier. It is advisable to have the recommended amplifier for the job and if in doubt please ask.

   Identification

   Yellow panel — Bistable amplifier for some total loss battery applications and Triumph and Ducati twins.

   Green panel — Advance curve modified for R90S BMW.

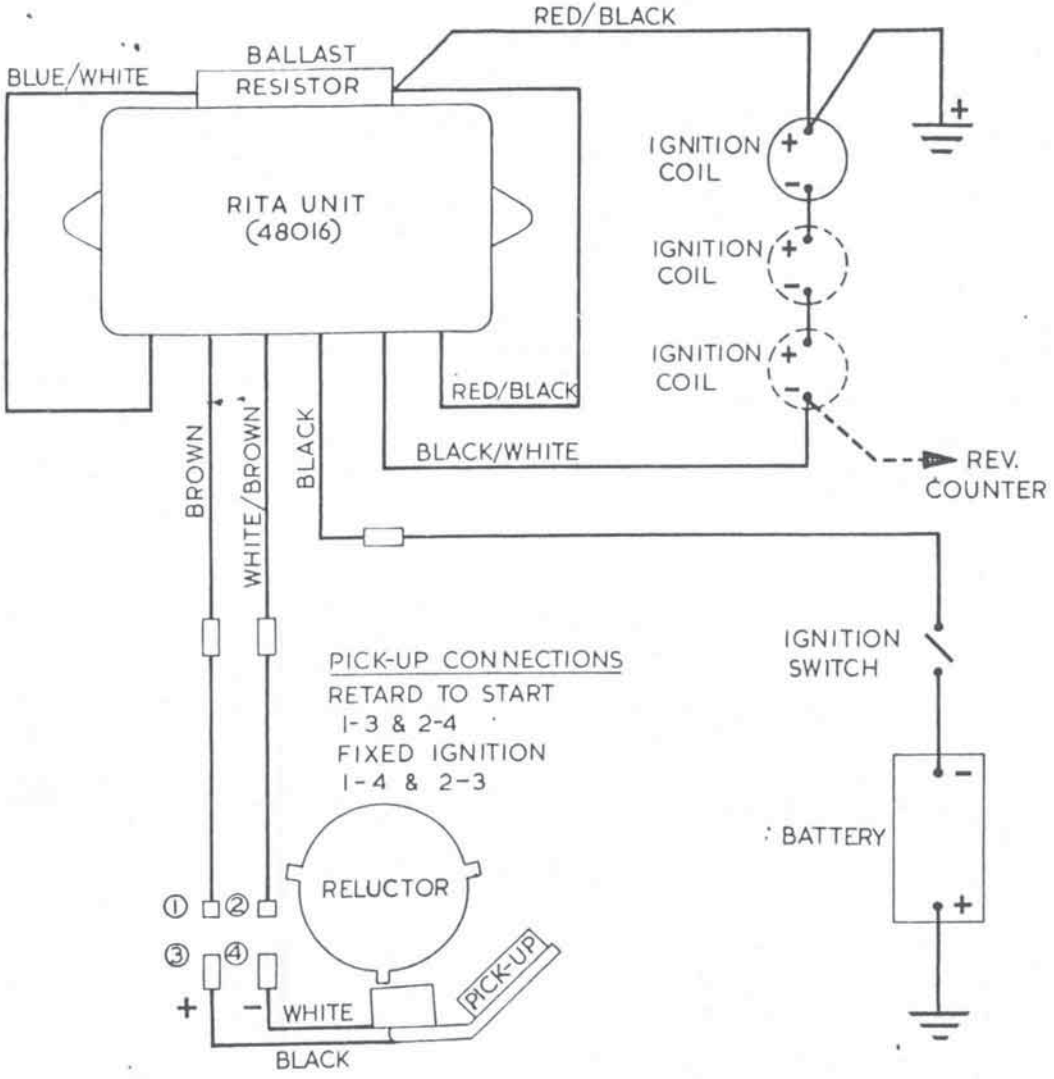
   Black case — (with or without yellow panel) — Advance curve modified for Norton twins with 4S cams.
4. The shape of the triggering poles on the reluctor are different for Fixed Ignition and Automatic Advance/Retard. It should therefore be noted that a four stroke Reluctor will not run a two-stroke satisfactorily on Fixed Ignition as at 3. Please ask our Technical Department if considering a non-standard application.
5. There are three Pickups in use and these are identified as follows:
   (i) 2 P.U. Type. Basically hexagonal in shape and full encapsulated. Normally only used on racing machines.
   (ii) The standard 'C' type used on Trident and Suzuki three-cylinder.
   (iii) The low 'C' type used on all other road machines.
6. Krober electronic rev. counters can be used with RITA and the triggering point is the spare coil spade (–) where the white-black wire from the RITA Unit is connected. Follow the instructions supplied with the rev. counter regarding the difference in connecting to positive or negative earth ignition systems. When ordering the instrument, point out the number of sparks produced at any one spark plug, by the RITA ignition per engine revolution, i.e. Suzuki 750 — three sparks per revolution; Trident — three sparks per two revolutions, etc.
7. For machines running with RITA ignition and no battery there are various suitable alternator parts and control circuits available.
   For racing use, without a lighting requirement, and where a Lucas alternator is used originally, then the low output Daytona Stator with a Welded Rotor and half-wave Control Box should be obtained. (Prices on application.) In all other cases, i.e. road machines, endurance racers and where an alternator other than Lucas is to be employed, please contact our Technical Department before proceeding.
8. In the event of failure to run (i.e. no sparks when engine is revolved), check petrol and battery and remove a spark plug and earth it on the cylinder head and turn the ignition switch on and off a few times. If this does not produce sparks at the plugs the RITA amplifier is faulty. If sparks are produced disconnect the white-brown amplifier lead and test as follows:
   (i) Negative earth machines. Switch on ignition and hold white-brown to earth on frame or engine. Sparks should occur at the plugs each time the wire is touched to earth.
   (ii) Positive earth machines. Switch on ignition and hold the white-brown to the negative battery terminal or any negative feed wire. Sparks should occur at the plugs each time the connection is made.

   If sparks are not produced the amplifier is faulty.

   If sparks are produced then the Pickup is faulty.

   The above tests make certain assumptions about other components, e.g. that the coils are in correct working order. For auto electricians and service engineers a comprehensive service sheet is available on request.
9. On racing applications where an electric petrol pump is used it is possible for the pump operation to trigger the ignition causing misfiring. Please consult our Technical Department.
10. Spark rate requirements in the range 20-60,000 sparks per minute may require battery voltage in excess of 12 volts, depending on the coils employed and the state of tune of the engine. Again, our Technical Department will advise.
11. RITA amplifiers supplied from October 1976 have a plug and socket breaking the wiring harness 150mm from the amplifier. If a spare amplifier is required for a unit supplied prior to this date please state that a wiring harness is also required.
12. The greatest care is taken in manufacture and testing and we believe that this is the most reliable electronic ignition system available for motor cycles. Even so, there is the possibility of a component failure during the early service life of the unit and all units carry a six month guarantee.

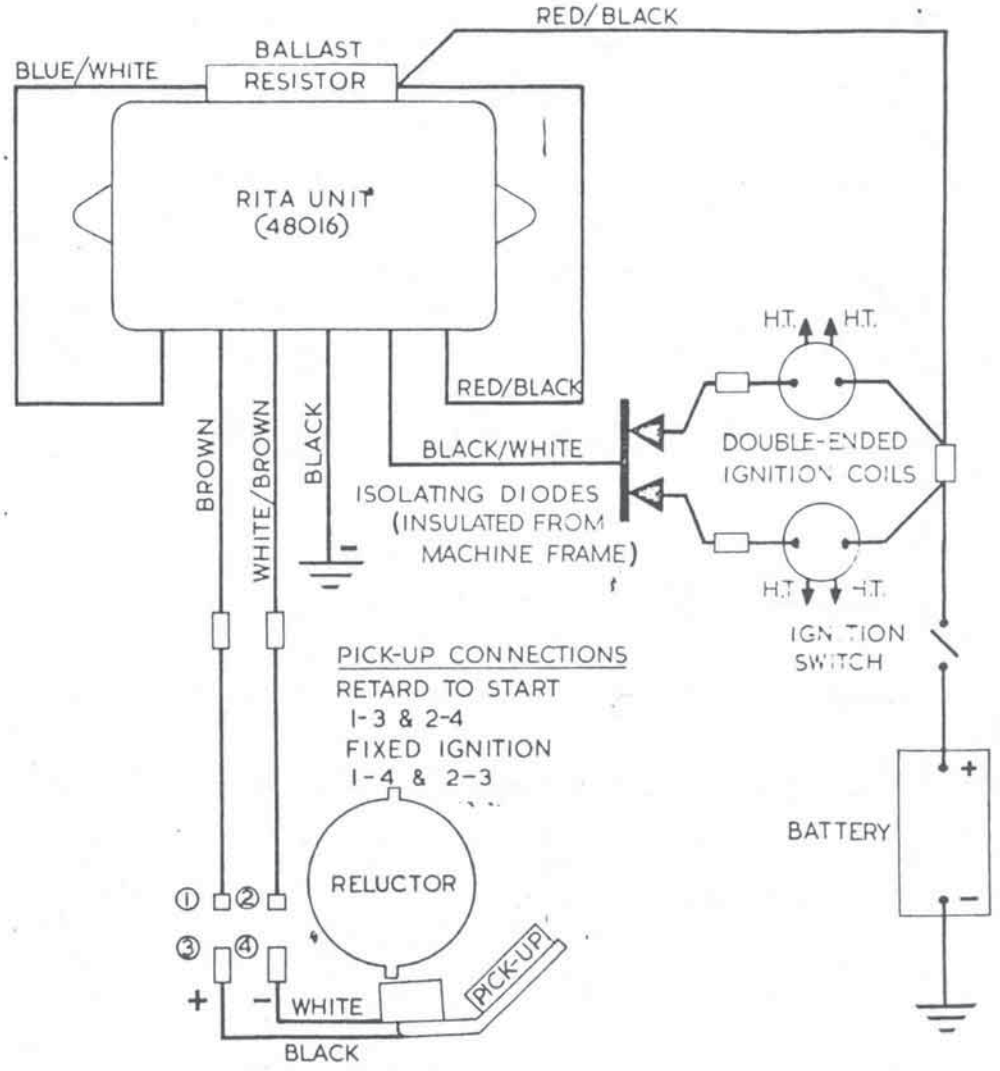
2035 2038 2044 2043 2063 207



RITA IGNITION SYSTEM

ONE, TWO OR THREE CYLINDERS (POSITIVE EARTH)

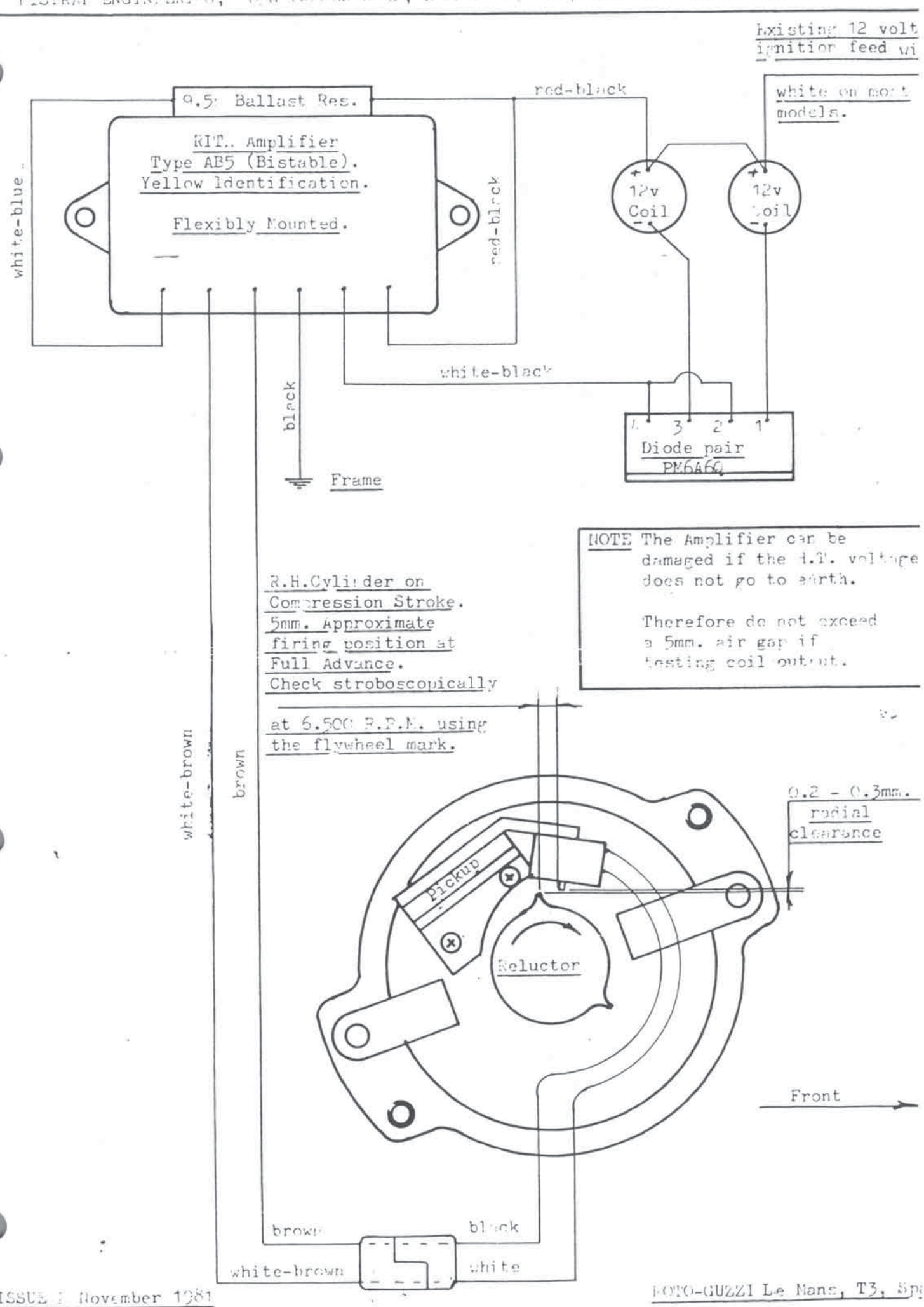
Publication No. 3824 Printed in England 300/376/PS

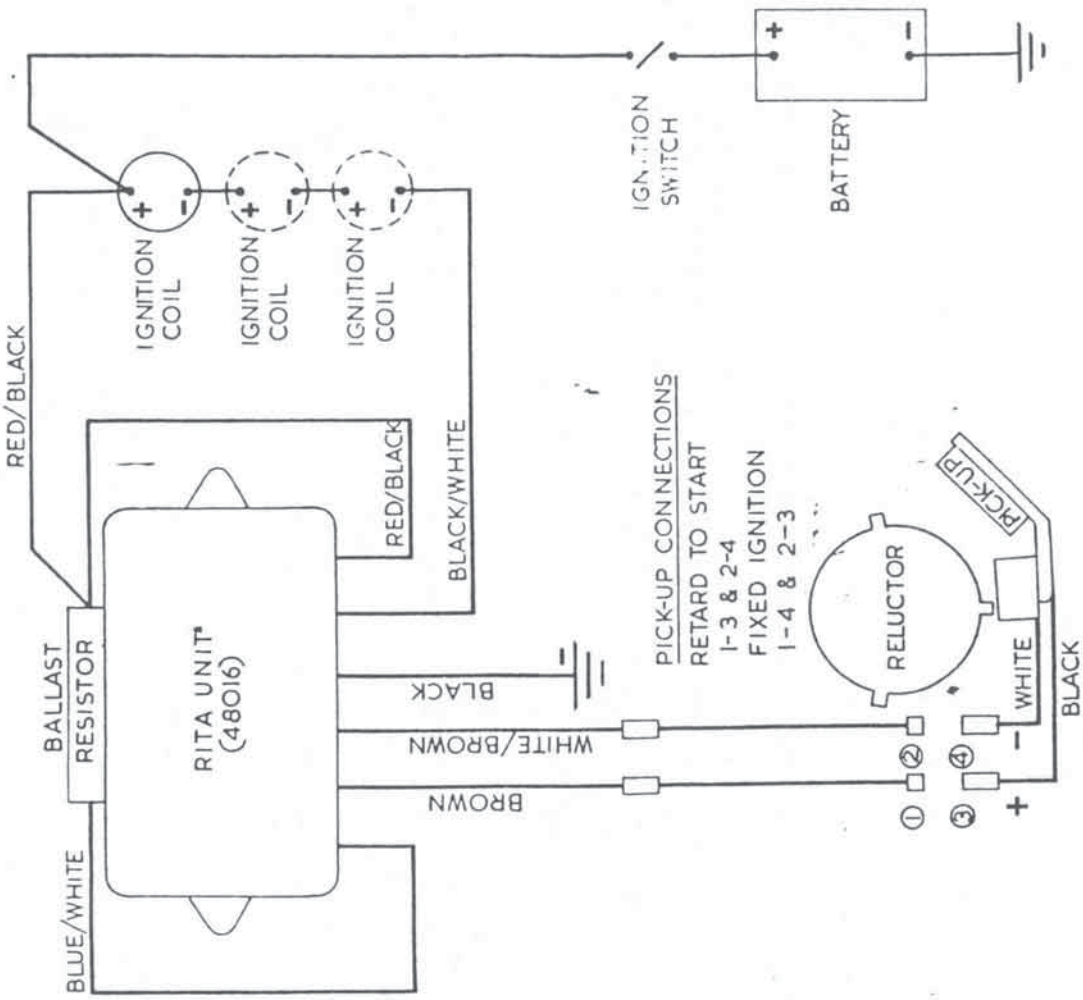


RITA IGNITION SYSTEM

FOUR CYLINDERS (NEGATIVE EARTH)

Publication No. 3822 Printed in England 300/376/PS

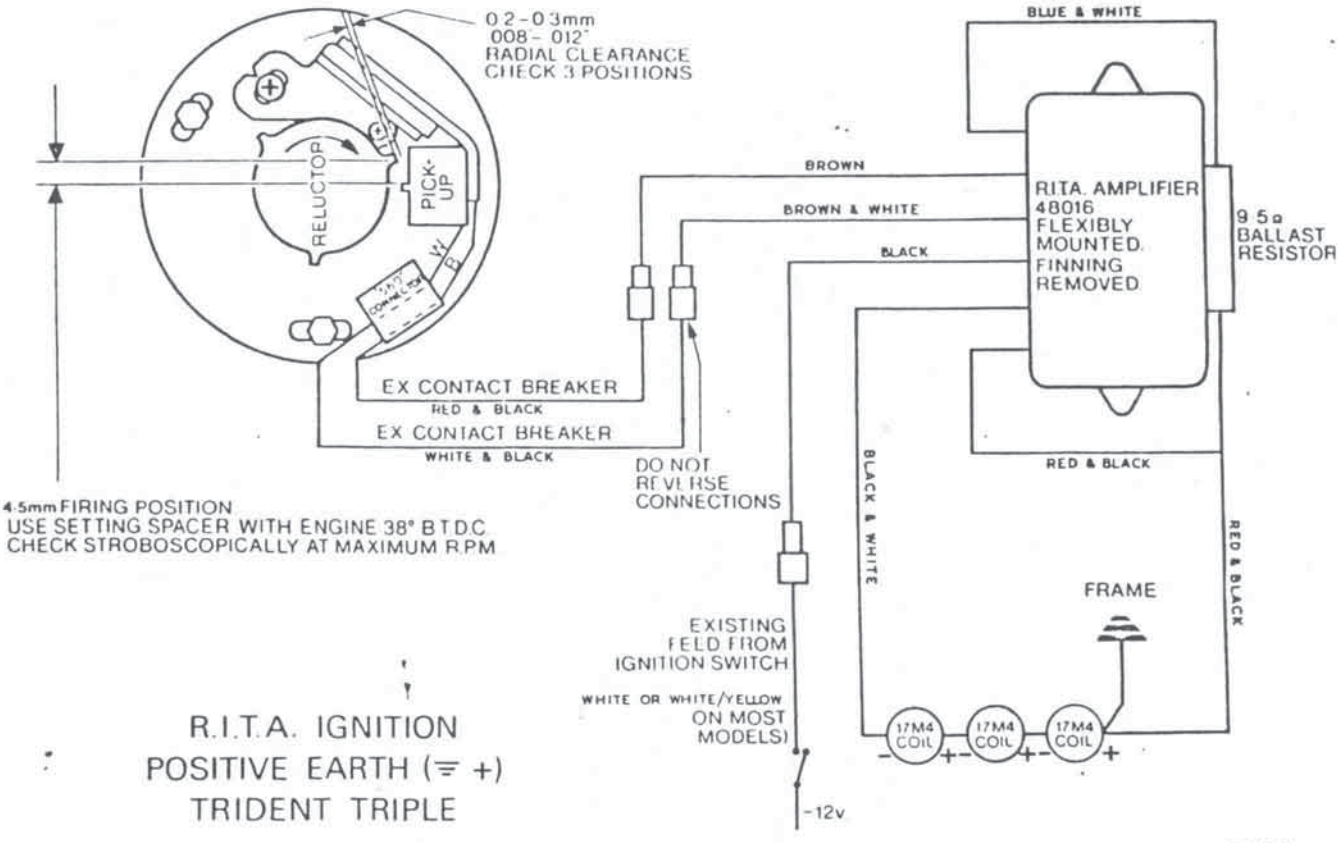

Existing 12 volt ignition feed wi
white on most models.
9.5Ω Ballast Res.
RIT.. Amplifier
Type AB5 (Bistable).
Yellow Identification.
Flexibly Mounted.
red-black
red-black
white-blue
12v Coil
12v Coil
white-black
black
Frame
4 3 2 1
Diode pair
PM6A60
NOTE The Amplifier can be damaged if the H.T. voltage does not go to earth.
Therefore do not exceed a 5mm. air gap if testing coil output.
R.H.Cylinder on Compression Stroke.
5mm. Approximate firing position at Full Advance.
Check stroboscopically
at 6,500 R.P.M. using the flywheel mark.
white-brown
brown
0.2 - 0.3mm. radial clearance
Pickup
Reluctor
Front
brown
black
white-brown
white



RITA IGNITION SYSTEM

ONE, TWO OR THREE CYLINDERS (NEGATIVE EARTH)

Publication No. 3823
Printed in England



R.I.T.A. IGNITION
POSITIVE EARTH (⏚ +)
TRIDENT TRIPLE

Publication No. 3823
Printed in England

Birmingham B19 2XF

Telephone: 021-554 5252
Telex: 338681

RITA ELECTRONIC IGNITION SERVICING INSTRUCTIONS

PART A

FAILURE OF ENGINE TO RUN

Check h.t. leads are clean and dry, and connections are tight.
Check l.t. connections to ignition coils, RITA unit, ballast resistor, pick-up, isolating diodes (where appropriate), and ignition swtich, and in-line and earch connections are tight.
Check pick-up coil is not loose on pick-up poles, and that pick-up assembly is secured rigidly to the base plate.
Check reluctor rotates when engine is cranked and that the air gap is correctly set.
Remove spark plugs, clean, set gaps and replace, or renew plugs if necessary. Disconnect any rev. counter connections to the ignition coil circuit.

1. Check battery terminal voltage

   Connect a voltmeter (0-20V) across the battery. A reading of 12V or more should be indicated.

2. Check supply to RITA unit

   (a) Connect a voltmeter (0-20V) to RITA unit black (negative) and red/black (positive) leads without breaking their circuit connections. Switch on the ignition and check voltmeter indicates the battery voltage measured in test 1. If the same reading is obtained and the machine is fitted with a starter motor proceed to test 2(c), but if no motor is fitted proceed to test 3(a). If a different voltmeter reading is obtained proceed to test 2(b).

   (b) Disconnect in turn each run of cable between the RITA unit black and red/black supply leads and the battery, and check its continuity by connecting an ohmmeter to each cable end. Also check the ignition switch is closed in the 'on' position. Rectify faulty wiring, connections or ignition switch.

   (c) Keeping the same voltmeter connections as in test 2(a) switch on the ignition, operate the starter motor, and

observe the voltmeter reading. Switch off the ignition. If the voltmeter indicates less than 9V during cranking, check the battery-to-earth lead and its connections to the battery and machine frame. Otherwise proceed to test 3(a).

3 Check ignition coil l.t. circuit

(a) Remove the spark plugs and, with h.t. leads still connected, rest the plugs on the cylinder head. Disconnect the RITA unit white/black lead from the '-' terminal of the appropriate coil or, on systems which have parallel coils, from the isolating diodes heat sink. Short the same coil '-' terminal or the isolating diodes heat sink whichever is appropriate either to earth (negative earth systems) or to the battery negative terminal (positive earth systems). Alternate the ignition switch between the 'on' and 'off' positions (negative earth systems) or make and break a number of times the shorting lead connection to the battery negative terminal (positive earth systems). Check sparks occur at all plugs each time the ignition is switched off or the shorting lead connection is broken.

If sparks are not obtained at all plugs proceed to test 3(b). Otherwise reconnect white/black lead, and on machines with series connected ignition coil systems proceed to test 4(a): where parallel-connected coils are fitted proceed first to test 3(d) and then, if no diode faults are discovered, to test 4(a).

(b) Where the positive supply to the ignition coil(s), ballast resistor and RITA unit is wired exactly as shown in the wiring diagrams, check either the continuity of the coil link cables and their terminations (series-connected coils) or the fly-lead terminations of each coil (parallel-connected coils).

Where the positive supply to the ignition (coil(s) etc. is wired other than shown, the following tests are also required. On series-connected coil systems check the continuity of the wiring between the '+' terminal of the

appropriate coil and either the ignition switch (negative earth systems) or earth (positive earth systems). On parallel-connected coil systems check the continuity of the supply cable between the positive common coil connection and the ignition switch.
Rectify any faulty wiring or connections. If checks were satisfactory, proceed to test 3(c).

(c) Disconnect the l.t. connections or fly-leads of each ignition coil in turn and connect an ohmmeter across the l.t. terminals ('+' and '-') or fly-leads (double-ended coils). If no continuity exists, the coil primary winding is open-circuit and the coil must be renewed.
Should continuity be obtained, connect the ohmmeter between the coil can or fixing bracket and either l.t. terminal or lead. Any continuity that may be registered indicates the coil primary winding is shorted to the can. In which case renew the faulty coil.
In the case of a machine having an ignition system which incorporates parallel connected double-ended coils, and where the cause of failure to operate has not been discovered in tests 3(b) or 3(c), proceed to test 3(d).

(d) Check that the isolating diode mounting bracket (heat-sink) is not touching the machine frame, and that each diode is securely fixed to the mounting bracket. Check in turn each of the isolating diodes and its fly-lead as follows.
Disconnect the fly-lead of the diode to be tested from its associated in-line connector. Connect an ohmmeter across the diode fly-lead and check continuity is obtained. If continuity is not obtained renew faulty fly-lead or termination, otherwise proceed as follows.
Connect a 1.5W bulb and a 12V d.c. supply in series with the diode and fly-lead, and then repeat the test with the connections to the diode and fly-lead reversed. A faulty diode will cause the bulb in both tests either to light or to remain extinguished. In this event the complete isolating diode must be renewed. Reconnect diode after

test. Alternatively each diode may be checked using a battery-powered ohmmeter, but since the forward resistance of a diode varies with the voltage applied, no definite meter readings can be quoted. However, a faulty diode will produce either infinite readings or near-zero readings in both directions.

Note: Ohmmeters of the type incorporating a hand-driven generator must never be used to check a diode.

4 Check ballast resistor circuit and RITA unit

(a) With the ignition switch in the 'on' position, alternately disconnect and reconnect the RITA unit white/blue lead at the ballast resistor.

Note: On positive earth systems, take care not to let white/blue lead short to earth.

Check whether sparks occur at all plugs each time this connection is broken. Switch off the ignition and remake the connection. If sparks were obtained at all plugs proceed to test 4(d). If sparks were not obtained at all plugs then proceed either to test 4(c) if the positive supply to the ignition coil, ballast resistor and RITA unit is wired exactly as shown in the wiring diagrams: or to test 4(b) if the positive supply to these units is wired differently.

(b) Check the terminations and continuity of cable runs between the ballast resistor and earth (positive earth systems) or ignition switch (negative earth systems) with an ohmmeter.

If the terminations and wiring are in order proceed to test 4(c), otherwise renew faulty termination or wiring.

(c) Disconnect the ballast resistor and check the continuity or resistance (9.5) of the resistor with an ohmmeter. If continuity or a resistance reading of 9.5 is obtained the RITA unit is faulty. Verify by substituting a new unit.

(d) Disconnect RITA unit white/brown lead and switch on the ignition. Connect the RITA unit white/brown lead to a

good earth point (negative earth systems) or the battery negative supply line (positive earth systems) and check sparks occur at all plugs each time connection is made.

If no sparks are obtained at the plugs, renew RITA unit.

If sparks are obtained, leave the RITA unit white/brown lead disconnected and proceed to test 5

5 Check pick-up circuit

Disconnect RITA unit brown lead and check continuity of cable runs between points at which RITA unit leads (brown and brown/white) were connected and the corresponding pick-up lead terminations. If continuity is obtained and the pick-up lead terminations are in order then the pick-up is faulty and should be renewed.

PART B

MISFIRE CONDITIONS

1 Irregular misfire

Proceed as for failure of engine to run, Part A.

2 Regular misfire

(a) Remove the spark plugs and, with h.t. leads still connected, rest the plugs on the cylinder head. Operate the ignition switch and observe plug(s) not sparking. Check h.t. leads of plug(s) not firing are clean and dry, and connections are tight. Clean and reset gap(s) of plugs not firing or renew if necessary.

If plug(s) still misfire when ignition switch is operated once more, proceed either to test 2(b) (series-connected ignition coil circuits) or to test 2(c) (parallel-connected ignition coil circuits).

(b) Remove leads from ignition coil associated with plug(s) not sparking. Connect an ohmmeter between coil can and either the '+' or '-' terminal. Any continuity indicates the primary winding is shorting to the can, and the faulty coil must be renewed.

(c) When misfiring occurs on machines having parallel-connected ignition coils, it is necessary to check both parallel l.t. circuits.

Disconnect both l.t. fly-leads of each ignition coil and

check terminations.

Connect an ohmmeter between the l.t. fly-leads of each coil and check for continuity. If no continuity exists, the primary winding is open-circuit and the coil must be renewed.

If continuity is obtained, check for no continuity between either l.t. fly-lead and the fixing bracket of each coil. Any continuity indicates the primary winding is shorted to the coil can, and the coil must be renewed.

If no continuity exists and both isolating diodes are securely fixed to their mounting bracket, then one of the isolating diodes or its fly-lead is faulty. Check in turn each diode and fly-lead as in Part A test 3(d).

Please note that all amplifiers have a standard production number - 40816 - and that any 'specials' will carry a colour code on the side of the box.

For example the only change to date is on the BMW 90/s, all other BMW's and other makes of road going machines are standard.

Some racing machines are colour coded and must be adhered to.

COLOUR CODE

Road Machines

BMW 90/s - Green Panel

Racing Machines (ONLY)

Norton Racer. Twin Cylinder - Black box with yellow panel

Weslake Twin Cylinder - Natural die cast box with yellow panel

RACING AND COMPETITIONS DEPARTMENT