Contents

The 225 DX shaft-drive model

About this manual

Its purpose

The purpose of this manual is to help you maintain and repair your ATV. It can do so in several ways. It can help you decide what work must be done, even if you choose to have it done by a dealer service department or a repair shop, it provides information and procedures for routine maintenance and it offers diagnostic and repair procedures to follow when trouble occurs.

It is hoped that you will use the manual to tackle the work yourself. For many simple jobs, doing it yourself may be quicker than arranging an appointment to get the machine into a shop and making the trips to leave it and pick it up. More importantly, a lot of money can be saved by avoiding the expense the shop must pass on to you to cover its labor and overhead costs. An added benefit is the sense of satisfaction and accomplishment that you feel after having done the job yourself.

Using the manual

The manual is divided into Chapters. Each Chapter is divided into numbered Sections which are headed in bold type between horizontal lines. Each Section consists of consecutively numbered paragraphs.

The two types of illustrations used (figures and photographs) are referenced by a number preceding the caption. Figure reference numbers denote Chapter and numerical sequence within the Chapter (i.e. Fig. 3.4 means Chapter 3, figure number 4). Figure captions are followed by a Section number which ties the figure to a specific portion of the text. All photographs apply to the Chapter in which they appear and the reference number pinpoints the pertinent Section and paragraph.

Procedures, once described in the text, are not normally repeated. When it is necessary to refer to another Chapter, the reference will be given as Chapter and Section number (i.e. Chapter 1, Section 16). Cross references given without use of the word "Chapter" apply to Sections and/or paragraphs in the same Chapter. For example, "see Section 8" means in the same Chapter.

Reference to the left or right side of the machine is based on the assumption that one is sitting on the seat, facing forward.

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

Even though extreme care has been taken during the preparation of this manual, neither the publisher nor the author can accept responsibility for any errors in, or omissions from, the information given.

Introduction to the Yamaha ATVs

Yamaha has produced and marketed a wide variety of ATVs, ranging from the diminutive YT 60 to the fire-breathing YTZ 250. Both three and four-wheelers are included in the range of models, along with two-stroke and four-stroke cycle engines and shaft and chain final drive.

Various models are equipped with rear suspensions, electric starters, a reverse gear, carrying racks and hydraulic disc brakes. Most have an automatic clutch that operates in conjunction with the gearshift mechanism.

The entire model line, taken as a whole, is sensiby equipped and functional, yet each model retains the simplicity necessary for ease of maintenance and long-term durability.

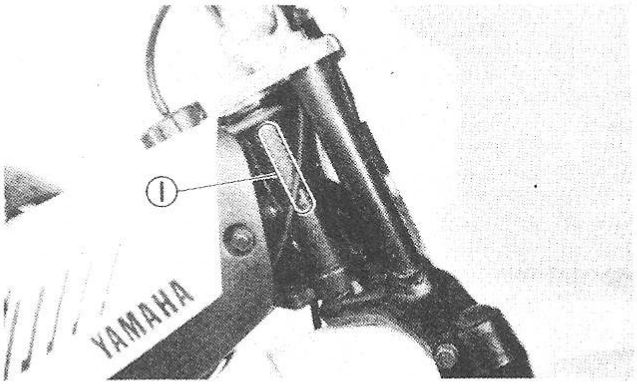
Right-side engine view

Identification numbers

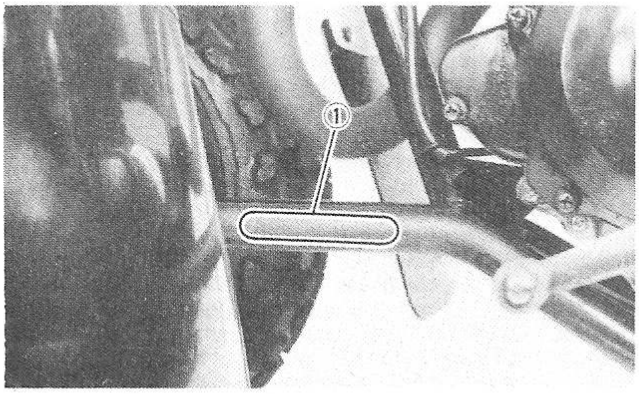
Yamaha ATVs have a Vehicle Identification Number (VIN) stamped into the steering head (usually on the right side) or, as in the case of four-wheelers, to the front, left lower frame member. This number is normally required for registration and licensing of the vehicle.

The frame serial number is the same as the Vehicle Identification Number and the engine serial number is stamped into the engine case (usually the right one). Both of these numbers should be recorded and kept in a safe place so they can be furnished to law enforcement officials in the event of theft.

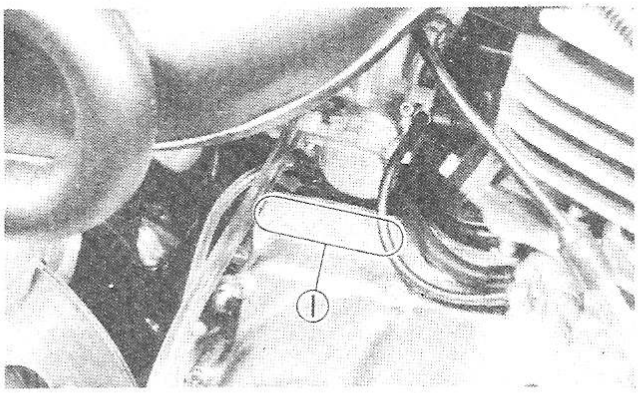
The frame serial number, engine serial number and carburetor identification number should also be kept in a handy place (such as with your driver's license) so they are always available when purchasing or ordering parts for your machine.



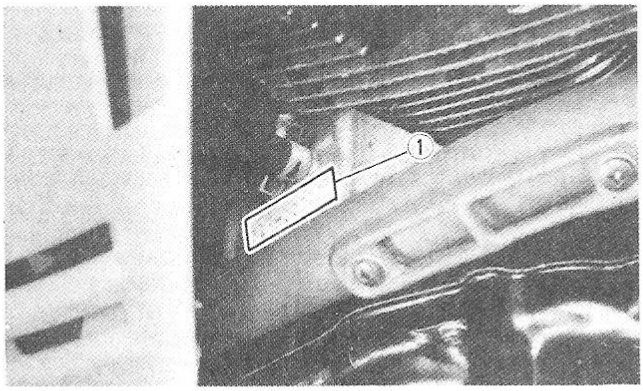
Typical three wheel ATV VIN/frame number location (1)



Typical four wheel ATV VIN/frame number location (1)



Two-stroke engine serial number location (1)



Four-stroke engine serial number location (1)

Buying parts

Once you have found all the identification numbers, record them for reference when buying parts. Since the manufacturers change specifications, parts and vendors (companies that manufacture various components on the machine), providing the ID numbers is the only way to be reasonably sure that you are buying the correct parts.

Whenever possible, take the worn part to the dealer so direct comparison with the new component can be made. Along the trail from the manufacturer to the parts shelf, there are numerous places that the part can end up with the wrong number or be listed incorrectly.

The two places to purchase new parts for your ATV — the accessory store and the franchised dealer — differ in the type of parts that they carry. While dealers can obtain virtually every part for your machine, the accessory dealer is usually limited to normal high wear items such as shock absorbers, tune-up parts, various engine gaskets, cables, brake parts, etc. Rarely will an accessory outlet have major suspension components, cylinders, transmission gears, or cases.

Used parts can be obtained for roughly half the price of new ones, but you can't always be sure of what you're getting. Once again, take your worn part to the wrecking yard for direct comparison.

Whether buying new, used or rebuilt parts, the best course is to deal directly with someone who specializes in parts for your particular make.

Maintenance techniques, tools and working facilities

Basic maintenance techniques

There are a number of techniques involved in maintenance and repair that will be referred to throughout this manual. Application of these techniques will enable the amateur mechanic to be more efficient, better organized and capable of performing the various tasks properly, which will ensure that the repair job is thorough and complete.

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, locknut, locking tab or thread adhesive). All threaded fasteners should be clean, straight, have undamaged threads and undamaged corners on the hex head where the wrench fits. Develop the habit of replacing all damaged nuts and bolts with new ones.

Rusted nuts and bolts should be treated with a penetrating fluid to ease removal and prevent breakage. Some mechanics use turpentine in a spout type oil can, which works quite well. 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 chiseled off or removed with a special nut breaker, available at tool stores.

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).

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 aluminum), thin sheet metal or plastic. Special locknuts can only be used once or twice before they lose their locking ability and must be replaced.

Torquing sequences and procedures

When threaded fasteners are tightened, they are often tightened to a specific torque value (torque is a twisting force). Over-tightening the fastener can weaken it and cause it to break, while under tightening can cause it to eventually come loose. Each bolt, depending on the material it's made of, the diameter of its shank and the material it is threaded into, has a specific torque value, which is noted in the Specifications. Be sure to follow the torque recommendations closely.

Fasteners laid out in a pattern (i.e. cylinder head bolts, engine case bolts, etc.) must be loosened or tightened in a sequence to avoid warp ing the component. Initially, the bolts/nuts should go on finger tight only. Next, they should be tightened one full turn each, in a criss-cross or diagonal pattern. After each one has been tightened one full turn, return to the first one tightened and tighten them all one half turn, following the same pattern. Finally, tighten each of them one quarter turn at a time until each fastener has been tightened to the proper torque. To loosen and remove the fasteners the procedure would be reversed.

Disassembly sequence

Component disassembly should be done with care and purpose to help ensure that the parts go back together properly during reassembly. Always keep track of the sequence in which parts are removed. Take note of special characteristics or marks on parts that can be installed more than one way (such as a grooved thrust washer on a shaft). It's a good idea to lay the disassembled parts out on a clean surface in the order that they were removed. It may also be helpful to make sketches or take instant photos of components before removal.

When removing fasteners from a component, keep track of their locations. Sometimes threading a bolt back in a part, or putting the washers and nut back on a stud, can prevent mixups later. If nuts and bolts cannot be returned to their original locations, they should be kept in a compartmented box or a series of small boxes. A cupcake or muffin tin is ideal for this purpose, since each cavity can hold the bolts and nuts from a particular area (i.e. engine case bolts, valve cover bolts, engine mount bolts, etc.). A pan of this type is especially helpful when working on assemblies with very small parts (such as the carburetors and the valve train). The cavities can be marked with paint or tape to identify the contents.

Whenever wiring looms, harnesses or connectors are separated, it's a good idea to identify the two halves with numbered pieces of masking tape so they can be easily reconnected.

Gasket sealing surfaces

Throughout any engine, gaskets are used to seal the mating surfaces between components and keep lubricants, fluids, vacuum or pressure contained in an assembly.

Many times these gaskets are coated with a liquid or paste type gasket sealing compound before assembly. Age, heat and pressure can sometimes cause the two parts to stick together so tightly that they are very difficult to separate. In most cases, the part can be loosened by striking it with a soft-faced hammer near the mating surfaces. A regular hammer can be used if a block of wood is placed between the hammer and the part. Do not hammer on cast parts or parts that could be easily damaged. With any particularly stubborn part, always recheck to make sure that every fastener has been removed.

Avoid using a screwdriver or bar to pry apart components, as they can easily mar the gasket sealing surfaces of the parts (which must remain smooth). If prying is absolutely necessary, use a piece of wood, but keep in mind that extra clean-up will be necessary if the wood splinters.

After the parts are separated, the old gasket must be carefully scraped off and the gasket surfaces cleaned. Stubborn gasket material can be soaked with a gasket remover (available in aerosol cans) to soften it so it can be easily scraped off. A scraper can be fashioned from a piece of copper tubing by flattening and sharpening one end. Copper is recommended because it is usually softer than the surfaces to be scraped, which reduces the chance of gouging the part. Some gaskets can be removed with a wire brush, but regardless of the method used, the mating surfaces must be left clean and smooth. If for some reason the gasket surface is gouged, then a gasket sealer thick enough to fill scratches will have to be used during reassembly of the components. For most applications, a non-drying (or semi-drying) gasket sealer is best.

Hose removal tips

Hose removal precautions closely parallel gasket removal precautions. Avoid scratching or gouging the surface that the hose mates against or the connection may leak. Because of various chemical reactions, the rubber in hoses can bond itself to the metal spigot that the hose fits over. To remove a hose, first loosen the hose clamps that secure it to the spigot. Then, with slip joint pliers, grab the hose at the clamp and rotate it around the spigot. Work it back and forth until it is completely free, then pull it off (silicone or other lubricants will

ease removal if they can be applied between the hose and the outside of the spigot). Apply the same lubricant to the inside of the hose and the outside of the spigot to simplify installation. If a hose clamp is broken or damaged, do not reuse it. Also, do not reuse hoses that are cracked, split or torn.

Tools

A selection of good tools is a basic requirement for anyone who plans to maintain and repair an ATV. For the owner who has few tools, if any, the initial investment might seem high, but when compared to the spiraling costs of routine maintenance and repair, it is a wise one.

To help the owner decide which tools are needed to perform the tasks detailed in this manual, the following tool lists are offered: *Maintenance and minor repair, Repair and overhaul* and *Special*. The newcomer to practical mechanics should start off with the *Maintenance and minor repair* tool kit, which is adequate for the simpler jobs. Then, as confidence and experience grow, the owner can tackle more difficult tasks, buying additional tools as they are needed. Eventually the basic kit will be built into the *Repair and overhaul* tool set. Over a period of time, the experienced do-it-yourselfer will assemble a tool set complete enough for most repair and overhaul procedures and will add tools from the *Special* category when it is felt that the expense is justified by the frequency of use. Note that an asterisk (*) after the tool name in the following lists indicates that the tool is not required for all models.

Maintenance and minor repair tool kit

The tools in this list should be considered the minimum required for performance of routine maintenance, servicing and minor repair work. We recommend the purchase of combination wrenches (box end and open end combined in one wrench); while more expensive than open-ended ones, they offer the advantages of both types of wrench.

Combination wrench set (6 mm to 22 mm)
Adjustable wrench — 8 in
Spark plug socket (with rubber insert)
Spark plug gap adjusting tool
Feeler gauge set
*Valve adjustment wrench**
Standard screwdriver (5/16 in x 6 in)
Phillips screwdriver (No. 2 x 6 in)
Combination (slip-joint) pliers — 6 in
Hacksaw and assortment of blades
Tire pressure gauge
Control cable pressure luber
Grease gun
Oil can
Fine emery cloth
Wire brush
Hand impact screwdriver and bits
Funnel (medium size)
Safety goggles
Drain pan

Note: *Since basic ignition timing checks are a part of routine maintenance, it will be necessary to purchase a good quality, inductive pickup stroboscopic timing light. Although it is included in the list of Special tools, it is mentioned here because ignition timing checks cannot be made without one.*

Repair and overhaul tool set

These tools are essential for anyone who plans to perform major repairs and are intended to supplement those in the *Maintenance and minor repair* tool kit. Included is a comprehensive set of sockets which, though expensive, are invaluable because of their versatility (especially when various extensions and drives are available). We recommend the 3/8 inch drive over the 1/2 inch drive for general ATV maintenance and repair (ideally, the mechanic would have a 3/8 inch drive set and a 1/2 inch drive set).

Socket set(s)
Reversible ratchet
Extension — 6 in
Universal joint
Torque wrench (same size drive as sockets)
Ball peen hammer — 8 oz
Soft-faced hammer (plastic/rubber)
Standard screwdriver (1/4 in x 6 in)
Standard screwdriver (stubby — 5/16 in)
Phillips screwdriver (No. 3 x 8 in)
Phillips screwdriver (stubby — No. 2)
Pliers — vise grip
Pliers — lineman's
Pliers — needle nose
Pliers — snap-ring (internal and external)
Cold chisel — 1/2 in
Scriber
Scraper (made from flattened copper tubing)
Centerpunch
Pin punches (1/16, 1/8, 3/16 in)
Steel rule/straightedge — 12 in
Allen wrench set (4 mm to 10 mm)
Clutch holding tool
*Fork damper rod holding tool**
Pin-type spanner wrench
A selection of files
Wire brush (large)

Note: *Another tool which is often useful is an electric drill motor with a chuck capacity of 3/8 inch (and a set of good quality drill bits).*

Special tools

The tools in this list include those which are not used regularly, are expensive to buy, or which need to be used in accordance with their manufacturer's instructions. Unless these tools will be used frequently, it is not very economical to purchase many of them. A consideration would be to split the cost and use between yourself and a friend or friends.

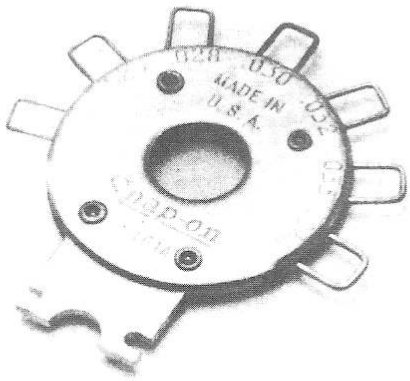
This list primarily contains tools and instruments widely available to the public, as well as some special tools produced by the vehicle manufacturer for distribution to dealer service departments. As a result, references to the manufacturer's special tools are occasionally included in the text of this manual. Generally, an alternative method of doing the job without the special tool is offered. However, sometimes there is no alternative to their use. Where this is the case, and the tool cannot be purchased or borrowed, the work should be turned over to the dealer service department or a repair shop.

Valve spring compressor
Piston ring removal and installation tool
*Piston pin puller**
Telescoping gauges
Micrometer(s) and/or dial/vernier calipers
Cylinder surfacing hone
Cylinder compression gauge
Dial indicator set
Multimeter
Crankcase separation tool
*Torx driver bits (T-25 and T-30)**
Flywheel (AC generator/magneto rotor) puller
Stroboscopic timing light
Work light with extension cord
Small air compressor with blow gun and tire chuck

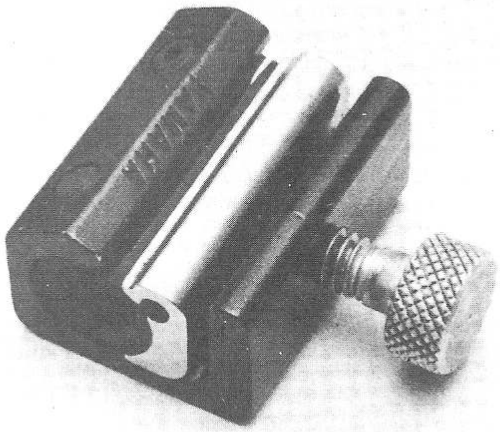
Buying tools

For the do-it-yourselfer who is just starting to get involved in ATV maintenance and repair, there are a number of options available when purchasing tools. If maintenance and minor repair is the extent of the work to be done, the purchase of individual tools is satisfactory. If, on the other hand, extensive work is planned, it would be a good idea to purchase a modest tool set from one of the large retail chain stores. A set can usually be bought at a substantial savings over the individual tool prices (and they often come with a tool box). As additional tools are needed, add-on sets, individual tools and a larger tool box can be purchased to expand the tool selection. Building a tool set gradually allows the cost of the tools to be spread over a longer period of time and gives the mechanic the freedom to choose only those tools that will actually be used.

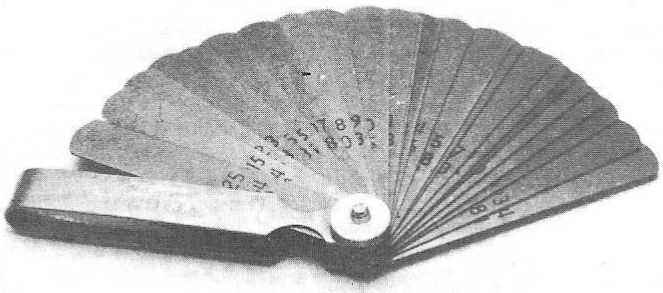
Tool stores and Yamaha dealers will often be the only source of some of the special tools that are needed, but regardless of where tools are bought, try to avoid cheap ones (especially when buying screwdrivers and sockets) because they won't last very long. The expense involved in replacing cheap tools will eventually be greater than the initial cost of quality tools.



Spark plug gap adjusting tool



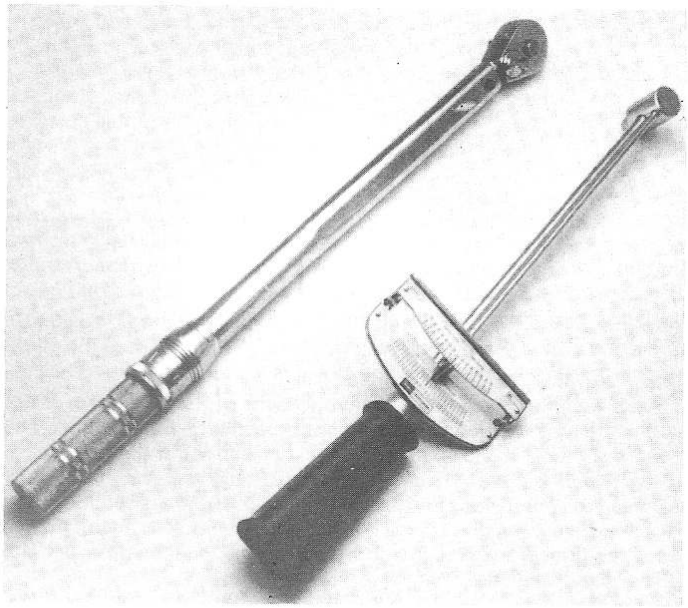
Control cable pressure luber



Feeler gauge set

Hand impact screwdriver and bits

0-to-1 inch micrometer



Torque wrenches (left—click type; right—beam type)

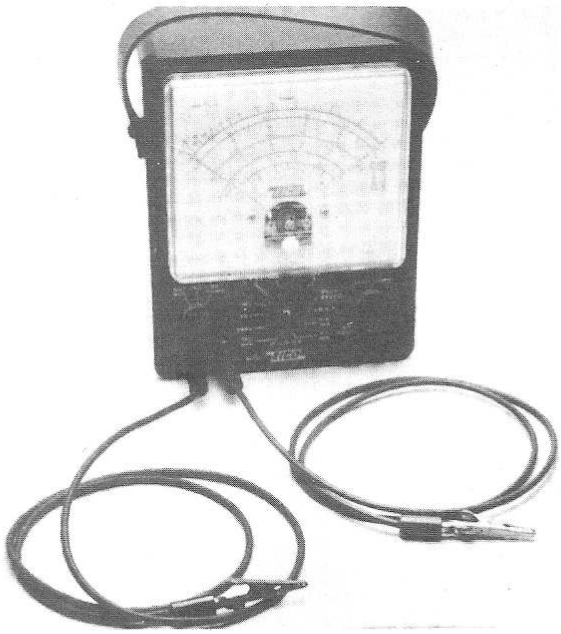
Care and maintenance of tools

Good tools are expensive, so it makes sense to treat them with respect. Keep them clean and in usable condition and store them properly when not in use. Always wipe off any dirt, grease or metal chips before putting them away. Never leave tools lying around in the work area.

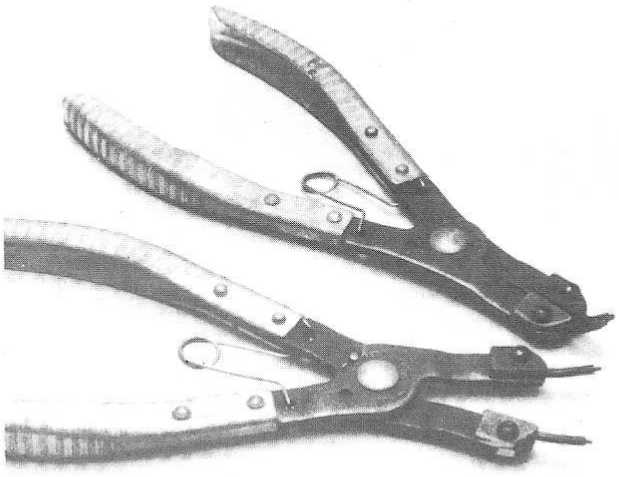
Some tools, such as screwdrivers, pliers, wrenches and sockets, can be hung on a panel mounted on the garage or workshop wall, while others should be kept in a tool box or tray. Measuring instruments, gauges, meters, etc. must be carefully stored where they cannot be damaged by weather or impact from other tools.

When tools are used with care and stored properly, they will last a very long time. Even with the best of care, tools will wear out if used frequently. When a tool is damaged or worn out, replace it; subsequent jobs will be safer and more enjoyable if you do.

Cylinder compression gauge

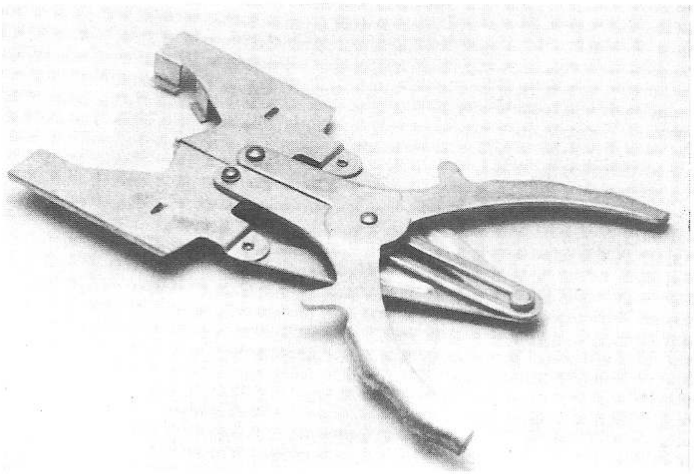


Multimeter (volt/ohm/ammeter)

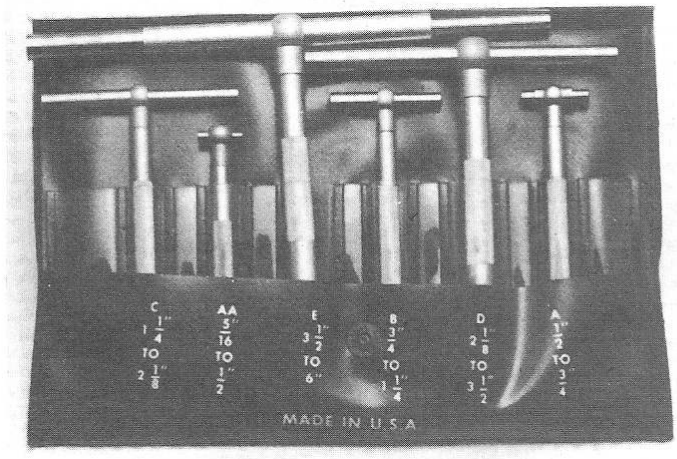


Snap-ring pliers (top—external; bottom—internal)

Allen wrenches (left) and Allen head sockets (right)



Piston ring removal/installation tool

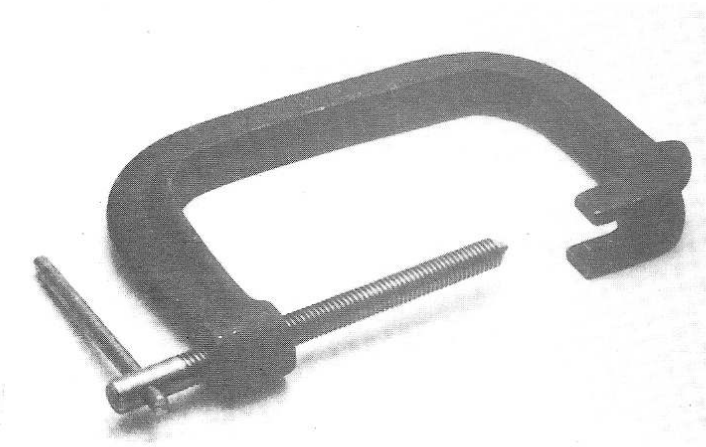


Telescoping gauges

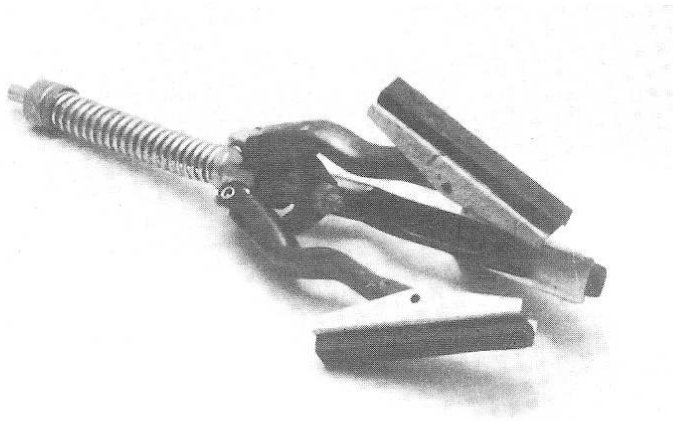
Working facilities

Not to be overlooked when discussing tools is the workshop. If anything more than routine maintenance is to be carried out, some sort of suitable work area is essential.

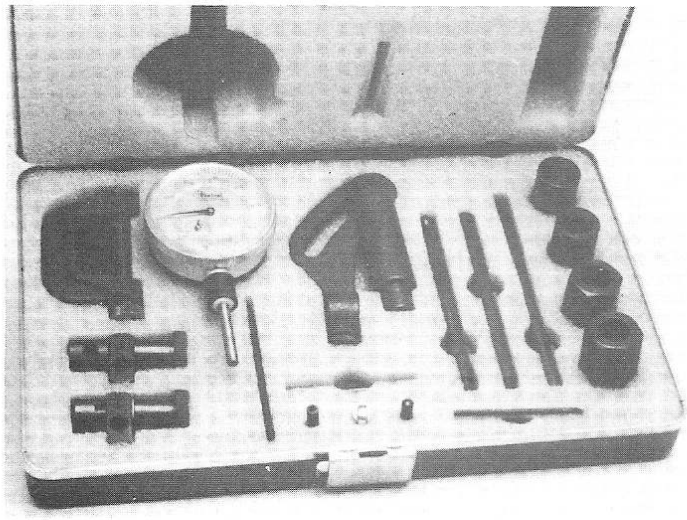
It is understood, and appreciated, that many home mechanics do not have a good workshop or garage available and end up removing an engine or doing major repairs outside (it is recommended, however, that the overhaul or repair be completed under the cover of a roof).



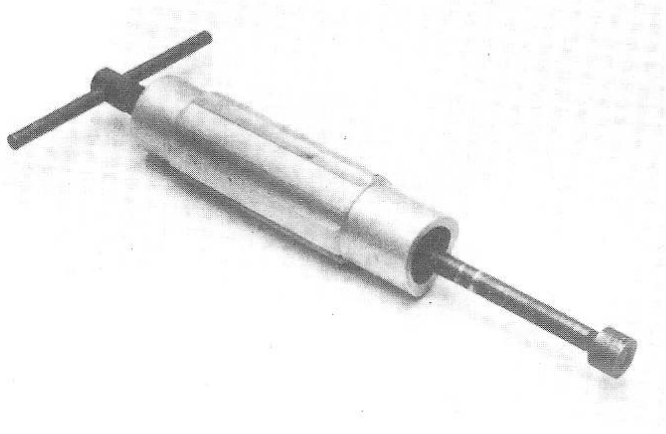
Valve spring compressor



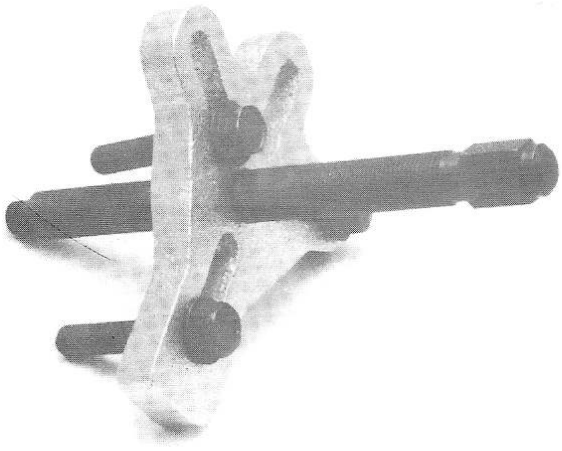
Cylinder surfacing hone



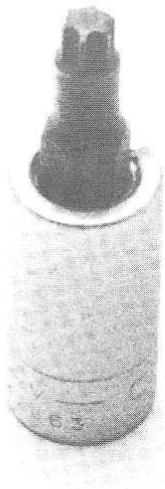
Dial indicator set



Piston pin puller



Rotor (flywheel) puller/crankcase separating tool



Torx driver (T-25 shown)

A clean, flat workbench or table of comfortable working height is an absolute necessity. The workbench should be equipped with a vise that has a jaw opening of at least four inches.

As mentioned previously, some clean, dry storage space is also required for tools, as well as the lubricants, fluids, cleaning solvents, etc. which soon become necessary.

Sometimes waste oil and fluids, drained from the engine or cooling system during normal maintenance or repairs, present a disposal problem. To avoid pouring them on the ground or into a sewage system, simply pour the used fluids into large containers, seal them with caps and take them to an authorized disposal site or service station. Plastic jugs (such as old antifreeze containers) are ideal for this purpose.

Always keep a supply of old newspapers and clean rags available. Old towels are excellent for mopping up spills. Many mechanics use rolls of paper towels for most work because they are readily available and disposable. To help keep the area under the machine clean, a large cardboard box can be cut open and flattened to protect the garage or shop floor.

Whenever working over a painted surface (such as the fuel tank) cover it with an old blanket or bedspread to protect the finish.

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*

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 jeopardized. A moment's lack of attention can result in an accident, as can failure to recognize simple safety precautions. The possibility of an accident will always exist, 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 machine.

Essential DOs and DON'Ts

DON'T start the engine without first checking to see if the transmission is in Neutral.
DON'T use gasoline for cleaning parts.
DON'T attempt to drain oil until you are sure it has cooled to the point that it will not burn you.
DON'T touch any part of the engine or exhaust system until they have cooled down sufficiently to avoid burns.
DON'T allow brake fluid or antifreeze to contact the machine's paintwork or plastic components.
DON'T syphon toxic liquids such as gasoline, antifreeze and brake fluid by mouth, or allow them to remain on your skin.
DON'T inhale dust – it may be injurious to health (see *Asbestos* heading).
DON'T allow any spilled oil or grease to remain on the floor – wipe it up before someone slips on it.
DON'T use loose fitting wrenches or other tools which may slip and cause injury.
DON'T push on wrenches when loosening or tightening nuts or bolts. Always try to pull the wrench towards you. If the situation calls for pushing the wrench away, push with an open hand to avoid scraped knuckles if the wrench should slip.
DON'T attempt to lift a heavy component which may be beyond your capability – get someone to help you.
DON'T rush or take unsafe shortcuts, to finish a job.
DON'T allow children on or around the motorcycle while you are working on it.
DO wear eye protection when using power tools such as drill, bench grinder etc.
DO keep loose clothing and long hair well out of the way of moving parts.
DO make sure that any hoist used has a safe working load rating adequate for the job.
DO make sure that the machine is securely supported, especially when removing wheels.
DO get someone to check on you periodically when working alone.
DO carry out work in a logical sequence and make sure that everything is correctly assembled and tightened.
DO remember that your motorcycle's safety affects that of yourself and others. If in doubt on any point, get professional advice.

Asbestos

Certain friction, insulating, sealing, and other products – such as brake linings, clutch linings, gaskets, etc – contain asbestos. *Extreme care must be taken to avoid inhalation of dust from such products since it is hazardous to health.* If in doubt, assume that they *do* contain asbestos.

Fire

Remember at all times that gasoline is highly flammable. Never smoke, or have any kind of open flame around, when working on your machine. 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 gasoline vapors, which in a confined space are highly explosive. Do not, under any circumstances, use gasoline for cleaning parts; use an approved safety solvent.

Always disconnect the battery ground cable before working on any part of the fuel or electrical system, and never risk spilling fuel on to a hot engine or exhaust system component.

It is highly recommended that a fire extinguisher of a type suitable for fuel and electrical fires be 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. Gasoline vapor falls into this category, as do the vapors from some cleaning solvents. 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 on the container carefully. Never use materials from unmarked containers.

Never run the engine 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 machine outside the work area.

The battery

Never create a spark, or allow a bare light bulb near the battery vent hose. It will normally be giving off a certain amount of hydrogen gas, which is highly explosive.

Always disconnect the battery ground cable 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 adding water and when carrying the battery. The electrolyte, even when diluted, is very corrosive and should not be allowed to contact clothing or skin.

Household current

When using an electric power tool, inspection light etc., which operates on household current, always make sure that the tool is correctly connected to its plug and that, where necessary, it is properly grounded. Do not use such items in damp conditions and, again, do not create a spark or apply excessive heat in the vicinity of fuel or fuel vapor.

Secondary ignition system voltage

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

ATV chemicals and lubricants

A number of chemicals and lubricants are available for use in ATV maintenance and repair. They include a wide variety of products ranging from cleaning solvents and degreasers to lubricants and protective sprays for rubber, plastic and vinyl.

Contact point/spark plug cleaner is a solvent used to clean oily film and dirt from points, grime from electrical connectors and oil deposits from spark plugs. It is oil free and leaves no residue. It can also be used to remove gum and varnish from carburetor jets and other orifices.

Carburetor cleaner is similar to contact point/spark plug cleaner but it usually has a stronger solvent and may leave a slight oily reside. It is not recommended for cleaning electrical components or connections.

Brake system cleaner is used to remove grease or brake fluid from brake system components (where clean surfaces are absolutely necessary and petroleum-based solvents cannot be used); it also leaves no residue.

Silicone-based lubricants are used to protect rubber parts such as hoses and grommets, and are used as lubricants for hinges and locks.

Multi-purpose grease is an all purpose lubricant used wherever grease is more practical than a liquid lubricant such as oil. Some multi-purpose grease is colored white and specially formulated to be more resistant to water than ordinary grease.

Gear oil (sometimes called gear lube) is a specially designed oil used in transmissions and final drive units, as well as other areas where high friction, high temperature lubrication is required. It is available in a number of viscosities (weights) for various applications.

Motor oil, of course, is the lubricant specially formulated for use in the engine. It normally contains a wide variety of additives to prevent corrosion and reduce foaming and wear. Motor oil comes in various weights (viscosity ratings) of from 5 to 80. The recommended weight of the oil depends on the seasonal temperature and the demands on the engine. Light oil is used in cold climates and under light load conditions; heavy oil is used in hot climates and where high loads are encountered. Multi-viscosity oils are designed to have characteristics of both light and heavy oils and are available in a number of weights from 5W-20 to 20W-50.

Gas additives perform several functions, depending on their chemical makeup. They usually contain solvents that help dissolve gum and varnish that build up on carburetor and intake parts. They also serve to break down carbon deposits that form on the inside surfaces of the combustion chambers. Some additives contain upper cylinder lubricants for valves and piston rings.

Brake fluid is a specially formulated hydraulic fluid that can withstand the heat and pressure encountered in brake systems. Care must be taken that this fluid does not come in contact with painted surfaces or plastics. An opened container should always be resealed to prevent contamination by water or dirt.

Chain lubricants are formulated especially for use on ATV final drive chains. A good chain lube should adhere well and have good penetrating qualities to be effective as a lubricant inside the chain and on the side plates, pins and rollers. Most chain lubes are either the foaming type or quick drying type and are usually marketed as sprays.

Degreasers are heavy duty solvents used to remove grease and grime that may accumulate on engine and frame components. They can be sprayed or brushed on and, depending on the type, are rinsed with either water or solvent.

Solvents are used alone or in combination with degreasers to clean parts and assemblies during repair and overhaul. The home mechanic should use only solvents that are non-flammable and that do not produce irritating fumes.

Gasket sealing compounds may be used in conjunction with gaskets, to improve their sealing capabilities, or alone, to seal metal-to-metal joints. Many gasket sealers can withstand extreme heat, some are impervious to gasoline and lubricants, while others are capable of filling and sealing large cavities. Depending on the intended use, gasket sealers either dry hard or stay relatively soft and pliable. They are usually applied by hand, with a brush, or are sprayed on the gasket sealing surfaces.

Thread cement is an adhesive locking compound that prevents threaded fasteners from loosening because of vibration. It is available in a variety of types for different applications.

Moisture dispersants are usually sprays that can be used to dry out electrical components such as the fuse block and wiring connectors. Some types can also be used as treatment for rubber and as a lubricant for hinges, cables and locks.

Waxes and polishes are used to help protect painted and plated surfaces from the weather. Different types of paint may require the use of different types of wax polish. Some polishes utilize a chemical or abrasive cleaner to help remove the top layer of oxidized (dull) paint on older vehicles. In recent years, many non-wax polishes (that contain a wide variety of chemicals such as polymers and silicones) have been introduced. These non-wax polishes are usually easier to apply and last longer than conventional waxes and polishes.

Troubleshooting

Contents

Engine doesn't start or is difficult to start

1 Starter motor does not rotate

1 Engine stop switch Off.
2 Fuse blown.
3 Battery voltage low. Check and recharge battery (Chapter 7).
4 Starter motor defective. Make sure that the wiring to the starter is secure. Make sure the starter solenoid (relay) clicks when the start button is pushed. If the solenoid clicks, then the fault is in the wiring or motor.
5 Starter solenoid (relay) faulty. Check it according to the procedure in Chapter 7.
6 Starter button not contacting. The contacts could be wet, corroded or dirty. Disassemble and clean the switch (Chapter 7).
7 Wiring open or shorted. Check all wiring connections and wiring looms to make sure that they are dry, tight and not corroded. Also check for broken or frayed wires that can cause a short to ground (see wiring diagram, Chapter 7).
8 Main switch defective. Check the switch according to the procedure in Chapter 7. Replace the switch with a new one if it is defective.
9 Engine stop switch defective. Check for wet, dirty or corroded contacts. Clean or replace the switch as necessary (Chapter 8).
10 Faulty neutral switch. Check the wiring to the switch and the switch itself according to the procedures in Chapter 7.

2 Starter motor rotates but engine does not turn over

1 Starter motor clutch defective. Inspect and repair or replace (Chapter 2).
2 Damaged idler or starter gears. Inspect and replace the damaged parts (Chapter 2).

3 Starter works but engine won't turn over (seized)

Seized engine caused by one or more internally damaged components. Failure due to wear, abuse or lack of lubrication. Damage can include seized valves, camshaft, piston, crankshaft, connecting rod bearings, or transmission gears or bearings. Refer to Chapter 2 for engine disassembly.

4 No fuel flow

1 No fuel in tank.
2 Fuel petcock hose broken or disconnected.
3 Tank cap air vent obstructed. Usually caused by dirt or water. Remove it and clean the cap vent hole or hose.
4 Fuel petcock clogged. Remove the petcock and clean it and the filter (Chapter 1).
5 Fuel line clogged. Pull the fuel line loose and carefully blow through it.
6 Inlet needle valve clogged. For the valve to be clogged, either a very bad batch of fuel with an unusual additive has been used, or some other foreign object has entered the tank. Many times after a machine has been stored for many months without running, the fuel turns to a varnish-like liquid and forms deposits on the inlet needle valve and jets. The carburetor should be removed and overhauled if draining the float bowl does not alleviate the problem.

5 Engine flooded

1 Float level too high. Check and adjust as described in Chapter 3.
2 Inlet needle valve worn or stuck open. A piece of dirt, rust or other debris can cause the inlet needle to seat improperly, causing excess fuel to be admitted to the float bowl. In this case, the float chamber should be cleaned and the needle and seat inspected. If the needle and seat are worn, then the leaking will persist and the parts should be replaced with new ones (Chapter 3).
3 Starting technique faulty. Under normal circumstances (i.e., if all the carburetor functions are sound) the machine should start with no throttle. When the engine is cold, the choke should be operated and the engine started without opening the throttle. When the engine is at operating temperature, only a very slight amount of throttle should be necessary.

6 No spark or weak spark

1 Main switch Off.
2 Engine stop switch turned to the Off position.
3 Battery voltage low. Check and recharge battery as necessary (Chapter 7).
4 Spark plug dirty, defective or worn out. Locate reason for fouled plug using spark plug condition chart and follow the plug maintenance procedures in Chapter 1.
5 Spark plug cap or high-tension wiring faulty. Check condition. Replace either or both components if cracks or deterioration are evident (Chapter 4).
6 Spark plug cap not making good contact. Make sure that the plug cap fits snugly over the plug end.
7 CDI unit defective. Refer to Chapter 4 for details.
8 Pick-up coil defective. Check the unit, referring to Chapter 4 for details.
9 Ignition coil defective. Check the coil, referring to Chapter 5.
10 Main or stop switch shorted. This is usually caused by water, corrosion, damage or excessive wear. The switches can be disassembled and cleaned with electrical contact cleaner. If cleaning does not help, replace the switches (Chapter 7).
11 Wiring shorted or broken between:
a) Ignition switch and engine stop switch
b) CDI unit and engine stop switch
c) CDI unit and ignition coil
d) Ignition coil and plug
e) CDI unit and pick-up coil Make sure that all wiring connections are clean, dry and tight. Look for chafed and broken wires (Chapters 4 and 7).

7 Compression low

1 Spark plug loose. Remove the plug and inspect the threads. Reinstall and tighten to the specified torque (Chapter 1).
2 Cylinder head not sufficiently tightened down. If the cylinder head is suspected of being loose, then there's a chance that the gasket or head is damaged if the problem has persisted for any length of time. The head bolts should be tightened to the proper torque in the correct sequence (Chapter 2).
3 Improper valve clearance. This means that the valve is not closing completely and compression pressure is leaking past the valve. Check and adjust the valve clearances (Chapter 1).
4 Cylinder and/or piston worn. Excessive wear will cause compression pressure to leak past the rings. This is usually accompanied by worn rings as well. A top end overhaul is necessary (Chapter 2).
5 Piston rings worn, weak, broken, or sticking. Broken or sticking piston rings usually indicate a lubrication or carburetion problem that causes excess carbon deposits to form on the pistons and rings. Top end overhaul is necessary (Chapter 2).
6 Piston ring-to-groove clearance excessive. This is caused by excessive wear of the piston ring lands. Piston replacement is necessary (Chapter 2).
7 Cylinder head gasket damaged. If the head becomes loose, or if excessive carbon build-up on the piston crown and combustion chamber causes extremely high compression, the head gasket may leak. Retorquing the head is not always sufficient to restore the seal, so gasket replacement is necessary (Chapter 2).
8 Cylinder head warped. This is caused by overheating or improperly tightened head bolts. Machine shop resurfacing or head replacement is necessary (Chapter 2).
9 Valve spring broken or weak. Caused by component failure or wear; the spring(s) must be replaced (Chapter 2).
10 Valve not seating properly. This is caused by a bent valve (from over-revving or improper valve adjustment), burned valve or seat (improper carburetion) or an accumulation of carbon deposits on the seat (from carburetion, lubrication problems). The valves must be cleaned and/or replaced and the seats serviced if possible (Chapter 2).
11 Faulty reed valve (two-stroke engine only). Check and replace if necessary (chapter 2).

8 Stalls after starting

1 Improper choke action. Make sure the choke (starter valve) is getting a full stroke and staying in the "out" position. Adjustment of the cable slack is covered in Chapter 1.
2 Ignition malfunction. See Chapter 4.
3 Carburetor malfunction. See Chapter 3.
4 Fuel contaminated. The fuel can be contaminated with either dirt or water, or can change chemically if the machine is allowed to sit for several months or more. Drain the tank and float bowl (Chapter 3).
5 Intake air leak. Check for loose carburetor-to-intake manifold connections, loose hose, and loose carburetor top (Chapter 3).
6 Idle speed incorrect. Turn idle speed adjusting screw until the engine idles at the specified rpm (Chapters 1 and 3).
7 Crankcase air leak (two-stroke engine only). Refer to Chapter 2 for testing procedure.

9 Rough idle

1 Ignition malfunction. See Chapter 4.
2 Idle speed incorrect. See Chapter 1.
3 Carburetor malfunction. See Chapter 3.
4 Fuel contaminated. The fuel can be contaminated with either dirt or water, or can change chemically if the machine is allowed to sit for several months or more. Drain the tank and float bowls. If the problem is severe, a carburetor overhaul may be necessary (Chapters 1 and 3).
5 Intake air leak.
6 Air cleaner clogged. Service or replace air filter element (Chapter 1).
7 Crankcase air leak (two-stroke engine only). Refer to Chapter 2 for testing procedure.

Poor running at low speed

10 Spark weak

1 Battery voltage low. Check and recharge battery (Chapter 7).
2 Spark plug fouled, defective or worn out. Refer to Chapter 1 for spark plug maintenance.
3 Spark plug cap or high tension wiring defective. Refer to Chapters 1 and 4 for details on the ignition system.
4 Spark plug cap not making contact.
5 Incorrect spark plug. Wrong type, heat range or cap configuration. Check and install correct plugs listed in Chapter 1. A cold plug or one with a recessed firing electrode will not operate at low speeds without fouling.
6 CDI unit defective. See Chapter 4.
7 Pick-up coil defective. See Chapter 4.
8 Ignition coil defective. See Chapter 5.

11 Fuel/air mixture incorrect

1 Pilot screw out of adjustment (Chapter 1).
2 Pilot jet or air passage clogged. Remove and overhaul the carburetor (Chapter 3).
3 Air bleed holes clogged. Remove carburetor and blow out all passages (Chapter 3).
4 Air cleaner clogged, poorly sealed or missing.
5 Air cleaner-to-carburetor boot poorly sealed. Look for cracks, holes or loose clamps and replace or repair defective parts.
6 Fuel level too high or too low. Adjust the float (Chapter 3).
7 Fuel tank air vent obstructed. Make sure that the air vent passage in the filler cap is open.
8 Carburetor intake manifold loose. Check for cracks, breaks, tears or loose clamps or bolts. Repair or replace the rubber boot.
9 Choke (starter) valve stuck open.
10 Crankcase air leak (two-stroke engine only). Refer to Chapter 2 for testing procedure.

12 Compression low

1 Spark plug loose. Remove the plug and inspect the threads. Reinstall and tighten to the specified torque (Chapter 1).
2 Cylinder head not sufficiently tightened down. If the cylinder head is suspected of being loose, then there's a chance that the gasket and head are damaged if the problem has persisted for any length of time. The head bolts should be tightened to the proper torque in the correct sequence (Chapter 2).
3 Improper valve clearance. This means that the valve is not closing completely and compression pressure is leaking past the valve. Check and adjust the valve clearances (Chapter 1).
4 Cylinder and/or piston worn. Excessive wear will cause compression pressure to leak past the rings. This is usually accompanied by worn rings as well. A top end overhaul is necessary (Chapter 2).
5 Piston rings worn, weak, broken, or sticking. Broken or sticking piston rings usually indicate a lubrication or carburetion problem that causes excess carbon deposits to form on the pistons and rings. Top end overhaul is necessary (Chapter 2).
6 Piston ring-to-groove clearance excessive. This is caused by excessive wear of the piston ring lands. Piston replacement is necessary (Chapter 2).
7 Cylinder head gasket damaged. If the head becomes loose, or if excessive carbon build-up on the piston crown and combustion chamber causes extremely high compression, the head gasket may leak. Retorquing the head is not always sufficient to restore the seal, so gasket replacement is necessary (Chapter 2).
8 Cylinder head warped. This is caused by overheating or improperly tightened head bolts. Machine shop resurfacing or head replacement is necessary (Chapter 2).
9 Valve spring broken or weak. Caused by component failure or wear; the spring(s) must be replaced (Chapter 2).
10 Valve not seating properly. This is caused by a bent valve (from over-revving or improper valve adjustment), burned valve or seat (improper carburetion) or an accumulation of carbon deposits on the seat (from carburetion, lubrication problems). The valves must be cleaned and/or replaced and the seats serviced if possible (Chapter 2).
11 Faulty reed valve (two-stroke engine only). Check and replace if necessary (Chapter 2).

13 Poor acceleration

1 Timing not advancing. The pick-up coil unit or the alternator may be defective. If so, they must be replaced with new ones, as they cannot be repaired.
2 Engine/transmission oil viscosity too high. Using a heavier oil than the one recommended in Chapter 1 can damage the oil pump or lubrication system and cause drag on the engine.
3 Brakes dragging. Usually caused by debris which has entered the brake piston sealing boot, or from a warped disc or bent axle. Repair as necessary (Chapter 6).
4 Crankcase air leak (two-stroke engine only). Refer to Chapter 2 for testing procedure.

Poor running or no power at high speed

14 Firing incorrect

1 Timing not advancing.
2 Spark plug fouled, defective or worn out. See Chapter 1 for spark plug maintenance.
3 Spark plug cap or high tension wiring defective. See Chapters 1 and 4 for details on the ignition system.
4 Spark plug cap not making good contact. See Chapter 4.
5 Incorrect spark plug. Wrong type, heat range or cap configuration. Check and install correct plugs listed in Chapter 1. A cold plug or one with a recessed firing electrode will not operate at low speeds without fouling.
6 CDI unit defective. See Chapter 4.
7 Ignition coil defective. See Chapter 4.

15 Fuel/air mixture incorrect

1 Main jet clogged. Dirt, water and other contaminants can clog the main jet. Clean the fuel petcock filter (if equipped), the float bowl area, and the jets and carburetor orifices (Chapter 3).
2 Main jet wrong size. The standard jetting is for sea level atmospheric pressure and oxygen content.
3 Air bleed holes clogged. Remove and overhaul carburetor (Chapter 3).
4 Air cleaner clogged, poorly sealed or missing.
5 Air cleaner-to-carburetor boot poorly sealed. Look for cracks, holes or loose clamps, and replace or repair defective parts.
6 Fuel level too high or too low. Adjust the float (Chapter 3).
7 Fuel tank air vent obstructed. Make sure that the air vent passage

in the filler cap is open.
8 Carburetor intake manifold loose. Check for cracks, breaks, tears or loose clamps or bolts. Repair or replace the rubber boot.
9 Fuel petcock clogged. Remove the petcock and clean it and the filter (Chapter 1).
10 Fuel line clogged. Pull the fuel line loose and carefully blow through it.
11 Choke (starter) valve stuck open.
12 Crankcase air leak (two-stroke engine only). Refer to Chapter 2 for testing procedure.

16 Compression low

1 Spark plug loose. Remove the plug and inspect the threads. Reinstall and tighten to the specified torque (Chapter 1).
2 Cylinder head not sufficiently tightened down. If the cylinder head is suspected of being loose, then there's a chance that the gasket and head are damaged if the problem has persisted for any length of time. The head bolts should be tightened to the proper torque in the correct sequence (Chapter 2).
3 Improper valve clearance. This means that the valve is not closing completely and compression pressure is leaking past the valve. Check and adjust the valve clearances (Chapter 1).
4 Cylinder and/or piston worn. Excessive wear will cause compression pressure to leak past the rings. This is usually accompanied by worn rings as well. A top end overhaul is necessary (Chapter 2).
5 Piston rings worn, weak, broken, or sticking. Broken or sticking piston rings usually indicate a lubrication or carburetion problem that causes excess carbon deposits to form on the pistons and rings. Top end overhaul is necessary (Chapter 2).
6 Piston ring-to-groove clearance excessive. This is caused by excessive wear of the piston ring lands. Piston replacement is necessary (Chapter 2).
7 Cylinder head gasket damaged. If the head becomes loose, or if excessive carbon build-up on the piston crown and combustion chamber causes extremely high compression, the head gasket may leak. Retorquing the head is not always sufficient to restore the seal, so gasket replacement is necessary (Chapter 2).
8 Cylinder head warped. This is caused by overheating or improperly tightened head bolts. Machine shop resurfacing or head replacement is necessary (Chapter 2).
9 Valve spring broken or weak. Caused by component failure or wear; the spring(s) must be replaced (Chapter 2).
10 Valve not seating properly. This is caused by a bent valve (from over-revving or improper valve adjustment), burned valve or seat (improper carburetion) or an accumulation of carbon deposits on the seat (from carburetion, lubrication problems). The valves must be cleaned and/or replaced and the seats serviced if possible (Chapter 2).
11 Faulty reed valve (two-stroke engine only). Check and replace if necessary.

17 Knocking or pinging

1 Carbon build-up in combustion chamber. Use of a fuel additive that will dissolve the adhesive bonding the carbon particles to the crown and chamber is the easiest way to remove the build-up. Otherwise, the cylinder head will have to be removed and decarbonized (Chapter 2).
2 Incorrect or poor quality fuel. Old or improper grades of gasoline can cause detonation. Drain old gas and always use the recommended fuel grade.
3 Spark plug heat range incorrect. Uncontrolled detonation indicates that the plug heat range is too hot. The plug in effect becomes a glow plug, raising cylinder temperatures. Install the proper heat range plug (Chapter 1).
4 Improper air/fuel mixture. This will cause the engine to run hot, which leads to detonation. Clogged jets or an air leak can cause this imbalance. See Chapter 4.
5 Fuel/oil mixture incorrect (two-stroke engine only).
6 Crankcase air leak (two-stroke engine only). Refer to Chapter 2 for testing procedure.

18 Miscellaneous causes

1 Throttle slide doesn't open fully. Adjust the cable slack (Chapter 1).
2 Clutch slipping. Caused by a cable that is improperly adjusted or snagging or damaged, loose or worn clutch components. Refer to Chapters 1 and 2 for adjustment and overhaul procedures.
3 Timing not advancing.
4 Engine oil viscosity too high. Using a heavier oil than the one recommended in Chapter 1 can damage the oil pump or lubrication system and cause drag on the engine.
5 Brakes dragging. Usually caused by debris which has entered the brake piston sealing boot, or from a warped disc or bent axle. Repair as necessary.

Overheating

19 Cooling system not operating properly

1 Coolant level low. Check coolant level as described in Chapter 1.
2 Leak in cooling system. Check cooling system hoses and radiator for leaks and other damage. Repair or replace parts as necessary (Chapter 3).
3 Thermostat sticking open or closed. Check and replace as described in Chapter 2.
4 Faulty radiator cap. Remove the cap and have it pressure checked at a service station.
5 Coolant passages clogged. Have the entire system drained and flushed, then refill with new coolant.
6 Water pump defective. Remove the pump and check the components.
7 Clogged radiator fins. Clean them by blowing compressed air through the fins from the back side.

20 Firing incorrect

1 Spark plug fouled, defective or worn out. See Chapter 1 for spark plug maintenance.
2 Incorrect spark plug.
3 Improper ignition timing. Timing that is too far advanced will cause high cylinder temperatures and lead to overheating (Chapter 1).

21 Fuel/air mixture incorrect

1 Main jet clogged. Dirt, water and other contaminants can clog the main jet. Clean the fuel petcock filter (if equipped), the float bowl area and the jets and carburetor orifices (Chapter 3).
2 Main jet wrong size. The standard jetting is for sea level atmospheric pressure and oxygen content.
3 Air cleaner poorly sealed or missing.
4 Air cleaner-to-carburetor boot poorly sealed. Look for cracks, holes or loose clamps and replace or repair as needed.
5 Fuel level too low. Adjust the float (Chapter 3).
6 Fuel tank air vent obstructed. Make sure that the air vent passage in the filler cap is open.
7 Carburetor intake manifold loose. Check for cracks, breaks, tears or loose clamps or bolts. Repair or replace the rubber boots.
8 Crankcase air leak (two-stroke engine only). Refer to Chapter 2 for testing procedure.

22 Compression too high

1 Carbon build-up in combustion chamber. Use of a fuel additive that will dissolve the adhesive bonding the carbon particles to the piston crown and chamber is the easiest way to remove the build-up. Otherwise, the cylinder head will have to be removed and decarbonized (Chapter 2).

2 Improperly machined head surface or installation of incorrect gasket during engine assembly. Check Specifications (Chapter 2).

23 Engine load excessive

1 Clutch slipping. Caused by an out of adjustment or snagging cable or damaged, loose or worn clutch components. Refer to Chapters 1 and 2 for adjustment and overhaul procedures.
2 Engine oil level too high. The addition of too much oil will cause pressurization of the crankcase and inefficient engine operation. Check Specifications and drain to proper level (Chapter 1).
3 Engine oil viscosity too high. Using a heavier oil than the one recommended in Chapter 1 can damage the oil pump or lubrication system as well as causing drag on the engine.
4 Brakes dragging. Usually caused by debris which has entered the brake piston sealing boot, or from a warped disc or bent axle. Repair as necessary.

24 Lubrication inadequate

1 Engine oil level too low. Friction caused by intermittent lack of lubrication or from oil that is "overworked" can cause overheating. The oil provides a definite cooling function in the engine. Check the oil level (Chapter 1).
2 Poor quality engine oil or incorrect viscosity or type. Oil is rated not only according to viscosity but also according to type. Some oils are not rated high enough for use in these engines. Check the Specifications section and change to the correct oil (Chapter 1).
3 Fuel/oil mixture incorrect (two-stroke engine only).

25 Miscellaneous causes

1 Engine fins packed with mud or dirt. Clean the cylinder and head area to remove the buildup.
2 Modification to exhaust system. Most aftermarket exhaust systems cause the engine to run leaner, which make them run hotter. When installing an accessory exhaust system, always rejet the carburetor.

Clutch problems

26 Clutch slipping

1 No clutch lever play. Adjust clutch lever free play according to the procedure in Chapter 1.
2 Friction plates worn or warped. Overhaul the clutch assembly (Chapter 2).
3 Steel plates worn or warped (Chapter 2).
4 Clutch springs broken or weak. Old or heat-damaged (from slipping clutch) springs should be replaced with new ones (Chapter 2).
5 Clutch release not adjusted properly. See Chapter 1.
6 Clutch inner cable hanging up. Caused by a frayed cable or kinked outer cable. Replace the cable. Repair of a frayed cable is not advised.
7 Clutch release mechanism defective. Check the shaft, cam, actuating arm and pivot. Replace any defective parts (Chapter 2).
8 Clutch hub or housing unevenly worn. This causes improper engagement of the discs. Replace the damaged or worn parts (Chapter 2).

27 Clutch not disengaging completely

1 Clutch lever play excessive. adjust at bars or at engine (Chapter 1).
2 Clutch plates warped or damaged. this will cause clutch drag, which in turn causes the machine to creep. Overhaul the clutch assembly (Chapter 2).
3 Clutch spring tension uneven. Usually caused by a sagged or broken spring. Check and replace the springs (Chapter 2).
4 Engine oil deteriorated. Old, thin, worn out oil will not provide proper lubrication for the discs, causing the clutch to drag. Replace the oil and filter (Chapter 1).
5 Engine oil viscosity too high. Using a heavier oil than recommended in Chapter 1 can cause the plates to stick together, putting a drag on the engine. Change to the correct weight oil (Chapter 1).
6 Clutch housing seized on shaft. Lack of lubrication, severe wear or damage can cause the housing to seize on the shaft. Overhaul of the clutch, and perhaps transmission, may be necessary to repair damage (Chapter 2).
7 Clutch release mechanism defective. Worn or damaged release mechanism parts can stick and fail to apply force to the pressure plate. Overhaul the clutch cover components (Chapter 2).
8 Loose clutch hub nut. Causes housing and hub misalignment putting a drag on the engine. Engagement adjustment continually varies. Overhaul the clutch assembly (Chapter 2).

Gear shifting problems

28 Doesn't go into gear or lever doesn't return

1 Clutch not disengaging. See Section 26.
2 Shift fork(s) bent or seized. Often caused by dropping the machine or from lack of lubrication. Overhaul the transmission (Chapter 2).
3 Gear(s) stuck on shaft. Most often caused by a lack of lubrication or excessive wear in transmission bearings and bushings. Overhaul the transmission (Chapter 2).
4 Shift drum binding. Caused by lubrication failure or excessive wear. Replace the drum and bearings (Chapter 2).
5 Shift lever return spring weak or broken (Chapter 2).
6 Shift lever broken. Splines stripped out of lever or shaft, caused by allowing the lever to get loose or from dropping the machine. Replace necessary parts (Chapter 2).
7 Shift mechanism pawl broken or worn. Full engagement and rotary movement of shift drum results. Replace shaft assembly (Chapter 2).
8 Pawl spring broken. Allows pawl to "float", causing sporadic shift operation. Replace spring (Chapter 2).

29 Jumps out of gear

1 Shift fork(s) worn. Overhaul the transmission (Chapter 2).
2 Gear groove(s) worn. Overhaul the transmission (Chapter 2).
3 Gear dogs or dog slots worn or damaged. The gears should be inspected and replaced. No attempt should be made to service the worn parts.

30 Overshifts

1 Pawl spring weak or broken (Chapter 2).
2 Shift drum stopper lever not functioning (Chapter 2).

Abnormal engine noise

31 Knocking or pinging

1 Carbon build-up in combustion chamber. Use of a fuel additive that will dissolve the adhesive bonding the carbon particles to the piston crown and chamber is the easiest way to remove the build-up. Otherwise, the cylinder head will have to be removed and decarbonized (Chapter 2).
2 Incorrect or poor quality fuel. Old or improper fuel can cause detonation. Drain the old gas and always use the recommended grade fuel (Chapter 4).
3 Spark plug heat range incorrect. Uncontrolled detonation indicates that the plug heat range is too hot. The plug in effect becomes a glow plug, raising cylinder temperatures. Install the proper heat range plug (Chapter 1).
4 Improper air/fuel mixture. This will cause the cylinder to run hot and lead to detonation. Clogged jets or an air leak can cause this im-

balance. See Chapter 4.
5 Fuel/oil mixture incorrect (two-stroke engine only).
6 Crankcase air leak (two-stroke engine only). Refer to Chapter 2 for testing procedure.

32 Piston slap or rattling

1 Cylinder-to-piston clearance excessive. Caused by improper assembly. Inspect and overhaul top end parts (Chapter 2).
2 Connecting rod bent. Caused by over-revving, trying to start a badly flooded engine or from ingesting a foreign object into the combustion chamber. Replace the damaged parts (Chapter 2).
3 Piston pin or piston pin bore worn or seized from wear or lack of lubrication. Replace damaged parts (Chapter 2).
4 Piston ring(s) worn, broken or sticking. Overhaul the top end (Chapter 2).
5 Piston seizure damage. Usually from lack of lubrication or overheating. Replace the pistons and bore the cylinders, as necessary (Chapter 2).
6 Connecting rod big and/or small end clearance excessive. Caused by excessive wear or lack of lubrication. Replace worn parts.

33 Valve noise

1 Incorrect valve clearances. Adjust the clearances by referring to Chapter 1.
2 Valve spring broken or weak. Check and replace weak valve springs (Chapter 2).
3 Camshaft or cylinder head worn or damaged. Lack of lubrication at high rpm is usually the cause of damage. Insufficient oil or failure to change the oil at the recommended intervals are the chief causes. Since there are no replaceable bearings in the head, the head itself will have to be replaced if there is excessive wear or damage (Chapter 2).

34 Other noise

1 Cylinder head gasket leaking. This will cause compression leakage into the cooling system (which may show up as air bubbles in the coolant in the radiator). Also, coolant may get into the oil (which will turn the oil gray). In either case, have the cooling system checked by a dealer service department.
2 Exhaust pipe leaking at cylinder head connection. Caused by improper fit of pipe or loose exhaust flange. All exhaust fasteners should be tightened evenly and carefully. Failure to do this will lead to a leak.
3 Crankshaft runout excessive. Caused by a bent crankshaft (from over-revving) or damage from an upper cylinder component failure. Can also be attributed to dropping the machine on either of the crankshaft ends.
4 Engine mounting bolts loose. Tighten all engine mount bolts to the specified torque (Chapter 2).
5 Crankshaft bearings worn (Chapter 2).
6 Camshaft chain tensioner defective. Replace according to the procedure in Chapter 2.
7 Camshaft chain, sprockets or guides worn (Chapter 2).
8 Loose AC generator rotor. Tighten the nut to the specified torque Chapter 2).

Abnormal driveline noise

35 Clutch noise

1 Clutch housing/friction plate clearance excessive (Chapter 2).
2 Loose or damaged clutch pressure plate and/or bolts (Chapter 2).

36 Transmission noise

1 Bearings worn. Also includes the possibility that the shafts are worn. Overhaul the transmission (Chapter 2).
2 Gears worn or chipped (Chapter 2).
3 Metal chips jammed in gear teeth. Probably pieces from a broken clutch, gear or shift mechanism that were picked up by the gears. This will cause early bearing failure (Chapter 2).
4 Engine oil level too low. Causes a howl from transmission. Also affects engine power and clutch operation (Chapter 1).

37 Driveshaft or final drive noise

Note: *If unusual noises or other problems with the driveshaft or final drive occur, take the ATV to a reputable dealer service department for diagnosis and repair.*

Abnormal frame and suspension noise

38 Front end noise

1 Low fork oil level or improper viscosity oil. This can sound like "spurting" and is usually accompanied by irregular fork action (Chapter 5).
2 Spring weak or broken. Makes a clicking or scraping sound. Fork oil, when drained, will have a lot of metal particles in it (Chapter 5).
3 Steering head bearings loose or damaged. Clicks when braking. Check and adjust or replace as necessary (Chapter 5).
4 Fork clamps loose. Make sure all fork clamp pinch bolts are tight (Chapter 6).
5 Fork tube bent. Good possibility if machine has been dropped. Replace tube with a new one (Chapter 5).
6 Front axle or axle clamp bolt loose. Tighten them to the specified torque (Chapter 5).

39 Shock absorber noise

1 Fluid level incorrect. Indicates a leak caused by defective seal. Shock will be covered with oil. Replace shock (Chapter 5).
2 Defective shock absorber with internal damage. This is in the body of the shock and cannot be remedied. The shock must be replaced with a new one (Chapter 5).
3 Bent or damaged shock body. Replace the shock with a new one (Chapter 5).

40 Disc brake noise

1 Squeal caused by shim not installed or positioned correctly (Chapter 6).
2 Squeal caused by dust on brake pads. Usually found in combination with glazed pads. Clean using brake cleaning solvent (Chapter 6).
3 Contamination of brake pads. Oil, brake fluid or dirt causing brake to chatter or squeal. Clean or replace pads (Chapter 6).
4 Pads glazed. Caused by excessive heat from prolonged use or from contamination. Do not use sandpaper, emery cloth, carborundum cloth or any other abrasive to roughen the pad surfaces as abrasives will stay in the pad material and damage the disc. A very fine flat file can be used, but pad replacement is suggested as a cure (Chapter 7).
5 Disc warped. Can cause a chattering, clicking or intermittent squeal. Usually accompanied by a pulsating lever and uneven braking. Resurface or replace the disc (Chapter 6).

Oil indicator light comes on

41 Engine lubrication system

1 Oil level low. Inspect for leak or other problem causing low oil level and add recommmended lubricant (Chapters 1 and 2).
2 Oil viscosity too low. Very old, thin oil or an improper weight of oil used in engine. Change to correct lubricant (Chapter 1).

42 Electrical system

Oil indicator light wiring system defective. Check for pinched, shorted, disconnected or damaged wiring (Chapter 7).

43 White smoke

1 Piston oil ring worn. The ring may be broken or damaged, causing oil from the crankcase to be pulled past the piston into the combustion chamber. Replace the rings with new ones (Chapter 2).
2 Cylinder worn, cracked, or scored. Caused by overheating or oil starvation. The cylinders will have to be rebored and new pistons installed.
3 Valve oil seal damaged or worn. Replace oil seals with new ones (Chapter 2).
4 Valve guide worn. Perform a complete valve job (Chapter 2).
5 Engine oil level too high, which causes oil to be forced past the rings. Drain oil to the proper level (Chapter 1).
6 Head gasket broken between oil return and cylinder. Causes oil to be pulled into combustion chamber. Replace the head gasket and check the head for warpage (Chapter 2).
7 Abnormal crankcase pressurization, which forces oil past the rings. Clogged breather or hoses usually the cause (Chapter 1).
8 Oil/fuel mixture incorrect (two-stroke engine only). Drain tank and refill with properly-mixed fuel or check oil pump (Chapter 1).

44 Black smoke

1 Air cleaner clogged. Clean or replace the element (Chapter 1).
2 Main jet too large or loose. Compare the jet size to the Specifications (Chapter 3).
3 Choke stuck open, causing fuel to be pulled through choke circuit (Chapter 3).
4 Fuel level too high. Check and adjust the float level as necessary (Chapter 3).
5 Inlet needle held off needle seat. Clean float bowl and fuel line and replace needle and seat if necessary (Chapter 3).

45 Brown smoke

1 Main jet too small or clogged. Lean condition caused by wrong size main jet or by a restricted orifice. Clean float bowl and jets and compare jet size to Specifications (Chapter 3).
2 Fuel flow insufficient. Fuel inlet needle valve stuck closed due to chemical reaction with old gas. Float level incorrect. Restricted fuel line. Clean line and float bowl and adjust float if necessary (Chapter 3).
3 Carburetor intake manifold loose (Chapter 3).
4 Air cleaner poorly sealed or not installed (Chapter 1).

Poor handling or stability

46 Handlebar hard to turn

1 Steering stem locknut too tight (Chapter 5).
2 Bearings damaged. Roughness can be felt as the bars are turned from side-to-side. Replace bearings and races (Chapter 5).
3 Races dented or worn. Denting results from wear in only one position (i.e., straight ahead) from impacting an immovable object or hole. Replace races and bearings (Chapter 5).
4 Steering stem lubrication inadequate. Causes are grease getting hard from age or being washed out by high pressure car washes. Disassemble steering head and repack bearings (Chapter 5).
5 Steering stem bent. Caused by hitting a hole or from dropping the machine. Replace damaged part. Do not try to straighten stem (Chapter 5).
6 Front tire pressure low (Chapter 1).

47 Handlebar shakes or vibrates excessively

1 Tires worn or out of balance (Chapter 6).
2 Swingarm bearings worn. Replace worn bearings by referring to Chapter 5.
3 Rim(s) warped or damaged. Inspect wheels for runout (Chapter 6).
4 Wheel bearings worn. Worn front or rear wheel bearings can cause poor tracking. Worn front bearings can cause wobble (Chapter 6).
5 Handlebar clamp bolts loose (Chapter 5).
6 Steering stem or fork clamps loose. Tighten them to the specified torque (Chapter 5).
7 Motor mount bolts loose. Will cause excessive vibration with increased engine rpm (Chapter 2).

48 Handlebar pulls to one side

1 Frame bent. Definitely suspect this if the machine has been dropped. May or may not be accompanied by cracking near the bend. Replace the frame.
2 Wheel out of alignment. Caused by improper location of axle spacers or from bent steering stem or frame (Chapter 5).
3 Swingarm bent or twisted. Caused by age (metal fatigue) or impact damage. Replace the arm (Chapter 6).
4 Steering stem bent. Caused by impact damage or from dropping the machine. Replace the steering stem (Chapter 5).
5 Fork leg bent. Disassemble the forks and replace the damaged parts (Chapter 5).
6 Fork oil level uneven.

49 Poor shock absorbing qualities

1 Too hard:
   a) Fork oil level excessive (Chapter 5).
   b) Fork oil viscosity too high. Use a lighter oil, per the Specifications (Chapter 1).
   c) Fork tube bent. Causes a harsh, sticking feeling (Chapter 5).
   d) Shock shaft or body bent or damaged (Chapter 5).
   e) Fork internal damage (Chapter 5).
   f) Shock internal damage.
   g) Tire pressure too high (Chapter 1).
2 Too soft:
   a) Fork or shock oil insufficient and/or leaking (Chapter 5).
   b) Fork oil level too low (Chapter 5).
   c) Fork oil viscosity too light (Chapter 1).
   d) Fork springs weak or broken (Chapter 5).

Braking problems

50 Brakes are spongy, don't hold (hydraulic disc brakes only)

1 Air in brake line. Caused by inattention to master cylinder fluid level or by leakage. Locate problem and bleed brakes (Chapter 6).
2 Pad or disc worn (Chapters 1 and 6).
3 Brake fluid leak. See paragraph 1.
4 Contaminated pads. Caused by contamination with oil, grease, brake fluid, etc. Clean or replace pads. Clean disc thoroughly with brake cleaner (Chapter 6).
5 Brake fluid deteriorated. Fluid is old or contaminated. Drain system, replenish with new fluid and bleed the system (Chapter 6).
6 Master cylinder internal parts worn or damaged causing fluid to bypass (Chapter 6).
7 Master cylinder bore scratched. From ingestion of foreign material or broken spring. Repair or replace master cylinder (Chapter 6).
8 Disc warped. Resurface or replace disc (Chapter 6).

51 Brake lever pulsates

1 Disc warped. Resurface or replace disc (Chapter 6).

2 Axle bent. Replace axle (Chapter 6).
3 Brake carrier or caliper bolts loose (Chapter 6).
4 Brake caliper shafts damaged or sticking, causing caliper to bind. Lube the shafts and/or replace them if they are corroded or bent (Chapter 6).
5 Wheel warped or otherwise damaged (Chapter 6).
6 Wheel bearings damaged or worn (Chapter 6).

52 Brakes drag

1 Master cylinder piston seized. Caused by wear or damage to piston or cylinder bore (Chapter 6).
2 Lever balky or stuck. Check pivot and lubricate (Chapter 6).
3 Brake caliper binds. Caused by inadequate lubrication or damage to caliper shafts (Chapter 6).
4 Brake caliper piston seized in bore. Caused by wear or ingestion of dirt past deteriorated seal (Chapter 6).
5 Brake pad damaged. Pad material separating from backing plate. Usually caused by faulty manufacturing process or from contact with chemicals. Replace pads (Chapter 6).
6 Pads improperly installed (Chapter 6).
7 Rear brake pedal free play insufficient.

Electrical problems

53 Battery dead or weak

1 Battery faulty. Caused by sulphated plates which are shorted through the sedimentation or low electrolyte level. Also, broken battery terminal making only occasional contact (Chapter 7).
2 Battery cables making poor contact (Chapter 7).
3 Load excessive. Caused by addition of high wattage lights or other electrical accessories.
4 Main switch defective. Switch either grounds internally or fails to shut off system. Replace the switch (Chapter 7).
5 Regulator/rectifier defective (Chapter 7).
6 Stator coil open or shorted (Chapter 7).
7 Wiring faulty. Wiring grounded or connections loose in charging or lighting circuits (Chapter 7).

54 Battery overcharged

1 Regulator/rectifier defective. Overcharging is noticed when battery gets excessively warm or "boils" over (Chapter 7).
2 Battery defective. Replace battery with a new one.
3 Battery amperage too low, wrong type or size. Install manufacturer's specified amp-hour battery to handle charging load (Chapter 7).

55 Light does not work (engine running)

1 Bulb burned out. Replace with new one (Chapter 7).
2 Faulty switch. Disassemble switch and clean contacts with electrical contact cleaner (Chapter 7).
3 Poor connection. Check wiring and connections (Chapter 7).
4 Defective lighting coil. Check as described in Chapter 7.

Chapter 1 Tune-up and routine maintenance

Contents

Specifications

Engine

Recommended spark plug	
YT 60	NGK BP6HS or ND W20FPU
YT 125/175	Champion N10Y or NGK BP7ES
YTZ 250	NGK B8ES
All four stroke models	NGK D7EA or ND X22ESU
Spark plug gap	
Two stroke engines	0.028 to 0.031 in (0.7 to 0.8 mm)
Four stroke engines	0.024 to 0.028 in (0.6 to 0.7 mm)
Ignition timing (YTZ 250 only)	0.07 ± 0.004 in (1.66 ± 0.1 mm) BTDC
Ignition timing check engine speed (rpm)	
YT 60/175	1600 ± 50
YT 125	2000
All four stroke models	1400 ± 50
Clutch lever free play (YTZ 250 only)	0.4 to 0.6 in (10 to 15 mm)
Throttle lever free play	0.120 to 0.200 in (3 to 5 mm)
Idle speed (rpm)	
YT 60	1700
YT 125	1500 ± 50
YT 175	1600 ± 50
All four stroke models	1400 ± 50
Standard pilot air screw setting	See Chapter 3
Valve clearances	
Intake	0.002 to 0.004 in (0.05 to 0.09 mm)
Exhaust	0.004 to 0.006 in (0.09 to 0.15 mm)
Autolube pump stroke	
YT 60	
Minimum	0.010 to 0.012 in (0.25 to 0.30 mm)
Maximum	0.039 to 0.045 in (1.0 to 1.15 mm)
All others (minimum)	0.008 to 0.010 in (0.20 to 0.25 mm)
Battery specific gravity	
YFM 200 N/YTM 200 ERN	1.280
All others	1.260
Cylinder compression pressure	
YT 175	128 psi
All four stroke models	
Standard	128 psi
Minimum	114 psi
Maximum	142 psi

Frame and suspension

Drive chain free play	
YT 125 H	0.20 to 0.60 in (5 to 15 mm)
YT 175/200 and all remaining YT 125 models	0.20 to 0.40 in (5 to 10 mm)
YTZ 250	1.2 to 1.4 in (30 to 35 mm)
Brake pad lining material thickness limit (minimum)	
YT 125	0.039 in (1 mm)
YT 175	0.060 in (1.5 mm)
YTZ 250	0.030 in (0.8 mm)
All others	See text
Brake lever free play	
YT 125 (lever end)	0.60 in (15 mm)
YT 175 (lever end)	0.35 to 0.60 in (9 to 15 mm)
YTZ 250 (lever end)	0.16 to 0.30 in (4 to 8 mm)
All others (lever pivot)	0.20 to 0.30 in (5 to 8 mm)
Rear brake pedal free play	
YT 125 H	0.24 to 0.40 in (6 to 10 mm)
YT 175 and all remaining YT 125 models	0.80 to 1.20 in (20 to 30 mm)
Tire pressures	
YT 60	2.4 to 3 psi
YTZ 250	
Front	3.0 to 3.3 psi
Rear	2.1 to 2.4 psi
All others	1.8 to 2.2 psi
Tire circumference	
YT 175/YTM 200 K	
Standard	68.3 in (1735 mm)
Minimum	67.9 in (1725 mm)
YFM 200 N	
Front	
Standard	69.1 in (1754 mm)
Minimum	68.8 in (1747 mm)
Rear	
Standard	69.8 in (1773 mm)
Minimum	69.4 in (1762 mm)
YTZ 250	
Front	
Standard	75.7 in (1923 mm)
Minimum	75.5 in (1917 mm)
Rear	
Standard	68.7 in (1745 mm)
Minimum	68.5 in (1740 mm)

Recommended lubricants and fluids

Engine/transmission oil	
Type (all models)	Yamalube 4-cycle oil, Grade SE or better
Viscosity	
Two stroke engine transmissions	SAE 10W30
Four stroke engines	SAE 20W40
Autolube system oil	Yamalube 2-cycle oil
Fuel/oil mix (YTZ 250 only)	
Fuel type	Premium gasoline with octane rating of 90 minimum
Oil type	Yamalube R
Mixing ratio	
Break in period	20:1
Normal riding	24:1
Final drive gear oil	
Type	API GL4 Hypoid gear oil
Viscosity	SAE 80 or 80W90
Brake fluid type (YTZ 250 only)	DOT 3
Standard fork oil	Yamaha 10W fork oil
Coolant (YTZ 250 only)	50/50 mixture of soft water and ethylene glycol based antifreeze
Swingarm bearings, wheel bearings, shock absorber linkage lubricant	Medium weight lithium based grease
Cable, drive chain, control pivot lubricant	Yamaha chain and cable lube

Torque specifications	Ft-lbs	mKg
Engine/transmission oil drain plug		
YT 60	13	1.8
YT 125/175/YTZ 250	14	2.0
All four stroke models	31	4.3
Filter cover bolts (four stroke engine)	7	1.0
Oil gallery bolt (four stroke engine)	5	0.7
Final drive unit drain plug	17	2.3
Spark plug		
YT 60/175 and all four stroke models	14	2.0
YT 125/YTZ 250	18	2.5
YFM 200 N	12.5	1.75
Cam chain adjuster locknut (four stroke engine)	22	3.0
Swingarm pivot shaft (shaft drive models)	4.3	0.6
Swingarm pivot shaft locknut	72	10
Cooling system drain bolts (YTZ 250 only)	7	1.0

1 Introduction to tune-up and routine maintenance

This chapter covers in detail the checks and procedures necessary for tune-up and routine maintenance on your ATV. It is divided into two parts. The first contains specifications and service data and outlines routine maintenance intervals. The second covers procedures, or how to perform each of the maintenance functions.

Since routine maintenance plays such and important part in keeping your ATV in safe condition and operating at its best, it is presented here as a comprehensive checklist. For the rider who does all his/her own maintenance, these lists outline the procedures and checks which should be done on a regular basis.

Deciding where to start the routine maintenance schedule depends on several factors. If you have an ATV whose warranty has recently expired, and if it has been maintained according to the warranty standards, you may want to pick up routine maintenance as it coincides with the next calendar interval. If you have owned the machine for some time but have never performed any maintenance on it, then you may want to start at the nearest interval and include some additional procedures to ensure that nothing important is overlooked. If you have just had a major engine overhaul you may want to start the maintenance routine from the beginning. If you have a used machine and have no knowledge of its history or maintenance record, you could combine all the checks into one large initial service, then settle into the maintenance schedule prescribed.

Note that the procedures normally associated with ignition and carburetion tune-ups are included in the routine maintenance schedule. A regular tune-up ensures optimum engine performance and helps prevent engine damage due to improper carburetion and ignition timing.

The Sections which actually outline the inspection and maintenance procedures are written as step-by-step guides to the actual performance of the work. They explain in detail each of the routine inspections and maintenance procedures on the checklist. References to additional information in applicable Chapters is also included and should not be overlooked.

Before beginning any actual maintenance or repair the machine should be cleaned thoroughly, especially around the controls, spark plug, side covers, carburetor and airbox. Cleaning will help ensure that dirt does not contaminate the engine and will allow you to detect wear and damage that could otherwise go unnoticed.

2 Daily or pre-ride inspection and maintenance

The pre-ride inspection list includes checks and maintenance that should be done daily or before you ride. Always perform the pre-ride check at each maintenance interval in addition to the procedures listed. **Note:** *The regular maintenance intervals are recommended by the manufacturer. In many cases, it may be wise to perform the maintenance more frequently than recommended. Refer to the appropriate Section for the actual inspection procedure.*

Check daily:

Autolube reservoir oil level
Drive chain
Engine and transmission oil levels
Fuel level
Fuel leaks
Front brake operation
Rear brake operation
Tire inflation and condition
Throttle action
Engine stop switch
Lights

3 Routine maintenance intervals

Since ATVs have no odometer as standard equipment, maintenance intervals are based on calendar days for all models except the YTZ 250. The intervals for the YTZ 250 are based on *operation days.* Yamaha doesn't say what an operation day is, but you might consider each day you ride the machine to be one operation day, regardless of how long, hard or far you ride. Play it safe and overestimate your riding time — your machine's reliability will be extended. **Note:** *The scheduled maintenance intervals are recommended by the manufacturer. If you operate your ATV in fine sand, unusually dusty areas, or if you tend to subject the machine to severe use, shorten the recommended intervals.*

Do the following in addition to the pre-ride check:

Every 30 days

Clean and oil the air filter elements (do this more frequently if operated in extremely dusty or sandy conditions)
Inspect, clean and adjust the spark plug
Inspect, clean and adjust (if necessary) the carburetor
Inspect the fuel line
Check and clean the fuel petcock and filter
Check and lubricate the throttle and adjust the freeplay
Check and lubricate the drive chain
Check the brake fluid level (front and rear)*
Check the coolant level*
Inspect and lubricate the shock and swingarm bearings and linkage joints and check the fasteners
Adjust the brakes, lubricate the pivots and check for leaks
Check and adjust the clutch
Inspect and tighten all fasteners to the specified torque
Inspect the tires for wear and damage and check the pressures
Retighten the sprocket bolts
Check and lubricate the wheel bearings
Check and clean the spark arrestor
Check the water release valve
Check the final drive gear oil level (shaft drive models)

Every 3 months

Check the brake system
Check the brake pads for wear
Check the cooling system*

Every 6 months

Replace the spark plug
Check and clean the air filter element
Check and adjust the Autolube pump
Check the wheels and tires
Check and clean the fuel petcock
Check the starter valve and adjust the cable if necessary
Tighten all fasteners to the specified torque
Decarbonize the cylinder head and exhaust system
Check the cylinder compression
Change the engine and transmission oil and clean the filter/strainer
Check the throttle and brake lever free play and lubricate the pivot
Lubricate the brake camshaft in the backing plate
Adjust the cam chain tension
Check and adjust the valve clearances
Check the fuel line for cracks or other damage
Check and adjust the clutch
Check the battery electrolyte and specific gravity
Check the steering system and lubricate the knuckle shafts and steering shaft (four wheelers only)

Every year

Check and adjust the carburetor
Check the ignition timing
Check and lubricate the wheel bearings
Change the fork oil
Change the final drive gear oil (shaft drive models)
Check the chain guard and rollers
Drain, flush and refill the cooling system*

Every 2 years

Check, adjust and lubricate the steering head bearings

**YTZ 250 only*

4 Lubrication — general

1 Since a two-stroke engine is lubricated by oil mixed with the gas, either pre-mixed in the gas or by an automatic oil injection system, it is vitally important that the recommended oil be added to the reservoir or mixed with the gas to ensure adequate lubrication.

2 Since the controls, cables, and various other components of an ATV are exposed to the elements, they should be lubricated periodically to ensure proper operation.

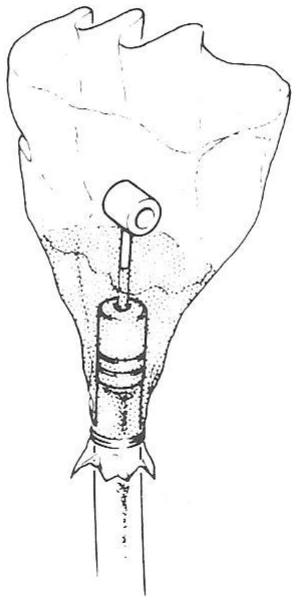


Fig. 1.1 Lubricating a control cable with a makeshift funnel and motor oil (Sec 4)

3 The throttle, clutch and brake pedal and levers, shift lever and footpeg pivots should be lubricated frequently. In order for the lubricant to be applied where it will do the most good, the component should be disassembled. However, if chain and cable lubricant is being used it can be applied to the pivot joint gaps and will usually work its way into the areas where friction occurs. If motor oil or light grease is being used, apply it sparingly as it may attract dirt, which could cause the controls to bind or wear at an accelerated rate. **Note:** *One of the best lubricants for the control lever pivots is a dry-film lubricant, available from many sources.*

4 The brake, clutch and throttle cables should be treated with a commercially available cable lubricant which is specially formulated for use on motorcycle/ATV control cables or motor oil. The cable should be removed from the lever and bracket before it is lubricated. Small adapters for pressure lubricating cables with spray can lubricants are available to ensure that the cable is lubricated along its entire length (photo). If motor oil is being used, tape a funnel-shaped piece of heavy paper or plastic to the end of the cable housing, then pour the oil into the funnel and suspend the cable upright. Leave it until the oil runs down into the housing and out the other end. When attaching the cable to the lever be sure to lubricate the barrel-shaped fitting at the end.

5 The brake camshaft in the backing plate should be lubricated with a light grease at the recommended intervals (refer to Chapter 6 for the procedure to follow when removing the camshaft).

6 Lubricate the front axle and collars with grease to prevent corrosion.

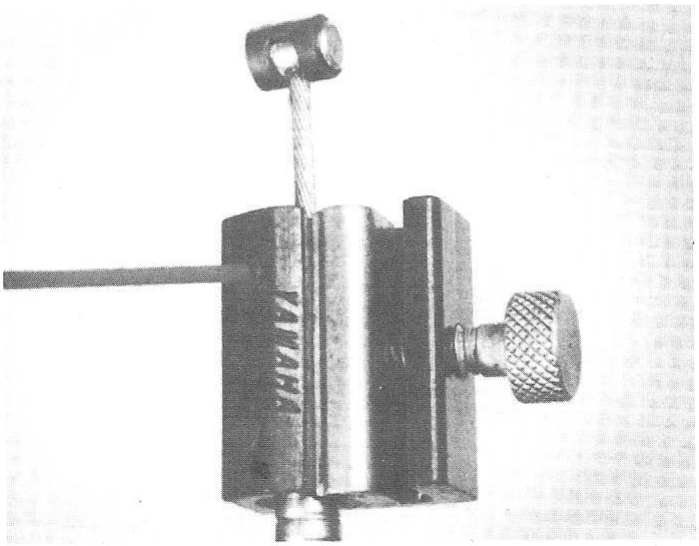
5 Drive chain — inspection, adjustment and lubrication

Note: *Some chain drive models are equipped with a tensioner assembly which keeps the chain free play from changing. These models usually require only periodic lubrication and removal of the chain for cleaning and inspection. Check for wear with the chain in place by referring to Step 4. Other models are equipped with an enclosed chain and the chain case cover must be removed to check the free play.*

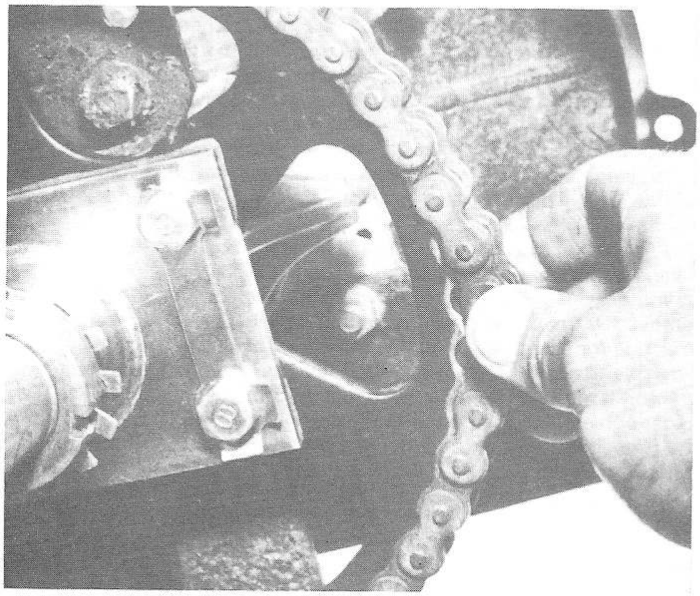
1 A neglected drive chain will not last long and can quickly damage the countershaft and rear wheel sprockets. Routine chain adjustment and lubrication will ensure maximum chain and sprocket life.

2 To check the chain free play, place the transmission in Neutral. Do not raise the machine — make sure the rear wheels are on the ground.

3 Check for the specified amount of free play (slack) on the upper chain run, midway between the sprockets. Chains do not usually wear evenly, so rotate the rear wheels and check the free play at the point of least play. As wear occurs the chain will stretch, which means that adjustment usually involves removing some slack from the chain. In some cases, where lubrication has been neglected, corrosion and galling may cause the links to bind and kink, which effectively shortens the chain's length. If the chain is tight between the sprockets, rusty or kinked, it is time to replace it with a new one.



4.4 Lubricating a cable with a pressure lubrication tool (make sure the tool seals around the inner cable)



5.4 If the chain can be pulled away from the back side of the sprocket more than 1/4-inch, the chain is excessively worn

4 After checking the slack, grasp the chain where it wraps around the back side of the rear wheel sprocket and try to pull it away from the sprocket (photo). If more than 1/4-inch of play is evident the chain is excessively worn and should be replaced with a new one.

5 If adjustment is necessary, rotate the rear wheels until the chain is positioned where the least amount of slack is present. Loosen the rear wheel hub bolts and the locknuts on the chain adjuster(s).

6 On YTZ 250 models turn the adjusting bolts clockwise equally until the correct chain free play is obtained. If the chain is too tight, turn them counterclockwise and push the wheels forward. If the adjusting bolts reach the end of their travel, the chain is excessively worn and should be replaced with a new one. Use the reference lines on each side of the swingarm and the index marks on each adjuster yoke to line up the rear wheels correctly when the chain is adjusted.

7 On other models tighten or loosen the single chain puller bolt until the specified free play is obtained.

8 On models equipped with a tensioner that bears only on the lower chain run, if the free play exceeds the specified amount, loosen the tensioner mounting bolts and move it until the chain free play is 0.200 to 0.590-inch. If the adjustment is not effective, loosen the bolts and free the tensioner from the chain. If the free play now exceeds 1-1/2 inches, loosen the six rear wheel hub bolts and move the hub to the rear. Reverse the hub stopper and bolt it between the frame and hub as shown in the accompanying illustration. Replace the tensioner and adjust the free play as described above.

9 Tighten the adjusting bolt locknuts and the wheel hub bolts securely and recheck the free play.

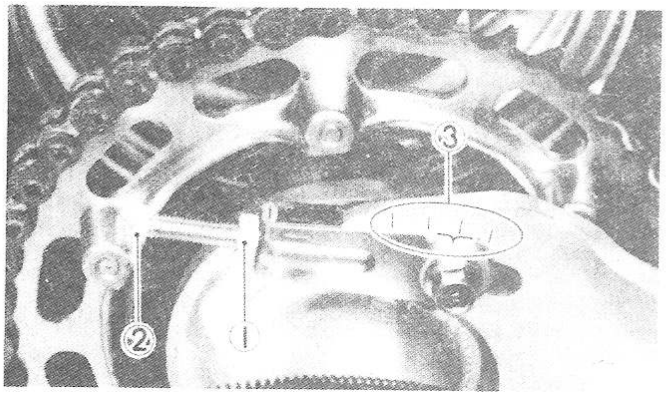


Fig. 1.2 On YTZ 250 models, the chain is adjusted by loosening the locknut (1) and turning the bolt (2) on each side (make sure the marks [3] on the adjuster yoke and swingarm are aligned the same on each side) (Sec 5)

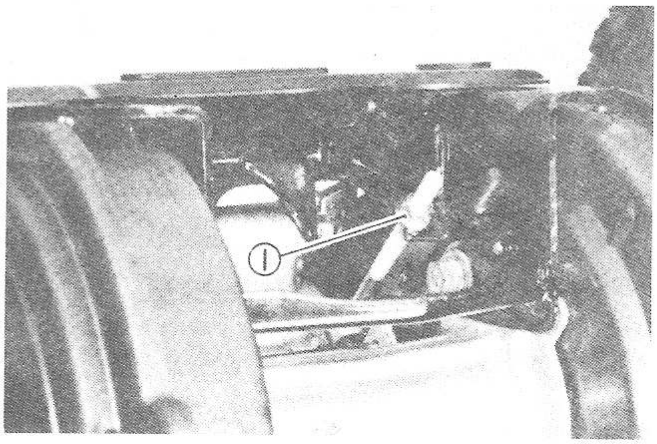


Fig. 1.3 On other models, the chain is adjusted by turning the single adjusting nut (1) (Sec 5)

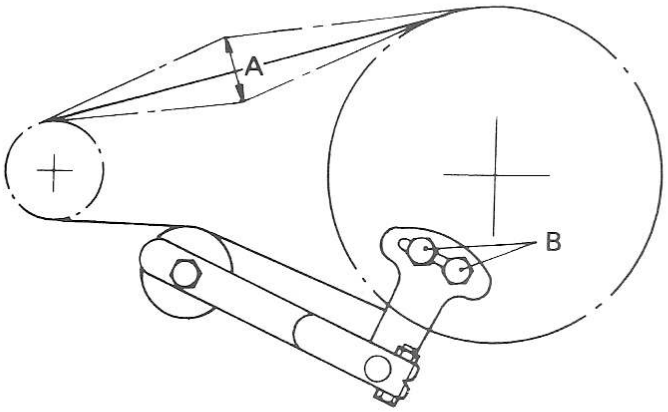


Fig. 1.4 On models with a chain tensioner that bears on the lower chain run, the free play is checked at A (the tensioner can be adjusted by loosening bolts B) (Sec 5)

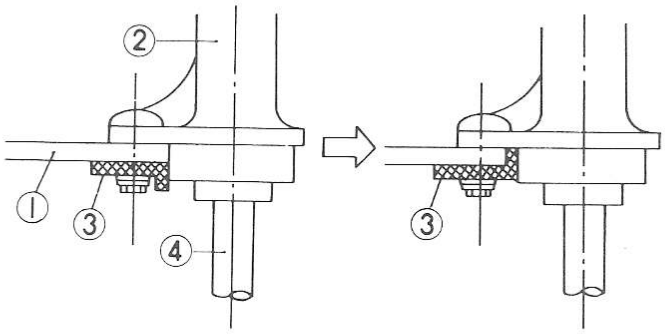


Fig. 1.5 If the tensioner cannot be adjusted, move the hub to the rear and turn the hub stopper around (Sec 5)

1 Frame
2 Hub
3 Hub stopper
4 Axle

10 As an added precaution, once the free play adjustment is complete, sight along the top of the chain to see if the chain and sprockets are obviously out of alignment. If they appear to be in the same plane, the alignment is, for all practical purposes, correct. If the sprockets appear to be cocked, the rear wheel alignment should be readjusted or rapid chain wear will occur.

11 Have someone sit on the machine while you recheck the chain free play. The chain should not be tight or the adjustment will have to be repeated.

12 The best time to lubricate the chain is after the machine has been ridden. When the chain is warm the lubricant will penetrate the joints between the side plates, pins, bushings and rollers to provide lubrication of the internal load bearing areas. Use a good quality chain lubricant and apply it to the area where the side plates overlap — not the middle of the rollers. After applying the lubricant let it soak in for a few minutes before wiping off any excess.

6 Drive chain — removal, cleaning and sprocket wear check

Note: *To detach the chain on some models, the tensioner assembly must be removed or released to free the chain. Other models require the removal of the chain case cover.*

1 If the chain is extremely dirty it should be removed and cleaned before it is lubricated. Remove the chain case cover and remove or release the tensioner assembly (photo) (if equipped). Remove the master link retaining clip with pliers (photo). Be careful not to bend or twist it. Remove the link side plate and the two O-rings (not all models are equipped with O-ring chains), then slide out the master link and remove the chain from the motorcycle. Clean the chain and master link thoroughly with kerosene (do not use solvent, as the O-rings in the chain may be damaged). Use a small brush to remove caked-on dirt. Wipe off the kerosene then hang up the chain and allow it to dry.

2 Inspect the chain for wear and damge. Look for cracked rollers and side plates and check for excessive looseness between the links.

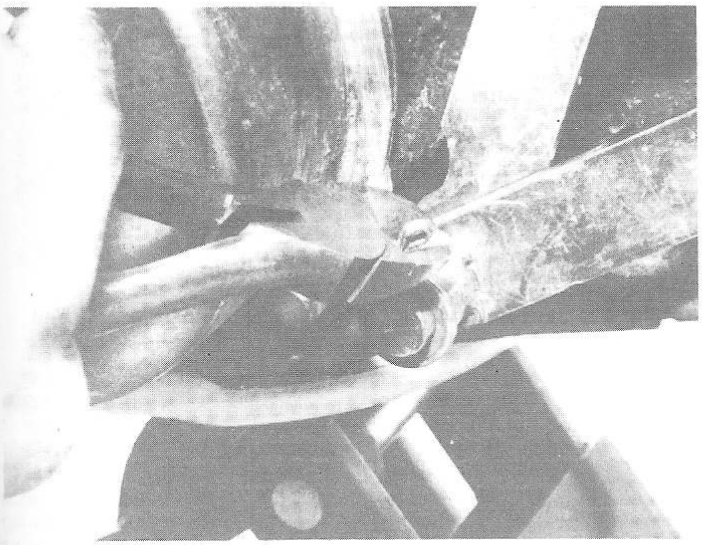
3 Check the master link, especially the clip and O-rings, for damage. It is recommended that a new master link be used whenever the chain is reassembled.

4 Check the sprockets for wear. If the teeth have a hooked appearance, or are excessively worn (photo) or damaged, replace the sprockets with new ones. Always replace the sprockets as a set. Never put a new chain on worn sprockets or a worn chain on new sprockets. Both chain and sprockets must be in good condition or the new parts will wear rapidly.

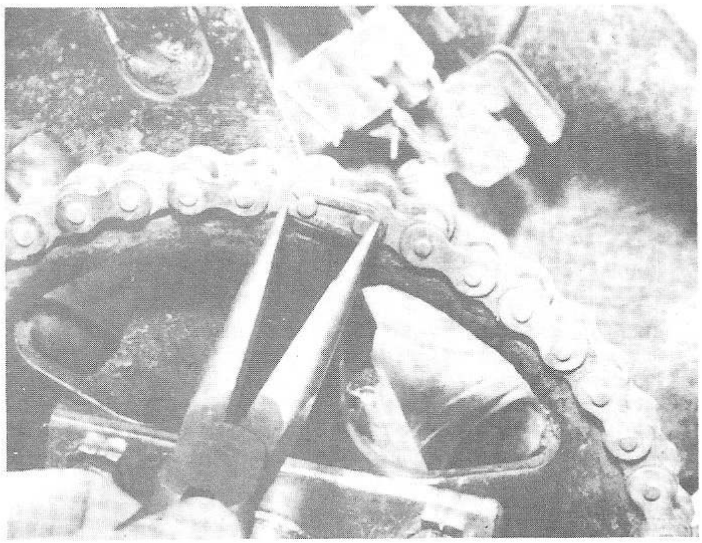
5 Reposition the chain on the sprockets and insert the master link. This should be done with both ends of the chain adjacent to each other on the back side of the rear wheel sprocket. Install the O-rings and the link side plate, followed by the retaining clip. **Note:** *Make sure the closed end of the master link clip points in the direction of chain travel.*

6 Install the tensioner assembly and chain case.

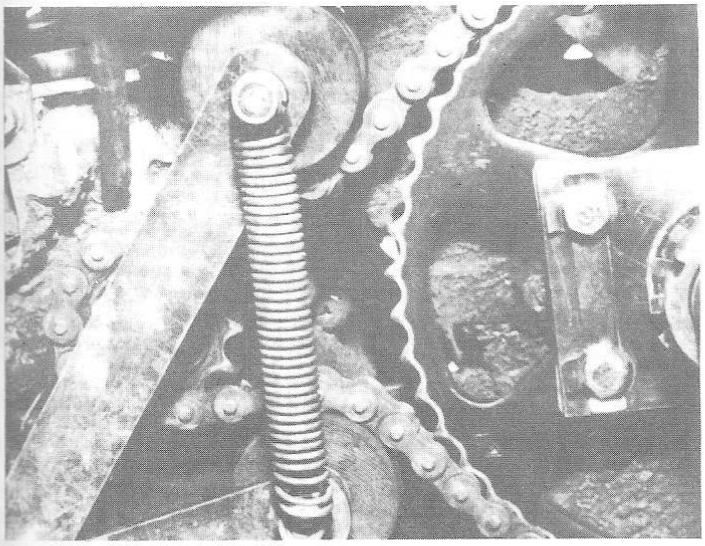
7 Lubricate and adjust the chain as described in Section 5.



6.1a Some chain tensioners are held in place by a cotter pin and washer (shown), while others are bolted in place



6.1b Removing the chain master link clip with needle-nose pliers



6.4 Check the sprocket teeth for wear (this sprocket is extremely worn and should be replaced with a new one)

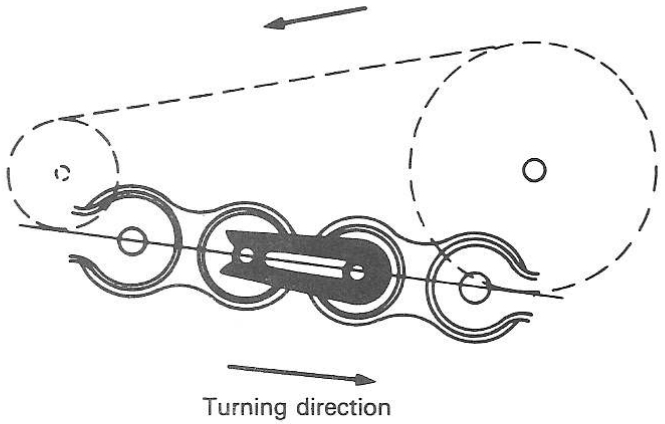
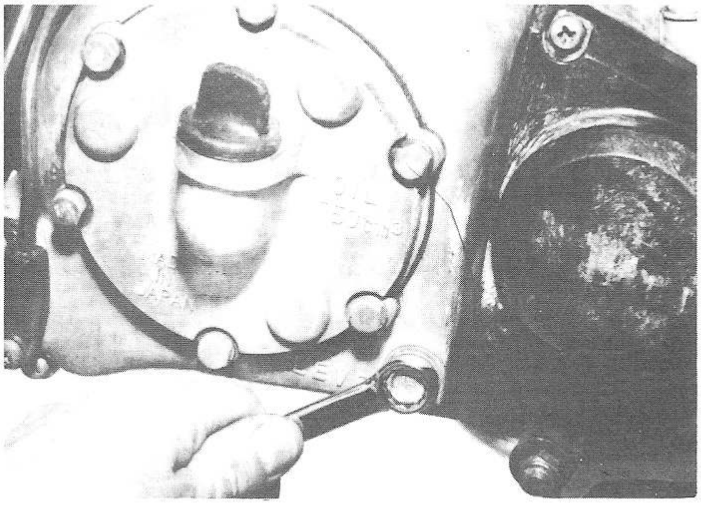


Fig. 1.6 Make sure the drive chain master link retaining clip is installed with the closed end pointing in the direction of chain travel (Sec 6)



8.3 On some two stroke models, the transmission oil is checked by removing the bolt in the right-hand case (YT 125 shown)

7 Drive chain guard and rollers — check

1 The drive chain guard and rollers (or chain tensioner assembly) should be checked for damage, distortion and proper alignment of the rollers with the chain.
2 Look at each roller surface and make sure it is not worn to the hub. If it is, the roller should be replaced with a new one.
3 Make sure the rollers turn freely. Apply light weight oil to the axles if they don't.

8 Engine and transmission oil level — check

1 Proper lubrication is the most important routine maintenance check. Your engine and transmission oil not only reduce friction, but also acts as a coolant, a sealant, a cleaner and a protectant. During the following check the machine must be on a level surface. **Caution:** *Do not run the engine in an enclosed space such as a garage or shop.* When adding oil, a small funnel should be used to prevent spills. Do not overfill the engine or transmission.

Two-stroke engines

2 Before performing the check have a rag handy to catch any oil spills. Start the engine and let it run for two minutes, then shut it off and wait for a couple of minutes. Remove the oil filler cap to vent the transmission case.
3 On the right crankcase cover, near the bottom edge, is an oil level check bolt. With the engine stopped, remove the bolt (photo).
4 A small amount of oil should flow out of the bolt hole. If this does not occur, the oil level is low. Add oil until a small amount flows out of the hole. Be sure to install and tighten the bolt when finished.

Four-stroke engines

5 On these models the oil level is checked with a dipstick that is threaded into the right engine case cover. Start the engine and let it run for several minutes, then shut it off and wait a few minutes before proceeding.
6 Unscrew the dipstick and wipe it off, then insert it into the hole and rest it on the threads (do not thread it in).
7 Remove it again and check the oil level on the end. It must be between the marks on the end of the dipstick.
8 If the level is low, add oil through the hole until it is at the upper mark, then reinstall the dipstick.

9 Engine and transmission oil — change

1 Consistent routine oil changes are the most important maintenance procedure you can perform on an ATV. The oil not only lubricates the engine, transmission and clutch, but it also acts as a coolant, cleaner, sealant, and protectant. Because of these demands, the oil takes a terrific amount of abuse and should be replaced often with new oil of the recommended grade and type. Saving a little money on the difference in the cost between a good oil and a cheap oil won't pay off if the engine or transmission is damaged.
2 Before changing the oil, warm up the engine so that the oil will drain easily. Be careful when draining the oil, as the exhaust pipe, the engine and the oil itself can cause burns.
3 Place the machine over a clean drain pan. Remove the oil filler cap or dipstick to vent the crankcase and act as a reminder that there is no oil in the engine and transmission.
4 Remove the drain plug from the bottom of the crankcase and allow the oil to drain into the pan (on four-stroke engines, also remove the lower bolt holding the filter cover in place on the right side of the engine). Do not lose the sealing washer on the drain plug. **Note:** *Four-stroke engines are equipped with a filter and an oil strainer that should be removed, cleaned with solvent and reinstalled at this time. The strainer is located on the left side of the engine and is held in place by a large threaded cap. The filter is located on the right side and is under a cover held in place with two bolts and the drain bolt. Make sure the O-rings in the filter cover and the lower bolt hole are positioned correctly.*
5 If additional maintenance is planned for this time period, check or service another component while the oil is allowed to drain.
6 Check the condition of the drain plug threads and the sealing washer.
7 Slip the sealing washer over the drain plug, then install and tighten the plug. If a torque wrench is available, tighten the drain plug to the specified torque. Avoid overtightening, as damage to the case can result.
8 Before refilling, check the old oil carefully. If the oil was drained

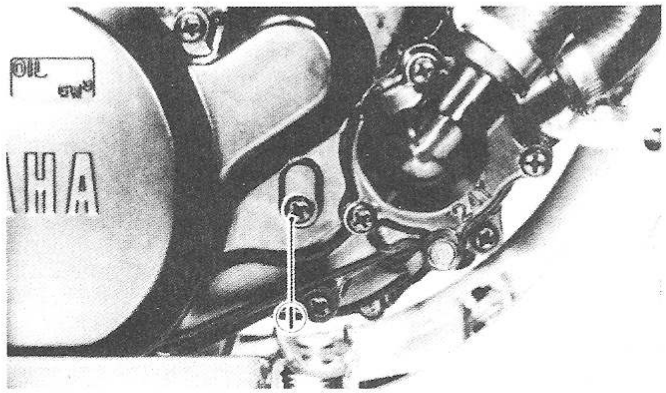


Fig. 1.7 Transmission oil level checking screw location (1) on YT50 models (Sec 8)

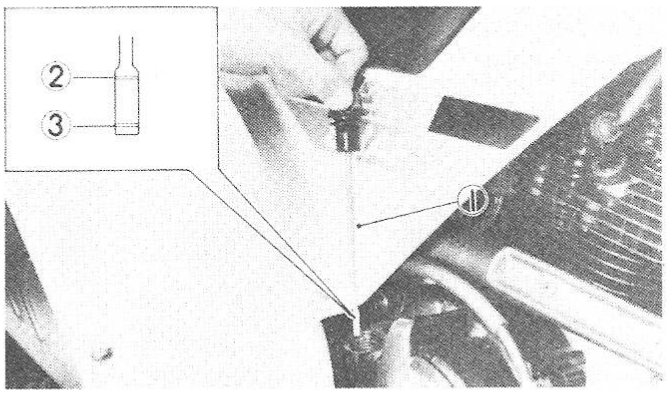


Fig. 1.8 On four stroke models, remove the dipstick (1) and make sure the oil level is between the maximum (2) and minimum (3) marks (Sec 8)

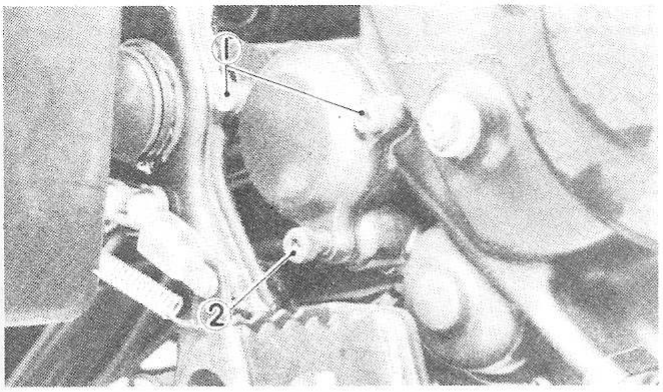


Fig. 1.9 When draining the oil on four stroke models, remove the lower bolt (2) as well as the drain plug; remove the remaining bolts (1) to gain access to the filter (Sec 9)

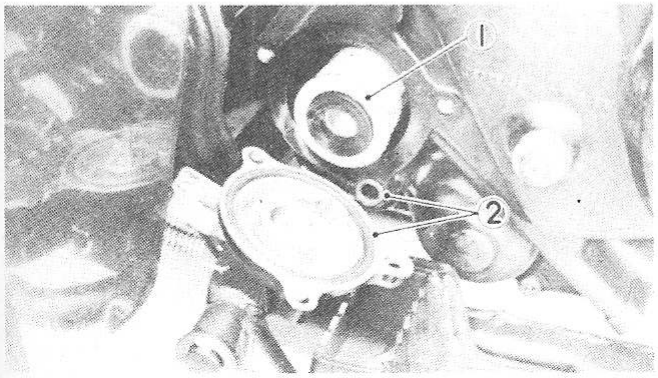


Fig. 1.11 When reinstalling the filter (1), make sure the O-rings (2) are in place and in good condition (Sec 9)

into a clean pan, small pieces of metal or other material can be easily detected. If the oil is very metallic colored the engine or transmission is experiencing high wear from break-in (new engine) or from insufficient lubrication. If there are flakes or chips of metal in the oil, then something is drastically wrong internally and the engine and transmission will have to be disassembled for inspection and repair.

9 If there are pieces of fiber-like material in the oil, the clutch is experiencing excessive wear and should be checked.

10 If the inspection of the oil turns up nothing unusual, refill the engine and transmission to the proper level with the recommended oil. Check around the drain plug for leaks.

11 The old oil cannot be reused in its present state and should be disposed of. Oil reclamation centers, auto repair shops and gas stations will normally accept the oil, which can be refined and used again. After the oil has cooled, it can be drained into a suitable container (capped plastic jugs, topped bottles, milk cartons, etc.) for transport to one of these disposal sites.

12 **Caution:** *On four-stroke engines, check the oil flow after changing the oil.* Loosen the oil gallery bolt in the cylinder head, then start the engine and allow it to *idle* until oil flows out around the bolt. If no oil flows out in one minute, shut off the engine and check the oil level. After solving any problems, restart the engine and repeat the check. Be sure to tighten the bolt when the check is complete.

10 Cylinder compression — check

1 Poor engine performance may be caused by leaking valves, incorrect valve clearances, a leaking head gasket or worn piston, rings or cylinder walls. A cylinder compression check will help pinpoint these conditions and can also indicate the presence of excessive carbon deposits in the cylinder head.

2 The tools required are a compression gauge and a spark plug wrench. A squirt-type oil can may also be needed.

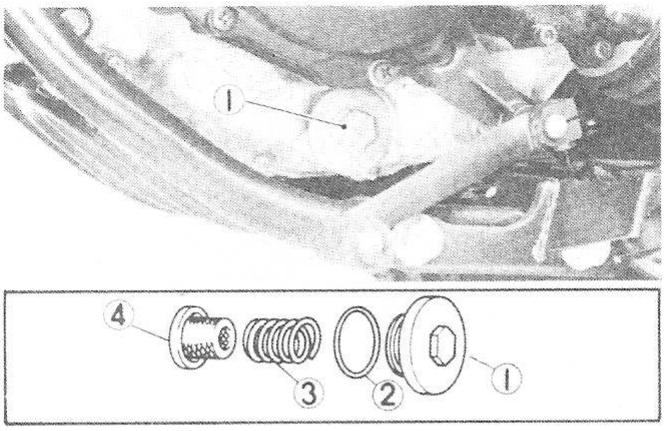


Fig. 1.10 The oil strainer is held in place by a large threaded cover (Sec 9)

1 Cover
2 O-ring
3 Spring
4 Oil strainer

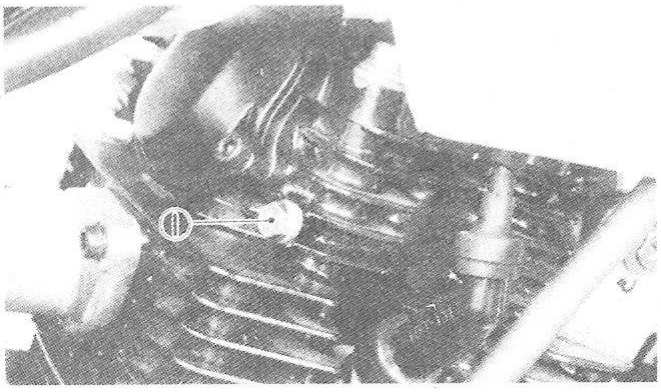


Fig. 1.12 On four stroke models, loosen the oil gallery bolt (1) start the engine and let it idle until oil flows out around the bolt (don't let it run for longer than one minute if no oil flows out) (Sec 9)

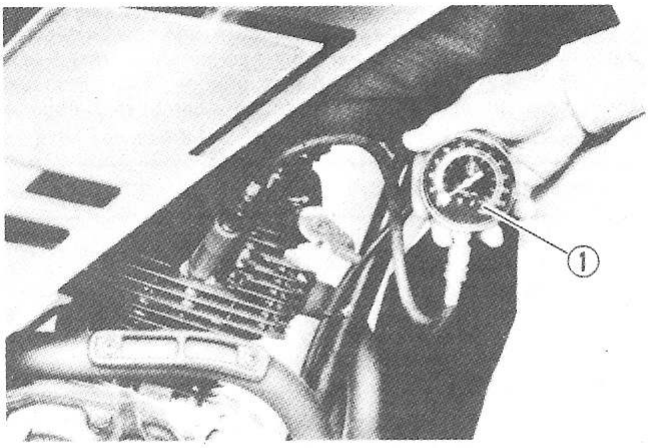
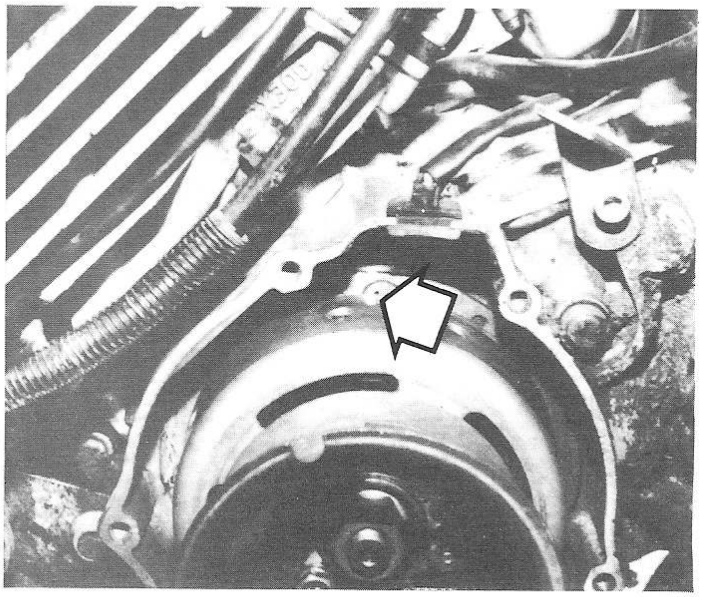


Fig. 1.13 Checking the cylinder compression (make sure the gauge [1] is firmly seated in the plug hole) (Sec 10)

3 Warm the engine to normal operating temperature. Ten minutes of riding should be sufficient. Remove the spark plug. Work carefully. Do not strip the spark plug hole threads and do not burn your hands.

4 Install the compression gauge in the spark plug hole.

5 Crank the engine over a minimum of five revolutions with the throttle held wide open. Observe the initial movement of the compression gauge needle and the final gauge reading. Compare the results to the Specifications.



11.3 The timing mark on the rotor should be highlighted with chalk or paint so it can be seen easily with the timing light (note the corresponding mark on the case)

6 If the compression built up quickly and evenly to the specified amount, you can assume that the engine upper end is in reasonably good mechanical condition. Worn or sticking piston rings and a worn cylinder will produce very little initial movement of the gauge needle, but compression will tend to build up gradually as the engine spins over. Valve and valve seat leakage, or head gasket leakage, is indicated by low initial compression which does not build up.

7 To further confirm your findings, add a small amount of engine oil to the cylinder by inserting the nozzle of a squirt-type oil can through the spark plug hole. The oil will partially seal the piston rings if they are leaking. Repeat the test.

8 If the compression increases significantly after the addition of the oil, the piston rings and/or the cylinder are definitely worn. If the compression does not increase, the pressure is leaking past the valves or head gasket. Leakage past the valves may be due to insufficient valve clearances, burned, warped or cracked valves or valve seats or valves that are hanging up in the guides.

9 If the compression readings are considerably higher than specified, the combustion chamber is probably coated with carbon deposits. It is possible for carbon deposits to raise the compression enough to compensate for the effects of leakage past rings or valves. Remove the cylinder head and carefully decarbonize the combustion chamber.

11 Ignition timing — check

1 Most ATVs incorporate a CDI ignition system which is not adjustable. If the following check indicates incorrect ignition timing, check the CDI unit and the magneto coils as described in Chapter 4 and the Woodruff key in the crankshaft. The YTZ 250 ignition timing can be adjusted.

All models except YTZ 250

2 Check the timing with an inductive pickup strobe-type timing light. The engine must be running, so perform the check in a well-ventilated area. Do not perform the test in direct sunlight.

Two-stroke engines

3 Remove the cover from the left side of the engine. Locate the timing mark on the AC generator rotor and carefully fill it in with white paint to aid visibility when the timing light flashes (photo).

4 Connect the timing light according to the manufacturer's instructions. Generally, the power leads must be connected to a 12 volt battery and the pickup lead must be clipped over the spark plug wire.

5 Start the engine and point the timing light at the mark on the engine case. The timing is correct if the rotor mark aligns with the case mark at the specified rpm.

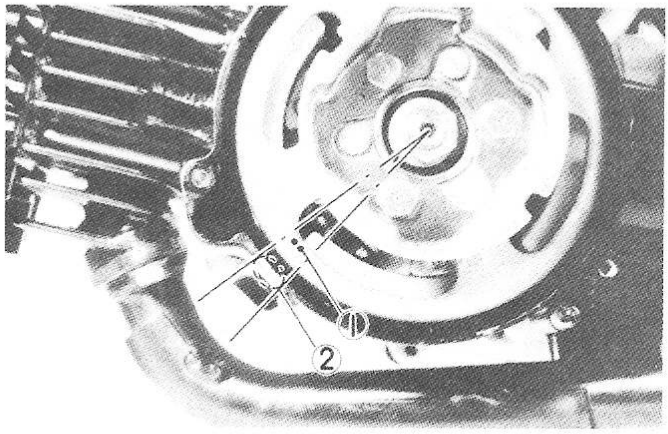


Fig. 1.14 YT 60 models have two marks (1) on the rotor and a wide mark on the case (2), which must be aligned as shown for correct ignition timing (Sec 11)

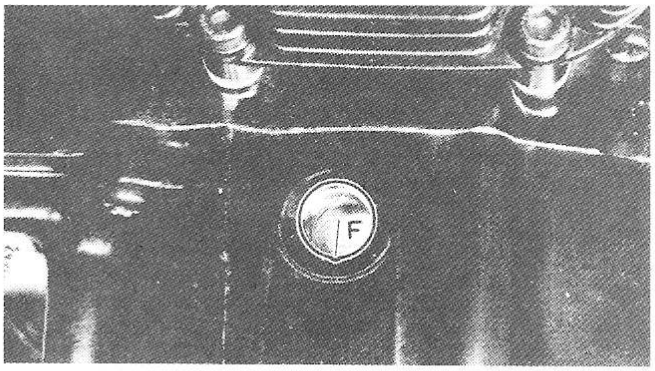


Fig. 1.15 On four stroke models, the F mark on the rotor must be aligned with the notch in the window when the timing light flashes (Sec 11)

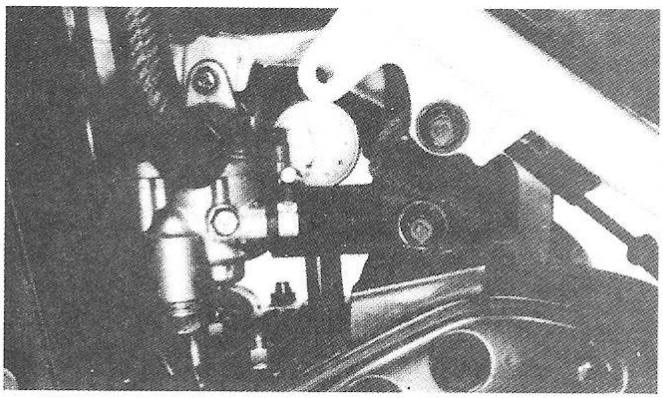


Fig. 1.16 On YTZ 250 models, install the dial indicator in the spark plug hole, . . .

Four-stroke engines

6 The procedure is the same as for two-stroke engines, but the mark on the rotor is exposed by removing the timing window plug from the upper surface of the left engine case. The *F* mark on the rotor must be aligned with the notch in the window when the engine is running at the specified rpm.

YTZ 250

7 The ignition timing must be set precisely to ensure that the spark occurs at the proper time to provide maximum power. A dial indicator timing set will be required for this procedure.

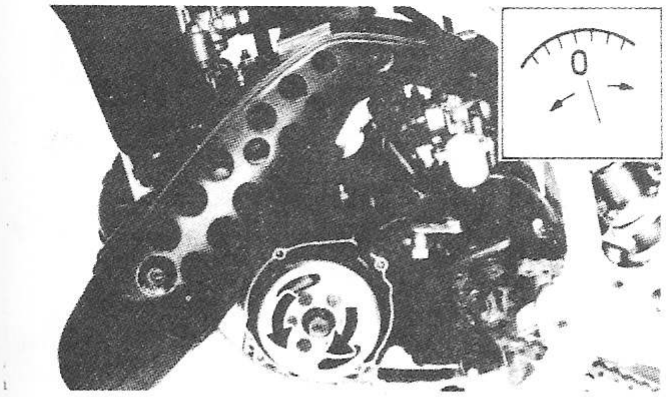


Fig. 1.17 ...locate TDC and zero the indicator's needle (Sec 1)

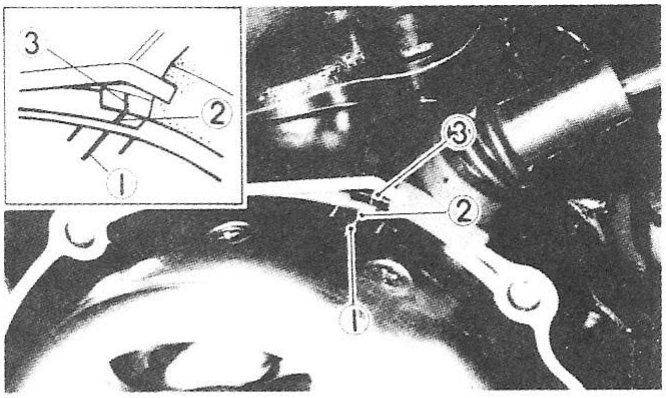


Fig. 1.18 Turn the rotor until the dial needle moves the specified amount, then check the alignment of the timing marks (Sec 11)

1 Rotor mark
2 Stator mark
3 Crankcase mark

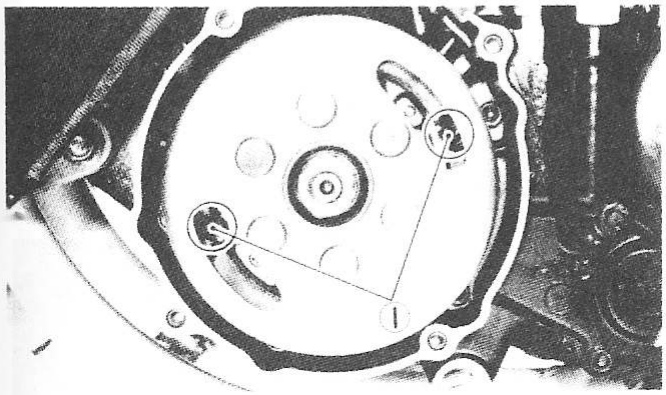
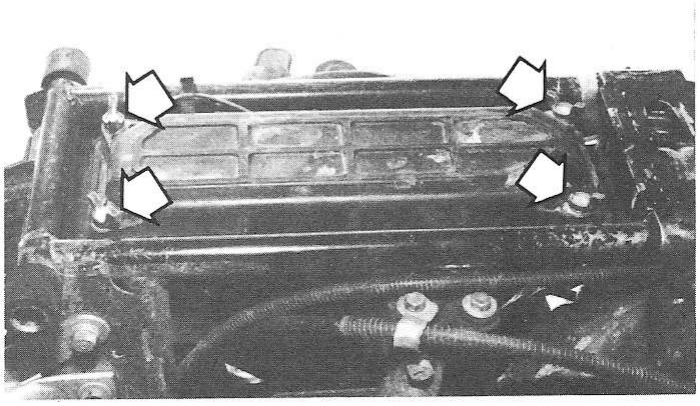


Fig. 1.19 If the marks are not aligned, loosen the stator screw (1) and turn it as required, then retighten the screws (Sec 11)



13.3 Most airbox covers are held in place with four bolts

8 Remove the spark plug, the left side cover, the gearshift pedal and the left crankcase cover.
9 Install the dial indicator in the spark plug hole (follow the manufacturer's instructions).
10 Rotate the AC generator rotor until the piston reaches TDC (when this happens, the needle on the dial indicator will stop and reverse directions even though the rotor is being turned in the same direction). Zero the dial indicator at TDC.
11 From TDC, rotate the rotor *clockwise* until the dial indicator shows that the piston is the specified distance from TDC. At this point the scribed marks on the rotor and stator plate should be aligned.
12 If the marks are not aligned, loosen the two stator retaining screws and rotate the stator until they align. Tighten the screws and recheck the marks.
13 Remove the dial indicator, install the spark plug, the left side cover, the gearshift pedal and the left crankcase cover.

12 Spark plug — check and replacement

1 Make sure that your spark plug wrench or socket is the correct size before attempting to remove the plug.
2 Disconnect the spark plug cap and remove the plug.
3 Inspect the electrodes for wear. Both the center and side electrodes should have square edges and the side electrode should be of uniform thickness. Look for excessive deposits and evidence of a cracked or chipped insulator around the center electrode. Compare your spark plug to the color spark plug reading chart. Check the threads, the washer and the porcelain insulator body for cracks or other damage.
4 If the electrodes are not excessively worn and if the deposits can be easily removed with a wire brush, the plug can be regapped and reused. If in doubt concerning the condition of the plug, replace it with a new one, as the expense is minimal.
5 Cleaning spark plugs by sandblasting is not recommended, as grit from the sandblasting process may remain in the plug and be dislodged after the plug is installed in the engine, which can cause damage and increased wear.
6 Before installing the new plug, make sure it is the correct type and heat range. Check the gap between the electrodes, as it is not pre-set (photo). For best results, use a wire-type gauge rather than a flat gauge to check the gap. If the gap must be adjusted, bend the side electrode only and be very careful not to chip or crack the insulator nose (photo).
7 Since the cylinder head is made of aluminum, which is soft and easily damaged, thread the plug into the head by hand. Once the plug is finger-tight, the job can be finished with a wrench. If a torque wrench is available, tighten the spark plug to the specified torque. If you do not have a torque wrench, tighten the plug finger-tight (until the washer bottoms on the cylinder head) then use a wrench to tighten it an additional 1/4-turn.
8 Reconnect the spark plug cap.

13 Air filter — servicing

1 The air filter on all models except the YTZ 250 is located in the airbox under the seat. On YTZ 250 models it is ahead of the seat in the position normally occupied by the fuel tank. It incorporates an oil-soaked foam filter element which, if clogged, will adversely affect performance. **Note:** *Some models are equipped with a check hose on the bottom of the airbox. If water or dirt collects in the hose, service the filter immediately.*
2 Clean the air filter element periodically. First, remove the seat, and on YTZ 250 models the upper cover.
3 Remove the airbox cover. It is attached by a screw or screws, bolts or a rubber strap (photo). Check the rubber cover seal for cracks and deterioration.

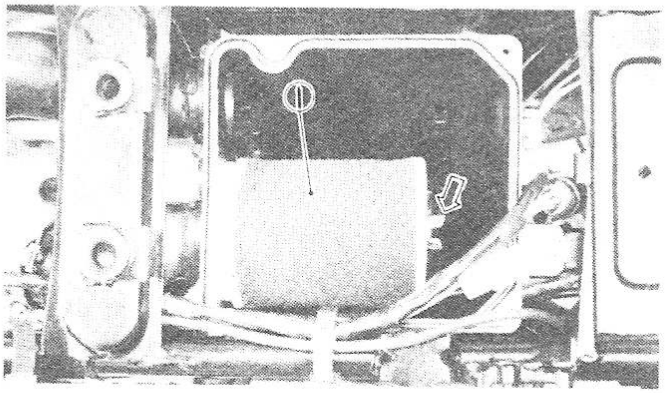


Fig. 1.20 On some models, the filter element (1) is held in place in the airbox by a wingnut (arrow) (Sec 13)

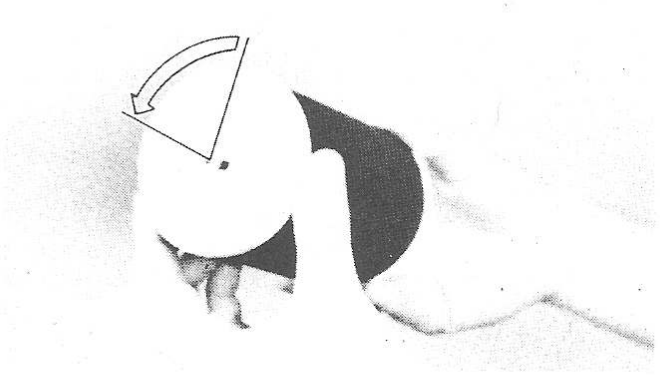


Fig. 1.21 Some filter elements are attached to the holder by a plate which must be turned 90° to remove it (Sec 13)

Fig. 1.22 Apply grease to the end(s) of the element to ensure sealing in the airbox (Sec 13)

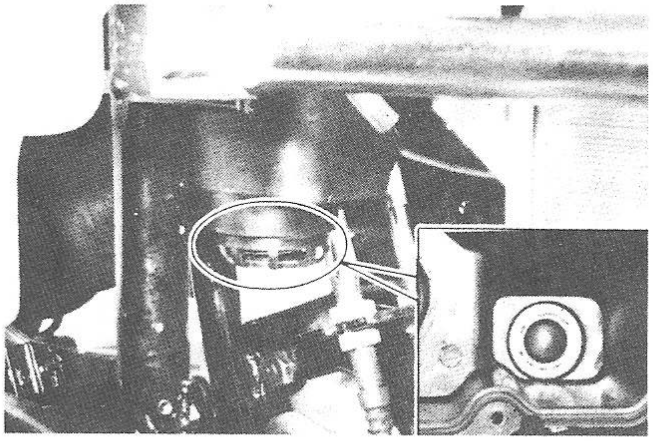
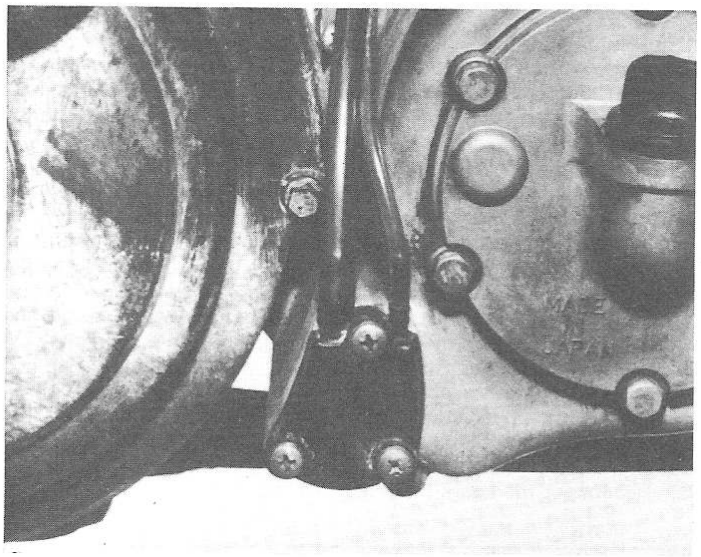


Fig. 1.23 The water release valve is located on the underside of the airbox (not all models) (Sec 14)



14.3 Remove the three screws to detach the overflow chamber for draining

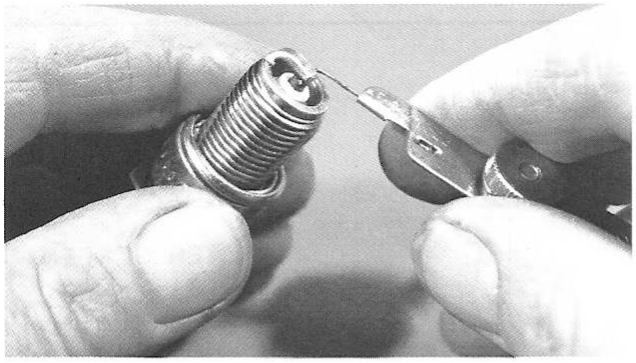
4 Lift out the filter element. Some models require removal of a wing nut to detach the filter/holder from the airbox mount, while others simply lift out.
5 If necessary, remove the element from the holder. Some elements simply pull off the holder, while others are held in place with a band. Still others have a cap that must be turned 90° and removed to withdraw the element. Wash it in a high flashpoint, petroleum-based solvent. **Warning:** *Never use gasoline to clean the filter element.* Allow it to dry thoroughly. Soak the element in 10W-30 motor oil or foam air filter oil and squeeze out the excess. Do not twist the filter to wring out the oil.
6 Reinstall the element on the holder and apply grease to the ends of the element to ensure complete sealing in the airbox.
7 Install the element and cover.
8 Check the air inlet for obstructions and make sure the rubber boot connecting the airbox and carburetor is secure and undamaged to prevent unfiltered air from entering the carburetor.

14 Water release valve/overflow chamber — check

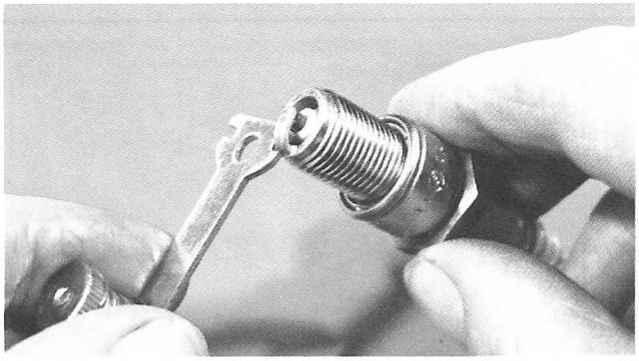
1 Some models have a water release valve on the underside of the airbox to allow for drainage of any water that may find its way into the airbox.
2 The valve must be checked periodically to make sure it is closed and not allowing dirt, water and debris into the airbox.
3 YT 125/175 models have an overflow chamber attached to the lower right side of the engine. If gasoline begins to build up in the large tube, remove the three screws and separate the chamber from the engine to drain it (photo).

15 Fuel system — inspection

1 Check the fuel tank, the petcock, the line and the carburetor for leaks and evidence of damage.
2 If carburetor gaskets are leaking, the carburetor should be disassembled and rebuilt by referring to Chapter 3.
3 If the fuel petcock is leaking, tightening the bolts and bowl may help. If leakage persists, the petcock should be disassembled and repaired or replaced with a new one.
4 If the fuel line is cracked or otherwise deteriorated, replace it with a new one.

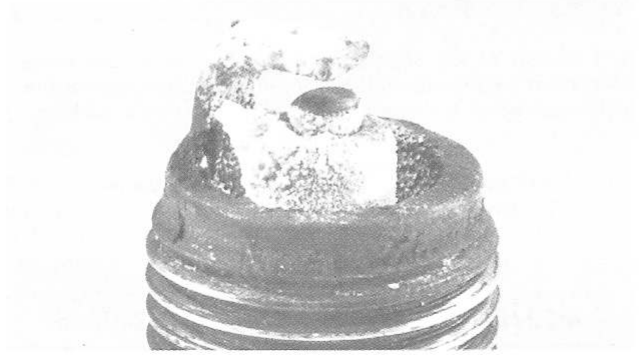


Spark plug maintenance: Checking plug gap with feeler gauges



Altering the plug gap. Note use of correct tool

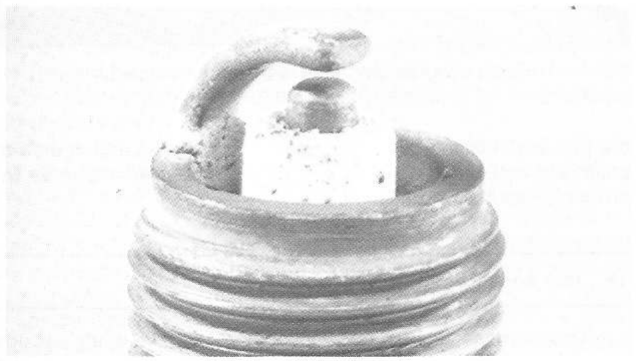
Spark plug conditions: A brown, tan or grey firing end is indicative of correct engine running conditions and the selection of the appropriate heat rating plug



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

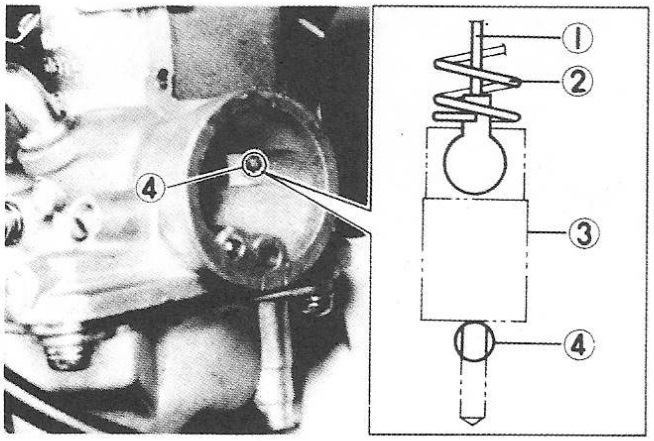


Fig. 1.24 On YT 60 models, the bottom of the starter valve piston must be aligned with the top of the outlet hole in the carburetor when the starter lever is in the second position (Sec 16)

1 Cable
2 Spring
3 Starter valve piston
4 Outlet hole

16 Starter (choke) valve free play — check and adjustment

1 The starter valve must be closed completely when the choke knob is pushed in and open when it is pulled out. Make sure the cable moves the valve to the open position and that there is slack in the cable when it is closed. **Note:** *On YT 60 models the valve can be checked by removing the seat, body cowl assembly and airbox.* Position the starter lever in the second position and see if the bottom of the starter valve piston is aligned with the top of the starter outlet hole in the carburetor. If it isn't, adjust the cable.
2 The cable slack can be adjusted by loosening the locknut and turning the adjuster at the carburetor.

17 Fuel petcock and filter — cleaning

Warning: *Gasoline is extremely flammable and extra precautions must be taken when working on any part of the fuel system. Do not smoke and do not allow open flames or bare light bulbs near the machine. Do not perform this operation in a garage where a natural gas type appliance with a pilot light is present.*

1 The fuel filter, which is attached to the fuel petcock, may become clogged and should be removed and cleaned periodically. In order to clean the filter, the fuel tank must be drained and the petcock removed. This can be accomplished with the tank on the machine, but it may not drain completely unless it is removed.
2 With the petcock in the *Off* position, slide back the hose clamp and pull the fuel line off the carburetor.
3 Remove the fuel tank.
4 Support the tank, place the free end of the fuel line in an approved gasoline container, move the petcock lever to the *Reserve* position and drain the fuel out of the tank.
5 Once the tank is emptied, loosen and unscrew the bolts/screws and separate the petcock from the tank.
6 Clean the filter with solvent and blow it dry with compressed air. If the filter is torn or otherwise damaged, replace it with a new one. If equipped, remove the bowl from the petcock and clean it thoroughly. Check the O-ring for damage and distortion.
7 Install the filter and the petcock on the tank, replace the tank and hook up the fuel line. Refill the tank and check carefully for leaks around the petcock bowl and fuel line fitting.
8 If you choose not to remove the tank, place the petcock lever in the *Off* position, slide back the hose clamp and pull the fuel line off the carburetor. Place the free end of the fuel line in an approved gasoline container, move the petcock lever to the *Reserve* position and drain the fuel out of the tank. Remove the bolts/screws and detach the petcock and fuel filter. Be prepared to spill some gasoline, as the tank probably will not drain completely.

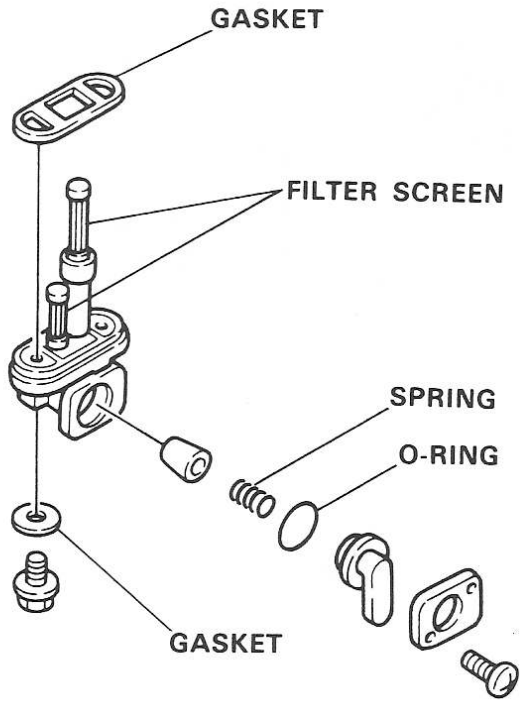
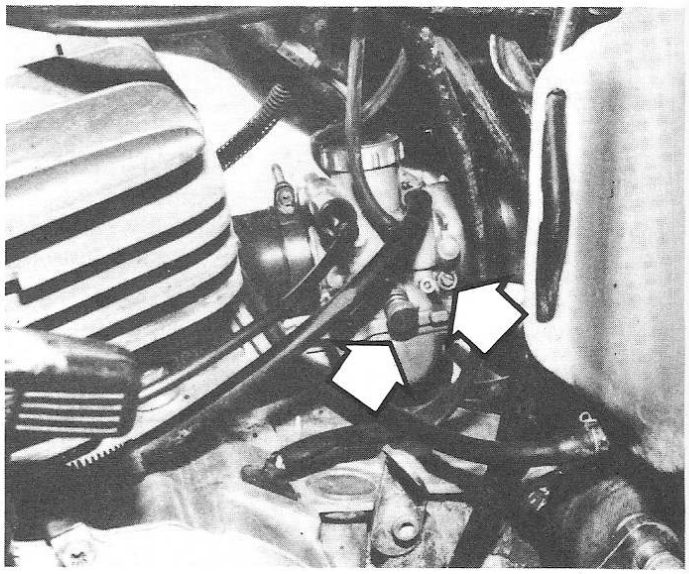


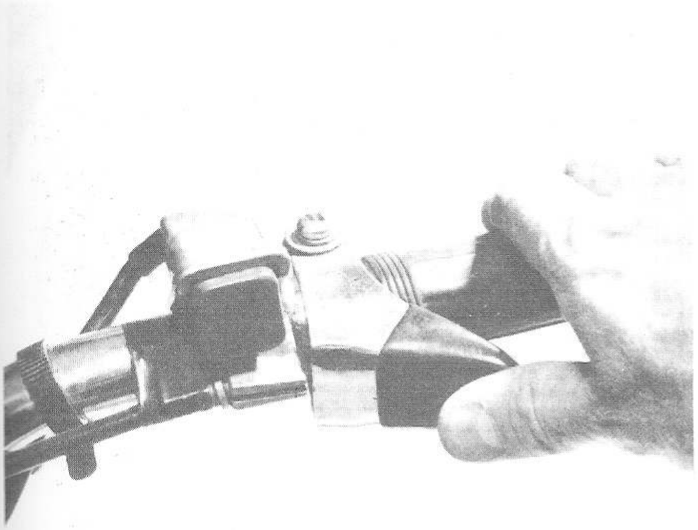
Fig. 1.25 Typical fuel petcock components — exploded view (Sec 17)



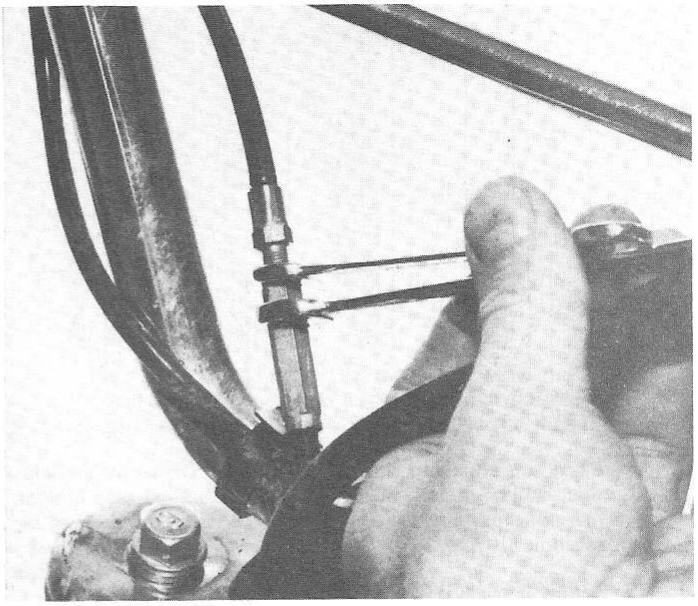
18.4 Throttle stop screw (left) and pilot air screw (right) locations

18 Idle speed and mixture — adjustment

1 The idle speed should be checked and adjusted when it is obviously too high or too low. Before adjusting the idle speed, be sure the ignition timing is correct and the spark plug is properly gapped.
2 The engine should be at normal operating temperature. Place the transmission in Neutral.
3 Attach a tachometer to the engine.
4 Turn the throttle stop screw to obtain the specified idle speed (photo).



19.2 Checking the throttle free play (measured at the end of the throttle lever)



19.3 The free play can be adjusted by loosening the locknut and turning the cable adjuster as required

5 If the engine misses or runs erratically, turn the pilot air screw in until it seats lightly, then back it out the specified number of turns (see Chapter 3).
6 Reset the idle speed with the throttle stop screw.
7 Turn the air screw in or out, as required, until the highest engine speed is obtained, then reset the idle speed with the throttle stop screw.

19 Throttle operation and free play — check and adjustment

1 Make sure that the throttle lever moves easily from fully closed to fully open with the front wheel turned at various angles. The lever should return automatically from fully open to fully closed when released. If the throttle sticks, check the throttle cable for cracks or kinks in the housing. Make sure the inner cable is clean and well-lubricated.
2 See if the very end of the lever moves the specified amount before the carburetor slide begins to move (the engine speed will increase when the slide moves) (photo).
3 Free play adjustments can be made at the cable adjuster or the adjuster on the carburetor. Loosen the locknut (photo) and turn the adjuster until the specified free play is obtained, then retighten the locknut.

20 Clutch free play — check and adjustment

YTZ 250

1 Correct clutch free play is necessary to ensure proper clutch operation and reasonable clutch service life. Free play normally changes because of cable stretch and clutch wear, so it should be checked and adjusted periodically.
2 Clutch free play is checked at the lever on the handlebar. Slowly pull in on the lever until resistance is felt. Measure the distance the lever end has traveled and compare it to the Specifications.
3 Minor clutch free play adjustments can be made at the clutch lever by loosening the lock wheel and turning the adjuster until the desired free play is obtained. Always retighten the lock wheel once the adjustment is complete. If the lever adjuster reaches the end of its travel, a major adjustment will have to be made at the adjuster on the engine.
4 Before making the adjustment at the engine, thread the handlebar lever adjuster all the way in. Refer to Chapter 2 and disconnect the clutch cable from the lever on the engine. Remove the footrest, kick starter and right crankcase cover.
5 Rotate the engine lever to align it with the edge of the crankcase, then loosen the clutch pushrod locknut and turn the pushrod until it lightly seats. Retighten the locknut.

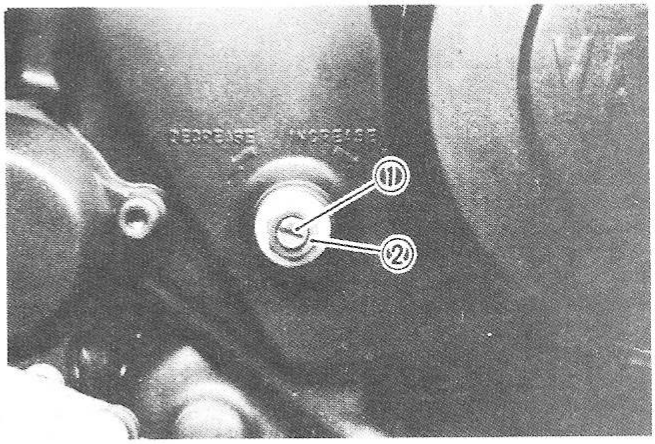


Fig. 1.26 On four stroke models, the clutch is adjusted by loosening the locknut (2) and turning the adjuster (1) (Sec 20)

6 Reconnect the cable and reinstall the removed components, then adjust the free play at the handlebar lever.

All others

7 Four-stroke models are not equipped with a manual clutch lever on the handlebar, but provision is made for clutch adjustment on the engine.
8 Loosen the locknut and turn the adjuster *counterclockwise* until resistance is felt.
9 Turn the adjuster 1/8-turn *clockwise*, then tighten the locknut while holding the adjuster to keep it from turning.

21 Brake system — general check

1 A routine general check of the brakes will ensure that any problems are discovered and remedied before the rider's safety is jeopardized.
2 Check the brake shoes for excessive wear and the lever, brake cables and pedal for loose connections, excessive play, distortion, or other damage. Replace any damaged parts with new ones.
3 Check the disc brake pads for wear and make sure the fluid level in the reservoirs is correct (hydraulic disc brakes only). Look for leaks at the hose connections and check for cracks in the hoses. If the lever or pedal is spongy, bleed the brakes as described in Chapter 6.

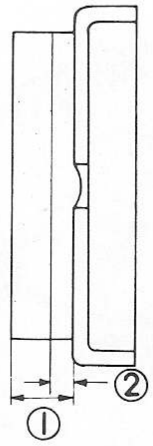


Fig. 1.27 When checking the brake pads, do not include the metal backing plate in the measurement (Sec 22)

1 Pad thickness when new
2 Wear limit

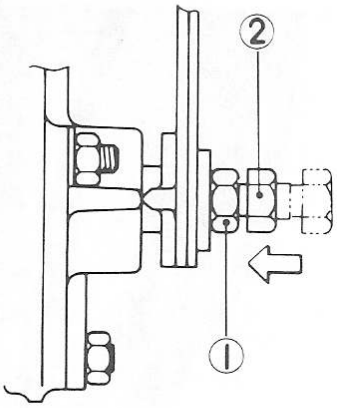


Fig. 1.28 On some models with mechanical disc brakes, the pad wear is indicated by the position of the caliper bolt (2) in relationship to the locknut (1) (Sec 22)

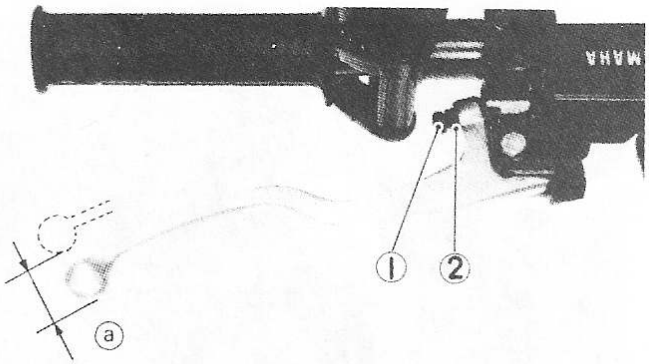


Fig. 1.30 On YTZ 250 models (hydraulic brakes), the brake lever free play (a) is changed by loosening the locknut (2) and turning the adjusting screw (1) (Sec 23)

22 Brake shoes/pads — wear check

1 The brake shoes and pads should be checked at the recommended intervals and replaced when worn beyond the specified limits.

Disc brake pads

Hydraulic brakes

2 A wear indicator is molded into each brake pad to facilitate wear checks. The indicator permits visual checks without removing the pads. Pry the rubber plug out of the caliper inspection window.

3 To check the pads, depress the pedal or lever and note the position of the wear indicator (the small molded ridge on the pad lining material next to the metal backing plate). If it is almost in contact with the disc, replace the pads as a set (see Chapter 6).

Mechanical brakes (YT 125/175)

4 The pads should be removed to examine them for wear, since it is very difficult to determine how much pad friction material is left when they are in place in the caliper.

5 Refer to Chapter 6 and remove the pads, then measure the thickness of the lining material (do not include the metal backing plate) and compare it to the Specifications. If it is thinner than specified, replace the pads with a new set.

Mechanical brakes (all others)

6 Check the caliper lever adjusting bolt position. If the underside of the bolt head is touching or nearly touching the locknut, the pads are worn and should be replaced with new ones.

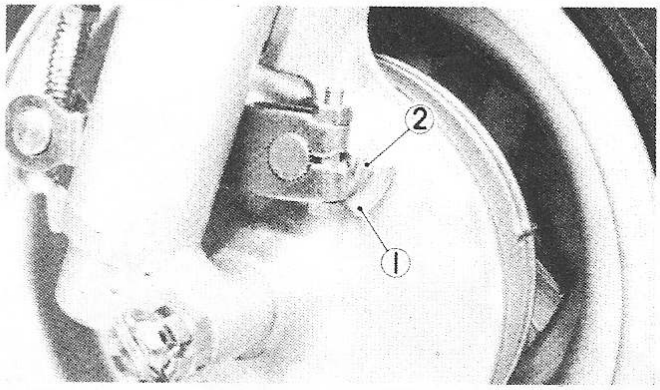


Fig. 1.29 Drum brake shoe wear on most models is checked by looking at the limit line (1) and the indicator (2) with the brake applied (Sec 22)

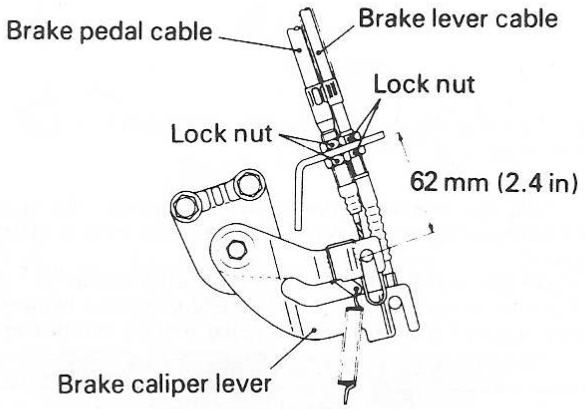


Fig. 1.31 On YT 125/175 J models, the center of the brake pedal cable should be the specified distance from the frame tab before beginning the brake adjustment (Sec 23)

Drum brake shoes

7 Maximum wear of the drum brake shoes is indicated if the reference mark on the brake backing plate aligns with the point of the wear indicator plate when the brake pedal or lever is fully applied. If these indicators align, the brake shoes are worn and must be replaced with new ones. **Note:** *On YT 60 models, remove the rubber plug from the backing plate and check the thickness of the shoe lining material by looking through the hole.* Always replace the shoes in pairs to ensure proper brake shoe-to-drum contact.

23 Brake lever free play — check and adjustment

1 Free play is the distance the lever can be pulled before the brake pads or shoes make contact and pressure is felt.

2 The free play should be as specified. If the play is excessive, check the brake shoes/pads for wear and bleed the brake hydraulic system (hydraulic disc brakes only).

Drum brakes

3 On these models the free play is measured at the brake lever on the handlebar. **Note:** *On YT 125/175 models the measurement is made at the outer end of the lever.* On all others it is made at the joint between the lever and pivot bracket.

4 If the play is excessive, adjust as follows.

5 Loosen the lever adjuster lock wheel and turn the adjuster all the way in (if equipped). Turn the adjuster on the brake drum end of the cable until the free play is correct, then make the final adjustment at the lever adjuster. Be sure to tighten the lock wheel when the adjustment is complete.

6 On YFM 200 models the adjuster on each front brake cable end should be turned until the single cable-to-dual cable joint is horizontal, then the free play adjustment should be made at the handlebar lever.

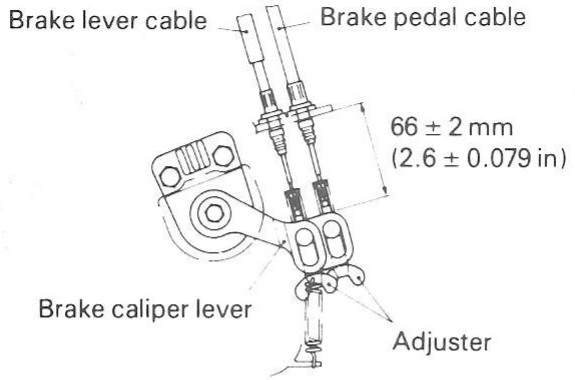


Fig. 1.32 On YT 125/175 K/L/N models, the top of the caliper lever should be the specified distance from the frame tab before beginning the brake adjustment (Sec 23)

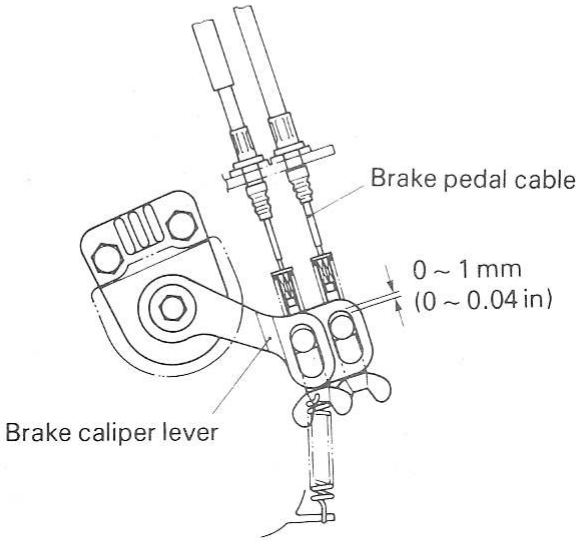


Fig. 1.34 On YT 125/175 models, the clearance between the pedal cable end and the end of the lever slot must be as specified (Sec 3)

Hydraulic disc brakes

7 The free play is measured at the outer end of the lever and adjustment is done by loosening the adjusting screw locknut and turning the screw as required until the free play is as specified before the adjusting screw contacts the master cylinder piston.

8 Retighten the locknut when the adjustment is complete. **Note:** *A soft or spongy feeling at the brake lever may indicate the presence of air in the brake hydraulic system. Refer to Chapter 6 for the bleeding procedure.*

Mechanical disc brakes

YT 125/175

9 When adjusting the brake, start with the brake pedal cable, go on to the pad adjusting bolt and finish with the lever cable.

10 Loosen the handlebar lever adjuster lock wheel and turn the adjuster all the way in. Loosen the lever cable locknuts at the caliper end and adjust the cable housing until the caliper lever top or the center of the pedal cable end is the specified distance from the frame tab (see the accompanying illustrations).

11 Remove the bolts/nuts and slide the brake disc cover to the right. Loosen the caliper adjusting bolt locknut and insert a 0.008-inch (0.2 mm) feeler gauge between the outer brake pad and the disc. To determine the position of the pad, screw the adjusting bolt in as tightly as possible by hand, then unscrew it 1/2-turn. Using your fingers only, turn the adjusting bolt until the gap between the pad and disc is as specified. Hold the bolt with a wrench and tighten the locknut securely.

12 Adjust the brake pedal cable at the caliper to provide a gap of 0.040-inch (1 mm) between the cable end and the caliper lever slot.

13 Block the machine off the ground and spin the wheels to see if the brake is dragging. If it is, repeat Steps 10 through 12.

14 Check the lever and pedal free play and compare it to the specifications. If the free play is not as specified, repeat Steps 10 through 12. Be sure to retighten the adjuster lock wheel.

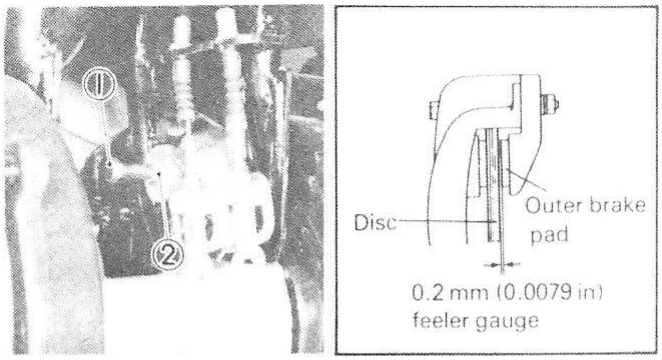


Fig. 1.33 On YT 125/175 models, loosen the locknut (2) and bolt (1), then slip a feeler gauge between the disc and outer brake pad to adjust the pad-to-disc clearance (Sec 23)

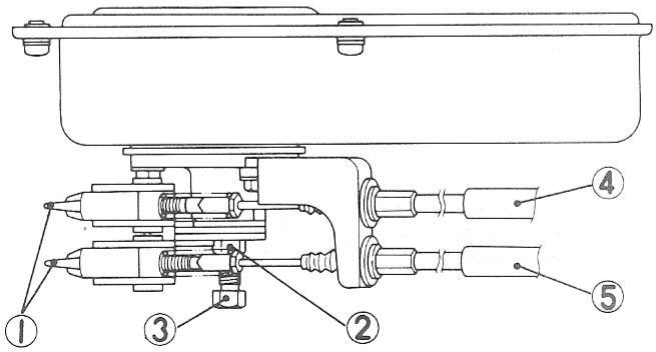


Fig. 1.35 On models other than the YT 125/175, the brake adjusting components look like this (Sec 23)

1 Cable adjusters
2 Locknut
3 Adjusting bolt
4 Pedal cable
5 Lever cable

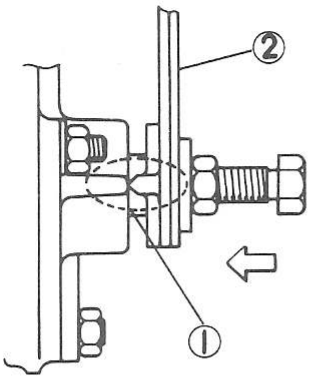


Fig. 1.36 Turn the brake lever cable adjuster in until the pointer on the caliper lever (2) is aligned with the tab on the caliper (1) (Sec 23)

All others

Note: *If the pedal free play is greater than 2-inches (50 mm) and the lever free play is greater than 0.400-inch (10 mm) at the lever-to-pivot joint, adjust the brake as follows.*

15 Pump the brake pedal three times, then loosen the lockwheel at the lever on the handlebar and turn the adjuster all the way in.

16 Loosen the brake pedal and brake lever cable adjusters at the caliper, then loosen the caliper adjusting bolt locknut and turn the bolt out slightly.

17 Turn the brake *lever* cable adjuster in until the caliper lever is centered (the pointer on the lever will be aligned with the tab on the caliper).

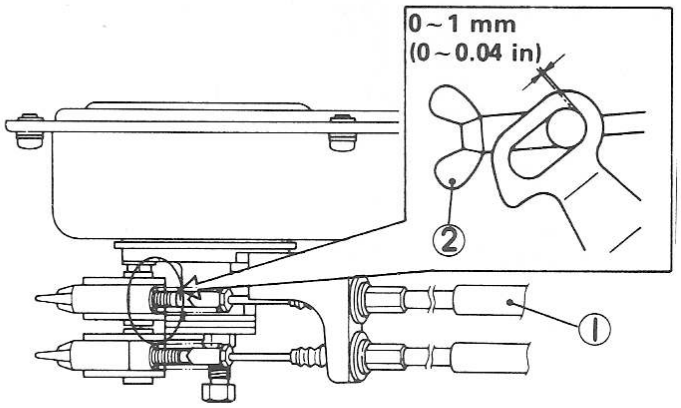


Fig. 1.37 Turn the brake pedal cable (1) adjuster (2) until the specified gap exists between the cable fitting and the lever slot (Sec 23)

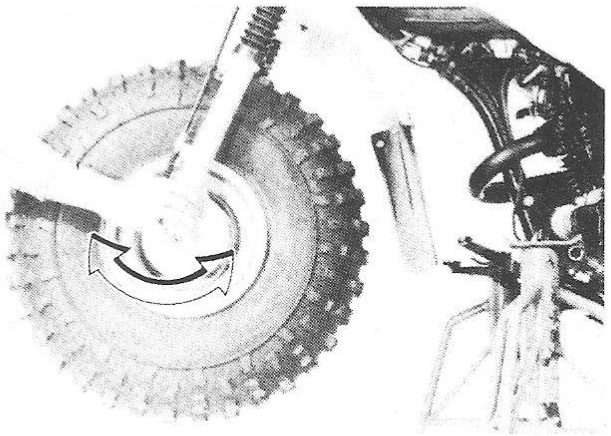


Fig. 1.38 Checking the steering head bearings for wear (Sec 26)

18 Turn the bolt in by hand until it feels tight, then back it out 1/4-turn and tighten the locknut (hold the bolt with a wrench as the nut is tightened).
19 Turn the *pedal* cable adjuster in until a gap of 0.040-inch (1 mm) exists between the end of the cable and the caliper lever slot.
20 Block the rear of the machine off the ground and spin the rear wheels to see if the brake is dragging. If it is, repeat the procedure.

24 Rear brake pedal free play — check and adjustment

The rear brake pedal free play is checked and adjusted in conjunction with the brake lever adjustment. Refer to Section 23 for the procedure.

25 Rear brake pedal height — adjustment

1 On YTZ 250 models the rear brake pedal height can be adjusted to suit the rider's preference.
2 Loosen the locknut on the master cylinder pushrod and turn the adjuster until the pedal height is comfortable for the rider. Be sure to hold the adjuster with a wrench and retighten the locknut when the adjustment is complete.
3 On models with a pedal height stop bolt, the top of the pedal should be 0.200-inch (5 mm) from the top surface of the footrest. If it isn't, loosen the locknut and turn the bolt until the height is correct, then retighten the locknut.

26 Steering head bearings — check and adjustment

1 Steering head bearings can become dented, rough or loose during normal use. In extreme cases, worn or loose steering head bearings can cause steering wobble that is potentially dangerous.
2 To check the bearings, block the machine so that the front wheel is in the air.
3 Point the wheel straight ahead and slowly move the handlebars from side-to-side. Dents or roughness in the bearing races will be felt and the bars will not move smoothly.
4 Grasp the fork legs and try to move the wheel forward and backward. Any looseness in the steering head bearings will be felt.
5 The bearings can be adjusted to remove sloppiness, but it is preferable to remove and lubricate them as described in Chapter 5 to cure the problem.
6 On some models the ring nut under the upper triple clamp is visible and can be turned with a pin-type spanner wrench to remove the play in the bearings. The steering stem nut and upper fork pinch bolts must be loosened before the adjustment is performed. Do not overtighten the ring nut. The handlebars should move from side-to-side without binding.

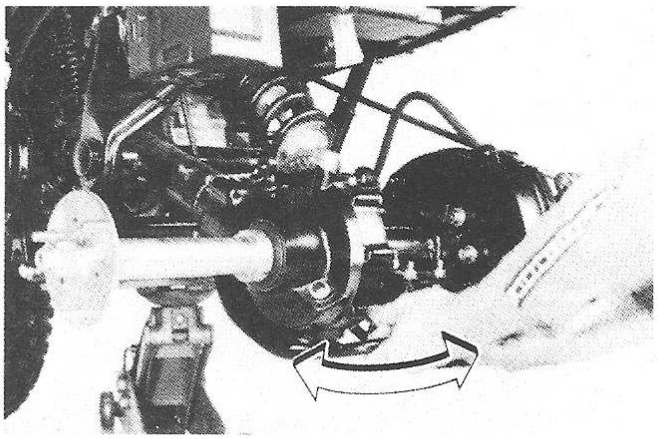


Fig. 1.39 Checking the swingarm bearings for wear (Sec 28)

7 On the remaining models, the upper triple clamp must be removed to gain access to the ring nut. Refer to Chapter 5 for the removal procedure and turn the ring nut to remove the play in the bearing.

27 Rear shock absorber and linkage — lubrication

1 At the recommended intervals the rear shock absorber and linkage on YTZ 250 models must be lubricated with lithium-base grease. Grease zerks are provided at the critical points so a grease gun can be used. Be sure to wipe off any dirt before the grease gun is attached to the grease fittings.
2 On other models the shock must be removed and the pivot bushings lubricated with grease (see Chapter 5).

28 Swingarm bearings — check and adjustment

1 Raise the rear of the machine and remove the rear wheels. Detach the lower shock absorber mount bolt and separate the shock absorber from the swingarm.
2 Grasp the rear of the swingarm and try to move it from side-to-side. There should be no noticeable play.
3 Move the swingarm up-and-down and check for smooth movement. If you can feel tightness, binding or rough spots, the bearings may be damaged and require service (Chapter 5).
4 On shaft-drive models the bearings can be adjusted. Remove the caps over the swingarm pivot bolts.
5 Loosen the right side shaft locknut and shaft, then loosen the left

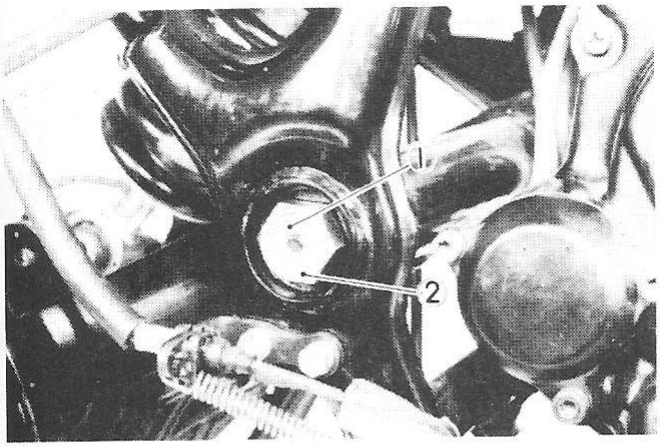


Fig. 1.40 Loosen the locknut (2) and tighten the pivot shaft (1) to adjust the bearings (be sure to retighten the locknut) (Sec 28)

side locknut. The shafts require a large Allen wrench to loosen them.
6 Tighten the left side shaft to the specified torque, then tighten the locknut while holding the shaft to keep it from turning.
7 Tighten the right side shaft and locknut in the same manner.

29 Fork oil — change

1 Position a jack or blocks of wood under the front of the engine to support the machine when the fork caps are removed. Bleed off any air from the fork legs.
2 Remove the caps with a large wrench or ratchet and socket. Push down on the wrench/ratchet as the last couple of threads are disengaged, as the cap is under slight spring pressure.
3 Place a drain pan under each fork leg and remove the drain screws. **Warning:** *Do not allow the fork oil to contact the brake disc or pads. If it does, clean the disc with alcohol or lacquer thinner and replace the pads with new ones before riding the machine.*
4 After most of the oil has drained, slowly compress and release the forks to pump out the remaining oil.
5 Check the drain screw gaskets for damage and replace them if necessary. Reinstall the screws in the fork legs and tighten them securely.
6 Pour the specified amount of oil into each of the fork tubes through the openings at the top. **Note:** *For optimum fork performance, remove the springs before adding new fork oil, then compress the forks completely and add oil until the level is the specified distance from the top of the fork tube — it should be exactly the same in each fork leg. Be sure to use oil that is formulated for use in front suspensions. Slowly pump the forks up and down to distribute the oil.*
7 Check the O-rings on the fork caps, then coat them with a thin layer of multi-purpose grease. Install the caps and tighten them securely. Apply pressure to the caps as the first few threads are engaged in the fork tubes.

30 Wheel bearings — check

1 The wheel bearings should be checked at the recommended intervals or whenever a rumbling noise, which increases with vehicle speed, is noticed.
2 To check the front wheel bearings raise the machine and support it so the front wheel is off the ground.
3 Spin the wheel by hand and touch the axle or fender lightly. If a rumbling vibration is felt, the wheel should be removed and the bearings inspected. See Chapter 6 for inspection and maintenance of the bearings.
4 To check the rear bearings the axle must be removed (see Chapter 6). If radial or axial play can be felt as the bearings are turned with your fingers they should be replaced with new ones.
5 Lubrication of the bearings (or repacking, as it is sometimes called)

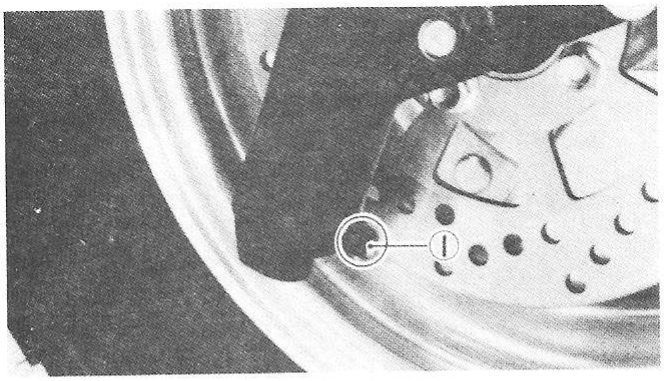


Fig. 1.41 The fork drain screws (1) are located at the bottom of each slider (Sec 29)

does not have to be done very often. It is an involved procedure requiring removal of the wheel or rear axle and careful removal and installation of the bearings. Refer to Chapter 6 for the procedure.

31 Wheels and tires — general check

1 Routine tire and wheel checks should be made with the realization that your safety depends to a great extent on their condition.
2 Check the tires carefully for cuts, tears, embedded nails or other sharp objects and excessive wear. Check the tread depth at the center of the tire and replace worn tires with new ones when the tread depth is shallow.
3 Repair or replace punctured tires as soon as damage is noted. Do not try to patch a torn tire, as wheel balance and tire reliability may be impaired.
4 Check the tire pressures or circumferences when the tires are cold and keep them properly inflated. Proper air pressure will increase tire life and provide maximum stability and ride comfort. Keep in mind that low tire pressures may cause the tire to slip on the rim or come off, while high tire pressures will cause abnormal tread wear and unsafe handling.
5 The wheels used on ATV's are virtually maintenance free, but they should be kept clean and checked periodically for cracks or other damage. Never attempt to repair damaged wheels. They must be replaced with new ones.

32 Fasteners — check

1 Since vibration of the machine tends to loosen fasteners, all nuts, bolts and screws that are visible should be checked periodically to make sure they are tight.
2 Pay particular attention to the following:
Brake fasteners
Exhaust system fasteners
Spark plug
Engine oil drain plug
Oil filter cover bolts
Oil strainer cover
Gearshift lever
Engine mount bolts
Shock absorber mount bolts
Front axle clamp bolt
Rear axle ring nuts
Final drive housing drain and fill plugs
Sprocket bolts/nuts
3 If a torque wrench is available, use it along with the torque specifications at the beginning of each Chapter.

33 Cam chain — check and adjustment

1 Four-stroke engines must have the cam chain adjusted at the specified intervals. Remove the timing window plug from the left side

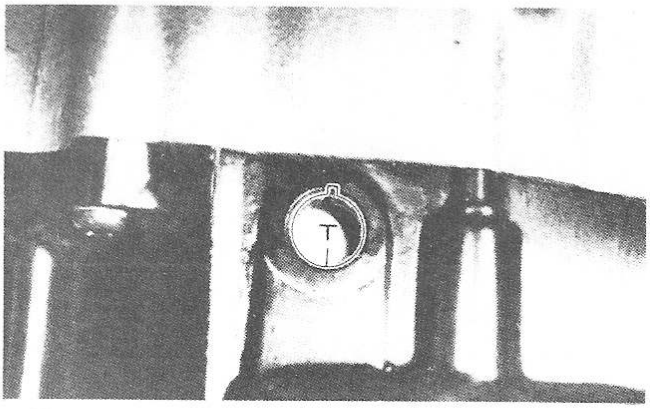


Fig. 1.42 When adjusting the cam chain tension, the T mark on the rotor must be aligned with the notch in the timing window (Sec 33)

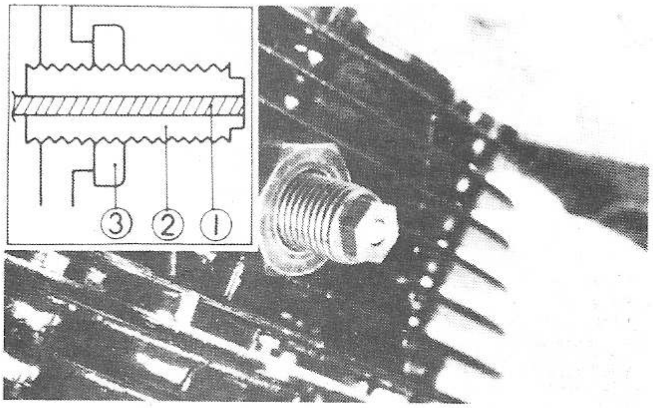


Fig. 1.43 Cam chain adjuster components (Sec 33)

1 Pushrod
2 Adjuster
3 Locknut

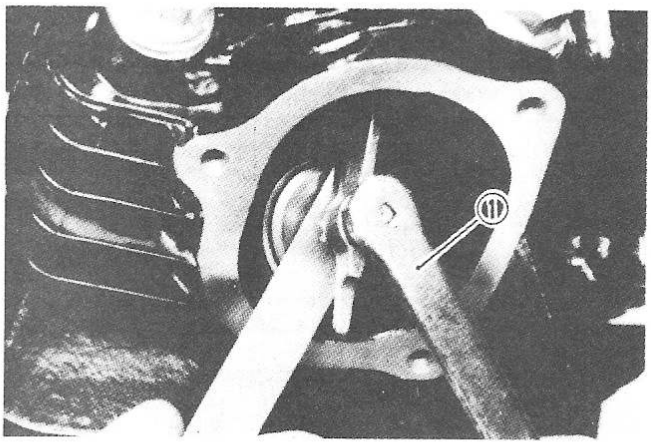


Fig. 1.44 The special wrench (1) is used to turn the adjusting screw when the valve clearance is adjusted (Sec 34)

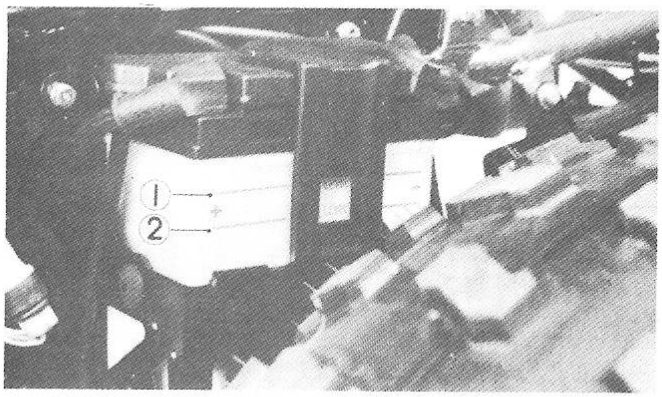


Fig. 1.45 The battery electrolyte level must be between the upper (1) and lower marks (2) (Sec 35)

crankcase cover.
2 Pull the recoil starter rope out very slowly until the *T* mark on the rotor is aligned with the notch in the window.
3 Remove the cap from the adjuster and loosen the locknut. The adjuster is located on the rear of the cylinder, near the carburetor.
4 Turn the adjuster in until the pushrod inside is flush with the end of the adjuster. **Note:** *Start the engine and allow it to idle while watching the pushrod. If it moves slightly, the adjustment is correct. If it doesn't move, loosen the adjuster slightly so the pushrod moves.*
5 Tighten the locknut while holding the adjuster, then install the cap and timing window plug.

34 Valve clearance — check and adjustment

1 On four-stroke engines the valve clearances must be checked and adjusted periodically to ensure proper engine operation. The check must be carried out only when the engine is completely cool to the touch. A special wrench is needed to turn the valve adjusting screws.
2 Remove the seat/rear fender assembly. **Note:** *On YFM 200 models, remove the front carrier mounting bolts and pull it forward. Remove the front panel and the seat and fuel tank cover. Unhook the fuel tank cover first, then carefully pull the cover forward.*
3 Remove the bolts and separate the valve covers from the cylinder head.
4 Remove the timing window plug from the left side engine cover.
5 Slowly pull on the recoil starter rope until the *T* mark on the rotor is aligned with the notch in the window. The piston is now at TDC on the compression stroke and the valves are closed completely, so the clearances can be checked accurately.
6 Insert the appropriate size feeler gauge between the intake valve (rear valve) and the adjusting screw. If the clearance is correct, a slight drag will be felt as the gauge is withdrawn.
7 If the correct size feeler gauge will not fit between the valve and adjusting screw, or if it fits very loosely, the clearance will have to be adjusted.
8 Loosen the locknut on the adjusting screw and turn the screw out until the feeler gauge can be slipped between the screw and valve. Slowly turn the screw in until a slight drag is felt as the feeler gauge is withdrawn.
9 Hold the screw with the wrench to keep it from turning and tighten the locknut. Recheck the clearance to be sure it hasn't changed.
10 Repeat the procedure for the exhaust valve.
11 Install the valve covers and the timing window plug.

35 Battery electrolyte level and specific gravity — check

Caution: *Be extremely careful when handling or working around the battery. The electrolyte is very caustic and an explosive gas is given off when the battery is charging.*

1 To check and replenish the battery electrolyte it will be necessary to remove the seat and rear cowl assembly.
2 The electrolyte level in each cell should be between the upper and lower marks on the battery case.
3 If it is low, remove the cover and the cell caps and fill each cell to the upper level mark with distilled water. Do not use tap water, except in an emergency, and do not overfill. The cell holes are quite small, so it may help to use a plastic squeeze bottle with a small spout to add the water. If the level is within the marks on the case, additional water is not necessary.
4 Check the specific gravity of the electrolyte in each cell with a small hydrometer made especially for motorcycle batteries. These are available from most dealer parts departments or motorcycle accessory stores.
5 Remove the caps, draw some electrolyte from the first cell into the hydrometer and note the specific gravity. Compare the reading to the Specifications. Return the electrolyte to the cell and repeat the

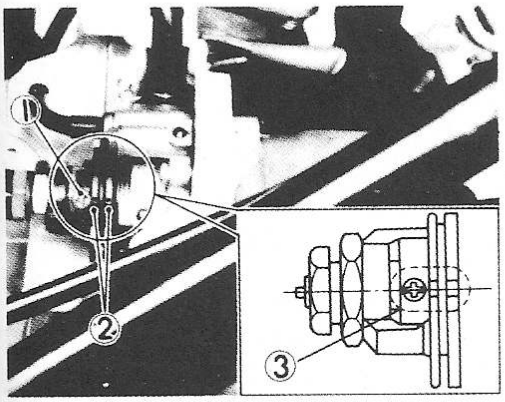


Fig. 1.46 On YT 60 models, the plunger pin (1) must be aligned with the marks (2) when adjusting the Autolube pump (Sec 36)

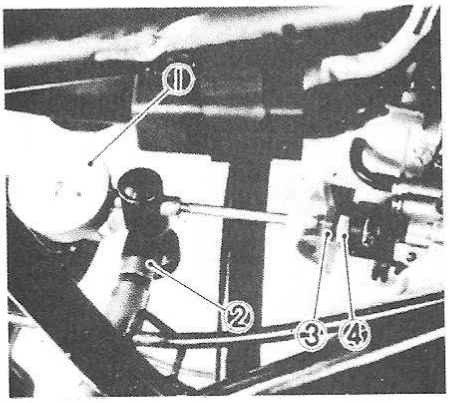


Fig. 1.47 The dial indicator must be mounted as shown when checking/adjusting the pump stroke on YT 60 models (Sec 36)

1 Dial indicator 3 Adjusting bolt
2 Indicator base 4 Locknut

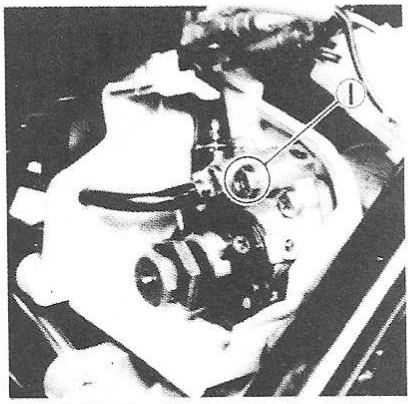


Fig. 1.48 Bleed screw location (1) on YT 60 models (Sec 36)

check for the remaining cells. When the check is complete, rinse the hydrometer thoroughly with clean water.

6 If the specific gravity of the electrolyte in each cell is as specified, the battery is in good condition and is apparently being charged by the machine's charging system.

7 If the specific gravity is low, the battery is not fully charged. This may be due to corroded battery terminals, a dirty battery case, a malfunctioning charging system, or loose or corroded wiring connections. On the other hand, it may be that the battery is worn out, especially if the machine is old, or that infrequent use of the machine prevents normal charging from taking place.

8 Be sure to correct any problems and charge the battery if necessary. Refer to Chapter 7, *Electrical system*, for additional battery maintenance and charging procedures.

9 Install the battery cell caps, the plastic cover and the seat/cowl. Be very careful not to pinch or otherwise restrict the battery vent tube, as the battery may build up enough internal pressure during normal charging system operation to explode.

36 Autolube pump — check and adjustment

1 Two-stroke engines with Yamaha's Autolube oil injection system are equipped with an oil pump that must be checked and adjusted periodically to ensure correct engine lubrication.

YT 60

2 Adjust the throttle cable free play to the specified amount by turning the adjuster at the carburetor.

3 Remove the pump cover and close the throttle completely, then see if the plunger pin (Phillips screw) is aligned with the mark on the pump pulley. If they are not aligned, adjust the cable slack until they are.

4 The pump stroke check requires a dial indicator, so it may be necessary to have it done by a dealer service department.

5 To make the check, remove the muffler and position the dial indicator with the stem resting against the end of the pump shaft.

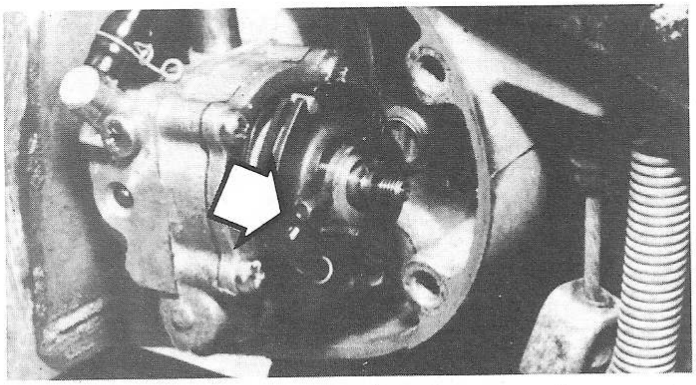
6 Zero the indicator, then start the engine and see how far the pump shaft moves with the engine idling. Compare the results to the Specifications.

7 If adjustment is required, loosen the locknut and turn the adjusting bolt *clockwise* to decrease the stroke or *counterclockwise* to increase the stroke. When it is correct, retighten the locknut and install the muffler.

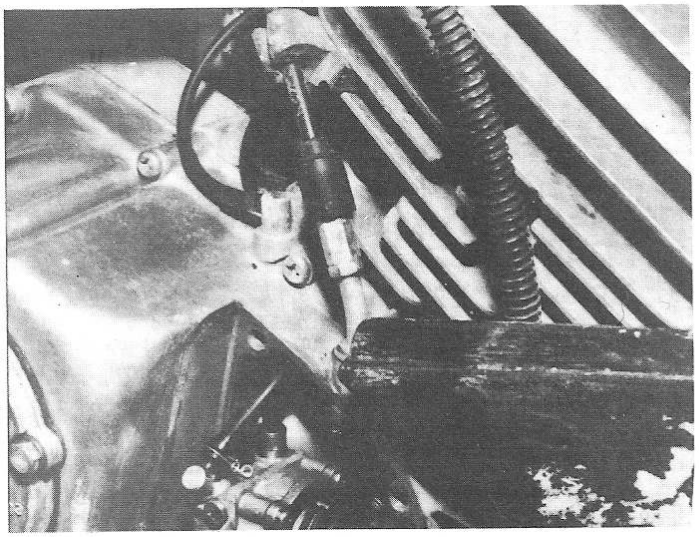
8 The pump must be bled if the Autolube tank runs dry, any portion of the system is disconnected or the machine tips over and remains on its side.

9 Remove the bleed screw and allow the oil to run out until all air bubbles disappear, then reinstall the screw and start the engine (if the gasket on the screw is damaged, replace it with a new one).

10 Pull the pump cable housing all the way out to set the pump stroke to maximum. Keep the engine running at about 2000 rpm for two minutes or so to ensure that the distributor and line are completely bled. Install the pump cover.



36.12a If the plunger pin and mark on the pump pulley are not aligned, . . .

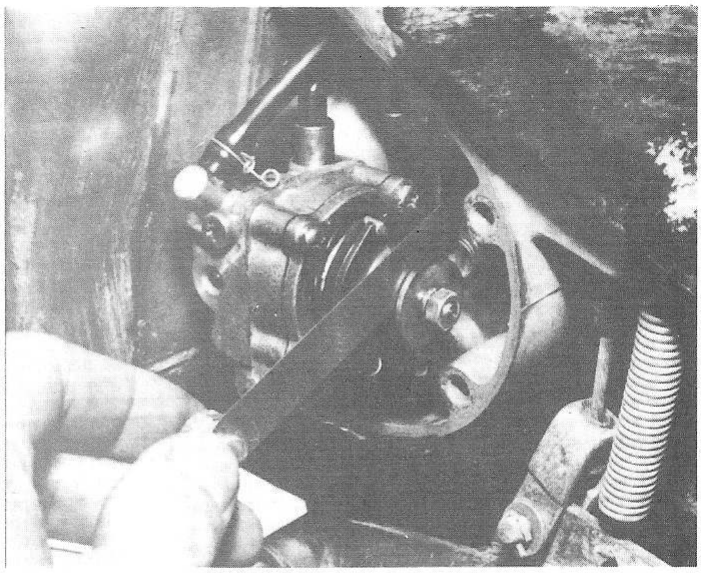


36.12b . . . loosen the locknut and turn the cable adjuster until they are

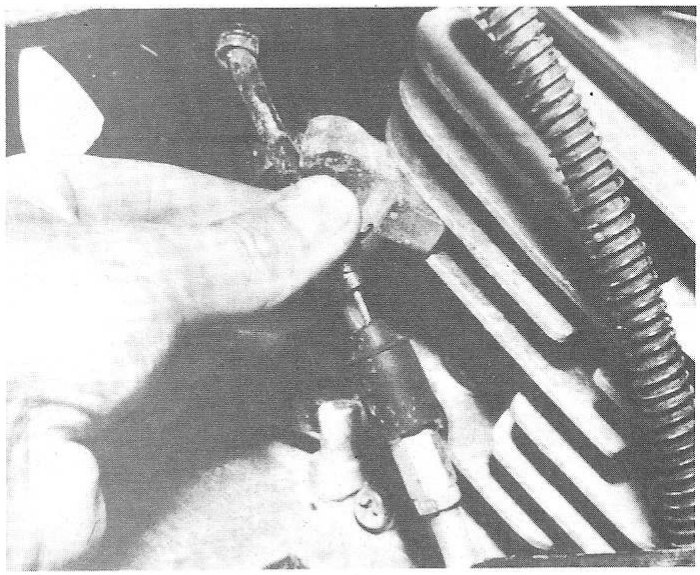
All others

11 Adjust the throttle cable free play to the specified amount by turning the adjuster at the carburetor.

12 Remove the pump cover and close the throttle completely, then see if the plunger pin is aligned with the mark on the pump pulley (photo). If they are not aligned, loosen the cable adjuster locknut and

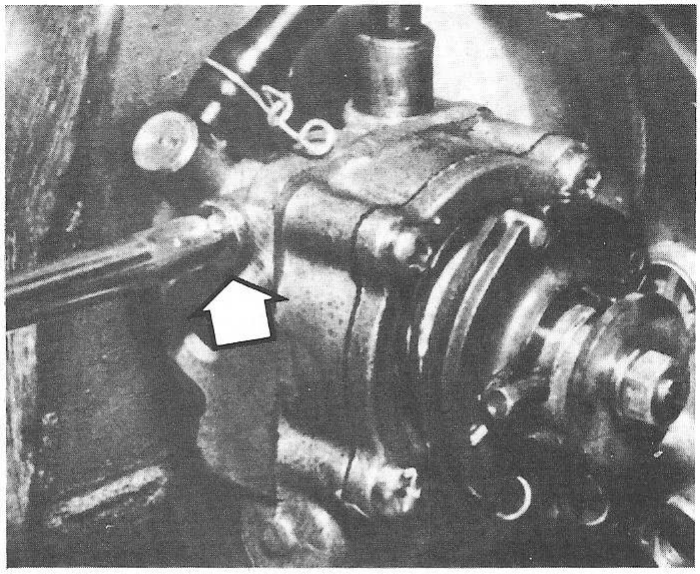


36.14 Using a feeler gauge to measure the gap between the adjust plate and the raised portion of the pulley



36.19 Pull the cable housing out to set the pump stroke at maximum when bleeding the system

turn the adjuster until they are (photo).
13 Start the engine and watch the end of the pump shaft. When it reaches the end of its stroke, quickly stop the engine.
14 Using a feeler gauge, measure the gap between the adjust plate and the raised portion of the pulley (do not force the gauge into the gap) (photo).
15 Repeat the procedure several times to ensure that the stroke is at a minimum. When the gap is the widest, the stroke is considered to be at the minimum. Compare the results to the Specifications.
16 If adjustment is required remove the locknut and separate the plate from the pump. Remove or add shims behind the plate to change the clearance. **Note:** *Thicker shims will increase pump stroke and output, while thinner shims will decrease it.*
17 The pump must be bled if the Autolube tank runs dry, any portion of the system is disconnected or the machine tips over and remains on its side.
18 Remove the bleed screw (photo) and allow the oil to run out until all air bubbles disappear, then reinstall the screw and start the engine (if the gasket on the screw is damaged, replace it with a new one).
19 Pull the pump cable housing all the way out to set the pump stroke to maximum (photo). Keep the engine running at about 2000 rpm for two minutes to ensure that the distributor and line are completely bled.
20 Install the pump cover and tighten the screws securely.



36.18 Removing the bleed screw

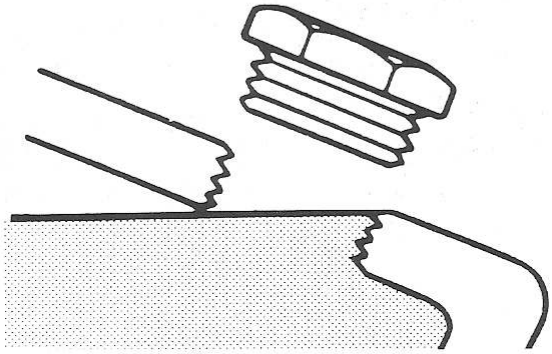


Fig. 1.49 Correct final drive gear oil level (Sec 38)

37 Cylinder head and exhaust system — decarbonization

1 Since two-stroke engines burn oil as a part of the lubrication process, carbon build-up can be a problem.
2 The exhaust system and cylinder head should be removed periodically and the carbon deposits should be scraped or wire brushed away. Chemicals that will remove carbon are available at auto parts stores, but they should be used with extreme care to avoid damage to parts.
3 Refer to Chapter 2 for the cylinder head removal procedure. When scraping the carbon away, be very careful not to gouge or scratch the combustion chamber (use a rounded scraper) or the gasket mating surface of the head. A wire brush can be used, but protect the gasket mating surface or leaks could result.

38 Final drive gear oil level — check

1 Place the machine on a level surface. The engine must be completely cool when this check is made.
2 Clean the area around the final drive assembly oil filler cap, then remove the cap. The level should be at the upper outside edge of the threaded hole as shown in the accompanying illustration. If the level is low, add enough oil of the recommended grade and type to bring it up to the specified point. Be very careful not to get any dirt into the final drive unit.
3 Clean the filler cap, then reinstall and tighten it securely.

39 Final drive gear oil — change

1 Ride the machine for several miles before performing this opera-

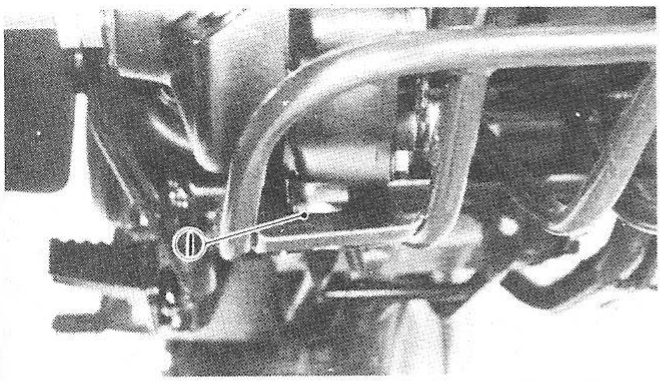


Fig. 1.50 Final drive gear oil drain plug (1) (Sec 39)

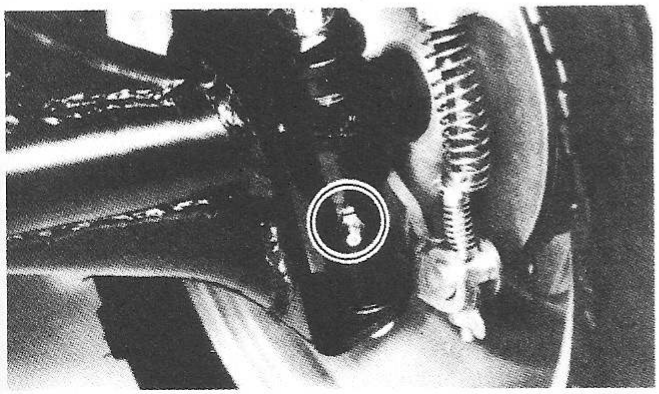


Fig. 1.52 Knuckle shaft lubrication fitting (Sec 41)

tion. This will ensure that the old oil and contaminants drain completely.
2 Clean the area around the final drive gear housing drain plug and filler cap. This will help prevent the entry of dirt when the plugs are removed.
3 Place a clean drain pan under the housing, then remove the filler cap and the drain plug. Allow the oil to drain into the pan, then clean the plug and drain hole thoroughly. Reinstall the drain plug and tighten it securely.
4 Pour new gear oil of the recommended grade and type into the filler hole until the level reaches the upper outside edge of the hole (refer to Section 38 if necessary).
5 Clean the filler cap and reinstall it.

40 Steering linkage — check

1 The steering linkage on four wheel ATV's should be checked periodically for damage and play.
2 Try to move the handlebars up-and-down and back-and-forth. If excessive play is evident, the bushings on the shaft must be replaced with new ones.
3 Turn the handlebar to one side until it stops, then move it back-and-forth slightly. While moving the bar, check for slop in the balljoints on the tie-rods. Any vertical play indicates that new balljoints are required.
4 Raise the front of the machine and support it securely on jackstands.
5 Grasp each tire at the top and try to rock it back-and-forth. If excessive play is noted, check the wheel bearings, the knuckle bushings, the thrust covers, the collars and the knuckle shafts (see Chapters 5 and 6).

41 Knuckle shaft — lubrication

1 At the recommended intervals, lubricate the knuckle shafts and steering shaft mount on four wheel ATV's with lithium-base grease.
2 Grease zerks are provided so a grease gun can be used and no

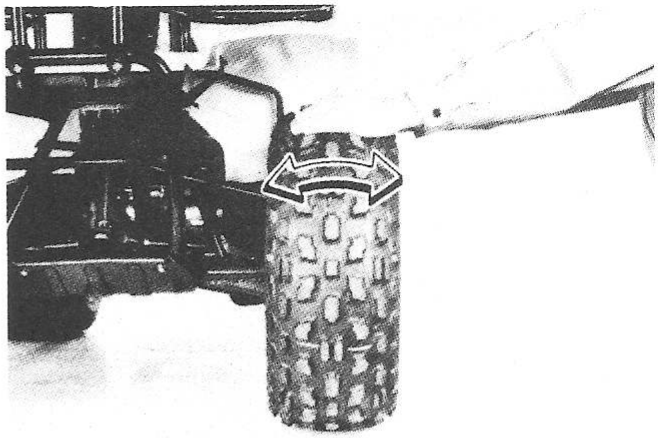


Fig. 1.51 Checking the knuckle shafts for wear (Sec 40)

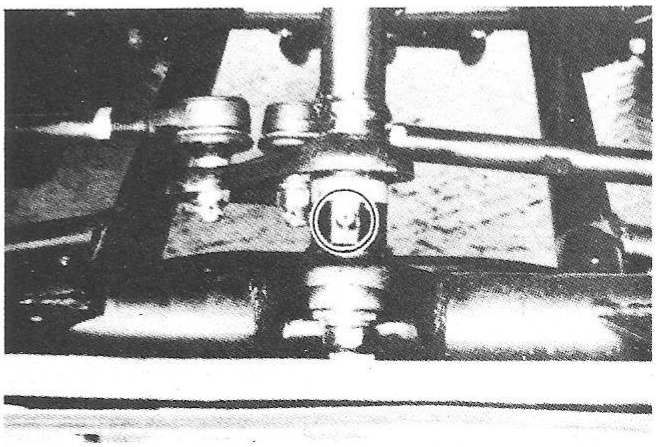


Fig. 1.53 Steering shaft lubrication fitting (Sec 41)

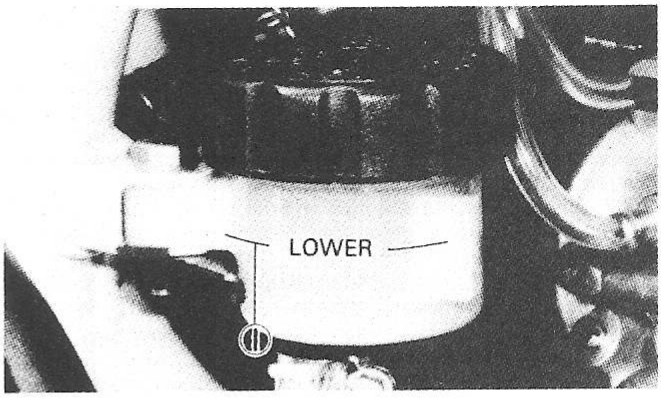


Fig. 1.54 On YTZ 250 models, the brake fluid level in the rear brake master cylinder must be maintained above the lower mark (1) (Sec 42)

disassembly is required. Be sure to wipe off the grease fittings before attaching the grease gun to them.

42 Brake fluid level — check

1 In order to ensure proper operation of the hydraulic disc brakes, the fluid level in the master cylinders must be properly maintained.
2 When checking the front brake fluid level, turn the handlebars until the top of the master cylinder is as level as possible. If necessary, loosen the brake lever clamp and rotate the master cylinder assembly slightly to make it level.
3 A transparent master cylinder reservoir is used at the rear, while

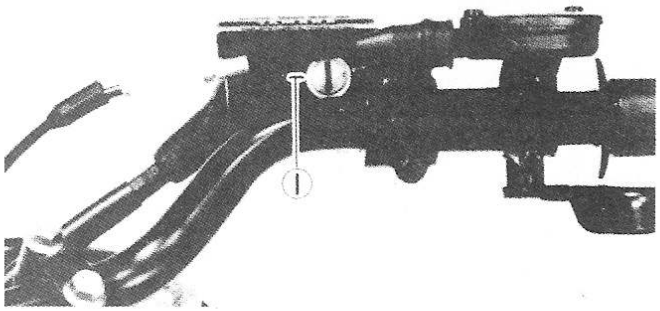


Fig. 1.55 The front brake fluid level must be above the mark on the reservoir (Sec 42)

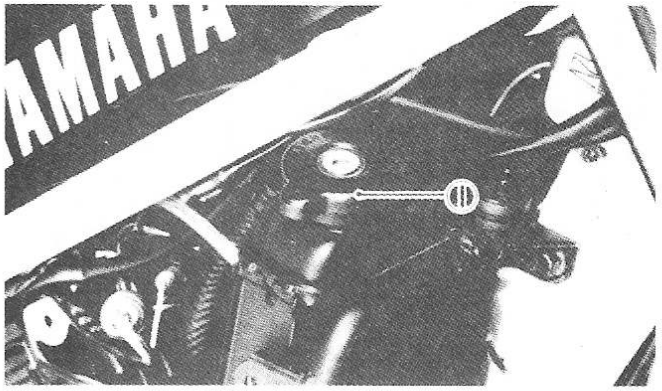


Fig. 1.56 The right side shroud must be detached to gain access to the radiator cap (1) (Sec 43)

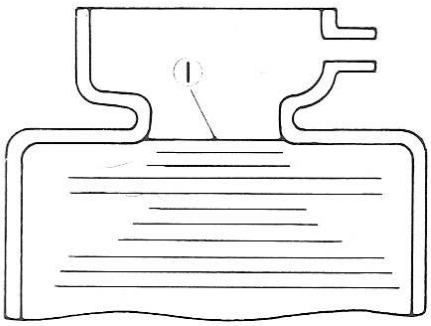


Fig. 1.57 Correct coolant level (1) in the radiator (Sec 43)

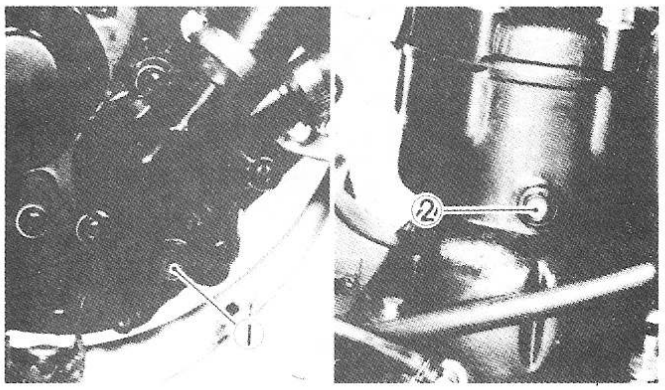


Fig. 1.58 When draining the coolant, remove the pump cover drain bolt (1) and the cylinder drain bolt (2) (Sec 45)

a window is provided in the front reservoir. Check to make sure that the fluid level is above the mark on the reservoir body.

4 If the level is low the fluid must be replenished. Before removing the master cylinder cap cover any painted areas to protect them from brake fluid spills and remove all dust and dirt from the area around the cap.

5 To add fluid to the front brake reservoir, remove the screws and lift off the cap and rubber diaphragm. The rear brake reservoir has a screw-on cap. Do not operate the brake lever with the cap removed.

6 Add new, clean brake fluid of the recommended type until the level is above the mark. Do not mix different brands of brake fluid in the reservoir, as they may not be compatible.

7 Replace the rubber diaphragm and the cover. Tighten the screws evenly, but do not overtighten them. Tighten the rear brake master cylinder cap securely.

8 If the brake fluid level was low, check the entire system for leaks.

9 Wipe any spilled fluid off the reservoir body and reposition and tighten the front brake lever and master cylinder assembly if moved.

43 Coolant level — check

Caution: *The engine must be cool to the touch when this check is performed. Never remove the radiator cap when the engine is hot as serious injury could occur.*

1 Detach the radiator shroud by removing the mounting screws. Remove the radiator cap by turning it counterclockwise.

2 The level is correct if it is at or near the narrow portion of the radiator neck. If it is low, add the specified coolant until the level is correct.

3 Reinstall the radiator cap and shroud when the check is complete.

44 Cooling system — check

Note: *Refer to Section 43 and check the coolant level before performing this check.*

1 The entire cooling system should be checked carefully at the recommended intervals. Look for evidence of leaks, check the condition of the coolant and check the radiator for clogged fins and damage.

2 Examine each of the rubber coolant hoses along its entire length. Look for cracks, abrasions and other damage. Squeeze each hose at various points. They should feel firm yet pliable, and return to their original shape when released. If they are dried out or hard replace them with new ones.

3 Check for evidence of leaks at each cooling system joint. Tighten the hose clamps carefully to prevent future leaks.

4 Remove the plastic radiator shrouds and check the radiator for evidence of leaks and other damage. Leaks in the radiator leave telltale scale deposits or coolant stains on the outside of the core below the leak. If leaks are noted, remove the radiator (refer to Chapter 2) and have it repaired at a radiator shop or replace it with a new one. **Caution:** *Do not use a liquid leak stopping compound to try to repair leaks.*

5 Check the radiator fins for mud, dirt and insects which may impede the flow of air through the radiator. If the fins are dirty force water or low pressure compressed air through the fins from the backside. If the fins are bent or distorted straighten them carefully with a screwdriver.

6 Remove the radiator cap and check the condition of the coolant in the radiator. If it is rust colored or if accumulations of scale are visible in the radiator, drain, flush and refill the system with new coolant. Check the cap gaskets for cracks and other damage. Have the cap tested by a dealer service department or replace it with a new one. Replace the cap and install the radiator cover.

7 Start the engine and let it reach normal operating temperature, then check for leaks.

8 If the coolant level is consistently low, and no evidence of leaks can be found, have the entire system pressure checked by a Yamaha dealer service department, motorcycle repair shop or service station.

45 Cooling system — draining, flushing and refilling

Caution: *Allow the engine to cool completely before performing this maintenance operation.*

1 Remove the plastic radiator shroud and loosen the radiator cap. Place a large, clean drain pan under the front of the engine.
2 Remove the drain bolt from the side of the water pump and allow the coolant to drain into the pan. **Note:** *The coolant will rush out with considerable force, so position the drain pan accordingly.* Remove the radiator cap completely to ensure that all of the coolant can drain.
3 Remove the drain bolt from the cylinder and allow the coolant to drain into the pan.
4 Flush the system with clean tap water by inserting a garden hose in the radiator filler neck. Allow the water to run through the system until it is clear when it exits the drain holes. If the radiator is extremely corroded remove it by referring to Chapter 2 and have it cleaned at a radiator shop.
5 Check the drain bolt gaskets for damage. Replace them with new ones if necessary.
6 Clean the holes, then install the drain bolts and tighten them securely.
7 Pour a 50/50 mixture of soft water and new ethylene glycol based antifreeze into the radiator until it is full. Start the engine and allow it to run for several minutes — but do not allow it to reach normal operating temperature.
8 Stop the engine. Cover the radiator cap with a heavy rag and loosen it to the first stop to allow any pressure in the system to bleed off before the cap is removed completely. Recheck the coolant level in the radiator. If it is low, add more coolant until it reaches the top of the radiator. Reinstall the cap.
9 Start the engine again and allow it to run until it reaches normal operating temperature. Check the system for leaks.
10 Do not dispose of the old coolant by pouring it down the drain. Instead, pour it into a heavy plastic container, cap it tightly and take it to an authorized disposal site or a service station.

Chapter 2 Part A Two-stroke engines

Contents

Specifications

Engine

Bore	
YT 60	1.73 in (44 mm)
YT 125	2.20 in (56 mm)
YT 175	2.6 in (66 mm)
YTZ 250	2.68 in (68 mm)
Stroke	
YT 60	1.54 in (39.2 mm)
YT 125	1.97 in (50 mm)
YT 175	2.0 in (50 mm)
YTZ 250	2.68 in (68 mm)
Displacement	
YT 60	59 cc
YT 125	123 cc
YT 175	171 cc
YTZ 250	246 cc
Compression ratio	
YT 60	6.6:1
YT 125	6.4:1
YT 175	5.2:1
YTZ 250	7.7:1
Cylinder head warpage limit	
YT 60/YTZ 250	0.0012 in (0.03 mm)
YT 125/175	0.002 in (0.05 mm)
Cylinder bore diameter	
YT 60	1.7320 to 1.7328 in (43.993 to 44.012 mm)
YTZ 250	2.6808 in (68.020 mm)
Cylinder bore wear limit	
YT 60	1.7362 in (44.1 mm)
YT 125/175	2.21 in (56.10 mm)
Cylinder bore taper limit	0.002 in (0.05 mm)
Cylinder bore out-of-round limit	0.0004 in (0.01 mm)

Piston diameter	
YT 60	1.7304 to 1.7312 in (43.952 to 43.972 mm)
YTZ 250	2.678 to 2.680 in (67.94 to 68.00 mm)
Measuring point	
YTZ 250	1.22 in (31 mm) from bottom of skirt
All others	0.390 in (10 mm) from bottom of skirt
Cylinder-to-piston clearance (max.)	
YT 60	0.0016 to 0.0019 in (0.040 to 0.045 mm)
YT 125	0.0014 to 0.0016 in (0.035 to 0.040 mm)
YT 175	0.0016 to 0.0018 in (0.040 to 0.045 mm)
YTZ 250	0.0024 to 0.0026 in (0.060 to 0.065 mm)
Piston ring-to-groove clearance	
YT 60	0.0012 to 0.0020 in (0.03 to 0.05 mm)
YT 125	
Top ring	0.0008 to 0.0024 in (0.02 to 0.06 mm)
Bottom ring	0.0012 to 0.0028 in (0.03 to 0.07 mm)
YT 175	0.002 to 0.003 in (0.04 to 0.08 mm)
YTZ 250	
Top ring	0.001 to 0.002 in (0.03 to 0.05 mm)
Bottom ring	0.001 to 0.003 in (0.03 to 0.07 mm)
Piston ring end gap	
YT 60	0.0059 to 0.0118 in (0.15 to 0.30 mm)
YT 125/175	0.012 to 0.020 in (0.30 to 0.50 mm)
YTZ 250	0.014 to 0.020 in (0.35 to 0.50 mm)
Connecting rod side clearance (big end) limit	
YT 60/125	0.0138 to 0.0217 in (0.35 to 0.55 mm)
YT 175	0.003 to 0.008 in (0.20 to 0.70 mm)
YTZ 250	0.0098 to 0.0295 in (0.25 to 0.75 mm)
Connecting rod small end free play limit	
YT 60/175/YTZ 250	0.0787 in (2.0 mm)
YT 125	0.030 to 0.040 in (0.8 to 1.0 mm)
Crankshaft width (between outside faces of flywheels)	
YT 60	1.4921 to 1.4941 in (37.90 to 37.95 mm)
YT 125	2.198 to 2.200 in (55.95 to 56.00 mm)
YT 175	2.196 to 2.198 in (56.90 to 56.95 mm)
YTZ 250	2.438 to 2.440 in (61.95 to 62.00 mm)
Crankshaft runout limit (on bearing surfaces)	0.0012 in (0.03 mm)
Reed plate warpage limit	
YT 60	0.030 in (0.8 mm)
YT 125/175	0.008 in (0.2 mm)
YTZ 250	0.022 in (0.6 mm
Stopper plate-to-reed block clearance	
YT 60	0.190 ± 0.008 in (4.8 ± 0.2 mm)
YT 125	0.240 in (6 mm)
YT 175	0.350 in (9 mm)
YTZ 250	0.472 ± 0.008 in (12 ± 0.2 mm)
Autolube pump output (maximum throttle — 200 strokes)	
YT 60	0.91 to 1.06 cc
YT 125	4.17 to 4.80 cc
YT 175	3.29 cc

Clutch

Clutch spring free length	
YT 60	1.45 in (36.8 mm)
YT 125	0.68 in (17.3 mm)
YT 175	0.60 in (15.2 mm)
YTZ 250	1.374 in (34.9 mm)
Off spring free length	
YT 125	1.15 in (29.2 mm)
YT 175	1.36 in (34.6 mm)
Clutch spring minimum length	
YT 60	1.37 in (34.8 mm)
YT 125	0.64 in (16.3 mm)
YT 175	See free length
YTZ 250	1.335 in (33.9 mm)
Off spring minimum length	
YT 125	1.14 in (29.0 mm)
YT 175	See free length
Friction disc thickness	
Standard	
YT 125/175	0.090 in (2.4 mm)
YTZ 250	0.120 in (3.0 mm)
Service limit	
YT 125/175	0.080 in (2.1 mm)
YTZ 250	0.110 in (2.7 mm)

Clutch (continued)

Metal clutch plate warpage limit	0.002 in (0.05 mm)
Clutch gap adjustment	
YT 125	0.071 in (1.8 mm)
YT 175	0.063 in (1.6 mm)
Pushrod runout limit (YTZ 250 only)	0.008 in (0.2 mm)
Clutch housing thrust clearance (YTZ 250 only)	0.0067 to 0.009 in (0.17 to 0.23 mm)
Clutch housing radial clearance (YTZ 250 only)	0.0012 to 0.0217 in (0.03 to 0.55 mm)
Clutch shoe wear limit (YT 60 only)	0.030 in (0.7 mm)

Transmission

Mainshaft runout limit	
YT 60	0.008 in (0.2 mm)
All others	0.0004 in (0.01 mm)
Countershaft runout limit	0.0004 in (0.01 mm)
Shift fork shaft runout limit (YTZ 250 only)	0.002 in (0.05 mm)

Torque specifications	Ft-lbs	m-Kg
Cylinder head nuts		
YT 60	7.2	1.0
YT 125/175	22	3.0
YTZ 250	18	2.5
Cylinder nuts (all)	25	3.5
AC generator rotor nut		
YT 60	31	4.3
YT 125/175	51	7.0
YTZ 250	58	8.0
Primary drive gear nut		
YT 60	22	3.0
YT 125/175	40	5.5
YTZ 250	85	11.5
Clutch hub nut		
YT 125	29	4.0
YT 175	27	3.8
YTZ 250	54	7.5
Drive sprocket nut		
YT 125/175	40	5.5
YTZ 250	54	7.5
Engine mounts		
YT 60		
Upper	35	4.8
Lower (6 mm)	7.2	1.0
Lower (8 mm)	17	2.3
YT 125		
Upper	18	2.5
Lower	29	4.0
YT 175		
Upper	22.5	3.1
Lower	30.5	4.2
YTZ 250		
Upper bracket-to-engine	40	5.5
All others	22	3.0

1 General information

The YT 60, 125 and 175 models are powered by an air-cooled engine, while the YTZ 250 has a liquid-cooled engine. The cylinder barrel on each engine has a steel sleeve to improve durability. Engine lubrication is accomplished by an Autolube pump or oil mixed with the gas (YTZ 250 only).

The crankcase is a vertically-split, two-piece cast aluminum assembly. Ball bearings or roller bearings are used on all rotating components. The crankshaft is pressed together with a one-piece connecting rod. Lubrication in the transmission case is by oil splash.

A 5-speed, constant-mesh transmission is used on all models except the YT 60, which has a single speed. The wet, multiplate clutch is mounted on the right end of the transmission mainshaft. YT 60 models are equipped with a centrifugal clutch. The rotor/AC generator and CDI ignition components are mounted on the left end of the crankshaft.

Note: *If service or repair of the shaft drive output gear components used on YT 60 models is required it must be done by a Yamaha dealer service department.*

2 Major engine repair — general note

1 It is not always easy to determine when an engine should be overhauled, as a number of factors must be considered.

2 High mileage is not necessarily an indication that an overhaul is necessary, while low mileage does not preclude the need for an overhaul. Frequency of servicing is probably the single most important consideration. An engine that has regular required maintenance will most likely give many miles of reliable service. Conversely, a neglected engine, or one which had not been broken in properly, may require an overhaul very early in its life.

3 Perform a cylinder compression check to determine the condition of the piston rings.

4 If the engine is making obvious knocking or rumbling noises, the connecting rod and/or main bearings are probably at fault.

5 Loss of power, rough running and high fuel consumption may also point to the need for an overhaul, especially if they are all present at the same time. If a complete tune-up does not remedy the situation, major mechanical work is the only solution.

6 An engine overhaul generally involves restoring the internal parts to the specifications of a new engine. During an overhaul the piston rings and/or the piston are replaced with new ones and the cylinder may require boring and/or honing. The main and connecting rod bearings are generally replaced with new ones and, if necessary, the crankshaft is also replaced. While the engine is being overhauled other components, such as the carburetor, can be rebuilt as well. The end result should be a like-new engine that will give many trouble-free miles.
7 Before beginning the engine overhaul, read through the related procedures to familiarize yourself with the scope and requirements of the job. Overhauling an engine is not difficult, but it is time consuming. Plan on the machine being tied up for a minimum of two weeks. Check on the availability of parts and make sure that any necessary special tools, equipment and supplies are obtained in advance.
8 Most work can be done with typical hand tools, although a number of precision measuring tools are required for inspecting parts to determine if they must be replaced. Often a dealer service department or motorcycle repair shop will handle the inspection of parts and offer advice concerning reconditioning or replacement. As a general rule, time is the primary cost of an overhaul, so it doesn't pay to install worn or substandard parts.
9 As a final note, to ensure maximum life and minimum trouble from a rebuilt engine, everything must be assembled with care in a spotlessly clean environment.

3 Crankcase pressure and vacuum test

1 The engine used in these models is a two-stroke design. As a result, the crankcase, as well as the cylinder, must be completely sealed for the engine to run properly. If air leaks occur at the crankshaft seals, the cylinder-to-crankcase mating surface, the crankcase parting line or the reed valve mounting surface, the engine will run poorly.
2 An engine with crankcase leaks may exhibit one or more of the following symptoms:

Erratic operation, particularly at idle (takes a long time for engine rpm to drop to normal idle speed, or idle speed fluctuates [surges] from very slow to relatively fast speeds).
Unusual surges of power or power increases.
Frequent spark plug fouling (plug appears black/oily).
Frequent drop in transmission oil level or oil coming out of transmission vent.
Limited top speed (may run well part of the time).
Frequent 'whiskering' of spark plug (plug appears white or gray).
Oil residue inside AC generator cover.
Oil residue on cooling fins around cylinder head or base gaskets.
Piston seizure or holed piston.

3 In order to thoroughly check all of the components involved, crankcase pressure and vacuum tests should be performed. The vacuum test (in addition to the pressure test) is required to adequately check the condition of the crankshaft seals.
4 To perform the tests you will need a crankcase vacuum/pressure testing kit (available from Yamaha dealers) or a suitable home-made substitute. If the necessary tools and test equipment are not available, or are too expensive, a Yamaha dealer service department or motorcycle repair shop can perform the tests and make repair recommendations.
5 A pressure/vacuum testing kit (photo) can be assembled using the following items:

Vacuum/pressure gauge — *Many automotive style vacuum gauges are designed to read both engine manifold vacuum and fuel pump pressure, making them ideal for use in this procedure. They are readily available at auto parts and tool stores and are relatively inexpensive. As an alternative, two separate gauges (one pressure and one vacuum) can be used.*

Threaded fitting for spark plug hole — *This fitting (available at auto parts stores) will be installed in the plug hole and should have a provision for attaching a hose.*

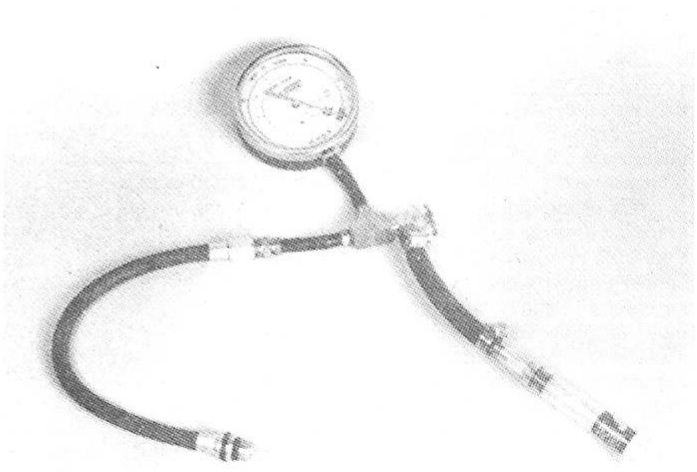
Pressure pump — *A small bicycle tire pump or pump used to pressurize motorcycle air forks would be ideal.*

T-fitting — *Used to connect the gauge, pump and valve to the spark plug hole fitting.*

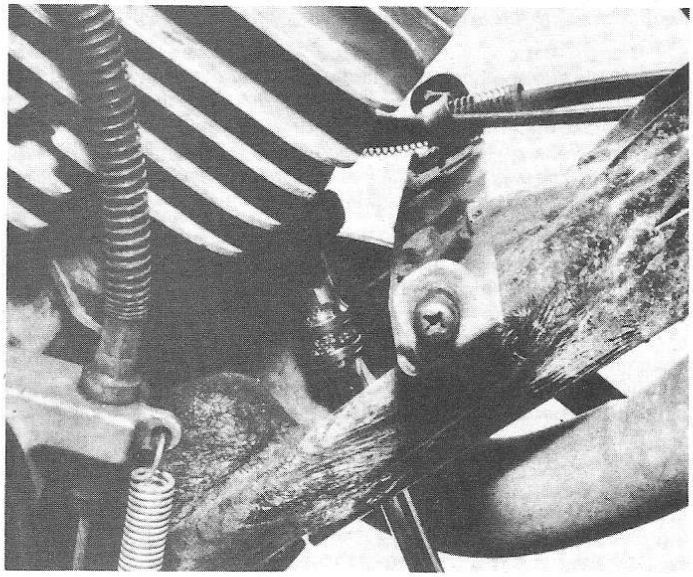
Shut-off valve — *Small air or water line shut-off valve available at hardware stores (to be installed in the line between the pump and the gauge).*

Expandable automotive freeze plugs — *Rubber plugs (available at auto parts stores) which come in various diameters. Buy two — one to seal off the intake manifold and one to seal off the exhaust port. As an alternative, a piece of solid steel or aluminum bar stock of the proper diameter can be used to seal the intake manifold (slip it into the manifold and tighten the clamp band).*

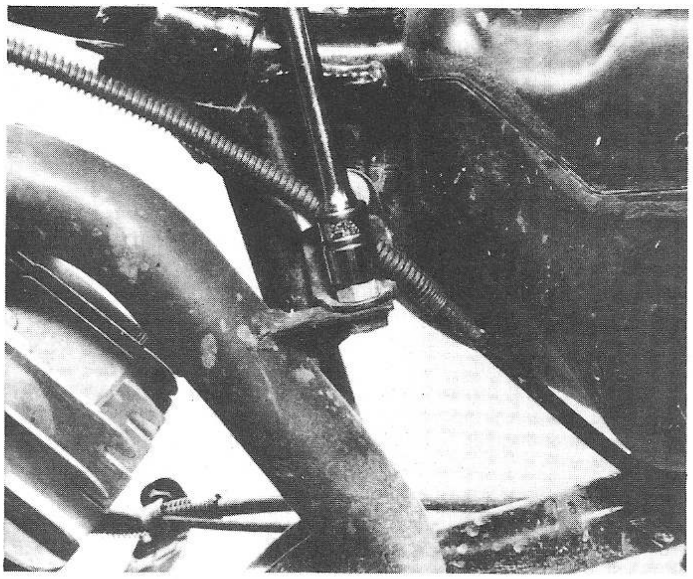
Rubber hose — *This will be used to connect the pump to the shut-off valve, the gauge to the valve and the valve/gauge to the spark plug hole fitting. Automotive vacuum hose or fuel line is ideal.*
6 In addition to the components mentioned above, you will also need a mixture of dishwashing soap and water and a small paint brush. Also, a number of common hand tools and a special AC generator rotor puller will be necessary, since the engine may have to be partially disassembled to perform the tests. Engine removal is not necessary.
7 If the engine is in the frame, remove the seat/fender assembly, the fuel tank cover and the exhaust pipe. Loosen both carburetor clamp bands, then slip the carburetor out of the intake manifold and the air cleaner boot and support it to one side. Leave the intake manifold opening clear.
8 Use the two expandable freeze plugs to seal off the intake manifold and exhaust port openings.
9 Remove the spark plug, clean the seat around the hole, rotate the crankshaft until the piston is at BDC (bottom dead center) and install the threaded fitting in the spark plug hole. Connect the gauge, shut-off valve and pump as shown in the accompanying illustration (photo 3.5). Use hose clamps at all hose junctions to prevent leaks in the tester itself.
10 Slowly operate the pump (with the shut-off valve open) until the gauge indicates 6 psi. **Caution:** *Do not pressurize the crankcase above 6 psi, as damage to the crankshaft seals will result. Close the shut-off valve and observe the gauge closely.*
11 Ideally, the pressure should remain at 6 psi for at least 6 minutes. If it does, the crankcase is sealed properly. If the pressure drops more than 1 psi during the first minute, the crankcase is leaking excessively and repair is absolutely essential. If the pressure drops less than 1 psi during the first minute, but cannot be maintained between 5 and 6 psi for at least 3 minutes, repair is not essential but should be considered.
12 If the pressure drops, check the tester hose fittings and the intake and exhaust plugs for leaks before blaming the engine. If the test equipment is working properly, proceed as follows. Keep in mind that as the pressure drops due to a leak, it must be brought back to approximately 6 psi by operating the pump during the following tests.
13 Check all engine gaskets for leaks by applying the soapy water solution to the gasket mating surfaces with the paint brush. Check the head gasket, the cylinder base gasket, the reed valve gasket and the crankcase joint gasket. In order to adequately check the head and



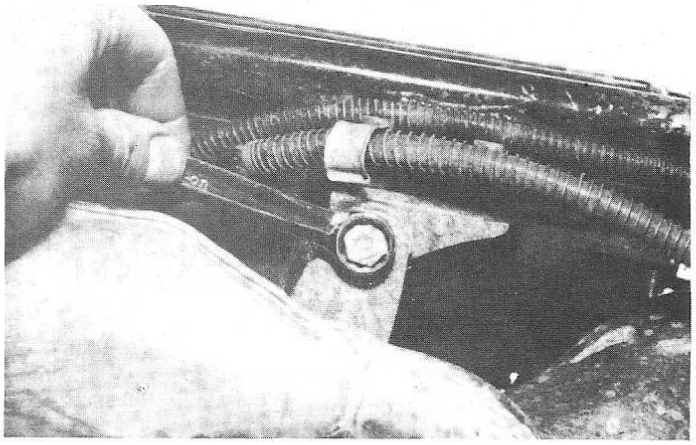
3.5 Crankcase vacuum/pressure testing equipment



5.11a Removing the exhaust pipe-to-cylinder flange nuts (YT 125)



5.11b Removing the front exhaust pipe mounting bolt (YT 125)



5.11c Removing the rear exhaust pipe mounting bolt (YT 125)

cylinder base gaskets the machine should be tipped on its side. If leaks are detected (by bubbles forming in the soapy water solution), the gasket in question will have to be replaced.

14 Apply the soapy water solution to the area around the cylinder head nuts and the fitting in the spark plug hole. Leaks around the head nuts indicate a bad cylinder head gasket. If leaks occur around the spark plug hole, the plug seat may have to be remachined.

15 If everything checks to this point, the most likely cause of pressure loss is the crankshaft seal. If the right side seal is leaking, pressure will be built up in the transmission case. Detach the vent line from the vent fitting and apply the soapy water solution to the fitting. If pressure is being built up in the transmission, a bubble should form.

16 A more conclusive check requires the removal of the right side crankcase cover and the primary drive gears (which will expose the right side crankshaft seal. Check for leaks between the seal and the spacer and between the spacer and the crankshaft. If a leak occurs between the spacer and the crankshaft, the O-ring on the crankshaft must be replaced.

17 The left side seal can be checked in the same manner after removing the recoil starter or case cover, the rotor and the stator assembly (refer to the appropriate Sections in this Chapter).

18 If the seals are leaking, they must be replaced with new ones. It is possible to remove and replace them without disassembling the engine and removing the crankshaft, but damage to the crankshaft could result so disassembly is recommended.

19 Once the test is complete make sure that all traces of the soapy water solution are removed from the crankshaft, as rust damage could result.

4 Repair operations requiring engine removal

1 Although many repair operations can be performed with the engine in the frame, others, especially those related to the lower end and the transmission, require that it be removed.

2 Inspection and repair or replacement of the following components requires the removal of the engine:

Crankcase
Crankshaft/connecting rod
Transmission shafts/gears
Shift drum/shift forks
Crankshaft and transmission bearings
Crankshaft seals

3 Components and systems other than those mentioned above are accessible for inspection, repair or replacement with the engine in the frame.

5 Engine — removal and installation

1 Go to the beginning of this book and read the Sections on *Maintenance techniques, tools and working facilities* and *Safety first*. Note especially that your working area throughout the entire teardown, overhaul and reassembly procedure must be spotlessly clean. This includes the machine and the engine itself, which should be cleaned as thoroughly as possible before beginning any operation in this Chapter.

2 Engine removal should be done with the aid of an assistant to avoid damage if the engine falls or is dropped.

3 Remove the seat and rear fender assembly. Store it out of the way until the end of the procedure you are performing. On YT 125/175 models remove the fuel tank cover bolts and detach the cover.

4 On YTZ 250 models refer to Chapter 1 and drain the coolant, then separate the hoses from the water pump and radiator. Remove the right-side footrest assembly. The YEIS chamber hose must be disconnected as well.

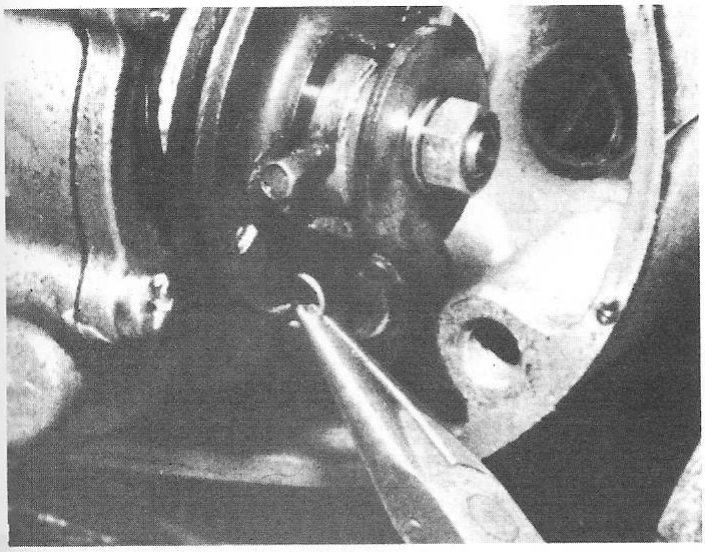
5 Refer to Chapter 1 and drain the transmission oil. While the oil is draining you can perform other removal procedures.

6 Remove the spark plug lead and loop it around the frame to keep it out of the way.

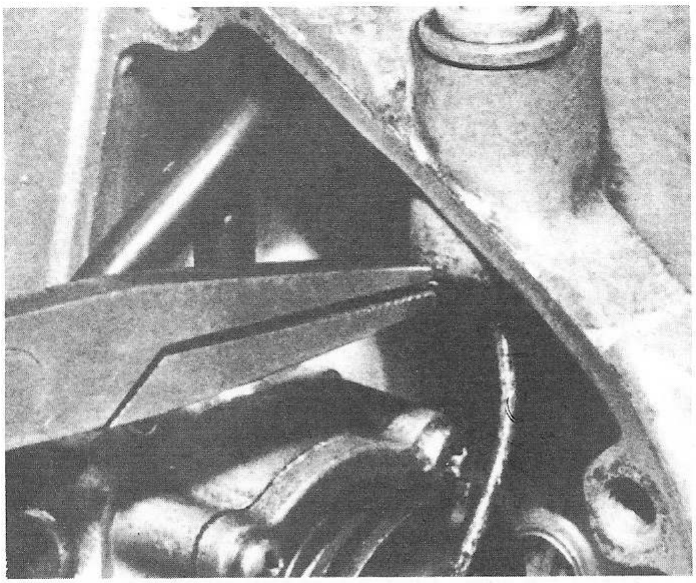
7 On YTZ 250 models detach the cylinder head-to-frame brackets and remove the hose from the head fitting.

8 Disconnect the electrical connectors for the ignition system and lighting coil and separate the wires from the frame so they won't hang up when the engine is removed.

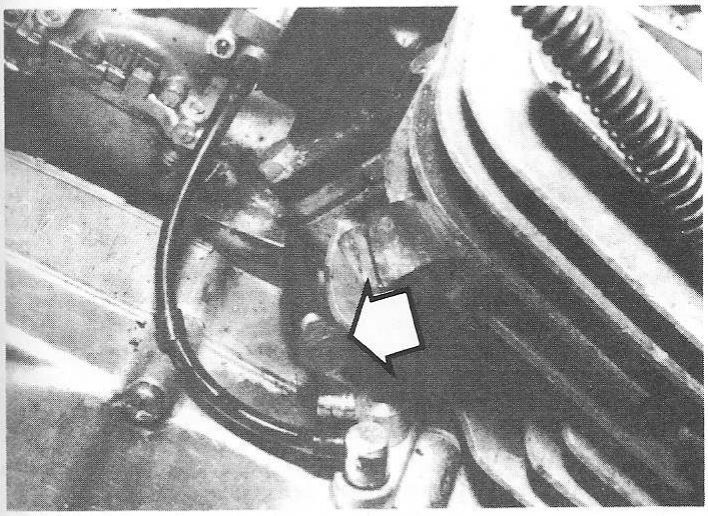
9 Trace the clutch cable (*YTZ 250 only*) to the lever on the left crankcase cover and detach it from the lever and crankcase mount. Detach the vacuum hose that leads to the fuel pump at the crankcase.



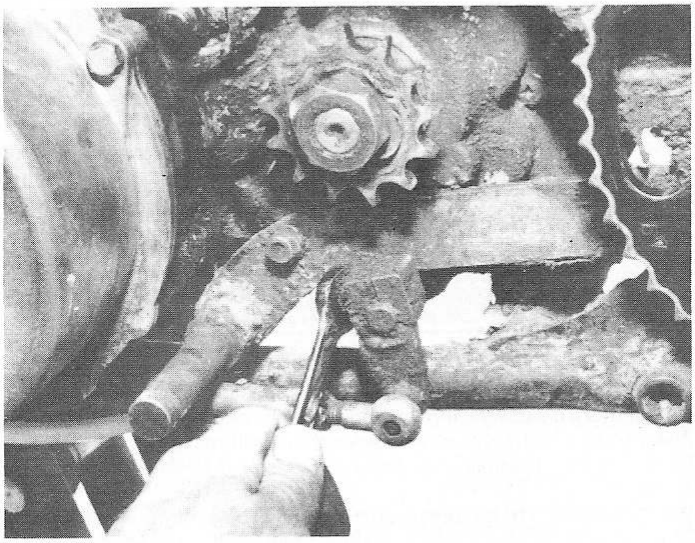
5.13a The small clip on the pulley must be removed to detach the cable from the Autolube pump



5.13b The clip on the cable end must be removed to pull the cable housing out of the case

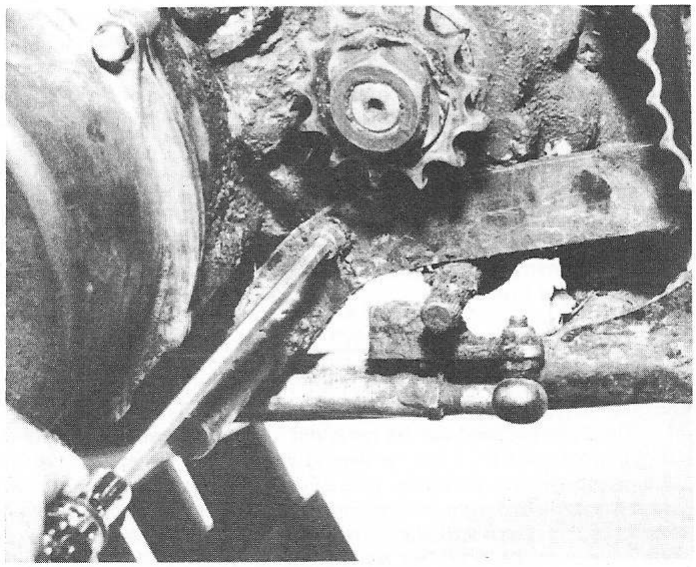


5.15 Plug the end of the Autolube hose with a bolt to prevent oil from running onto the engine



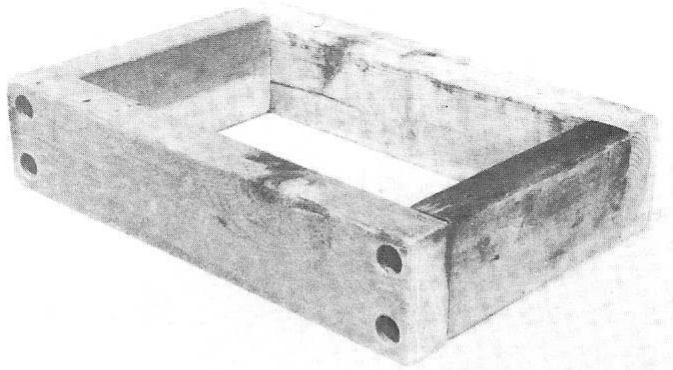
5.16 Removing the shift lever mounting bolt

10 On YTZ 250 models only detach the rear brake reservoir from the frame.
11 Remove the exhaust pipe and muffler assembly. Some are held in place with nuts/bolts (photos), while others are held in place with a combination of springs, nuts and bolts.
12 Remove the drive chain by referring to Chapter 1.
13 Remove the Autolube pump cover, disconnect the cable and pull the cable out of the crankcase (photos). Wrap it around the frame, out of the way.
14 The transmission oil should now be completely drained. Replace the drain plug and wipe up any spills.
15 Disconnect the Autolube hose from the fitting on the crankcase or carburetor and plug the end with a bolt (photo).
16 Separate the shift lever from the engine shaft (photo).
17 On models so equipped, remove the Allen head bolt that attaches the chain tensioner to the engine case (photo).
18 Refer to Chapter 3 and remove the carburetor. Detach the vent hoses from the crankcase fittings (there may be several, so mark them to ensure correct reinstallation).
19 On YT 125/175 models detach the brake cable and return spring from the rear brake pedal. Remove the engine mounting bolts/nuts and pull the engine up and out of the right side of the frame.
20 On YTZ 250 models support the machine under the engine with a jack or blocks of wood, then remove the engine mounting bolts and lift out the engine. **Note:** *The swingarm pivot shaft acts as the rear*



5.17 On some models the chain tensioner is attached to the case with an Allen head bolt

6.2 Yamabond-4 is used to seal the crankcase mating surfaces when they are rejoined



6.3 An engine stand can be made from short lengths of 2 x 4 lumber and lag bolts or nails

engine mount bolt, so be very careful when pulling it out.

21 On YT 60 models support the engine on a block of wood and remove the upper and lower engine mounting bolts/nuts. Remove the rear hub and final drive gear housing bolts, then pull up on the rear of the frame and separate it from the engine assembly. Remove the driveshaft housing bolts from the engine and detach the final drive unit assembly.

22 Check carefully for broken parts, stripped bolts and damage which may have occurred during the removal procedure. Make a list of any parts requiring replacement and have them available before beginning the installation procedure. Organize the various parts and components so that you will be able to tell exactly where they go during engine installation.

23 Installation is basically the reverse of removal. On YT 60 models apply Yamabond-4 gasket sealant to the front upper final drive gear housing-to-frame bolt threads before installing it.

6 Engine disassembly and reassembly — general note

1 Before disassembling the engine clean the exterior with a degreaser and rinse it with water. A clean engine will make the job easier and prevent the possibility of getting dirt into the internal areas of the engine.

2 In addition to the precision measuring tools mentioned earlier, you will need a torque wrench, a rotor puller and a sprocket holder and a chain wrench or strap wrench for removing the AC generator rotor. A motorcycle piston ring removal and installation tool will also be helpful. Although they may not be considered tools, some new, clean two-stroke oil, some grease (moly-base) and a tube of Yamabond-4 sealant (photo) will also be required.

3 An engine support stand made from short lengths of 2 x 4's bolted together will facilitate the disassembly and reassembly procedures (photo).

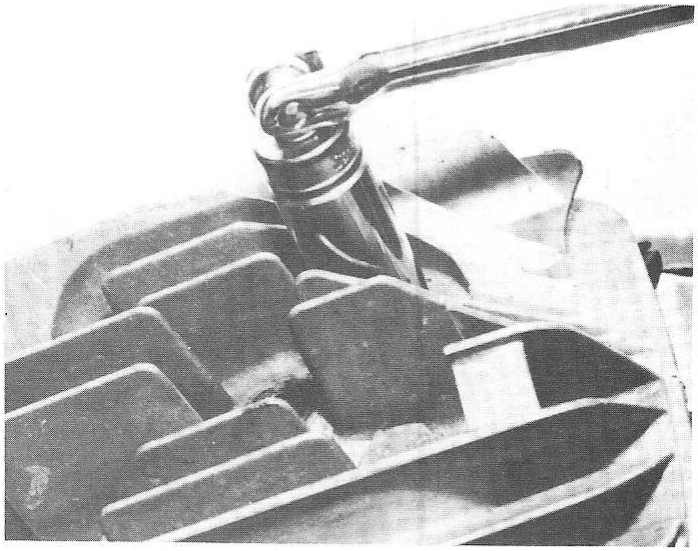
4 When disassembling the engine, keep 'mated' parts together. These 'mated' parts must be reused or replaced as an assembly.

5 If the engine/transmission is to be completely disassembled to the point where the crankcase must be split to gain access to the transmission components or the crankshaft, refer to Section 20 for a general outline of the procedure.

7 Cylinder head — removal, inspection and installation

1 The cylinder head can be removed for service and repair with the engine in or out of the frame. Begin by removing the spark plug wire and the spark plug. **Note:** *On YTZ 250 models, refer to Chapter 1 and drain the coolant before proceeding. Detach the cylinder head-to-frame brackets and remove the hose from the fitting on the head. The YEIS chamber must be detached as well.*

2 Loosen the cylinder head bolts/nuts 1/4-turn at a time until they are loose enough to remove by hand (photo). **Note:** *To avoid warping the cylinder head, follow a criss-cross pattern when initially loosening the nuts.*



7.2 A socket and breaker bar should be used to loosen the head bolts/nuts (a wrench won't reach down into the fins)

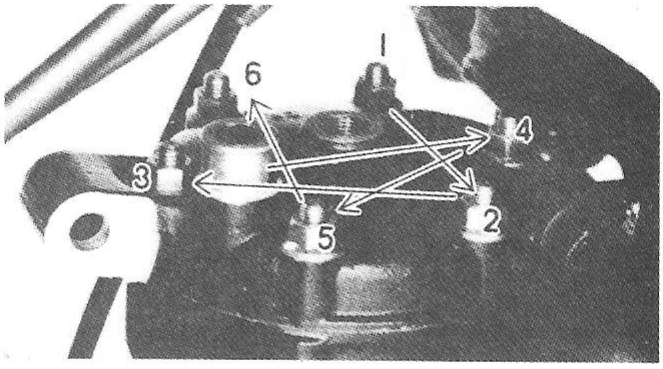


Fig. 2A.1 Loosen the head bolts/nuts in a criss-cross pattern to avoid warping the head (YTZ 250 shown) (Sec 7)

3 If the machine has accumulated much mileage the cylinder head may be stuck to the cylinder. Do not try to pry it off. Using a soft-face hammer, tap lightly around the edge of the head to knock it loose, then lift the head off of the cylinder. Remove the head gasket (replace it with a new one during reassembly).

4 Clean the cylinder head with solvent and dry it thoroughly. Compressed air will speed the drying process.

5 Inspect the head very carefully for cracks or other damage. If cracks

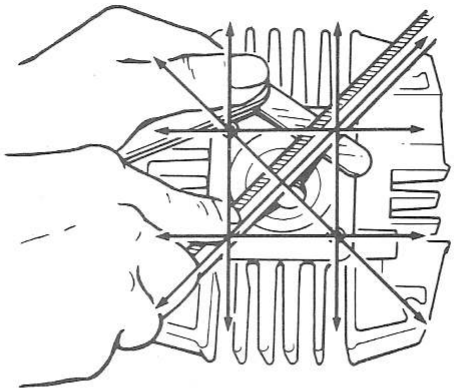


Fig. 2A.2 Check the head for warpage by laying the straightedge in the directions shown and trying to slip the specified feeler gauge under it at the gasket mating surface (Sec 7)

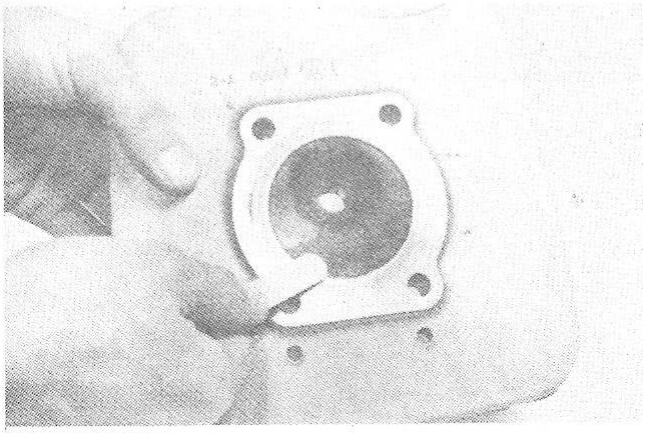


Fig. 2A.4 Use a blunt tool to scrape the carbon out of the combustion chamber and be very careful not to damage the gasket surface (Sec 7)

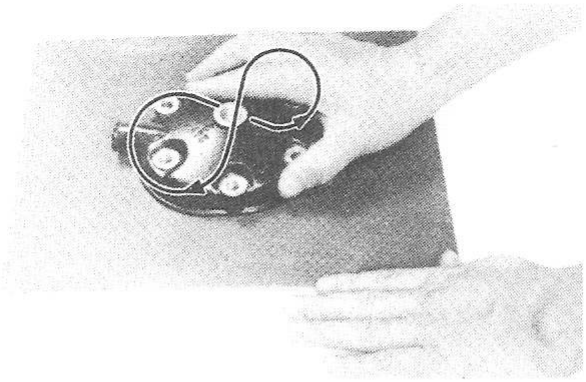
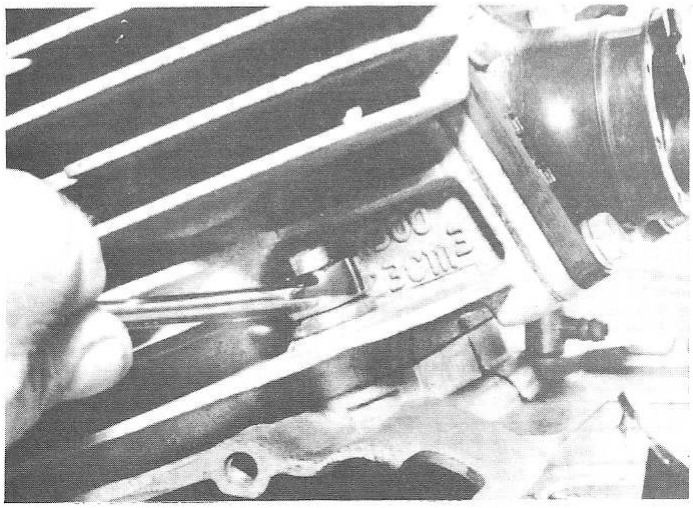


Fig. 2A.3 If the head is slightly warped, it can be lapped on 600 grit sandpaper to restore it (Sec 7).



8.2 Removing the cylinder mounting nuts (be sure to loosen them gradually in a criss-cross pattern)

are found a new head will be required.

6 Using a straightedge and a feeler gauge, check the head gasket mating surface for straightness. Lay the straightedge across the head and try to slip a feeler gauge of the specified size under the straightedge. If the head is warped it must be replaced with a new one. **Note:** *If the warpage is slight, place a piece of 400 or 600 grit wet-or-dry sandpaper on a large piece of plate glass and lap the head gasket mating surface to restore it. Use a figure-eight pattern and rotate the head several times during the operation to avoid removing too much material from one edge.*

7 Carbon deposits on the inside surface of the cylinder head should be removed from the combustion chamber with a blunt scraper so the head material is not scratched or otherwise damaged. To achieve a smooth, shiny finish, polish the chamber with steel wool. Do not use a wire brush mounted in an electric drill.

8 Be sure the gasket mating surfaces on both the cylinder head and the cylinder are absolutely clean before installing a new head gasket. **Note:** *If the gasket is marked* Head *or* Un, *install it with the mark up (against the head). With the gasket in place, install the cylinder head. Install the bolts/nuts and tighten them to the specified torque. Use a criss-cross pattern and work up to the final torque in three steps.*

9 Replace the spark plug and the spark plug wire.

10 On YTZ 250 models reattach the hose, brackets and YEIS chamber and refill the cooling system (Chapter 1).

8 Cylinder — removal, inspection and installation

1 The cylinder can be removed with the engine in the frame after the cylinder head, exhaust pipe and carburetor have been removed (on YTZ 250 models the wire must be separated from the clip on the cylinder). Make sure the piston is at TDC (the top of its stroke) before proceeding. **Note:** *The cylinder on YT 60 models is free after the cylinder head nuts have been removed and the head lifted off. No additional fasteners need to be removed (proceed to Step 3).*

2 At the base of the cylinder where the cylinder connects to the crankcase, there are four retaining nuts. Loosen each of the nuts 1/4-turn, in a criss-cross pattern, then completely remove them (photo).

3 It may be necessary to tap the cylinder with a soft-face hammer to break the gasket seal. Careful — don't break the fins. Do not try to pry the cylinder off the crankcase or damage to the gasket mating surfaces may occur.

4 Slowly work the cylinder up the piston until there is enough room to stuff a clean, lint-free cloth around the base of the cylinder to prevent debris from falling into the engine.

5 Continue pulling the cylinder up until it clears the studs, then carefully free it from the piston (don't let the piston bang against the crankcase).

6 Give the cylinder bore a close visual inspection. Use a flashlight to help reveal any damage. If the surface of the bore is scored or scratched, a rebore will be required as this type of damage causes compression loss and decreases performance.

7 Clean all carbon deposits from the exhaust port with a blunt scraper. It is important that all the ports have a clean, smooth surface. This improves gas flow and prevents carbon build-up.

8 There may be a ridge at the upper end of the cylinder bore, which marks the limit of travel of the top piston ring. The size of this ridge gives an indication of the amount of wear that has taken place in the bore, even though the wear may not be evenly distributed.

9 Using a telescoping gauge and micrometer, or an inside micrometer, check the cylinder diameter at the four positions shown in the accom-

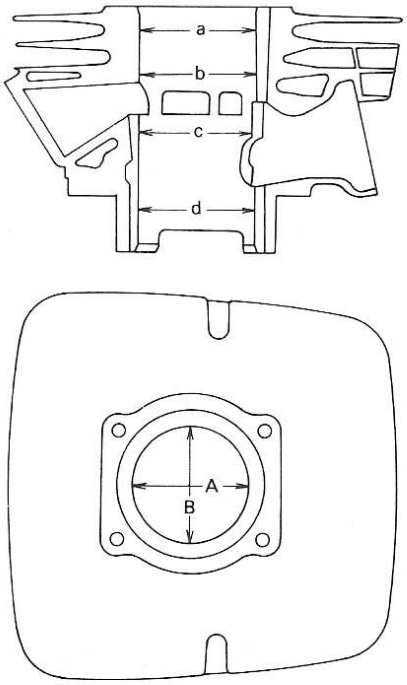
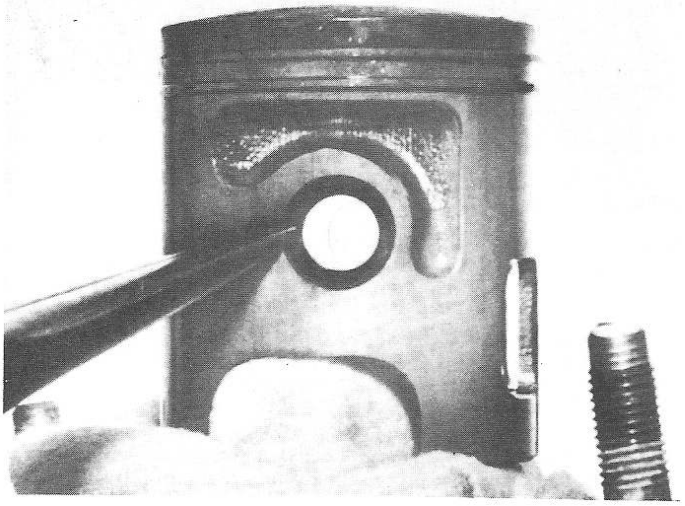


Fig. 2A.5 Make the cylinder bore measurements at the points shown (Sec 8)



9.3 Removing the piston pin circlip

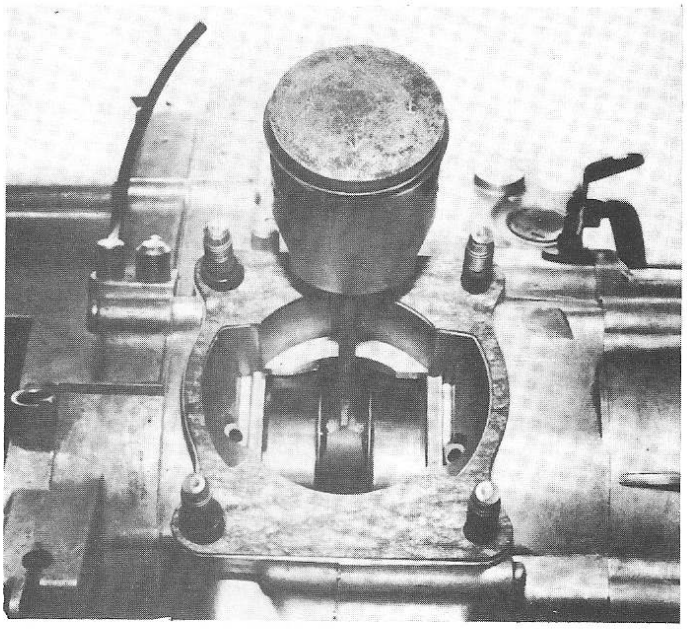
panying illustration, parallel to the crankshaft axis. Next, take the same measurements across the crankshaft axis. Use the measurements to determine cylinder bore taper and out-of-round conditions. Record them for future use. When the piston is measured, the minimum bore size will be subtracted from the maximum piston size to determine the piston-to-bore clearance. If the clearance is excessive, or if the cylinder is tapered or out-of-round beyond the specified limits, new parts and/or a rebore will be needed. **Note:** *The cylinder should be honed with fine stones to remove all wear marks and provide the correct surface for seating of the new rings (if they are being installed). Refer to Chapter 2, Part B, for the honing procedure.*

10 Remove all gasket material from the mating surfaces of the cylinder and crankcase. Position a new cylinder base gasket on the crankcase (photo).

11 Be sure that the sleeves on the studs are in place.

12 Check to see that the ring end gaps straddle the anti-rotation pins in each ring groove.

13 Lubricate the cylinder bore and the piston and rings with two-stroke



8.10 Correct installed position of the dowel pins and cylinder base gasket

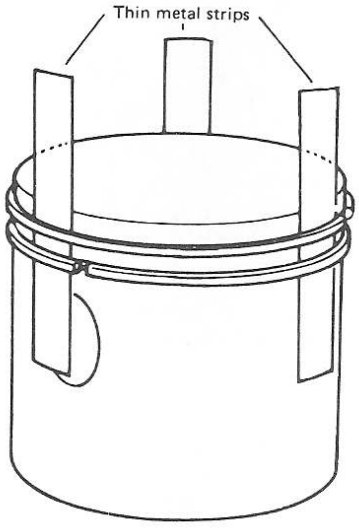


Fig. 2A.6 Insert the metal strips under the rings and ease the rings off with a peeling motion (Sec 9)

oil. Install the cylinder over the piston while compressing the piston rings with your fingers. Slide the cylinder down over the studs. **Note:** *Do not rotate the cylinder as you are installing it over the piston as it may cause the piston ring ends to catch in a cylinder port.*

14 Install the four nuts and tighten them finger-tight, then tighten them in 1/4-turn increments, using a criss-cross pattern, until they are at the specified torque.

9 Piston and rings — removal, inspection and installation

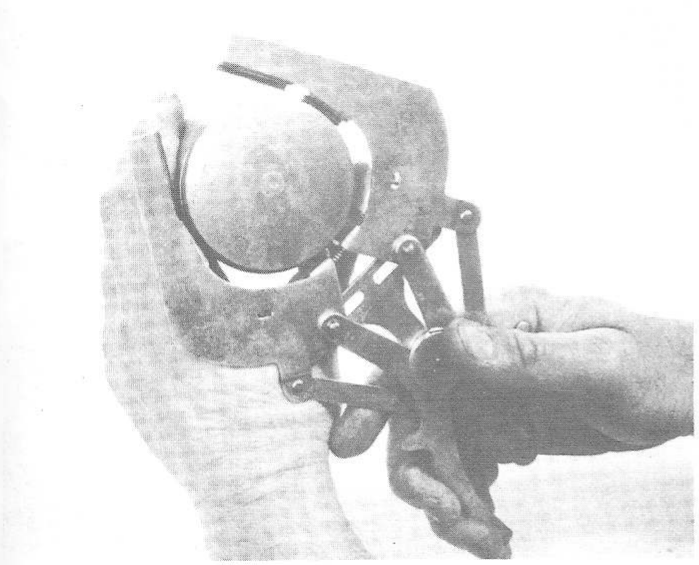
1 Refer to the appropriate Sections and remove the cylinder head and cylinder.

2 If not already done, place a rag in the mouth of the crankcase to prevent damage to the connecting rod and piston and to prevent dust, grit or pieces of broken piston ring from falling into the crankcase.

3 Using needle-nose pliers, remove one of the piston pin clips (photo). Make a note to buy new ones if you haven't already done so. Never reuse the old clips. Do not damage or scratch the piston. Do not apply force to the piston pin and do not let the clip fall into the crankcase.

4 Remove the piston pin and piston and set them aside for inspection. Remove the roller bearing from the connecting rod and put it aside with the other components for inspection.

5 To remove the piston rings, use a ring installation tool (photo) or



9.5 Removing a piston ring with the special tool

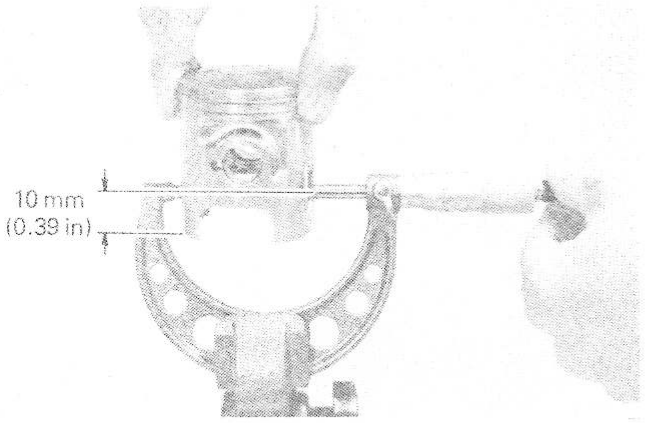
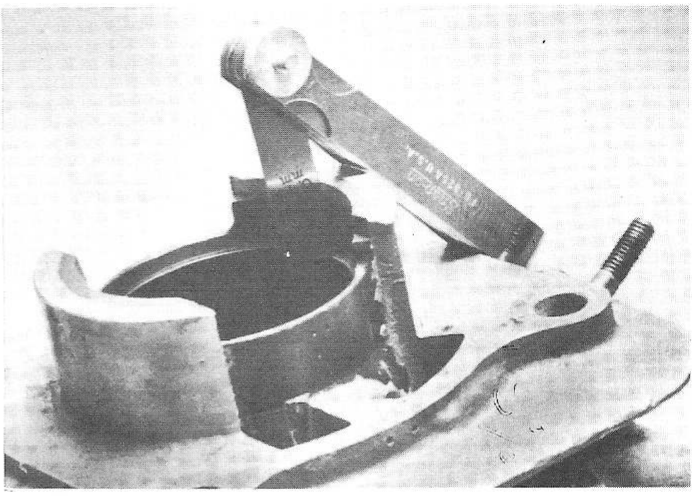
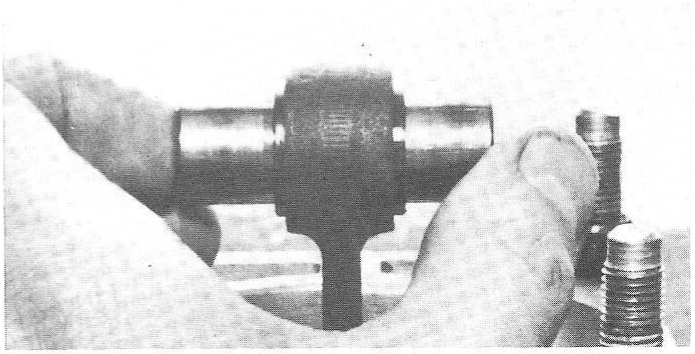


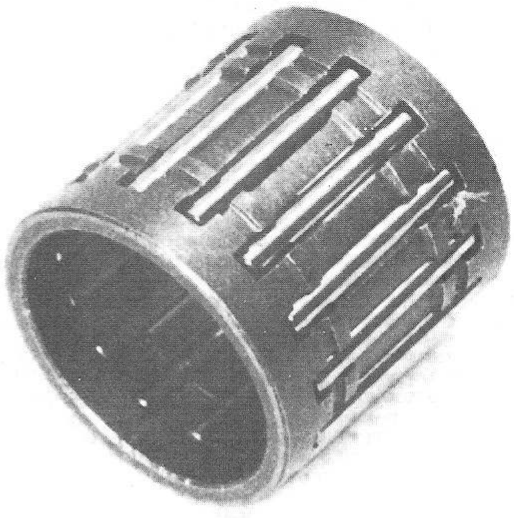
Fig. 2A.7 Measuring the piston diameter (note that the YTZ 250 piston is measured further up the skirt) (Sec 9)



9.8 Checking the piston ring end gap with a feeler gauge (note that the ring is in the bottom of the cylinder)



9.12a Checking for play in the piston pin/roller bearing when it is in place in the connecting rod



9.12b Inspect the rollers for wear, galling and other damage and make sure they rotate freely

expand the ends with your thumbs and ease them off with your index fingers. This is a very delicate operation, since the piston rings are brittle and can easily snap. An optional technique is shown in the accompanying illustration which requires thin metal strips such as pieces of feeler gauge stock.

6 Inspection of the piston and rings can be eliminated if the inspection of the cylinder in the previous Section showed that a rebore is necessary, since a new piston and rings will be supplied with the rebored cylinder.

7 If a rebore is not necessary the piston should be closely examined. Reject the piston and replace it with a new one if it is badly scored or discolored. **Note:** *Light score marks and deposits of carbon and varnish can be removed with 400 or 600 grit sandpaper (move the sandpaper in a criss-cross pattern). Check the pin bosses to ensure that they are not enlarged and that the piston pin circlip grooves are not damaged.*

8 Piston ring wear can be checked by inserting each ring (one at a time) into the cylinder bore and pushing it down with the base of the piston so it rests square in the bore. Make sure that the end gap is away from the ports. Measure the piston ring end gap with a feeler gauge. If it is within the correct range, the rings are suitable for further use (photo).

9 Inspect the face of each piston ring. If it is discolored or scored the ring should be replaced with a new one. Check for carbon build-up on the back of the ring and in the ring groove. If the grooves need cleaning, a piece of broken ring works well. Use caution when cleaning ring grooves to avoid gouging the aluminum piston.

10 Make sure that the piston ring anti-rotation pins are firmly seated in each piston ring groove. It is imperative that these pins do not work loose, as they prevent the rings from rotating into a position where ring ends can catch in a port.

11 Measure the outside diameter of the piston with a micrometer at the specified distance from the bottom of the skirt and 90° from the piston pin hole. Subtract the piston diameter from the bore diameter (Section 8) to determine the piston-to-cylinder bore clearance. If it is excessive, a new piston and rings will be required (a rebore and finish hone may also be needed — see Section 8).

12 Insert the roller bearing into the connecting rod small end and insert the piston pin into the roller bearing. Rock the piston pin in the bearing to check for excessive play (photo). With the roller bearing out of the

9.13 Checking the piston ring-to-groove clearance (move the feeler gauge around the piston and make the check at several points)

connecting rod, check the rollers for signs of pitting or other damage and ensure that all the rollers rotate smoothly and freely (photo). If you suspect that the bearing is unserviceable take it to a Yamaha dealer when you go to buy parts and have them check the bearing.

13 Install the piston rings. They should go on over the top of the piston and the bottom one should go on first. Avoid breaking the ring by using a piston ring installation tool. Be sure that the manufacturer's identification mark is facing up. Do not expand the ring any more than is necessary to slide it into place. Check the ring-to-groove clearance with a feeler gauge at several places around the ring circumference (photo). If the clearance is incorrect, make sure you have the correct rings for your application.

14 Be sure that the ring end gaps straddle the anti-rotation pins. After making sure that all parts of the assembly are absolutely clean, lubricate the roller bearing with two-stroke engine oil and insert it into the small end of the connecting rod. Lubricate the piston pin and the piston pin bore with two-stroke engine oil and install the piston with the arrow pointing toward the front of the engine.

15 Push the pin into position and install a new circlip (do not use pliers — push it into place). Make sure both clips are properly seated in the grooves.

16 Reassemble the cylinder and cylinder head by referring to the appropriate Sections.

10 Reed valve — removal, inspection and installation

1 The reed valve can be serviced with the engine in place. If you are servicing it this way, loosen the carburetor clamp screw and remove the reed cage/intake manifold bolts. Remove the intake manifold and then gently pull the reed valve assembly out of the cylinder.

2 If you have removed the engine from the frame, the carburetor will have already been removed. In this case, remove the bolts from the intake manifold (photo). Remove the manifold and then pull the reed valve assembly from the cylinder.

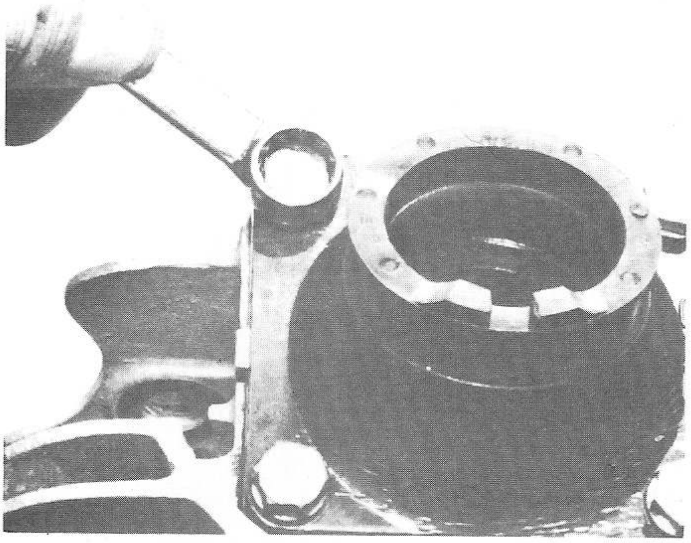
3 Inspect the manifold for deterioration and cracks, especially at the base plate. Be sure to replace the gasket upon reassembly.

4 Check the reed plates to see if they lay flat against the seat. Apply suction to the carburetor side of the reed block and check for leakage (which should be slight).

5 Check the seats for deterioration and delamination. If the reed plates are warped, or there is clearance between the end of any of the plates and the seat, replace the reed valve. Check the stopper plate-to-reed block clearance as well. **Note:** *Do not bend the reed stopper plates, as this may affect engine performance. If the reed valve is disassembled, make sure that thread locking compound is used on the screws.*

6 Install the reed valve in the reverse order of removal. Use a thread locking compound on the bolts.

7 When the reed valve has been completely installed, check for air leaks around the reed cage and intake manifold (see Section 3).



10.2 Removing the intake manifold/reed valve assembly mounting bolts

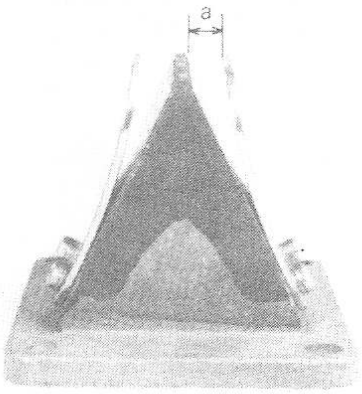


Fig. 2A.8 Check the stopper plate-to-reed block clearance (a) to see if it is correct (don't make it larger by bending the stopper) (Sec 10)

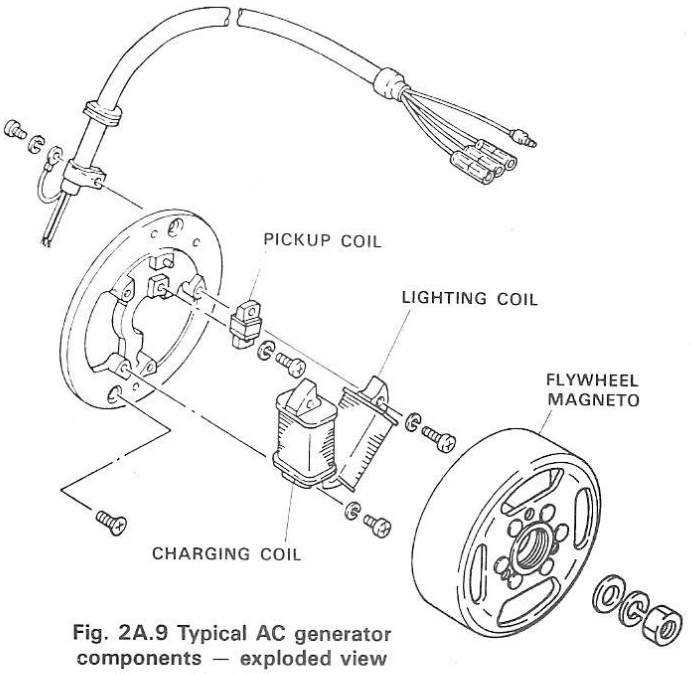
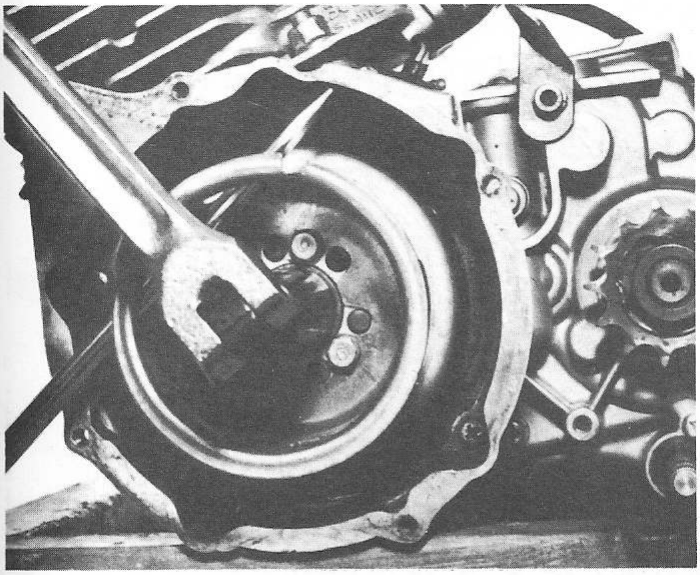
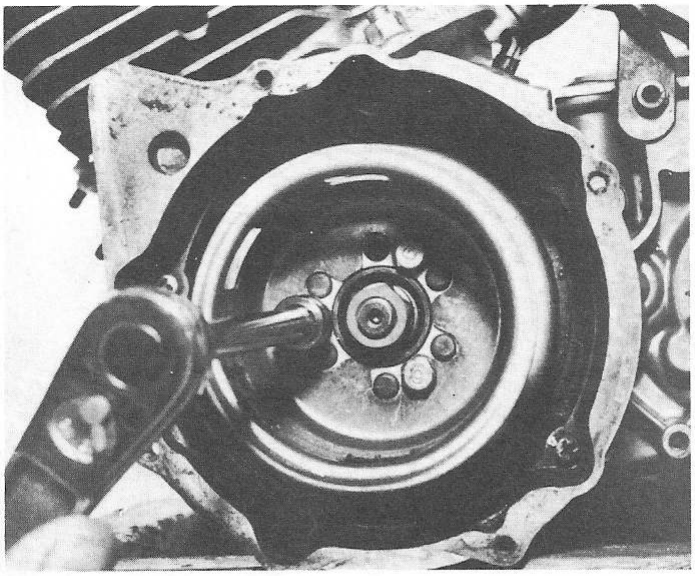


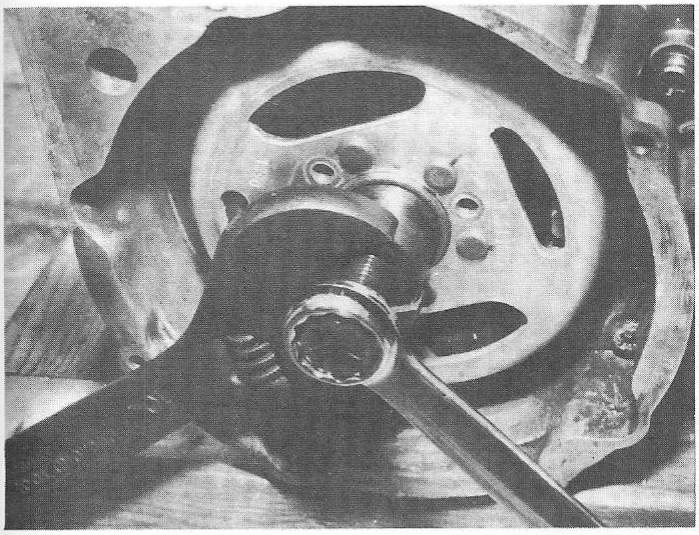
Fig. 2A.9 Typical AC generator components — exploded view (Sec 11)



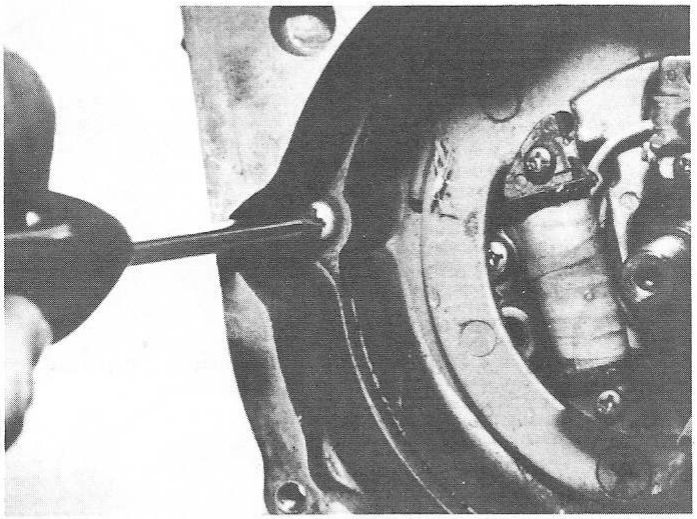
11.2a On YT 125/175 models, hold the starter pulley with a screwdriver to keep the rotor from turning as the nut is loosened



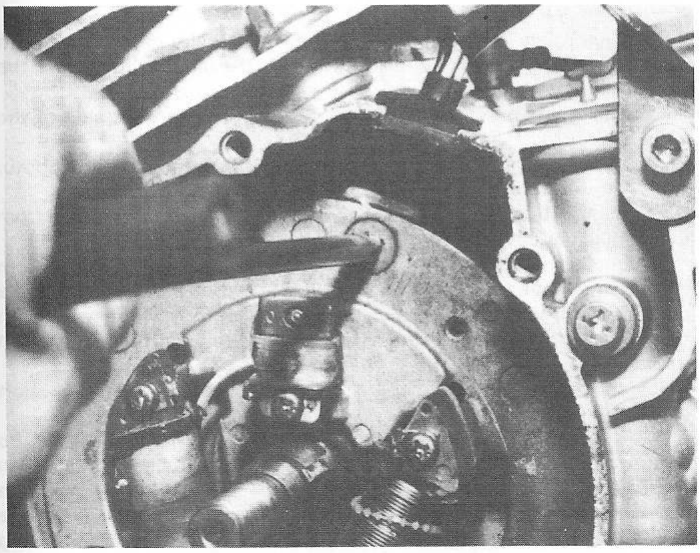
11.2b Removing the starter pulley-to-rotor bolts (YT 125/175)



11.3 Removing the rotor with the special puller (don't try to use a gear puller or the rotor will be damaged)



11.7 Removing the recoil starter spacer/mounting plate (YT 125/175)



11.8 Removing the stator plate-to-case screws (an impact screwdriver may be needed — they are tight)

11 AC generator — removal and installation

Removal

1 The AC generator is located on the left side of the engine. It can be removed with the engine in the frame.

2 On YT 60/125/175 models remove the recoil starter and loosen the rotor nut (photo), then remove the starter pulley (photo).

3 Remove the rotor by threading the puller into the large threaded hole in the center (left-hand threads) and tightening the puller center bolt (photo). It is a good idea to apply moly-base grease to the puller center bolt threads and the end of the crankshaft before installing the puller.

4 On YTZ 250 models remove the bolts and detach the left-side engine cover. The rotor nut must now be removed. In order to do this, the flywheel/rotor must be kept from turning. This can be accomplished with a rotor holding tool.

5 Remove the rotor with the special tool. Thread it into the hole in the rotor and hold the rotor while tightening the puller.

6 Remove the rotor and the Woodruff key from the crankshaft.

7 On YT 125/175 models remove the screws (photo) and detach the recoil starter spacer/mount from the left side of the crankcase.

8 Detach the generator stator plate by removing the mounting screws (photo). **Note:** *Scribe alignment marks across the plate and crankcase mounting boss before removing the screws. Pull the wire harness and*

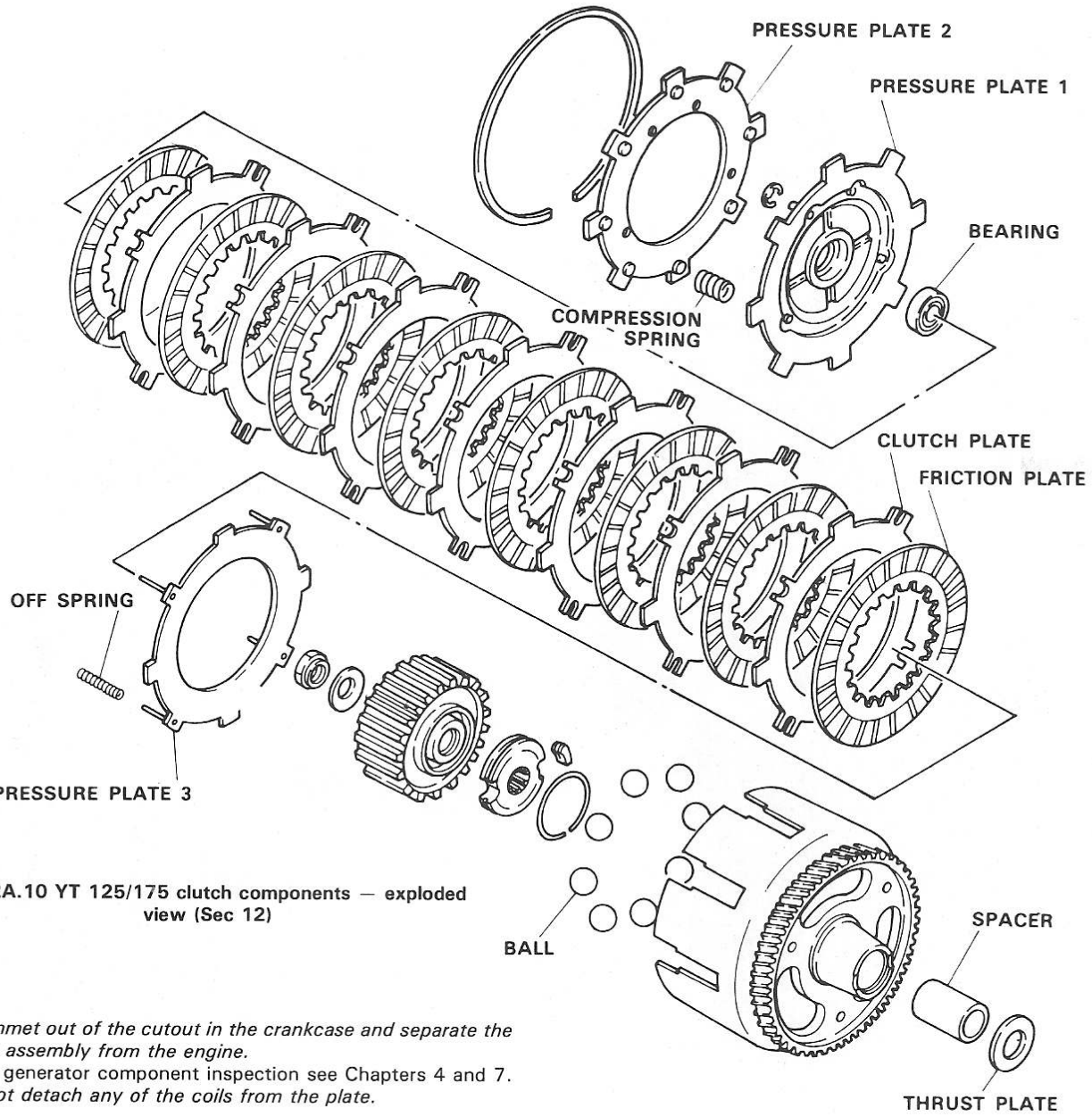


Fig. 2A.10 YT 125/175 clutch components — exploded view (Sec 12)

rubber grommet out of the cutout in the crankcase and separate the stator plate assembly from the engine.

9 For AC generator component inspection see Chapters 4 and 7.

Note: *Do not detach any of the coils from the plate.*

Installation

10 Install the AC generator stator plate. Be sure to align the scribed mark on the stator with the scribed mark on the case. Tighten the screws securely.

11 Wedge the AC generator wire harness grommet into the cutout in the case.

12 Wipe the inside of the rotor completely clean and install the Woodruff key in the end of the crankshaft.

13 Install the rotor on the end of the crankshaft and seat it on the taper by striking it sharply with a soft-face hammer (be sure to hit only the hub area in line with the crankshaft). Install the washer and nut and tighten the nut to the specified torque. On YT 125/175 models install the recoil starter spacer.

14 Install the generator cover or the recoil starter pulley and recoil starter.

12 Clutch — removal, inspection and installation

1 It should be noted that the clutch assembly can be removed with the engine in the frame. To do so, first drain the transmission oil. **Note:** *On YTZ 250 models the coolant must be drained (Chapter 1) and the hoses detached from the water pump. Remove the kick starter pedal, the rear brake pedal and the right-side footrest.*

Removal — YT 125/175 models

2 If the engine is in the frame, detach the brake cable and return spring from the right crankcase cover and pull the hoses off the overflow chamber.

3 Remove the bolts from the clutch cover on the right side of the engine (photo).

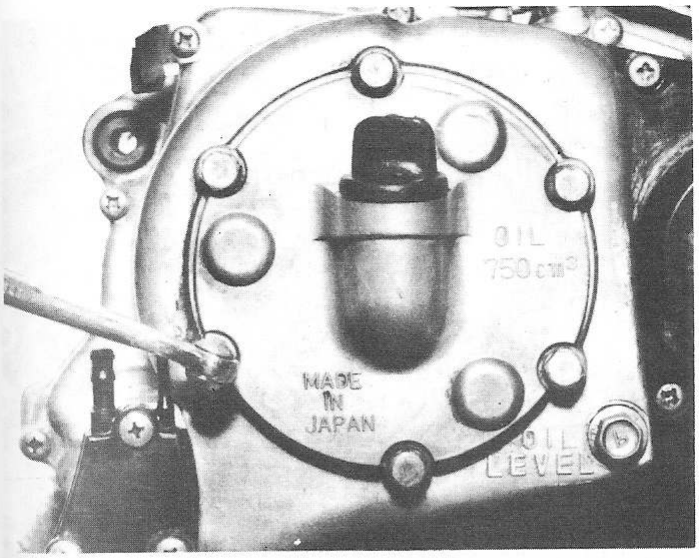
4 Detach the cover, then loosen the clutch adjuster locknuts (photo) and remove them.

5 Remove the three bolts and separate the release mechanism from the crankcase cover (photo).

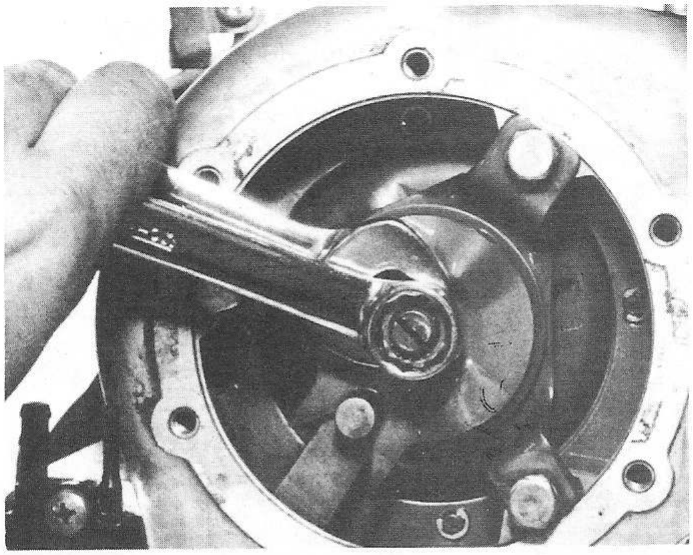
6 Remove the crankcase cover screws and separate the cover from the engine (leave the Autolube pump attached to the cover). Make a cardboard holder for the screws to ensure that they are reinstalled in their original locations (photo). You may have to tap on the cover with a soft-face hammer to break the gasket seal.

7 Remove the bolt and separate the release lever from the shaft (photo).

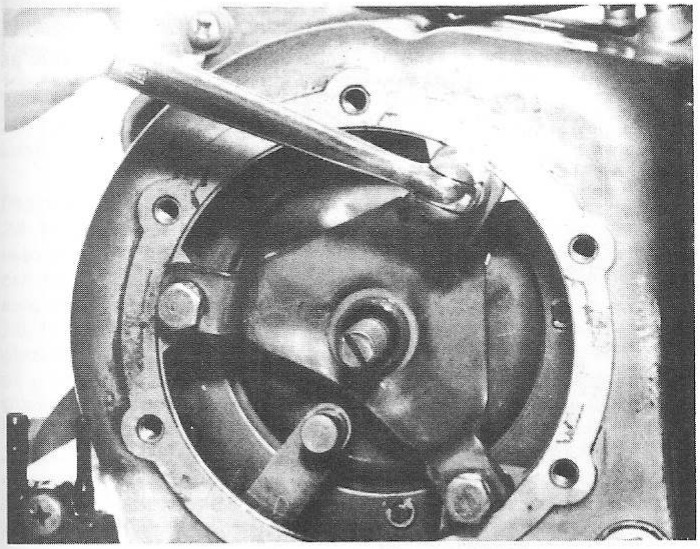
8 Position the engine on the left side so the right side is facing *up* (failure to do this will result in the release of large ball bearings when the clutch is removed). Carefully pry out the large circlip with a screwdriver and lift out the pressure plate assembly (photo). Remove the clutch plate assembly from the clutch housing and set it aside. Keep the plates in their original order so they will be mated correctly during installation.



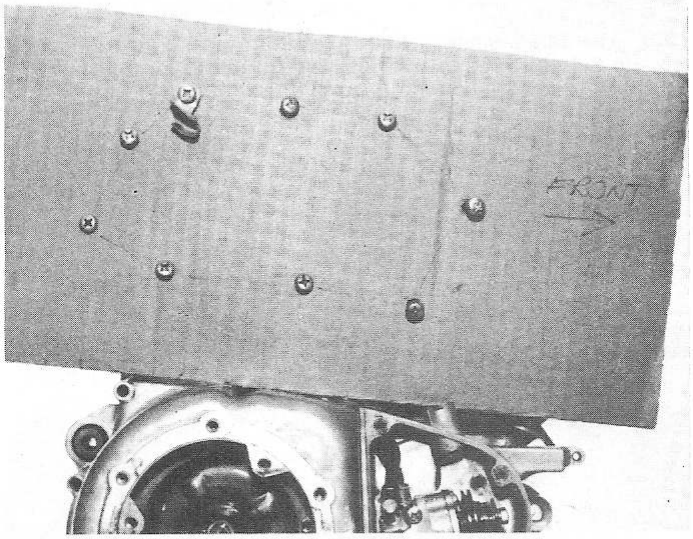
12.3 Removing the clutch cover bolts (YT 125/175)



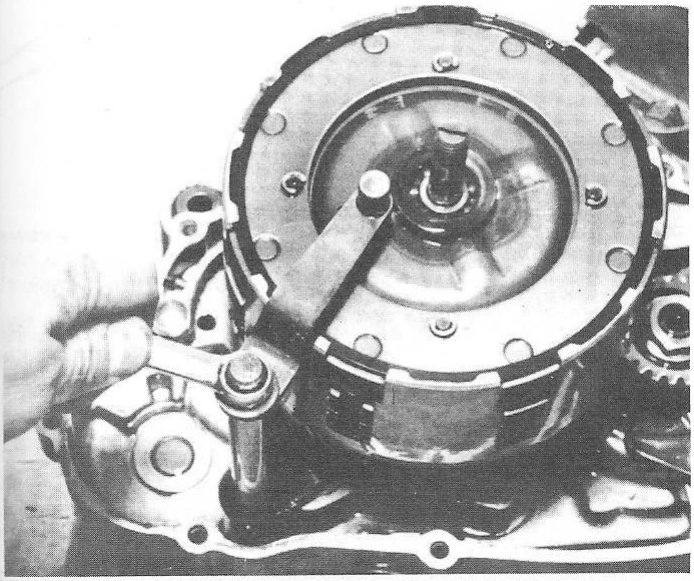
12.4 Loosening the release mechanism adjusting bolt locknut (125/175)



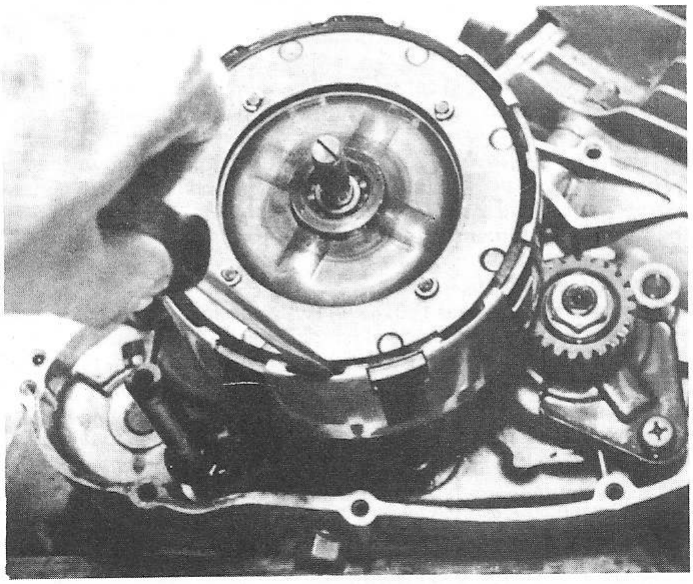
12.5 Removing the release mechanism mounting bolts (note the adjusting bolt locknut has been removed)



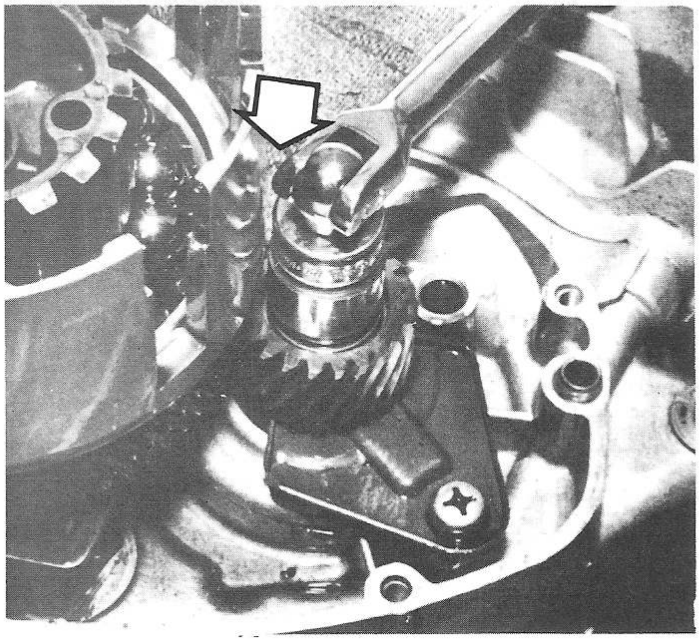
12.6 A simple cardboard holder can save time and prevent confusion during installation of the cover



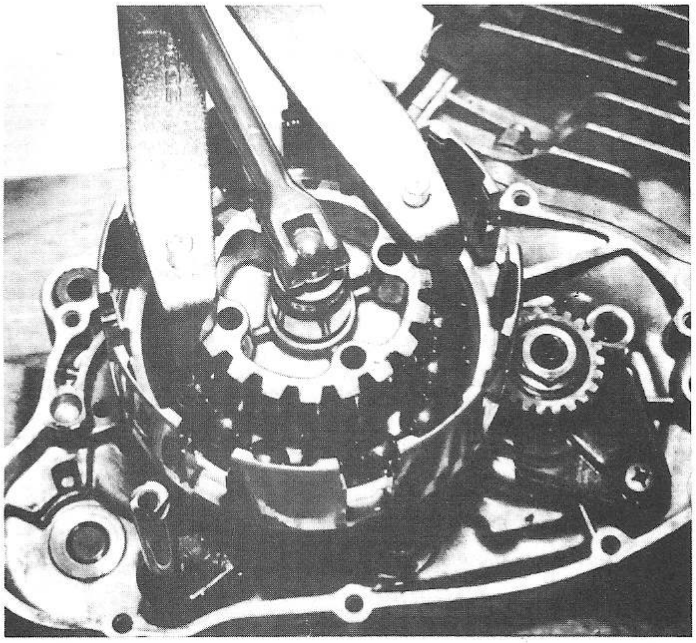
12.7 The release lever must be removed from the shift shaft to pull off the clutch assembly



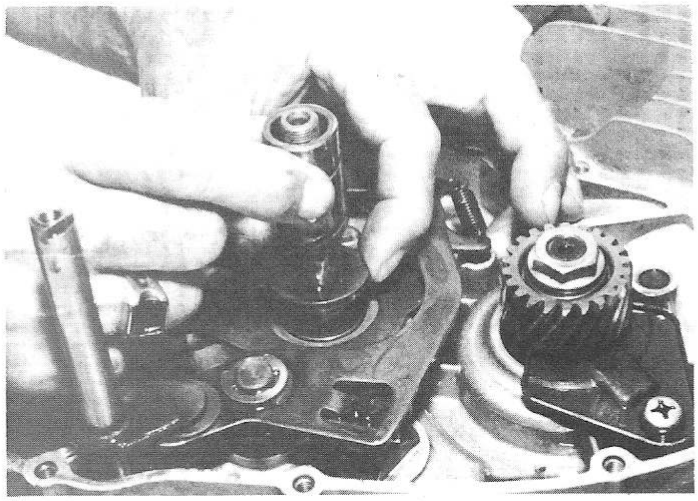
12.8 Use a screwdriver to release the large circlip from the groove in the clutch housing



12.9 The primary gears can be kept from turning by stuffing a rag into the gear teeth as the primary gear nut is loosened



12.10a The special tool should be used to hold the clutch hub as the nut is loosened (it will prevent damage to the splines)



12.10b Slide the spacer and thrust plate off the transmission shaft

9 If the engine is being completely disassembled, wedge a rag in the drive gears and loosen the primary gear nut with a socket and breaker bar (photo).

10 Hold the clutch hub with the special tool and remove the nut (photo). Lift off the washer and clutch hub, then slide the clutch housing off the shaft (leave the ratchet mechanism inside the housing). Slide the spacer and thrust plate off the shaft (photo).

Removal — YT 60 models

11 Remove the crankcase cover screws and separate the cover from the engine. Make a cardboard holder for the screws to ensure that they are reinstalled in their original locations. You may have to tap on the cover with a soft-face hammer to break the gasket seal.

12 Remove the snap-ring and slide the clutch housing off the shaft. Slide the clutch shoe/driven gear assembly off the shaft, then remove the washer and inner snap-ring and slide off the Autolube pump drive gear.

13 If the engine is being completely disassembled, hold the AC generator rotor (Section 11) and loosen the primary drive gear nut.

Removal — YTZ 250 models

14 Remove the screws and separate the kick start cover from the right crankcase cover. Remove the crankcase cover screws and separate

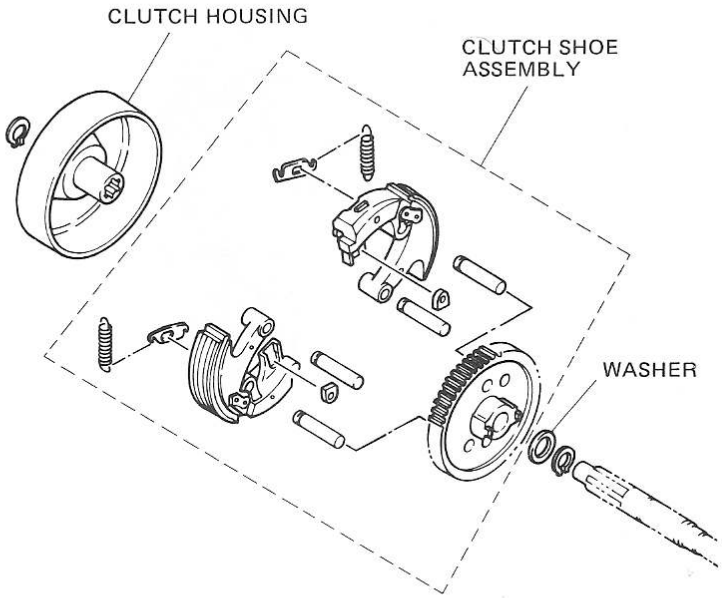


Fig. 2A.11 YT 60 clutch components — exploded view (Sec 12)

the cover from the engine. Make a cardboard holder for the screws to ensure that they are reinstalled in their original locations. You may have to tap on the cover with a soft-face hammer to break the gasket seal.

15 Loosen the six screws in the center of the pressure plate, following a criss-cross pattern, in three steps. Remove the screws and the clutch springs beneath them.

16 Remove the clutch pressure plate.

17 Remove the clutch lifter, the steel ball and the clutch pushrod from the hole in the shaft. Store these pieces together.

18 Remove the clutch friction discs and clutch plates. Keep them together in the same sequence they were inside the clutch housing.

19 Bend back the tabs on the tabbed washer underneath the large retaining nut in the clutch hub (boss).

20 Shift the transmission into low and apply the brake if the engine has not been removed from the frame. If the engine has been removed from the frame, keep the clutch hub from turning with the