

SUZUKI

CL 50 Love

49cc. 1983 to 1984

OWNERS WORKSHOP MANUAL



THE
BOOK



Suzuki CL50 Love Owners Workshop Manual

by Pete Shoemark

Models covered

CL50. 49cc. Introduced March 1983

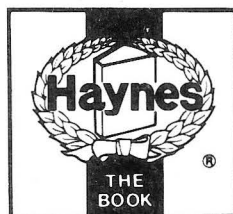
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reproduce their line drawings.

The Avon Rubber Company supplied information on tyre care and fitting, and NGK Spark Plugs (UK) Ltd provided information on plug maintenance and electrode conditions.

About this manual

The purpose of this manual is to present the owner with a concise and graphic guide which will enable him to tackle any operation from basic routine maintenance to a major overhaul. It has been assumed that any work would be undertaken without the luxury of a well-equipped workshop and a range of manufacturer's service tools.

To this end, the machine featured in the manual was stripped and rebuilt in our own workshop, by a team comprising a mechanic, a photographer and the author. The resulting photographic sequence depicts events as they took place, the hands shown being those of the author and the mechanic.

The use of specialised, and expensive, service tools was avoided unless their use was considered to be essential due to risk of breakage or injury. There is usually some way of improvising a method of removing a stubborn component, providing that a suitable degree of care is exercised.

The author learnt his motorcycle mechanics over a number of years, faced with the same difficulties and using similar facilities to those encountered by most owners. It is hoped that this practical experience can be passed on through the pages of this manual.

Where possible, a well-used example of the machine is chosen for the workshop project, as this highlights any areas which might be particularly prone to giving rise to problems. In this way, any such difficulties are encountered and resolved before the text is written, and the techniques used to deal with them can be incorporated in the relevant section. Armed with a working knowledge of the machine, the author undertakes a considerable amount of research in order that the maximum amount of data can be included in the manual.

A comprehensive section, preceding the main part of the manual, describes procedures for carrying out the routine maintenance of the machine at intervals of time and mileage. This section is included particularly for those owners who wish to ensure the efficient day-to-day running of their motorcycle, but who choose not to undertake overhaul or renovation work.

Each Chapter is divided into numbered sections. Within these sections are numbered paragraphs. Cross reference throughout the manual is quite straightforward and logical. When reference is made 'See Section 6.10' it means Section 6, paragraph 10 in the same Chapter. If another Chapter were intended, the reference would read, for example, 'See Chapter 2, Section 6.10'. All the photographs are captioned with a section/paragraph number to which they refer and are relevant to the Chapter text adjacent.

Figures (usually line illustrations) appear in a logical but numerical order, within a given Chapter. Fig. 1.1 therefore refers to the first figure in Chapter 1.

Left-hand and right-hand descriptions of the machines and their components refer to the left and right of a given machine when the rider is seated normally.

Motorcycle manufacturers continually make changes to specifications and recommendations, and these, when notified, are incorporated into our manuals at the earliest opportunity.

Whilst every care is taken to ensure that the information in this manual is correct, no liability can be accepted by the author or publishers for loss, damage or injury caused by any errors in or omissions from the information given.

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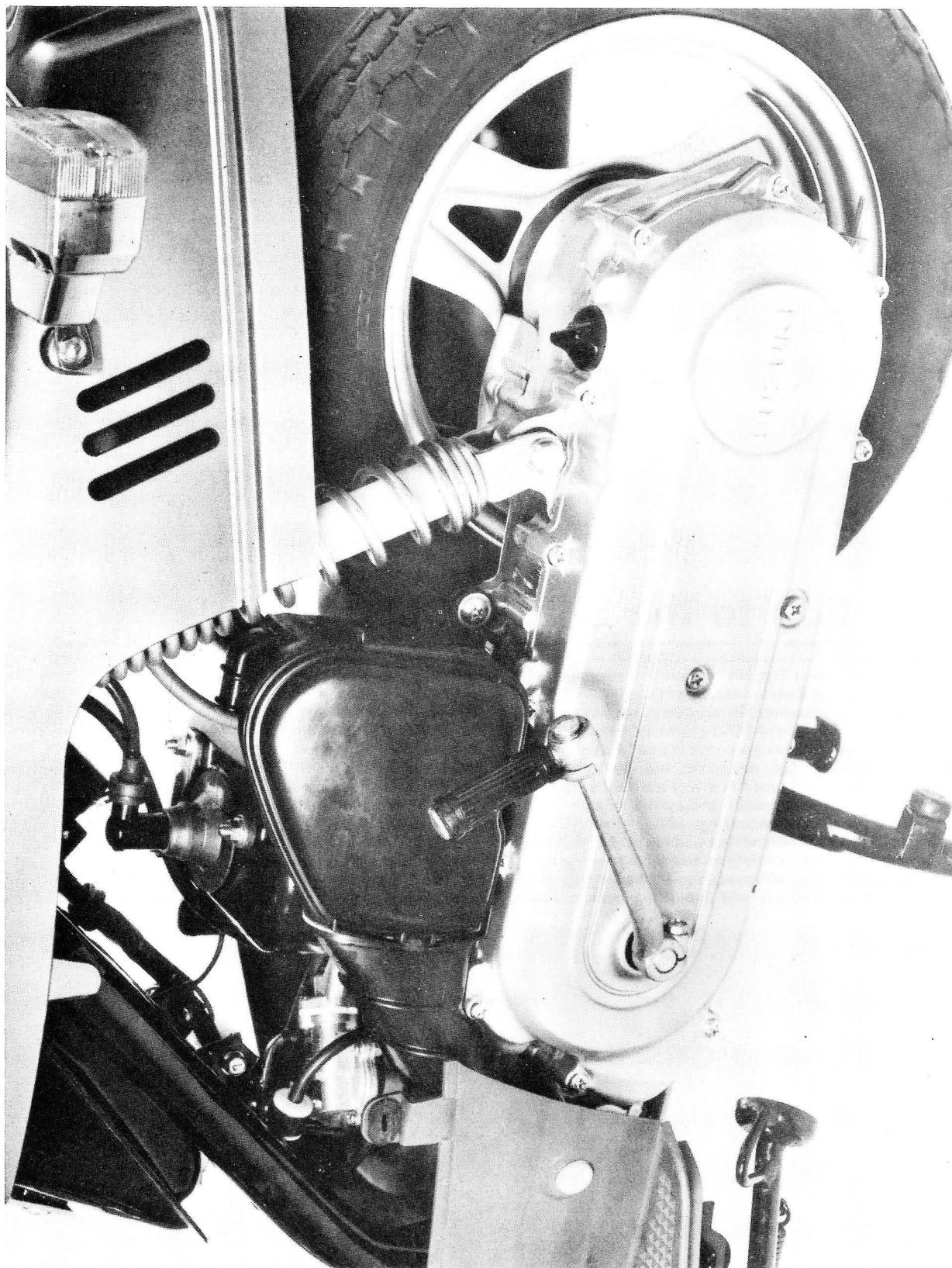
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Left-hand view of the Suzuki CL50 D



Right-hand view of the Suzuki CL50 D



Engine and transmission unit

Introduction to the Suzuki CL50 models

The CL50 models represent Suzuki's continued development of a range of easily ridden lightweight machines aimed at the non-motorcyclist in general and women riders in particular. As with the earlier FZ50 and CS50 models, the CL50 machines feature a lightweight scooter layout, the frame being open at the front to permit easy mounting and dismounting. The design of the frame and the engine/transmission unit have resulted in a very low seat height; this combined with a low centre of gravity makes the machine easily handled at road junctions and when parking.

In the UK, licensing laws permit holders of a full car licence to ride restricted 50cc machines with no further test being necessary. It follows that machines like the CL50 have become increasingly popular as shopping and commuter vehicles, and the luggage rack and front basket reflect this role.

The machine is designed to be simple to ride and unobtrusive in use. A notably quiet two-stroke engine/transmission unit doubles as the rear suspension swinging arm member, and is attached to the

frame by way of rubber-bushed mountings. As a result very little noise or vibration reach the rider. The controls are minimal, consisting of two bicycle-type brake levers and the throttle twistgrip. The two-speed transmission is fully automatic in operation, the rider being left free to concentrate on the road.

Despite its simplicity, the CL50 models are well equipped and feature a full electrical system. In addition to the dipping headlamp, stop/tail lamp and turn signals, the CL50D model is equipped with an electric starter as well as the kickstart arrangement fitted to both. The engine oil tank level is monitored by a warning system, and the fuel tank is fitted with a mechanical gauge to simplify topping up.

Much thought has gone into making the machines foolproof in use. The fuel tap and choke mechanism are both automatic in operation, whilst an interlock arrangement ensures that the engine cannot be started unless the brake is applied first. The mechanical parts of the machine are well hidden beneath plastic bodywork, making them easy to keep clean.

Model dimensions and weights

Overall length	1560 mm (61.4 in)
Overall width	645 mm (25.4 in)
Overall height	975 mm (38.4 in)
Wheelbase	1120 mm (44.1 in)
Ground clearance	90 mm (3.5 in)
Dry weight:	
CL50	57 kg (125.7 lb)
CL50D	58 kg (127.9 lb)

Ordering spare parts

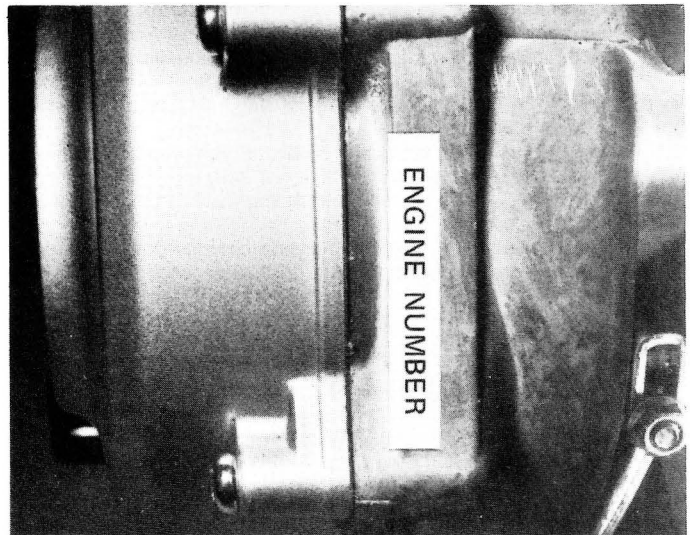
When ordering spare parts for any Suzuki model it is advisable to deal direct with an official Suzuki Service Agent who will be able to supply most items ex-stock. Where parts have to be ordered, an authorised dealer will be able to obtain them as quickly as possible. The engine and frame numbers must always be quoted in full. This avoids the risk of incorrect parts being supplied and is particularly important where detail modifications have been made in the middle of production runs. In some instances it will be necessary for the Service Agent to check compatability of later parts designs with earlier models. The frame number is stamped into the frame behind the front mudguard and the engine number on a raised boss at the rear of the transmission casing.

It is recommended that genuine Suzuki parts are used. Although pattern parts are often cheaper, remember that there is no guarantee that they are of the same specification as the original, and in some instances may be positively dangerous. Note also that the use of non-standard parts may invalidate the warranty in the event of a subsequent failure.

Some of the more expendable parts such as oils, greases, spark plugs, tyres and bulbs, can safely be obtained from auto accessory shops. These are often more conveniently positioned and may open during weekends. It is also possible to obtain parts on a mail order basis from specialists who advertise in the motorcycle magazines.



Frame number location



Engine number location

Safety First!

Professional motor mechanics are trained in safe working procedures. However enthusiastic you may be about getting on with the job in hand, do take the time to ensure that your safety is not put at risk. A moment's lack of attention can result in an accident, as can failure to observe certain elementary precautions.

There will always be new ways of having accidents, and the following points do not pretend to be a comprehensive list of all dangers; they are intended rather to make you aware of the risks and to encourage a safety-conscious approach to all work you carry out on your vehicle.

Essential DOs and DON'Ts

DON'T start the engine without first ascertaining that the transmission is in neutral.

DON'T attempt to drain oil until you are sure it has cooled sufficiently to avoid scalding you.

DON'T grasp any part of the engine, exhaust or silencer without first ascertaining that it is sufficiently cool to avoid burning you.

DON'T syphon toxic liquids such as fuel, brake fluid or antifreeze by mouth, or allow them to remain on your skin.

DON'T inhale brake lining dust – it is injurious to health.

DON'T allow any spilt oil or grease to remain on the floor – wipe it up straight away, before someone slips on it.

DON'T use ill-fitting spanners or other tools which may slip and cause injury.

DON'T attempt to lift a heavy component which may be beyond your capability – get assistance.

DON'T rush to finish a job, or take unverified short cuts.

DON'T allow children or animals in or around an unattended vehicle.

DON'T inflate a tyre to a pressure above the recommended maximum. Apart from overstressing the carcass and wheel rim, in extreme cases the tyre may blow off forcibly.

DO ensure that the machine is supported securely at all times. This is especially important when the machine is blocked up to aid wheel or fork removal.

DO take care when attempting to slacken a stubborn nut or bolt. It is generally better to pull on a spanner, rather than push, so that if slippage occurs you fall away from the machine rather than on to it.

DO wear eye protection when using power tools such as drill, sander, bench grinder etc.

DO use a barrier cream on your hands prior to undertaking dirty jobs – it will protect your skin from infection as well as making the dirt easier to remove afterwards; but make sure your hands aren't left slippery.

DO keep loose clothing (cuffs, tie etc) and long hair well out of the way of moving mechanical parts.

DO remove rings, wristwatch etc, before working on the vehicle – especially the electrical system.

DO keep your work area tidy – it is only too easy to fall over articles left lying around.

DO exercise caution when compressing springs for removal or installation. Ensure that the tension is applied and released in a controlled manner, using suitable tools which preclude the possibility of the spring escaping violently.

DO ensure that any lifting tackle used has a safe working load rating adequate for the job.

DO get someone to check periodically that all is well, when working alone on the vehicle.

DO carry out work in a logical sequence and check that everything is correctly assembled and tightened afterwards.

DO remember that your vehicle's safety affects that of yourself and others. If in doubt on any point, get specialist advice.

IF, in spite of following these precautions, you are unfortunate enough to injure yourself, seek medical attention as soon as possible.

Fire

Remember at all times that petrol (gasoline) is highly flammable. Never smoke, or have any kind of naked flame around, when working on the vehicle. But the risk does not end there – a spark caused by an electrical short-circuit, by two metal surfaces contacting each other, or even by static electricity built up in your body under certain conditions, can ignite petrol vapour, which in a confined space is highly explosive.

Always disconnect the battery earth (ground) terminal before working on any part of the fuel system, and never risk spilling fuel on to a hot engine or exhaust.

It is recommended that a fire extinguisher of a type suitable for fuel and electrical fires is kept handy in the garage or workplace at all times. Never try to extinguish a fuel or electrical fire with water.

Fumes

Certain fumes are highly toxic and can quickly cause unconsciousness and even death if inhaled to any extent. Petrol (gasoline) vapour comes into this category, as do the vapours from certain solvents such as trichloroethylene. Any draining or pouring of such volatile fluids should be done in a well ventilated area.

When using cleaning fluids and solvents, read the instructions carefully. Never use materials from unmarked containers – they may give off poisonous vapours.

Never run the engine of a motor vehicle in an enclosed space such as a garage. Exhaust fumes contain carbon monoxide which is extremely poisonous; if you need to run the engine, always do so in the open air or at least have the rear of the vehicle outside the workplace.

If you are fortunate enough to have the use of an inspection pit, never drain or pour petrol, and never run the engine, while the vehicle is standing over it; the fumes, being heavier than air, will concentrate in the pit with possibly lethal results.

The battery

Never cause a spark, or allow a naked light, near the vehicle's battery. It will normally be giving off a certain amount of hydrogen gas, which is highly explosive.

Always disconnect the battery earth (ground) terminal before working on the fuel or electrical systems.

If possible, loosen the filler plugs or cover when charging the battery from an external source. Do not charge at an excessive rate or the battery may burst.

Take care when topping up and when carrying the battery. The acid electrolyte, even when diluted, is very corrosive and should not be allowed to contact the eyes or skin.

If you ever need to prepare electrolyte yourself, always add the acid slowly to the water, and never the other way round. Protect against splashes by wearing rubber gloves and goggles.

Mains electricity

When using an electric power tool, inspection light etc which works from the mains, always ensure that the appliance is correctly connected to its plug and that, where necessary, it is properly earthed (grounded). Do not use such appliances in damp conditions and, again, beware of creating a spark or applying excessive heat in the vicinity of fuel or fuel vapour.

Ignition HT voltage

A severe electric shock can result from touching certain parts of the ignition system, such as the HT leads, when the engine is running or being cranked, particularly if components are damp or the insulation is defective. Where an electronic ignition system is fitted, the HT voltage is much higher and could prove fatal.

Tools and working facilities

The first priority when undertaking maintenance or repair work of any sort on a motorcycle is to have a clean, dry, well-lit working area. Work carried out in peace and quiet in the well-ordered atmosphere of a good workshop will give more satisfaction and much better results than can usually be achieved in poor working conditions. A good workshop must have a clean flat workbench or a solidly constructed table of convenient working height. The workbench or table should be equipped with a vice which has a jaw opening of at least 4 in (100 mm). A set of jaw covers should be made from soft metal such as aluminium alloy or copper, or from wood. These covers will minimise the marking or damaging of soft or delicate components which may be clamped in the vice. Some clean, dry, storage space will be required for tools, lubricants and dismantled components. It will be necessary during a major overhaul to lay out engine/gearbox components for examination and to keep them where they will remain undisturbed for as long as is necessary. To this end it is recommended that a supply of metal or plastic containers of suitable size is collected. A supply of clean, lint-free, rags for cleaning purposes and some newspapers, other rags, or paper towels for mopping up spillages should also be kept. If working on a hard concrete floor note that both the floor and one's knees can be protected from oil spillages and wear by cutting open a large cardboard box and spreading it flat on the floor under the machine or workbench. This also helps to provide some warmth in winter and to prevent the loss of nuts, washers, and other tiny components which have a tendency to disappear when dropped on anything other than a perfectly clean, flat, surface.

Unfortunately, such working conditions are not always available to the home mechanic. When working in poor conditions it is essential to take extra time and care to ensure that the components being worked on are kept scrupulously clean and to ensure that no components or tools are lost or damaged.

A selection of good tools is a fundamental requirement for anyone contemplating the maintenance and repair of a motor vehicle. For the owner who does not possess any, their purchase will prove a considerable expense, offsetting some of the savings made by doing-it-yourself. However, provided that the tools purchased are of good quality, they will last for many years and prove an extremely worthwhile investment.

To help the average owner to decide which tools are needed to carry out the various tasks detailed in this manual, we have compiled three lists of tools under the following headings: *Maintenance and minor repair*, *Repair and overhaul*, and *Specialized*. The newcomer to

practical mechanics should start off with the simpler jobs around the vehicle. Then, as his confidence and experience grow, he can undertake more difficult tasks, buying extra tools as and when they are needed. In this way, a *maintenance and minor repair* tool kit can be built-up into a *repair and overhaul* tool kit over a considerable period of time without any major cash outlays. The experienced home mechanic will have a tool kit good enough for most repair and overhaul procedures and will add tools from the specialized category when he feels the expense is justified by the amount of use these tools will be put to.

It is obviously not possible to cover the subject of tools fully here. For those who wish to learn more about tools and their use there is a book entitled *How to Choose and Use Car Tools* available from the publishers of this manual. Although, as its title implies, this publication is directed at car owners, the information given is equally applicable to motorcycle owners. It also provides an introduction to basic workshop practice which will be of interest to a home mechanic working on any type of motor vehicle.

As a general rule, it is better to buy the more expensive, good quality tools. Given reasonable use, such tools will last for a very long time, whereas the cheaper, poor quality, item will wear out faster and need to be renewed more often, thus nullifying the original saving. There is also the risk of a poor quality tool breaking while in use, causing personal injury or expensive damage to the component being worked on. It should be noted, however, that many car accessory shops and the large department stores sell tools of reasonable quality at competitive prices. The best example of this is found with socket sets, where a medium-priced socket set will be quite adequate for the home owner and yet prove less expensive than a selection of individual sockets and accessories. This is because individual pieces are usually only available from expensive, top quality, ranges and whilst they are undeniably good, it should be remembered that they are intended for professional use.

The basis of any toolkit is a set of spanners. While open-ended spanners with their slim jaws, are useful for working on awkwardly-positioned nuts, ring spanners have advantages in that they grip the nut far more positively. There is less risk of the spanner slipping off the nut and damaging it, for this reason alone ring spanners are to be preferred. Ideally, the home mechanic should acquire a set of each, but if expense rules this out a set of combination spanners (open-ended at one end and with a ring of the same size at the other) will provide a good compromise. Another item which is so useful it should be

considered an essential requirement for any home mechanic is a set of socket spanners. These are available in a variety of drive sizes. It is recommended that the $\frac{1}{2}$ -inch drive type is purchased to begin with as although bulkier and more expensive than the $\frac{3}{8}$ -inch type, the larger size is far more common and will accept a greater variety of torque wrenches, extension pieces and socket sizes. The socket set should comprise sockets of sizes between 8 and 24 mm, a reversible ratchet drive, an extension bar of about 10 inches in length, a spark plug socket with a rubber insert, and a universal joint. Other attachments can be added to the set at a later date.

Maintenance and minor repair tool kit

- ✓ Set of spanners 8 – 24 mm
- ✓ Set of sockets and attachments
- ✓ Spark plug spanner with rubber insert – 10, 12, or 14 mm as appropriate
- ✓ Adjustable spanner
- ✓ C-spanner/pin spanner
- ✓ Torque wrench (same size drive as sockets)
- ✓ Set of screwdrivers (flat blade)
- ✓ Set of screwdrivers (cross-head)
- ✓ Set of Allen keys 4 – 10 mm
- ✓ Impact screwdriver and bits
- ✓ Ball pein hammer – 2 lb
- ✓ Hacksaw (junior)
- ✓ Self-locking pliers – Mole grips or vice grips
- ✓ Pliers – combination
- ✓ Pliers – needle nose
- ✓ Wire brush (small)
- ✓ Soft-bristled brush
- ✓ Tyre pump
- ✓ Tyre pressure gauge
- ✓ Tyre tread depth gauge
- ✓ Oil can
- ✓ Fine emery cloth
- ✓ Funnel (medium size)
- ✓ Drip tray
- ✓ Grease gun
- ✓ Set of feeler gauges
- ✓ Strobe timing light
- ✓ Continuity tester (dry battery and bulb)
- ✓ Soldering iron and solder
- ✓ Wire stripper or craft knife
- ✓ PVC insulating tape
- ✓ Assortment of split pins, nuts, bolts, and washers

Repair and overhaul toolkit

The tools in this list are virtually essential for anyone undertaking major repairs to a motorcycle and are additional to the tools listed above. Concerning Torx driver bits, Torx screws are encountered on some of the more modern machines where their use is restricted to fastening certain components inside the engine/gearbox unit. It is therefore recommended that if Torx bits cannot be borrowed from a local dealer, they are purchased individually as the need arises. They are not in regular use in the motor trade and will therefore only be available in specialist tool shops.

- ✓ Plastic or rubber soft-faced mallet
- ✓ Torx driver bits
- ✓ Pliers – electrician's side cutters
- ✓ Circlip pliers – internal (straight or right-angled tips are available)
- ✓ Circlip pliers – external
- ✓ Cold chisel
- ✓ Centre punch
- ✓ Pin punch
- ✓ Scriber
- ✓ Scraper (made from soft metal such as aluminium or copper)
- ✓ Soft metal drift
- ✓ Steel rule/straight edge
- ✓ Assortment of files

- ✓ Electric drill and bits
- ✓ Wire brush (large)
- ✓ Soft wire brush (similar to those used for cleaning suede shoes)
- ✓ Sheet of plate glass
- ✓ Hacksaw (large)
- ✓ Stud extractor set (E-Z out)

Specialized tools

This is not a list of the tools made by the machine's manufacturer to carry out a specific task on a limited range of models. Occasional references are made to such tools in the text of this manual and, in general, an alternative method of carrying out the task without the manufacturer's tool is given where possible. The tools mentioned in this list are those which are not used regularly and are expensive to buy in view of their infrequent use. Where this is the case it may be possible to hire or borrow the tools against a deposit from a local dealer or tool hire shop. An alternative is for a group of friends or a motorcycle club to join in the purchase.

- ✓ Piston ring compressor
- ✓ Universal bearing puller
- ✓ Cylinder bore honing attachment (for electric drill)
- ✓ Micrometer set
- ✓ Vernier calipers
- ✓ Dial gauge set
- ✓ Cylinder compression gauge
- ✓ Multimeter
- ✓ Dwell meter/tachometer

Care and maintenance of tools

Whatever the quality of the tools purchased, they will last much longer if cared for. This means in practice ensuring that a tool is used for its intended purpose; for example screwdrivers should not be used as a substitute for a centre punch, or as chisels. Always remove dirt or grease and any metal particles but remember that a light film of oil will prevent rusting if the tools are infrequently used. The common tools can be kept together in a large box or tray but the more delicate, and more expensive, items should be stored separately where they cannot be damaged. When a tool is damaged or worn out, be sure to renew it immediately. It is false economy to continue to use a worn spanner or screwdriver which may slip and cause expensive damage to the component being worked on.

Fastening systems

Fasteners, basically, are nuts, bolts and screws used to hold two or more parts together. There are a few things to keep in mind when working with fasteners. Almost all of them use a locking device of some type; either a lock washer, lock nut, locking tab or thread adhesive. All threaded fasteners should be clean, straight, have undamaged threads and undamaged corners on the hexagon head where the spanner fits. Develop the habit of replacing all damaged nuts and bolts with new ones.

Rusted nuts and bolts should be treated with a rust penetrating fluid to ease removal and prevent breakage. After applying the rust penetrant, let it 'work' for a few minutes before trying to loosen the nut or bolt. Badly rusted fasteners may have to be chiselled off or removed with a special nut breaker, available at tool shops.

Flat washers and lock washers, when removed from an assembly should always be replaced exactly as removed. Replace any damaged washers with new ones. Always use a flat washer between a lock washer and any soft metal surface (such as aluminium), thin sheet metal or plastic. Special lock nuts can only be used once or twice before they lose their locking ability and must be renewed.

If a bolt or stud breaks off in an assembly, it can be drilled out and removed with a special tool called an E-Z out. Most dealer service departments and motorcycle repair shops can perform this task, as well as others (such as the repair of threaded holes that have been stripped out).

Spanner size comparison

Jaw gap (in)	Spanner size	Jaw gap (in)	Spanner size
0.250	$\frac{1}{4}$ in AF	0.945	24 mm
0.276	7 mm	1.000	1 in AF
0.313	$\frac{5}{16}$ in AF	1.010	$\frac{9}{16}$ in Whitworth; $\frac{5}{8}$ in BSF
0.315	8 mm	1.024	26 mm
0.344	$\frac{11}{32}$ in AF; $\frac{1}{8}$ in Whitworth	1.063	$1\frac{1}{16}$ in AF; 27 mm
0.354	9 mm	1.100	$\frac{5}{16}$ in Whitworth; $\frac{11}{16}$ in BSF
0.375	$\frac{3}{8}$ in AF	1.125	$1\frac{1}{8}$ in AF
0.394	10 mm	1.181	30 mm
0.433	11 mm	1.200	$\frac{11}{16}$ in Whitworth; $\frac{3}{4}$ in BSF
0.438	$\frac{7}{16}$ in AF	1.250	$1\frac{1}{4}$ in AF
0.445	$\frac{3}{16}$ in Whitworth; $\frac{1}{4}$ in BSF	1.260	32 mm
0.472	12 mm	1.300	$\frac{3}{4}$ in Whitworth; $\frac{7}{8}$ in BSF
0.500	$\frac{1}{2}$ in AF	1.313	$1\frac{5}{16}$ in AF
0.512	13 mm	1.390	$\frac{13}{16}$ in Whitworth; $\frac{15}{16}$ in BSF
0.525	$\frac{1}{4}$ in Whitworth; $\frac{5}{16}$ in BSF	1.417	36 mm
0.551	14 mm	1.438	$1\frac{7}{16}$ in AF
0.563	$\frac{9}{16}$ in AF	1.480	$\frac{7}{8}$ in Whitworth; 1 in BSF
0.591	15 mm	1.500	$1\frac{1}{2}$ in AF
0.600	$\frac{5}{16}$ in Whitworth; $\frac{3}{8}$ in BSF	1.575	40 mm; $\frac{15}{16}$ in Whitworth
0.625	$\frac{5}{8}$ in AF	1.614	41 mm
0.630	16 mm	1.625	$1\frac{5}{8}$ in AF
0.669	17 mm	1.670	1 in Whitworth; $1\frac{1}{8}$ in BSF
0.686	$\frac{11}{16}$ in AF	1.688	$1\frac{11}{16}$ in AF
0.709	18 mm	1.811	46 mm
0.710	$\frac{3}{8}$ in Whitworth; $\frac{7}{16}$ in BSF	1.813	$1\frac{13}{16}$ in AF
0.748	19 mm	1.860	$1\frac{1}{8}$ in Whitworth; $1\frac{1}{4}$ in BSF
0.750	$\frac{3}{4}$ in AF	1.875	$1\frac{7}{8}$ in AF
0.813	$\frac{13}{16}$ in AF	1.969	50 mm
0.820	$\frac{7}{16}$ in Whitworth; $\frac{1}{2}$ in BSF	2.000	2 in AF
0.866	22 mm	2.050	$1\frac{1}{4}$ in Whitworth; $1\frac{3}{8}$ in BSF
0.875	$\frac{7}{8}$ in AF	2.165	55 mm
0.920	$\frac{1}{2}$ in Whitworth; $\frac{9}{16}$ in BSF	2.362	60 mm
0.938	$\frac{15}{16}$ in AF		

Standard torque settings

Specific torque settings will be found at the end of the specifications section of each chapter. Where no figure is given, bolts should be secured according to the table below.

Fastener type (thread diameter)	kgf m	lbf ft
5mm bolt or nut	0.45 – 0.6	3.5 – 4.5
6 mm bolt or nut	0.8 – 1.2	6 – 9
8 mm bolt or nut	1.8 – 2.5	13 – 18
10 mm bolt or nut	3.0 – 4.0	22 – 29
12 mm bolt or nut	5.0 – 6.0	36 – 43
5 mm screw	0.35 – 0.5	2.5 – 3.6
6 mm screw	0.7 – 1.1	5 – 8
6 mm flange bolt	1.0 – 1.4	7 – 10
8 mm flange bolt	2.4 – 3.0	17 – 22
10 mm flange bolt	3.0 – 4.0	22 – 29

Choosing and fitting accessories

The range of accessories available to the modern motorcyclist is almost as varied and bewildering as the range of motorcycles. This Section is intended to help the owner in choosing the correct equipment for his needs and to avoid some of the mistakes made by many riders when adding accessories to their machines. It will be evident that the Section can only cover the subject in the most general terms and so it is recommended that the owner, having decided that he wants to fit, for example, a luggage rack or carrier, seeks the advice of several local dealers and the owners of similar machines. This will give a good idea of what makes of carrier are easily available, and at what price. Talking to other owners will give some insight into the drawbacks or good points of any one make. A walk round the motorcycles in car parks or outside a dealer will often reveal the same sort of information.

The first priority when choosing accessories is to assess exactly what one needs. It is, for example, pointless to buy a large heavy-duty carrier which is designed to take the weight of fully laden panniers and topbox when all you need is a place to strap on a set of waterproofs and a lunchbox when going to work. Many accessory manufacturers have ranges of equipment to cater for the individual needs of different riders and this point should be borne in mind when looking through a dealer's catalogues. Having decided exactly what is required and the use to which the accessories are going to be put, the owner will need a few hints on what to look for when making the final choice. To this end the Section is now sub-divided to cover the more popular accessories fitted. Note that it is in no way a customizing guide, but merely seeks to outline the practical considerations to be taken into account when adding aftermarket equipment to a motorcycle.

Luggage racks or carriers

Carriers are possibly the commonest item to be fitted to modern motorcycles. They vary enormously in size, carrying capacity, and durability. When selecting a carrier, always look for one which is made specifically for your machine and which is bolted on with as few separate brackets as possible. The universal-type carrier, with its mass of brackets and adaptor pieces, will generally prove too weak to be of any real use. A good carrier should bolt to the main frame, generally using the two suspension unit top mountings and a mudguard mounting bolt as attachment points, and have its luggage platform as low and as far forward as possible to minimise the effect of any load on the machine's stability. Look for good quality, heavy gauge tubing, good welding and good finish. Also ensure that the carrier does not prevent opening of the seat, sidepanels or tail compartment, as appropriate. When using a carrier, be very careful not to overload it. Excessive weight placed so high and so far to the rear of any motorcycle will have an adverse effect on the machine's steering and stability.

Luggage

Motorcycle luggage can be grouped under two headings: soft and hard. Both types are available in many sizes and styles and have advantages and disadvantages in use.

Soft luggage is now becoming very popular because of its lower cost and its versatility. Whether in the form of panniers, or strap-on bags, soft luggage requires in general no brackets and no modification to the motorcycle. Equipment can be swapped easily from one motorcycle to another and can be fitted and removed in seconds. Awkwardly shaped loads can easily be carried. The disadvantages of soft luggage are that the contents cannot be secure against the casual thief, very little protection is afforded in the event of a crash, and waterproofing is generally poor. Also, in the case of panniers, carrying capacity is restricted to approximately 10 lb, although this amount will vary considerably depending on the manufacturer's recommendation. When purchasing soft luggage, look for good quality material, generally vinyl or nylon, with strong, well-stitched attachment points. It is always useful to have separate pockets, especially on tank bags, for items which will be needed on the journey. When purchasing a tank bag, look for one which has a separate, well-padded, base. This will protect the tank's paintwork and permit easy access to the filler cap at petrol stations.

Hard luggage is confined to two types: panniers, and top boxes or tail trunks. Most hard luggage manufacturers produce matching sets of these items, the basis of which is generally that manufacturer's own heavy-duty luggage rack. Variations on this theme occur in the form of separate frames for the better quality panniers, fixed or quickly-detachable luggage, and in size and carrying capacity. Hard luggage offers a reasonable degree of security against theft and good protection against weather and accident damage. Carrying capacity is greater than that of soft luggage, around 15 – 20 lb in the case of panniers, although top boxes should never be loaded as much as their apparent capacity might imply. A top box should only be used for lightweight items, because one that is heavily laden can have a serious effect on the stability of the machine. When purchasing hard luggage look for good quality mounting brackets and fittings, and well-finished fibreglass or ABS plastic cases. Always purchase luggage made specifically for your motorcycle, using as few separate brackets as possible, to ensure that everything remains securely bolted in place. When fitting hard luggage, be careful to check that the rear suspension and brake operation will not be impaired in any way and remember that many pannier kits require re-siting of the indicators.

Electrical equipment

The vast range of electrical equipment available to motorcyclists is so large and so diverse that only the most general outline can be given here. Electrical accessories vary from electric ignition kits fitted to replace contact breaker points, to additional lighting at the front and rear, more powerful horns, various instruments and gauges, clocks, anti-theft systems, heated clothing, CB radios, radio-cassette players, and intercom systems, to name but a few of the more popular items of equipment.

As will be evident, it would require a separate manual to cover this subject alone and this section is therefore restricted to outlining a few basic rules which must be borne in mind when fitting electrical equipment. The first consideration is whether your machine's electrical system has enough reserve capacity to cope with the added demand of the accessories you wish to fit. The motorcycle's manufacturer or importer should be able to furnish this sort of information and may also be able to offer advice on upgrading the electrical system. Failing this, a good dealer or the accessory manufacturer may be able to help. In some cases, more powerful generator components may be available, perhaps from another motorcycle in the manufacturer's range. The second consideration is the legal requirements in force in your area. The local police may be prepared to help with this point. In the UK for example, there are strict regulations governing the position and use of auxiliary riding lamps and fog lamps.

When fitting electrical equipment always disconnect the battery first to prevent the risk of a short-circuit, and be careful to ensure that all connections are properly made and that they are waterproof. Remember that many electrical accessories are designed primarily for use in cars and that they cannot easily withstand the exposure to vibration and to the weather. Delicate components must be rubber-mounted to insulate them from vibration, and sealed carefully to prevent the entry of rainwater and dirt. Be careful to follow exactly the accessory manufacturer's instructions in conjunction with the wiring diagram at the back of this manual.

Accessories – general

Accessories fitted to your motorcycle will rapidly deteriorate if not cared for. Regular washing and polishing will maintain the finish and will provide an opportunity to check that all mounting bolts and nuts are securely fastened. Any signs of chafing or wear should be watched for, and the cause cured as soon as possible before serious damage occurs.

As a general rule, do not expect the re-sale value of your motorcycle to increase by an amount proportional to the amount of money and effort put into fitting accessories. It is usually the case that an absolutely standard motorcycle will sell more easily at a better price than one that has been modified. If you are in the habit of exchanging your machine for another at frequent intervals, this factor should be borne in mind to avoid loss of money.

Fault diagnosis

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1 Introduction

This Section provides an easy reference-guide to the more common ailments that are likely to afflict your machine. Obviously, some faults can occur as a result of obscure failures, and to try and cover all eventualities is impossible.

Successful fault diagnosis is not a mysterious 'black art' but the application of a bit of knowledge combined with a systematic and logical approach to the problem. Approach any fault diagnosis by first accurately identifying the symptom and then checking through the list of possible causes, starting with the simplest or most obvious and progressing in stages to the most complex. Take nothing for granted, but above all apply liberal quantities of common sense.

The main symptom of a fault is given in the text as a major heading below which are listed, as Section headings, the various systems or areas which may contain the fault. Details of each possible cause for a fault and the remedial action to be taken are given, in brief,

in the paragraphs below each Section heading. Further information should be sought in the relevant Chapter.

Starter motor problems (CL50D only)

2 Starter motor not rotating

- Fuse blown. Check the main fuse located adjacent to the battery.
- Battery voltage low. Switching on the headlamp and operating the horn will give a good indication of the charge level. If necessary recharge the battery from an external source.
- Faulty front or rear stop lamp switch. Check the switch wiring and switches for correct operation.
- Ignition switch defective. Check switch for continuity and connections for security.
- Starter button switch faulty. Check continuity of switch.

- Starter relay (solenoid) faulty. If the switch is functioning correctly a pronounced click should be heard when the starter button is depressed. This presupposes that current is flowing to the solenoid when the button is depressed.
- Wiring open or shorted. Check first that the battery terminal connections are tight and corrosion free. Follow this by checking that all wiring connections are dry, tight and corrosion free. Check also for frayed or broken wiring. Occasionally a wire may become trapped between two moving components, particularly in the vicinity of the steering head, leading to breakage of the internal core but leaving the softer but more resilient outer cover intact. This can cause mysterious intermittent or total power loss.
- Starter motor defective. A badly worn starter motor may cause high current drain from a battery without the motor rotating. If current is found to be reaching the motor, after checking the starter button and starter relay, suspect a damaged motor. The motor should be removed for inspection.

3 Starter motor rotates but engine does not turn over

- Damaged starter motor drive train. Inspect and renew component where necessary. Failure in this area is unlikely.

4 Starter motor and clutch function but engine will not turn over

- Engine seized. Seizure of the engine is always a result of damage to internal components due to lubrication failure, or component breakage resulting from abuse, neglect or old age. A seizing or partially seized component may go un-noticed until the engine has cooled down and an attempt is made to restart the engine. Suspect first seizure of the piston. Instantaneous seizure whilst the engine is running indicates component breakage. In either case major dismantling and inspection will be required.

Engine does not start when turned over

5 No fuel flow to carburettor

- Fuel tank empty or level too low. Check that the tap is turned to 'On' or 'Pri' position as required. If in doubt, prise off the fuel feed pipe at the carburettor end and check that fuel runs from pipe when the engine is running, or when the tap is in the 'Pri' position.
- Tank filler cap vent obstructed. This can prevent fuel from flowing into the carburettor float bowl because air cannot enter the fuel tank to replace it. The problem is more likely to appear when the machine is being ridden. Check by listening close to the filler cap and releasing it. A hissing noise indicates that a blockage is present. Remove the cap and clear the vent hole with wire or by using an air line from the inside of the cap.
- Fuel tap or filter blocked. Blockage may be due to accumulation of rust or paint flakes from the tank's inner surface or of foreign matter from contaminated fuel. Remove the tap and clean it and the filter. Look also for water droplets in the fuel.
- Fuel line blocked. Blockage of the fuel line is more likely to result from a kink in the line rather than the accumulation of debris.

6 Fuel not reaching cylinder

- Float chamber not filling. Caused by float needle or float sticking in an up position. This may occur after the machine has been left standing for an extended length of time allowing the fuel to evaporate. When this occurs a gummy residue is often left which hardens to a varnish-like substance. This condition may be worsened by corrosion and crystalline deposits produced prior to the total evaporation of contaminated fuel. Sticking of the float needle may also be caused by wear. In any case removal of the float chamber will be necessary for inspection and cleaning.
- Blockage in starting circuit, slow running circuit or jets. Blockage of these items may be attributable to debris from the fuel tank by-passing the filter system or to gumming up as described in paragraph 1. Water droplets in the fuel will also block jets and passages. The carburettor

should be dismantled for cleaning.

- Fuel level too low. The fuel level in each float chamber is controlled by float height. The float height may increase with wear or damage but will never reduce, thus a low fuel level is an original fault rather than a developing condition. Check the float height, renewing the float or needle if required.

7 Engine flooding

- Float valve needle worn or stuck open. A piece of rust or other debris can prevent correct seating of the needle against the valve seat thereby permitting an uncontrolled flow of fuel. Similarly, a worn needle or needle seat will prevent valve closure. Dismantle the carburettor float bowl for cleaning and, if necessary, renew the worn components.
- Fuel level too high. The fuel level is controlled by the float height which may increase due to wear of the float needle, pivot pin or operating tang. Check the float height, and make any necessary adjustment. A leaking float will cause an increase in fuel level, and thus should be renewed.
- Cold starting mechanism. Check the choke (starter mechanism) for correct operation. If the mechanism jams in the 'On' position subsequent starting of a hot engine will be difficult.
- Blocked air filter. A badly restricted air filter will cause flooding. Check the filter and clean or renew as required. A collapsed inlet hose will have a similar effect. Check that the air filter inlet has not become blocked by a rag or similar item.

8 No spark at plug

- Ignition switch not on.
- Spark plug dirty, oiled or 'whiskered'. Because the induction mixture of a two-stroke engine is inclined to be of a rather oily nature, it is comparatively easy to foul the plug electrodes, especially where there have been repeated attempts to start the engine. A machine used for short journeys will be more prone to fouling because the engine may never reach full operating temperature, and the deposits will not burn off. On rare occasions a change of plug grade may be required but the advice of a dealer should be sought before making such a change. 'Whiskering' is a comparatively rare occurrence on modern machines. An electrode deposit in the form of a barely visible filament across the plug electrodes can short circuit the plug and prevent its sparking. On all two-stroke machines it is a sound precaution to carry a new spare spark plug for substitution in the event of fouling problems.
- Spark plug failure. Clean the spark plug thoroughly and reset the electrode gap. Refer to the spark plug section and the colour condition guide in Chapter 3. If a spark plug shorts internally or has sustained visible damage to the electrodes, core or ceramic insulator it should be renewed. On rare occasions a plug that appears to spark vigorously will fail to do so when refitted to the engine and subjected to the compression pressure in the cylinder.
- Spark plug cap or high tension (HT) lead faulty. Check condition and security. Replace if deterioration is evident. Most spark plug caps have an internal resistor designed to inhibit electrical interference with radio and television sets. On rare occasions the resistor may break down, thus preventing sparking but in the case of the Suzuki CL50 models the spark plug has its own built-in resistor. Check that a resistor-type spark plug cap has not been fitted in error.
- Spark plug cap loose. Check that the spark plug cap fits securely over the plug and, where fitted, the screwed terminal on the plug end is secure.
- Shorting due to moisture. Certain parts of the ignition system are susceptible to shorting when the machine is ridden or parked in wet weather. Check particularly the area from each spark plug cap back to the ignition coil. A water dispersant spray may be used to dry out waterlogged components. Recurrence of the problem can be prevented by using an ignition sealant spray after drying out and cleaning.
- Ignition switch shorted. May be caused by water, corrosion or wear. Water dispersant and contact cleaning sprays may be used. If this fails to overcome the problem dismantling and visual inspection of the switches will be required.

- Shorting or open circuit in wiring. Failure in any wire connecting any of the ignition components will cause ignition malfunction. Check also that all connections are clean, dry and tight.
- Ignition coil failure. Check the coils, referring to Chapter 3.
- Generator source coil failure. Refer to Chapter 3.

9 Weak spark at plug

- Feeble sparking at the plug may be caused by any of the faults mentioned in the preceding Section other than those items in the first 3 paragraphs. Check first the spark plug, this being the most likely culprit.

10 Compression low

- Spark plug loose. This will be self-evident on inspection, and may be accompanied by a hissing noise when the engine is turned over. Remove the plug and check that the threads in the cylinder head are not damaged. Check also that the plug sealing washer is in good condition.
- Cylinder head gasket leaking. This condition is often accompanied by a high pitched squeak from around the cylinder head and oil loss, and may be caused by insufficiently tightened cylinder head fasteners, a warped cylinder head or mechanical failure of the gasket material. Re-torquing the fasteners to the correct specification may seal the leak in some instances but if damage has occurred, this course of action will provide, at best, only a temporary cure.
- Low crankcase compression. This can be caused by worn main bearings and seals and will upset the incoming fuel/air mixture. A good seal in these areas is essential on any two-stroke engine.
- Piston rings sticking or broken. Sticking of the piston rings may be caused by seizure due to lack of lubrication or heating as a result of poor carburation or incorrect fuel type. Gumming of the rings may result from lack of use, or carbon deposits in the ring grooves. Broken rings result from over-revving, overheating or general wear. In either case a top-end overhaul will be required.

Engine stalls after starting

11 General causes

- Improper cold start mechanism operation. Carburettor must be removed and dismantled to check mechanism. Refer to Chapter 2. A cold engine may not require application of an enriched mixture to start initially but may balk without choke once firing. Likewise a hot engine may start with an enriched mixture but will stop almost immediately if the choke is inadvertently in operation.
- Ignition malfunction. See Section 9, 'Weak spark at plug'.
- Carburettor incorrectly adjusted. Maladjustment of the idle speed may cause the engine to stop immediately after starting. See Chapter 2.
- Fuel contamination. Check for filter blockage by debris or water which reduces, but does not completely stop, fuel flow or blockage of the slow speed circuit in the carburettor by the same agents. If water is present it can often be seen as droplets in the bottom of the float bowl. Clean the filter and, where water is in evidence, drain and flush the fuel tank and float bowl.
- Intake air leak. Check for security of the carburettor mounting and hose connections, and for cracks or splits in the hoses. Check also that the carburettor top is secure.
- Air filter blocked or omitted. A blocked filter will cause an over-rich mixture; the omission of a filter will cause an excessively weak mixture. Both conditions will have a detrimental effect on carburation. Clean or renew the filter as necessary.
- Fuel filler cap air vent blocked. Usually caused by dirt or water. Clean the vent orifice.
- Choked exhaust system. Caused by excessive carbon build-up in the system, particularly around the silencer baffles. Clean exhaust as described in Routine Maintenance.
- Excessive carbon build-up in the engine. This can result from failure to decarbonise the engine at the specified interval or through excessive oil consumption.

Poor running at idle and low speed

12 Weak spark at plug or erratic firing

- Battery voltage low. In certain conditions low battery charge, especially when coupled with a badly sulphated battery, may result in misfiring. If the battery is in good general condition it should be recharged; an old battery suffering from sulphated plates should be renewed.
- Spark plug fouled, faulty or incorrectly adjusted. See Section 8 or refer to Chapter 3.
- Spark plug cap or high tension lead shorting. Check the condition of both these items ensuring that they are in good condition and dry and that the cap is fitted correctly.
- Spark plug type incorrect. Fit plug of correct type and heat range as given in Specifications. In certain conditions a plug of hotter or colder type may be required for normal running.
- Ignition timing incorrect. Check the ignition timing as described in Chapter 3.
- Faulty ignition coil. Partial failure of the coil internal insulation will diminish the performance of the coil. No repair is possible, a new component must be fitted.
- Defective flywheel generator ignition source. Refer to Chapter 3 for further details on test procedures.

13 Fuel/air mixture incorrect

- Intake air leak. Check carburettor mountings and air cleaner hoses for security and signs of splitting. Ensure that the carburettor top is tight.
- Pilot jet or slow running circuit blocked. The carburettor should be removed and dismantled for thorough cleaning. Blow through all jets and air passages with compressed air to clear obstructions.
- Air filter clogged or omitted. Clean or fit air filter element as necessary. Check also that the element and air filter cover are correctly seated.
- Cold start mechanism in operation. Check that the choke has not been left on inadvertently and the operation is correct.
- Fuel level too high or too low. Check the float height, renewing float or needle if required. See Section 6 or 7.
- Fuel tank air vent obstructed. Obstruction usually caused by dirt or water. Clean vent orifice.

14 Compression low

- See Section 7.

Acceleration poor

15 General causes

- All items as for previous Section.
- Choked air filter. Failure to keep the air filter element clean will allow the build-up of dirt with proportional loss of performance. In extreme cases of neglect acceleration will suffer.
- Choked exhaust system. This can result from failure to remove accumulations of carbon from the silencer baffles at the prescribed intervals. The increased back pressure will make the machine noticeably sluggish. Refer to Routine Maintenance for further information on decarbonisation.
- Excessive carbon build-up in the engine. This can result from failure to decarbonise the engine at the specified interval or through excessive oil consumption.
- Ignition timing incorrect. Check the ignition timing as described in Chapter 3.
- Carburation fault. See Section 13.
- Mechanical resistance. Check that the brakes are not binding. On small machines in particular note that the increased rolling resistance caused by under-inflated tyres may slow down acceleration.

Poor running or lack of power at high speeds

16 Weak spark at plug or erratic firing

- All items as for Section 12.
- HT lead insulation failure. Insulation failure of the HT lead and spark plug cap due to old age or damage can cause shorting when the engine is driven hard. This condition may be less noticeable, or not noticeable at all at lower engine speeds.

17 Fuel/air mixture incorrect

- All items as for Section 13, with the exception of items relative exclusively to low speed running.
- Main jet blocked. Debris from contaminated fuel, or from the fuel tank, and water in the fuel can block the main jet. Clean the fuel filter, the float bowl area, and if water is present, flush and refill the fuel tank.
- Main jet is the wrong size. The standard carburettor jetting is for sea level atmospheric pressure. For high altitudes, usually above 5000 ft, a smaller main jet will be required.
- Jet needle and needle jet worn. These can be renewed individually but should be renewed as a pair. Renewal of both items requires partial dismantling of the carburettor.
- Air bleed holes blocked. Dismantle carburettor and use compressed air to blow out all air passages.
- Reduced fuel flow. A reduction in the maximum fuel flow from the fuel tank to the carburettor will cause fuel starvation, proportionate to the engine speed. Check for blockages through debris or a kinked fuel line.

18 Compression low

- See Section 7.

Knocking or pinking

19 General causes

- Carbon build-up in combustion chamber. After high mileages have been covered large accumulations of carbon may occur. This may glow red hot and cause premature ignition of the fuel/air mixture, in advance of normal firing by the spark plug. Cylinder head removal will be required to allow inspection and cleaning.
- Fuel incorrect. A low grade fuel, or one of poor quality may result in compression-induced detonation of the fuel resulting in knocking and pinking noises. Old fuel can cause similar problems. A too highly leaded fuel will reduce detonation but will accelerate deposit formation in the combustion chamber and may lead to early pre-ignition as described in item 1.
- Spark plug heat range incorrect. Uncontrolled pre-ignition can result from the use of a spark plug the heat range of which is too hot.
- Weak mixture. Overheating of the engine due to a weak mixture can result in pre-ignition occurring where it would not occur when engine temperature was within normal limits. Maladjustment, blocked jets or passages and air leaks can cause this condition.

Overheating

20 Firing incorrect

- Spark plug fouled, defective or maladjusted. See Section 8.
- Spark plug type incorrect. Refer to the Specifications and ensure that the correct type plug is fitted.
- Incorrect ignition timing. Timing that is far too much advanced or far too much retarded will cause overheating. Check the ignition timing is correct.

21 Fuel/air mixture incorrect

- Main jet wrong size. The carburettor is jetted for sea level atmospheric conditions. For high altitudes, usually above 5000 ft, a smaller main jet will be required.
- Air filter badly fitted or omitted. Check that the filter element is in place and that it and the air filter box cover are sealing correctly. Any leaks will cause a weak mixture.
- Induction air leaks. Check the security of the carburettor mountings and hose connections, and for cracks and splits in the hoses. Check also that the carburettor top is secure.
- Fuel level too low. See Section 6.
- Fuel tank filler cap air vent obstructed. Clear blockage.

22 Lubrication inadequate

- Oil tank empty or low. This will have disastrous consequences if left unnoticed. Check and replenish tank regularly.
- Transmission oil low or worn out. Check the level regularly and investigate any loss of oil. If the oil level drops with no sign of external leakage it is likely that the crankshaft main bearing oil seals are worn, allowing transmission oil to be drawn into the crankcase during induction.

23 Miscellaneous causes

- Engine fins clogged. A build-up of mud in the cylinder head and cylinder barrel cooling fins will decrease the cooling capabilities of the fins. Clean the fins as required.
- Cooling fan defective or cowling blocked. Dismantle and check as described in Chapter 1.

Transmission faults

24 General

- The transmission is a complex self-contained assembly which cannot be adjusted to compensate for wear. The oil level should be checked regularly as described in Routine Maintenance, but if any noises (see Section 28) are heard or if a transmission fault is suspected it must be dismantled and any defective components renewed. Refer to Chapter 1.
- Section 21 of Chapter 1 describes a test procedure used to check the transmission operation.

Abnormal engine noise.

25 Knocking or pinking

- See Section 19.

26 Piston slap or rattling from cylinder

- Cylinder bore/piston clearance excessive. Resulting from wear, or partial seizure. This condition can often be heard as a high, rapid tapping noise when the engine is under little or no load, particularly when power is just beginning to be applied. Reboring to the next correct oversize should be carried out and a new oversize piston fitted.
- Connecting rod bent. This can be caused by over-revving, trying to start a very badly flooded engine (resulting in a hydraulic lock in the cylinder) or by earlier mechanical failure. Attempts at straightening a bent connecting rod are not recommended. Careful inspection of the crankshaft should be made before renewing the damaged connecting rod.
- Gudgeon pin, piston boss bore or small-end bearing wear or seizure. Excess clearance or partial seizure between normal moving parts of these items can cause continuous or intermittent tapping

noises. Rapid wear or seizure is caused by lubrication starvation.

- Piston rings worn, broken or sticking. Renew the rings after careful inspection of the piston and bore.

27 Other noises

- Big-end bearing wear. A pronounced knock from within the crankcase which worsens rapidly is indicative of big-end bearing failure as a result of extreme normal wear or lubrication failure. Remedial action in the form of a bottom end overhaul should be taken; continuing to run the engine will lead to further damage including the possibility of connecting rod breakage.
- Main bearing failure. Extreme normal wear or failure of the main bearings is characteristically accompanied by a rumble from the crankcase and vibration felt through the frame and footrests. Renew the worn bearings and carry out a very careful examination of the crankshaft.
- Crankshaft excessively out of true. A bent crank may result from over-revving or damage from an upper cylinder component or gearbox failure. Damage can also result from dropping the machine on either crankshaft end. Straightening of the crankshaft is not possible in normal circumstances; a replacement item should be fitted.
- Engine mounting loose. Tighten all the engine mounting nuts and bolts.
- Cylinder head gasket leaking. The noise most often associated with a leaking head gasket is a high pitched squeaking, although any other noise consistent with gas being forced out under pressure from a small orifice can also be emitted. Gasket leakage is often accompanied by oil seepage from around the mating joint or from the cylinder head holding down bolts and nuts. Leakage results from insufficient or uneven tightening of the cylinder head fasteners, or from random mechanical failure. Retightening to the correct torque figure will, at best, only provide a temporary cure. The gasket should be renewed at the earliest opportunity.
- Exhaust system leakage. Popping or crackling in the exhaust system, particularly when it occurs with the engine on the overrun, indicates a poor joint at the cylinder port. Failure of the gasket or looseness of the clamp should be looked for.

Abnormal transmission noise

28 Transmission noise

- Primary drive chain worn or damaged.
- Bearing or bushes worn or damaged. Renew the affected components.
- Transmission oil level too low. Top up immediately to prevent damage to transmission.

Exhaust smokes excessively

29 White/blue smoke (caused by oil burning)

- Piston rings worn or broken.
- Cylinder cracked, worn or scored. These conditions may be caused by overheating, lack of lubrication, component failure or advanced normal wear. The cylinder barrel should be renewed and, if necessary, a new piston fitted.
- Crankshaft left-hand main bearing oil seal worn. Wear in the main bearing oil seal, often in conjunction with wear in the bearing itself, can allow transmission oil to find its way into the crankcase and thence to the combustion chamber. This condition is often indicated by a mysterious drop in the transmission oil level with no sign of external leakage.
- Accumulated oil deposits in exhaust system. If the machine is used for short journeys only it is possible for the oil residue in the exhaust gases to condense in the relatively cool silencer. If the machine is then taken for a longer run in hot weather, the accumulated oil will burn off producing ominous smoke from the exhaust.

30 Black smoke (caused by over-rich mixture)

- Air filter element clogged. Clean or renew the element.
- Main jet loose or too large. Remove the float chamber to check for tightness of the jet. If the machine is used at high altitudes re-jetting will be required to compensate for the lower atmospheric pressure.
- Cold start mechanism jammed on. Check that the mechanism works smoothly and correctly. Apply heat transfer grease if necessary. Refer to Chapter 2.
- Fuel level too high. The fuel level is controlled by the float height which can increase as a result of wear or damage. Remove the float bowl and check the float height. Check also that the float has not punctured; a punctured float will lose buoyancy and allow an increased fuel level.
- Float valve needle stuck open. Caused by dirt or a worn valve. Clean the float chamber or renew the needle and, if necessary, the valve seat.

Poor handling or roadholding

31 Directional instability

- Steering head bearing adjustment too tight. This will cause rolling or weaving at low speeds. Re-adjust the bearings.
- Steering head bearing worn or damaged. Correct adjustment of the bearing will prove impossible to achieve if wear or damage has occurred. Inconsistent handling will occur including rolling or weaving at low speed and poor directional control at higher speeds. The steering head bearings should be dismantled for inspection and renewed if required. Lubrication should also be carried out.
- Bearing races pitted or dented. Impact damage caused, perhaps, by an accident or riding over a pot-hole can cause indentation of the bearing, usually in one position. This should be noted as notchiness when the handlebars are turned. Renew and lubricate the bearings.
- Steering stem bent. This will occur only if the machine is subjected to a high impact such as hitting a curb or a pot-hole. The column should be renewed; do not attempt to straighten it.
- Front or rear tyre pressures too low.
- Front or rear tyre worn. General instability, high speed wobbles and skipping over white lines indicates that tyre renewal may be required. Tyre induced problems, in some machine/tyre combinations, can occur even when the tyre in question is by no means fully worn.
- Swinging arm bearings worn. Difficulties in holding line, particularly when cornering or when changing power settings indicates wear in the swinging arm bearings. The swinging arm should be removed from the machine and the bearings renewed.
- Wheel bearings worn. Renew the worn bearings.
- Tyres unsuitable for machine. Not all available tyres will suit the characteristics of the frame and suspension, indeed, some tyres or tyre combinations may cause a transformation in the handling characteristics. If handling problems occur immediately after changing to a new tyre type or make, revert to the original tyres to see whether an improvement can be noted. In some instances a change to what are, in fact, suitable tyres may give rise to handling deficiencies. In this case a thorough check should be made of all frame and suspension items which affect stability.

32 Steering bias to left or right

- Wheels out of alignment. This can be caused by impact damage to the frame, swinging arm, wheel spindles or front forks. Although occasionally a result of material failure or corrosion it is usually as a result of a crash.

33 Handlebar vibrates or oscillates

- Tyres worn or out of balance. Either condition, particularly in the front tyre, will promote shaking of the handlebars.
- Tyres badly positioned on the wheel rims. A moulded line on each wall of a tyre is provided to allow visual verification that the tyre is

correctly positioned on the rim. A check can be made by rotating the tyre; any misalignment will be immediately obvious.

- Wheel rims warped or damaged. Inspect the wheels for runout as described in Chapter 5.
- Swinging arm bearings worn. Renew the bearings.
- Wheel bearings worn. Renew the bearings.
- Steering head bearings incorrectly adjusted. Vibration is more likely to result from bearings which are too loose rather than too tight. Re-adjust the bearings.
- Loose suspension component fasteners. Loose nuts and bolts holding the suspension pivot bearings, stub axles, mudguards or steering column can promote shaking at the handlebars. Fasteners on running gear such as the suspension should be checked tightened occasionally to prevent dangerous looseness of components occurring.
- Engine mounting bolts loose. Tighten all fasteners.

34 Poor front suspension performance

- Weak springs. Progressive fatigue of the springs, resulting in a reduced spring free length, will occur after extensive use. This condition will promote excessive fork dive under braking, and in its advanced form will reduce the at-rest extended length of the suspension. Renewal of the springs is the only satisfactory course of action.

35 Front end judder when braking (see also Section 43)

- Wear between the suspension components. Renewal of the affected components is required.
- Slack steering head bearings. Re-adjust the bearings.
- Warped brake drum. If irregular braking action occurs fork judder can be induced in what are normally serviceable suspension components. Renew the damaged brake components.

36 Poor rear suspension performance

- Rear suspension unit damper worn out or leaking. The damping performance of most rear suspension units falls off with age. This is a gradual process, and thus may not be immediately obvious. Indications of poor damping include hopping of the rear end when cornering or braking, and a general loss of positive stability.
- Weak rear spring. If the suspension unit spring fatigues it will promote excessive pitching of the machine and reduce the ground clearance when cornering.
- Swinging arm bearings worn. See Sections 31 and 33.
- Bent suspension unit damper rod. This is likely to occur only if the machine is dropped or if seizure of the damper piston occurs.

37 Front end noise

- Worn suspension components can cause knocking or clicking noises. Renew defective components.
- Steering head bearings loose or damaged. Clicks when braking. Check, adjust or replace.

38 Rear suspension noise

- Fluid level too low. Leakage of a suspension unit, usually evident by oil on the outer surfaces, can cause a spurting noise.
- Defective rear suspension unit with internal damage. Renew the suspension unit.

Brake problems

39 Brakes are spongy or ineffective

- Brake cable deterioration. Damage to the outer cable by stretching or being trapped will give a spongy feel to the brake lever. The cable

should be renewed. A cable which has become corroded due to old age or neglect of lubrication will partially seize making operation very heavy. Lubrication at this stage may overcome the problem but the fitting of a new cable is recommended.

- Worn brake linings. Determine lining wear using the external brake wear indicator on the brake backplate, or by removing the wheel and withdrawing the brake drum. See Chapter 5. Renew the shoe/lining units as a pair if the linings are worn below the recommended limit.
- Worn brake camshaft. Wear between the camshaft and the bearing surface will reduce brake feel and reduce operating efficiency. Renewal of one or both items will be required to rectify the fault.
- Worn brake cam and shoe ends. Renew the worn components.
- Linings contaminated with dust or grease. Any accumulations of dust should be cleaned from the brake assembly and drum using a petrol dampened cloth. Do not blow or brush off the dust because it is asbestos based and thus harmful if inhaled. Light contamination from grease can be removed from the surface of the brake linings using a solvent; attempts at removing heavier contamination are less likely to be successful because some of the lubricant will have been absorbed by the lining material which will severely reduce the braking performance.

40 Brake drag

- Incorrect adjustment. Re-adjust the brake operating mechanism.
- Drum warped or oval. This can result from overheating or impact. The condition is difficult to correct, although if slight ovality only occurs, skimming the surface of the brake drum can provide a cure. This is work for a specialist engineer. Renewal of the complete wheel is normally the only satisfactory solution.
- Weak brake shoe return springs. This will prevent the brake lining/shoe units from pulling away from the drum surface once the brake is released. The springs should be renewed.
- Brake camshaft lever pivot or cable poorly lubricated. Failure to attend to regular lubrication of these areas will increase operating resistance which, when compounded, may cause tardy operation and poor release movement.

41 Brake lever or pedal pulsates in operation

- Drums warped or oval. This can result from overheating or impact. This condition is difficult to correct, although if slight ovality only occurs skimming the surface of the drum can provide a cure. This is work for a specialist engineer. Renewal of the hub is normally the only satisfactory solution.

42 Drum brake noise

- Drum warped or oval. This can cause intermittent rubbing of the brake linings against the drum. See the preceding Section.
- Brake linings glazed. This condition, usually accompanied by heavy lining dust contamination, often induces brake squeal. The surface of the linings may be roughened using glass-paper or a fine file.

43 Brake induced fork judder

- Worn front suspension components, or worn or badly adjusted steering head bearings. These conditions, combined with uneven or pulsating braking as described in Section 41 will induce more or less judder when the brakes are applied, dependent on the degree of wear and poor brake operation. Attention should be given to both areas of malfunction. See the relevant Section.

Electrical problems

44 Battery dead or weak

- Battery faulty. Battery life should not be expected to extend beyond 3 to 4 years, particularly where a starter motor is used regularly (CL50D model only). Gradual sulphation of the plates and sediment

deposits will reduce the battery performance. Plate and insulator damage can often occur as a result of vibration. Complete power failure, or intermittent failure, may be due to a broken battery terminal. Lack of electrolyte will prevent the battery maintaining charge.

- Battery leads making poor contact. Remove the battery leads and clean them and the terminals, removing all traces of corrosion and tarnish. Reconnect the leads and apply a coating of petroleum jelly to the terminals.
- Load excessive. If additional items such as spot lamps, are fitted, which increase the total electrical load above the maximum alternator output, the battery will fail to maintain full charge. Reduce the electrical load to suit the electrical capacity.
- Rectifier failure.
- Alternator generating coils open-circuit or shorted.
- Charging circuit shorting or open circuit. This may be caused by frayed or broken wiring, dirty connectors or a faulty ignition switch. The system should be tested in a logical manner. See Section 47.

45 Battery overcharged

- Regulator faulty. Overcharging is indicated if the battery becomes hot or it is noticed that the electrolyte level falls repeatedly between checks. In extreme cases the battery will boil, causing corrosive gases and electrolyte to be emitted through the vent pipe.
- Battery wrongly matched to the electrical circuit. Ensure that the specified battery is fitted to the machine.

46 Total electrical failure

- Fuse blown. Check the main fuse. If a fault has occurred, it must be rectified before a new fuse is fitted.
- Battery faulty. See Section 44.
- Earth failure. Check that the main earth strap from the battery is

securely affixed to the crankcase and is making a good contact.

- Ignition switch or power circuit failure. Check for current flow through the battery positive lead (red) to the ignition switch. Check the ignition switch for continuity.

47 Circuit failure

- Cable failure. Refer to the machine's wiring diagram and check the circuit for continuity. Open circuits are a result of loose or corroded connections, either at terminals or in-line connectors, or because of broken wires. Occasionally, the core of a wire will break without there being any apparent damage to the outer plastic cover.
- Switch failure. All switches may be checked for continuity in each switch position, after referring to the switch position boxes incorporated in the wiring diagram for the machine. Switch failure may be a result of mechanical breakage, corrosion or water.
- Fuse blown. Replace the fuse, if blown, only after the fault has been identified and rectified.

48 Bulbs blowing repeatedly

- Vibration failure. This is often an inherent fault related to the natural vibration characteristics of the engine and frame and is, thus, difficult to resolve. Modification of the lamp mounting to change the damping characteristics, may help.
- Intermittent earth. Repeated failure of one bulb, particularly where the bulb is fed directly from the generator, indicates that a poor earth exists somewhere in the circuit. Check that a good contact is available at each earthing point in the circuit.
- Reduced voltage. Do not overload the system with additional electrical equipment in excess of the system's power capacity and ensure that all circuit connections are maintained clean and tight.

SUZUKI CL 50 LOVE

Check list

Daily

- 1 Check the operation of the brakes
- 2 Check that the throttle twistgrip rotates smoothly
- 3 Check the engine oil level
- 4 Check the tyres for damage and check the pressures
- 5 Ensure the electrical system functions correctly
- 6 Check the fuel level

Three monthly, or every 1800 miles (3000 km)

- 1 Check the battery electrolyte level
- 2 Clean the air filter element
- 3 Clean and reset the spark plug
- 4 Check the transmission oil level
- 5 Check and adjust the carburettor
- 6 Check and adjust the brakes
- 7 Check the condition of the tyres
- 8 Check and adjust the steering head bearings
- 9 Lubricate all pivot points and control cables, and check the tightness of all fasteners

Six monthly, or every 3600 miles (6000 km)

- 1 Renew the spark plug
- 2 Decarbonize the engine and exhaust system
- 3 Change the transmission oil
- 4 Thoroughly lubricate the control cables and pivot points

Yearly, or every 7200 miles (12 000 km)

- 1 Dismantle and clean the carburettor
- 2 Grease the steering head bearings
- 3 Grease the throttle twistgrip drum
- 4 Grease the brake cams and speedometer drive

Adjustment data

Tyre pressures

Front	18 psi (1.25 kg/cm ²)
Rear	25 psi (1.75 kg/cm ²)

Ignition timing

22° BTDC @ 4000 rpm

Spark plug type

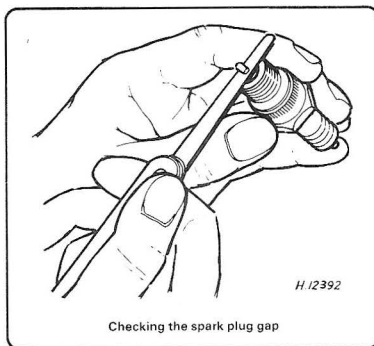
NGK BPR4HS
Nippon Denso W14EPR-UL

Spark plug gap

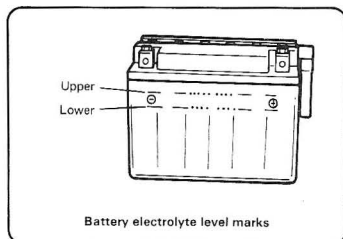
0.6 – 0.8 mm (0.024 – 0.032 in)

Idle speed

1600 ± 50 rpm



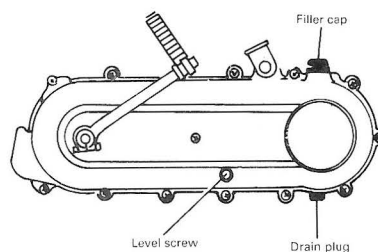
Checking the spark plug gap



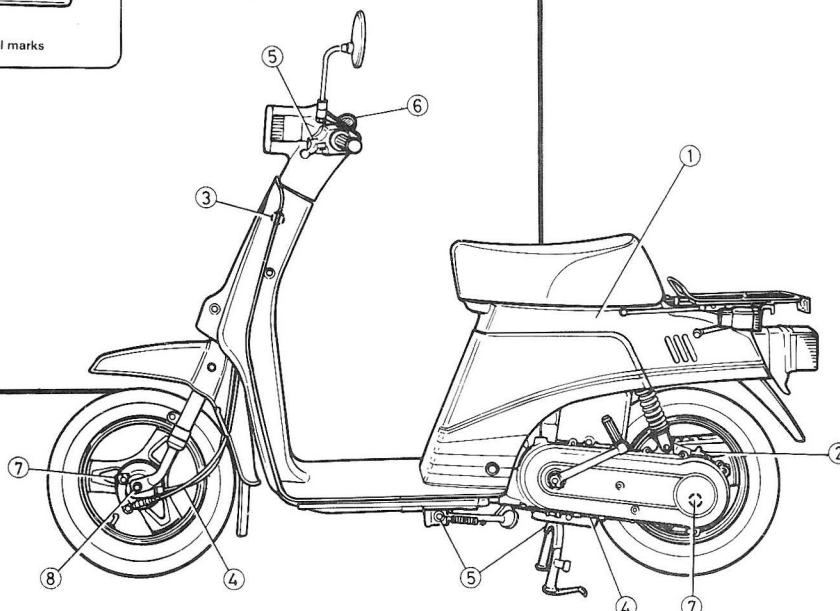
Battery electrolyte level marks

Recommended lubricants

Component	Quantity	Type/viscosity
① Engine oil	0.8 lit (1.4 Imp pt)	Good quality pump type 2-stroke oil
② Transmission oil	400 cc (0.70 Imp pt)	SAE 20W/40 engine oil
③ Steering head bearings	As required	General purpose grease
④ Control cables	As required	Light machine oil
⑤ Pivot points	As required	General purpose grease
⑥ Throttle twistgrip	As required	General purpose grease
⑦ Brake cams	As required	High melting point grease
⑧ Speedometer drive	As required	High melting point grease



Transmission case oil level, filler and drain plug locations



ROUTINE MAINTENANCE GUIDE

Routine maintenance

Periodic routine maintenance is a continuous process which should commence immediately the machine is used. The object is to maintain all adjustments and to diagnose and rectify minor defects before they develop into more extensive, and often more expensive, problems.

It follows that if the machine is maintained properly, it will both run and perform efficiently, and be less prone to unexpected breakdowns. Regular inspection of the machine will show up any parts which are wearing, and with a little experience, it is possible to obtain the maximum life from any one component, renewing it when it becomes so worn that it is liable to fail.

Regular cleaning can be considered as important as mechanical maintenance. This will ensure that all the cycle parts are inspected regularly and are kept free from accumulations of road dirt and grime.

Cleaning is especially important during the winter months, despite its appearance of being a thankless task which very soon seems pointless. On the contrary, it is during these months that the paintwork, chromium plating, and the alloy casings suffer the ravages of abrasive grit, rain and road salt. A couple of hours spent weekly on cleaning the machine will maintain its appearance and value, and highlight small points, like chipped paint, before they become a serious problem.

The various maintenance tasks are described under their respective mileage and calendar headings, and are accompanied by diagrams and photographs where pertinent.

It should be noted that the intervals between each maintenance task serve only as a guide. As the machine gets older, or if it is used under particularly bad conditions, it is advisable to reduce the period

between each check.

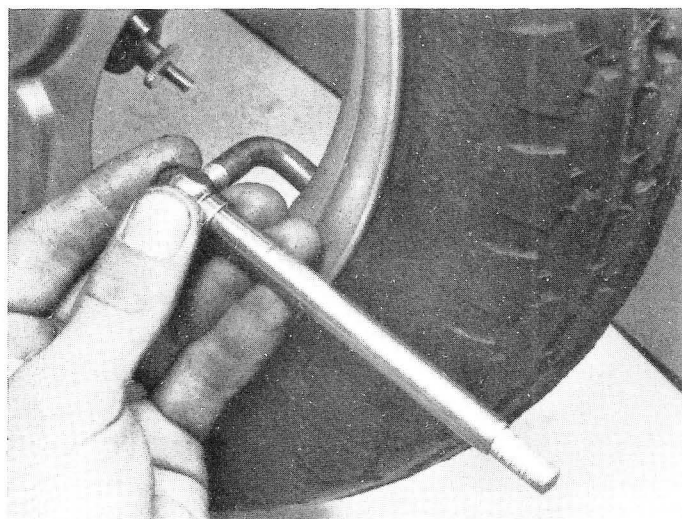
For ease of reference, most service operations are described in detail under the relevant heading. However, if further general information is required, this can be found under the pertinent Section heading and Chapter in the main text.

Although no special tools are required for routine maintenance, a good selection of general workshop tools is essential. Included in the tools must be a range of metric ring or combination spanners, a selection of crosshead screwdrivers, and two pairs of circlip pliers, one external opening and the other internal opening. Additionally, owing to the extreme tightness of most casing screws on Japanese machines, an impact screwdriver, together with a choice of large or small cross-head screw bits, is absolutely indispensable. This is particularly so if the engine has not been dismantled since leaving the factory.

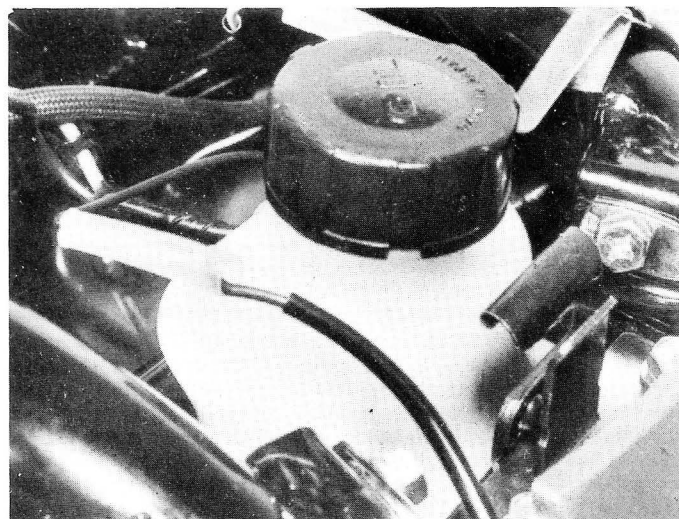
Daily

The checklist shown below should be carried out prior to riding the machine each day. The procedure should take only a few moments, and will reduce the risk of unexpected failure in use.

- (a) Check brake operation
- (b) Check throttle operation (engine stopped)
- (c) Check engine oil level
- (d) Check tyre pressures and check for damage
- (e) Check the electrical system
- (f) Check fuel level



Check tyre pressures as shown, using an accurate gauge

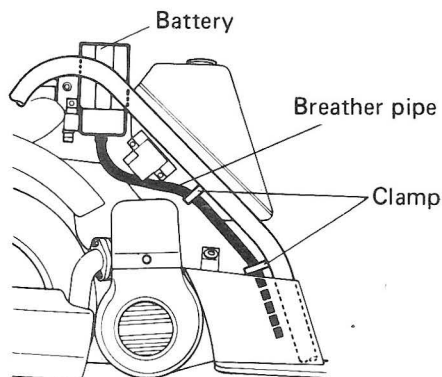


Oil tank filler is located under the seat

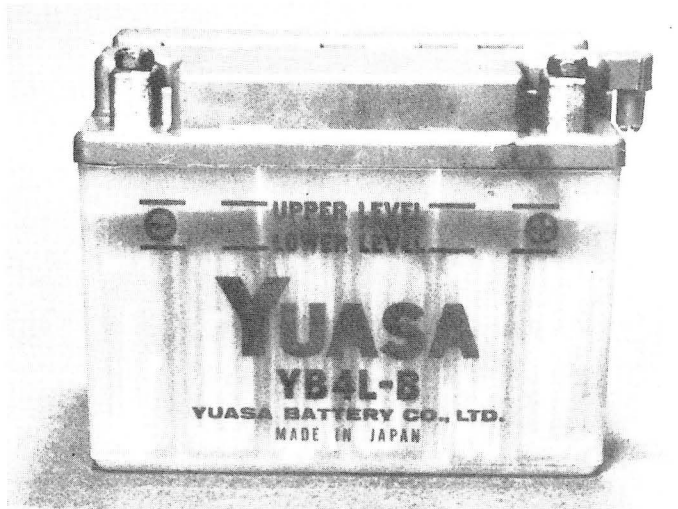
Three monthly, or every 1800 miles (3000 km)

1 Checking the battery

Open the seat and check the battery electrolyte level, ensuring that it is between the maximum and minimum lines on the battery casing. If topping up is required, use only distilled water. Check that the filler plugs are secure and that the terminal connections are sound and free of corrosion. Check that the vent pipe which runs from the underside of the battery tray is clear and routed away from the frame or bodywork.



Battery vent pipe routing



Check that electrolyte lies between level lines (battery removed for clarity)

2 Cleaning the air filter element

It is vitally important that the air filter element is kept clean and in good condition if the engine is to function properly. If the element becomes choked with dust, the airflow to the engine will be impaired, leading to poor performance and high fuel consumption. Conversely, a damaged air filter will allow excessive amounts of unfiltered air to enter the engine, which can result in an increased rate of wear and possible damage due to the weak nature of the mixture. The interval specified above indicates the maximum time limit between each cleaning operation. Where the machine is used in particularly bad conditions, cleaning should take place on a much more frequent basis.

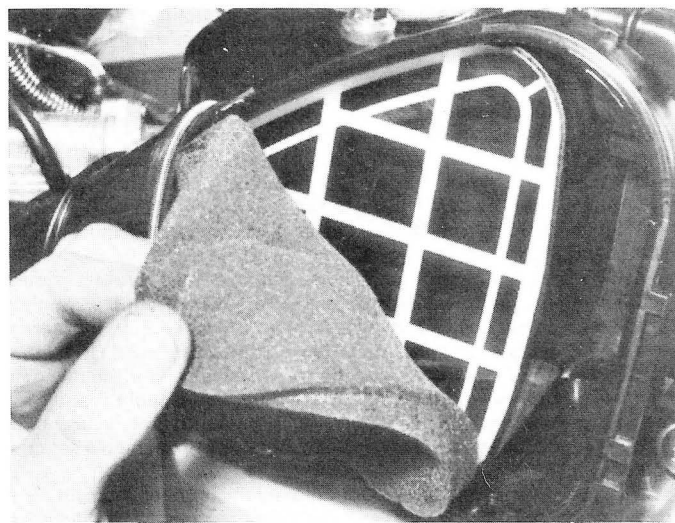
Remove the left-hand side panel and use a pair of pliers to pull off the clip which secures the air filter cover. Unclip the cover to expose the foam filter element which must be pulled away from its supporting frame.

Examine the element carefully. It must be renewed if there are any splits or tears, or if the foam has hardened through age. To clean the element, immerse it in a bath of a non-flammable solvent such as white spirit. Petrol may be used, but be careful to take suitable precautions against the risk of fire. When the foam is clean, gently squeeze out the surplus solvent and allow the remainder to evaporate. Do not wring the element out, as this will damage the foam. Soak the cleaned, dry, element in two-stroke oil or SAE 20W/40 engine oil and gently squeeze out the surplus to leave the element slightly oily to the touch. Filter reassembly is a straightforward reversal of the dismantling procedure, being careful to ensure that both the element and the filter cover are correctly seated so that no unfiltered air can bypass the element and enter the carburettor. A light application of grease to the sealing surfaces of the filter cover will help to achieve good sealing.

On no account should the air filter element be omitted while the engine is running in view of the increased noise level and of the high risk of severe damage to the engine due to overheating caused by the resultant weak mixture.

3 Cleaning and resetting the spark plug

Detach the spark plug cap, and using the correct spanner remove the spark plug. Clean the electrodes using a wire brush followed by a strip of fine emery cloth or paper. Check the plug gap with a feeler gauge, adjusting it if necessary to within the range of 0.6 - 0.8 mm (0.024 - 0.031 in). Make adjustments by bending the outer electrode, never the inner (central) electrode. Before fitting the spark plug, smear the threads with a graphited grease to aid subsequent removal, then



Lift away filter element for cleaning and re-oiling



Secure filter cover by sliding clip into place

tighten the plug by hand only until the sealing washer seats firmly, and apply a further quarter of a turn using the correct spanner. If a torque wrench is available, tighten the plug to a setting of 2.5 - 3.0 kgf m (18 - 22 lbf ft).

4 Checking the transmission oil level

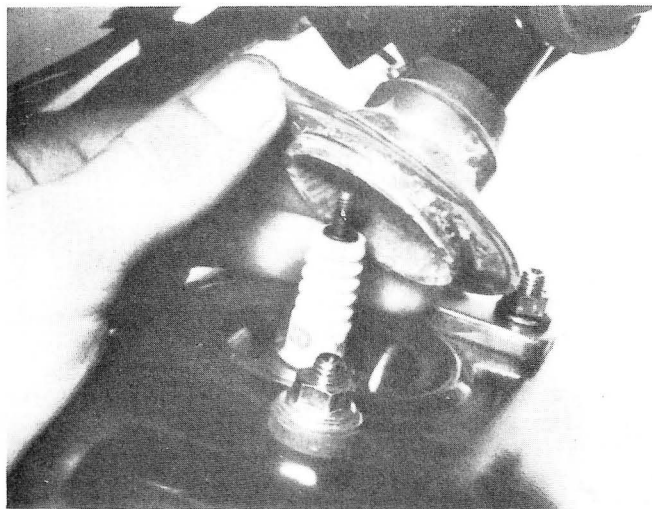
Before the transmission oil level is checked, the machine must be taken for a journey of at least 10 minutes duration so that the engine/transmission unit is warmed up to normal operating temperature. Place the machine on its stand so that it is upright on level ground. Unscrew the oil level plug, which is situated in the crankcase left-hand cover, immediately behind the kickstart shaft. Oil should slowly trickle out if the level is correct. Top up through the filler plug orifice if necessary, but be careful not to overfill. If oil flows out in a steady stream, allow it to drain until the flow slows to a steady trickle. Use a good quality SAE 20W/40 oil when topping up, and ensure that both filler and level plugs are securely tightened.

5 Checking and adjusting the carburettor

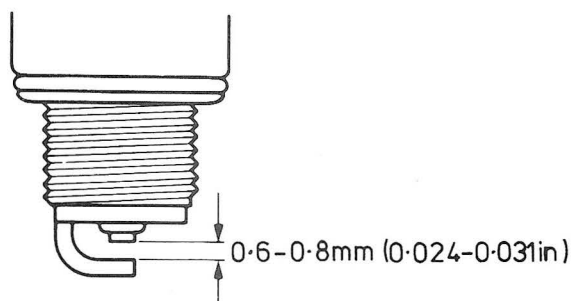
If rough running of the engine has developed, the carburettor may require some attention. If this is the case refer to Section 9 of Chapter 2; do not alter the carburettor settings unless absolutely necessary as there is little to be gained by unnecessary attention.

Check that all mounting nuts and bolts are secure, that the fuel and vacuum pipes are securely fastened, that they are undamaged and are not chafing on any other component, and that there are no signs of fuel leaks.

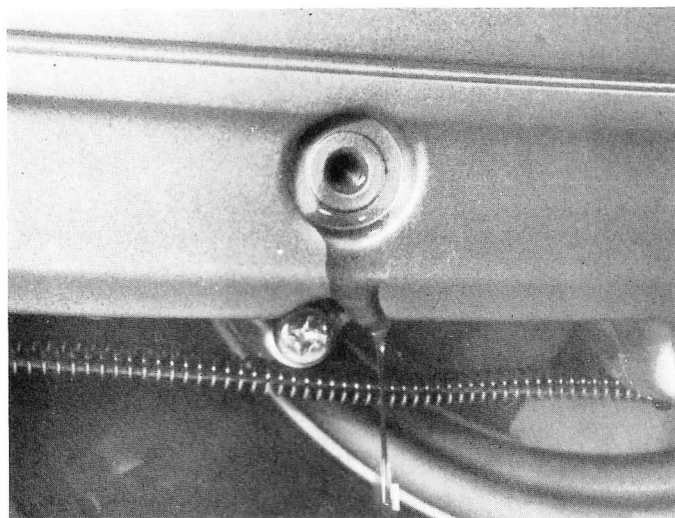
Unclip the steering column cover to expose the throttle cable adjuster, and check that there is 0.5 - 1.0 mm (0.02 - 0.04 in) of free play in the cable, measured between the outer cable and the top of the adjuster. If adjustment is necessary, slacken the locknut and rotate the adjuster nut until the setting is correct, then tighten the locknut securely and refit the cover.



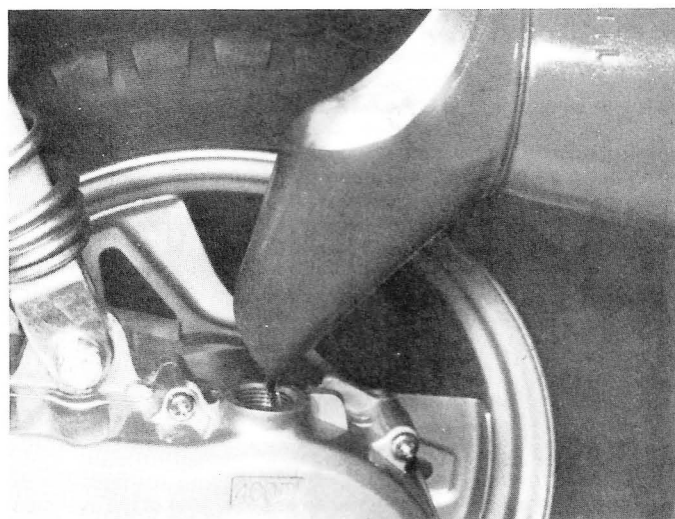
Pull off the waterproof cover to expose spark plug



Spark plug gap



Transmission oil should just trickle from level hole



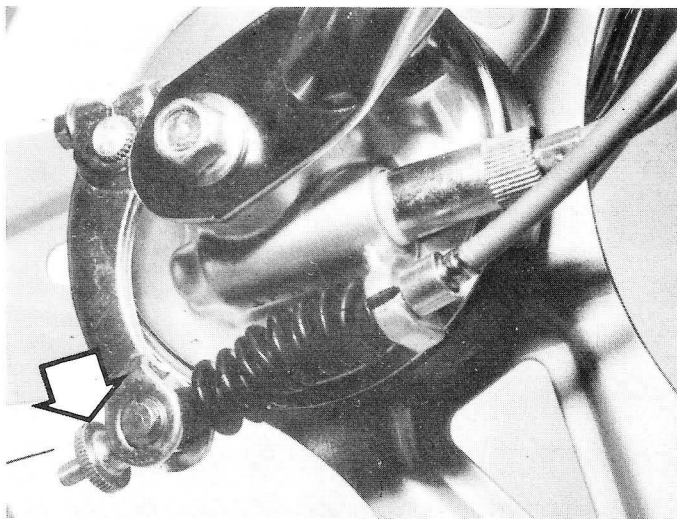
Top up using SAE 20W40 motor oil

6 Checking and adjusting the brakes

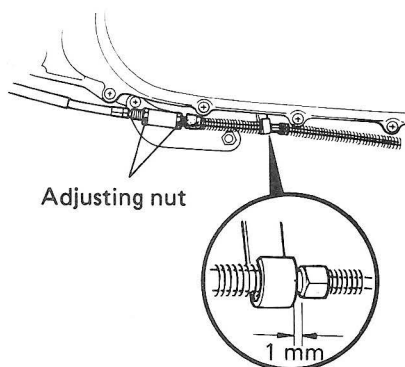
The brakes will require regular adjustment to compensate for shoe wear and cable stretch, the adjustment being made by rotating the adjusting nut at the lower end of the operating cable inner wire. The setting is correct when, with the handlebar lever firmly applied, the distance between the lever ball end and the end of the handlebar is 20 - 30 mm (0.8 - 1.2 in).

To adjust the brakes, place the machine on its centre stand and support it so that the wheel to be checked is clear of the ground, then spin the wheel and tighten the adjusting nut until a rubbing sound is heard as the shoes begin to contact the drum. Unscrew the adjusting nut until the noise has just disappeared, then spin the wheel hard and apply the brake firmly. Release the brake and check that the wheel revolves freely with no rubbing noises, then measure the lever setting as described above. In the case of the rear brake, check that the safety interlock lever has 1 mm (0.04 in) free play, as shown in the accompanying illustration. This is checked with the brake lever released and is adjusted by rotating one of the nuts on each side of the cable guide plate.

Brake shoe wear can be measured by applying the brake firmly and observing the angle made by the cable and the operating arm on the brake backplate. If this angle is more than 90°, the shoes are excessively worn and must be renewed, as described in Chapter 5.



Adjust brakes via knurled adjuster on cable end (arrowed)



Safety interlock lever adjustment

7 Checking the tyres

The daily checks should give you an accurate idea of the condition of the tyres, but they must still be checked thoroughly. Ensure that the pressures are correct as already mentioned and remove any foreign matter from the treads.

8 Checking and adjusting the steering head bearings

The symptoms of wrongly-adjusted steering head bearings are as follows: slack bearings will cause an alarming judder when the front brake is applied, and the steering will be generally imprecise. If the bearings are overtightened, the machine will roll from side to side, especially at low speeds.

To adjust the bearings, place the machine on its centre stand and place wooden blocks under the front of the footboards so that the machine is securely supported with the front wheel clear of the ground, then unclip the steering column front cover.

With the handlebars in the straight ahead position, grasp the bottom of the steering column firmly in front of the suspension unit and attempt to move the front suspension backwards and forwards while feeling for free play with the fingers of the other hand placed around the steering head top bearing. Any free play should be felt by the steering column moving in relation to the frame: none should be discernible. Check for overtightened bearings by placing the handlebars again in the straight ahead position, then tap lightly on one handlebar end. The handlebars should move smoothly to the full lock position under their own weight, with no stiffness or notchiness being apparent.

If adjustment is required, use a pin spanner or C-spanner to slacken the adjuster locknut, having first displaced the dust cover, then tighten lightly the adjuster nut until slight resistance is felt. Slacken the adjuster nut by $\frac{1}{8}$ - $\frac{1}{4}$ of a turn and tighten the locknut. As described

above, check that the bearings are correctly adjusted, resetting the adjustment if necessary, then slide down the dust cover and refit the steering column front cover.

While the steering head bearings are being adjusted, take the opportunity to check the suspension. With the machine on its wheels sit astride it and apply the brakes firmly, then bounce the suspension several times. If it does not move smoothly through its full travel or if any noises are heard, the cause must be found and rectified. Check for free play in the suspension components as described in the relevant Sections of Chapter 4.

9 General checks and lubrication

Proceed methodically round the machine, checking all nuts, bolts, and screws, tightening securely any that may have worked loose. Be careful not to overtighten any component, and make sure of the torque wrench settings given in the Specifications Section of the various Chapters of this Manual to ensure that this does not happen. If any fastener is found repeatedly to be loose, the reason must be discovered and the fault rectified.

Using a spout-type oil can, proceed again around the machine, apply a few drops of oil to all control cables and operating linkages, and to all stand pivots. Ensure that all cable end nipples and any exposed adjuster threads are also lightly lubricated. Similarly, use a water dispersant lubricant such as WD40 to protect and lubricate all exposed electrical components such as the horn and stop lamp switches. Use the long plastic nozzle supplied with the aerosol can to lubricate the internal contacts of the handlebar switches, ignition switch and the seat lock. The above checks are an essential part of the routine maintenance procedure, and play an important role in preserving the smooth and safe operation of the handlebar controls and in offsetting the effects of wear and corrosion.

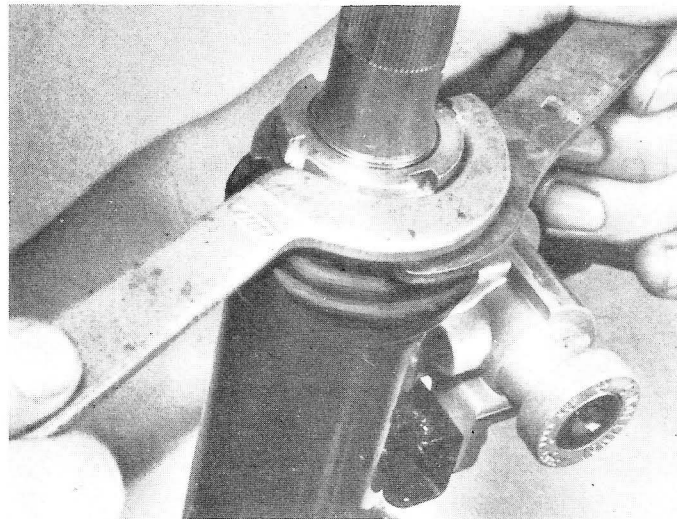
Six monthly, or every 3600 miles (6000 km)

Complete the tasks listed under the 1800 mile/3 monthly heading, then carry out the following operations.

1 Renewing the spark plug

Remove the right-hand side panel, pull off the HT lead and remove the spark plug. Examine the plug, comparing its condition with the colour section in Chapter 3 to gain an idea of the operating conditions inside the engine. The standard fitment is an NGK BPR4HS or NIPPON DENSO W14FPR-UL. If the old plug looks wet, fit an NGK BPR2HS or NIPPON DENSO W9FPR-UL instead, whilst if overheating is indicated, an NGK BPR5HS or NIPPON DENSO W16FPR-UL should be used. If in doubt, ask the advice of a Suzuki Service Agent on this point.

Before fitting the new plug, set the electrode gap to 0.6 - 0.8 mm (0.024 - 0.031 in), bending the outer, earth electrode only. Apply a smear of graphite grease to the threads before fitting the plug hand tight plus a quarter turn with the plug spanner. Avoid overtightening.



Set steering head bearings using C-spanners (handlebar assembly removed for clarity)

2 Decarbonising the engine and exhaust system

Due to the lubrication system employed on two-stroke engines there is a surplus of oil present in the combustion chamber which is not completely burned during combustion. This surplus oil creates a relatively rapid build-up of carbon in the combustion chamber, exhaust port, and exhaust system. Regular decarbonising of the engine and exhaust is therefore necessary. The exact interval depends very much on the way in which the machine is used, as an engine which is used on short journeys only, or run at consistently low speeds, will build up carbon deposits at a faster rate, and therefore need more frequent decarbonising, than an engine run at higher speeds or used for longer journeys. It is therefore recommended that the owner carries out a full decarbonising operation every six months, or at the distance specified, until he has acquired enough experience to decide for himself when decarbonising is actually necessary.

The cylinder head, barrel and piston cannot be dismantled until the engine/transmission unit has been removed completely from the frame as described in Chapter 1. The exhaust system, air filter, carburettor and fan cowlings must be detached as described in Section 6. The engine top half can then be dismantled as described in Section 7 for cleaning and checking for wear.

Once the exhaust has been detached it can be cleaned most easily using a solution of caustic soda. Scrape any carbon deposits out of the tailpipe and plug it with a cork or wooden bung, being careful to ensure that the bung can be withdrawn when necessary. Suspend the exhaust system from a convenient point by passing rope through its mounting brackets. Pour caustic soda crystals gradually into a container of fresh water, stirring gently, until a mixture ratio of 3 lbs of caustic soda to 1 gallon of water is achieved. Never add water to the crystals or the solution will get very hot and perhaps boil. Pour the mixture into the system until it is completely full, then place the system in a well ventilated area and leave it for as long as possible, at least overnight, so that the mixture has time to dissolve all the carbon deposits. When ready, pour out the solution and flush the system with clean fresh water, having unplugged the tailpipe.

The above method is by far the most effective cleaning process that can be applied by the private owner; the only alternative is to burn out the carbon deposits using a welding torch, but this requires a great deal of skill and knowledge as well as the equipment.

Note however that *caustic soda is a very dangerous chemical*, especially at the recommended strength. Always wear full protective clothing, particularly eye protection. If any solution touches skin or clothing it must be washed clear with plenty of fresh water, but if any is swallowed or comes into contact with the eyes, medical advice should be sought *immediately*. Take the greatest care when handling the crystals or the solution. Also, never allow any alloy casting near the solution; caustic soda reacts violently with aluminium alloy and will do serious damage if spilt on to an engine casting.

Finally, examine closely the outside of the exhaust. Any signs of corrosion must be removed by rubbing back to the bare metal and repainting with a good quality heatproof paint. Any good motorcycle dealer should be able to recommend a suitable brand; the best are generally those which must be baked on. If corrosion is not cured at the earliest opportunity, the exhaust system will rot and will have to be renewed.

3 Changing the transmission oil

To prevent the risk of damage or increased wear of the transmission components, the transmission oil must be changed at regular intervals before it deteriorates to the point where it is no longer effective as a lubricant.

Warm the engine/transmission up to normal operating temperature by taking the machine on a journey of at least 10 minutes duration; this will thin the oil, causing it to run more freely and making the operation more effective. Stop the machine and place it on its centre stand on level ground, then place a container of at least 650 cc (1.14 pint) capacity underneath the drain plug at the rear of the engine/transmission unit. Remove the oil filler and drain plugs and allow the oil to drain fully.

When draining is complete, examine the condition of the drain plug sealing washer, renewing it if it is damaged or worn, then refit the drain plug, tightening it to a torque setting of 1.8 - 2.8 kgf m (13 - 20 lbf ft). Refill the gearbox with 400 cc (0.70 Imp pint) of good quality SAE 20W/40 engine oil and tighten securely the filler plug.

Start the engine and ride the machine around for a few minutes to ensure that the oil is fully distributed throughout the transmission, then

stop the engine and check the transmission oil level as described under the three monthly/2000 mile service heading. Refit the level plug, tightening it securely, then wipe away any surplus oil.

4 Checking and lubricating the control cables

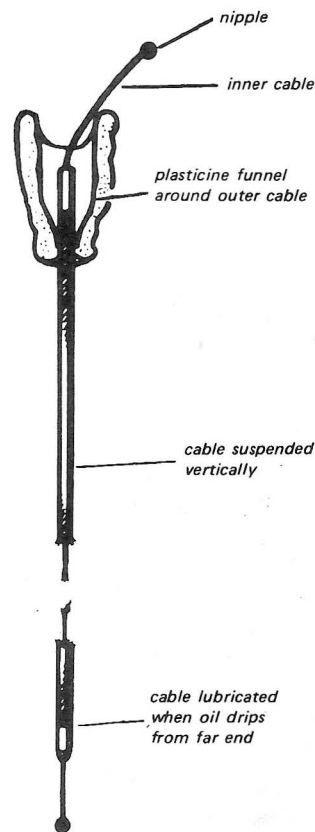
Although the previous checks will ensure that the control cables are lubricated and maintained in good order, a positive check should be made on each cable at this mileage/time interval to ensure that any faults will not develop unnoticed to the point where smooth and safe control operation is impaired. Check the outer cables for signs of damage, then examine the exposed portions of the inner cables. Any signs of kinking or fraying will indicate renewal is required. To obtain maximum life and reliability from the cables, they should be thoroughly lubricated. To do the job properly and quickly use one of the hydraulic cable oilers available from most motorcycle shops. Free one end of the cable and assemble the cable oiler as described by the manufacturer's instructions. Operate the oiler until oil emerges from the lower end, indicating that the cable is lubricated throughout its length. This process will expel any dirt or moisture and will prevent its subsequent ingress.

If a cable oiler is not available, an alternative is to remove the cable from the machine. Hang the cable upright and make up a small funnel arrangement using plasticine or by taping a plastic bag around the upper end. Fill the funnel with oil and leave it overnight to drain through. Note that where nylon-lined cables are fitted, they should be used dry or lubricated with a silicone-based lubricant suitable for this application. On no account use ordinary engine oil because this will cause the liner to swell, pinching the cable.

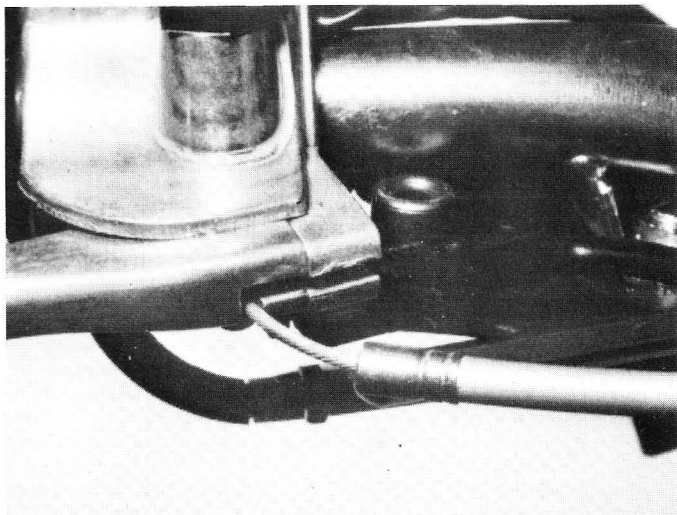
Check all pivots and control levers, cleaning and lubricating them to prevent wear or corrosion. Where necessary, dismantle and clean any moving part which may have become stiff in operation.

When refitting the cables, ensure that they are routed in easy curves and that full use is made of any guide or clamps that have been provided to secure the cable out of harm's way. Adjustment of the individual cables is described under previous Routine Maintenance tasks or in the relevant Sections of Chapter 2 (throttle) and Chapter 5 (brake).

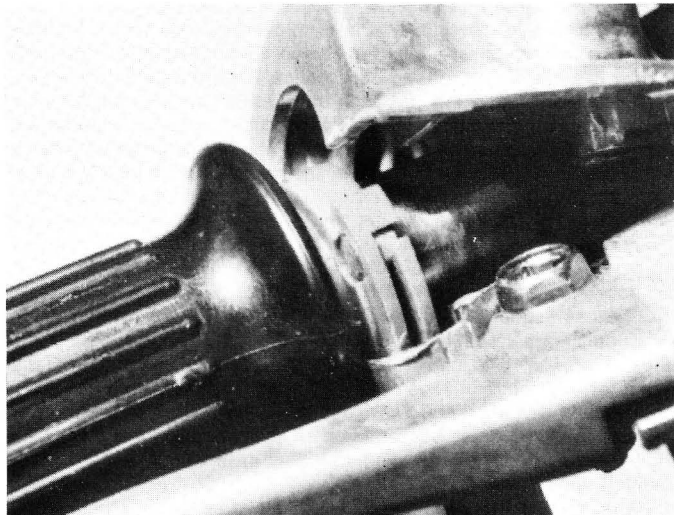
Be very careful to ensure that all controls are properly adjusted and are functioning correctly before taking the machine out on the road.



Oiling a control cable



Disengage cables at upper end for lubrication



Separate twistgrip housing as shown and grease drum and cable groove

Yearly, or every 7200 miles (12 000 km)

Complete the tasks listed under the previous headings, then carry out the following operations.

1 *Cleaning the carburettor*

Suzuki recommend that the carburettor is removed and dismantled for cleaning at every 8000 mile service interval. This should only be necessary if there is real evidence of fuel contamination, or if the performance of the machine is thought to be affected by a fault in carburation.

Evidence of fuel contamination will be found in the fuel tap filter element. Full details of servicing the carburettor may be found in Chapter 2 of this Manual.

2 *Greasing the steering head bearings*

Although the steering head bearings are checked and adjusted every three months or 2000 miles (3000 km) they should also be

dismantled and repacked with new grease at yearly intervals, assuming that this has not been done before during the course of Routine Maintenance or accident damage repairs. For further information, refer to Chapter 4.

3 *Greasing the throttle twistgrip*

Remove the screws which retain the two halves of the throttle twistgrip assembly. Disengage the throttle cable and remove the twistgrip drum for cleaning. Before refitting the assembly, grease the inside of the drum and the cable groove. Check the operation of the throttle and reset the throttle cable free play.

4 *Greasing the brake cams and speedometer drive*

These components must be dismantled as described in Chapter 4 and Chapter 5. Since the brakes must be dismantled, take the opportunity to examine them carefully, also the wheel bearings and suspension components. Renew any worn components and ensure that all components (where applicable) are lubricated with grease on reassembly.

Chapter 1 Engine and transmission

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Specifications

Engine

Type	Single cylinder fan-cooled two-stroke
Bore	41.0 mm (1.61 in)
Stroke	37.4 mm (1.47 in)
Capacity	49 cc (2.99 cu in)
Compression ratio	7.2:1

Cylinder head

Type	Cast alloy
Maximum warpage	0.05 mm (0.0020 in)

Cylinder barrel

Standard bore size	41.000 – 41.015 mm (1.6142 – 1.6148 in)
Service limit	41.070 mm (1.6169 in)

Piston

Diameter	40.935 – 40.950 mm (1.6116 – 1.6122 in)
Service limit	40.880 mm (1.6095 in)
Piston/cylinder clearance	0.060 – 0.070 mm (0.0023 – 0.0028 in)
Service limit	0.120 mm (0.0047 in)
Gudgeon pin bore	10.002 – 10.010 mm (0.3938 – 0.3941 in)
Service limit	10.030 mm (0.3949 in)
Gudgeon pin diameter	9.995 – 10.000 mm (0.3935 – 0.3937 in)
Service limit	9.980 mm (0.3929 in)

Piston rings

End gap (installed)	0.10 – 0.25 mm (0.0039 – 0.0098 in)
Service limit	0.75 mm (0.0295 in)
End gap (free)	Approx. 4.5 mm (0.177 in)
Service limit	3.6 mm (0.1417 in)
Ring/groove clearance	0.020 – 0.060 mm (0.0008 – 0.0024 in)

Crankshaft and connecting rod

Connecting rod small-end diameter	14.003 – 10.011 mm (0.5513 – 0.3941 in)
Service limit	14.040 mm (0.5528 in)
Connecting rod max. deflection (measured at small-end)	3.0 mm (0.118 in)
Connecting rod maximum runout	0.05 mm (0.0020 in)
Width across flywheels	38.0 ± 0.1 mm (1.4961 ± 0.0039 in)

Transmission

Type	Two-speed automatic operated by centrifugal clutches
Primary reduction ratio	2.857:1 (40/14)
Gear ratios:	
Low	5.786:1 (81/14)
Top	3.735:1 (40/57 x 46/50 x 81/14)
Drive chain:	
Make	DID
Type	270
Number of links	78
Max. length of 20 links	173.0 mm (6.811 in)
Clutch No.1:	
Type	Centrifugal expanding shoe, in oil bath
Function	Initial engagement in Low gear
Engagement commences at	2500 ± 200 rpm
Full lock-up at	3500 ± 200 rpm
Drum ID	100.00 – 100.15 mm (3.937 – 3.943 in)
Service limit	100.50 mm (3.957 in)
Spring free length	Not available
Service limit	32.5 mm (1.2795 in)
Clutch No.2:	
Type	Centrifugal expanding shoe, in oil bath
Function	Change from Low to Top gear
Gearchange point	18 ± 2 kph (11.2 ± 1.24 mph)
Drum ID	116.00 – 116.15 mm (4.567 – 4.573 in)
Service limit	116.50 mm (4.587 in)
Spring free length	Not available
Service limit	38.0 mm (1.4961 in)

Torque wrench settings

Component	kgf m	lbf ft
Engine mounting nut	2.4 – 4.0	18.0 – 30.0
Engine mounting bracket bolts:		
A (upper bolt)	2.5 – 4.0	18.0 – 30.0
B (lower bolt)	2.0 – 3.0	14.5 – 22.0
Rear axle shaft nut (1h)	3.0 – 3.5	22.0 – 25.0
Kickstart driven gear nut	5.0 – 6.0	36.0 – 43.0
Generator stator screws	0.3 – 0.6	2.2 – 4.3
Generator rotor nut	3.5 – 4.3	25.0 – 31.0
Cylinder head nut	0.8 – 1.2	5.8 – 8.7
Kickstart lever bolt	0.8 – 1.2	5.8 – 8.7
Spark plug	2.5 – 3.0	18.0 – 22.0
Oil drain plug	1.8 – 2.8	13.0 – 20.3

1 General description

The Suzuki CL50 models are available in two forms. The basic CL50 has a 6 volt electrical system with kick starting, whilst the CL50D is equipped with an additional electric starter and has a 12 volt electrical system. In other respects the two models are identical.

The engine and transmission components are built in unit, the left-hand crankcase half and the transmission housing being incorporated in one casting. A detachable crankcase right-hand half completes the crankcase in which is housed the pressed-up crankshaft assembly, carried on a journal ball main bearing at each end. Needle roller bearings are fitted at the connecting rod big-end and small-end.

The engine is of the single cylinder two-stroke type, the barrel and cylinder head being of light alloy. The former incorporates a steel liner in which the bore surface is machined. The cylinder assembly is shrouded by ducting through which cooling air is forced by a crankshaft-mounted fan.

The protruding right-hand end of the crankshaft carries the flywheel generator assembly and cooling fan, these being covered by a louvred plastic shroud. The left-hand end of the crankshaft projects through the main bearing into the transmission case.

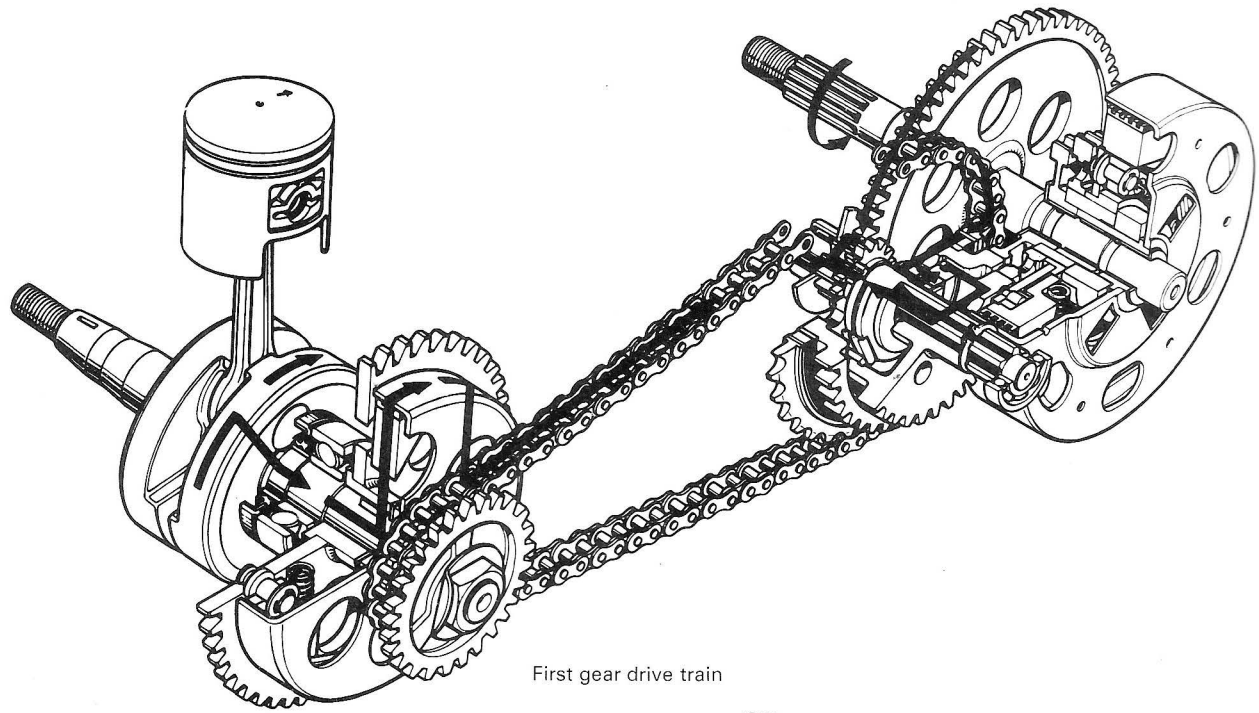
The transmission system is automatic in operation, and although rather complex at first sight is really quite simple, once understood.

The arrangement is described below to facilitate work on the transmission components.

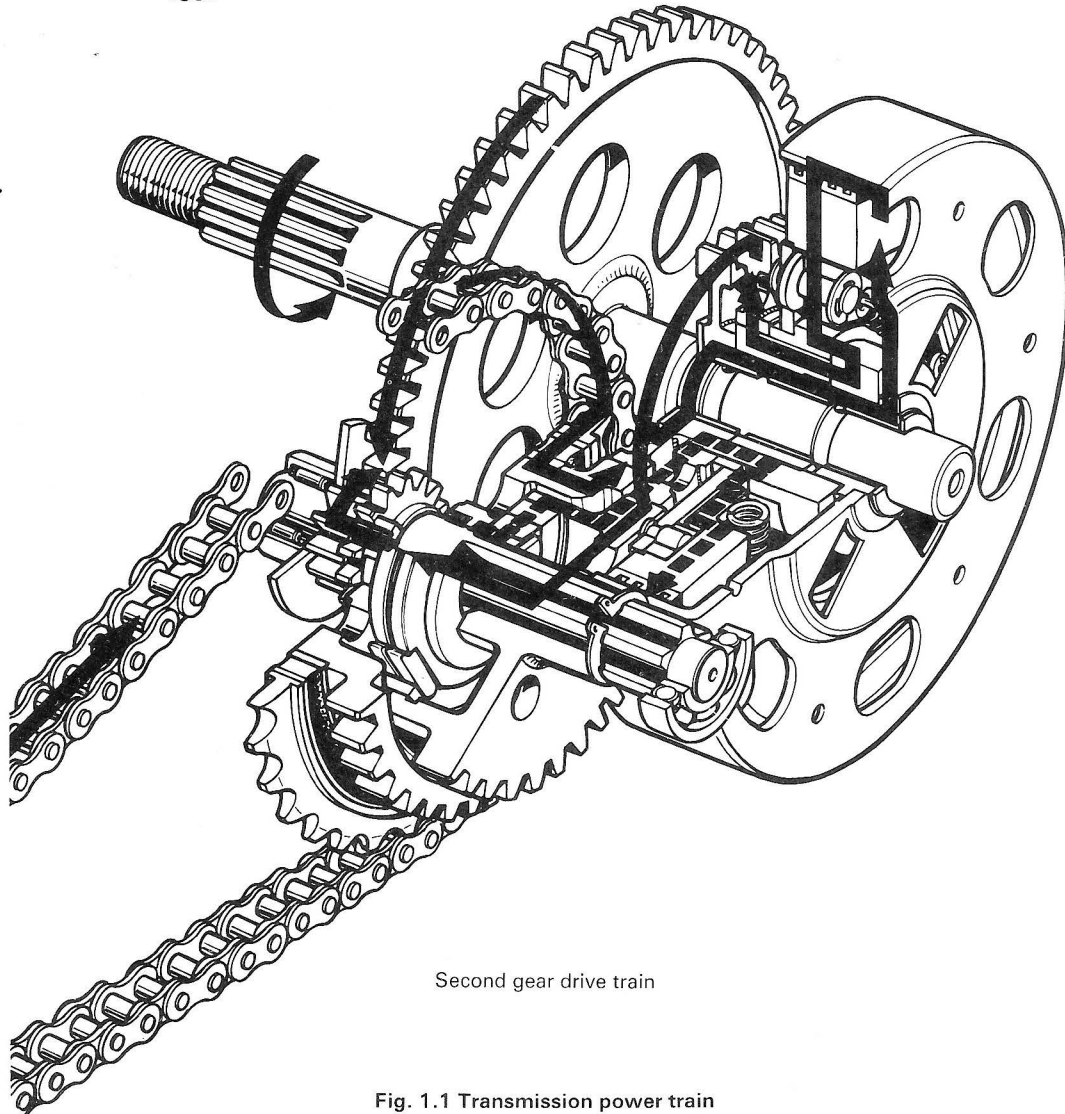
The transmission is two-speed, its operation being controlled by two centrifugal clutches. The first of these is mounted on the end of the crankshaft and is designed to engage drive between the crankshaft and the transmission when the engine reaches a certain speed.

As the engine speed is raised from idle speed, shoes in the 1st gear clutch are thrown outwards by centrifugal force and against spring pressure until they begin to bear on the clutch drum. The drum and the drive sprocket thus begin to turn, and this motion is conveyed to the driven sprocket by way of a chain. Power is fed through a one-way clutch housed in the top driven gear to the drive shaft and the final driven gear. This in turn drives the rear axle shaft and thus the rear wheel.

With the machine now moving, the second (2nd gear) clutch on the rear axle shaft begins to turn. At a predetermined road speed, the 2nd gear clutch engages, overriding the 1st gear drive which idles by way of the one-way clutch. Power is now transmitted through the top gears, allowing engine speed to fall in relation to the road speed. The machine will normally remain in top gear unless it slows on a steep hill or in traffic, in which case 1st gear will be selected automatically once more. The power train in each of the two ratios can be seen in the accompanying line drawings.



First gear drive train



Second gear drive train

Fig. 1.1 Transmission power train

2 Operations with the engine/transmission unit in the frame

The following items can be overhauled with the engine/transmission unit in the frame. Note that access to the components marked * is rather limited. It is possible to arrange the machine so that it is supported with the rear wheel clear of the ground by about a foot or so. If the necessary wiring and hoses are disconnected, the rear suspension unit lower mounting bolt can be freed to allow the unit to drop down at the rear. In view of the complexity of this approach when compared to full engine removal, it is recommended that the latter option is the better of the two, offering easier access to all areas of the unit.

- a) Exhaust system and air filter
- b) Flywheel generator
- c) Starter motor (where fitted)
- d) All transmission components
- e) Kickstart mechanism
- f) *Carburettor
- g) *Reed valve assembly
- h) *Engine cowlings
- i) *Cylinder head, barrel and piston

3 Operations with the engine/transmission unit removed from the frame

As will be seen from Section 2, it is possible to attend to all but the crankshaft and main bearings with the unit installed. It is recommended, however, that where several operations are to be undertaken simultaneously, the engine should be removed to gain better access and more comfortable working conditions. Removal is easily accomplished by one person and should take about half an hour.

4 Removing the engine/transmission unit from the frame

1 Place the machine on its centre stand on level ground, leaving plenty of room to work on each side and to the rear. Drain the transmission oil into a suitable container, noting that it must hold about 500 cc (0.8 Imp pint). The oil will drain more quickly and completely if the engine is at or near operating temperature. The drain plug is located at the rear underside of the transmission casing. While the oil is draining, remove the body panels to gain access to the engine area as described below, then refit the drain plug for safe keeping.

2 Set aside a safe place to store the panels; they are all plastic mouldings and easily scratched or damaged if mishandled. In all cases take great care not to snap off the small location lugs which hold each section in contact with the next. In most cases it will be necessary to bend each panel slightly to free it. Do not use excessive force and distort the panel no more than is necessary to free it. See photographs in Chapter 4 for further information.

3 Remove the single cross-head screw below the seat and disengage the centre section. Carefully disengage the side panels, noting that they are held by projections which pass through grommets in the footboard lugs and are also located by lugs against the main frame moulding and the footboard.

4 The footboard assembly is secured by four bolts to the frame lower members. Start by removing the rear left-hand bolt, noting that the nut on its underside should be held with a spanner while it is unscrewed. Remove the remaining bolts, then lift the rear of the footboard and pull it back to free the location lugs on its front edge.

5 Open the seat and disconnect both battery leads. Trace the oil feed pipe back to the oil tank outlet. Before disconnecting the pipe it will be necessary to devise some means of plugging the tank outlet. The best method is to use about an inch or so of tubing blocked at one end with a bolt or screw. If necessary, a section of the battery tray drain tube can be used. Pull off the oil tank pipe and push the short section of tubing over the stub.

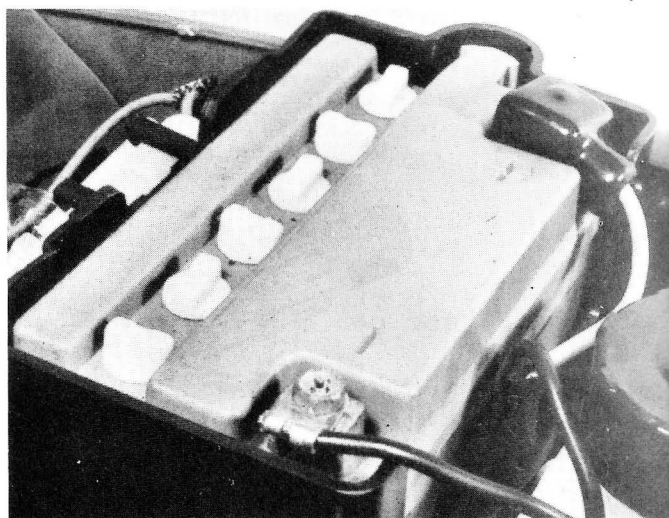
6 Disconnect the spark plug HT lead and lodge it clear of the engine. Free the vacuum transmitting valve (VTV) from its frame clip. The VTV is a small cylindrical component attached at each end by a length of tubing and mounted just forward of the carburettor.

7 Moving to the right-hand side of the machine, disconnect the generator wiring at the multi-pin connector. Remove the fan shroud bolt which secures the engine earth lead. On CL50D models only, separate the starter motor lead connector.

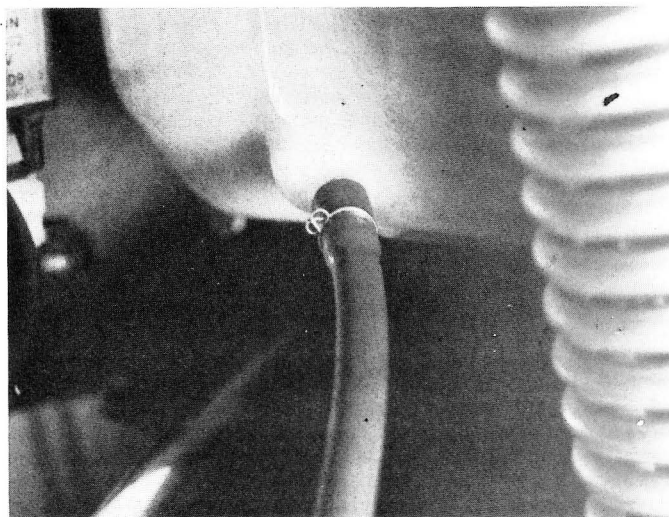
8 Free the fuel and vacuum pipes from the carburettor. Each is secured by a small clip, the 'ears' of which should be squeezed together and slid along the pipe. The pipe can then be worked off its stub, using a small screwdriver. Unscrew the carburettor top and withdraw the throttle valve assembly, lodging it clear of the engine.

9 Slacken and remove the rear brake adjuster from the end of the operating arm and disengage the cable. Remove the screw and nut which retain the brake cable guide to the underside of the transmission casing to free the cable outer. Note that the bolt also retains the centre stand and should not be removed.

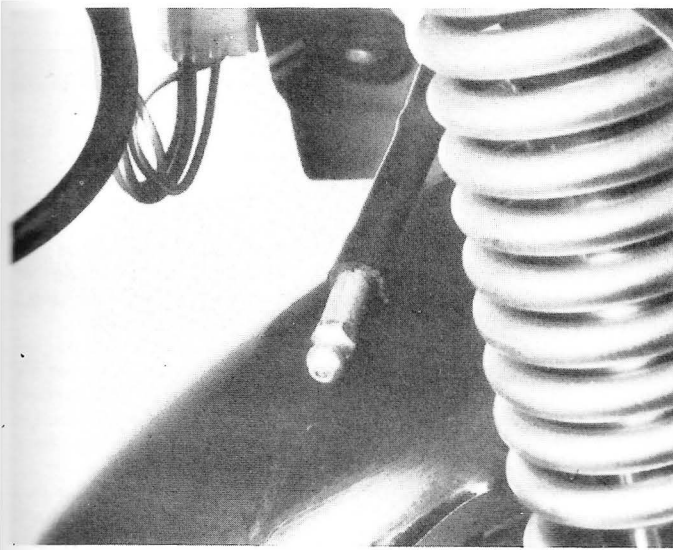
10 Place some wooden blocks beneath the frame, just forward of the engine mounting, so that the machine is raised very slightly. Slacken and remove the rear suspension unit lower mounting bolt and lower the rear wheel to the ground. Remove the engine mounting nut and bolt to free the engine/transmission unit. Note that the engine mounting hooks over the rubber-bushed bolt, which need not be removed. Manoeuvre the assembly back, then lift it clear of the frame. Check that the latter is secure on its blocks, then place the unit on the workbench to await further dismantling.



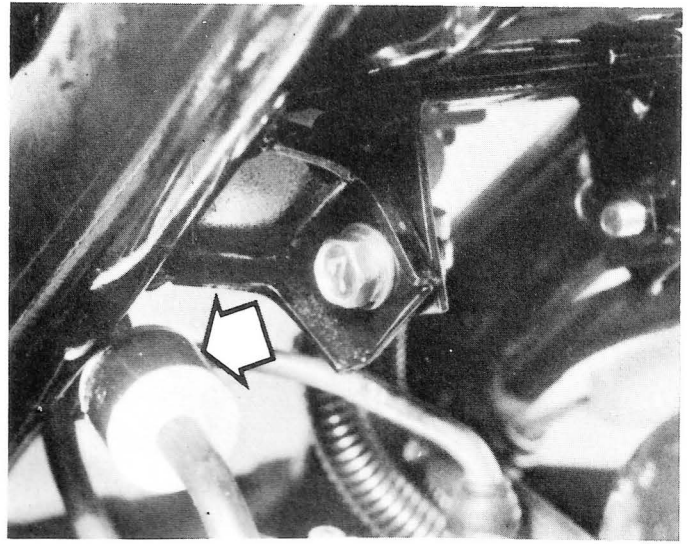
4.5a Disconnect battery leads to avoid accidental short circuits



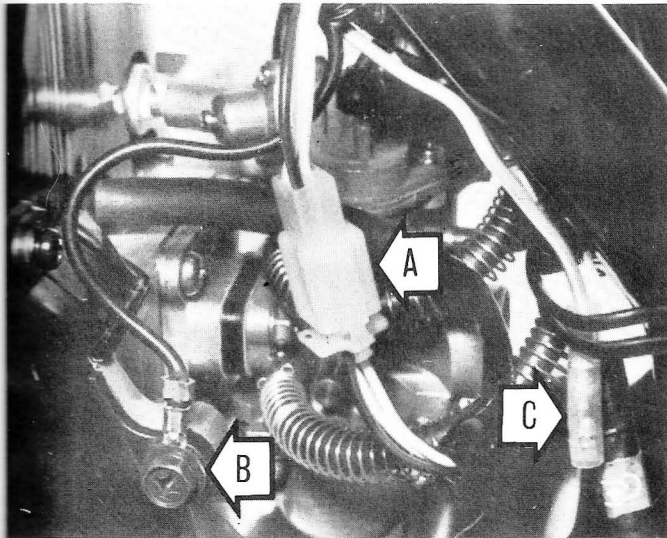
4.5b Displace clip and pull off the oil tank pipe ...



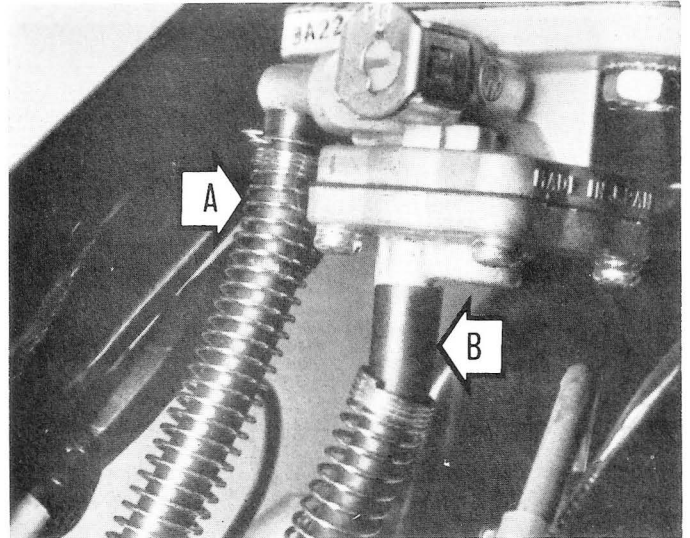
4.5c ... using short plugged length to contain oil



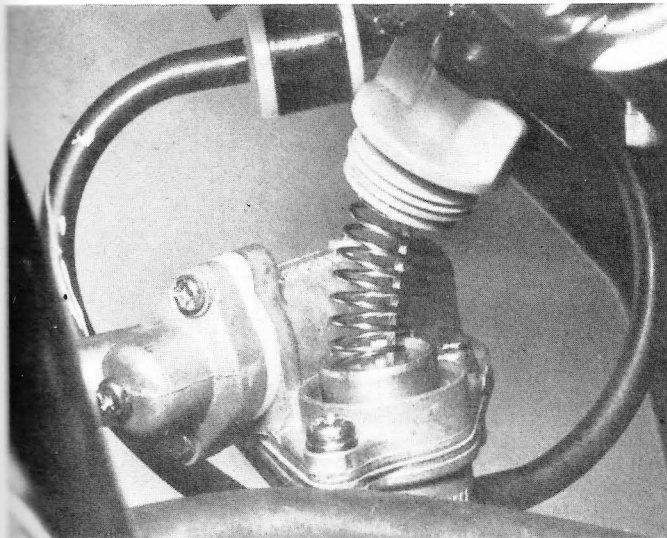
4.6 Free the vacuum transmitting valve (arrowed) from its frame strap



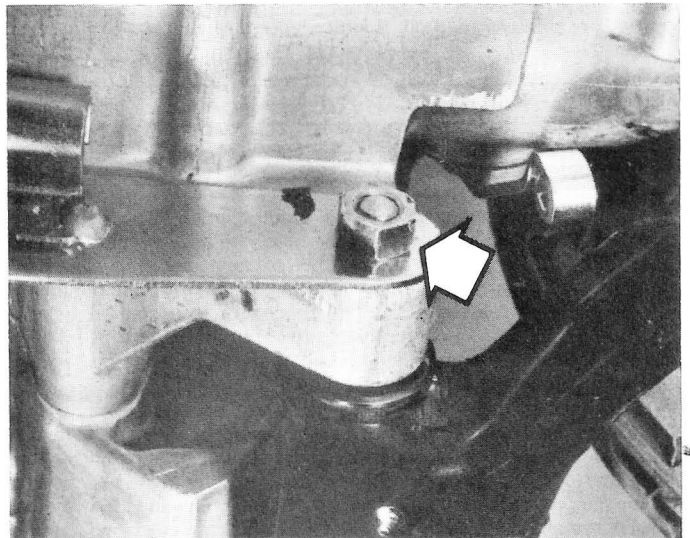
4.7 Disconnect generator wiring (A), engine earth terminal (B) and starter motor lead (C) where appropriate



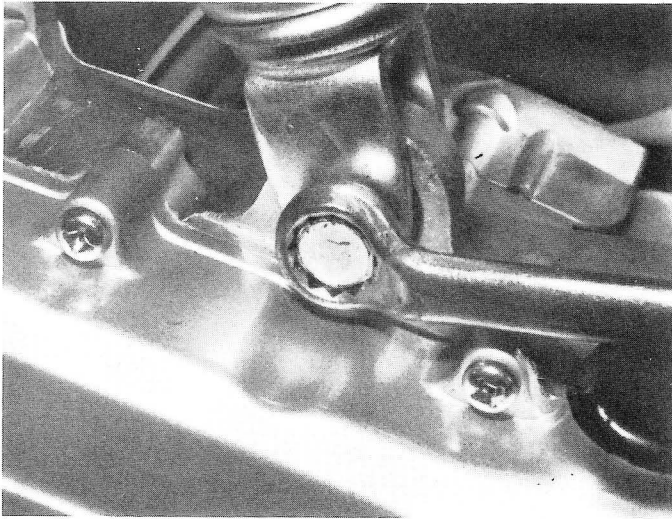
4.8a Remove fuel pipe (A) and vacuum pipe (B) at the fuel tap



4.8b Unscrew plastic carburettor top and withdraw valve assembly



4.9 When removing cable guide, unscrew nut only – **do not** remove stand bolt



4.10 Support frame with wooden blocks, then release rear suspension unit lower mounting bolt

5 Dismantling the engine/transmission unit: preliminaries

1 Before any dismantling work is undertaken, the external surfaces of the unit should be thoroughly cleaned and degreased. This will prevent the contamination of the engine internals, and will also make working a lot easier and cleaner. A high flash point solvent, such as paraffin (kerosene) can be used, or better still, a proprietary engine degreaser such as Gunk. Use old paintbrushes and toothbrushes to work the solvent into the various recesses of the engine castings. Take care to exclude solvent or water from the electrical components and inlet and exhaust ports. The use of petrol (gasoline) as a cleaning medium should be avoided, because the vapour is explosive and can be toxic if used in a confined space.

2 When clean and dry, arrange the unit on the workbench, leaving a suitable clear area for working. Gather a selection of small containers and plastic bags so that parts can be grouped together in an easily identifiable manner. Some paper and a pen should be on hand to permit notes to be made and labels attached where necessary. A supply of clean rag is also required.

3 Before commencing work, read through the appropriate section so that some idea of the necessary procedure can be gained. When removing the various engine components it should be noted that great force is seldom required, unless specified. In many cases, a component's reluctance to be removed is indicative of an incorrect approach or removal method. If in any doubt, re-check with the text.

6 Dismantling the engine/transmission unit: removing the ancillary components

1 Depending on the areas to be worked upon, it will first be necessary to remove some or all of the following ancillary parts. In the case of a full engine overhaul, the exhaust system, air filter, carburettor, reed valve unit, engine cowlings and the engine mounting bracket must be released, and this procedure is described below. Where only one or two components are to be attended to it follows that the preliminary dismantling can be confined to those operations necessary to gain access.

2 Slacken the hose clip which retains the air filter hose to the carburettor. Release the two screws which hold the filter body to the transmission casing, then lift away the filter and hose. Remove the single bolt which secures the silencer body to the engine near to the fan cowling. Release the two exhaust port flange nuts and lift away the exhaust system.

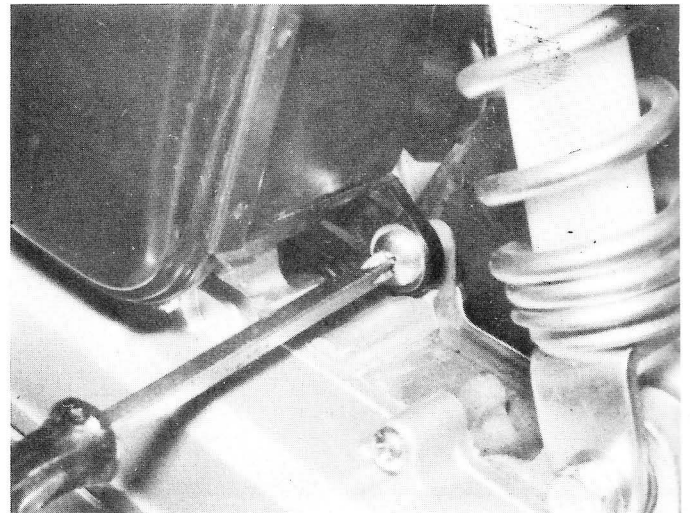
3 Unscrew the five remaining fan cowling screws and lift the fan cowling clear of the unit. Remove the two screws which secure the cooling fan to the generator rotor and lift it away. Remove the three

nuts which retain the metal cylinder head cowlings section to the cylinder head, lift away the metal strip, then remove the cowlings.

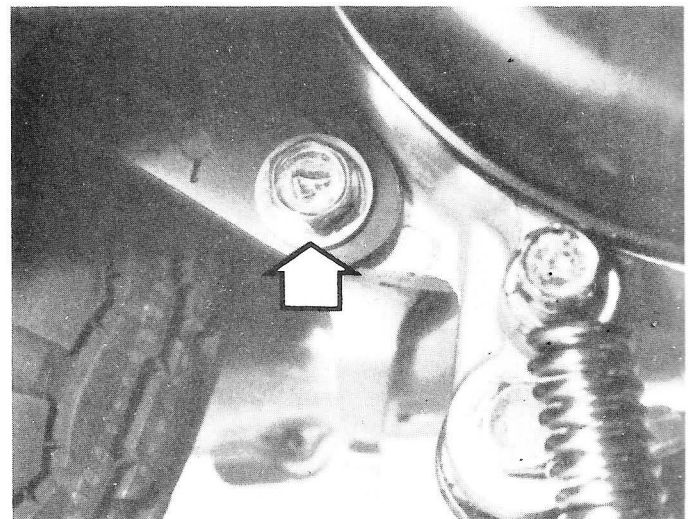
4 Slacken the two screws which retain the carburettor to its mounting flange. Note that one of these is partly hidden behind the carburettor body but can be reached by passing a screwdriver through the access hole provided. Lift away the carburettor complete with the vacuum transmitting valve (VTV) and its hoses attached. As the carburettor is lifted clear, note that the copper heat transfer bar may drop free. Keep this with the carburettor and take care **not** to wipe off the special heat conductive grease which coats it; unless you have a supply of this substance it will be needed during reassembly.

5 The reed valve unit to which the carburettor is attached bridges the crankcase joint and must be removed if the crankcase halves are to be separated. The four retaining screws will be tight and are best removed using an impact driver to avoid damage to their heads. Lift away the reed valve unit, then pack the opening with lint-free rag to prevent the ingress of dirt.

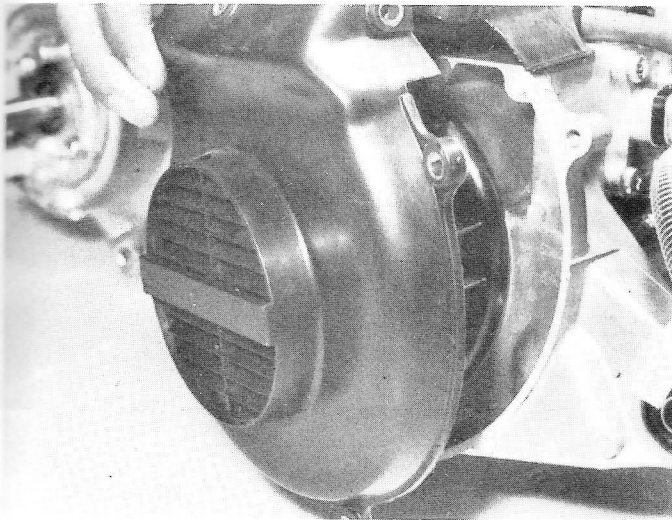
6 Unscrew the engine mounting pivot bolt nut and tap the bolt through to free the mounting. If corrosion has formed between it and the inner metal sleeve of the bonded rubber bushes, try soaking in penetrating fluid (WD 40 or similar), leaving it for an hour or so before attempting removal.



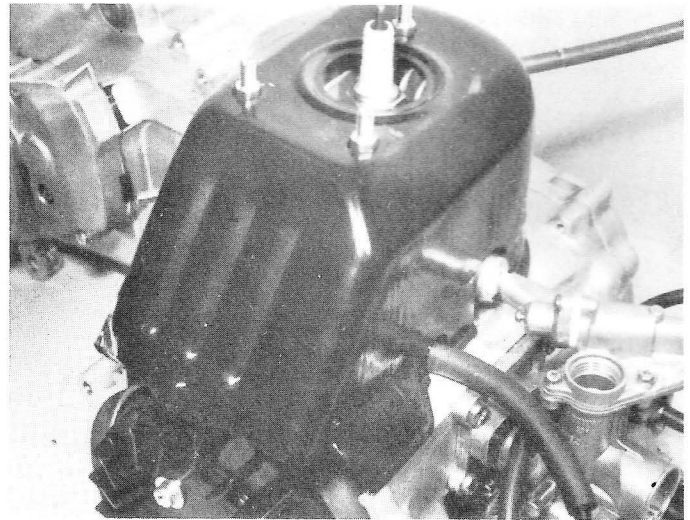
6.2a Disconnect hose and mounting screws and lift filter assembly away



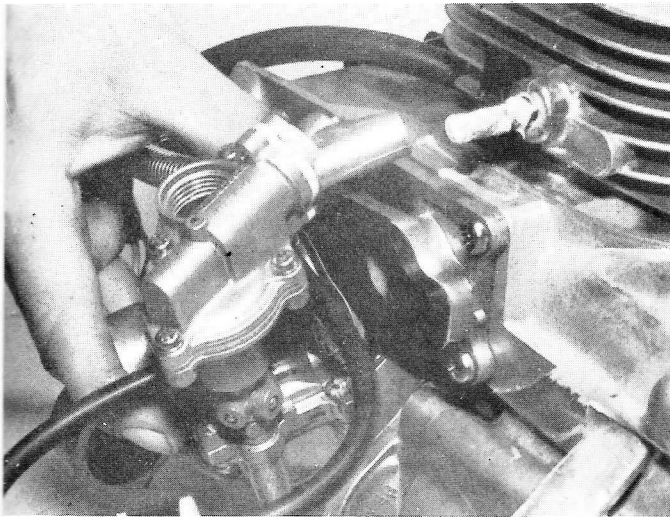
6.2b Release single bolt (arrowed) and flange nuts to free exhaust system



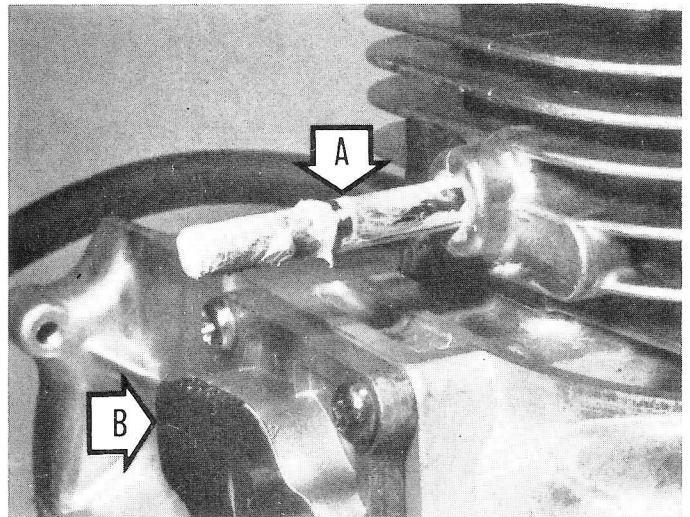
6.3a Remove fan cowling screws and lift it away



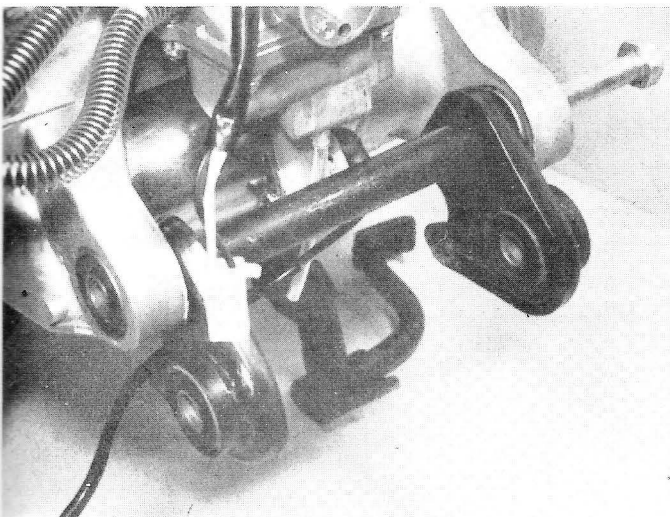
6.3b Remove nuts and metal strip, then lift cylinder cowling clear



6.4a Release carburettor mounting screws and lift instrument away



6.4b Remove heat transfer bar (A) then remove reed valve (B)



6.6 Remove pivot bolt and lift away engine mounting

7 Dismantling the engine/transmission unit: removing the cylinder head, barrel and piston

1 To gain access to the cylinder head, barrel and piston, it will first be necessary to remove the fan cowling and the cylinder head cowling, the carburettor and heat transfer bar and the exhaust system. These operations are described in Section 6.

2 Working in a diagonal sequence, gradually slacken the four cylinder head nuts by a quarter turn at a time to prevent warpage of the head casting. When all four nuts are loose, run them off the studs. Lift the cylinder head off the holding studs and remove the head gasket. If the head is stuck on its gasket do not be tempted to lever between the head and barrel; this usually results in damaged fins. Tap around the edge of the head using a hide mallet or a hammer and a wooden block to jar it loose.

3 Hold the barrel down against the crankcase and turn the generator rotor until the piston is at the top of its stroke. Lift the barrel by about an inch, then pack some clean rag into the crankcase mouth. This will prevent any debris from entering the crankcase as the barrel is removed. Continue lifting the barrel, supporting the piston as it emerges from the bore.

4 Using an electrical screwdriver, prise out one of the gudgeon pin circlips by way of the slots provided in the piston wall. Push out the gudgeon pin from the opposite end until it clears the small-end bush,

then lift the piston away. If the pin proves to be tight in the piston, try warming it by applying a rag soaked in near-boiling water. In the unlikely event that this fails to expand the piston sufficiently to release its grip on the pin, use a drawbolt arrangement as shown in the accompanying line drawing to extract the pin.

5 Displace the small-end bearing and store it with the piston. The old circlips should be renewed as a matter of course; they are inexpensive items but can cause extensive damage if they drop free

when the engine is running.

6 The piston rings can be removed by gently spreading their ends with the thumbs and sliding them off the piston. Care should be taken not to break the rings; they are made of cast iron which is brittle and easily fractured if spread too far. A safe method, and one which can be used to remove rings which have become gummed in their grooves, is to use thin metal strips as shown in the accompanying illustration. Keep the rings separate and in their original positions after removal.

Fig. 1.2 Cylinder head and barrel

- 1 Cylinder head
- 2 Cylinder head gasket
- 3 Nut - 4 off
- 4 Spark plug
- 5 Cylinder barrel
- 6 Cylinder base gasket
- 7 Stud - 4 off
- 8 Heat transfer bar
- 9 Damping rubber
- 10 Damping rubber

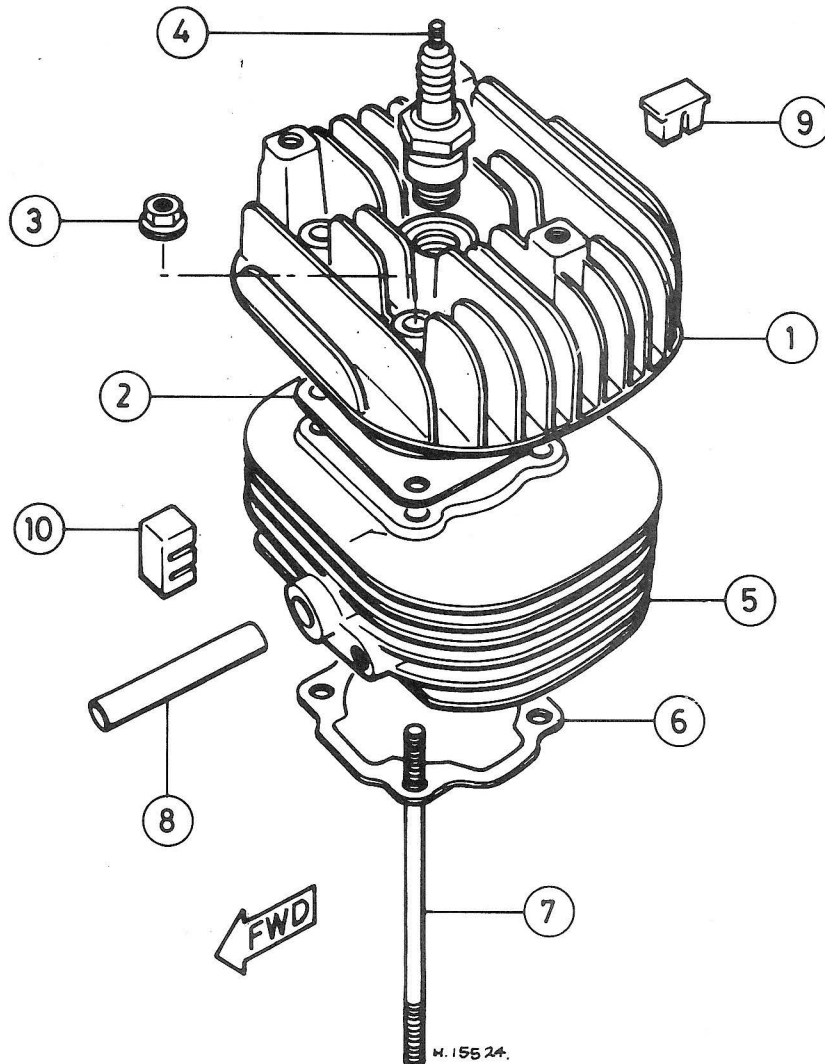
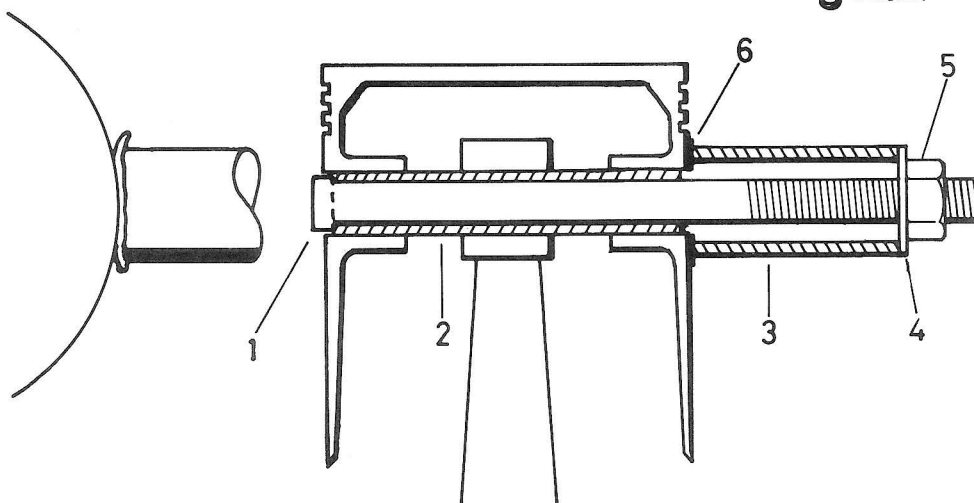
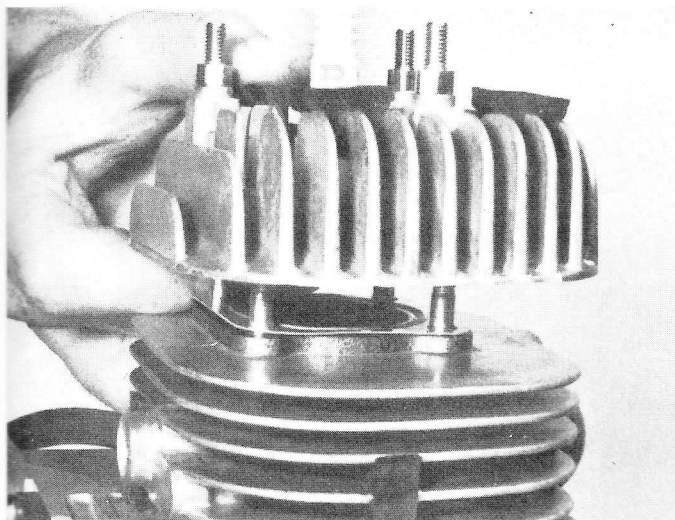


Fig. 1.3 Drawbolt arrangement for removing a tight gudgeon pin

- 1 Drawbolt
- 2 Gudgeon pin
- 3 Tube
- 4 Washer
- 5 Nut
- 6 Rubber washer

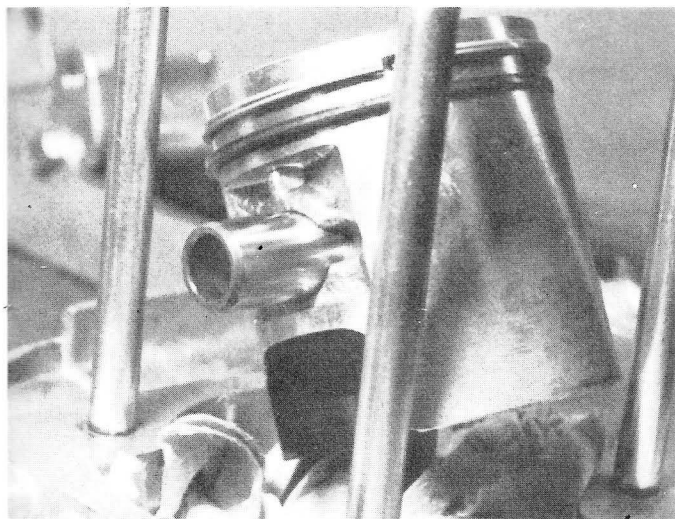




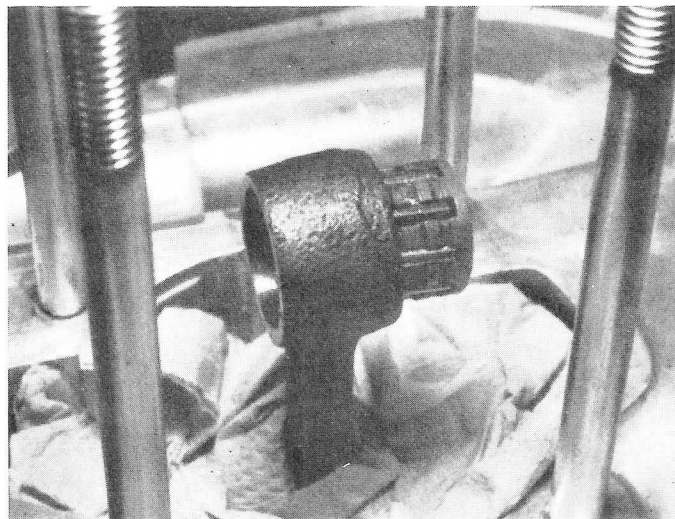
7.2 Unscrew the four cylinder head nuts and remove head. Note that cowl studs are left in position



7.4a Prise out circlip using small screwdriver. Note rag packing in crankcase mouth



7.4b Displace gudgeon pin and remove piston



7.5 Displace the small-end bearing and keep it with piston

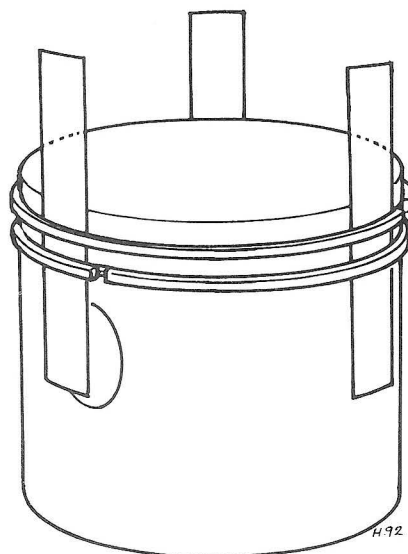


Fig. 1.4 Freeing gummed piston rings

8 Dismantling the engine/transmission unit: removing the flywheel generator

Note: If the engine transmission unit is being overhauled and the transmission components are to be removed at a later stage, it may prove necessary to have the rotor in position as a method of holding the crankshaft. Refer to Section 11 before proceeding further.

1 Access to the flywheel generator requires the removal of the right-hand side panel if the engine/transmission unit is still in the frame. Remove the fan cowl and the fan as described in Section 6.

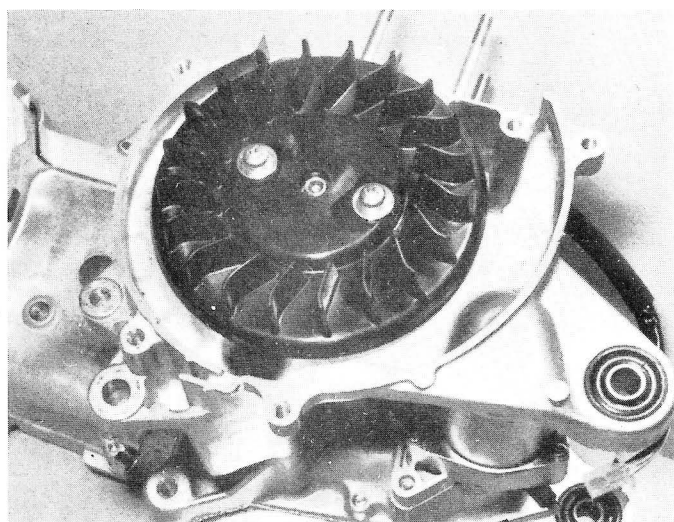
2 Removal of the generator rotor will require the use of two special tools or the alternative methods described below. The appropriate tools can be ordered through a Suzuki Service Agent and are as follows. Part Number 09930-40113, (rotor holder). Part Number 09930-30102 (slide hammer). Part Number 09930-30161 (attachment C).

3 To prevent the rotor from turning whilst the retaining nut is removed, use the rotor holder, or fabricate an equivalent tool from two steel strips fitted with bolts as shown in the accompanying illustration. An alternative method can be employed if the cylinder head, barrel and

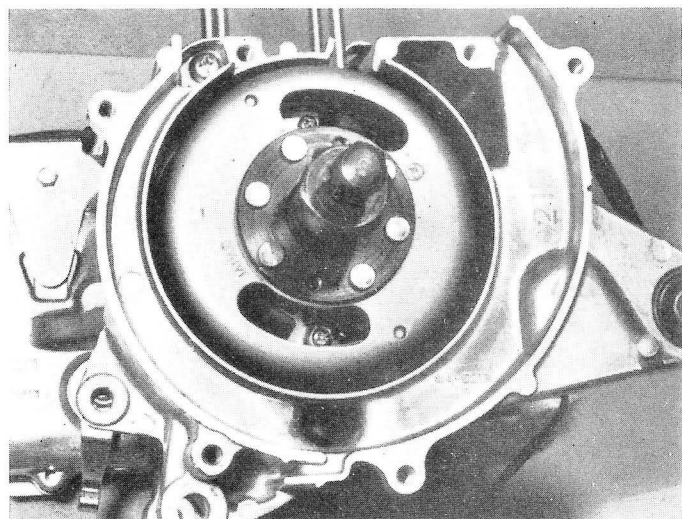
piston have been removed. Pass a smooth metal bar through the connecting rod small-end eye, resting its ends on wooden blocks placed against the crankcase mouth. With the rotor thus locked, slacken and remove the retaining nut.

4 Screw the slide hammer attachment into the thread provided, fit the slide hammer and use this to shock the rotor off the crankshaft taper. Alternatively, use one of the pattern centre bolt flywheel extractors. These have almost universal use on small capacity Japanese two-stroke engines and may be purchased from most motorcycle dealers. Screw the extractor into the rotor thread, tighten the centre bolt firmly and then tap the centre bolt head sharply to free the rotor. Do not use any other method to remove the rotor.

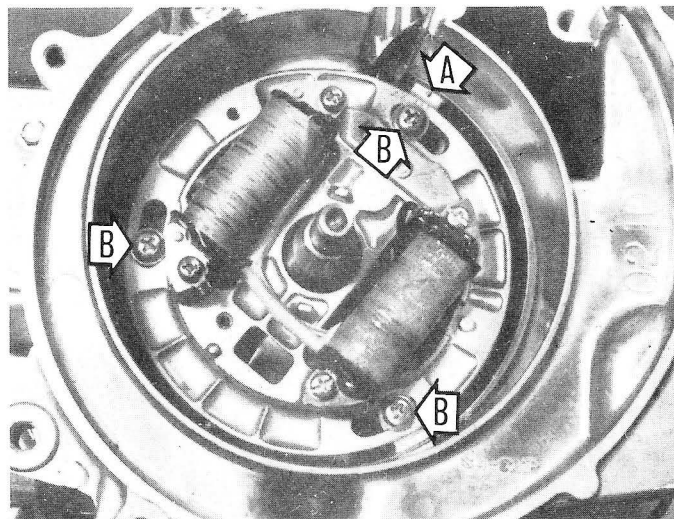
5 Remove the Woodruff key from the crankshaft end and store it with the rotor. Note the position of the index mark between the stator and the adjoining crankcase boss; these should be in alignment, but if this is not the case make a new alignment mark so that the setting can be duplicated during reassembly. Remove the stator screws using an impact driver, and lift the stator away.



8.1 Remove cowling and fan to reveal generator rotor



8.4 Pattern extractor can be used to draw off rotor



8.5 Check timing marks (A) then remove stator screws (B) and lift stator out of casing recess

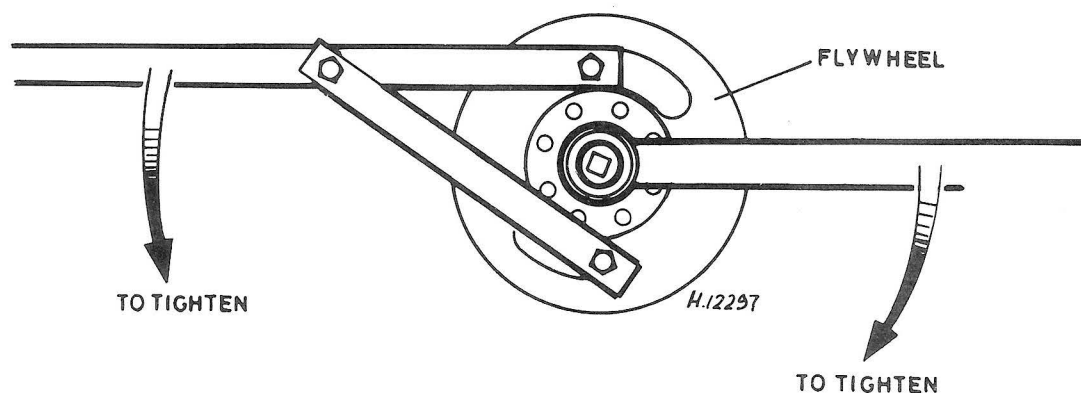


Fig. 1.5 Fabricated rotor holding tool

9 Dismantling the engine/transmission unit: removing the transmission cover

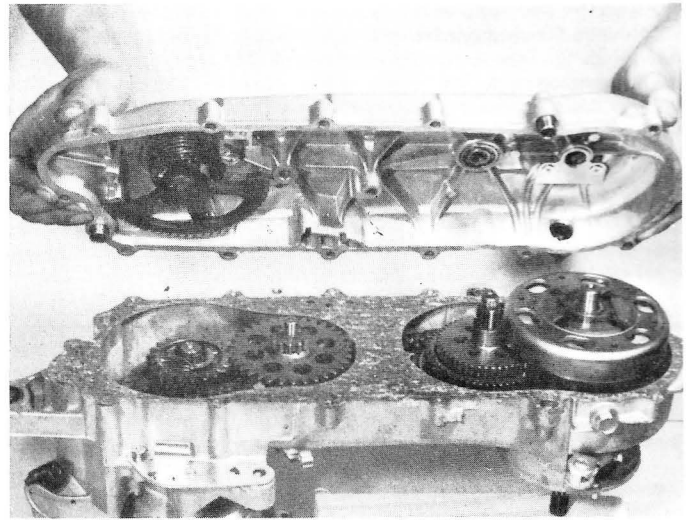
- 1 The transmission cover can be removed with the engine unit in or out of the frame, noting that in the former case it will first be necessary to drain the transmission oil. The side panel and footboard assemblies can be left in position, taking care not to damage them.
- 2 Before the cover is removed, it is recommended that its outline is drawn on a piece of stiff card. Make a hole through the card in the position of each cover screw and push each screw through the card as it is removed. In this way the correct position of the screws is known which will save time during reassembly.
- 3 Slacken and remove the cover screws, using an impact driver to avoid damage to the heads. Tap around the cover joint face with a hide mallet to help break the seal, then lift the cover away. If any shims remain inside the cover, remove them and place them over their respective shafts. Remove and discard the cover gasket, having ensured that a new one is to hand. If the locating dowels are loose, remove them and store them with the cover.

10 Dismantling the engine/transmission unit: removing the kickstart mechanism

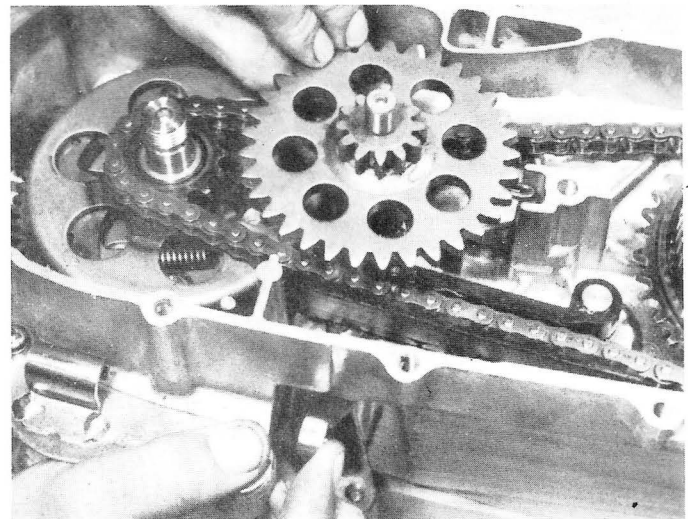
- 1 Access to the kickstart mechanism is gained after the transmission cover has been removed as described in Section 9. The kickstart idler gear assembly (second shaft from the front of the casing) can be withdrawn once the safety interlock lever on the underside of the casing has been pushed forward slightly.
- 2 The kickstart shaft assembly is attached to the inside of the outer cover and should only be removed if specific attention is required. Note that a new oil seal will be required each time it is removed.
- 3 Release the tension on the return spring by grasping its fixed end with snipe-nosed pliers. Remove the retaining screw from the cover, then unhook the spring and allow it to unwind slowly. The spring is under considerable tension and care should be taken to avoid injury or damage as it is released.
- 4 Moving to the outside of the cover, prise out and discard the oil seal, using a small screwdriver. Damage to the seal is inevitable, but take care not to score the seal recess during removal. The shaft retaining circlip is now exposed and can be removed. Push the shaft assembly through the casing bore and lift it away.

11 Dismantling the engine/transmission unit: removing the transmission components

- 1 The transmission components can be removed with the engine unit in or out of the frame. It should be noted, however, that to remove the nut from the crankshaft end will necessitate locking the crankshaft by passing a bar through the small-end eye or by using the rotor holding tool described in Section 8. For this reason the cylinder head, barrel and piston must first be removed, or the rotor left in position. In the case of the former, it is easier if the work is undertaken with the engine unit removed. It will also be necessary to remove the transmission cover (Section 9) and lift out the kickstart idler gear assembly (Section 10).
- 2 Using the accompanying line drawing as an aid to component identification, lift away the 2nd gear clutch drum from the end of the rear wheel stub axle, ensuring that the thrust washer is kept with it. Remove the 2nd gear clutch together with the keyed spacer which precedes it. Remove the top driven gear, idle driven gear and the thrust washer.
- 3 Release the circlip from the end of the drive shaft, then lift away the top driven gear and the large plain thrust washer.
- 4 Flatten the locking washer which secures the kickstart driven gear on the projecting crankshaft end. Place a smooth metal bar through the connecting rod small-end eye, supporting its ends on wooden blocks to protect the crankcase surface. As an alternative, hold the crankshaft by using the rotor holding tool described in Section 8. With the crankshaft locked, slacken and remove the retaining nut, then lift away the locking washer and the gear.
- 5 Grasp the primary drive sprocket and driven sprocket and lift them out of the casing as an assembly, together with the endless drive



9.3 Remove cover screws, tap around joint face and lift cover away. Retain any shims or dowels which drop free



10.1 Push interlock lever forwards, then lift idler gear assembly out of casing

chain. The 1st gear clutch drum is integral with the drive sprocket and will come away with it.

6 Lift off the spacer, thrust washer and the 1st speed clutch from the end of the crankshaft. Prise off the E-clip which retains the white plastic upper chain guide and remove it. Lift out the lower chain guide and the small fibre kickstart stop roller.

7 Slide the oil pump drive gear off the drive shaft and remove the shim which fits behind it. The drive shaft can now be lifted out of the casing and placed to one side. The oil pump pinion and the rear wheel stub axle assembly will remain in the casing. If these are to be removed, it will first be necessary to remove the oil pump so that the pump pinion can be withdrawn.

8 Working from the right-hand side of the transmission casing, straighten and remove the split pin which secures the rear wheel nut. Apply the brake by hand to stop the wheel turning, then remove the nut. The wheel can now be slid off its splines and put to one side. Remove the rear brake shoes by grasping them and 'folding' them inwards, to relieve spring pressure. Remove the two cross-head screws which retain the oil pump cover and lift it away.

9 Release the pump hose guide plate, noting that it is retained by a single cross-head screw and a union bolt. The latter acts as a breather and must **not** be replaced by an ordinary bolt. Slacken the two screws

which secure the pump to the casing (do not remove the bleed screw which has a fibre washer beneath its head) and lift the pump clear of the casing.

10 Release the circlip which retains the pump pinion and displace it. Remove the stub axle bearing retainer, using an impact driver to free the two screws. The stub axle can now be removed by driving it inwards using a soft-faced mallet or a hammer and hardwood block. The axle will be a fairly tight fit in the bearing.

11 On CL50D models only, the starter motor can be displaced from its casing recess and removed, if desired. Note that it is retained by two of the cover screws and is thus free once these have been released.

12 Dismantling the engine/transmission unit: separating the crankcase halves

1 The crankcase halves can be separated, and the crankshaft removed, after the unit has been withdrawn from the frame and the

various engine and transmission components removed as described in the preceding Sections. Note that whilst it is theoretically possible to remove the right-hand crankcase half with the transmission assembly intact, there is little to be gained by this because the crankshaft cannot then be removed from the left-hand crankcase half.

2 Invert the engine/transmission unit, raise the centre stand and disengage the stand spring. Use a screwdriver, a pair of heavy pliers or a self-locking wrench to unhook the spring, noting that it is strong and will require care if injury is to be avoided. Unscrew the stand pivot bolt and lift the stand away.

3 Lay the engine/transmission unit on its left-hand side and use an impact driver to release the five crankcase screws. They are recessed and may require the use of an extended bit to reach them. Temporarily refit the kickstart driven gear retaining nut to the left-hand crankshaft end, positioning it so that it is flush with the end of the crankshaft to protect the threads during removal.

4 Tap around the joint face using a soft-faced mallet to assist in breaking the seal between the crankcase halves, then tap on the left-hand end of the crankshaft to displace it and the right-hand crankcase

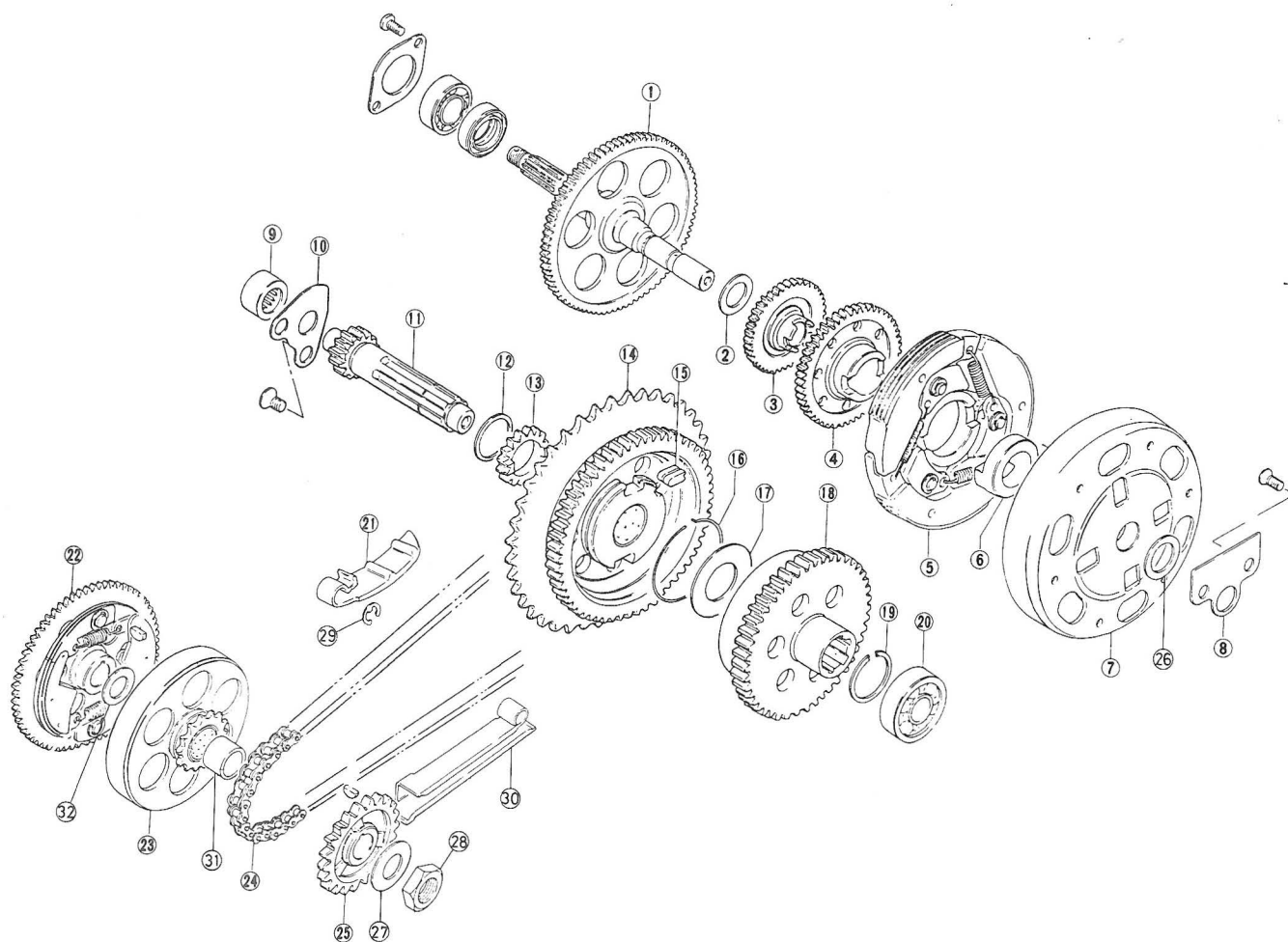


Fig. 1.6 Transmission components

1 Rear wheel stub axle
2 Thrust washer
3 Idle driven gear
4 Top driven gear
5 2nd gear clutch
6 Keyed spacer
7 2nd gear clutch drum
8 Retaining plate

9 Bearing
10 Retaining plate
11 Drive shaft
12 Shim
13 Oil pump drive gear
14 Primary driven sprocket
15 Ratchet pawls
16 Wire spring

17 Thrust washer
18 Top driven gear
19 Circlip
20 Bearing
21 Upper chain guide
22 1st gear clutch unit
23 1st gear clutch drum
24 Drive chain

25 Kickstart driven gear
26 Thrust washer
27 Lock washer
28 Nut
29 E-clip
30 Lower chain guide
31 Spacer
32 Thrust washer

half. It is preferable to tackle this stage with the aid of an assistant who can support the transmission casing/left-hand crankcase half. As soon as the crankshaft becomes free in its bearing, remove the nut and separate the crankcase halves.

5 Place the crankshaft and the right-hand crankcase half on wooden blocks on the workbench, leaving plenty of room below the crankshaft end. Refit the rotor nut to the end of the crankshaft and drive the latter out of its bearing.

13 Dismantling the engine/transmission unit: removing bearings and oil seals

1 Where a bearing or oil seal is secured by a retaining plate, use an impact driver to remove the plate mounting screws, then withdraw the plate. Note which way round the bearing or seal is fitted.

2 Oil seals are removed by prising them from position using a flat-bladed screwdriver or similar lever, and taking great care not to scratch the seal housing. All oil seals should be renewed whenever they are disturbed; discard the old items regardless of their condition.

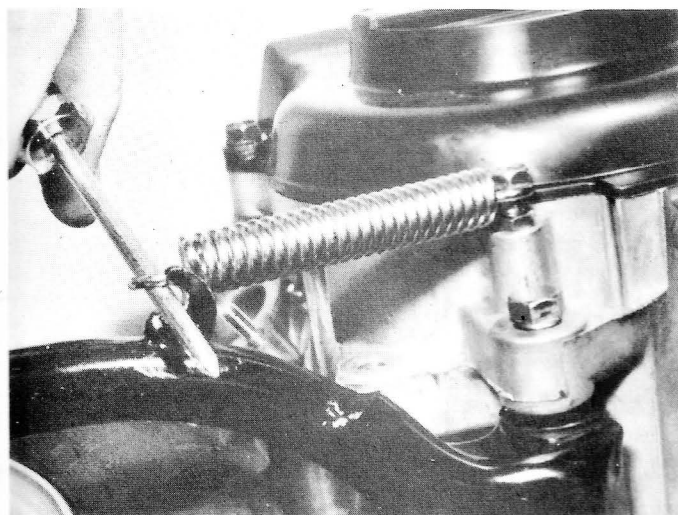
3 Before any bearing can be removed, the casing must be heated so that it expands and releases its grip on the bearing outer race. First remove from the casing any components such as oil seals or rubber bushes which might be damaged by heat. To avoid the risk of

distortion, the casing must be heated evenly; the best method of doing this is to place the casing in an oven and to heat it to a temperature of approximately 80 – 100°C. If a large enough oven is not available, place it in a container and carefully pour boiling water over it until it is completely submerged. Take great care to prevent personal injury when heating components or when handling them.

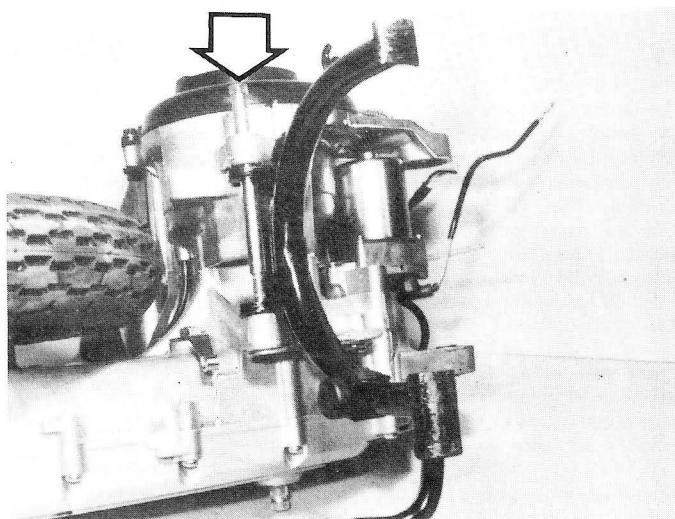
4 Place the heated casting on a flat wooden surface, ensuring that it is fully supported, if necessary, by additional wooden blocks, then drive out the bearing using a hammer and a tubular drift such as a socket spanner. Where possible, the drift should bear only on the bearing outer race; if the bearing inner race only is accessible, the bearing should be examined very closely to check that the bearing balls or rollers and their cage have not been damaged.

5 In a number of cases, bearings are pressed into blind holes in the crankcase castings, and cannot be drifted out. In such cases heat the casting as described above and tap it sharply on to a flat wooden surface in an attempt to dislodge the bearing by jarring it free. If this fails to work, the casting must be taken to a competent Suzuki Service Agent for the bearing to be extracted, using a slide hammer and the correct internally expanding bearing puller attachment.

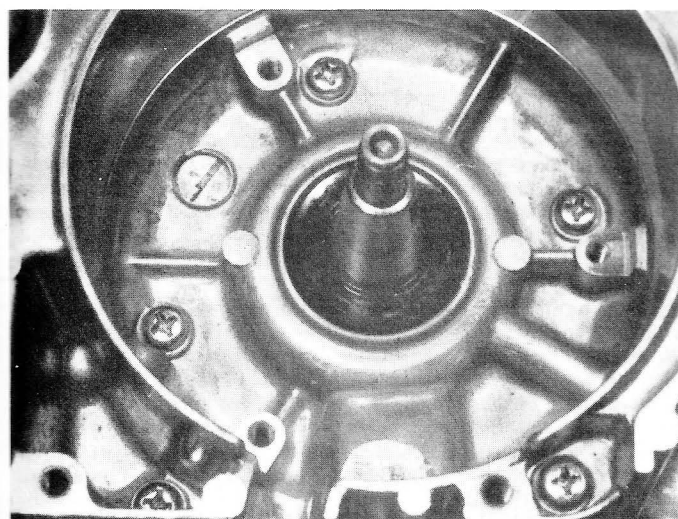
6 The engine mounting pivot bushes are removed as described in the relevant Section of Chapter 4, while the rear brake components can be removed, as described in the relevant Section of Chapter 5.



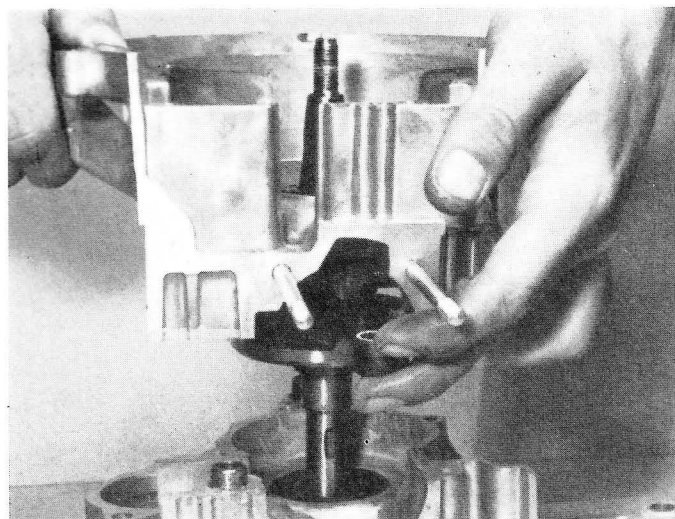
12.2a Unhook the stand spring as shown, taking care to avoid injury



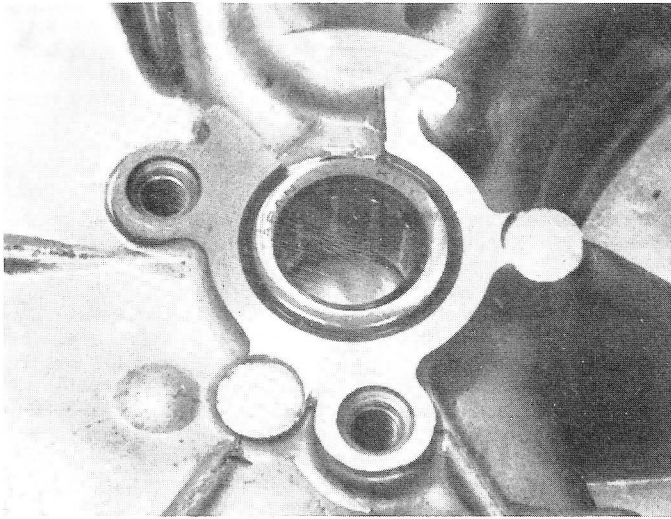
12.2b Withdraw pivot bolt (arrowed) to free the stand



12.3 The crankcase screws are deeply recessed, requiring an extended impact driver bit



12.4 Tap around joint to break seal, then lift away right-hand casing half



13.5 Where bearings are fitted to blind bores, heat casing and tap it to jar bearing free, or use slide hammer

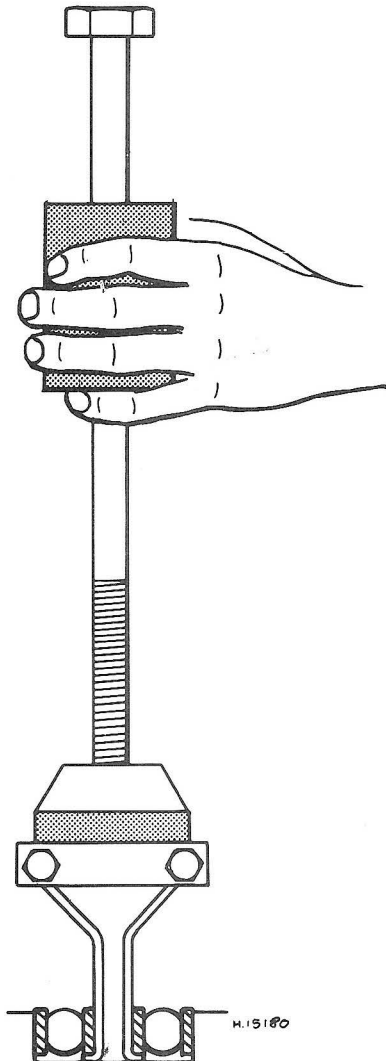


Fig. 1.7 Use of slide hammer to withdraw bearing from blind housing

14 Examination and renovation: general

1 Before examining the parts of the dismantled engine unit for wear it is essential that they should be cleaned thoroughly. Use a petrol/paraffin mix or a high flash-point solvent to remove all traces of old oil and sludge which may have accumulated within the engine. Where petrol is included in the cleaning agent normal fire precautions should be taken and cleaning should be carried out in a well ventilated place.

2 Examine the crankcase castings for cracks or other signs of damage. If a crack is discovered it will require a specialist repair.

3 Examine carefully each part to determine the extent of wear, checking with the tolerance figures listed in the Specifications section of this Chapter or in the main text. If there is any doubt about the condition of a particular component, play safe and renew.

4 Use a clean lint free rag for cleaning and drying the various components. This will obviate the risk of small particles obstructing the internal oilways, and causing the lubrication system to fail.

5 Various instruments for measuring wear are required, including a vernier gauge or external micrometer and a set of standard feeler gauges. An internal and external micrometer will be required to check wear limits. Additionally, although not absolutely necessary, a dial gauge and mounting bracket is invaluable for accurate measurement of end float, and play between components of very low diameter bores – where a micrometer cannot reach.

After some experience has been gained the state of wear of many components can be determined visually or by feel and thus a decision on their suitability for continued service can be made without resorting to direct measurement.

15 Examination and renovation: engine castings

1 Small cracks or holes may be repaired with an epoxy resin adhesive, such as Araldite, as a temporary expedient. Permanent repairs can only be effected by argon-arc welding, and a specialist in this process should advise on the viability of proposed repair. Often it may be cheaper to buy a new replacement.

2 Damaged threads can be economically reclaimed by using a diamond section wire insert, of the Helicoil type, which is easily fitted after drilling and re-tapping the affected thread. The process is quick and inexpensive, and does not require as much preparation and work as the older method of fitting brass, or similar inserts. Most motorcycle dealers and small engineering firms offer a service of this kind.

3 Sheared studs or screws can usually be removed with screw extractors, which consist of tapered, left-hand thread screws of very hard steel. These are inserted by screwing anti-clockwise, into a pre-drilled hole in the stud, and usually succeed in dislodging the most stubborn stud or screw. If a problem arises which seems to be beyond your scope, it is worth consulting a professional engineering firm before condemning an otherwise sound casing. Many of these firms advertise regularly in the motorcycle papers.

16 Examination and renovation: bearings and oil seals

1 All oil seals should be removed and discarded whenever they are disturbed, regardless of their condition. New seals are relatively cheap but serve a vital role, and should be renewed as a matter of course during an overhaul. This is particularly important in the case of the main bearing oil seals, which play a large part in the smooth running and efficiency of the engine.

2 Most of the bearings in the engine/transmission unit may be examined in position, although it is easier if they are removed first. Wash each bearing thoroughly to remove all traces of oil, then examine it carefully, looking for signs of damage to the balls or rollers, of the bearing cage, or to the bearing tracks. Any such damage will mean that the bearing must be renewed.

3 When checking ball journal bearings, hold the outer race firmly and attempt to move the inner race up and down, then from side to side. No free play should be discernible. Spin the outer race; if any roughness or clicking noises are apparent, or if the bearing does not revolve smoothly and easily, it must be renewed.

4 Roller bearings are checked by temporarily assembling the components concerned, and by feeling for free play; again, none should be

discernible. If possible, spin the bearing as described above to check for rough or jerky movement. Where a roller bearing's tracks are formed by two separate components, check carefully that the track surface is smooth and polished. Any signs of scoring, pitting or indentation will mean that the component concerned must be renewed.

5 Plain bushes should be examined to check that there are no signs of scoring or other damage on their bearing surfaces. Since no specifications are provided by the manufacturer, bearing wear can be assessed only by temporarily assembling the components concerned and feeling for free play. If any free play is discernible, the bush should be renewed where possible. In many cases the bush is available only as an integral part of a larger component.

6 If any doubt arises about the condition of any bearing, compare it with a new component to assess the degree of wear present. If this is not possible, err on the side of safety and renew all suspect components.

17 Examination and renovation: cylinder head

1 Check that the cylinder head fins are not clogged with oil or road dirt, otherwise the engine will overheat. If necessary, use a degreasing agent and brush to clean between the fins. Check that no cracks are evident, especially in the vicinity of the holes through which the holding down studs pass, and near the spark plug thread. Use a soft metal or hard wooden scraper to remove all traces of carbon from the combustion chamber, taking care not to scratch the alloy.

2 Check the condition of the thread in the spark plug hole. If it is damaged an effective repair can be made using a Helicoil thread insert. This service is available from most Suzuki Service Agents. The cause of a damaged thread can usually be traced to overtightening of the plug or using a plug of too long a reach. Always use the correct plug and do not overtighten.

3 If leakage problems have been experienced between the cylinder head and cylinder barrel mating surfaces, the cylinder head should be checked for distortion by placing a straight-edge across several places on the mating surface and attempting to slide a 0.05 mm (0.002 in) feeler gauge between the straight-edge and the mating surface.

4 If the cylinder head is found to be warped beyond this limit, grind it flat by placing a sheet of emery paper on a surface plate or sheet of plate glass and rubbing the cylinder head mating surface against it, in a slow, circular motion. Commence with 200 grade paper and finish with 400 grade paper and oil. If it is found necessary to remove a substantial amount of metal before the mating surface becomes completely flat, obtain advice from a Suzuki Service Agent as to whether it is necessary to obtain a new head.

18 Examination and renovation: cylinder barrel

1 Thoroughly clean the cylinder barrel, removing all traces of road dirt and oil from the cooling fins, the carbon deposits from the exhaust port and cylinder bore, and any gasket material from the mating surfaces. The heat transfer bar aperture must be completely clean and free from dirt or corrosion.

2 Check the cylinder barrel to cylinder head mating surface for distortion by placing a straight-edge across several places on it and attempting to slide a 0.05 mm (0.002 in) feeler gauge between the straight-edge and mating surface. If the cylinder barrel proves to be warped beyond this limit, grind it flat by placing a sheet of emery paper on a surface plate or sheet of plate glass and rubbing the mating surface against it, in a slow, circular motion. Commence this operation with 200 grade paper and finish with 400 grade paper and oil. If it is thought necessary to remove a substantial amount of metal in order to bring the mating surface back to within limits, obtain advice from a Suzuki Service Agent whether it is necessary to obtain a replacement barrel.

3 A close visual examination of the bore surface must be made, to check for scoring or any other damage, particularly if broken piston rings were encountered during stripdown. Any damage of this nature will necessitate reboring and a new piston, as it is impossible to obtain a satisfactory seal if the bore is not perfectly finished.

4 There will probably be a lip at the top of the cylinder bore which marks the limit of travel of the top piston ring. The depth of the lip will give some indication of the amount of wear that has taken place.

5 The most accurate method of measuring bore wear is by the use

of a cylinder bore DTI (Dial Test Indicator) or a bore micrometer. Suzuki supply a special tool, No. 09900-20508, specifically for this purpose. Measurement should be taken at a point 20 mm (0.8 in) from the top of the cylinder bore and the reading obtained compared with the service limit given in the Specifications Section of this Chapter. Note that it is necessary to rotate the measuring instrument so that the point of greatest wear in the bore is found. If the cylinder is already rebored, the oversize must be included.

6 If such specialised measuring equipment is not available, the degree of bore wear can be assessed using a set of feeler gauges and a piston. The piston must be new or known from measurement to be within the specified wear limits (see Section 19). Insert the piston skirt into the bore from the top, ensuring that the arrow embossed on the piston crown faces towards the exhaust port, and push it down until the base of the skirt is 20 mm (0.8 in) from the top of the bore. If a feeler gauge of 0.12 mm (0.005 in) thickness or greater can be inserted between the skirt and the cylinder wall, the cylinder bore is excessively worn and in need of a rebore, although this should be confirmed by an expert using accurate equipment.

7 If it is found that the amount of wear in the bore exceeds those limits given it will be necessary to have the cylinder barrel rebored to the next oversize and the appropriate oversize piston and rings fitted. Suzuki supply pistons and piston rings in two oversizes; +0.5 mm (0.0196 in) and +1.0 mm (0.0394 in).

8 On receiving the cylinder barrel back from the Service Agent who has carried out the rebore, check the edges of the ports to ensure that they have been correctly chamfered to the measurements given in the figure accompanying this text. This work must be done before the cylinder barrel is refitted to the machine, otherwise there is a distinct possibility that the piston rings will catch on the unchamfered edge of each port and break, thus necessitating a further strip down and rebore. Chamfering of the port edges can be carried out by very careful use of a scraper but it is essential to ensure that the wall of the bore does not become damaged in the process. Finish off the process by polishing the cut edges with fine emery paper. The bore surface should have been honed lightly by the reborer to provide the correct surface finish; check whether this has been done. If not, and the necessary equipment is not available, any good motorcycle dealer should be able to carry out the work for a small fee. Alternatively, the entire bore wall should be polished lightly with fine emery paper.

9 If the cylinder bore is found to be unworn or within wear limits, check that there are no irregularities on the bore wall; for example, those caused by piston seizure. If these cannot be removed completely by polishing with fine emery paper, the barrel must be rebored regardless of the amount of wear.

10 If the barrel is not to be rebored, but a new piston or piston rings are to be fitted, the bore surface must be prepared first by glaze-busting. This is a process which involves the use of a cylinder-bore honing tool, usually in conjunction with an electric drill, to break down the surface glaze which forms on any cylinder bore in normal use. The prepared bore surface will have a very lightly roughened finish which will assist the new components to bed in rapidly and fully. Furthermore, the lip at the top of the bore, which will have been formed by the bore wearing, must be removed. If this is not done the new top ring will come into contact with the ridge and shatter. Most motorcycle dealers have glaze-busting equipment and will be able to carry out the necessary work for a small charge.

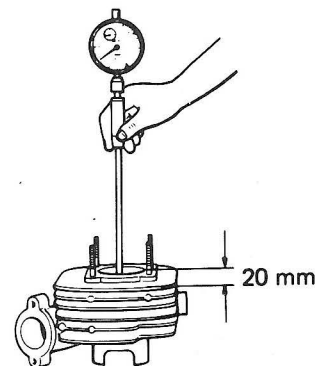


Fig. 1.8 Measuring cylinder bore wear

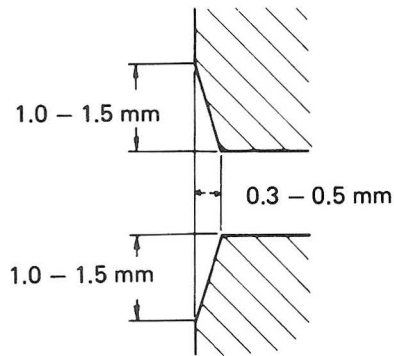


Fig. 1.9 Cylinder bore port chamfer measurements

19 Examination and renovation: piston and rings

- 1 If the cylinder barrel is to be rebored, the original piston and piston rings can be discarded, since they will be replaced with their oversize equivalents. If this is not the case, proceed as follows.
- 2 Remove all traces of carbon from the piston, using a soft metal or hard wooden scraper to avoid scratching the piston. The ring grooves can be cleaned using a section of broken piston ring, to avoid enlarging the grooves.
- 3 Piston wear is normally shown in the form of vertical score marks on the thrust side of the piston skirt. If not excessive, these marks and any high spots caused by the piston picking up, or seizing temporarily, may be removed by the careful use of a fine swiss file. The application of chalk to the file teeth will prevent the teeth from clogging. Do not use abrasive paper.
- 4 The degree of piston wear is assessed by measuring its diameter at a point 14 mm (0.6 in) above the base of the skirt on CL50 and CL50 D models, the measurement being made at right angles to the line of the gudgeon pin. If the measurement obtained is less than the service limit given in the Specifications Section of this Chapter, the piston must be renewed. Remember to allow for the amount of oversize, if the cylinder has been rebored and an oversize piston fitted.
- 5 The piston/cylinder clearance figure can be established by subtracting the piston diameter, as measured above, from the cylinder bore diameter or by measuring with feeler gauges as described in Section 18. If the clearance exceeds 0.12 mm (0.005 in), either the piston must be renewed or the cylinder barrel must be rebored.
- 6 Closely examine the piston. If there are any signs of cracks or other damage, if the circlip grooves are damaged, or if the locating peg in each ring groove is loose, the piston should be renewed. Insert fully the gudgeon pin into the piston and feel for any signs of free play; the pin should be a reasonably tight press fit in the piston. If free play can be felt, measure the gudgeon pin outside diameter at each end and in the centre, followed by three more measurements at right angles to the first. If the gudgeon pin is worn at any point to less than the service limit given in the Specifications Section, it must be renewed. If the pin is found to be within the wear limits, measure the internal diameter of each piston boss, first vertically and then horizontally; if any of these measurements exceed the service limit given, the piston must be renewed.
- 7 To check that the piston ring grooves have not become enlarged, temporarily refit the piston rings, ensuring that each is the right way up and in its original position, then measure the clearance between each ring and its groove using feeler gauges. Since Keystone-type rings are employed which have a 7° taper on their top surface, the feeler gauge must be inserted between the ring bottom surface and the groove bottom edge to obtain an accurate reading. The standard clearance is 0.02 – 0.06 mm (0.0008 – 0.0024 in); if this is exceeded at any point, and the piston rings show no obvious signs of wear, the piston should be renewed. It is, however, worth repeating the test with new piston rings to ensure that the piston is at fault before it is finally discarded.
- 8 Before detailed instructions are given to describe the checking of the piston rings, it should be noted that many consider it a worthwhile expense to renew the piston rings as a matter of course at each overhaul, regardless of their condition. This ensures that compression is maintained at peak efficiency. If this course is not followed, proceed as described below.

9 Carefully remove all traces of carbon from the rings, not forgetting the thin expander, then examine each ring closely. The working surface should be clean and polished, with no discoloured areas indicating that blow-by has occurred, and the top and bottom surfaces should be smooth and unworn. The rings should be discarded if these or any other signs of excessive wear or damage are encountered.

10 The elasticity of each ring is checked by placing it flat on the work surface and measuring its free end gap, as shown in the accompanying photograph. This must not be less than the service limit given in the Specifications Section of this Chapter. To measure the amount of ring wear, check first that the cylinder bore is within wear limits (see previous Section), then insert each ring in turn into the bottom of the bore. Using the piston crown to push the ring down and to keep it square in the bore, position the ring at approximately 10 mm (0.4 in) from the cutouts in the bore spigot. Measure the ring gap with feeler gauges as shown in the accompanying photograph. If the ring free or installed end gaps are found to be greater than the service limits given, the rings must be renewed.

11 When fitting new rings, do not assume that the end gap will be correct. As with part-worn rings, the installed end gap must be measured, working as described above, and corrected if necessary. If the gap is too large, the bore should be measured again to ensure that it is within wear limits; if it is, another set of rings should be tried. If the gap is too small, it can be widened by the careful use of a needle file.

12 Finally, discard any circlips disturbed during piston removal and examination; circlips should never be re-used. Ensure that new ones are used during reassembly.

20 Examination and renovation: crankshaft

- 1 The crankshaft assembly comprises two full flywheels, two mainshafts, a crankcase and big-end bearing, a connecting rod, and a caged needle roller small-end bearing. Commence by making a close visual check; any sign of obvious damage such as worn mainshaft threads, damaged keyways, distorted mainshafts, or a connecting rod that is bent or cracked will mean that the complete assembly must be renewed. If no damage is evident, make a closer examination as described below.
- 2 Big-end failure is characterised by a pronounced knock which will be most noticeable when the engine is worked hard. The usual causes of failure are normal wear, or a failure of the lubrication supply. In the case of the latter, big-end wear will become apparent very suddenly, and will rapidly worsen. Check for wear with the crankshaft set in the TDC (top dead centre) position, by pushing and pulling the connecting rod. No discernible movement will be evident in an unworn bearing, but care must be taken not to confuse end float, which is normal, and bearing wear. If a dial gauge is readily available, a further test may be carried out by setting the gauge pointer so that it abuts against the upper edge of the periphery of the small-end eye. Measurement may then be taken of the amount of side-to-side deflection of the connecting rod. If this measurement exceeds the service limit of 3.0 mm (0.12 in) then the big-end bearing must be renewed.
- 3 Any measurement of crankshaft deflection can only be made with the crankshaft assembly removed from the crankcase and set up on V-blocks which themselves have been positioned on a completely flat surface. The amount of deflection should be measured with a dial gauge at a point just inboard of the threaded portion of the left-hand mainshaft. If the amount of deflection shown by the gauge needle exceeds the service limit of 0.05 mm (0.002 in), then the assembly must be replaced with a serviceable item.
- 4 Like the big-end bearing, the small-end bearing is of the caged needle roller type and will seldom give trouble unless a lubrication failure has occurred. Push the bearing into the small-end eye of the connecting rod and push the gudgeon pin through the bearing. Hold the connecting rod steady and feel for any discernible movement between it and the gudgeon pin. If movement is felt, do not automatically assume that the bearing is worn but check that the bore of the small-end eye and the outer diameter of the gudgeon pin are not worn beyond their service limits. If both the connecting rod and gudgeon pin are found to be within limits, discard the bearing and replace it with a new item. Close inspection of the bearing will show if the roller cage is beginning to crack or wear, in which case the bearing must be renewed.
- 5 If any fault is found or suspected in any of the components

comprising the crankshaft assembly, it is recommended that the complete crankshaft assembly is taken to a Suzuki Service Agent, who will be able to confirm the worst, and supply a new or service-

exchange assembly. The task of dismantling and reconditioning the big-end assembly is a specialist task, and is beyond the scope and facilities of the average owner.

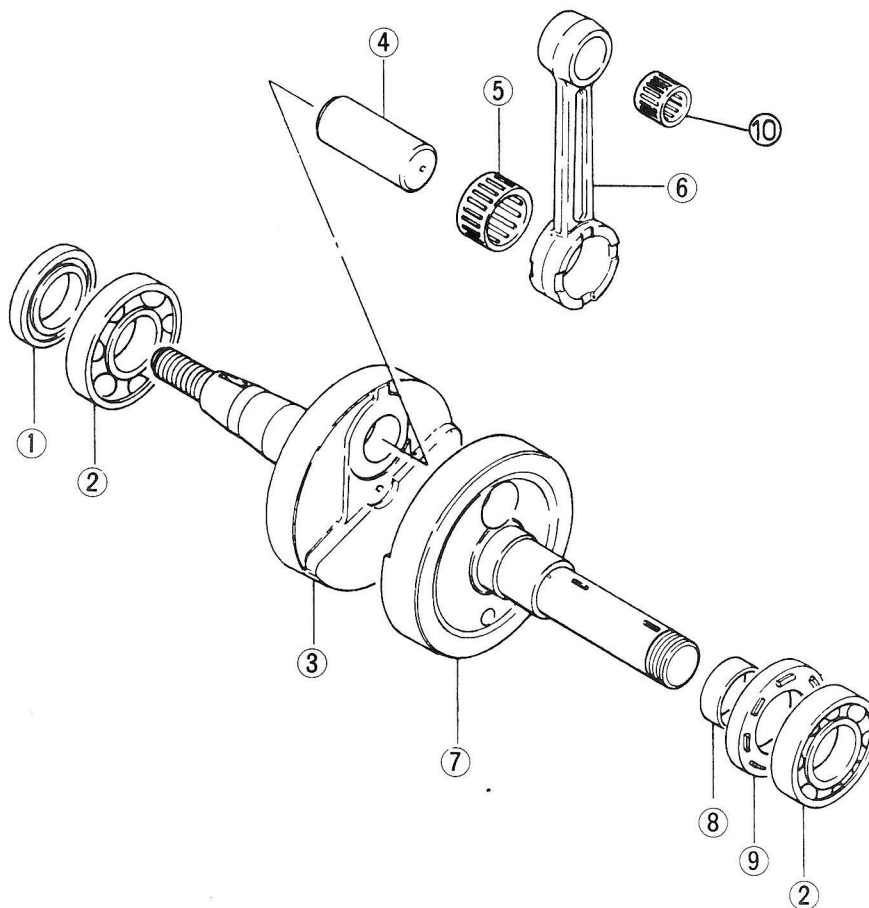


Fig. 1.10 Crankshaft

- 1 Oil seal
- 2 Main bearing - 2 off
- 3 Flywheel/mainshaft
- 4 Crankpin

- 5 Big-end bearing
- 6 Connecting rod
- 7 Flywheel/mainshaft

- 8 Spacer
- 9 Oil seal
- 10 Small-end bearing

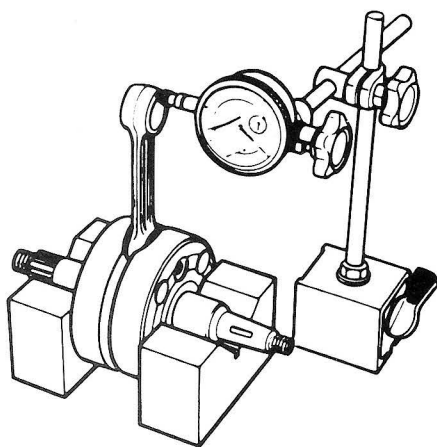


Fig. 1.11 Measuring side-to-side deflection of the connecting rod

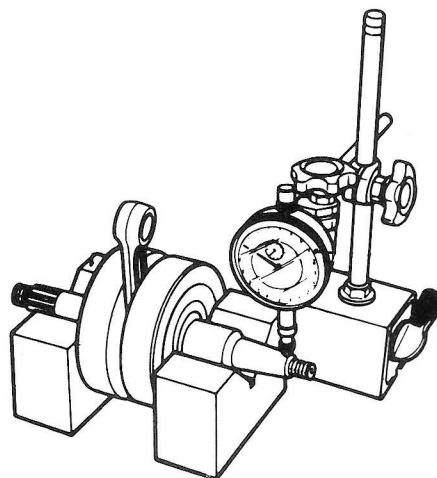


Fig. 1.12 Measuring crankshaft deflection

21 Examination and renovation: transmission components

1st and 2nd gear clutches

1 The transmission clutches are of the shoe type, being brought into action at the appropriate time by centrifugal force. It will be noted that the clutches resemble drum brakes in design, and they can be checked for wear in a similar manner.

2 If the operation of the clutches is suspect, they can be checked prior to dismantling as described below. Note that an electronic tachometer is required to check the 1st gear clutch, and if a suitable instrument is not available it is suggested that the check is performed by a Suzuki Service Agent.

3 Bring the engine to normal operating temperature and connect the test tachometer, following the manufacturer's instructions. Sit on the machine with the stand retracted and the engine idling. Slowly increase the engine speed until the machine begins to move forward and note the engine speed at which engagement commences. The standard figure is 2500 ± 200 rpm.

4 To check the 'lock-up' speed of the 1st gear clutch, repeat the above test, but this time apply the rear brake fully to hold the machine stationary. Open the throttle fully for a maximum of ten seconds and note the engine speed shown on the tachometer. This should not exceed the standard figure of 3500 ± 200 rpm. Note that the ten second limit quoted above must not be exceeded or damage to the clutch or engine may occur.

5 The 2nd gear clutch is checked without the tachometer connected and takes the form of a road test. Ride the machine normally and note at what road speed the change to 2nd gear takes place. The standard figure is 18 ± 2 kph (11.2 ± 1.2 mph).

6 In all of the above tests, wear of the clutch shoes or springs will tend to increase the engine or road speed at which engagement occurs. If it is noted that either clutch is slipping or is erratic in operation, it should be dismantled for further examination.

7 Examine the shoe surfaces for indications of wear or damage. When new, each shoe has a grooved surface, and these are intended to act as wear indicators. If the grooves have worn away across the width of the shoe at any point, the shoes must be renewed as a pair. The shoes must also be renewed if there are signs of damage such as cracking or chipping of the friction material, or if the surface is burnt or glazed. Where glazing or burning is noted, this may have been caused by damaged or weakened springs allowing excessive clutch slip to take place.

8 Examine the springs visually, renewing them if obviously stretched or deformed. Check the free length, using a vernier caliper, and renew

the springs as a set if any exceed the service limit given in the Specifications.

9 It is unusual for the clutch drums to wear significantly in normal use, but they should be checked as a precaution. Very light scoring of the drum surface is to be expected, but renewal will be required if deep scores or cracking is noted. Where clutch judder has been evident this can often be traced to ovality, and this should be checked by measuring the drum inside diameter at several points. If the drum has worn in excess of its service limit, it must be renewed.

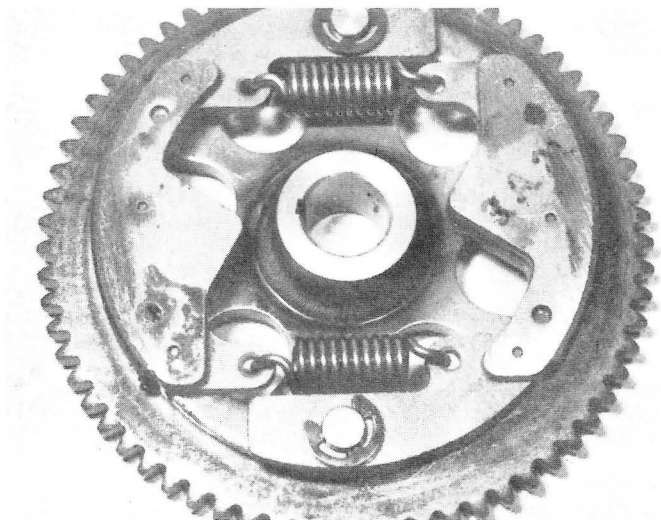
Remaining transmission components

10 The primary drive chain must be checked to ensure that it has no damaged rollers or sideplates, and that all links are free to move; any signs of such damage or excessive wear will mean that the chain must be renewed in conjunction with both sprockets. To assess chain wear, wash the chain thoroughly to remove all traces of oil, then lay the chain on its side on a flat surface and pull it out until it is at full stretch. Mark any rivet head, count off 21 rivets and measure the distance between the two, as shown in the accompanying illustration. If the distance is 173 mm (6.81 in) or greater, the chain is worn out and must be renewed. If the chain is found to be within wear limits and is to be reused, soak it in engine oil or molten chain grease before refitting it.

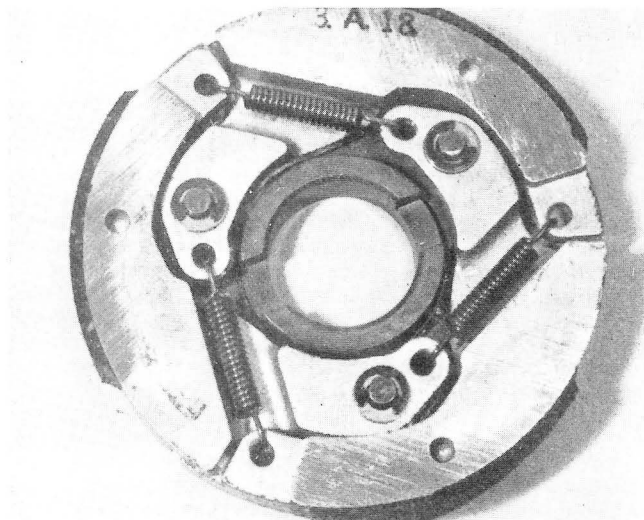
11 Examine the rubbing surfaces of both chain guides. While grooves will form naturally as a result of the sideplates eating into each guide surface, the guides must be renewed if the grooves have eroded more than 50% of the guide material. Check that the guides are otherwise undamaged and are not split or cracked; if other damage is found they should be renewed.

12 Closely examine all transmission shafts, gear pinions, splined or plain spacers and thrust washers. Any signs of worn or chipped gear teeth or splines, damaged shaft threads or keyways, or worn bearing surfaces will mean that the components concerned must be renewed. Pay particular attention to components surrounding any thrust bearings; damage or excessive wear found on a bearing track must be rectified by the renewal of any affected component, or the transmission will not be able to function correctly. Check that all Woodruff keys are a secure fit in their respective keyways; no trace of free play should be found.

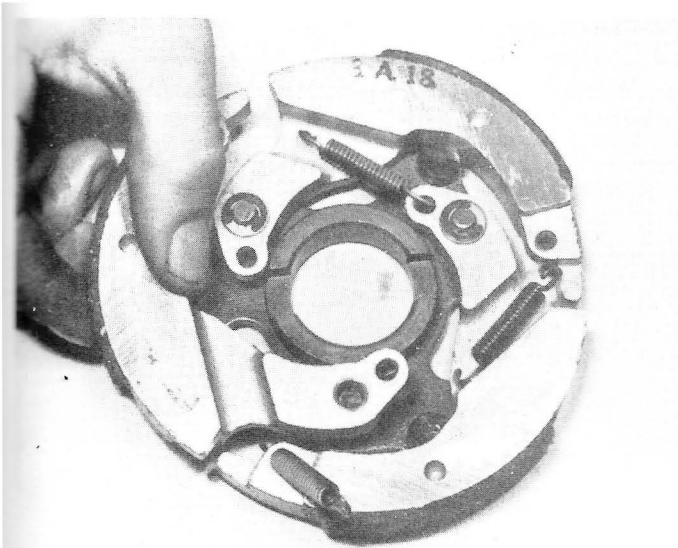
13 The one-way ratchet clutch fitted to the primary drive shaft should be checked to ensure that the ratchet pawls are unworn and that they locate fully in the respective cut-outs machined in the driven gear. Renew the pawls or the driven gear if any wear is found. The wire spring clip around the clutch assembly must be renewed if it appears to be weakened or damaged, or there is any doubt about its efficiency.



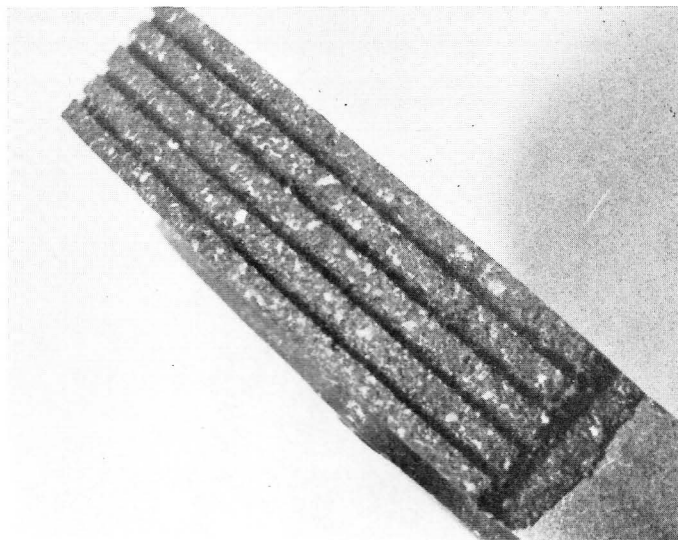
21.6a The 1st speed clutch



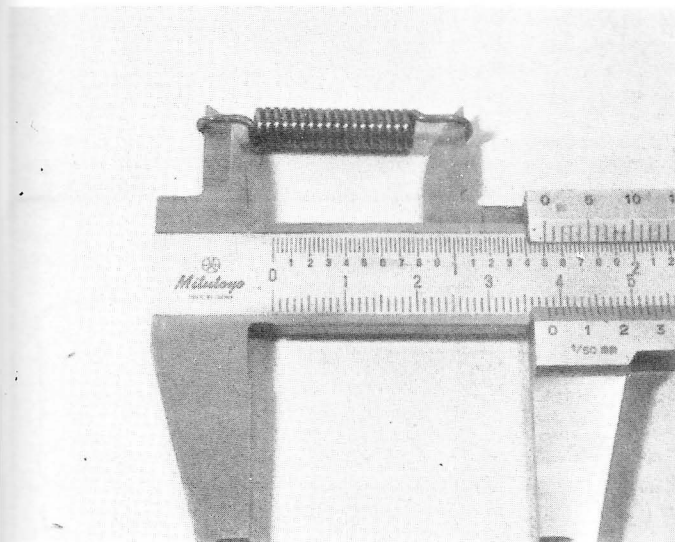
21.6b The 2nd speed clutch



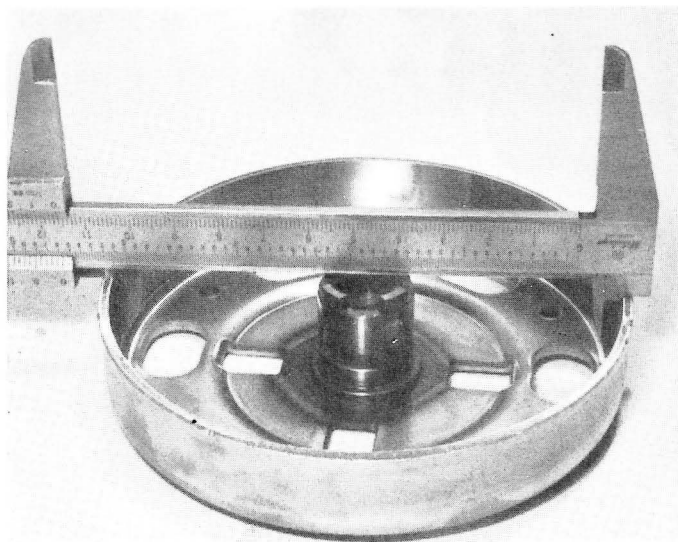
21.6c To free shoes, remove E-clips and lift away as shown



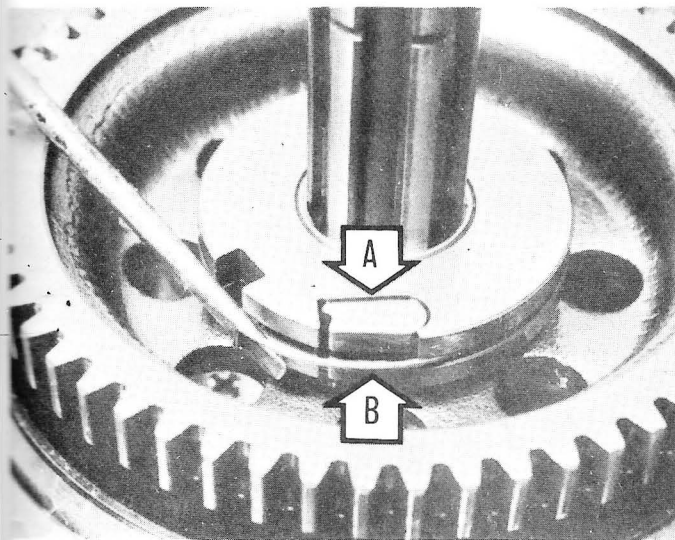
21.7 Renew shoes if wear indicator grooves have disappeared (new shoe shown)



21.8 Check clutch spring free lengths as shown



21.9 Measure drum diameter at several points to check for ovality



21.13 Check ratchet pawls (A) for wear. Renew wire spring (B) if obviously weak or loose

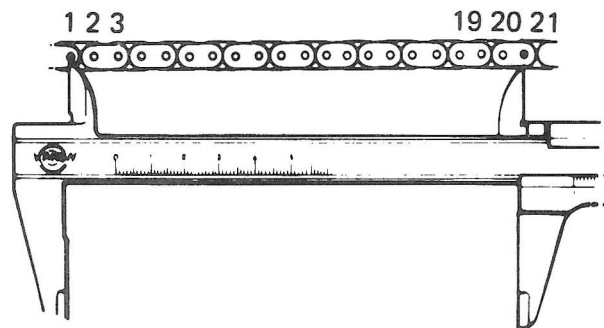


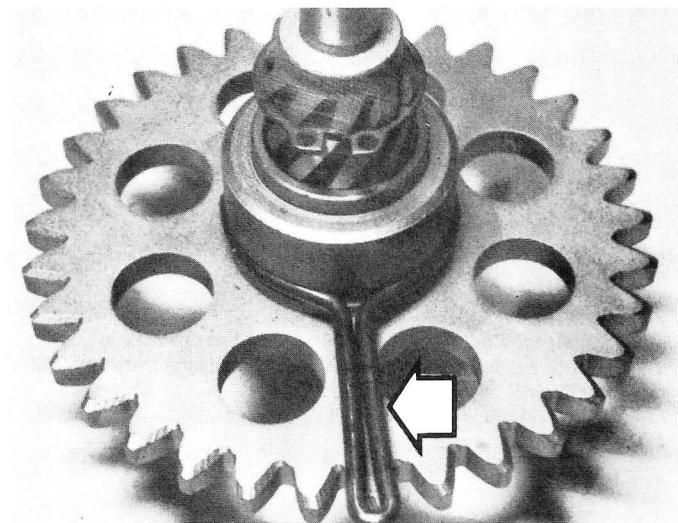
Fig. 1.13 Measuring primary drive chain wear

22 Examination and renovation: kickstart assembly

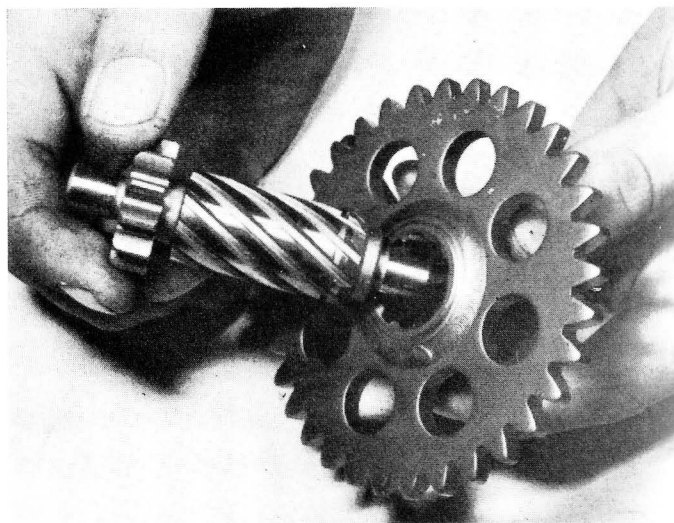
1 Collect the various components that comprise the kickstart assembly and lay them out on a clean work surface ready for inspection. Wear on the kickstart components is only likely after a

considerable mileage has been covered, with damaged or fatigued kickstart springs being the most likely components to fail.

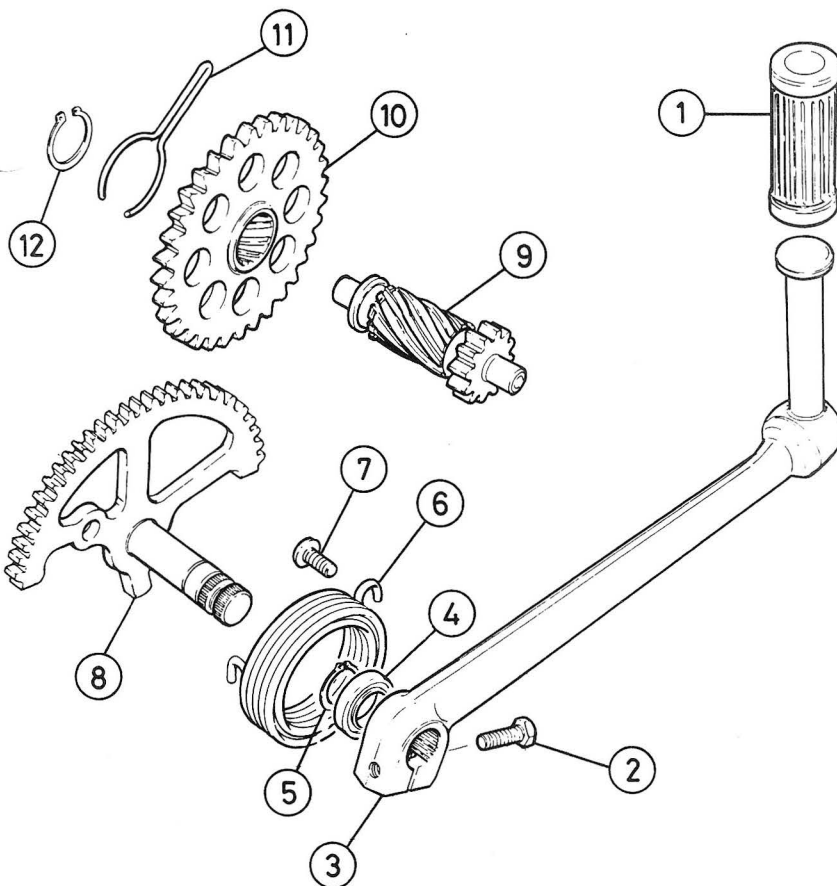
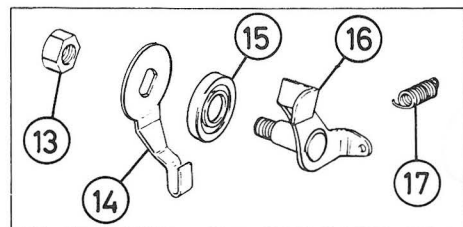
2 Carefully clean and inspect each item, looking for worn or chipped gear teeth, damaged splines, and worn bearing surfaces. Any component found to be worn or damaged must be renewed, as no repairs are possible.



22.1a Idler gear is retained on shaft by circlip. Renew friction clip (arrowed) if loose



22.1b Check for wear between idler gear and shaft



- 1 Lever rubber
- 2 Pinch bolt
- 3 Kickstart lever
- 4 Oil seal
- 5 Circlip
- 6 Return spring
- 7 Screw
- 8 Kickstart shaft
- 9 Idler gear shaft
- 10 Idler gear
- 11 Friction clip
- 12 Circlip
- 13 Nut
- 14 Guide lever
- 15 Oil seal
- 16 Kickstart engaging guide
- 17 Guide return spring

Fig. 1.14 Kickstart components

23 Engine reassembly: general

1 Before reassembly of the engine/gear unit is commenced, the various component parts should be cleaned thoroughly and placed on a sheet of clean paper, close to the working area.

2 Make sure all traces of old gaskets have been removed and that the mating surfaces are clean and undamaged. Great care should be taken when removing old gasket compound not to damage the mating surface. Most gasket compounds can be softened using a suitable solvent such as methylated spirits, acetone or cellulose thinner. The type of solvent required will depend on the type of compound used. Gasket compound of the non-hardening type can be removed using a soft brass-wire brush of the type used for cleaning suede shoes. A considerable amount of scrubbing can take place without fear of harming the mating surfaces. Some difficulty may be encountered when attempting to remove gaskets of the self-vulcanising type, the use of which is becoming widespread, particularly as cylinder head and base gaskets. The gasket should be pared from the mating surface using a scalpel or a small chisel with a finely honed edge. Do not, however, resort to scraping with a sharp instrument unless necessary.

3 Gather together all the necessary tools and have available an oil can filled with clean engine oil. Make sure that all new gaskets and oil seals are to hand, also all replacement parts required. Nothing is more frustrating than having to stop in the middle of a reassembly sequence because a vital gasket or replacement has been overlooked. As a general rule each moving engine component should be lubricated thoroughly as it is fitted into position.

4 Make sure that the reassembly area is clean and that there is adequate working space. Refer to the torque and clearance settings wherever they are given. Many of the smaller bolts are easily sheared if overtightened. Always use the correct size screwdriver bit for the cross-head screws and never an ordinary screwdriver or punch. If the existing screws show evidence of maltreatment in the past, it is advisable to renew them as a complete set.

24 Reassembling the engine/transmission unit: preparing the crankcases

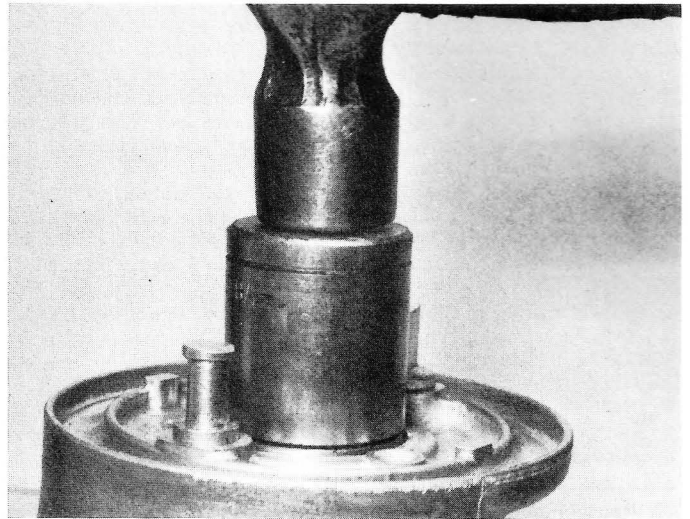
1 Before any bearing is refitted, the casting must be heated evenly, to a temperature of 80 – 100°C, using an oven or by placing the casting in boiling water. Place the casting on a flat wooden surface, using additional wooden blocks for support, if required.

2 Place each bearing squarely over its housing, ensuring that any manufacturer's stamped marks or numbers face outwards, then tap it into place, taking great care that the bearing remains absolutely square to its housing. If the bearing is allowed to enter at an angle it will jam, causing serious damage. Use a hammer and a tubular drift such as a socket spanner, which bears only on the bearing outer race. Excessive force will not be needed if the casing has been correctly heated. Note that the stub axle bearing sealed surface must face outwards.

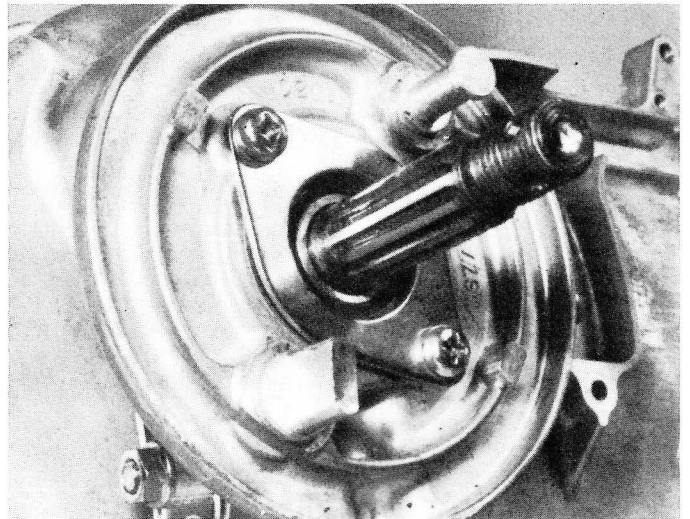
3 Oil seals are refitted in a similar manner without the necessity of heat, but thread locking compound or similar must be applied to the periphery of both crankshaft main bearing seals to prevent any risk of them rotating. All oil seals are positioned so that the seal centre boss, which has a spring around its outer edge, faces inward. If in doubt, refer to the illustrations which accompany the text. When drifting oil seals into place, it is essential that a tubular drift is used which bears only on the seal's hardened outer edge, or the seal will be damaged.

4 Where retaining plates are employed, these should be refitted to secure the new bearing or seal. Apply thread locking compound to the threads of the retaining screws and use an impact driver to ensure each is securely tightened.

5 Liberally oil all bearings and bearing surfaces with clean engine oil, and apply grease to the sealing lips of all oil seals. The engine mounting pivot bushes and rear brake components, if disturbed, should be refitted as described in the relevant Sections of Chapters 4 and 5.



24.2 Heat casing, then drive bearing home using socket as a drift



24.4 Fit bearing retainers using locking compound on screws

25 Reassembling the engine/transmission unit: refitting the crankshaft and joining the crankcase halves

1 Support the crankcase left-hand half on two wooden blocks on the work surface so that its right-hand side is uppermost. Check that both locating dowels have been refitted to their locations in the gasket surface.

2 Refit the spacer, if disturbed, to the crankshaft left-hand mainshaft, tapping it down with a hammer and a tubular drift until it bears firmly against the shaft shoulder. Smear oil over the mainshaft. Refit the rotor retaining nut to the crankshaft right-hand end, screwing the nut down until it is flush with the crankshaft end.

3 Insert the crankshaft into the left-hand bearing and oil seal, pressing it down as far as possible by hand only. Check that the connecting rod is aligned with the crankcase mouth, and that the crankshaft is absolutely square in the bearing. Using only a soft-faced mallet, tap firmly on the crankshaft right-hand end to drive it fully into position. Excessive force will not be necessary. When the crankshaft is in place, remove the rotor retaining nut and check that the crankshaft revolves freely, with no trace of distortion.

4 Apply a thin bead of silicone RTV jointing compound to the gasket face, following the manufacturer's instructions, allowing time for the compound to cure. Lower the crankcase right-hand half into position, ensuring that both crankcase halves are square to each other. Press the right-hand half down by hand only, then use a soft-faced mallet to tap it fully into place. Working progressively and in a diagonal sequence, refit and tighten securely with an impact driver the five crankcase fastening screws.

5 Check that the crankshaft revolves freely and without stiffness; a sharp tap on each mainshaft end with a soft-faced mallet will centralise the crankshaft in its bearings. If this does not work, separate the crankcase halves and rectify the problem before proceeding further.

6 If all is well, wipe off any surplus jointing compound, lubricate the big-end bearing with clean engine oil and rotate the crankshaft to the TDC position. Pack the crankcase mouth and reed valve aperture with clean rag to prevent the entry of dirt.

7 Refit the centre stand, tightening its pivot bolt to a torque setting of 1.8 – 2.8 kgf m (13 – 20 lbf ft) and take great care when refitting the stand return spring.

26 Reassembling the engine/transmission unit: refitting the transmission components

1 Place the unit on its side, supporting it with wooden blocks so that the transmission casing area is uppermost. Check that the drive shaft needle roller bearing is correctly installed in its recess and that the bearing retainer has been fitted.

2 Fit the rear wheel stub axle, pushing it through the bearing with hand pressure only. Temporarily refit the rear wheel over the stub axle splines, refit the securing nut and tighten it to draw the stub axle fully home in the bearing. Once it is in place remove the wheel.

3 Fit the shim and the oil pump drive gear to the end of the drive shaft. If the pump driven gear was removed from the casing, slide it into position. Ensure that the pump driven gear does not foul the stub axle gear face. If it does, check whether the stub axle is fully home in its bearing. Turn the unit over and fit the circlip which retains the pump driven gear. Place the drive shaft in position and fit the shim washer and oil pump drive gear.

4 Slide the 1st gear clutch shoe assembly over the protruding crankshaft end, ensuring that it locates correctly on its Woodruff key. Fit the large plain thrust washer followed by the clutch drum bush inner sleeve. Fit the upper and lower chain guides into the casing, securing the upper guide with its E-clip.

5 Lay out the 1st gear clutch drum unit and the large driven gear/one way clutch assembly, joining them with the drive chain. Lower the above into the casing, checking that the clutch drum locates correctly over its bush and that the driven gear engages the dogs on the oil pump drive gear. Make sure that the assembly rotates smoothly and that the chain passes through both guides.

6 Check that the two pawls of the one way clutch are in place and secured by the wire retaining clip. Place the large plain washer over the end of the drive shaft and then install the top driven gear, turning it clockwise until the one way clutch pawls engage. Fit a new circlip noting that the rounded face must bear against the gear and taking care not to stretch the clip more than is necessary to slide it onto the shaft end.

7 Fit the thrust washer to the end of the stub axle, then install the idle driven gear. The top driven gear is fitted next, noting that it must mesh with the dogs on the idle driven gear. Fit the 2nd gear clutch over the top driven gear boss, then place the dogged spacer in position. Finally, fit the clutch drum and the small shim.

8 Fit the kickstart idle gear into the casing, moving the safety interlock lever to allow it to seat fully. Ensure that the friction clip locates between the two lugs in the casing. Place the kickstart driven gear over the crankshaft end, fit the locking washer and the retaining nut. Lock the crankshaft and tighten to 5.0 – 6.0 kgf m (18.0 – 30.0 lbf ft) then bend up the washer to secure it.

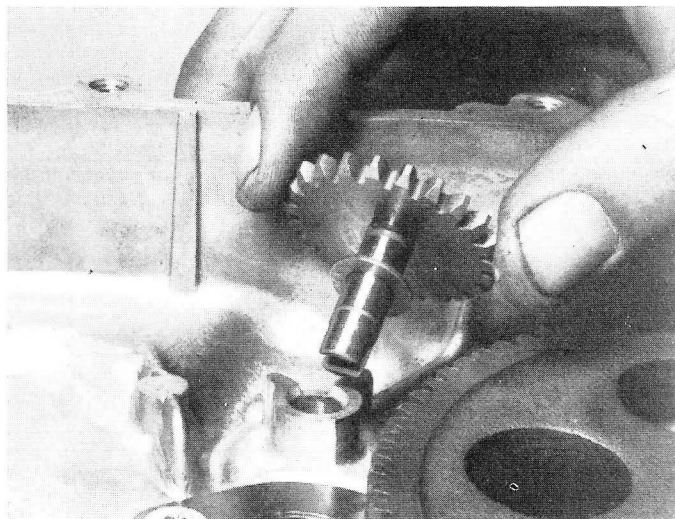
9 If the kickstart mechanism in the outer cover was dismantled, fit the spring anchor screw finger-tight only. Place the spring in position and hook its end over the screw head. Slide the shaft into the casing and engage the other end of the spring. Carefully turn the quadrant through 180° to tension the spring, pushing the shaft inwards until it engages the stop in the cover. Fit the circlip to retain the shaft assembly and tighten the anchor screw firmly. Carefully drive in a new kickstart shaft oil seal using a socket as a drift.

10 On CL50D models only, offer up the starter motor having first applied a little oil to the O-ring to assist installation. Push the motor fully home, noting that it is retained by the cover screws when these are fitted.

11 Check that each shaft turns freely and apply a little oil to the moving parts and the drive chain. If not in place, drop the tubular fibre kickstart stop over its boss in the casing. Fit a new cover gasket, holding it in place with a smear of grease, and check that the two locating dowels are in position.

12 Offer up the cover, checking that it locates correctly over the shaft ends. Tap the cover home using the palm of the hand only. If it sticks do not use force; pull it off and rectify the cause of the problem and then refit it. Drop the cover screws into position noting that each should protrude by a similar amount. Tighten the screws evenly and progressively by hand, then go over them again using an impact driver for final tightening.

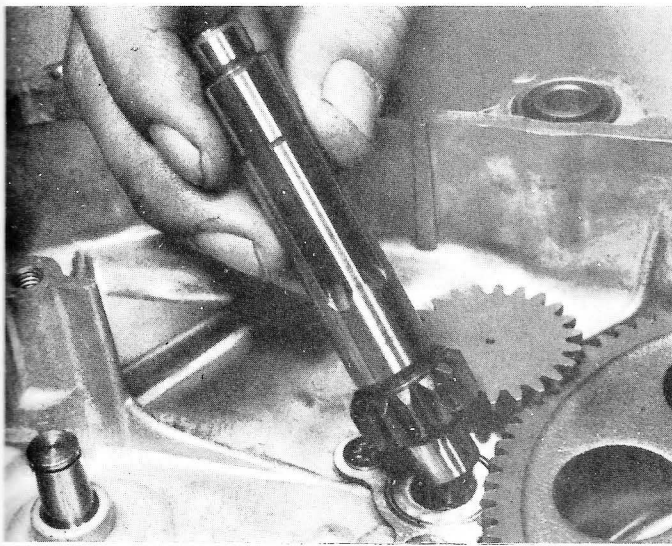
13 Note that it is advantageous to refit the brake shoes and rear wheel at this stage. The unit can then be supported upright on the wheel and centre stand during the remaining reassembly operations. The rear wheel nut should be tightened to 6.0 – 9.0 kgf m (43.4 – 65.1 lbf ft).



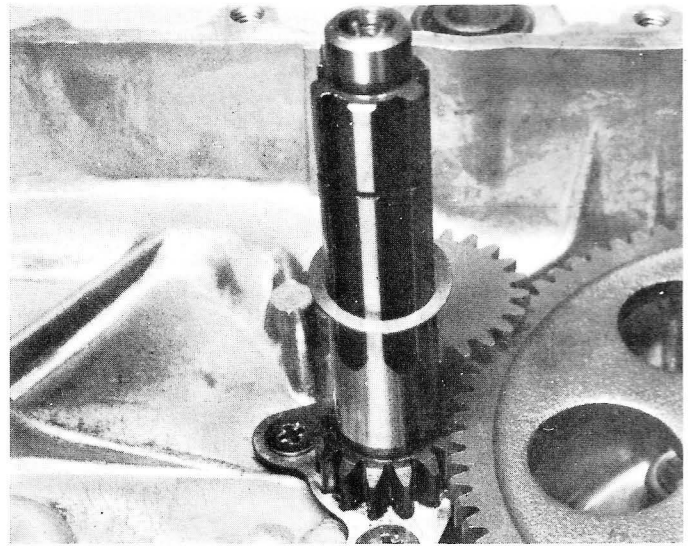
26.3a Fit oil pump driven gear, noting thrust washer ...



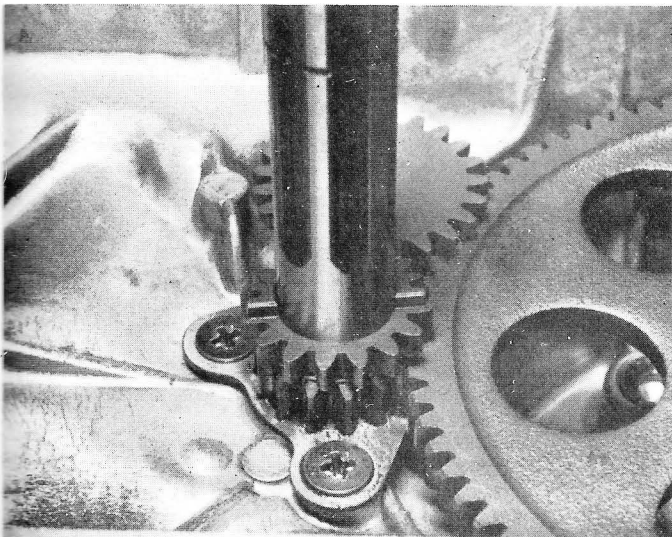
26.3b ... and secure with circlip



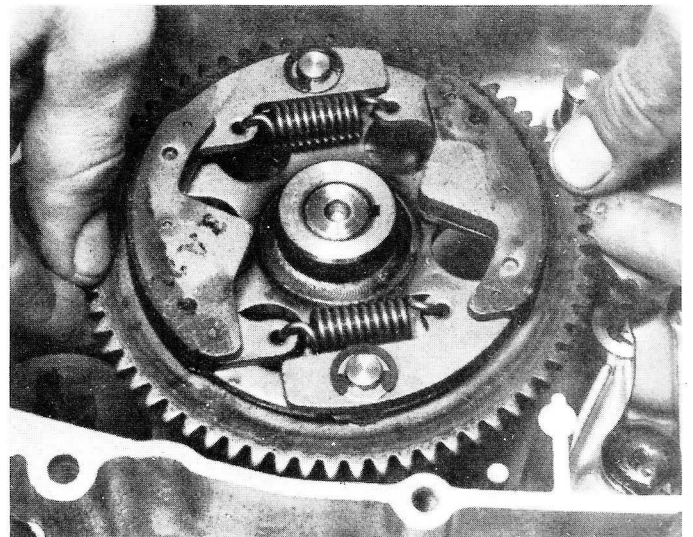
26.3c Install the driveshaft in its bearing ...



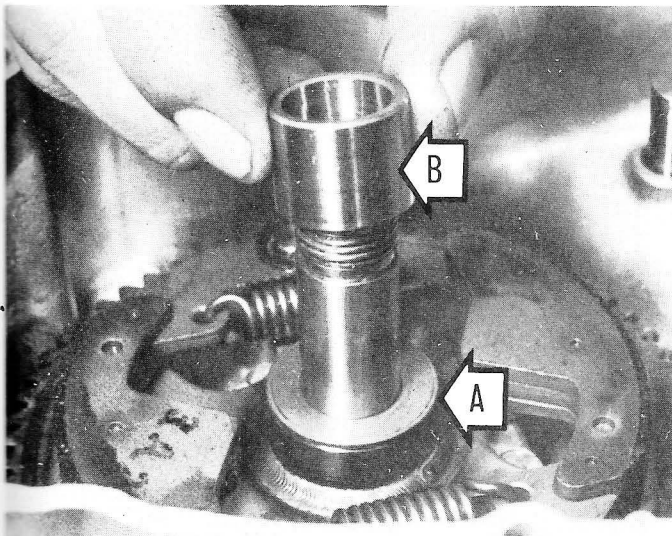
26.3d ... fit the thin shim washer ...



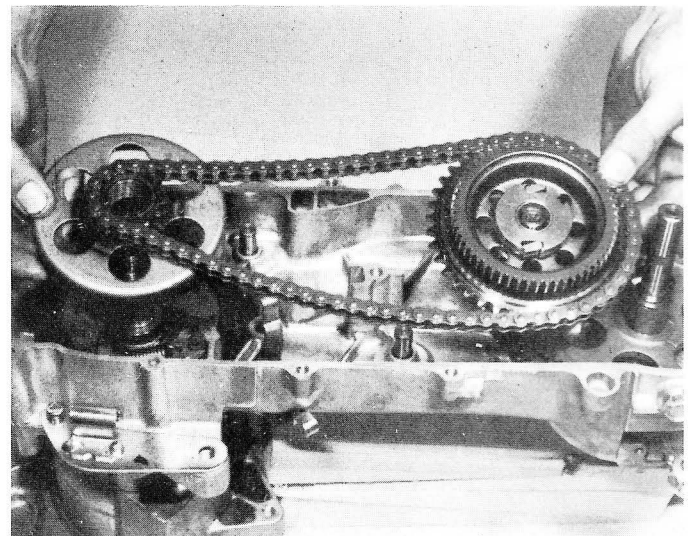
26.3e ... followed by the oil pump drive gear, dogs uppermost



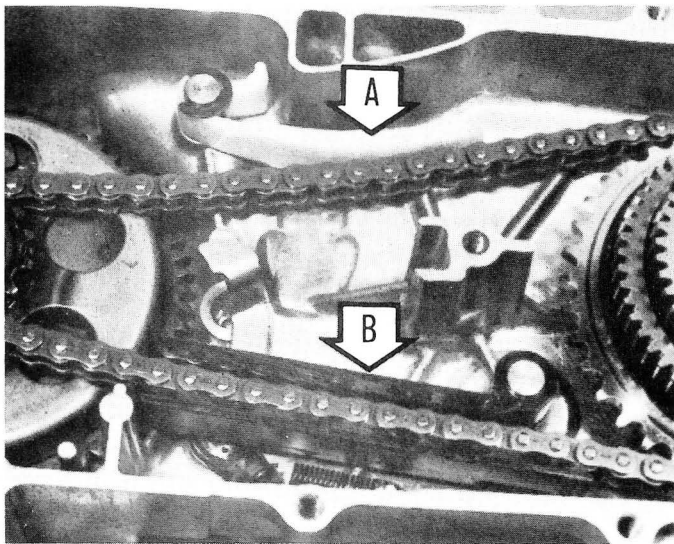
26.4a Slide 1st gear clutch cover crankshaft end ...



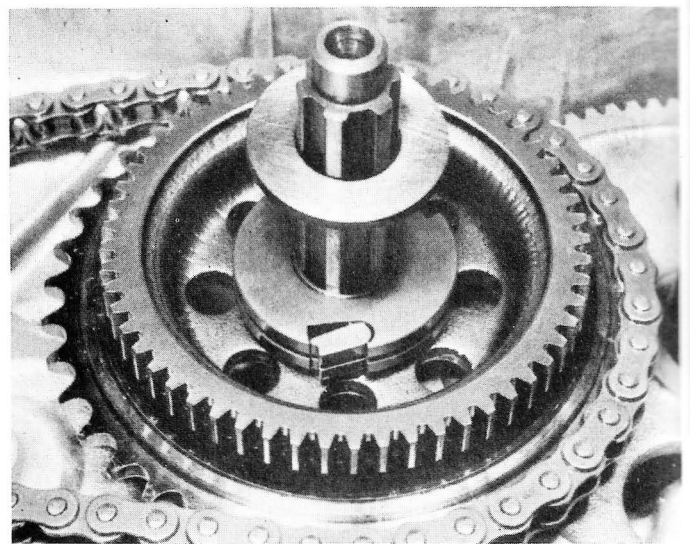
26.4b ... then fit thrust washer (A) and inner bush (B)



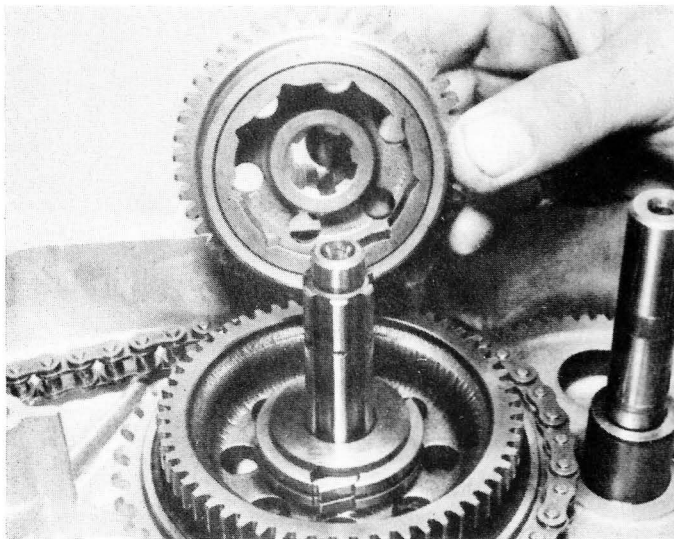
26.5a Lower assembled primary drive into position



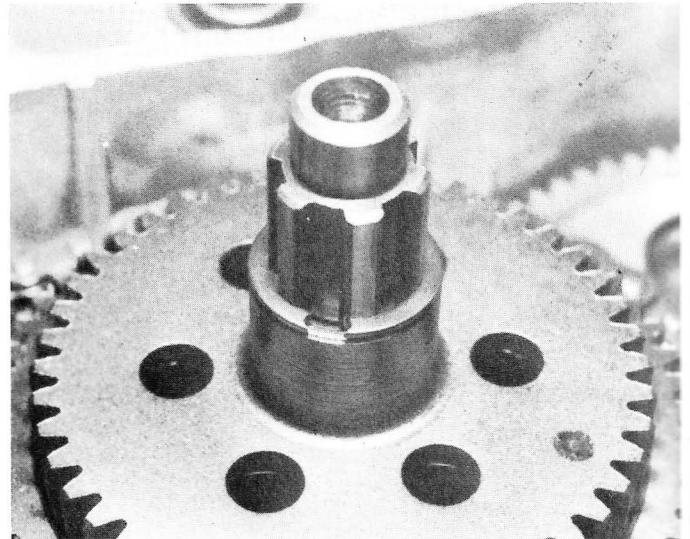
26.5b Check that chain runs as shown through upper (A) and lower (B) guides



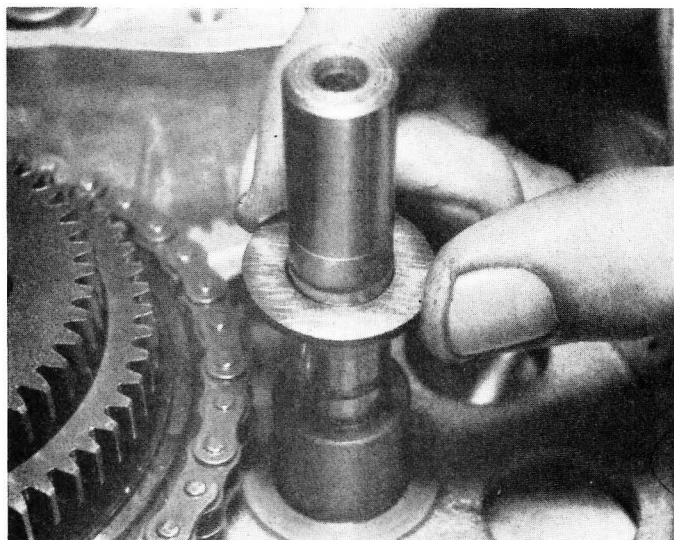
26.6a Check that pawl spring is secure, then fit large thrust washer



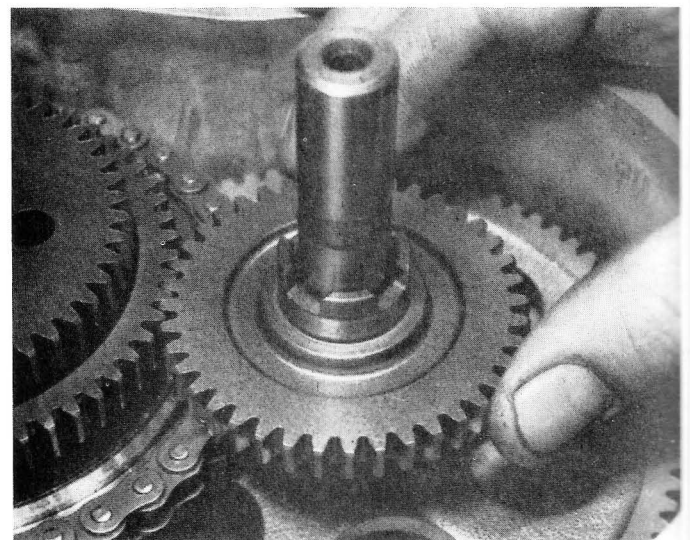
26.6b Fit the top driven gear, turning it clockwise until pawls engage



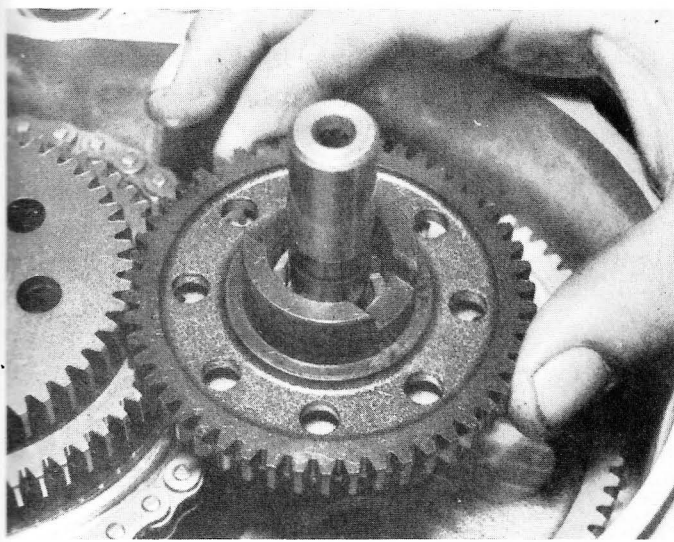
26.6c Secure top driven gear using a new circlip



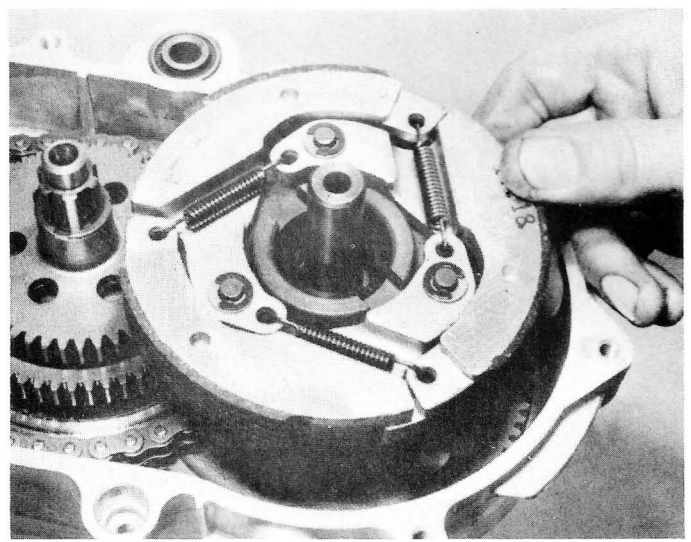
26.7a Fit thrust washer over rear wheel stub axle



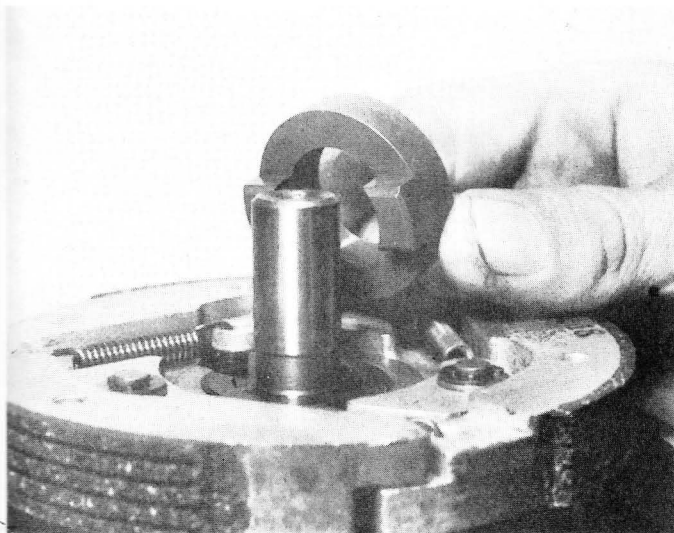
26.7b Place the idle driven gear over the shaft as shown ...



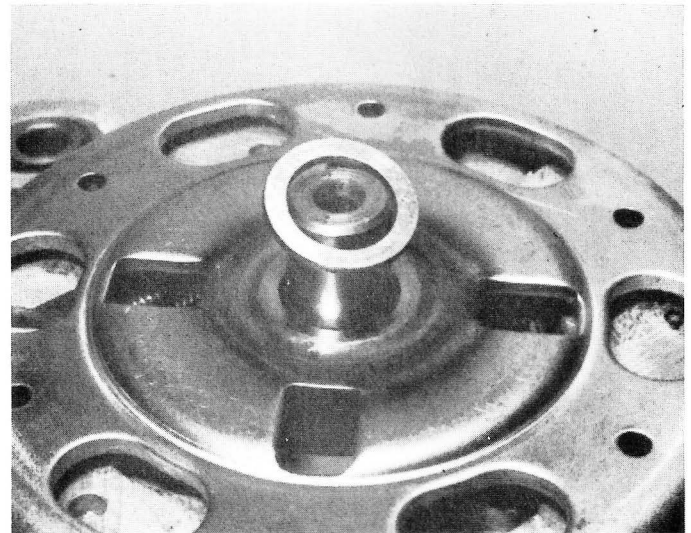
26.7c ... followed by the top driven gear



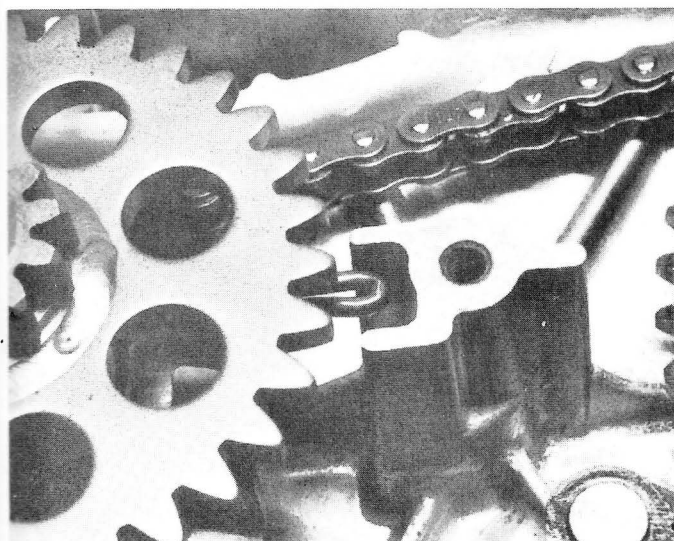
26.7d Place the 2nd gear clutch in position ...



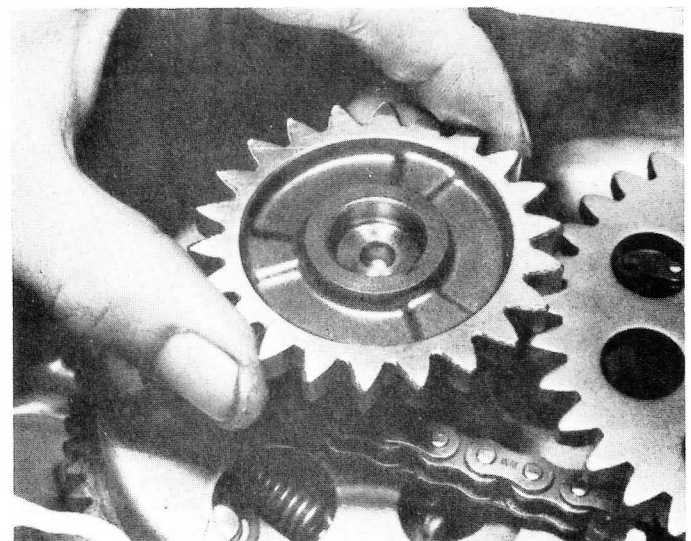
26.7e ... then fit the dogged spacer



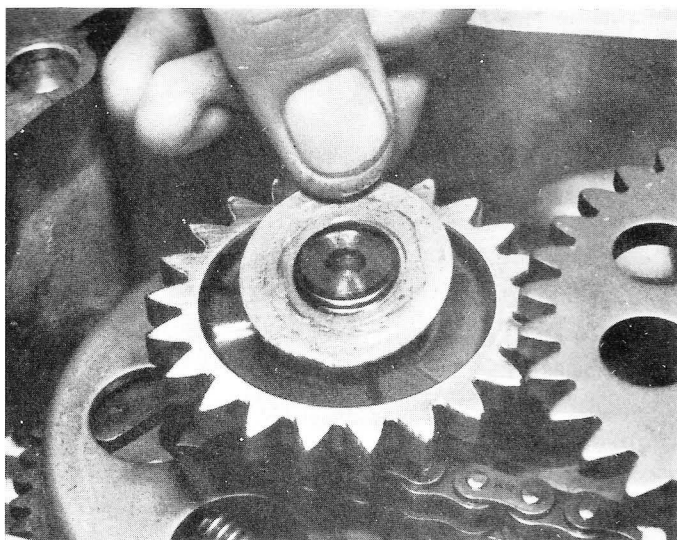
26.7f Fit the clutch drum and the small shim



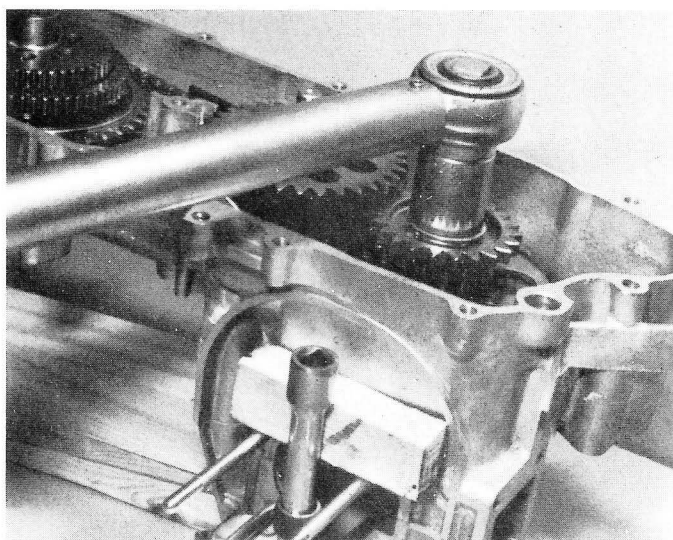
26.8a Offer up the kickstart idle gear assembly, noting that the friction clip must engage as shown



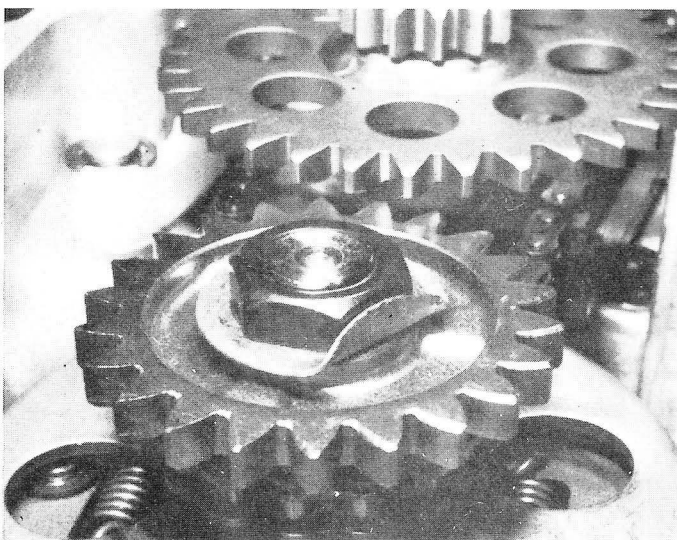
26.8b Place the kickstart driven gear over the crankshaft end



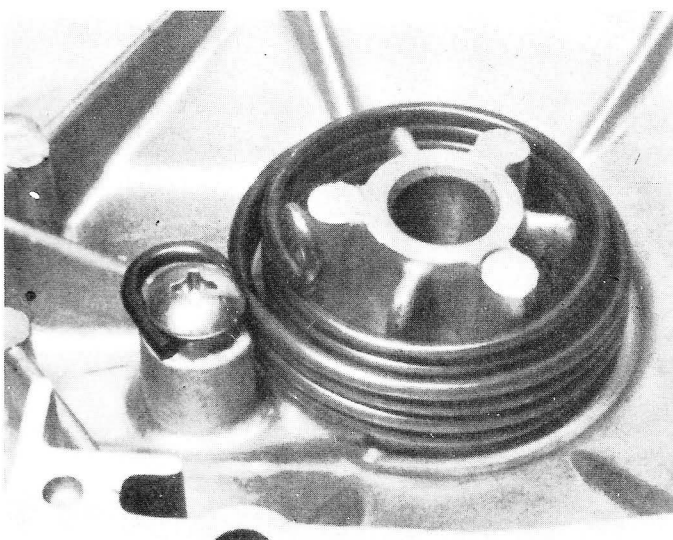
26.8c Fit the locking washer ...



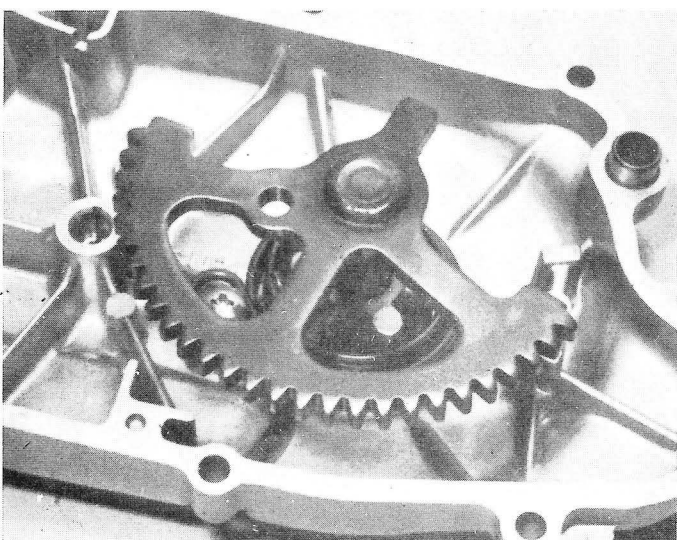
26.8d ... lock crankshaft and tighten retaining nut



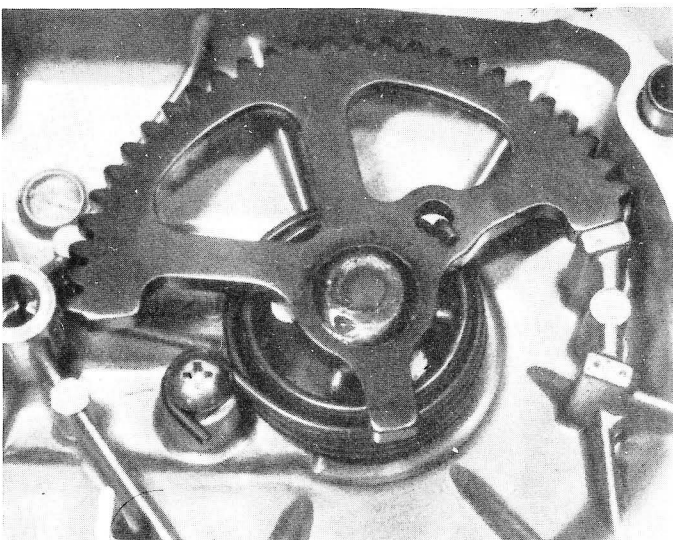
26.8e Bend over the locking tab to secure nut



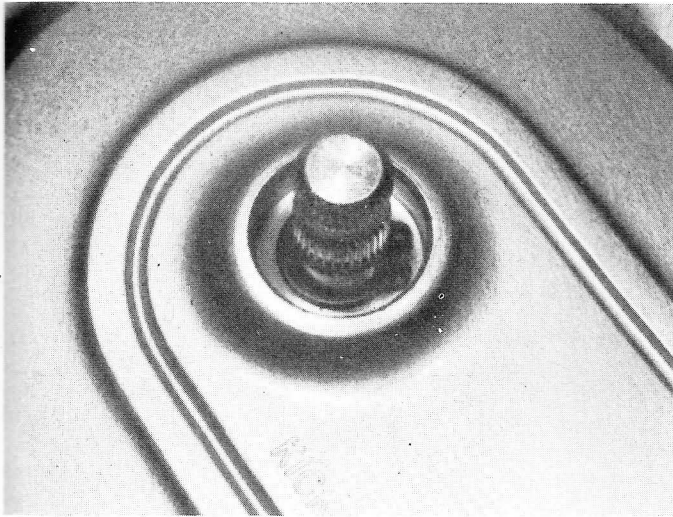
26.9a Position kickstart return spring as shown



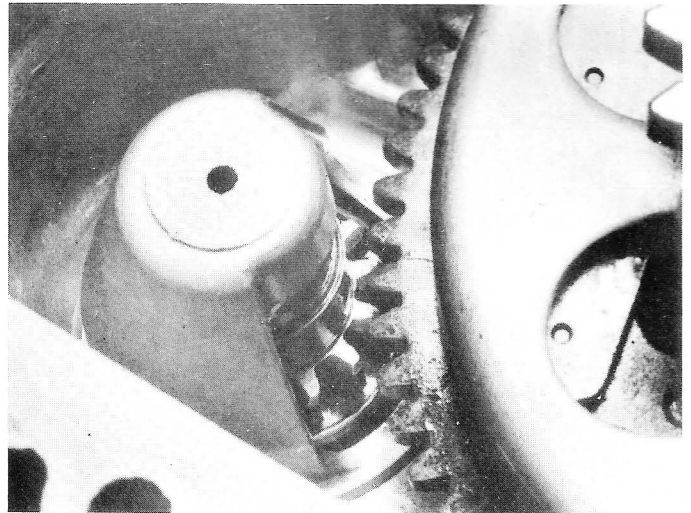
26.9b Offer up the quadrant, hooking spring end into hole



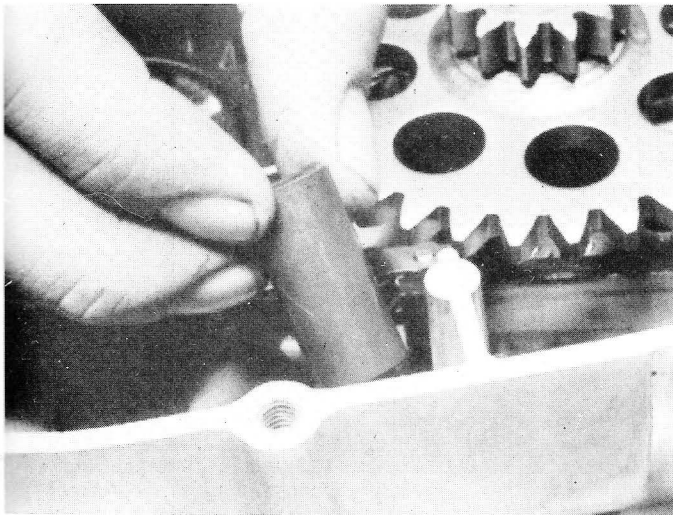
26.9c Carefully turn to this position to tension spring ...



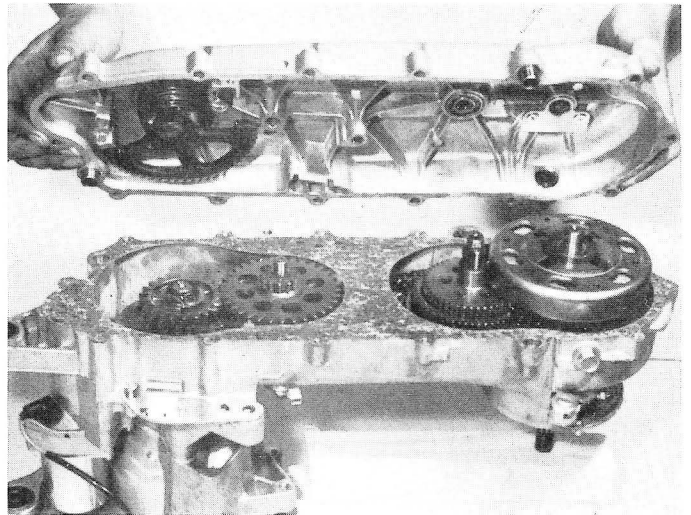
26.9d ... then secure with circlip, fit new seal and tighten anchor screw fully



26.10 Fit starter motor noting that it should engage as shown (CL50 D model only)



26.11 Fit the tubular kickstart stop over locating boss



26.12 Fit the cover, using a new gasket

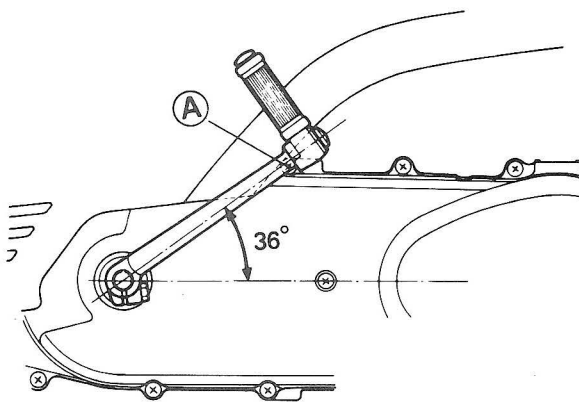


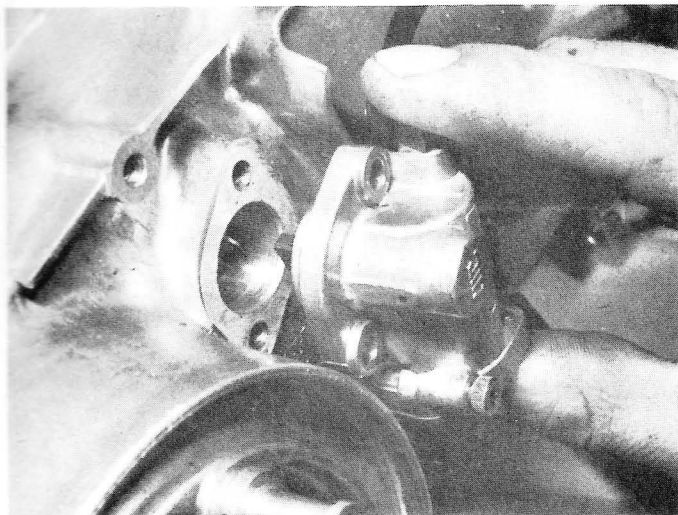
Fig. 1.15 Correct alignment of the kickstart lever

Align lever with crankcase screw A

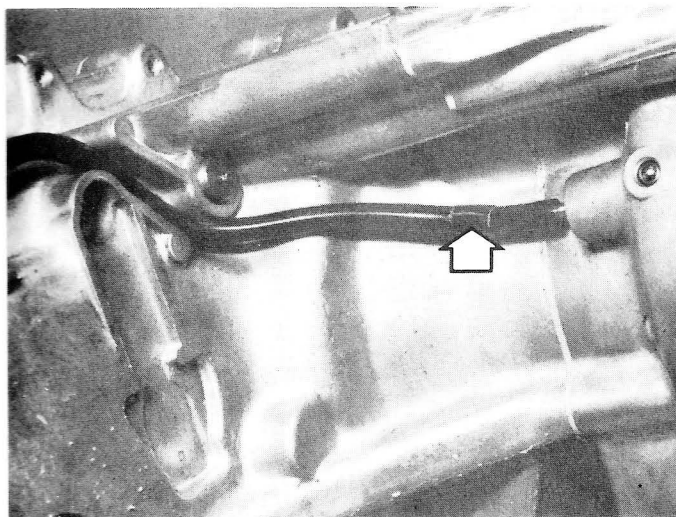
27 Reassembling the engine/transmission unit: refitting the oil pump

1 If the oil pump was removed during the overhaul, it can be refitted at this stage. Fit a new gasket to the pump body flange. Offer up the pump body, routing the pipes through the channel in the casing and ensuring that the drive dog engages in its slot. Fit and tighten the two retaining screws.

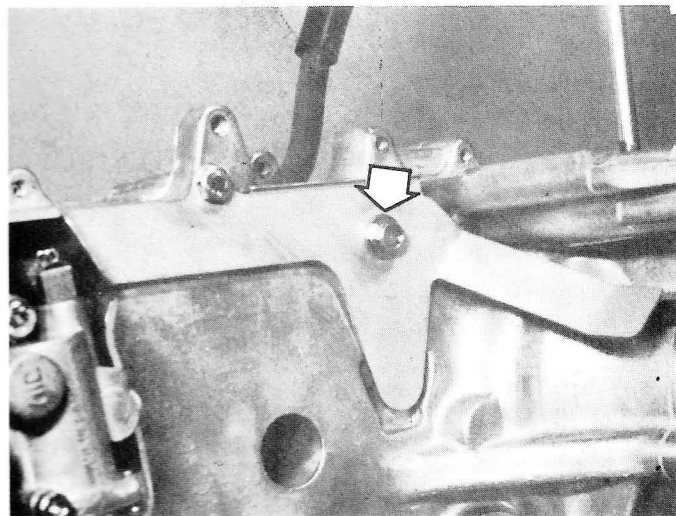
2 Connect the thinner delivery pipe to its stub at the rear of the flywheel generator housing and slide the steel clip over the stub to secure it. Check that both pipes are routed correctly (see photograph) and fit the pressed steel cover plate. Place the small rubber trim over the raised edge of the casting next to the pump body, then offer up and secure the pump cover. Remember that the pump must be bled after the engine unit has been installed.



27.1 Offer up the oil pump using a new gasket



27.2a Reconnect the oil delivery pipe, remembering to slide clip (arrowed) over pipe end to secure it



27.2b Fit cover plate, noting position of banjo bolt (arrowed)

28 Reassembling the engine/transmission unit: refitting the flywheel generator

- 1 Offer up the stator, ensuring that the wiring passes through the slot in the casing. Ensure that the stator plate locates fully in its recess, then turn it until the timing marks align accurately. Fit and tighten the retaining screws, making sure that the stator is not moved during tightening.
- 2 Clean and degrease the rotor bore and the crankshaft taper and refit the Woodruff key to its slot. Fit the rotor over the crankshaft end, ensuring that it seats fully over the key. If necessary, remove the rotor and realign the key. Apply a non-hardening thread locking compound to the rotor nut threads and screw it into place. Lock the crankshaft and tighten the nut to 3.5 – 4.3 kgf m (25.0 – 31.0 lbf-ft).

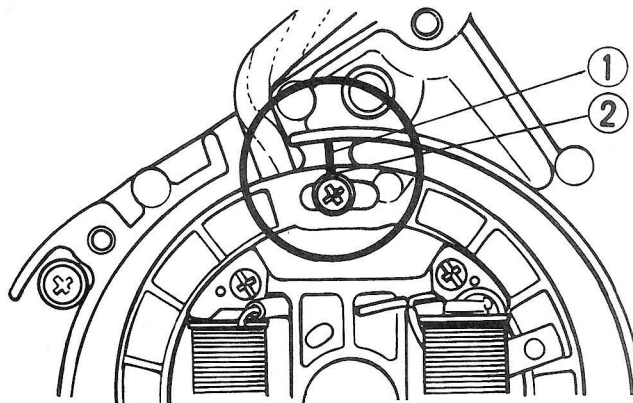
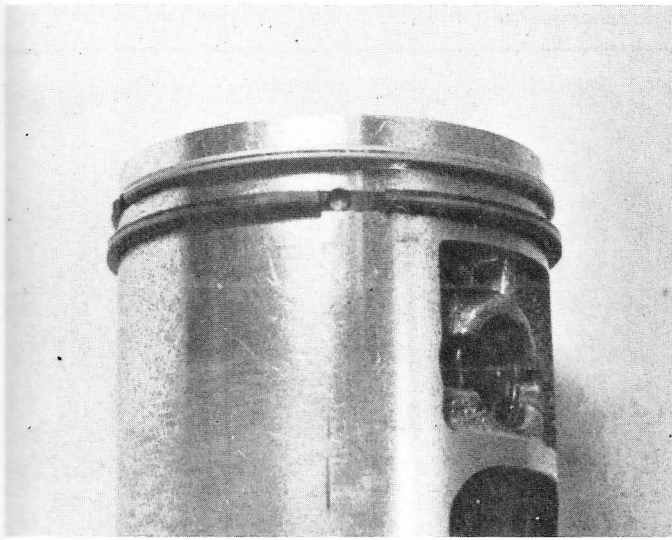


Fig. 1.16 When refitting the stator plate ensure that timing marks align as shown

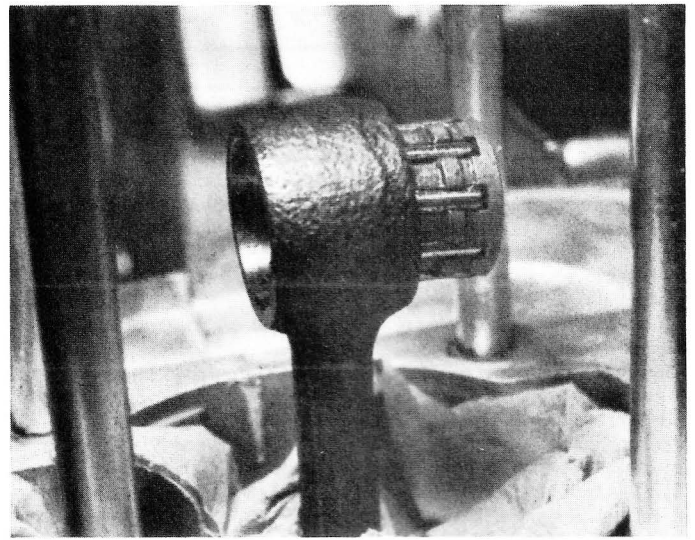
1 Crankcase index mark 2 Stator plate index mark

29 Reassembling the engine/transmission unit: refitting the piston, cylinder barrel and cylinder head

- 1 If the piston rings are not installed on the piston they should be fitted at this stage. Ensure that each ring is fitted to its correct groove and that they are fitted the right way up. It will be noted that the ring location peg slots are offset to prevent incorrect fitting.
- 2 Lubricate the small-end eye and bearing with engine oil and slide the bearing into position. Push the gudgeon pin into the piston from one side until it lies flush with the inner face of its supporting boss. Offer up the piston, ensuring that the arrow mark on the piston crown faces towards the exhaust port (towards the rear of the engine unit).
- 3 Push the gudgeon pin fully home, using hot water if necessary to expand the piston and thus facilitate fitting. Once the gudgeon pin is in place, secure it using only new circlips. Take care not to stretch the circlips more than is necessary to fit them and position the ends well clear of the removal slots.
- 4 Place a new cylinder base gasket over the holding studs, using a smear of grease to hold it in place and to ensure a good seal. Temporarily remove the rag packing from the crankcase mouth and lubricate the big-end bearing, and piston and rings and the bore surface with engine oil. Set the crankshaft at top dead centre (TDC) by pulling the piston to the top of its stroke.
- 5 Lower the cylinder barrel over the holding studs, ensuring that the exhaust port faces to the rear of the unit. Lower the barrel until the top of the piston is just engaged in the barrel spigot. Make sure that the rings are aligned with their locating pegs, then compress each one in turn and feed it into the bore. There is a tapered lead-in at the bottom of the bore to assist this operation, and no tools should be required.
- 6 Once the piston is located in the bore, remove the rag from the crankcase mouth and push the barrel down onto the base gasket. Place a new cylinder head gasket over the holding studs, then lower the cylinder head into place. Note that the two cowling studs should be on the generator (right-hand) side of the spark plug.
- 7 Fit the cylinder head nuts, tightening them evenly and progressively in a diagonal sequence to prevent warpage. The final torque figure is 0.8 – 1.2 kgf m (5.8 – 8.7 lbf ft). Check that the spark plug is clean and correctly gapped (it is good practice to fit a new plug and refit it).



29.1 Refit piston rings, aligning ends with location pegs



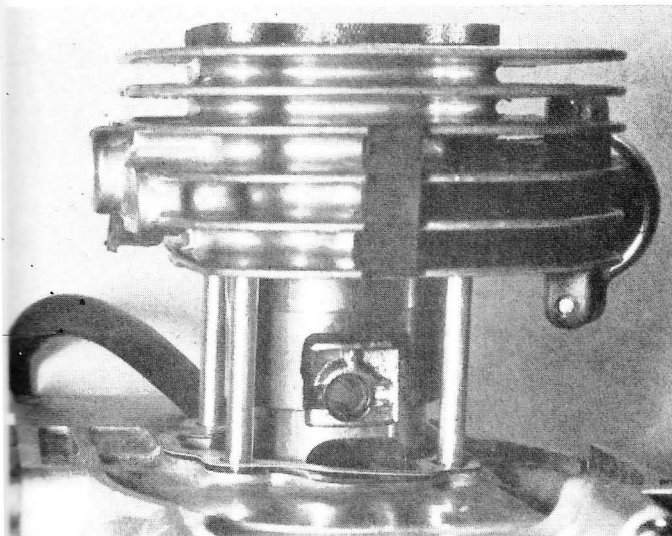
29.2a Fit small-end bearing and lubricate with oil



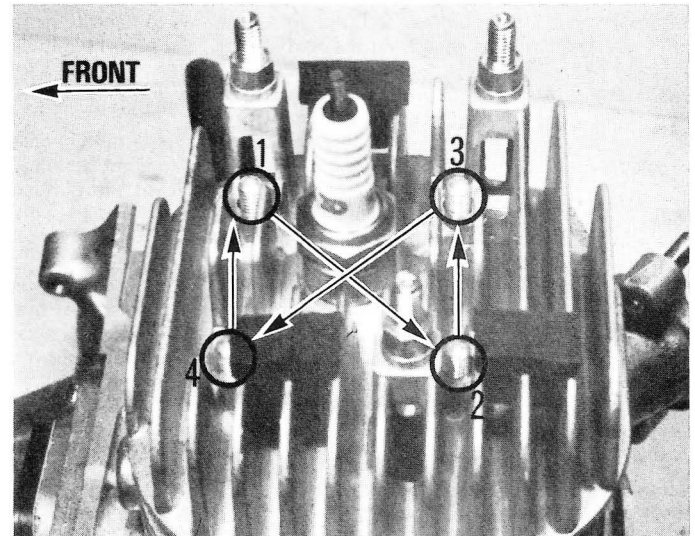
29.2b Arrow on piston crown must face exhaust port (rear of engine unit)



29.3 Secure gudgeon pin using new circlips



29.4 Fit new base gasket, then lower barrel into place



29.7 Tighten head nuts progressively, in sequence shown

30 Reassembling the engine/transmission unit: refitting the ancillary components

Reed valve unit

- 1 Carefully check and clean the reed valve unit, referring to Chapter 2 for details. Note that the unit should be absolutely free of dirt or dust, and can be washed in clean petrol to ensure this.
- 2 Remove the rag from the induction port and offer up the reed valve unit. Fit the retaining screws and tighten them evenly and progressively to prevent warpage. Note that on no account should a silicon rubber (RTV) sealant be used on the reed valve assembly; it is affected by direct contact with fuel and could be drawn into the engine.

Carburettor

- 3 Fit the heat transfer bar into its bore in the cylinder barrel, making sure that it is liberally coated in the white coloured heat transfer grease. The grease is of a special type and **must** be applied during installation, omission of the grease will render the automatic choke inoperative. If the existing grease was wiped off, do not use an ordinary lubricating grease. The correct grease can be ordered through a Suzuki Service Agent as Part Number 99000-25180.
- 4 Offer up the carburettor complete with the vacuum transmitting valve and hoses and ensure that the heat transfer bar enters the hole provided in the carburettor. Tighten the mounting screws evenly to prevent warpage.

Engine cowlings

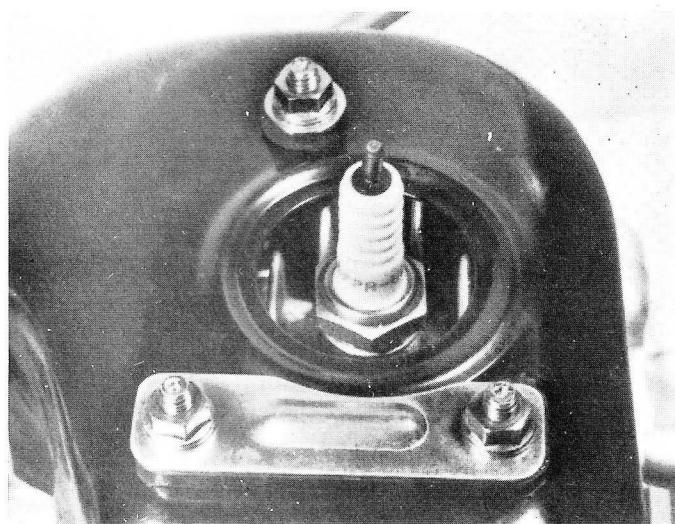
- 5 Place the cylinder cowl in position, noting that the generator output leads are routed through a cutout at the front of the unit. Fit the metal plate and washers, then tighten the retaining nuts evenly to prevent warpage.
- 6 Locate and retain the plastic cooling fan to the generator rotor, then fit the fan cowl.

Engine mounting

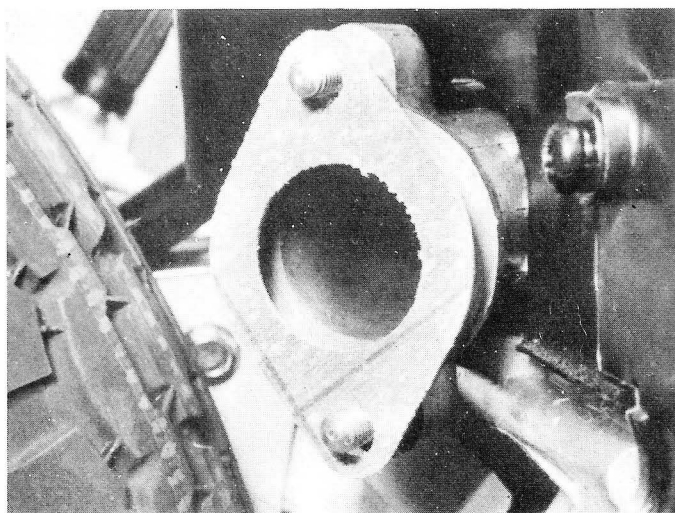
- 7 Offer up the engine mounting then grease and fit its retaining bolt. Do not tighten the bolt fully at this stage; it will be necessary to adjust the position of the mounting during engine installation.

Exhaust system

- 8 Fit a new gasket over the exhaust port studs. Offer up the system and fit the retaining nuts at the flange and the single lower bolt. Tighten them securely.



30.5 Fit cylinder cowl and secure using nuts and metal plate

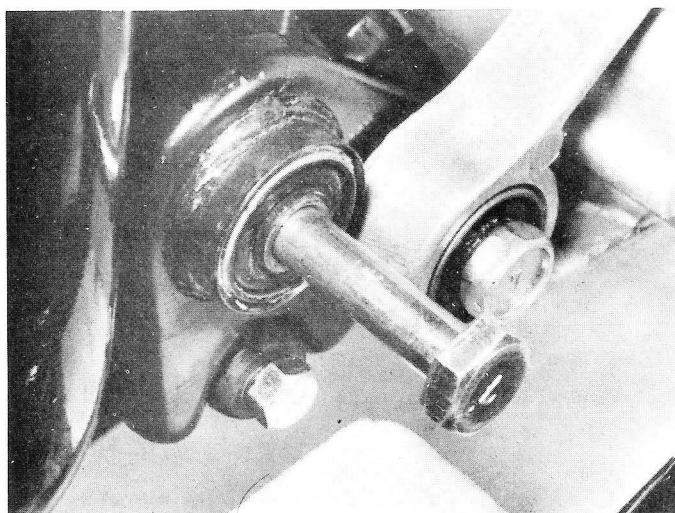


30.8 Use a new gasket at the exhaust port flange

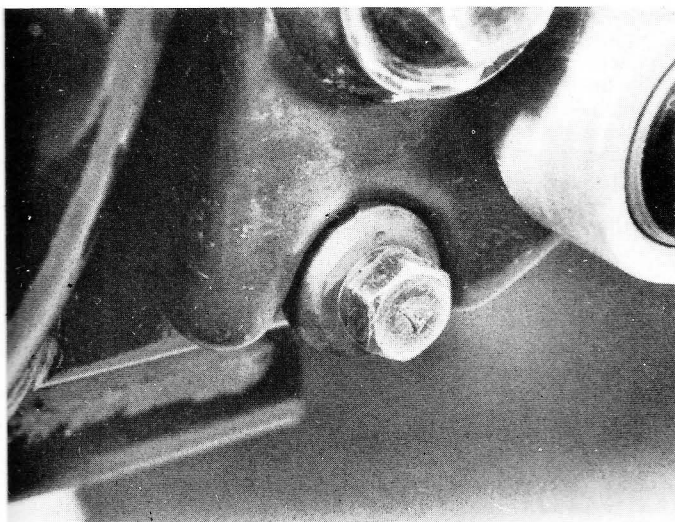
31 Refitting the engine/transmission unit in the frame

- 1 The engine/transmission unit can be installed by one person if necessary, but it is recommended that an assistant is to hand to help with manoeuvring and steadying the frame. Place the unit roughly in position below the frame, leaving it supported by its centre stand and rear wheel. Set the engine mounting bracket in the correct position and tighten the bolt just enough to hold it in place.
- 2 The engine mounting bracket locates over two rubber buffers and is retained by a rubber-bushed through bolt, the arrangement isolating the frame from engine vibration. To ease location over the buffers spray them with a small quantity of WD40 or similar, then manoeuvre the bracket into position. Grease and fit the through bolt, but do not tighten it at this stage.
- 3 Engage the rear suspension unit lower mounting and fit the retaining bolt, leaving it loose. Remove the wooden blocks from the underside of the frame and retract the centre stand. With the machine on its wheels and an assistant sitting on it to compress the suspension to its normal ride position, tighten the rear suspension unit bolt, the engine mounting bolt and the mounting bracket bolts. This ensures that the various rubber bushes are not under excessive stress due to twisting. The correct torque settings are as follows:

	kgf m	lbf ft
Engine mounting bolt	2.5 – 4.0	18.0 – 30.0
Engine bracket bolts:		
upper (through bolt)	2.5 – 4.0	18.0 – 30.0
lower (buffer bolts)	2.0 – 3.0	14.5 – 22.0
Rear suspension unit	2.0 – 3.0	14.5 – 22.0



31.2a Grease through bolt and slide it into position



31.2b Note how buffers engage in notches on the underside of engine mounting

32 Refitting the engine/transmission ancillaries

1 Refit the rear brake cable to the kickstart interlock lever and the rear brake arm. Note that the cable has two adjusters, and that the in-line adjuster near the interlock lever must be adjusted first to give approximately 1 mm of movement in the cable before the lever begins to move. The rear brake adjuster can then be set so that the brake begins to operate soon after the handlebar lever is squeezed. The exact setting is to some extent discretionary, but check that both the brake and the kickstart mechanism function normally.

2 Refit the vacuum transmitting valve to its securing strap on the frame. Fit the spark plug cap, ensuring that the rubber seal engages in the cowlings cut out. Remove the plug which was fitted to the oil tank outlet and reconnect the oil pipe. Remember that it will be necessary to bleed the pump of air when the engine is first started. For details of this procedure refer to Chapter 2, Section 14.

3 Install the carburettor throttle valve assembly, making sure that the slot in the side of the valve engages over its locating pin, and screw the top firmly home. Reconnect the carburettor fuel and vacuum pipes to the fuel tap. Note that the fuel pipe runs from the lower stub on the carburettor to the higher stub on the fuel tap and that the two are connected by the longer of the two hoses. Check that the tank contains fuel then use a screwdriver to turn the tap to the 'PRI' (prime) position.

4 Reconnect the wiring connectors near the fan cowling. The wires are colour-coded to facilitate reconnection. On the CL50D model the separate starter motor lead should also be connected. Refit the engine earth lead to the adjacent fan cowling screw. Note that all wiring connectors will benefit from the application of silicone grease during assembly. This will prevent problems from corrosion or the ingress of water at a later date.

5 If not already in position, offer up and secure the air filter assembly, ensuring that the intake hose is fitted securely. Install the battery in its recess and reconnect the battery leads. Make sure that the red lead is connected to the + terminal and the black lead to the - terminal. Switch on the ignition and check that the parking lamps, brake lamp, turn signals and warning lamps operate normally.

6 Check that the transmission drain plug is secure, then add 500 cc (0.88 Imp pint) of SAE 20W 40 engine oil. The oil level should be checked after the engine has been run for a few minutes as described in Section 32. Refit the footboard assembly but do not fit the front or side panels at this stage. Make a final check around the machine to ensure that all components and connections are secure.

33 Starting and running the rebuilt engine

1 Attempt to start the engine using the usual procedure adopted for a cold engine. Where applicable, the kickstart should be used in preference to the electric starter, to preserve battery charge if the engine proves reluctant to start or is difficult to turn over because of tightness caused by the fitting of new components. Do not be disillusioned if there is no sign of life initially. A certain amount of perseverance may prove necessary, to coax the engine into activity even if new parts have not been fitted. Should the engine persist in not starting, check that the spark plug has not become fouled by the oil used during re-assembly. Failing this, go through the fault finding routine and work out what the problem is methodically.

2 When the engine does start, keep it running as slowly as possible to allow the oil to circulate. Check that the fuel tap is switched back to the 'On' position. During the initial running, a certain amount of smoke may be in evidence due to the oil used in the reassembly sequence being burnt away. The resulting smoke should gradually subside.

3 Check the engine for blowing gaskets and oil leaks. Before using the machine on the road, check that all controls are correctly adjusted and working efficiently, and that the transmission is working properly. A quick check for the latter can be made by placing the machine on its centre stand so that the rear wheel is clear of the ground, then increasing engine speed while listening for any untoward noises. Take great care that the machine does not fall off its stand.

4 When the engine and transmission have warmed up to normal operating temperature, and before the machine is taken out on the road, stop the engine, place the machine on its centre stand on level ground and allow a few minutes for the transmission oil level to settle before removing the oil level plug. Oil should trickle slowly from the level plug orifice. If no oil appears, add the necessary amount until the level is correct. If the oil flow is too fast, allow the surplus to drain into a container. Refit the level plug, ensuring that its gasket is in good order, and wipe off any surplus oil.

34 Taking the rebuilt engine on the road

1 Any rebuilt machine will need time to settle down, even if parts have been replaced in their original order. For this reason it is highly advisable to treat the machine gently for the first few miles to ensure oil has circulated throughout the lubrication system and that new parts fitted have begun to bed down.

2 Even greater care is necessary if the engine has been rebored or if a new crankshaft has been fitted. In the case of rebore, the engine will have to be run in again, as if the machine were new. This means a restraining hand on the throttle until at least 500 miles have been covered. There is no point in keeping to any set speed limit; the main requirement is to keep a light loading on the engine and to gradually work up performance until the 500 mile mark is reached. These recommendations can be lessened to an extent when only a new crankshaft is fitted. Experience is the best guide since it is easy to tell when an engine is running freely.

3 Remember that a good seal between the piston and the cylinder barrel is essential for the correct functioning of the engine. A rebored two-stroke engine will require more careful running-in, over a long period, than its four-stroke counterpart. There is a far greater risk of engine seizure during the first hundred miles if the engine is permitted to work hard.

4 If at any time a lubrication failure is suspected, stop the engine immediately and investigate the cause. If an engine is run without oil, even for a short period, irreparable damage is inevitable.

5 Do not on any account add oil to the petrol under the mistaken belief that a little extra oil will improve the engine lubrication. Apart from creating excess smoke, the addition of oil will make the mixture much weaker, with the consequent risk of overheating and engine seizure. The oil pump alone should provide full engine lubrication.

6 Do not tamper with the exhaust system. Unwarranted changes in the exhaust system will have a marked effect on engine performance, invariably for the worse. The same advice applies to dispensing with the air filter or the air filter element.

7 When the initial run has been completed, allow the engine unit to cool and then check all the fittings and fasteners for security. Re-adjust any controls which may have settled down during initial use.

Chapter 2 Fuel system and lubrication

Contents

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Specifications

Fuel tank capacity

Overall	3.0 litres (5.3 Imp pint)
---------------	---------------------------

Carburettor

Make	Mikuni
Model	VM14SH
Bore size	14 mm (0.55 in)
Identification No	02120
Main jet	65
Air jet	2.5 mm
Jet needle	3D23
Clip position	4th groove from top
Needle jet	E-1
Cut-away	2.0
Pilot jet	17.5
Pilot outlet	0.8 mm
Float valve seat	1.5
Starter jet	37.5
Float height	22.4 ± 1.0 mm (0.88 ± 0.04 in)
Throttle cable free play	0.5 - 1.0 mm (0.02 - 0.04 in)
Idle speed	1600 ± 50 rpm

Reed valve

Reed maximum warpage	0.2 mm (0.008 in)
Reed tip/valve case minimum overlap	1.0 mm (0.039 in)

Engine lubrication system

Type	Pump fed total loss, Suzuki CCI
Oil tank capacity	0.8 litre (1.4 Imp pint)
Oil grade	Any good quality pump type two-stroke oil
Oil pump drive ratio	4.107 : 1 (40/14 x 23/16)
Oil pump discharge rate @ 3000 rpm	0.9 - 1.2 cc (0.032 - 0.042 Imp fl oz) in 6 minutes

Transmission lubrication system

Type	Oil bath
Oil capacity:	
At oil change	400 cc (0.70 Imp pint)
At overhaul	500 cc (0.88 Imp pint)
Oil grade	SAE 20W/40 engine oil

1 General description

Fuel is supplied by gravity to the carburettor from a tank mounted underneath the seat. The fuel tap is of the vacuum type, being opened by the negative pressure created in the inlet stub as the engine is running; the tap therefore has no 'Off' position. No reverse supply is provided, a fuel gauge being fitted to give visual warning of the amount of fuel remaining in the tank.

The carburettor is of the conventional concentric float type with a slide throttle valve. It is fitted with a fully automatic choke to provide a rich mixture for starting. A choke plunger is in the raised position when the engine is cold, thus opening an auxiliary circuit within the carburettor which allows fuel to pass into the carburettor venturi from the float chamber. When the engine starts, the negative pressure created in the inlet stub passes via the vacuum transmitting valve to act on a diaphragm, partially closing the plunger and automatically reducing the amount of surplus fuel feed to the engine. As the engine warms up to normal operating temperature the heat is transferred from the cylinder barrel via a copper heat transfer bar and wax thermostatic plunger, to depress fully the choke plunger, shutting off completely the choke circuit.

A reed valve is fitted in the inlet tract to improve engine efficiency, particularly at lower speeds, thus improving fuel economy and acceleration.

The piston, cylinder bore, the connecting rod big- and small-end bearings and the crankshaft right-hand main bearing are fed with oil from a separate tank mounted underneath the seat, eliminating the need for mixing oil with the petrol. The oil feed is by a pump driven by gears from the primary shaft. This means that oil consumption is reduced, since the supply is made only when the machine is moving, but protracted periods of idling must be avoided since the engine will be receiving no direct lubrication. The system is completely automatic and is not adjustable.

All transmission components and the crankshaft left-hand main bearing are lubricated by splash from a supply of oil contained in the transmission casing.

2 Fuel tank: removal, examination and refitting

- 1 Place the machine on the centre stand, remove the centre panel and both side panels, and lift the seat. Release the nuts which secure the seat to its hinge and remove it, then remove the two screws which retain the main bodywork centre section to the front of the tank.
- 2 Disconnect the fuel and vacuum pipes at the fuel tap, noting that it should be set to the 'On' position. Mark the pipes to avoid confusion during reassembly. Remove the tank mounting bolts and manoeuvre it clear of the frame.
- 3 Refitting is a straightforward reversal of the above procedure, but

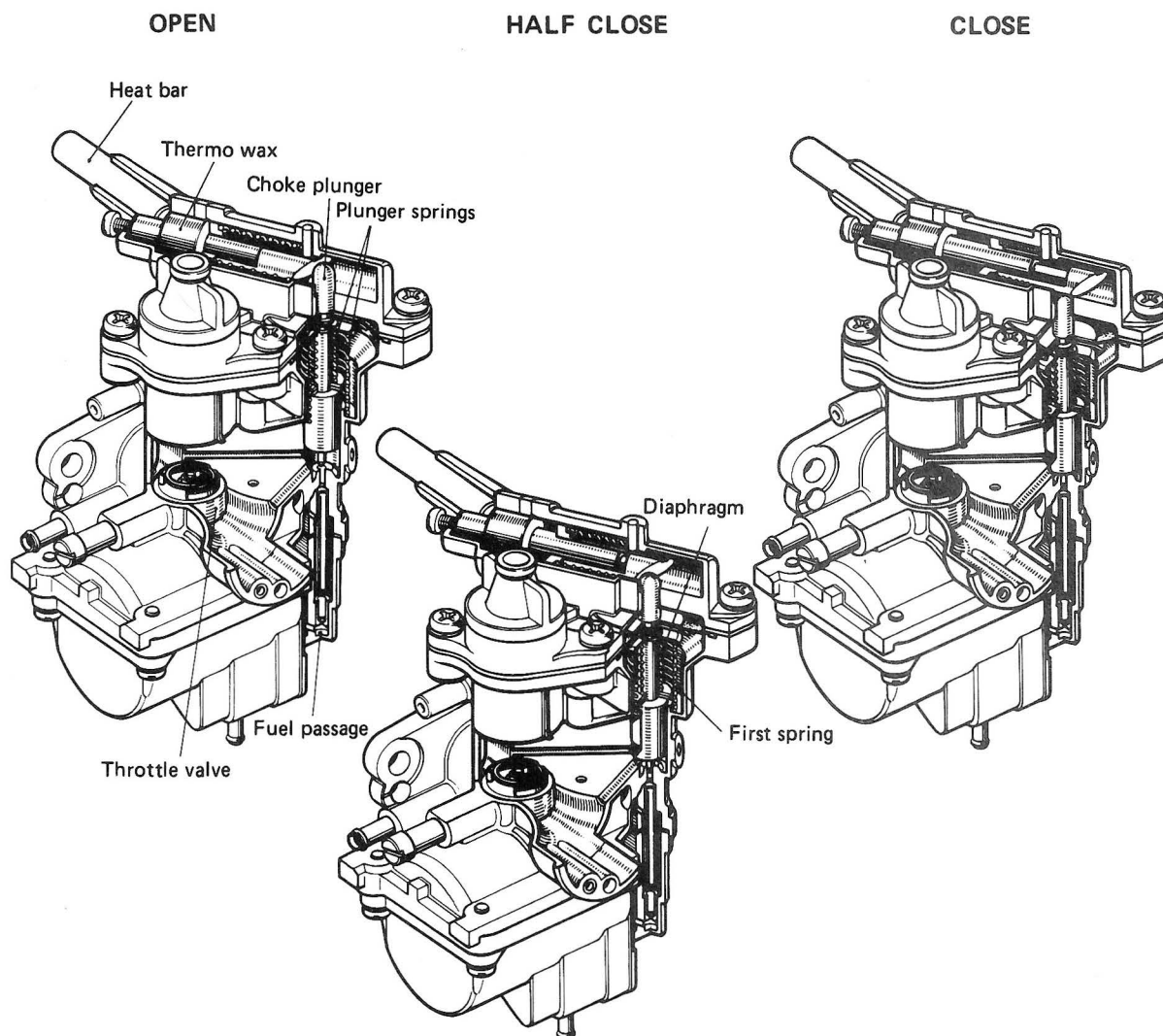
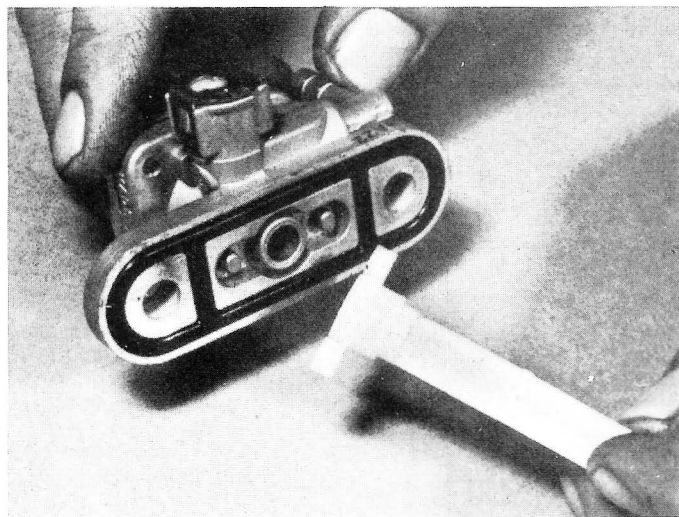


Fig. 2.1 Operation of the automatic choke

care must be taken to ensure that the vacuum and fuel pipes are correctly refitted, and that the seat is aligned correctly with the rear catch before the seat/fuel tank mounting bolts are tightened.

4 Since the fuel tank is well enclosed within the frame, the only likely cause of problems is corrosion. For this reason, care must be taken to repaint any areas of bare metal whenever the tank is removed; ensure that the surface is thoroughly cleaned and properly prepared before paint is applied. One of the many proprietary rust-proofing compounds will prove useful in preventing future rusting. Internal corrosion can be removed by withdrawing the fuel tap and the fuel gauge sender unit, blanking off their mounting holes, and swilling a mixture of paraffin and gravel around inside the tank to chip away as much of the rust as possible; be very careful to wash out the tank several times after such an operation to ensure that surplus dirt does not cause blockage in the fuel system.

5 If cracks or splits are found at any time, these may be repaired by welding, but all components must be removed from the tank and great care taken to flush out the tank several times with water to remove all trace of petrol before the tank is taken to a welding expert for attention. Remember that petrol vapour is highly explosive; take care to prevent the risk of fire or explosion when working on any part of the fuel system.



3.2 Fuel filter gauze can be detached for cleaning

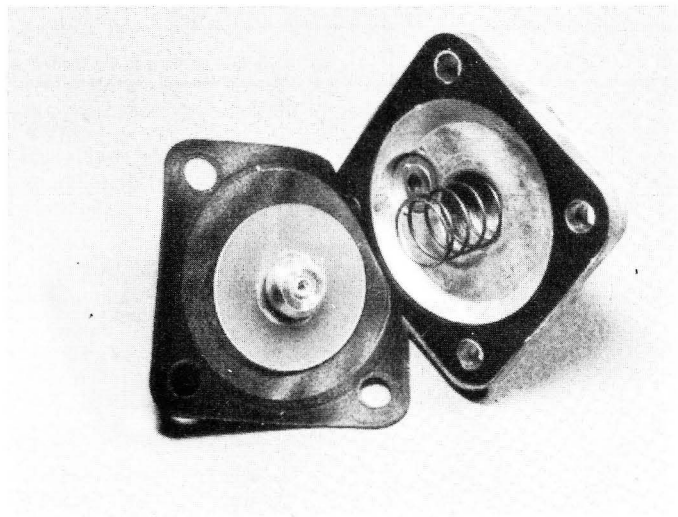
3 Fuel tap: removal, examination and refitting

1 Disconnect the vacuum and fuel pipes at the carburettor end, marking them as a guide during reassembly. Place the end of the fuel pipe into a suitable can, then turn the tap to the 'PRI', or prime position, using a screwdriver. Allow the tank to drain, then set the tap back to the 'ON' position. Remove the two bolts which secure the tap, to the underside of the tank and lift it away.

2 The filter gauze set in the tap body can be detached for cleaning with a soft-bristled brush. If the gauze is found to be torn, the complete tap assembly must be renewed to prevent the entry of dirt into the carburettor.

3 The tap action can be checked by disconnecting the fuel and vacuum pipes from the carburettor. With the tap in the 'On' position, no petrol should emerge from the fuel pipe end until suction is applied to the vacuum pipe. If petrol is found to be leaking while suction is not applied to the vacuum pipe, the tap is damaged or worn and must be renewed to prevent flooding.

4 While the tap can be partially dismantled, this is only of use if it is necessary to clear a blockage caused by dirt. No individual components are available to repair a tap that is damaged or worn.



3.4 If tap is dismantled for cleaning, take care not to damage the diaphragm

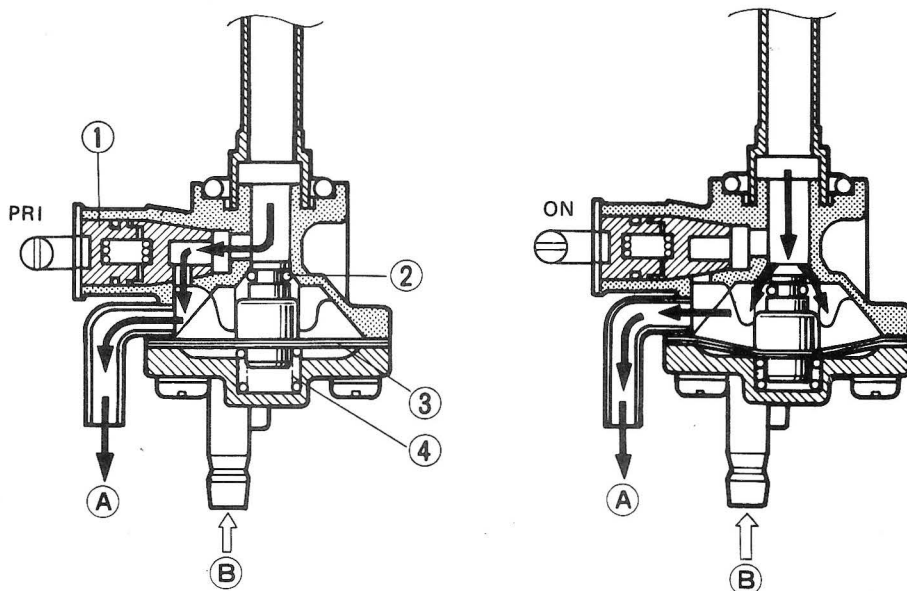


Fig. 2.2 Operation of the vacuum fuel tap

- 1 Fuel valve
- 2 O-ring
- 3 Diaphragm
- 4 Spring
- A Fuel flow
- B Vacuum

4 Fuel gauge assembly: removal and replacement

1 The fuel tank incorporates a mechanical fuel level gauge located next to the filler cap. A foamed plastic float projects downwards into the tank, supported by a metal frame. As the float moves up or down in response to the change in fuel level, it turns a thin spiral strip which is attached to the gauge needle and the fuel level is thus indicated against a scale in the gauge head.

2 The gauge mechanism is extremely simple in construction and operation, and it is unlikely that it will need to be removed other than in the course of tank repairs. If the gauge jams in one position it can usually be freed by rocking the machine from side to side.

3 If removal is necessary, unscrew the plastic lens from the top of the unit, using the projections provided. Note that the plastic is brittle, so take care not to damage it during removal. Lift away the sealing washer, then manoeuvre the gauge mechanism out of the tank, taking care not to bend it. The unit is refitted by reversing the above sequence, and the lens should be fitted hand tight only.

5 Fuel and vacuum pipes: examination and renewal

1 Since both fuel and vacuum pipes are made from thin-walled synthetic rubber, with the seal being made largely by an interference fit between each pipe and its union, the pipes will not require attention unless they become hardened with age or split. If such damage occurs only at the union, it can be repaired by cutting off the damaged length and refitting the pipe, but this can be done only once or twice before the complete pipe must be renewed. On renewal, use only tubing of the correct size and type; never use natural rubber or clear plastic tubing. Always replace the pipe protecting springs to prevent chafing.

2 Note that the manufacturer recommends that the fuel and vacuum pipes be renewed every four years.

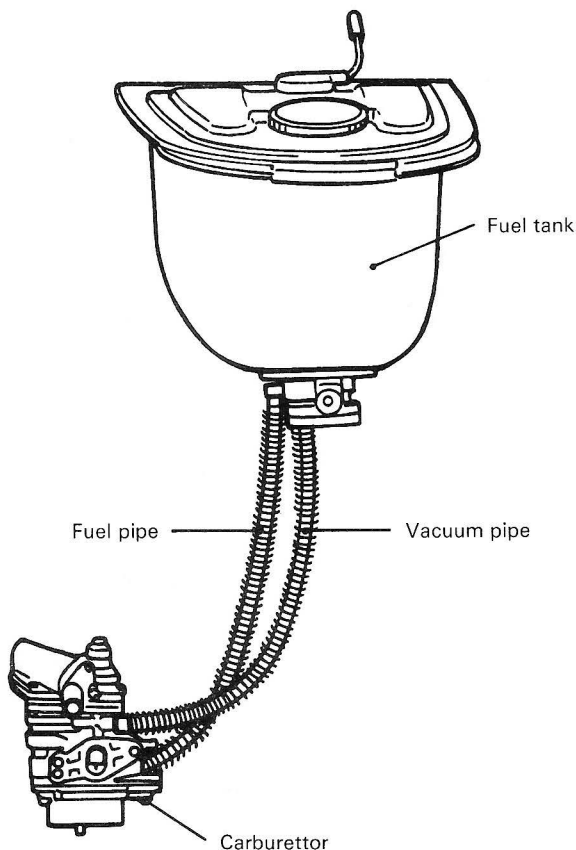
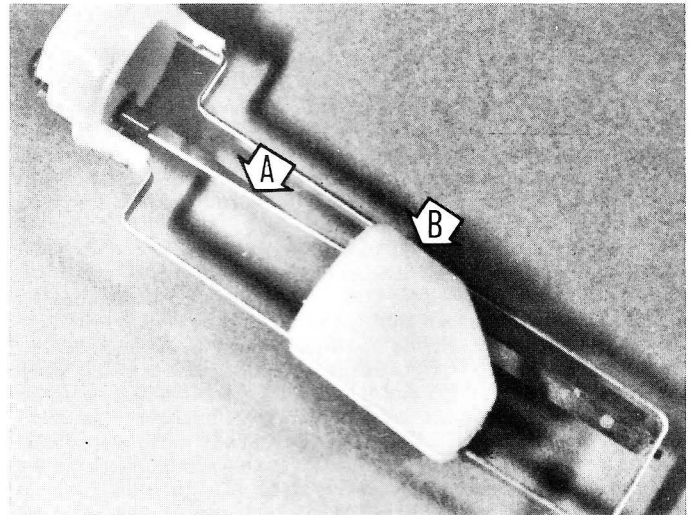


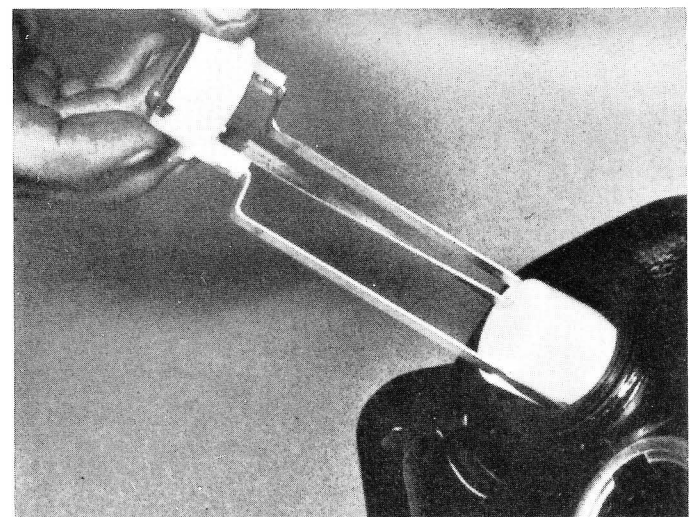
Fig. 2.3 Fuel and vacuum pipe locations



4.1 Gauge needle is turned by spiral strip (A) moved by the formed plastic float (B)



4.3a Unscrew the plastic lens, taking care not to damage it



4.3b Gauge assembly can now be manoeuvred out of tank

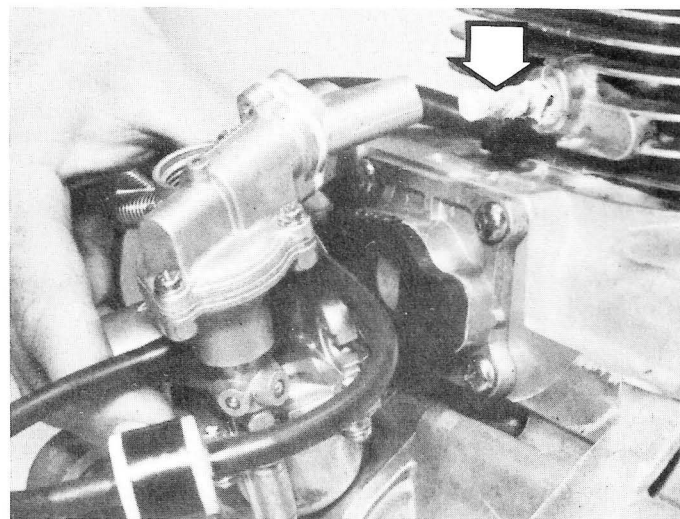
6 Carburettor: removal and refitting

1 To gain access to the carburettor it will be necessary to remove the side panels and the centre section below the seat. Start by releasing the single cross-head screw which retains the centre section and carefully remove it. The side panels are retained by projections which pass through rubber grommets and are also located by lips against the main frame panel and the footboard. The lips are easily damaged and care must be taken when freeing them.

2 Free the fuel and vacuum pipes at the carburettor end, having first marked one as an aid to identification during reassembly. Release the vacuum transmitting valve from its retaining clip on the frame, but leave the connecting pipes attached to the carburettor.

3 The carburettor is secured by two screws to its mounting flange. One of these is obscured by the carburettor body, but can be reached by way of a hole provided in the casting. Slacken both screws, then carefully lift the instrument clear of the mounting flange. Note that a copper heat transfer bar connects the automatic choke mechanism on the top of the carburettor to the cylinder. The bar will drop clear as the carburettor is lifted away, and care should be taken to catch it. Try not to wipe off or contaminate the white coloured heat conducting grease which coats the bar.

4 Refitting is a straightforward reversal of the removal sequence, but it should be noted that the heat transfer bar must be coated with the special grease mentioned above. On no account should ordinary lubricating grease be used; it will not work, and the automatic choke will thus be rendered inoperative. The correct grease can be ordered through a Suzuki Service Agent as Part Number 99000 – 25180.



6.3 Removing the carburettor. Note copper heat transfer bar (arrowed) and its coating of special grease

7 Carburettor: dismantling, examination and reassembly

1 Remove the drain screw from the base of the float chamber and allow all surplus petrol to drain into a suitable clean container. Check that no droplets of water or particles of dirt have emerged with the petrol; if any are found, great care must be taken to remove all traces of foreign matter from the carburettor.

2 Invert the carburettor, remove the four screws which retain the float chamber and withdraw it; a gentle tap may be required to break the seal. If undamaged and in good condition, the float chamber gasket may be re-used; it will generally stick to one surface or the other. Push out the float pivot pin and withdraw the float assembly and float needle. Remove the screw which secures the float needle seat retaining plate, then withdraw the retaining plate and carefully use a pair of pliers to pull out the seat, complete with its sealing O-ring.

3 The main jet is screwed into the base of the pillar in the centre of the carburettor body; use a close-fitting screwdriver to unscrew it. The needle jet is inserted into the pillar above the main jet and can be pressed out from above by passing a wooden dowel down through the throttle valve bore. Unscrew the pilot jet from its recessed location in the pillar adjacent to the main jet.

4 If it is necessary to remove the throttle stop screw, first screw it inwards until it seats lightly, counting and recording the exact number of turns necessary, then remove the screw, complete with its spring, metal washer and O-ring.

5 The automatic choke assembly is contained in the top of the carburettor body and should be left undisturbed. If any damage or wear occurs to any part of the choke assembly it can be repaired only by the renewal of the complete carburettor assembly; no individual components are available as replacement parts. If dismantling is necessary, proceed as follows.

6 Remove the vacuum transmitting valve, then unscrew the four screws which secure the carburettor top, and withdraw the top and its gasket. Remove from the carburettor body the choke plunger assembly and the coil spring. The plunger assembly can be dismantled by displacing the small circlip which retains the spring top collar so that the collar and spring can be removed from the plunger itself.

7 Withdraw the choke diaphragm from the carburettor top, taking care not to tear it and noting which way round it is fitted. Pull the copper heat transfer bar out of the end of the carburettor top, then remove the two screws which retain the carburettor top end cap. Do not disturb the screw in the end cap centre. Displace the white nylon spacer and the thermostatic plunger from the end cap, and the white nylon plunger guide and coil spring from the carburettor body.

8 Carefully clean all components of the choke assembly. As noted previously, any serious wear or damage will mean that the carburettor must be renewed. Remove all traces of corrosion or dirt, then check that the springs are in good condition, the diaphragm is not split or damaged, and that the plungers are free to move in their respective bores. Suck on each end in turn of the vacuum transmitting valve to ensure that it is not leaking; it must be renewed if faulty.

9 On reassembly, apply heat transfer grease (see Section 5 of this Chapter) to the outer end of the thermostatic plunger and to the inside of the carburettor top end cap. Insert the plunger into the end cap, followed by the white nylon spacer; note that the spacer has three raised collars on one surface which fit into matching recesses in the end cap. Refit over the longer end of the plunger the white nylon plunger guide and the coil spring, then insert the assembly into the carburettor top, noting that the slot in the side of the plunger guide must engage with the locating projection in the bore of the carburettor top. Refit the two end cap retaining screws and their washers, tightening securely the screws. Refit the diaphragm to the carburettor top, as shown in the accompanying photograph, ensuring that the diaphragm outer edge locates correctly in the groove cast in the carburettor top. Fit a new gasket to the carburettor top.

10 Rebuild the choke plunger assembly if this was disturbed, then insert the larger coil spring into the carburettor body, followed by the plunger assembly, ensuring that the top of the spring is fitted inside the plunger assembly top collar. Refit the carburettor top, ensuring the diaphragm and plunger assembly are not displaced, then tighten securely the four retaining screws. Connect the vacuum transmitting valve to its union above the left-hand side of the carburettor mounting flange and to its union on the carburettor air filter side. Note that the body of the vacuum transmitting valve has one yellow face and one either black or transparent; the yellow face should also be marked with the manufacturer's name (Aisin). The valve should be fitted so that the yellow face is adjacent to the choke assembly, ie the union on the carburettor air filter side. Apply heat transfer grease to the entire surface of the copper heat transfer bar and insert the bar fully into the carburettor top.

11 The throttle valve is removed by using a pair of needle-nose pliers to compress the return spring so that the cable inner wire can be eased out through the slot in the valve side. Withdraw the throttle needle retaining spring clip and remove the needle with its small locating clip.

12 Thoroughly clean all carburettor components, removing all traces of dirt or corrosion. Jets and passageways should be cleaned with a blast of compressed air; a foot pump will suffice if nothing else is available. Obstructions can be poked clear using a bristle from a nylon toothbrush or similar; never use wire or any metal implement to clear a blocked jet since this will damage the jet. Use only a soft-bristled brush to clean larger components; a piece of rag should **not** be used

since particles of lint might work into a passageway and cause a blockage.

13 Examine the major castings. Any signs of cracks, distortion or damaged threads will mean that the complete carburettor must be renewed; repairs are not possible unless undertaken by an expert. Examine all gaskets and O-rings, renewing any that are damaged or worn.

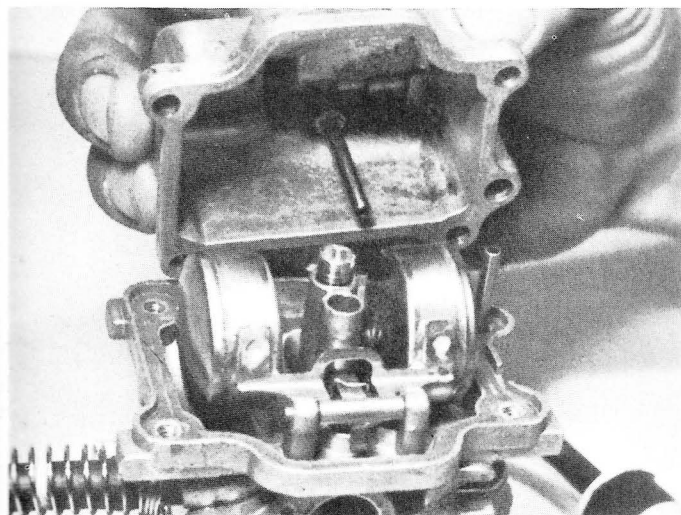
14 Check that the throttle valve is smooth and unworn, and that it fits snugly in the carburettor body. Any excessive free play will mean that the valve or the complete carburettor assembly must be renewed.

15 Check that the throttle needle is straight by rolling it on a flat surface. If it is found to be bent, or if its profile is worn, it must be renewed in conjunction with the needle jet. Check that the jet orifice is unworn; any signs of ovality will mean that the jet must be renewed, in conjunction with the throttle needle.

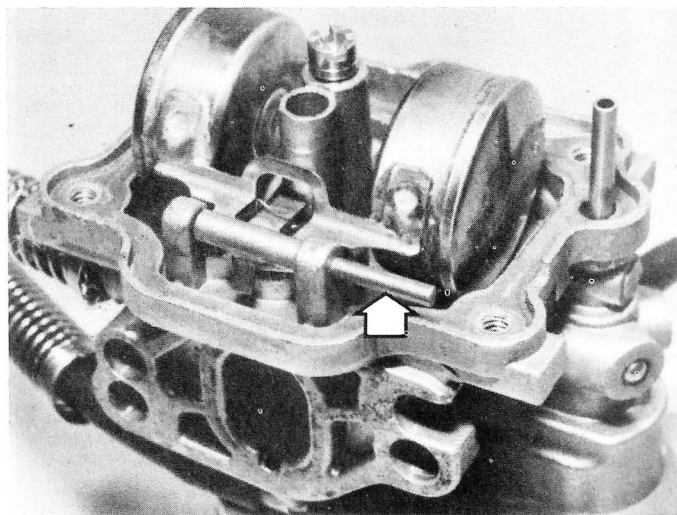
16 The only other likely area of wear is in the float valve. Check that the float needle tip is clean and unworn; any signs of a groove on the needle tip will mean that the needle and its seat must be renewed to ensure that flooding does not occur and that the correct float height is maintained. Note the procedure for checking the float height in

Section 9 of this Chapter. Shake the float and listen for any sound of petrol inside it, or immerse the float in hot water and look for any signs of air bubbles. If the presence of a leak is indicated, the float should be renewed. While it is possible to repair a leaky brass float by soldering, such a repair should be attempted only by an expert as there is a significant risk of the float exploding; the repair is so difficult that renewal is the simplest and most effective answer, although a temporary repair can be affected using Araldite.

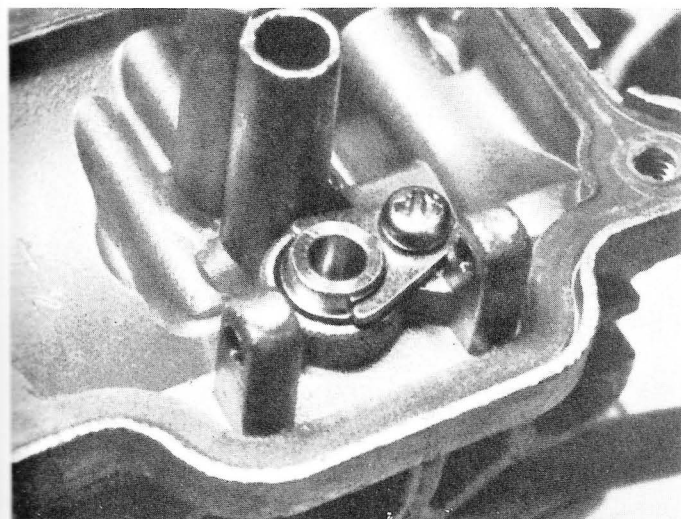
17 Reassemble the carburettor following the reverse of the dismantling procedure. Be very careful not to overtighten any jet or screw; the jets are fragile and easily sheared and the material of the carburettor body has no great tensile strength and is easily damaged. Refer to the illustration and photographs accompanying the text if in doubt about the position of any component. On refitting the throttle stop screw, first fit the spring to the screw, followed by the metal washer and O-ring, then insert the screw assembly into the carburettor body and tighten it down until it seats lightly. Then unscrew the throttle stop screw by the number of turns previously recorded to provide an initial setting which will serve as a basis for subsequent adjustment as described in Sections 8 and 9 of this Chapter.



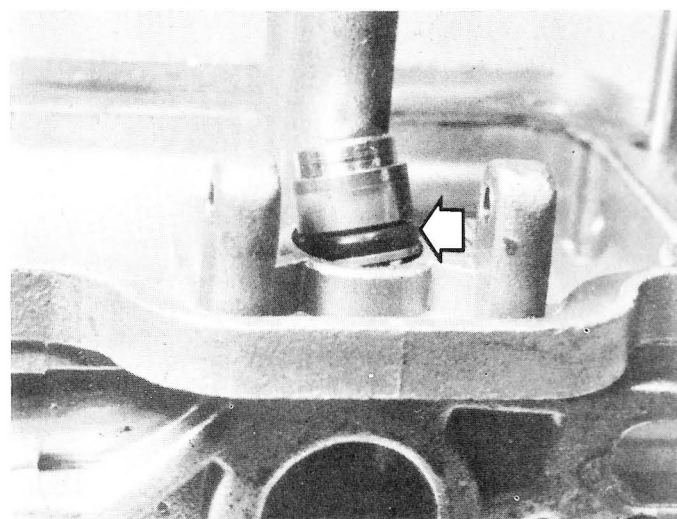
7.2a Remove float bowl screws and lift bowl away



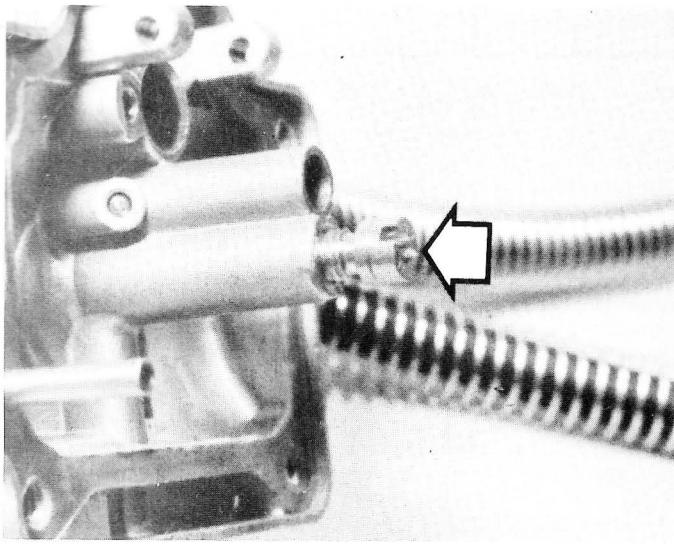
7.2b Displace pivot pin (arrowed) and remove float assembly



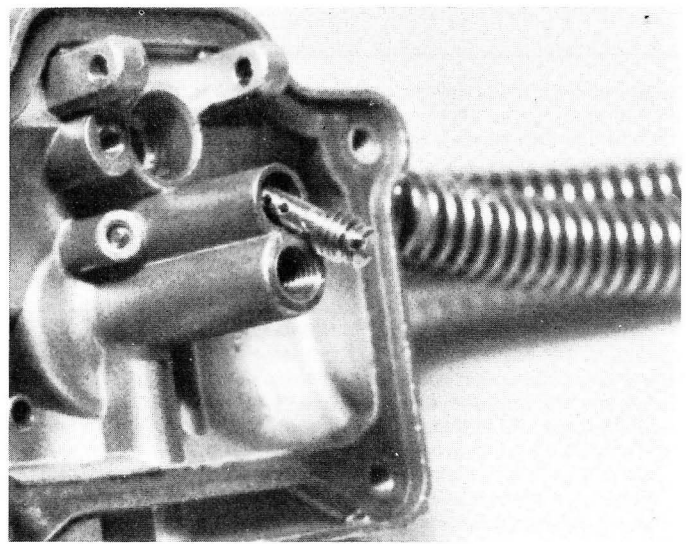
7.2c Float needle seat is retained by plate and single screw



7.2d Note O-ring seal around seat (arrowed)



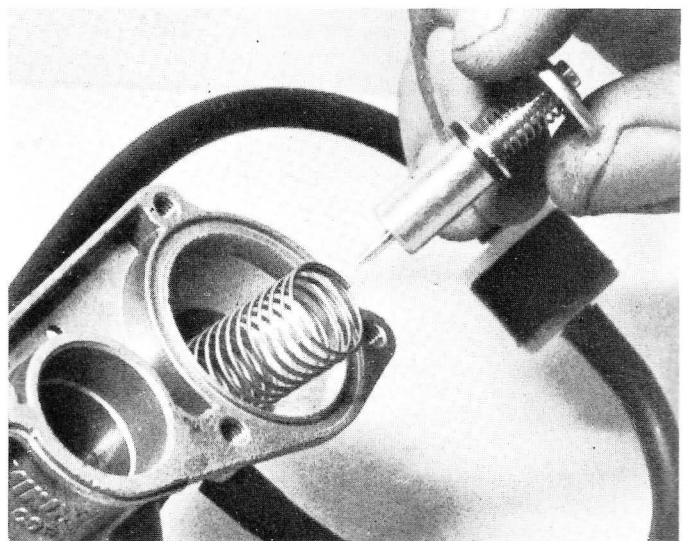
7.3a Main jet screws into central pillar ...



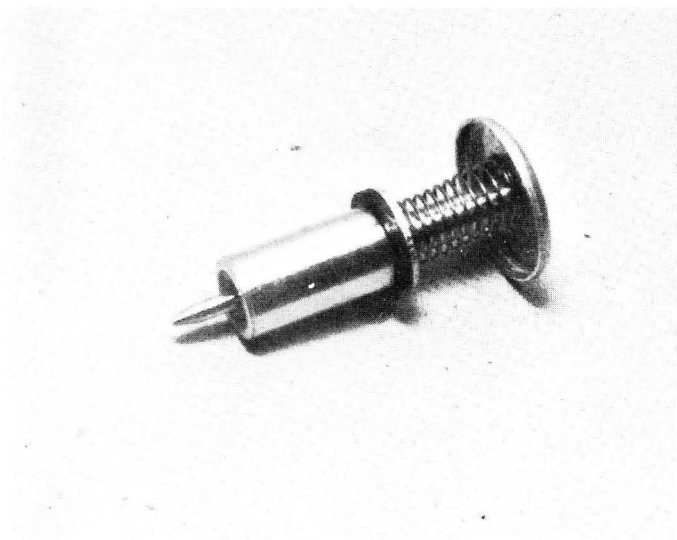
7.3b ... whilst the pilot jet is recessed in adjacent pillar



7.6a Automatic choke assembly is mounted on top of carburettor



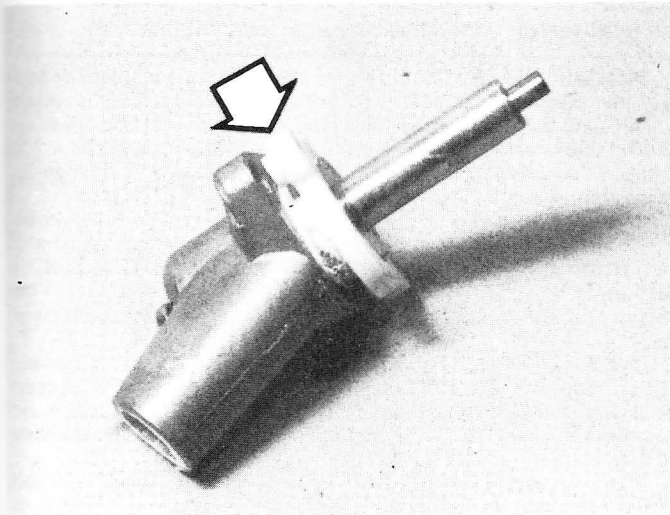
7.6b Lift away the choke plunger assembly and return spring



7.6c Check plunger for damage but do not dismantle needlessly



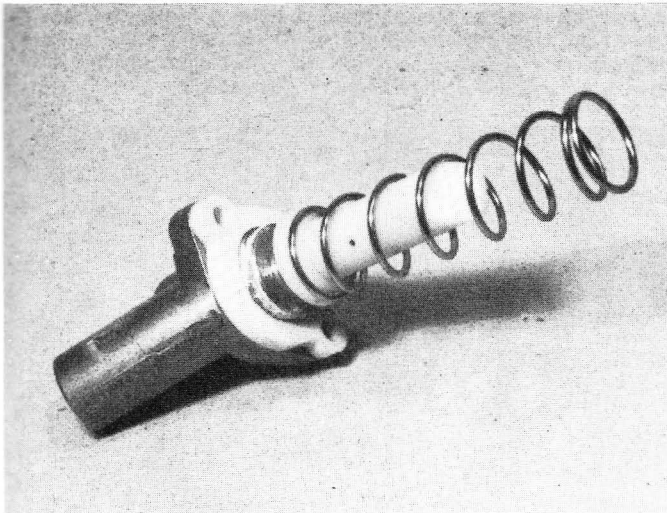
7.7a Carefully peel diaphragm off carburettor top



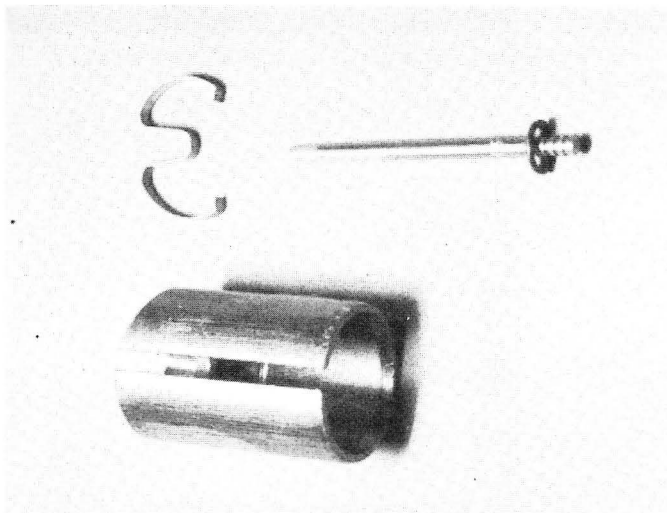
7.7b Remove end cap and spacer (arrowed) ...



7.7c ... and withdraw plunger



7.9 End cap components awaiting installation



7.11 The throttle valve, needle and locating clip

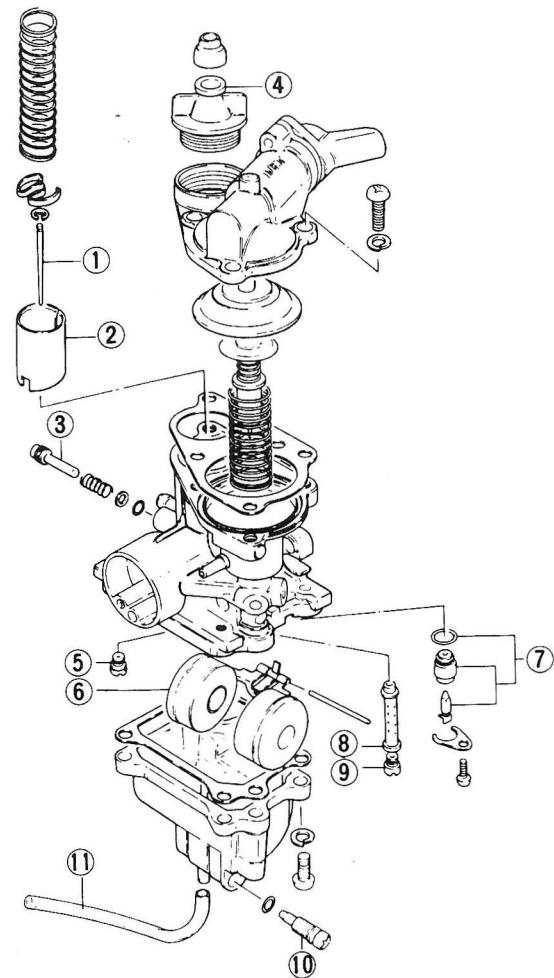


Fig. 2.4 Carburettor

- | | |
|-----------------------|------------------|
| 1 Jet needle | 7 Needle valve |
| 2 Throttle valve | 8 Needle jet |
| 3 Throttle stop screw | 9 Main jet |
| 4 Top cap | 10 Drain screw |
| 5 Pilot jet | 11 Overflow pipe |
| 6 Float | |

8 Carburettor: checking the settings

1 The various jet sizes, throttle valve cutaway and needle position are predetermined by the manufacturer and should not require modification. Check with the Specifications list at the beginning of this Chapter if there is any doubt about the types fitted. If a change appears necessary it can often be attributed to a developing engine fault. Although carburettors do wear in service, this process occurs slowly over an extended length of time and hence it is unlikely to cause sudden or extreme malfunction. If a fault does occur, check first other main systems in which a fault may give similar symptoms, before proceeding with carburettor examination or modification.

2 Where non-standard items, such as exhaust systems or air filters have been fitted to a machine, some alterations to carburation may be required. Arriving at the correct settings often requires trial and error, a method which demands skill borne of previous experience. In many cases the manufacturer of the non-standard equipment will be able to advise on correct carburation changes.

3 As a rough guide, up to $\frac{1}{8}$ throttle is controlled by the pilot jet, $\frac{1}{8}$ to $\frac{1}{4}$ by the throttle valve cutaway, $\frac{1}{4}$ to $\frac{3}{4}$ throttle by the needle position and from $\frac{3}{4}$ to full by the size of the main jet. These are only approximate divisions, which are by no means clear cut. There is a certain amount of overlap between the various stages.

4 If alterations to the carburation must be made, always err on the side of a slightly rich mixture. A weak mixture will cause the engine to overheat which, particularly on two-stroke engines, may cause engine seizure. Reference to the Chapter on the ignition system will show how, after some experience has been gained, the condition of the spark plug electrodes can be interpreted as a reliable guide to a mixture strength.

9 Carburettor: adjustment

1 Before the carburettor can be adjusted correctly, the float height must be checked, especially if flooding of the carburettor or excessive weakness (fuel starvation) has been encountered. Remove the carburettor as described in Section 6 of this Chapter, then withdraw the float chamber as described in Section 7. If the float chamber gasket adheres to the carburettor body gasket surface it must be peeled off.

2 Invert the carburetor assembly and carefully measure the distance between the carburettor body gasket surface and lowest position of each float, as shown in the accompanying illustration. The distance must be the same for each float, any discrepancy being corrected by bending carefully the bridge piece which connects the two. With the tang of the float assembly just touching the float needle, but not compressing it, the float height should be that given in the Specifications Section of this Chapter, noting that a small tolerance is permissible above or below the set figure. If adjustment is necessary, it is made by bending gently and very carefully the float tang.

3 When the float height is known to be correct, refit the float chamber, using a new gasket if required, and refit the carburettor to the machine. Start the engine and warm it up fully to normal operating temperature by taking the machine for a journey of at least 10 minutes duration, then place the machine on its centre stand.

4 The specified idling speed is 1600 ± 150 rpm. If a tachometer is not available, this can be approximated by turning the throttle stop screw to find the speed at which the engine will tick over smoothly and reliably, and yet slowly enough to avoid engaging the 1st clutch. This is essential to avoid the engine stalling at road junctions or similar halts. Be careful to place the machine on its centre stand so that the rear wheel is clear of the ground when the test is made. Check that the engine speed does not alter when the rear brake is applied to lock the rear wheel and transmission.

5 No other adjustments can be made to the carburettor itself. The only task therefore remaining is to adjust the throttle cable free play. With the twistgrip fully closed there should be 0.5 – 1.0 mm (0.02 – 0.04 in) free play, measured in vertical movement of the outer cable above the adjuster. If adjustment is required, slacken the adjuster locknut and rotate the adjusting nut. Fasten the locknut securely and open and close fully the throttle once or twice to settle the cable. Check the adjustment again, altering it if necessary, then refit the cover(s).

10 Reed valves: removal, examination and refitting

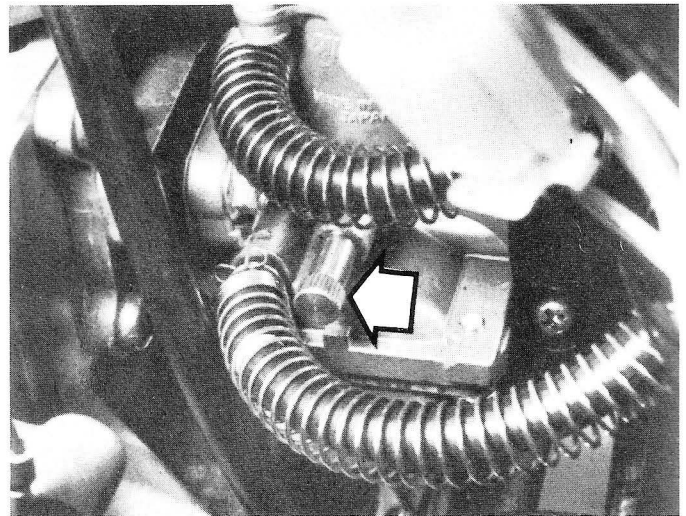
1 Access to the reed valve unit is gained after the carburettor has been removed as described in Section 6. Note that access is rather limited, and since it will be necessary to use an impact driver to remove the retaining screws, the job may entail engine removal. For further information refer to Chapter 1, Section 4 and Section 6, paragraphs 4 and 5.

2 It should be noted that the reed valve is fragile and should be handled carefully at all times, also that it is a completely automatic unit which should not be dismantled and cannot be repaired; if damage or wear of any sort is found, the valve assembly must be renewed. No individual components are available as replacement parts.

3 Thoroughly clean the valve assembly, then examine it very closely, using a magnifying glass, if necessary. If the stopper plate or the reed petal itself show any sign of cracks or other damage, the valve must be renewed, also if the valve body mating surfaces are damaged or distorted.

4 Place the assembly to the lips with the reed petal facing away and suck; there should be little or no leakage in this direction. Referring to the accompanying illustration, check that the reed petal is distorted by no more than 0.2 mm (0.008 in) and that it overlaps the valve case by at least 1.0 mm (0.039 in) at all points.

5 Lastly, check that the stopper plate/reed petal retaining screws are securely fastened; use thread locking compound if any is found to be loose. Also, check that the O-ring set in the valve body/crankcase mating surface is in good condition. Since this is not detachable, the valve assembly must be renewed if it is damaged.



9.4 The throttle stop screw (arrowed) controls the idle speed

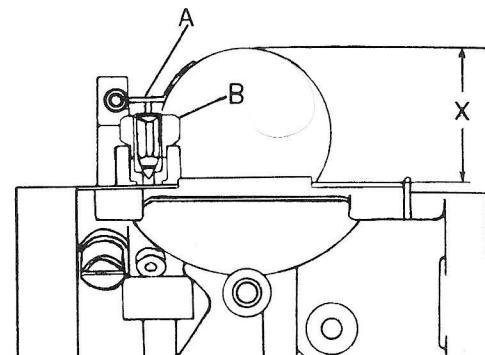
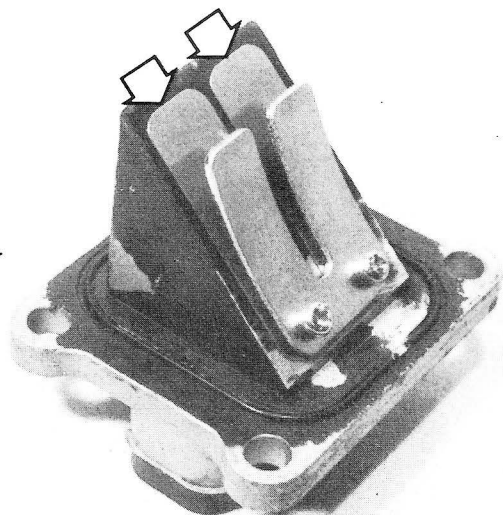


Fig. 2.5 Measuring the float height

A Float tang
B Float valve assembly

X Float height



10.2 Handle reed valve carefully; petals (arrowed) are easily damaged

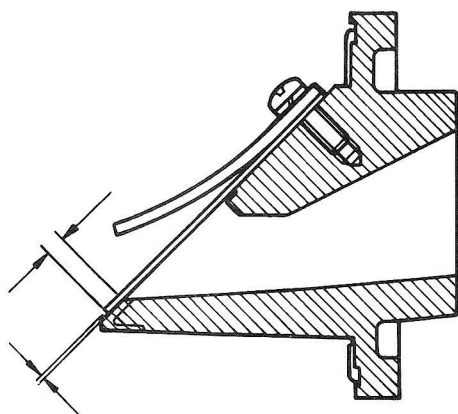


Fig. 2.6 Checking the reed valve

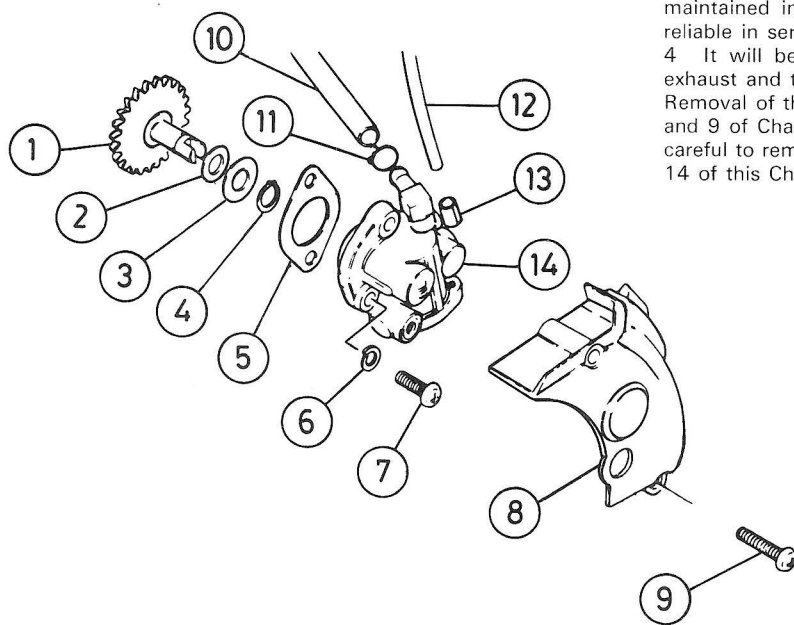


Fig. 2.7 Oil pump

- 1 Driveshaft
- 2 Small thrust washer
- 3 Large thrust washer
- 4 Circlip
- 5 Gasket
- 6 Spring washer – 2 off
- 7 Screw – 2 off
- 8 Oil pump cover
- 9 Screw – 2 off
- 10 Oil tank/oil pump feed pipe
- 11 Clip – 2 off
- 12 Oil pump/crankcase feed pipe
- 13 Tubular clip – 2 off
- 14 Oil pump

11 Air filter: general

- 1 Refer to Routine Maintenance, at the front of this Manual, for details of air filter cleaning.
- 2 Never run the engine with the air filter disconnected or with the element removed. Apart from the risk of increased wear due to unfiltered air being allowed to enter the engine, the carburettor is jetted to compensate for the presence of the air filter, and a dangerously weak mixture will result if the filter is omitted.

12 Exhaust system: general

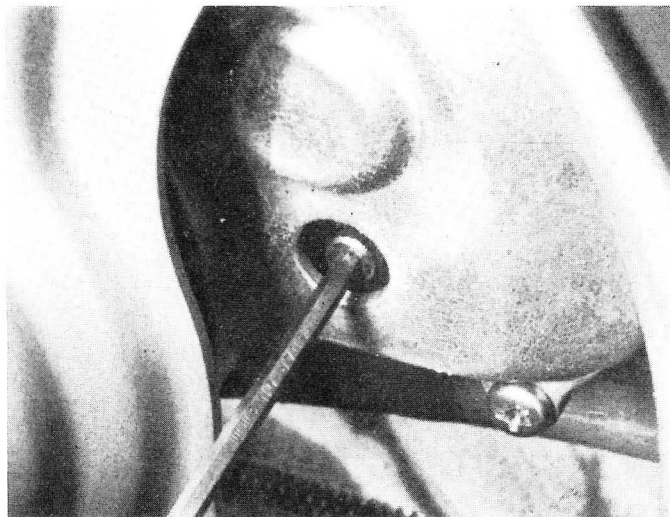
- 1 The only attention the exhaust system will require is regular cleaning to remove carbon deposits and regular maintenance of the painted finish to prevent damage through corrosion. Refer to Routine Maintenance.
- 2 The exhaust system can be removed and refitted as described in Sections 6 and 30 of Chapter 1, requiring no preliminary dismantling save the removal of the right-hand side panel. Always renew the exhaust gasket whenever the exhaust is disturbed, to prevent exhaust leaks.
- 3 Severe damage due to accidents, corrosion, or old age may be repaired by welding, but if the internal baffles start to break up, the exhaust should be renewed. Do not attempt to modify the exhaust in any way; any extra noise will be both annoying and illegal, and the machine's performance will almost certainly be reduced.

13 Oil pump: removal, examination and refitting

- 1 The oil pump is a sealed, non-adjustable unit mounted on the rear of the engine/transmission unit. It is not repairable; if any wear or damage is found or suspected, the pump must be renewed.
- 2 The only means of testing the pump is to measure its suction rate which will require the use of Suzuki service tool Part Number 09900-21602. This is a very finely graduated measuring vessel which is filled with two-stroke oil and connected to the pump's suction side, ie the oil tank/oil pump feed line. The engine is then started, run at a set speed for a certain length of time, then stopped and the amount of oil consumed by the pump measured. The details of the test, and of the correct amount of oil to be consumed, are given in the Specifications Section of this Chapter.
- 3 Since the test involves the use of expensive equipment which will not be needed very often, it is recommended that the machine be taken to a competent Suzuki Service Agent, if doubts arise about the pump's efficiency. All that the private owner can do is to ensure that the oil tank is kept topped up at all times and that the feed pipes are maintained in good condition. Fortunately oil pumps are extremely reliable in service, failure being a rare event.
- 4 It will be necessary to remove the right-hand side panel, the exhaust and the rear wheel to gain access to the pump for removal. Removal of the pump itself is described in Section 11, paragraphs 8 and 9 of Chapter 1, refitting in Section 27 of the same Chapter. Be careful to remove all traces of air by bleeding, as described in Section 14 of this Chapter, whenever the oil feed pipe unions are disturbed.

14 Oil pump: bleeding

- 1 If the oil level in the tank is ever allowed to fall so low that air enters the system, or if either of the oil feed lines is damaged or their unions disturbed, all traces of air must be removed from the system. This is essential to prevent any risk of the oil supply being interrupted.
- 2 Place the machine on its centre stand and check that the oil tank is topped up. Make up a cardboard chute to deflect oil from the left-hand side of the rear wheel and into a suitable container, then pass a screwdriver through the rear wheel to remove the bleed screw from the oil pump, as shown in the accompanying photograph.
- 3 As the oil trickles from the bleed screw orifice, watch carefully for signs of air bubbles and tighten the bleed screw securely when no more bubbles can be seen. Mop up any surplus oil and top up the oil tank to just below the filler neck. This operation will remove air from the suction side of the pump and from the tank and feed pipe.
- 4 The only way of removing air from the oil pump/crankcase feed pipe is to force oil through it, using a spout-type oil can, which will mean that the right-hand side panel, the exhaust, and the rear wheel must be removed so that the oil pump cover and oil pipe cover plate can be detached to gain access to the pipe union.



14.2 Position rear wheel as shown to gain access to the pump bleed screw

Chapter 3 Ignition system

Contents

General description	1	Ignition source coil: location and testing	6
Ignition system: fault diagnosis	2	Ignition timing: general	7
Ignition system: checking the wiring	3	Spark plug: checking and resetting the gap	8
Ignition system: checking the ignition switch	4	Spark plug (HT) lead and suppressor cap: examination	9
Ignition HT coil/CDI unit: location and testing	5		

Specifications

Ignition system

Type	CDI (capacitor discharge ignition)
System voltage:	
CL50	6 volt
CL50D	12 volt
Ignition timing	22° BTDC @ 4000 rpm

Flywheel generator

Ignition primary resistance (B/R-B/W):	
CL50	160 – 240 Ohms
CL50D	160 – 240 Ohms

Ignition coil/CDI unit

Internal resistances	Refer to Section 5 of text
----------------------------	----------------------------

Spark plug

Make	NGK	Nippon Denso (ND)
Type	BPR4HS	W14EPR-UL
Gap	0.6 – 0.8 mm (0.024 – 0.032 in)	

1 General description

A simple form of capacitor discharge ignition is employed which requires little or no maintenance. Apart from the ignition switch and related wiring, the system comprises only the combined ignition HT coil/CDI unit, this being supplied with current and triggered at the correct moment by a source coil built into the generator stator.

2 Ignition system: fault diagnosis

1 As no means of adjustment is available, any failure of the system can be traced to the breakdown of a system component or a simple wiring fault. Of the two possibilities, the latter is by far the most likely. In the event of failure, check the system in a logical fashion, as described below.

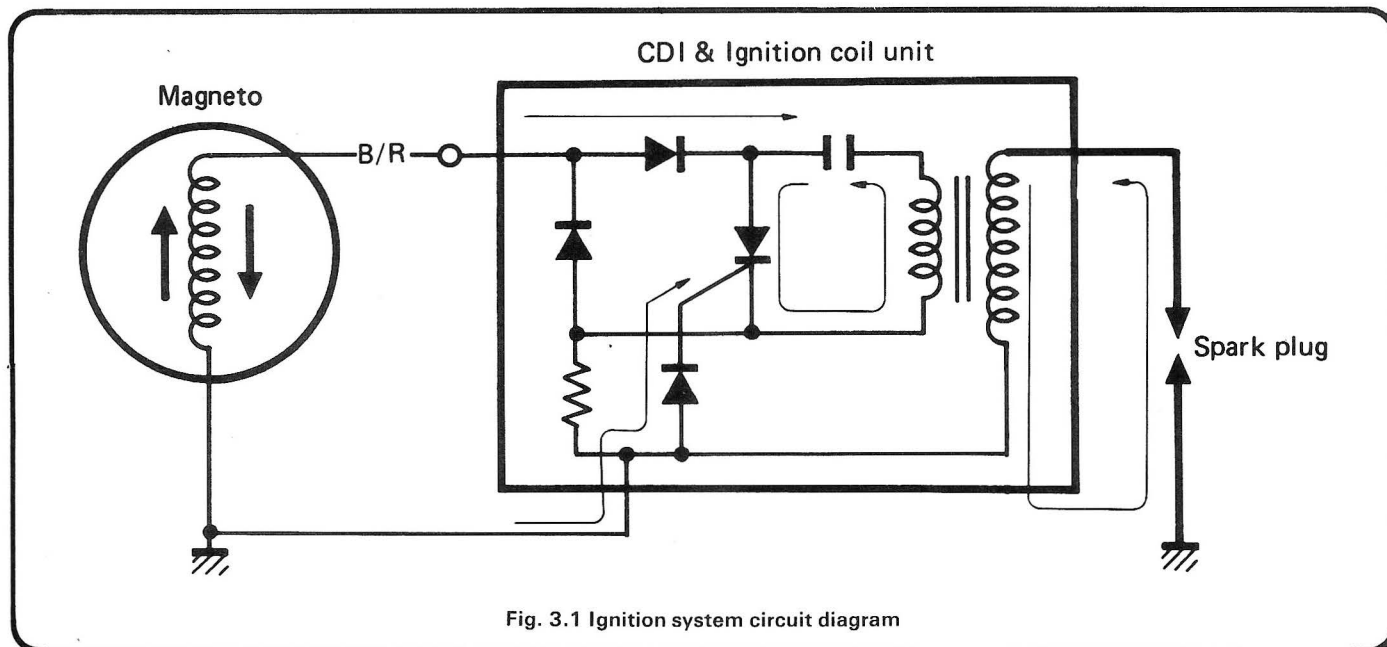


Fig. 3.1 Ignition system circuit diagram

2 Remove the spark plug, giving it a quick visual check, noting any obvious signs of flooding or oiling. Fit the plug into the plug cap and rest it on the cylinder head so that the metal body of the plug is in good contact with the cylinder head metal, not the fan cowling. The electrode end of the plug should be positioned so that sparking can be checked as the engine is spun over.

3 **Important note:** The energy levels in electronic ignition systems can be very high. On no account should the ignition be switched on whilst the plug or plug cap are being held. Shocks from the HT circuit can be most unpleasant. Secondly, it is vital that the plug is in position and soundly earthed when the system is checked for sparking. The ignition components can be seriously damaged if the HT circuit becomes isolated.

4 Having observed the above precautions, turn the ignition switch to 'On' and kick the engine over. If the system is in good condition a regular, fat blue spark should be evident at the plug electrodes. If the spark appears thin or yellowish, or is non-existent, further investigation will be necessary. Before proceeding further, turn the ignition off and remove the key as a safety measure.

5 Ignition faults can be divided into two categories, namely those where the ignition system has failed completely, and those which are due to a partial failure. The likely faults are listed below, starting with the most probable sources of failure. Work through the list systematically, referring to the subsequent sections for full details of the necessary checks and tests.

- a) Defective spark plug or spark plug cap
- b) Loose, corroded or damaged wiring connections, broken or shorted wiring between any of the ignition system components
- c) Faulty ignition switch
- d) Faulty ignition HT coil/CDI unit
- e) Faulty source coil

3 Ignition system: checking the wiring

1 The wiring should be checked visually, noting any signs of corrosion around the various terminals and connectors. If the fault has developed in wet conditions, it follows that water may have entered any of the connectors or switches, causing a short circuit. A temporary cure can be effected by spraying the relevant area with one of the proprietary de-watering aerosols, such as WD40 or similar. A more permanent solution is to dismantle the switch or connector and coat the exposed parts with silicone grease to prevent the ingress of water. The exposed backs of connectors can be sealed off using a silicone rubber sealant.

2 Light corrosion can normally be cured by scraping or sanding the affected area, though in serious cases it may prove necessary to renew the switch or connector affected. Check the wiring for chafing or breakage, particularly where it passes close to part of the frame or its fittings. As a temporary measure, damaged insulation can be repaired with PVC tape, but the wire concerned should be renewed at the earliest opportunity.

3 Using the wiring diagram at the end of the manual, check each wire for breakage or short circuits using a multimeter set on the resistance scale or a dry battery and bulb wired as shown in the accompanying illustration. In each case, there should be continuity between the ends of each wire.

4 Ignition system: checking the ignition switch

Again using the test equipment described in the previous Section and the wiring diagram at the back of this Manual, check whether the switch connections are being made and broken as indicated by the switch diagram which is part of the main wiring diagram. It will be necessary to remove the steering column front cover to gain access to the switch connector. If the switch is found to be defective, usually renewal will be required, although nothing can be lost by attempting repair.

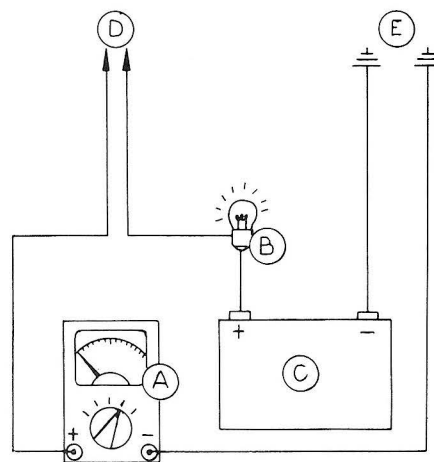


Fig. 3.2 Method of checking the wiring

- | | |
|--------------|------------------|
| A Multimeter | D Positive probe |
| B Bulb | E Negative probe |
| C Battery | |

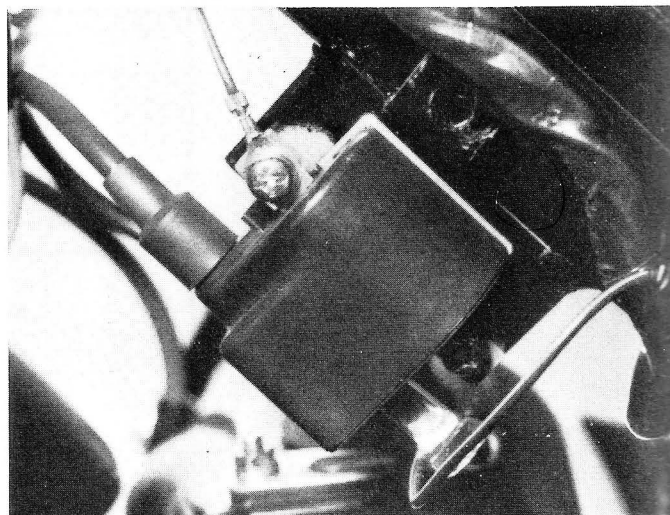
5 Ignition HT coil/CDI unit: location and testing

1 The ignition coil and CDI unit are combined in a single sealed unit mounted behind the right-hand side panel. With this type of arrangement the entire ignition system, with the exception of the source coil in the flywheel generator, is contained in the one unit. It follows that if either component fails, the unit must be renewed complete. It is unlikely, though, that the unit will give much trouble.

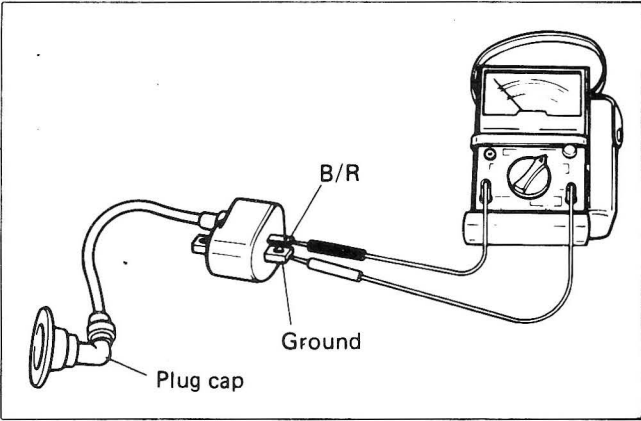
2 In the event of a suspected fault, it is strongly recommended that the unit is removed and taken to a Suzuki Service Agent for a full test. This requires the use of an electro-tester, a piece of equipment unlikely to be available to the owner. The test will discover whether the unit is able to provide an 8 mm spark for the specified five minutes to simulate normal riding conditions. From the results of the test the dealer will be able to advise whether renewal is necessary.

3 A less conclusive test can be performed using a multimeter set on the kilo ohms (ohms x 1000) range. The unit should be unbolted from the frame and the meter leads connected as shown in the accompanying table. The values shown are approximate, but if the readings obtained differ greatly, the unit can be considered faulty. It is recommended that the suspect unit is given a full check as described above to confirm this.

Note: The test figures shown are those expected when using a Suzuki 'Pocket Tester', Part Number 09900-25002. If using a multimeter of another make, readings may vary.



5.1 The ignition coil/CDI unit is bolted to the right-hand side of the frame



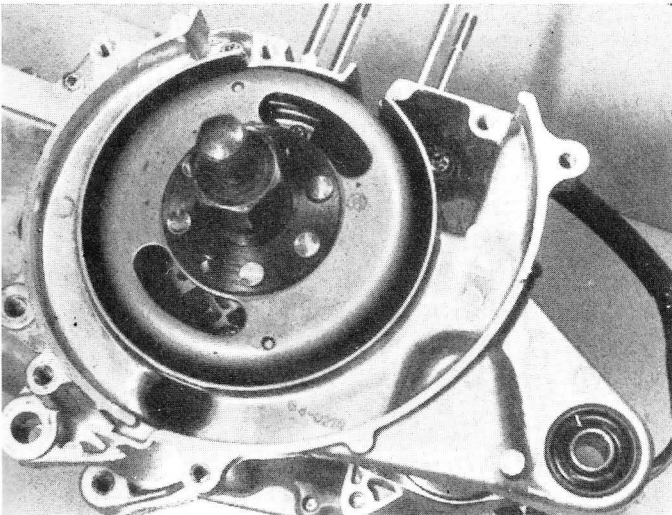
Unit: approx. k Ω

Negative $\ominus$ probe of tester to:	Positive $\oplus$ probe of tester to:			
	B/R	Plug cap	Ground	
	B/R	OFF	OFF	
	Plug cap	25	15	
	Ground	3.4	15	

Fig. 3.3 Ignition HT coil/CDI unit test table

6 Ignition source coil: location and testing

1 The ignition source coil is mounted on the generator stator plate. While it can be tested in place, after removing the right-hand side panel and disconnecting the generator lead at its multi-pin block connector, if it is to be removed for repair or renewal, the generator rotor and stator must be withdrawn first, as described in Section 8 of Chapter 1. Refitting is described in Section 27 of the same Chapter.



6.1 If access to stator is required, a puller will be necessary to remove rotor

2 To test the coil, use a good quality multimeter set to the ohms scale; disconnect the generator lead at its snap connector and connect the meter positive (+) probe to the black/red wire terminal. Connect the meter negative (-) probe either to the black/white wire terminal or to a suitable earth point on the crankcase. The reading obtained should be 160 – 240 ohms.

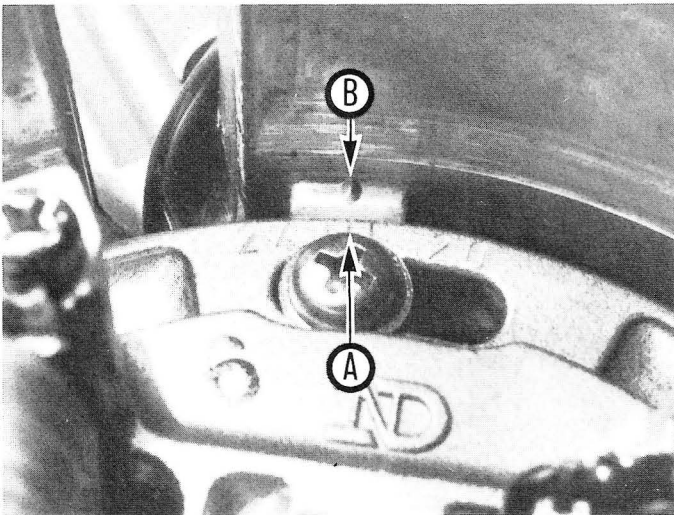
3 If the reading obtained does not correspond with that given, the coil must be considered faulty and renewed, although it is worthwhile taking the machine to a competent Suzuki Service Agent for your findings to be confirmed. Check also that the fault is not due to a trapped or broken wire which can be repaired easily.

7 Ignition timing: general

1 It should be noted that there is no method by which the ignition timing can be checked, since neither timing marks nor sufficient information are available. All that can be done is to check that the source coil is securely fastened in its correct position on the generator stator plate, that the plate itself is securely fastened, that the rotor is correctly located on the crankshaft by its Woodruff key, and that the rotor retaining nut is securely fastened.

2 If symptoms occur such as a lack of power, which lead one to suspect that the ignition timing is faulty, and all other possibilities have been eliminated, timing marks can be created by attaching a degree disc to the rotor face. This must be set so that a pointer (attached to any suitable point on the engine) reads exactly zero when the piston is at TDC; a task that will require the use of a dial gauge with an adaptor suitable for fitting to the spark plug thread. With the degree disc and pointer accurately set, connect a strobe lamp and an electronic tachometer, following the manufacturer's instructions, and start the engine. The spark should occur at 22° BTDC when the engine is running at 4000 rpm; note that a tolerance of 2° before or after this setting is permissible. The ignition timing is adjusted by removing the generator rotor so that the stator plate retaining screws can be slackened, thus allowing the plate to be rotated; its mounting holes are slotted to permit some adjustment.

3 It will be evident that expensive equipment is necessary to carry out the task outlined above, in addition to the skill necessary to achieve a sufficiently accurate result. It is therefore recommended that in the unlikely event of such a need arising, the machine is taken to a Suzuki Service Agent for the ignition timing to be checked.



7.1 Ensure that the timing mark (A) is aligned with the fixed index mark (B)

8 Spark plug: checking and resetting the gap

1 The spark plug supplied as original equipment is listed in the Specifications Section of this Chapter. The standard plug will prove satisfactory in most operating conditions, but alternatives are available to allow for varying altitudes, climatic conditions, and the use to which the machine is put. If the spark plug is suspected of being faulty, it can be tested only by the substitution of a brand new (never second-hand) plug of the correct make, type and heat range; always carry a spare on the machine.

2 Note that the advice of a Suzuki Service Agent or similar expert should be sought before the plug heat range is altered from standard. The use of too cold, or hard, a grade of plug will result in plug fouling and the use of too hot, or soft, a grade of plug will result in engine damage due to the excess heat being generated. If the correct grade of plug is fitted, however, it will be possible to use the condition of the spark plug electrodes to diagnose a fault in the engine or to decide whether the engine is operating efficiently or not. The accompanying series of colour photographs will show this clearly.

3 The final point on the selection of spark plug types and grades concerns the letter 'R' in the prefix. This indicates that the plug has a resistor built in to suppress the radio and TV interference produced by the HT pulse, the manufacturers having decided that it is better to suppress the interference as close to its source as possible, ie in the spark plug itself. The ignition system has been designed and constructed with this type of spark plug in mind; its reliability and performance would be adversely affected if a standard, non-resistor spark plug were substituted for the correct type, therefore not only must the spark plug be of the correct heat range, it must also be a resistor type at all times.

4 The correct electrode gap is 0.6 – 0.8 mm (0.024 – 0.032 in). The gap can be assessed using feeler gauges. If necessary, alter the gap by removing the outer electrodes, preferably using a proper electrode tool. **Never** bend the centre electrode, otherwise the porcelain insulator will crack, and may cause damage to the engine if particles break away whilst the engine is running.

5 Before fitting a spark plug into the cylinder head coat the threads sparingly with a graphited grease to aid future removal. Use the correct size spanner when tightening the plug otherwise the spanner may slip and damage the ceramic insulator. The plug should be tightened by hand only at first and then secured with a quarter turn of

the spanner so that it seats firmly on its sealing ring. If a torque wrench is available, tighten the plug to a torque setting of 2.5 – 3.0 kgf m (18 – 22 lbf ft).

6 Never overtighten a spark plug otherwise there is risk of stripping the threads from the cylinder head, especially as it is cast in light alloy. A stripped thread can be repaired without having to scrap the cylinder head by using a 'Helicoil' thread insert. This is a low-cost service, operated by a number of dealers.

9 Spark plug (HT) lead and suppressor cap: examination

1 Erratic running faults and problems with the engine suddenly cutting out in wet weather can often be attributed to leakage from the high tension lead and spark plug cap. If this fault is present, it will often be possible to see tiny sparks around the lead and cap at night. One cause of this problem is the accumulation of mud and road grime around the lead, and the first thing to check is that the lead and cap are clean. It is often possible to cure the problem by cleaning the components and sealing them with an aerosol ignition sealer, which will leave an insulating coating on both components.

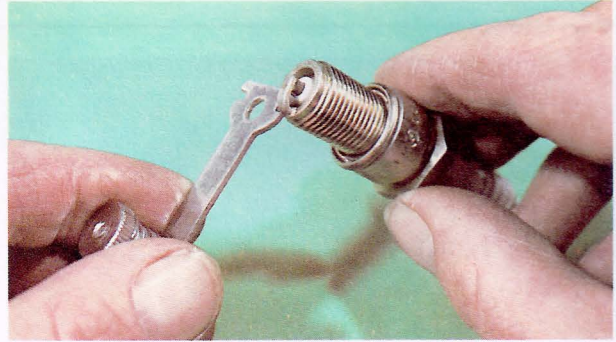
2 Water dispersant sprays are also highly recommended where the system has become swamped with water. Both these products are easily obtainable at most garages and accessory shops. Occasionally, the suppressor cap or the lead itself may break down internally. If this is suspected, the component should be renewed.

3 Where the HT lead is permanently attached to the ignition coil, the renewal of the HT lead should be entrusted to an auto-electrician who will have the expertise to solder on a new lead without damaging the coil windings.

4 When renewing the spark plug cap, be careful to purchase one that is suitable for use with resistor spark plugs. The traditional method of suppressing HT interference was to incorporate a resistor into the spark plug cap; now that the resistor is sited in the spark plug itself, suppressing any interference at its source, the caps have much lower resistance values and the ignition system is designed with this in mind. If the original suppressor cap should have been replaced by an old style item, the combination of the heavy resistances would overload the ignition system, producing initially bad starting and a misfire, and ultimately causing failure of the ignition system.



Spark plug maintenance: Checking plug gap with feeler gauges



Altering the plug gap. Note use of correct tool



Spark plug conditions: A brown, tan or grey firing end is indicative of correct engine running conditions and the selection of the appropriate heat rating plug



White deposits have accumulated from excessive amounts of oil in the combustion chamber or through the use of low quality oil. Remove deposits or a hot spot may form



Black sooty deposits indicate an over-rich fuel/air mixture, or a malfunctioning ignition system. If no improvement is obtained, try one grade hotter plug



Wet, oily carbon deposits form an electrical leakage path along the insulator nose, resulting in a misfire. The cause may be a badly worn engine or a malfunctioning ignition system



A blistered white insulator or melted electrode indicates over-advanced ignition timing or a malfunctioning cooling system. If correction does not prove effective, try a colder grade plug



A worn spark plug not only wastes fuel but also overloads the whole ignition system because the increased gap requires higher voltage to initiate the spark. This condition can also affect air pollution

Chapter 4 Frame and forks

Contents

General description	1	Rear suspension unit: general	6
Body panels: removal	2	Frame: examination and renovation	7
Fork stanchions and springs: removal, examination and refitting	3	Stands and controls: examination and renovation	8
Steering column assembly: dismantling, examination and reassembly	4	Speedometer heads: removal, examination and refitting	9
Rear suspension: dismantling, examination and reassembly	5	Speedometer drive cable: examination and renovation	10
		Speedometer drive: location and examination	11

Specifications

Frame

Type	Fabricated steel tube, 'Step-through' type
------------	--

Front suspension

Type	Undamped telescopic forks
Stroke	40 mm (1.6 in)

Rear suspension

Type	Swinging arm, employing engine/transmission unit as main member
Rear wheel travel	70 mm (2.8 in)
Pivot shaft max. runout	0.6 mm (0.024 in)

Torque wrench settings

Component	kgf m	lbf ft
Handlebar clamp nut	4.5 – 6.0	32.5 – 43.4
Fork outer tube nut	2.5 – 3.5	18.1 – 25.3
Front wheel spindle nut	2.7 – 4.3	19.5 – 31.1
Rear wheel spindle nut	6.0 – 9.0	43.4 – 65.1
Rear suspension unit mounting:		
Upper	1.0 – 1.5	7.2 – 10.8
Lower	2.0 – 3.0	14.5 – 21.7
Footboard mounting bolt	1.5 – 2.5	10.8 – 18.1
Front brake cam lever bolt	0.6 – 0.8	4.3 – 4.6
Rear brake cam lever bolt	0.6 – 0.8	4.4 – 4.6
Steering stem locknut	6.0 – 10.0	43.4 – 72.3
Centre stand nut	1.8 – 2.8	13.0 – 20.3

1 General description

The frame is of the open, or scooter type, and is fabricated from welded tubular steel. A main platform section supports the plastic footboard assembly and provides location for the steering column. Outrigger tubes run back and over the engine/transmission unit and provide support for the seat and bodywork.

The front forks are a one-piece assembly consisting of a long

steering column supported on cup and cone bearings. At the lower end the column splits into two legs, each containing a short stanchion and spring. The forks are telescopic in operation and are undamped.

Rear suspension follows the traditional Italian scooter arrangement, the engine/transmission unit forming a swinging arm section. The assembly pivots on rubber-bushed mounts to minimise the transmission of road and engine vibration to the rider. Suspension is provided by a single telescopic coil spring suspension unit with hydraulic damping.

2 Body panels: removal

1 When working on the frame or suspension, or if access to many of the ancillary components is required, it will be necessary to remove one or more of the body panels. Whilst the removal process is to some extent self-explanatory, the panels all require careful handling, so details concerning the removal of each panel are given below.

2 Set aside a safe place to store the panels; they are all plastic mouldings and easily scratched or damaged if mishandled. In all cases take great care not to snap off the small location lugs which hold each section in contact with the next. In most cases it will be necessary to bend the panel slightly to free it. Do not use excessive force and distort the panel no more than is necessary to free it.

Side panels and centre section

3 Remove the single cross-head screw below the seat and disengage the centre section. Carefully disengage the side panels, noting that they are held by projections which pass through grommets in the footboard lugs and are also located by lugs against the main frame moulding and the footboard.

Footboard assembly

4 The footboard assembly is secured by four bolts to the frame lower members. Start by removing the rear left-hand bolt, noting that the nut on its underside should be held with a spanner while it is unscrewed. Remove the remaining bolts, then lift the rear of the footboard and pull it back to free the location lugs on its front edge.

Frame main section

5 Start by unbolting the luggage rack, remembering to disconnect the turn signal leads as it is lifted away. Unscrew the two seat mounting nuts and remove it. Release the wing nut which fastens the section to the rear mudguard and release the two front mounting screws (see photographs). Lift the rear of the section and disconnect the rear lamp wiring at the connector behind the right-hand louvre. Carefully manoeuvre the section up and forwards to free it. When refitting it, remember to reconnect the rear lamp wiring before securing the section to the frame.

Steering column cover

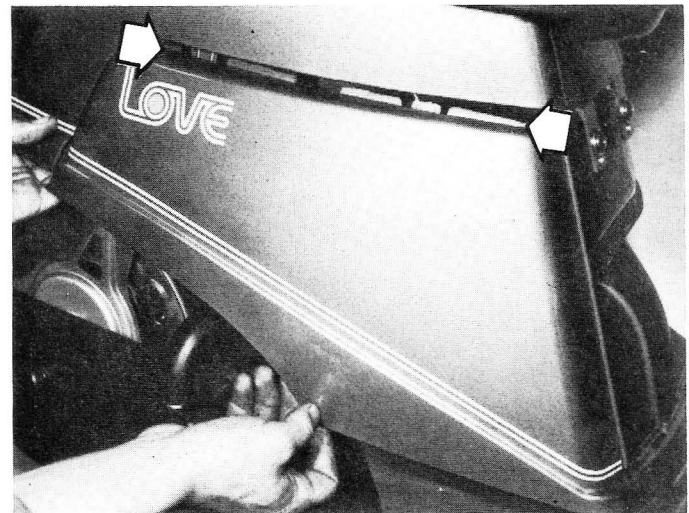
6 Remove the two screws which retain the cover to the steering column, these being located on either side of the horn grille. Lift the cover out and upwards to disengage it from the legshield and remove it.

Legshield

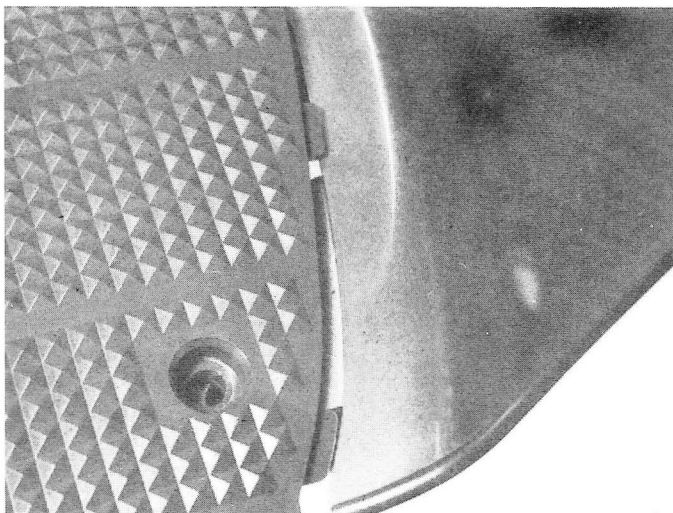
7 Remove the two retaining screws on the inside of the legshield, just below the ignition switch. Manoeuvre the section back, taking care that it is not damaged when it passes over the ignition switch. Lift the legshield clear of the frame and place to one side.



2.3a Centre section is retained by large cross-head screw



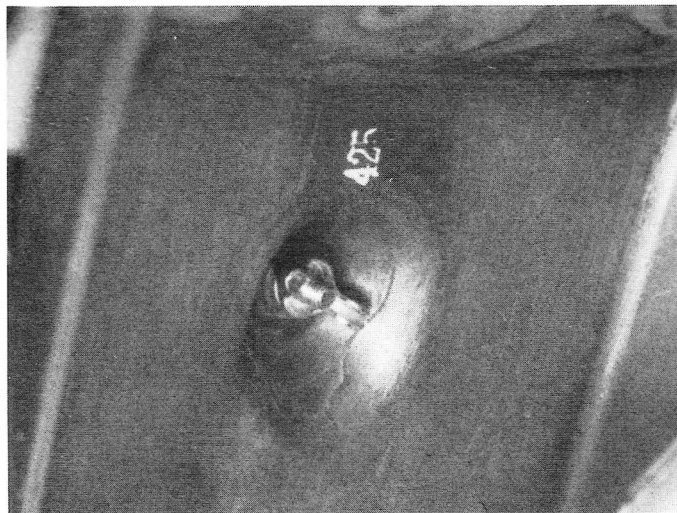
2.3b Carefully disengage side panels, noting the lugs along locating edges (arrowed)



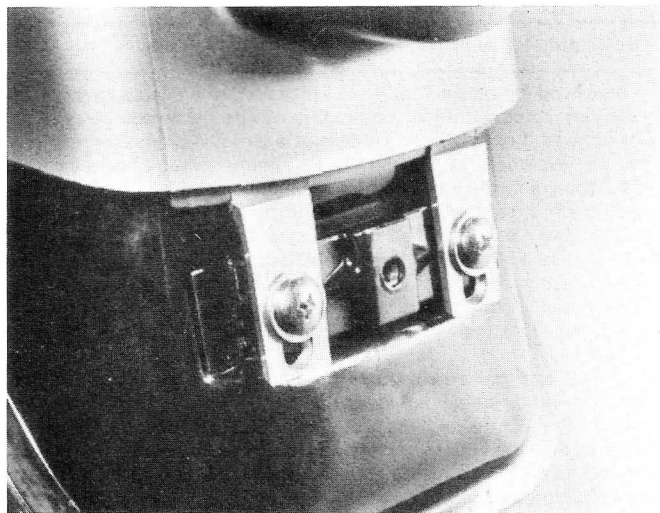
2.4 Take care not to break lugs on front edge of footboard



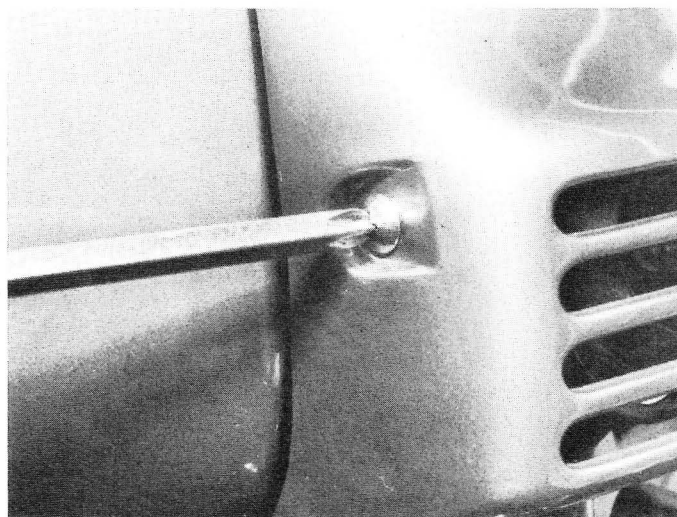
2.5a Remove nuts (arrowed) and lift seat away



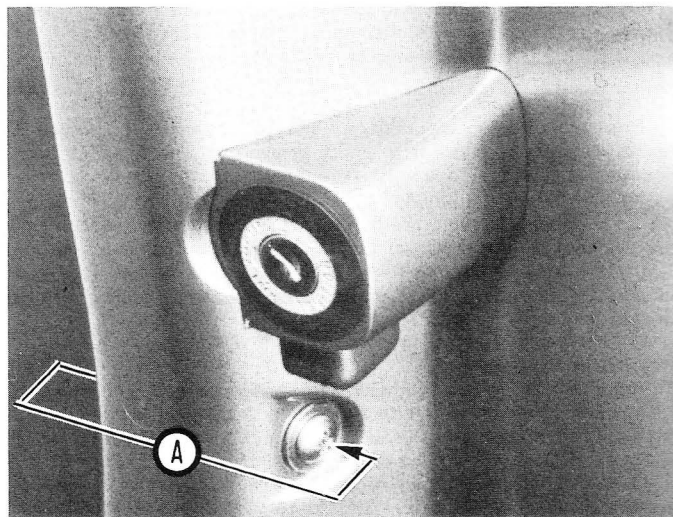
2.5b Release wing-nut from underside of rear mudguard



2.5c Free the front mounting by removing the two screws



2.6 Remove screws to free steering column cover



2.7 Legshield is secured by two screws (A). Avoid damage as the legshield is manoeuvred clear of ignition switch

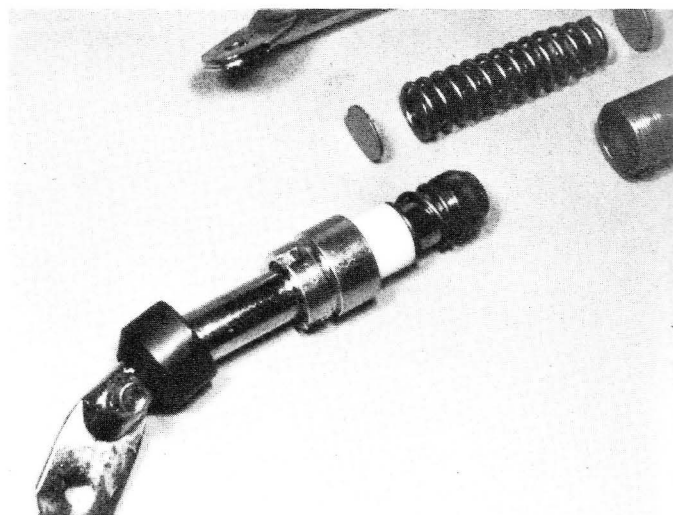
3 Fork stanchions and springs: removal, examination and refitting

1 The individual fork stanchions can be removed from the steering column assembly without disturbing the latter. Before starting work it should be noted that the stanchions are retained by slotted nuts and will be tight; a suitable C-spanner will be required to remove them. Do not be tempted to use a punch or strap wrench on the slotted nuts. The best tool for this purpose, and one which can also be used during steering column removal, is the Suzuki 'Universal clamp wrench', Part Number 09910-60611.

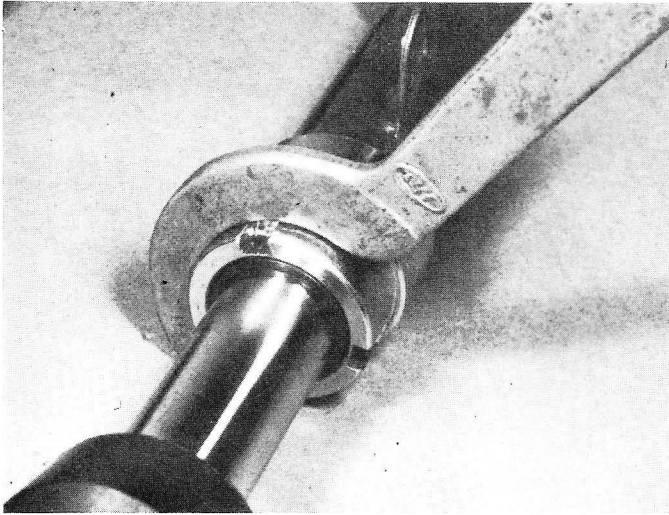
2 Place the machine on its centre stand on a level surface, allowing adequate working space to the front. Arrange a scissor jack or some wooden blocks beneath the footboard supporting framework so that the front wheel is raised clear of the ground. Remove the wheel, referring to Chapter 5 for details.

3 Slide down the dust seals to expose the bottom of the slotted nuts. Using a C-spanner, slacken the nuts and then withdraw the stanchion assembly. Clean off all old grease and lay out the individual parts for examination.

4 If play is evident between the stanchions and the steering column tubes it is likely that both surfaces will have worn and will require renewal. The procedure for removing the steering column is described in Section 4.



3.3 Clean the fork components and lay out for examination



3.5 Grease liberally during reassembly and tighten slotted nuts securely

5 If the stanchion assembly is in good condition, refit it by reversing the dismantling sequence. Check that the various components are fitted in the correct order (see accompanying line drawing) and grease liberally prior to installation.

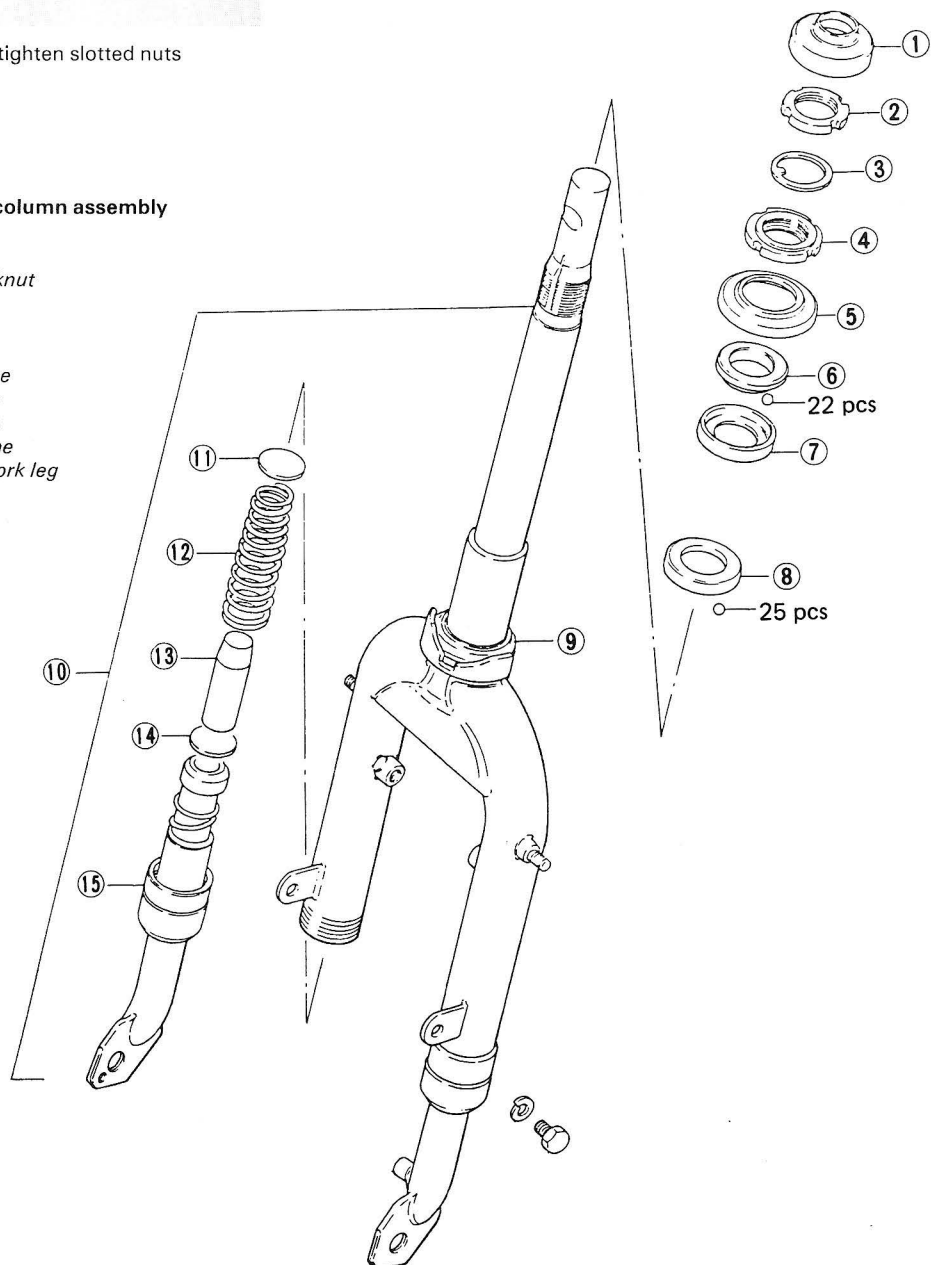
4 Steering column assembly: dismantling, examination and reassembly

1 Place the machine on its centre stand on a level surface, allowing adequate working space to the front. Arrange a scissor jack or some wooden blocks beneath the footboard supporting framework so that the front wheel is raised clear of the ground. Remove the steering column cover, footboard and the legshield as described in Section 2.

2 Release the four domed nuts which retain the front luggage rack and lift it away taking care not to scratch the paintwork. Remove the front wheel, referring to Chapter 5 for details, then remove the two bolts which secure the front mudguard and lift it clear of the forks. If

Fig. 4.1 Fork legs and steering column assembly

- 1 Dust cover
- 2 Steering stem locknut
- 3 Washer
- 4 Adjusting nut
- 5 Dust seal
- 6 Upper bearing cone
- 7 Upper bearing cup
- 8 Lower bearing cup
- 9 Lower bearing cone
- 10 Steering column/fork leg assembly
- 11 Spring seat
- 12 Fork spring
- 13 Bump stop
- 14 Spring seat
- 15 Slotted nut



the stanchions are to be removed from the steering column tube, it is advisable to do so at this stage (see Section 3).

3 Slacken and remove the clamp bolt which retains the handlebar assembly to the steering column. Lift the assembly clear of the steering column splines and lodge it on the seat (it is a good idea to tie it in place to avoid accidental damage). Slacken the steering stem locknut using a C-spanner. The Suzuki 'Universal clamp wrench', Part Number 09910-60611, is recommended for this purpose. Remove the cross-head screw from the splined portion of the steering column.

4 Place an old blanket or similar beneath the steering column to catch any bearing balls which might be dropped. Support the column, then remove the adjuster nut. Carefully lower the steering column, noting that the bearing balls are not caged and will drop out of the races as the column is removed. Due to the length of the steering column it may prove necessary to lift the front of the machine slightly to allow removal. Collect the balls and place them in a container to await examination.

5 Thoroughly clean all components, removing all traces of road dirt, corrosion and old grease. The steering column must be straight and undamaged. If accident damage is suspected, it must be checked for straightness by an expert or compared with a new item. Note that chipped or flaking paint will often reveal a bent section of any suspension component. It may be possible to repair such damage, but renewal is the safest course of action.

6 The bearing balls should be renewed as a complete set if any is chipped, broken, discoloured or marked in any way. There is a total of 47.

7 The polished tracks of the bearing cups and cones must be completely smooth and unmarked; any signs of cracks, chipping or of indentations caused by overtightening will mean that the component concerned must be renewed.

8 The steering head bottom bearing cone can be tapped off its locating shoulder on the steering column using a hammer and a suitable drift. The bearing cups are removed from the frame steering head lug by passing a long drift through the lug to bear on the inner surface of each cup so that the cup can be dislodged by tapping.

9 On reassembly, check that all components are clean and dry. The bearing cups should be pressed by hand only at first into their respective locations in the frame head lug, ensuring that each is positioned squarely to its housing. Using a hammer and a tubular drift such as a socket spanner which bears only on the raised outer edge of the cup, tap each cup fully into place. Slide the bottom bearing cone down the length of the steering column and tap it into place on its shoulder using either a long metal tube which bears only on the cone's raised inner edge or a suitable metal drift, tapping evenly around the cone's inner edge. Be very careful not to strike directly on the polished bearing surfaces of the cups and cones when installing them.

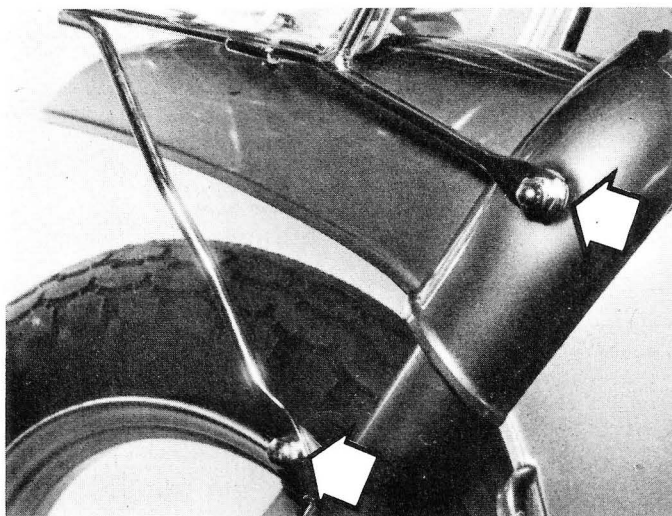
10 Smear grease over the length of the steering column and on the inside of the frame head lug, then lift the front of the machine so that the steering column can be inserted into the frame. Rest the column on the ground and pack grease thickly around the bottom bearing cup and cone. Fit 22 steel balls to the bottom bearing cone, using the grease to stick them in place, then raise the steering column until the balls seat fully in the bearing cup. Wedge a wooden box under the front suspension so that the steering column is securely held.

11 Note that when refitting the bearing steel balls, the number specified for each race will leave room for one more ball. This gap is intentional, and is necessary to prevent the balls from skidding against one another, thus greatly increasing the rate of wear. Fit only the specified number of balls.

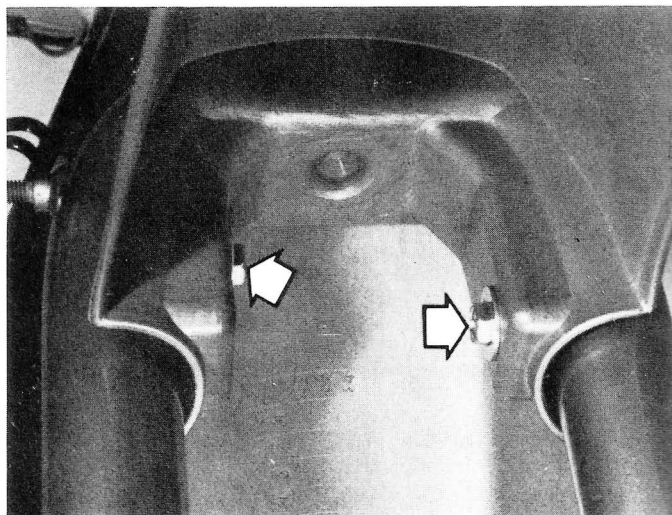
12 Pack the top bearing cup with grease and place 25 steel balls in it, using the grease to retain them. Smear grease over the bearing cone and lower this over the steering column, pressing it firmly into the bearing without dislodging any balls. This is followed by the dust seal, the adjuster nut, the plain washer and the locknut.

13 Tighten down firmly the adjuster nut until resistance is encountered then remove the support and move the steering column once or twice through its full movement to check that it is free to rotate. Slacken the adjuster nut by $\frac{1}{8}$ - $\frac{1}{4}$ turn, then tighten down lightly the locknut. Check that the steering moves easily and freely from lock to lock with no trace of notchiness or of free play. This will serve as the basis for correct adjustment when the machine is fully reassembled. Refit the dust cover.

14 The remainder of the reassembly procedure is the reverse of the dismantling procedure given above. Check that the control cables and wiring are correctly routed and secured when refitting the handlebars.



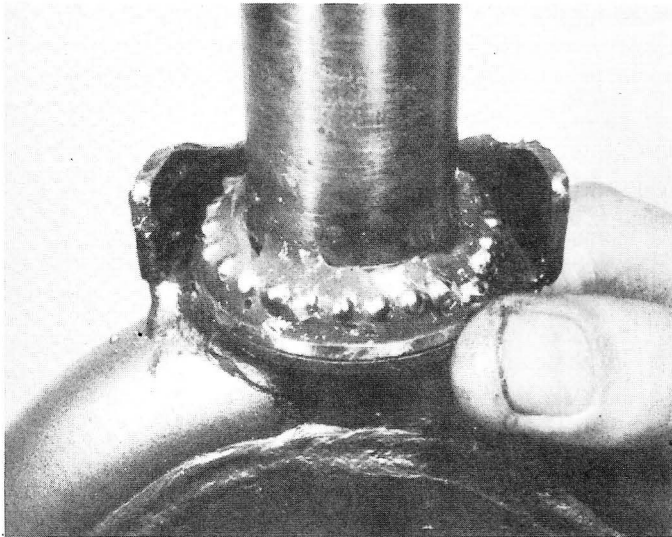
4.2a Release domed nuts (arrowed) and lift away rack



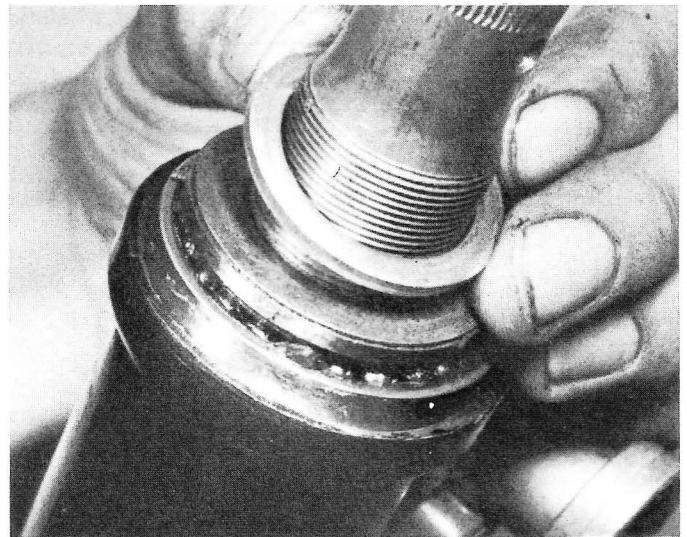
4.2b Front mudguard is retained by two bolts (arrowed)



4.3 Remove clamp bolt and lift handlebar assembly clear of steering column splines



4.9 Stick bearing balls to bottom cone using grease



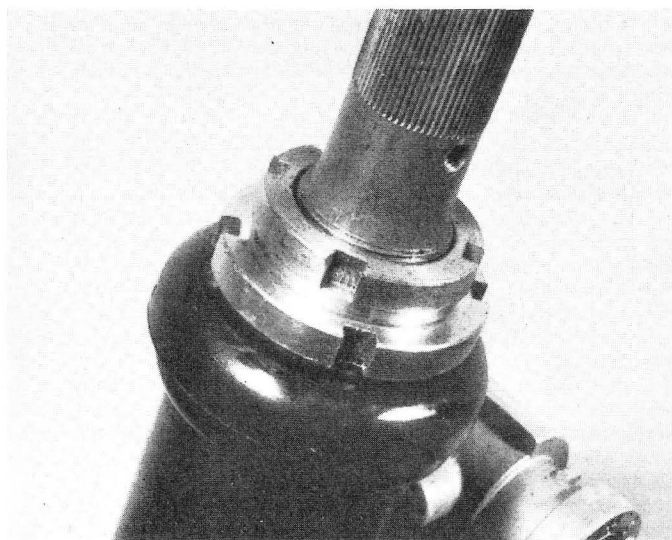
4.11 a Refit bearing balls, cone and washer ...



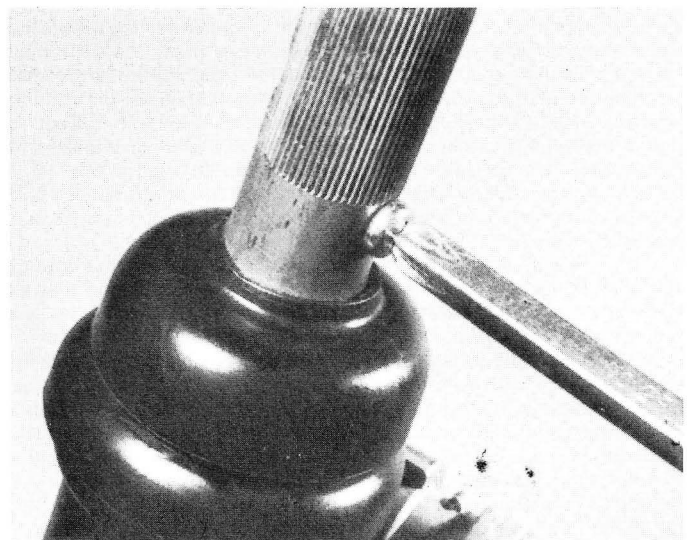
4.11 b ... followed by the dust seal



4.11 c Adjust the steering head bearings ...



4.11 d ... and secure the locknut



4.11 e This screw locates handlebars; do not omit it!

5 Rear suspension: dismantling, examination and reassembly

1 Since the removal of the engine mounting bracket alone will require a great deal of care in blocking up the frame and the engine/transmission unit at exactly the correct height, and since there is a significant risk of damage being done to control cables and wiring if either should fall, it is recommended that the rear suspension is checked only after the engine/transmission unit has been removed from the frame, as described in Chapter 1. The removal of the engine mounting bracket is described in Section 6 of the same Chapter, while refitting is described in Section 30 and the refitting of the engine/transmission unit to the frame is described in Section 31.

2 The rear suspension pivot bearings are formed by bonded rubber bushes, in which a thick rubber tube is joined to a metal centre sleeve and outer rim. Wear is not common unless a very high mileage has been covered, and can be checked only by looking for free play. Place the machine on its wheels and have an assistant hold it upright. Grasping the rear of the engine/transmission unit, push and pull firmly from side to side, while watching for free play at the pivot. Any free play found will be magnified by the leverage. No free play should be found; if any is present the bushes concerned must be renewed.

3 It is difficult to detect a worn rubber bush by visual examination, unless the rubber is obviously torn or damaged. Heavily corroded metal sleeves with signs of wear in the centre sleeve, or cracked, perished or otherwise damaged rubber sections can be regarded as good indicators of a faulty bush, but are not conclusive. If the suspension is showing signs of wear and if free play can be felt, but no one set of bushes can be found to be worn, it is best to err on the side of safety and renew all the bushes, regardless of their apparent condition.

4 If any bush is to be renewed, start by soaking it in penetrating oil for as long as possible. Bonded rubber bushes are notoriously difficult to remove, especially when corrosion has formed to stick the outer sleeve to the bush housing. While there may be many methods of removing a bush, those involving the use of force, ie attempting to tap out the bush with a hammer and drift, normally result in the rubber tearing away from the outer sleeve, leaving it jammed in the housing. For this reason a drawbolt arrangement is recommended, the principle of which is shown in the accompanying illustration.

5 By altering the size of the various components, the drawbolt can be adapted to remove or refit any of the bushes, whether set in the engine mounting bracket or in a crankcase casting. The components required are: a thick-walled tube at least as long as the width of the bush to be removed and with an inside diameter only slightly larger than the bush outside diameter, two thick steel washers, one of which will fit over the tube and the other with an outside diameter the same as that of the bush outer sleeve, and a high tensile bolt and nut. The bolt must be long enough to pass through the tube, the bush and both washers. Assemble the drawbolt and tighten the nut to press the bush from its housing.

6 If a bush is being removed from a crankcase casting, the application of heat will assist the task, but this should be done only after the engine/transmission has been completely dismantled so that no other component can be damaged or distorted. Also, the casting must be heated evenly to prevent distortion, as described in Section 13 of Chapter 1. It is, therefore, far better to rely on a good soaking in penetrating fluid to assist bush removal. If all else fails, do not resort to force or any other means of bush removal; the risk of serious and expensive damage is too great. Take the component concerned to a Suzuki Service Agent for expert advice and help.

7 On refitting, use emery paper or similar to clean both the bore of the bush housing and the outside of the new bush, ensuring that all burrs or raised edges are removed, and all traces of dirt and corrosion are polished away. Apply a thin smear of grease to both surfaces.

8 Assemble the drawbolt and press the new bush into place until its outer sleeve is flush with the bush housing. Take great care that the bush remains square to its housing as it is inserted. Bushes may also be inserted using a hammer and a tubular drift which bears only on the bush outer sleeve, but great care will be required; the drawbolt method is much more accurate and carries far less risk of damage.

9 Before the new bushes are fitted, the housing should be checked for splits, cracks or other damage. This may be repaired by welding, but should be entrusted only to an expert. If repair work is necessary on the crankcase castings, the engine/transmission must be dismantled so that the casting is presented to the welder with no other

components attached. In severe cases, it may be necessary to renew the casting.

10 Examine the pivot bolts. All traces of corrosion should be removed using abrasive paper and the bolts should be checked to ensure that they are straight and that their shanks are not worn at the points where they bear on the bush inner sleeves. Renew any bolt that is found to be bent or worn, or if its thread is damaged.

11 On reassembly, apply a smear of grease to the bolt surfaces to prevent corrosion from forming, and ensure that the retaining nuts are tightened to the correct torque setting only when the machine is supported on its wheels, as described in Section 30 of Chapter 1. This is essential to prevent the rubber from being distorted excessively as the rear suspension moves.

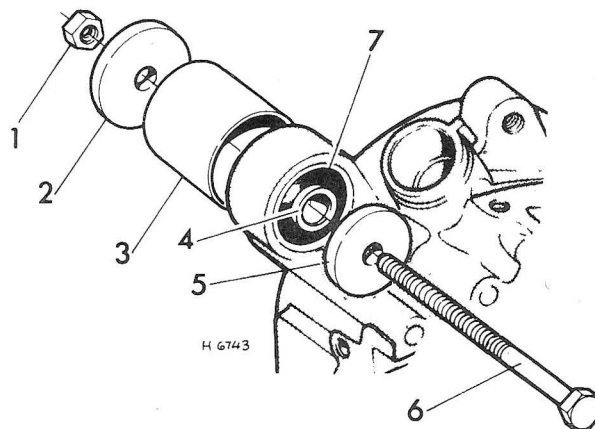


Fig. 4.2 Suspension bush removal tool

- | | |
|---------------------|---------------------|
| 1 Nut | 5 Thick washer |
| 2 Thick washer | 6 High tensile bolt |
| 3 Tube | 7 Bush outer sleeve |
| 4 Bush inner sleeve | |

6 Rear suspension unit: general

1 The suspension unit can be examined in place. First check that the mountings are securely fastened and that the mounting bushes are intact. Also, there should be no signs of oil leakage which would indicate a worn seal and loss of damping efficiency. Place the machine on its wheels and have an assistant bounce several times in turn the front and rear suspension. The suspension unit should operate smoothly with no squeaks, rattles or knocks which might indicate a fault.

2 If a fault of any kind is found, the suspension unit must be renewed, as repairs are not possible and no individual components are available as replacement parts. The unit is sealed and is not adjustable in any way.

7 Frame: examination and renovation

1 The frame is unlikely to require attention unless accident damage has occurred. In some cases, renewal of the frame is the only satisfactory remedy if the frame is badly out of alignment. Only a few frame specialists have the jigs and mandrels necessary for resetting the frame to the required standard of accuracy, and even then there is no easy means of assessing to what extent the frame may have been overstressed.

2 After the machine has covered a considerable mileage, it is advisable to examine the frame closely for signs of cracking or splitting at the welded joints. Rust corrosion can also cause weakness at these joints. Minor damage can be repaired by welding or brazing, depending on the extent and nature of the damage.

3 Remember that a frame which is out of alignment will cause handling problems and may even promote 'speed wobbles'. If misalignment is suspected, as a result of an accident, it will be necessary to strip the machine completely so that the frame can be checked, and if necessary, renewed.

8 Stands and controls: examination and renovation

1 Periodically check and lubricate all stands and all controls. All mounting bolts or nuts should be securely fastened to the correct torque setting (where applicable), and securing split-pins (where fitted) must be in good condition and correctly fastened.

2 Check that the bearing surfaces at all pivot points are well greased and unworn, renewing any component that is excessively worn. If any lubrication is required, dismantle the assembly to ensure that grease can be packed fully into the bearing surfaces. Return springs, where fitted, must be in good condition, with no traces of fatigue, and must be securely mounted.

3 If accident damage is to be repaired, check that the damaged component is not cracked or broken. Such damage can be repaired by welding, if the pieces are taken to an expert, but since this will destroy the finish, renewal is usually the more satisfactory course of action. If a component is merely bent it can be straightened after the affected area has been heated to a dull cherry red, using a blowlamp or welding torch. Again the finish will be destroyed and while painted surfaces can be repainted easily, chromed or plated surfaces can only be replated if the cost is justified.

9 Speedometer head: removal, examination and refitting

1 The speedometer head must be carefully handled at all times and must never be dropped or held upside down. Dirt, oil, grease and water all have an equally adverse effect on it, and so a clean working area must be provided if it is to be removed.

2 The instrument head is very delicate and should not be dismantled at home. In the event of a fault developing, the instrument should be entrusted to a specialist repairer or a new unit fitted. If a replacement is required it is well worth trying to obtain a good secondhand item from a motorcycle breaker in view of the high cost of a new instrument.

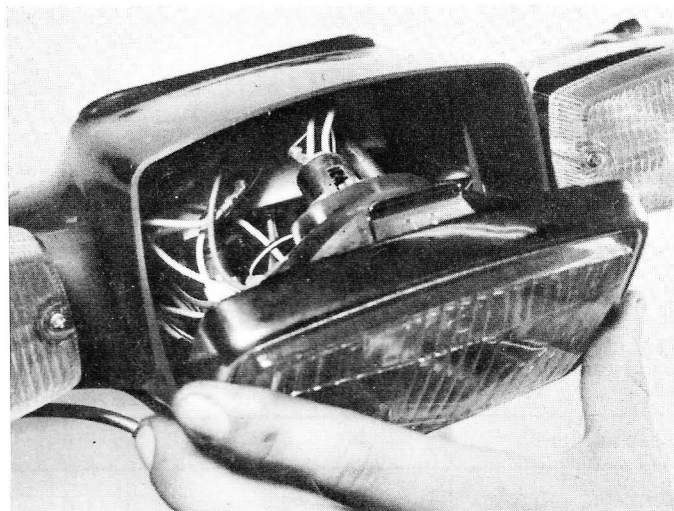
3 Remember that a speedometer in correct working order is a statutory requirement in the UK. Apart from this legal necessity, reference to the odometer readings is the most satisfactory means of keeping pace with the maintenance schedules.

4 To remove the unit, withdraw the headlamp assembly so that the speedometer drive cable knurled retaining ring can be unscrewed, then remove the two screws which secure the speedometer to the headlamp/handlebar top cover. Pull the unit upwards until the various warning and illuminating bulbs can be unplugged from its base.

10 Speedometer drive cables: examination and renovation

1 It is advisable to detach the speedometer drive cable from time to time to check whether it is adequately lubricated and whether the outer cable is compressed or damaged at any point along its run. A jerky or sluggish movement at the instrument head can often be attributed to a cable fault.

2 To grease the cable, uncouple both ends and withdraw the inner cable. After removing any old grease, clean the inner cable with a petrol soaked rag and examine the cable for broken strands or other damage. Do not check the cable for broken strands by passing it



9.4 Remove headlamp to free speedometer cable

through the fingers or palm of the hand, this may well cause a painful injury if a broken strand snags the skin. It is best to wrap a piece of rag around the cable and pull the cable through it; any broken strands will snag on the rag.

3 Regrease the cable with high melting point grease, taking care not to grease the last six inches closest to the instrument head. If this precaution is not observed, grease will work into the instrument and immobilise the sensitive movement.

4 The cable is retained by a knurled, threaded ring at its top end and at the bottom.

5 When refitting drive cables, always ensure that they have smooth, easy runs to minimise wear, and check that the cables are secured where necessary by any clamps or ties provided for the purpose of keeping the cables away from any hot or moving parts.

11 Speedometer drive: location and examination

1 The speedometer drive is housed inside the front brake plate, access to it being gained after the wheel and brake shoes have been removed as described in Chapter 5. The worm drive assembly should not normally require attention other than greasing whenever the wheel bearings or brakes are overhauled.

2 If the drive fails, it will be necessary to remove and renew the damaged parts. Start by prising out the grease seal which should be renewed as a matter of course. Tip out the plastic scroll, then remove the worm assembly by unscrewing it from its recess in the brake plate. Renew the damaged parts, greasing them during reassembly. Check that the speedometer cable turns freely; a seized cable may have caused the original damage. Fit a new grease seal, ensuring that it enters its recess squarely.

Chapter 5 Wheels, brakes and tyres

Contents

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Specifications

Wheels

Type	Pressed steel
Rim runout (maximum):	
Axial	2.0 mm (0.08 in)
Radial	2.0 mm (0.08 in)

Brakes

Type	Cable operated drum (front and rear)
Brake lever to handlebar gap (brakes applied fully)	20 – 30 mm (0.79 – 1.18 in)
Brake drum maximum ID:	
Front	80.7 mm (3.18 in)
Rear	90.7 mm (3.57 in)
Lining thickness (min)	1.5 mm (0.059 in)

Tyres

Size (front and rear)	2.75-10 2PR
Recommended min tread depth	1.6 mm (0.063 in)
Tyre pressures:	
Front	18 psi (1.27 kg/cm ²)
Rear	25 psi (1.75 kg/cm ²)

Torque wrench settings

Component	kgf m	lbf ft
Front wheel spindle nut	2.7 – 4.3	19.5 – 31.1
Rear wheel spindle nut	6.0 – 9.0	43.4 – 65.1
Front brake cam lever bolt	0.6 – 0.8	4.3 – 4.6
Rear brake cam lever bolt	0.6 – 0.8	4.4 – 4.6

1 General description

Unlike most scooter designs, the CL50 models do not employ identical wheels front and rear. Although both are of pressed steel construction, the front wheel is mounted between two fork legs on a spindle, whilst the rear fits directly on a stub axle by way of a splined boss.

The front and rear brakes are of similar design, both being of the internal expanding single leading shoe type. The two brakes are operated by cable from the handlebar levers in the same manner as bicycle brakes.

2 Wheels: examination and renovation

- 1 Place the machine on its centre stand. If checking the front wheel, place wooden blocks underneath the front of the footboards so that the machine is supported securely, with the wheel clear of the ground. Both wheels may be examined fully when in position.
- 2 Spin the wheel and check for distortion from side to side (axial) and for signs that the wheel is off centre (radial distortion) by placing a fixed pointer close to the rim. If the wheel is distorted by more than 2.0 mm (0.8 in) in either plane it must be renewed.
- 3 Check for signs of cracking, especially around the mounting points

and at the spoke plate/rim, welded joints. Repairs by welding are possible, but should be entrusted only to an expert. Any signs of corrosion should be treated at the earliest possible opportunity by rubbing down to the bare metal and repainting. Use one of the many proprietary rustproofing compounds that also act as a primer for the final coat of paint. A heavily corroded wheel must be renewed to prevent the risk of it breaking up.

4 Any small dents in the wheel rims can be removed by an expert using panel-beating equipment, but major damage will mean that the wheel must be renewed. The rim must be undamaged if it is to support the tyre correctly.

5 Lastly, check the condition of the wheel bearings by grasping the wheel rim firmly at two opposite points and attempting to rock it up and down and from side to side. Ensure that the handlebars are held securely on full left lock while the front wheel bearings are checked. If any free play is felt, check that it is not due to slack mounting nuts, or on the back brake only, to slack in the brake drum/stub axle splines. Spin the wheel and listen to ensure that it revolves freely and easily with no squeaks or other noises to indicate worn bearings.

6 If free play is felt, or if the bearings can be heard to be running roughly, they must be renewed. For the front wheel, removal and refitting of the bearings is described in Section 5 of this Chapter, but for the rear wheel it will be necessary to dismantle the transmission to gain access to the stub axle bearings, as described in the relevant Sections of Chapter 1.

3 Front wheel: removal and refitting

1 Place the machine on its centre stand on a level surface and raise the front wheel clear of the ground by placing a jack or wooden blocks beneath the frame. Unscrew the knurled ring which retains the speedometer cable to the brake plate and lodge the cable clear of the wheel. Remove the front brake adjuster from the end of the cable, then disengage the cable from the operating arm and the brake plate.

2 Slacken and remove the wheel spindle nut and withdraw the

spindle. Turn the ends of the fork stanchions outwards and lift the wheel away. Note that the headed spacer on the right-hand (nut) side will drop free and should be retained.

3 When refitting the wheel, ensure that the brake plate engages correctly over the projecting anti-torque peg on the left-hand fork stanchion. Slide the wheel spindle into position, remembering to refit the headed spacer. Fit the spindle nut, tightening it to 2.7 – 4.3 kgf m (19.5 – 31.1 lbf ft). Reconnect the speedometer and front brake cables, adjusting the latter so that the brake begins to operate just after the lever is moved.

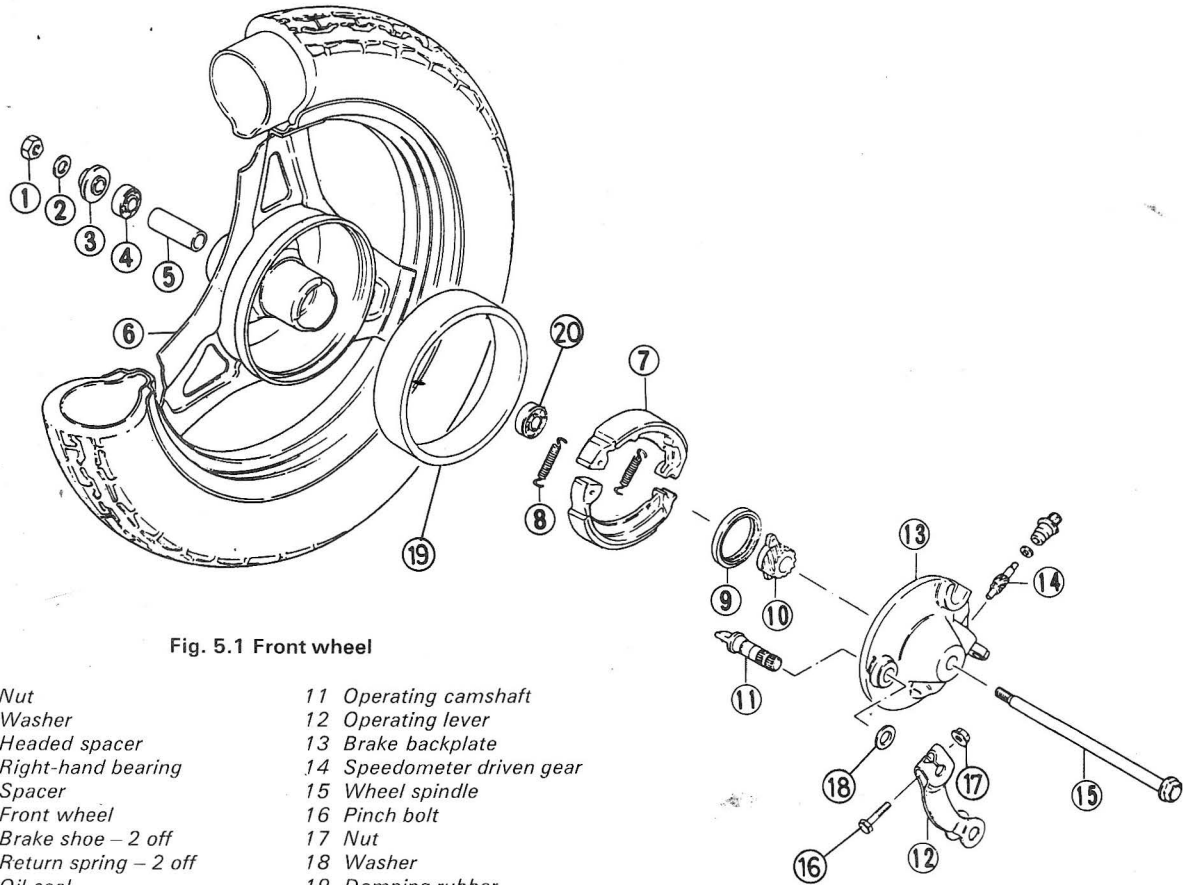
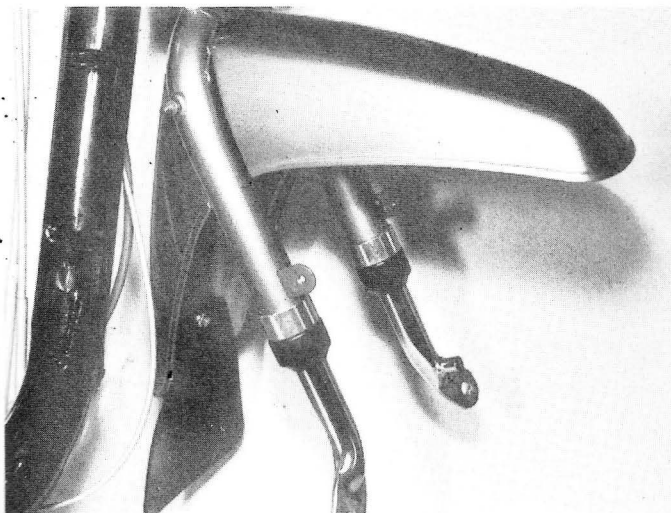
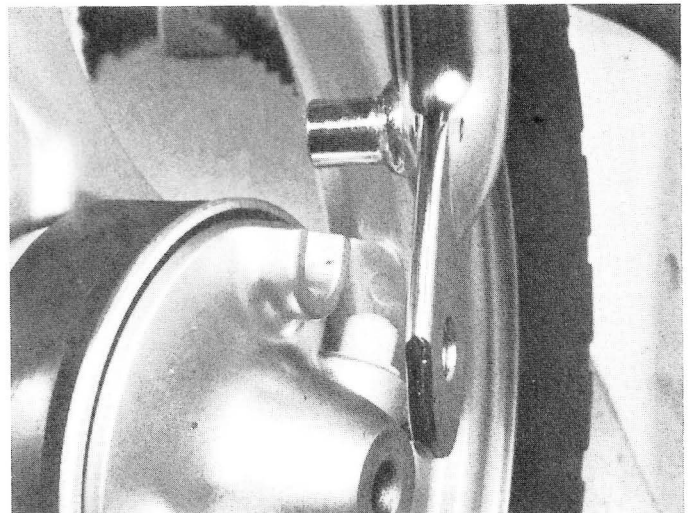


Fig. 5.1 Front wheel

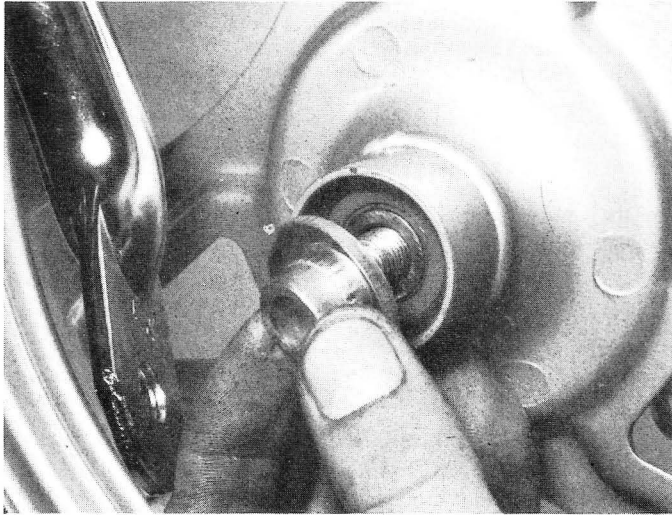
- | | |
|---------------------------|----------------------------|
| 1 Nut | 11 Operating camshaft |
| 2 Washer | 12 Operating lever |
| 3 Headed spacer | 13 Brake backplate |
| 4 Right-hand bearing | 14 Speedometer driven gear |
| 5 Spacer | 15 Wheel spindle |
| 6 Front wheel | 16 Pinch bolt |
| 7 Brake shoe – 2 off | 17 Nut |
| 8 Return spring – 2 off | 18 Washer |
| 9 Oil seal | 19 Damping rubber |
| 10 Speedometer drive gear | 20 Left-hand bearing |



3.3a Turn fork ends outwards to allow wheel to be slid into position



3.3b Ensure that brake plate notch engages over pin on right-hand lower leg



3.3c Remember to fit headed spacer as spindle is fitted

4 Rear wheel: removal and refitting

1 Place the machine on its centre stand on level ground. Carefully remove the right-hand side panel to gain access to the exhaust system. The latter must, unfortunately, be removed before the wheel can be slid off the stub axle. The system is retained by two nuts at the exhaust port flange and a single bolt just to the rear of the fan cowling. The fasteners are easy to reach, but beware of burns if the machine has been ridden recently.

2 Straighten and remove the split pin which secures the wheel nut, which can then be removed. The wheel can now be slid off the splined end of the stub axle. If it proves tight on the splines, try rocking it until it comes free.

3 The wheel is refitted by reversing the removal operation. Note that the wheel nut must be tightened to 6.0 – 9.0 kgf m (43.4 – 65.1 lbf ft) and secured using a new split pin. Before the exhaust system is fitted, check the condition of the exhaust port gasket, renewing it if damaged.

5 Front wheel bearings: removal, examination and refitting

1 Remove the front wheel as described in Section 3 and lift away the brake plate. Check the condition of the bearings before attempting

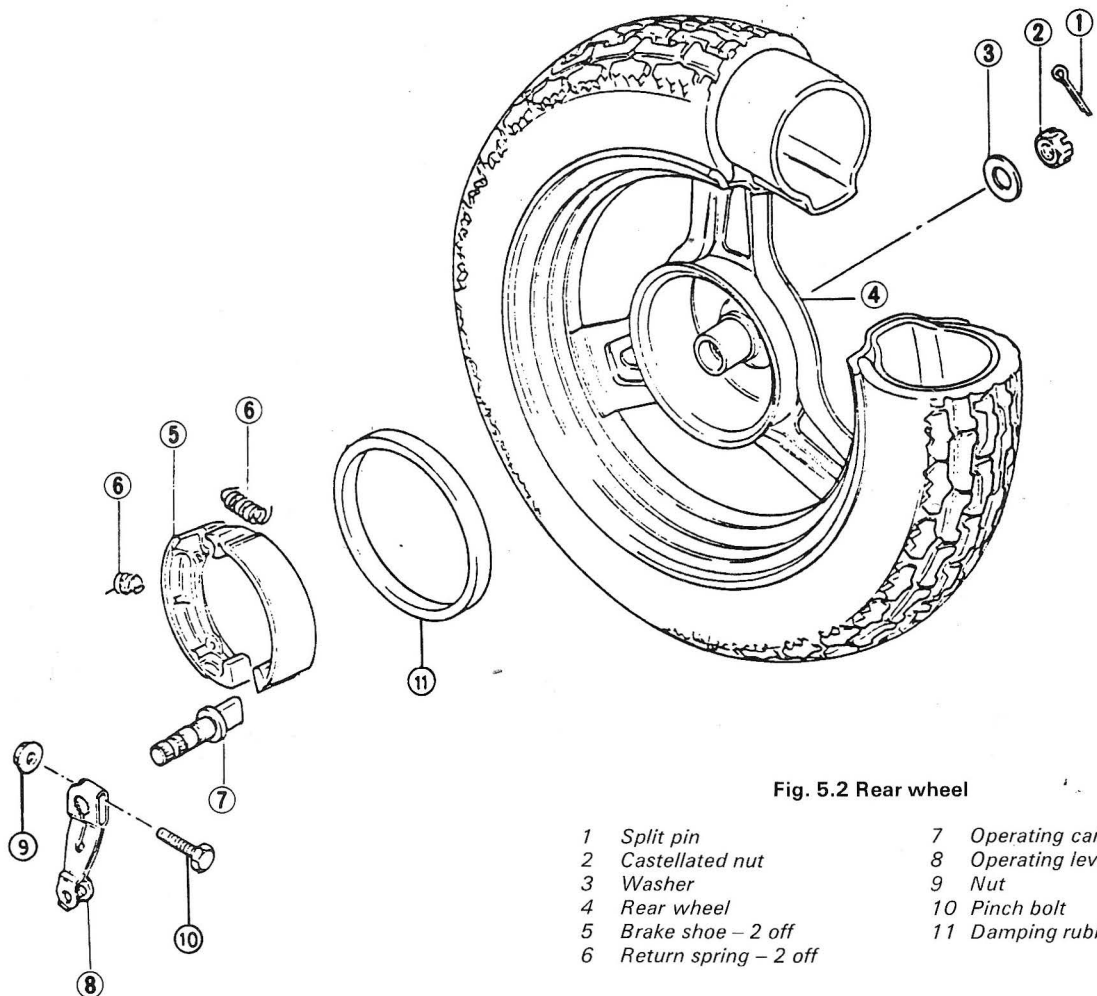


Fig. 5.2 Rear wheel

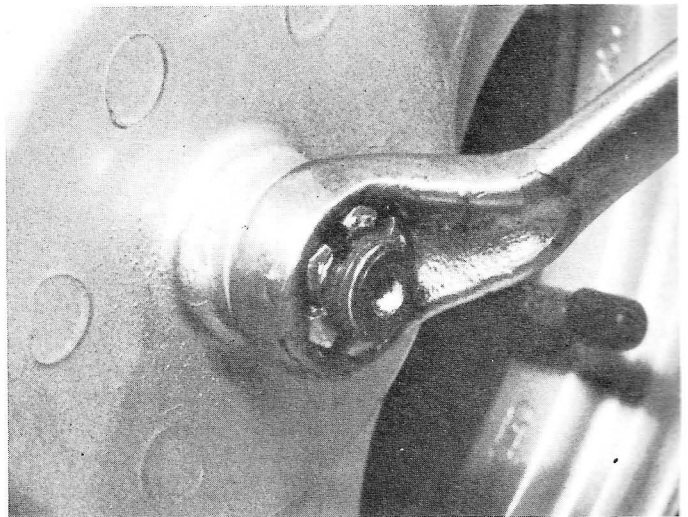
- | | |
|-------------------------|----------------------|
| 1 Split pin | 7 Operating camshaft |
| 2 Castellated nut | 8 Operating lever |
| 3 Washer | 9 Nut |
| 4 Rear wheel | 10 Pinch bolt |
| 5 Brake shoe – 2 off | 11 Damping rubber |
| 6 Return spring – 2 off | |

removal; it is quite likely that they will be undamaged and should not be disturbed needlessly. If radial (up and down) play can be felt, or if the bearings feel notchy or rough when turned, it is safe to assume that they are in need of renewal.

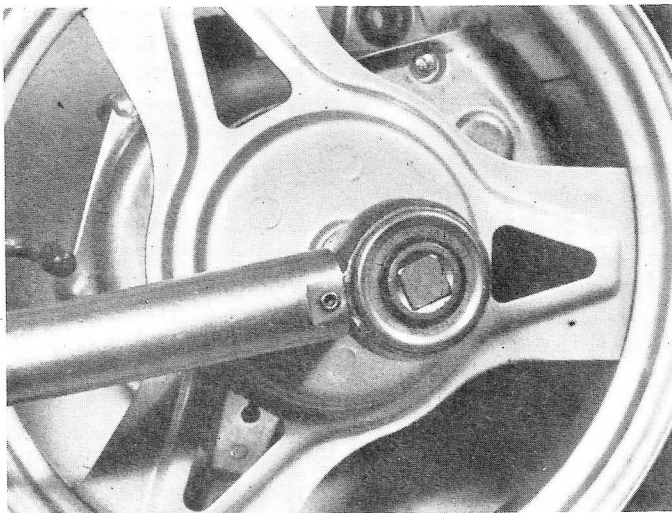
2 The bearings can be driven out of the hub using a long thin drift. They are likely to be a tight fit in their recesses, so a hard steel rod of slightly smaller diameter than the spindle and about ten inches in length will be needed. During the workshop project it was discovered that a discarded steel pushrod from a car engine worked well, it should be possible to find something suitable at a local scrap yard. Alternatively, an old screwdriver may be used.

3 The two bearings are separated by a steel spacer which will be trapped firmly between them. This must be knocked to one side so that the drift can bear on the inner race of the furthest bearing, a process which requires some persistence. When purchase can be obtained, check that the wheel is well supported and drive out the bearing. Remove the spacer, invert the wheel and remove the remaining bearing.

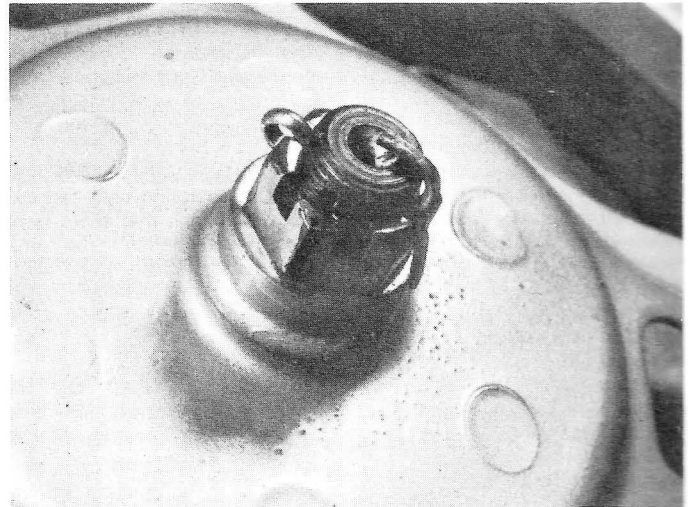
4 Clean out all old grease from the hub and check that no burrs have been left which might impede fitting. Pack the new bearings with high melting-point grease, then fit the first one, using a large socket as a drift and ensuring that it enters the hub squarely. Turn the wheel over, drop the spacer into the hub and fit the remaining bearing in the same manner.



4.2 Remove split pin and unscrew wheel nut. Remove washer and wheel



4.3a Tighten wheel nut to prescribed torque setting ...



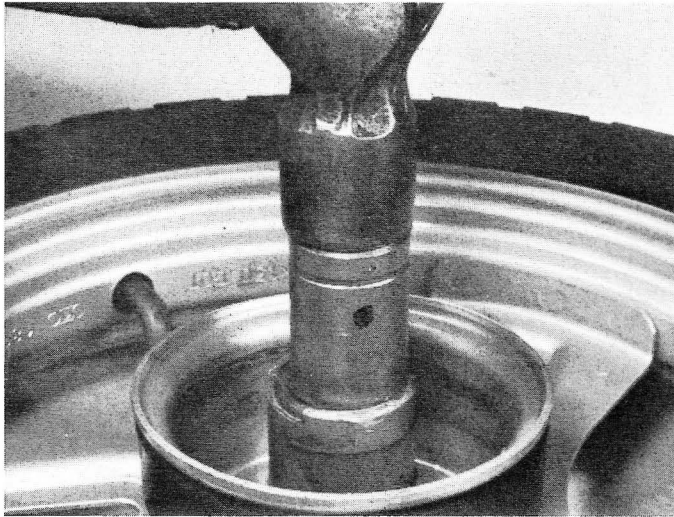
4.3b ... and secure with a new split pin



5.3 Bearings are separated by a spacer



5.4a Pack bearings with high melting point grease ...



5.4b ... and refit using a socket as a drift

6 Brakes: removal, examination and refitting

1 Access to the brakes is gained after the appropriate wheel has been removed. Refer to Section 3 or 4 for details. Once the wheel, and thus the brake drum, have been lifted away, the remaining brake components can be dismantled. Note that the sequence is similar for both the front and rear brakes.

2 The shoes are best removed by 'folding' them together until the return spring tension has been relieved. The operating cam can be displaced after the lever has been removed. Check that there is a reference mark showing the position of the lever in relation to the cam, then remove the pinch bolt, pull off the lever and displace the cam from the brake plate.

3 Examine the inside of the brake drum; it must be smooth and unworn, with no signs of excessive wear. Asbestos dust must be removed using only a rag soaked in petrol; never blow it away with compressed air as it is toxic. The petrol-soaked rag will also remove any grease or oil deposits, but care must be taken to prevent any risk of fire. Measure the brake drum inside diameter, making several measurements at points all around the drum to ensure that it has not warped or become oval. The maximum permissible drum diameter is given in the Specifications Section of this Chapter; if it is worn at any point to beyond the limit, or if it has worn to an oval shape, the drum must be renewed. Light wear or scoring may be reclaimed by having an expert skim the drum on a lathe, provided that the maximum diameter is not exceeded.

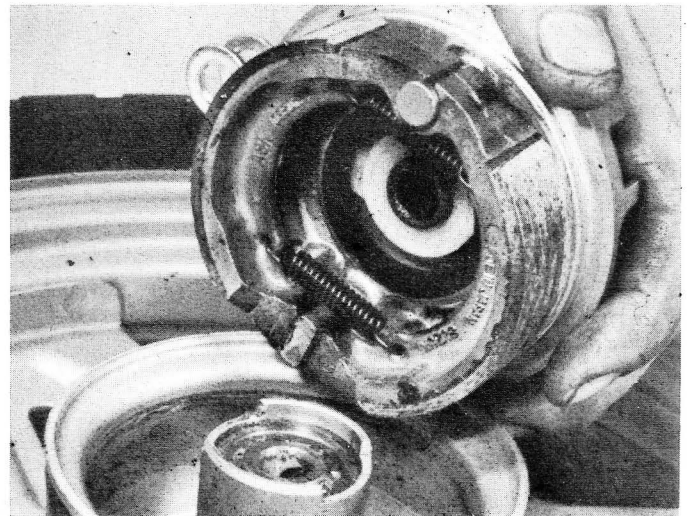
4 Measure the amount of friction material remaining on each brake shoe; if either shoe is worn down to 1.5 mm (0.06 in) or less at any point, both must be renewed. If the shoes are within wear limits, clean them thoroughly. Any areas of glazing on the friction material can be cured by rubbing down with emery cloth, and any foreign bodies can be picked out with a sharp-pointed instrument, but if the material is contaminated with oil or grease both shoes should be renewed regardless of the amount of material remaining; there is no satisfactory way of degreasing friction material.

5 If the existing shoes are to be refitted, roughen slightly their friction surfaces with emery cloth to break any glaze that may have formed in use, and lightly polish the drum inside diameter to assist the shoes to bed in again. This is also beneficial when fitting new brake shoes, but care must be taken to avoid inhaling asbestos dust.

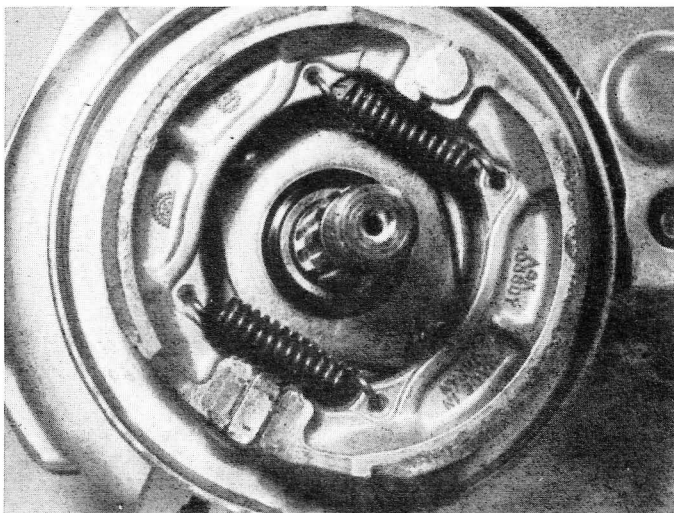
6 Check that the shoe return springs are undamaged and in good condition. If there is any doubt about their condition they should be renewed.

7 Thoroughly clean the camshaft and operating arm, using emery paper if necessary. If the camshaft is a sloppy fit in the backplate, or if it shows any other signs of wear, it must be renewed. Renew the sealing O-ring fitted around the camshaft if it appears worn or damaged.

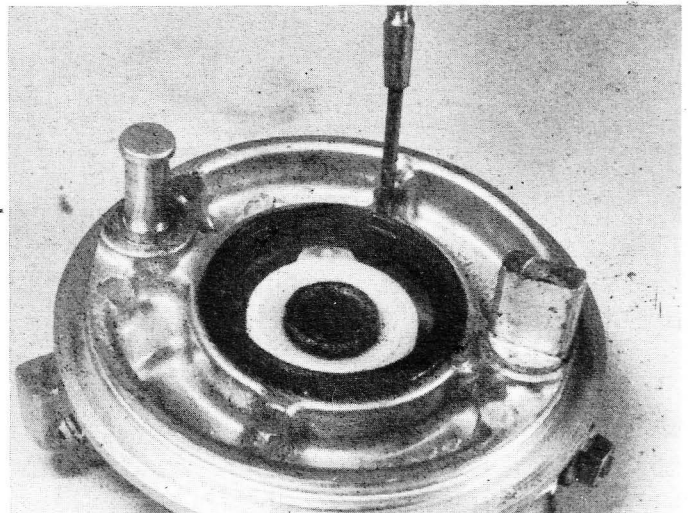
8 On reassembly, smear grease over the camshaft and the O-ring and insert them into the brake backplate. Refit the operating arm. Refer to the photographs and illustrations accompanying the text to ensure that all components are correctly refitted.



6.1a Front brake plate assembly can be lifted away ...



6.1b ... whilst rear brake plate is integral with transmission casing



6.8a Grease seal can be levered out using slot provided ...



Tyre removal: Deflate inner tube and insert lever in close proximity to tyre valve



Use two levers to work bead over the edge of rim



When first bead is clear, remove tyre as shown



Tyre fitting: Inflate inner tube and insert in tyre



Lay tyre on rim and feed valve through hole in rim



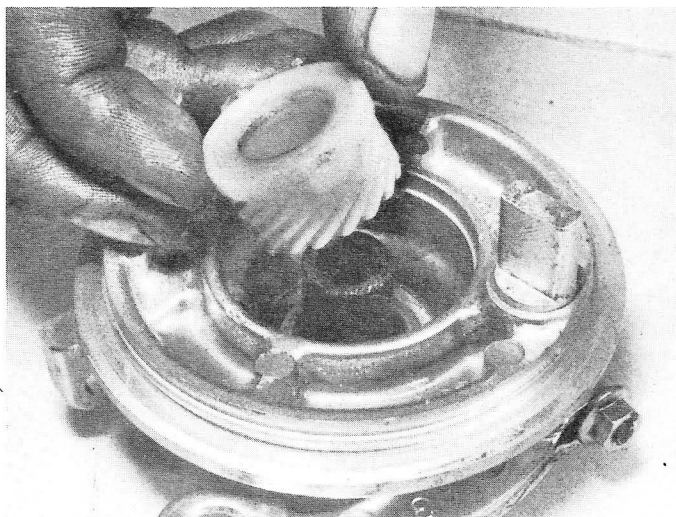
Work first bead over rim, using lever in final section



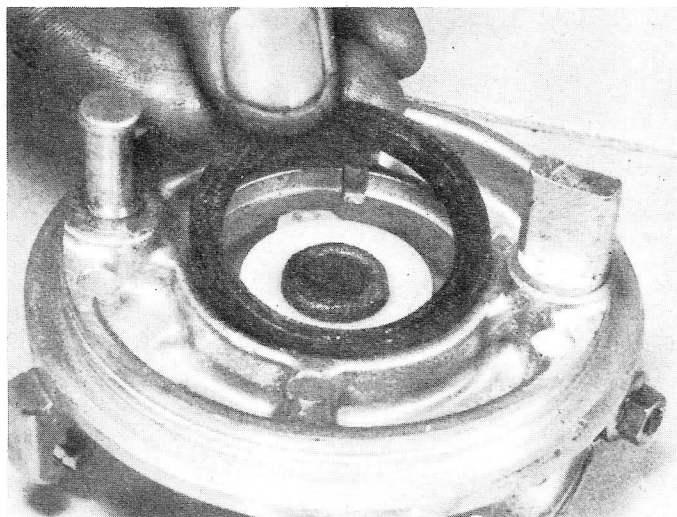
Use similar technique for second bead, finish at tyre valve position



Push valve and tube up into tyre when fitting final section, to avoid trapping



6.8b ... to allow speedometer drive components to be greased



6.8c The old seal will have been damaged during removal – it should be renewed

7 Tyres: removal, repair and refitting

1 At some time or other the need will arise to remove and replace the tyres, either as a result of a puncture or because replacements are necessary to offset wear. To the inexperienced, tyre changing represents a formidable task, yet if a few simple rules are observed and the technique learned, the whole operation is surprisingly simple.

2 To remove the tyre from either wheel, first detach the wheel from the machine. Deflate the tyre by removing the valve core, and when the tyre is fully deflated, push the bead away from the wheel rim on both sides so that the bead enters the centre well of the rim. Remove the locking ring and push the tyre valve into the tyre itself.

3 Insert a tyre lever close to the valve and lever the edge of the tyre over the outside of the rim. Very little force should be necessary; if resistance is encountered it is probably due to the fact that the tyre beads have not entered the well of the rim, all the way round. If aluminium rims are fitted, damage to the soft alloy by tyre levers can be prevented by the use of plastic rim protectors.

4 Once the tyre has been edged over the wheel rim, it is easy to work round the wheel rim, so that the tyre is completely free from one side. At this stage the inner tube can be removed.

5 Now working from the other side of the wheel, ease the other edge of the tyre over the outside of the wheel rim that is furthest away. Continue to work around the rim until the tyre is completely free from the rim.

6 If a puncture has necessitated the removal of the tyre, reinflate the inner tube and immerse it in a bowl of water to trace the source of the leak. Mark the position of the leak, and deflate the tube. Dry the tube, and clean the area around the puncture with a petrol soaked rag. When the surface has dried, apply rubber solution and allow this to dry before removing the backing from the patch, and applying the patch to the surface.

7 It is best to use a patch of self vulcanizing type, which will form a permanent repair. Note that it may be necessary to remove a protective covering from the top surface of the patch after it has sealed into position. Inner tubes made from a special synthetic rubber may require a special type of patch and adhesive, if a satisfactory bond is to be achieved.

8 Before replacing the tyre, check the inside to make sure that the article that caused the puncture is not still trapped inside the tyre. Check the outside of the tyre, particularly the tread area to make sure nothing is trapped that may cause a further puncture.

9 If the inner tube has been patched on a number of past occasions, or if there is a tear or large hole, it is preferable to discard it and fit a replacement. Sudden deflation may cause an accident, particularly if it occurs with the rear wheel.

10 To replace the tyre, inflate the inner tube for it just to assume a circular shape but only to that amount, and then push the tube into the tyre so that it is enclosed completely. Lay the tyre on the wheel at an angle, and insert the valve through the rim tape and the hole in the

wheel rim. Attach the locking ring on the first few threads, sufficient to hold the valve captive in its correct location.

11 Starting at the point furthest from the valve, push the tyre bead over the edge of the wheel rim until it is located in the central well. Continue to work around the tyre in this fashion until the whole of one side of the tyre is on the rim. It may be necessary to use a tyre lever during the final stages.

12 Make sure there is no pull on the tyre valve and again commencing with the area furthest from the valve, ease the other bead of the tyre over the edge of the rim. Finish with the area close to the valve, pushing the valve up into the tyre until the locking ring touches the rim. This will ensure that the inner tube is not trapped when the last section of bead is edged over the rim with a tyre lever.

13 Check that the inner tube is not trapped at any point. Reinflate the inner tube, and check that the tyre is seating correctly around the wheel rim. There should be a thin rib moulded around the wall of the tyre on both sides, which should be an equal distance from the wheel rim at all points. If the tyre is unevenly located on the rim, try bouncing the wheel when the tyre is at the recommended pressure. It is probable that one of the beads has not pulled clear of the centre well.

14 Always run the tyres at the recommended pressures and never under or over inflate. The correct pressures are given in the Specifications Section of this Chapter.

15 Tyre replacement is aided by dusting the side walls, particularly in the vicinity of the beads, with a liberal coating of french chalk. Washing up liquid can also be used to good effect, but this has the disadvantage, where steel rims are used, of causing the inner surface of the wheel rim to rust.

16 Never replace the inner tube and tyre without the rim tape in position. If this precaution is overlooked there is a good chance of the ends of the spoke nipples chafing the inner tube and causing a crop of punctures.

17 Never fit a tyre that has a damaged tread or sidewalls. Apart from legal aspects, there is a very great risk of a blowout, which can have very serious consequences on a two wheeled vehicle.

18 Tyre valves rarely give trouble, but it is always advisable to check whether the valve itself is leaking before removing the tyre. Do not forget to fit the dust cap, which forms an effective extra seal.

8 Valve cores and caps: tubed tyres

1 Valve cores seldom give trouble, but do not last indefinitely. Dirt under the seating will cause a puzzling 'slow-puncture'. Check that they are not leaking by applying spittle to the end of the valve and watching for air bubbles.

2 A valve cap is a safety device, and should always be fitted. Apart from keeping dirt out of the valve, it provides a second seal in case of valve failure, and may prevent an accident resulting from sudden deflation.

Chapter 6 Electrical system

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Specifications

Electrical system

Voltage:	
CL50	6 volt
CL50 D	12 volt
Earth (ground)	Negative (-)

Battery

Make	Yuasa
Model:	
6 volt	6N4-2A
12 volt	YB4L-B or FB4L-B
Rating:	
CL50	6V 4Ah (10 hour rate)
CL50 D	12V 4Ah (10 hour rate)

Fuse

Rating	10 amp
--------------	--------

Starter motor (CL50 D only)

Minimum brush length	4.0 mm (0.157 in)
Minimum commutator undercut	0.2 mm (0.008 in)

Bulbs

	CL50	CL50 D
Headlamp	6V 25/25W	12V 25/25W
Tail/brake lamp	6V 5/21W	12V 5/12W
Turn signal lamp	6V 18W	12V 21W
Speedometer lamp	6V 3W	12V 3.4W
Turn signal warning lamp	6V 3W	12V 3.4W
Oil level warning lamp	6V 3W	12V 3.4W
Main beam warning lamp	6V 1.7W	12V 1.7W
Parking lamp	6V 3W	12V 3.4W

1 General description

The two CL50 models differ considerably as far as their respective electrical systems are concerned, the CL50 employing a 6 volt system, whilst the CL50 D's electric starter requires a 12 volt system. In each case the system is powered by a flywheel generator assembly mounted on the right-hand end of the crankshaft. Alternating current

(ac) from the generator is converted to direct current (dc) by a silicon rectifier before being supplied for battery charging purposes. A separate lighting coil provides ac power to the lighting system, this being controlled by an electronic regulator unit. The main difference between the two systems is that on 6 volt machines the battery charging voltage is regulated directly, whilst on 12 volt models it is regulated indirectly by controlling the lighting circuit voltage.

2 Testing the electrical system

1 Simple continuity checks, for instance when testing switch units, wiring and connections, can be carried out using a battery and bulb arrangement to provide a test circuit. For most tests described in this chapter, however, a pocket multimeter should be considered essential. A basic multimeter capable of measuring volts and ohms can be bought for a very reasonable sum and will prove an invaluable tool. Note that separate volt and ohm meters may be used in place of the multimeter, provided those with the correct operating ranges are available. In addition, if the generator output is to be checked, an ammeter of 0-5 amperes range will be required.

2 Care must be taken when performing any electrical test, because some of the electrical components can be damaged if they are incorrectly connected or inadvertently shorted to earth. This is particularly so in the case of electronic components. Instructions regarding meter probe connections are given for each test, and these should be read carefully to prevent accidental damage occurring.

3 Where test equipment is not available, or the owner feels unsure of the procedure described, it is strongly recommended that professional assistance is sought. Errors made through carelessness or lack of experience can so easily lead to damage and need for expensive replacement parts.

4 A certain amount of preliminary dismantling will be necessary to gain access to the components to be tested. Normally, removal of the seat and side panels will be required, with the possible addition of the fuel tank and headlamp unit to expose the remaining components.

5 Because of the high cost of replacement electrical components it is recommended that test findings are confirmed by a Suzuki Service Agent before a suspect component is discarded.

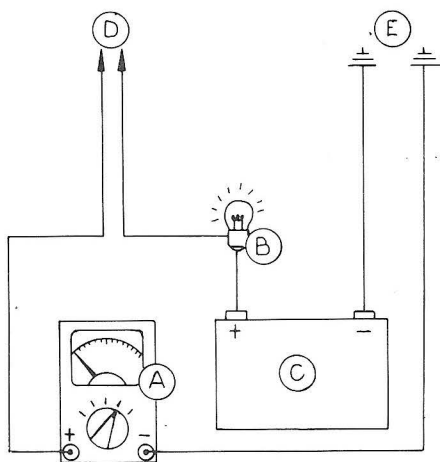


Fig. 6.1 Method of checking the wiring

- | | |
|--------------|------------------|
| A Multimeter | D Positive probe |
| B Bulb | E Negative probe |
| C Battery | |

3 Wiring: examination and layout

1 The wiring harness is colour coded and will correspond with the accompanying wiring diagram. When socket connectors are used, they are designed so that reconnection can be made in the correct position only.

2 Visual inspection will usually show whether there are any breaks or frayed outer coverings which will give rise to short circuits. Occasionally a wire may become trapped between two components, breaking the inner core but leaving the more resilient outer cover intact. This can give rise to mysterious intermittent or total circuit failure. Another source of trouble may be the snap connectors and sockets, where the connector has not been pushed fully home in the outer housing, or where corrosion has occurred.

3 Intermittent short circuits can often be traced to a chafed wire that passes through or is close to a metal component such as a frame member. Avoid tight bends in the lead or situations where a lead can become trapped between casings.

4 Charging system: checking the output

1 Before commencing this test, note that it is essential that the battery is fully charged and in good condition. If this is not the case, the test readings will be meaningless. Open and remove the seat, then remove the rear luggage rack and the main frame section and side panels to gain access to the system components. For details see Section 2 of Chapter 4.

Unregulated output check

2 Disconnect the battery negative (-) lead at the bullet connector. Set the multimeter to the dc Amps range or use a separate dc ammeter. Locate the regulator and disconnect the lead(s) at its terminal. The regulator is bolted to the right-hand side of the frame, just below the top loop. On 12 volt machines it is next to the starter relay which has several leads connected to it; do not confuse the two. Refer to Fig 6 for details.

3 Connect a test tachometer, following the maker's instructions, then start the engine and turn on the lights. Note the readings shown and compare them to those given below. These are minimum readings, and on a normal system should be exceeded.

CL50 (6 volt):	above 0.9A @ 4000 rpm
	below 2.8A @ 8000 rpm
CL50 D (12 volt):	above 0.9A @ 4000 rpm
	below 2.5A @ 8000 rpm

Regulated output check

4 The charging output is checked by connecting a multimeter set to the 0-20 volts dc scale or an equivalent voltmeter to the battery terminals. Connect the meter negative (-) probe to the battery negative terminal and the positive (+) probe to the positive terminal. A test tachometer will also be required so that the engine speed can be monitored, and this should be connected according to the manufacturer's instructions.

5 Check that the rear wheel is clear of all obstructions and free to rotate. Start the engine, switch on the headlamp, and run it at 5000 rpm, noting the reading shown on the meter. On 6 volt models (CL50) only, repeat the test with the lights off. Compare the reading(s) shown with those given below. If markedly different, check the condition of the stator coil resistance, the regulator and the rectifier.

CL50 (6 volt):	
Lights off	7.9 – 8.5 volts @ 5000 rpm
Lights on	9.6 – 10.6 volts @ 5000 rpm
CL50 D (12 volt):	
Lights on	13.5 – 14.5 volts @ 5000 rpm

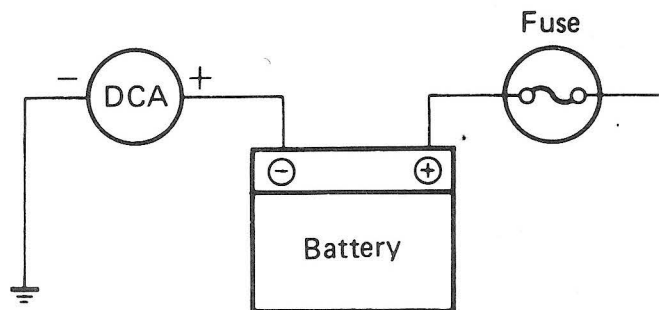


Fig. 6.2 Charging system unregulated output check

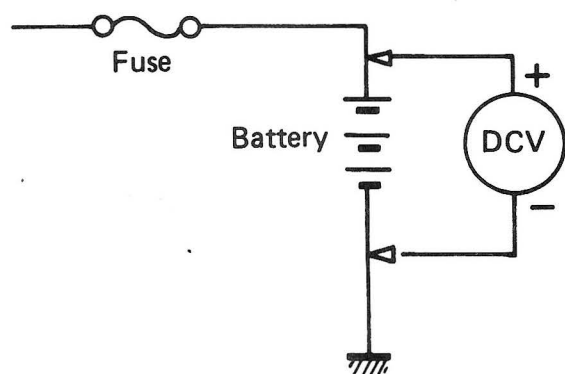


Fig. 6.3 Charging system regulated output check

5 Lighting system: checking the output

1 Set the multimeter to the 10 volts ac range (CL50 6 volt) or 25 volts ac range (CL50 D 12 volt), connecting it at the lighting switch lead connector inside the headlamp, as shown in the accompanying line drawing. Locate the regulator and disconnect its lead, then connect a test tachometer as described above.

2 Turn on the lights and start the engine, comparing the readings obtained with those given below. If these differ radically, it must be assumed that the lighting coil has failed and must be renewed. The coil is listed as a separate part and can be ordered from Suzuki dealers.

Lighting coil output

CL50 (6 volt):

above 6.2 volts @ 2500 rpm

below 9.5 volts @ 8000 rpm

CL50 D (12 volt):

above 11.0 volts @ 2500 rpm

below 17.0 volts @ 8000 rpm

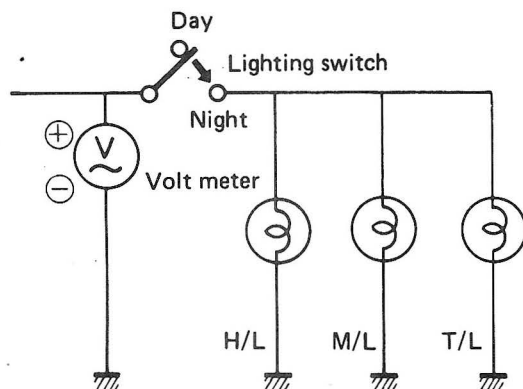


Fig. 6.4 Lighting system output check

6 Rectifier: location and testing

1 The function of the rectifier is to convert alternating current (ac) from the flywheel generator to direct current (dc) for battery charging purposes. The rectifier consists of a heavy duty diode encapsulated in a plastic box. It is similar in operation to a one-way valve, allowing current to flow in one direction only.

2 The rectifier unit is bolted to the right-hand side of the frame near the rear of the oil tank and is normally covered by the main frame section of the bodywork. Disconnect the two leads, noting their correct positions as a guide when refitting them.

3 Set the multimeter to the ohms x 1 scale and connect the (+)

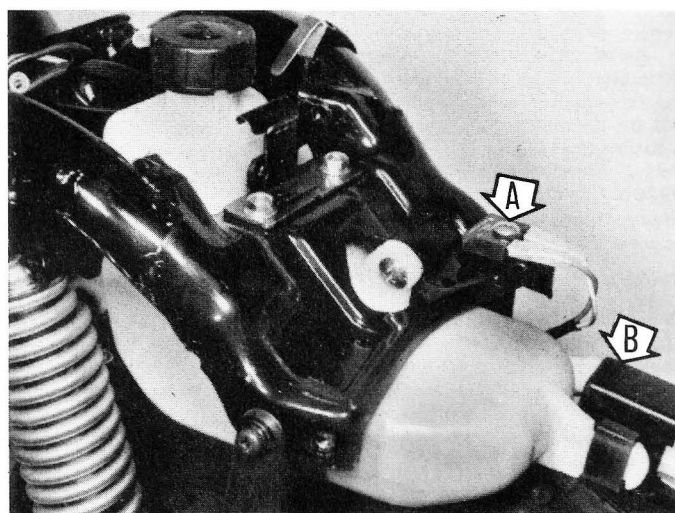
meter probe to the rectifier (⋈) terminal and the (-) meter probe to the rectifier (+) terminal. The meter should show no continuity, or infinite resistance. Reverse the meter probe connections and repeat the test, where a reading of low resistance should be indicated. If low or infinite resistance is shown in both directions, the unit is faulty and must be renewed.

7 Regulator: location and testing

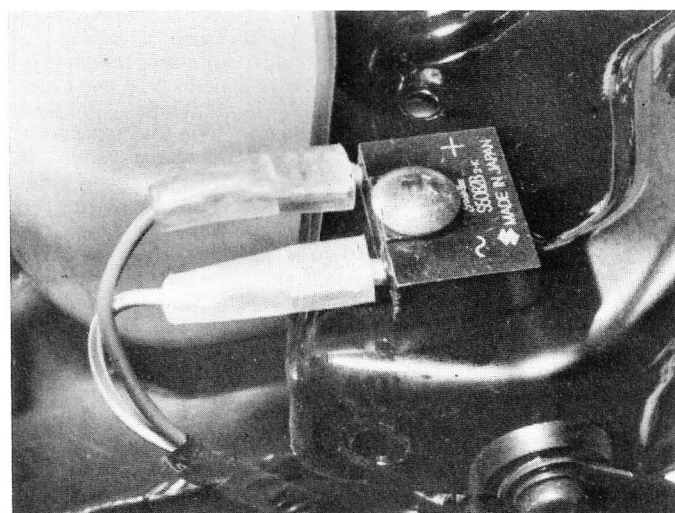
1 The regulator unit is another small 'black box' component attached to the underside of the top frame loop on the right-hand side of the machine. It is normally covered by the centre section of the bodywork and this is best removed to provide access, though it is just possible to reach it with the bodywork in place.

2 The manufacturer provides no test information, so diagnosis of any fault is a matter of deduction. If the first part of the test procedure in Section 4 indicates that the unregulated output is as specified, and the second part of the test shows the regulated output to be at fault, it can be assumed that the regulator is the culprit. If faulty, the unit must be renewed, repair being impracticable.

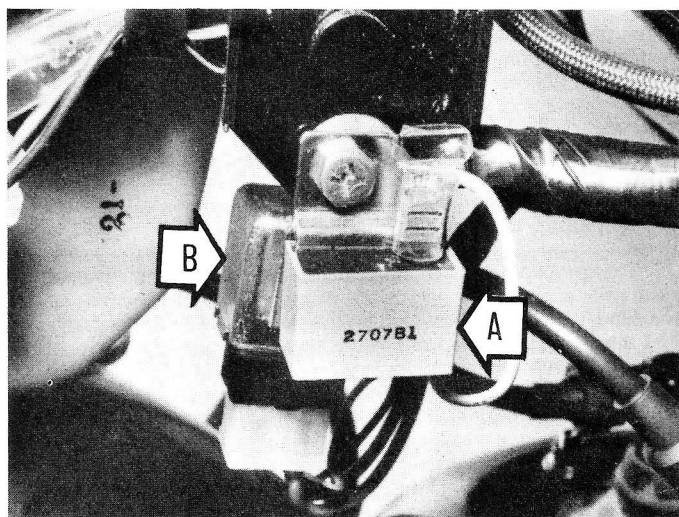
3 As with all electrical components, be sure to tell the Service Agent whether it is for a 6 volt or 12 volt machine; the two components differ for obvious reasons.



6.2a Location of rectifier (A) and turn signal relay (B)



6.2b The rectifier, showing + and ~ terminal markings



7.1 Regulator unit (A) location – do not confuse with starter relay (B) on CL50 D model

8 Flywheel generator: checking the stator coils

1 Carefully remove the right-hand side panel and disconnect the generator wiring at the block connector. In the case of 12 volt machines note that the separate lead is for the starter motor and need not be disturbed. Set the multimeter on the ohms $\times 1$ scale and measure the resistances of the charging and lighting coils as shown below. Note that if the Suzuki Pocket Tester (Part Number 09900-25002) is not being used, the readings may vary from those shown. If, however, infinite or zero resistance is indicated, it is safe to assume that an open or short circuit exists in the coil under test.

Stator coil resistances

Component	Wiring colours	Resistance
CL50 (6 volt):		
Charging coil	white/red-black/white	0 - 1.0 ohms
Lighting coil	yellow/white-black/white	0 - 1.0 ohms
CL50 D (12 volt):		
Charging coil	white/red-black/white	0.5 - 1.5 ohms
Lighting coil	yellow/white-black/white	0 - 1.0 ohms

9 Battery: examination and maintenance

1 The battery is housed in a tray underneath the seat and is retained in position by the seat base.

2 The transparent plastic case of the battery permits the upper and lower levels of the electrolyte to be observed without disturbing the battery by removing the side cover. Maintenance is normally limited to keeping the electrolyte level between the prescribed upper and lower limits and making sure that the vent tube is not blocked. The lead plates and their separators are also visible through the transparent case, a further guide to the general condition of the battery. If electrolyte level drops rapidly, suspect over-charging and check the system.

3 Unless acid is spilt, as may occur if the machine falls over, the electrolyte should always be topped up with distilled water to restore the correct level. If acid is spilt onto any part of the machine, it should be neutralised with an alkali such as washing soda or baking powder and washed away with plenty of water, otherwise serious corrosion will occur. Top up with sulphuric acid of the correct specific gravity (1.260 to 1.280) only when spillage has occurred. Check that the vent pipe is well clear of the frame or any of the other cycle parts.

4 It is seldom practicable to repair a cracked battery case because the acid present in the joint will prevent the formation of an effective seal. It is always best to renew a cracked battery, especially in view of the corrosion which will be caused if the acid continues to leak.

5 If the machine is not used for a period of time, it is advisable to remove the battery and give it a 'refresher' charge every six weeks or so from a battery charger. The battery will require recharging when the

specific gravity falls below 1.260 (at 29°C - 68°F). The hydrometer reading should be taken at the top of the meniscus with the hydrometer vertical. If the battery is left discharged for too long, the plates will sulphate. This is a grey deposit which will appear on the surface of the plates, and will inhibit recharging. If there is sediment on the bottom of the battery case, which touches the plates, the battery needs to be renewed. Prior to charging the battery, refer to the following Section for correct charging rate and procedure. If charging from an external source with the battery on the machine, disconnect the leads, or the rectifier will be damaged.

6 Note that when moving or charging the battery, it is essential that the following basic safety precautions are taken:

- Before charging check that the battery vent is clear or, where no vent is fitted, remove the combined vent/filler caps. If this precaution is not taken the gas pressure generated during charging may be sufficient to burst the battery case, with disastrous consequences.
- Never expose a battery on charge to naked flames or sparks. The gas given off by the battery is highly explosive.
- If charging the battery in an enclosed area, ensure that the area is well ventilated.
- Always take great care to protect yourself against accidental spillage of the sulphuric acid contained within the battery. Eyeshields should be worn at all times. If the eyes become contaminated with acid they must be flushed with fresh water immediately and examined by a doctor as soon as possible. Similar attention should be given to a spillage of acid on the skin.

Note also that, should an emergency arise, it is possible to charge the battery at a more rapid rate than that stated in the following Section. However, this will shorten the life of the battery and should be avoided if at all possible.

7 Occasionally, check the condition of the battery terminals to ensure that corrosion is not taking place, and that the electrical connections are tight. If corrosion has occurred, it should be cleaned away by scraping with a knife and then using emery cloth to remove the final traces. Remake the electrical connections whilst the joint is still clean, then smear the assembly with petroleum jelly (**NOT** grease) to prevent recurrence of the corrosion. Badly corroded connections can have a high electrical resistance and may give the impression of complete battery failure.

10 Battery: charging procedure

1 Whilst the machine is used on the road it is unlikely that the battery will require attention other than routine maintenance because the generator will keep it fully charged. However, if the machine is used for a succession of short journeys only, mainly during the hours of darkness when the lights are in full use, it is possible that the output from the generator may fail to keep pace with the heavy electrical demand, especially if the machine is parked with the lights switched on. Under these circumstances it will be necessary to remove the battery from time to time to have it charged independently.

2 The normal maximum charging rate for any battery is 1/10 the rated capacity. Hence the charging rate for the battery fitted is 0.4 amp. A slightly higher charge rate may be used in emergencies only, but this should never exceed 1 amp.

3 Ensure that the battery/charger connections are properly made, ie the charger positive (usually coloured red) lead to the battery positive (the red wire) lead, and the charger negative (usually coloured black or blue) lead to the battery negative (the black/white wire) lead. Refer to the previous Section for precautions to be taken during charging. It is especially important that the battery cell cover plugs are removed to eliminate any possibility of pressure building up in the battery and cracking its casing. Switch off the charger if the cells become overheated, ie over 45°C (117°F).

4 Charging is complete when the specific gravity of the electrolyte rises to 1.260 - 1.280 at 20°C (68°F). A rough guide to this state is when all cells are gassing freely. At the normal (slow) rate of charge this will take between 3 - 15 hours, depending on the original state of charge of the battery.

5 If the higher rate of charge is used, never leave the battery charging for more than 1 hour as overheating and buckling of the plates will inevitably occur.

11 Fuse: location and renewal

1 Both 6 volt and 12 volt models incorporate a 10 amp main fuse housed in an in-line holder in the battery positive (+) lead. It is recommended that a spare fuse is carried at all times. Purchase a suitable fuse from a Suzuki Service Agent and tape it to the battery tray next to the fuse holder if the spare has been used.

2 In the event of a fuse 'blowing', always try to find the cause of the fault before renewing it. If no obvious fault is noted, renew the fuse. If the new fuse operates normally, the system can be considered sound, but repeated failures indicate an intermittent fault, possibly due to a damaged wire or water contamination.

3 If a fuse fails and there is no spare available, it is possible to get home by wrapping some metal foil around the damaged component. Note that this removes the protection normally afforded by the fuse, so make sure that there is no short circuit in the system before resorting to this measure. The doctored fuse **must** be renewed as soon as practicable to restore protection to the electrical system.

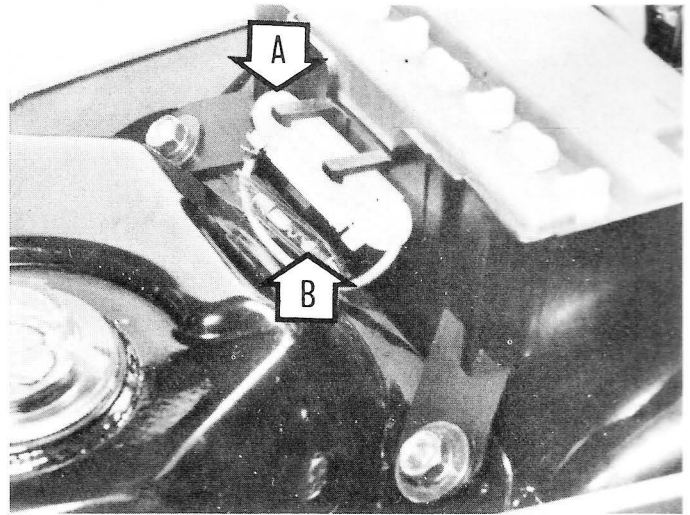
12 Switches: general maintenance and repairs

1 While the switches should give little trouble, they can be tested using a multimeter set to the resistance function or a battery and bulb test circuit. Using the information given in the wiring diagram at the end of this Manual, check that full continuity exists in all switch positions and between the relevant pairs of wires. When checking a particular circuit, follow a logical sequence to eliminate the switch concerned.

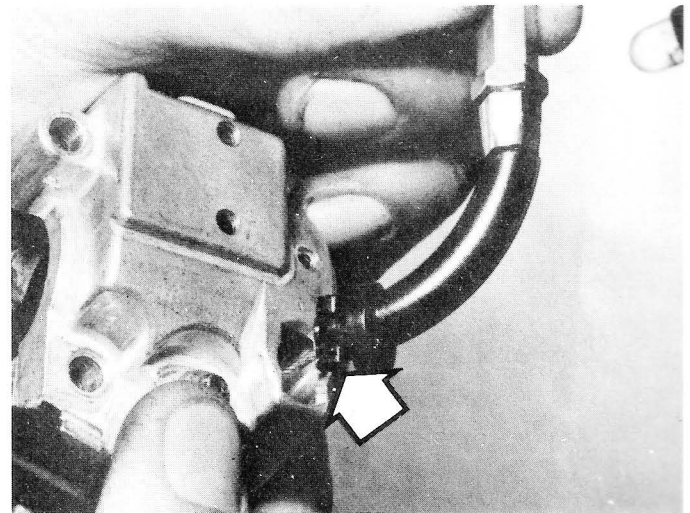
2 As a simple precaution always disconnect the battery before removing any of the switches, to prevent the possibility of a short circuit. Most troubles are caused by dirty contacts, but in the event of the breakage of some internal part, it will be necessary to renew the complete switch.

3 It should, however, be noted that if a switch is tested and found to be faulty, there is nothing to be lost by attempting a repair. It may be that worn contacts can be built up with solder, or that a broken wire terminal can be repaired, again using a soldering iron. The handlebar switches can all be dismantled to a greater or lesser extent. It is however, up to the owner to decide if he has the skill to carry out this sort of work.

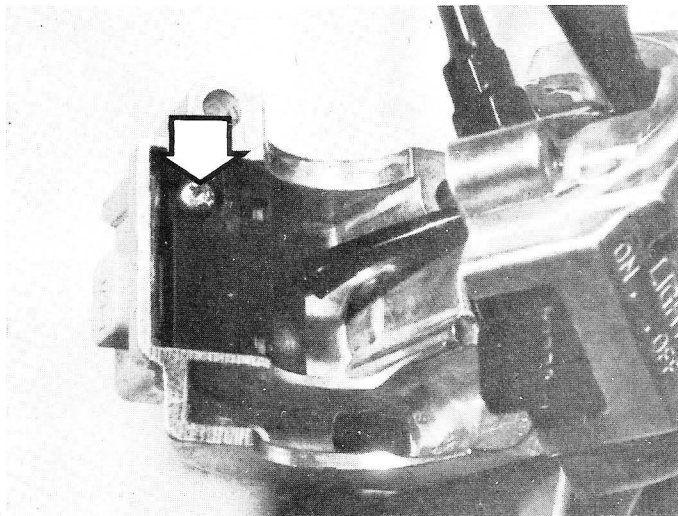
4 While none of the switches require routine maintenance of any sort, some regular attention will prolong their life a great deal. In the author's experience, the regular and constant application of WD40 or a similar water-dispersant spray not only prevents problems occurring due to waterlogged switches and the resulting corrosion, but also makes the switches much easier and more positive to use. Alternatively, the switch may be packed with a silicone-based grease to achieve the same result.



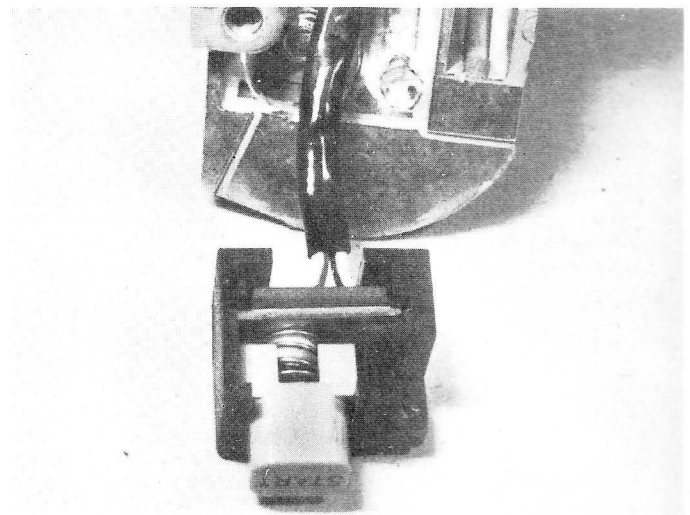
11.1 The fuse holder (A) and spare fuse (B)



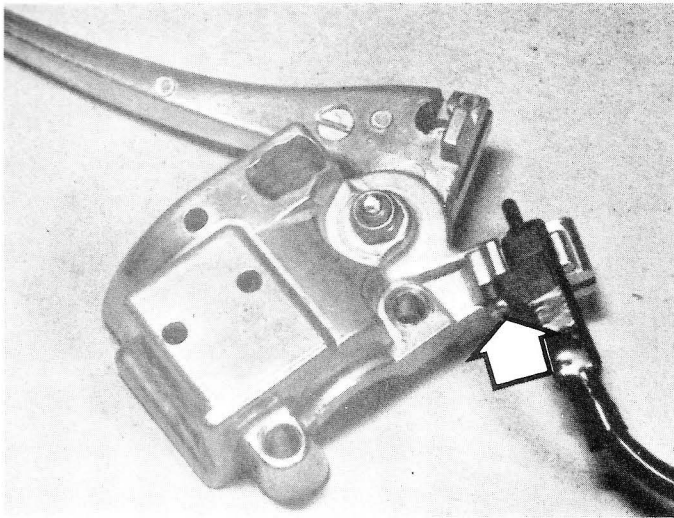
12.3a When removing right-hand switch cluster, note bayonet fitting of throttle cable guide (arrowed)



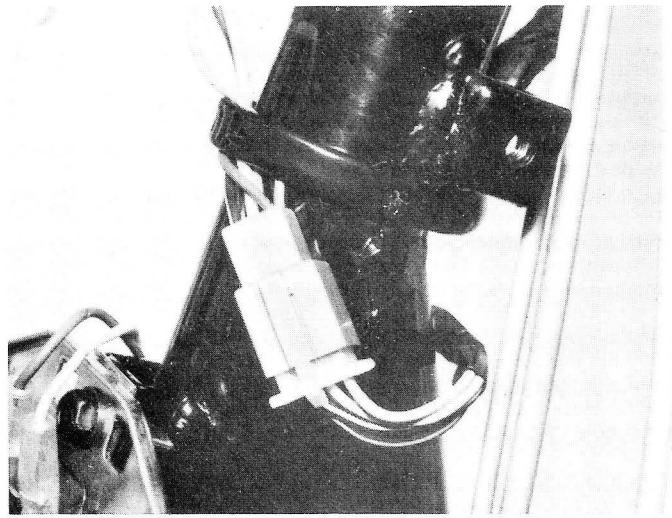
12.3b Switch units are retained by screws to casting



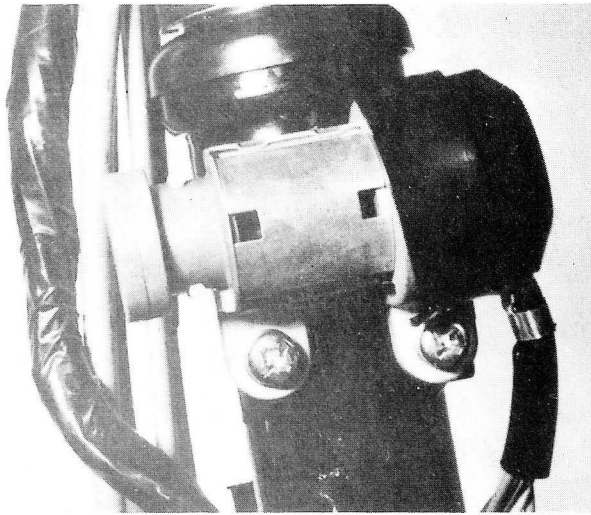
12.3c Unit removed to gain access to contacts



12.3d Brake switches are held by a single screw (arrowed) to the lever stock



12.3e Always check connectors in the event of an inexplicable switch malfunction



12.3f Ignition switch is housed under legshield assembly

13 Starter motor: examination and renovation – CL50 D model only

1 The starter motor can be removed for examination after the lead has been traced back and released from its bullet connector and the two mounting screws have been removed. The motor is retained by the two front transmission case screws, these passing through the cover and into the motor body. Once freed, pull the motor back to disengage it from the casing and manoeuvre it away from the crankcase. It is a tight fit but it can just be done.

2 To dismantle the motor remove its three retaining screws and pull away the plated metal body to expose the armature windings. Remove the two screws which secure the two halves of the motor drive casing and pull the left-hand cover away complete with the drive gear assembly. The armature can then be pulled carefully out of the brush holder. Each brush is connected to a copper wire lead which is secured by a single screw. Slide the brushes out of their holders, taking care not to lose the coil springs, then remove the screws to release them.

3 Examine the motor body. If the brush holder is damaged or worn in any way it may be renewed, but any damage to the plated metal

body, particularly if a magnet has cracked or become loose, or to the drive gear housing, will mean that the motor must be renewed as a complete assembly. Check for dents, cracks or other damage, particularly at the motor mounting flange.

4 Since the drive gear assembly is lubricated by the transmission oil and is totally enclosed, wear should not occur until a very high mileage has been covered. If the motor is jammed, or if it rotates but does not turn the engine over, the clutch incorporated in the drive gear assembly is at fault and the assembly must be renewed; no individual components are available.

5 It is advisable to renew the two O-rings and the gasket whenever the motor is disturbed. A smear of grease will stick each in place and minimise the risk of damage on reassembly.

6 The brushes are the only components which wear during normal use, and should be measured as shown in the accompanying photograph. If either is worn to 4 mm (0.16 in) or less both must be renewed as a set. Check also that the brushes are not chipped and that they move freely in their holders, and that the coil springs are in good condition.

7 Clean carefully the commutator using a piece of glass paper. Never use emery cloth or 'wet-and-dry' as the small abrasive fragments may embed themselves in the soft copper of the commutator and cause excessive wear of the brushes. Finish off the commutator with metal polish to give a smooth surface and finally wipe the segments over with a methylated spirits soaked rag to ensure a grease free surface. Check that the mica insulators, which lie between the segments of the commutator, are undercut. If the amount of undercut is seen to be less than the service limit of 0.2 mm (0.008 in), then the armature should be withdrawn from the motor body and returned to an official Suzuki Service Agent or an experienced auto-electrician for re-cutting.

8 If the motor has given indications of a more serious fault, withdraw the armature from the motor body, set a multimeter to its resistance function and carry out a check for equal resistance between the commutator segments and for good insulation between each commutator segment and the armature core. A fault in insulation or continuity will require renewal of the armature.

9 On reassembly, insert the brush springs into the holders, followed by the brushes, then hold back each brush against spring pressure while the armature is inserted; a task that will require an assistant and some care. Check that the brushes are engaged correctly on the commutator and hold firmly the protruding toothed end of the armature shaft. Check the gasket is in place on the brush holder left-hand face.

10 Holding the armature against the pull off the magnets, refit the plated metal body. Refit the drive gear assembly into its housing and the O-ring to the brush holder right-hand face, then reassemble the starter motor, tightening the retaining screws.

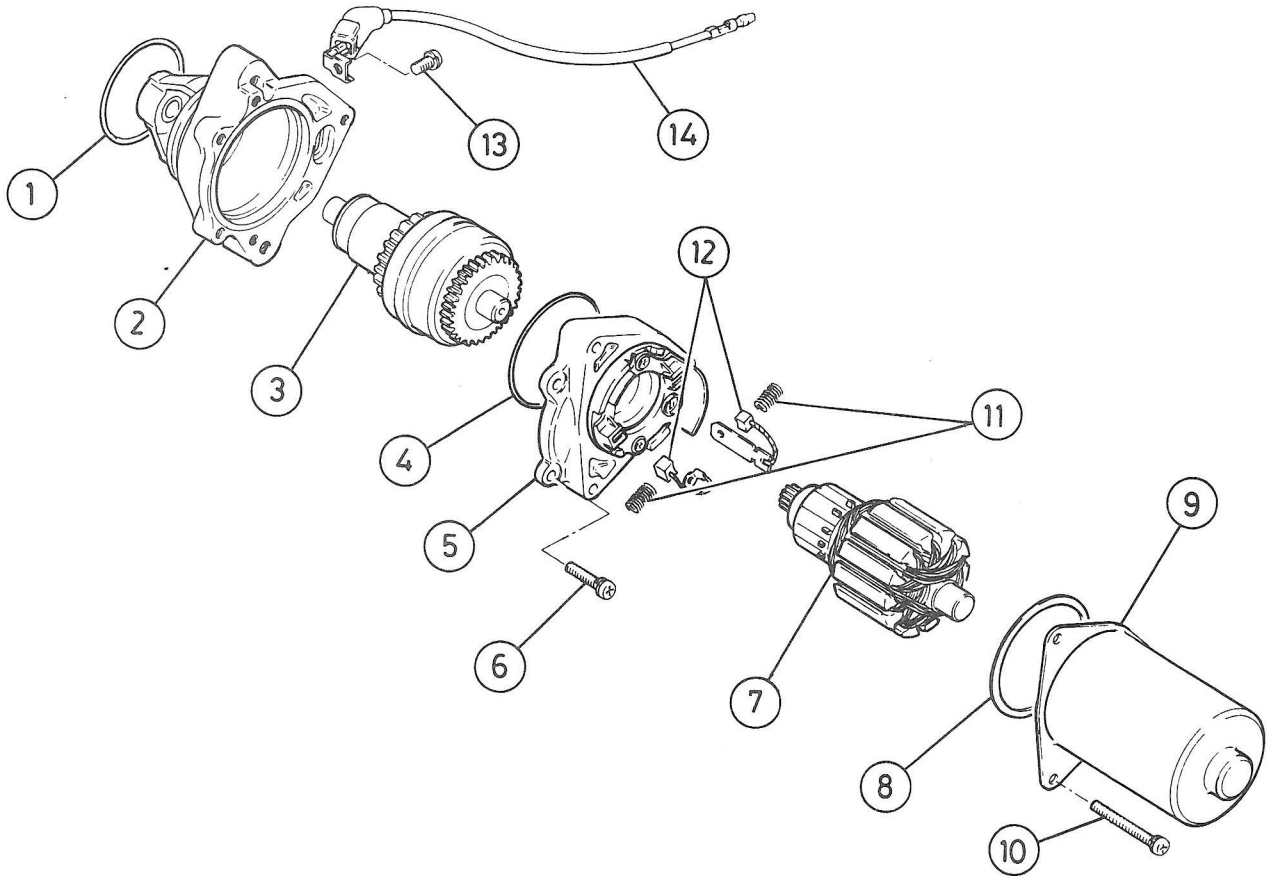
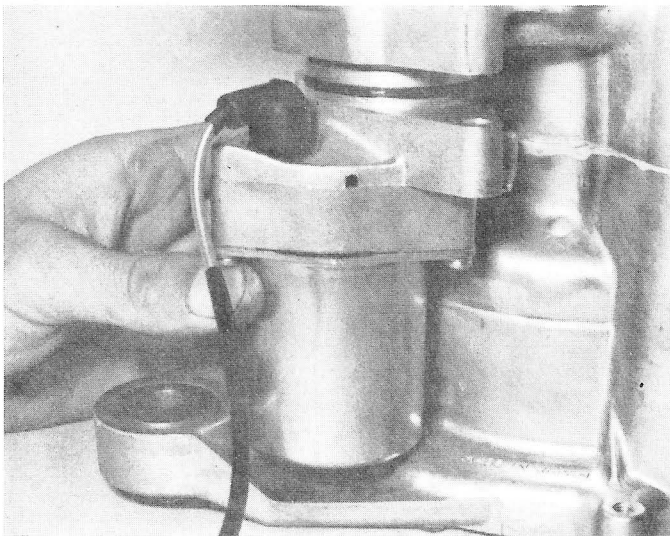
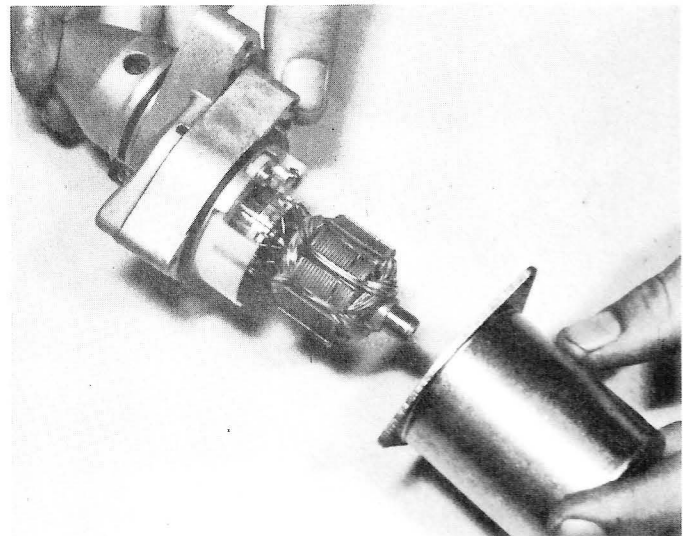


Fig. 6.5 Starter motor

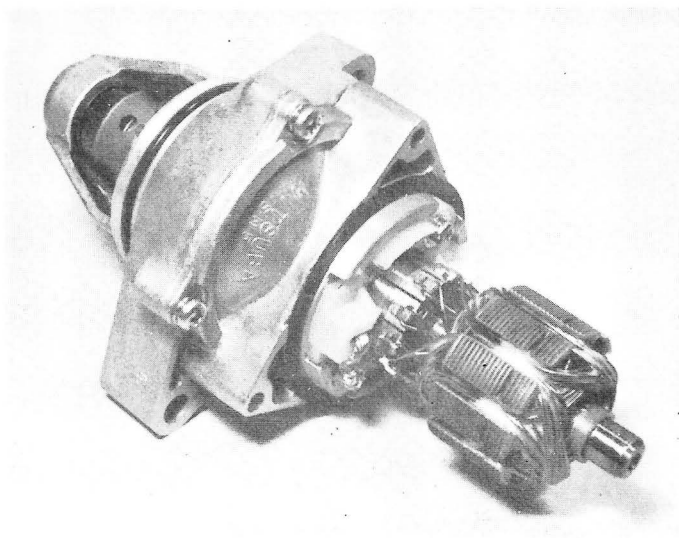
- | | | |
|-----------------------|---------------------|-------------------|
| 1 O-ring | 6 Screw | 11 Spring - 2 off |
| 2 Drive gear housing | 7 Armature | 12 Brush set |
| 3 Drive gear assembly | 8 Gasket | 13 Screw |
| 4 O-ring | 9 Plated metal body | 14 Lead wire |
| 5 Brush holder | 10 Screw - 3 off | |



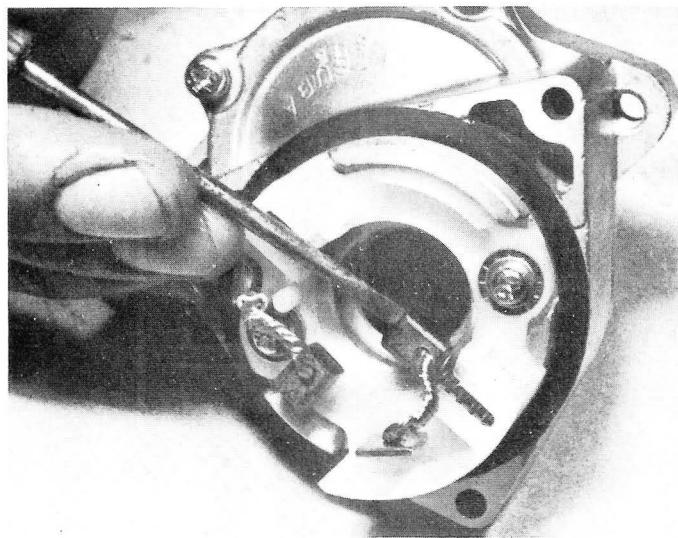
13.1 Removing the starter motor (shown with engine removed for clarity)



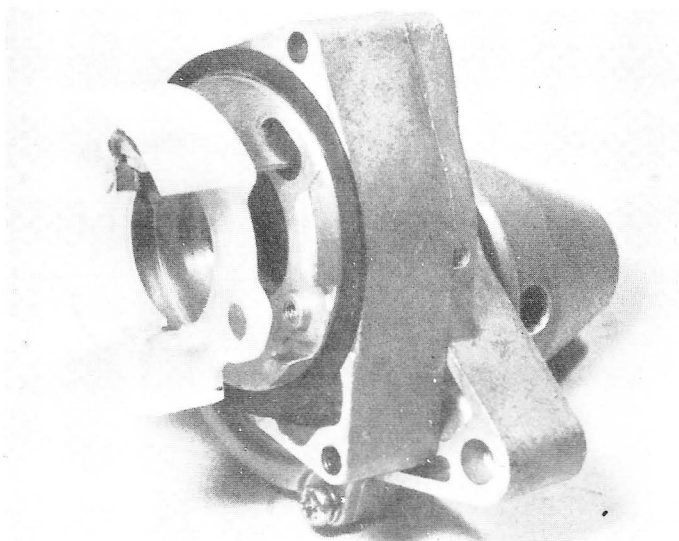
13.2a Release the three retaining screws to free body



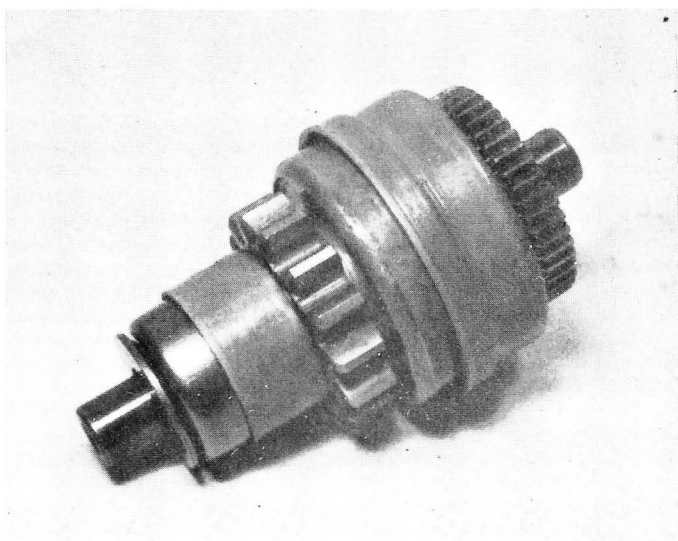
13.2b Carefully pull armature out of the brush holder



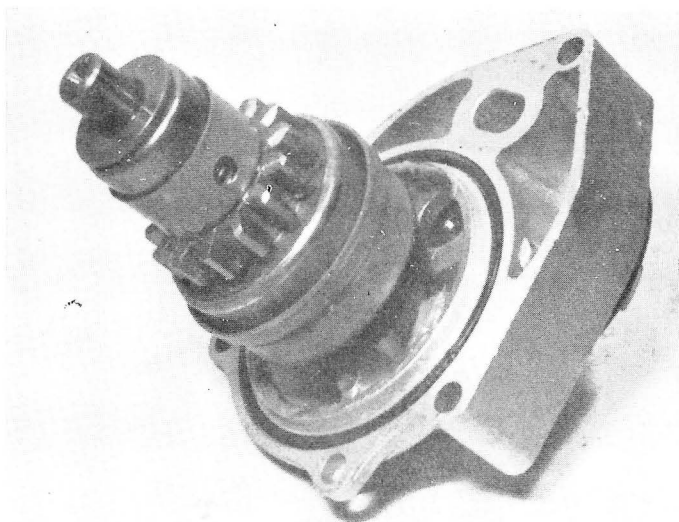
13.2c Each brush lead is secured by a screw – brushes are under spring tension



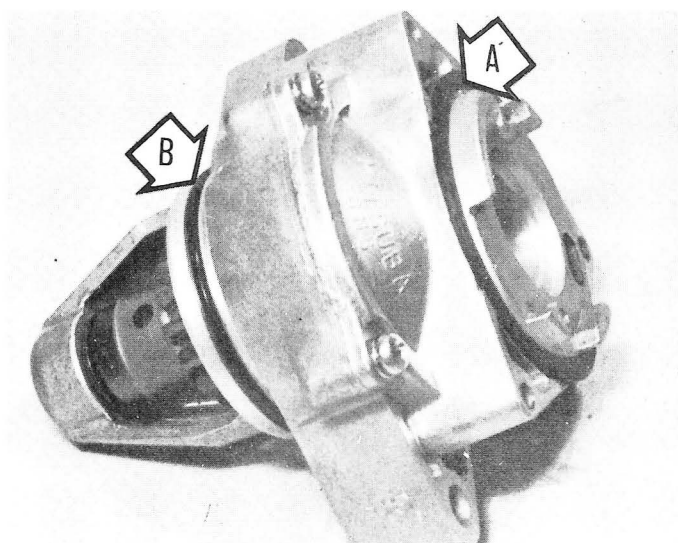
13.3 Renew the brush holder if damaged



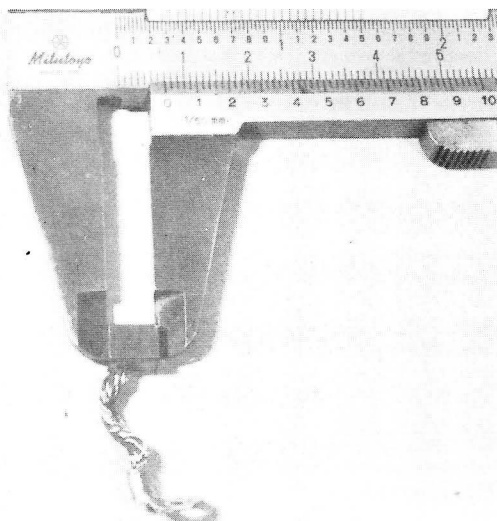
13.4 Check drive gear assembly for signs of wear or damage



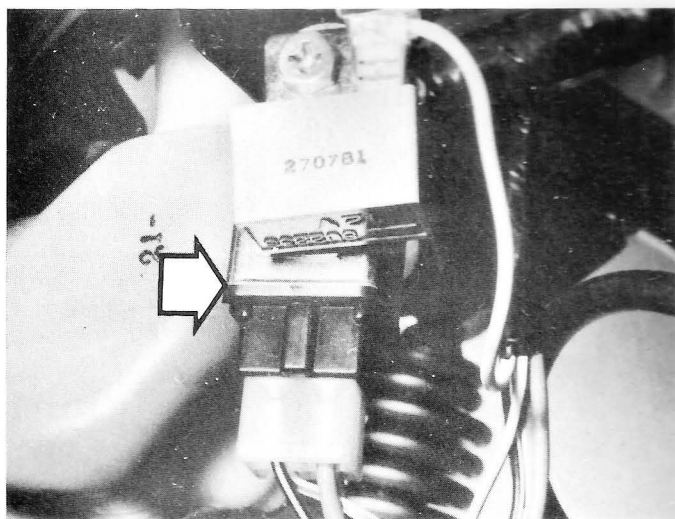
13.5a Renew O-ring between drive casing halves if worn or damaged



13.5b It is good practice to renew gasket (A) and the spigot O-ring (B) during assembly



13.6 Measure brush length using a vernier caliper



14.1 The starter relay (arrowed) is mounted inboard of the regulator

14 Starter relay: location and testing – CL50D model only

1 The starter relay is bolted to a frame lug next to the regulator unit, and may be removed for testing after the right-hand side panel has been removed to permit access.

2 If the starter motor fails to operate, suspect first the battery and make a quick check by sounding the horn. The battery must be fully charged for the starter motor to work. If it is, the relay can be tested as follows. Disconnect the starter motor lead (heavy gauge red/white wire) at its connector then connect the probes of a multimeter set to

the x 1 ohm range between the terminals of the red and the black/white wires at the relay connector plug. Switch on the ignition, apply the front or rear brake and press the starter button. If the relay is in good condition, continuity will be found.

3 The relay coil resistance can be measured by removing the relay connector plug and measuring the resistance between the terminals of the yellow/green and black/white wires. The reading obtained should be approximately 55 - 70 ohms. If the actual reading is significantly above or below the figure given, the relay is faulty and must be renewed. No repairs are possible.

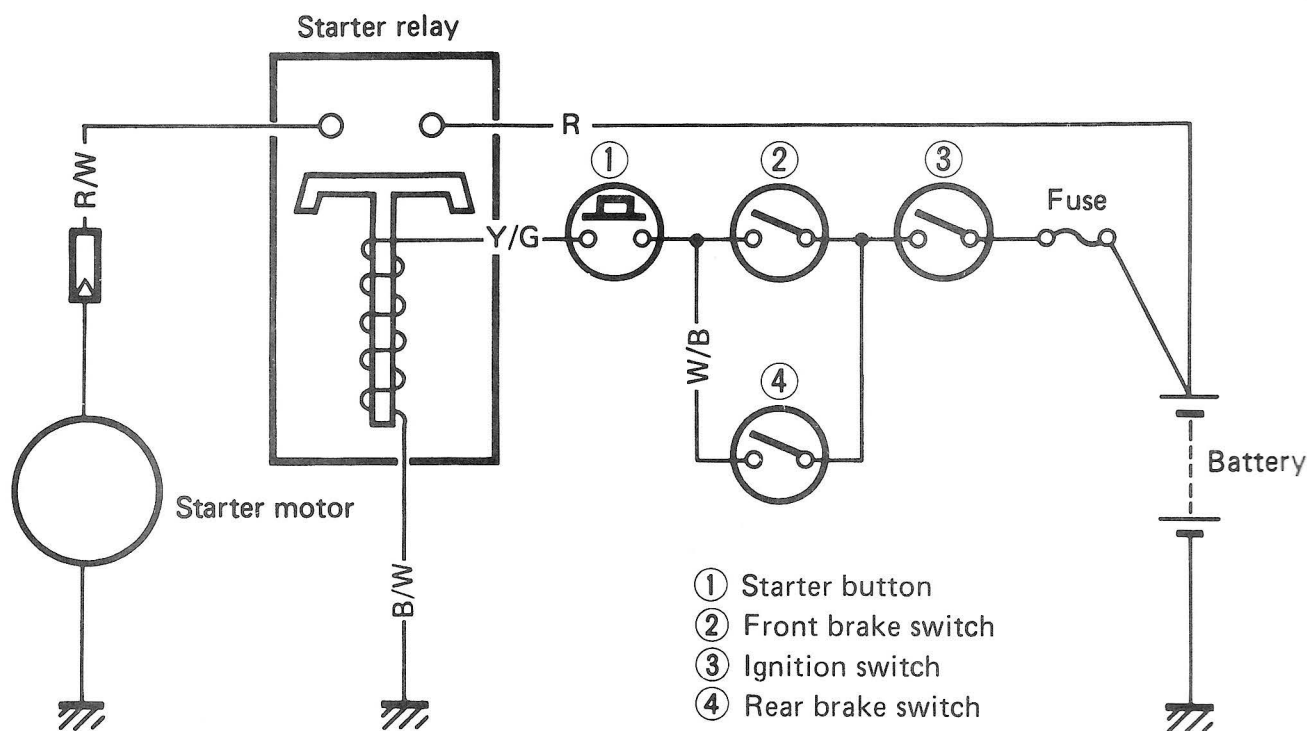


Fig. 6.6 Starter motor circuit

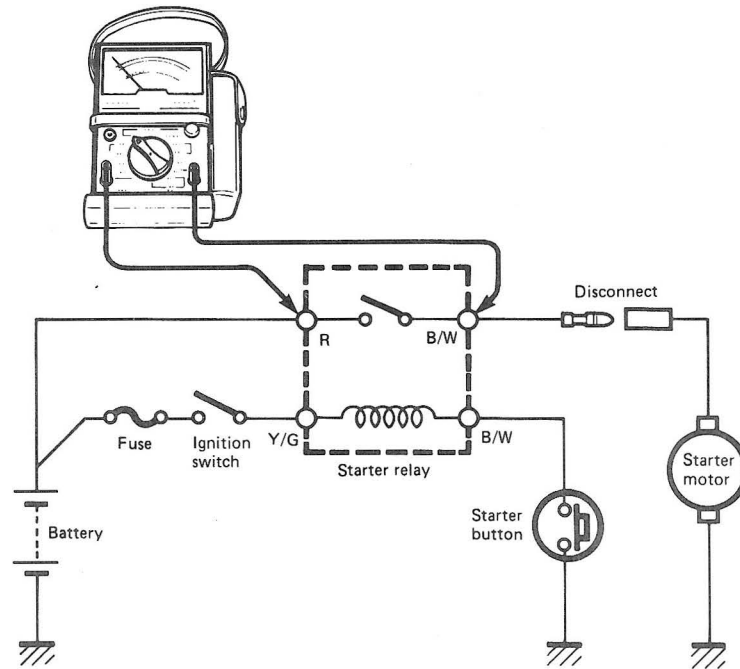


Fig. 6.7 Testing the starter relay

15 Oil level/turn signal warning lamp circuit checking

1 A single warning lamp incorporated in the speedometer face serves to indicate the operation of the turn signals and warns of low oil level in the engine oil tank. The accompanying circuit diagram shows the interconnection of the two systems.

2 The way in which the two circuits interconnect provides a valuable diagnostic aid. If the warning lamp fails to operate when either the turn signals are used or the oil level is low, it is fairly safe to assume that

the fault lies in the warning bulb or its wiring. If the fault is confined to either the turn signals or the oil level circuit, the bulb is obviously sound and attention can be confined to the appropriate circuit.

3 It will be noted from the circuit diagram that a diode is fitted in the wiring harness to prevent the turn signals from operating when the oil level switch operates. If problems of this nature are experienced, check the diode as follows. Trace the harness to the rear of the regulator unit (on the right-hand side of the machine near the oil tank). The diode will be seen in a transparent section of the harness. Check that the diode conducts in one direction only, using the multimeter.

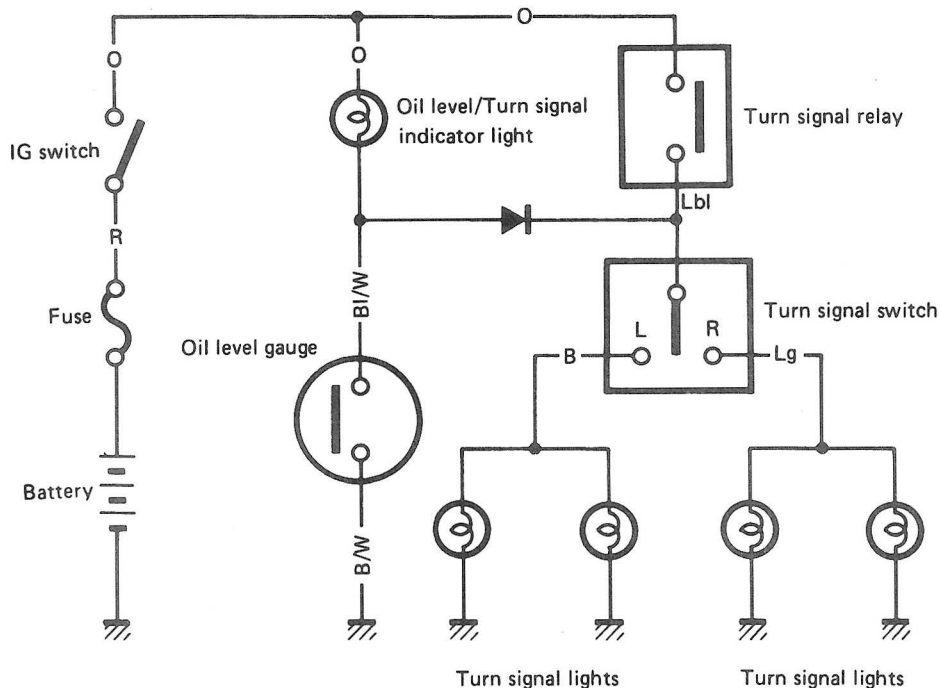


Fig. 6.8 Oil level/turn signal warning lamp circuit diagram

4 If the diode has failed, note that it is not listed separately from the wiring harness. A good vehicle electrical specialist, however, will be able to supply a suitable replacement and solder it in place, if required. If it is to be fitted at home, ensure that it is fitted in the correct direction and that the diode leads are held in a pair of pliers to act as a heat shunt during soldering.

16 Oil level switch unit: location and checking

1 The oil level switch is screwed into the oil tank, just to the rear of the filler neck. To gain access to the switch for testing it will be necessary to remove the centre of the bodywork to reveal the tank (see Section 2 of Chapter 4). Disconnect and remove the battery and its tray, then remove the tank mounting screws. Pull the tank forward until the switch can be reached. Disconnect the lead and unscrew it.

2 The switch is a simple float type, the contacts closing as the float drops down to its stop. Check continuity using a multimeter set on the resistance scale. If continuity is shown when the float is against the stop, with isolation being indicated when it is lifted, the switch can be considered sound.

3 If the switch is inoperative, try cleaning the contacts using fine abrasive paper. If this fails to rectify the problem, check that the switch leads are unbroken. As a last resort, renew the switch.

17 Turn signal circuit: testing

1 In the event of a fault in the turn signals, it is essential that the problem is diagnosed methodically to avoid a good deal of confusion and wasted time. Start by attempting to operate both right and left turn signals in turn. If one side operates normally, the fault can only lie in the bulbs, wiring or switch contacts on the affected side; the relay can be taken as sound. The most likely cause by far is a blown bulb, and this should always be checked first. Usually, the remaining bulb on that side will flash dimly and rapidly, indicating the faulty item.

2 To gain access to the bulb, remove the two lens retaining screws and lift the lens away. The bulb is a bayonet fitting and is removed by depressing it slightly and turning it anti-clockwise. If the suspect bulb proves sound, check the contacts in the bulb holder, the wiring and the switch contacts, to locate the fault.

3 Where the fault is common to the whole turn signal circuit, attention should be directed to the turn signal relay and its wiring. Check the wiring first, and if this proves to be sound, check the relay by substituting a new one. The relay is mounted at the rear of the frame and access to it requires the removal of the bodywork centre section (see Chapter 4, Section 2).

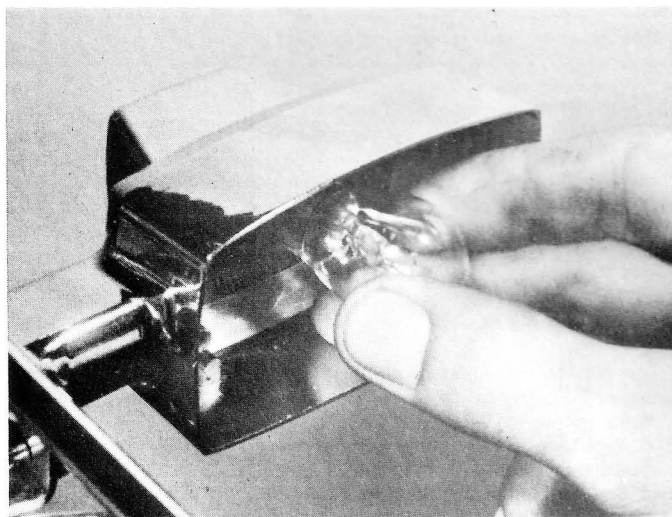
18 Horn: location and testing

1 The horn is mounted by a flexible steel bracket to the frame front downtube. No maintenance is required other than regular cleaning to remove road dirt and occasional spraying with WD40 or a similar water dispersant lubricant to minimise internal corrosion.

2 Different types of horn may be fitted; if a screw and locknut is provided on the outside of the horn, the internal contacts may be adjusted to compensate for wear and to cure a weak or intermittent horn note. Slacken the locknut and rotate slowly the screw until the clearest and loudest note is obtained, then retighten the locknut. If no means of adjustment is provided on the horn fitted, it must be renewed, if defective.

3 If the horn fails to work, first check that power is reaching it by disconnecting the wires and substituting a bulb (6 or 12 volt; as appropriate). If the bulb lights when the horn button is pressed (ignition switch on), the circuit is sound and the horn is at fault; if the bulb does not light, there is a fault in the circuit which must be found and remedied.

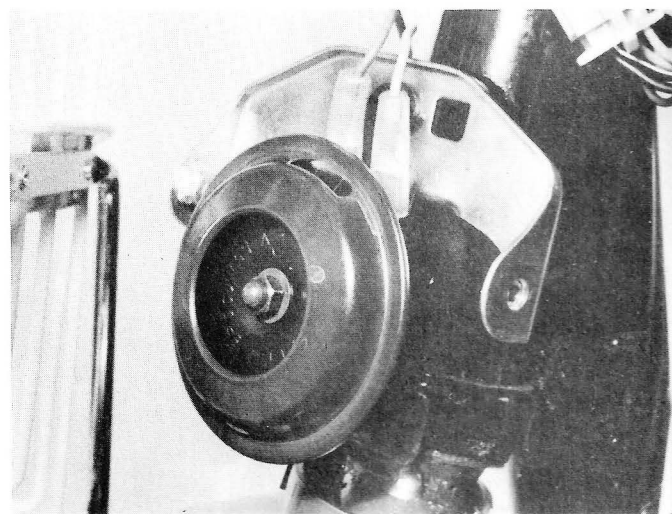
4 To test the horn itself, connect a fully-charged battery (6 or 12 volt, as appropriate), directly to the horn. If it does not sound, a gentle tap on the outside may free the internal contacts. If this fails, the horn must be renewed as repairs are not possible.



17.2 Release lens to gain access to bulb



17.3 The turn signal relay. Note information on voltage, flash rate and specified bulb wattages



18.1 Remove cover to gain access to horn

19 Headlamp: bulb renewal and beam alignment

1 Remove from underneath the front of the headlamp housing the two screws which retain the headlamp rim, then unclip the rim from the top of the housing and withdraw the headlamp assembly. Press in the bulb holder, twist it anti-clockwise and remove it. Remove the bulb from the reflector unit. Refitting is a straightforward reversal of the above.

2 The parking lamp bulb is a conventional bayonet fitting in a bulb holder that is pressed into a rubber grommet set in the rear of the reflector unit.

3 Beam height is altered by rotating the spring-loaded screw set in the bottom of the headlamp rim. The beam cannot be adjusted from side to side.

4 In the UK, regulations stipulate that the headlamp must be arranged so that the light will not dazzle a person standing at a distance greater than 25 feet from the lamp, whose eye level is not less than 3 feet 6 inches above that plane. It is easy to approximate this setting by placing the machine 25 feet away from a wall, on a level road, and setting the dip beam height so that it is concentrated at the same height as the distance of the centre of the headlamp from the ground. The rider must be seated normally during this operation and also the pillion passenger, if one is carried regularly.

20 Instrument panel: bulb renewal

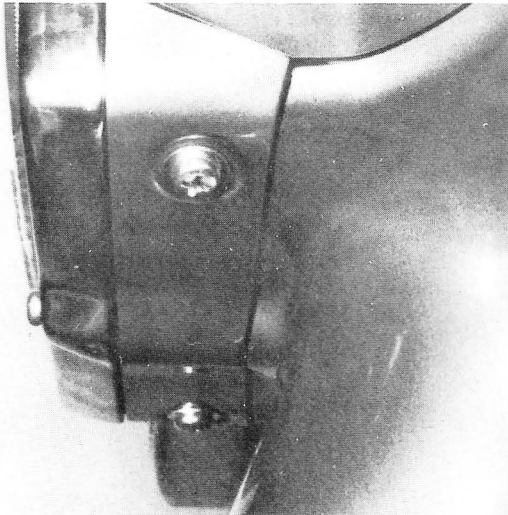
1 Remove the headlamp unit as described in Section 19 and disconnect the speedometer drive cable by unscrewing the knurled ring which secures it. Wrap some tape or a rubber band around the cable below the ring to stop it dropping down the cable.

2 Remove the screws which pass through the speedometer surround and lift the unit slightly. The bulb holders can now be pulled out of the instrument, allowing it to be lifted away. When fitting new bulbs, ensure that they are of the correct voltage and wattage.

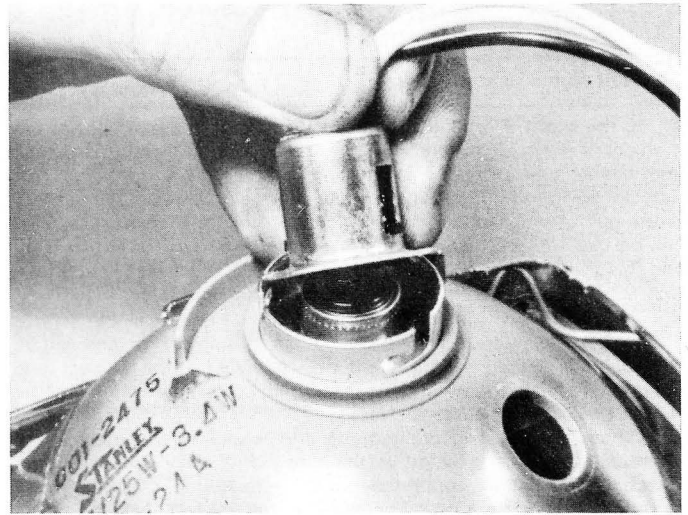
21 Stop/tail lamp: bulb renewal

1 Remove the two screws securing the lens and withdraw the lens, taking care not to dislodge or tear the sealing gasket (where fitted). Press the bulb in and twist anti-clockwise to release it.

2 Remove all traces of moisture and corrosion from the lamp interior and the bulb holder, and renew the gasket if it is damaged. Note that the bulb locating pins are offset so the bulb can be refitted only the correct way. Do not overtighten the lens screws.



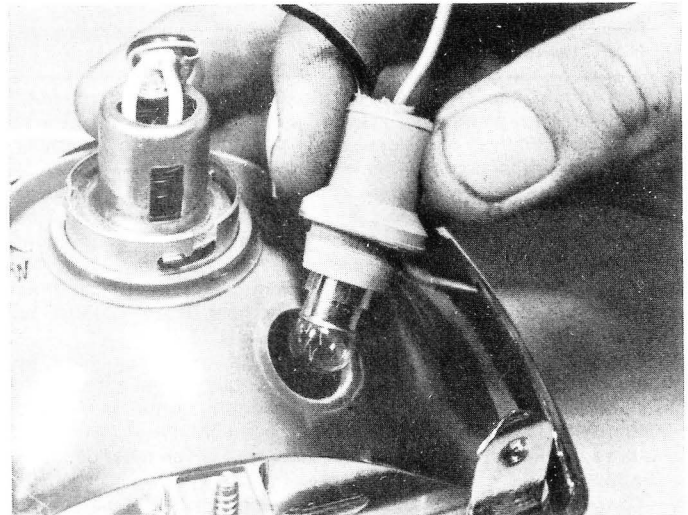
19.1a Release screws to free headlamp unit



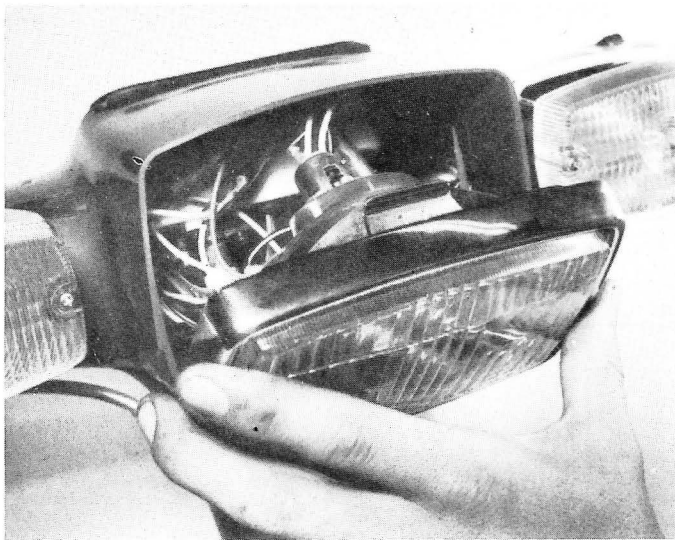
19.1b Disengage the bulb holder ...



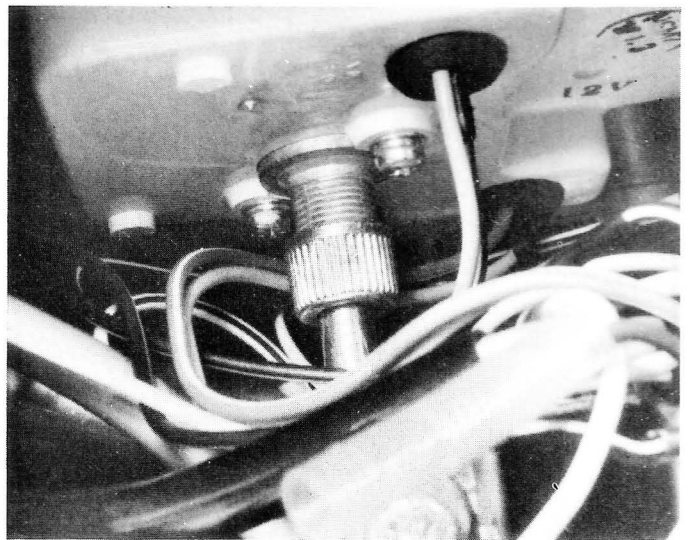
19.1c ... and lift the bulb out of the reflector



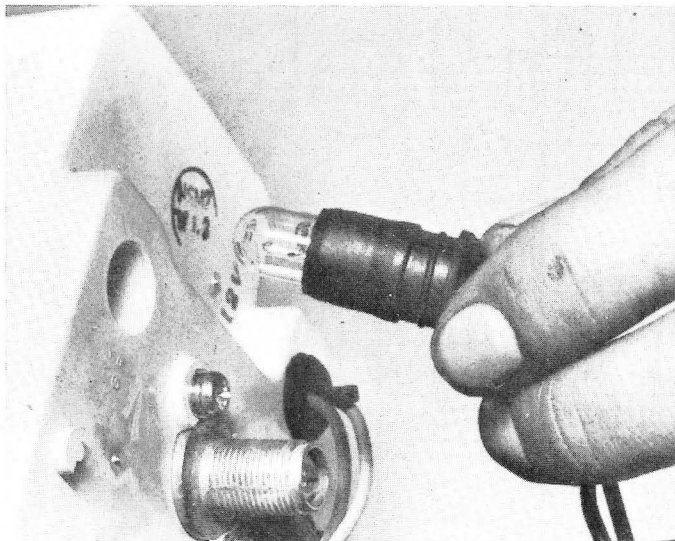
19.2 Parking bulb holder is a push-fit in reflector



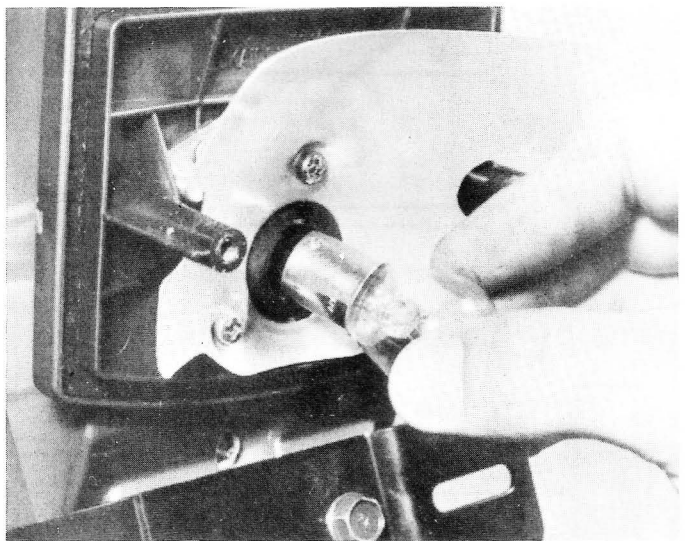
20.1a Release headlamp unit from shell ...



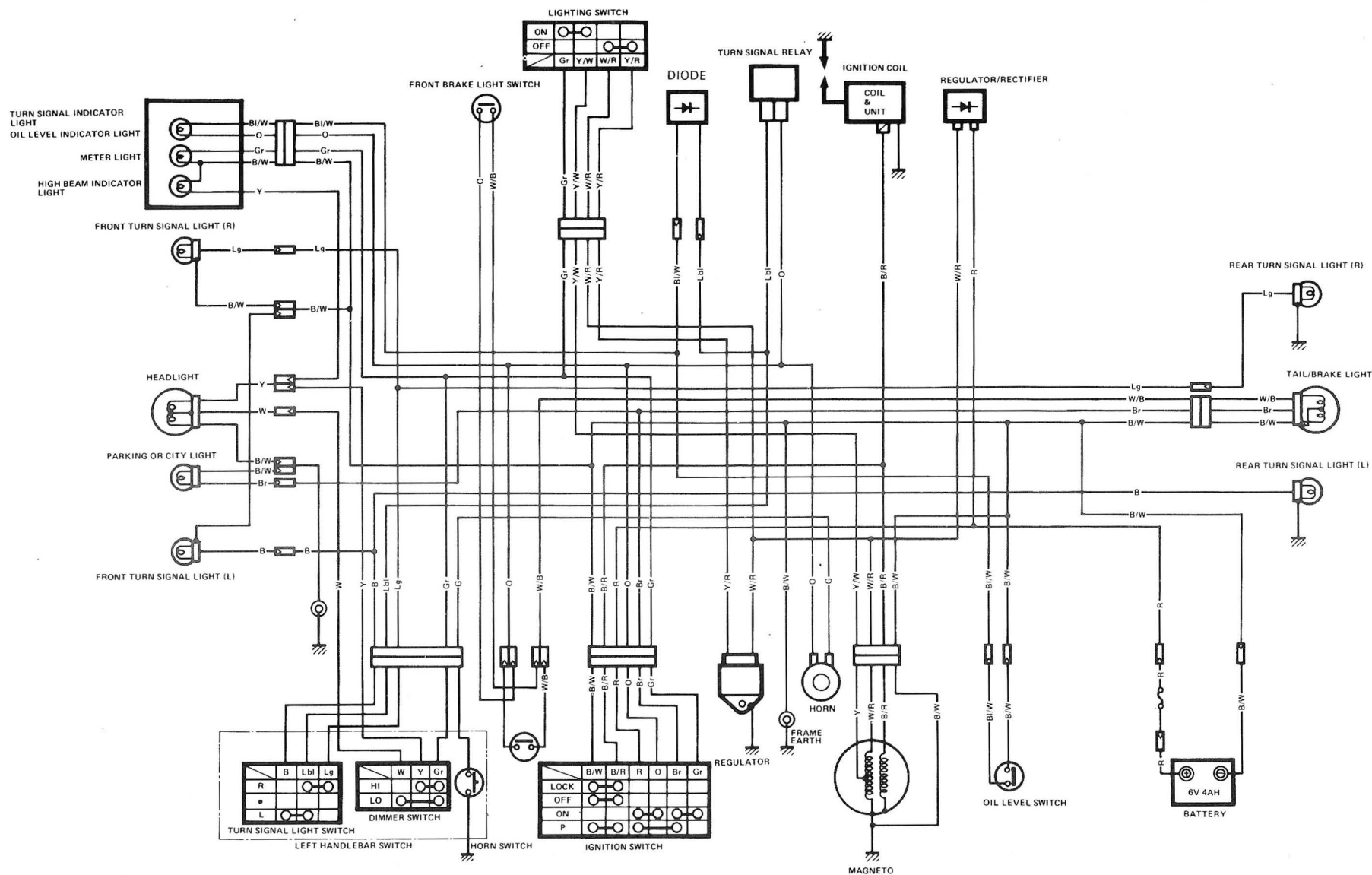
20.1b ... and unscrew the speedometer cable knurled ring



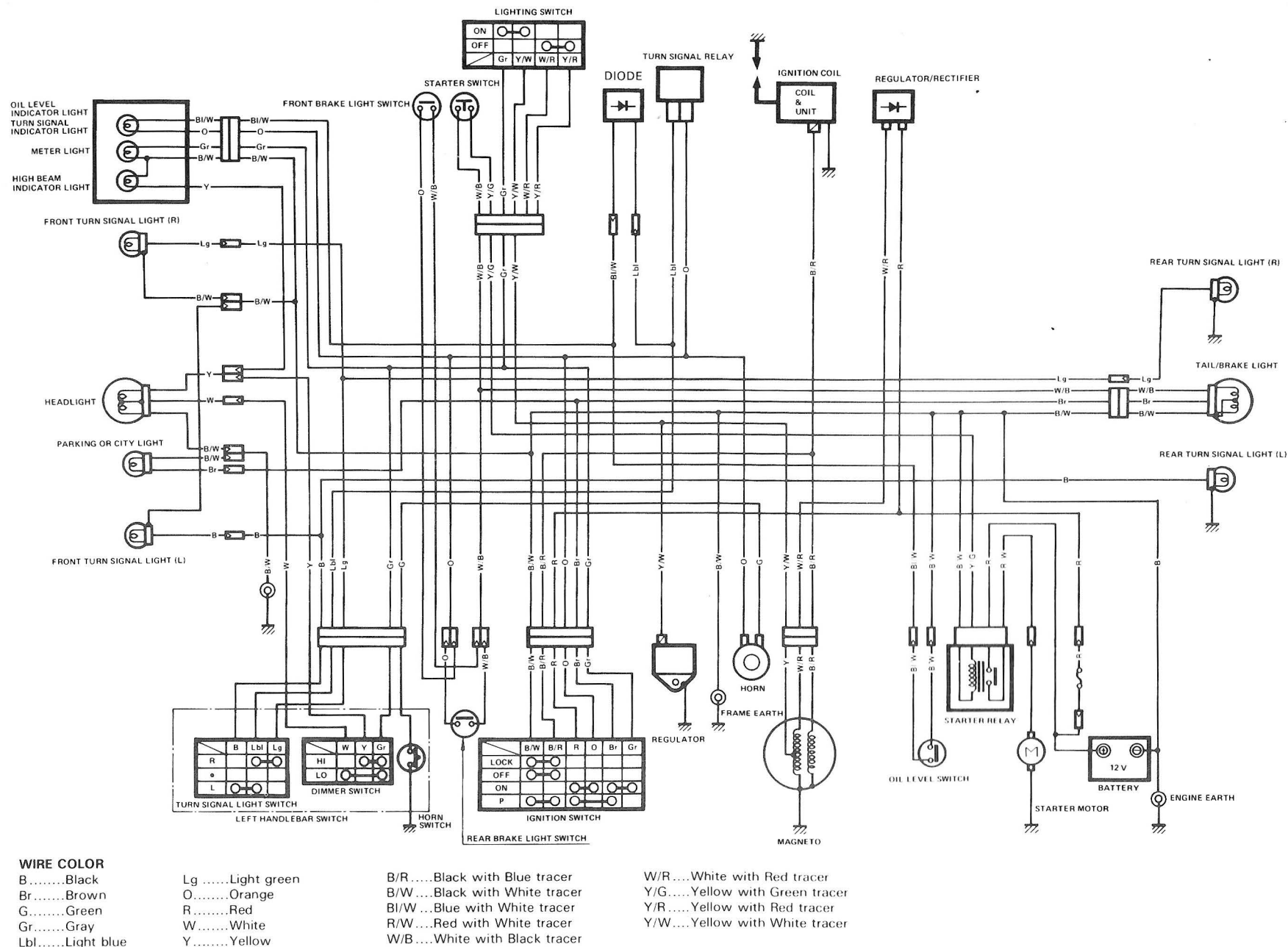
20.2 Bulb holders are a push fit in base of instrument



21.1 Stop/tail bulb can be changed after lens has been removed



Wiring diagram – CL50 model



Wiring diagram – CL50 D model

Conversion factors

Length (distance)

Inches (in)	X 25.4 = Millimetres (mm)	X 0.0394 = Inches (in)
Feet (ft)	X 0.305 = Metres (m)	X 3.281 = Feet (ft)
Miles	X 1.609 = Kilometres (km)	X 0.621 = Miles

Volume (capacity)

Cubic inches (cu in; in ³)	X 16.387 = Cubic centimetres (cc; cm ³)	X 0.061 = Cubic inches (cu in; in ³)
Imperial pints (Imp pt)	X 0.568 = Litres (l)	X 1.76 = Imperial pints (Imp pt)
Imperial quarts (Imp qt)	X 1.137 = Litres (l)	X 0.88 = Imperial quarts (Imp qt)
Imperial quarts (Imp qt)	X 1.201 = US quarts (US qt)	X 0.833 = Imperial quarts (Imp qt)
US quarts (US qt)	X 0.946 = Litres (l)	X 1.057 = US quarts (US qt)
Imperial gallons (Imp gal)	X 4.546 = Litres (l)	X 0.22 = Imperial gallons (Imp gal)
Imperial gallons (Imp gal)	X 1.201 = US gallons (US gal)	X 0.833 = Imperial gallons (Imp gal)
US gallons (US gal)	X 3.785 = Litres (l)	X 0.264 = US gallons (US gal)

Mass (weight)

Ounces (oz)	X 28.35 = Grams (g)	X 0.035 = Ounces (oz)
Pounds (lb)	X 0.454 = Kilograms (kg)	X 2.205 = Pounds (lb)

Force

Ounces-force (ozf; oz)	X 0.278 = Newtons (N)	X 3.6 = Ounces-force (ozf; oz)
Pounds-force (lbf; lb)	X 4.448 = Newtons (N)	X 0.225 = Pounds-force (lbf; lb)
Newtons (N)	X 0.1 = Kilograms-force (kgf; kg)	X 9.81 = Newtons (N)

Pressure

Pounds-force per square inch (psi; lbf/in ² ; lb/in ²)	X 0.070 = Kilograms-force per square centimetre (kgf/cm ² ; kg/cm ²)	X 14.223 = Pounds-force per square inch (psi; lbf/in ² ; lb/in ²)
Pounds-force per square inch (psi; lbf/in ² ; lb/in ²)	X 0.068 = Atmospheres (atm)	X 14.696 = Pounds-force per square inch (psi; lbf/in ² ; lb/in ²)
Pounds-force per square inch (psi; lbf/in ² ; lb/in ²)	X 0.069 = Bars	X 14.5 = Pounds-force per square inch (psi; lbf/in ² ; lb/in ²)
Pounds-force per square inch (psi; lbf/in ² ; lb/in ²)	X 6.895 = Kilopascals (kPa)	X 0.145 = Pounds-force per square inch (psi; lbf/in ² ; lb/in ²)
Kilopascals (kPa)	X 0.01 = Kilograms-force per square centimetre (kgf/cm ² ; kg/cm ²)	X 98.1 = Kilopascals (kPa)

Torque (moment of force)

Pounds-force inches (lbf in; lb in)	X 1.152 = Kilograms-force centimetre (kgf cm; kg cm)	X 0.868 = Pounds-force inches (lbf in; lb in)
Pounds-force inches (lbf in; lb in)	X 0.113 = Newton metres (Nm)	X 8.85 = Pounds-force inches (lbf in; lb in)
Pounds-force inches (lbf in; lb in)	X 0.083 = Pounds-force feet (lbf ft; lb ft)	X 12 = Pounds-force inches (lbf in; lb in)
Pounds-force feet (lbf ft; lb ft)	X 0.138 = Kilograms-force metres (kgf m; kg m)	X 7.233 = Pounds-force feet (lbf ft; lb ft)
Pounds-force feet (lbf ft; lb ft)	X 1.356 = Newton metres (Nm)	X 0.738 = Pounds-force feet (lbf ft; lb ft)
Newton metres (Nm)	X 0.102 = Kilograms-force metres (kgf m; kg m)	X 9.804 = Newton metres (Nm)

Power

Horsepower (hp)	X 745.7 = Watts (W)	X 0.0013 = Horsepower (hp)
-----------------	---------------------	----------------------------

Velocity (speed)

Miles per hour (miles/hr; mph)	X 1.609 = Kilometres per hour (km/hr; kph)	X 0.621 = Miles per hour (miles/hr; mph)
--------------------------------	--	--

Fuel consumption*

Miles per gallon, Imperial (mpg)	X 0.354 = Kilometres per litre (km/l)	X 2.825 = Miles per gallon, Imperial (mpg)
Miles per gallon, US (mpg)	X 0.425 = Kilometres per litre (km/l)	X 2.352 = Miles per gallon, US (mpg)

Temperature

Degrees Fahrenheit = (°C x 1.8) + 32

Degrees Celsius (Degrees Centigrade; °C) = (°F - 32) x 0.56

*It is common practice to convert from miles per gallon (mpg) to litres/100 kilometres (l/100km), where mpg (Imperial) x l/100 km = 282 and mpg (US) x l/100 km = 235

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