About this manual

Its purpose

The purpose of this manual is to help you get the best value from your motorcycle. 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 servicing; and it offers diagnostic and repair procedures to follow when trouble occurs.

We hope you use the manual to tackle the work yourself. For many simpler jobs, doing it yourself may be quicker than arranging an appointment to get the vehicle 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 doing 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 or steps.

At the beginning of each numbered Section you will be referred to any illustrations which apply to the procedures in that Section. The reference numbers used in illustration captions pinpoint the pertinent Section and the Step within that Section. That is, illustration 3.2 means the illustration refers to Section 3 and Step (or paragraph) 2 within that Section.

Procedures, once described in the text, are not normally repeated. When it's necessary to refer to another Chapter, the reference will be given as Chapter and Section number. 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.

References to the left or right side of the vehicle assume you are 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 we have prepared this manual with extreme care, neither the publisher nor the author can accept responsibility for any errors in, or omissions from, the information given.

NOTE

A Note provides information necessary to properly complete a procedure or information which will make the procedure easier to understand.

CAUTION

A Caution provides *a* special procedure or special steps which must be taken while completing the procedure where the Caution is found. Not heeding a Caution can result in damage to the assembly being worked on.

WARNING

A Warning provides a special procedure or special steps which must be taken while completing the procedure where the Warning is found. Not heeding a Warning can result in personal injury.

Introduction to the Honda V45/65 Sabre & Magna (VF700, 750 & 1100 V-Fours)

The first Honda V-Four engine, introduced in 1982 in a 750 cc (45 cu in) capacity, was widely regarded as a milestone of motorcycle engineering. Its 90° V configuration allowed for a lighter engine which was more compact, yet more powerful than any previous Honda 750 cc engine. Because of the inherent balancing characteristics of a V-engine, as well as the rubber mountings, it is also an unusually smooth and quiet engine compared with the more conventional in-line, air-cooled counterparts in production at the time.

The 750 cc engine was superceded in 1984 by a shorter-stroke 700 cc model, designed to fall below the heavyweight motorcycle import tariff imposed on machines imported into the US. The 700 cc engine continued for the remaining years of the Sabre, but a return was made to the 750 cc unit in 1988 for the last year of the Magna's production. All models imported into the UK were of 750 cc capacity.

An 1100 cc (65 cu in) engine was introduced in 1983 for the US market.

There are two distinctly different models, the Sabre (known as the Sport in the UK) and the Magna (known as the Custom in the UK). The Sabre differs from the Magna in having Honda's Pro-Link rear suspension and sophisticated electronic instrumentation. Conversely, Magna models are custom-styled, with high handlebars, teardrop tank and a stepped seat. The Magnas have conventional twin-shock rear suspension.

Both Sabre and Magna have appeared in 700, 750 and 1100 cc engine sizes during the model run, and have received a number of improvements and modifications. Owners are therefore advised to refer to the table under *'Identification numbers'* to establish the exact model year of their machine before carrying out any of the procedures given in the main text of the manual.

Identification numbers

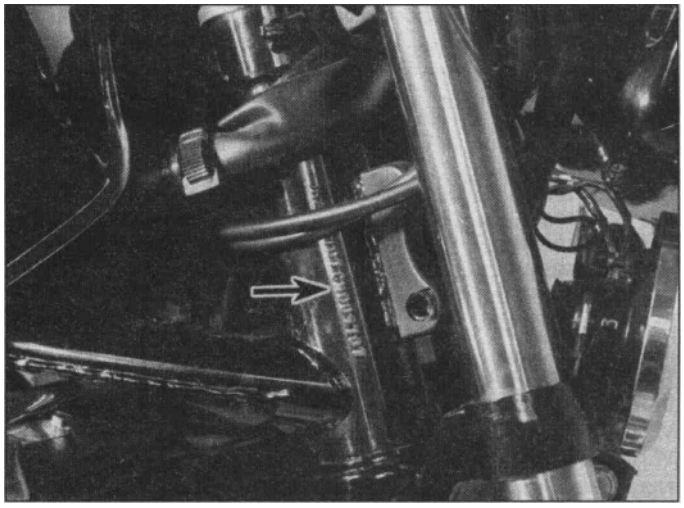
The frame serial number is stamped into the right side of the steering head and the VIN (Vehicle Identification Number) appears on the left side of the steering head; on 1987 and 1988 700/750 Magna models, it is attached to the right frame top tube under the fuel tank. The engine number is stamped into the right upper side of the crankcase, directly above the clutch unit.

A label attached to the right or left frame tube under the side cover, or attached to the rear fender top surface under the seat, gives the color code of the machine. The carburetor identification number appears on the carburetor body casting, just above the float chamber joint. Emission control information (US models only) is given on a label attached to the right lower frame tube on models through 1986, or to the right upper frame tube on later models.

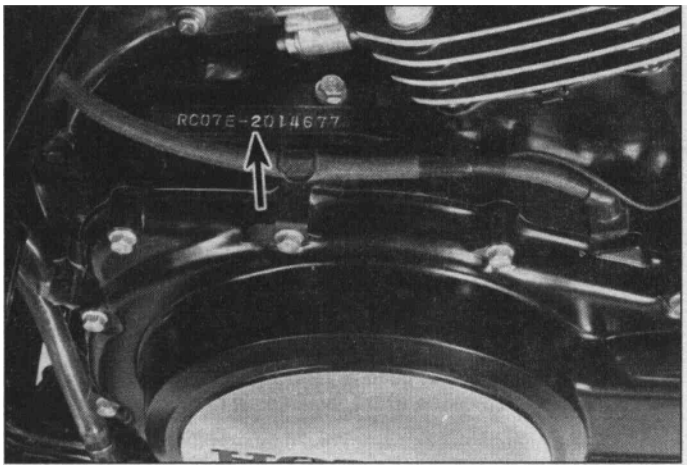
All serial numbers should be recorded and kept in a safe place so they can be furnished to law enforcement officials in the event of a theft.

The frame serial number, engine serial number, carburetor identification number and color code 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.

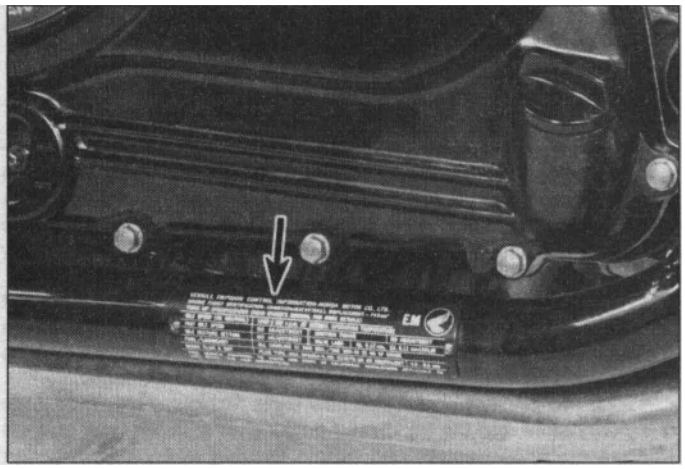
The procedures in this manual identify the bikes by production year. If this is not known, it can be determined from the engine and frame serial numbers as shown in the chart on the next page.



Frame number location on steering head right side



Engine number location on crankcase top surface



Emission Control label location (models through 1986)

		Engine number	Frame number
US models (except California)			
VF750S (1982)	RC07E-2000066 to 2015996	RC070-CM000036 to 012083	
VF750S (1983)	RC07E-2100018 to 2115544	RC070-DM100006 to 108632	
VF700S (1984)	RC22E-2000008 to 2005978	RC220-EM000007 to 005012	
VF700S (1985)	RC22E-2100001 to 2103668	RC220-FM100001 to 102800	
VF750C (1982)	RC07E-4000046 to 4029232	RC071-CM000033 to 027062	
VF750C (1983)	RC07E-4100013 to 4124548	RC071-DM100011 to 122819	
VF700C (1984)	RC21E-2000021 to 2016382	RC210-EM000002 to 014552	
VF700C (1985)	RC21E-2100016 to 2110238	RC210-FM100006 to 108900	
VF700C (1986)	RC21E-2200005 to 2209873	RC210-GM200003 to 208928	
VF700C (1987)	RC21E-2300015 to 2304999	RC210-HM300007 to 303508 or HA305001 to 310415	
VF750C (1988)	RC07E-4600001 on	RC280-JA100001 on	
VF1100S (1984)	SC17E-2000001 to 2008727	SC170-EM000001 to 010029	
VF1100S (1985)	SC17E-2100001 on	SC170-FA100001 on	
VF1100C (1983)	SC12E-2000039 to 2018597	SC120-DM000029 to 017677	
VF1100C (1984)	SC12E-2100001 to 2116075	SC120-EA100001 to 117064	
VF1100C (1985)	SC12E-2200001 to 2208055	SC120-FA200006 to 208465	
VF1100C (1986)	SC12E-2300020 to 2304336	SC120-GM300101 to 304425	
US California models			
VF750S (1982)	As above	As above	
VF750S (1983)	As above	As above	
VF700S (1984)	RC22E-2002575 to 2006097	RC221-EM000006 to 001081	
VF700S (1985)	RC22E-2100001 to 2103285	RC221-FM100001 to 100863	
VF750C (1982)	As above	As above	
VF750C (1983)	As above	As above	
VF700C (1984)	RC21E-2000019 to 2018662	RC211-EM000003 to 002300	
VF700C(1985)	RC21E-2100022 to 2108674	RC211-FM100007 to 101325	
VF700C (1986)	RC21E-2200011 to 2210193	RC211-GM200001 to 201250	
VF700C(1987)	RC21E-2300020 to 2303889	RC211-HM300006 to 300514 or HA305003to311015	
VF750C (1988)	RC07E-4600001 on	RC281-JA100001 on	
VF1100S (1984)	SC17E-2000001 to 2009087	SC170-EA100004 to 117067	
VF1100S (1985)	SC17E-2100001 on	SC170-FA100001 on	
VF1100C (1983)	As above	As above	
VF1100C (1984)	SC12E-2102298 to 2114635	SC120-EA100004 to 117067	
VF1100C (1985)	SC12E-2200001 to 2206580	SC120-FA200001 to 206845	
VF1100C (1986)	SC12E-2300001 to 2302532	SC120-GM301306 to 302625	
UK models			
VF750S-C (1982-84)	RC07E-2007411 to 2020350	RC07-2000034 to 2008149	
VF750C-H (1987)	RC07E-4501116 to 4501315	RC28-2000607 to 2000806	
VF750C-J (1988)	RC07E-4604226 on	RC28-2100005 on	

Note: *Unless specifically mentioned in this manual, the information given for the 1982 750 Sabre applies to the UK VF750S-C, and that for the 1987 and 1988 700/750 Magnas applies to the UK VF750C-H and C-J respectively.*

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 motorcycle - the accessory store and the franchised dealer - differ in the type of parts they carry. While dealers can obtain virtually every part for your motorcycle, the accessory dealer is usually limited to normal high wear items such as shock absorbers, tune-up parts, various engine gaskets, cables, chains, 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 (breaker) 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.

General specifications

Wheelbase	
1982 750 Sabre model	1562 mm (61.5 in)
1983 through 1985 700/750 Sabre models	1570 mm (61.8 in)
1982 through 1984 700/750 Magna models	1540 mm (60.6 in)
1985 and 1986 700 Magna models	1565 mm (61.6 in)
1987 and 1988 700/750 Magna models	1660 mm (65.4 in)
1100 Sabre models	1590 mm (62.6 in)
1100 Magna models	1595 mm (62.8 in)
Overall length	
700/750 Sabre models	2245 mm (88.4 in)
1982 through 1984 700/750 Magna models	2190 mm (86.2 in)
1985 and 1986 700 Magna models	2220 mm (87.4 in)
1987 and 1988 700/750 Magna models	2360 mm (92.9 in)
1100 models	2280 mm (89.8 in)
Overall width	
1982 through 1984 700/750 Sabre models	830 mm (32.7 in)
1985 700 Sabre model	800 mm (31.5 in)
1982 through 1984 700/750 Magna models	815 mm (32.1 in)
1985 and 1986 700 Magna models	850 mm (33.5 in)
1987 and 1988 700/750 Magna models	800 mm (31.5 in)
1100 Sabre models	790 mm (31.1 in)
1983 and 1986 1100 Magna models	810 mm (31.9 in)
1984 and 1985 1100 Magna models	825 mm (32.5 in)
Overall height	
1982 and 1983 750 Sabre models	1165 mm (45.9 in)
1984 and 1985 700 Sabre models	1160 mm (45.7 in)
1982 through 1984 700/750 Magna models	1195 mm (47.0 in)
1985 and 1986 700 Magna models	1200 mm (47.2 in)
1987 and 1988 700/750 Magna models	1155 mm (43.9 in)
1100 Sabre models	1185 mm (46.7 in)
1983 and 1986 1100 Magna models	1210 mm (47.6 in)
1984 and 1985 1100 Magna models	1230 mm (48.4 in)
Seat height	
1982 and 1983 750 Sabre models	780 mm (30.7 in)
1984 and 1985 700 Sabre models	790 mm (31.1 in)
1982 through 1984 700/750 Magna models	760 mm (29.9 in)
1985 and 1986 700 Magna models	740 mm (29.1 in)
1987 and 1988 700/750 Magna models	705 mm (27.8 in)
1100 Sabre models	820 mm (32.3 in)
1100 Magna models	800 mm (31.5 in)
Ground clearance	
1982 and 1983 750 Sabre models	135mm (5.3 in)
1984 and 1985 700 Sabre models	145 mm (5.7 in)
1982 through 1984 700/750 Magna models	165 mm (6.5 in)
1985 and 1986 700 Magna models	150 mm (5.9 in)
1987 and 1988 700/750 Magna models	152 mm (6.0 in)
1100 Sabre models	145 mm (5.7 in)
1100 Magna models	155 mm (6.1 in)
Weight (with oil and full fuel tank)	
700/750 models	Approx 243 kg (535 lb)
1100 Sabre models	268 kg (591 lb)
1100 Magna models	265 kg (584 lb)

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 oil 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 (or screw extractor). 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.

Tightening sequences and procedures

When threaded fasteners are tightened, they are often tightened to a specific torque value (torque is basically 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 warping the component. Initially, the bolts/nuts should go on finger tight only. Next, they should be tightened one full turn each, in a crisscross 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 can't 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 motorcycle, 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.

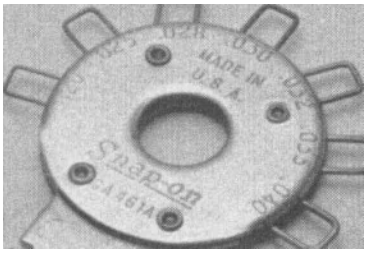
Avoid using a screwdriver or bar to pry apart components, as they can easily mar the gasket sealing surfaces of the parts (which must remain smooth). If prying is absolutely necessary, use a piece of wood, but keep in mind that extra clean-up will be necessary if the wood splinters.

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.

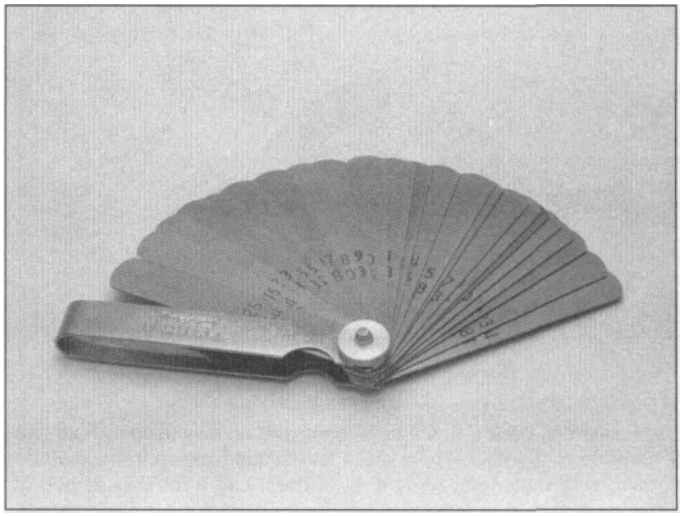
Hose removal tips

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.

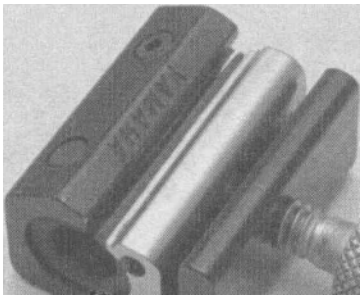
If a hose clamp is broken or damaged, do not reuse it. Also, do not reuse hoses that are cracked, split or torn.



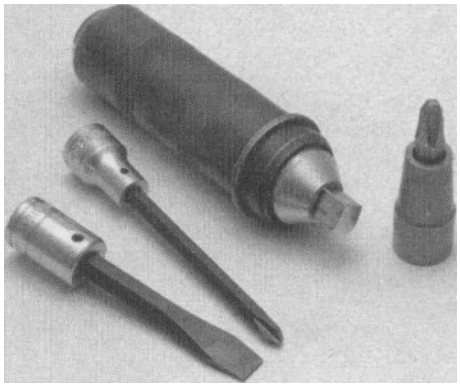
Spark plug gap adjusting tool



Feeler gauge set



Control cable pressure luber



Hand impact screwdriver and bits

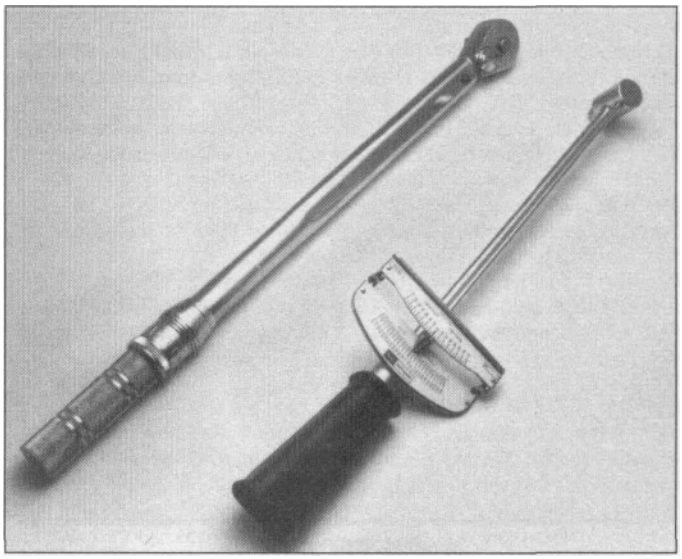
Tools

A selection of good tools is a basic requirement for anyone who plans to maintain and repair a motorcycle. 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.

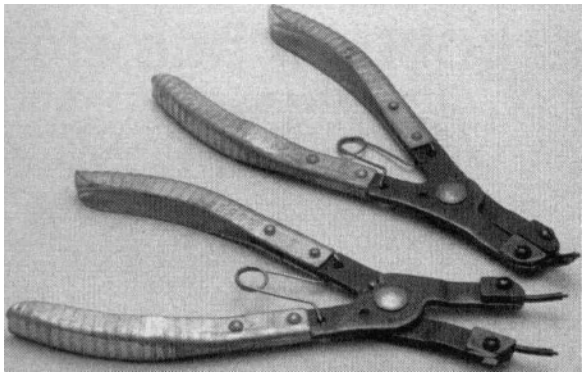
To help the owner decide which tools are needed to perform the tasks detailed in this manual, the following tool lists are offered: Maintenance and minor repair, Repair and overhaul and Special. The newcomer to practical mechanics should start off with the Maintenance and minor repair tool kit, which 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.

Maintenance and minor repair tool kit

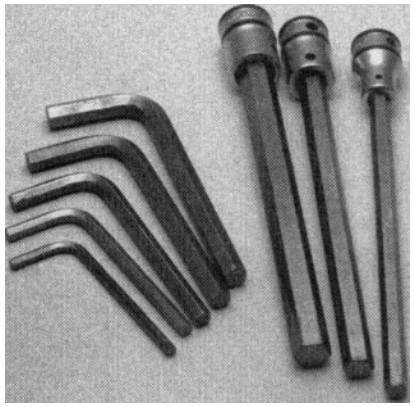
The tools in this list should be considered the minimum required for performance of routine maintenance, servicing and minor repair work. We recommend the purchase of combination wrenches (box end



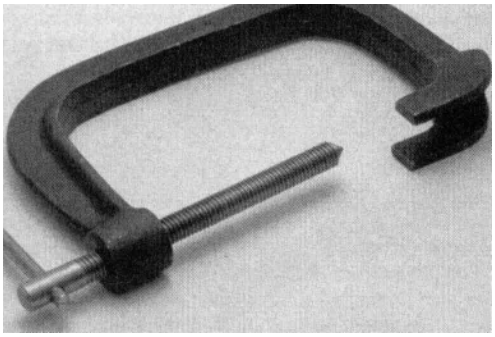
Torque wrenches (left - click type; right - beam type)



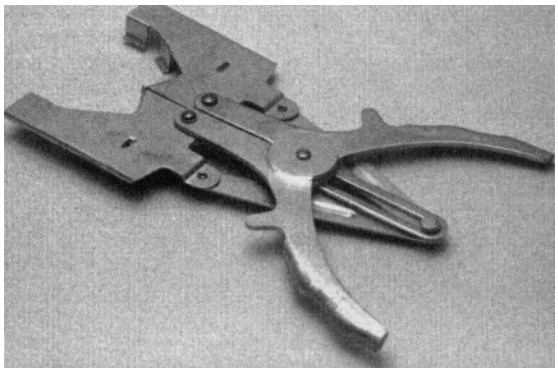
Snap-ring pliers (top - external; bottom - internal)



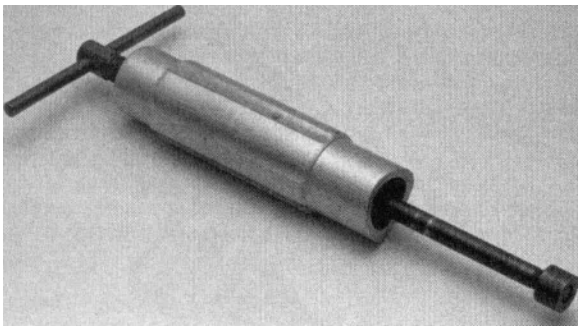
Alien wrenches (left) and Alien head sockets (right)



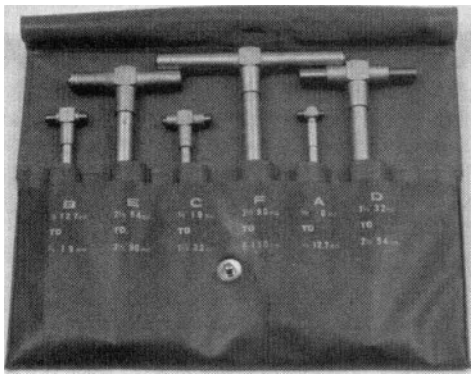
Valve spring compressor



Piston ring removal/installation tool

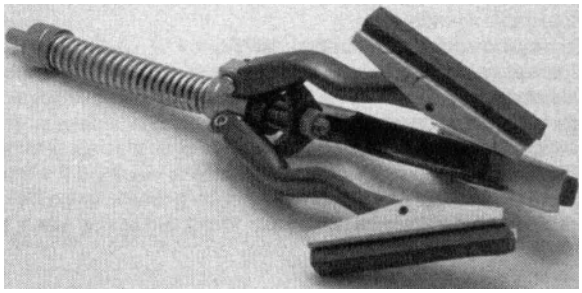


Piston pin puller

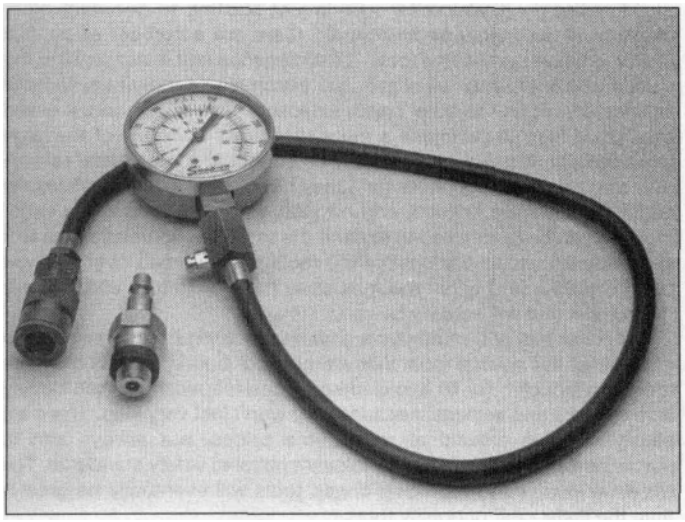


Telescoping gauges

0-to 1-inch micrometer

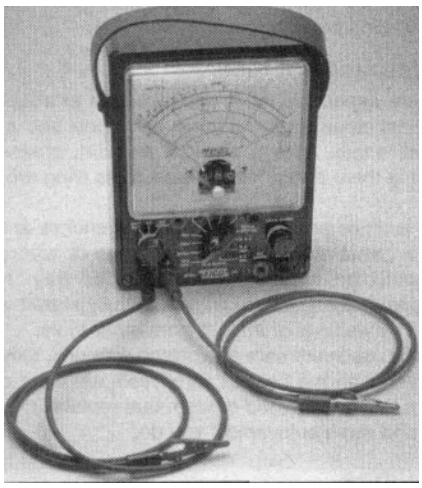


Cylinder surfacing hone

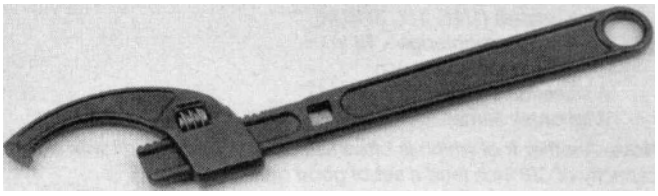


Cylinder compression gauge

Dial indicator set



Multimeter (volt/ohm/ammeter)



Adjustable spanner

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
Standard screwdriver (5/16 in x 6 in)
Phillips screwdriver (No. 2 x 6 in)
Alien (hex) wrench set (4 mm to 12 mm)
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
Work light with extension cord

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 motorcycle maintenance and repair (ideally, the mechanic would have a 3/8 inch drive set and a 1/2 inch drive set).

Alternator rotor removal tool
Socket set(s)
Reversible ratchet
Extension - 6 in
Universal joint
Torque wrench (same size drive as sockets)
Ball pein hammer - 8oz
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 - locking
Pliers - lineman's
Pliers - needle nose
Pliers - snap-ring (internal and external)
Cold chisel - 1/2 in
Scriber
Scraper (made from flattened copper tubing)
Center punch
Pin punches (1/16, 1/8, 3/16 in)
Steel rule/straightedge - 12 in
Pin-type spanner wrench
A selection of files
Wire brush (large)

Note: *Another tool which is often useful is an electric drill 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 (i.e. members of a motorcycle club).

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 can't be purchased or borrowed, the work should be turned over to the dealer service department or a motorcycle repair shop.

Valve spring compressor
Piston ring removal and installation tool
Piston pin puller
Telescoping gauges
Micrometers) and/or dial/Vernier calipers
Cylinder surfacing hone
Cylinder compression gauge
Dial indicator set
Multimeter
Adjustable spanner
Manometer or vacuum gauge set
Small air compressor with blow gun and tire chuck

Buying tools

For the do-it-yourselfer who is just starting to get involved in motorcycle 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 motorcycle 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. There are plenty of tools around at reasonable prices, but always aim to purchase items which meet the relevant national safety standards. The expense involved in replacing cheap tools will eventually be greater than the initial cost of quality tools.

It is obviously not possible to cover the subject of tools fully here. For those who wish to learn more about tools and their use, there is a book entitled *Motorcycle Workshop Practice Manual* (Book no. 1454) available from the publishers of this manual. It also provides an introduction to basic workshop practice which will be of interest to a home mechanic working on any type of motorcycle.

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 can't 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.

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).

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 motorcycle 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.

Safety first

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

There will always be new ways of having accidents, and the following is not a comprehensive list of all dangers; it is intended rather to make you aware of the risks and to encourage a safe approach to all work you carry out on your bike.

Essential DOs and DON'Ts

DON'T start the engine without first ascertaining that the transmission is in neutral.
DON'T suddenly remove the pressure cap from a hot cooling system - cover it with a cloth and release the pressure gradually first, or you may get scalded by escaping coolant.
DON'T attempt to drain oil until you are sure it has cooled sufficiently to avoid scalding you.
DON'T grasp any part of the engine or exhaust system without first ascertaining that it is cool enough not to burn you. **DON'T** allow brake fluid or antifreeze to contact the machine's paint work or plastic components.
DON'T siphon toxic liquids such as fuel, hydraulic fluid or antifreeze 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 right away, before someone slips on it.
DON'T use ill fitting wrenches or other tools which may slip and cause injury.
DON'T attempt to lift a heavy component which may be beyond your capability - get assistance.
DON'T rush to finish a job or take unverified short cuts. **DON'T** allow children or animals in or around an unattended vehicle. **DON'T** inflate a tire to a pressure above the recommended maximum. Apart from over stressing the carcase and wheel rim, in extreme cases the tire may blow off forcibly.
DO ensure that the machine is supported securely at all times. This is especially important when the machine is blocked up to aid wheel or fork removal.
DO take care when attempting to loosen a stubborn nut or bolt. It is generally better to pull on a wrench, rather than push, so that if you slip, you fall away from the machine rather than onto it. **DO** wear eye protection when using power tools such as drill, sander, bench grinder etc.
DO use a barrier cream on your hands prior to undertaking dirty jobs - it will protect your skin from infection as well as making the dirt easier to remove afterwards; but make sure your hands aren't left slippery. Note that long-term contact with used engine oil can be a health hazard. **DO** keep loose clothing (cuffs, ties etc. and long hair) well out of the way of moving mechanical parts.
DO remove rings, wristwatch etc., before working on the vehicle - especially the electrical system.
DO keep your work area tidy - it is only too easy to fall over articles left lying around.
DO exercise caution when compressing springs for removal or installation. Ensure that the tension is applied and released in a controlled manner, using suitable tools which preclude the possibility of the spring escaping violently.
DO ensure that any lifting tackle used has a safe working load rating adequate for the job.
DO get someone to check periodically that all is well, when working alone on the vehicle.
DO carry out work in a logical sequence and check that everything is correctly assembled and tightened afterwards. **DO** remember that your vehicle's safety affects that of yourself and others. If in doubt on any point, get professional advice.

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

Asbestos

Certain friction, insulating, sealing and other products - such as brake pads, 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 (petrol) is highly flammable. Never smoke or have any kind of naked flame around, when working on the vehicle. But the risk does not end there - a spark caused by an electrical short-circuit, by two metal surfaces contacting each other, by careless use of tools, or even by static electricity built up in your body under certain conditions, can ignite gasoline (petrol) vapor, which in a confined space is highly explosive. Never use gasoline (petrol) as a cleaning solvent. Use an approved safety solvent.

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

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

Fumes

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

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

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

The battery

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

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

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

Take care when topping up, cleaning or carrying the battery. The acid electrolyte, even when diluted, is very corrosive and should not be allowed to contact the eyes or skin. Always wear rubber gloves and goggles or a face shield. If you ever need to prepare electrolyte yourself, always add the acid slowly to the water; never add the water to the acid.

Electricity

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

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

Motorcycle chemicals and lubricants

A number of chemicals and lubricants are available for use in motorcycle 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 *(petrol) 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 motorcycle 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 doesn't rotate

1 Engine kill switch Off.
2 Fuse blown. Check fuse block (Chapter 8).
3 Battery voltage low. Check and recharge battery (Chapter 8).
4 Starter motor defective. Make sure the wiring to the starter is secure. Make sure the starter relay clicks when the start button is pushed. If the relay clicks, then the fault is in the wiring or motor.
5 Starter relay faulty. Check it according to the procedure in Chapter 8.
6 Starter button not contacting. The contacts could be wet, corroded or dirty. Disassemble and clean the switch (Chapter 8).
7 Wiring open or shorted. Check all wiring connections and harnesses 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 (earth) (see wiring diagram, Chapter 8).
8 Ignition switch defective. Check the switch according to the procedure in Chapter 8. Replace the switch with a new one if it is defective.
9 Engine kill switch defective. Check for wet, dirty or corroded contacts. Clean or replace the switch as necessary (Chapter 8).
10 Faulty neutral/gearchange/sidestand/clutch switch. Check the wiring to each switch and the switch itself according to the procedures in Chapter 8.

2 Starter motor rotates but engine does not turn over

1 Starter motor clutch defective. Inspect and repair or replace (Chapter 8).
2 Damaged idler or starter gears. Inspect and replace the damaged parts (Chapter 8).

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, pistons, 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 valve/tap vacuum hose broken or disconnected or turned OFF.
3 Tank cap air vent obstructed (not later California models). Usually caused by dirt or water. Remove it and clean the cap vent hole.
4 Fuel tap filter clogged. Clean or replace the filter (Chapter 1).
5 Fuel line clogged. Pull the fuel line loose and carefully blow through it.
6 Inlet needle valve clogged. For all of the valves to be clogged, either a very bad batch of fuel with an unusual additive has been used, or some other foreign material 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 valves and jets. The carburetors should be removed and overhauled if draining the float bowls doesn't solve the problem.

5 Engine flooded

1 Float height too high. Check as described in Chapter 4.
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 4).
3 Starting technique incorrect. Under normal circumstances (i.e., if all the carburetor functions are sound) the machine should start with little or 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. If the engine is flooded, turn the fuel tap off and hold the throttle open while cranking the engine. This will allow additional air to reach the cylinders. Remember to turn the fuel tap back on after the engine starts.

6 No spark or weak spark

1 Ignition switch Off.
2 Engine kill switch turned to the Off position.
3 Battery voltage low. Check and recharge battery as necessary (Chapter 8).
4 Spark plug dirty, defective or worn out. Locate reason for fouled plug(s) using spark plug condition chart and follow the plug maintenance procedures in Chapter 1.
5 Spark plug cap or secondary (HT) wiring faulty. Check condition. Replace either or both components if cracks or deterioration are evident (Chapter 5).
6 Spark plug cap not making good contact. Make sure that the plug cap fits snugly over the plug end.
7 Spark unit defective. Check the unit(s), referring to Chapter 5 for details.
8 Pulse generator defective. Check the unit, referring to Chapter 5 for details.
9 Ignition coil(s) defective. Check the coils, referring to Chapter 5.
10 Ignition or kill 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 8).
11 Wiring shorted or broken between:

a) Ignition switch and engine kill switch (or blown fuse)
b) Spark unit and engine kill switch
c) Spark unit and ignition coil
d) Ignition coil and plug
e) Spark unit and pulse generator

Make sure that all wiring connections are clean, dry and tight. Look for chafed and broken wires (Chapters 5 and 8).

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 heads not sufficiently tightened down. If either 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 carburation problem that causes excess carbon deposits or seizures 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 is allowed to become 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 carburation) or an accumulation of carbon deposits on the seat (from carburation or lubrication problems). The valves must be cleaned and/or replaced and the seats serviced if possible (Chapter 2).

8 Stalls after starting

1 Improper choke action. Make sure the choke rod is getting a full stroke and staying in the out position.
2 Ignition malfunction. See Chapter 5.
3 Carburetor malfunction. See Chapter 4.
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 (Chapter 4).
5 Intake air leak. Check for loose carburetor-to-intake manifold connections, loose or missing vacuum gauge access port cap or hose, or loose carburetor top (Chapter 4).
6 Engine idle speed incorrect. Turn throttle stop screw until the engine idles at the specified rpm (Chapters 1 and 4).

9 Rough idle

1 Ignition malfunction. See Chapter 5.
2 Idle speed incorrect. See Chapter 1.
3 Carburetors not synchronized. Adjust carburetors with vacuum gauge or manometer set as described in Chapter 1.
4 Carburetor malfunction. See Chapter 4.
5 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 (Chapter 4).
6 Intake air leak. Check for loose carburetor-to-intake manifold connections, loose or missing vacuum gauge access port cap or hose, or loose carburetor top (Chapter 4).
7 Air cleaner clogged. Service or replace air filter element (Chapter 1).

Poor running at low speed

10 Spark weak

1 Battery voltage low. Check and recharge battery (Chapter 8).
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 5 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 Spark unit(s) defective. See Chapter 5.
7 Pulse generator defective. See Chapter 5.
8 Ignition coil(s) defective. See Chapter 5.

11 Fuel/air mixture incorrect

1 Pilot screw(s) out of adjustment (Chapter 4).
2 Pilot jet or air passage clogged. Remove and overhaul the carburetors (Chapter 4).
3 Air bleed holes clogged. Remove carburetor and blow out all passages (Chapter 4).
4 Air cleaner clogged, poorly sealed or missing (Chapter 1).
5 Air cleaner housing poorly sealed. Look for cracks, holes or loose clamps and replace or repair defective parts.
6 Fuel level too high or too low. Check the float height (Chapter 4).
7 Fuel tank air vent obstructed (not later California models). Make sure that the air vent passage in the filler cap is open.
8 Carburetor intake manifolds loose. Check for cracks, breaks, tears or loose clamps or bolts. Repair or replace the rubber boots.

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 heads not sufficiently tightened down. If either 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 carburation problem that causes excess carbon deposits or seizures 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 is allowed to become 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 carburation) or an accumulation of carbon deposits on the seat (from carburation, lubrication problems). The valves must be cleaned and/or replaced and the seats serviced if possible (Chapter 2).

13 Poor acceleration

1 Carburetors leaking or dirty. Overhaul the carburetors (Chapter 4).
2 Timing not advancing. The pulse generator or the spark unit(s) may be defective. If so, they must be replaced with new ones, as they

can't be repaired.
3 Carburetors not synchronized. Adjust them with a vacuum gauge set or manometer (Chapter 1).
4 Engine oil viscosity too high. Using a heavier oil than that 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 seals, or from a warped disc or bent axle. Repair as necessary (Chapter 7).

Poor running or no power at high speed

14 Firing incorrect

1 Air filter restricted. Clean or replace filter (Chapter 1).
2 Spark plug fouled, defective or worn out. See Chapter 1 for spark plug maintenance.
3 Spark plug cap or secondary (HT) wiring defective. See Chapters 1 and 5 for details of the ignition system.
4 Spark plug cap not in good contact. See Chapter 5.
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 Spark unit(s) defective. See Chapter 5.
7 Ignition coil(s) defective. See Chapter 5.

15 Fuel/air mixture incorrect

1 Main jet clogged. Dirt, water or other contaminants can clog the main jets. Clean the fuel tap filter, the float bowl area, and the jets and carburetor orifices (Chapter 4).
2 Main jet wrong size. The standard jetting is for sea level atmospheric pressure and oxygen content.
3 Jet needle or needle jet worn. These can be replaced individually, but should be replaced as a pair (Chapter 4).
4 Air bleed holes clogged. Remove and overhaul carburetors (Chapter 4).
5 Air cleaner clogged, poorly sealed, or missing (Chapter 1).
6 Air cleaner housing poorly sealed. Look for cracks, holes or loose clamps, and replace or repair defective parts.
7 Fuel level too high or too low. Check the float height (Chapter 4).
8 Fuel tank air vent obstructed (not later California models). Make sure the air vent passage in the filler cap is open.
9 Carburetor intake manifolds loose. Check for cracks, breaks, tears or loose clamps or bolts. Repair or replace the rubbers (Chapter 4).
10 Fuel filter clogged. Clean or replace the filter (Chapter 1).
11 Fuel line clogged. Pull the fuel line loose and carefully blow through it.

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 heads not sufficiently tightened down. If either 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 carburation problem that causes excess carbon deposits or seizures 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 is allowed to become 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 carburation) or an accumulation of carbon deposits on the seat (from carburation or lubrication problems). The valves must be cleaned and/or replaced and the seats serviced if possible (Chapter 2).

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 fuel can cause detonation. This causes the piston to rattle, thus the knocking or pinging sound. Drain old fuel and always use the recommended fuel grade.
3 Spark plug heat range incorrect. Uncontrolled detonation indicates 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, which leads to detonation. Clogged jets or an air leak can cause this imbalance. See Chapter 4.

18 Miscellaneous causes

1 Throttle valve doesn't open fully. Adjust the cable slack (Chapter 1).
2 Clutch slipping. May be caused by loose or worn clutch components. Refer to Chapter 2 for clutch 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 seals, or from a warped disc or bent axle. Repair as necessary.

Overheating

19 Engine overheats

1 Coolant level low. Check and add coolant (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 3.
4 Faulty radiator cap. Remove the cap and have it checked at a service station.
5 Coolant passages clogged. Have the entire system drained and flushed, then refill with fresh coolant.
6 Water pump defective. Remove the pump and check the components (Chapter 3).
7 Clogged radiator fins. Clean them by blowing compressed air through the fins from the backside.

20 Firing incorrect

1 Spark plugs fouled, defective or worn out. See Chapter 1 for spark plug maintenance.
2 Incorrect spark plugs.
3 Faulty ignition coil(s) (Chapter 5).

21 Fuel/air mixture incorrect

1 Main jet clogged. Dirt, water and other contaminants can clog the main jets. Clean the fuel tap filter, the float bowl area and the jets and carburetor orifices (Chapter 4).
2 Main jet wrong size. The standard jetting is for sea level atmospheric pressure and oxygen content.
3 Air cleaner clogged, poorly sealed or missing (Chapter 1).
4 Air cleaner housing poorly sealed. Look for cracks, holes or loose clamps and replace or repair.
5 Fuel level too low. Check float height(s) (Chapter 4).
6 Fuel tank air vent obstructed (not later California models). Make sure that the air vent passage in the filler cap is open.
7 Carburetor intake manifolds loose. Check for cracks, breaks, tears or loose clamps or bolts. Repair or replace the rubbers (Chapter 4).

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.

23 Engine load excessive

1 Clutch slipping. Can be caused by damaged, loose or worn clutch components. Refer to Chapter 2 for 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 cause drag on the engine.
4 Brakes dragging. Usually caused by debris which has entered the brake piston seals, from a warped disc or bent axle (disc brake), or sticking operating cam (drum brake). 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 this engine. Check the Specifications section and change to the correct oil (Chapter 1).

25 Miscellaneous causes

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 carburetors.

Clutch problems

26 Clutch slipping

1 Piston in master cylinder or slave cylinder sticking (Chapter 2).
2 Friction plates worn or warped. Overhaul the clutch assembly (Chapter 2).
3 Steel plates worn or warped (Chapter 2).
4 Clutch spring(s) broken or weak. Old or heat-damaged (from slipping clutch) springs should be replaced with new ones (Chapter 2).
5 Clutch center or housing unevenly worn. This causes improper engagement of the plates. Replace the damaged or worn parts (Chapter 2).

27 Clutch not disengaging completely

1 Air bubbles or lack or fluid in hydraulic system. Check fluid level (Chapter 1) and bleed system (Chapter 7).
2 Clutch plates warped or damaged. This will cause clutch drag, which in turn will cause 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 spring (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 the damage (Chapter 2).
7 Clutch release mechanism defective. Bent or damaged pushrod can stick and fail to apply force to the pressure plate. Overhaul the clutch cover components (Chapter 2).
8 Loose clutch center nut. Causes housing and center misalignment putting a drag on the engine. Engagement adjustment continually varies. Overhaul the clutch assembly (Chapter 2).
9 Hydraulic system leaking. Check all hoses and connections.
10 Piston in master cylinder or slave cylinder sticking (Chapter 2).

Gear shifting problems

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

1 Clutch not disengaging. See Section 27.
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 bearing (Chapter 2).
5 Shift linkage 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 stopper arm broken or worn. Full engagement and rotary movement of shift drum results. Replace the arm (Chapter 2).
8 Pawl spring broken. Allows arm to 'float', causing sporadic shift operation. Replace springs (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.
4 Shift drum stopper arm broken. Check and replace (Chapter 2).
5 Shift drum shaft bent. Check and replace (Chapter 2).

30 Overshifts

1 Pawl springs weak or broken (Chapter 2).
2 Shift drum stopper arm broken (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. This causes the pistons to rattle, thus the knocking or pinging sound. Drain the old fuel 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 cylinders to run hot and lead to detonation. Clogged jets or an air leak can cause this imbalance. See Chapter 4.

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 upper or lower 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.
2 Exhaust pipe leaking at cylinder head connection. Caused by improper fit of pipe(s) 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 (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).

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 Final drive noise

1 Oil level too low (Chapter 1).
2 Excessive backlast between pinion and ring gear (Chapter 6).
3 Scored driven flange or wheel hub. Inspect the components (Chapter 6).
4 Worn or damaged internal components in the driveshaft or final drive unit. Have a Honda dealer overhaul the assembly.

Abnormal frame and suspension noise 38

Front end noise

1 Low fluid level or improper viscosity oil in forks. This can sound like spurting and is usually accompanied by irregular fork action (Chapter 6).
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 6).
3 Steering head bearings loose or damaged. Clicks when braking. Check and adjust or replace as necessary (Chapters 1 and 6).
4 Fork triple 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 6).
6 Front axle or axle clamp bolt/nut loose. Tighten them to the specified torque (Chapter 6).

39 Shock absorber noise

1 Fluid level incorrect. Indicates a leak caused by defective seal. Shock will be covered with oil. Replace shock (Chapter 6).
2 Defective shock absorber with internal damage. This is in the body of the shock and can't be remedied. The shock must be replaced with a new one (Chapter 6).
3 Bent or damaged shock body. Replace the shock with a new one (Chapter 6).
4 Loose shork or shock linkage fasteners on Sabre models (Chapter 6).

40 Disc brake noise

1 Brake disc-to-caliper bracket clearance incorrect (front brake) (Chapter 7).
2 Squeal caused by dust on brake pads. Usually found in combination with glazed pads. Clean using brake cleaning solvent (Chapter 7).
3 Contamination of brake pads. Oil, brake fluid or dirt causing brake to chatter or squeal. Clean or replace pads (Chapter 7).
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. Replace the disc (Chapter 7).
6 Loose or worn wheel bearings. Check and replace as needed (Chapter 7).

Oil pressure indicator light comes on 41

Engine lubrication system

1 Engine oil pump defective (Chapter 2).
2 Engine oil level low. Inspect for leak or other problem causing low oil level and add recommended oil (Chapters 1 and 2).
3 Engine oil viscosity too low. Very old, thin oil or an improper weight of oil used in the engine. Change to correct oil (Chapter 1).
4 Camshaft or journals worn. Excessive wear causing drop in oil pressure. Replace cam and/or/cylinder head. Abnormal wear could be caused by oil starvation at high rpm from low oil level or improper weight of type of oil (Chapter 1).
5 Crankshaft and/or bearings worn. Same problems as paragraph 4. Check and replace crankshaft and/or bearings (Chapter 2).
6 Clogger oil strainer. Clean in (Chapter 2).

42 Electrical system

1 Oil pressure switch defective. Check the switch according to the procedure in Chapter 8. Replace it if it is defective.
2 Oil pressure indicator light circuit defective. Check for pinched, shorted, disconnected or damaged wiring (Chapter 8).

Excessive exhaust smoke 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 Cylinders 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 the 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 the 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/separator or hoses usually the cause (Chapter 4).

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 4).
3 Choke stuck, causing fuel to be pulled through choke circuit (Chapter 4).
4 Fuel level too high. Check and adjust the float height(s) as necessary (Chapter 4).
5 Inlet needle held off needle seat. Clean the float bowls and fuel line and replace the needles and seats if necessary (Chapter 4).

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 4).
2 Fuel flow insufficient. Fuel inlet needle valve stuck closed due to chemical reaction with old fuel. Float height incorrect. Restricted fuel line. Clean line and float bowl and adjust floats if necessary.
3 Carburetor intake manifolds loose (Chapter 4).
4 Air cleaner poorly sealed or not installed (Chapter 1).

Poor handling or stability

46 Handlebar hard to turn

1 Steering stem nut too tight (Chapter 6).
2 Bearings damaged. Roughness can be felt as the bars are turned from side-to-side. Replace bearings and races (Chapter 6).
3 Races dented or worn. Denting results from wear in only one position (e.g., straight-ahead), from a collision or hitting a pothole or from dropping the machine. Replace races and bearings (Chapter 6).
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 6).
5 Steering stem bent. Caused by a collision, hitting a pothole or by dropping the machine. Replace damaged part. Don't try to straighten the steering stem (Chapter 6).
6 Front tire air pressure too low (Chapter 1).

47 Handlebar shakes or vibrates excessively

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

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 (Chapter 6).
2 Wheel out of alignment. Caused by improper location of axle spacers or from bent steering stem or frame (Chapter 6).
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 by dropping the motorcycle. Replace the steering stem (Chapter 6).
5 Fork leg bent. Disassemble the forks and replace the damaged parts (Chapter 6).
6 Fork oil level uneven. Check and add or drain as necessary (Chapter 6).
7 Defective shock absorber on one side (Magna models).

49 Poor shock absorbing qualities

1 Too hard:
a) Fork oil level excessive (Chapter 6).
b) Fork oil viscosity too high.
c) Fork tube bent. Causes a harsh, sticking feeling (Chapter 6).
d) Anti-dive passages clogged (Chapter 6).
e) Shock shaft or body bent or damaged (Chapter 6).
f) Fork internal damage (Chapter 6).
g) Shock internal damage.
h) Tire pressure too high (Chapter 1).

2 Too soft:
a) Fork or shock oil insufficient and/or leaking (Chapter 6).
b) Fork oil level too low (Chapter 6).
c) Fork oil viscosity too light (Chapter 6).
d) Fork springs weak or broken (Chapter 6).
e) Shock internal damage or leakage (Chapter 6).

Braking problems

50 Disc brakes are spongy, don't hold

1 Air in brake line. Caused by inattention to master cylinder fluid level or by leakage. Locate problem and bleed brakes (Chapter 7).
2 Pad or disc worn (Chapters 1 and 7).
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 7).
5 Brake fluid deteriorated. Fluid is old or contaminated. Drain system, replenish with new fluid and bleed the system (Chapter 7).
6 Master cylinder internal parts worn or damaged causing fluid to bypass (Chapter 7).
7 Master cylinder bore scratched by foreign material or broken spring. Repair or replace master cylinder (Chapter 7).
8 Disc warped. Replace disc (Chapter 7).

51 Brake lever or pedal pulsates

1 Disc warped or drum out-of-round (Chapter 7).
2 Axle bent. Replace axle (Chapter 7).
3 Brake caliper or bracket bolts loose (Chapter 7).
4 Brake caliper sticking on its mounting bolt shafts, causing caliper to bind. Lube the shafts or replace them if they are corroded or bent (Chapter 7).
5 Wheel warped or otherwise damaged (Chapter 7).
6 Wheel bearings damaged or worn (Chapter 7).

52 Brakes drag

1 Master cylinder piston seized. Caused by wear or damage to piston or cylinder bore (Chapter 7).
2 Lever balky or stuck. Check pivot and lubricate (Chapter 7).
3 Brake caliper binds. Caused by inadequate lubrication or damage to caliper sliders (Chapter 7).
4 Brake caliper pistons seized in bore. Caused by wear or ingestion of dirt past deteriorated seal (Chapter 7).
5 Brake pad damaged. Pad material separated from backing plate. Usually caused by faulty manufacturing process or from contact with chemicals. Replace pads (Chapter 7).
6 Pads improperly installed (Chapter 7).
7 Drum brake operating cam sticking or broken/sagged shoe return strings (Chapter 7).
8 Rear brake pedal freeplay insufficient.

Electrical problems 53

Battery dead or weak

1 Battery faulty. Caused by sulfated plates which are shorted through sedimentation or low electrolyte level. Also, broken battery terminal making only occasional contact (Chapter 8).
2 Battery cables making poor contact (Chapter 8).

3 Load excessive. Caused by addition of high wattage lights or other electrical accessories.
4 Ignition main (key) switch defective. Switch either grounds (earths) internally or fails to shut off system. Replace the switch (Chapter 8).
5 Regulator/rectifier defective (Chapter 8).
6 Alternator stator coil open or shorted (Chapter 8).
7 Wiring faulty. Wiring grounded (earthed) or connections loose in ignition, charging or lighting circuits (Chapter 8).

54 Battery overcharged

1 Regulator/rectifier defective. Overcharging is noticed when battery gets excessively warm or boils over (Chapter 8).
2 Battery defective. Replace battery with a new one (Chapter 8).
3 Battery amperage too low, wrong type or size. Install manufacturer's specified amp-hour battery to handle charging load (Chapter 8).

Chapter 1
Tune-up and routine maintenance

Contents

Specifications

Engine

Spark plug type	
Standard	NGK DPR8EA-9 or ND X24EPR-U9
Below 41°F (5°C)	NGK DPR7EA-9 or ND X22EPR-U9
Extended high speeds	NGK DPR9EA-9 or ND X27EPR-U9
Spark plug electrode gap	0.8 to 0.9 mm (0.031 to 0.035 in)
Valve clearances (COLD engine)	
1982 through 1984 700/750 Magnas and all 700/750 Sabre models	0.12 mm (0.0047 in)
1985 700 Magna models	0.13 mm (0.0051 in)
1986-on 700/750 and all 1100 models	0.15 mm (0.0059 in)
Engine idle speed	
750 Sabre and 1982 through 1984 700/750 Magna models	1000 ± 100 rpm
700 Sabre and 1985-on 700/750 Magna models	1200 ± 100 rpm
1100 Sabre models	1000 to 1100 rpm
1100 Magna models	1000 ± 100 rpm
Cylinder compression pressures	184 ±28 psi (psi)
Carburetor synchronization (maximum vacuum difference between any two cylinders	
1985 through 1988 700/750 Magna models	40 mm (1.6 in) Hg
All other models	60 mm (2.4 in) Hg
Cylinder identification	See illustration 1.1 in Chapter 2

Miscellaneous

Battery electrolyte specific gravity	1.280 at 68°F (20°C)
Brake pad minimum thickness	See text
Brake pedal freeplay (700/750 models)	20 to 30 mm (0.8 to 1.2 in)
Throttle grip freeplay	2 to 6 mm (0.08 to 0.24 in)

Tire sizes	Front	Rear
700/750 Sabre models	110/90-18 61H	130/90-17 68H
1982 through 1984 700/750 Magna models	110/90-18 61H	130/90-16 67H
1985 and 1986 700 Magna models	110/90-18 61H	140/90-15 70H
1987 and 1988 700/750 Magna models	100/90-19 57H	150/80-15 70H
1100 Sabre models	M110/90-18	M130/90-17
1100 Magna models	M110/90-18	M140/90-16
Minimum tire tread depth*	1.5 mm (0.06 in)	2.0 mm (0.08 in)
Tire pressures (cold)		
1100 Sabres		
Up to 90 kg (200 lb) load	32 psi	36 psi
Over 90 kg (200 lb) load	32 psi	40 psi
700/750 Sabres, 1982 through 1984 700/750 Magnas, all 1100 Magnas		
Up to 90 kg (200 lb) load	32 psi	32 psi
Over 90 kg (200 lb) load	32 psi	40 psi
1985 through 1988 700/750 Magnas		
Up to 90 kg (200 lb) load	32 psi	32 psi
Over 90 kg (200 lb) load	32 psi	42 psi

'In the UK, tread depth must be at least 1 mm over 3/4 of the tread breadth all the way around the tire, with no bald patches.

Torque setting	Nm	ft-ibs
Engine oil pan drain plug	35 to 40	25 to 29
Front cylinder oil drain plug	10 to 14	7 to 10
Oil filter (using Honda tool)	15to20	11 to 14
Spark plugs	12 to 16	9 to 12

Recommended lubricants and fluids

Engine/transmission oil	
Type	API grade SE or SF
Viscosity	SAE10W/40
Capacity (700/750 models)	
After draining	2.9 lit (3.1 US qt, 5.1 Imp pts)
After engine rebuild	3.0 lit (3.2 US qt, 5.3 Imp pts)
Capacity (1100 models)	
After draining	3.0 lit (3.2 US qt, 5.3 Imp pts)
After engine rebuild	3.5 lit (3.7 US qt, 6.2 Imp pts)
Final drive unit	
Type	
1982 and 1983 750 models (above 41°F/5°C)	Hypoid gear oil SAE90
1982 and 1983 750 models (below 41°F/5°C)	Hypoid gear oil SAE80
All other models	Hypoid gear oil SAE80
Capacity*	
1982 and 1983 750 models	110 cc (3.7 US fl oz, 3.9 Imp fl oz)
1984-on 700/750 models and all 1100 models	130 cc (4.4 Usfl oz, 4.6 Imp fl oz)

"Refill quantity is greater if the final drive has been dismantled

Coolant	
Mixture type	50% distilled water, 50% corrosion inhibited ethylene glycol antifreeze
Radiator capacity	
700/750 models	2.4 lit (2.5 US qt, 4.2 Imp pt)
1100 Sabre model	2.8 lit (2.9 US qt, 4.9 Imp pt)
1100 Magna model	3.0 lit (3.2 US qt, 5.3 Imp pt)
Reservoir tank capacity (approx.)	
1100 Sabre model	0.6 lit (0.6 US qt, 1.0 Imp pt)
All other models	0.4 lit (0.4 US qt, 0.7 Imp pt)
Brake and clutch fluid	DOT 3 or 4 (see reservoir cap)

Miscellaneous

Wheel bearings	Medium weight, lithium-based multi-purpose grease
Final drive flange grease	See Chapter 6
Swingarm pivot bearings	Molybdenum disulfide grease
Suspension linkage bearings (Sabre)	Molybdenum disulfide grease
Cables and lever pivots	Chain and cable lubricant or 10W40 motor oil
Stand pivots	Medium-weight, lithium-based multi-purpose grease
Brake pedal/shift lever pivots	Chain and cable lubricant or 10W40 motor oil
Throttle grip	Multi-purpose grease or dry film lubricant

1 Honda 700, 750 & 1100 V-Four Routine maintenance intervals

Routine maintenance intervals

Note: *The pre-ride inspection outlined in the owner's manual covers the checks and maintenance that should be carried out on a daily basis. It's condensed and included here to remind you of its importance. Always perform the pre-ride inspection at every maintenance interval (in addition to the procedures listed). The intervals listed below are the shortest intervals recommended by the manufacturer for each particular operation during the model years covered in this manual. Your owner's manual may have different intervals for your model.*

Daily or before riding

Check the engine oil level
Check the fuel level and inspect for leaks
Check the engine coolant level and look for leaks
Check the operation of both brakes - also check the fluid levels and look for leakage Check the tires for damage, the presence of foreign objects and correct air pressure Check the throttle for smooth operation Check the operation of the clutch - make sure the freeplay is correct Make sure the steering operates smoothly, without looseness or binding Check for proper operation of the headlight, taillight, brake light, turn signals, indicator lights, speedometer and horn Make sure the sidestand and main stand return to their fully up positions and stay there under spring pressure Make sure the engine stop switch works properly

After the initial 600 miles (1000 km)

Replace the engine oil and oil filter
Check and adjust the valve clearances Check and adjust the idle speed Check the throttle operation Check the carburetor synchronization Check the cooling system Check the brake hydraulic system Check the clutch hydraulic system Check the tightness of all fasteners Check the steering head bearings

Every 4000 miles (6000 km)

Clean the air filter element(s) (Sabre models) Drain the crankcase breather separator tank (where applicable)
Replace the spark plugs
Check the idle speed
Check the battery electrolyte level and condition
Check the brake fluid level and pad wear
Check the drum brake lining wear
Check the clutch fluid level

Every 8000 miles (12,000 km)

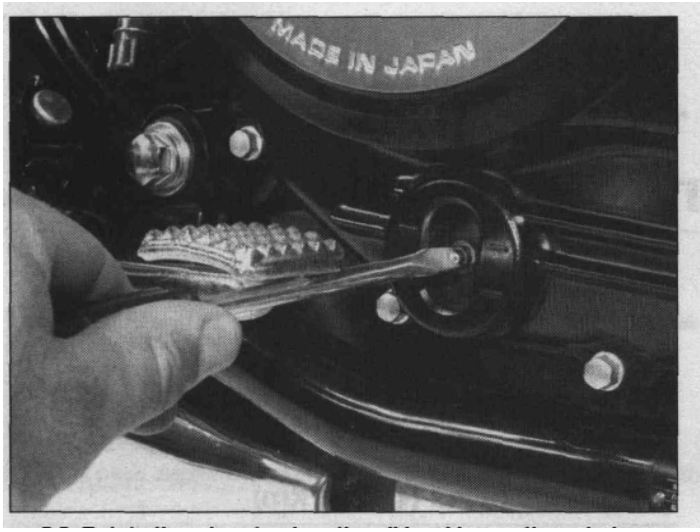
Replace the engine oil and filter
Check the fuel system hoses
Check the battery
Check and adjust the throttle and choke cables
Check/adjust the valve clearances
Replace the air cleaner element (1982 through 1985 Magna models)
Check/adjust the carburetor synchronization Check the Evaporative emission control system (1982 through 1985 models) Check the Secondary air supply system (1986 through 1988 models)
Check the coolant level and check the cooling system
Check the final drive oil level Lubricate the final driven flange with fresh grease - 700/750 Sabres and 1982 through 1984 700/750 Magnas (see Chapter 6)
Check the brake hydraulic system Check the operation of the brake light switches Check the headlight aim (see Chapter 8) Check the clutch hydraulic system Check the stand pivots Check the operation of the suspension Check the steering head bearings for play Check the condition of the wheels and tires Check the tightness of all nuts, bolts and fasteners

Every 12,000 miles (19,200 km)

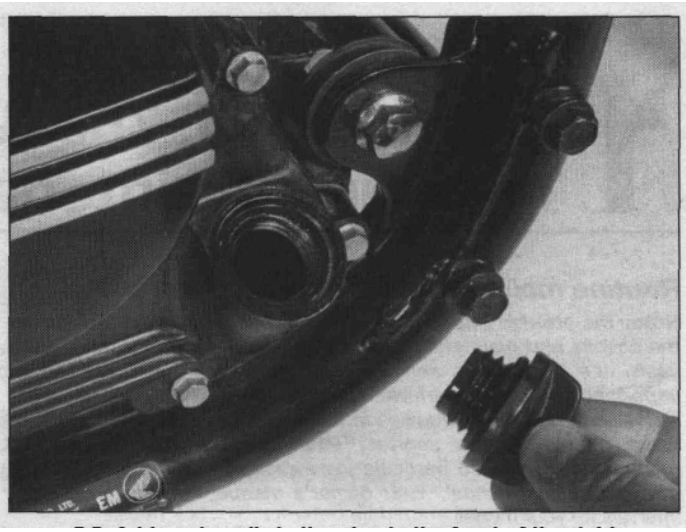
Replace the air filter element (1986 through 1988 Magnas) Check the Evaporative emission control system (1986 through 1988 models) Replace the clutch and brake fluid (or every two years, whichever comes sooner)

Every 24,000 miles (36,000 km)

Replace the coolant
Replace the fuel filter (1982 through 1986 Magnas and 1100 Sabres) Replace the final drive oil



3.2 Rotate the wiper to clear the oil level inspection window (1982 750 models)



3.3 Add engine oil via the plug in the front of the right engine case

2 Introduction to tune-up and routine maintenance

This Chapter covers in detail the checks and procedures necessary for the tune-up and routine maintenance of your motorcycle. Section 1 includes the routine maintenance schedule, which is designed to keep the machine in proper running condition and prevent possible problems. The remaining Sections contain detailed procedures for carrying out the items listed on the maintenance schedule, as well as additional maintenance information designed to increase reliability.

Since routine maintenance plays such an important role in the safe and efficient operation of your motorcycle, it is presented here as a comprehensive check list. For the rider who does all his/her own maintenance, these lists outline the procedures and checks that should be done on a routine basis.

Maintenance information is printed on decals attached to the motorcycle. If the information on the decals differs from that included here, use the information on the decal.

Deciding where to start or plug into the routine maintenance schedule depends on several factors. If you have a motorcycle 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 mileage or 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, then 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 may desire to combine all the checks into one large service initially and then settle into the maintenance schedule prescribed.

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

Before beginning any maintenance or repair, the machine should be cleaned thoroughly, especially around the oil filter, spark plugs, cylinder head covers, side covers, carburetors, etc. Cleaning will help ensure that dirt does not contaminate the engine and will allow you to detect wear and damage that could otherwise easily go unnoticed.

3 Fluid levels - check

Engine oil

Refer to illustrations 3.2, 3.3 and 3.7

1982 750 models

1 Check the oil level with the engine cold. Place the motorcycle on its main stand on level ground.

2 Locate the engine oil inspection window on the lower right side of the engine. If necessary, use a screwdriver to rotate the wiper in order to clean the inspection window **(see illustration).**

3 Note where the oil level is in relation to the upper and lower level marks located on either side of the inspection window. The level should be between these two marks. If the oil level is below the lower mark, remove the filler cap and add enough oil of the recommended grade and type to bring the level up to the upper mark **(see illustration).** Do not overfill. Re-install the filler cap.

4 Run the engine and check that the oil pressure warning light goes out after a few seconds.

All other models

5 Run the engine for 2 to 3 minutes, then stop it. **Caution:** *Do not run the engine in an enclosed space such as a garage or shop.* Place the motorcycle on its main stand (have an assistant hold it vertical on 1987 and 1988 700/750 Magna models) on level ground.

6 Remove the oil level dipstick from the rear of the engine right cover and wipe its end clean. Re-insert the dipstick, but don't screw it in, then remove it and check the oil level.

7 Note where the oil level is in relation to the upper and lower level marks on the dipstick. The level should be between these two marks. If the oil level is below the lower mark, remove the filler cap and add enough oil of the recommended grade and type to bring the level up to the upper mark **(see illustration).** Do not overfill. Re-install the filler cap.

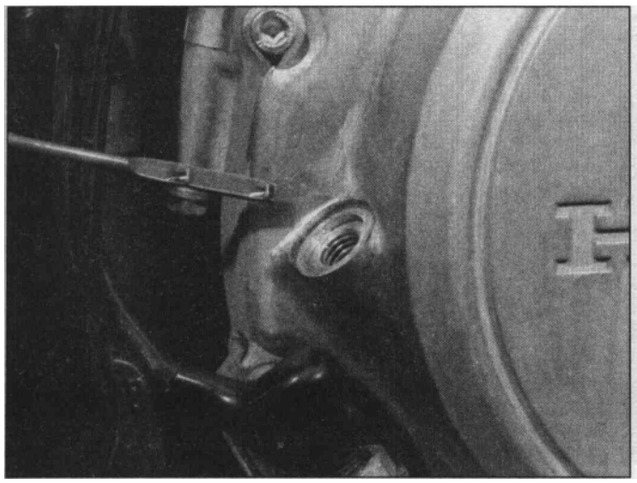
8 Some later 700/750 models retain the oil level inspection window (see Step 2), although the dipstick method is recommended.

9 Run the engine and check that the oil pressure warning light goes out after a few seconds.

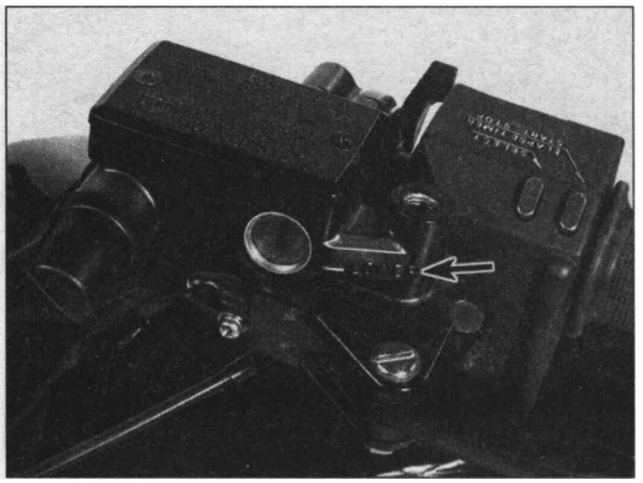
Brake fluid

Refer to illustration 3.12

10 In order to ensure proper operation of the hydraulic disc brakes,



3.7 Oil level should lie between dipstick marks (all except 1882 750 models)



3.12 Brake/clutch fluid level must be above LOWER mark on master cylinder

the fluid level in the master cylinder reservoir(s) must be properly maintained.

Front brake

11 With the motorcycle on the main stand (or held upright), turn the handlebars until the top of the master cylinder is as level as possible. If necessary, tilt the motorcycle to make it level.
12 Look closely at the inspection window in the master cylinder reservoir. Make sure that the fluid level, visible in the sightglass, is above the LOWER mark on the reservoir **(see illustration).**
13 If the level is low, the fluid must be replenished. Before removing the master cylinder cover, cover the fuel tank to protect it from brake fluid spills (which will damage the paint) and remove all dust and dirt from the area around the cap.
14 Unscrew the retaining screws and lift off the cover, diaphragm plate (where fitted), diaphragm and float (1988 750 Magna model). Using a good quality brake fluid of the recommended type, from a freshly opened container, top up the reservoir to the upper level mark; this mark is in the form of a line, cast on the inside of the front face of the reservoir.
15 When the fluid level is correct, clean and dry the diaphragm, fold it into its compressed state and install it in the reservoir followed by the diaphragm plate. Install the reservoir cover and securely tighten its retaining screws.

Rear brake (1100 models)

16 With the motorcycle on the main stand, remove the right side cover and check the fluid level in the rear brake reservoir. Make sure that the fluid level, visible through the translucent material of the reservoir, is above the LOWER mark on the reservoir.
17 If the level is low, the fluid must be replenished. Remove any dust and dirt from the area around the cap. Unscrew the reservoir cap and remove the diaphragm plate and diaphragm. Using a good quality brake fluid of the recommended type, from a freshly opened container, top up the reservoir to the UPPER level mark.
18 When the fluid level is correct, clean and dry the diaphragm, fold it into its compressed state and install it in the reservoir followed by the diaphragm plate. Install the reservoir cap, tightening it securely, and install the right side cover.

Both brakes

19 Check the operation of both brakes before riding the motorcycle; if there is evidence of air in the system, it must be bled as described in Chapter 7.
20 If the brake fluid level was low, inspect the brake system for leaks.

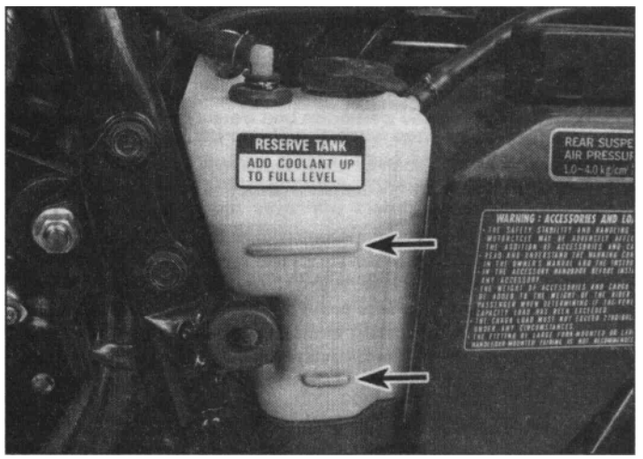
Clutch fluid

21 The procedure for checking the clutch fluid is identical to the front brake fluid checking procedure above.

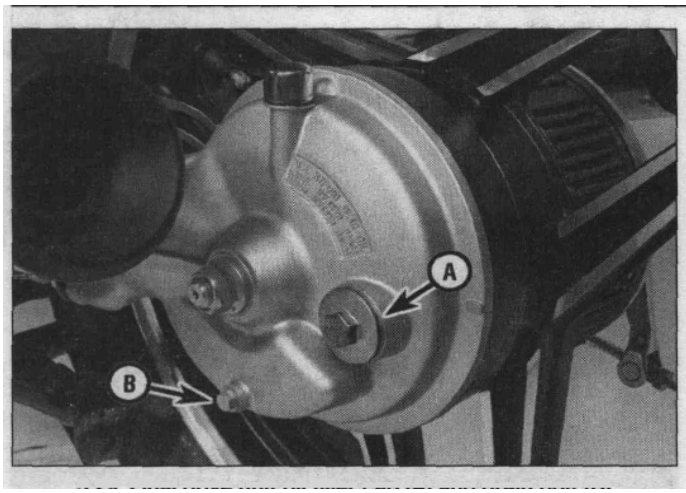
Coolant level

Refer to illustration 3.23

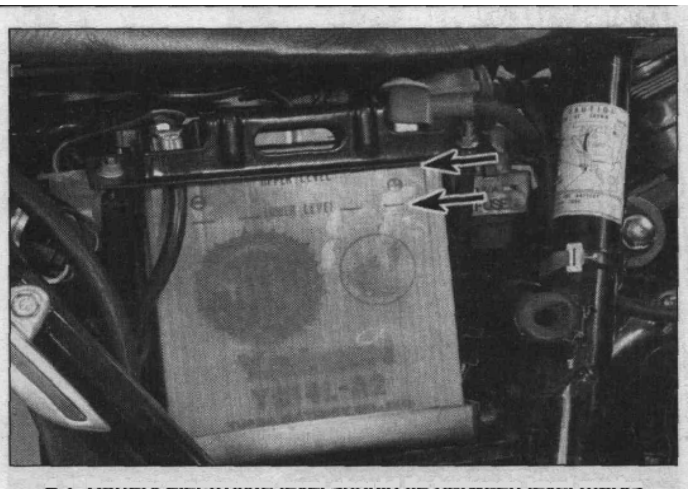
22 Remove the left side cover on 700/750 Sabres, or the right side cover on all other models.
23 Start the engine and allow it to idle until it reaches normal operating temperature. With the engine thoroughly warmed up, the coolant level in the reservoir should be between the Upper and Lower marks on the side of the reservoir **(see illustration).**
24 If the coolant is below the Lower mark, remove the cap from the reservoir tank and add coolant of the specified type (see Specifications) to bring the level to the Upper mark. **Note:** *Be careful not **to** spill coolant on any painted surfaces, as damage to the paint could occur.*
25 Re-install the reservoir cap and the side cover.
26 If the coolant is significantly above the upper level mark at any time, the surplus coolant should be siphoned off to prevent it from being expelled out of the breather hose when the engine is running.
27 If the coolant level falls steadily, check the system for leaks as



3.23 Coolant level should lie between UPPER and LOWER lines on reservoir tank



3.29 Final drive unit oil filler cap (A) and drain bolt (B)



4.1 Battery electrolyte level should lie between level marks on casing

described in Section 19. If no leaks are found and the level still continues to fall, it is recommended that the machine be taken to *a* Honda
service agent who will pressure test the system.

Final drive unit oil

Refer to illustration 3.29

28 If the motorcycle has just been ridden, wait ten minutes for the oil to settle before checking the level. Place the motorcycle on its main stand. Be sure it is on level ground.

29 On 1982 and 1983 750 models, remove the oil filler cap **(see illustration).** Look into the aperture, using *a* hand-held flashlight if necessary, and locate the step in the casting. Align the top edge of one of the ring gear teeth with the top of the step (rotate the rear wheel to move the ring gear) - at this point the oil should be level with the top of the next tooth down on the ring gear. If the oil level is lower than this, add more oil of the correct type and grade, using a funnel, syringe or pump, to bring it to its proper level.

30 On all other models, remove the oil filler cap **(see illustration** 3.29). The level of the oil should be just at the lower edge of the oil filler
hole. If the oil level is lower than this, add more oil of the correct type
and grade, using a funnel, syringe or pump, to bring it to its proper level.

31 On all models, re-install the oil filler cap, tightening it securely.

4 Battery - check

Battery electrolyte

Caution: *Take care when working with the battery that you do not allow the electrolyte to contact your eyes, skin or clothing, as it contains sulphuric acid. Flush any contacted area immediately with plenty of water. Any contact with eyes requires prompt medical attention.*

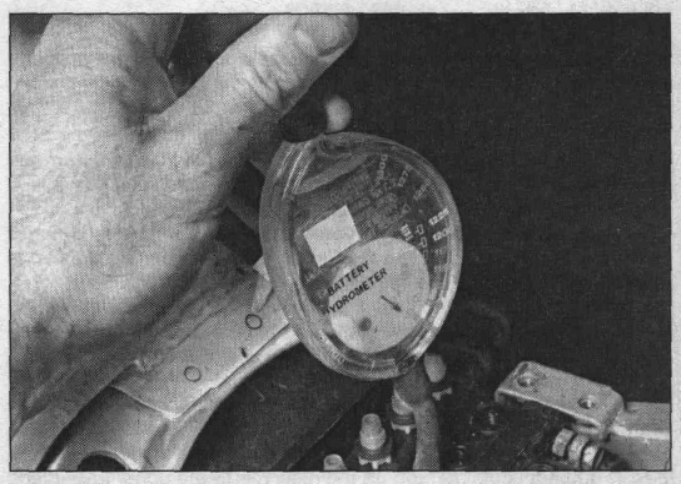
Refer to illustration 4.1

1 To check the level of the electrolyte in the battery, remove the right side cover (1982 through 1984 700/750 Magnas, all 700/750 Sabres and all 1100 Magnas) or left side cover (1100 Sabres). On 1985 through 1988 700/750 Magnas, the battery must be lifted out of its holder to check the level (see Chapter 8). The level should be between the Upper and Lower level marks printed on the outside of the battery case **(see illustration).**

2 If the electrolyte level is at or below the Lower mark, the battery must be removed in order to add more water (see Chapter 8).

3 With the battery removed from the motorcycle, remove each cell cap and add enough distilled water to each cell to bring the level to the Upper mark. Do not overfill. Also, do not use tap water, except in an emergency, as this will shorten the service life of the battery. The cell holes are quite small so it may help to use a plastic squeeze bottle with a small spout to add the water.

4 After filling install the battery and ensure its vent hose is routed correctly (see Chapter 8).



4.6 Measuring electrolyte specific gravity with a hydrometer

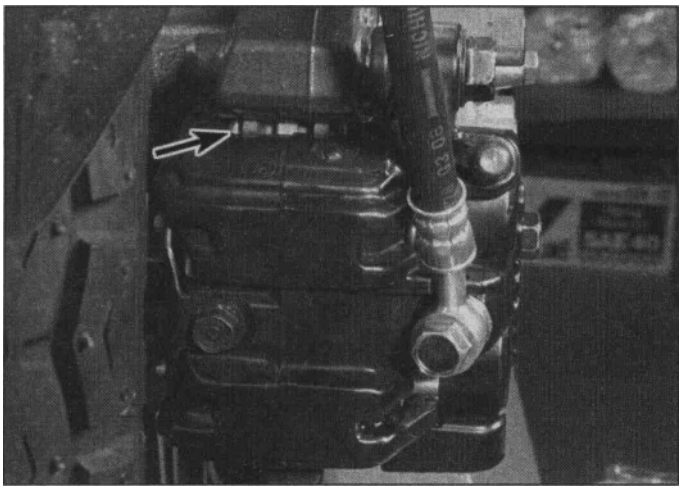
Specific gravity check

Refer to illustration 4.6

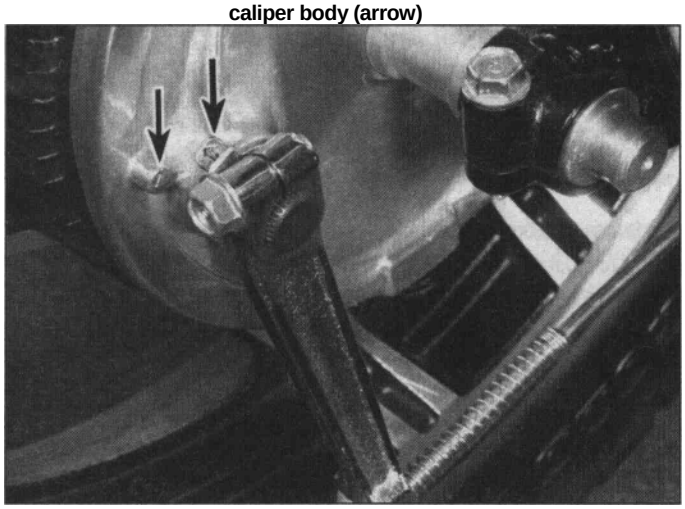
5 Remove the battery (see Chapter 8). Check the specific gravity of the electrolyte in each cell using a small hydrometer made especially for motorcycle batteries. These are available from most dealer parts departments.

6 Remove the caps, draw some electrolyte from the first cell into the hydrometer and note the specific gravity **(see illustration).** Compare the reading to the Specifications listed in this Chapter. **Note:** *Add 0.004 points to the reading for every 10°F above 68°F (20°C) -subtract 0.004 points from the reading for every 10°F below 68°F (20°F). Return the electrolyte to the cell and repeat the check for the remaining cells. When the check is complete, rinse the hydrometer thoroughly with clean water.*

7 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 motorcycle's charging system.



5.1 Brake pad wear can be checked through inspection window in caliper body (arrow)



5.4 Drum brake linings are worn when indicator pointer and index mark align

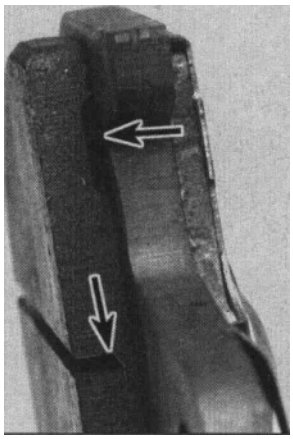
8 If the specific gravity is low, the battery is not fully charged. This may be due to corroded battery terminals, a dirty battery case, a malfunctioning charging system, or loose or corroded wiring connections. On the other hand, it may be that the battery is worn out, especially if the motorcycle is old, or that infrequent use of the motorcycle prevents normal charging from taking place.
9 Be sure to correct any problems and charge the battery if necessary. Refer to Chapter 8 for additional battery maintenance and charging procedures.
10 Install the battery (see Chapter 8).

5 Brake pads/linings - wear check

Disc brake pads

Refer to illustrations 5.1 and 5.2

1 A quick check of the brake pads can be made without removing them from the caliper. Pad wear can be judged by viewing the pad material through the inspection slot indicated by the cast arrow on the caliper body; the use of a hand-held flashlight will aid visibility. The original equipment pads have a cutout between the pad metal backing and the friction material which denotes the wear limit - if the friction material of either pad has worn down to expose the cutout, the pads



5.2 Brake pad wear cutout (upper arrow) and wear grooves (lower arrow)

must be replaced **(see illustration).**
2 As a further check, view the pads from the caliper mouth. If the friction material has worn down level with the base of the grooves or slots in the pad, the need for replacement is indicated **(see illustration).** Refer to Chapter 7 for the pad replacement procedure. However, it is recommended that the pads be removed and a more detailed inspection be carried out as described in Sections 2 and 15 of Chapter 7.
3 If it is impossible to check the amount of pad material remaining due to a build-up of road dirt, remove the pads for thorough inspection and cleaning (see Chapter 7).

Drum brake linings (700/750 models)

Refer to illustration 5.4

4 The drum brake shoes are checked by applying the brake fully and checking to see whether the wear indicator pointer on the brake lever aligns with the index mark on the brake panel **(see illustration).**
5 If it aligns with the index mark or exceeds it, the brake shoes are worn and must be replaced with new ones (see Chapter 7). If in any doubt about the amount of lining material remaining on the shoes, or if brake action is poor, remove the wheel for measurement of the lining thickness (see Chapter 7).

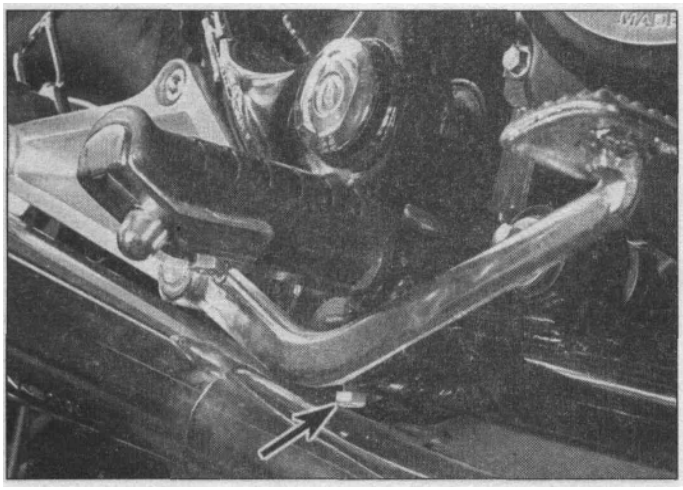
6 Brake system -

checks ***Brake checks***

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 lever and pedal for loose connections, excessive play, bends, and other damage. Replace any damaged parts with new ones (see Chapter 7).
3 Make sure all brake fasteners are tight. Check the brake pads/linings for wear (see Section 5) and on disc brake models, make sure the fluid level in the reservoirs is correct (see Section 3).
4 On disc brakes, 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 7. Drain and replace the brake fluid at the specified interval.

Brake lever freeplay (1985 1100 Sabre and 1985/86 1100 Magna)

5 Measure the freeplay at the ball end of the front brake lever. Assuming that there is no air in the hydraulic system, resulting in a



6.8 Brake pedal height adjustment bolt on 700/750 models (arrow)

spongy feel to the lever (see below), the lever should move 20 to 30 mm before the front brake comes on.

6 If outside of this measurement, adjust using the knurled ring at the lever pivot, noting that one of the index marks on the ring must align with the arrow stamped in the top of the lever. Check operation of the front brake and check that there is no brake drag.

Brake pedal height

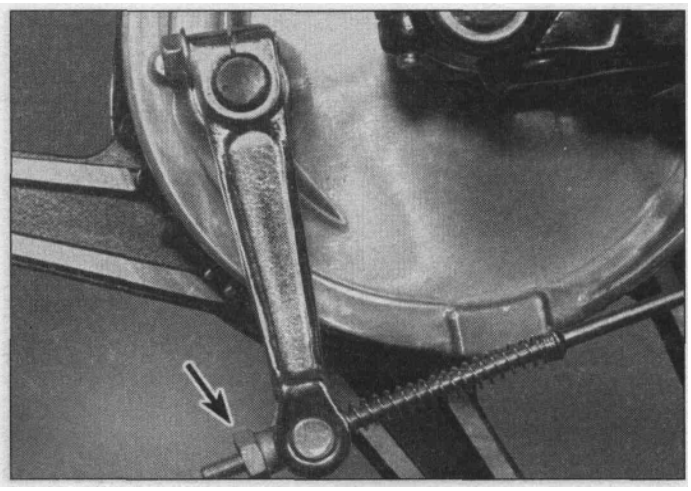
Refer to illustration 6.8

7 Brake pedal height is important to ensure maximum braking efficiency. Incorrect height can cause brake drag or prevent full application of the rear brake.

8 On 700/750 Sabres and 1982 through 1984 700/750 Magnas, the top of the brake pedal should be 7 mm (0.3 in) below the top of the rider's footpeg. On later 700/750 Magna models, the top of the brake pedal should be 25 mm (1 in) above the top of the rider's footpeg. To adjust, loosen the locknut on the adjusting screw and turn the screw in or out until the pedal height is correct, the tighten the locknut **(see illustration).**

9 On 1100 Sabre models the top of the brake pedal should be 15 mm (0.6 in) below the top of the footpeg. On 1100 Magna models the top of the brake pedal should be 30 mm (1.2 in) above the top of the rider's footpeg. Make adjustment at the master cylinder pushrod by loosening the locknut on the clevis and rotating the pushrod to alter the pedal height; tighten the locknut on completion.

6.12 Rear brake stop light switch adjuster nut (arrow)



6.10 Adjust brake pedal freeplay using nut at end of brake rod (arrow)

Brake pedal freeplay

Refer to illustration 6.10

10 On 700/750 models, depress the pedal and measure how far it travels before the shoes contact the drum. Compare the results to the Specifications. Adjustment is made by turning the adjusting nut on the brake rod end **(see illustration).**

Brake stop lights

Refer to illustration 6.12

11 Make sure the brake light operates when the front brake lever is depressed. The front brake light switch is not adjustable. If it fails to operate properly, replace it with a new one (see Chapter 8).

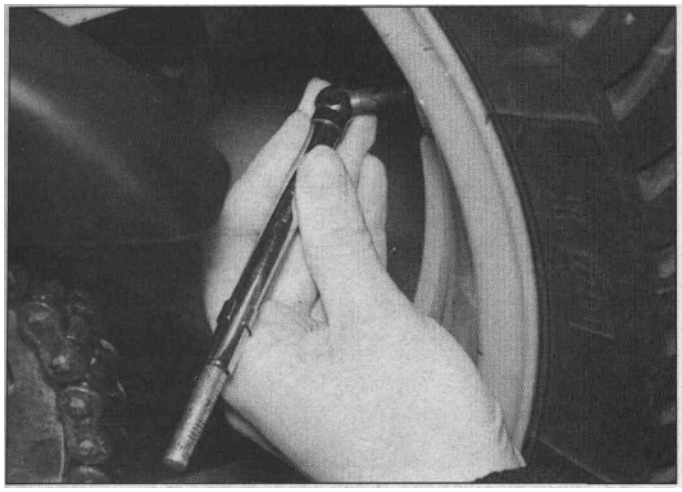
12 Make sure the brake light is activated just before the rear brake pedal takes effect. If adjustment is necessary, hold the switch and turn the adjusting ring on the switch body until the brake light is activated when required **(see illustration).** If the switch doesn't operate the brake lights, check it as described in Chapter 8.

7 Tires/wheels - general check

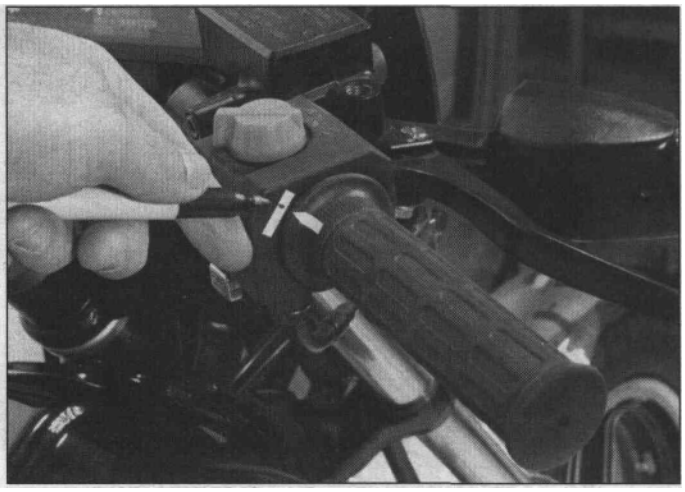
Refer to illustrations 7.2 and 7.4

1 Routine tire and wheel checks should be made with the

7.2 Measuring tire tread depth



7.4 Measuring tire air pressure



8.3a With the throttle at rest, mark the relationship of the grip to the right switch assembly ...

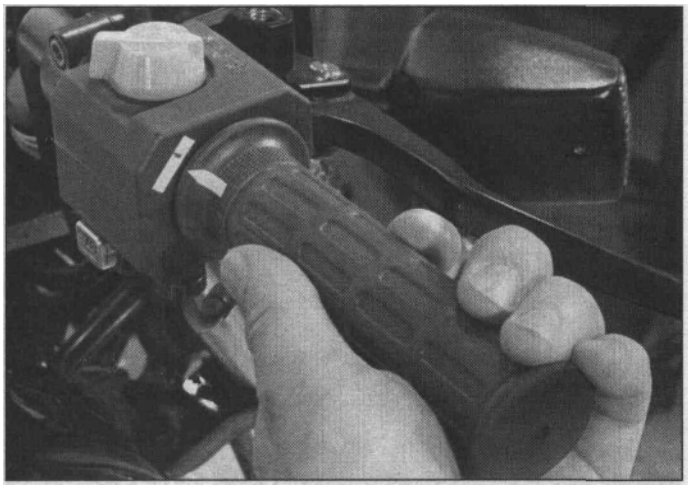
realization that your safety depends to a great extent on their condition.
2 Check the tires carefully for cuts, tears, embedded nails or other sharp objects and excessive wear. Operation of the motorcycle with excessively worn tires is extremely hazardous, as traction and handling are directly affected. Measure the tread depth at the center of the tire and replace worn tires with new ones when the tread depth is less than specified **(see illustration).**
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 when the tires are **cold** and keep them properly inflated **(see illustration).** 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 cast wheels used on this machine are virtually maintenance free, but they should be kept clean and checked periodically for cracks and other damage. Never attempt to repair damaged cast wheels; they must be replaced with new ones.
6 Check the valve rubber for signs of damage or deterioration and have it replaced if necessary. Also, make sure the valve stem cap is in place and tight. If it is missing, install a new one made of metal or hard plastic.

8 Throttle and choke operation/grip freeplay - check and adjustment

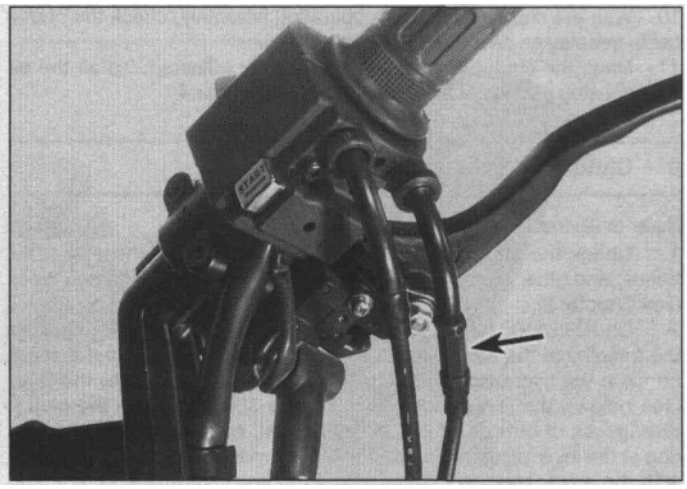
Throttle cables

Refer to illustrations 8.3a, 8,3b, 8.4 and 8.5

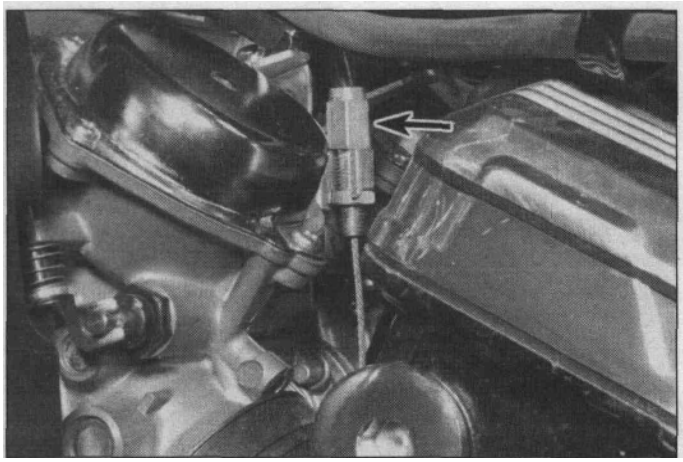
1 Make sure the throttle grip rotates easily from fully closed to fully open with the front wheel turned at various angles. The grip should return automatically from fully open to fully closed when released.
2 If the throttle sticks, this is probably due to a cable fault. Remove the cables as described in Chapter 4 and lubricate them as described in Section 15. Install each cable, routing them so they take the smoothest route possible. If this fails to improve the operation of the throttle, the cables must be replaced. Note that in very rare cases the fault could lie in the carburetors rather than the cables, necessitating the removal of the carburetors and inspection of the throttle linkage (see Chapter 4).
3 With the throttle operating smoothly, check for a small amount **of** freeplay at the grip. The amount of freeplay in the throttle cables, measured in terms of twistgrip rotation, should be as given in this Chapter's Specifications **(see illustrations).** If adjustment is necessary, adjust idle speed first (see Section 17).
4 Loosen the locknut on the cable upper adjuster and rotate the adjuster until the correct amount of freeplay is obtained, then tighten



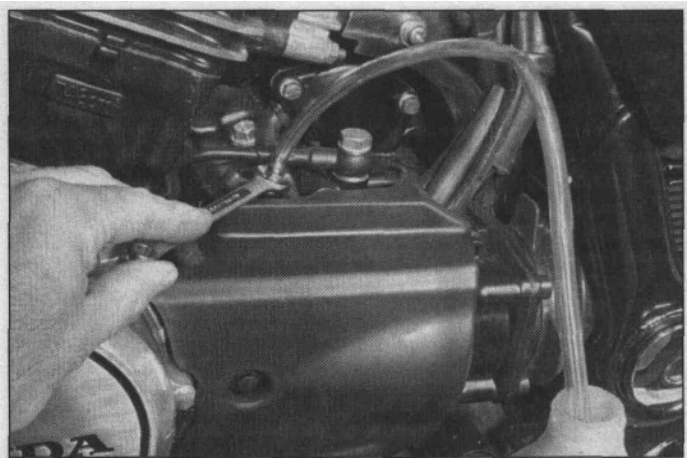
8.3b ... then measure the distance the throttle grip can be rotated before a slight resistance is felt



8.4 Throttle cable upper adjuster (arrow).



8.5 ... and lower adjuster on carburetors (arrow)



9.4 When bleeding the clutch connect tube to bleed valve as shown

the locknut **(see illustration).** If it is not possible to obtain the correct freeplay with the upper adjuster, it will also be necessary to make adjustment at the lower adjuster, situated on the carburetors.

5 To gain access to the lower adjuster remove the fuel tank or trig it up on early Magnas (see Chapter 4) **(see illustration).** Screw the upper cable adjuster in to obtain the maximum possible freeplay, then loosen the lower adjuster locknut and set the cable freeplay using first the lower adjuster and then, if necessary, the upper adjuster. Once the freeplay is correct tighten the locknuts securely.

6 Check that the throttle twistgrip operates smoothly and snaps shut quickly when released. **Warning:** *Turn the handlebars all the way through their travel with the engine idling. Idle speed should not change. If it does, the cables may be routed incorrectly. Correct this condition before riding the bike (see Chapter 4).*

Choke cable

7 Proper choke operation will ensure fast starts and quick engine warm up. Initially, move the choke lever up and down making sure it moves smoothly.

8 If there is any binding or drag in the lever's operation, the cable should be checked for kinks or damage to the cable casing and then removed (see Chapter 4) and lubricated as described in Section 15.

9 If cable lubrication fails to improve the operation of the choke, the cable must be replaced. Note that in very rare cases the fault could lie in the carburetors rather than the cable, necessitating the removal of the carburetors and inspection of the choke plungers as described in Chapter 4.

10 With the choke mechanism operating smoothly, check the choke cable freeplay as described in Chapter 4.

11 Once the choke mechanism is correctly adjusted, install the air filter housing and fuel tank as described in Chapter 4.

9 Clutch - checks and bleeding

Refer to illustration 9.4

1 Check the clutch lever for loose connections, excessive play, bends, and other damage. Replace any damaged parts with new ones (see Chapter 2).

2 On 1985 1100 Sabres and 1985/86 1100 Magna models, measure the freeplay at the ball end of the clutch lever. Assuming that there is no air in the hydraulic system, resulting in a spongy feel to the lever (see below), the lever should move 20 to 30 mm before the clutch disengages. If outside of this measurement, adjust using the knurled ring at the lever pivot, noting that the index mark on the ring must align with the arrow stamped in the top of the lever. Start the engine and check that the clutch disengages and engages smoothly, without slip or drag.

3 Check that the fluid level in the reservoir is correct (see Section 3). Look for leaks at the hose connections and check for cracks in the hoses.

4 If the lever is spongy, bleed the clutch line of air. The bleeding operation is exactly the same as described for bleeding the brakes in Chapter 7, Section 11. Remove the slave cylinder bleed valve cap, and connect the bleed tube to the valve **(see illustration).**

10 Engine oil/filter - change

Refer to illustrations 10.4a and 10.4b

1 Consistent routine oil and filter changes are the single most important maintenance procedure you can perform on a motorcycle. The oil not only lubricates the internal parts of the engine, transmission and clutch, but it also acts as a coolant, a cleaner, a sealant, and a 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 cost between a good oil and a cheap oil won't pay off if the engine is damaged.

2 Before changing the oil and filter, warm up the engine so the oil will drain easily. Be careful when draining the oil, as the exhaust pipes, the engine, and the oil itself can cause severe burns.

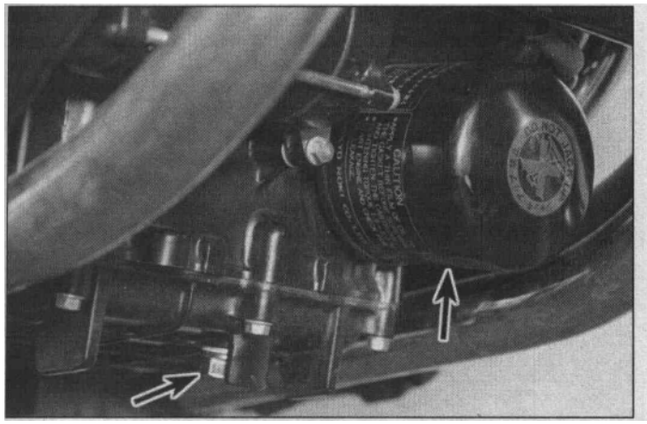
3 Put the motorcycle on the main stand (where fitted) and position a clean drain pan below the engine. Unscrew the oil filler cap to vent the crankcase and act as a reminder that there is no oil in the engine.

4 Next, remove the drain plug from the oil pan, as well as the drain plug from the front cylinder head and allow the oil to drain into the pan (on 1987 and 1988 700/750 Magnas hold the motorcycle upright to ensure that the oil drains fully) **(see illustrations).** Discard the sealing washers on the drain plugs; they should be replaced whenever the plugs are removed.

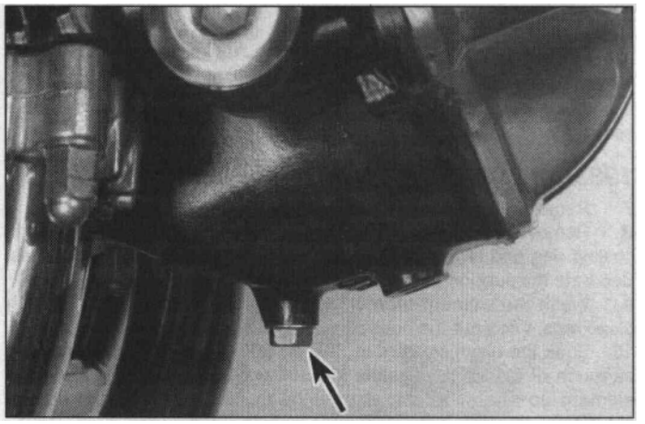
5 On certain California models, the emission control system canister will prevent access to the oil filter. Disconnect its hoses and remove it from the frame (see Chapter 4). On 1987 and 1988 700/750 Magna models access to the filter is improved is the belly fairing is removed (see Chapter 6). Make sure the drain pan is under the filter, then loosen the oil filter using a strap wrench or the Honda service tool. **Warning:** *Take great care not to burn your hands on the exhaust system.* Unscrew the filter from the engine unit and empty its contents into the drain pan. If additional maintenance is planned for this time period, check or service another component while the oil is allowed to drain completely.

6 Clean the filter thread and housing on the crankcase with solvent or clean shop towels. Wipe any remaining oil off the filter sealing area of the crankcase.

7 Slip a new sealing washer over the drain plugs. Fit them to the oil



10.4a Engine oil drain plug in oil pan and oil filter (arrows)



10.4b Engine oil drain plug in front cylinder bank

pan and front cylinder and tighten to the specified torque setting. Avoid bvertightening, as damage will result.

8 Apply a smear of clean oil to the sealing ring of the new filter and screw it into position on the engine. Tighten the filter firmly by hand. If access to the special Honda oil filter tool can be gained, the filter should be tightened to the specified torque setting.

9 Before refilling the engine, check the old oil carefully. If the oil was drained into a clean pan, small pieces of metal or other material can be easily detected. If the oil is very metallic colored, then the engine is experiencing 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 will have to be disassembled for inspection and repair.

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

11 If inspection of the oil turns up nothing unusual, refill the crankcase to the proper level with the recommended type and amount of oil and install the filler cap. Start the engine and let it run for two or three minutes. Shut it off, wait a few minutes, then check the oil level. If necessary, add more oil to bring the level up to the upper mark. Check around the drain plugs and filter for leaks.

12 The old oil drained from the engine cannot be re-used and should be disposed of properly. Check with your local refuse disposal company, disposal facility or environmental agency to see whether they will accept the used oil for recycling. Don't pour used oil into drains or onto the ground. 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.

11 Final drive unit - oil change

1 Place the motorcycle on its stand, and position a drain tray beneath the drain plug in the base of the final drive unit. Remove the plug and allow the oil to drain - allow 10 minutes or so for the oil to drain fully, then install the drain plug and tighten it securely **(see illustration 3.29).**

2 Remove the large oil filler cap from the rear of the unit, and fill with the specified type and quantity of oil. Wait a few minutes for the oil level to settle then check it as described in Section 3, adjusting the level accordingly. Install the oil filler cap.

12 Air filter element - cleaning and replacement

1982 750 Sabre

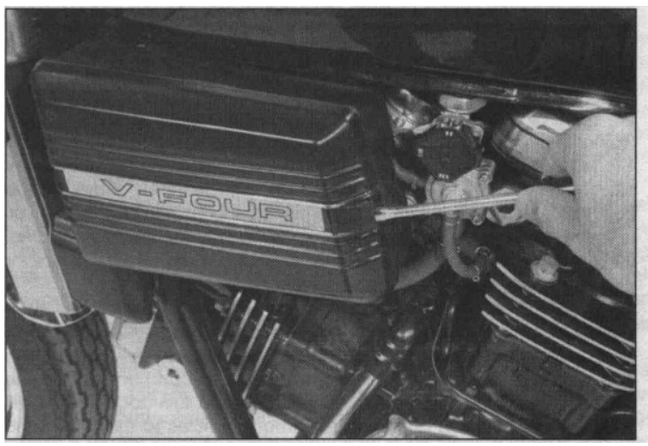
Refer to illustrations 12.1 and 12.3

1 Pry out the plastic caps that cover the air cleaner cover screws. Do this on both the left and right air cleaners **(see illustration).**

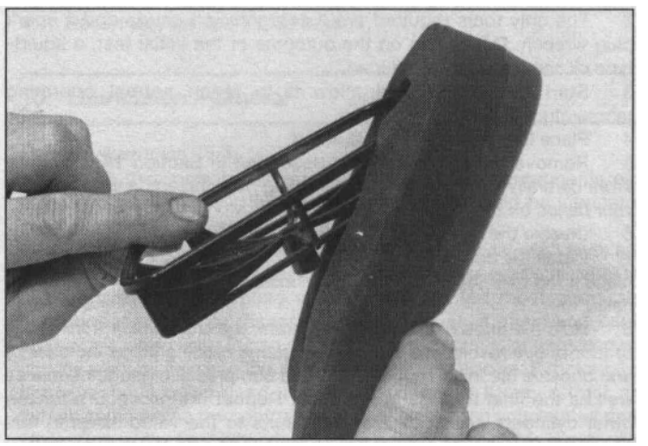
2 Remove the cover screws and lift off the covers. Recover their sealing rings.

3 Remove the nuts and washers that retain the air filter elements and lift them out. Remove the plastic frames from inside of the foam elements **(see illustration).**

4 Wash each element thoroughly in clean solvent, then dry it with clean rags. Wipe out the housings with a clean rag.



12.1 Pry out caps to reveal air filter cover screws on 1982 Sabre



12.3 Separate element from frame for cleaning on 1982 Sabre

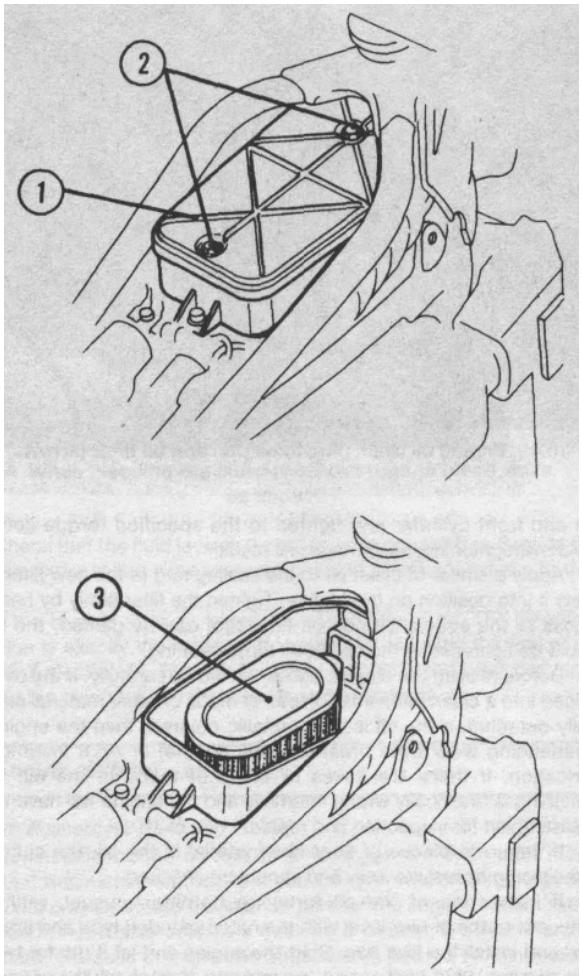
5 Soak the clean elements in SAE 80-90 gear oil, then squeeze out as much of the oil as possible (do not wring the element). Hang the elements up and allow any excess oil to drip out - they must not be saturated with oil.
6 Install the filters by reversing the removal steps. Ensure the cover sealing rings are in place and apply a light smear of grease to them.

1983-on 700/750 and all 1100 Sabre models

7 Remove the fuel tank (see Chapter 4).
8 Remove the two air filter cover screws, lift off the cover with its sealing ring and lift out the element together with its support frames. Separate the support frames from the element.
9 Wash the element thoroughly in clean solvent, then dry it with clean rags. Wipe out the housing with a clean rag.
10 Soak the clean element in SAE 80-90 gear oil, then squeeze out as much of the oil as possible (do not wring the element). Hang the element up and allow any excess oil to drip out - it must not be saturated with oil.
11 Install the filter by reversing the removal steps. Ensure the cover sealing ring is in place and apply a light smear of grease to it.

Magna models

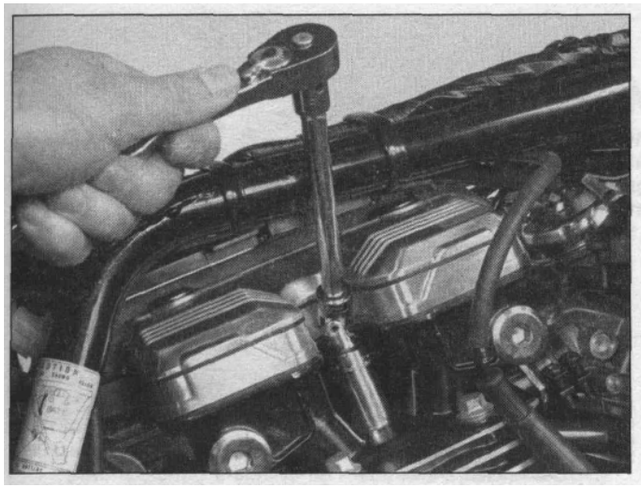
Refer to illustration 12.14
12 Remove the fuel tank (see Chapter 4); on 1100 models and early 700/750 models, it can be raised on its support rod if less than half full.
13 On 1985 through 1988 700/750 models, release their retaining screws and remove the plastic covers from each side of the frame deadstock. On 1985/86 700 models remove the fresh air intake cover from the front of the air filter.
14 Remove the air cleaner cover screws, lift off the cover and its sealing ring **(see illustration).** Lift out the paper filter and tap it on a solid surface to dislodge any dirt and dust.
15 If compressed air is available, use it to remove dirt and dust from the element by blowing from the inside outwards. Wipe out the housing with a clean rag.
16 Replace the paper element with a new one at the required intervals, regardless of its apparent condition.
17 Install the new filter by reversing the removal steps. Ensure the cover sealing ring is in place and apply a smear of grease to it. If removed, install the fuel tank as described in Chapter 4.



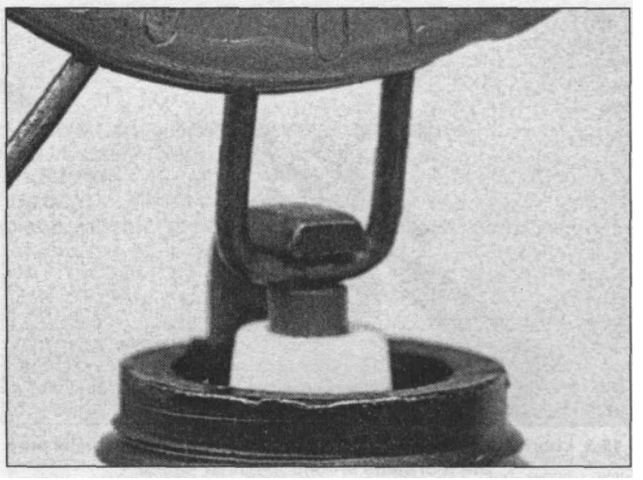
12.14 Remove air cleaner cover (1) screws (2) to access element (3) on Magna models

13 Cylinder compression - check

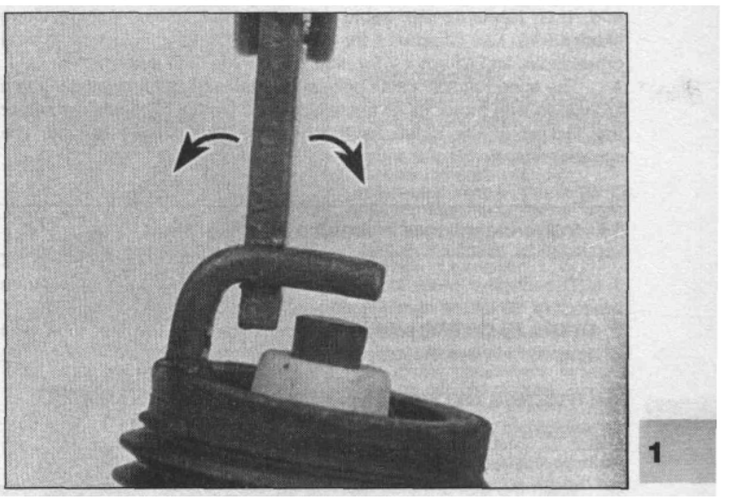
1 Among other things, poor engine performance may be caused by leaking valves, incorrect valve clearances, a leaking head gasket, or worn pistons, rings and/or cylinder walls. A cylinder compression check will help pinpoint these conditions and can also indicate the presence of excessive carbon deposits in the cylinder heads.
2 The only tools required are a compression gauge and a spark plug wrench. Depending on the outcome of the initial test, a squirt-type oil can may also be needed.
3 Start the engine and allow it to reach normal operating temperature, then stop it.
4 Place the motorcycle on its stand.
5 Remove the spark plugs as described in Section 14. **Caution:** *Work carefully - don't strip the spark plug hole threads and don't burn your hands on the hot cylinder head.*
6 Disable the ignition by switching the kill switch to OFF.
7 Install the compression gauge in one of the spark plug holes and place a rag over the other three plug holes as a precaution against fire risk.
8 Hold the throttle wide open and crank the engine over a minimum of four or five revolutions (or until the gauge reading stops increasing) and observe the initial movement of the compression gauge needle as well as the final total gauge reading. Repeat the procedure for the other cylinders and compare the results to the value listed in this Chapter's Specifications.
9 If the compression in all four cylinders built up quickly and evenly to the specified amount, you can assume the engine upper end is in reasonably good mechanical condition. Worn or sticking piston rings and worn cylinders 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 tend to build up.
10 To further confirm your findings, add a small amount of engine oil to each cylinder by inserting the nozzle of a squirt-type oil can through the spark plug holes. The oil will tend to seal the piston rings if they are leaking. Repeat the test for the other cylinders.
11 If the compression increases significantly after the addition of the oil, the piston rings and/or cylinders are definitely worn. If the compression does not increase, the pressure is leaking past the valves or the 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.
12 If the compression readings are considerably higher than specified, the combustion chambers are probably coated with excessive carbon deposits. It is possible (but not very likely) for carbon deposits to raise the compression enough to compensate for the effects of leakage past rings or valves. 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(s) will have to be removed and decarbonized (Chapter 2).



14.2 Use the correct size tool when removing spark plugs



14.6a Using *a* wire type gauge to measure the spark plug gap



14.6b Bend the side electrode only to adjust spark plug gap

14 Spark plugs - check and replacement

Refer to illustrations 14.2, 14.6a and 14.6b

1 All models are equipped with spark plugs which have 12 mm threads and an 18 mm hex. Make sure that your spark plug wrench or socket is the correct size before attempting to remove the plugs.

2 Disconnect the spark plug caps from the spark plugs. If available, use compressed air to blow any accumulated debris from around the spark plugs. Remove the plugs and lay them out in relation to their cylinder number; if any plug shows up a problem it will then be easy to identify the troublesome cylinder **(see illustration).**

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 plugs to the color spark plug reading chart. Check the threads, the washer and the ceramic insulator body for cracks and other damage.

4 If the electrodes are not excessively worn, and if the deposits can be easily removed with a wire brush, the plugs can be regapped and re-used (if no cracks or chips are visible in the insulator). If in doubt concerning the condition of the plugs, replace them with new ones, as the expense is minimal.

5 Cleaning spark plugs by sandblasting is permitted, provided you clean the plugs with a high flash-point solvent afterwards.

6 Before installing new plugs, make sure they are the correct type and heat range. Check the gap between the electrodes, as they are not preset. For best results, use a wire-type gauge rather than a flat (feeler) 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 **(see illustrations).** Make sure the washer is in place before installing each plug.

7 Since the cylinder head is made of aluminum, which is soft and easily damaged, thread the plugs into the heads by hand. Since the plugs are recessed, slip a short length of hose over the end of the plug to use as a tool to thread it into place. The hose will grip the plug well enough to turn it, but will start to slip if the plug begins to cross-thread in the hole - this will prevent damaged threads and the resultant repair costs.

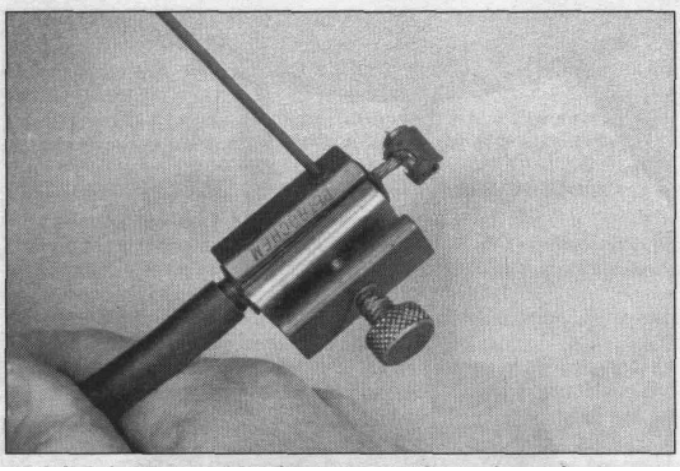
8 Once the plugs are finger-tight, the job can be finished with a socket. If a torque wrench is available, tighten the spark plugs to the specified torque listed in this Chapter's Specifications. If you do not have a torque wrench, tighten the plugs finger-tight (until the washers bottom on the cylinder head) then use a wrench to tighten them an additional 1/4 turn. Regardless of the method used, do not over-tighten them. 9 Reconnect the spark plug caps.

15 Lubrication - general

Refer to illustration 15.3

1 Since the controls, cables and various other components of a motorcycle are exposed to the elements, they should be lubricated periodically to ensure safe and trouble-free operation.

2 The footpegs, clutch and brake lever, brake pedal, shift lever and side and main stand 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 by different names).*



15.3 Lubricating a cable with a pressure lube adapter (make sure the tool seats around the inner cable)

3 To lubricate the cables, disconnect the relevant cable at its upper end, then lubricate the cable with a pressure lube adapter **(see illustration).** See Chapter 4 for the choke and throttle cable removal procedures, and Chapter 2 for clutch cable removal details.

4 The speedometer cable should be removed from its housing and lubricated with motor oil or cable lubricant. Do not lubricate the upper few inches of the cable as the lubricant may travel up into the speedometer head.

16 Valve clearances - check and adjustment

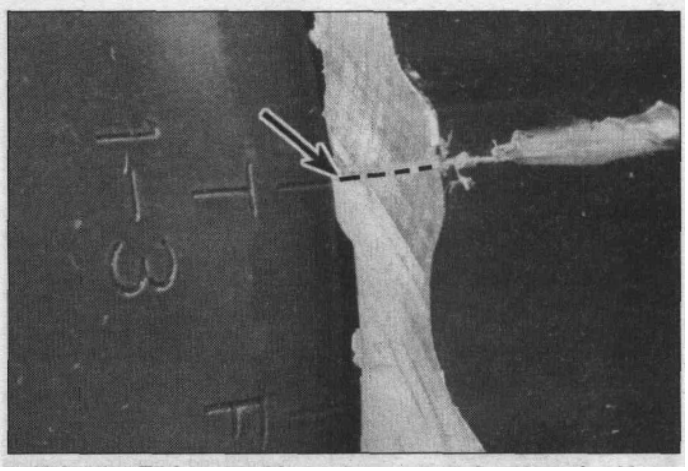
1 The engine must be completely cool for this maintenance procedure, so let the machine sit overnight before beginning.

2 Place the motorcycle on its stand. Remove the fuel tank (see Chapter 4). Remove the side covers (see Chapter 6).

All models except 1986 through 1988 700/750 Magnas

Refer to illustrations 16.6, 16.8 and 16.9

3 Drain the coolant (see Section 20) and remove the radiator (See Chapter 3). On the 1986 1100 Magna model it is possible to shut off the tap at the radiator bottom hose union, having released coolant pressure by momentarily loosening the coolant drain plug set in the



16.6 Align TDC mark with crankcase rear joint when checking valve clearances (mark for cylinders 1 and 3 shown)

subframe, disconnect the radiator side mountings and wiring, disconnect the top and bottom hoses and pivot the radiator forwards about its top mounting point; tie it to the forks out of the way of the front cylinder (see Section 20).

4 Remove all four spark plugs.

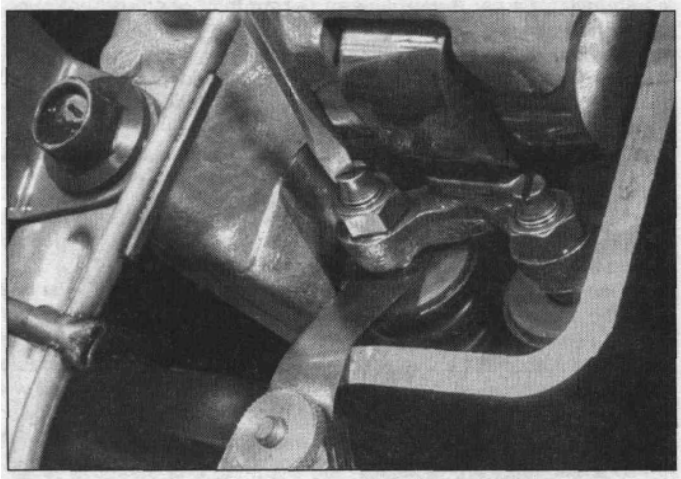
5 Remove the valve cover bolts and lift off both valve covers, plus the rear cylinder valve cover base (see Chapter 2).

6 Remove the alternator cover from the left side of the engine. Note that oil will run from the cover so have a drain tray positioned to catch the oil. Wipe any oil off the alternator rotor. Rotate the crankshaft end bolt clockwise until the T1.3 mark on the rotor aligns exactly with the casing rear joint **(see illustration).**

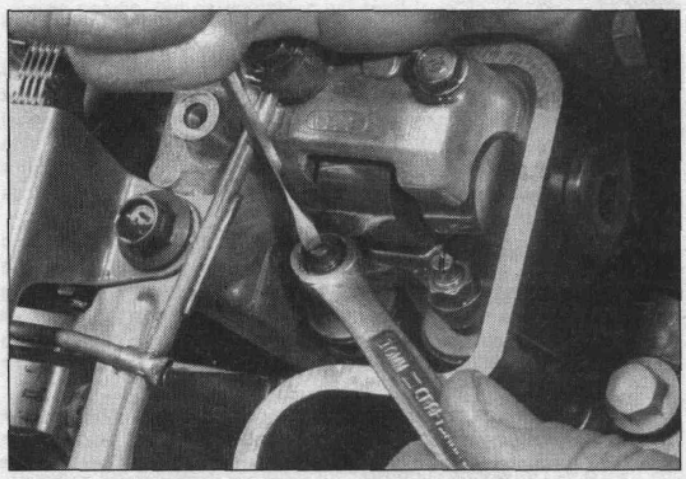
7 With the T1.3 mark positioned as described, the rear cylinders are at TDC. Check whether cylinder No 1 is on compression (all four valves closed) and if not, rotate the crankshaft one full turn to realign the T1.3 mark. Carry out the valve clearance check on No 1 cylinder's valves.

8 Using two feeler blades of the correct thickness (see Specifications), insert them between each valve stem end and its adjuster screw tip of the rocker and check that they are a firm sliding fit **(see illustration).** **Note:** *It is important that two feeler blades are used to prevent twisting of the rocker arm and subsequently incorrect readings.*

9 If the feeler blades are not a firm sliding fit, loosen the locknut on the adjusting screws and turn the adjusting screw in or out to obtain the correct clearance. Hold the adjuster screw still screw while the locknut is tightened, then recheck the clearance to ensure that it has

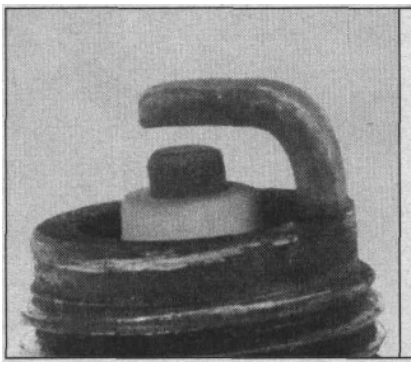


16.8 Measuring the valve clearances (both valves should be checked at the same time)



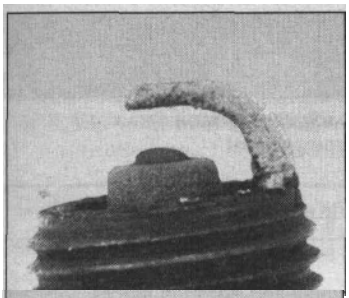
16.9 Adjusting the valve clearances

Common spark plug conditions



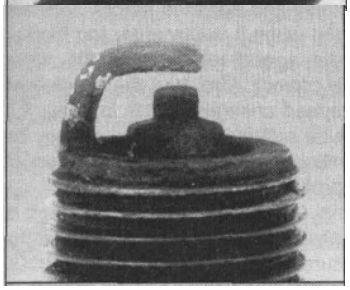
NORMAL

Symptoms: Brown to grayish-tan color and slight electrode wear. Correct heat range for engine and operating conditions.
Recommendation: When new spark plugs are installed, replace with plugs of the same heat range.



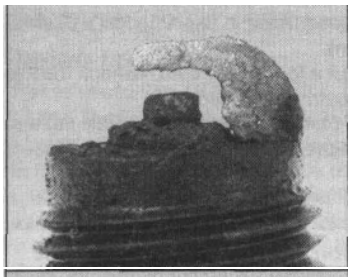
WORN

Symptoms: Rounded electrodes with a small amount of deposits on the firing end. Normal color. Causes hard starting in damp or cold weather and poor fuel economy.
Recommendation: Plugs have been left in the engine too long. Replace with new plugs of the same heat range. Follow the recommended maintenance schedule.



CARBON DEPOSITS

Symptoms: Dry sooty deposits indicate a rich mixture or weak ignition. Causes misfiring, hard starting and hesitation.
Recommendation: Make sure the plug has the correct heat range. Check for a clogged air filter or problem in the fuel system or engine management system. Also check for ignition system problems.



ASH DEPOSITS

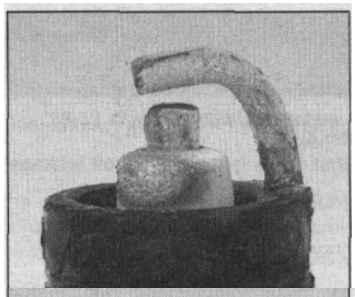
Symptoms: Light brown deposits encrusted on the side or center electrodes or both. Derived from oil and/or fuel additives. Excessive amounts may mask the spark, causing misfiring and hesitation during acceleration.
Recommendation: If excessive deposits accumulate over a short time or low mileage, install new valve guide seals to prevent seepage of oil into the combustion chambers. Also try changing gasoline brands.

OIL DEPOSITS

Symptoms: Oily coating caused by poor oil control. Oil is leaking past worn valve guides or piston rings into the combustion chamber. Causes hard starting, misfiring and hesitation.
Recommendation: Correct the mechanical condition with necessary repairs and install new plugs.

GAP BRIDGING

Symptoms: Combustion deposits lodge between the electrodes. Heavy deposits accumulate and bridge the electrode gap. The plug ceases to fire, resulting in a dead cylinder.
Recommendation: Locate the faulty plug and remove the deposits from between the electrodes.

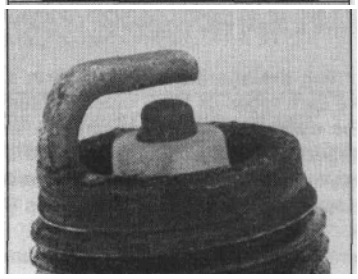


TOO HOT

Symptoms: Blistered, white insulator, eroded electrode and absence of deposits. Results in shortened plug life.
Recommendation: Check for the correct plug heat range, over-advanced ignition timing, lean fuel mixture, intake manifold vacuum leaks, sticking valves and insufficient engine cooling.

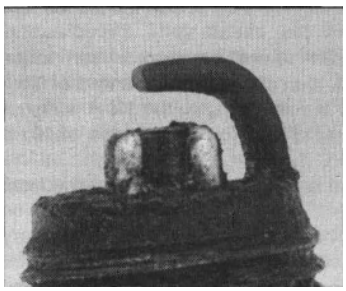
PREIGNITION

Symptoms: Melted electrodes. Insulators are white, but may be dirty due to misfiring or flying debris in the combustion chamber. Can lead to engine damage.
Recommendation: Check for the correct plug heat range, over-advanced ignition timing, lean fuel mixture, insufficient engine cooling and lack of lubrication.



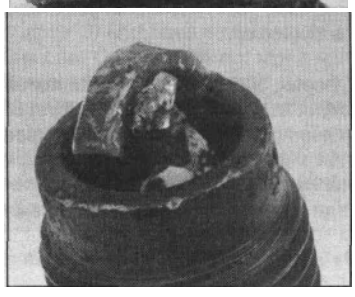
HIGH SPEED GLAZING

Symptoms: Insulator has yellowish, glazed appearance. Indicates that combustion chamber temperatures have risen suddenly during hard acceleration. Normal deposits melt to form a conductive coating. Causes misfiring at high speeds.
Recommendation: Install new plugs. Consider using a colder plug if driving habits warrant.



DETONATION

Symptoms: Insulators may be cracked or chipped. Improper gap setting techniques can also result in a fractured insulator tip. Can lead to piston damage.
Recommendation: Make sure the fuel anti-knock values meet engine requirements. Use care when setting the gaps on new plugs. Avoid lugging the engine.



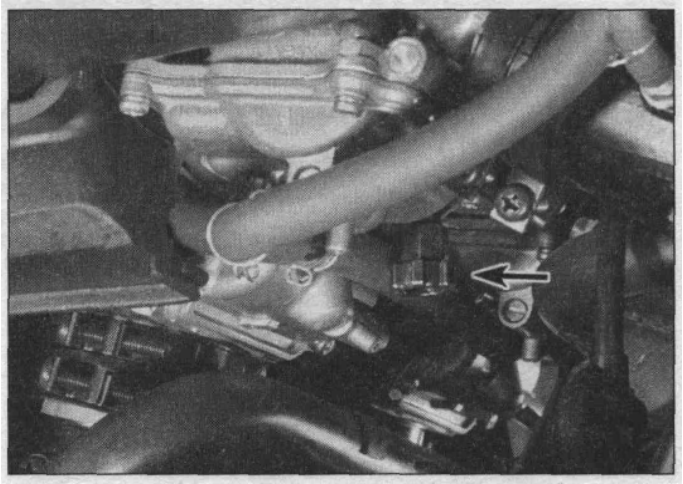
MECHANICAL DAMAGE

Symptoms: May be caused by a foreign object in the combustion chamber or the piston striking an incorrect reach (too long) plug. Causes a dead cylinder and could result in piston damage.
Recommendation: Repair the mechanical damage. Remove the foreign object from the engine and/or install the correct reach plug.

not altered **(see illustration). Note:** *A Honda service tool is available which allows the adjuster screw to be held securely while the locknut is tightened.* Carry out the check on the other pair of valves.
10 Rotate the crankshaft clockwise until the T2.4 mark is aligned with the rear crankcase joint, then all clearances on No 2 cylinder.
11 Rotate the crankshaft clockwise to align the T1.3 mark once again and check the valves of No 3 cylinder.
12 Rotate the crankshaft further clockwise and align the T2.4 mark, then check the valves of No 4 cylinder.
13 When all clearances have been checked and if necessary adjusted, install the valve covers (see Chapter 2).
14 Fit a new gasket to the left side engine cover, install the cover and tighten its bolts securely. Top up the engine oil.
15 Install the spark plugs.
16 Install the radiator (see Chapter 3) and refill the cooling system with fresh coolant and bleed it of air (see Section 20). On 1986 1100 Magna models, reconnect the radiator (see Chapter 3) and check that its hoses are securely clamped. Turn the radiator tap to ON. Check the level of coolant, topping it up if necessary. Bleed the cooling system of air (see Section 20).
17 Install the fuel tank (see Chapter 4).
18 Start the engine and check that there is no sign of oil leakage from the valve covers.

1986 through 1988 700/750 Magna models

19 Shut off the tap at the radiator bottom hose union and release coolant pressure by momentarily loosening the coolant drain plug set in the subframe. Disconnect the radiator side mountings and its top and bottom hoses, disconnect its wiring, then pivot the radiator forwards about its top mounting point; tie it to the forks out of the way of the front cylinder (see Section 20).
20 On 1987 and 1988 models, pull off its wires and unbolt the horn from the left frame tube.
21 Remove all four spark plugs.
22 Remove the valve cover bolts and lift off both valve covers, plus the rear cylinder valve cover base (see Chapter 2).
23 Remove the alternator cover from the left side of the engine. Note that oil will run from the cover so have a drain tray positioned to catch the oil.
24 Rotate the crankshaft by turning the alternator rotor bolt in a clockwise direction until the intake cam lobes of No 3 cylinder **(see illustration 1.1 in Chapter 2 for cylinder identification)** are at maximum lift (valves fully depressed). In this position, check the clearances on the intake valves of cylinder No 1.
25 Check and adjust the valve clearances as described in Steps 8 and 9 above.
26 Rotate the alternator bolt further clockwise until the intake cam lobes of No 1 cylinder are at maximum lift, then check the clearances of No 3 intake valves.
27 Rotate the alternator bolt clockwise until the exhaust cam lobes of No 3 cylinder are at maximum lift, then check the clearances of No 1 exhaust valves. Further rotate the crankshaft until the No 1 exhaust cam lobes are a maximum lift and check the clearances of No 3 exhaust valves.
28 Repeat the same procedure to check the clearances of the front cylinders (Nos 2 and 4).
29 When all clearances have been checked and if necessary adjusted, install the valve covers (see Chapter 2).
30 Fit a new gasket to the left side engine cover, install the cover and tighten its bolts securely. Top up the engine oil.
31 Install the spark plugs.
32 Reconnect the radiator (see Chapter 3) and check that its hoses are securely clamped. Turn the radiator tap to ON. Check the level of coolant, topping it up if necessary. Bleed the cooling system of air (see Section 20).
33 Install the fuel tank (see Chapter 4).
34 Start the engine and check that there is no sign of oil leakage from the valve covers.



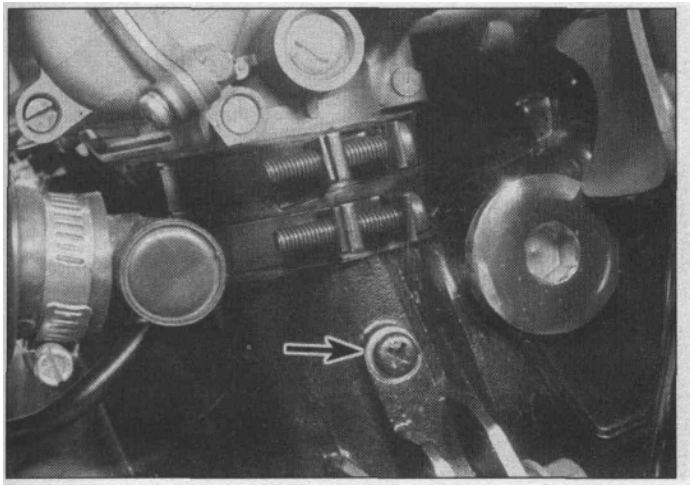
17.3 Idle speed adjuster (arrow)

17 Idle speed - check and adjustment

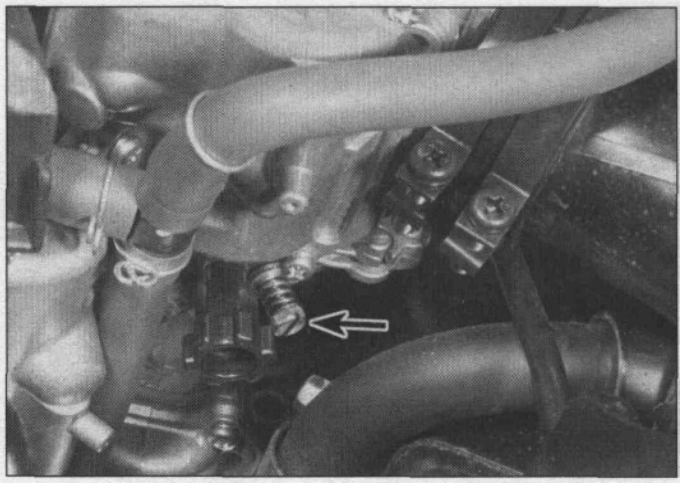
Refer to *illustration 17.3*
1 The idle speed should be checked and adjusted before and after the carburetors are synchronized and when it is obviously too high or too low. Before adjusting the idle speed, make sure the valve clearances and spark plug gaps are correct. Also, turn the handlebars back-and-forth and see if the idle speed changes as this is done. If it does, the throttle cables may not be adjusted correctly, or may be worn out. This is a dangerous condition that can cause loss of control of the bike. Be sure to correct this problem before proceeding.
2 The engine should be at normal operating temperature, which is usually reached after 10 to 15 minutes of stop and go riding. Place the motorcycle on its stand and make sure the transmission is in Neutral.
3 Turn the idle speed screw, located at the base of the No 1 cylinder carburetor until the idle speed listed in this Chapter's Specifications is obtained **(see illustration).**
4 Snap the throttle open and shut a few times, then recheck the idle speed. If necessary, repeat the adjustment procedure.
5 If a smooth, steady idle can't be achieved, the fuel/air mixture may be incorrect. Refer to Chapter 4 for additional carburetor information.

18 Carburetor synchronization - check and adjustment

Warning: *Gasoline (petrol) is extremely flammable, so take extra precautions when you work on any part of the fuel system. Don't smoke or allow open flames or bare light bulbs near the work area, and don't work in a garage where a natural gas-type appliance (such as a water heater or clothes dryer) is present. If you spill any fuel on your skin, rinse it off immediately with soap and water. When you perform any kind of work on the fuel system, wear safety glasses and have a fire extinguisher suitable for a Class B type fire (flammable liquids) on hand.*
1 Carburetor synchronization is simply the process of adjusting the carburetors so they pass the same amount of fuel/air mixture to each cylinder. This is done by measuring the vacuum produced in each cylinder. Carburetors that are out of synchronization will result in decreased fuel mileage, increased engine temperature, less than ideal throttle response and higher vibration levels.
2 To properly synchronize the carburetors, you will need some sort of vacuum gauge setup, preferably with a gauge for each cylinder, or a mercury manometer, which is a calibrated tube arrangement that utilizes columns of mercury to indicate engine vacuum.
3 A manometer can be purchased from a motorcycle dealer or accessory shop and should have the necessary screw-in adaptors



18.8 Carburetor synchronization adapter plugs are located in intake tracts (arrow)



18.12 Synchronization screw for No 3 carburetor (arrow)

supplied with it for hooking into the intake tract of the engine.

4 A vacuum gauge setup can also be purchased from a dealer or fabricated from commonly available hardware and automotive vacuum gauges.

5 The manometer is the more reliable and accurate instrument, and for that reason is preferred over the vacuum gauge setup; however, since the mercury used in the manometer is a liquid, and extremely toxic, extra precautions must be taken during use and storage of the instrument.

6 Because of the nature of the synchronization procedure and the need for special instruments, most owners leave the task to a dealer service department or a reputable motorcycle repair shop.

7 Start the engine and let it run until it reaches normal operating temperature. Check the idle speed and adjust if necessary, then shut it off.

700/750 Sabres, 1987 and 1988 700/750 Magna models

Refer to illustration 18.8

8 On Sabre models, remove the plugs from the No 2, 3 and 4 cylinder intake tracts, and on Magna models remove the plugs from the No 1, 3 and 4 cylinder intake tracts **(see illustration).** Install the vacuum gauge or manometer adaptors into the intake tract plug holes, then hook up the vacuum gauge set or the manometer according to the manufacturer's instructions. Make sure there are no air leaks in the set up, as false readings will result.

9 Start the engine and clamp the vacuum line running between the automatic fuel valve and the No 1 (Sabre) or No 2 (Magna) cylinder head intake tract, then stop the engine and disconnect the vacuum line from the fitting on the cylinder head. Connect the remaining line from the vacuum gauge or manometer to this fitting.

All other models

10 Remove the plugs from the intake tracts on all cylinders, install the adaptors into the plug holes and connect up the vacuum gauges or manometer to the adaptors. Make sure there are no air leaks in the set up, as false readings will result.

All models

Refer to illustration 18.12

11 Start the engine and check that the idle speed is correct, adjusting it if necessary. If the gauges are fitted with damping adjustment, set this so that the needle flutter is just eliminated but so that they can still respond to small changes in pressure.

12 The vacuum readings for all of the cylinders should be the same, or at least within the tolerance listed in this Chapter's Specifications. If the vacuum readings vary, adjust as necessary. First locate the adjusting screws; the adjusting screw for No 3 carburetor is next to the throttle stop screw, whereas those for Nos 2 and 4 carburetors are located in-between the carburetor bodies - all are accessed from underneath **(see illustration). Note:** Wo *1 carburetor has no adjustment* screw *and should be regarded as the base setting.*

13 Adjust each screw until all carburetors are synchronized, then open and close the throttle quickly to settle the linkage and recheck the gauge readings, re-adjusting if necessary. **Note:** *Do not press down on the* screws *while adjusting them, otherwise a false reading will be obtained.*

14 When the adjustment is complete, recheck the idle speed, then stop the engine. Remove the vacuum gauge or manometer and adaptors, then install the intake tract plugs. On 700/750 Sabres and 1987 and 1988 700/750 Magnas, remove the clamp from the fuel valve line and reconnect the line to the fitting on the No 1 (Sabre) or No 2 (Magna) carburetor.

19 Cooling system - check

Warning: *The engine must be cool before beginning this procedure.*

1 Check the coolant level as described in Section 3.

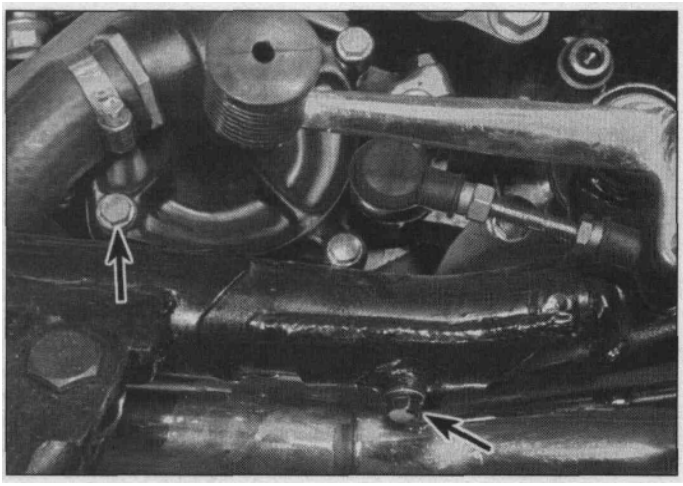
2 The entire cooling system should be checked for evidence of leakage. Examine each rubber coolant hose along its entire length. Look for cracks, abrasions and other damage. Squeeze each hose at various points. They should feel firm, yet pliable, and return to their original shape when released. If they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

3 Check for evidence of leaks at each cooling system joint. Tighten the hose clips carefully to prevent future leaks. Similarly, check the coolant crossover pipes between the cylinder banks, the coolant inlet pipe on the left side of the engine, and the subframe connections with the radiator and water pump short hose.

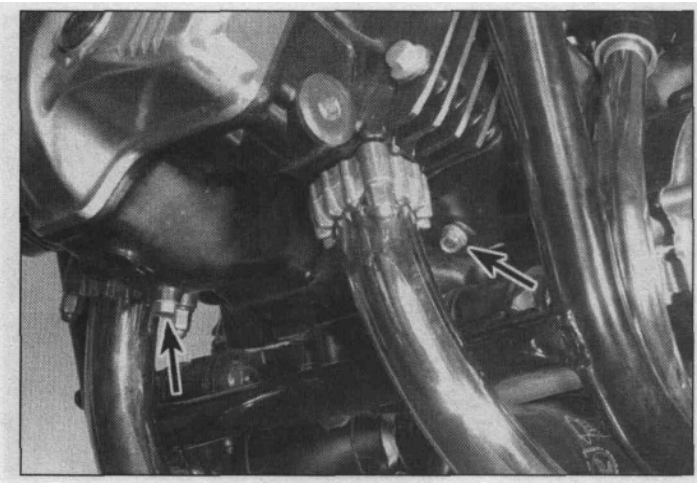
4 Check the radiator for leaks and other damage. Leaks in the radiator leave telltale scale deposits or coolant stains on the outside of the core below the leak. If leaks are noted, remove the radiator (see Chapter 3) and have it repaired at a radiator shop or replace it with a new one. **Caution:** 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 by turning it counterclockwise (anticlockwise) until it reaches a stop. If you hear a hissing sound



20.2 Coolant drain plug in subframe (right arrow) and in water pump cover (left arrow)



20.4 Coolant drain plugs in engine case (arrows)

(indicating there is still pressure in the system), wait until it stops. Now press down on the cap and continue turning the cap until it can be removed. Check the condition of the coolant in the system. If it is rust-colored or if accumulations of scale are visible, drain, flush and refill the system with new coolant (see Section 20). Check the cap seal for cracks and other damage. If in doubt about the pressure cap's condition, have it tested by a dealer service department or replace it with a new one. Install the cap by turning it clockwise until it reaches the first stop then push down on the cap and continue turning until it can turn further.

7 Check the antifreeze content of the coolant with an antifreeze hydrometer. Sometimes coolant looks like it's in good condition, but might be too weak to offer adequate protection. If the hydrometer indicates a weak mixture, drain, flush and refill the system (see Section 20).

8 Start the engine and let it reach normal operating temperature, then check for leaks again. As the coolant temperature increases, the fan should come on automatically and the temperature should begin to drop. If it does not, refer to Chapter 3 and check the fan and fan circuit carefully.

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

20 Cooling system - draining, flushing and refilling

Warning: *Allow the engine to cool completely before performing this maintenance operation. Also, don't allow antifreeze to come into contact with your skin or the painted surfaces of the motorcycle. Rinse off spills immediately with plenty of water. Antifreeze is highly toxic if ingested. Never leave antifreeze lying around in an open container or in puddles on the floor; children and pets are attracted by its sweet smell and may drink it. Check with local authorities (councils) about disposing of antifreeze. Many communities have collection centers which will see that antifreeze is disposed of safely. Antifreeze is also combustible, so don't store it near open flames.*

Draining

Refer to illustrations 20.2 and 20.4

1 With the engine cold place the motorcycle on the main stand on level ground. Where no main stand is fitted, ensure that the motorcycle is supported in an upright position. Remove the belly fairing on 1987 and 1988 700/750 Magna models (see Chapter 6) and on all models, remove the engine rear cover on the left side (see Chapter 2).

2 Place a suitable container under the coolant drain bolt located in the subframe near the gearshift lever and remove the drain bolt to drain the coolant from the radiator **(see illustration).**

3 Remove the radiator cap by turning it counterclockwise (anticlockwise) until it reaches a stop. If you hear a hissing sound (indicating there is still pressure in the system), wait until it stops. Now press down on the cap and continue turning the cap until it can be removed. As the cap is removed the flow of coolant will increase, be prepared for this.

4 Drain coolant from the engine by removing the coolant drain bolt at the water pump and the two drain bolts in the front of the engine case **(see illustration).**

5 When the system is fully drained, replace all drain bolts.

6 Drain the coolant reservoir. Refer to Chapter 3 for reservoir removal procedure. Wash out the reservoir with water and install it.

Flushing

7 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 and flows cleanly out of both drain holes. If the radiator is extremely corroded, remove it by referring to Chapter 3 and have it cleaned at a radiator shop.

8 Clean the holes then install the drain bolts and sealing washers, tightening them securely.

9 Fill the cooling system with clean water mixed with a flushing compound. Make sure the flushing compound is compatible with aluminum components, and follow the manufacturer's instructions carefully.

10 Start the engine and allow it reach normal operating temperature. Let it run for about ten minutes.

11 Stop the engine. Let it cool for a while, then cover the pressure cap with a heavy shop towel and turn it counterclockwise (anticlockwise) to the first stop, releasing any pressure that may be present in the system. Once the hissing stops, push down on the cap and remove it completely.

12 Drain the system once again.

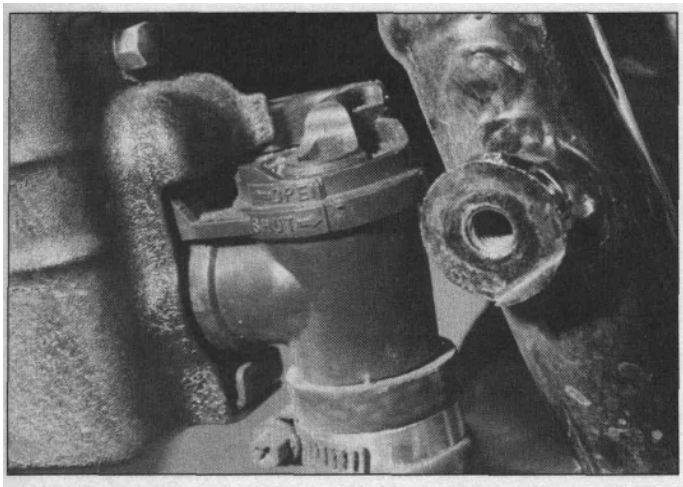
13 Fill the system with clean water and repeat the procedure in Steps 10 to 12.

Refilling

14 Fit new sealing washers to the drain bolts and install them in the engine case, pump cover and subframe, tightening each one securely.

15 Fill the system with the proper coolant mixture (see this Chapter's Specifications) until it is level with the lower edge of the filler neck. Filling it slowly will reduce the amount of air trapped in the system and lessen the time required to bleed it.

16 Remove the rubber cap from the bleed nipple on the thermostat housing and attach a clear plastic hose to it. Place the other end into a



20.22 1986 through 1988 models have tap in radiator outlet

21.2 Remove plug to drain crankcase separator tank on later models

clean container, such as the one used for draining the coolant.
17 Start the engine and let it idle until it reaches normal operating temperature. Watch the level of the coolant in the radiator and if it drops, add more coolant.
18 Loosen the bleed nipple and observe the coolant running through the hose for air bubbles. Let the engine run until no more air bubbles can be seen in the coolant escaping the tube, then tighten the bleed nipple. Keep checking the coolant level in the radiator, adding more when necessary. The coolant emptied into the container can be poured back into the radiator if the bleed nipple is temporarily tightened while this is being done. When the bleeding procedure is complete, stop the engine and fill the radiator to the bottom of the filler neck one more time, then reinstall the radiator cap.
19 Check the level of coolant in the reservoir tank and, with the coolant hot, fill it to the Upper mark. As a final step, ride the motorcycle for a couple of miles and then recheck the coolant level one last time. Install the engine rear cover and on 1987 and 1988 700/750 Magna models also install the belly fairing.
20 Check the system for leaks and rectify them immediately.
21 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 into an authorized disposal site or service station - see Warning at the beginning of this Section.

Radiator tap

Refer to illustration 20.22
22 1986 through 1988 models are equipped with a tap at the radiator outlet union **(see illustration).** If the radiator requires removal for access to the front cylinder components, full draining of the radiator and lower coolant pipes can be avoided by shutting off the tap in the direction indicated by its arrows.
23 Having shut the tap, loosen and then tighten the coolant drain bolt in the subframe **(see illustration 20.2)** to release pressure. The radiator can be pivoted forwards about its top mounting after removal of the side mounting bolts and disconnection of the radiator hoses.
24 On installation, ensure that all hose connections are securely made, and open the radiator tap.

21 Crankcase breather - check

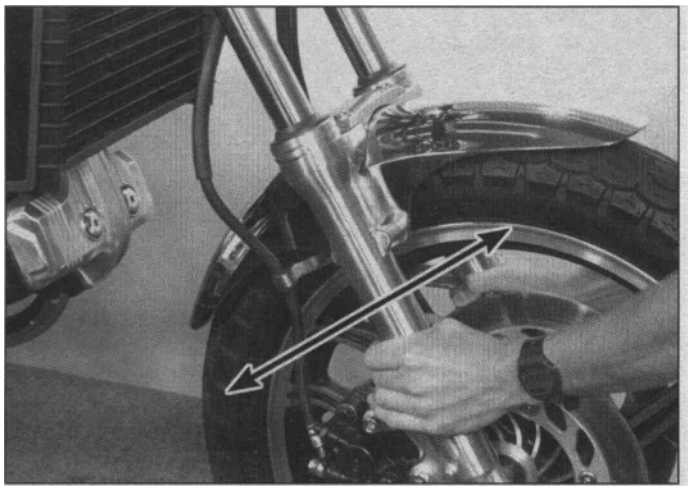
Refer to illustration 21.2
1 On 700/750 Sabres and 1982 through 1984 700/750 Magnas, drain any sludge from the crankcase breather tank at the specified interval.
2 Disengage the drain hose from its bracket, hold it over a container and remove the plug from its end **(see illustration).** After the deposits have drained, install the plug and secure the hose in its bracket. Note that the crankcase breather is likely to require draining more often if the motorcycle is used at high speeds or in the rain. The transparent drain hose will any build up to be seen at a glance.
3 Check the crankcase breather hoses which run from the rear of the crankcase to the separator tank and from the separator tank to the air filter housing. Replace them if cracked or damaged.
4 On 1100 models and later 700/750 Magnas, there is no drain hose facility on the crankcase breather. For the purpose of routine maintenance, check that the hoses from the breather to the crankcase and air filter housing are not cracked or deteriorated and that they are securely fastened to their unions. If the separator tank is suspected of blockage at any time, disconnect its hoses and drain off any fluid.

22 Evaporative emission control system and Secondary air supply system (California models only) - check

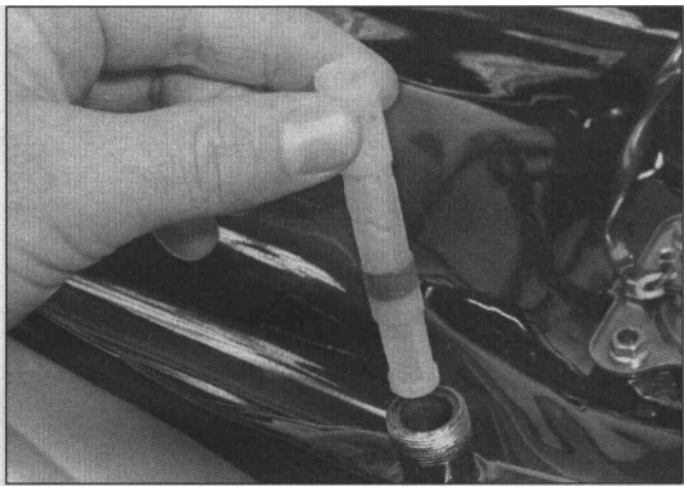
1 The Evaporative emission control system (installed from 1984-on) routes fuel vapors from the fuel system into the engine to be burned, instead of letting them evaporate into the atmosphere. When the engine isn't running, vapors are stored in a carbon canister. The Secondary air supply system (installed from 1986-on) introduces fresh air into the exhaust ports to promote the burning of any excess fuel present in the exhaust gases, reducing that which passes into the atmosphere. Both systems and their components are described in greater detail in Chapter 4.
2 Refer to Chapter 4 for component location details, and inspect the hoses between each system component, replacing them if split or cracked. If any require replacement, take note of their exact routing and connections before removal. Check the emission system canister located on the subframe crosstube for cracks or damage.

23 Exhaust system - check

1 Periodically check all of the exhaust system joints for leaks and loose fasteners. The belly fairing will have to be removed to do this properly on 1987 and 1988 700/750 Magna models (see Chapter 6). If tightening the fasteners fails to stop any leaks, replace the gaskets with new ones (see Chapter 4).
2 The exhaust pipe flange nuts at the cylinder heads are especially prone to loosening, which could cause damage to the head. Check them frequently and keep them tight.



24.4 Feeling for play in the steering head bearings



26.13 Fuel filter takes the form of a gauze element on 700/750 Sabres and 1987/88 Magnas

24 Steering head bearings - check and adjustment

1 This vehicle is equipped with caged taper-roller or caged ball type steering head bearings which can become dented, rough or loose during normal use of the machine. In extreme cases, worn or loose steering head bearings can cause steering wobble - a condition that is potentially dangerous.

Check

Refer to illustration 24.4

2 To check the bearings, place the motorcycle on its main stand and block the machine so the front wheel is in the air. On 1987 and 1988 700/750 Magna models, block the vehicle under the crankcase so that the front wheel is raised off the ground.

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 Next, grasp the fork sliders and try to move them forward and backward **(see illustration).** Any looseness in the steering head bearings will be felt as front-to-rear movement of the forks, although make sure that this is not due to worn fork bushings. If play is felt in the bearings, adjust the steering head as follows.

Adjustment

5 Refer to Chapter 6 *'Steering stem - removal and installation'* and remove the upper triple clamp from the forks and steering stem. The forks can remain in place, although the handlebars and instruments must be removed. The upper triple clamp need only be raised sufficiently to access the steering stem locknut and adjuster nuts, so the ignition switch (1982 through 1986 models) can remain attached to the triple clamp if the wiring will allow.

6 Free the lockwasher tabs from the steering stem locknut and adjuster nut, remove the locknut and lockwasher, then carry out adjustment of the adjuster nut as described under the installation sub-Section of Section 10, Chapter 6.

7 After adjustment, check that all steering play has been removed as described above.

25 Fasteners - check

1 Since vibration of the machine tends to loosen fasteners, all nuts, bolts, screws, etc. should be periodically checked for proper tightness.

2 Pay particular attention to the following:

Spark plugs Engine oil drain plugs
Gearshift lever
Footpegs, stand bolts
Engine mounting bolts
Shock absorber mounting bolts
Handlebar and triple clamp pinch bolts
Rear suspension linkage bolts (Sabres)
Front axle and clamp bolts
Rear axle nut and clamp bolt
Exhaust system bolts/nuts

3 If a torque wrench is available, use it along with the torque specifications at the beginning of this, or other, Chapters.

26 Fuel system - checks and filter replacement

Warning: *Gasoline (petrol) is extremely flammable, so take extra precautions when you work on any part of the fuel system. Don't smoke or allow open flames or bare light bulbs near the work area, and don't work in a garage where a natural gas-type appliance (such as a water heater or clothes dryer) is present. If you spill any fuel on your skin, rinse it off immediately with soap and water. When you perform any kind of work on the fuel system, wear safety glasses and have, a fire extinguisher suitable for a Class B type fire (flammable liquids) on hand.*

Check

1 Check the fuel tank, the tank breather hose (not California models), the fuel tap, the lines and the carburetors for leaks and evidence of damage.

2 If the carburetor gaskets are leaking, the carburetors should be disassembled and rebuilt by referring to Chapter 4.

3 If the fuel tap is leaking, tightening the retaining nut may help but if leakage persists, the tap should be disassembled and repaired or replaced with a new one (see Chapter 4).

4 If the fuel lines are cracked or otherwise deteriorated, replace them with new ones.

5 On 700/750 Sabres and 1987 and 1988 700/750 Magnas, check the vacuum line connecting the fuel diaphragm valve to No 1 (Sabre) or No 2 (Magna) cylinder intake tract. If it is cracked or otherwise damaged, replace it with a new one.

Filter replacement (1982 through 1986 Magnas and 1100 Sabres)

6 An in-line fuel filter is fitted, which must be replaced at the specified interval.

700/750 Magna models

7 On 1982 through 1984 Magnas, remove the right side cover and turn the fuel valve Off; the filter is located below the valve and to the rear of the battery. On later models turn the fuel valve on the tank Off, then remove the left side cover; the fuel filter is located just above the fuel pump.
8 Release the filter from its holder, clamp the fuel lines each side of the filter, then release the hose clips and pull the hoses off the filter.
9 Install the new filter in the same position as the original, push on the hoses and secure with the clips. Clamp the filter in place, turn the fuel valve On and check that there are no leaks.

1100 models

10 On Sabre models, remove the right side cover (see Chapter 6) and turn the fuel valve Off. On Magna models, remove the seat and left side cover (see Chapter 6). Turn the fuel valve Off.
11 Release the single screw which retains the filter clamp to the fuel valve mounting bracket (Sabre) or frame (Magna). Clamp the fuel lines each side of the filter, then release the hose clips and pull the hoses off the filter.
12 Install the new filter in the same position as the original, push on the hoses and secure with the clips. Clamp the filter in place, turn the fuel valve On and check that there are no leaks.

Filter cleaning (700/75O Sabres, 1987 and 1988 700/750 Magnas)

Refer to illustration 26.13

13 A gauze type stack filter is fitted inside the fuel tank as part of the fuel valve. Cleaning is not specified as a maintenance item, but if problems with fuel restriction or fuel contamination are noted it should be removed for cleaning **(see illustration).**
14 Remove the fuel valve and clean the filter (see Chapter 4).

27 Suspension - check

Front suspension

1 The suspension components must be maintained in top operating condition to ensure rider safety. Loose, worn or damaged suspension parts decrease the vehicle's stability and control.
2 While standing alongside the motorcycle, apply the front brake and push on the handlebars to compress the forks several times. See if they move up-and-down smoothly without binding. If binding is felt, the forks should be disassembled and inspected as described in Chapter 6.
3 Carefully inspect the area around the fork seals for any signs of fork oil leakage. If leakage is evident, the seals must be replaced as described in Chapter 6.
4 Check the tightness of all suspension nuts and bolts to be sure none have worked loose.
5 Where applicable, check the fork air pressure, anti-dive setting and damping setting (see Chapter 6) to ensure that they suit the riding style and load carried.
6 Fork oil replacement is not specified as a maintenance item, but fork oil will degrade in time with loss of damping performance. Renew the oil periodically (see Chapter 6).

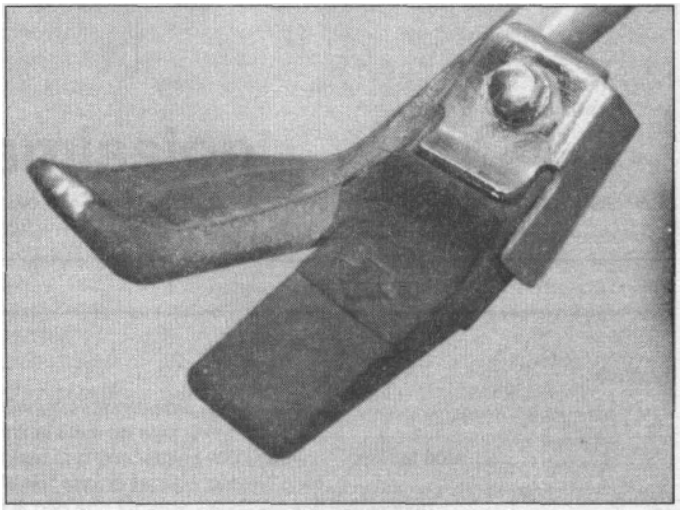
Rear suspension

7 Inspect the rear shock(s) for fluid leakage and tightness of the mounting nuts. If leakage is found, the shock should be replaced.
8 Set the bike on its main stand, or support it securely where no main stand is fitted. Grab the swingarm on each side, just ahead of the axle. Rock the swingarm from side to side - there should be no discernible movement at the rear. If there's a little movement or a slight clicking can be heard, make sure the pivot shaft locknut is tight (see Chapter 6). If the pivot nut is tight but movement is still noticeable, the swingarm will have to be removed and the bearings replaced as described in Chapter 6.
9 Inspect the tightness of the rear suspension linkage nuts and bolts on Sabre models.
10 Where applicable, check the preload and damping settings to ensure that they suit the riding style and load carried (see Chapter 6).

28 Stands - check

Refer to illustration 28.2

1 Check that the side and main stands are mounted securely and that their return springs are not stretched or damaged.
2 The side stand has a wear pad attached to its foot which must be replaced when worn down to the wear line indicated by the moulded arrow **(see illustration).**



28.2 Side stand rubber wear limit is indicated by arrow

Chapter 2
Engine, clutch and transmission

Note: *Unless specifically mentioned in this Chapter, the information given for the 1982 750 Sabre applies to the UK VF750S-C, and that for the 1987 and 1988 700/750 Magnas applies to the UK VF750C-H and C-J respectively.*

Contents

Specifications

General

Capacity	
700 models	699 cc (42.6 cu in)
750 models	748 cc (45.6 cu in)
1100 models	1098 cc (67 cu in)
Bore	
700 and 750 models	70 mm (2.75 in)
1100 models	79.5 mm (3.13 in)
Stroke	
700 models	45.4 mm (1.79 in)
750 models	48.6 mm (1.9 in)
1100 models	55.3 mm (2.18 in)
Compression ratio	
700/750 models 1982 through 1986	10.5 to 1
700/750 models 1987 and 1988	10.2 to 1
1100 models	10.5 to 1
Engine weight (dry) - approximate	
700/750 models	85 to 87 kg (187 to 192 lbs)
1100 models	97 kg (213 lbs)

Camshafts

Cam lobe height - 1982 through 1984 700/750 models and all 1100 models	
Standard	35.355 to 35.495 mm (1.3911 to 1.3974 in)
Service limit	35.3 mm (1.39 in)
Cam lobe height - 1985 and 1986 700 models	
Standard	35.243 to 35.403 mm (1.3875 to 1.3938 in)
Service limit	35.2 mm (1.39 in)
Cam lobe height - 1987 700 models	
Standard	35.063 to 35.223 mm (1.3804 to 1.3867 in)
Service limit	35.0 mm (1.38 in)
Cam lobe height - 1988 750 model (except California)	
Standard	34.845 to 35.005 mm (1.3718 to 1.3781 in)
Service limit	34.8 mm (1.37 in)
Cam lobe height - 1988 750 model (California)	
Standard	34.562 to 34.722 mm (1.3607 to 1.3670 in)
Service limit	34.5 mm (1.358 in)
Camshaft runout	
1985 through 1988 700/750 Magna models	Less than 0.05 mm (0.002 in)
All other models	Less than 0.10 mm (0.004 in)
Camshaft bearing oil clearance -1982 through 1985 700/750 models	
Center journal	
Standard	0.030 to 0.091 mm (0.001 to 0.004 in)
Service limit	0.10 mm (0.004 in)
Inner and outer journals	
Standard	0.50 to 0.111 mm (0.002 to 0.004 in)
Service limit	0.12 mm (0.005 in)
Camshaft bearing oil clearance -1100 models	
Standard (all journals)	0.030 to 0.091 mm (0.001 to 0.004 in)
Service limit (all journals)	0.095 mm (0.0037 in)
Camshaft journal OD -1986 through 1988 700/750 Magna models	
Outer journal (A)	
Standard	23.949 to 23.970 mm (0.9429 to 0.9437 in)
Service limit	23.89 mm (0.941 in)
Center and inner journals (B and C)	
Standard	23.861 to 23.882 mm (0.9394 to 0.9402 in)
Service limit	23.80 mm (0.937 in)
Camshaft bearing holder ID - 1986 through 1988 700/750 Magna models Intake	
Standard	24.000 to 24.021 mm (0.9449 to 0.9457 in)

Service limit.....	24.05 mm (0.947 in)
Exhaust	
Standard	24.000 to 24.084 mm (0.9449 to 0.9482 in)
Service limit.....	24.11 mm (0.949 in)

Camshaft bearing oil clearance - 1986 through 1988 700/750 Magna models	
Outer journal (A) - intake and exhaust	
Standard	0.030 to 0.072 mm (0.0012 to 0.0028 in)
Service limit	0.10 mm (0.004 in)
Center and inner journals (B and C) - intake	
Standard	0.118 to 0.160 mm (0.0046 to 0.0063 in)
Service limit	0.20 mm (0.008 in)
Center and inner journals (B and C) - exhaust	
Standard	0.118 to 0.223 mm (0.0046 to 0.0088 in)
Service limit	0.25 mm (0.010 in)
Camchain length (at 13 kg/29 lbs)	
All 700/750 Sabres and 1982 through 1984 700/750 Magnas	
Standard	323.85 to 324.30 mm (12.750 to 12.767 in)
Service limit	326.12 (12.84 in)
1985 through 1988 700/750 Magna models	
Standard	342.90 to 343.35 mm (13.500 to 13.518 in)
Service limit	340.50 (13.405 in)
1100 models	
Standard	361.95 to 362.40 mm (14.250 to 14.269 in)
Service limit	364.90 mm (14.37 in)

Rocker arms

Rocker arm bore diameter	
Standard	12.000 to 12.018 mm (0.4724 to 0.4731 in)
Service limit	12.05 mm (0.474 in)
Rocker arm shaft outer diameter	
Standard	11.966 to 11.984 mm (0.4711 to 0.4718 in)
Service limit	11.93 mm (0.470 in)

Cylinder head

Maximum warpage	
All 700/750 Sabres, 1982 through 1984 700/750 Magna models	0.25 mm (0.010 in)
1985 through 1988 700/750 Magna models	0.10 mm (0.004 in)
1100 models	0.05 mm (0.002 in)

Valves, guides and springs

Intake valve stem OD	
Standard	5.475 to 5.490 mm (0.2156 to 0.2161 in)
Service limit	5.47 mm (0.215 in)
Exhaust valve stem OD	
Standard	5.455 to 5.470 mm (0.2148 to 0.2154 in)
Service limit	5.45 mm (0.214 in)
Valve guide ID - intake and exhaust	
Standard	5.500 to 5.515 mm (0.2165 to 0.2171 in)
Service limit	5.55 mm (0.219 in)
Valve stem-to-guide clearance	
Intake	
Standard	0.010 to 0.040 mm (0.0004 to 0.0016 in)
Service limit	0.08 mm (0.003 in)
Exhaust	
Standard	0.030 to 0.060 mm (0.0012 to 0.0024 in)
Service limit	0.10 mm (0.004 in)
Valve seat width - intake and exhaust	
Standard	0.99 to 1.27 mm (0.039 to 0.050 in)
Service limit	1.5 mm (0.06 in)
Valve spring free length - all 700/750 Sabre models, 1982 through 1984 700/750 Magna models	
Inner spring	
Standard	40.70 mm (1.60 in)
Service limit	39.35 mm (1.55 in)
Outer spring	
Standard	43.90 mm (1.73 in)
Service limit	42.43 mm (1.67 in)
Valve spring free length - 1985 through 1987 700 Magna models	
Inner spring	
Standard	39.49 mm (1.555 in)
Service limit	38.19 mm (1.504 in)
Outer spring	
Standard	44.61 mm (1.756 in)
Service limit	43.14 mm (1.698 in)

Valves, guides and springs (continued)

Valve spring free length - 1988 750 Magna model	
Inner spring	
Standard	41.43 mm (1.631 in)
Service limit	40.13 mm (1.580 in)
Outer spring	
Standard	45.31 mm (1.784 in)
Service limit	43.84 mm (1.726 in)
Valve spring free length - 1100 models	
Inner spring	
Standard	40.85 mm (1.608 in)
Service limit	39.45 mm (1.553 in)
Outer spring	
Standard	44.50 mm (1.752 in)
Service limit	43.10 mm (1.70 in)

Clutch

Friction plate thickness	
Standard	3.72 to 3.88 mm (0.147 to 0.153 in)
Service limit	3.5 mm (0.14 in)
Plain plate maximum warpage	0.3 mm (0.012 in)
Clutch spring free length - except 1983 750 Sabre and all 1100 models	
Standard	35.5 mm (1.40 in)
Service limit	34.0 mm (1.34 in)
Clutch diaphragm spring free height - 1983 750 Sabre and all 1100 models	
Standard - 750 model	3.9 mm (0.15 in)
Standard - 1100 models	4.6 mm (0.18 in)
Service limit - all models	3.6 mm (0.14 in)
Outer guide inner diameter - 700/750 models	
Standard	24.995 to 25.012 mm (0.9841 to 0.9847 in)
Service limit	25.08 mm (0.987 in)
Outer guide inner diameter - 1100 models	
Standard	29.995 to 30.012 mm (1.1809 to 1.1816 in)
Service limit	30.08 mm (1.184 in)
One-way clutch inner piece outer diameter - 1983 750 Sabre and all 1100 models	
Standard	57.755 to 57.768 mm (2.2738 to 2.2743 in)
Service limit	57.74 mm (2.273 in)
Outer center inner diameter -1983 750 Sabre and all 1100 models	
Standard	74.414 to 74.440 mm (2.9296 to 2.9307 in)
Service limit	74.50 mm (2.933 in)
Master cylinder bore diameter - 700/750 models	
Standard	14.000 to 14.043 mm (0.5512 to 0.5528 in)
Service limit	14.06 mm (0.554 in)
Master cylinder piston diameter - 700/750 models	
Standard	13.957 to 13.984 mm (0.5495 to 0.5506 in)
Service limit	13.94 mm (0.549 in)
Master cylinder bore diameter -1100 models	
Standard	15.870 to 15.913 mm (0.6248 to 0.6265 in)
Service limit	15.93 mm (0.627 in)
Master cylinder piston diameter -1100 models	
Standard	15.827 to 15.854 mm (0.6231 to 0.6242 in)
Service limit	15.80 mm (0.622 in)
Slave cylinder bore diameter	
Standard	38.100 to 38.162 mm (1.5000 to 1.5024 in)
Service limit	38.18 mm (1.503 in)
Slave cylinder piston diameter	
Standard	38.036 to 38.075 mm (1.4975 to 1.4990 in)
Service limit	38.02 mm (1.497 in)

Lubrication system

Oil pressure (at switch)	
700/750 models	64 ± 11 psi (4.4 ± 0.8 Bars) at 80°C/176°F
1100 models	71 ± 10 psi (4.9 ± 0.7 Bars) at 80°C/176°F
Oil pump rotor tip-to-outer rotor clearance	
Standard	0.15 mm (0.006 in)
Service limit	0.20 mm (0.008 in)
Oil pump outer rotor-to-body clearance	
Standard	0.15 to 0.22 mm (0.006 to 0.009 in)
Service limit	0.35 mm (0.014 in)

Oil pump rotor endfloat	
Standard	0.02 to 0.07 mm (0.001 to 0.003 in)
Service limit	0.10 mm (0.004 in)

Starter clutch

Driven gear OD - 700/750 models	
Standard	47.175 to 47.200 mm (1.8573 to 1.8583 in)
Service limit	47.16 mm (1.857 in)
Driven gear OD -1100 models	
Standard	54.170 to 54.200 mm (2.1327 to 2.1339 in)
Service limit	54.16 mm (2.132 in)

Cylinder block

Cylinder bore ID	
700/750 models	
Standard	70.000 to 70.015 mm (2.755 to 2.756 in)
Service limit	70.10 mm (2.76 in)
1100 models	
Standard	79.500 to 79.515 mm (3.1299 to 3.1305 in)
Service limit	79.60 mm (3.134 in)
Maximum ovality (out-of-round)	
700/750 models	0.10 mm (0.004 in)
1100 models	0.05 mm (0.002 in)
Maximum taper	0.10 mm (0.004 in)
Cylinder-to-piston clearance	0.010 to 0.055 mm (0.0004 to 0.0022 in)
Service limit	0.10 mm (0.004 in)

Pistons

Piston OD (measured 11 mm up from base of skirt)	
700/750 models	
Standard	69.960 to 69.990 mm (2.754 to 2.755 in)
Service limit	69.85 mm (2.750 in)
1100 models	
Standard	79.460 to 79.490 mm (3.1283 to 3.1295 in)
Service limit	79.35 mm (3.124 in)
Piston pin bore OD	
700/750 models	
Standard	18.002 to 18.008 mm (0.7087 to 0.7090 in)
Service limit	18.10 mm (0.71 in)
1100 models	
Standard	20.002 to 20.008 mm (0.7875 to 0.7877 in)
Service limit	20.06 mm (0.790 in)
Piston pin OD	
700/750 models	
Standard	17.994 to 18.000 mm (0.7084 to 0.7086 in)
Service limit	17.98 mm (0.708 in)
1100 models	
Standard	19.994 to 20.000 mm (0.7872 to 0.7874 in)
Service limit	19.98 mm (0.787 in)
Piston-to-piston pin clearance	
Standard	0.002 to 0.014 mm (0.0001 to 0.0006 in)
Service limit	0.04 mm (0.002 in)

Piston rings

Ring-to-groove clearance (top and second rings)	
Standard	0.015 to 0.045 mm (0.0006 to 0.0018 in)
Service limit	0.10 mm (0.004 in)
Top ring end gap	
Standard	
1982 750 model	0.10 to 0.30 mm (0.004 to 0.012 in)
1983-on 700/750 models	0.15 to 0.30 mm (0.006 to 0.012 in)
1100 models	0.20 to 0.35 mm (0.008 to 0.014 in)
Service limit	0.5 mm (0.02 in)
Second ring end gap	
Standard	
1982 750 model	0.10 to 0.30 mm (0.004 to 0.012 in)
1983-on models	0.20 to 0.35 mm (0.008 to 0.014 in)
Service limit	0.5 mm (0.02 in)

Piston rings (continued)

Oil control ring side rail end gap	
700/750 models	
Standard	0.2 to 0.9 mm (0.008 to 0.035 in)
Service limit	1.1 mm (0.04 in)
1100 models	
Standard	0.2 to 0.7 mm (0.008 to 0.028 in)
Service limit	0.9 mm (0.04 in)

Connecting rods and bearings

Connecting rod side clearance (all models)	
Standard	0.10 to 0.30 mm (0.004 to 0.012 in)
Service limit	0.4 mm (0.016 in)
Connecting rod piston pin bore ID	
700/750 models	
Standard	18.016 to 18.034mm (0.7093 to 0.7100 in)
Service limit	18.08 mm (0.712 in)
1100 models	
Standard	20.016 to 20.034 mm (0.7880 to 0.7887 in)
Service limit	20.08 mm (0.791 in)
Connecting rod crankpin bore ID - 700/750 models	
Size group 1	39.000 to 39.008 mm (1.5354 to 1.5357 in)
Size group 2	39.008 to 39.016 mm (1.5357 to 1.5361 in)
Size group 3	39.016 to 39.024 mm (1.5361 to 1.5364 in)
Connecting rod crankpin bore ID - 1100 models	
Size group 1	43.000 to 43.008 mm (1.6929 to 1.6932 in)
Size group 2	43.008 to 43.016 mm (1.6932 to 1.6935 in)
Crankshaft crankpin OD - 700/750 models	
Size groupA	35.992 to 36.000 mm (1.4170 to 1.4173 in)
Size group B	35.984 to 35.992 mm (1.4167 to 1.4170 in)
Size group C	35.976 to 35.984 mm (1.4164 to 1.4167 in)
Crankshaft crankpin OD -1100 models	
Size group A	39.992 to 40.000 mm (1.5745 to 1.5748 in)
Size group B	39.984 to 39.992 mm (1.5742 to 1.5745 in)
Connecting rod bearing oil clearance (all models)	
Standard	0.028 to 0.052 mm (0.0011 to 0.0020 in)
Service limit	0.08 mm (0.003 in)
Bearing insert thicknesses - 700/750 models	
Blue	1.502 to 1.506 mm (0.0591 to 0.0593 in)
Black	1.498 to 1.502 mm (0.0590 to 0.0591 in)
Brown	1.494 to 1.498 mm (0.0588 to 0.0590 in)
Green	1.490 to 1.494 mm (0.0587 to 0.0588 in)
Yellow	1.486 to 1.490 mm (0.0585 to 0.0587 in)
Bearing insert thicknesses -1100 models	
Brown	1.494 to 1.498 mm (0.0588 to 0.0590 in)
Green	1.490 to 1.494 mm (0.0587 to 0.0588 in)
Yellow	1.486 to 1.490 mm (0.0585 to 0.0587 in)

Crankshaft and main bearings

Maximum crankshaft runout	0.03 mm (0.001 in)
Crankcase main bearing bore ID - 700/750 models	
Size group A	39.000 to 39.008 mm (1.5354 to 1.5357 in)
Size group B	39.008 to 39.016 mm (1.5357 to 1.5361 in)
Size group C	39.016 to 39.024 mm (1.5361 to 1.5364 in)
Crankcase main bearing bore ID -1100 models	
Size group I or 1	43.000 to 43.008 mm (1.6929 to 1.6932 in)
Size group II or 2	43.008 to 43.016 mm (1.6932 to 1.6935 in)
Crankshaft journal OD - 700/750 models	
Size group 1	35.992 to 36.000 mm (1.4170 to 1.4173 in)
Size group 2	35.984 to 35.992 mm (1.4167 to 1.4170 in)
Size group 3	35.976 to 35.984 mm (1.4164 to 1.4167 in)
Crankshaft journal OD -1100 models	
Size group 1	39.992 to 40.000 mm (1.5745 to 1.5748 in)
Size group 2	39.984 to 39.992 mm (1.5742 to 1.5745 in)
Main bearing oil clearance	
Standard	0.028 to 0.052 mm (0.0011 to 0.0020 in)
Service limit (all models)	0.08 mm (0.003 in)

Bearing insert thicknesses - 700/750 models	
Blue	1.506 to 1.510 mm (0.0593 to 0.0594 in)
Black	1.502 to 1.506 mm (0.0591 to 0.0593 in)
Brown	1.498 to 1.502 mm (0.0590 to 0.0591 in)
Green	1.494 to 1.498 mm (0.0588 to 0.0590 in)
Yellow	1.490 to 1.494 mm (0.0587 to 0.0588 in)
Bearing insert thicknesses -1100 models	
Brown	1.498 to 1.502 mm (0.0590 to 0.0591 in)
Green	1.494 to 1.498 mm (0.0588 to 0.0590 in)
Yellow	1.490 to 1.494 mm (0.0587 to 0.0588 in)

Transmission shafts

Ratios	
1st	2.294 to 1
2nd	
1986 1100 Magna	1.667 to 1
All other models	1.619 to 1
3rd	
1986 1100 Magna	1.286to1
All other models	1.292 to 1
4th	1.074 to 1
5th	1.897 to 1
6th (overdrive)	0.750 to 1
Gear backlash (except 1985 through 1988 700/750 Magna models)	
1 st gear	
Standard - 700/750 models	0.089 to 0.170 mm (0.0035 to 0.0066 in)
Standard -1100 models	0.089 to 0.179 mm (0.0035 to 0.0070 in)
Service limit - all models	0.24 mm (0.009 in)
2nd, 3rd, 4th, 5th, 6th gears	
Standard	0.068 to 0.136 mm (0.0027 to 0.0054 in)
Service limit	0.18 mm (0.007 in)
Gear inner diameter - 700/750 models	
M5, M6, C2, C3 gears	
Standard	28.000 to 28.021 mm (1.1024 to 1.1032 in)
Service limit	28.04 mm (1.104 in)
C1 gear	
Standard -1982 through 1986	24.000 to 24.021 mm (0.9449 to 0.9457 in)
Standard - 1987 through 1988	24.007 to 24.028 mm (0.9451 to 0.9459 in)
Service limit	24.04 mm (0.946 in)
C4 gear	
Standard	29.000 to 29.021 mm (1.1417 to 1.1426 in)
Service limit	29.04 mm (1.143 in)
Gear inner diameter -1100 models	
M5, M6, C2, C3, C4 gears	
Standard	31.000 to 31.016 mm (1.2205 to 1.2211 in)
Service limit	31.18 mm (1.228 in)
Gear bushing outer diameter - 700/750 models	
M5, M6, C2, C3 gears	
Standard	27.959 to 27.980 mm (1.1007 to 1.1016 in)
Service limit	27.94 mm (1.100 in)
C1 gear (except 1987 and 1988 models)	
Standard	23.959 to 23.980 mm (0.9433 to 0.9441 in)
Service limit	23.94 mm (0.943 in)
C4 gear	
Standard	28.959 to 28.980 mm (1.1401 to 1.1409 in)
Service limit	28.94 mm (1.139 in)
Gear bushing outer diameter -1100 models	
M5, M6, C2, C3, C4 gears	
Standard	30.950 to 30.975 mm (1.2185 to 1.2195 in)
Service limit	30.93 mm (1.218 in)
Gear bushing inner diameter - 700/750 models	
M5, C4 gears	
Standard	24.985 to 25.006 mm (0.9837 to 0.9845 in)
Service limit	25.04 mm (0.986 in)
C1 gear (except 1987 and 1988 models)	
Standard	20.16 to 20.37 mm (0.7937 to 0.8019 in)
Service limit	20.40 mm (0.803 in)

Transmission shafts (continued)

Gear bushing inner diameter -1100 models	
M5, C4 gears	
Standard	27.995 to 28.016 mm (1.1022 to 1.1030 in)
Service limit	28.05 mm (1.104 in)
Mainshaft outer diameter at M5 gear - 700/750 models	
Standard	24.959 to 24.980 mm (0.9826 to 0.9835 in)
Service limit	24.90 mm (0.980 in)
Countershaft outer diameter - 700/750 models	
At C1 gear	
Standard	19.98 to 19.993 mm (0.7866 to 0.7871 in)
Service limit	19.93 mm (0.785 in)
At C4 gear	
Standard	24.959 to 24.980 mm (0.9826 to 0.9835 in)
Service limit	24.90 mm (0.980 in)
Mainshaft outer diameter at M5 gear and countershaft outer diameter at C4 gear - 1100 models	
Standard	27.977 to 27.990 mm (1.1015 to 1.1020 in)
Service limit	27.92 mm (1.099 in)
Gear to bushing or shaft clearance - 700/750 models	
M5, M6, C1, C2, C3, C4 gears-to-bushing	
Standard	0.020 to 0.062 mm (0.0008 to 0.0024 in)
Service limit	0.10 mm (0.004 in)
M5, C4 bushings-to-shaft	
Standard	0.005 to 0.047 mm (0.0002 to 0.0019 in)
Service limit	0.06 mm (0.002 in)
C1 bushing-to-shaft (except 1987 and 1988 models)	
Standard	0.167 to 0.390 mm (0.0066 to 0.0154 in)
Service limit	0.10 mm (0.004 in)
Gear to bushing or shaft clearance -1100 models	
M5, M6, C2, C3, C4 gears-to-bushing	
Standard	0.025 to 0.066 mm (0.0010 to 0.0026 in)
Service limit	0.10 mm (0.004 in)
M5, C4 bushings-to-shaft	
Standard	0.005 to 0.039 mm (0.0002 to 0.0015 in)
Service limit	0.05 mm (0.002 in)
Countershaft spacer clearance (endfloat)	
700/750 models	0.3 to 0.4 mm (0.012 to 0.016 in)
1100 models	0.4 to 0.9 mm (0.016 to 0.035 in)
Countershaft spacer available thicknesses	
700/750 models except 1985-on Magnas	1.0 mm, 1.2 mm, 1.3 mm
1985 through 1988700/750 Magnas	0.85 mm, 0.90 mm, 0.95 mm, 1.05mm
1100 models	0.85 mm, 0.90 mm, 0.95 mm, 1.0 mm, 1.05 mm

Shift drum and forks

Shift fork end thickness	
Standard	6.43 to 6.50 mm (0.253 to 0.256 in)
Service limit	6.1 mm (0.24 in)
Shift fork bore ID	
Standard -1982 through 1985 models	14.000 to 14.021 mm (0.5511 to 0.5520 in)
Standard - 1986-on models	14.016 to 14.034 mm (0.5518 to 0.5525 in)
Service limit - all models	14.04 mm (0.553 in)
Shift fork shaft OD	
Standard - 1986-on 700/750 models	13.973 to 13.984 mm (0.5501 to 0.5505 in)
Standard - all other models	13.966 to 13.984 mm (0.5498 to 0.5505 in)
Service limit	13.90 mm (0.547 in)

Torque settings

	Mm	ft-ibs
Valve cover bolts	8 to 12	6 to 9.0
Camshaft sprocket bolts	18 to 20	13 to 14
Cylinder head/cam holder bolts		
6 mm	10 to 14	7 to 10
8 mm	21 to 25	15 to 18
9 mm		
1982 through 1984 700/750 models	33 to 37	24 to 27
1985 700 models	38 to 42	27 to 30
1986 through 1988 700/750 models	43 to 47	31 to 34
10 mm (1100 models)	48 to 52	35 to 38
Rocker arm shaft bolts or caps	45 to 50	33 to 36

Torque settings (continued)	Mm	n-ibs
Clutch center locknut		
1982 750 models	47 to 53	34 to 38
1983 through 1985 700/750 Sabres, 1983/84 700/750 Magnas	45 to 55	33 to 40
1985 through 1988 700/750 Magnas	62 to 68	45 to 49
1100 models	63 to 67	46 to 48
Clutch fluid line banjo bolts	25 to 35	18 to 25
Oil pump sprocket bolt (1985 through 1988 700/750 Magnas)	15 to 20	11 to 14
Starter clutch bolt	80 to 100	58 to 72
Starter clutch cover bolts	26 to 30	19 to 22
Alternator rotor bolt	80 to 100	58 to 72
Output gear case bolts		
6 mm bolts	10 to 14	7 to 10
Bearing holder bolts	30 to 34	22 to 25
8 mm standard/socket bolts	21 to 25	14 to 18
Crankcase bolts		
6 mm bolts	10 to 14	7 to 10
8 mm bolts	21 to 25	15 to 18
9 mm bolts (700/750 models)	30 to 34	22 to 25
10 mm bolts (1100 models)	43 to 47	31 to 34
Connecting rod bearing cap nuts	30 to 34	22 to 25
Engine oil drain bolt (in oil pan)	35 to 40	25 to 29
Engine oil drain bolt (in front cylinders)	10 to 14	7 to 10
Oil pressure switch	15 to 20	11 to 14
Engine mounting bolts		
8 mm bolts (1982 through 1986 models	20 to 30	14 to 22
8 mm bolts (1987 and 1988 700/750 models)	24 to 30	17 to 22
10 mm bolts	35 to 45	25 to 33
Subframe bolts (US 700/750 Sabres and 1982 through 1984 700/750 Magna models)		
8 mm bolts	20 to 30	14 to 22
10 mm upper bolts	70 to 80	51 to 58
10 mm lower bolts	30 to 40	22 to 29
Subframe bolts (UK VF750S-C models)		
8 mm bolts	20 to 30	14 to 22
10 mm bolts	60 to 70	43 to 51
Subframe bolts/nuts (1985 through 1988 700/750 Magna models, all 1100 models)		
Upper bolts	60 to 70	43 to 51
Lower bolts	35 to 45	25 to 33

General information

Refer to illustration 1.1

The engine is a four-stroke, liquid-cooled type with its four cylinders arranged in a 90° V configuration. This particular design is inherently smoother in its operation than in-line engines because the movement of the pistons in both cylinder banks tends to dampen out the other's vibrations. It also allows the engine to be designed narrower and more compact **(see illustration).**

To prevent overheating problems in the rear cylinder bank, the engine is liquid cooled. The coolant is circulated through passages surrounding the cylinder liners and valve area.

Dual overhead cams in each cylinder bank are driven off the crankshaft by link plate chains. The cams ride directly in the cylinder heads and are secured by upper cam holders. There are four valves per cylinder, two intake and two exhaust. Each pair of valves is operated by a single forked rocker arm, requiring only one cam lobe for each pair of valves. Each cam chain is kept tight by a self-adjusting tensioner, located between the cylinders within the loop formed by the chain.

The crankcase splits horizontally, and all four cylinders are integrated with the upper crankcase half in a single casting. The crankshaft rides in four plain main bearings and the firing order is determined by the position of the connecting rods on the crank.

The multi-plate clutch is hydraulically operated using a master cylinder mounted on the handlebars and a slave cylinder on the left side of the engine. All 1100 cc models and the 1983 VF750 Sabre are fitted with a diaphragm spring instead of the coil springs of the other models and also feature a one-way clutch unit. The one-way clutch is essentially a two-piece clutch center with a locking device and prevents rear wheel lockup under severe down shifting or engine braking conditions, by allowing the inner clutch plates to slip.

The 6-speed transmission is a traditional constant-mesh type incorporating an output gear assembly, driven off the countershaft, which transmits drive via the shaft to the rear wheel.

2 Operations possible with the engine in the frame

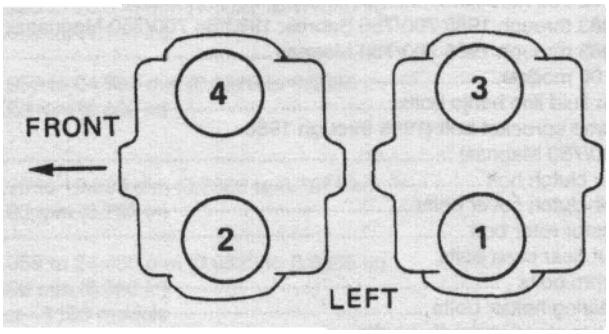
The components and assemblies listed below can be removed without having to remove the engine/transmission assembly from the frame. If however, a number of areas require attention at the same time, removal of the engine is recommended.

Valve cover, camshafts and rocker arms
Cylinder heads
Cam chain (ens/oners
Gearshift mechanism external components
Oil pump, relief valve and strainer
Clutch
Starter clutch
Starter motor
Alternator
Water pump

3 Operations requiring engine removal

It is necessary to remove the engine/transmission assembly from the frame, remove the output gear case and separate the crankcase halves to gain access to the following components.

Crankshaft
Main and connecting rod bearings
Pistons and connecting rods
Camshaft drive chains
Transmission shafts/gears
Shift drum/shift forks



1.1 Cylinder identification

4 Major engine repair - general note

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

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

3 Exhaust smoke and excessive oil consumption are both indications that piston rings and/or valve guides are in need of attention, although make sure that the fault is not due to oil leakage. Refer to Chapter 1 and perform a cylinder compression check to determine for certain the nature and extent of the work required.

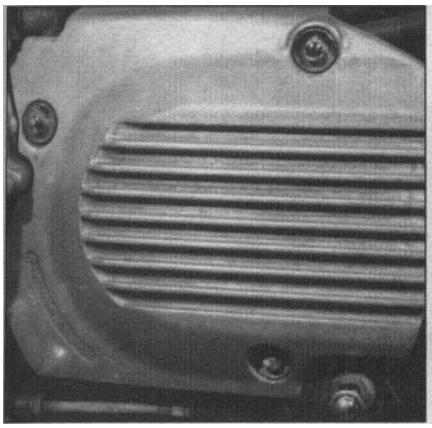
4 If the engine is making obvious knocking or rumbling noises, the connecting rod and/or main bearings are probably at fault.

5 Loss of power, rough running, excessive valve train noise and high fuel consumption rates 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.

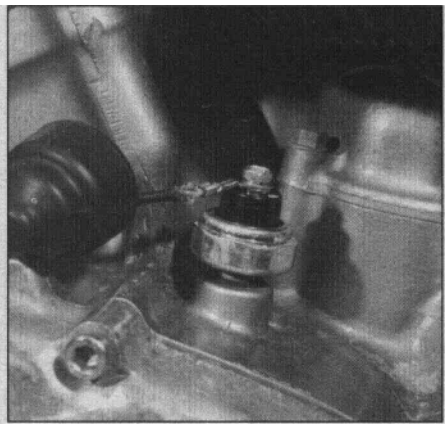
6 An engine overhaul generally involves restoring the internal parts to the specifications of a new engine. During an overhaul the piston rings are replaced and the cylinder walls are bored and/or honed. If a rebore is done, then new pistons will also be required. The main and connecting rod bearings are usually replaced during a major overhaul. Generally the valve seats are serviced as well, since they are usually in less than perfect condition at this point. While the engine is being overhauled, other components such as the carburetors and the starter motor can also be rebuilt. The end result should be a like new engine that will give as many trouble-free miles as the original.

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 all that difficult, but it is time consuming. Plan on the motorcycle 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.

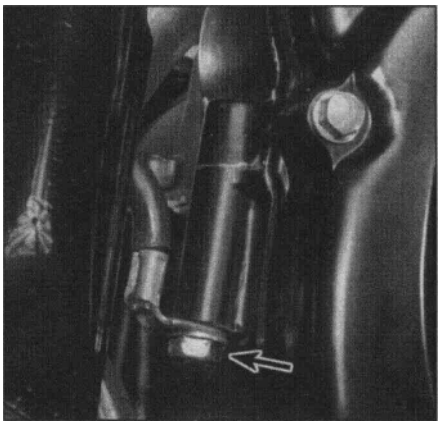
8 Most work can be done with typical shop hand tools, although a number of precision measuring tools are required for inspecting parts to determine if they must be replaced. Often a dealer service department or motorcycle repair shop will handle the inspection of parts and offer advice concerning reconditioning and replacement. As a general rule, time is the primary cost of an overhaul so it does not pay to install worn or substandard parts.



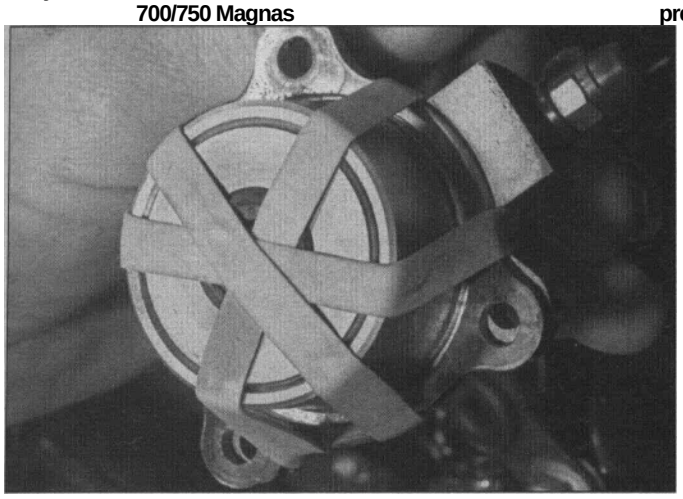
5.5 Engine left side rear cover is retained by three bolts on 1100 models and later 700/750 Magnas



5.15 Peel back its rubber cover and disconnect the wire from the oil pressure switch



5.16 Battery ground (earth) cable connection



5.17 Retain clutch slave cylinder piston with strong rubber bands

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.

5 Engine - removal and installation

Note: *Engine removal and installation should be carried out with the aid of an assistant; personal injury or damage could occur if the engine falls or is dropped. An hydraulic floor-type jack should be used to support and lower the engine to the floor if possible (they can be rented at low cost).*

Removal

Refer to illustrations 5.5, 5.15, 5.16, 5.17, 5.21, 5.22, 5.23a, 5.23b and 5.23c

1 Place the motorcycle on the main stand. On 1987 and 1988 700/750 Magnas (without a main stand), first remove the belly fairing (see Chapter 6), then support the machine with an auxiliary motorcycle stand to ensure it will not topple when the engine unit is removed.

2 Remove the seat (see Chapter 6) and main fuel tank (see Chapter 4).

3 Remove both the left and right side covers (see Chapter 6). Disconnect the negative battery lead.

4 Drain the engine oil (see Chapter 1).

5 Remove the engine left rear cover; it is retained by a single bolt on all 700/750 Sabre models and 1982 through 1984 700/750 Magna models (note the long collar inside the cover) and by three bolts on all 1100 models and 1985-on 700/750 Magna models **(see illustration).** Remove the gearshift lever and linkage (see Section 18).

6 Drain the coolant (see Chapter 1), then remove the water hose that runs between the water pump and subframe.

7 Remove the radiator (see Chapter 3).

8 Remove the exhaust pipes (see Chapter 4). **Note:** *The two rear head pipes need not be removed.*

9 Remove the air filter housing(s) and carburetors (see Chapter 4).

10 On 1984-on California models, detach the emission control system canister from the front lower frame brace.

11 On 1986 California models, detach the secondary air supply system reed valve blocks from each side of the rear cylinder bank. On 1986 through 1988 700/750 California models, detach the secondary air supply system air suction valve from the front of the oil pan.

12 Remove the thermostat and its housing (see Chapter 3).

13 Disconnect the crankcase breather tube from the air chamber/air filter housing, then disconnect its lower end from the rear of the crankcase.

14 On 1987 and 1988 700/750 Magna models, release the rear brake switch from its bracket on the engine right cover (see Chapter 8).

15 Pull the spark plug caps off the spark plugs and tie them to the frame top tubes. Disconnect the wiring harness that leads to the following components:

a) Oil pressure switch **(see illustration).**
b) Pulse generators.
c) Alternator.
d) Starter motor.
e) Gearchange switch or neutral/OD switch (as applicable).

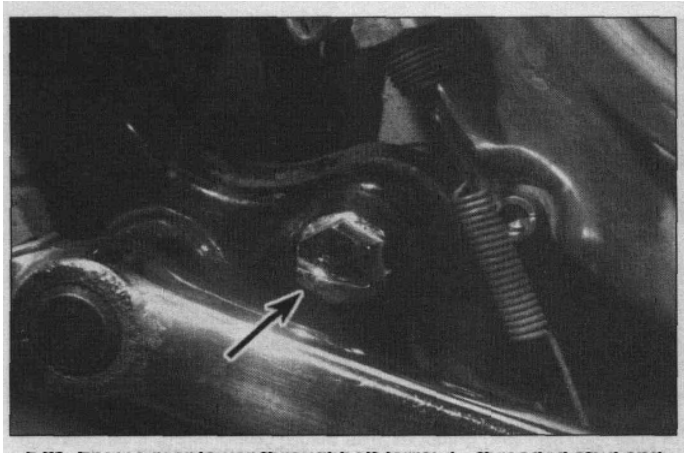
16 Disconnect the battery ground (earth) cable where it attaches to the engine, directly in front of the right swingarm pivot **(see illustration).**

17 Without disconnecting the clutch fluid line, remove the clutch slave cylinder from the engine. Once removed, the clutch lever should not be applied. To ensure this, place a wooden block between the lever and the handlebar grip and tie the lever tight to the block. Also, wrap strong rubber bands around the slave cylinder housing and piston to make sure the piston does not come out **(see illustration).**

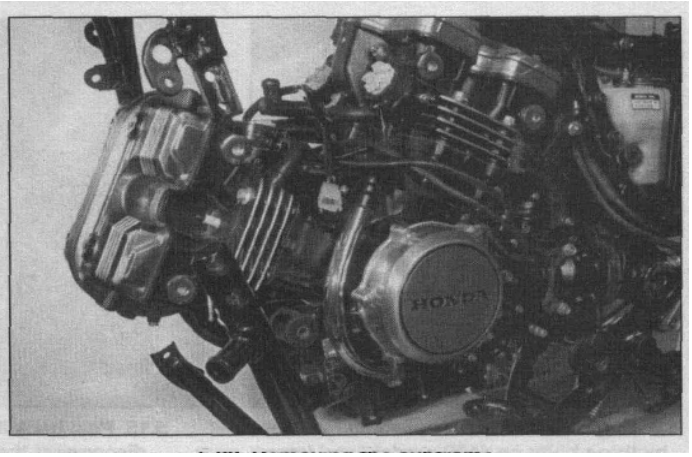
18 Remove the rear wheel and disconnect the driveshaft from the gearcase (see Chapter 6).

19 Position a jack under the engine oil pan; this will be used to support the engine once the mounting bolts have been removed. **Note:** *A piece of wood should be used between the jack and the oil pan to protect it and give a better grip.*

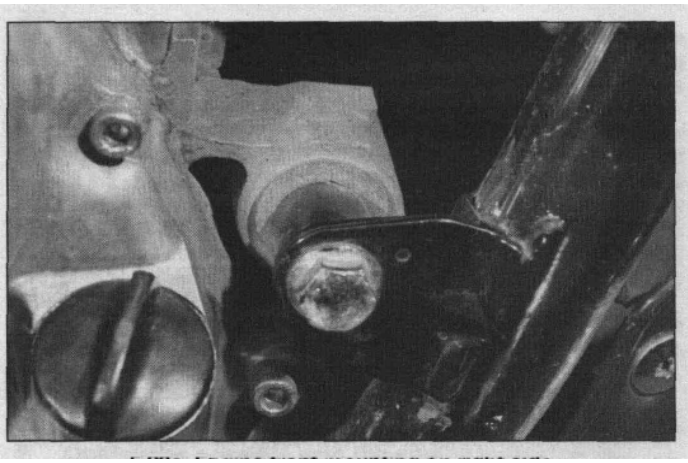
20 Remove the left footpeg (see Chapter 6). On 1100 Sabre models, also remove the rear brake pedal from its shaft.



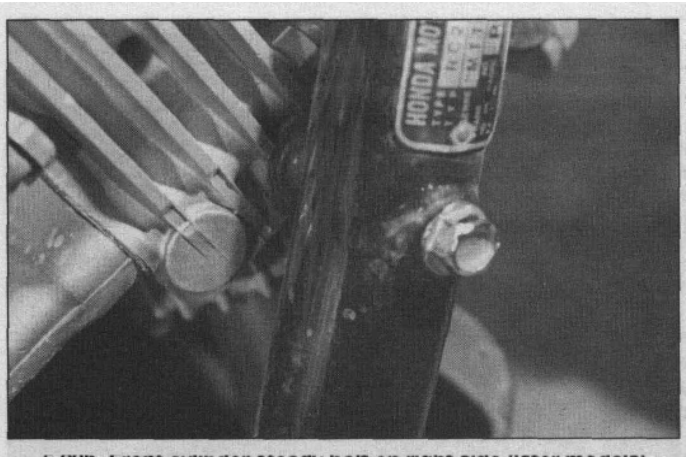
5.21 Engine rear lower throughbolt (arrow) - threaded stud and nuts on some models



5.22 Removing the subframe



5.23a Engine front mounting on right side



5.23b Front cylinder steady bolt on right side (later models)

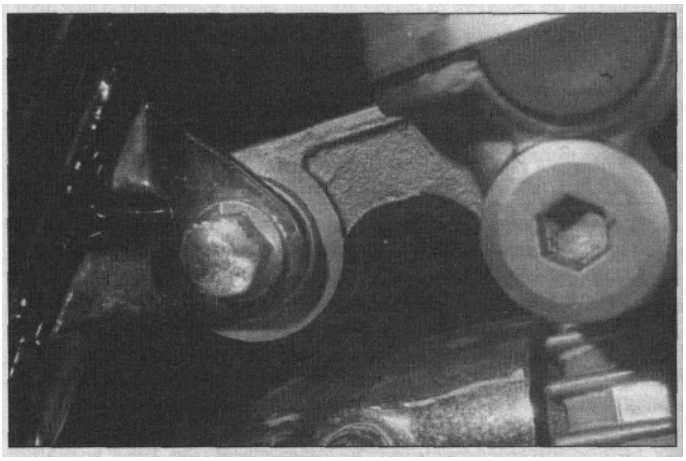
21 Remove the engine rear lower throughbolt or threaded stud and nuts (as applicable) **(see illustration).**

22 Remove the subframe-to-engine mounting bolt on the left side and then remove the subframe-to-main frame mounting bolts and remove the subframe **(see illustration).**

23 Raise the jack just enough to take the weight off the remaining engine mounting bolts and then remove them **(see illustrations).** **Note:** *You should have an assistant on hand to help you balance the engine on the jack while these last two mounting bolts are removed.* Take note of the position of all collars, wire clamps and washers so that they can be returned to their original positions on installation.

24 The engine can now be lowered on the jack and removed from the left side of the frame. **Note:** *Lower the jack slowly and carefully and check all clearances as the engine is lowered. The engine may have to be pivoted slightly on the jack to clear the frame tubes.*

25 Remove any engine mount rubbers or bushings. Inspect them for wear or damage and replace them if necessary.



5.23c Engine rear upper throughbolt

Installation

26 Installation of the engine is essentially the reverse of the removal procedure, with the following notes:

a) When installing the engine in the frame, use the jack to align the mounting bolt holes to prevent damage to the bolt threads. Install all engine mounting bolts loosely until the subframe bolts are tightened. Then tighten all engine mounting bolts to their proper torque.

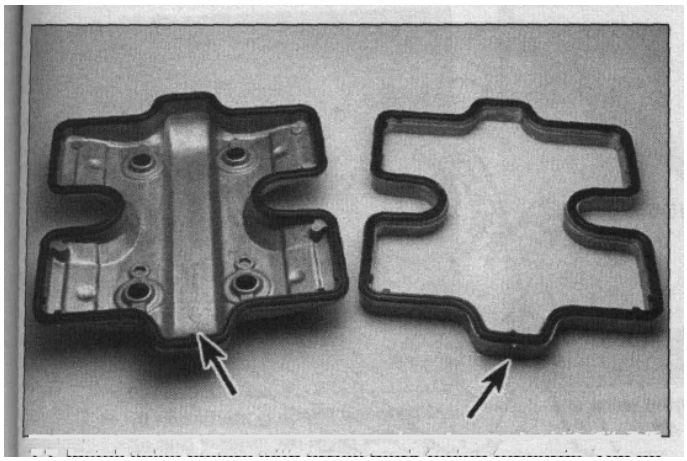
b) When installing components, be sure to refer to the appropriate Section or Chapter for the proper installation procedure.

c) Following installation, fill the crankcase with the proper amount and grade of oil (see Chapter 1).

d) Fill the cooling system with fresh coolant and bleed it of air (see Chapter 1).

e) Adjust the throttle cables and idle speed (see Chapter 1).

f) Set the choke cable freeplay (see Chapter 4).



7.7 Install valve covers with arrow mark facing forwards. Tab on rear cover base must also face forwards

6 Engine disassembly and reassembly - general information

Note: *Refer to the 'Maintenance techniques, tools and working facilities' in the Introductory pages of this manual for further information.*

Disassembly

Before disassembling the engine, the external surfaces of the unit should be thoroughly cleaned and degreased. This will prevent contamination of the engine internals, and will also make working a lot easier and cleaner. A high flash-point solvent, such as kerosene (paraffin) can be used, or better still, a proprietary engine degreaser. Use old paintbrushes and toothbrushes to work the solvent into the various recesses of the engine casings. Take care to exclude solvent or water from the electrical components and intake and exhaust ports. **Warning:** *The use of gasoline (petrol) as a cleaning agent should be avoided because of the risk of fire.*

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

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

4 When disassembling the engine, keep "mated" parts together (including gears, cylinders, pistons, valves, etc. that have been in contact with each other during engine operation). These 'mated' parts must be re-used or replaced as an assembly.

5 Engine/transmission disassembly should be done in the following general order with reference to the appropriate Sections.

Remove the valve covers (see Section 7)
Remove the camchain tensioners (see Section 8)
Remove the camshafts (see Section 9)
Remove the cylinder heads (see Section 10)
Remove the starter motor (see Chapter 8)
Remove the ignition pulse generators (see Chapter 5)
Remove the starter clutch (see Section 13)
Remove the clutch (see Section 14)
Remove the external gearshift components (see Section 17)
Remove the alternator rotor and stator (see Section 19)
Remove the water pump (see Chapters)
Remove the oil pan and oil pump (see Sections 20 and 21)
Remove the output gear case (see Section 23)
Separate the crankcases (see Section 24)
Remove the crankshaft (see Section 28)
Remove the pistons and connecting rods (see Section 29)
Remove the transmission shafts (see Section 31)
Remove the shift drum and forks (see Section 32)

Reassembly

6 Reassembly is accomplished by reversing the general disassembly sequence.

7 Valve covers - removal and installation

Note: *The valve covers can be removed with the engine in the frame. If the engine has been removed, ignore the steps which do not apply.*

Removal

1 Place the motorcycle its stand, then remove the seat and both side covers.

2 Remove the fuel tank (see Chapter 4).

3 Drain the coolant and remove the radiator as described in Chapter 3. This is necessary to gain access to the front cylinder valve cover. **Note:** *The coolant can be re-used if it is drained into a clean container.*

4 On models where the ignition HT coils are mounted across the frame top tubes, and therefore prevent access to the rear cylinder, remove them and the plastic heat shield (see Chapter 5). Also release any wiring ties to improve access to the valve covers.

5 Remove all four spark plugs.

6 Remove all valve cover bolts from both cylinder banks and lift off both of the valve covers, plus the valve cover base from the rear cylinder.

Installation

Refer to illustration 7.7

7 Make sure the gasket surfaces of the cylinder head and the valve covers are clean. If the valve cover seal is damaged in any way replace it. Apply a smear of sealant to the cover seal and on 1987 and 1988 700/750 Magna models also to the half circle projections, then carefully install the covers. The valve covers should be installed with the cast arrow marks on the inside of the covers facing forward. Also, the cover base for the rear valve cover should be installed with the mark and the tab on the gasket to the front **(see illustration).**

8 Install the spark plugs, plastic heat shield, HT coils, wiring harness ties, radiator, fuel tank, side covers and seat.

9 Refill and bleed the cooling system as described in Chapter 1.

10 Start the engine and check that there are no oil leaks around the valve covers.

8 Camchain tensioner and guides - removal and installation

Note: *The camchain tensioner and guides can be removed with the engine in the frame.*

Note: *Be especially careful not to drop any parts into the crankcase. The minimal amount of work necessary to retrieve dropped parts will be removal of the oil pan and at worst separation of the crankcases.*

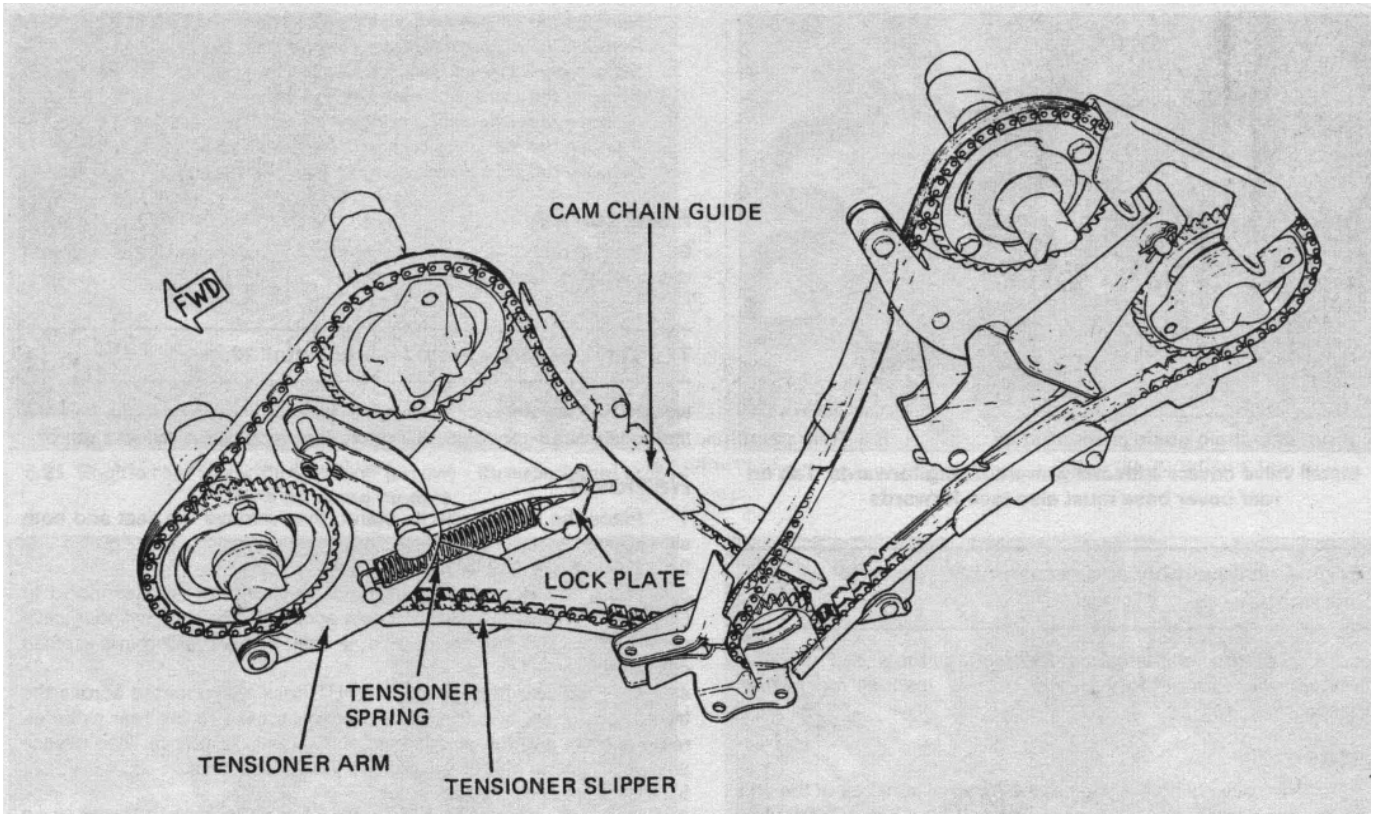
Removal

Cam chain tensioners and slippers

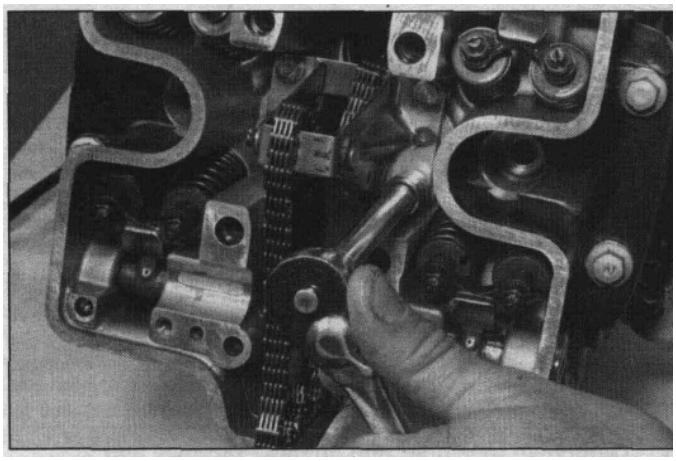
Refer to illustrations 8.2a, 8.2b and 8.2c

1 Follow Steps 1 to 14 of Section 9 to remove the camshafts.

2 Remove the cam chain tensioner base bolts and pull the tensioner base up. Then remove the clip and clevis pin that attaches the



8.2a Camchain and tensioner assembly



8.2b Remove tensioner base bolts to free it from the head ... tensioner arm to the slipper (see illustrations). Lift out the base, complete with tensioner arm.

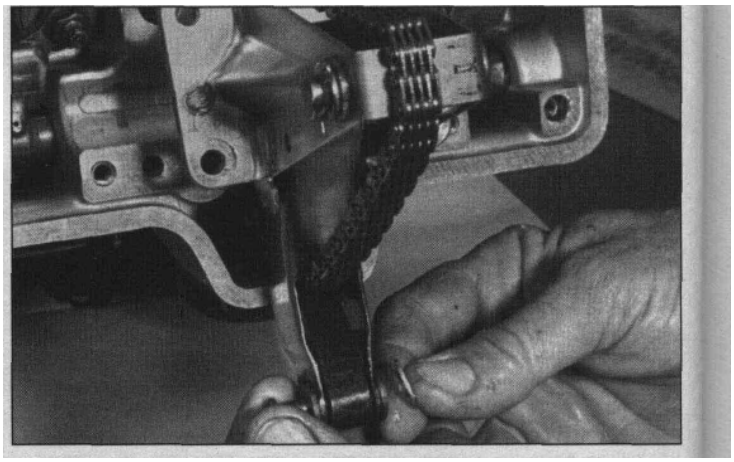
3 Gently pull the slipper out of its support in the crankcase.

Cam chain guides and slipper supports

Refer to *illustrations 8.5, 8.6 and 8.7*

4 Remove the cylinder heads (see Section 10).

5 The front cylinder bank chain guide is slipped over a pivot pin on the cavity wall and secured with a wire clip (see illustration). Insert a hooked piece of wire through the clip to keep it from falling and then push the clip out from the other side using a screwdriver. Carefully reach in and remove the washer from the pivot pin. Remove the guide from the pivot pin and lift it out.



8.2c ... then release slipper from tensioner arm

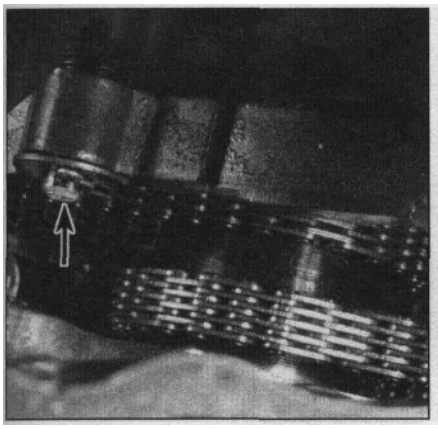
6 The rear cylinder bank chain guide is held by two mounting bolts. Slowly unscrew the bolts while lifting up on the guide to keep tension on the bolts. When the bolts are completely unscrewed, carefully lift the guide, with bolts, out of the cylinder cavity (see illustration).

7 The slipper support holders are also located in the crankcase cavity. Carefully loosen their mounting bolts until they are completely unscrewed, then use needle-nose pliers to pick the bolts and supports out (see illustration).

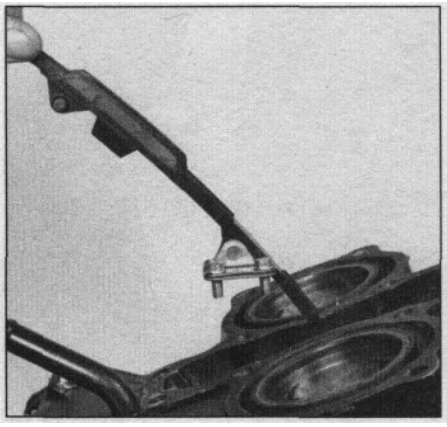
Installation

Cam chain guides and slipper supports

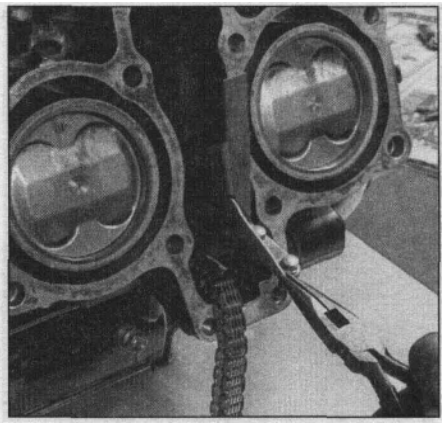
8 Apply thread locking agent to the slipper support holder bolts and insert them into the holder. Use needle-nose pliers to install the holder



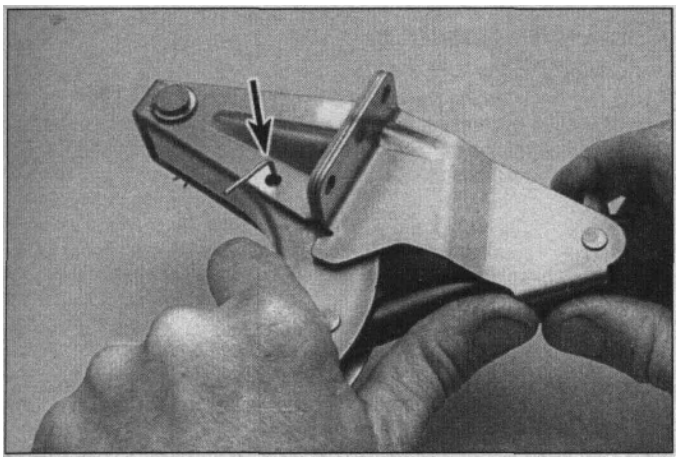
8.5 Front camchain guide is secured by clip and washer on pivot pin



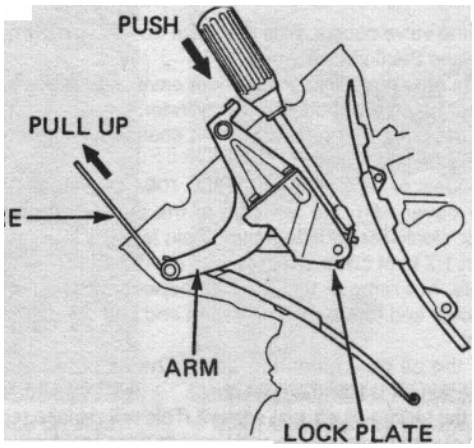
8.6 Rear camchain guide is bolted to crankcase



8.7 Pick slipper support holders out of crankcase once their bolts have been removed



8.13 Camchain pensioner locked in the Off position



8.16 Method of unlocking camchain tensioner

into place in the crankcase cavity. The bolts are most easily tightened using a socket with a swivel joint, while keeping the holder raised slightly to prevent the bolts from falling out.

9 Install the front cylinder bank chain guide onto the pivot pin. Carefully slip the washer over the pin. Then, again with a piece of hooked wire inserted through the clip, lower it into the cavity, set it in its hole and push it through with a screwdriver. Disconnect the wire from the clip.

10 Apply thread locking agent to the rear cylinder bank guide bolts and insert them into place on the guide. Then carefully lower the guide into place in the cavity. Tighten the bolts while keeping the guide raised slightly to prevent them from dropping out.

11 Install the cylinder heads.

Cam chain tensioners and slippers

Refer to illustrations 8.13 and 8.16

12 Insert the slipper's rounded end into the slipper holder in the crankcase. **Caution:** *The slipper end must be slotted into the holder (use a hand-held flashlight to check this) otherwise it will not be properly secured and engine damage will result.*

13 The cam chain tensioner should be locked to keep tension off the chain during installation of the camshafts and subsequent valve timing. A plate at the bottom of the tensioner rod locks the rod in place. Release this plate so the tensioner arm can be raised enough to insert a lock pin or piece of wire through the aligned holes in the arm and base **(see illustration).** This will keep the tensioner locked in the off position.

14 Place the tensioner base into position in the cylinder head and thread the chain over it. Do not install the tensioner base bolts yet. Attach the slipper to the tensioner with the clevis pin and clip.

15 Refit the camshafts and oil pipe (see Section 9).

16 Unlock the tensioner by holding pressure on the tensioner lock plate with a screwdriver, then pull up on the tensioner arm and remove the lock pin or piece of wire **(see illustration).** Slowly let the arm pull itself back into the cavity. After unlocking the tensioner, install and tighten the tensioner base bolts. Install the tensioner top guide.

17 Remove any rags from the cylinder head and install all components in a reverse of the removal procedure. Check the oil level and top up if necessary and set the valve clearances (see Chapter 1). Top up the coolant (see Chapter 1).

9 Camshaft and rocker arms - removal, inspection and installation

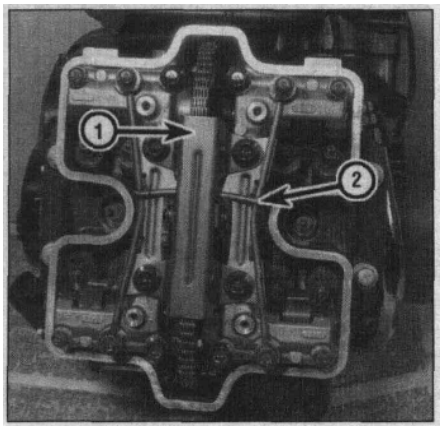
Note: *This procedure can be carried out with the engine in the frame. If the engine has been removed, ignore the steps which don't apply.*

Camshaft removal

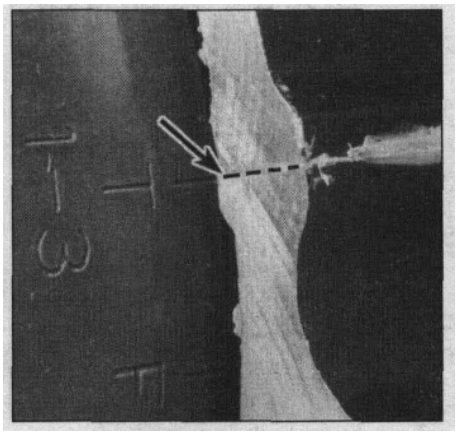
Refer to illustrations 9.4, 9.8a and 9.8b

1 Drain the engine oil from the front cylinder head by removing the

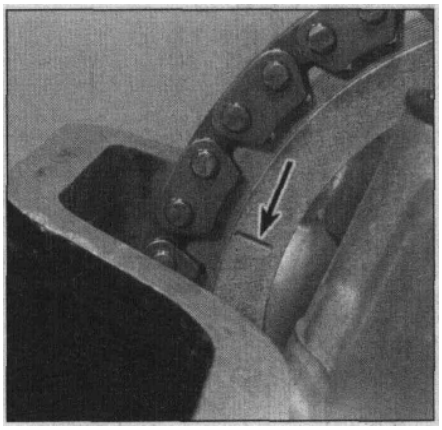
front cylinder bank drain bolt (see Chapter 1 *'Engine oil and filter change').*



9.4 Camchain tensioner guide (1) is retained by four bolts. Note oil pipe (2)



9.8a With alternator T1.3 mark aligned with crankcase mating surface (all except 1987/88 models)...



9.8b ... both cam sprocket alignment marks should align with head surface

2 Remove the valve covers, plus the valve cover base from the rear cylinder bank (see Section 7).

3 Stuff clean rags down into the cylinder cavities to prevent bolts or other parts from being dropped into the cylinder.

4 Remove the bolts that retain the cam chain tensioner guide and lift the guide out **(see illustration).**

5 On all models except 1987 and 1988 700/750 Magnas, remove the alternator cover from the left side of the engine and rotate the alternator rotor clockwise until the cam chain is at its loosest point; it will have about 1/2 in of slack. Do the same on 1987 and 1988 700/750 Magna models, but remove the circular inspection cover set in the engine right cover and rotate the crankshaft end bolt counterclockwise (anticlockwise).

6 Remove the oil pipe mounting bolts. The oil pipe can now be removed by passing it under the cam chain.

7 Back off the valve adjustment screws. This will release tension on the camshafts during disassembly and prevent possible damage to the cam holders.

8 On all except 1987 and 1988 700/750 Magna models, rotate the alternator rotor until the T1.3 mark is aligned with the rear crankcase mating surface. On 1987 and 1988 700/750 Magna models, rotate the starter clutch bolt until the T1.3 mark aligns with the punch mark on the inspection cover aperture. In this position, the index marks on the camshaft sprockets should be in alignment with the top surface of the cylinder heads **(see illustrations).**

Note: *On early engines (circa 1982/83) the valve timing index marks were incorrectly marked on the front cylinder camshaft sprockets. It is recommended that you check the accuracy of these marks at this stage; if they do not exist, mark the sprockets level with the cylinder head surface using a fine-tipped felt marker to serve as a guide to reassembly.*

9 Remove the exposed cam sprocket mounting bolts. Then rotate the engine one complete turn until the T1.3 mark is again aligned and remove the other cam sprocket bolts. **Note:** *Take care that the cam chain in the opposite cylinder does not bind while rotating the crankshaft.*

10 Lift the cam sprockets off the camshaft shoulders and disengage the camchain from them.

11 Before removing the cam holders, mark their top surfaces with a felt marker pen for identification (eg, 1E to denote cylinder no. 1 exhaust cam holder).

12 Loosen the cam holder bolts evenly in a criss-cross sequence to prevent distortion, then lift off the holders. Retrieve the dowels if they are loose - on later models they are pressed into the holders.

13 Lift the camshafts out and remove the sprockets from them. Support the camchain over the tensioner.

14 Clean all of the parts with solvent and dry them thoroughly.

Camshaft inspection

Refer to illustrations 9.15, 9.16,9.17, 9.21 a, 9.21 b, 9.23 and 9.24 **Note:** *Before replacing the camshafts or the cylinder head and bearing caps because of damage, check with local machine shops specializing in motorcycle engineering work. In the case of the camshafts, it may be possible for cam lobes to be welded, reground and hardened, at a cost far lower than that of a new camshaft. If the bearing surfaces in the cylinder head are damaged, it may be possible for them to be bored out to accept bearing inserts. Due to the cost of a new cylinder head it is recommended that all options be explored before condemning it as trash!*

15 Inspect the cam bearing surfaces of the head and the bearing caps. Look for score marks, deep scratches and evidence of spalling (a pitted appearance). Check the camshaft lobes for heat discoloration (blue appearance), score marks, chipped areas, flat spots and spalling **(see illustration).**

16 Camshaft runout can be checked by supporting each end of the camshaft on V-blocks, and measuring any runout using a dial gauge **(see illustration).** If the runout exceeds the specified limit the camshaft must be replaced.

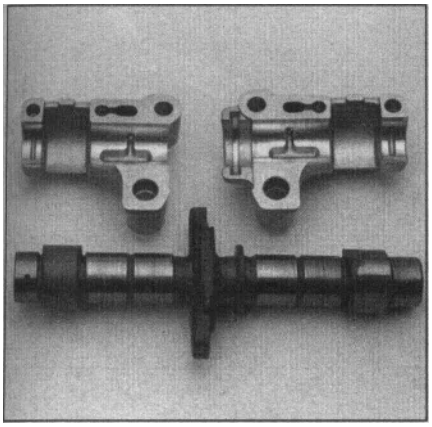
17 Measure the height of each lobe with a micrometer **(see illustration)** and compare the results to the lobe height service limit listed in this Chapter's Specifications. If damage is noted or wear is excessive, the camshaft must be replaced.

18 The camshaft bearing oil clearance is checked either by a product known as Plastigage or by direct measurement, depending on the model being worked on. If working on a 1986 through 1988 700/750 Magna model check by direct measurement (see Steps 19 and 24), and on all other models check using Plastigage (see Steps 20 through 24).

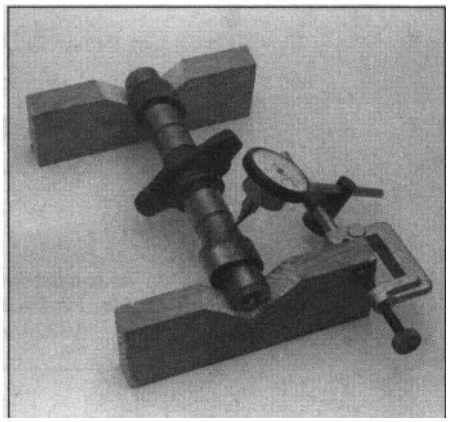
19 To check by direct measurement you will need a small hole gauge type micrometer. Fit the bearing holders to the head in their correct positions (do not install the camshafts). Tighten the retaining bolts to the specified torque in a criss-cross pattern. Measure the internal diameter of each bearing cap journal and compare the measurements obtained with the service limit given in the Specifications at the start of this Chapter. If any bore is worn beyond the service limit, the cylinder head and bearing holders must be repaired/replaced. The camshaft bearing oil clearance can then calculated by subtracting the camshaft bearing journal diameter from the bearing cap journal diameter (see Step 24).

20 If using Plastigage first clean the camshafts, the bearing surfaces in the cylinder head and the bearing holders with a clean, lint-free cloth, then lay the camshafts in place in the cylinder head.

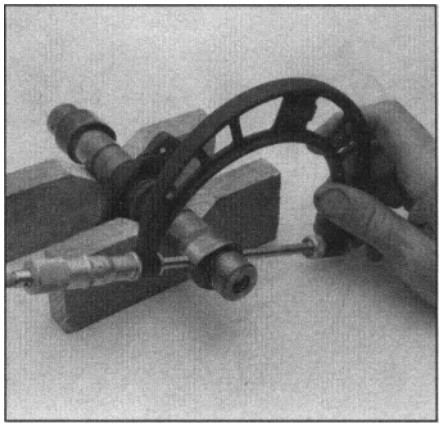
21 Cut strips of Plastigage and lay one piece on each bearing journal, parallel with the camshaft centerline. Make sure the dowels are installed in the cam holders and fit them in their proper positions;



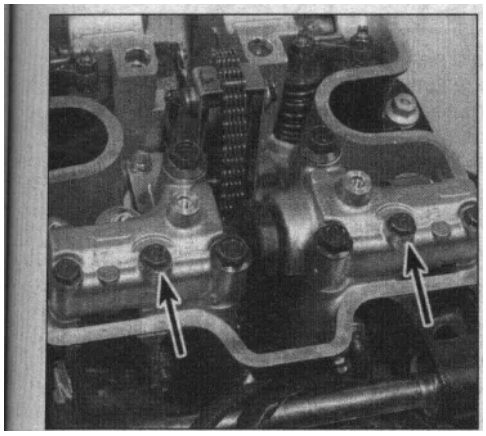
9.15 Check the cam bearing surfaces and camshaft for wear or damage



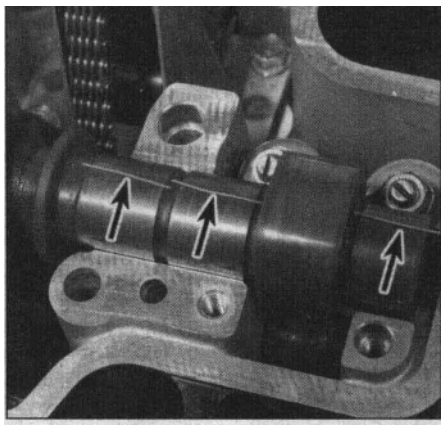
9.16 Measuring camshaft runout



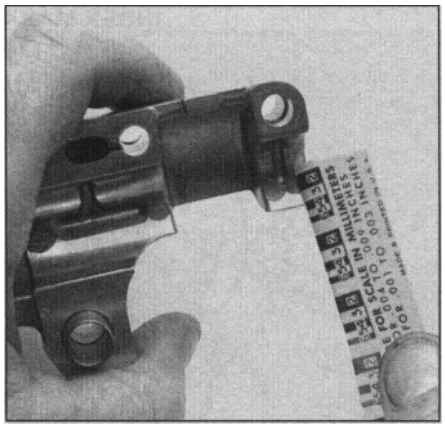
9.17 Measuring camshaft lobe height



9.21a Use shorter 6 mm bolts (arrows) in place of the oil pipe bolts when checking bearing oil clearance



9.21b Lay a strip of Plastigage on each camshaft journal



9.23 Measure the crushed Plastigage against the scale on the envelope

substitute shorter 6 mm bolts in place of the oil pipe mounting bolts when measuring the oil clearance **(see illustrations).** Ensuring the camshafts are not rotated at all, tighten the cam holder bolts to the specified torque in a criss-cross pattern.

22 Now unscrew the bolts in a criss-cross pattern and carefully lift off the cam holders, again making sure the camshafts are not rotated.

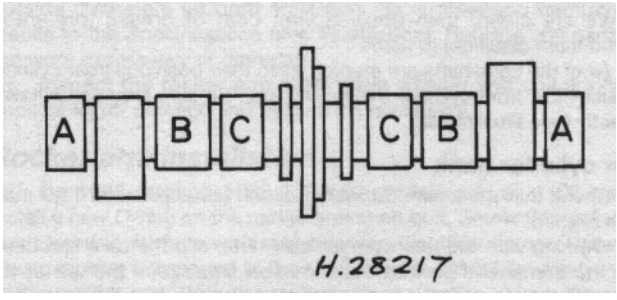
23 To determine the oil clearance, compare the crushed Plastigage (at its widest point) on each journal to the scale printed on the Plastigage container **(see illustration).**

24 Compare the results to this Chapter's Specifications. If the oil clearance is greater than specified, measure the diameter of the camshaft bearing journal with a micrometer **(see illustration).** If the journal diameter is less than the specified limit, replace the camshaft with a new one and recheck the clearance. If the clearance is still too great, replace the cylinder head and cam holders with new parts (see the Note at the start of this sub-Section). On early models the manufacturer does not specify a figure for camshaft journal wear; if the oil clearance is too great the camshafts must be replaced, and if still too great the cylinder head and cam holders must also be replaced.

25 Except in cases of oil starvation, the camchain wears very little. If the camchain has stretched excessively, which makes it difficult to maintain proper tension, remove and measure it as described in Section 26.

26 Check the sprockets for wear, cracks and other damage, replacing them if necessary. If the sprockets are worn, the camchain is also worn, and also the sprocket on the crankshaft. If wear this severe is apparent the camchain and all sprockets should be replaced.

27 Refer to Section 26 and examine the camchain guides for wear.



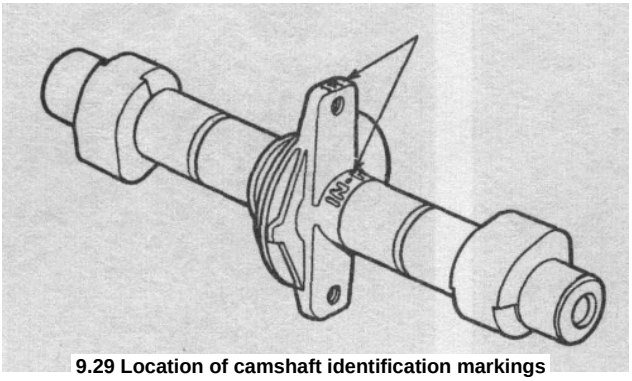
9.24 Camshaft journal identification for diameter measurement • 1986 through 1988 700/750 Magna models (see Specifications)

A Outer journal
B Center journal
C Inner journal (nearest sprocket)

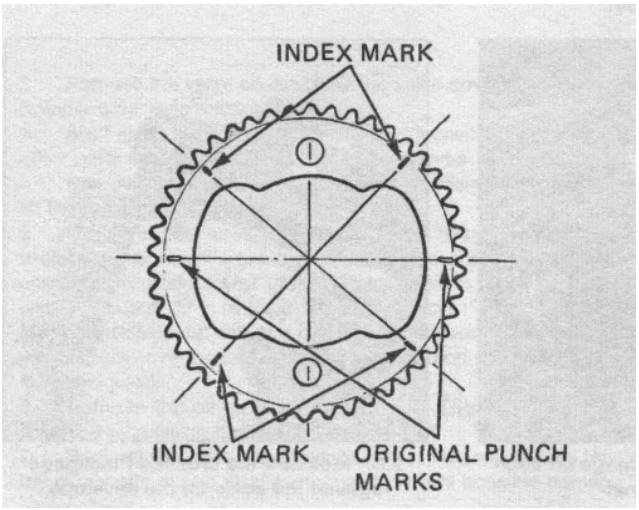
Camshaft installation

Refer to illustrations 9.29, 9.32, 9.36 and 9.38

Note: *If there is insufficient slack in the camchain to allow the sprockets to be mounted on the camshafts, refer to Section 8 and lock the tensioner in position.*



9.29 Location of camshaft identification markings

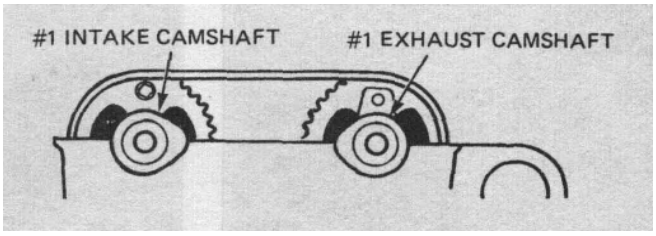


9.36 New front cylinder camshaft sprocket index marks (1982/83 models)

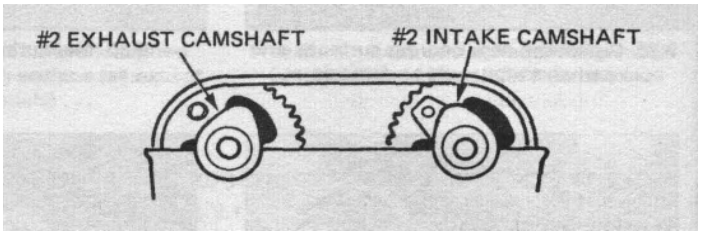
28 Make sure the bearing surfaces in the cylinder head and cam holders are clean, then apply a light coat of grease (preferably molybdenum disulfide) to them.
29 All of the camshafts are marked as to their positions (rear cylinder exhaust - ER, front cylinder intake - IF, etc). Be sure they are installed correctly **(see illustration).**

Rear cylinder bank

30 Check that the alternator/starter clutch (as applicable) T1.3 mark is still aligned.
31 Working with the rear cylinder bank first, slip the cam sprockets onto the camshafts so that their marked sides face the left of the engine. The inlet camshaft sprocket should be on the left side of its camshaft boss, and the exhaust sprocket on the right side of its camshaft boss.
32 Carefully pass the camshafts through the camchain and into position in the cylinder head bearing surfaces. On all 700/750 Sabres and 1982 through 1984 700/750 Magnas they should be positioned so the number 1 cylinder's lobes are parallel with the head surface and facing each other **(see illustration).** On all other models, position the camshafts so that their identification markings **(see illustration 9.29)** are facing upwards. Position the cam sprockets so their index marks are in line with the head surface and place the camchain onto the sprockets.
33 Place the cam holders into position (using the notes made on removal) and loosely install the bolts, noting their correct position **(see illustration 10.22).**
34 Place the cam sprockets onto the camshaft flanges and install the mounting bolts in the exposed holes finger-tight. Carefully rotate the engine making sure the camchain in the other cylinder back doesn't bunch up, and install the other sprocket bolts finger-tight.



9.32 Rear cylinder bank camshaft installation positions as seen from No. 1 cylinder side (1982 through 1985 700/750 Sabre and 1982 through 1984 700/750 Magna models)



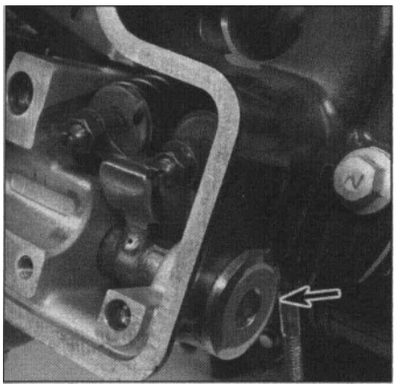
9.38 Front cylinder bank camshaft installation positions as seen from No 2 cylinder side (1982 through 1985 700/750 Sabre and 1982 through 1984 700/750 Magna models)

Front cylinder bank

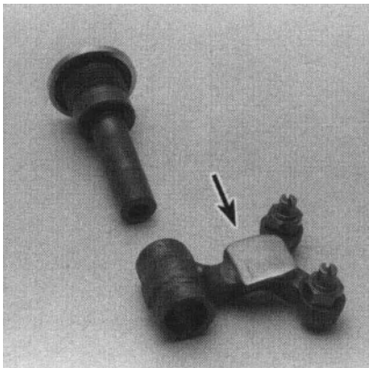
35 Rotate the engine until the T2.4 mark is aligned with the casing mark.
36 If on early models (circa 1982/83), index marks were neither found nor made on the front cylinder sprockets on removal, this must be done at this stage. These marks are made six teeth (or at a 45° angle) from the original indented index marks, using a scribe or permanent ink marker **(see illustration).**
37 Install the sprockets onto the camshafts so that their marked side faces the left of the engine and pass the camshafts through the chain into place in their cylinder head bearing surfaces. The inlet camshaft sprocket should be on the right side of its camshaft boss, and the exhaust sprocket on the left side of its camshaft boss.
38 On all 700/750 Sabres and 1982 through 1984 700/750 Magnas the lobes for cylinder no. 2 should be positioned as shown **(see illustration).** On all other models the camshaft identification markings must be facing upwards. The sprocket index marks should align with the head surface on all models.
39 Position the camchain on the sprockets. On 1985 through 1988 700/750 Magna models, Honda specify that there should be a total of 46 camchain link pins between the sprocket index marks when correctly positioned.
40 Place the cam holders into position (using the notes made on removal) and loosely install the bolts, noting their correct location **(see illustration 10.22).**
41 Place the cam sprockets onto the camshaft flanges and install the mounting bolts in the exposed holes finger-tight. Rotate the engine and install the other sprocket bolts finger-tight.

Both cylinder banks

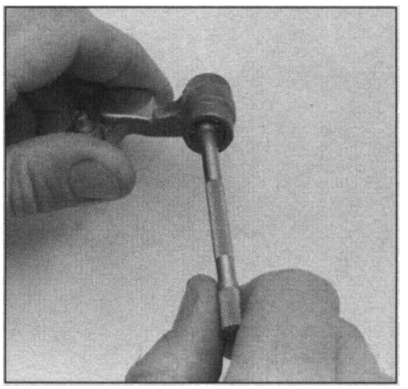
42 Make a final check that the sprocket and cam lobe positions are correct (see Steps 32, 37 and 38). If only one cylinder bank was



9.53 Rocker shaft is unscrewed from side of head on 1982 through 1985 700/750 models and all 1100 models



9.56a Inspect the cam lobe contact surface of the rocker arms for wear



9.56b Measure the rocker arm inside diameter...

worked on, remove the valve cover from the other cylinder bank and check that the valve timing marks align as specified above.

43 Remove each sprocket bolt in turn, apply thread-locking compound to its threads and tighten to the specified torque.

44 Rotate the engine until the camchain is at its loosest point and slip the oil pipe under the chain and into position. Install the oil pipe mounting bolts. Install the oil pipe in the other cylinder in the same manner.

45 Tighten the cam holder bolts evenly in two or three stages until the specified torque is reached; refer to the cylinder head/cam holder tightening sequence in illustration 10.22.

46 If the camchain tensioner was locked during installation of the chain, refer to Section 8 and release it. **Note:** *Make a check (using a hand-held flashlight) that the bottom end of the tensioner slipper blade has remained in its holder socket - if it has popped out engine damage will result. Install the camchain tensioner guide.*

47 Remove the rags from the cylinders.

48 Adjust the valve clearances and install the valve covers and rear valve cover base as described in Chapter 1.

49 Refit all disturbed components in a reverse of the removal procedure.

50 Refill and bleed the cooling system as described in Chapter 1.

51 Top up the engine oil (see Chapter 1).

Rocker arm removal

Refer to illustration 9.53

52 Remove the camshafts, as described in Steps 1 to 13.

53 On 1982 through 1985 700/750 models and all 1100 models, remove the rocker arm shaft bolt **(see illustration).** Lift the rocker arm out of the cylinder head. Remove the wave washer and O-ring from the shaft bolt.

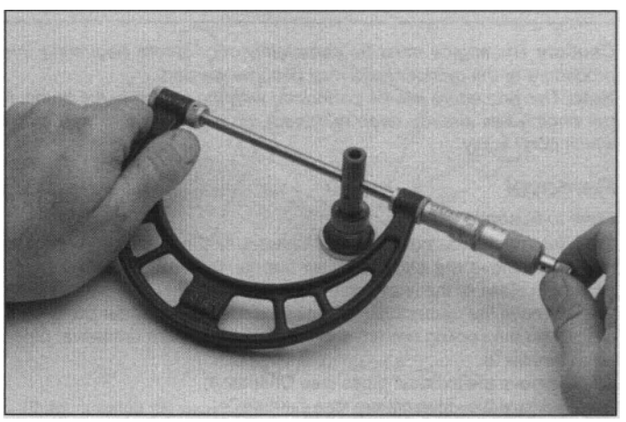
54 On 1986 through 1988 700/750 models, remove the rocker arm shaft cap and withdraw the coil spring. Thread a 10 mm diameter bolt into the end of the rocker shaft and pull on the bolt head with pliers to extract the shaft from the cylinder head. Remove the wave washer from the shaft and the O-ring from the cap.

55 Clean the parts, except for the O-ring, in clean solvent and dry them thoroughly.

Rocker arm inspection

Refer to illustrations 9.56a, 9.56b and 9.57

56 Check the camshaft lobe contact surfaces and the adjusting screw faces of the rocker arms **(see illustration)** for excessive wear, evidence of galling, chipping and cracks. Make sure the oil holes are not clogged, then measure the inside diameter of the rocker arm bore and compare it to the Specifications **(see illustration).** If any damage or excessive wear is evident, replace the rocker arms with new ones



9.57 ... and the shaft outside diameter

and check the camshaft lobes for scoring, chipping and flat spots.

57 Inspect each of the rocker arm shafts for wear, then measure their outside diameters (at both ends and the middle) and compare the results to the Specifications **(see illustration).** Replace any parts that — are worn excessively or damaged.

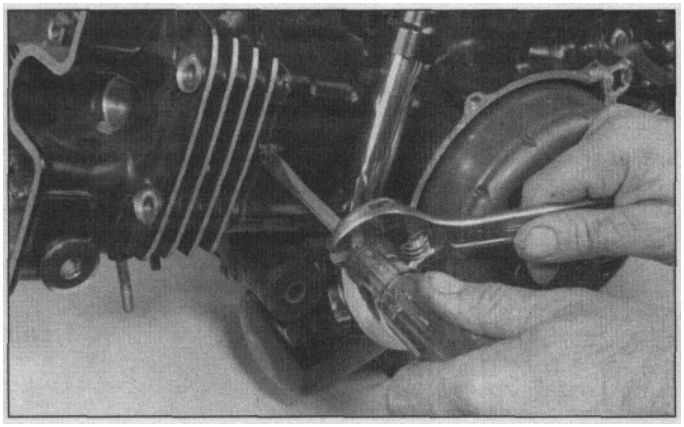
58 Inspect the rocker arm shaft wave washer and coil spring (as applicable) for damage and replace it if necessary.

Rocker arm installation

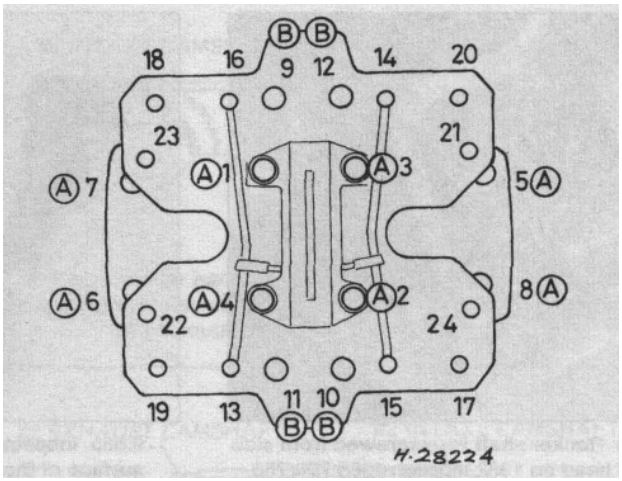
59 On 1982 through 1985 700/750 models and all 1100 models install a new O-ring on the rocker arm shaft bolt. Smear the rocker arm shaft bearing surface with molybdenum disulfide grease and apply thread locking compound to the shaft threads. Install the wave washer on the rocker arm. With the rocker arm in position, screw the rocker shaft into place, tightening it to the specified torque.

60 On 1986 through 1988 700/750 models, install the wave washer on the rocker arm and smear the shaft bearing surface with molybdenum disulfide grease. With the rocker arm in position, push the rocker shaft into place. Install the 6 mm cylinder head pin bolt in the corner hole of the cylinder head, and use a large flat-bladed screwdriver in the shaft end to rotate it so that the pin bolt passes fully down into the head casting. Leaving the pin bolt in position install the coil spring and cap, having applied thread locking compound to the cap threads and installed a new O-ring. Tighten the cap to the specified torque and remove the pin bolt.

61 Install the camshafts as described above.



10.11 Pry cylinder head off crankcase only at reinforced areas



10.22 Cylinder head/cam holder tightening sequence

10 Cylinder heads - removal and installation

Caution: *The engine must be completely cool before beginning this procedure or the cylinder head may become warped.* **Note:** *This procedure can be performed with the engine in the frame. If the engine has already been removed, ignore the preliminary steps which don't apply.*

Removal

Refer to illustration 10.11

1 Remove the carburetors (see Chapter 4). On 1986 700 California models, remove the secondary air supply system reed valve block from both sides of the rear cylinder bank.
2 Remove the carburetor rubber boots from the cylinder ports.
3 Drain the cooling system and remove the coolant crossover pipes (see Chapter 3).
4 Remove the exhaust pipes (see Chapter 4).
5 Remove the valve covers (see Section 7).
6 Remove the camshafts (see Section 9).
7 Remove the exterior oil pipe that runs between the two cylinder banks. Do not lose the metal washers used at the pipe banjo fittings.
8 Remove the rear upper engine mount bolt attached to the rear cylinder head.
9 Remove the camchain tensioner and slipper from both cylinder heads (see Section 8).
10 Remove the four cylinder head bolts located on the outside of the heads.
11 Using a pair of large screwdrivers or pry bars, carefully separate the head from the cylinders. Position the tools on opposite sides and pry only on the reinforced areas **(see illustration). Caution:** *Do not wedge the tool between the gasket surfaces and do not, under any circumstances, use excessive force or the head and crankcase may be damaged.*
12 Remove the dowel pins (note how they are installed), then peel up the old head gasket.
13 Using a blunt gasket scraper or similar tool, remove any trace of old gasket material left on the cylinder. Clean the gasket surfaces of the head and cylinders with a solvent such as lacquer thinner or acetone.
14 For disassembly of the cylinder head components, refer to Sections 11 and 12. If the cam chain guides must be removed for further disassembly of the engine, refer to Section 8.

Installation

Refer to illustration 10.22

15 Install the dowel pins (with new O-rings) and lay the new head gasket in place. Never re-use the old gasket and do not use any type of gasket sealer. If the camchain guides were removed, install them at this stage (see Section 8).

A 9 mm bolts/nuts (700/750 models), 10 mm bolts (1100 models) *B 8 mm bolts Others are 6 mm bolts*

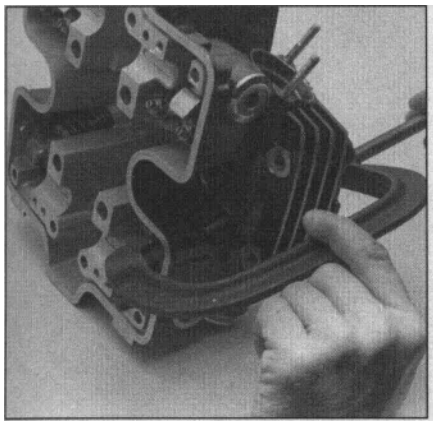
Note: 6 *mm bolts 17 through 20 are pin type on 1986 through 1988 700/750 models, plain on all others.* **Note:** 6 *mm bolts 21 through 24 only fitted to 1986-on* 700/750 *models*

16 Place the cylindr heads into position on the crankcase and feed the camchains through the center cavity.
17 Prior to installing the cylinder head bolts (nuts on 1987 and 1988 700/750 Magna models), the camchain tensioner should be locked to keep slack off of the chain during installation of the camshafts and subsequent valve timing (see Section 8).
18 Place the tensioner base into position in the cylinder head and thread the chain over it. Do not install the tensioner base bolts yet. Attach the slipper to the tensioner with the clevis pin and clip and insert the lower end of the slipper into its holder located in the crankcase cavity. **Caution:** *Engine damage will occur if the slipper end is not located properly in the holder socket.*
19 Repeat the tensioner locking and installation procedure on the other cylinder head.
20 Install the four outer cylinder head bolts (nuts on 1987 and 1988 700/750 Magna models), tightening them only lightly at this stage.
21 Install the camshafts. It is important that the procedure described in Section 9 be followed carefully as maintaining correct valve timing is critical. **Note:** *After the cam holders and sprockets, as well as the oil pipe, have been installed and the bolts tightened, unlock the cam chain tensioner (see Section 8).* After unlocking the tensioner, install and tighten the tensioner base bolts.
22 With the camshafts and camchain installed, refer to the tightening sequence and tighten the cylinder head/cam holder bolts and nuts evenly in two or three stages to the specified torque **(see illustration).**
23 The remainder of the cylinder head installation procedure is the reverse of the removal procedure, while taking note of the following.

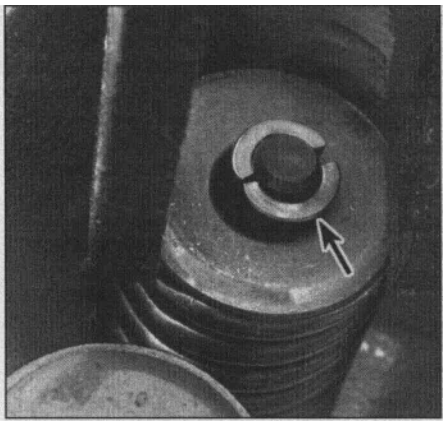
a) Use new sealing washers on the external oil pipe union bolts.
b) Before installing the valve covers, adjust the valve clearances as described in Chapter 1.
c) Refill the cooling system as described in Chapter 1.
d) Fill the crankcase to the proper level with engine oil, referring to Chapter 1 if necessary.

11 Valves/valve seats/valve guides - servicing

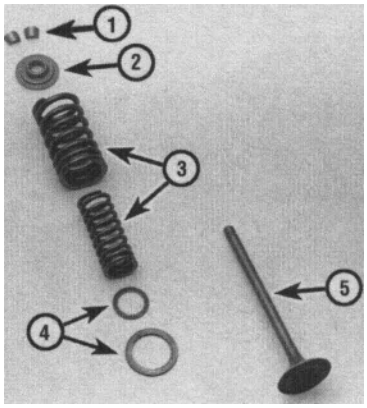
1 Because of the complex nature of this job and the special tools and equipment required, servicing of the valves, the valve seats and the valve guides (commonly known as a valve job) is best left to a professional.



12.7a Use a spring compressor to depress valve spring safely ...



12.7b ... then remove keepers/collets (arrow) and release spring pressure slowly



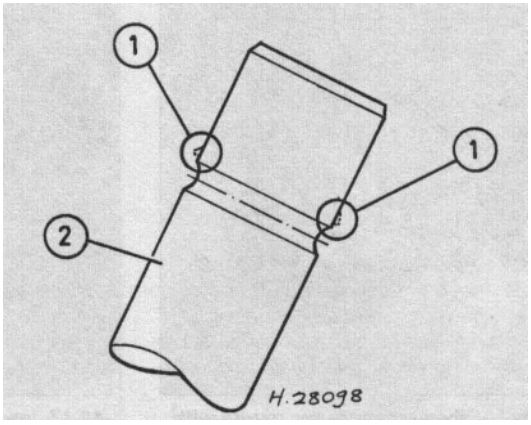
12.7c Valve components

1 Keepers (collets)
2 Spring retainer
3 Valve springs
4 Spring seats
5 Valve

2 The home mechanic can, however, remove and disassemble the head, do the initial cleaning and inspection, then reassemble and deliver the head to a dealer service department or properly equipped motorcycle repair shop for the actual valve servicing. Refer to Section 12 for those procedures.

3 The dealer service department will remove the valves and springs, recondition or replace the valves and valve seats, replace the valve guides, check and replace the valve springs, spring retainers and keepers (collets) (as necessary), replace the valve seals with new ones and reassemble the valve components.

4 After the valve job has been performed, the head will be in like-new condition. When the head is returned, be sure to clean it again very thoroughly before installation on the engine to remove any metal particles or abrasive grit that may still be present from the valve service operations. Use compressed air, if available, to blow out all the holes and passages.



12.7d If valve (2) won't pull through guide, deburr area around keeper/collet groove (1)

12 Cylinder head and valves - disassembly, inspection and reassembly

1 As mentioned in the previous Section, valve servicing and valve guide replacement should be left to a dealer service department or motorcycle repair shop. However, disassembly, cleaning and inspection of the valves and related components can be done (if the necessary special tools are available) by the home mechanic. This way no expense is incurred if the inspection reveals that service work is not required at this time.

2 To properly disassemble the valve components without the risk of damaging them, a valve spring compressor is absolutely necessary. This special tool can usually be rented, but if it's not available, have a dealer service department or motorcycle repair shop handle the entire process of disassembly, inspection, service or repair (if required) and reassembly of the valves.

Disassembly

Refer to illustrations 12.7a, 12.7b, 12.7c and 12.7d

3 Remove the rocker arms if you haven't already done so (see Section 9). Store the components in such a way that they can be returned to their original locations without getting mixed up.

4 Before the valves are removed, scrape away any traces of gasket material from the head gasket sealing surface. Work slowly and do not nick or gouge the soft aluminum of the head. Gasket removing solvents, which work very well, are available at most motorcycle shops and auto parts stores.

5 Carefully scrape all carbon deposits out of the combustion chamber area. A hand held wire brush or a piece of fine emery cloth can be used once the majority of deposits have been scraped away. Do not use a wire brush mounted in a drill motor, or one with extremely stiff bristles, as the head material is soft and may be eroded away or scratched by the wire brush.

6 Before proceeding, arrange to label and store the valves along with their related components so they can be kept separate and reinstalled in the same valve guides they are removed from (labeled plastic bags work well for this).

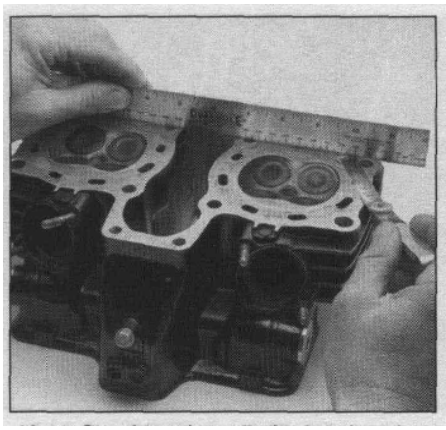
7 Compress the valve spring on the first valve with a spring compressor, then remove the keepers (collets) and the retainer from the valve assembly. **Note:** *Take great care not to mark the cylinder head follower bore with the spring compressor.* Do not compress the springs any more than is absolutely necessary. Carefully release the valve spring compressor and remove the springs and the valve from the head. If the valve binds in the guide (won't pull through), push it back into the head and deburr the area around the keeper (collet) groove with a very fine file or whetstone **(see illustrations).**

8 Repeat the procedure for the remaining valves. Remember to keep the parts for each valve together so they can be reinstalled in the same location.

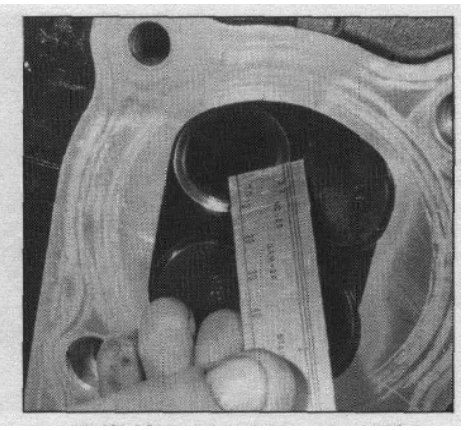
9 Once the valves have been removed and labeled, pull off the valve stem seals with pliers and discard them (the old seals should never be re-used), then remove the spring seats.

10 Next, clean the cylinder head with solvent and dry it thoroughly. Compressed air will speed the drying process and ensure that all holes and recessed areas are clean.

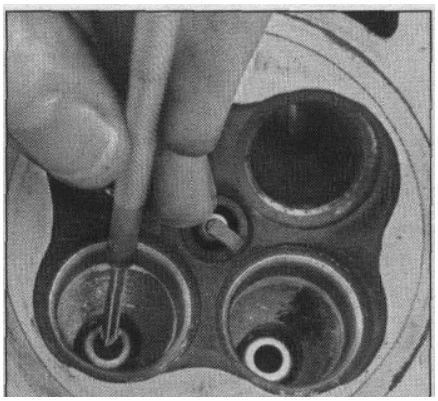
11 Clean all of the valve springs, keepers (collets), retainers and



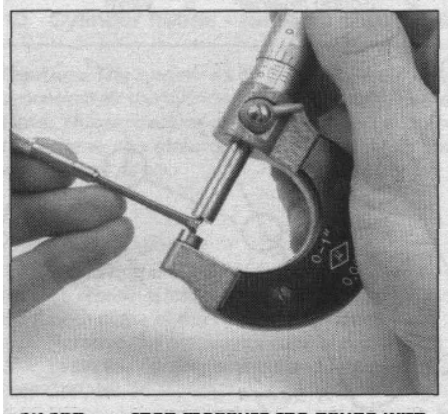
12.14 Checking the cylinder head gasket surface for warpage



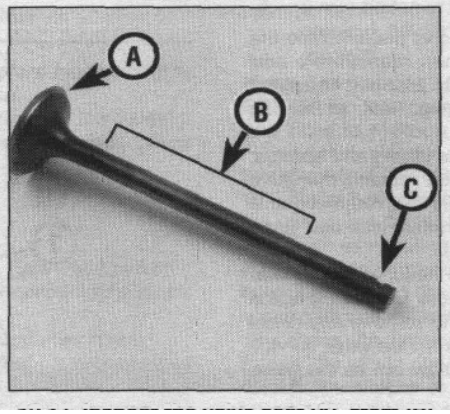
12.15 Measuring valve seat width



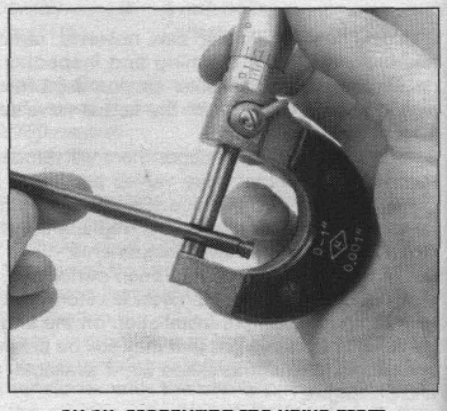
12.16a Use a small hole gauge to measure valve guide inside diameter...



12.16b ... then measure the gauge with a micrometer



12.17 Inspect the valve seat (A), stem (B) and keeper/collet groove (C) for damage



12.18 Measuring the valve stem outside diameter

spring seats with solvent and dry them thoroughly. Do the parts from one valve at a time so that no mixing of parts between valves occurs.

12 Scrape off any deposits that may have formed on the valve, then use a motorized wire brush to remove deposits from the valve heads and stems. Again, make sure the valves do not get mixed up.

Inspection

Refer to illustrations 12,14, 12.15, 12.16a, 12.16b, 12.17, 12.18, 12.19aand12.19b

13 Inspect the head very carefully for cracks and other damage. If cracks are found, a new head will be required. Check the cam bearing surfaces for wear and evidence of seizure. Check the camshafts and rocker arms for wear as well (see Section 9).

14 Using a precision straightedge and a feeler gauge, check the head gasket mating surface for warpage. Lay the straightedge lengthwise, across the head and diagonally (corner-to-corner), intersecting the head stud holes, and try to slip a feeler gauge under it, on either side of each combustion chamber **(see illustration).** The gauge should be the same thickness as the cylinder head warp limit listed in this Chapter's Specifications. If the feeler gauge can be inserted between the head and the straightedge, the head is warped and must either be machined or, if warpage is excessive, replaced with a new one.

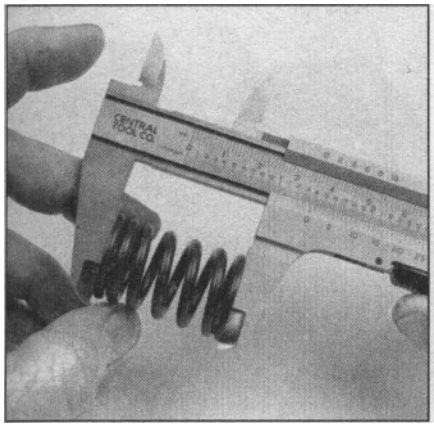
15 Examine the valve seats in each of the combustion chambers. If they are pitted, cracked or burned, the head will require valve service that's beyond the scope of the home mechanic. Measure the valve seat width and compare it to this Chapter's Specifications **(see illustration).** If it exceeds the service limit, or if it varies around its circumference, valve service work is required.

16 Clean the valve guides to remove any carbon build-up, then measure the inside diameters of the guides (at both ends and the center of the guide) with a small hole gauge and micrometer **(see illustrations).** Record the measurements for future reference. These measurements, along with the valve stem diameter measurements, will enable you to compute the valve stem-to-guide clearance. This clearance, when compared to the Specifications, will be one factor that will determine the extent of the valve service work required. The guides are measured at the ends and at the center to determine if they are worn in a bell-mouth pattern (more wear at the ends). If they are, guide replacement is an absolute must.

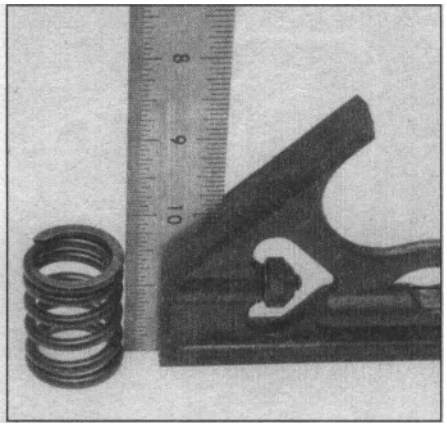
17 Carefully inspect each valve face for cracks, pits and burned spots **(see illustration).** Check the valve stem and the keeper (collet) groove area for cracks. Rotate the valve and check for any obvious indication that it is bent. Check the end of the stem for pitting and excessive wear. The presence of any of the above conditions indicates the need for valve servicing.

18 Measure the valve stem diameter **(see illustration).** By subtracting the stem diameter from the valve guide diameter, the valve stem-to-guide clearance is obtained. If the stem-to-guide clearance is greater than listed in this Chapter's Specifications, the guides and valves will have to be replaced with new ones.

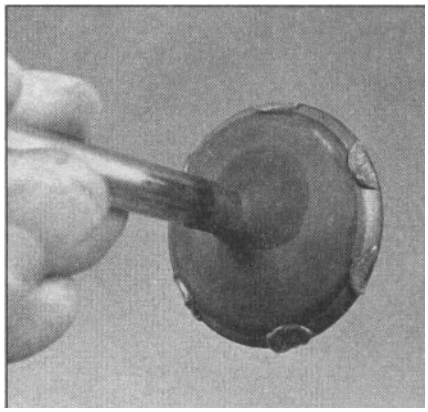
19 Check the end of each valve spring for wear and pitting. Measure the free length and compare it to this Chapter's Specifications. Any springs that are shorter than specified have sagged and should not be



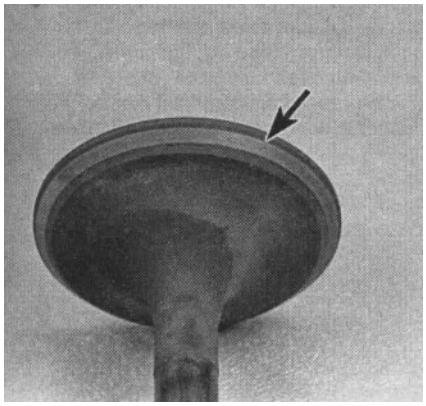
12.19a Measuring the valve spring free length



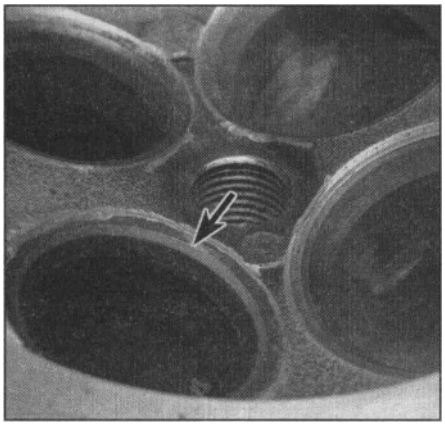
12.19b Measuring the valve springs for squareness



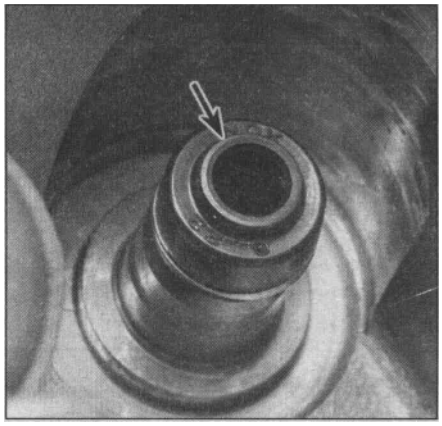
12.23 Apply valve lapping compound sparingly to the valve face



12.24a After lapping, the valve face should exhibit a uniform, unbroken contact pattern (arrow)...



12.24b … and the seat should be the specified width (arrow) with a smooth, unbroken appearance



12.27 Install new valve stem seals (arrow) on the guides

re-used. Stand the spring on a flat surface and check it for squareness **(see illustrations).**

20 Check the spring retainers and keepers (collets) for obvious wear and cracks. Any questionable parts should not be re-used, as extensive damage will occur in the event of failure during engine operation.

21 If the inspection indicates that no service work is required, the valve components can be reinstalled in the head.

Reassembly

Refer to illustrations 12.23, 12.24a, 12.24band 12.27

22 Before installing the valves in the head, they should be lapped to ensure a positive seal between the valves and seats. This procedure requires coarse and fine valve lapping compound (available at auto parts stores) and a valve lapping tool. If a lapping tool is not available, a piece of rubber or plastic hose can be slipped over the valve stem (after the valve has been installed in the guide) and used to turn the valve.

23 Apply a small amount of coarse lapping compound to the valve face, then slip the valve into the guide **(see illustration). Note:** *Make sure the valve is installed in the correct guide and be careful not to get any lapping compound on the valve stem.*

24 Attach the lapping tool (or hose) to the valve and rotate the tool between the palms of your hands. Use a back-and-forth motion rather than a circular motion. Lift the valve off the seat and turn it at regular intervals to distribute the lapping compound properly. Continue the lapping procedure until the valve face and seat contact area is of uniform width and unbroken around the entire circumference of the valve face and seat **(see illustrations).**

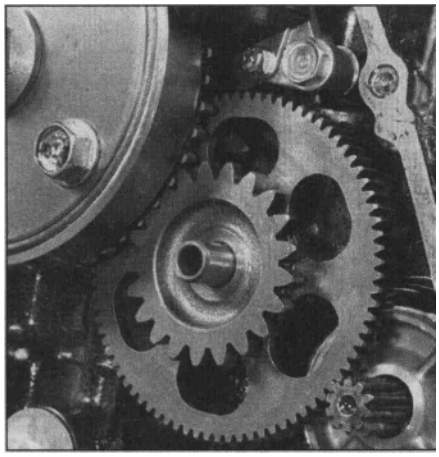
25 Carefully remove the valve from the guide and wipe off all traces of lapping compound. Use solvent to clean the valve and wipe the seat area thoroughly with a solvent soaked cloth.

26 Repeat the procedure with fine valve lapping compound, then repeat the entire procedure for the remaining valves.

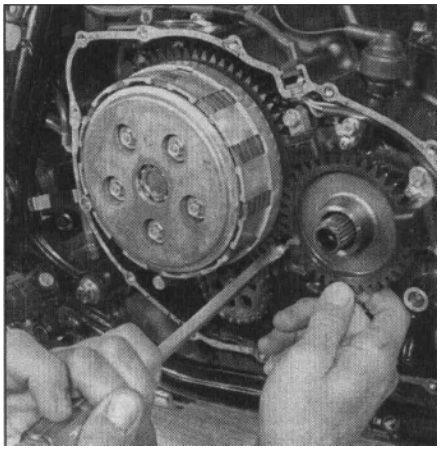
27 Lay the spring seats in place in the cylinder head, then install new valve stem seals on each of the guides **(see illustration).** Use an appropriate size deep socket to push the seals into place until they are properly seated. Don't twist or cock them, or they will not seal properly against the valve stems. Also, don't remove them again or they will be damaged.

28 Coat the valve stems with clean engine oil, then install one of them into its guide. Next, install the springs and retainer, compress the springs and install the keepers (collets). **Note:** *Install the springs with their tightly wound coils at the bottom (next to the spring seat).* When compressing the springs with the valve spring compressor, depress them only as far as is absolutely necessary to slip the keepers (collets) into place. Apply a small amount of grease to the keepers (collets) to help hold them in place as the pressure is released from the springs. Make certain that the keepers (collets) are securely locked in their retaining grooves.

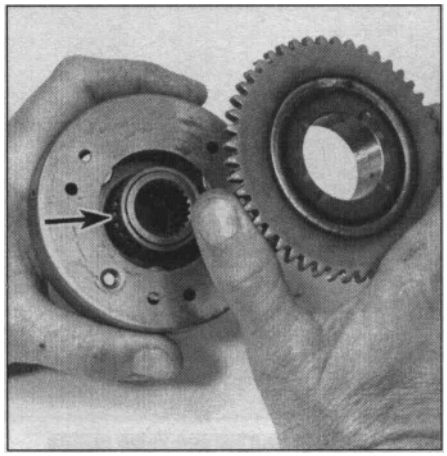
29 Support the cylinder head on blocks so the valves can't contact the workbench top, then very gently tap each of the valve stems with a



13.5 Extract its shaft, and maneuver the starter idler gear out of the casing



13.9 Taking the load off the primary drive gear so that it can be pulled off the crankshaft splines



13.10 Detach the driven gear and needle bearing (arrow) from the starter clutch

soft-faced hammer. This will help seat the keepers (collets) in their grooves.

30 Once all of the valves have been installed in the head, check for proper valve sealing by pouring a small amount of solvent into each of the valve ports. If the solvent leaks past the valve(s) into the combustion chamber area, disassemble the valve(s) and repeat the lapping procedure, then reinstall the valve(s) and repeat the check. Repeat the procedure until a satisfactory seal is obtained.

13 Starter motor clutch and primary drive gear - removal, overhaul and installation

Note: *The starter motor clutch can be removed with the engine in the frame.*

Removal

Refer to illustrations 13.5 and 13.9

1 Drain the engine oil (see Chapter 1).

2 On all models remove the rear brake pedal, and on 1100 Magna models also remove the right footpeg.

3 Remove the right crankcase cover bolts. There are two different size bolts, so make a note of their location or store them in the old gasket when this has been removed. Note that one of the cover bolts secures the rear brake light switch on 1985 through 700/750 Magna models.

4 Tap the crankcase cover gently with a soft-faced hammer to break the gasket seal, then pull it away from the engine. Do not pry between the gasket sealing surfaces, as damage and eventually oil leaks will occur. Discard the old gasket and remove the dowels for safekeeping if they are loose.

5 Pull the starter idler gear shaft out of the casing and remove the idler gear **(see illustration).** The shaft should simply pull out - it may even pull out as the casing is removed.

6 Remove the starter clutch bolt from the crankshaft end. The crankshaft will have to be locked to allow the bolt to be loosened. This can be achieved in one of several ways.

a) Have an assistant hold the alternator rotor with a strap wrench around its periphery, or the Honda service tool described in Section 19.

b) On 1987 and 1988 700/750 Magna models the Honda sprag-type gear holder tool (part no. 07724-0010100) can be used to lock the primary drive gear and clutch housing.

c) If the engine is in the frame, shift the transmission into sixth gear and have an assistant sit on the bike with the rear brake held on firmly (refit pedal temporarily if removed).

7 If the starter clutch is to be disassembled, the three starter clutch cover bolts should also be broken loose at this time (while the alternator is being held). Do not remove these bolts yet.

8 Withdraw the starter clutch assembly and thrust washer from the crankshaft splines, taking care not to knock the ignition system pulse generators.

9 Use a screwdriver engaged in the teeth of the clutch housing gear to take the load off the primary drive gear. The primary drive gear can then be pulled off its shaft **(see illustration).**

Overhaul

Refer to illustrations 13.10, 13.12 and 13.15

10 Remove the starter driven gear and needle bearing from the starter clutch **(see illustration).**

11 Inspect the rollers of the needle bearing for smooth operation and replace it if necessary.

12 Remove the three bolts from the starter clutch cover and lift off the cover **(see illustration).**

13 Remove the clutch rollers, plungers and springs.

14 Check the rollers and plungers for excessive wear, scratches or score marks and replace them if necessary.

15 Inspect the inner and outer surfaces of the starter driven gear for scratches and score marks. Also measure the outer diameter of the driven gear and compare it with the service limit Specifications at the beginning of this Chapter **(see illustration).**

16 Inspect the splines of the starter clutch cover. Any component which is not in good condition should be replaced with a new one.

17 To begin reassembly, install the springs into their bores in the starter clutch, then install the plungers into their bores and retain them by installing the rollers.

18 Install the starter clutch cover onto the starter clutch. Be sure the dowel pin in the starter clutch is aligned with the hole in the cover, then tighten the cover bolts to the specified torque. **Note:** *A liquid locking agent should be applied to the bolt threads prior to installation.*

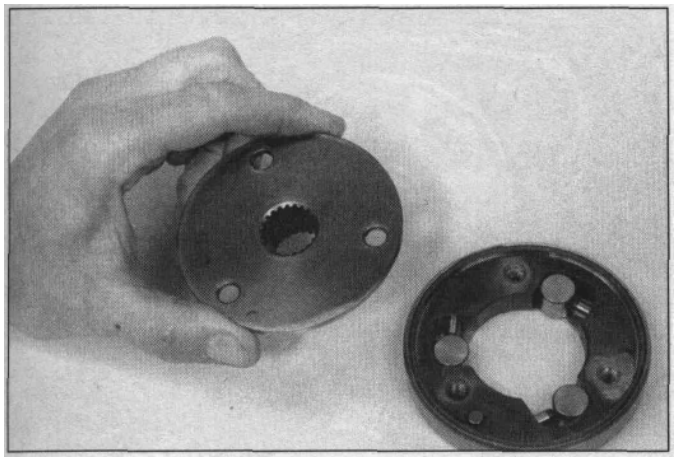
19 With the starter clutch positioned with the cover down, insert the needle bearing into place. Install the starter driven gear by depressing it into the starter clutch while turning it counterclockwise (anticlockwise).

Installation

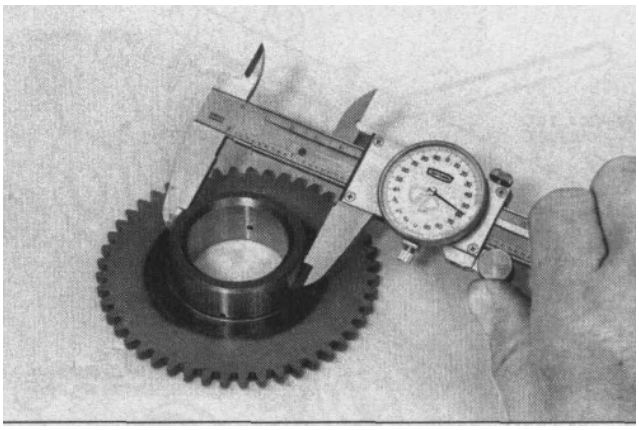
Refer to illustration 13.20

20 Installation is the reverse of the removal procedure with the following notes. *a) It is easier to install the starter idler gear and shaft after installation*

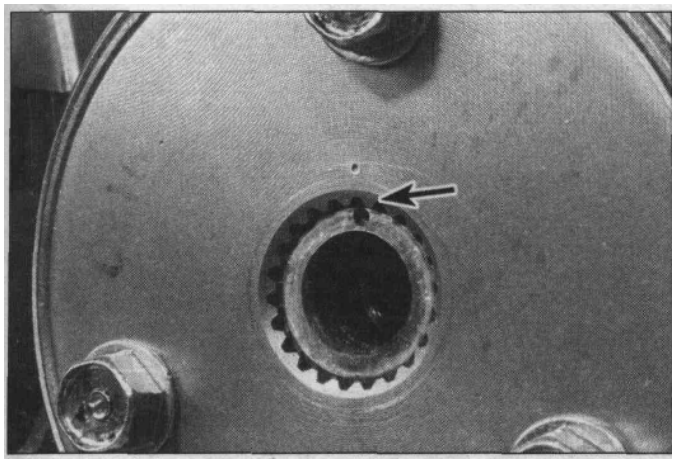
of the primary drive gear but before installation of the starter clutch.



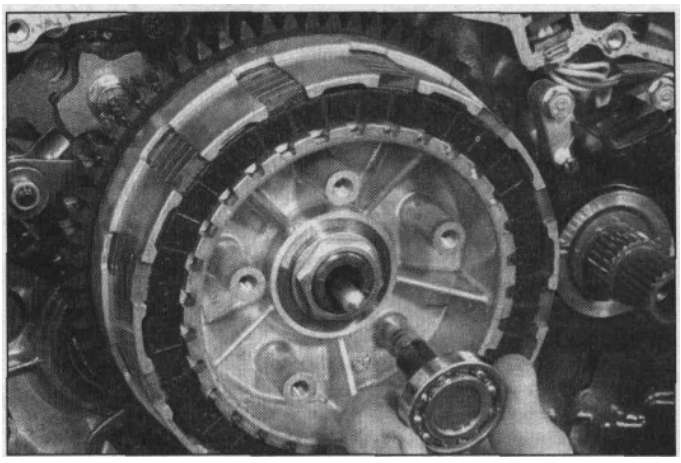
13.12 Remove the three bolts to separate the starter clutch



13.15 Measuring the starter driven gear outside diameter



13.20 Align punch marks on crankshaft and starter clutch on installation



14.7 Removing clutch lifter guide and release bearing

b) When installing the starter clutch on the crankshaft, be sure that the punch marks on the clutch and shaft are aligned ***(see illustration).***

c) The alternator rotor will again have to be held stationary while the starter clutch bolt is tightened to the specified torque.

d) Install a new gasket, using a dab of grease to stick it to the crankcase while the cover is installed. Be sure the longer bolts are reinstalled in their original places.

e) Refill the crankcase with the proper amount and grade of oil. Refer to Chapter 1 if necessary.

14 Clutch - removal, inspection and installation

Note: *This procedure can be performed with the engine in the frame. If the engine has already been removed, ignore the preliminary steps which don't apply.* **Note:** *Do not operate the clutch lever after removal of the bolts as this will cause difficulty in reassembling the clutch.*

Removal

Refer to illustrations 14.7, 14.11 a, 14.11b, 14.12 and 14.13

1 Drain the engine oil (see Chapter 1).

2 On all models remove the rear brake pedal, and on 1100 Magna models also remove the right footpeg.

3 Remove the right crankcase cover bolts. There are two different size bolts, so make a note of their location or store them in the old gasket when this has been removed. Note that one of the cover bolts secures the rear brake light switch on 1985 through 1988 700/750 Magna models.

4 Tap the crankcase cover gently with a soft-faced hammer to break the gasket seal, then pull it away from the engine. Do not pry between the gasket sealing surfaces, as damage and eventually oil leaks will occur. Discard the old gasket and remove the dowels for safekeeping if they are loose.

5 Remove the starter clutch and primary drive gear as described in Section 13.

All 700/750 models except the 1983 750 Sabre

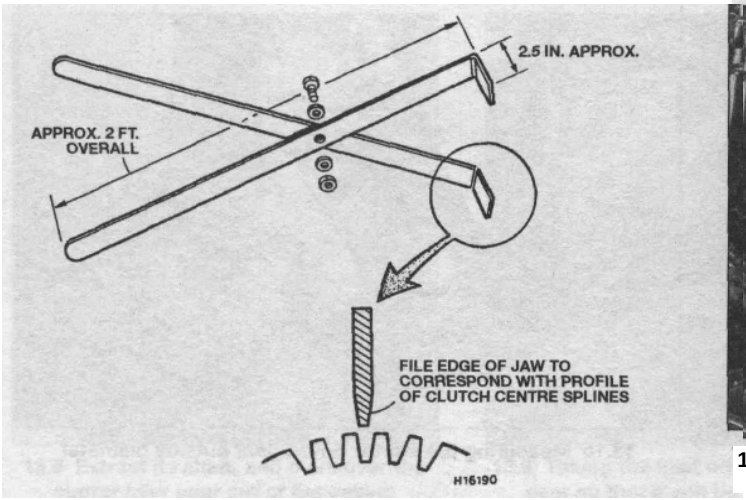
6 Remove the five bolts which retain the clutch pressure plate. Loosen these bolts gradually, one turn at a time each, following a crisscross pattern, until the pressure from the springs has been released. With the bolts removed, lift out the springs.

7 Lift off the clutch pressure plate, along with the lifter guide and release bearing **(see illustration).**

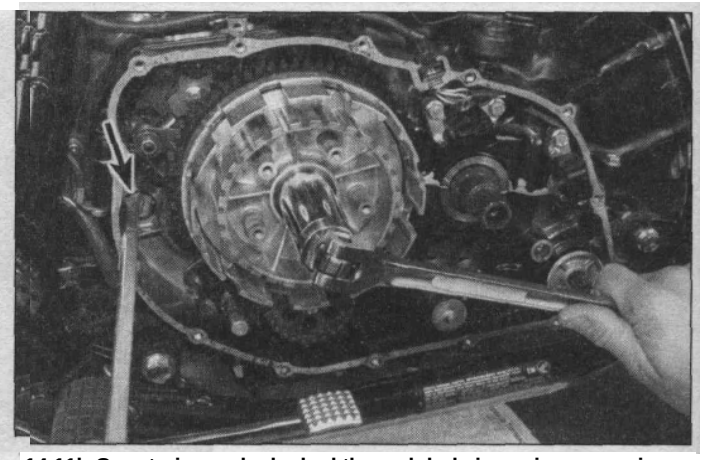
8 Pull out the lifter rod extending from the clutch center.

9 Remove the clutch plates. These can be removed either all at once or one at a time.

10 On 1987 and 1988 models knock back the lockwasher tabs from the clutch center locknut.



14.11a Clutch holding tool made from steel strap



14.11b Gear train can be locked through hole in casing - exercise extreme care

11 In order to loosen the clutch center nut, you'll need to prevent the mainshaft from rotating. The following methods can be used **(see illustrations).**

a) If the engine is in the frame, shift the transmission into top gear and have an assistant apply the rear brake hard (install the pedal temporarily if removed) with the rear tire in firm contact with the ground.

b) The Honda service tool (part no. 07923-6890101) provides another means of locking the mainshaft via the splines of the output shaft.

c) The clutch center and housing can be locked together using the Honda clutch center holder (part no. 07724-0050001), or an equivalent can be made up from some steel strap bent at the ends and bolted together in the middle.

d) Another means of holding the clutch center is to insert a long screwdriver through the crankcase hole to the left of the clutch and engage the blade in the gear teeth visible there. If held securely, this will prevent the clutch center from rotating while the locknut is loosened and removed.

12 With the locknut removed, lift off the lock washer and clutch center. The clutch housing and clutch housing guide can also be lifted out **(see illustration).**

1983 750 Sabre and all 1100 cc models

13 Remove the large circlip from the clutch lifter plate and withdraw the lifter plate, complete with release bearing and lifter plate guide. Withdraw the long pushrod **(see illustration).**

14 Remove the clutch center locknut and its washer. Use one of the methods described in Step 11 above to lock the mainshaft.

15 With the locknut and washer removed, lift out the spring set plate, diaphragm spring and washer. Remove the pressure plate and clutch friction and plain plates from the clutch housing.

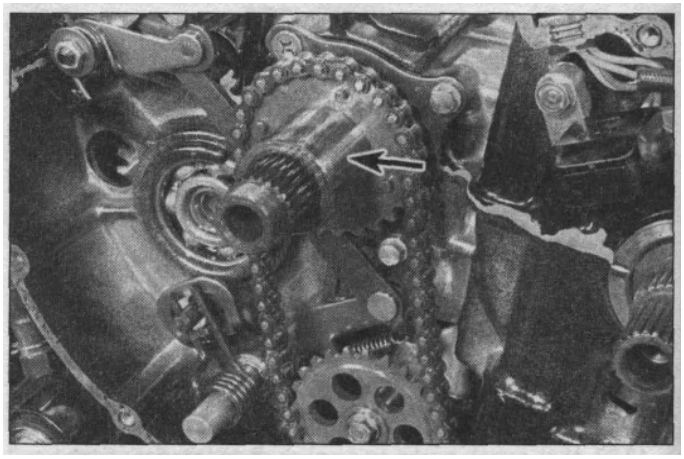
16 Remove the outer clutch center together with the one-way clutch and its inner piece. Withdraw the large washer and inner clutch center, followed by the clutch housing and its guide.

Inspection - all models

Refer to illustrations 14.18, 14.19, 14.20, 14.22 and 14.23

17 Examine the splines on both the inside and the outside of the clutch center(s). If any wear is evident, replace the clutch center(s).

18 On all 700/750 models except the 1983 750 Sabre measure the free length of the clutch springs and compare the results to the Specifications **(see illustration).** If the springs have sagged, or if cracks are noted, replace them with new ones as a set. The diaphragm spring on the 1983 750 Sabre and all 1100 models should be checked carefully for signs of cracking or fatigue - replacement is the only solution. The spring's free height can be measured with a tire tread-depth gauge with the spring placed dished side downward on a flat surface; if it is less than the service limit it should be replaced.

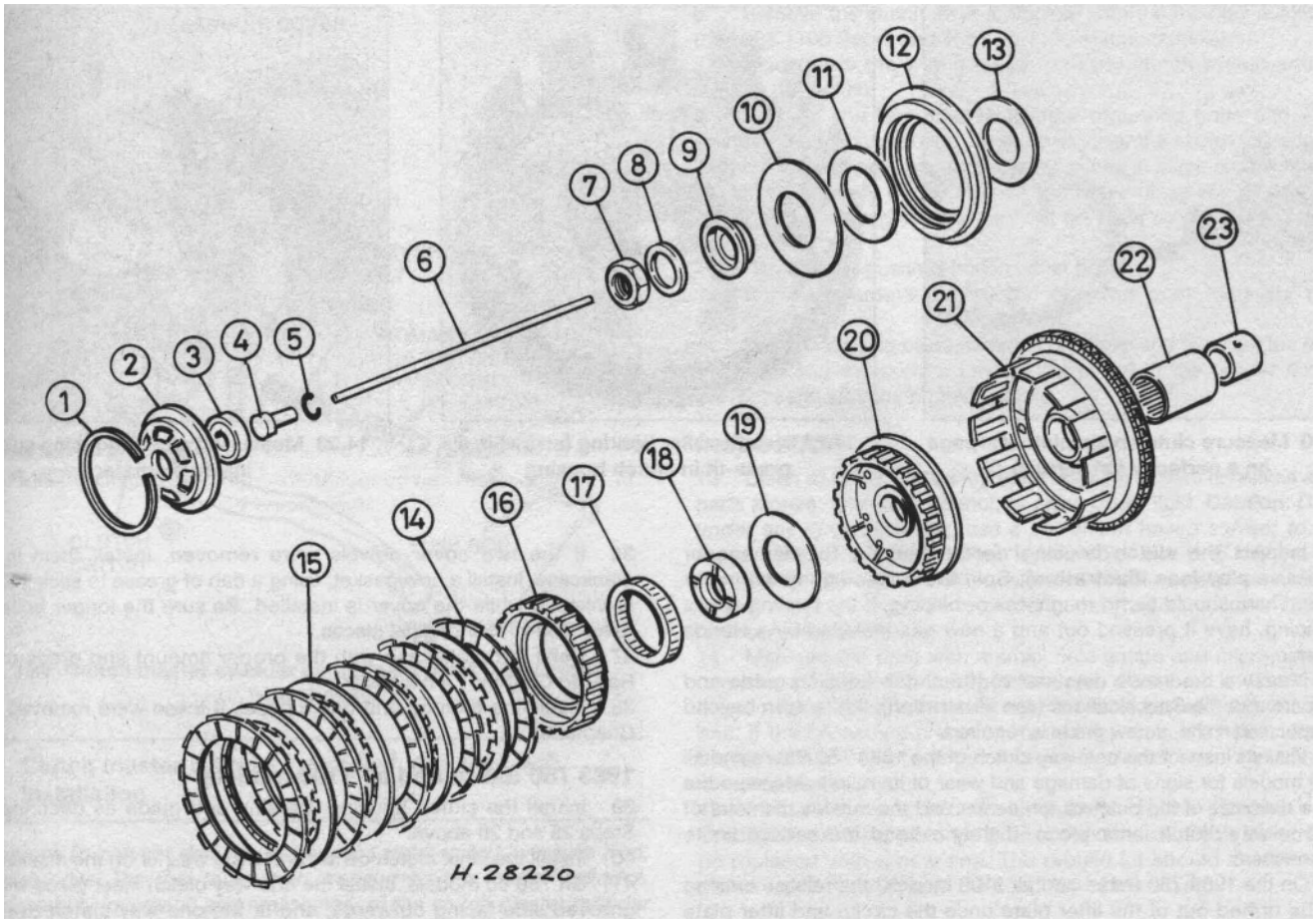


14.12 Remove the clutch housing guide (arrow) from the mainshaft

19 If the lining material of the friction plates smells burnt or if it is glazed, new parts are required. If the metal clutch plates are scored or discolored, they must be replaced with new ones. Measure the thickness of each friction plate and compare the results to the Specifications **(see illustration).** Replace with new parts any friction plates that are near the wear limit.

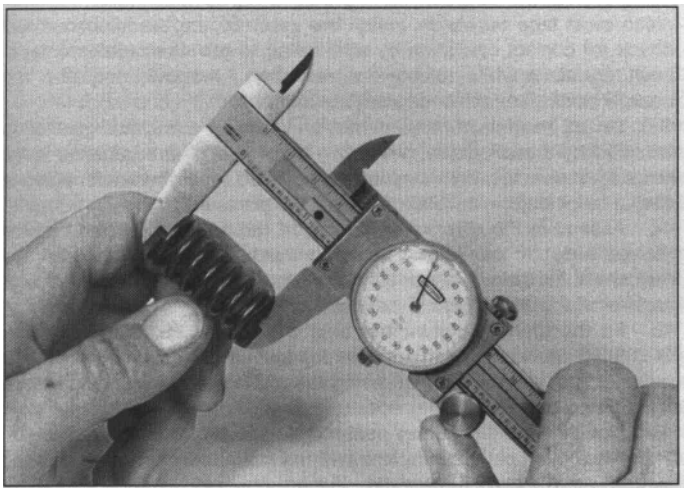
20 Lay the metal plates, one at a time, on a perfectly flat surface (such as a piece of plate glass) and check for warpage by trying to slip a 0.3 mm (0.012 in) feeler gauge between the flat surface and the plate **(see illustration).** Do this at several places around the plate's circumference. If the feeler gauge can be slipped under the plate, it is warped and should be replaced with a new one. Check the tabs on the friction plates for excessive wear and mushroomed edges. They can be cleaned up with a file if the deformation is not severe.

21 Check the edges of the slots in the clutch housing for indentations made by the friction plate tabs. If the indentations are deep they can prevent clutch release, so the housing should be replaced with a new one. If the indentations can be removed easily with a file, the life of the housing can be prolonged to an extent. Also, check the primary gear teeth for cracks, chips and excessive wear. If the gear is worn or damaged, the clutch housing must be replaced with a new one.

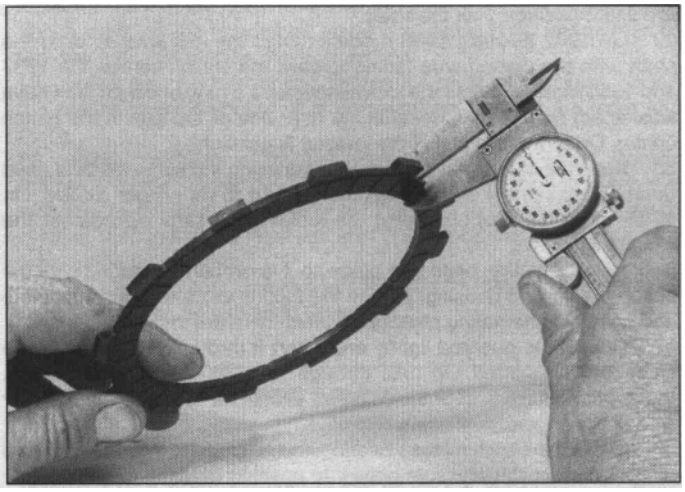


14.13 Clutch components (1983 750 Sabre and all 1100 models)

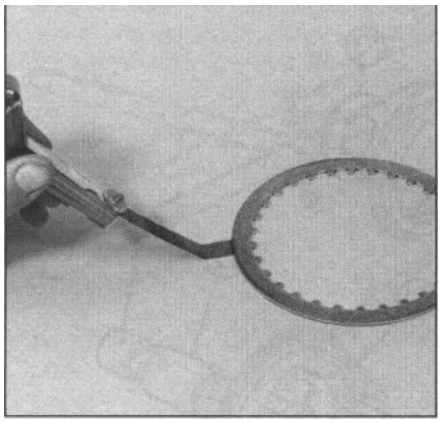
7 *Large circlip*
2 *Lifter plate*
3 *Release bearing*
4 *Lifter plate guide*
5 *Circlip*
6 *Pushrod*
7 *Locknut*
8 *Washer*
9 *Spring set plate*
10 *Diaphragm spring*
11 *Washer*
12 *Pressure plate*
13 *Washer*
14 *Friction plates*
15 *Plain plates*
16 *Outer clutch center*
17 *One-way clutch*
18 *Inner piece*
19 *Washer*
20 *Inner clutch center*
21 *Clutch housing*
22 *Needle roller bearing*
23 *Guide*



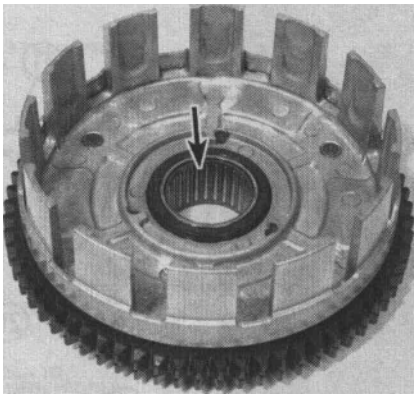
14.18 Measuring clutch spring free length



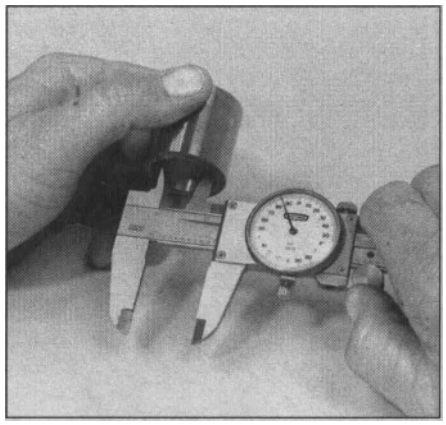
14.19 Measuring clutch friction plate thickness



14.20 Measure clutch plain plate warpage on a perfectly flat surface



14.22 Needle roller bearing (arrow) is a press-fit in clutch housing



14.23 Measuring clutch housing guide inside diameter

22 Inspect the clutch housing needle bearing for damage or excessive play **(see illustration).** Spin the rollers lightly with your finger. There should be no roughness or binding. If the bearing needs replacing, have it pressed out and a new one installed by a Honda dealer.

23 Measure the inside diameter of the clutch housing guide and compare it to the Specifications **(see illustration).** If it is worn beyond the specified limits, a new guide is required.

24 Visually inspect the one-way clutch of the 1983 750 Sabre and all 1100 models for signs of damage and wear of its rollers. Measure the inside diameter of the outer clutch center and the outside diameter of the one-way clutch inner piece. If they exceed the service limits replace them.

25 On the 1983 750 Sabre and all 1100 models, the release bearing can be drifted out of the lifter plate once the circlip and lifter plate guide have been removed.

Installation

All 700/750 models except the 1983 750 Sabre

26 Apply a coat of engine oil to the inside and outside of the clutch housing guide and install it over the mainshaft.

27 If the needle bearing was removed from the clutch housing reinstall it. Then install the clutch housing into position over the guide. Be sure the holes in the rear of the housing engage with the pins protruding from the oil pump drive sprocket behind the guide.

28 Lubricate the inner splines of the clutch center with engine oil and slip it into position over the shaft.

29 On 1982 through 1986 models install the lockwasher onto the shaft with the dished side facing toward the clutch center. On 1987 and 1988 models, install the lockwasher (use a new one if its tabs have weakened) so that its extension fits over one of the ribs in the clutch center. On all models install the locknut finger-tight.

30 Keep the clutch center from rotating using the same method used during disassembly and tighten the locknut to its proper torque. On 1987 and 1988 models, bend the lockwasher tabs up against the locknut sides.

31 Install a friction plate into place so it is properly engaged with the clutch center and housing. Follow the friction plate with a metal plate and continue alternating plates until all of them are installed.

32 Grease the pushrod lightly and insert it through the center of the shaft until it is seated. On 1985 through 1988 700/750 Magna models, the gold anodized end of the pushrod should be on the slave cylinder side of the engine.

33 Install the clutch release bearing and lifter guide into the pressure plate and place the pressure plate into position over the clutch center.

34 Place the clutch springs into place. Then install the pressure plate bolts and washers and tighten them evenly in a criss-cross pattern.

35 Reinstall the primary drive gear and starter clutch assembly.

36 If the two cover dowels were removed, install them in the crankcase. Install a new gasket, using a dab of grease to stick it to the crankcase while the cover is installed. Be sure the longer bolts are reinstalled in their original places.

37 Refill the crankcase with the proper amount and grade of oil. Refer to Chapter 1 if necessary.

38 Install the footpeg and brake pedal, if these were removed (see Chapter 6).

1983 750 Sabre and all 1100 models

39 Install the clutch housing, bearing and guide as described in Steps 25 and 26 above.

40 Install the inner clutch center and large washer on the mainshaft.

41 On 750 cc models, install the one-way clutch inner piece with its grooved side facing outwards, and fit the one-way clutch over the inner piece with its marked side facing outwards. The outer clutch center should be installed over the one-way clutch (its grooved side faces inwards) using a counterclockwise (anticlockwise) motion. At this point, check that the one-way clutch is assembled correctly by attempting to turn the outer clutch center in both directions while holding the mainshaft - it should only turn in a counterclockwise (anticlockwise) direction.

42 On 1100 cc models, assembly the outer clutch center, one-way clutch and inner piece before installing on the mainshaft. Fit the one-way clutch to the outer clutch center with its flanged side facing into the outer clutch center. Install the inner piece into the one-way clutch using a clockwise motion, noting that the grooved face of the inner piece must face outwards. Install the assembly on the mainshaft and check for correct operation by attempting to turn the clutch center in both directions while holding the mainshaft - it should only turn in a counterclockwise (anticlockwise) direction.

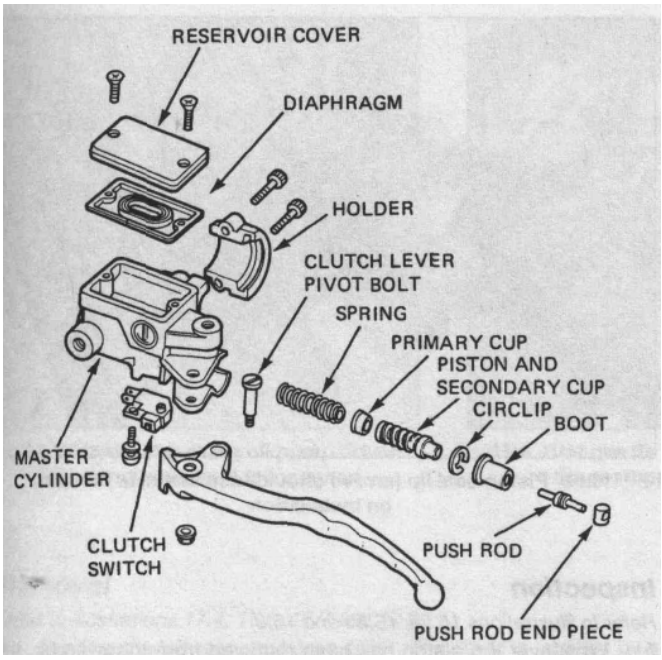
43 On all models, install a friction plate in the clutch housing, followed by a plain plate, alternating them until all are installed in the housing. If new friction plates are being fitted, coat them with a smear of engine oil before installation. Install the pressure plate.

44 Assemble the diaphragm spring on the setting plate so that the dished side of the spring faces inwards when installed on the mainshaft. Fit the washer against the inner (dished) side of the spring and install the assembly on the mainshaft.

45 Fit the dished lockwasher over the mainshaft (dished side or OUTSIDE marking facing outwards) and install the clutch center locknut. Retain the mainshaft using the method employed on removal and tighten the nut to the specified torque.

46 Lightly grease the long pushrod and slide it into the mainshaft. Install the lifter plate, complete with release bearing and guide and secure with the large circlip.

47 Refer to Steps 35 to 38 above to install the remaining components and refill the engine with the proper amount and grade of oil (see Chapter 1).



15.1 Clutch master cylinder component parts (early model type shown)

15 Clutch master cylinder - removal, overhaul and installation

Caution: *To prevent damage to the paint from spilled hydraulic fluid, always cover the fuel tank when working on the master cylinder. Disassembly, overhaul, and reassembly of the clutch master cylinder must be done in a spotlessly clean work area to avoid contamination and possible failure of the hydraulic system components. Refer to illustration 15.1*

Removal and dismantling

1 If the master cylinder is leaking fluid or if lever movement does not produce clutch disengagement, and bleeding the system does not help, master cylinder overhaul is recommended **(see illustration).** Before disassembling the master cylinder, read through the entire procedure and make sure that you have the correct rebuild kit. Also, you will need some new, clean brake fluid of the recommended type, some clean rags, internal snap-ring pliers, a O-to-1 inch micrometer and a small hole gauge.
2 Remove the left rear view mirror.
3 Refer to Chapter 1 and drain just enough fluid from the system to empty the master cylinder. **Note:** *When pumping the clutch lever, do not bring it all the way back to the handlebar, as this will cause piston over-travel and fluid leakage.* To prevent this, hold a 3/4 in (20 mm) spacer (made from a block of wood) between the lever and the handlebar. When the master cylinder is empty, retighten the bleeder valve on the slave cylinder.
4 To reduce the amount of air entering the clutch lines, and subsequent bleeding, the line should be securely plugged immediately after disconnecting it from the master cylinder. This can be done with an 8 x 20 mm bolt and nut.
5 Pull back the rubber boot, loosen the master cylinder banjo fitting bolt and pull the hose and bolt away from the cylinder as a unit. Have a container handy to catch any brake fluid that may drip out of the master cylinder fitting. Quickly place your finger over the end of the hollow bolt to prevent the entrance of air into the lower part of the hydraulic system. Working quickly, remove the hollow bolt, slip the 8 mm bolt (along with the sealing washers) through the banjo fitting, thread on the nut and tighten it securely. Wipe up any spilled brake fluid.
6 Remove the clutch lever (complete with the freeplay adjuster on the 1985 1100 Sabre and 1985/86 1100 Magna models).
7 Disconnect the wiring leads from the clutch switch and then remove the switch.
8 Remove the two master cylinder mounting bolts and lift the cylinder off the handlebars. On early models, the choke cable locates in the master cylinder clamp; leave the clamp in place on the cable.
9 If not already done, remove the reservoir cover, plate (where fitted) and diaphragm, plus the float on 1988 models. Drain off any residual fluid.
10 Remove the pushrod from its dust boot.
11 Carefully remove the rubber pushrod boot from the piston opening.
12 Using snap-ring pliers, remove the circlip and slide out the piston, the cups and the spring. Lay the parts out in the proper order to prevent confusion during reassembly.

Inspection

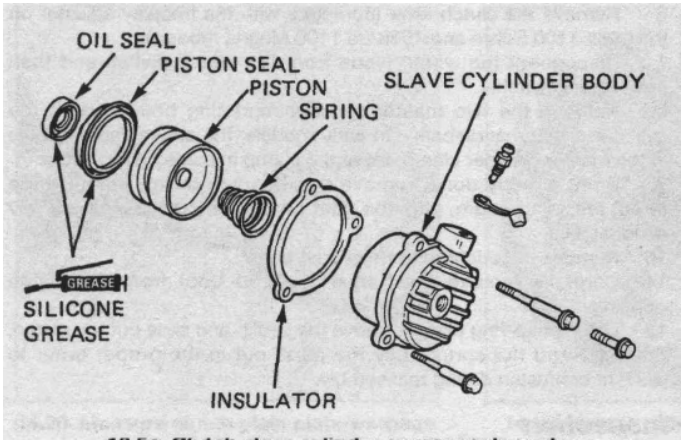
13 Clean all of the parts with brake cleaning solvent (available at auto parts stores), isopropyl alcohol, or clean brake fluid. **Caution:** *Do not, under any circumstances, use a petroleum based solvent to clean these parts.* If compressed air is available, use it to dry the parts thoroughly. Check the master cylinder bore for scratches, nicks and score marks. If damage is evident, the master cylinder must be replaced with a new one.
14 Measure the bore with a small hole gauge and micrometer and compare the results to the Specifications. If the bore is worn beyond the allowable limits, the master cylinder must be replaced with a new one. If the necessary precision measuring tools are not available, a dealer service department or motorcycle repair shop can make the measurements for you.
15 Measure the outside diameter of the piston and compare it to the Specifications. If the piston is worn beyond the allowable limits, it must be replaced with a new one. The rebuild kit should contain a new piston; use it regardless of the condition of the old one.

Reassembly and installation

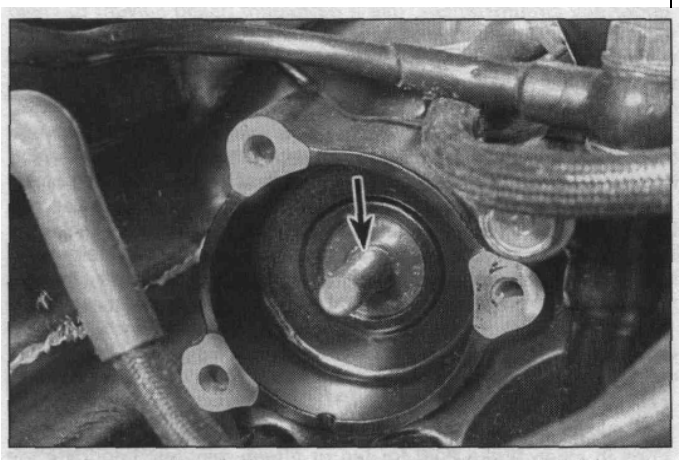
16 Before reassembling the master cylinder, soak the new rubber cups in clean brake fluid for ten or fifteen minutes. Lubricate the master cylinder bore with clean brake fluid, then carefully insert the piston and related parts in the reverse order of disassembly. Make sure the lips on the cups do not turn inside out when the cups are slipped into the bore.
17 Install the circlip, making sure it is properly seated in its groove, then install the rubber dust boot and pushrod.
18 Attach the master cylinder to the handlebar (if the clamp has an UP marking, fit is so that it is facing upwards) and position the assembly so that the body-to-clamp top mating surface aligns with the punch mark on the handlebar. Install the clamp bolts and tighten the top one fully, followed by the bottom bolt.
19 Install the clutch lever and tighten the pivot bolt locknut. Be sure the master cylinder pushrod is correctly engaged in the lever end-piece.
20 Install the clutch switch and hook up the switch wiring. Connect the hose to the master cylinder and install the mirror. Fill the system with new hydraulic fluid and refer to Chapter 1 to bleed the air from the system, then install the reservoir float (1988 models), diaphragm, plate (where fitted) and cover.
21 On the 1985 1100 Sabre and 1985/86 1100 Magnas set the clutch lever freeplay as described in Chapter 1.

16 Clutch slave cylinder - removal, overhaul and installation

Caution: To *prevent damage to the painted cycle parts from spilled brake fluid, always cover the surrounding area when working on the slave cylinder. Disassembly, overhaul, and reassembly of the clutch slave cylinder must be done in a spotlessly clean work area to avoid*



16.5a Clutch slave cylinder components parts



16.8 Pry pushrod oil seal out of casing when pushrod has been removed

contamination and possible failure of the hydraulic system components,

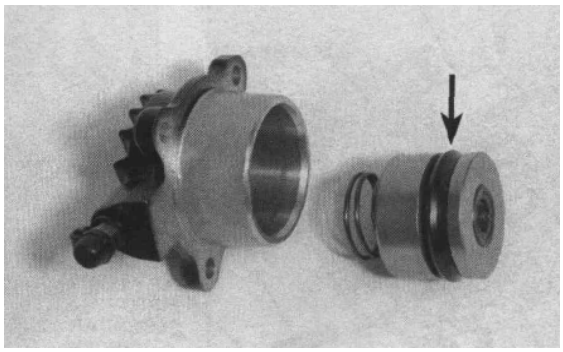
Removal and dismantling

1 Remove the left rear crankcase cover. The cover is retained by a single bolt on all 700/750 Sabre models and 1982 through 1984 700/750 Magna models; note the long collar inside the cover. On all 1100 models and 1985 through 1988 700/750 Magna models the cover is retained by three bolts.

2 Place a container under the slave cylinder to catch dripping fluid and then remove the banjo bolt that retains the fluid line coupling to the slave cylinder cover. Allow the clutch hose to drain into the container.

3 Remove the slave cylinder mounting bolts (plus the rear cover bracket bolts where the bracket might hinder removal) and withdraw the cylinder and insulating gasket from the crankcase. Note that the cylinder assembly may separate during removal. If the piston does not come out with the cylinder, pull the piston off of the clutch pushrod and remove it from the motorcycle.

4 If the piston and cylinder come out as one unit, the cylinder can be tapped with a block of wood to force the piston out. Another method is to reconnect the clutch hose to the cylinder and operate the clutch lever to force the piston out. A third method, if an air compressor is available, is to force the piston out using compressed air, but do not try to catch the piston with your hand. Always use a thick towel or rag and apply the air in short spurts.



16.5b Piston seal lip (arrow) should face towards the bore on installation

Inspection

Refer to illustrations 16.5a, 16.5b and 16.8

5 Whenever the piston has been removed from the cylinder, the piston seal and oil seal should both be replaced. Note that the lip of the piston seal should face into the bore **(see illustrations).**

6 Inspect both the outer surface of the piston and the inner surface of the cylinder for scoring or scratches.

7 Measure the outside diameter of the piston with a micrometer and the inside diameter of the cylinder bore and compare it to the Specifications at the beginning of this Chapter. If either the piston or the cylinder needs to be replaced, both should be replaced together, Remove the spring from the piston and check it for weakness or damage.

8 With the assembly out of the crankcase, wipe the cavity clean and inspect it for the presence of any crankcase oil, which would mean a new oil seal is needed in the cavity **(see illustration).** To replace this, pull out the clutch pushrod and pry the old seal out, drive the new one in using a suitable sized socket.

Reassembly and installation

9 If the long pushrod was removed, grease it lightly and insert it into the oil seal. On 1985 through 1988 700/750 Magna models, the gold anodized end of the pushrod should be on the slave cylinder side of the engine.

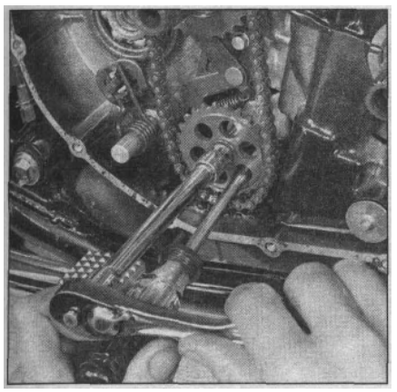
10 Assemble the slave cylinder by attaching the spring to the piston and installing the piston into the cylinder body with the oil seal side facing out. Prior to installing the piston or piston seal, lubricate them with a medium grade high-temperature silicon grease or brake fluid.

11 Installation of the assembly is the reverse of the removal procedure, while noting the following.

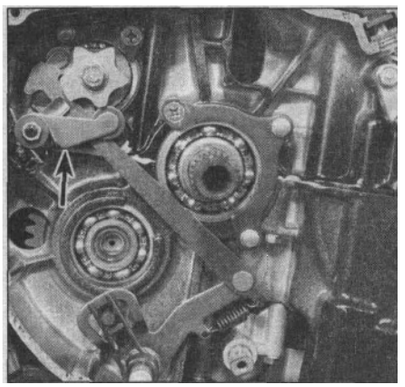
a) Install the insulating gasket between the slave cylinder and crankcase.
b) New sealing washers should be used on each side of the fluid line banjo bolt
c) On later models ensure that the line coupling butts against the cast tab on the slave cylinder.
d) Fill the clutch fluid reservoir with fresh fluid and bleed the system as described in Chapter 1.

17 External gearshift mechanism - removal, inspection and installation

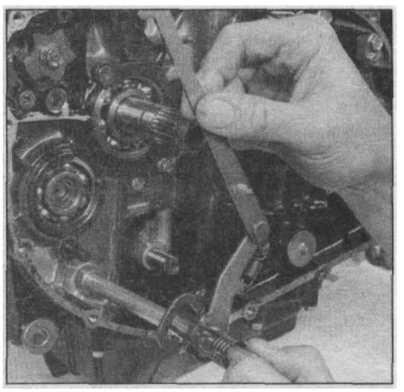
Note: *The gearshift mechanism components can be removed with the engine in the frame. If work is being carried out with the engine removed ignore the preliminary steps.*



17.4 Method of locking oil pump driven sprocket while bolt is loosened



17.6 Remove its nut and withdraw the drum stopper arm (arrow)



17.7 Support the claw arm as shown and withdraw the gearshift splindle from the crankcase

Removal

Refer to illustrations 17.4, 17.6, 17.7and 17.8

1 Remove the left rear crankcase cover. The cover is retained by a single bolt on all 700/750 Sabre models and 1982 through 1984 700/750 Magna models; note the long collar inside the cover. On all 1100 models and 1985 through 700/750 Magna models the cover is retained by three bolts.

2 Remove the gearshift lever, as described in Section 18.

3 Remove the clutch assembly as described in Section 14.

4 Insert a long screwdriver through one of the holes of the oil pump sprocket, located below the clutch, and engage it in the crankcase opening behind the sprocket **(see illustration).** This will keep the sprocket from rotating. Now remove the sprocket bolt, disengage the sprocket from the chain and lift it out.

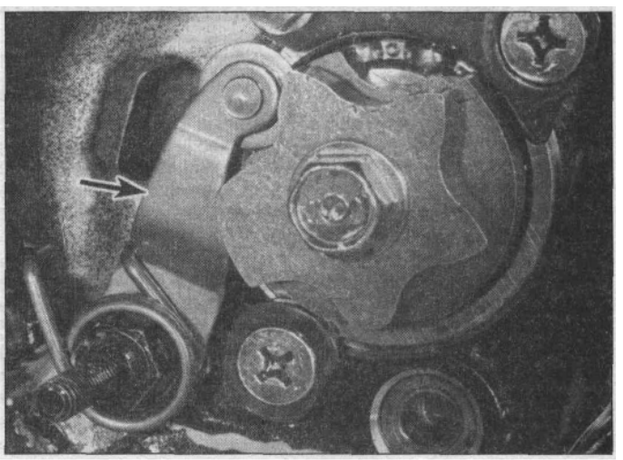
5 Lift off the drive chain, and remove the oil pump drive sprocket from the mainshaft.

6 Make a note of the engaged position of the spring, then remove the nut that retains the drum stopper arm and lift the arm off along with its spring, collar and washers **(see illustration).**

7 Withdraw the complete gearshift spindle assembly from the crankcase **(see illustration).** The springs do not need to be removed from the spindle unless they are being replaced.

8 Disengage the spring from the neutral stopper arm. Remove the bolt and lift off the arm **(see illustration).**

9 Remove the shift drum cam plate bolt and lift off the cam plate. Do not lose the five pins in the cam plate.



17.8 Remove its bolt and lift off the neutral stopper arm (arrow)

Inspection

10 Clean all the parts with solvent and dry them thoroughly.

11 Examine the gearshift spindle for wear, particularly at the upper arm shift pawls. Make sure the shaft is not bent and check the springs for cracks and excessive stretch; the small spring at the upper arm join was liable to fracture at its upper connecting hook on early models - ensure that this spring is replaced with the modified type, marked with yellow paint. The upper arm must be straight and free to move at its pivot point.

12 Check the stopper arm, the plate and the pins for excessive wear and replace any worn or damaged parts with new ones.

13 The gearshift shaft oil seal is located behind the output gear case on the left side of the lower crankcase half. If signs of oil leakage are evident, remove the output gear case (see Section 23) and with the gearshift shaft removed, pry the oil seal from position. Use a socket wrench as a drift to drive the new seal squarely into the crankcase.

Installation

14 If removed, insert the five pins in the cam plate. Position the cam plate on the shift drum so that the shift drum dowel pin is engaged in the cam plate hole. Apply thread sealant to the cam plate bolt and tighten it securely.

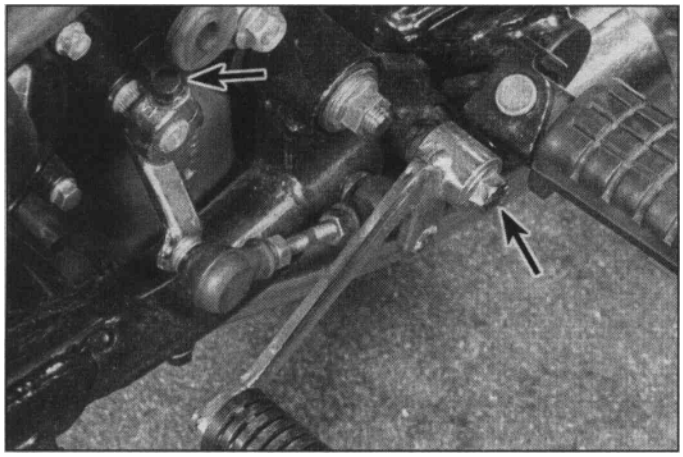
15 Install the neutral stopper arm and bolt. Again, apply thread sealant to the bolt before installing it. Slip the spring over the bolt and engage it with the stopper arm and crankcase boss.

16 If the springs were removed from the gearshift spindle, assemble them. Apply a smear of grease to the gearshift spindle and wrap its splines with electrical tape, so they won't damage the seal as the shaft is installed. Insert it through the crankcase ensuring that the return spring is properly engaged on the crankcase stud. Also, be sure the upper arm is correctly positioned in relation to the cam plate.

17 Assemble the drum stopper arm, spring, washers and collar into position and secure them with the retaining nut. Be sure the spring is properly engaged. On later models, the inner washer has an extension which engages the cast rib in the bottom of the casing.

18 Having removed any tape from its splines, install the gearshift lever and operate the gearshift linkage mechanism to be sure it works smoothly. Be sure the punch mark on the lever aligns with the mark on the gearshift spindle.

19 The remainder of the components are installed in the reverse order of removal. When installing the oil pump drive sprocket, the drive dogs must face outwards. If the pump driven sprocket has an IN marking on one of its faces, position the sprocket with the IN marking facing the crankcase.



18.1 Gearshift lever-to-footpeg and gearshift shaft bolts

18 Gearshift lever - removal, and installation

Removal

Sabre models

Refer to illustration 18.1

1 Remove the shift lever bolt that attaches it to the footpeg bracket **(see illustration).**

2 Remove the left crankcase rear cover. Remove the pinch bolt that attaches the lever assembly to the gearshift shaft and slide it off of the shaft.

3 If only the gearshift lever needs to be replaced, loosen the locknut on the threaded link and unscrew the balljoint from the stud. The balljoint and lever are replaced as one unit. **Note:** *Prior to loosening the stud nuts, mark them with a dot of paint to show the original adjustment position.*

4 Both balljoints should be inspected for freedom of movement. If there is any roughness or binding they should be replaced by unscrewing them from the threaded link.

Magna models

5 Remove the left crankcase rear cover.

6 Disconnect the gearshift lever from the gearshift shaft.

7 Remove the left footpeg bracket bolts and lift off the bracket with the gearshift lever.

8 Unscrew the attaching bolt and lift the gearshift lever off of the bracket.

9 Dismantle the balljoints and threaded link as described in Steps 3 and 4 above.

Installation - all models

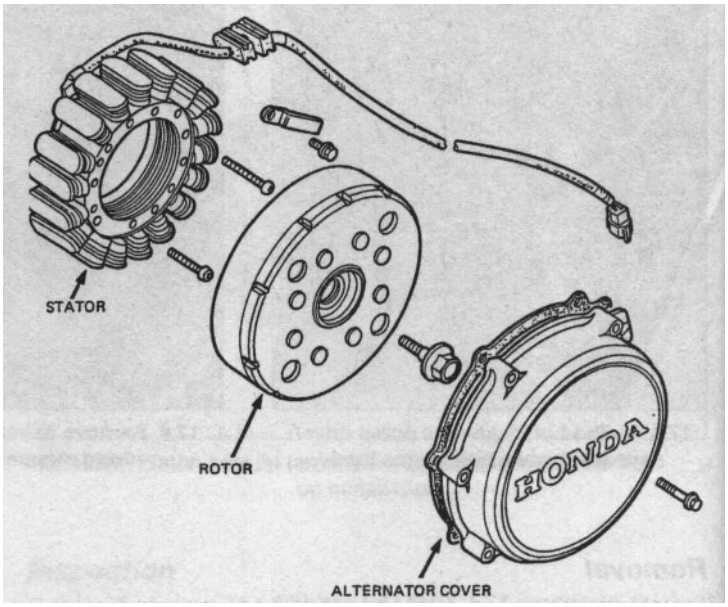
10 Installation is the reverse of the removal procedure, noting the following.

a) When installing the gearshift lever onto the gearshift shaft ensure that the two punch marks line up.

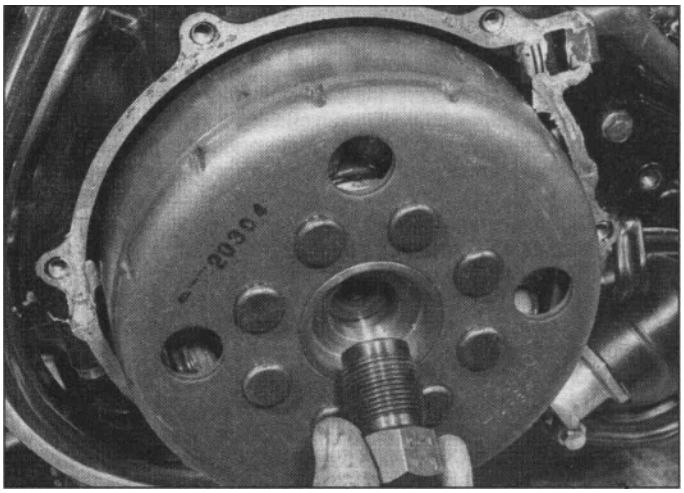
b) If the balljoints positions were disturbed, ensure that they are returned to their original positions on the threaded link. If no record was made, or new parts are being fitted, adjust the threaded link so that pedal height is comfortable in the riding position.

19 Alternator - removal and installation

Note: To *remove the alternator rotor the special Honda rotor puller, Part Number 07733-0020001 or 07933-3290001, or a pattern equivalent will be required. Do not attempt to remove the rotor using any other method. The alternator can be removed with the engine in the frame. If work is being carried out with the engine removed, ignore the preliminary steps.*



19.1 Alternator component parts (early type shown)



19.3 Rotor must be withdrawn using center-bolt puller

Removal

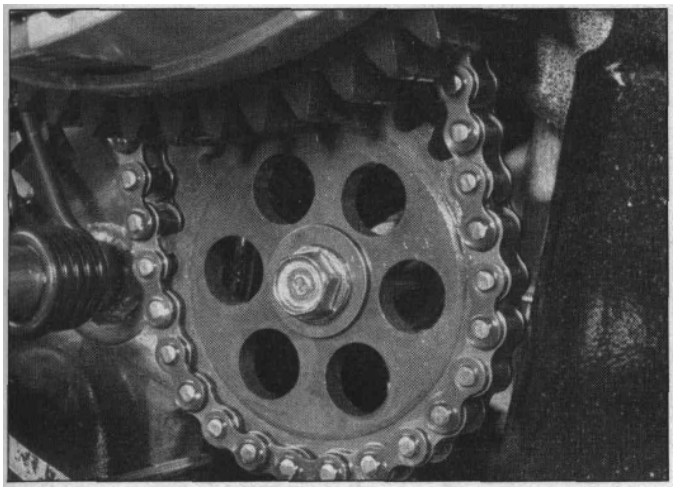
Refer to illustrations 19.1 and 19.3

1 There will be a certain amount of oil loss when the alternator cover is removed, so make sure the motorcycle is positioned upright (on its main stand if one is fitted) and place a drain tray under the cover. Remove its six bolts and withdraw the alternator cover from the left side of the engine **(see illustration).**

2 In order to remove the rotor mounting bolt, the rotor must be kept from turning. Honda dealers can supply service tools to engage the holes in the rotor face or a band-type strap wrench to fit around the rotor periphery. Alternatively, try one of the following methods.

a) A strap wrench can be used on the periphery of the rotor to hold it still.

b) The engine can be locked through the transmission. If the engine is in the frame, shift it into sixth gear and have an assistant sit on the motorcycle while applying the rear brake hard.



21.15 Oil pump driven sprocket bolt

3 Once the rotor bolt has been removed, the rotor can be pulled from its shaft by screwing the special Honda tool (see Note at beginning of this section) into its thread. The tool threads into the rotor and pushes against the crankshaft to draw the rotor off its taper **(see illustration).** A bolt of the correct diameter and thread size would also work if one large enough is available. Carefully tighten the tool until the rotor pops off of the shaft. **Caution:** *Be careful not to drop or strike the rotor or its magnetism will be impaired. Do not, under any circumstances use a common gear puller to remove the rotor, as damage will result.*
4 If the Woodruff key in the crankshaft taper is loose, keep it with the rotor for safekeeping.
5 If the stator needs to be removed, first remove the seat and left side cover from the motorcycle to gain access to its wiring connector. Disconnect the connector and free the wiring from any clamps and ties on the frame.
6 Remove the wiring harness clamp from inside the alternator housing and free the grommet from the casing.
7 Remove the stator mounting screws and lift it off, complete with the harness.

Installation

8 Installation is the reverse of the removal procedure, with the following notes.

a) Degrease the rotor and crankshaft tapers and remove any metal particles of swarf from the rotor magnet. Remove all traces of gasket from the cover and crankcase mating surfaces.
b) Be sure the wiring harness is properly routed and secured with the wire bands.
c) The rotor is installed on the crankshaft by aligning its groove with the Woodruff key and sliding it on. Install the mounting bolt and, while keeping the rotor from turning, tighten the bolt to its proper torque.
d) Top up the engine oil if work is being carried out with the engine in the frame (see Chapter 1).

20 Oil pan and strainer - removal and installation

Note: *The oil pan and strainer can be removed with the engine in the frame. If work is being carried out with the engine removed ignore the preliminary steps.*

Removal

1 Place the motorcycle on its main stand or an auxiliary stand if no main stand is fitted. Remove the front cylinder bank exhaust pipes (see Chapter 4). On 1987 and 1988 700/750 Magna models, remove the belly fairing (see Chapter 6). On 1986 through 1988 California models, detach the secondary air supply system air suction valve from the front of the oil pan.
2 Drain the engine oil (see Chapter 1).
3 Remove the nine oil pan bolts and lift off the oil pan. Have a drain pan handy to catch any residual oil.
4 Remove the oil strainer from the oil pump **(see illustration 21.18).**

Installation

5 Clean the strainer thoroughly with solvent and reinstall it on the oil pump, taking care not to displace the sealing ring on its union.
6 While the oil pan is removed, check the operation of the pressure relief valve as described in Section 22.
7 Clean the oil pan interior thoroughly and install it on the engine (if its sealing ring is damaged, replace it with a new one). Install the exhaust pipes, air suction valve and belly fairing (where fitted), then fill the crankcase with the proper amount and grade of oil (see Chapter 1).

21 Oil pump - pressure check, removal, overhaul and installation

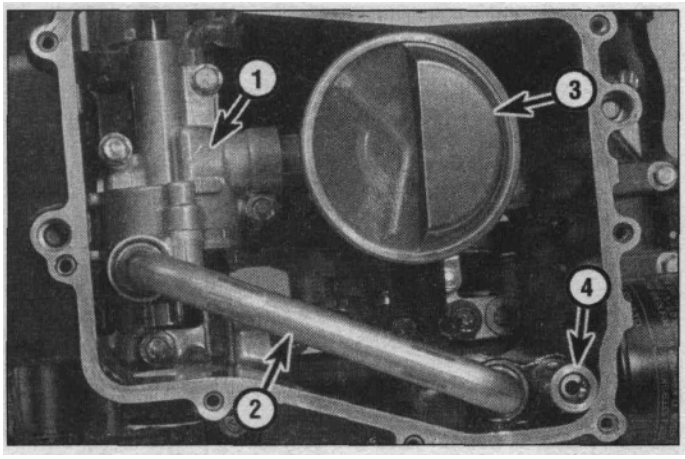
Pressure check

1 To check the oil pressure, a suitable gauge and adapter piece (which screws into the oil pressure switch thread) will be needed.
2 Check the oil level (Chapter 1). Warm the engine up to normal operating temperature then stop it.
3 Remove the oil pressure switch as described in Chapter 8.
4 Screw the adapter into the oil pressure switch threads in the top of the crankcase and connect the gauge to the adapter.
5 Start the engine and increase the engine speed to 5000 rpm while watching the gauge reading. The oil pressure should be similar to that given in the Specifications at the start of this Chapter.
6 If the pressure is significantly lower than the standard, either the relief valve is stuck open, the oil pump is faulty, the oil pump pick-up strainer is blocked or there is other engine damage. Begin diagnosis by checking the oil pump pick-up strainer and relief valve, then the oil pump. If those items check out okay, chances are the bearing oil clearances are excessive and the engine needs to be overhauled.
7 If the pressure is too high, the relief valve is stuck closed. To check it, see Section 22.
8 Stop the engine and unscrew the gauge and adapter from the crankcase.
9 Install the oil pressure switch as described in Chapter 8.

Removal

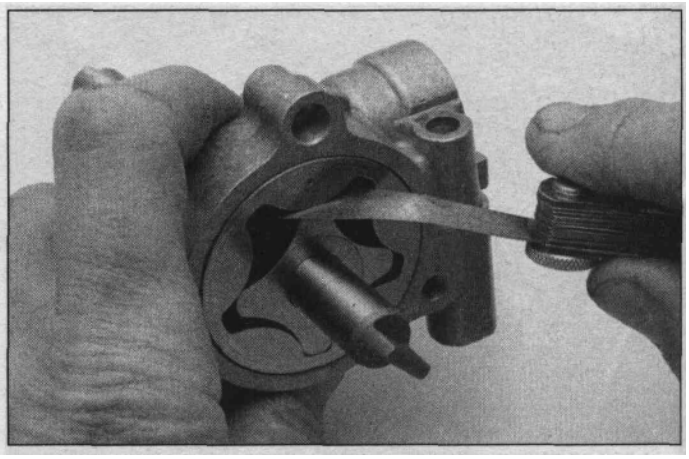
Refer to illustrations 21.15 and 21.18

Note: *The oil pump can be removed with the engine in the frame; if the engine has already been removed ignore the steps which don't apply.*
10 Drain the engine oil.
11 Remove the oil pan (see Section 20).
12 On all models remove the rear brake pedal, and on 1100 Magna models also remove the right footpeg.
13 Remove the right crankcase cover bolts. There are two different size bolts, so make a note of their location or store them in the old gasket when this has been removed.
14 Tap the crankcase cover gently with a soft-faced hammer to break the gasket seal, then pull it away from the engine. Do not pry between the gasket sealing surfaces, as damage and eventually oil leaks will occur. Discard the old gasket and remove the dowels for safekeeping in they are loose.
15 Locate the oil pump driven sprocket, directly below the clutch assembly, and remove the sprocket bolt and washer **(see illustration).** Hold the sprocket in place in order to loosen the bolt by inserting a screwdriver through one of the sprocket holes and engaging it in the crankcase opening behind the sprocket **(see illustration 17.4).**

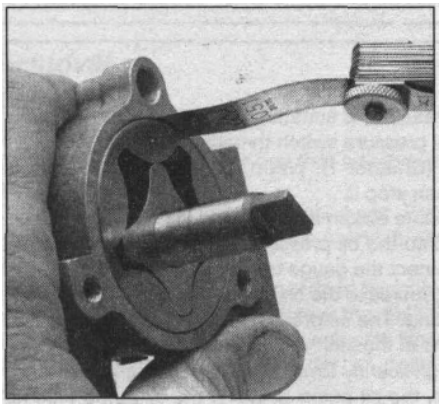


21.18 Oil pan component locations

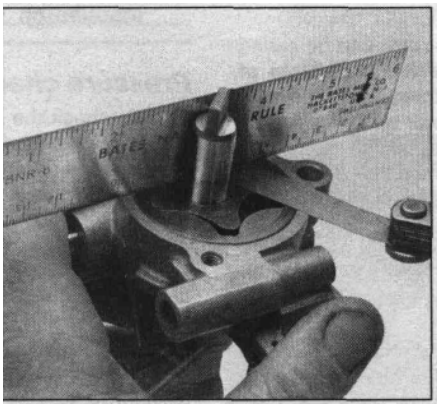
1 Oil pump
2 Oil pass pipe
3 Oil strainer
4 Oil pressure relief valve



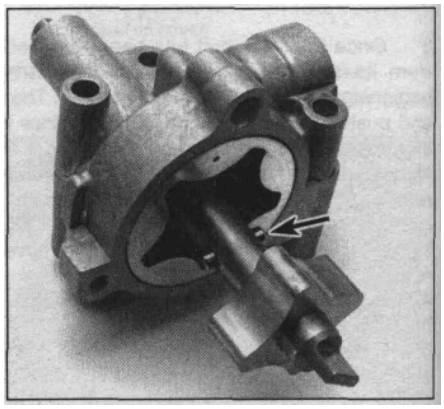
21.26a Measuring oil pump inner-to-outer rotor clearance



21.26b Measuring oil pump outer rotor-to-body clearance



21.26c Use a straightedge and feeler blades to measure rotor end clearance



21.29 Engage inner rotor slots with drive pin (arrow) on installation

16 Disengage the sprocket from the chain and remove it.
17 Remove the water pump on all models except the 1985 through 1988 700/750 Magna models (see Chapter 3).
18 Remove the oil strainer and lift out the oil pass pipe **(see illustration).** Check the condition of the O-rings on both ends of the pass pipe. If they are nicked or damaged, replace them with new ones.
19 Remove the oil pump mounting bolts and lift out the pump.
20 If the oil pump is to be disassembled, straighten and remove the pin that retains the oil strainer stay to the oil pump. Check the oil strainer stay O-rings for damage and replace them if necessary.

Overhaul

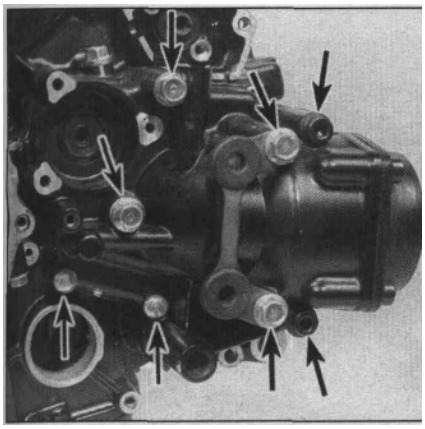
Refer to illustrations 21.26a, 21.26b, 21.26c and 21.29

21 Remove the three bolts that secure the oil pump body cover and lift it off. Do not lose the dowel pin.
22 Withdraw the rotor shaft and inner rotor from the body and remove the drive pin from the shaft. Separate the inner rotor from the shaft.
23 Remove the outer rotor from the body.
24 Clean the parts with solvent and dry them thoroughly. If available, use compressed air to blow out all of the passages.
25 Check the entire pump body and cover for cracks and evidence of wear. Look closely for a ridge where the rotors contact the body and cover.
26 Reassemble the rotors and the shaft in the pump body and use feeler gauges to check the inner rotor-to-outer rotor clearance, the outer rotor-to-pump body clearance and the rotor end clearance **(see illustrations).**
27 If the oil pump clearances are excessive, or if excessive wear is evident, replace the oil pump as a complete unit.
28 As the parts are assembled, lubricate them liberally with clean engine oil or grease.
29 Install the outer rotor in the pump body. Be sure the indented mark in the rotor faces away from the body. Slip the drive pin through the shaft, then slide the inner rotor onto the shaft and engage the slots in the rotor with the drive pin ends **(see illustration).**
30 Insert the shaft through the pump body and mesh the rotors. Install the cover (with the dowel pin in place) and tighten the screws evenly and securely.
31 Make sure the pump operates smoothly.

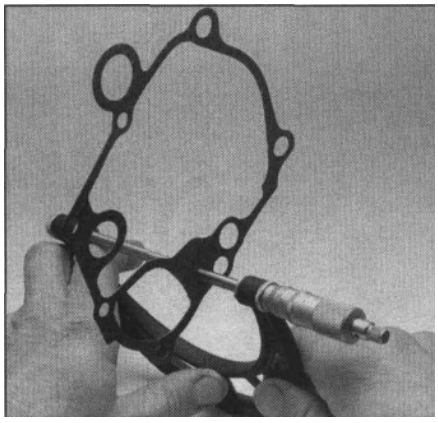
Installation

32 Installation is the reverse of the removal procedure with the following notes:

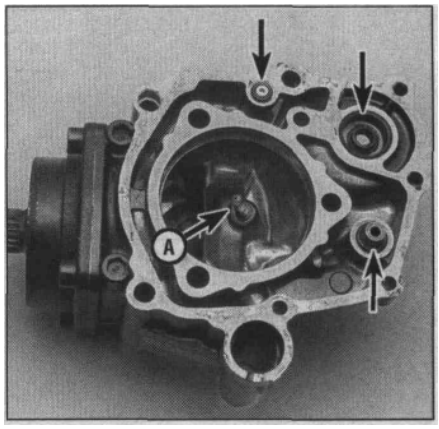
a) On 1985 through 1988 700/750 Magna models, where the water pump remained in place, mesh the oil pump and water pump driveshaft ends.
b) When installing the strainer stay to the oil pump, use a new pin. Also, be sure the O-rings are properly installed on the strainer stay and pass pipe.
c) If the oil pump driven sprocket has an IN marking on one of its faces, this must be installed so that it faces the crankcase.
d) Following installation, fill the crankcase with the proper amount and grade of new engine oil. Refer to Chapter 1, if necessary.



23.2 Release all eight bolts (arrows) to release **output gearcase from crankcase and countershaft bearing holder**



23.4 Measuring gearcase gasket thickness (1982 models)



23.5 O-ring and pushrod oil seal positions (arrow). Check that oil nozzle (A) is clear.

22 Oil pressure relief valve - removal, inspection and installation

Note: *The pressure relief valve can be removed with the engine in the frame.*

Removal

1 Remove the oil pan as described in Section 20.

2 Pull the oil pressure relief valve out of its location in the crankcase, next to the oil pass pipe **(see illustration 21.18).**

Inspection

3 Push the plunger into the relief valve body and check for free movement. If the valve operation is sticky it must be replaced (apart from the O-ring, individual parts are not available). It is, however, possible to dismantle the valve for cleaning; using snap-ring pliers, remove the snap-ring from the valve end and withdraw the plain washer, spring and piston from the body.

Installation

4 Use a new O-ring on the relief valve body and push it into the crankcase. Install the oil pan (see Section 20).

23 Output gearcase - removal, inspection and installation

Note: *The output gear assembly must be removed with the engine out of the frame.*

Removal

Refer to illustrations 23.2, 23.4 and 23.5

1 Remove the engine from the frame (see Section 5). Release its cover and remove the gearchange/neutral/OD switch and its wiring (see Chapter 8). Remove the water pump (see Chapter 3).

2 Remove all eight output gear assembly case bolts, and store them in a cardboard template of the case to ensure they can be returned to their original locations **(see illustration).** This will detach the case from the crankcases and from the output gear bearing housing, leaving the output gear and bearing housing installed on the countershaft.

3 Don't pry the output gear case off the crankcase; if it is stubborn, tap it with a soft-faced hammer while simultaneously pulling it off the casing and rotating the output shaft stub to help disengagement of the helical gears. **Caution:** *There will be a certain amount of resistance due to the countershaft bearing holder being an interference fit in the output shaft case - ensure that the output case is withdrawn squarely to prevent the bearing holder tying in the case bore.*

4 After removing the gearcase peel off the case gasket; a new one must be fitted on installation. On 1982 models the gasket must be inspected closely for a thickness marking. If marks can be found, be sure to use a new gasket of the same thickness, but if not use a micrometer to measure the thickness of the gasket **(see illustration).** When doing this, be sure the gasket is not torn at the point of measurement and due to the old gasket having been crushed slightly in use, add 0.05 mm (0.002 in) to the measurement to arrive at the required thickness of the replacement. **Note:** *Correct gasket thickness is critical to the alignment of the output gears.* On all later models only one thickness gasket is available so this check is not necessary.

5 Inspect the condition of the visible O-rings and pushrod oil seal **(see illustration).** If they show any signs of hardening, cracking or other damage they must be replaced. Also check the condition of the gearshift shaft oil seal located at the bottom of the output gearcase gasket surface on the crankcase. Due to its inaccessibility, it is a good idea to replace it at this stage if in an doubt about its condition (the gearshift shaft will have to be removed first - see Section 17).

6 Before disturbing the position of the countershaft, make thin alignment marks with a scribe or white paint across the bearing holder and crankcase as an aid to installation of the output gearcase.

Inspection

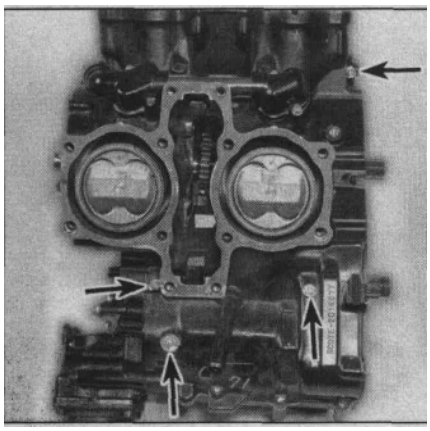
7 Because of the critical nature of the output gear assembly and the number of special tools needed to disassemble, inspect and reassemble it, the assembly should be taken to a Honda dealer if overhaul is required. This applies equally to removal of the helical gear and bearing on the countershaft end, although removal and disassembly of the countershaft gears can be accomplished in the home workshop (see Section 31).

Installation

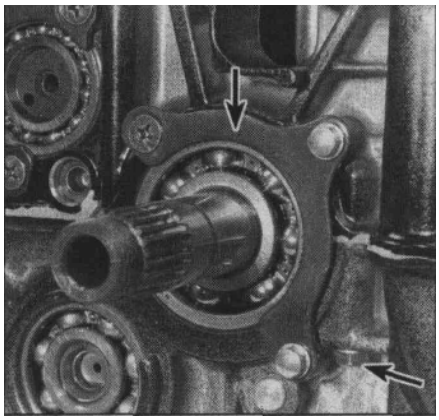
Note: *If a new output gearcase or new crankcase, new countershaft or bearing has been installed, the countershaft spacer clearance (endfloat) must be measured and if necessary adjusted, as described in Section 31.*

8 Using the marks made on removal, check that the countershaft bearing holder-to-crankcase alignment is correct; this will ensure that the holes line up when the output gearcase is fitted.

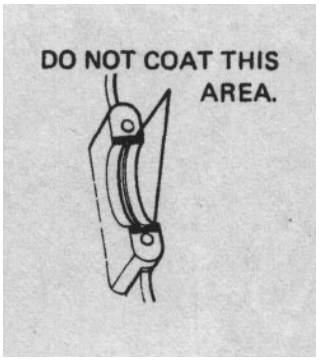
9 Fit a new gasket on the crankcase, having selected the correct thickness gasket on 1982 models. Check that the new O-rings and the dowel are in position and make sure any shims found when removing the output gearcase are installed against the bearing holder. Install the output gearcase on the crankcase and tap it squarely onto the bearing holder shoulder using a soft-faced hammer, rotating the output shaft stub to help the helical gears engage.



24.2 Upper crankcase half bolts (arrows) - rear three bolts have washers under their heads



24.3 Mainshaft bearing retaining plate and hidden crankcase bolt (arrows)



24.10 Do not apply sealant to this area of main bearing mating surfaces

10 Install the gearcase mounting bolts in their original positions and tighten them to the specified torque.
11 Refit the water pump (see Chapter 3), gearchange/neutral/OD switch (see Chapter 8), and engine (see Chapter 5).

24 Crankcase - separation and reassembly

Separation

Refer to illustrations 24.2 and 24.3

1 Prior to separating the crankcase halves, the engine must be removed from the frame as described in Section 5 and the following components removed from the engine.

Cylinder heads (Section 10)
Camchain fens/oner *guides (Section 8)*
Starter clutch (Section 13)
Clutch (Section 14)
Pulse generators (Chapter 4)
Oil pressure switch (Chapter 8)
Alternator rotor and stator (Section 19)
Water pump (Chapters)
Gearchange/neutral/OD switch (Chapter 8)
External gearshift linkage (Section 17)
Starter motor (Chapter 8)
Oil pump (Section 21)
Output gearcase (Section 23)

2 Remove the four upper crankcase bolts **(see illustration).**
3 Remove the mainshaft bearing holder by removing the screw and two bolts. Also remove the crankcase bolt located behind the holder, across the casing joint **(see illustration).**
4 Turn the engine over so it is resting on the upper half of the crankcase and remove the remaining 24 (1987 and 1988 700/750 Magnas) or 28 (all other models) lower crankcase bolts. To prevent distortion of the case, loosen the bolts evenly in a criss-cross pattern for 1987 and 1988 700/750 Magnas, or in a reverse of the tightening sequence for all other models. The bolts are of differing lengths, and some have washers under their heads; make up a cardboard template of the lower crankcase so that the bolts can be stored in their original locations.
5 Gently tap the lower case with a soft-faced hammer to break the seal, then carefully lift it away from the upper case. **Caution:** Do not *under any circumstances pry between the cases to separate them as damage to the sealing surfaces will result.* If resistance is encountered, double check to make sure that all of the bolts have been removed.
6 To completely strip the crankcase, refer to the following Sections to remove the pistons, connecting rods, crankshaft, transmission shafts and shift drum/forks.

Reassembly

Refer to illustrations 24.10, 24.12a and 24.12b

Note: *If new crankcases, or a new output gearcase, countershaft or countershaft bearing have been fitted, the countershaft endfloat must be checked before assembling the case halves (see Section 31).*
7 Prior to assembling the crankcase halves, be sure the shift drum and forks, transmission shafts, crankshaft (with camchains), pistons and connecting rods have been installed.
8 Clean the mating surfaces of both crankcase halves with lacquer thinner or acetone.
9 If not done previously, apply molybdenum disulfide grease to the shift fork grooves of the transmission gears.
10 Apply a thin coat of liquid gasket sealant to the mating surfaces of both crankcase halves. **Note:** *Do not apply sealant to the area near the main bearings* **(see illustration).** Ensure the locating dowel(s) is/are in position.
11 Carefully lower the crankcase half onto the upper crankcase, being sure to align the shift fork claws with the gear fork grooves.
12 With the crankcase halves pressed together, install the lower crankcase bolts, being sure they are installed in their original locations. Tighten the bolts evenly, in two or three steps to the specified torque, noting that the torque differs according to thread diameter. On 1987 and 1988 700/750 Magnas tighten them in a criss-cross pattern, starting with the 9 mm main bearing bolts first; on all other models follow the tightening sequence **(see illustrations).**
13 Turn the engine over so it is resting on the lower crankcase. Install the four upper crankcase bolts, again tightening them evenly and in a criss-cross pattern to their proper torque. **Note:** *Where fitted, ensure the plain washers are installed with the three rear bolts.*
14 Install the crankcase bolt located behind the mainshaft bearing holder, then install the bearing holder and tighten it securely.
15 When installing the output gearcase, refer to Section 23 for the proper procedure, including new gasket selection on 1982 models.
16 The remainder of the reassembly sequence is the reverse of the dismantling.

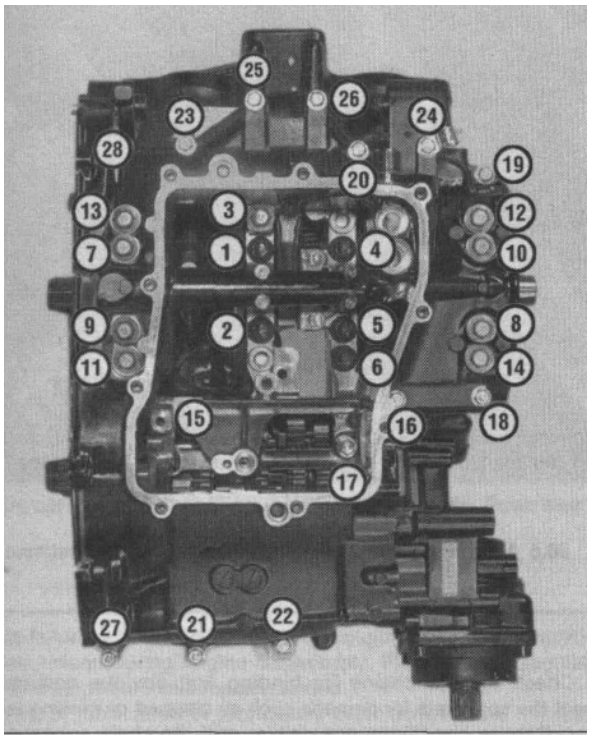
25 Crankcase - inspection and servicing

1 After the crankcases have been separated and the crankshaft and transmission components have been removed, the crankcases should be cleaned thoroughly with new solvent and dried with compressed air.

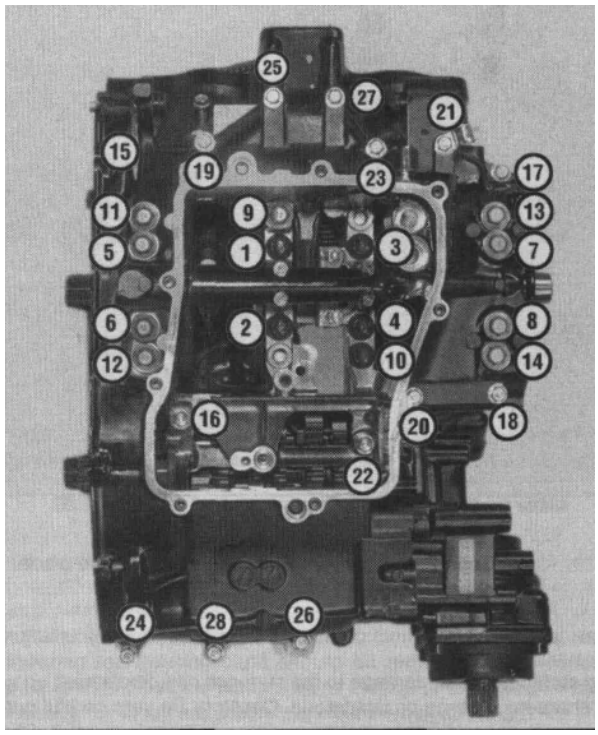
Cylinder bores

Refer to illustration 25.3

Note: *Don't attempt to separate the liners from the cylinder block.*



24.12a Lower crankcase bolt tightening sequence - 1982 through 1985 700/750 Sabre models, 1982 through 1984 700/750 Magna models, and all 1100 models



24.12b Lower crankcase bolt tightening sequence - 1985 and 1986 700 Magna models

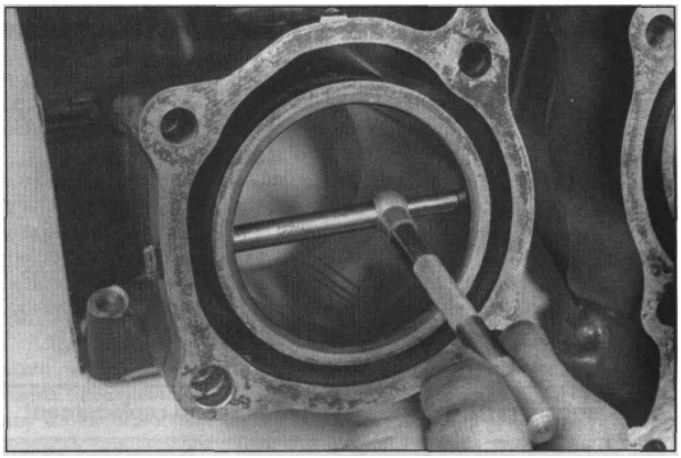
2 Check the cylinder walls carefully for scratches and score marks.

3 Using the appropriate precision measuring tools, check each cylinder's diameter **(see illustration).** Measure near the top, center and bottom of the cylinder bore, parallel to the crankshaft axis. Next, measure each cylinder's diameter at the same three locations across the crankshaft axis. Compare the results to this Chapter's Specifications. If the cylinder bores are tapered, out-of-round, worn beyond the specified limits, or badly scuffed or scored, have them rebored and honed by a dealer service department or a motorcycle repair shop. If a rebore is done, oversize pistons and rings will be required as well. Honda produce four sizes of oversize pistons (see Section 29).

4 As an alternative, if the precision measuring tools are not available, a dealer service department or motorcycle repair shop will make the measurements and offer advice concerning servicing of the cylinders.

5 If they are in reasonably good condition and not worn to the outside of the limits, and if the piston-to-cylinder clearances can be maintained properly (see Section 29), then the cylinders do not have to be rebored; honing is all that is necessary.

6 To perform the honing operation you will need the proper size flexible hone with fine stones, or a "bottle brush' type hone, plenty of light oil or honing oil, some shop towels and an electric drill motor. Hold the upper crankcase half in a vise (cushioned with soft jaws or wood blocks) when performing the honing operation. Mount the hone in the drill motor, compress the stones and slip the hone into the top of the cylinder. Lubricate the cylinder thoroughly, turn on the drill and move the hone up and down in the cylinder at a pace which will produce a fine crosshatch pattern on the cylinder wall with the crosshatch lines intersecting at approximately a 60(тут за цифро занчок бесконечности был) angle. Be sure to use plenty of lubricant and do not take off any more material than is absolutely necessary to produce the desired effect. Do not withdraw the hone from the cylinder while it is running. Instead, shut off the drill and continue moving the hone up and down in the cylinder until it comes to a complete stop, then compress the stones and withdraw the hone. Wipe the oil out of the cylinder and repeat the procedure on the other cylinders. Remember, do not remove too much material from the cylinder wall. If you do not have the tools, or do not desire to perform the honing operation, a dealer service department or motorcycle repair shop will generally do it for a reasonable fee.



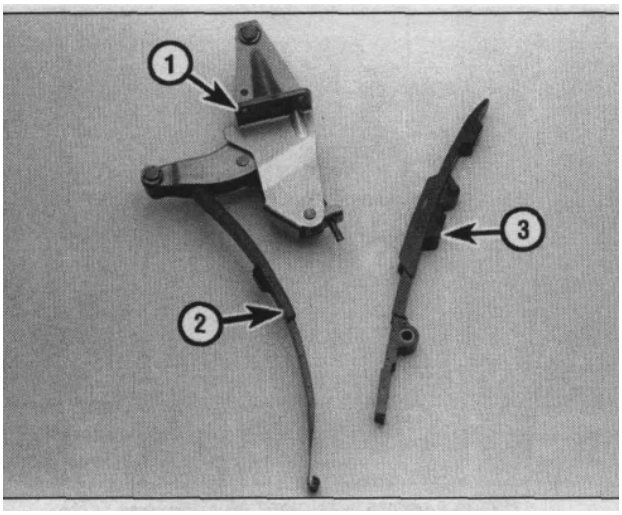
25.3 Measuring cylinder bore diameter

7 Next, the cylinders must be thoroughly washed with warm soapy water to remove all traces of the abrasive grit produced during the honing operation. Be sure to run a brush through the bolt holes and flush them with running water. After rinsing, dry the cylinders thoroughly and apply a coat of light, rust-preventative oil to all machined surfaces.

Crankcase castings

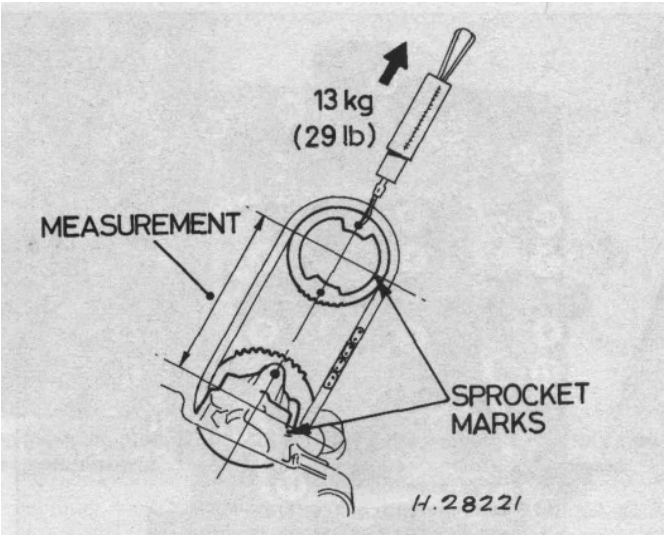
8 Remove any oil passage plugs that haven't already been removed. All oil passages should be blown out with compressed air.

9 All traces of old gasket sealant should be removed from the



26.2 Camchain tensioner components

1 Tensioner
2 Slipper blade
3 Guide blade



26.5 Measuring camchain stretch with a spring balance

mating surfaces. Minor damage to the surfaces can be cleaned up with a fine sharpening stone or grindstone. **Caution:** *Be very careful not to nick or gouge the crankcase mating surfaces or leaks will result. Check both crankcase halves very carefully for cracks and other damage.*

10 Small cracks or holes in aluminum castings may be repaired with an epoxy resin adhesive as a temporary measure. Permanent repairs can only be effected by argon-arc welding, and only a specialist in this process is in a position to advise on the economy or practical aspect of such a repair. If any damage is found that can't be repaired, replace the crankcase halves as a set.

11 Damaged threads can be economically reclaimed by using a diamond section wire insert, of the Helicoil type, which is easily fitted after drilling and re-tapping the affected thread. Most motorcycle dealers and small engineering firms offer a service of this kind.

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

26 Camchains and guides - inspection and replacement *Camchain tensioner, guides and slipper blades*

Note: *The camchain tensioner, guides and tensioner slipper blades can be removed with the engine in the frame (see Section 8). Refer to illustration 26.2*

1 Check for smooth operation of the tensioner, that its spring is unbroken and that there is no wear at any of the tensioner arm or body pivots.

2 Check the guides for deep grooves, cracking and other obvious damage, replacing them if necessary **(see illustration).**

Camchains

Note: *The engine must be removed from the frame and the crankcase halves separated to remove the camchains. Refer to illustration 26.5*

3 Remove the cylinder heads and separate the crankcase halves (see Sections 10 and 24). The camchains can then be slipped off the crankshaft sprockets.

4 Check the camchains for binding and obvious damage and inspect the sprockets for damage such as chipped or missing teeth. If either of these conditions are visible, or if the chain appears to be stretched, both chains and sprockets (crankshaft and both camshaft sprockets) should be replaced as a set.

5 With the use of a spring balance it is possible to measure the amount of chain stretch and compare it with the service limit (see Specifications) to determine whether it needs replacing. With the chain around the sprocket of one camshaft secured in the cylinder head, install the other sprocket in the chain loop and use apply a force of 13 kg (26 lbs) on the spring balance (hooked through the outer sprocket bolt hole). Measure the distance between the sprocket centers or between the sprocket alignment marks **(see illustration).**

6 Installation is a reverse of the removal procedure.

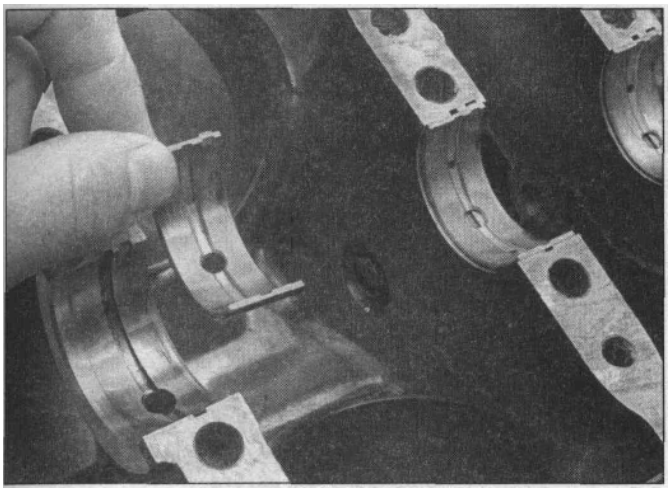
27 Main and connecting rod bearings - general note

1 Even though main and connecting rod bearings are generally replaced with new ones during the engine overhaul, the old bearings should be retained for close examination as they may reveal valuable information about the condition of the engine.

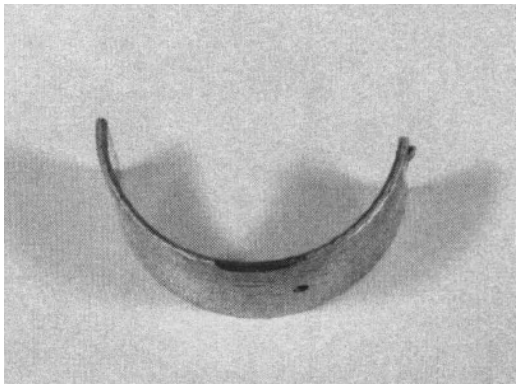
2 Bearing failure occurs mainly because of lack of lubrication, the presence of dirt or other foreign particles, overloading the engine and/or corrosion. Regardless of the cause of bearing failure, it must be corrected before the engine is reassembled to prevent it from happening again.

3 When examining the bearings, remove the main bearings from the case halves and the rod bearings from the connecting rods and caps and lay them out on a clean surface in the same general position as their location on the crankshaft journals. This will enable you to match any noted bearing problems with the corresponding crankshaft journal.

4 Dirt and other foreign particles get into the engine in a variety of ways. It may be left in the engine during assembly or it may pass through filters or breathers. It may get into the oil and from there into the bearings. Metal chips from machining operations and normal engine wear are often present. Abrasives are sometimes left in engine components after reconditioning operations such as cylinder honing, especially when parts are not thoroughly cleaned using the proper cleaning methods. Whatever the source, these foreign objects often end up imbedded in the soft bearing material and are easily recognized. Large particles will not imbed in the bearing and will score or gouge the bearing and journal. The best prevention for this cause of



28.4 Be careful when handling main bearing inserts. Push them to one side to release from casing



28.9 Bearing inserts are color-coded on their sides

bearing failure is to clean all parts thoroughly and keep everything spotlessly clean during engine reassembly. Frequent and regular oil and filter changes are also recommended.

5 Lack of lubrication or lubrication breakdown has a number of interrelated causes. Excessive heat (which thins the oil), overloading (which squeezes the oil from the bearing face) and oil leakage or throw off from excessive bearing clearances, worn oil pump or high engine speeds all contribute to lubrication breakdown. Blocked oil passages will also starve a bearing and destroy it. When lack of lubrication is the cause of bearing failure, the bearing material is wiped or extruded from the steel backing of the bearing. Temperatures may increase to the point where the steel backing and the journal turn blue from overheating.

6 Riding habits can have a definite effect on bearing life. Full throttle low speed operation, or lugging (labouring) the engine, puts very high loads on bearings, which tend to squeeze out the oil film. These loads cause the bearings to flex, which produces fine cracks in the bearing face (fatigue failure). Eventually the bearing material will loosen in pieces and tear away from the steel backing. Short trip riding leads to corrosion of bearings, as insufficient engine heat is produced to drive off the condensed water and corrosive gases produced. These products collect in the engine oil, forming acid and sludge. As the oil is carried to the engine bearings, the acid attacks and corrodes the bearing material.

7 Incorrect bearing installation during engine assembly will lead to bearing failure as well. Tight fitting bearings which leave insufficient bearing oil clearances result in oil starvation. Dirt or foreign particles trapped behind a bearing insert result in high spots on the bearing which lead to failure.

8 To avoid bearing problems, clean all parts thoroughly before reassembly, double check all bearing clearance measurements and lubricate the new bearings with clean engine oil during installation.

28 Crankshaft and main bearings - removal, inspection, bearing selection, oil clearance check and installation

Removal

Refer to illustration 28.4

1 Separate the crankcase halves as described in Section 24.

2 Remove the piston/connecting rod assemblies as described in Section 29. **Note:** *If no work is to be carried out on the piston/connecting rod assemblies there is no need to remove them from the bores. The cylinder heads can be left in position although the camchains should be detached from the camshaft sprockets, and the connecting rod bearing caps should be removed (see Section 29, Steps 2 and 3). Push the pistons up to the top of the bores so that the connecting rod ends are positioned clear of the crankshaft.*

3 Lift the crankshaft out of the upper crankcase half, taking care not to dislodge the bearing inserts.

4 The main bearing inserts can be removed from the crankcase halves by pushing their centers to the side, then lifting them out **(see illustration).** Keep the bearing inserts in order.

Inspection

5 Clean the crankshaft with solvent, using a rifle-cleaning brush to scrub out the oil passages. If available, blow the crank dry with compressed air.

6 Refer to Section 27 and examine the main bearing inserts. If they are scored, badly scuffed or appear to have been seized, new bearings must be installed. Always replace the main bearings as a set. If they are badly damaged, check the corresponding crankshaft journal. Evidence of extreme heat, such as discoloration, indicates that lubrication failure has occurred. Be sure to thoroughly check the oil pump and pressure relief valve as well as all oil holes and passages before reassembling the engine.

7 The crankshaft journals should be given a close visual examination, paying particular attention where damaged bearing inserts have been discovered. If the journals are scored or pitted in any way a new crankshaft will be required. Note that undersizes are not available, precluding the option of re-grinding the crankshaft.

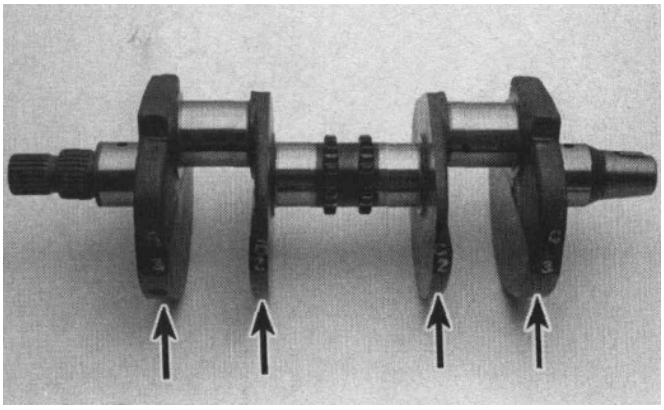
8 Set the crankshaft on V-blocks and check the runout with a dial indicator touching the center main bearing journal, comparing your findings with this Chapter's Specifications. If the runout exceeds the limit, replace the crank.

Bearing selection

Refer to illustrations 28.9, 28.10 and 28.11

9 The main bearing running clearance is controlled in production by selecting one of five (700/750 models) or three (1100 models) grades of bearing insert. The grades are indicated by a color-coding marked on the edge of each insert **(see illustration).** In order, from the thickest to the thinnest, the insert grades are: Black, Blue, Brown, Green and Yellow for 700/750 models and Brown, Green and Yellow for 1100 models. New bearing inserts are selected as follows using the crankshaft journal and crankcase main bearing bore size markings.

10 The standard crankshaft journal diameter is divided into size groups to allow for manufacturing tolerances. The size group of each journal can be determined by the numbers (1, 2 or 3 on 700/750



28.10 Location of main bearing journal size codes (arrows) - also connecting rod journal sizes

models and 1 or 2 on 1100 models) which are stamped on each crank web **(see illustration). Note:** *Ignore the letters as these refer to the crankpin journals.* The numbers indicate the diameter of the crankshaft journal immediately outboard of that web. If the equipment is available, these marks can be checked by direct measurement.

11 The crankcase main bearing bore diameters are also divided into size groups to allow for manufacturing tolerances. The size group of each main bearing bore can be determined using the four codes stamped on the rear outside face of the upper crankcase half **(see illustration).** These will be made up of the letters A, B or C on 700/750 models and I and II or 1 and 2 on 1100 models. The first letter indicates the diameter of the left journal, and the last the diameter of the right journal. If the equipment is available, these marks can be checked by direct measurement.

12 Match the relevant crankcase code with its crankshaft code and select a new set of bearing inserts using the following table.

700/750 models

Crank web mark	Case mark	Insert color
1	A	Yellow 1
B	Green 1	C
Brown 2	A	Green 2
B	Brown 2	C
Black 3	A	Brown 3
B	Black 3	C
Blue		

1100cc models

Crank web mark	**Case mark**	**Insert color**
1	**I or 1**	**Yellow 1**
II or 2	**Green 2**	**I or 1**
Green 2	**II or 2**	**Brown**

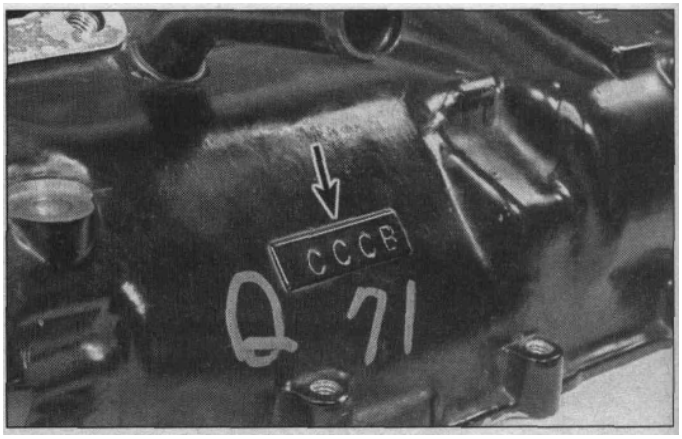
Oil clearance check

13 Whether new bearing inserts are being fitted or the original ones are being re-used, the main bearing oil clearance should be checked prior to reassembly.

14 Clean the backs of the bearing inserts and the bearing locations in both crankcase halves.

15 Press the bearing inserts into their locations, ensuring that the tab on each insert engages in the notch in the crankcase. Make sure the bearings are fitted in the correct locations and take care not to touch any insert's bearing surface with your fingers.

16 There are two possible ways of checking the oil clearance, the first method is by direct measurement (see Step 17 and 23) and the second by the use of a product known as Plastigage (see Steps 18 to 23).



28.11 Main bearing bore diameter codes are stamped in upper crankcase half (arrow)

17 If the first method is to be used, with the main bearing inserts in position, carefully lower the lower crankcase half onto the upper half. Make sure that the shift forks (if fitted) engage with their respective slots in the countershaft gears as the halves are joined. Check that the lower crankcase half is correctly seated. **Note:** *Do not tighten the crankcase bolts if the casing is not correctly seated.* Install all the lower crankcase bolts and following the correct tightening sequence (see Section 24) tighten them to the specified torque. Measure the internal diameter of each assembled pair of bearing inserts. If the diameter of each corresponding crankshaft journal is measured and then subtracted from the bearing internal diameter, the result will be the connecting rod bearing oil clearance.

18 If the second method is to be used, ensure the main bearing inserts are correctly fitted and that the inserts and crankshaft are clean and dry. Lay the crankshaft in position in the upper crankcase.

19 Cut several lengths of the appropriate size Plastigage (they should be slightly shorter than the width of the crankshaft journal). Place a strand of Plastigage on each (cleaned) crankshaft journal, avoiding the oilway.

20 Carefully lower the lower crankcase half onto the upper half. Make sure that the shift forks (if fitted) engage with their respective slots in the countershaft gears as the halves are joined. Check that the lower crankcase half is correctly seated. **Note:** Do *not tighten the crankcase bolts if the casing is not correctly seated and make sure the crankshaft is not rotated as the bolts are tightened.* Install all the lower crankcase bolts and following the correct tightening sequence (see Section 24) tighten them to the specified torque.

21 Loosen and remove the crankcase bolts in a reverse of the tightening sequence, making sure the Plastigage is not disturbed.

22 Compare the width of the crushed Plastigage on each crankshaft journal to the scale printed on the Plastigage envelope to obtain the main bearing oil clearance **(see illustration 29.37).**

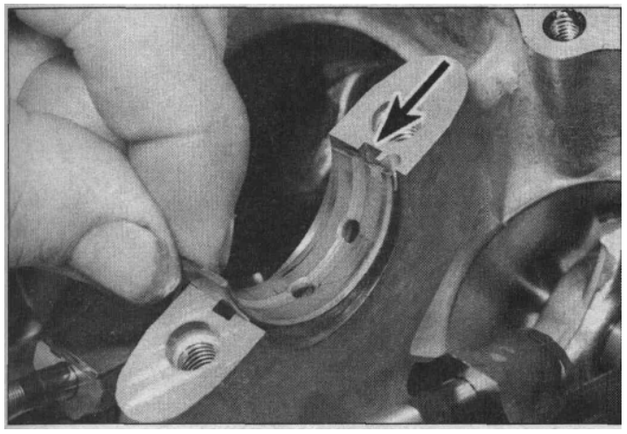
23 If the clearance is not within the specified limits, the bearing inserts may be the wrong grade (or excessively worn if the original inserts are being re-used). Before deciding that different grade inserts are needed, make sure that no dirt or oil was trapped between the bearing inserts and the crankcase halves when the clearance was measured. If the clearance is excessive, even with new inserts (of the correct size), the crankshaft journal is worn and the crankshaft should be replaced.

24 On completion carefully scrape away all traces of the Plastigage material from the crankshaft journal and bearing inserts; use a fingernail or other object which is unlikely to score the inserts.

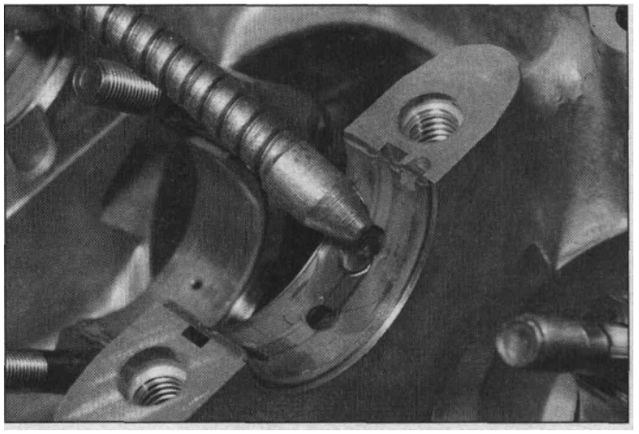
Installation

Refer to illustrations 28.26 and 28.27

25 Clean the backs of the bearing inserts and the bearing recesses in both crankcase halves. If new inserts are being fitted, ensure that all traces of the protective grease are cleaned off using kerosene



28.26 Ensure locating tab engages cutout (arrow) when installing main bearing inserts



28.27 Oil insert liberally before crankshaft is installed

(paraffin). Wipe dry the inserts and crankcase halves with a lint-free cloth.

26 Press the bearing inserts into their locations. Make sure the tab on each insert engages in the notch in the casing **(see illustration).** Make sure the bearings are fitted in the correct locations and take care not to touch any insert's bearing surface with your fingers.

27 Lubricate the bearing inserts in the upper crankcase with clean engine oil **(see illustration).**

28 Lower the crankshaft into position in the upper crankcase.

29 Fit the piston/connecting rod assemblies to the crankshaft as described in Section 29 if they were disconnected.

30 Reassemble the crankcase halves as described in Section 24.

29 Piston/connecting rod assemblies - removal, inspection, bearing selection, oil clearance check and installation

Removal

Refer to illustrations 29.1 and 29.8

1 Separate the crankcase halves as described in Section 24. Before removing the piston/connecting rods from the crankshaft measure the side clearance of each rod with a feeler gauge **(see illustration).** If the clearance on any rod is greater than the service limit listed in this Chapter's Specifications, that rod will have to be replaced with a new one.

2 Using a center punch or paint, mark the relevant cylinder number on each connecting rod and bearing cap (see illustration 1.1 at the beginning of this Chapter).

3 Unscrew the bearing cap nuts and withdraw the cap, complete with the lower bearing insert, from each of the four connecting rods. Push the connecting rods up and off their crankpins, then remove the upper bearing insert. Keep the cap, nuts and (if they are to be re-used) the bearing inserts together in their correct sequence.

4 Remove the ridge of carbon from the top of each cylinder bore. If there is a pronounced wear ridge at the top of each bore, remove it with a ridge reamer.

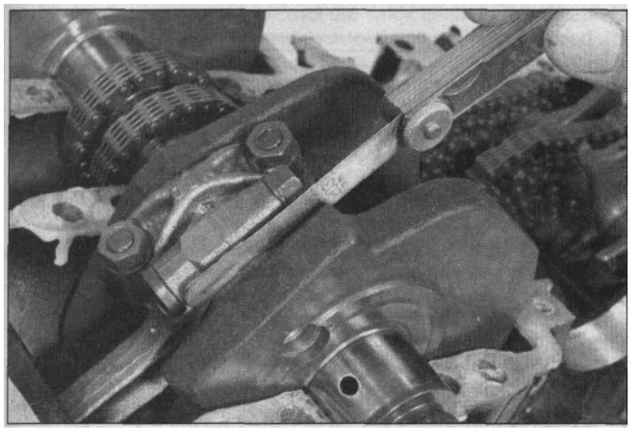
5 Push each piston/connecting rod assembly up and remove it from the top of the bore making sure the connecting rod does not mark the cylinder bore walls. **Caution:** Do *not try to remove the piston/connecting rod from the bottom of the cylinder bore. The piston will not pass the crankcase main bearing webs. If the piston is pulled right to the bottom of the bore the oil control ring will expand and lock the piston in position. If this happens it is likely the ring will be broken.*

6 Immediately install the relevant bearing cap, inserts and nuts on each piston/connecting rod assembly so that they are all kept together as a matched set.

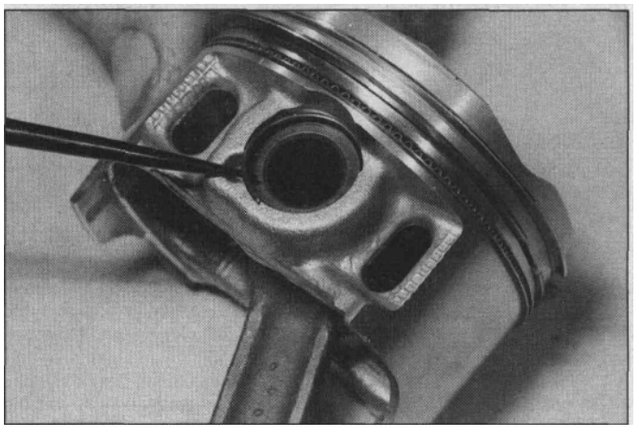
7 Using a sharp scriber, scratch the number of each piston into its crown (or use a suitable marker pen if the piston is clean enough).

8 Support the first piston and, using a small screwdriver or scriber, carefully pry out a circlip from the piston groove **(see illustration).**

9 Push the piston pin out from the opposite end to free the piston from the rod. You may have to deburr the area around the groove to

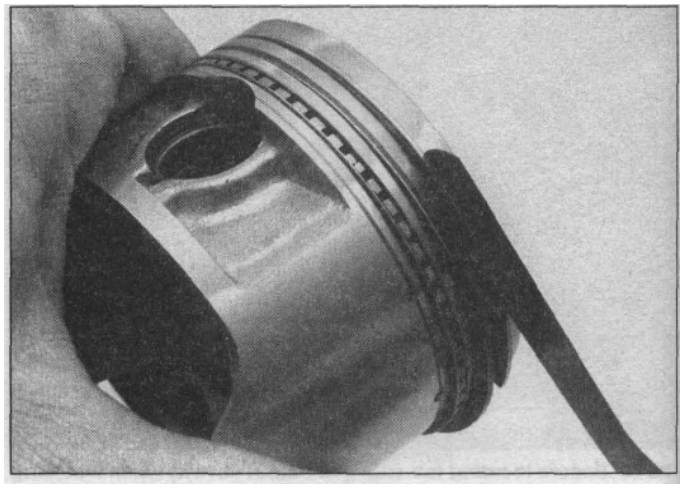


29.1 Measuring connecting rod side clearance



29.8 Pry out the circlip from the piston groove

29.11 Use a ring removal and installation tool to remove top and second piston rings



29.18 Measuring piston ring-to-groove clearance

enable the pin to slide out (use a triangular file for this procedure). If the pin is tight, tap it out using a suitable hammer and punch, taking care not to damage the piston. Repeat the procedure for the other pistons.

Inspection

Refer to illustrations 29.11, 29.18, 29.19, 29.20a, 29.20b and 29.23

Pistons

10 Before the inspection process can be carried out, the pistons must be cleaned and the old piston rings removed.

11 Using a piston ring removal and installation tool, carefully remove the rings from the pistons **(see illustration).** Do not nick or gouge the pistons in the process.

12 Scrape all traces of carbon from the tops of the pistons. A hand-held wire brush or a piece of fine emery cloth can be used once most of the deposits have been scraped away. Do not, under any circumstances, use a wire brush mounted in a drill motor to remove deposits from the pistons; the piston material is soft and will be eroded away by the wire brush.

13 Use a piston ring groove cleaning tool to remove any carbon deposits from the ring grooves. If a tool is not available, a piece broken off an old ring will do the job. Be very careful to remove only the carbon deposits. Do not remove any metal and do not nick or gouge the sides of the ring grooves.

14 Once the deposits have been removed, clean the pistons with solvent and dry them thoroughly. Make sure the oil return holes below the oil ring grooves are clear.

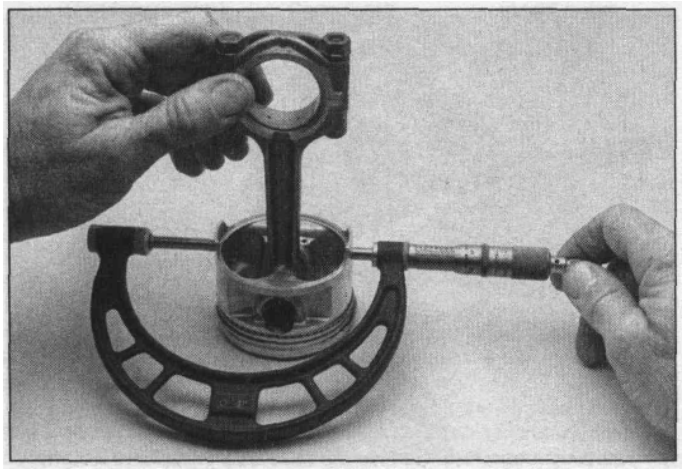
15 If the pistons are not damaged or worn excessively and if the cylinders are not to be rebored, new pistons will not be necessary. Normal piston wear appears as even, vertical wear on the thrust surfaces of the piston and slight looseness of the top ring in its groove. New piston rings, on the other hand, should always be used when an engine is rebuilt.

16 Carefully inspect each piston for cracks around the skirt, at the pin bosses and at the ring lands.

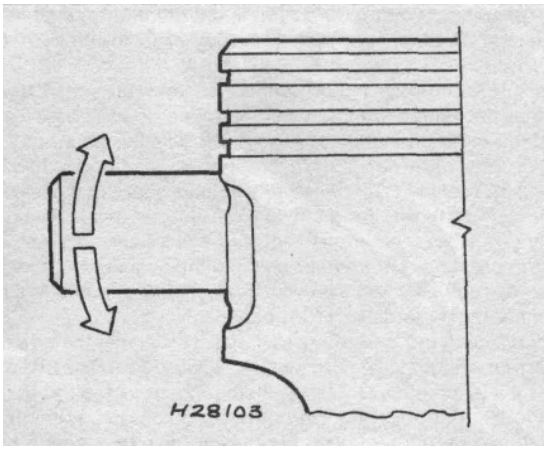
17 Look for scoring and scuffing on the thrust faces of the skirt, holes in the piston crown and burned areas at the edge of the crown. If the skirt is scored or scuffed, the engine may have been suffering from overheating and/or abnormal combustion, which caused excessively high operating temperatures. The oil pump should be checked thoroughly. A hole in the piston crown, an extreme to be sure, is an indication that abnormal combustion (pre-ignition) was occurring. Burned areas at the edge of the piston crown are usually evidence of spark knock (detonation). If any of the above problems exist, the causes must be corrected or the damage will occur again.

18 Measure the piston ring-to-groove clearance by laying a new piston ring in the ring groove and slipping a feeler gauge in beside it **(see illustration).** Check the clearance at three or four locations around the groove. Be sure to use the correct ring for each groove; they are different. If the clearance is greater than the service limit, new pistons will have to be used when the engine is reassembled.

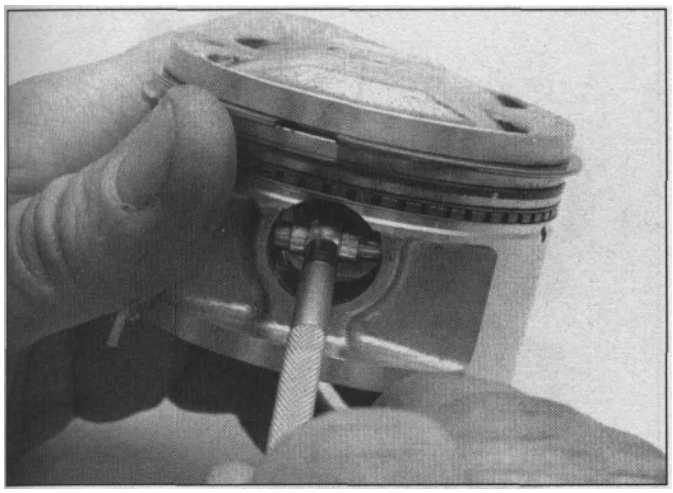
19 Calculate the piston-to-bore clearance by measuring the bore



29.19 Measuring piston diameter



29.20a Rock piston pin in piston boss to check for wear .



29.20b … or check by direct measurement

(see Section 25) and the piston diameter. Make sure that the pistons and cylinders are correctly matched. Measure the piston across the skirt on the thrust faces at a 90°° angle to the piston pin, 11 mm (1/2 inch) up from the bottom of the skirt **(see illustration).** Subtract the piston diameter from the bore diameter to obtain the clearance. If it is greater than specified, the cylinders will have to be rebored and new oversized pistons and rings installed.

20 Apply clean engine oil to the pin, insert it into the piston and check for freeplay by rocking the pin back-and-forth **(see illustration).** If the pin is loose, new pistons and pins must be installed. If the necessary measuring equipment is available measure the pin diameter and piston pin bore and check the readings obtained do not exceed the limits given in this Chapter's Specifications **(see illustration).** Replace components that are worn beyond the specified limit.

21 If the pistons are to be replaced, ensure the correct size of piston is ordered. Honda produce four oversizes of piston as well as standard pistons. The piston oversizes available are: +0.25 mm, +0.50 mm, +0.75 mm and +1.0 mm. **Note:** *Oversize pistons have their relevant size stamped on top of the piston crown, eg. a 0.25 mm oversize piston will be marked 0.25.*

22 Install the rings on the pistons as described in Section 30.

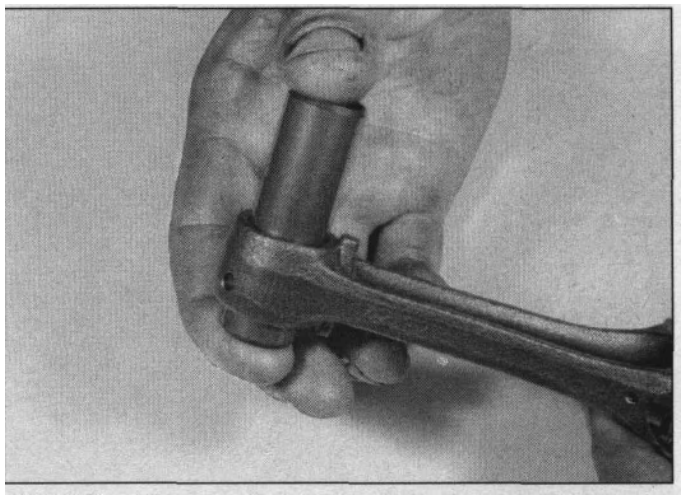
Connecting rods

23 Check the connecting rods for cracks and other obvious damage Lubricate the piston pin for each rod, install it in its original rod and check for play **(see illustration).** If it wobbles, replace the connecting rod and/or the pin. If the necessary measuring equipment is available measure the pin diameter and connecting rod bore and check the readings obtained do not exceed the limits given in this Chapter's Specifications. Replace components that are worn beyond the specified limit.

24 Refer to Section 27 and examine the connecting rod bearing inserts If they are scored, badly scuffed or appear to have been seized, new bearings must be installed. Always replace the bearings in the connecting rods as a set. If they are badly damaged, check the corresponding crankpin. Evidence of extreme heat, such as discoloration, indicates that lubrication failure has occurred. Be sure to thoroughly check the oil pump and pressure relief valve as well as all oil holes and passages before reassembling the engine.

25 Have the rods checked for twist and bending at a dealer service department or other motorcycle repair shop.

26 If a connecting rod is to replaced, it is essential that the new rod is of the correct weight group to minimize vibration. The weight is indicated by a letter (A, B, C, D or E) stamped across the rod and cap join. This letter together with the connecting rod size number (see Step 29) should be quoted when purchasing new connecting rod(s). Note: *When ordering a new connecting rod also provide the dealer with the markings for the opposite cylinder's rod on that journal.*



29.23 Checking for play between piston pin and connecting rod small-end

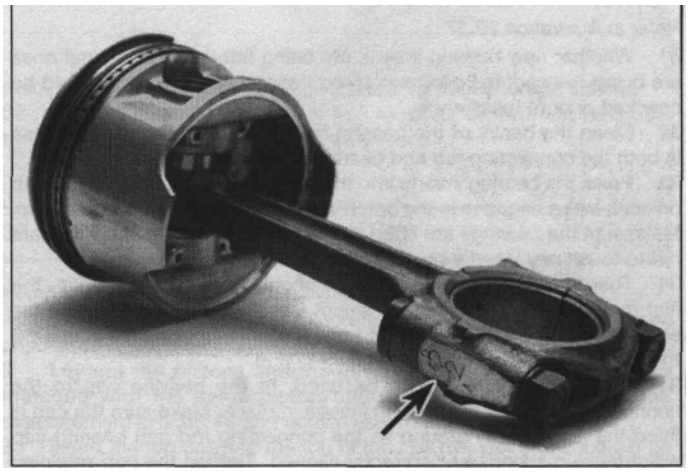
Bearing selection

Refer to illustration 29.29

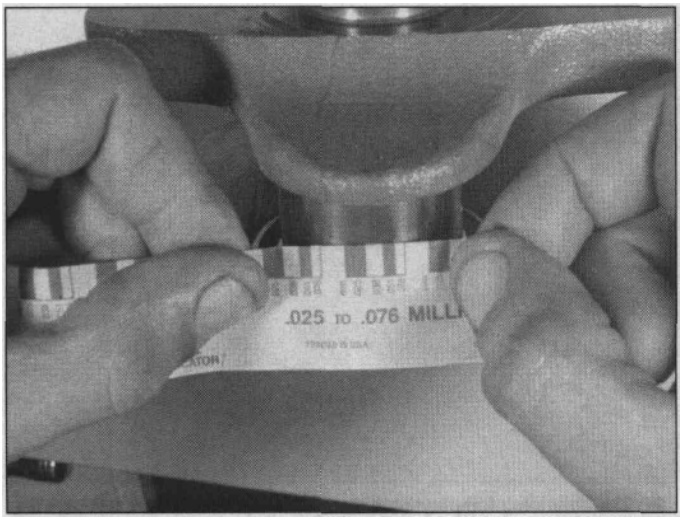
27 The connecting rod bearing running clearance is controlled in production by selecting one of five (700/750 models) or three (1100 models) grades of bearing insert. The grades are indicated by a color-coding marked on the edge of each insert **(see illustration 28.9).** In order, from the thickest to the thinnest, the insert grades for 700/750 models are: Blue, Black, Brown, Green and Yellow and for 1100 models are Brown, Green and Yellow. New bearing inserts are selected as follows using the crankpin and connecting rod size markings.

28 The standard crankpin journal diameter is divided into size groups to allow for manufacturing tolerances. The size group of each crankpin can be determined by the letters (700/750 models: A, B or C, 1100 models: A or B) stamped on the edge of each crank web **(see illustration 28.10). Note:** *Ignore the numbers as these refer to the main bearing journals.* Each letter indicates the diameter of each crankpin immediately inboard of that web. If the equipment is available, these marks can be checked by direct measurement.

29 The connecting rods are also divided into size groups to allow for manufacturing tolerances. The size group is in the form of numbers (700/750 models: 1, 2 or 3, 1100 models: 1 or 2) **(see illustration). Note:** *Ignore the letter as this indicates the weight group of the connecting rod.* If the equipment is available, these marks can be



29.29 Connecting rod bearing bore size group and weight marking (arrow)



29.37 Measure the crushed Plastigage to arrive at the connecting rod bearing oil clearance

checked by direct measurement.

30 Match the relevant connecting rod code with its crankshaft code and select a new set of bearing inserts using the following table.

700/750 models

Rod mark	Crank web mark	Insert color
1	A	Yellow
1	B	Green
1	C	Brown
2	A	Green
2	B	Brown
2	C	Black
3	A	Brown
3	B	Black
3	C	Blue

1100 models

Rod mark	Crank web mark	Insert color 1
A	Yellow 1	B
Green 2	A	Green 2
B	Brown	

Oil clearance check

Refer to illustration 29.37

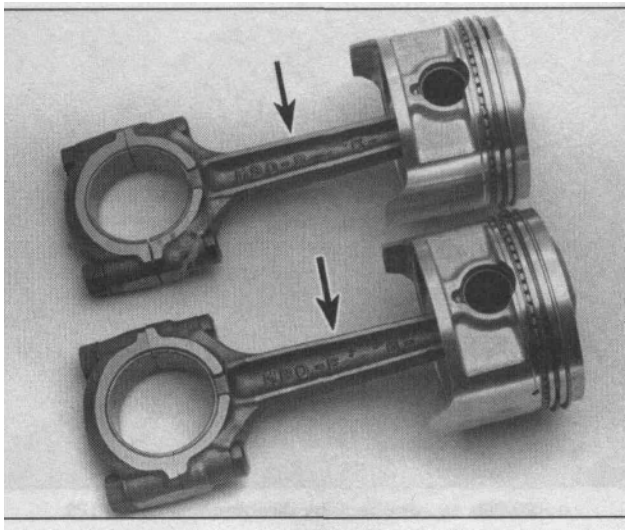
31 Whether new bearing inserts are being fitted or the original ones are being re-used, the connecting rod bearing oil clearance should be checked prior to reassembly.

32 Clean the backs of the bearing inserts and the bearing locations in both the connecting rod and bearing cap.

33 Press the bearing inserts into their locations, ensuring that the tab on each insert engages in the notch in the connecting rod/bearing cap. Make sure the bearings are fitted in the correct locations and take care not to touch any insert's bearing surface with your fingers.

34 There are two possible ways of checking the oil clearance, the first method is by direct measurement (see Steps 35 and 38) and the second by the use of a product known as Plastigage (see Steps 36 to 38).

35 If the first method is to be used, fit the bearing cap to the connecting rod, with the bearing inserts in place. Make sure the cap is fitted the correct way around so the connecting rod and bearing cap weight/size markings are correctly aligned. Tighten the cap retaining nuts to the specified torque and measure the internal diameter of each assembled pair of bearing inserts. If the diameter of each



29.40 Connecting rod identification markings (arrows)

corresponding crankpin journal is measured and then subtracted from the bearing internal diameter, the result will be the connecting rod bearing oil clearance.

36 If the second method is to be used, cut several lengths of the appropriate size Plastigage (they should be slightly shorter than the width of the crankpin). Place a strand of Plastigage on each (cleaned) crankpin journal and fit the (clean) piston/connecting rod assemblies, inserts and bearing caps. Make sure the cap is fitted the correct way around so the connecting rod and bearing cap weight/size markings are correctly aligned and tighten the bearing cap nuts to the specified torque while ensuring that the connecting rod does not rotate. Take care not to disturb the Plastigage. Loosen the bearing cap nuts and remove the connecting rod assemblies, again taking great care not to rotate the crankshaft.

37 Compare the width of the crushed Plastigage on each crankpin to the scale printed on the Plastigage envelope to obtain the connecting rod bearing oil clearance **(see illustration).**

38 If the clearance is not within the specified limits, the bearing inserts may be the wrong grade (or excessively worn if the original inserts are being re-used). Before deciding that different grade inserts are needed, make sure that no dirt or oil was trapped between the bearing inserts and the connecting rod or bearing cap when the clearance was measured. If the clearance is excessive, even with new inserts (of the correct size), the crankpin is worn and the crankshaft should be replaced.

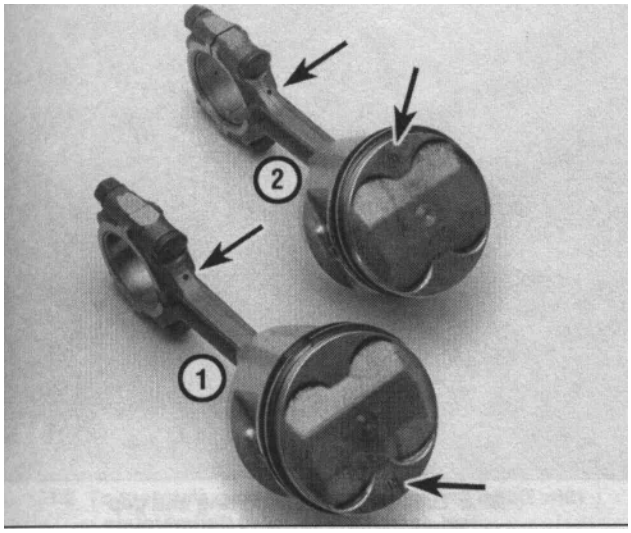
39 On completion carefully scrape away all traces of the Plastigage material from the crankpin and bearing inserts using a fingernail or other object which is unlikely to score the inserts.

Installation

Refer to illustration 29.40, 29.41, 29.44 and 29.47

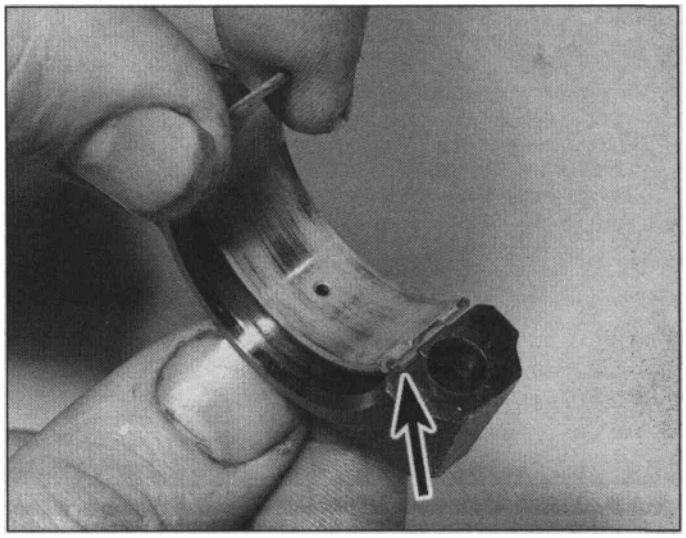
40 Check that each piston has one new snap-ring fitted to it and insert the piston pin from the opposite side. If it is a tight fit, the piston should be warmed first. If the original pistons/connecting rods are being installed, use the marks made on disassembly to ensure each piston is fitted to its correct connecting rod **(see illustration). Note:** *The front cylinder connecting rods are marked MBO-F or MBI-F on 700/750 models and MB4-F on 1100 models; the rear cylinder rods are similarly marked, but carry the letter R.*

41 Lubricate the piston pin and connecting rod bores with clean engine oil and fit each piston to its respective connecting rod making sure that the IN mark on the crown of the piston is on the opposite side to the connecting rod oilway on front cylinder pistons, and on the same side as the oilway on rear cylinder pistons **(see illustration).** When the

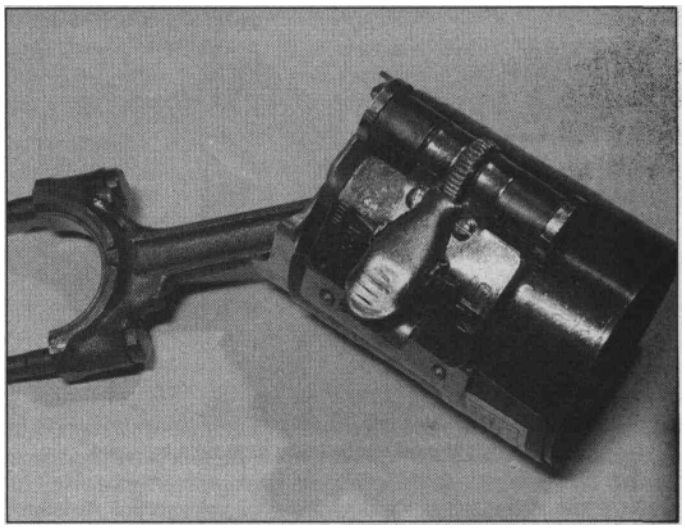


29.41 Piston crown IN marking to connecting rod oilway relationship

1 Front cylinder rods *2 Rear cylinder rods*



29.44 Align the bearing insert tab with the cutout (arrow) in the connecting rod and cap



29.47 Piston ring compressor installed

pistons are installed in their bores, the IN marks on their crowns should be on the carburetor side (toward the inside of the V formed by the cylinders).

42 Push the piston pin through both piston bosses and the connecting rod bore. If necessary the pin can be tapped carefully into position, using a hammer and suitable drift, while supporting the connecting rod and piston. Secure each piston pin in position with a second new snap-ring, making sure it is correctly seated in the piston groove.

43 Clean the backs of the bearing inserts and the bearing recesses in both the connecting rod and bearing cap. If new inserts are being fitted, ensure that all traces of the protective grease are cleaned off using kerosene (paraffin). Wipe dry the inserts and connecting rods with a lint-free cloth.

44 Press the bearing inserts into their locations, aligning the oilway in the insert with the corresponding oilway in the connecting rod. Make sure the tab on each insert engages in the notch in the connecting rod or bearing cap **(see illustration).** Make sure the bearings are fitted in the correct locations and take care not to touch any insert's bearing surface with your fingers.

45 Lubricate the cylinder bores, the pistons and piston rings then lay out each piston/connecting rod assembly in its respective position.

46 Starting with assembly number 1, position the top and second ring end gaps so they are 120°° apart then position the oil control ring side rails so that their end gaps are 120°° apart.

47 With the piston rings correctly positioned, clamp them in position with a piston ring compressor **(see illustration).**

48 Insert the piston/connecting rod assembly into the top of its bore, taking care not to allow the connecting rod to mark the bore. Make sure the IN mark on the piston crown is on the intake side of the bore and push the piston into the position until the piston crown is flush with the top of the bore.

49 Ensure that the connecting rod bearing insert is still correctly installed. Taking care not to mark the cylinder bores, apply molybdenum disulfide grease to the crankpin and both bearing inserts, then pull the piston/connecting rod assembly down its bore and onto the crankpin.

50 Fit the bearing cap and insert to the connecting rod. Make sure the cap is fitted the correct way around so the connecting rod and bearing cap weight/size markings are correctly aligned **(see illustration 29.29).**

51 Apply a smear of clean engine oil the threads and underside of the bearing cap nuts. Fit the nuts to the connecting rod and tighten them evenly, in two or three stages, to the specified torque setting.

52 Check that the crankshaft is free to rotate easily, then install the three remaining assemblies in the same way.

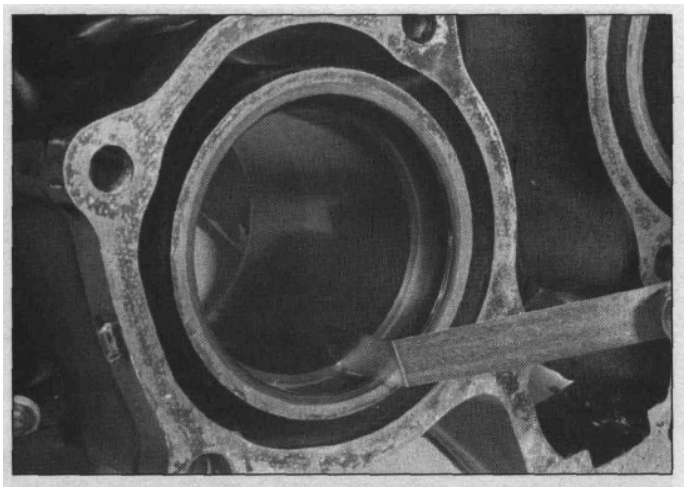
30 Piston rings - installation

Refer to illustrations 30.3, 30.5, 30.9a, 30.9b and 30.9c

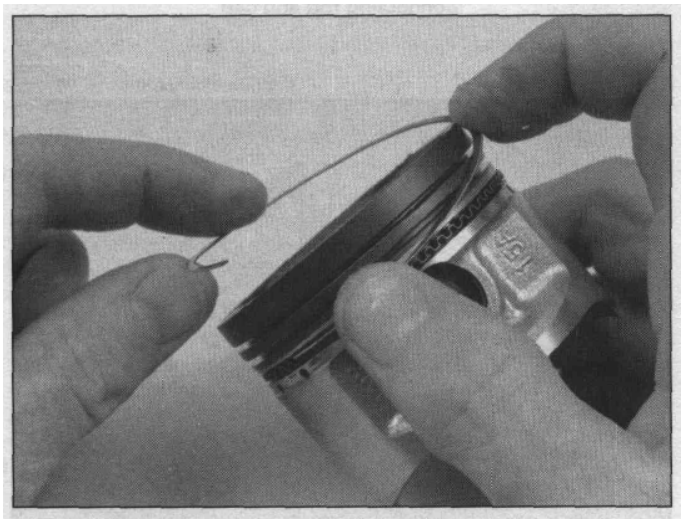
1 Before installing the new piston rings, the ring end gaps must be checked.

2 Lay out the pistons and the new ring sets so the rings will be matched with the same piston and cylinder during the end gap measurement procedure and engine assembly.

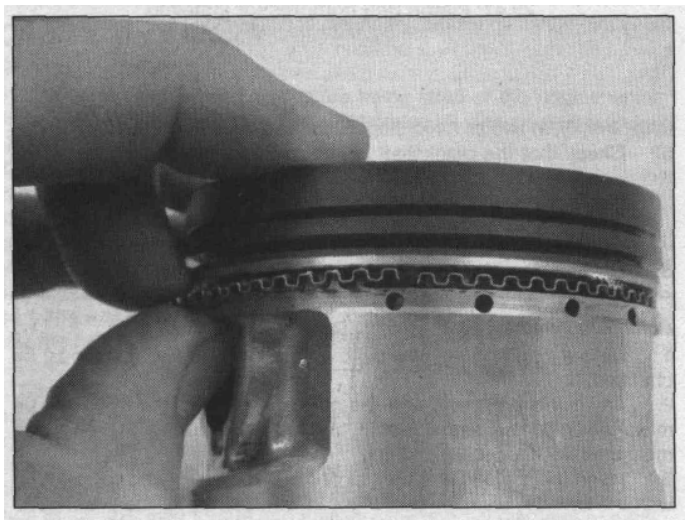
3 Insert the top ring into the top of the first cylinder and square it up with the cylinder walls by pushing it in with the top of the piston. The ring should be about 25 mm below the top edge of the cylinder. To measure the end gap, slip a feeler gauge between the ends of the ring



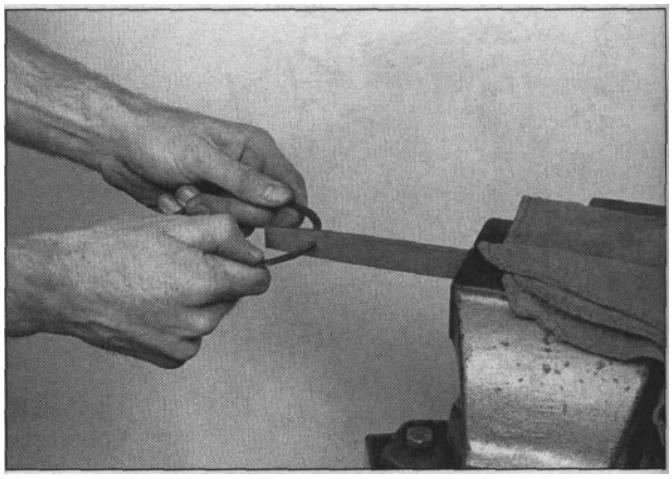
30.3 Position ring squarely in bore when measuring ring end gap



30.9a Install the oil control ring side rails by hand



30.9b Make sure the oil control expander ends don't overlap



30.5 Enlarging the piston ring end gap

and compare the measurement to the Specifications **(see illustration).**

4 If the gap is larger or smaller than specified, double check to make sure that you have the correct rings before proceeding.

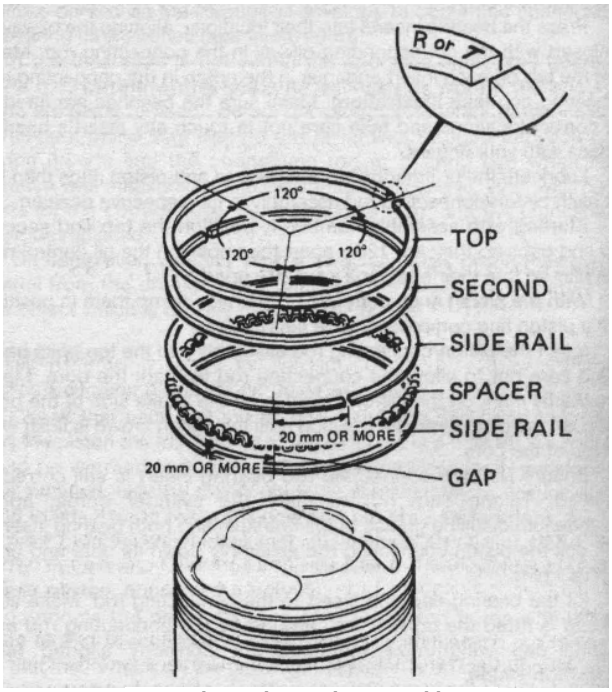
5 If the gap is too small, it must be enlarged or the ring ends may come in contact with each other during engine operation, which can cause serious damage. The end gap can be increased by filing the ring ends very carefully with a fine file. When performing this operation, file only from the outside in **(see illustration).**

6 Excess end gap is not critical unless it is greater than 1 mm. Again, double check to make sure you have the correct rings for your engine.

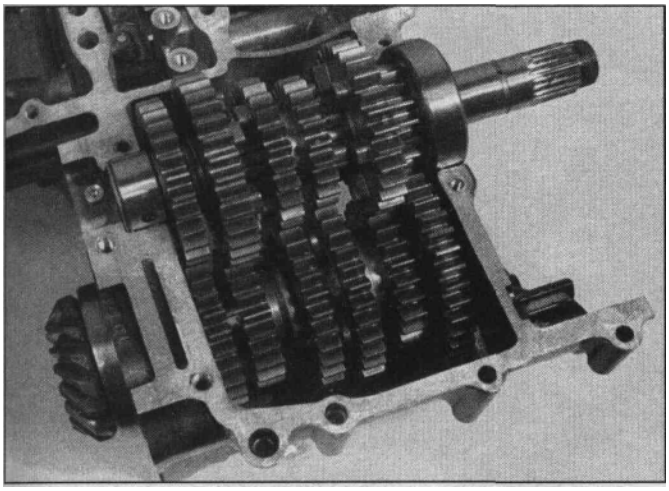
7 Repeat the procedure for each ring that will be installed in the first cylinder and for each ring in the remaining cylinders. Remember to keep the rings, pistons and cylinders matched up.

8 Once the ring end gaps have been checked/corrected, the rings can be installed on the pistons.

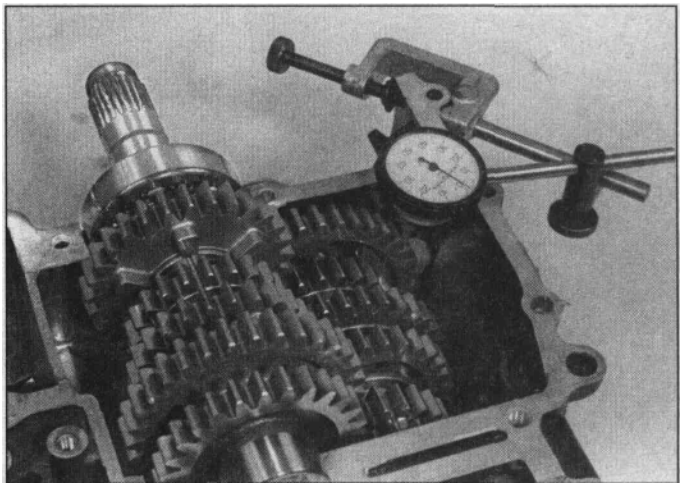
9 The oil control ring (lowest on the piston) is installed first. It is



30.9c Piston ring end gap positions



31.2 To measure gear backlash, mesh mainshaft with countershaft in lower crankcase half ...



31.3 … and set dial gauge up as shown

composed of three separate components. Slip the expander into the groove, then install the upper side rail. Do not use a piston ring installation tool on the oil ring side rails as they may be damaged. Instead, place one end of the side rail into the groove between the expander and the ring land. Hold it firmly in place and slide a finger around the piston while pushing the rail into the groove. Next, install the lower side rail in the same manner (see illustrations).

10 After the three oil ring components have been installed, check to make sure that both the upper and lower side rails can be turned smoothly in the ring groove.

11 Install the second (middle) ring next. Note: *The second ring and top ring are different in profile - don't mix them up.* To avoid breaking the ring, use a piston ring installation tool and make sure that the identification mark (either a T or R) is facing up. Fit the ring into the middle groove on the piston. Do not expand the ring any more than is necessary to slide it into place.

12 Finally, install the top ring in the same manner. Make sure the identifying mark (either a T or R) is facing up.

13 Repeat the procedure for the remaining pistons and rings.

31 Transmission shafts - removal and installation

Note: *When disassembling the transmission shafts, place the parts on a long rod or thread a wire through them to keep them in order and facing the proper direction.*

1 Separate the crankcase halves as described in Section 24.

Backlash check (except 1985 through 1988 700/750 Magna models)

Refer to illustrations 31.2 and 31.3

2 Before removing any transmission components, use a dial gauge to check the gear backlash between all mating gears. To do this, remove the mainshaft assembly from the upper crankcase and lay it in position in the lower crankcase, so it is properly engaged with the countershaft assembly **(see illustration).**

3 Backlash measurement is done by setting the dial gauge up so it just contacts the tooth face on one of the countershaft gears **(see illustration).** Then, while holding the mainshaft to keep it from moving, rotate the countershaft gear back and forth with your finger while watching the movement of the needle on the gauge. Jot down the reading.

4 Repeat the procedure on the other countershaft gears that mate with gears on the mainshaft. Compare the readings with the Specifications. If any of the gears have excessive backlash, that gear and the mainshaft gear it mates with are worn and require replacement.

Mainshaft

Refer to illustrations 31.10, 31.13a, 31.13b, 31.14 and 31.15

Removal and disassembly

5 Lift out the mainshaft.

6 Carefully remove the gears, washers, snap-rings and bushings from the mainshaft. Note: It *is very important that all components be kept in their installed order and relative position to each other. It is very easy to mix up transmission components, a mistake which will result in improper functioning of the transmission.*

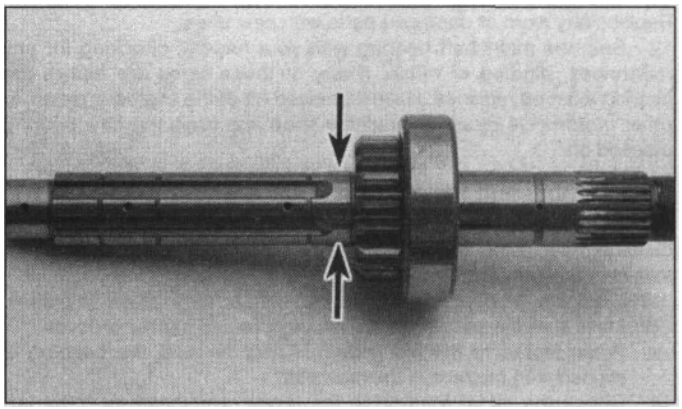
Inspection

7 Clean each part, one at a time, with solvent and dry them thoroughly. Make sure all the oil holes are not clogged.

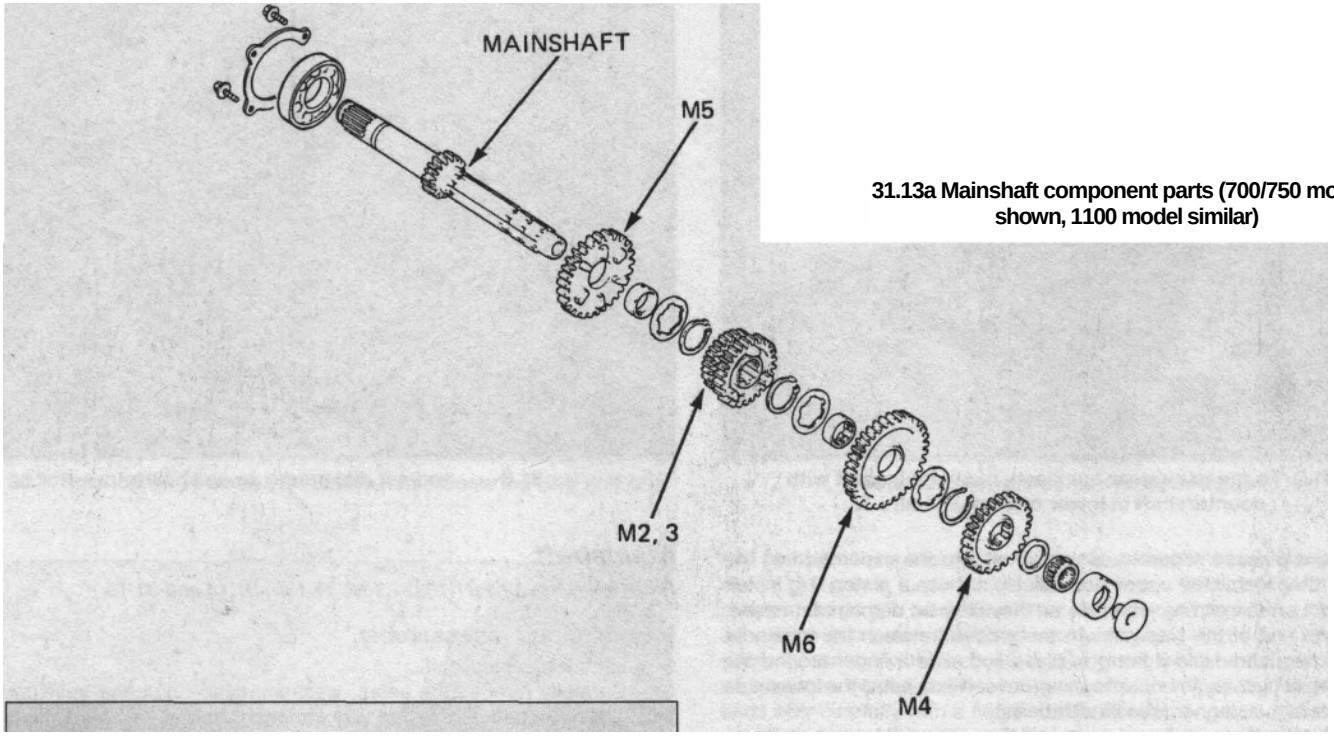
8 Check the gear teeth, the gear dogs and the shift fork grooves for cracks and excessive wear. If the gear dogs are rounded off, replace the gears with new ones. Measure the inside diameter of each gear and compare the results to the Specifications. If excessive wear has occurred, new gears are required.

9 Measure the outer diameter and inner diameter of the gear bushings, as appropriate, and compare the measurements to the Specifications. If they are excessively worn they must be replaced.

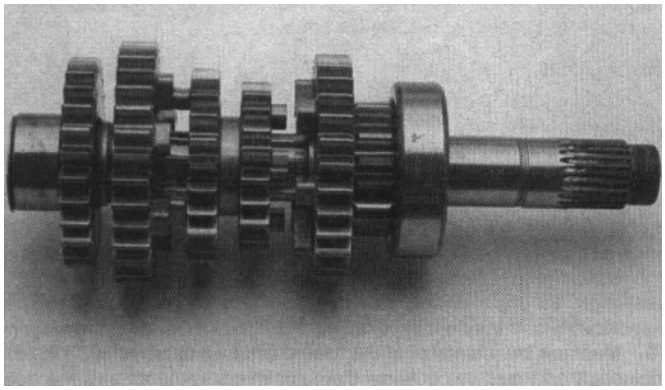
10 Measure the diameter of the mainshaft (see illustration). Use the mainshaft and bushing outside diameter measurements and the gear inside diameter measurements to determine the clearance between the gears and shaft or bushings. If they are excessive, a new mainshaft, bushings, and possibly new gears should be obtained. Also, check the shaft for score marks, cracks and evidence of seizure.



31.10 Measure mainshaft diameter at this point (arrows)



31.13a Mainshaft component parts (700/750 model shown, 1100 model similar)



31.13b Assembled mainshaft

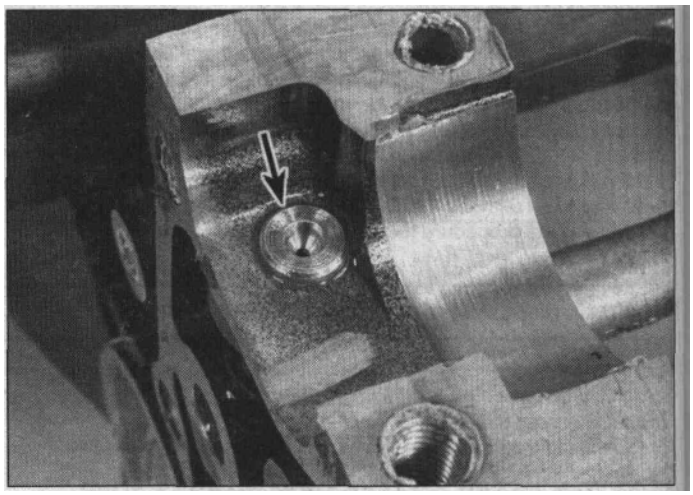
11 Check the thrust washers and snap-rings for wear and distortion. Replace any worn or damaged parts with new ones.
12 Spin the mainshaft bearing with your fingers, checking for any roughness, binding or noise. If any of these signs are found, the bearing must be replaced. Have it pressed off of the shaft at a dealer or other motorcycle repair or machine shop and have the new bearing pressed on.

Reassembly and installation

13 Reassemble the shaft components in the reverse order of disassembly, using the exploded view as a guide and noting the following **(see illustrations).**

a) Lubricate the contact surfaces with molybdenum disulfide grease.
b) Make sure the snap-rings are securely seated in their grooves.
c) When installing the M6 gear bushing, be sure the bushing is aligned with the hole in the mainshaft.

14 Check the oil jet located in the lower crankcase near the left mainshaft bearing surface **(see illustration).** Be sure it is not clogged.
15 If the shift drum and shift forks were removed, install them in the upper crankcase (see Section 32). Lay the mainshaft assembly in place. Be sure the center fork is correctly engaged with the proper gear **(see illustration).**
16 Reassemble the crankcases as described in Section 24.



31.14 Oil jet location (arrow) in lower crankcase

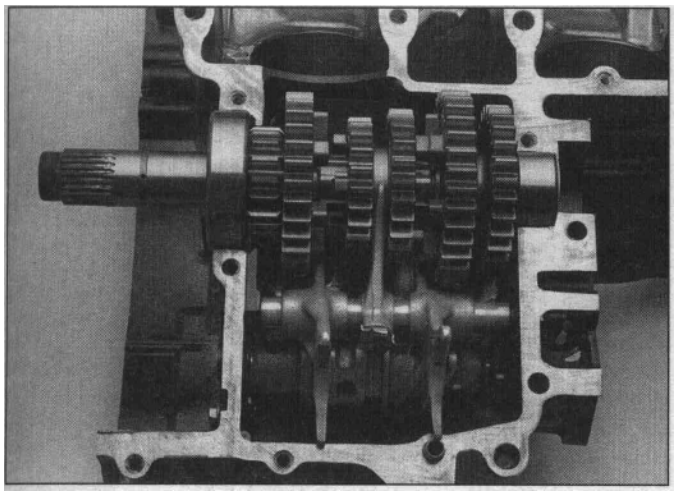
Countershaft

Refer to illustrations 31.18, 31.20, 31.21, 31.23 and 31.27

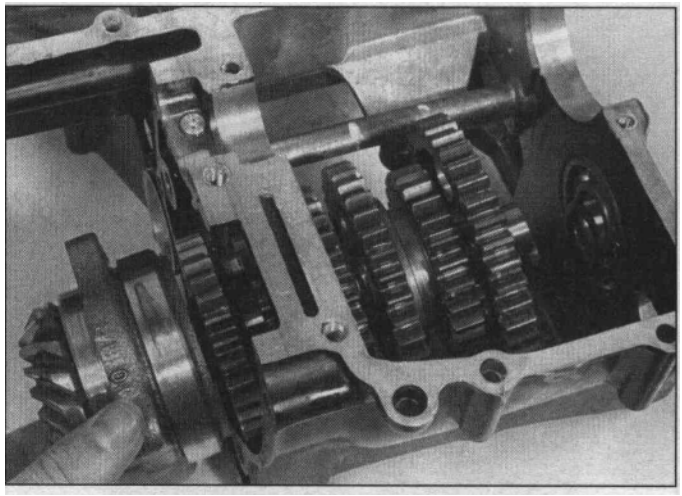
Removal and disassembly

Note: *The helical output gear assembly does not have to be removed from the countershaft in order to remove the countershaft from the crankcase, but it must be removed if the countershaft is to be replaced with a new one.*

17 Remove the mainshaft if not already done.
18 Before the countershaft can be removed from the crankcase,



31.15 Center shift fork engaged with mainshaft



31.18 Remove C1, C5, C2 and C3 then withdraw countershaft and bearing holder from crankcase

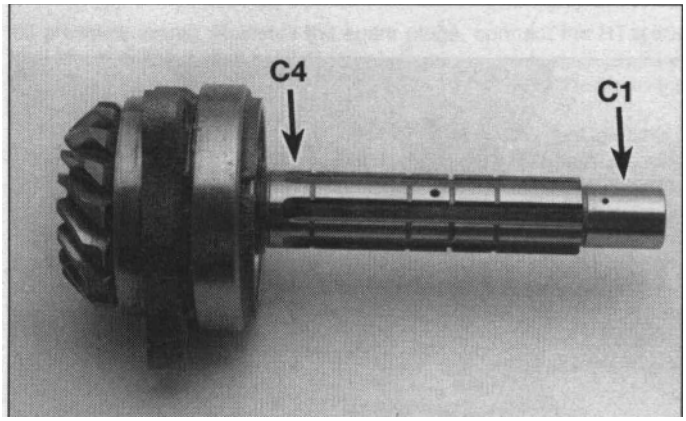
remove the C1, C5, C2 and C3 gears from the countershaft, along with their spline washers, snap-rings and bushings **(see illustration).**
19 After the countershaft has been removed from the crankcase, the remaining gears and related parts can be lifted off.

Inspection

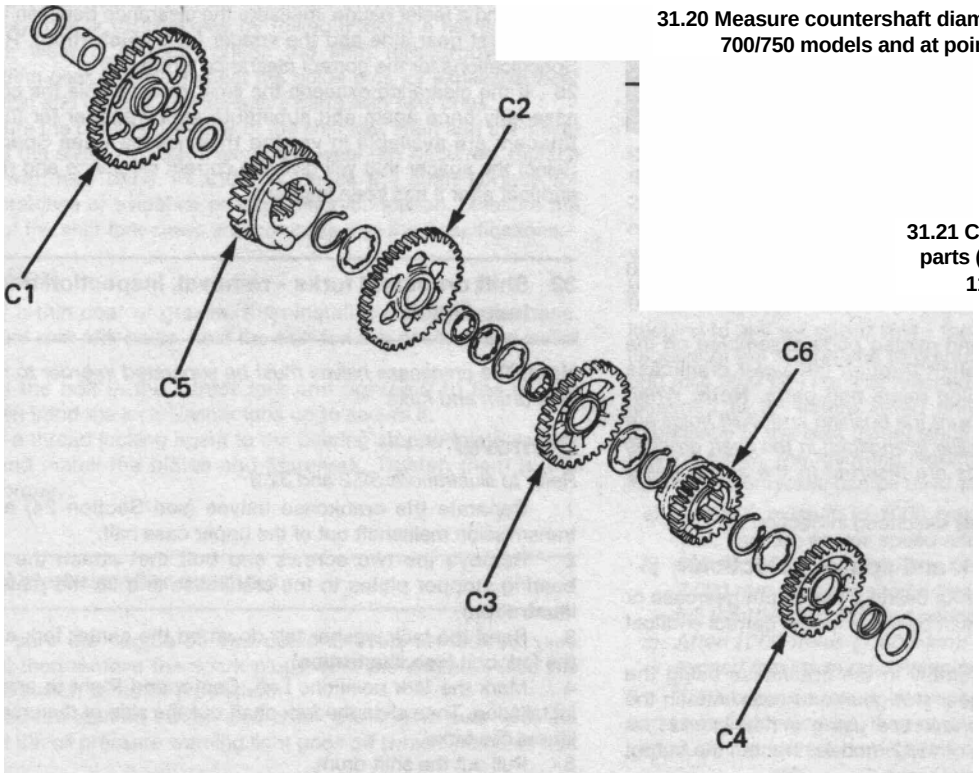
20 Refer to Steps 7 through 12 above, and examine the countershaft components. Measure the countershaft outside diameter at the C1 and C4 gear positions on 700/750 models and at the C4 gear position on 1100 models **(see illustration).**

Reassembly and installation

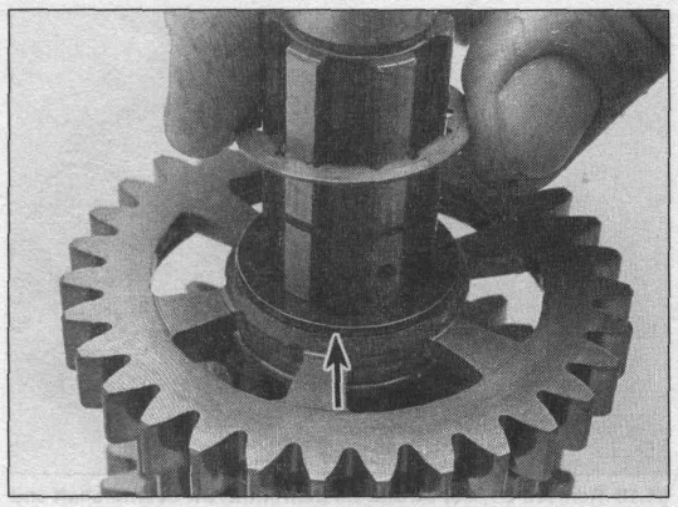
21 Reassemble the shaft components in the reverse order of disassembly, using the exploded view as a guide **(see illustration).**



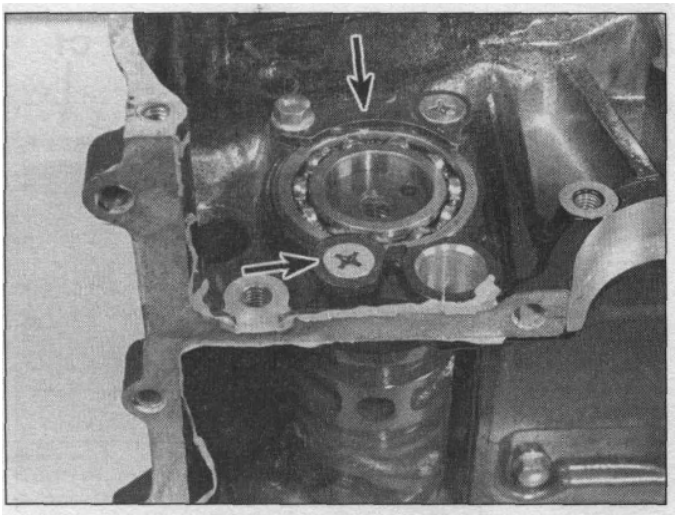
31.20 Measure countershaft diameter at point C4 and C1 on 700/750 models and at point C4 on 1100 models



31.21 Countershaft component parts (700/750 model shown, 1100 model similar)



31.23 The spline collar (arrow) is correctly installed when its tabs are engaged with the shaft grooves

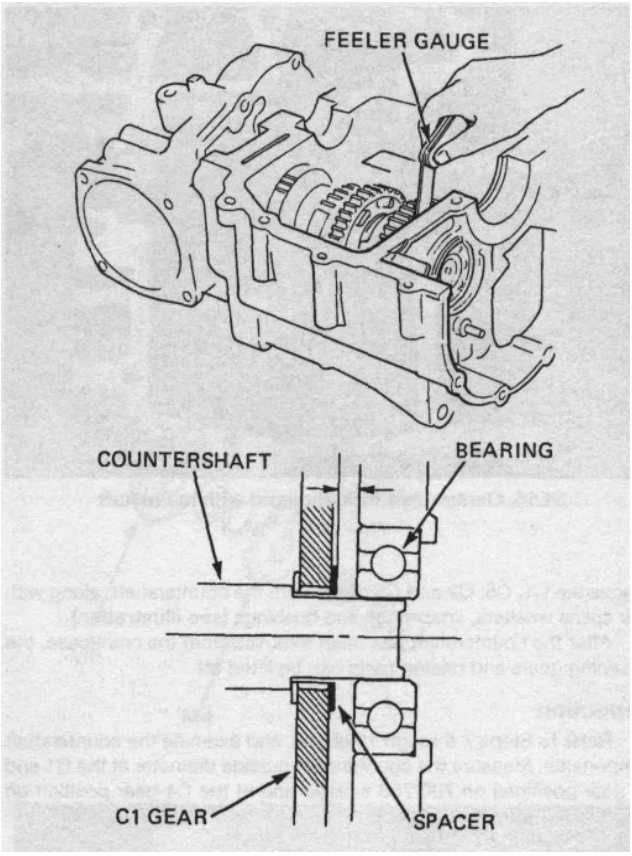


32.2 Shift drum stopper plates

22 As the parts are assembled, lubricate the contact surfaces with molybdenum disulfide grease. Also, make sure the snap-rings are securely seated in their grooves.
23 With the C4 and C6 gears and related parts assembled on the countershaft, insert the countershaft through the lower crankcase opening. Then install the remaining gears and parts. **Note:** *When installing the C3 gear bushing, be sure the bushing and shaft holes are aligned. Also, be sure the spline collar is engaged in the shaft grooves and that the stopper washer tabs are inserted in the spline collar indentations* **(see illustration).**
24 Reassemble the crankcases as described in Section 24.

Countershaft endfloat check and spacer selection

25 Whenever the countershaft or its bearing, the output gearcase or crankcase are replaced, a check must be made for the correct endfloat on the countershaft.
26 Install the countershaft assembly in the crankcase using the original spacer between the C1 gear (1 st gear) and case. Attach the output gearcase to the lower crankcase using a new gasket as selected in Section 23 in the case of 1982 models. Tighten the output gear assembly bolts to the specified torque.



31.27 Countershaft endfloat measurement

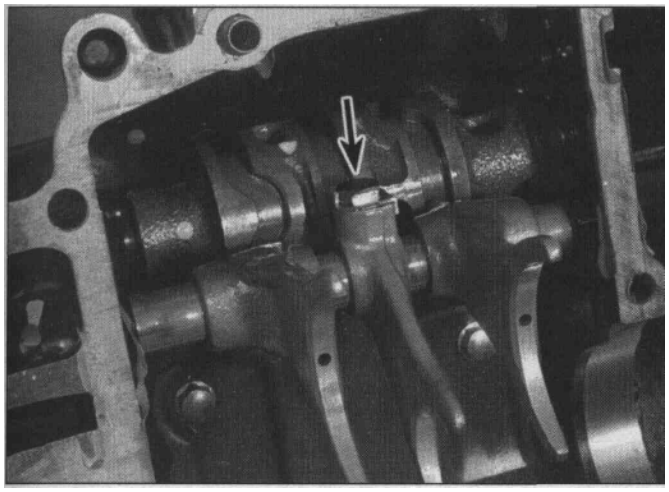
27 Using a feeler gauge, measure the clearance between the bearing on the first gear side and the spacer **(see illustration).** Refer to the Specifications for the correct clearance (endfloat).
28 If the clearance exceeds the limit, disassemble the countershaft assembly once again and substitute a new spacer for the old one. Spacers are available in varying thicknesses - see Specifications. Select the spacer that will give the correct clearance and recheck the endfloat after it has been installed.

32 Shift drum and forks - removal, inspection and installation

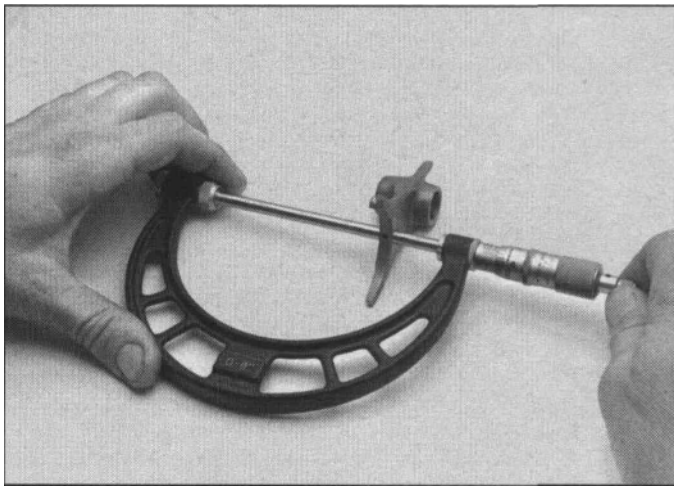
Note: *The crankcase halves must be separated in order to remove the shift drum and forks.*

Removal

Refer to illustrations 32.2 and 32.3
1 Separate the crankcase halves (see Section 24) and lift the transmission mainshaft out of the upper case half.
2 Remove the two screws and bolt that attach the shift drum bearing stopper plates to the crankcase and lift the plates off **(see illustration).**
3 Bend the lock washer tab down on the center fork and remove the fork bolt **(see illustration).**
4 Mark the fork positions Left, Center and Right to ensure proper installation. Then slide the fork shaft out the side of the crankcase and lift out the forks.
5 Pull out the shift drum.



32.3 Center shift fork is retained by bolt and lockwasher; bend lockwasher up again onto bolt to secure it



32.8 Measuring shift fork thickness

Inspection

Refer to illustration 32.8

6 Check the edges of the grooves in the drum for signs of excessive wear. Also, check the shift drum hole and shift fork shaft hole in the crankcase for any scoring or scratches. If wear or damage is excessive, the drum, shaft and possibly the crankcase half will have to be replaced.

7 Check the ball bearing for smooth operation. If noise or binding is evident or there is any sign of freeplay between its inner and outer race, the bearing must be replaced with a new one.

8 Measure the shift fork thickness and compare it to the Specifications **(see illustration).** If it is excessively worn, it should be replaced .

9 Check the shift forks for distortion and wear, especially at the fork ends. If they are discolored or severely worn they are probably bent and will cause difficulty in selecting gears and make the gearshift action heavy; check for trueness by rolling it along a flat surface. If damage or wear is evident, check the shift fork groove in the corresponding gear as well. Inspect the guide pins for excessive wear and distortion and replace any defective parts with new ones.

10 Measure the outside diameter of the shift fork shaft and the inside diameter of the shift fork hole. If excessive wear has occurred, replace the parts with new ones. In addition, check the shaft surface for scoring, scratches or evidence of insufficient lubrication. Measure the thickness of the shift fork claws and compare it to the Specifications.

Installation

11 Apply a thin coat of grease, then install the drum in the case. Lubricate the shift fork holes, hold the shift forks in position and install the shaft.

12 Install the bolt in the center fork and tighten it to the proper torque. Then bend the lock washer tabs up to secure it.

13 Apply a thread locking agent to the bearing stopper plate screws and bolt and install the plates and fasteners. Tighten them to the specified torque.

33 Initial start-up after overhaul

1 Make sure the engine oil and coolant levels are correct (see Chapter 1), then remove the spark plugs from the engine. Place the engine stop switch in the OFF position.

2 Turn on the ignition switch and crank the engine over with the starter until the oil pressure warning light goes off (which indicates that oil pressure exists). Reinstall the spark plugs, connect the HT leads and turn the stop switch to RUN.

3 Make sure there is fuel in the tank, then turn the fuel valve to the ON position and operate the choke.

4 Start the engine and allow it to run at a moderately fast idle until it reaches operating temperature. **Warning:** *If the oil pressure warning light doesn't go off, or it comes on while the engine is running, stop the engine immediately.*

5 Check carefully for oil and coolant leaks and make sure the transmission and controls, especially the brakes, function properly before road testing the machine. Refer to Section 34 for the recommended break-in procedure.

6 Upon completion of the road test, and after the engine has cooled down completely, recheck the valve clearances and check the engine oil and coolant levels (see Chapter 1).

34 Recommended break-in procedure

1 Any rebuilt engine needs time to break-in, even if parts have been installed in their original locations. For this reason, treat the machine gently for the first few miles to make sure oil has circulated throughout the engine and any new parts installed have started to seat.

2 Even greater care is necessary if the engine has been rebored or a new crankshaft has been installed. In the case of a rebore, the engine will have to be broken in as if the machine were new. This means greater use of the transmission and a restraining hand on the throttle until at least 500 miles (800 km) have been covered. There's no point in keeping to any set speed limit - the main idea is to keep from lugging (labouring) the engine and to gradually increase performance until the 500 mile (800 km) mark is reached. These recommendations can be lessened to an extent when only a new crankshaft is installed. Experience is the best guide, since it's easy to tell when an engine is running freely. The following recommendations, which Honda provide for new motorcycles, can be used as a guide.

a) 0 to 600 miles (0 to 1000 km): Keep engine speed below 5,000 rpm. Vary the engine speed and don't use full throttle.

b) 600 to 1000 miles (1,000 to 1,600 km): Keep engine speed below 7,000 rpm. Rev the engine freely through the gears, but don't use full throttle for prolonged periods.

c) After 1000 miles (1,600 km): Full throttle can be used. Don't exceed maximum recommended engine speed (redline). 3 If a lubrication failure is suspected, stop the engine immediately and try to find the cause. If an engine is run without oil, even for a short period of time, severe damage will occur.

Chapter 3 Cooling system

Note:"fn/ess *specifically mentioned in this Chapter, the information given for the 1982 750 Sabre applies to the UK VF750S-C, and that for the 1987 and 1988 700/750 Magnas applies to the UK VF750C-H and C-J respectively.*

Contents

Specifications

Coolant

Mixture type.....	See Chapter 1	*
Capacity.....	See Chapter 1	

Radiator

Cap valve opening (relief) pressure	11 to 15 psi (0.76 to 1.04 Bars)

Thermostat

Opening temperature.....	80 to 84°C (176 to 183°F)
Fully open	95°C (203°F)
Minimum valve lift.....	8 mm (0.32 in) @ 95°C (203°F)

Torque settings

Water pump cover bolts (700/750 models).....	7.5 to 10.5 Nm (6 to 8 ft-lbs)

1 General information

The cooling system uses a water/antifreeze coolant to carry away excess energy in the form of heat. The cylinders are surrounded by a water jacket from which the heated coolant is circulated by thermo-siphonic action in conjunction with a water pump, driven off the oil pump. The hot coolant passes upwards to the thermostat and through to the radiator (mounted on the frame's front downtubes to take maximum advantage of the passing airflow). The coolant then flows across the radiator core, where it is cooled by the passing air, down to the water pump (via the left frame tube) and back up to the engine where the cycle is repeated. A thermostat is fitted in the system to prevent the coolant flowing through the radiator when the engine is cold, therefore accelerating the speed at which the engine reaches normal operating temperature. A thermostatically-controlled cooling fan is also fitted to aid cooling in extreme conditions.

The complete cooling system is partially sealed and pressurized, the pressure being controlled by a valve contained in the spring-loaded radiator cap. By pressurizing the coolant the boiling point is raised, preventing premature boiling in adverse conditions. The overflow pipe from the system is connected to a reservoir tank into which excess coolant is expelled under pressure. The discharged coolant automatically returns to the radiator when the engine cools. **Warning:** *Do not allow antifreeze to come in contact with your skin or painted surfaces of the motorcycle. Rinse off any spills immediately*

with plenty of water. Antifreeze is highly toxic if ingested. Never leave antifreeze lying around in an open container or in puddles on the floor; children and pets are attracted by its sweet smell and may drink it. Check with the local authorities about disposing of used antifreeze. Many communities will have collection centers which will see that antifreeze is disposed of safely.

Warning: *Do not remove the pressure cap from the radiator when the engine is hot. Scalding hot coolant and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, place a thick rag, like a towel, over the radiator cap; slowly rotate the cap counterclockwise (anticlockwise) to the first stop. This procedure allows any residual pressure to escape. When the steam has stopped escaping, press down on the cap while turning it counter-clockwise (anticlockwise) and remove it.*

2 Radiator cap - check

If problems such as overheating or loss of coolant occur, check the entire system as described in Chapter 1. The radiator cap opening (relief) pressure should be checked by a Honda dealer or service station equipped with the special tester required to do the job. If the cap is defective, replace it with a new one.

3 Coolant reservoir - removal and installation

700/750 Sabre models

Refer to illustration 3.5

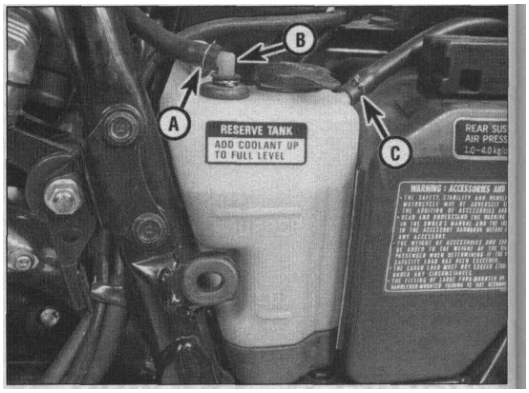
1 Remove the seat.
2 Remove the left side cover (see Chapter 6).
3 On 1982/83 750 models, trace the blue/yellow and green/black wires from the level sensor at the base of the reservoir tank to the connector, then disconnect it.
4 Disconnect the overflow/breather and coolant hoses from the top of the tank.
5 Remove the single mounting bolt and then lift the tank out of position **(see illustration).** The tank is a tight fit between the frame and the tool box but can be removed by lifting up and tilting the top away from the motorcycle. Invert the tank to drain the coolant.
6 If the level sensor is suspected of being faulty, test it as described in Chapter 8.
7 Installation is the reverse of the removal procedure. Top up the reservoir with new coolant (see Chapter 1).

1982 *through 1984 700/750 Magna models*

8 Remove the seat and right side cover.
9 Remove the battery and starter relay, with the bracket, as described in Chapter 8.
10 Free the overflow/breather hose from any retainers. Also disconnect the coolant hose from the top of the tank.
11 The tank can now be lifted out and inverted to drain the coolant.
12 Installation is the reverse of the removal procedure. Top up the reservoir with new coolant (see Chapter 1).

1985 and 1986 700 Magna models

13 Remove the right side cover (see Chapter 6).
14 Remove the rear wheel (see Chapter 7).
15 Remove the rear fender/mudguard.
16 Remove the battery (see Chapter 8).
17 Disconnect its wiring connector and remove the regulator/rectifier unit from the base of the battery holder.
18 Pull the overflow/breather hose off the neck of the reservoir tank and disconnect the coolant hose either from its in-line union or directly from the base of the tank; allow the coolant to drain.
19 Remove the single tank retaining bolt (accessed from the battery holder) and lower the tank free.



3.5 Reservoir tank mounting bolt (A), coolant hose (B) and overflow/breather hose (C)

20 Installation is the reverse of the removal procedure. Top up the reservoir with new coolant (see Chapter 1). When reconnecting the battery leads, remember to connect the negative lead last.

1987 and 1988 700/750 Magna models

Refer to illustration 3.24

21 Remove the right side cover (see Chapter 6).
22 Release the single screw retaining the fusebox and loosen the electrical components mounting plate bolt situated directly behind the fusebox.
23 Disconnect the overflow/breather hose from the top surface of the tank.
24 Remove the single tank mounting bolt and lift the electrical components plate upwards so that the tank can be maneuvered out from behind the frame **(see illustration).** Once free, disconnect the coolant hose and allow the coolant to drain.
25 Installation is the reverse of the removal procedure, noting that the peg on the front of the tank should be engaged with the frame grommet. Top up the reservoir with new coolant (see Chapter 1).

1100 models

26 Remove the right side cover (see Chapter 6).
27 Disconnect the overflow/breather hose and the coolant hose from the top of the tank.
28 Remove the single tank mounting bolt and maneuver it out of the frame sufficiently to gain access to the coolant hose connection. On Sabre models disconnect the hose from the tank's top surface and invert the tank to drain the coolant. On Magnas, pull off the coolant hose from the base of the tank and allow the coolant to drain.
29 Installation is the reverse of the removal procedure. Top up the reservoir with new coolant (see Chapter 1).

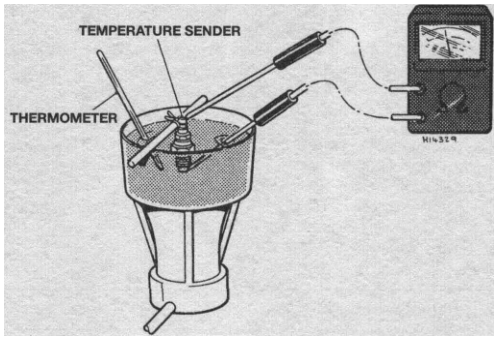
4 Cooling fan and thermostatic switch - check and replacement

Check

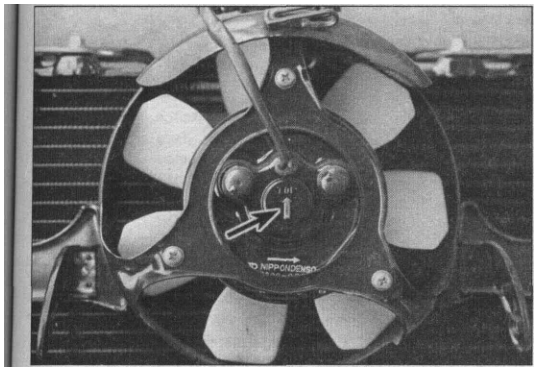
Refer to illustration 4.7

1 If the engine is overheating and the cooling fan isn't coming on, first check the cooling fan switch fuse. If the fuse is blown, check the fan circuit for a short to ground/earth (see the wiring diagrams at the end of this manual).
2 If the fuse is sound, disconnect the wire from the fan switch which

3.24 Reservoir tank mounting bolt on 1987 and 1988 700/750 Magnas



4.7 Cooling fan thermostatic switch test set-up



4.13 Install cooling fan motor with TOP marking upwards

is fitted to the left side of the radiator (remove any covers for access). Using a jumper wire short the two wire connector terminals together and turn the ignition key switch ON; the fan should come on. If it does the fan switch is defective and must be replaced, although a more comprehensive test is described below in Step 5 or Steps 6 to 8 depending on the model.

3 If the fan does not come on the fault lies in either the cooling fan motor or relevant wiring. The wiring can be tested as described in Chapter 8.

4 To test the cooling fan motor, trace the wiring from the fan motor to its connector block. Separate the connector and using a 12 volt battery and two jumper wires, connect the battery across the terminals of the cooling fan block connector. Once connected the fan should operate. If this is not the case the fan motor is faulty and must be replaced.

5 On 700/750 Sabre models and 1982 through 1984 700/750 Magna models, Honda advise that the switch is tested by removing the pressure cap (when cold) and placing a thermometer in the top of the radiator. Run the engine and check the temperature at which the cooling fan cuts in and out; it should cut in between 88 to 92°C (191 to 197°F) and cut out between 83 to 87°C (182 to 188°F). **Warning:** *This must be done very carefully to avoid the risk of personal injury.*

6 On 1985-on 700/750 Magnas and all 1100 models to fully test the fan switch, a heatproof container, a small gas-powered camping stove, a thermometer capable of reading up to 110°C (230°F) and an ohmmeter or multimeter will be required. Remove the switch as described in Steps 14 to 16.

7 Fill the container with coolant of the specified type and strength and suspend the switch on some wire so that just the sensing portion and threads are submerged. Connect one probe of the meter to the switch terminal and the other to the body of the switch. Suspend the thermometer so that its bulb is close to the switch **(see illustration). Note:** *No components should be allowed to touch the container.*

8 Set the meter to the ohms x 1 scale and start to heat the coolant, stirring it gently. No continuity (infinite resistance) should be shown until the coolant is between 98 to 110°C (208 to 215°F). **Warning:** *This must be done very carefully to avoid the risk of personal injury.* With the coolant at this temperature the meter should show continuity (0 ohms), indicating that the switch has closed. Carry on heating the coolant until it reaches 110°C (215°F) then turn the stove off. Note the resistance reading of the switch as the temperature falls. When the coolant cools to 98°C (208°F) there should no longer be continuity between the meter probes. If this is not the case the fan switch is defective and must be replaced.

Replacement

Refer to illustrations 4.13 and 4.15

Fan motor

9 Remove the radiator as described in Section 7.

10 Remove the right and left radiator cover bolts and nuts and lift off the covers and radiator grille, unless already done at radiator removal stage.

11 Remove the three (1987 and 1988 700/750 Magna models) or four (all other models) bolts/nuts that retain the fan and shroud to the radiator and lift them off.

12 Remove the nut from the fan center and separate it from the motor, then remove the three screws or nuts from the shroud and withdraw the fan motor.

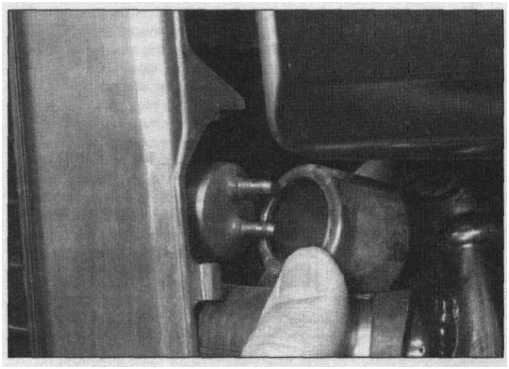
13 Installation is the reverse of removal, while noting the following **(see illustration).**

a) Apply thread locking compound to the fan motor threads before installing the nut.
b) Install the fan motor and fan in the shroud so that the TOP marking on the motor end is upwards.
c) Install the radiator as described in Section 7.

Thermostatic switch

Warning: *The engine must be completely cool before this procedure.*

14 The thermostatic switch, or fan switch, is located on the rear left side of the radiator. On some models a shield or rubber cover will obscure the switch; remove for access.



4.15 Cooling fan thermostatic switch Is located at rear left corner of radiator

15 Disconnect the wiring from the switch **(see illustration).**
16 Have ready a suitable plug so that excessive coolant loss is prevented, then unscrew the switch and recover the O-ring. Swiftly plug the radiator opening.
17 Fit a new O-ring to the switch and apply a smear of sealant to the switch threads.
18 Remove the plug and quickly install the new switch, tightening it to the specified torque setting.
19 Connect the wiring to the switch and install the access covers (where applicable).
20 Check the coolant level and if necessary, top up as described in Chapter 1.

5 Coolant temperature gauge/display/warning light and sender unit - check and replacement

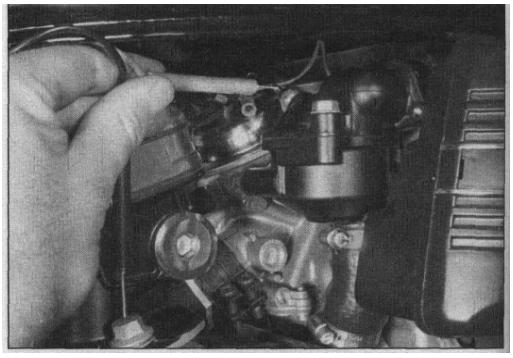
Check

Refer to illustration 5.3

1 The circuit consists of the sender unit mounted in the thermostat housing cover and the gauge assembly (1982 through 1986 700/750 Magnas), LED segments (all Sabres and 1100 Magnas) or coolant overheat warning light (1987 and 1988 700/750 Magnas) mounted in the instrument panel. If the system malfunctions check first that the battery is fully charged and that all fuses are in good condition.
2 To test the circuit, first disconnect the green/blue wire from the temperature sender unit. Removal of the right side air chamber cover is necessary on Magna models to access the thermostat housing. Turn the ignition key switch ON and ground (earth) the sender unit wire on the engine. When the wire is grounded (earthed) the needle, segments or bulb should swing/illuminate immediately over to the H on the gauge. **Caution:** Do *not ground/earth the wire for any longer than is necessary to take the reading, or the gauge may be damaged.* If the gauge operates as described above, the sender unit is defective and must be replaced, although a more comprehensive test is described below. If the gauge doesn't respond, of if it does not move at all, the fault lies in the wiring or the gauge/display/bulb.

Sender unit check -1982 through 1984 700/750 Magna models, all 700/750 Sabre models and all 1100 Magna models

3 Remove the radiator cap (when cold) and insert a thermometer in the top of the radiator. On Magna models remove the right side air chamber cover. Disconnect the wire from the sender unit and connect the probes of an ohmmeter between the sender unit tip and a good ground (earth) on the engine **(see illustration).**



5.3 Testing the temperature gauge sender unit resistance (see text for applicable models)

4 Run the engine and check the meter resistance reading at the temperatures specified. **Warning:** *This must be done very carefully to avoid the risk of personal injury.*

700/750 models

Temperature	Resistance
60°C(140°F)	104 ohms
85°C(176°F)	44 ohms
110°C(230°F)	20 ohms
120°C(248°F)	16 ohms

1100 models

Temperature	Resistance
60°C(140°F)	104 ohms
85°C(176°F)	44 ohms

5 If the resistance reading varies wildly from that stated, the sender unit must be replaced. If the gauge/display appears to be faulty, remove the instrument cluster as described in Chapter 8, and check the relevant wiring connectors. If all appears to be well, the gauge is' defective and must be replaced.

Sender unit check -1985 through 1988 700/750 Magna models and all 1100 Sabre models

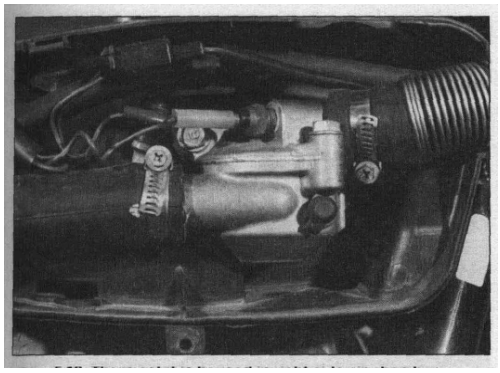
6 Remove the temperature sender unit as described below in Steps! 9 to 11. The sender unit is tested in the same way as the cooling fan thermostatic switch, referring to Steps 6 to 8 of Section 4, noting that the container should be filled with oil rather than coolant and a thermometer capable of reading up to 120°C (248°F) will be required.
7 Heat the oil gently, stirring it slowly to keep a uniform temperature throughout, while noting the resistance readings of the sender unit. A serviceable sender unit should give the following approximate resistance readings at the specified temperatures.

700/750 models

Temperature	Resistance
50°C(122°F)	154 ohms
80°C(176°F)	52 ohms
100°C(212°F)	27 ohms
120°C(248°F)	16 ohms

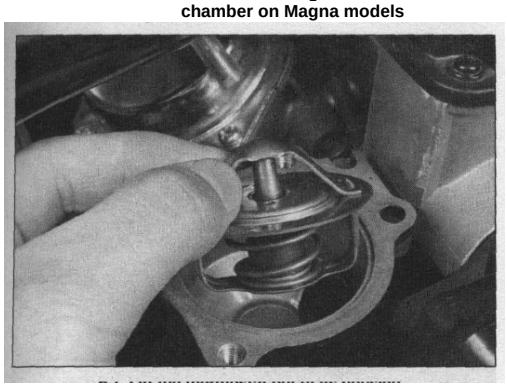
1100 models

Temperature	Resistance
60°C(140°F)	104 ohms
85°C(176°F)	44 ohms
110°C(230°F)	20 ohms
120°C(248°F)	16 ohms



5.10 Thermostat is housed in right side air chamber on Magna models

5.11 Temperature gauge sender unit location



6.7 Lift the thermostat out of its housing

8 If the resistance reading varies wildly from that stated the sender unit must be replaced. If the gauge appears to be faulty, remove the instrument cluster as described in Chapter 8, and check the relevant wiring connectors. If all appears to be well, the gauge/display/warning light bulb is defective and must be replaced.

Replacement

Refer to illustrations 5.10 and 5.11

Temperature sender unit

Warning: *The engine must be completely cool before this procedure.*

9 Remove the fuel tank for improved access (see Chapter 4).

10 On the 1982 750 Sabre model, remove the right side air filter, and on all later 700/750 Sabre models, remove the front side cover on the right side. On Magna models remove the right side air chamber cover (see **illustration).** On all models disconnect the wiring connector from the switch.

11 Unscrew the sender unit from the thermostat housing cover **(see illustration).** Plug the opening to minimize coolant loss.

12 Apply a smear of sealant to the switch threads.

13 Remove the plug and quickly install the new sender unit, tightening it to the specified torque setting.

14 Connect the wiring connector to the sender unit and install the fuel tank as described in Chapter 4.

15 Check the coolant level and, if necessary, top up as described in Chapter 1.

Temperature gauge/display/warning light bulb

16 See Chapter 8.

6 Thermostat - removal, testing and installation

1 The thermostat is automatic in operation and should give many years of service without requiring attention. In the event of a failure, the valve will probably jam open, in which case the engine will take much longer than normal to warm up. Conversely, if the valve jams shut, the coolant will be unable to circulate and the engine will overheat. Neither condition is acceptable, and the fault must be investigated promptly.

Removal

Refer to illustration 6.7

2 Remove the fuel tank (see Chapter 4).

3 Remove the coolant drain plug from the lower left front tube and drain about a quart of coolant from the system.

1982 750 Sabre models

4 Note the positions of the upper radiator hose clamps. If neither one is accessible to be loosened, the right air cleaner element and air cleaner case must be removed. If the hose clamp is accessible, loosen it (preferably, it should be the one that connects directly to the water pipe).

5 Remove the screw that retains the water pipe to the cylinder head.

6 Disconnect the wire from the coolant temperature sender unit.

7 Remove the thermostat cover bolts and lift off the cover. Lift out the thermostat **(see illustration).**

1983 through 1985 700/750 Sabre models

8 On later 700/750 models, disconnect the battery (negative lead first) and pull off the right side electrical components plate cover.

9 Disconnect the wire from the coolant temperature sender unit.

10 Loosen the hose clamp which retains the radiator hose to the thermostat and remove the bolts which retain the thermostat cover. Lift the cover and twist the hose off. Lift out the thermostat.

All 1100 Sabre models

11 Remove the two screws from the front of the thermostat cover to release the water pipe connection. Loosen the clamp of the hose at the bottom of the thermostat housing.

12 Disconnect the wire from the coolant temperature sender unit.

13 Remove the single bolt which retains the thermostat housing to the engine and remove the housing.

14 Remove the two bolts to release the housing cover and lift out the thermostat.

All Magna models

15 Remove the right side air chamber cover. Disconnect the wire from the coolant temperature sender unit. Remove the bolt that attaches the thermostat housing to the air chamber.

16 Loosen the hose clamps on both sides of the thermostat housing.

17 The thermostat housing can now be separated from the hoses. To reach the thermostat, remove the bolts that retain the housing cover to the housing and then lift out the thermostat.

Testing

18 Initially examine the thermostat visually. If it is open at room temperature it should be replaced with a new one. To test it, suspend it by a piece of wire in a pan of cold water. Do not let it touch the bottom of the pan. Place a thermometer in the pan and slowly heat the water. Note at what temperature the thermostat begins to open and compare it to the Specifications. If the thermostat does not open at the correct temperature replace it with a new one.

19 In the event of thermostat failure, as an emergency measure only, it can be removed and the machine used without it. **Note:** *Take care when starting the engine from cold as it will take much longer than usual to warm up. Ensure that a new unit is installed as soon as possible.*

Installation

20 Installation is the reverse of the removal procedure with the following notes.

a) Be sure the thermostat is reinstalled in its original position with the spring down.
b) Always install a new 0-ring on the thermostat housing cover whenever the cover has been removed.
c) On 1982 750 Sabre models and all 1100 Sabre models, install a new O-ring at the junction of the water pipe and thermostat cover.
d) When installing the thermostat housing mounting bolt, ensure that the ground (earth) wire is secured with it.
e) Following installation, refill and bleed the system (see Chapter 1).
f) On 1983 through 1985 700/750 Sabre models, remember to reconnect the battery (negative lead last).

7 Radiator - removal, inspection and installation

Removal

Refer to illustration 7.9a and 7.9b

1 Remove the fuel tank (see Chapter 4).

2 Remove the coolant drain plug from the lower left frame tube and drain the coolant from the radiator. **Note:** 7986 *through 1988 models have a tap on the radiator outlet stub which allows the radiator to be removed without draining the cooling system (see Chapter 1).*

3 Disconnect the reservoir tank tube located at the radiator filler neck.

4 Disconnect the wiring connectors leading to the fan motor and thermostatic switch, and detach the wiring from any clamps or ties.

5 On 1987 and 1988 700/750 Magna models, detach its wires and remove the horn mounting bolt from the left frame tube.

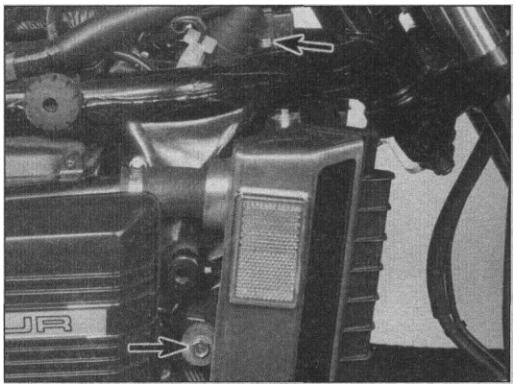
6 Remove their retaining screws/nuts and release the radiator side covers. On 700/750 Sabre models, remove the radiator lower hose cover.

7 On Magna models, also remove the right air chamber cover to gain access to the radiator top hose clamp.

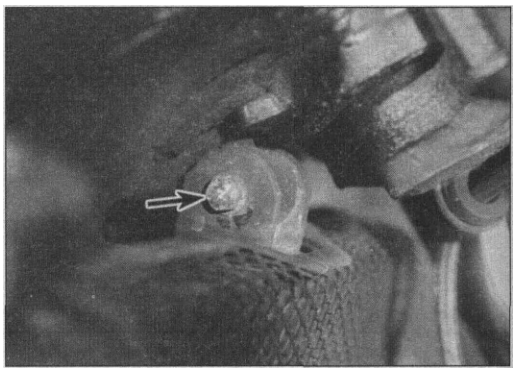
8 Loosen both the upper and lower radiator hose clamps.

9 Remove the radiator mounting bolts/nuts and pull it free from the upper and lower hoses. All models have a mounting bolt on each side which attaches the radiator to the frame downtubes, and have either two nuts or bolts on the top surface, or a single throughbolt and nut **(see illustrations).**

10 Refer to Section 4 for details of fan and fan motor removal.



7.9a Radiator top and side mountings (early model shown)



7.9b Radiator top mounting is formed by single throughbolt on later models (arrow)

Inspection

11 Bugs and dirt can be cleaned from the radiator by using a soft brush. Also use compressed air applied from the rear side of the radiator, but be careful not to bend the cooling fins as this is done.

12 If care is exercised, bent fins can be straightened using two screwdrivers. If the fins are badly damaged or are damaged over a large area, the radiator should be replaced with a new one.

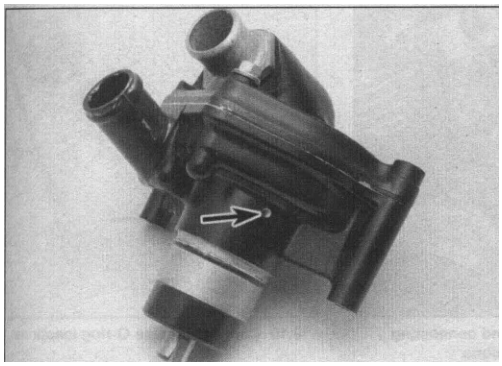
13 If the radiator is in need of welding due to large leaks, it should be done by a professional radiator shop or dealer, as special welding techniques are required.

14 Check the radiator mounting rubbers for signs of damage or deterioration and replace if necessary.

Installation

15 Installation is the reverse of removal, noting the following.

a) Ensure that all mounting dampers are returned to their original locations.
b) Make sure that the fan wiring is correctly routed, in no danger of being caught by the fan and is retained by any relevant clips.
c) Ensure the coolant hoses are securely retained by their clamps -do not overtighten the clamps or the stub may distort.



8.2 Water pump drainage hole (arrow)

d) "~0n completion refill the cooling system as described in Chapter 1 and check that there are no leaks from the radiator hoses.

8 Water pump - check, removal, inspection and installation

Check

Refer to illustration 8.2

1 Remove the left rear crankcase cover. The cover is retained by a single bolt on all 700/750 Sabre models and 1982 through 1984 700/750 Magna models; note the long collar inside the cover. On all 1100 models and 1985-on 700/750 Magna models the cover is retained by three bolts. Visually check the area around the water pump for signs of leakage.

2 To prevent leakage of water or oil from the cooling system to the lubrication system and vice versa, two seals are fitted on the pump shaft. On the underside of the pump body there is also a drainage hole (see **illustration).** If either seal fails this hole should allow the coolant or oil to escape and prevent the oil and coolant mixing.

3 The seal on the water pump side is of the mechanical type which bears on the rear face of the impeller. The second seal, which is mounted behind the mechanical seal is of the normal feathered lip type. However, neither seal is available as a separate item as the pump is a sealed unit. Therefore, if on inspection the drainage hole shows signs of leakage, the pump must be removed and replaced.

Removal

Refer to illustrations 8.5, 8.6 and 8.10

4 Remove the left rear crankcase cover (see Step 1).

5 Remove the coolant drain plug from the lower left frame tube and drain the coolant **(see illustration).**

6 Also remove the drain bolt at the water pump and the two drain plugs from the front cylinders **(see illustration).**

7 Disengage the wiring from any clamps on the water pump cover bolts and position it out of the way.

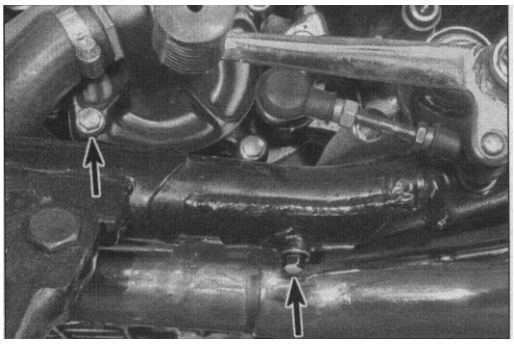
8 Disconnect the water hose from the water pump cover.

9 Remove the remaining water pump cover bolts and lift off the cover.

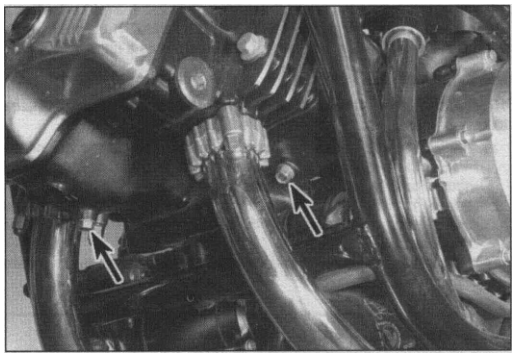
10 Remove the inlet water pipe mounting bolt located on the front of the engine **(see illustration).** It may be necessary on certain models to remove the left front engine mount bolt for clearance.

11 Loosen the hose clamps that secure the water hose between the water pump housing and the water pipe.

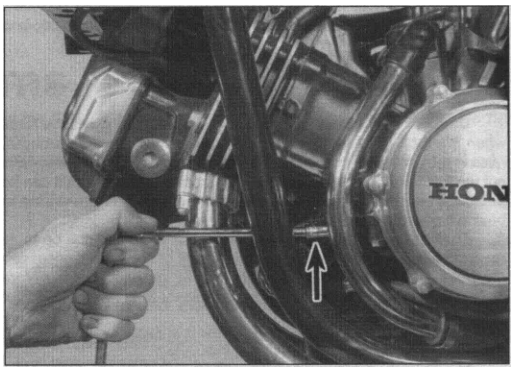
12 Pull the water pump out from the crankcase and then separate the water pipe from the pump.



8.5 Coolant drain plug in frame section (right arrow), and water pump drain plug (left arrow)



8.6 Front cylinder bank drain plugs (arrows)

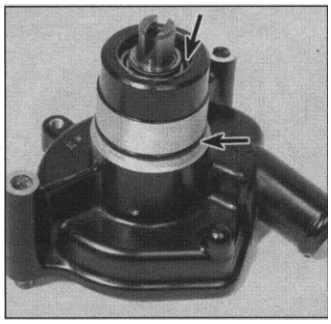


8.10 Inlet water pipe clamp bolt location (arrow)

Inspection

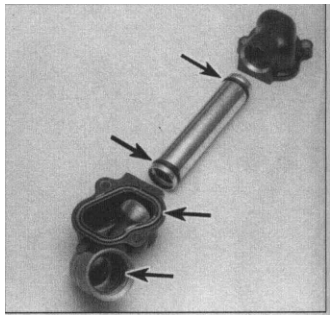
Refer to illustration 8.14

13 Wiggle the water pump impeller back-and-forth and in-and-out. If there is excessive movement the pump must be replaced.



8.14 Check the water pump seal for damage and replace the O-ring whenever the pump is removed (arrows)

9.7 Coolant inlet and connecting pipe locations



9.10 Connecting pipe O-ring locations

14 Check the bearing and oil seal for damage **(see illustration).** Make sure the bearing spins easily without noise. The water pump cannot be rebuilt and, if faulty, must be replaced as a unit.

Installation

15 Installation is the reverse of the removal procedure with the following notes.

a) Always replace the O-rings on the water pump, at the top of the water pipe and in the water pump cover. The water pump O-ring should be lubricated with engine oil before installing it.

b) When installing the water pump into the crankcase, be sure the water pump shaft meshes with the oil pump shaft, which drives the pump.

c) Following installation, refill and bleed the cooling system (see Chapter 1).

9 Coolant hoses and pipes - removal and installation

Note: *Before removing a hose or pipe, drain the coolant as described in Chapter 1. Total draining of the system is not always necessary, particularly if the hose is at the top of the system, but it does provide a good opportunity to drain, flush and refill the system with fresh coolant.*

Flexible hoses

1 Use a screwdriver to loosen the hose clamps, then slide them back along the hose and clear of the stub.

2 Caution: *The radiator stubs are fragile. Do not use excessive force when attempting to remove the hoses.* If a hose proves stubborn, release it by rotating it on its stub before working it off. If all else fails, cut the hose with a sharp knife then slit it at each stub so that it can be peeled off in two pieces. While this is expensive it is preferable to buying a new radiator.

3 To install, slide the clips onto the hose and then work it on to its respective union. **Note:** *Do not use a lubricant of any kind. If necessary the hose can be softened by soaking it in very hot water before installing, although care is obviously necessary to prevent the risk of personal injury while doing this.*

4 Rotate the hose on its stubs to settle it in position before sliding the clips into place and tightening them securely.

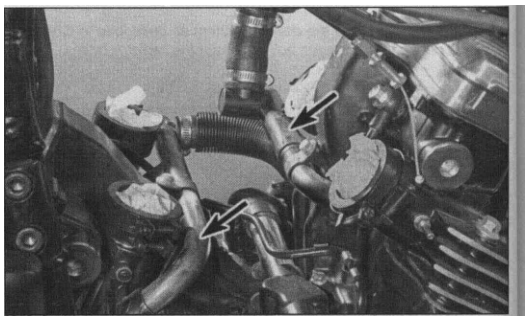
5 The short radiator top hose on Sabre models is linked to the thermostat by a solid pipe. Release the two screws to release the pipe flange from the thermostat housing. Use a new O-ring on installation.

6 Refill and bleeding the cooling system (see Chapter 1).

Metal coolant inlet pipe

Refer to illustrations 9.7 and 9.10

7 The curved inlet pipe delivers coolant from the water pump to the



9.13 Coolant crossover pipe locations

a union on the crankcase, where it is routed to cylinders No. 1 and 2; a link pipe connects the first union to a second on the right side of the crankcase, which supplies cylinders No. 3 and 4 **(see illustration).**

8 Remove the pipe mounting bolt on the front of the engine, noting that the front engine mounting bolt on the left side may have to be removed on some models for access. -»

9 Loosen the hose clamps at both ends of the pipe and work the pipe off the water pump hose and out of the crankcase union.

10 Remove the two bolts that attach each union to the crankcase. Once removed, the connecting pipe can be separated from the unions and the O-rings replaced **(see illustration).**

11 Installation is the reverse of the removal procedure, noting that all O-rings must be replaced with new ones.

12 Refill and bleed the cooling system (see Chapter 1).

Coolant crossover pipes

Refer to illustration 9.13

13 The coolant crossover pipes carry the coolant from the cylinder heads to the thermostat housing **(see illustration).** To gain access to them, first remove the carburetors as described in Chapter 4.

14 Loosen the hose clamp securing the coolant hose to the bottom of the thermostat housing.

15 Remove the coolant pipe clamp bolts and lift off the clamps.

16 Pull the pipes out of the cylinder head; if used with care, a screwdriver can be used to pry them out.

17 If necessary, separate the pipes from the connecting hoses.

18 Installation is the reverse of the removal procedure, noting that new sealing rings should be used on all joints.

19 Refill and bleed the cooling system (see Chapter 1).

Chapter 4
Fuel and exhaust systems

Note: *Unless specifically mentioned in this Chapter, the information given for the 1982 750 Sabre applies to the UK VF750S-C, and that for the **1987** and 1988 700/750 Magnas applies to the UK VF750C-H and C-J respectively.*

Contents

Specifications

Fuel grade	Unleaded or leaded (according to local regulations), minimum 91 octane (research method)

Fuel tank capacity

1982 through 1985 700/750 Sabre models	
Total	18 lit (4.8 US gal, 4.0 Imp gal)
Reserve	4 lit (1.1 US gal, 0.9 Imp gal)
1982 through 1984 700/750 Magna models	
Total (including auxiliary tank)	14 lit (3.7 US gal, 3.1 Imp gal)
Reserve	4 lit (1.1 US gal, 0.9 Imp gal)
1985 and 1986 700 Magna models	
Total	13.5 lit (3.6 US gal, 3.0 Imp gal)
Reserve	3.5 lit (0.9 US gal, 0.8 Imp gal)
1987 and 1988 700/750 Magna models	
Total	13 lit (3.4 US gal, 2.9 Imp gal)
Reserve	2.8 lit (0.7 US gal, 0.6 Imp gal)
1100 Sabre models	
Total	22 lit (5.8 US gal, 4.8 Imp gal)
Reserve	4 lit (1.1 US gal, 0.9 Imp gal)
1100 Magna models	
Total (including auxiliary tank)	17 lit (4.5 US gal, 3.7 Imp gal)
Reserve	3 lit (0.8 US gal, 0.7 Imp gal)

Carburetor jet sizes

Main jet	Front cylinders	Rear cylinders
1982 750 Sabre model	132	132
1983 750 Sabre model	135	138
1984 and 1985 700 Sabre models	122	130
UK VF750S model	132	132
1982 750 Magna model	128	128
1983 750 Magna model	128	132
1984 through 1986 700 Magna models	95	98
1987 700 Magna California model	105	105
1987 700 Magna model except California	108	105
1988 750 Magna model	110	108
UK VF750C-H model	110	108
UK VF750C-J model	112	110
1100 Sabre models	120	128
1983 1100 Magna models	140	140
1984and 1985 1100 Magna models	118	120
1986 1100 Magna models	115	118

Pilot jet (slow jet)

1982 750 Sabre model	38
1983 through 1985 700/750 Sabre models	40
UK VF750S model	Not available
1983 750 Magna model	40
1982, and 1984 through 1986 700/750 Magna models	38
1987 and 1988 700/750 Magna models	35
UK VF750 C-H model	35
UK VF750 C-J model	38
1100 models	38

Pilot screw — initial setting (turns out)

1982 750 models	2 3/4
1983 750 Sabre models	2 1/2
1984 and 1985 700 Sabre models	3
UK VF750S-C model	2 1/2
1983 through 1986 700/750 Magna models	2 1/2
1987 700 Magna models	1 7/8 (2 1/8 California models)
1988 750 Magna models	1 3/4 (2 1/8 California models)
UK VF750C-H model	2 1/2
UK VF750C-J model	2 1/4
1100 Sabre models	3 3/8 (2 California models)
1100 Magna	
1983 models	3
1984 and 1985 models	2 3/4 (3 California models)
1986 models	2 1/2

Carburetor adjustments

Float height (all models)	
1982 750 Sabre model	8.3 mm (0.327 in)
1983 750 Sabre model	7.0 mm (0.276 in)
1984 and 1985 700 Sabre models	7.5 mm (0.300 in)
UK VF750S model	6.8 mm (0.268 in)
1982 through 1984 700/750 Magna models	7.2 mm (0.283 in)
1985 700 Magna model	7.0 mm (0.276 in)
1986 700 Magna model	7.5 mm (0.300 in)
1987 and 1988 700/750 Magna models	9.8 mm (0.386 in)
UK VF750C-H model	7.5 mm (0.300 in)
UK VF750C-J model	8.5 mm (0.335 in)
1983 1100 Magna model	6.0 mm (0.236 in)
1984 and 1985 1100 models	7.5 mm (0.300 in)
1986 1100 Magna model	8.0 mm (0.315 in)
Idle speed	See Chapter 1

Torque settings

	Nm	ft-ibs
Exhaust system — 1982 through 1986 700/750 and all 1100 models		
Muffler mounting nuts	18 to 28	13 to 20
Front pipe-to-cylinder head nuts	8 to 14	6 to 10
Exhaust chamber mounting bolts	8 to 12	6 to 9
Rear headpipe-to-exhaust chamber clamp bolts	18 to 28	13 to 20
Exhaust system — 1987 and 1988 700/750 Magna models		
Muffler mounting nuts	24 to 30	17 to 22
Front pipe-to-cylinder head nuts	8 to 12	6 to 9
Rear headpipe-to-exhaust chamber clamp bolts	18 to 28	13 to 20

1 General information and precautions

General information

On 700/750 Sabre models fuel is fed to the carburetors in a conventional gravity-feed system from the fuel tank. The 1100 Sabre model has a pump-fed fuel supply.

Early 700/750 and all 1100 Magnas are fitted with an auxiliary fuel tank under the seat in addition to the main fuel tank, which is of relatively small capacity. Fuel is pumped from the auxiliary tank to the carburetors. The auxiliary tank was discontinued on the 1985-on 700/750 Magnas, although the fuel system remained pump-fed through 1986.

Keihin CV carburetors are fitted to all models in the range. The front two carburetors are downdraft, while the rear carburetors are sidedraft. The carburetors should not be interchanged from their original positions. The butterfly-type choke valves are cable-operated by a lever on the left side of the handlebars.

Air is draw to the carburetors from a moulded plastic air filter housing containing an oiled foam element on Sabre models and a pleated paper type element on Magna models.

The exhaust system is a four-into-two design on all models except the 1987 and 1988 700/750 Magnas, where it is a four-into-four design.

Many of the fuel system service procedures are considered routine maintenance items and for that reason are included in Chapter 1.

Precautions

Warning: *Gasoline (petrol) is extremely flammable, so take extra precautions when you work on any part of the fuel system. Don't smoke or allow open flames or bare light bulbs near the work area, and don't work in a garage where a natural gas-type appliance (such as a water heater or clothes dryer) is present. If you spill any fuel on your skin, rinse it off immediately with soap and water. When you perform any kind of work on the fuel system, wear safety glasses and have a fire extinguisher suitable for a class B type fire (flammable liquids) on hand.*

Always perform service procedures in a well-ventilated area to prevent a build-up of fumes.

Never work in a building containing a gas appliance with a pilot light, or any other form of naked flame. Ensure that there are no naked light bulbs or any sources of flame or sparks nearby.

Do not smoke (or allow anyone else to smoke) while in the vicinity of gasoline (petrol) or of components containing it. Remember the possible presence of vapor from these sources and move well clear before smoking.

Check all electrical equipment belonging to the house, garage or workshop where work is being undertaken (see the *Safety first!* section of this manual). Remember that certain electrical appliances such as drill, cutters etc create sparks in the normal course of operation and must not be used near gasoline (petrol) or any component containing it. Again, remember the possible presence of fumes before using electrical equipment.

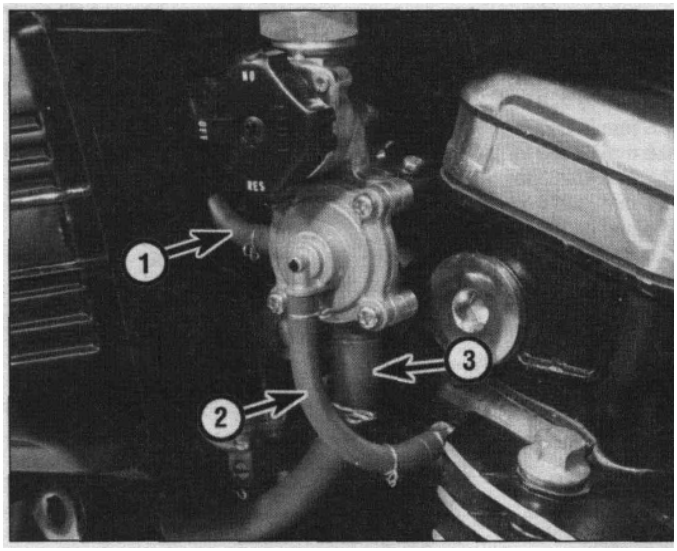
Always mop up any spilt fuel and safely dispose of the shop towel or rag used.

Any stored fuel that is drained off during servicing work, must be kept in sealed containers that are suitable for holding gasoline (petrol), and clearly marked as such; the containers themselves should be kept in a safe place. Note that this last point applies equally to the fuel tank, if it is removed from the machine; also remember to keep its cap closed at all times.

Note that the fuel system consists of the fuel tank, with its **cap** and related vent hoses, the fuel pump and filters. On US California models, this includes the Evaporative Emission Control (EVAP) System components.

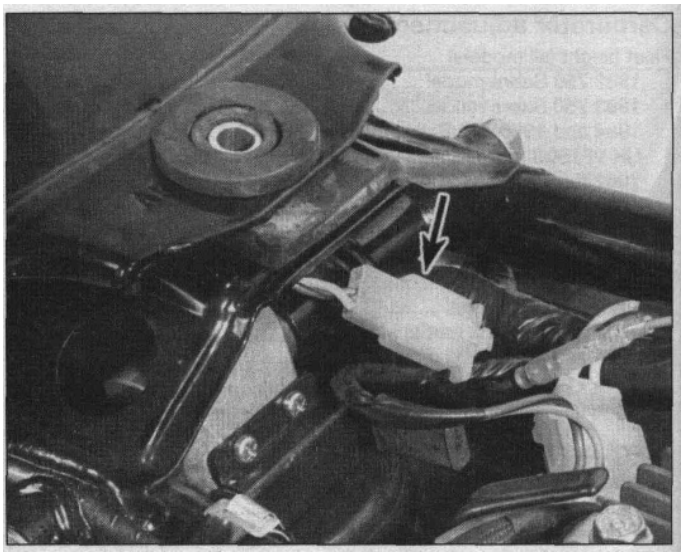
Read the Safety first! section of this manual carefully before starting work.

Owners of machines used in the US, particularly California, should note that their machines must comply at all times with Federal or State legislation governing the permissible levels of noise and of pollutants such as unburnt hydrocarbons, carbon monoxide etc that can be emitted by those machines. All vehicles offered for sale must comply with legislation in force at the date of manufacture and must not subsequently be altered in any way which will affect their emission of noise or of pollutants.



2.2 Fuel valve connections on 700/750 Sabre models

1 Vent hose
2 Vacuum hose
3 Fuel hose



2.3 Disconnect the fuel sender wiring at the connector

In practice, this means that adjustments may not be made to any part of the fuel, ignition or exhaust systems by anyone who is not authorized or mechanically qualified to do so, or who does not have the tools, equipment and data necessary to properly carry out the task. Also if any part of these systems is to be replaced it must be replaced with only genuine Honda components or by components which are approved under the relevant legislation. The machine must never be used with any part of these systems removed, modified or damaged.

2 Fuel tank - removal and installation

Warning: *Refer to the precautions given in Section 1 before starting work.*

Main fuel tank

Sabre models

Refer to illustrations 2.2 and 2.3

1 Remove the side covers and seat (see Chapter 6).
2 Turn the fuel valve to the OFF position. Have a rag handy to catch any spilled fuel and disconnect the fuel hose from the valve. On 700/750 models also disconnect the vacuum and vent hoses from the valve **(see illustration).**
3 On 700/750 models, remove the fuel tank mounting bolt and collar located at the rear of the tank, followed on 1983-on models by the mounting bolt and collar on each side at the tank front mounting. Locate the fuel sender wiring connector and disconnect it **(see illustration).** Lift the rear of the tank and pull it rearwards off the motorcycle (on 1982 models this is necessary to disengage its front mounting rubbers). On 1984-on California models, disconnect the evaporative emission control system hose from the tank.
4 On 1100 models, remove the two front mounting bolts and the single rear mounting bolt, noting their collars. Locate the fuel sender wiring connector and disconnect it, then lift the tank off the motorcycle. On California models disconnect the evaporative emission control system hose from the tank.
5 Installation is a reverse of the removal procedure. Ensure that all mounting rubbers and collars are correctly positioned, and that the tank does not trap any cables, wiring or hoses. Check that there are no fuel leaks when the fuel valve is turned ON.

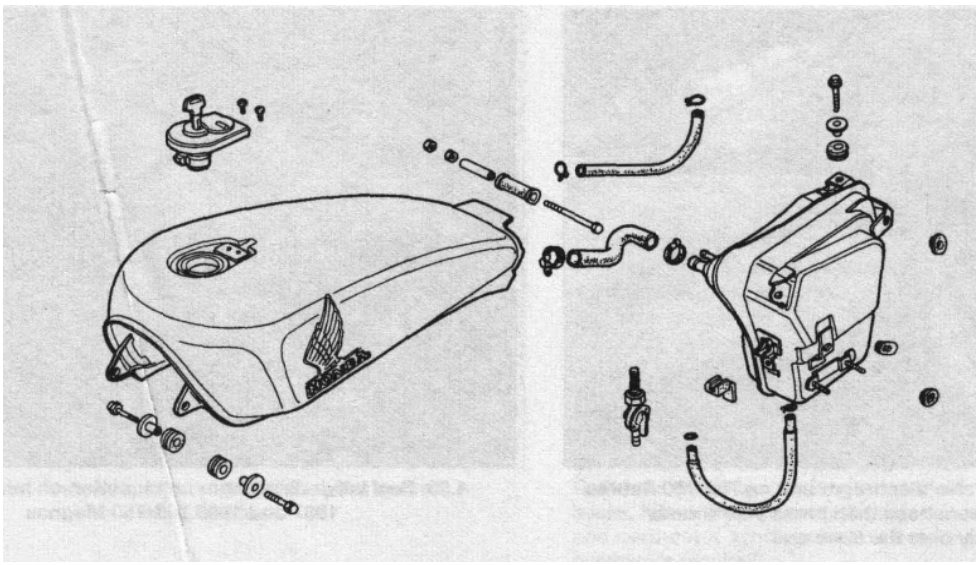
1982 through 1984 700/750 Magna models and all 1100 Magna models

Refer to illustration 2.8

6 Remove the seat (see Chapter 6).
7 Prior to removing the fuel tank, it must be drained. Remove the right (700/750 models) or left (1100 model) side cover and switch the fuel valve to the OFF position. Have a rag ready to catch any spilt fuel and disconnect the fuel pump supply hose from the valve or tank stub. Attach a length of hose of the proper diameter to the valve and place the other end of the hose in a clean container, such as a multi-gallon gas (petrol) can. Turn the valve to the ON position and drain enough fuel from the auxiliary tank to empty the main fuel tank. **Note:** *Raise the tank up on its support rod as described below to drain as much fuel as possible.* Turn the valve OFF and reconnect the fuel pump supply hose when draining is complete.
8 Remove the two front mounting bolts, then hinge the tank up on its support rod. With a rag handy to absorb any remaining fuel, disconnect the fuel and breather hoses from the rear underside of the fuel tank. On 1984-on California models, disconnect the evaporative emission control system hose from the tank **(see illustration).**
9 Disconnect the support rod hinge at the frame or tank end, and lower the tank onto the frame. Remove the throughbolt, collar and nut at the rear mounting and lift the main tank off the motorcycle.
10 Installation is a reverse of the removal procedure. Ensure that all mounting rubbers and collars are correctly positioned, and that the tank does not trap any cables, wiring or hoses. Check that there are no fuel leaks when the fuel valve is turned ON.

1985 through 1988 700/750 Magna models

11 Remove the seat (see Chapter 6).
12 Switch the fuel valve to OFF and have a rag handy to catch any drops of fuel as the hose is disconnected from it.
13 On 1985 and 1986 700 models, remove the two mounting bolts at the front of the tank and the single bolt at the rear, noting their collars. Raise the tank sufficiently to disconnect the sender unit wiring at the two-pin connector, then lift it off the motorcycle. On California models, disconnect the evaporative emission control system hose from the tank.
14 On 1987 and 1988 700/750 models remove the single mounting bolt at the front and rear of the tank, noting their collars. Lift the tank off the motorcycle. On California models, disconnect the evaporative emission control system hose from the tank.
15 Installation is a reverse of the removal procedure. Ensure that all



2.8 Main and auxiliary fuel tanks - 1982 through 1984 700/750 Magnas shown (1100 Magnas similar)

mounting rubbers and collars are correctly positioned, and that the tank does not trap any cables, wiring or hoses. Check that there are no fuel leaks when the fuel valve is turned ON.

Auxiliary fuel tank - 1982 through 1984 700/750 Magna models and all 1100 Magna models

16 Remove the seat and both side covers (see Chapter 6).
17 Disconnect the battery (negative lead first) and remove it.
18 Fully drain the main and auxiliary fuel tanks, then remove the main fuel tank as described above.
19 Disconnect the fuel level sender wiring from the sender in the tank top surface.
20 Remove the regulator/rectifier unit and its wiring tie from the side of the tank on 700/750 models (see Chapter 8).
21 Remove the rear wheel (see Chapter 7).
22 Remove the rear fender sections.
23 Have a rag ready to catch any drops of fuel and disconnect the auxiliary fuel tank hose from the fuel pump.
24 Remove the auxiliary fuel tank mounting bolt and withdraw the tank rearwards from the motorcycle.
25 The 1100 Magna has a drain bolt fitted in the base of the tank, which provides a useful means of draining any sludge or dirt which has settled in the bottom of the tank. If it is ever removed, always fit a new sealing washer on installation.
26 Installation is a reverse of the removal procedure. Ensure that the tank mounting bolt rubber grommet and collar are correctly positioned, and that the tank front edge engages the lower rubber mounting. Check that the tank does not trap any cables, wiring or hoses and that there are no fuel leaks when the fuel valve is turned ON.

3 Fuel tank - cleaning and repair

1 All repairs to the fuel tank should be carried out by a professional who has experience in this critical and potentially dangerous work. Even after cleaning and flushing of the fuel system, explosive fumes can remain and ignite during repair of the tank.
2 If the fuel tank is removed from the motorcycle, it should not be placed in an area where sparks or open flames could ignite the fumes coming out of the tank. Be especially careful inside garages where a natural gas-type appliance is located, because the pilot light could cause an explosion.

4 Fuel valve - removal and installation

Warning: Refer to *the precautions given in Section 1 before starting work.*

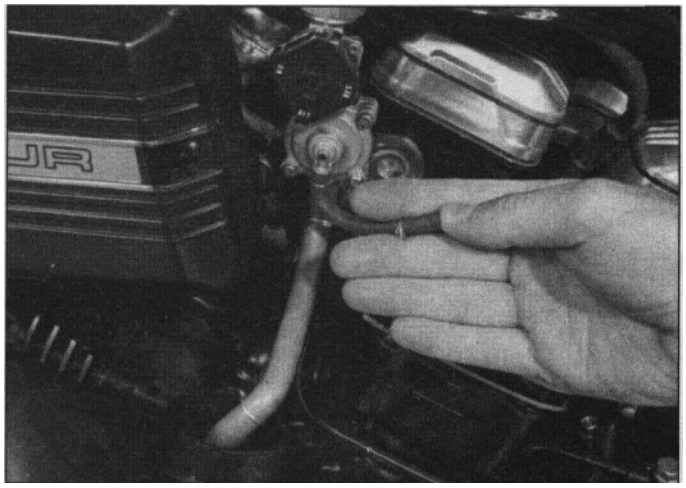
700/750 Sabre models

Fuel valve

Refer to illustration 4.10
1 Before the valve can be removed, all fuel must be drained from the tank.
2 Switch the fuel valve to the OFF position. Have a rag ready to catch any spilt fuel and disconnect the fuel, vent and vacuum hoses from the diaphragm valve stubs.
3 Attach a length of hose of the proper diameter to the fuel outlet stub (larger diameter of the three) and place the other end of the hose in a clean container, such as a multi-gallon gas (petrol) can. Turn the valve to the RES position and drain all fuel. Turn the valve OFF when draining is complete and disconnect the drain hose.
4 Remove the fuel tank (see Section 2).
5 Unscrew the fuel valve's gland nut and remove the valve and internal gauze filter from the tank. Recover the O-ring.
6 Taking suitable precautions against fire, rinse the filter gauze in fresh fuel to clean it.
7 Installation is a reverse of the removal procedure, noting that a new O-ring should be fitted at the valve-to-tank joint.

Diaphragm unit

8 The diaphragm valve housing forms part of the fuel valve body. The diaphragm can be inspected by removing the four screws and withdrawing the cover. If operating correctly it should only allow fuel to flow when the engine is running.
9 To check its operation, disconnect the vacuum hose from the no. 1 cylinder intake manifold and the fuel outlet pipe (to the carburetors) from the lower stub on the valve. Install a substitute length of hose on the outlet stub union and place its other end in a jar.
10 With the fuel valve in the ON position there should be no fuel flow



4.10 Checking the fuel valve diaphragm unit on 700/750 Sabres - suck on the vacuum hose then press your thumb tightly over the hose end

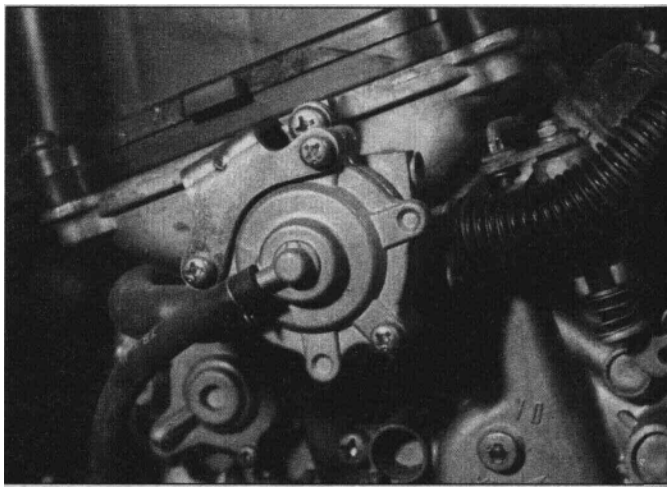
through the diaphragm valve apart from a very small amount which will be present in the pipe. Suck gently on the other end of the vacuum hose to simulate engine vacuum, then quickly cover the end with your thumb - fuel should flow from the outlet pipe if the valve is operating correctly and stop when the vacuum is released **(see illustration).**
11 If fuel is not flowing from the valve with vacuum applied, first make sure that the vacuum line is not clogged, then remove the assembly from the tank and make sure that the filter is not clogged.
12 If the valve fails to operate as described it must be replaced although check with your dealer if the diaphragm and cover assembly can be purchased separately.

1982 through 1984 700/750 Magna models

13 Before the valve can be removed, all fuel must be drained from the main and auxiliary tanks.
14 Remove the right side cover and switch the fuel valve to the OFF position. Have a rag ready to catch any spilt fuel and disconnect the fuel outlet hose from the valve stub.
15 Attach a length of hose of the proper diameter to the valve and place the other end of the hose in a clean container, such as a multi-gallon gas (petrol) can. Turn the valve to the RES position and drain all fuel. Turn the valve OFF when draining is complete and disconnect the drain hose.
16 Disconnect the inlet hose from the other union on the fuel valve and remove the two screws to detach the valve from its mounting bracket.
17 No replacement parts are available for the fuel valve; if it is faulty is must be replaced as a complete unit.
18 An in-line fuel filter is fitted to these models (see Chapter 1).

1985 and 1986 700 Magna models

19 Before the valve can be removed, all fuel must be drained from the tank.
20 Switch the fuel valve to the OFF position. Have a rag ready to catch any spilt fuel and disconnect the fuel hose from the valve stub.
21 Attach a length of hose of the proper diameter to the valve and place the other end of the hose in a clean container, such as a multi-gallon gas (petrol) can. Turn the valve to the RES position and drain all fuel. Turn the valve OFF when draining is complete and disconnect the drain hose.
22 Remove the fuel tank (see Section 2).
23 Unscrew the fuel valve's gland nut and remove the valve from the tank. Recover the O-ring.
24 Installation is a reverse of removal, noting that a new O-ring should be fitted at the valve-to-tank joint.
25 An in-line fuel filter is fitted to these models (see Chapter 1).



4.33 Fuel valve diaphragm unit location on air chamber - 1987 and 1988 700/750 Magnas

1987 and 1988 700/750 Magna models

Fuel valve

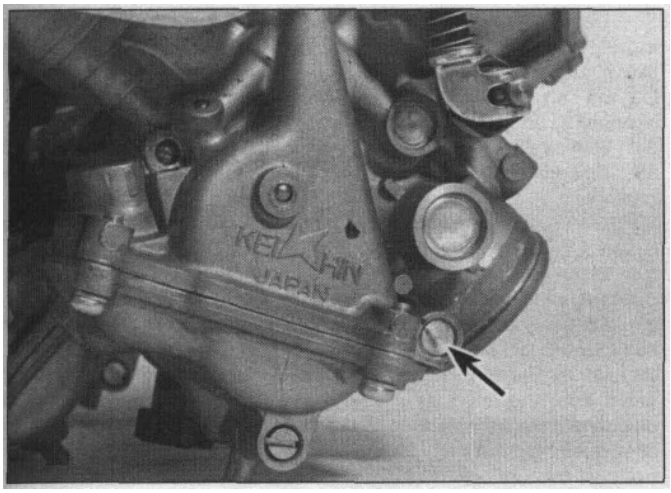
26 Before the valve can be removed, all fuel must be drained from the tank.
27 Switch the fuel valve to the OFF position. Have a rag ready to catch any spilt fuel and disconnect the fuel hose from the valve stub.
28 Attach a length of hose of the proper diameter to the valve and place the other end of the hose in a clean container, such as a multi-gallon gas (petrol) can. Turn the valve to the RES position and drain all fuel. Turn the valve OFF when draining is complete and disconnect thi drain hose.
29 Remove the fuel tank (see Section 2).
30 Unscrew the fuel valve's gland nut and remove the valve and internal gauze filter from the tank. Recover the O-ring.
31 Taking suitable precautions against fire, rinse the filter gauze in fresh fuel to clean it.
32 Installation is a reverse of the removal procedure, noting that a new O-ring should be fitted at the valve-to-tank joint.

Diaphragm unit

Refer to illustration 4.33
33 The fuel valve diaphragm is retained to the air chamber left by two screws; remove the air chamber left side cover for access (see **illustration).** If operating correctly it should only allow fuel to flow when the engine is running.
34 To check its operation, disconnect the vacuum hose from the no, 2 cylinder intake manifold and the fuel outlet pipe (to the carburetore] from the front stub on the valve. Install a substitute length of hose on the outlet stub union and place its other end in a jar.
35 With the fuel valve in the ON position there should be no fuel flow through the diaphragm valve. Suck gently on the other end of the vacuum hose to simulate engine vacuum, then quickly cover the end with your thumb - fuel should flow from the outlet stub if the valve is operating correctly and stop when the vacuum is released.
36 If fuel is not flowing from the valve with vacuum applied, first make sure that the vacuum line is not clogged, then remove the fuel valve from the tank and make sure that the filter is not clogged.
37 If the valve fails to operate as described it must be replaced individual parts are not available.

1100 Sabre models

38 Remove the fuel tank (see Section 2).
39 Turn the fuel valve to the RES position and drain the fuel via the outlet pipe into a container marked as being suitable for the storage of gasoline (petrol).
40 Remove its two retaining screws and remove the fuel valve from



5.1 Metal limiter caps (arrow) seal the pilot screws in certain markets

the rear of the tank. Recover the valve gasket.
41 Installation is a reverse of removal, noting that a new gasket should be fitted at the valve-to-tank joint.
42 An in-line fuel filter is fitted to this model (see Chapter 1).

1100 Magna models

43 Before the valve can be removed, all fuel must be drained from the tank.
44 Remove the left side cover and switch the fuel valve to the OFF position.
45 Have a rag ready to catch any spilt fuel and disconnect the fuel outlet hose from its tank stub. Attach a length hose of the proper diameter to the stub and place the other end of the hose in a clean container, such as a multi-gallon gas (petrol) can. Turn the valve to the RES position and drain all fuel from the auxiliary tank. Turn the valve OFF and reconnect the outlet hose when draining is complete. Complete draining can be achieved by removing the drain bolt from the base of the tank.
46 Remove the two screws to free the fuel valve and its gasket from the fuel tank.
47 Installation is a reverse of removal, noting that a new gasket should be fitted at the valve-to-tank joint and a new sealing washer fitted to the tank drain bolt if removed.
48 An in-line fuel filter is fitted to this model (see Chapter 1).

5 Idle fuel/air mixture adjustment - general information

Refer to *illustration 5.1*

1 Due to the increased emphasis on controlling motorcycle exhaust emissions, certain governmental regulations have been formulated which directly affect the carburetion of this machine. In order to comply with the regulations, the carburetors on many models have a metal limiter cap stuck onto the end of the pilot screw (which controls the idle fuel/air mixture) on each carburetor, so they can't be tampered with **(see illustration).** These should only be removed in the event of a complete carburetor overhaul, and even then the screws should be returned to their original settings. If a new pilot screw is fitted, set it to the basic setting given in the Specifications section of this chapter and have its setting checked with the use of an exhaust gas analyzer; this is the only accurate way to adjust the idle fuel/air mixture and be sure the machine doesn't exceed the emissions regulations.
2 Refer to Sections 8 and 9 for pilot screw removal and installation.
3 If the engine runs extremely rough at idle or continually stalls, and if a carburetor overhaul does not cure the problem, take the motorcycle to a Honda dealer service department or other repair shop equipped with an exhaust gas analyzer. They will be able to properly adjust the idle fuel/air mixture to achieve a smooth idle and restore low speed performance.
4 If the motorcycle is operated continuously at high altitudes (above 2000 meters, 6,500 feet) alteration of the pilot screw setting will be required - refer to a Honda dealer for details.

6 Carburetor overhaul - general information

1 Poor engine performance, hesitation, hard starting, stalling, flooding and backfiring are all signs that major carburetor maintenance may be required.
2 Keep in mind that many so-called carburetor problems are really not carburetor problems at all, but mechanical problems within the engine or ignition system malfunctions. Try to establish for certain that the carburetors are in need of maintenance before beginning a major overhaul.
3 Check the fuel filter, the fuel lines, the tank cap vent (except California models), the intake manifold hose clamps, the vacuum hoses, the air filter element, the cylinder compression, the spark plugs and carburetor synchronization before assuming that a carburetor overhaul is required.
4 Most carburetor problems are caused by dirt particles, varnish and other deposits which build up in and block the fuel and air passages. Also, in time, gaskets and O-rings shrink or deteriorate and cause fuel and air leaks which lead to poor performance.
5 When the carburetor is overhauled, it is generally disassembled completely and the parts are cleaned thoroughly with a carburetor cleaning solvent and dried with filtered, unlubricated compressed air. The fuel and air passages are also blown through with compressed air to force out any dirt that may have been loosened but not removed by the solvent. Once the cleaning process is complete, the carburetor is reassembled using new gaskets and O-rings.
6 Before disassembling the carburetors, make sure you have a carburetor rebuild kit (which will include all necessary O-rings and other parts), some carburetor cleaner, a supply of rags, some means of blowing out the carburetor passages and a clean place to work. It is recommended that only one carburetor be overhauled at a time to avoid mixing up parts.

7 Carburetors - removal and installation

Warning: Refer fo *the precautions given in Section 1 before starting work. Disconnect the battery negative lead.*

Removal

Sabre models

1 Remove the fuel tank (see Section 2).
2 Remove the air filter housing (see Section 14).
3 Disconnect the crankcase breather hose from its stub on the air chamber.
4 On the 1982 750 model, remove the right ignition coil mounting bolts so that the coil can be maneuvered to one side for access to the air chamber screws. Also remove the bolt which attaches the water pipe to the air chamber.
5 On 1983 through 1985 700/750 models, remove both front side covers and remove the ignition coil mounting bracket, complete with coils from the left side (right side on California models).
6 Remove the bolt that attaches the thermostat to the air chamber (it also secures the ground/earth cable).
7 Remove the air chamber cover screws and slide the chamber out of position.
8 On 1982 750 Sabre models remove the radiator side mounting bolts.
9 Disengage the choke cable outer from its retainer clamp and then disengage the end of the cable from the lever.
10 Loosen the throttle cable locknuts then free each outer cable from

its mounting bracket. Detach the inner cables from the throttle pulley.
11 Unbend the retainers that secure the front two spark plug wires and any wiring to the air chamber heat shield.
12 Label and then disconnect the fuel and emission hoses from the carburetors. On 1984-on California models, it may be necessary to disconnect the purge control valve from the frame to permit carburetor removal. On 1100 models, disconnect the air vent control valve hoses from the valve. If the valve hoses are disconnected, label them carefully as a guide to reinstallation.
13 Loosen all hose clamps that secure the carburetor-to-cylinder head boots.
14 Using a long screwdriver, carefully pry the carburetors out of their connecting boots, then carefully remove the carburetor and air chamber assembly through the left side of the motorcycle. **Note:** *Additional clearance is gained by removing the carburetor boots from the cylinder ports.*
15 With the carburetors removed, place a suitable container below the carburetor float chambers then loosen the drain screws and drain all the fuel from the carburetors. Once all the fuel has been drained, tighten all the drain screws securely.

1982 through 1984 700/750 Magna models

16 Remove the main fuel tank (see Section 2). **Note:** *If the tank is only half full it can be trigged up on its support rod after the tank front mounting bolts have been removed - this will save having to drain the tank of fuel.*
17 Remove both the right and left side air chamber covers.
18 Disconnect the crankcase breather hose from its stub on the air chamber.
19 Remove the air filter housing (see Section 14).
20 Remove its retaining screws and withdraw the air chamber top cover.
21 Remove the radiator (see Chapter 3).
22 Remove the bolt that attaches the thermostat housing to the air chamber; this bolt also secures the ground (earth) wire. Disconnect the coolant temperature sender unit wire. Remove the thermostat housing and detach its hose from the crossover pipes.
23 Disengage the choke cable outer from its retainer clamp and then disengage the end of the cable from the lever.
24 Loosen the throttle cable locknuts then free each outer cable from its mounting bracket. Detach the inner cables from the throttle pulley.
25 Unbend the retainers that secure the front two spark plug wires to the air chamber heat shield.
26 On early 1982 models, prior to serial number CM015298 (identified by all-metal air chamber covers), the carburetor assembly is removed from the right side. On models later than this serial number (identified by partly rubber air chamber covers) the carburetors are removed from the left side. On the earlier models, remove the coolant crossover pipes (see Chapter 3).
27 Label and then disconnect the fuel and emission hoses from the carburetors. On 1984-on California models, it may be necessary to disconnect the purge control valve from the frame to permit carburetor removal from the left side of the motorcycle. If the valve hoses are disconnected, label them carefully as a guide to reinstallation.
28 Loosen the carburetor boot clamps and withdraw the carburetors from the boots. A long screwdriver can be used to pry them out. Remove the boots from the cylinder ports. This is made easier by removing the clamps from the boots first.
29 Lift out the carburetor assembly. **Note:** *If additional clearance is necessary, loosen the engine mount bolts and move the engine on its mounts.*
30 With the carburetors removed, place a suitable container below the carburetor float chambers then loosen the drain screws and drain all the fuel from the carburetors. Once all the fuel has been drained, tighten all the drain screws securely.

1985 and 1986 700 Magna models

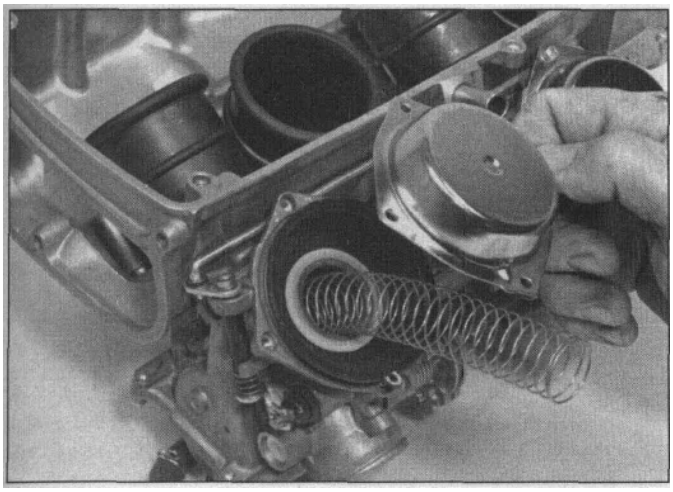
31 Remove the fuel tank (see Section 2).
32 Remove the air filter housing (see Section 14).
33 Remove the air chamber side covers from both sides of the motorcycle. On the right side remove the bolt which retains the thermostat housing to the air chamber, noting the ground (earth) wire. On the left side, remove the cover over the electrical multi-pin connectors and disconnect them.
34 Remove the radiator (see Chapter 3).
35 Disconnect the crankcase breather hose from the rear of the air chamber.
36 Remove its retaining screws and withdraw the air chamber top cover.
37 Disengage the choke cable outer from its retainer clamp and then disengage the end of the cable from the lever.
38 Loosen the throttle cable locknuts then free each outer cable from its mounting bracket. Detach the inner cables from the throttle pulley.
39 On all California models, label and disconnect the purge control valve from the left side of the motorcycle, then on 1986 models disconnect the air injection control valve and air vent control valve. On all models, disconnect the fuel supply hose and all emission hoses from the carburetors.
40 Loosen all hose clamps that secure the carburetor-to-cylinder head boots.
41 Using a long screwdriver, carefully pry the carburetors out of their connecting boots, then carefully remove the carburetor and air chamber assembly from the left side of the motorcycle. **Note:** *Additional clearance is gained by removing the carburetor boots from the cylinder ports.*
42 With the carburetors removed, place a suitable container below the carburetor float chambers then loosen the drain screws and drain all the fuel from the carburetors. Once all the fuel has been drained, tighten all the drain screws securely.

1987 and 1988 700/750 Magna models

43 Remove the fuel tank (see Section 2).
44 Remove the air filter housing (see Section 14). On the right side, remove the bolt which retains the thermostat housing to the air chamber, noting the ground (earth) wire and remove the screws which secure the side air chamber to the main chamber. On the left side label and disconnect the hoses from the air injection control valve, then remove the valve and its air chamber and detach the side air chamber from the main chamber.
45 Remove the air chamber top cover screws and withdraw the cover.
46 Disengage the choke cable outer from its retainer clamp and then disengage the end of the cable from the lever.
47 Loosen the throttle cable locknuts then free each outer cable from its mounting bracket. Detach the inner cables from the throttle pulley.
48 Disconnect the vacuum hose and fuel tank hose from the automatic fuel valve on the left side of the air chamber. Label and disconnect all emission system hoses from the carburetors. Label its hoses, then disconnect and remove the air vent control valve.
49 Loosen all hose clamps that secure the carburetor-to-cylinder head boots.
50 Using a long screwdriver, carefully pry the carburetors out of their connecting boots, then carefully remove the carburetor and air chamber assembly from the left side of the motorcycle. **Note:** *Additional clearance is gained by removing the carburetor boots from the cylinder ports.*
51 With the carburetors removed, place a suitable container below the carburetor float chambers then loosen the drain screws and drain all the fuel from the carburetors. Once all the fuel has been drained, tighten all the drain screws securely.

1100 Magna model

52 Remove the main fuel tank (see Section 2). **Note:** *If the tank is only half full it can be trigged up on its support rod after the tank front mounting bolts have been removed - this will save having to drain the tank of fuel.*
53 Remove the air filter (see Chapter 1).



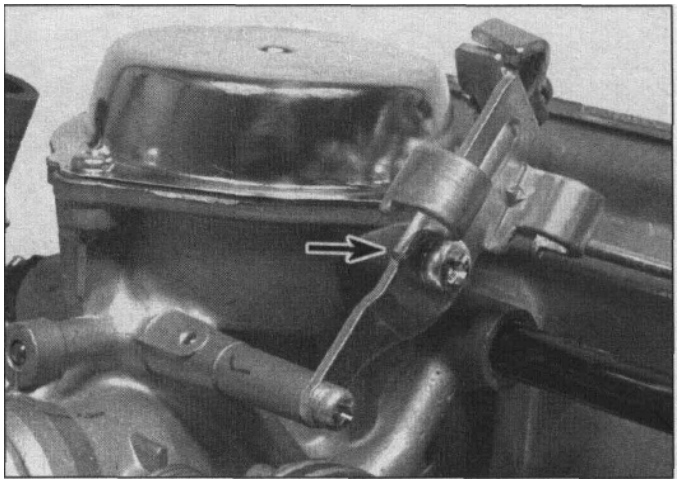
8.2a The vacuum chamber cover is under light pressure from the spring

54 Disconnect the crankcase breather hose from its stub on the air chamber.
55 Remove the screws retaining the air chamber side covers, followed by those retaining the air chamber top cover. Withdraw the covers from the motorcycle.
56 On the right side, remove the bolt which retains the thermostat housing to the air chamber, noting the ground (earth) wire.
57 Label and disconnect the emission system hoses from the carburetors and on 1986 models disconnect the hoses from the air vent control valve on the left side; detach the valve from its mounting.
58 Disengage the choke cable outer from its retainer clamp and then disengage the end of the cable from the lever.
59 Loosen the throttle cable locknuts then free each outer cable from its mounting bracket. Detach the inner cables from the throttle pulley.
60 Loosen all hose clamps that secure the carburetor-to-cylinder head boots.
61 Using a long screwdriver, carefully pry the carburetors out of their connecting boots, then carefully remove the carburetor and air chamber assembly from the left side of the motorcycle. **Note:** *Additional clearance is gained by removing the carburetor boots from the cylinder ports and also by loosening the engine mount bolts and moving the engine on its mounts.*
62 With the carburetors removed, place a suitable container below the carburetor float chambers then loosen the drain screws and drain all the fuel from the carburetors. Once all the fuel has been drained, tighten all the drain screws securely.

Installation - all models

63 Installation is basically the reverse of the removal procedure, with the following notes.

a) Clearance is tight when installing the carburetors, so it may be easier to install the boots on the cylinder ports with the clamps removed. The clamps can then be slipped over the boots prior to connecting the carburetors to them. Be sure the clamps are tightened securely to prevent possible air leaks.
b) On California models, ensure that the purge control valve, air injection control valve and air vent control valve hoses are all installed on their original unions - refer to the hose routing label under either side cover or on the rear fender for information. c) Don't omit to refit the ground (earth) wire when reconnecting the thermostat to the air chamber.
d) Reconnect the battery, negative lead first.
e) Following installation, adjust the choke cable freeplay (Section 12), throttle freeplay, idle speed and carburetor synchronization (Chapter 1).



8.2b Remove the choke/throttle cable bracket (arrow) first on no.1 carburetor

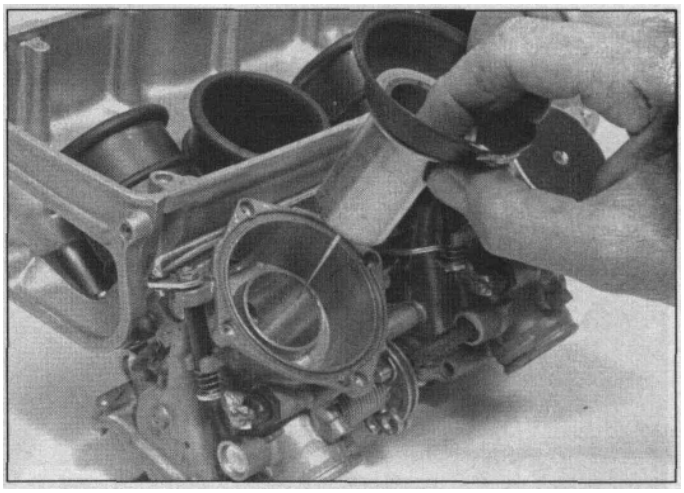
8 Carburetors - disassembly, cleaning and inspection

Warning: *Refer to the precautions given in Section 1 before proceeding.*

Disassembly

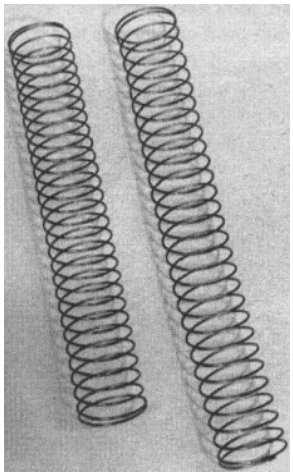
Refer to illustrations 8.2a, 8.2b, 8.3a, 8.3b, 8.5a, 8.5b, 8.6a, 8.6b, 8.7, 8.8, 8.9a, 8.9b and 8.11

1 Remove the carburetors from the machine as described in the previous Section. Remove the heat shield (where fitted) from the front of the carburetor assembly. **Note:** *There is no need to separate the carburetors from each other or from the air chamber unless absolutely necessary; each carburetor can be dismantled sufficiently for all normal cleaning and adjustments while in place on the mounting brackets. Dismantle the carburetors separately to avoid interchanging parts.* Note that it is necessary to separate the carburetors to remove the choke valves.
2 Remove the four screws that retain the vacuum chamber cover and lift it off **(see illustration).** If working on the no. 1 carburetor, remove the choke and throttle cable bracket prior to removing the vacuum chamber cover **(see illustration).**
3 Withdraw the spring and lift out the throttle piston/diaphragm assembly **(see illustration).** Note that the no. 1 and 3 carburetors (rear cylinders) use shorter springs and thinner jet needles than



8.3a Lifting the throttle piston/diaphragm out of the carburetor

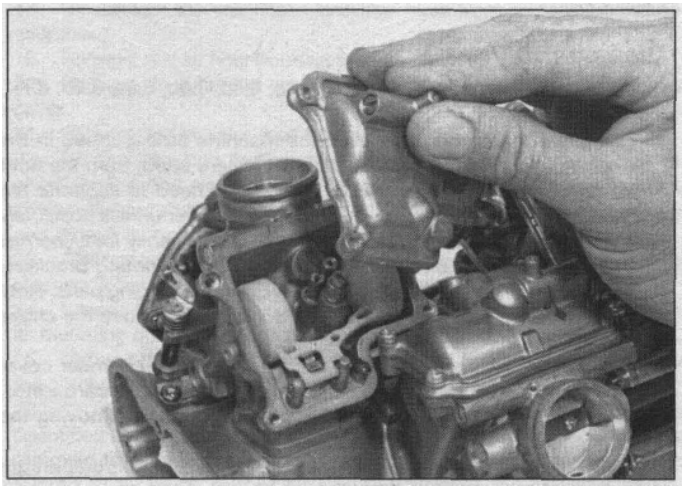
the no. 2



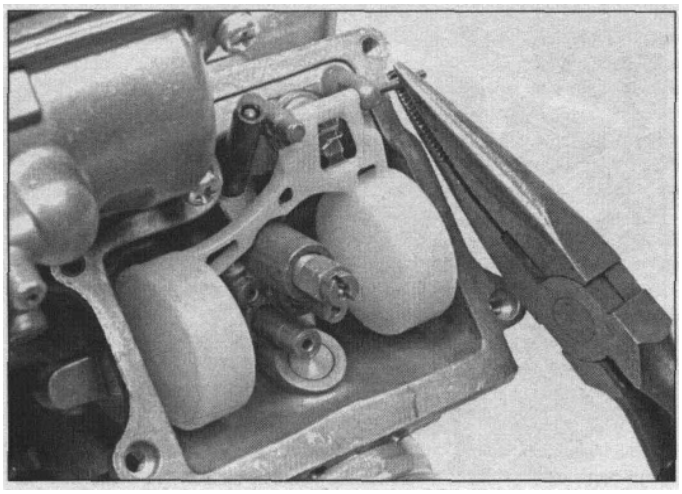
8.3b The front cylinder carburetors have longer springs than the rear

and 4 carburetors (front cylinders) **(see illustration).**

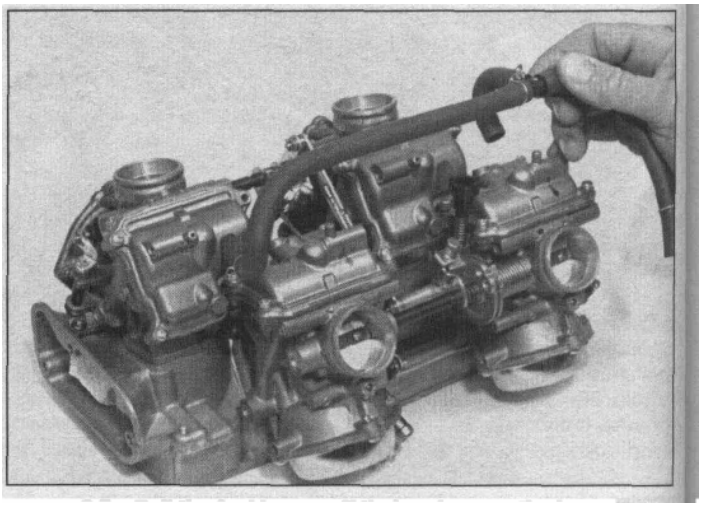
4 Insert an 8 mm socket, attached to a ratchet wrench, into the throttle piston, depress the needle holder and turn it 60° to release it.



8.5b Remove the four screws to detach the float chamber



8.6a Use needle-nose pliers to extract the float pin …



8.5a Pull the fuel hoses off their unions on the base of the carburetors

The needle holder, spring and jet needle can now be removed from the throttle valve.

5 Turn the carburetor over and remove first the fuel hoses and then the float chamber **(see illustrations).** It is attached to the carburetor body with four screws.

6 Use a needle-nose pliers to withdraw the float pin, then lift out the float and float valve **(see illustrations).**

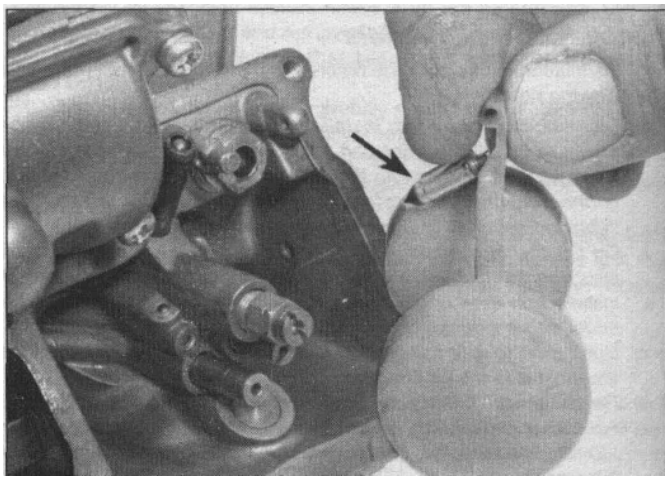
7 Unscrew the starter jet (press fit on later models), main jet, needle jet holder and pilot jet **(see illustration).**

8 Remove the float valve seat and washer **(see illustration).** Certain models also have a gauze filter attached to the valve seat.

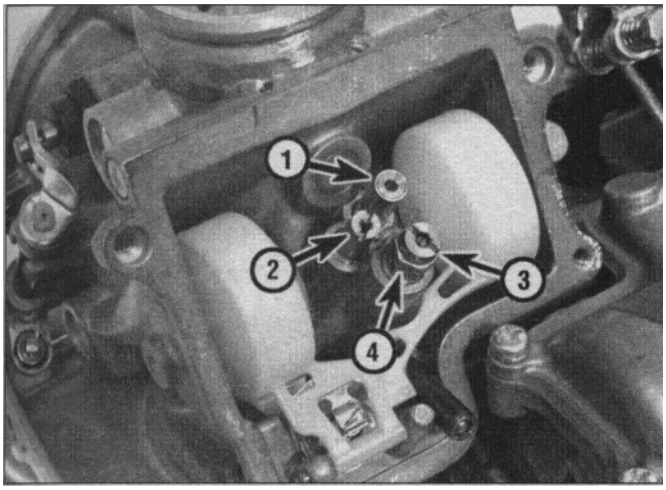
9 If pilot screw removal is required the metal limiter caps must be extracted (see Section 5). Center-punch the pilot screw cap to provide a starting point for the drill bit. Next, use a 4 mm drill bit to drill through the pilot screw plug **(see illustrations). Note:** Be *very careful not to drill into the pilot screw underneath.* Force a self-tapping screw into the drilled plug and use a screwdriver to turn it until the cap begins rotating with the screw. Grasp the head of the screw with pliers and pull it out.

10 Screw the pilot screw in until it seats lightly, counting the number of turns necessary to achieve this, then remove the screw along with its spring, flat washer and O-ring. If the screw is bent or damaged in any way, all the pilot screws must be replaced as a set.

11 If the carburetors have been separated, the choke valves can be removed from the bodies. Disconnect the linkage hook from the groove in the valve end, unscrew the valve nut and remove the choke valve and spring from the carburetor **(see illustration).**



8.6b ... and lift oft the float and float valve



8.7 Location of carburetor jets

1 Starter jet 3 Main jet
2 Pilot jet 4 Needle jet holder

12 On 1987 and 1988 700/750 Magna models, each carburetor body has an air cut-off valve on the side of its throttle bore. Remove the two screws to release the cover and withdraw the spring, O-ring and valve. Inspect all components for damage or deterioration and replace the cut-off valve assembly if necessary.

Cleaning

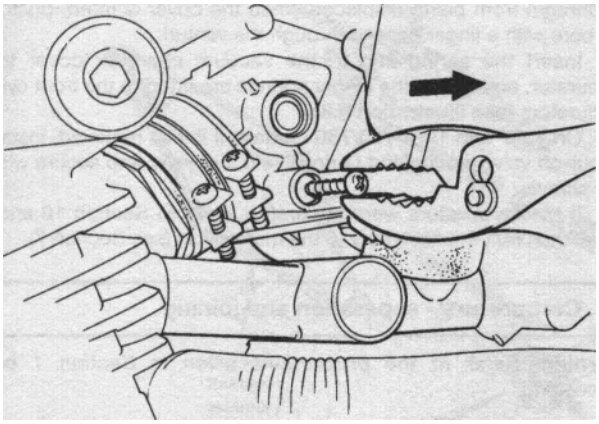
Caution: Use *only a petroleum based solvent for carburetor cleaning. Don't use caustic cleaners.*

13 Submerge the metal components in the solvent for approximately thirty minutes (or longer, if the directions recommend it).

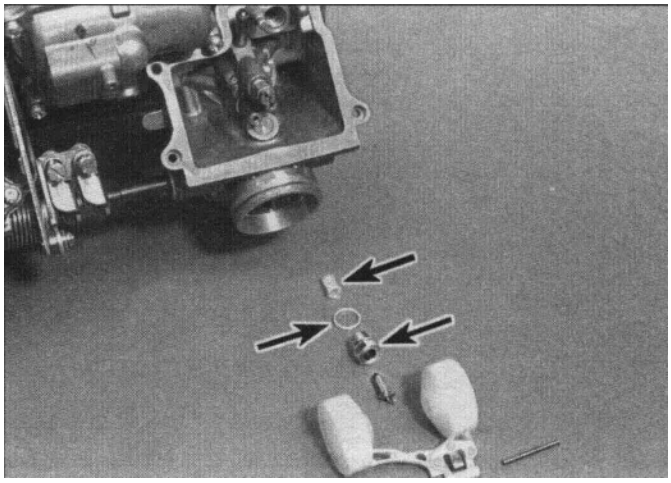
14 After the carburetor has soaked long enough for the cleaner to loosen and dissolve most of the varnish and other deposits, use a brush to remove the stubborn deposits. Rinse it again, then dry it with compressed air. Blow out all of the fuel and air passages in the main and upper body. **Caution:** *Never clean the jets or passages with a piece of wire or a drill bit, as they will be enlarged, causing the fuel and air metering rates to be upset.*

Inspection

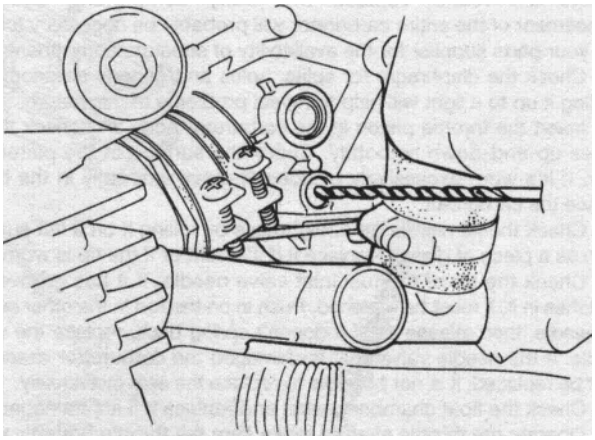
15 Check the operation of the choke plunger. If it doesn't move smoothly, replace it, along with the return spring. Inspect the needle on the end of the choke plunger and replace the plunger if it's worn or bent.



8.9b ... and a self-tapping screw used to extract them



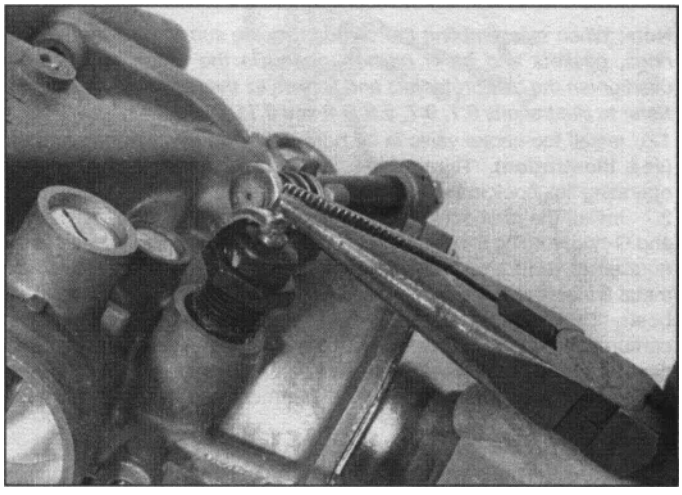
8.8 Float and valve components - valve seat, washer and filter (arrows) can be unscrewed from carburetor body



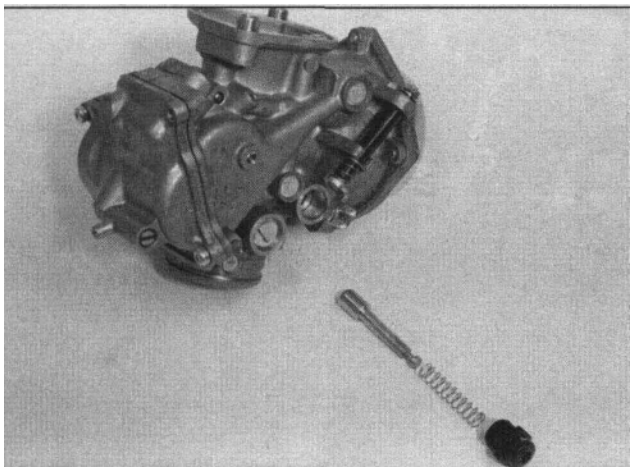
8.9a Pilot screw metal limiter caps can be drilled ...

16 Check the tapered portion of the pilot screw for wear or damage. Replace the pilot screw if necessary.

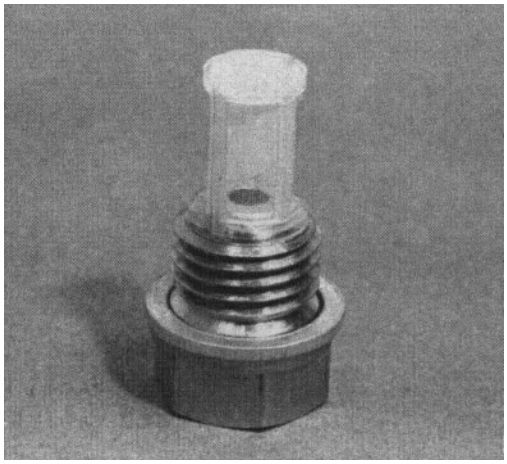
17 Check the carburetor body, float chamber and vacuum chamber



8.11 With the choke valve nut completely unscrewed, the choke valve can be pulled up and disengaged from its operating hook



9.1 Install the choke valve and its spring in the carburetor bore and secure with the nut



9.7 Assemble the float valve seat, washer and filter and install them in the carburetor body

cover for cracks, distorted sealing surfaces and other damage. If any defects are found, replace the faulty component, although replacement of the entire carburetor will probably be necessary (check with your parts supplier for the availability of separate components).

18 Check the diaphragm for splits, holes and general deterioration. Holding it up to a light will help to reveal problems of this nature.

19 Insert the throttle piston in the carburetor body and check that it moves up-and-down smoothly. Check the surface of the piston for wear. If it's worn excessively or doesn't move smoothly in the bore, replace the carburetor.

20 Check the jet needle for straightness by rolling it on a flat surface (such as a piece of glass). Replace it if it's bent or if the tip is worn.

21 Check the tip of the fuel inlet valve needle. If it has grooves or scratches in it, it must be replaced. Push in on the rod in the other end of the needle, then release it - if it doesn't spring back, replace the valve needle. If the needle valve seat is damaged the carburettor assembly must be replaced; it is not possible to replace the seat individually.

22 Check the float chamber gasket and replace it if it's damaged.

23 Operate the throttle shaft to make sure the throttle butterfly valve opens and closes smoothly. If it doesn't, replace the carburetor.

24 Check the floats for damage. This will usually be apparent by the presence of fuel inside one of the floats. If the floats are damaged, they must be replaced.

9 Carburetors - reassembly and float height check

Note: *When reassembling the carburetors, be sure to use the new Citings, gaskets and other parts supplied in the rebuild kit. Do not overtighten the carburetor jets and screws as they are easily damaged. Refer to illustrations 9.1, 9.7, 9.8, 9.9 and 9.11*

1 Install the choke valve in its bore, followed by its spring and nut **(see illustration).** Tighten the nut securely and reconnect the operating link hook in the valve groove.

2 Install the pilot screw (if removed) along with its spring, washer and O-ring, turning it in until it seats lightly. Now, turn the screw out the number of turns previously recorded. Where applicable, drive new metal limiter caps into the pilot screw bores. If a new pilot screw has been fitted, Honda advise that the screws in the other three carburetors be replaced also, and that having been set to the standard number of turns out (see Specifications), adjustment of their settings be carried out by a dealer service department before new limiter caps are installed.

3 Screw the needle jet into position in the carburetor.

4 Screw the main jet into the end of the needle jet.

5 Screw the pilot jet into position.

6 If the starter jet was removed, screw or press it into the body (as applicable).

7 Install the float valve seat, washer and filter **(see illustration).** Hook the needle valve over the float, then install the float and secure it with the pivot pin.

8 To check the float height, hold the carburetor so the float hangs down, then tilt it back until the valve needle is just seated, but not so far that the needle's spring-loaded tip is compressed. Measure the distance between the gasket face and the bottom of the float with a gauge or an accurate ruler **(see illustration).** The correct setting should be as given in the Specifications Section. On early models with brass floats, adjustment of the float height can be made by very carefully bending the tang which bears on the needle valve tip. On later models with plastic floats, the float height is not adjustable; if it is incorrect the float must be replaced. Repeat the procedure for all carburetors.

9 With the float height checked, install a new seal in the float chamber groove and install the chamber on the carburetor (see **illustration).**

10 Fit the washer to the jet needle and insert the needle into the throttle valve piston. Insert the spring and the needle holder into the center of the piston and turn it 60° in the opposite direction of removal using an 8 mm box wrench.

11 Insert the throttle piston/diaphragm assembly into the carburetor body and lightly push it down, ensuring the needle is correctly aligned with the needle jet. Press the diaphragm outer edge into its groove, ensuring the diaphragm tongue is correctly seated in the cutout on the carburetor **(see illustration).** Check the diaphragm is not creased, and that the piston moves smoothly up and down the bore. To prevent the diaphragm from being displaced when the cover is fitted, push it up the bore with a finger passed through the venturi.

12 Insert the spring and fit the vacuum chamber cover to the carburetor, noting that the longer springs are fitted to the front cylinder carburetors **(see illustration 8.3b).**

13 On 1987 and 1988 700/750 models, if it was removed, install the air cut-off valve, spring and O-ring. Refit the cover and secure with the two screws.

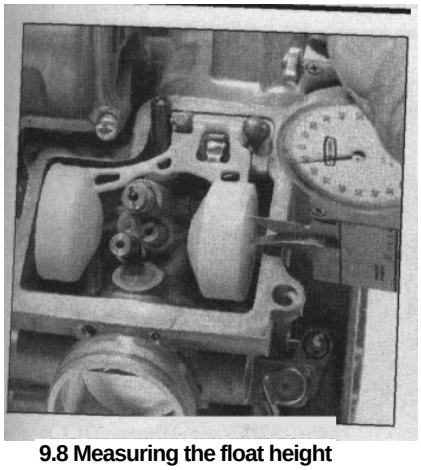
14 If the carburetors were separated, refer to Section 10 and join them, then refit the assembly to the motorcycle (see Section 7).

10 Carburetors - separation and joining

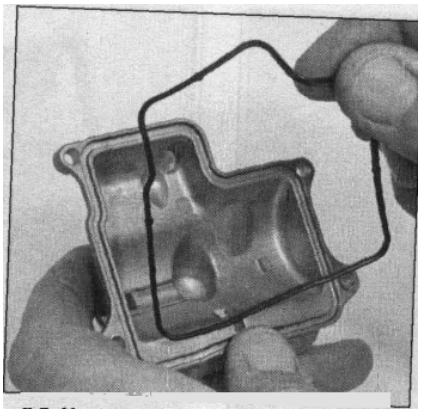
Warning: *Refer to the precautions given in Section 1 before proceeding*

Separation

Refer to illustrations 10.1, 10.6a, 10.6b, 10.7, 10.8, 10.9 and 10.11 1 The carburetors do not need to be separated for normal overhaul. If you need to separate them (to replace a carburetor body, for



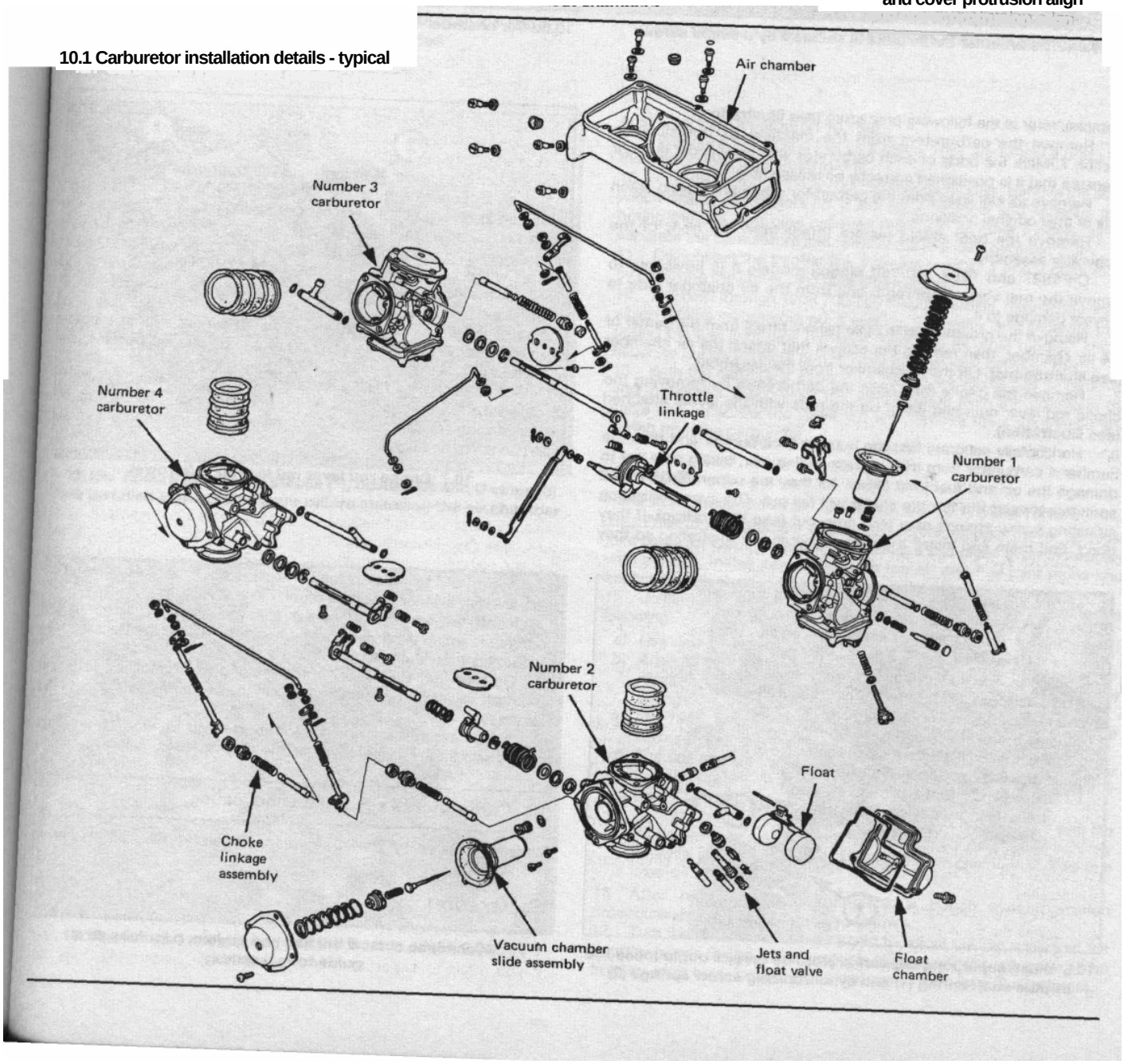
9.8 Measuring the float height

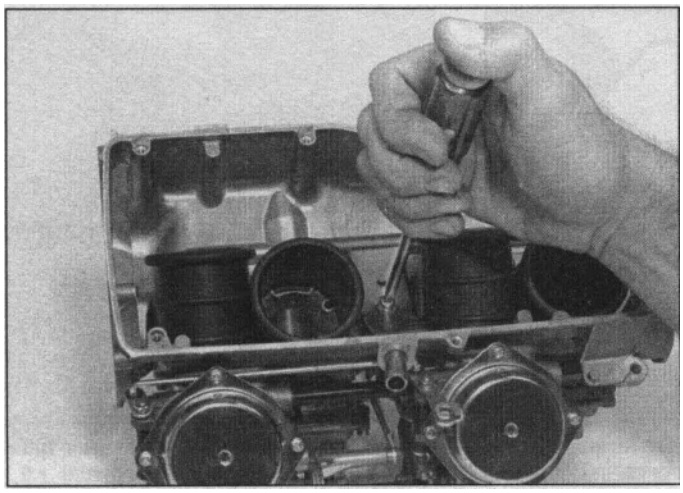


9.9 Use a new seal when installing the float chambers

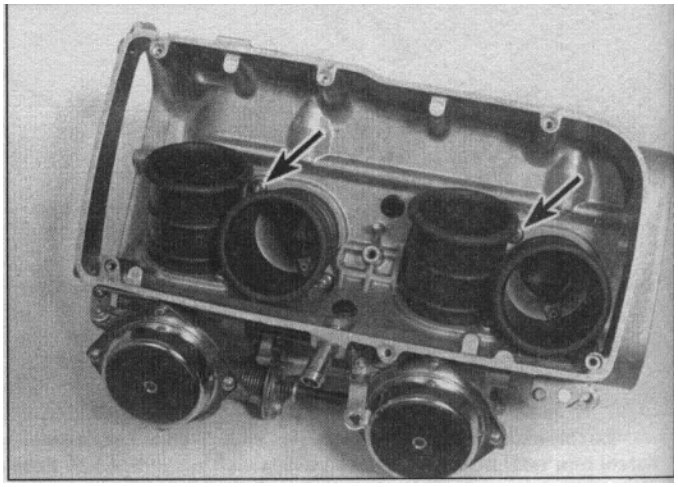
9.11 Ensure diaphragm tab, vacuum tube and cover protrusion align

10.1 Carburetor installation details - typical





10.6a The breather baffle plate is secured by a single screw



10.6b Air chamber-to-carburetor screws - there are eight in total

example), refer to the following procedure **(see illustration).**

2 Remove the carburetors from the machine as described in Section 7. Mark the body of each carburetor with its cylinder number to ensure that it is positioned correctly on reassembly.

3 Remove all fuel lines from the carburetor assembly, having taken note of their original positions.

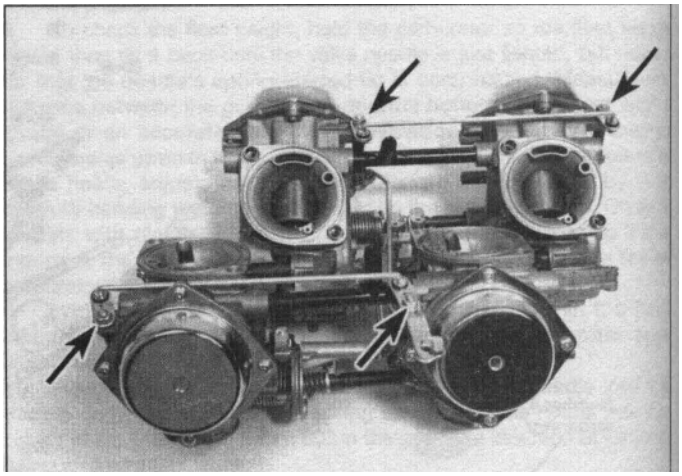
4 Remove the heat shield (where fitted) from the front of the carburetor assembly.

5 On 1987 and 1988 700/750 Magna models it is advisable to remove the fuel valve diaphragm unit from the air chamber side to prevent damage to it.

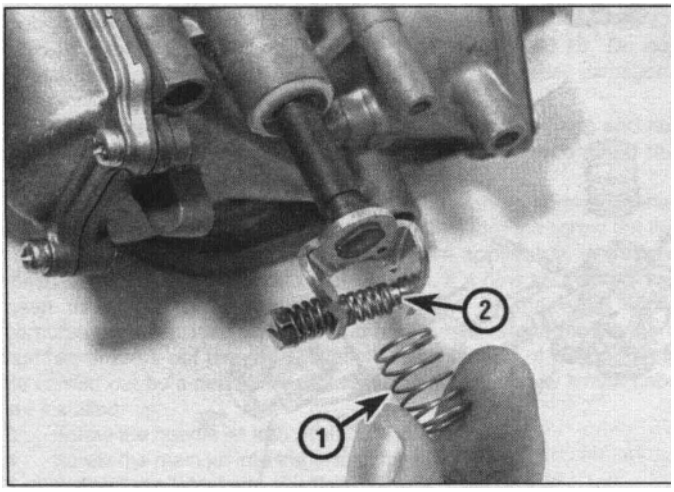
6 Remove the breather baffle plate (where fitted) from the center of the air chamber, then remove the screws that attach the air chamber **(see illustrations).** Lift the air chamber from the assembly.

7 Remove the choke rods from the carburetors by removing the choke rod lever nuts and lifting off the rods with the levers attached **(see illustration).**

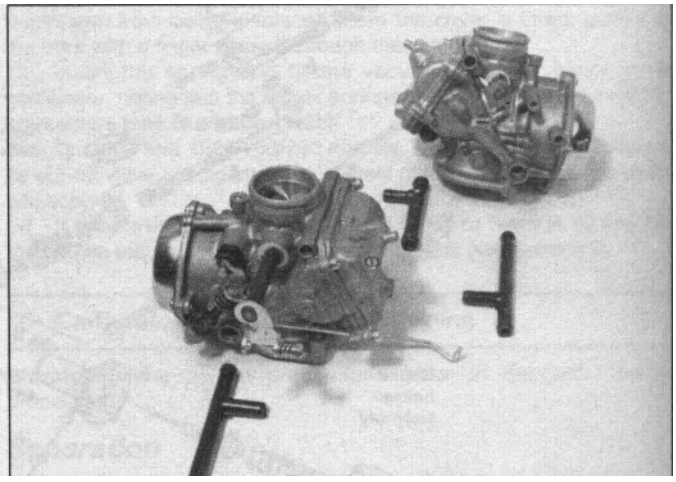
8 Horizontally separate first the number 3 carburetor and then the number 4 carburetor from their corresponding pair, taking care not to damage the air and fuel joint pipes. As they are separated, the coil springs between the throttle shafts will fall out. The synchronization adjusting screw springs may also drop out **(see illustration).** If they don't, find them and install them as shown in the illustration so they



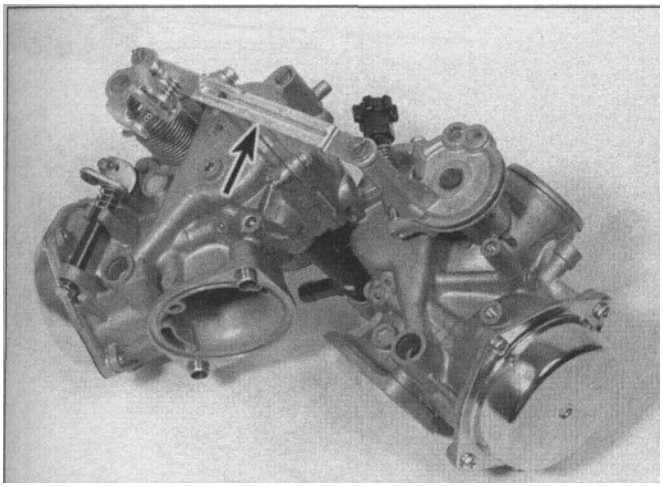
10.7 Choke rod lever nut locations (arrows)



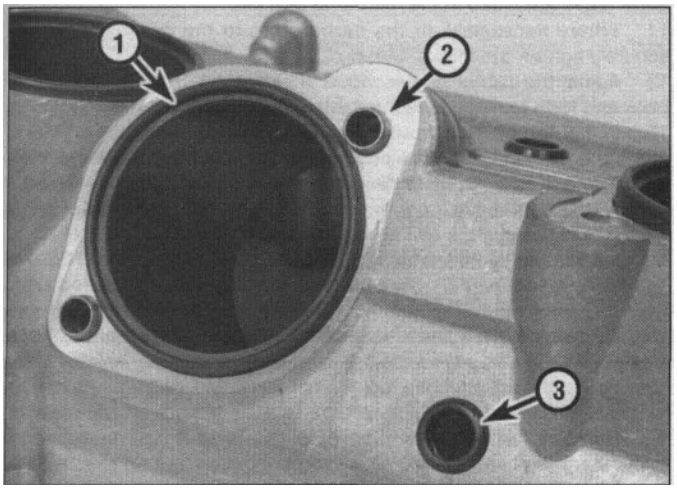
10.8 When separating the carburetors be careful not to loose the throttle shaft spring (1) and synchronizing screw springs (2)



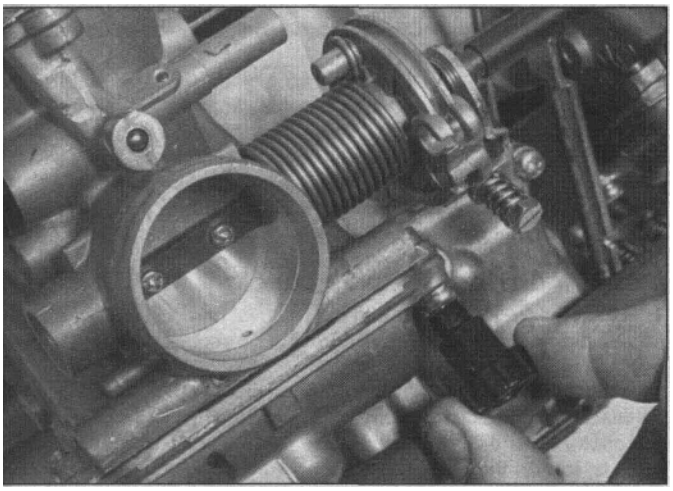
10.9 Make note of the fuel and air joint positions as a guide to reassembly



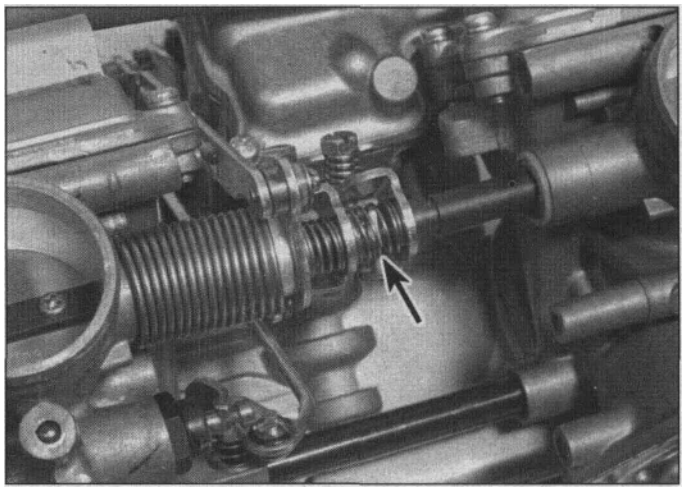
10.11 Throttle link must be detached before nos. 1 and 2 carburetors can be separated



10.15b Ensure all velocity stacks (1), dowels (2) and O-rings (3) are installed in the carburetors before installing the air chamber



10.17a On no. 1 carburetor, use the throttle stop screw ...



10.15a Installed position of the throttle shaft coil springs (arrow)

aren't lost **(see illustration 10.15a).**

9 Withdraw the air and fuel joint pipes. They are simply a press fit in the carburetors **(see illustration).**

10 On 1985 through 1988 700/750 Magna models, remove the screw which retains carburetors no. 3 and no. 4 together and separate them noting the fuel joint pipe between them. On all other models, simply separate the carburetors and retrieve the fuel joint between them.

11 Disconnect the throttle link from the number 1 and 2 carburetors by removing the cotter pins **(see illustration).**

12 On 1985 through 1988 700/750 Magna models, remove the screw which retains carburetors no. 1 and no. 2 together and separate them noting the fuel joint pipe between them. On all other models, simply separate the carburetors and retrieve the fuel joint between them.

13 With the carburetor separated, the choke valves can be removed and inspected. Disconnect the linkage hook from the groove in the valve end, unscrew the valve nut and remove the choke valve and spring from the carburetor.

Joining

Refer to illustrations 10.15a, 10.15b, 10.17a, 10.17b and 10.18

14 Prior to reconnection of the carburetors, inspect the air and fuel joint pipes for cracks, blockage or damage and clean them thoroughly with solvent. Install new O-rings on the air and fuel joint pipes and apply oil to the O-rings prior to installing the pipes in the carburetors.

15 Joining is the reverse of the disassembly procedure, noting the following.

a) Use new O-rings on the fuel and vent line fittings.

b) After all four carburetors are connected, loosen the synchronization adjusting screws and re-install the synchronization springs.

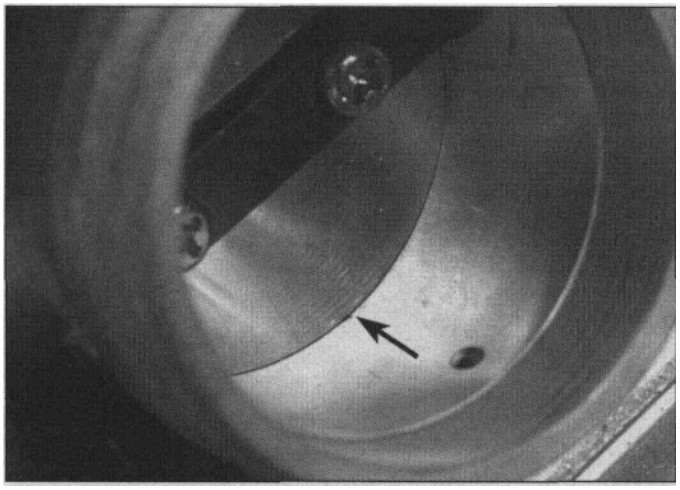
c) On 1985 through 1988 700/750 Magna models, tighten the carburetor joining screws only lightly at this stage.

d) The coil springs between the throttle shafts can be installed after the carburetors have been loosely attached to the air chamber **(see illustration).**

e) Prior to connecting the carburetors to the air chamber, be sure the rubber velocity stacks, grommets and dowel pins are all securely in place **(see illustration).** *Tighten the air chamber screws in a criss-cross sequence.*

16 After reconnection is complete, a bench synchronization procedure should be carried out as follows.

17 Turn the throttle stop screw (used to adjust the idle speed) so the throttle valve in the no. 1 carburetor is aligned with the rear edge of the front by-pass hole, located in the carburetor bore **(see illustrations).**



10.17b … to set the throttle valve level with the rear edge of the front bypass hole (arrow)

18 Align the throttle valves in each of the other carburetors in the same manner by turning the synchronization adjusting screws **(see illustration).**

19 Open the throttle slightly by pressing on the throttle linkage, then release it and make sure it returns smoothly with no drag or binding. Also check the choke valve linkage for smooth operation. If the choke linkage arms were disconnected from each other, new cotter pins should be used on reassembly.

20 Install the carburetors on the motorcycle (see Section 7).

21 On 1987 and 1988 700/750 Magna models, tighten the carburetor joining screws securely.

22 Carry out carburetor synchronization (see Chapter 1).

11 Throttle cables - removal and installation

Warning: Refer to *the precautions given in Section 1 before proceeding*

Removal

1 Remove the air filter housing as described in Section 14.

2 Loosen the throttle cable locknuts then free each outer cable from its mounting bracket. Detach the inner cables from the throttle pulley. If necessary to improve access to throttle cam, loosen the four retaining clips securing the carburetor intake rubbers to the cylinder head and disengage the carburetors from the cylinder head. Keep the carburetors upright to prevent fuel spillage.

3 Unscrew the three (early models) or two (later models) right handlebar switch screws and free the switch from the handlebar.

4 Disconnect the throttle cables from the throttle grip and unscrew each cable from the lower half of the handlebar switch. Mark each cable to ensure it is connected correctly on installation.

5 Remove the cables from the machine noting their exact routing.

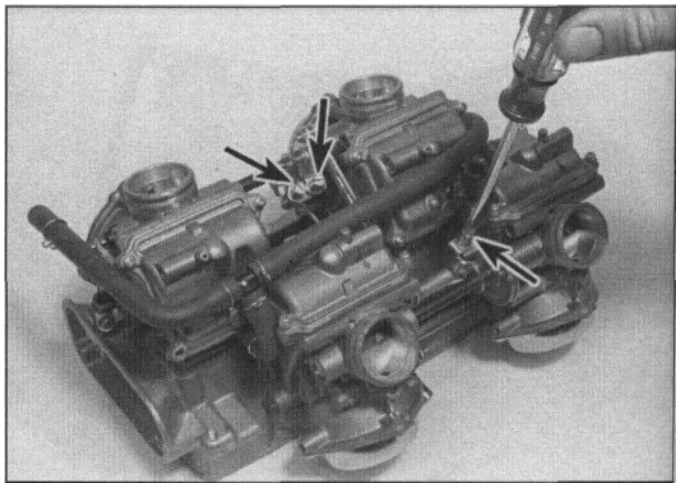
Installation

6 Install the cables making sure they are correctly routed. The cables must not interfere with any other component and should not be kinked or bent sharply.

7 Screw the cables into the lower half of the handlebar switch, making sure they are correctly connected. Lubricate the end of each cable with multi-purpose grease and attach the cables to the throttle grip pulley.

8 Fit the switch lower half to the handlebar, locating its peg in the handlebar hole. Fit the top half of the switch and securely tighten the screws (forward screws must be tightened first).

9 Lubricate the end of each cable with multi-purpose grease and attach them to the carburetor throttle cam.



10.18 Set up the other throttle valves using the synchronizing screws (arrows)

10 Make sure the cables are correctly connected and locate the outer cable adjusters in the mounting bracket.

11 Where necessary, fit the carburetors to the cylinder head and securely tighten the intake rubber clips.

12 Adjust the cables as described in Chapter 1. Turn the handlebars back and forth to make sure the cables don't cause the steering to bind.

13 Install the air filter housing as described in Section 14. Prior to fitting the fuel tank, start the engine and turn the handlebars back and forth to make sure the idle speed doesn't rise as the bars are turned. If it does, the cables are incorrectly routed. Sort out the problem before riding the motorcycle.

14 Install the fuel tank (see Section 2).

12 Choke cable - removal, installation and freeplay check

Removal

1 Remove the fuel tank (Sabre) or trig it up if less than half full (Magna).

2 Loosen the choke cable retainer screw, near the no. 1 carburetor.

3 Disengage the cable outer from its retainer clamp and then disengage the end of the cable from the lever.

4 Remove the rear view mirror from the left side.

5 On early models, remove the two bolts that hold the clutch master cylinder to the handlebars and lift the master cylinder off (keep it level to prevent fluid leakage). Disengage the cable trunnion from the choke lever.

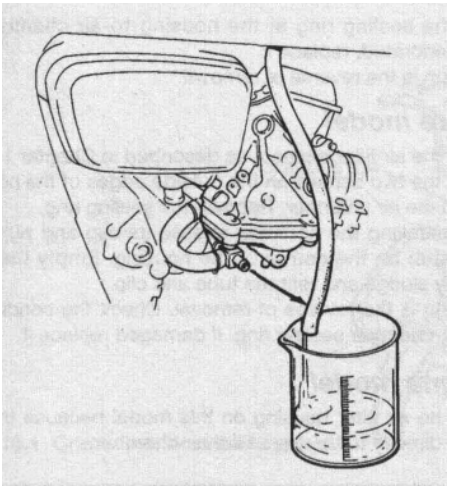
6 On later models (where the cable goes into the base of the handlebar switch), remove the two screws from the switch underside and separate the switch halves. Disengage the cable trunnion from the choke lever.

7 Unscrew the cable casing from the clutch master cylinder clamp (early models) or handlebar switch lower half (later models) and then withdraw it from the motorcycle.

Installation and freeplay check

8 Installation is the reverse of the removal procedure. Lubricate the cable inner and ensure that it is routed in its original path and secured with any relevant ties.

9 Set the cable freeplay by pulling the choke operating lever on the handlebar fully back (choke on) and check for any further movement at the choke lever on the carburetors. There should be no freeplay; if there is, loosen the outer cable clamp screw and reposition the outer cable accordingly. Push the choke operating lever fully forward (choke off) and check for a small amount of slack in the carburetor linkage, indicating that the choke is fully off.



13.3 When checking the fuel pump output, route the carburetor fuel supply hose into a glass jar or measuring vessel

13 Fuel pump - check, removal and installation

Warning: *Refer to the precautions given in Section 1 before proceeding.*

Check

Refer to illustration 13.3

1 Make sure there is adequate fuel in the fuel tank and that the battery is fully charged.
2 With the engine running, examine all fuel lines between the fuel tank and fuel pump for leaks, loose connections, kinks or crimps in the rubber hoses. Air leaks before the fuel pump can seriously affect the pump's output.
3 Disconnect the fuel supply hose from the carburetors. Place a clean container such as a glass jar at the end of the detached fuel hose and turn the ignition switch on for several seconds **(see illustration).** There should be strong, regular spurts of fuel from the line until the ignition switch is turned off again.
4 If little or no fuel emerges from the line during the test, then either the line or fuel filter is clogged or the fuel pump is not working properly. Disconnect all fuel lines and blow them out. Replace the fuel filter (see Chapter 1). If the lines and filter are not clogged, then the pump is faulty and should be replaced.
5 A more accurate method of testing fuel pump flow capacity is to perform the previous test using a measuring container and a watch according to the following sub-Section.

1982 through 1986 700/750 Magna models

6 Turn the ignition ON for 5 seconds, then turn it OFF. Measure the amount of fuel in the glass jar and multiply it by 12 to arrive at the output per minute. On 1982 through 1984 models the pump should produce approximately 614 cc (21 US fl oz, 22 Imp fl oz) of fuel, and on 1985 and 1986 models it should produce approximately 600 cc (20 US fl oz, 21 Imp fl oz) of fuel.

1100 Sabre models

7 Remove the seat and left side cover (see Chapter 6).
8 With the fuel supply hose connected to the carburetors, start the engine and pinch the fuel valve vacuum hose, then turn the fuel valve OFF and ignition switch OFF.
9 Disconnect the fuel pump relay connector, and using a jumper wire, short the black/light green and white wire terminals on the harness side of the connector together.
10 Disconnect the fuel supply hose from the carburetors and place its open end in a glass jar. Turn the fuel valve ON, then turn the ignition ON for 5 seconds, then turn the ignition OFF.
11 Measure the amount of fuel in the jar and multiply it by 12 to arrive at the output per minute. If the pump is operating correctly it should produce approximately 800 cc (27 US fl oz, 28 Imp fl oz).
12 Remove the testing equipment and reconnect the wiring and fuel hose.

1100 Magna models

13 Remove the seat and side covers (see Chapter 6).
14 Make sure the ignition switch is OFF, then disconnect the fuel pump relay connector. Using a jumper wire, short the black and white wire terminals on the harness side of the connector together.
15 Disconnect the fuel supply hose from the carburetors and place its open end in a glass jar. Turn the ignition ON for 5 seconds, then turn it OFF.
16 Measure the amount of fuel in the jar and multiply it by 12 to arrive at the output per minute. If the pump is operating correctly it should produce approximately 614 cc (21 US fl oz, 22 Imp fl oz).
17 Remove the testing equipment and reconnect the wiring and fuel hose.

Removal and installation

1982 through 1984 700/750 Magna models

18 Remove the seat.
19 Remove the main fuel tank as described in Section 2.
20 Remove both side covers (see Chapter 6).
21 Disconnect the battery leads, negative lead first. Remove the battery.
22 Remove the battery tray.
23 Remove the starter relay (see Chapter 8).
24 Turn the fuel valve OFF and clamp the fuel hoses to prevent fuel flow. Have a rag handy to catch fuel spills, then detach the fuel inlet and outlet hoses from the fuel pump.
25 Disconnect the wiring connectors leading to the fuel pump.
26 Remove the fuel pump mounting bolts and lift out the fuel pump.
27 Installation is the reverse of the removal procedure.

1985 and 1986 700 Magna models

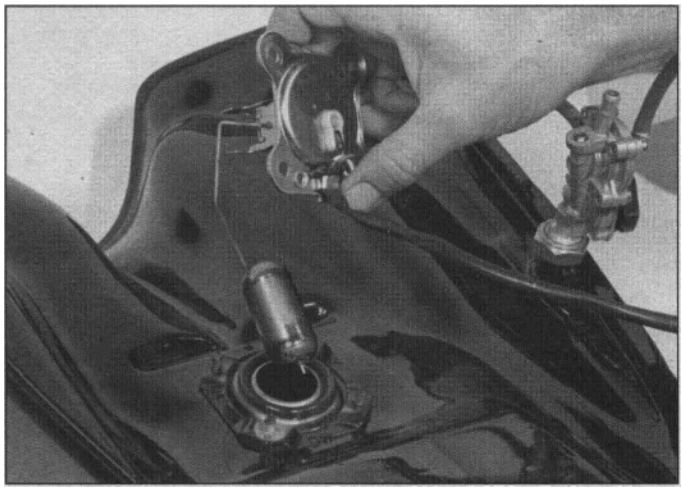
28 Remove both side covers (see Chapter 6).
29 Disconnect the battery leads, negative lead first.
30 Turn the fuel valve OFF and clamp the fuel hoses to prevent fuel flow. Have a rag handy to catch fuel spills, then detach the fuel inlet and outlet hoses from the fuel pump.
31 Disconnect the wiring connectors leading to the fuel pump.
32 Maneuver the fuel pump out of its mounting rubber.
33 Installation is the reverse of the removal procedure.

1100 Sabre models

34 Remove the seat and both side covers (see Chapter 6).
35 Disconnect the battery leads, negative lead first.
36 Disconnect the wiring connectors for the fuel pump, fuel unit **and** both spark units.
37 To gain access to the fuel pump, remove the right side spark **unit** from its holder and the stop/tail light sensor from its holder (use the wiring diagram at the end of this manual for component identification).
38 Turn the fuel valve OFF and clamp the fuel hoses to prevent fuel flow. Have a rag handy to catch fuel spills, then detach the fuel inlet and outlet hoses from the fuel pump.
39 Maneuver the fuel pump out of its rubber mounting.
40 Installation is the reverse of the removal procedure. Refer to the wiring diagram at the end of this manual, and ensure that all electrical connections have been made correctly.

1100 Magna models

41 Remove the seat and both side covers (see Chapter 6).
42 Disconnect the battery leads, negative lead first.
43 Turn the fuel valve OFF and clamp the fuel hoses to prevent fuel flow. Have a rag handy to catch fuel spills, then detach the fuel inlet and outlet hoses from the fuel pump.
44 Disconnect the wiring connector leading to the fuel pump.



15.2 Take care not to bend the float arm when removing the fuel sender from the tank

45 Remove the two mounting bolts and lift the pump upwards and out of the motorcycle. Note the location of the washer, grommet, collar and nut.
46 Installation is the reverse of the removal procedure.

14 Air filter housing - removal and installation

1982 750 Sabre model

1 Remove the air filter elements as described in Chapter 1.
2 Remove the three screws on each side and detach the air filter housings from the side of the air chamber. Recover the sealing rings.
3 Installation is a reverse of removal, noting that the sealing rings must be replaced if damaged.

1983 through 1985 700/750 Sabre and 1982 through 1986 700/750 Magna models

4 Remove the air filter element as described in Chapter 1.
5 On Magna models, remove the single screw and collar from the top rear of the housing and loosen the screw clamp which secures the housing to the carburetor air chamber. On Sabre models, remove the three screws which retain the housing to the air chamber.
6 Pull the crankcase breather hose off the back of the housing and lift the housing up and off the motorcycle.
7 Before installing the housing, release its clip and pull the drain tube off the stub on the base of the housing. Empty the tube and housing of any sludge and refit the tube and clip.
8 On Magna models, inspect the condition of the flexible hose between the air chamber and filter housing; replace it if split or deteriorated.
9 Installation is the reverse of removal. Ensure that the housing front end engages the air duct correctly.

1987 *and 1988 700/750 Magna models*

10 Remove the air filter element as described in Chapter 1.
11 Remove the air chamber side covers (single screw at lower edge) and the screws which secure the air chambers to the air filter housing; you may need to move the thermostat (right side) and air injection control valve assembly (left side) to gain access to the screws.
12 Working from the top of the air filter housing, remove the six screws which retain the housing to the air chamber on the carburetors.
13 Pull the crankcase breather hose off the back of the housing and lift it up and off the motorcycle.
14 Before installing the housing, release its clip and pull the drain tube off the stub on the base of the housing. Empty the tube and housing of any sludge and refit the tube and clip.
15 Check the sealing ring at the housing-to-air chamber joint; if broken to deteriorated, replace it.
16 Installation is the reverse of removal.

1100 Sabre model

17 Remove the air filter element as described in Chapter 1.
18 Remove the two screws on the outside edges of the housing and detach it from the air chamber. Recover the sealing ring.
19 Before installing the housing, release its clip and pull the drain tube off the stub on the corner of the housing. Empty the tube and housing of any sludge and refit the tube and clip.
20 Installation is the reverse of removal. Check the condition of the housing-to-air chamber sealing ring; if damaged replace it.

1100 Magna model

21 There is no air filter housing on this model because the element cover screws directly to the top of the air chamber.

15 Fuel sender - removal and installation

Warning: *Refer to the precautions given in Section 1 before proceeding.*

All Sabre models and 1985/86 700 Magna models

Refer to illustration 15.2

1 Remove the fuel tank (see Section 2) and drain all fuel into a container suitable for the storage of gasoline (petrol).
2 The fuel sender is secured to the tank base by four nuts. Recover the O-ring and be especially careful not to bend the float arm as the sender is withdrawn through the tank base **(see illustration).**
3 Installation is a reverse of the removal procedure, noting that a new O-ring should be used between the tank and sender.

1982 through 1984 700/750 Magna models and all 1100 Magna models

4 Remove the seat and left side cover (see Chapter 6).
5 Drain all fuel from the main fuel tank and half of the auxiliary tank into a container suitable for the storage of gasoline (petrol).
6 The sender is set in the top of the auxiliary fuel tank. Disconnect its wires and unscrew the sender from the tank. Plug the tank opening while the sender is removed.
7 Installation is a reverse of the removal procedure, noting that a new sealing ring should be installed between the tank and sender unit.

16 Crankcase breather - general information and system components check

General information

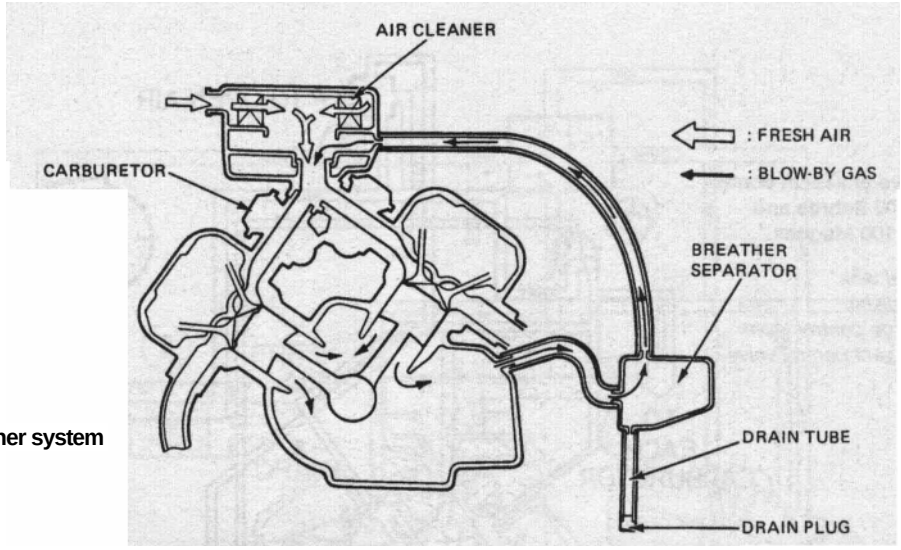
Refer to illustration 16.1

1 The crankcase breather prevents the discharge of hydrocarbons from crankcase vapor into the atmosphere. Gases are sucked out of the crankcase via engine vacuum, through a hose to the separator tank, and from there through another hose up to the air filter housing or chamber. From there, the gases combine with fresh air and are sucked into the carburetors for reburning **(see illustration).**
2 Over a period of time, sludge may build up in the separator tank and hoses to the extent that they become clogged. Rough idling or a reduced engine speed at idle are indications of this condition.
3 Certain models have a drain tube or catch tank linked to the separator tank which has to be emptied in accordance with the maintenance schedule (see Chapter 1), but on others, the system will have to be disassembled and cleaned out if a blockage is suspected.

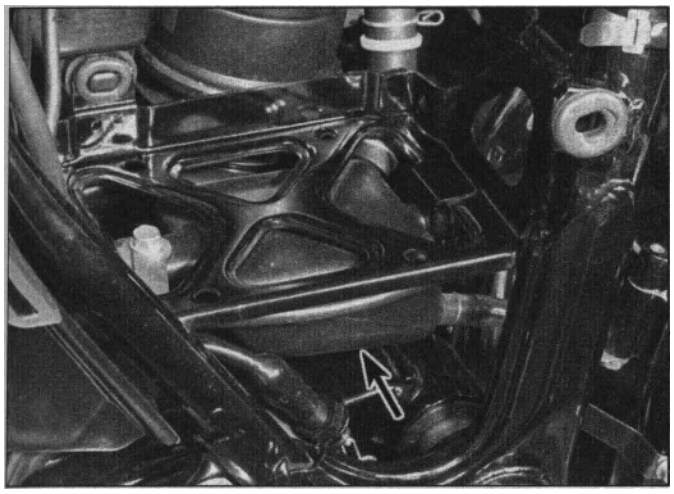
System components check

Refer to illustration 16.6

4 To check for proper vacuum in the system, disconnect the rubber



16.1 Crankcase breather system



16.6 Crankcase breather separator tank (arrow) will be found in the mid-frame area - 700/750 Sabre location shown

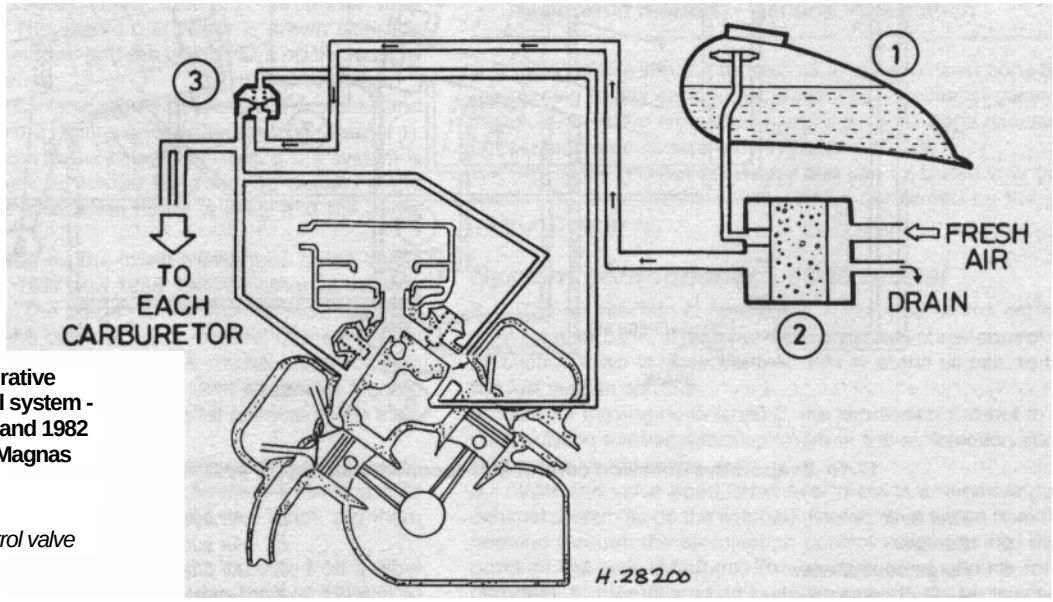
hose where it exits the rear of the crankcase. With the engine idling, place your thumb lightly over the end of the hose. You should feel a slight vacuum. The suction may be heard as your thumb is released. This will indicate that air is being drawn all the way through the system. If a vacuum is felt, the system is functioning properly.

5 If there is no or very little vacuum at the end of the hose, the system is either clogged or an air leak exists. Remove the separator tank and connecting hoses, and blow them through with compressed air.

6 Air leaks might be due to a cracked hose, poor connection or cracked separator tank **(see illustration).**

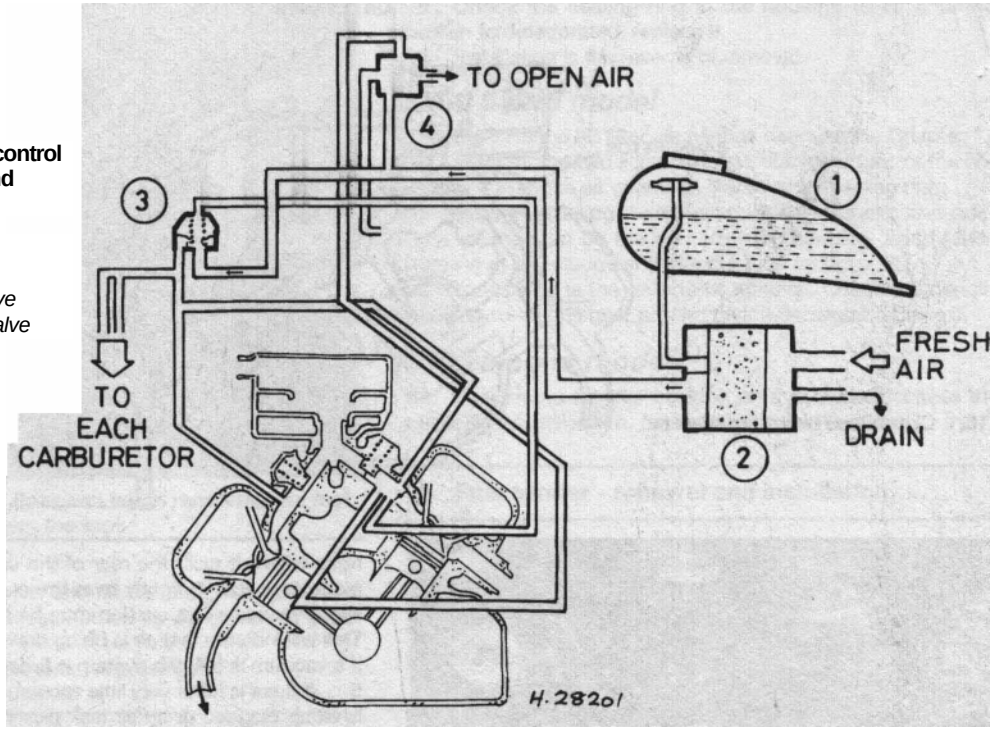
17 Evaporative emission control system (1984-on California models) - general information

Refer *to illustrations 17.1a, 17.1b, 17.1c and 17.1d* 1 This system conforms to the California Air Resources Board (CARB) requirements governing stringent emission control standards. Fuel vapors are routed from the fuel system into the engine to be burned, instead of letting them evaporate into the atmosphere. While the engine is stopped, vapors are absorbed by and stored in a carbon canister **(see illustrations).**



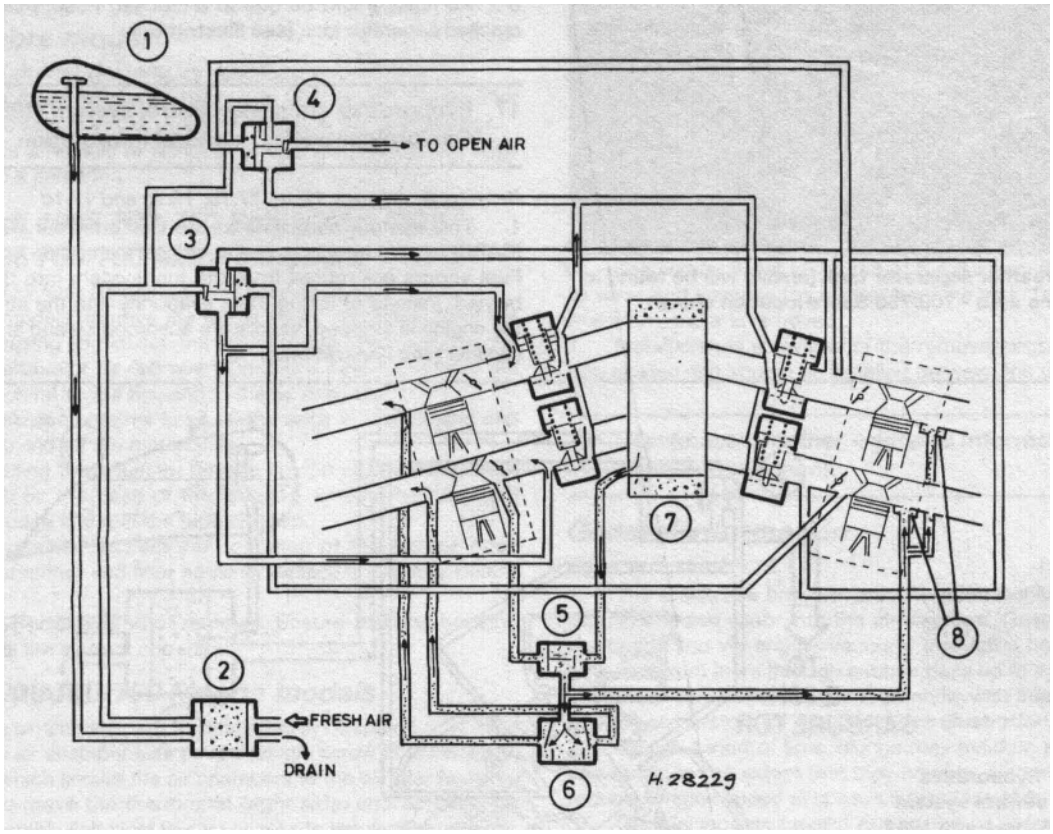
17.1a Evaporative emission control system - 700/750 Sabres and 1982 through 1985 Magnas

1 Fuel tank
2 Canister
3 Purge control valve



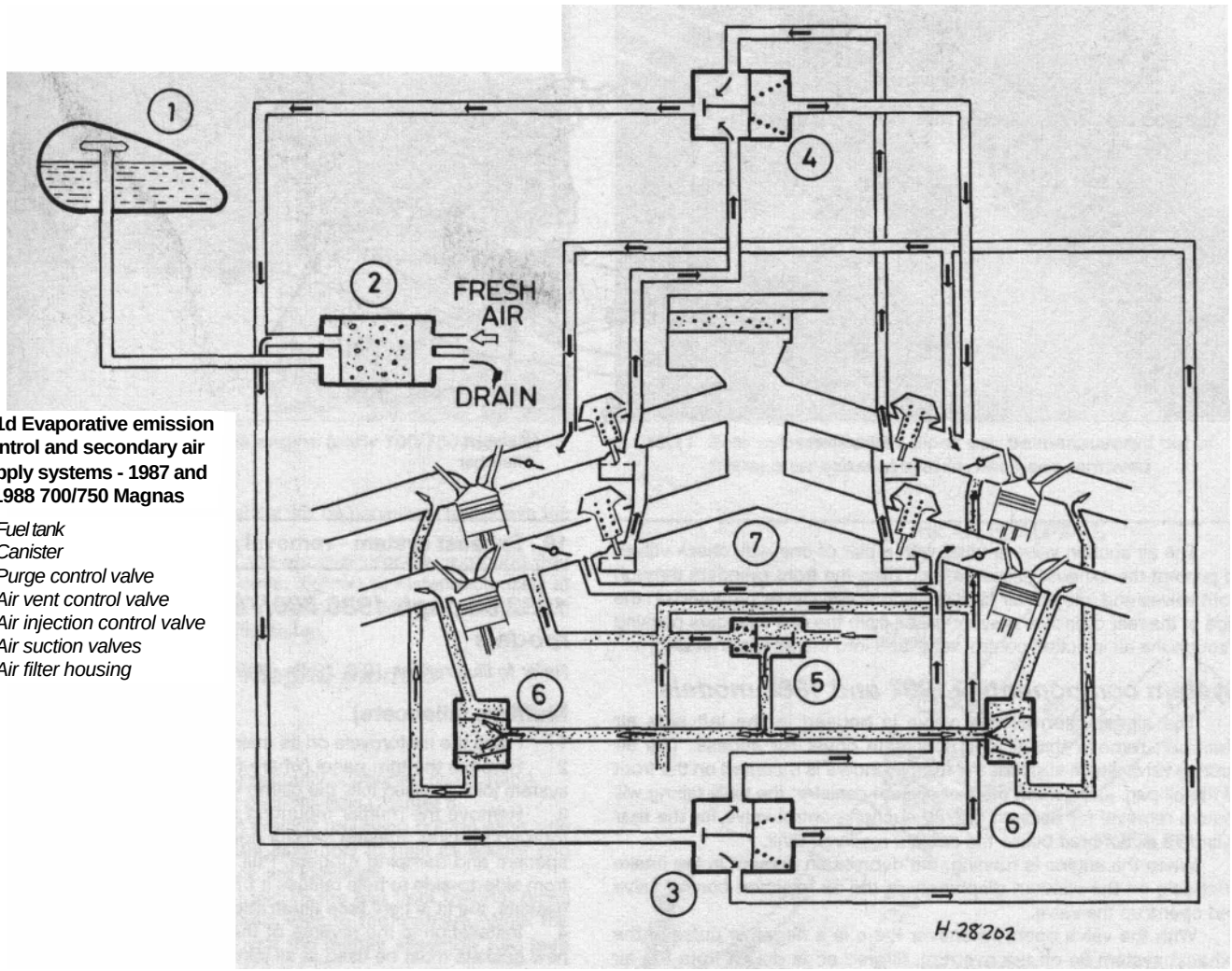
17.1b Evaporative emission control system -1100 Sabres and 1986-on 1100 Magnas

1 Fuel tank
2 Canister
3 Purge control valve
4 Air vent control valve



17.1c Evaporative emission control and secondary air supply systems - 1986 700 Magna

1 Fuel tank
2 Canister
3 Purge control valve
4 Air vent control valve
5 Air injection control valve
6 Air suction valve
7 Air filter housing
8 Reed valves (rear cylinders)



17.1d Evaporative emission control and secondary air supply systems - 1987 and 1988 700/750 Magnas

1 Fuel tank
2 Canister
3 Purge control valve
4 Air vent control valve
5 Air injection control valve
6 Air suction valves
7 Air filter housing

2 The air vent control valve (fitted to all 1100 Sabre models and all 1986-on Magna models) routes vapor from the carburetor float chambers to the canister. The stored fuel vapor is drawn from the canister when the engine is started and the purge valve opens to allow vapor to pass to the carburetors.

3 The system hoses and canister should be checked for cracks and damage in accordance with the maintenance schedule (see Chapter 1). Apart from the inspection and replacement of hoses, if the system is suspected of failure it must be tested by a Honda dealer. If the motorcycle is difficult to re-start when hot, it is likely that the purge control valve is at fault.

4 The canister is mounted on the lower frame tube brace at the front of the motorcycle (on 1987 and 1988 700/750 Magnas, remove the belly fairing for access). The purge control valve is mounted on a bracket on the left side of the cylinder head; removal of the front left side cover or air chamber side cover will be necessary on certain models for access to the valve. The air vent control valve is located above the carburetors and can be accessed after removal of the main fuel tank.

5 Details of the vacuum hose connections are given on a label stuck to the inside of either side cover or on the rear fender. All hoses should carry a label containing their number reference, but if not, tag them carefully when disconnecting.

6 Information relating to emission control is provided on a label stuck to the right side lower frame tube on models through 1986 or to the right side upper frame tube on models from 1987-on.

18 Secondary air supply system (1986-on 700/750 California models) - general information

1 This system introduces fresh air into the exhaust ports to promote the burning of any excess fuel present in the exhaust gases, resulting in reduction in the amount of harmful hydrocarbons released into the atmosphere **(see illustrations 17.1c and 17.1d).**

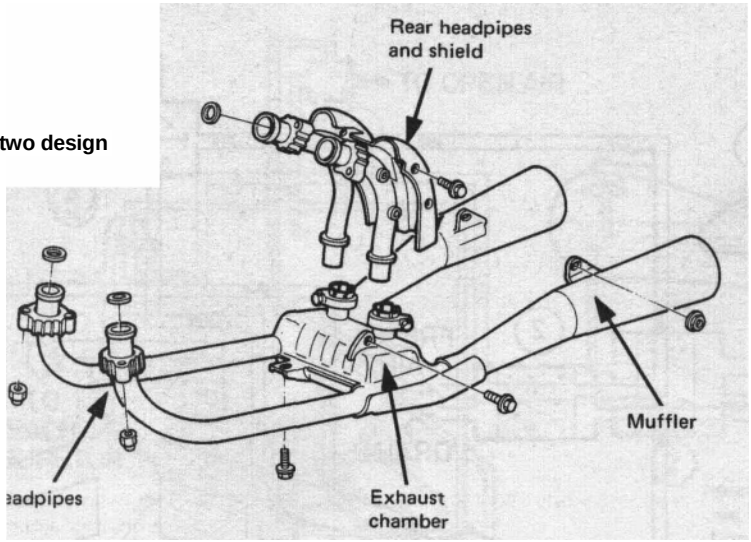
2 The system is not adjustable and can be tested only by a Honda dealer. Routine checks which can be performed by the owner are given in Chapter 1.

System *components -1986 model*

3 The air injection control valve is mounted on the left side of the front cylinder bank, just below the fuel system purge control valve. The air suction valve is mounted on the front of the oil pan, to the rear of the fuel system canister.

4 When the engine is running, the depression present in the intake duct acts on the vacuum diaphragm in the air injection control valve and opens up the valve.

5 With the valve open, whenever there is a negative pulse in the exhaust system (ie on the overrun), filtered air is drawn from the air filter housing through the air injection control valve and into the exhaust ports of the rear cylinders. The same system applies for the front cylinders, but the filtered air is drawn through the air injection control valve and the air suction valve before reaching the exhaust ports.

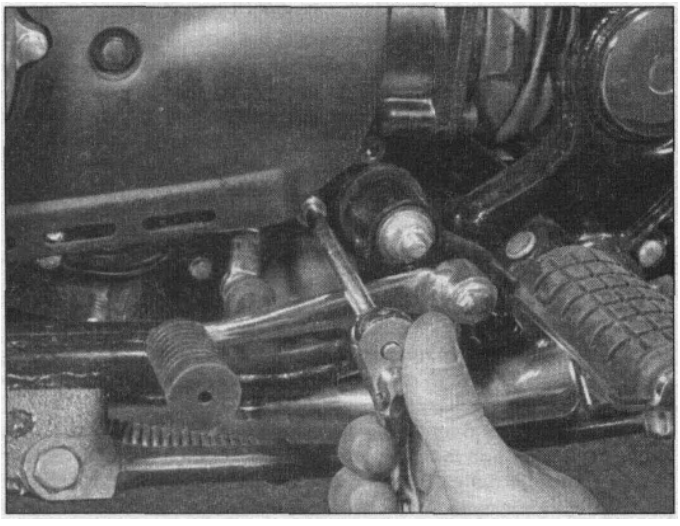


19.3 Exhaust system - early four-into-two design

6 The air suction valve is fitted with a pair of one-way check valves to prevent the exhaust gases passing from the front cylinders through both valves and into the air filter housing. Reed valves mounted on the side of the rear cylinders prevent gases from the rear cylinders passing through the air injection control valve and into the air filter housing.

System components - 1987 and 1988 models

7 The air injection control valve is housed in the left side air chamber; remove the air chamber side cover for access. The air suction valve which supplies the front cylinders is mounted on the front of the oil pan, just behind the fuel system canister; the belly fairing will require removal for access. The air suction control valve for the rear cylinders is mounted below the coolant reservoir tank.
8 When the engine is running, the depression present in the intake duct acts on the vacuum diaphragm in the air injection control valve and opens up the valve.
9 With the valve open, whenever there is a negative pulse in the exhaust system (ie on the overrun), filtered air is drawn from the air filter housing through the air injection control valve and air suction valves and into the exhaust ports.
10 The air suction valves are fitted with a pair of reed valves to prevent the exhaust gases passing from the cylinders through both valves and into the air filter housing.



19.9a Exhaust chamber bolts are located on left side of engine ...

19 Exhaust system - removal and installation

1982 through 1986 700/750 models and all 1100 models

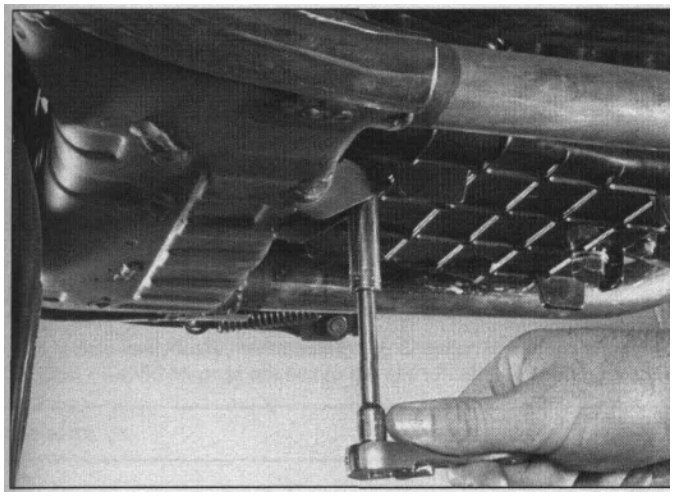
Refer to illustrations 19.3, 19.9a, 19.9b and 19.11

Mufflers (silencers)

1 Place the motorcycle on its main stand.
2 Remove the trim panel (where fitted) from the muffler-to-exhaust system joint. Loosen fully the clamp which retains this joint.
3 Remove the muffler mounting nut and bolt from the passenger footpeg bracket, making careful note of the position of all washers, spacers and damping rubbers. Pull the muffler rearwards, twisting it from side-to-side to help release it from its joint clamp. Due to the joint gaskets, the fit is tight **(see illustration).**
4 Installation is the reverse of the removal procedure, noting that new gaskets must be used at all joints. Tighten all fasteners loosely at first, and then when the system is in its correct position, secure them to the specified torque (see Specifications).

Complete system

5 Place the motorcycle on its main stand.
6 Remove the muffler (silencer) mounting bolt on each side and place a wood block under the assembly to take its weight and prevent strain while the main exhaust fasteners are released.
7 Remove the nuts that retain the exhaust pipes to the front cylinder head.
8 Loosen fully the clamps that secure the exhaust chamber to the two rear exhaust headpipes.
9 On 700/750 models remove the two exhaust chamber mounting bolts (one is located on the left side of the engine and one is located underneath the engine) **(see illustrations).** On 1100 models the chamber is held by a single long bolt on the left side of the engine (remove the rear left engine cover for access).
10 Carefully work the rear cylinder pipes out of the chamber stubs and lower the complete exhaust system clear of the motorcycle. Note that the rear cylinder pipe clamps may need to be rotated to clear the swingarm.
11 On all models except the 1985 and 1986 700 Magnas, the rear cylinder headpipes can be removed after removing the exhaust system. First remove the screws that attach the heat shield to both headpipes, then remove the nuts that attach the pipes to the rear cylinder head bank. Carefully work each pipe up and out the side of the motorcycle **(see illustration).** Due to lack of clearance, the heat shield cannot be removed without first removing other components. On 1985



19.9b ... and underneath the engine (early 700/750 models)

and 1986 700 models, engine removal will be necessary to remove the rear cylinder headpipes.
12 Installation is the reverse of the removal procedure, noting that new gaskets must be used at all joints. Tighten all fasteners loosely at first, and then when the system is in its correct position, secure them to the specified torque (see Specifications).

1987 and 1988 700/750 Magna models

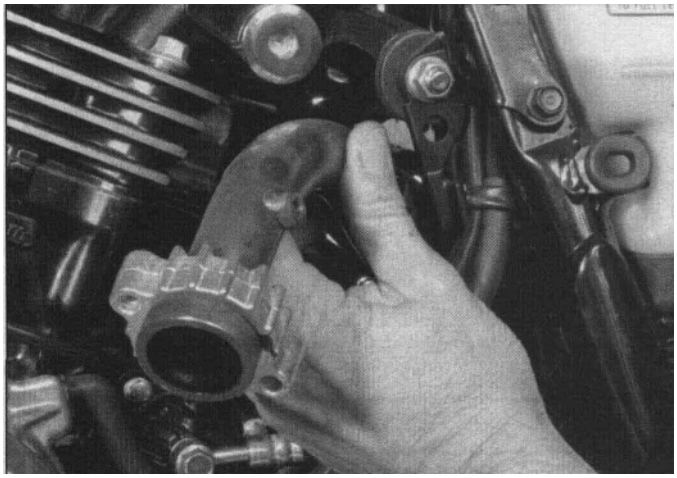
Refer to illustration 19.16

Muffler (silencer)

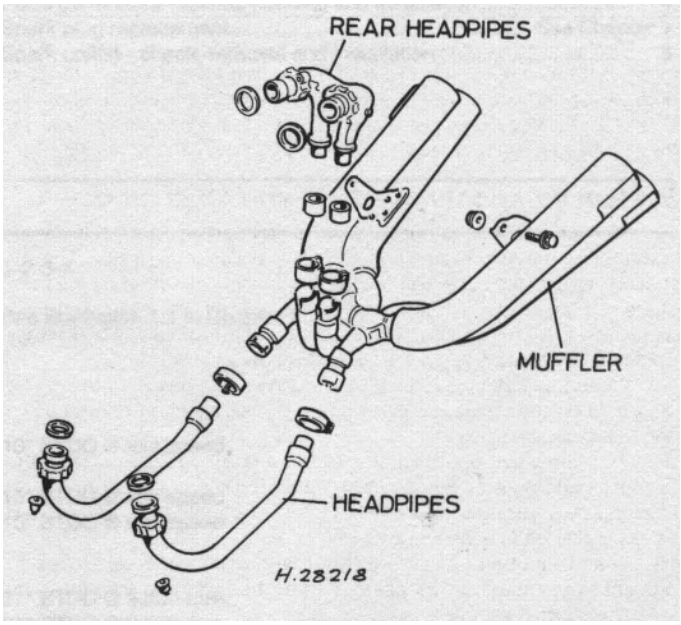
13 Ensure that the motorcycle is securely supported on its stand.
14 Remove the belly fairing rear sections (see Chapter 6).
15 Remove the muffler (silencer) bracket mounting bolt on each side and place a wood block under the assembly to take its weight and prevent strain while the joint clamps are loosened.
16 Loosen fully the clamps that secure the two front cylinder pipes and two rear cylinder exhaust headpipes to the mufflers. Work the muffler stubs off the pipes and lower the muffler assembly free **(see illustration).**
17 If required, the right and left side mufflers can be separated after the connecting pipe clamp bolt has been fully loosened and the joint pulled apart.
18 Installation is the reverse of the removal procedure, noting that new gaskets must be used at all joints. Tighten all fasteners loosely at first, and then when the system is in its correct position, secure them to the specified torque (see Specifications).

Complete system

19 Ensure that the motorcycle is securely supported on its stand.
20 Remove the belly fairing (see Chapter 6).
21 Remove the muffler (silencer) bracket mounting bolt on each side and place a wood block under the assembly to take its weight and prevent strain while the main exhaust fasteners are released.
22 Remove the nuts that retain the exhaust pipes to the front cylinder head.
23 Loosen fully the clamps that secure the two rear exhaust headpipes to the mufflers and carefully work the headpipes out of the stubs and lower the complete exhaust system clear of the motorcycle.



19.11 Rear cylinder header pipes can be maneuvered out of frame after exhaust system has been removed



19.16 Exhaust system - four-into-four design

24 If required, the right and left side mufflers can be separated after the connecting pipe clamp bolt has been fully loosened and the joint pulled apart.
25 Engine removal will be necessary to remove the rear cylinder headpipes from the cylinder head; the pipes are covered by a heat shield and retained to the head by nuts.
26 Installation is the reverse of the removal procedure, noting that new gaskets must be used at all joints. Tighten all fasteners loosely at first, and then when the system is in its correct position, secure them to the specified torque (see Specifications).

Chapter 5 Ignition system

Note: *Unless specifically mentioned in this Chapter, the information given for the 1982 750 Sabre applies to the UK VF750S-C, and that for the 1987 and 1988 700/750 Magnas applies to the UK VF750C-H and C-J respectively.*

Contents

Specifications

Firing order	1-2-3-4
Cylinder identification	See illustration 1.1 in Chapter 2

Ignition timing

Initial (at 'F' mark)	
1982 and 1983 750 Sabres, 1982 through 1984 700/750 Magna models	10° BTDC @ idle speed
1984 and 1985 700 Sabres, 1985 through 1988 700/750 Magna models	15° BTDC @ idle speed
1100 models	10° BTDC @ idle speed
Full advance	
1982 through 1985 700/750 Sabres, 1982 through 1984 700/750 Magna models	37° BTDC @ 3,300 rpm
1985 and 1986 700 Magna models	37° BTDC @ 3,500 rpm
1987 and 1988 700/750 Magna models	40° BTDC @ 3,500 rpm
1100 models	37° BTDC @ 3,800 rpm

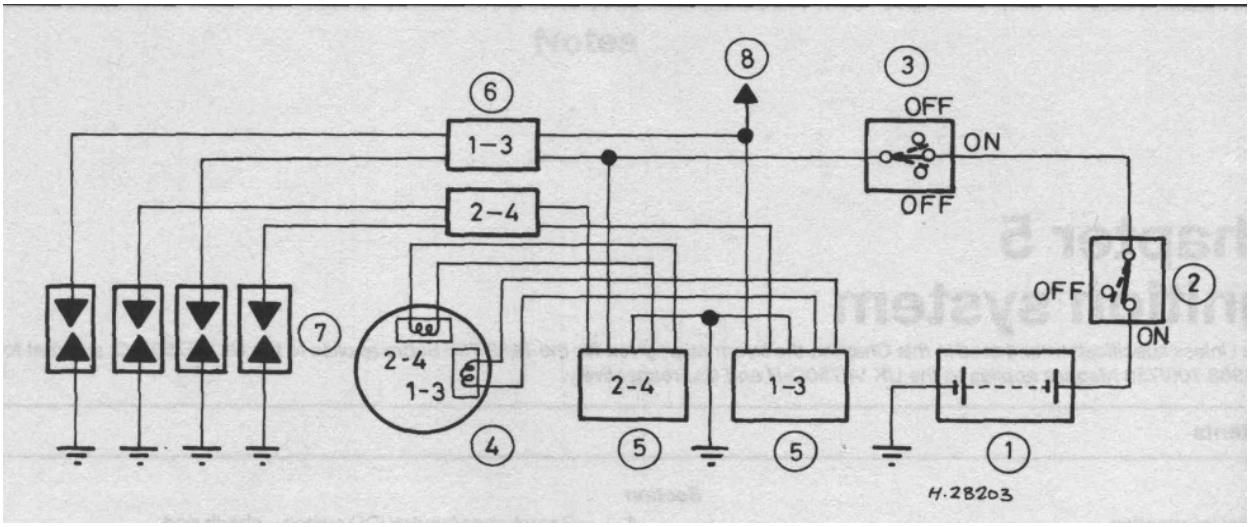
Pulse generators

Resistance	
1982 through 1986 models	480 ohms ±10%
1987 and 1988 700/750 models	450 to 550 ohms
Air gap (1100 models)	0.4 to 0.6 mm (0.016 to 0.024 in)

Ignition HT coils

Primary resistance	
1985 and 1986 700 Magna models	2.0 ohms
1987 and 1988 700/750 Magna models	2.6 to 3.2 ohms
All other models	2.8 ohms
Secondary resistance (with plug caps on)	
1985 and 1986 700 Magna models	29 to 40 K ohms
1987 and 1988 700/750 Magna models	21 to 29 K ohms
All other models	21 to 28 K ohms
Secondary resistance (with plug caps removed)	
1985 and 1986 700 Magna models	20.6 to 27.4 K ohms
1987 and 1988 700/750 Magna models	13 to 17 K ohms
All other models	13.6 to 15.5 K ohms

Spark plugs	See Chapter 1



1.1a Ignition system circuit diagram - 700/750 Sabres, 1982 through 1984 700/750 Magnas and all 1100 models

7 Battery
2 Ignition main (key) switch
3 Engine kill (stop) switch
4 Pulse generators
5 Spark units
6 Ignition HT coils
7 Spark plugs
8 To tachometer

1 General information

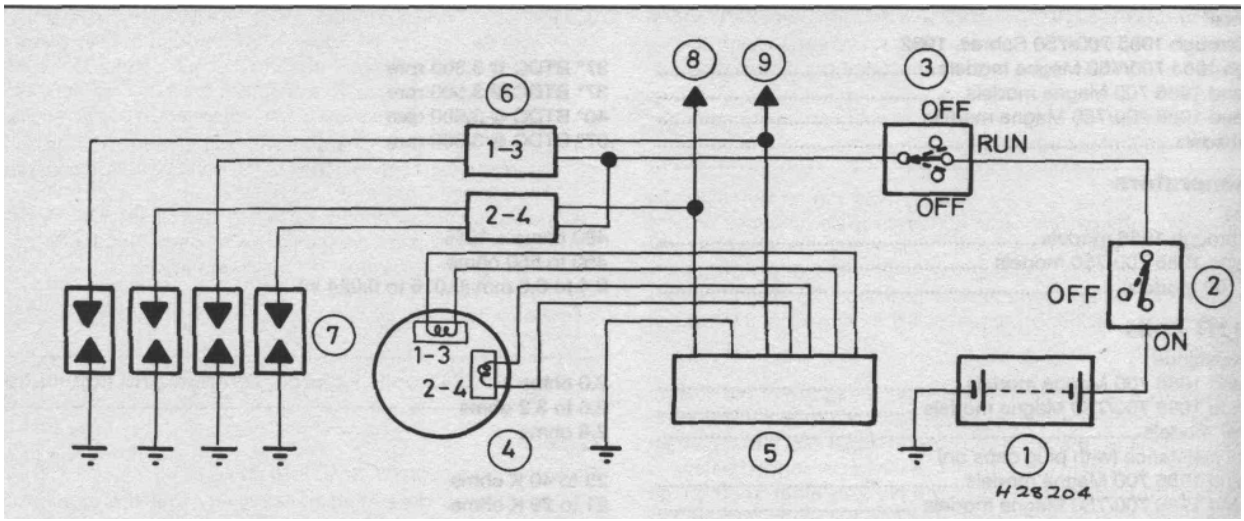
Refer to illustrations 1.1a, 1.1b and 1.1c

All models are fitted with a magnetically-triggered electronic ignition system, which due to its lack of mechanical parts is totally maintenance-free. The system comprises a trigger on the starter clutch body, two pulse generator coils, two spark units (single unit on 1985-on 700/750 Magnas) and two ignition HT coils **(see illustrations).**

The raised trigger on the starter clutch body magnetically operates the pulse generator coils as the crankshaft rotates. The pulse generators transmit a signal to the spark unit(s) which then supplies the ignition coils with the power necessary to produce the spark at the plugs. The spark unit(s) advances the ignition electronically.

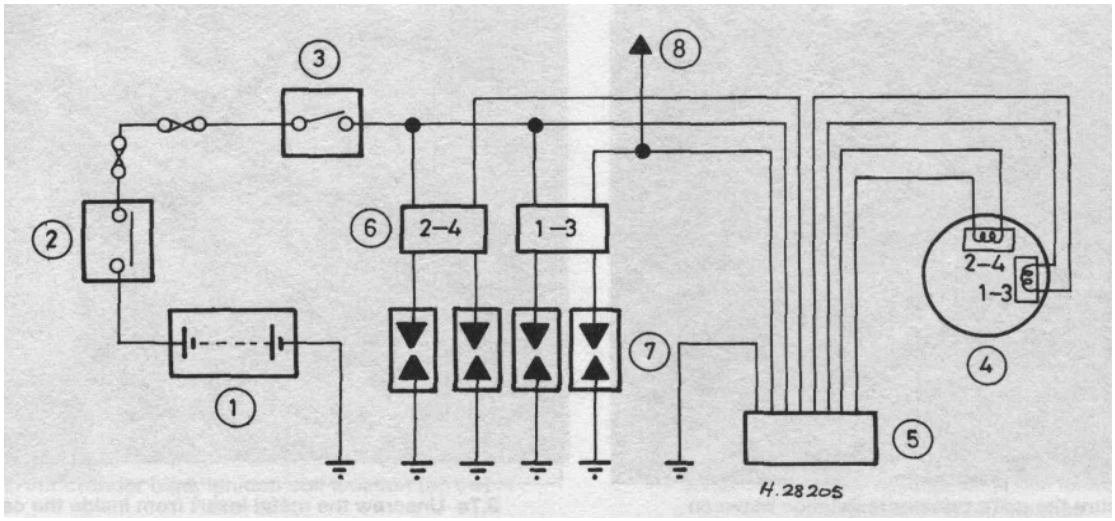
Each ignition HT coil supplies two spark plugs.

The rear cylinders (1 and 3) operate off one coil and the front cylinders (2 and 4) off the other. For any given cylinder, the plug is fired twice for every engine cycle, but one of the sparks occurs during the exhaust stroke and therefore performs no useful function. This arrangement is usually known as a 'spare spark' or "wasted spark' system.Because of their nature, the individual ignition system I components can be checked but not repaired. If ignition system troubles occur, and the faulty component can be isolated, the only cure for the problem is to replace the part with a new one. Keep id mind that most electrical parts, once purchased, can't be returned. To avoid unnecessary expense, make very sure the faulty component has been positively identified before buying a replacement part.



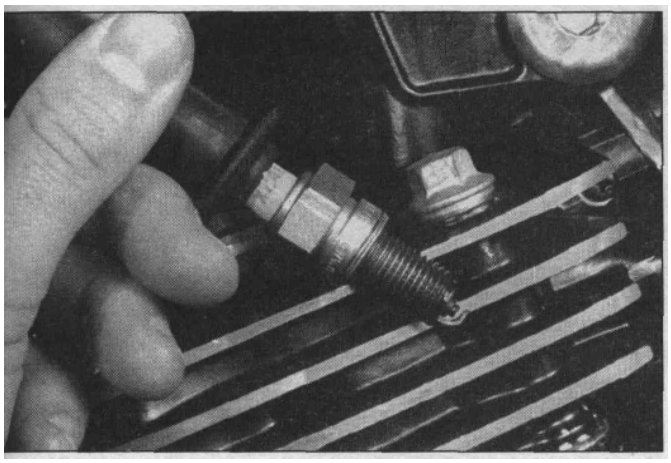
1.1b Ignition system circuit diagram -1985 and 1986 700 Magna models

7 Battery
2 Ignition main (key) switch
3 Engine kill (stop) switch
4 Pulse generators
5 Spark units
6 Ignition HT coils
7 Spark plugs
8 To tachometer
9 To fuel pump



1.1c Ignition system circuit diagram - 1987 and 1988 700/750 Magna models

1 Battery
2 Ignition main (key) switch
3 Engine kill (stop) switch
4 Pulse generators
5 Spark units
6 Ignition HT coils
7 Spark plugs
8 To tachometer



2.2 Position the test spark plug so that its threads touch the cylinder head - hold it there with insulated pliers if necessary

2 Ignition system - check

Warning: *The energy levels in electronic systems can* toe *very high. On no account should the ignition be switched on while the plugs or plug caps are being held. Shocks from the secondary (HT) circuit can be most unpleasant. Secondly, it is vital that the plugs are soundly grounded (earthed) when the system is checked for sparking. The ignition system components can be seriously damaged if the secondary (HT) circuit becomes isolated. Refer to illustration 2.2*

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

2 Disconnect the wires from No.1 and No.2 cylinder spark plugs and connect each lead to a spare spark plug. Lay each plug on the engine with the threads contacting the engine **(see illustration).** If necessary, hold each spark plug with an insulated tool. **Warning:** *Don't remove one of the spark plugs from the engine to perform this check -atomized fuel being pumped out of the open spark plug hole could ignite, causing severe injury!*

3 Having observed the above precautions, check that the kill switch is in the RUN position, turn the ignition switch On and turn the engine over on the starter motor. If the system is in good condition a regular, strong blue spark should be evident at each plug electrode. If the spark appears thin or yellowish, or is non-existent, further investigation will be necessary. Before proceeding further, turn the ignition off and remove the key as a safety measure.

4 Note that there are essentially two ignition circuits, one for cylinders 1 and 3, and another for cylinders 2 and 4. If one pair of cylinders is firing well, but the other isn't, only the components of that circuit must be tested. If one plug in a circuit is not firing correctly, but the other one is, the problem will probably lie in the plug cap or the wire. If the problem is occurring in all four plugs, the fault may be in the ignition switch, engine stop switch or the wiring leading to or from them. 5 Ignition faults can be divided into two categories, namely those where the ignition system has failed completely, and those which are due to a partial failure. The likely faults are listed below, starting with the most probable source of failure. Work through the list systematically, referring to the subsequent sections for full details of the necessary checks and tests. **Note:** *Before checking the following items ensure that the battery is fully-charged and that all fuses are in good condition.*

a) Loose, corroded or damaged wiring connections, broken or shorted wiring between any of the component parts of the ignition system (see Chapter 8).
b) Faulty ignition or engine kill switch (see Chapter 8).
c) Faulty gearchange/neutral/OD switch (see Chapter 8).
d) Faulty pulse generators or damaged trigger.
e) Faulty ignition HT coil(s).
f) Faulty spark unit(s).

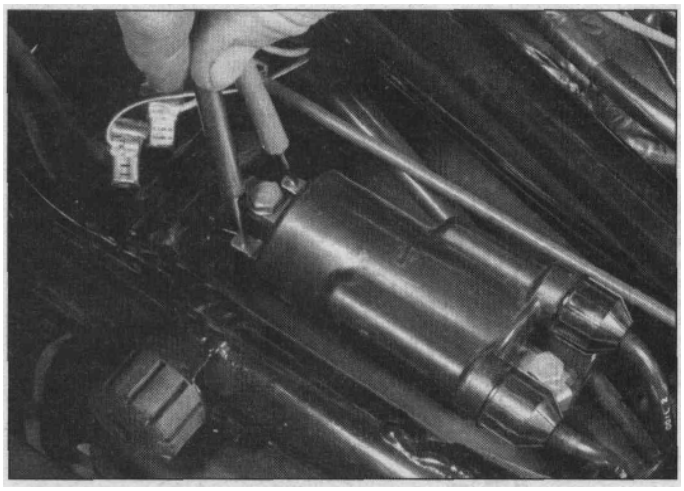
3 Ignition HT coils - check, removal and installation

Check

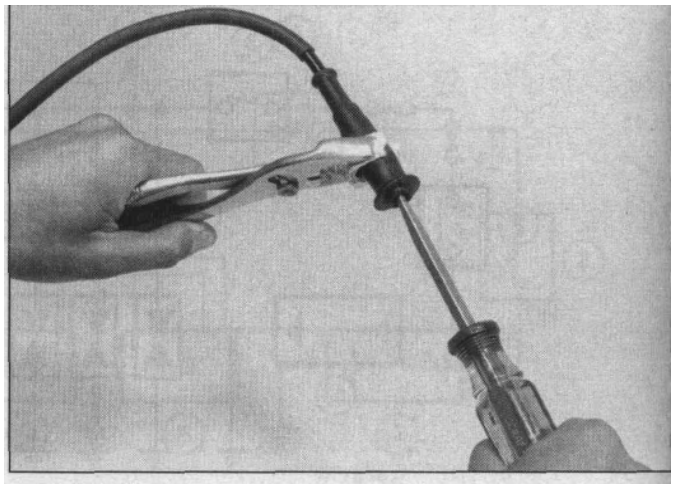
Refer to illustrations 3.5, 3.7a, 3.7b and 3.8

1 In order to determine conclusively that the ignition coils are defective, they should be tested by an authorized Honda dealer service department which is equipped with the special electrical tester required for this check.

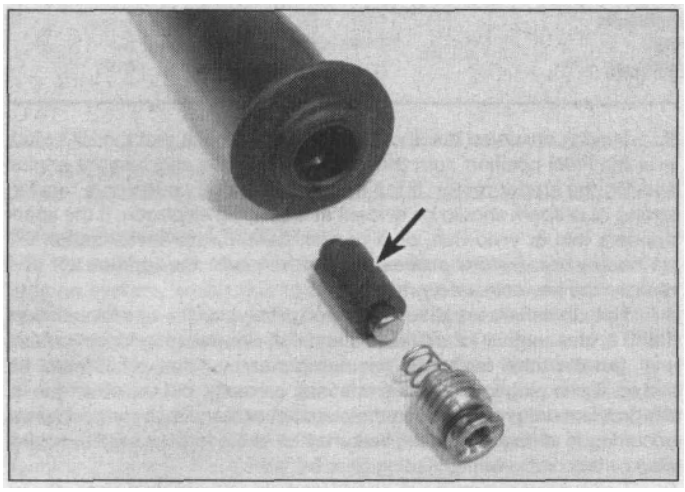
2 However, the coils can be checked visually (for cracks and other damage) and the primary and secondary coil resistances can be measured with an ohmmeter. If the coils are undamaged, and if the



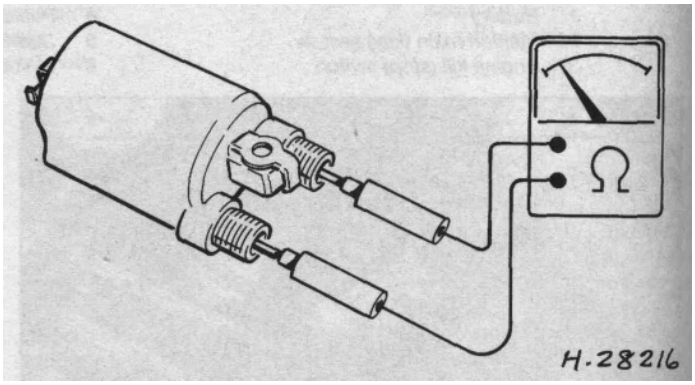
3.5 Measure the coil's primary resistance between the low tension terminals



3.7a **Unscrew the metal insert from inside the cap .**



3.7b … to free the resistor (arrow) on 1982 through 1986 models



3.8 On 1987 and 1988 models, the secondary coil resistance can be measured directly at the high tension terminals

resistances are as specified, they are probably capable of proper operation.

3 To gain access to the coils, remove the fuel tank (see Chapter 4). Refer to Steps 12 through 15 and the wire colors (see *Wiring diagrams* at the end of this manual) to identify the coils for the front (2-4) and rear (1 -3) cylinders.

4 Disconnect the primary circuit electrical connectors from the coil and disconnect the HT lead caps from the plugs that are connected to the coil being checked. Mark the locations of all wires before disconnecting them.

5 Set the meter to the ohms x 1 scale and measure the resistance between the low tension terminals. This will give a resistance reading of the primary windings and should be within the limits given in the Specifications **(see illustration).**

6 To check the condition of the secondary windings, set the meter to the K ohm scale and connect the meter probes to the spark plug caps, noting the reading obtained. If this reading is not within the range shown in the Specifications, refer to Step 7 for all 1982 through 1986 models, or Step 8 for 1987 and 1988 700/750 Magna models.

7 Grip each plug cap in turn with pliers (use padding between the cap and pliers to prevent damage to the cap rubber body) and using a flat-bladed screwdriver, unscrew the metal insert from inside the cap. Slide out the resistor, then slide the rubber body of the cap back along the HT lead to expose the end of the lead **(see illustrations).** Measure the resistance between each HT lead end. If both values obtained differ greatly from those specified it is likely that the coil is defective. **Note:** *If only the first reading obtained is suspect, then the fault lies in the spark plug cap resistor rather than the coil or HT leads itself.*

8 Unscrew the terminal nuts and detach the HT leads from the ignition coil. Measure the resistance between the coil terminals (see **illustration).** If both values differ greatly from those specified it is likely that the coil is defective. **Note:** *If only the first reading obtained is suspect, then the fault lies in the HT leads/caps.*

9 Should any of the above checks not produce the expected result, the coil should be taken to a Honda dealer or auto-electrician for a more thorough check. If the coil is confirmed to be faulty, it must be replaced; the coil is a sealed unit and cannot therefore be repaired.

Removal

Refer to illustrations 3.15a, 3.15b and 3.16

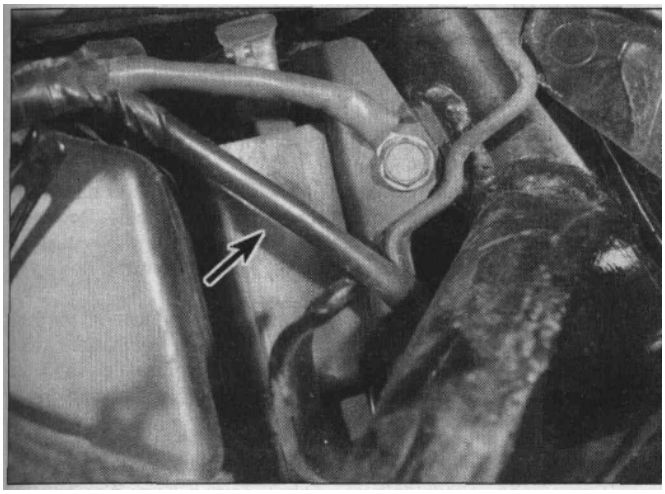
10 Remove the seat.

11 Remove fuel tank (see Chapter 4).

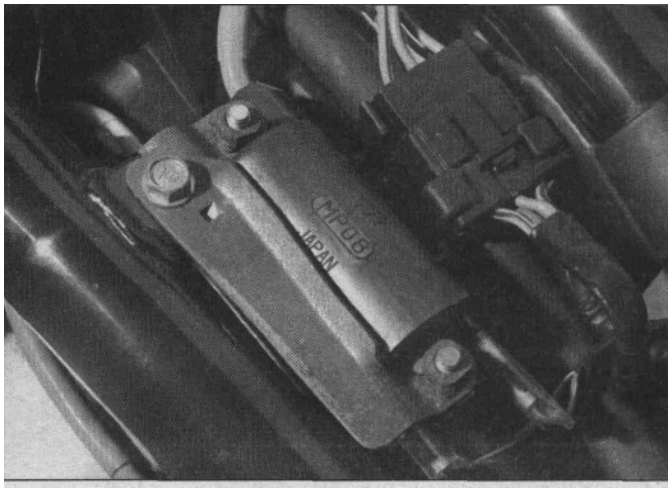
12 On the 1982 750 Sabre and 1982 through 1986 Magna models, the ignition coils are positioned side-by-side across the frame top tubes.

13 On 1983-on 700/750 Sabre models the coil for the front cylinders is mounted on a bracket on the left side of the machine (right side on California models), just to the rear of the radiator (remove the front side cover for access); the coil for the rear cylinders is mounted on the frame top tubes, near the fuel tank's rear mounting.

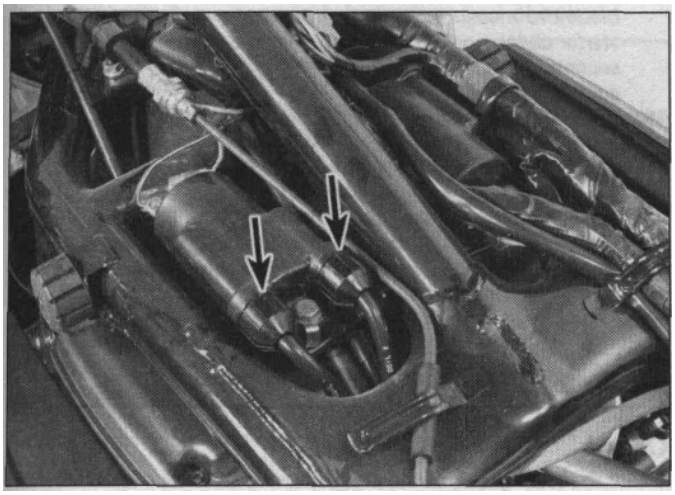
14 The 1100 Sabre's coils are mounted separately on the frame top tubes; the front coil controls the front cylinders and the rear coil controls the rear cylinders.



3.15a Front cylinder bank ignition coil location (arrow)...



3.15b ... and rear cylinder bank coil location on 1987 and 1988 700/750 Magnas



3.16 When removing the coil, unscrew the terminal nuts (arrows) to release the HT leads

15 On 1987-on Magna models the coil for the front cylinders is mounted on the right side of the steering head (remove plastic cover for access) and that for the rear cylinders is on the frame top tubes (see **illustrations).**

16 Disconnect the spark plug leads from the coil by unscrewing the terminal nuts **(see illustration).**

17 Disconnect the wires from the coil primary terminals, having made note of their original positions.

18 Remove the mounting bolts and lift the coil out.

Installation

19 Installation is the reverse of removal making sure the wiring connectors and HT leads are securely connected.

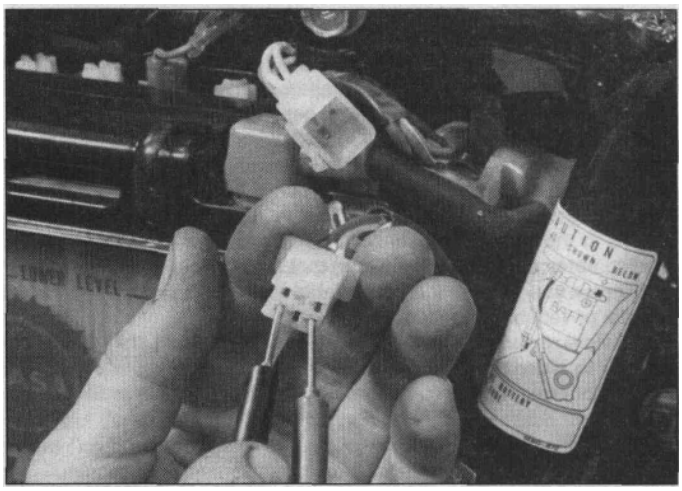
4 Pulse generators - check, removal and installation

Check

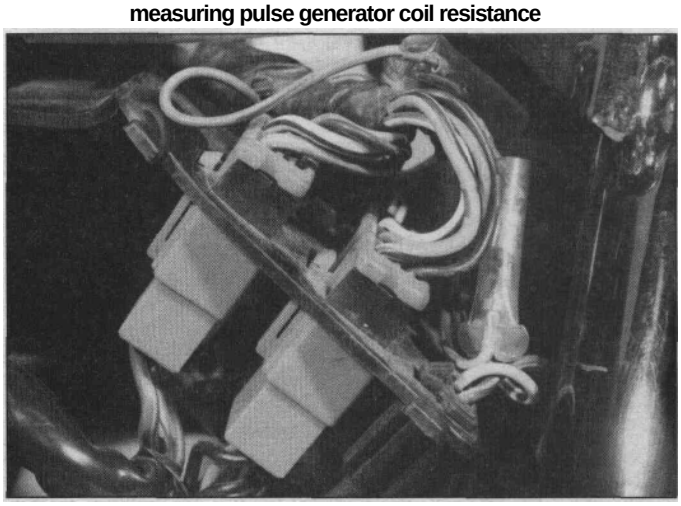
Refer to illustrations 4.2a and 4.2b

1 Remove the right side cover on 700/750 models and the fuel tank on 1100 models.

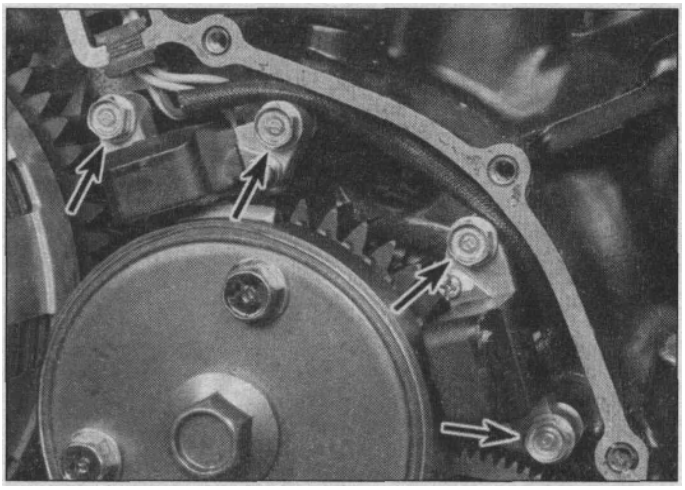
2 Trace the pulse generator wires up from the top of the right crankcase cover, and separate the wiring at the multi-pin connector **(see illustration).** Note that the oil pressure switch wire shares the same connector as the pulse generator coils on certain models. The connector on 1985-on 700/750 Magnas will be found pressed into the electrical components connector bracket **(see illustration).**



4.2a Make tests on the engine side of the connector when measuring pulse generator coil resistance



4.2b Pulse generator connector is located in electrical connector bracket on 1985-on models



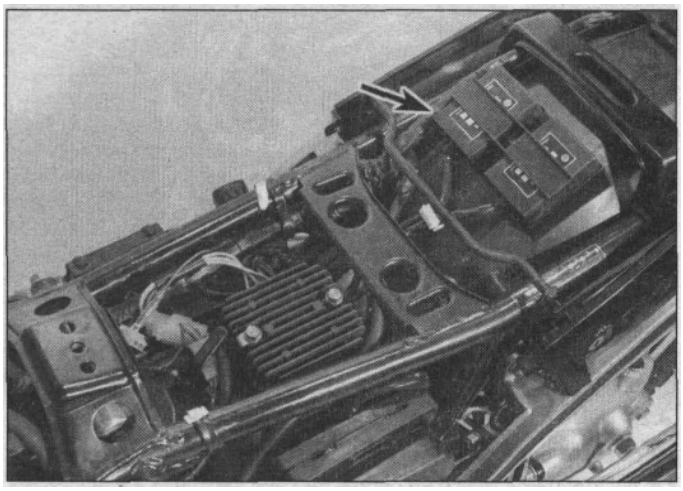
4.11 Pulse generator coils are retained by four bolts (arrows)

3 On all models except the 1985/86 700 Magnas, use a multimeter set to the ohms x 100 scale to measure the resistance between the white/yellow and yellow wires (cylinders 1 and 3) or white/blue and blue wires (cylinders 2 and 4) on the generator side of the connector. Carry out the same test on 1985/86 700 Magnas, but measure between the white/yellow and yellow/blue wires (cylinders 1 and 3) or white/blue and blue/yellow wires (cylinders 2 and 4).
4 Compare the reading obtained with that given in the Specifications at the start of this Chapter. Either coil must be replaced if the reading obtained differs greatly from that given, particularly if the meter indicates a short circuit (no measurable resistance) or an open circuit (infinite, or very high resistance).
5 Before replacing a pulse generator coil, first check that the fault is not due to a damaged or broken wire from the coil to the connector; pinched or broken wires can usually be repaired.

Removal

Refer to illustration 4.11

6 Remove the right side cover on 700/750 models or the fuel tank on 1100 models, and disconnect the pulse generator wiring at the multi-pin connector.
7 Free the pulse generator wiring from any ties, noting that it may be necessary to disconnect the oil pressure switch wire on certain models.
8 On all models remove the rear brake pedal, and on 1100 Magna models also remove the right footpeg. Drain the engine oil (see Chapter 1).
9 Remove the right crankcase cover bolts. There are two different size bolts, so make a note of their location or store them in the old gasket when this has been removed.
10 Tap the crankcase cover gently with a soft-faced hammer to break the gasket seal, then pull it away from the engine. Do not pry between the gasket sealing surfaces, as damage and eventually oil leaks will occur. Discard the old gasket and remove the dowels for safekeeping if they are loose.
11 Remove the pulse generator mounting bolts and then lift the pulse generator and wiring harness out of position **(see illustration). Note:** *On 700/750 models, do not remove the screws marked with white paint; these attach the generators to their brackets and should only be unscrewed if replacement is required.*



5.4 Spark units (arrow) are mounted on rear fender on 700/750 Sabres, 1100 Magnas and early 700/750 Magnas

Installation

12 Installation is the reverse of the removal procedure, noting the following:

a) If the pulse generators were removed on 1100 models, use feeler blades to measure the air gap between each coil face and the starter clutch body. If outside of that specified (see Specifications section of this Chapter), loosen the coil bolts and reposition them accordingly.
b) Ensure that the pulse generator wiring is routed away from the starter clutch gear and press the wiring grommet into the engine case.
c) Be sure to use a new gasket when installing the engine side cover and check that the two dowels are in place.
d) Fill the engine with oil to the proper level (see Chapter 1).
e) If the pulse generator coils were disturbed, check the ignition timing (see Chapter 1).

5 Spark unit(s) - check, removal and installation

Check

1 If the tests shown in the preceding Sections have failed to isolate the cause of an ignition fault, it is likely that the spark unit(s) is faulty. No test details are provided by the manufacturer so the unit(s) can only be checked by the substitution of a known good replacement.

Removal

All 700/750 Sabre models, 1982 through 1984 700/750 Magna models and all 1100 Magna models

Refer to illustration 5.4

2 Remove the seat and disconnect the battery negative lead.
3 The spark units are mounted on the rear fender. Free the spark unit wiring from any clamps or ties and separate its multi-pin connectors.
4 On 700/750 Sabre models, remove the screw that retains the spark unit upper bracket **(see illustration).** Note that on the 1985 700 Sabre one of the spark units is situated under the right side cover.
5 Maneuver the spark units free.

1985 and 1986 700 Magna models

6 Remove the seat and the side covers. Disconnect the battery negative lead.
7 Separate the 6-pin and 4-pin connectors housed in the electrical components connector bracket. On the other side of the motorcycle, free the fuel pump from its mounting rubber and remove the screw to release the fuel filter retaining bracket (there's no need to disconnect the pump or filter).
8 Remove the toolbox mounting bolt and withdraw it together with the spark unit.

1987 and 1988 700/750 Magna models

Refer to *illustration 5.10*

) Remove the seat and the side covers. Disconnect the battery

10 Separate the 6-pin and 4-pin connectors housed in the electrical components connector bracket and lift the spark unit free (it is located at the front of the battery) **(see illustration).**

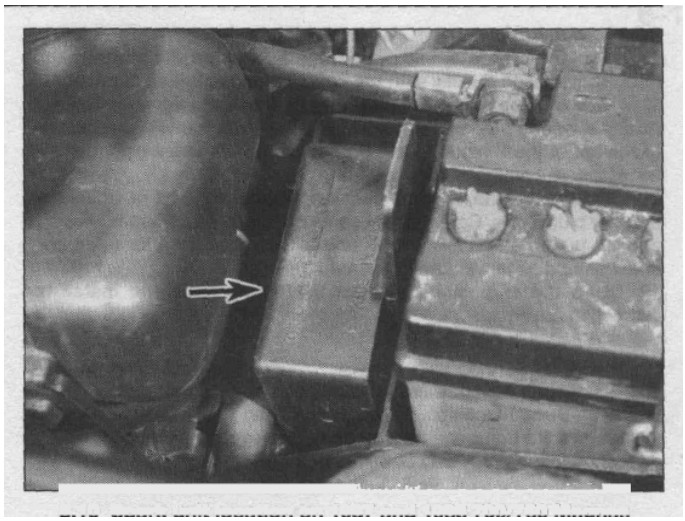
1100 Sabre models

11 Remove the seat and side covers. Disconnect the battery negative lead.

12 The spark units are mounted just to the rear of the fuel tank rear mounting point. Free the spark unit wiring from any clamps or ties and separate its multi-pin connectors. Maneuver the spark units free.

Installation

13 Installation is the reverse of removal ensuring that all wiring connections are correctly made. Reconnect the battery negative lead last.



5.10 Spark unit location on 1987 and 1988 700/750 Magnas

6 Ignition timing - general information and check

General information

1 No provision exists for adjusting the ignition timing and since no component is subject to mechanical wear, there is no need for regular checks; only if investigating a fault such as a loss of power or a misfire, should the ignition timing be checked.

2 The ignition timing can only be checked while the engine is mining using a stroboscopic (timing) light. The inexpensive neon amps should be adequate in theory, but in practice may produce a pulse of such low intensity that the timing mark remains indistinct. If possible, one of the more precise xenon tube lamps should be used, powered by an external source of the appropriate voltage. **Note:** *Do* not use *the machine's own battery* as *an incorrect reading may result mm stray impulses within the machine's electrical system.*

Check

All 1982 through 1986 models

Note: Access to *the ignition timing marks necessitates removal of the altemator cover and some loss of engine oil. Honda supply a cover for certain models which has an inspection aperture for* access to *the timing marks and allows the task to be carried out without oil loss; its art number is 07998-MBOOOOO for 1100 Magnas, 07998-MB40000 for 100 Sabres and 1985/86 700 Magnas, Refer to illustration 6.7*

Run the engine up to normal operating temperature then stop it.

Note: *The idle speed must be correct for this check* (see Chapter 1).

Place the motorcycle on its main stand.

Place a drain tray under the alternator cover, then remove its six retaining bolts and remove the alternator cover. Recover its gasket. Wipe any oil off the outside of the alternator rotor.

6 Remove the crankcase rear left cover.

7 Identify the timing marks on the rotor and casing **(see illustration).** The casing index mark is formed by the crankcase joint. It is advisable to highlight the timing marks with white paint to make them more distinct under the timing light.

8 If using the Honda replacement cover described above, install it at this stage. Note that the replacement cover has an index mark stamped in its aperture.

9 Connect the timing light to either of the rear cylinder plug leads. Start the engine and aim the timing light at the index mark on the casing.

10 With engine at idle speed the F mark on the rotor should align with the index mark. Increase engine speed to 3,500 rpm (1985 and 1986 700 Magnas) or 3,300 rpm (all 700/750 Sabres and earlier Magnas) or 3,800 rpm (all 1100 models) and check that the index mark lies between the two full advance lines on the rotor. **Note:** Do not *run the engine any longer than is necessary to complete this check. If significant oil loss occurs (due to the replacement cover not being used) stop the engine and top up the oil level.*

11 Stop the engine, then connect the timing light to either of the front cylinder plug leads. Carry out the same check as described in Step 10, but note that the F mark and full advance lines for cylinders 2 and 4 should align with the index mark.

12 Stop the engine, disconnect the timing light and install the alternator cover using a new gasket. Top up the engine oil (see Chapter 1).

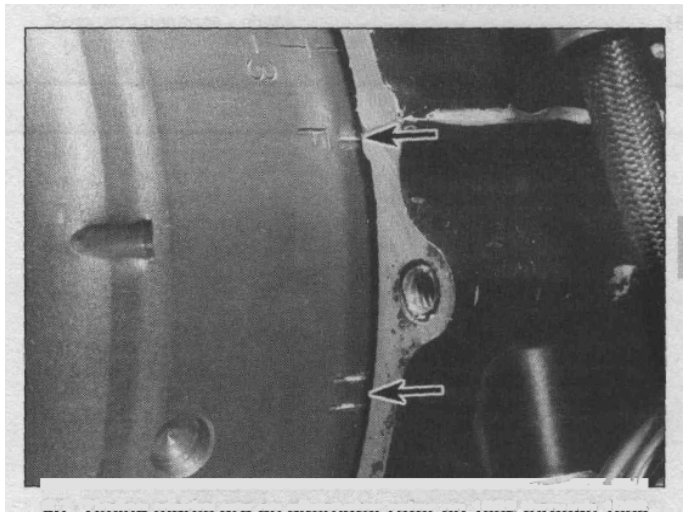
1987 and 1988 700/750 Magna models

Refer to illustration 6.16

13 Run the engine up to normal operating temperature then stop it. **Note:** *The idle speed must be correct for this check* (see Chapter 1).

14 Using a box wrench or socket, remove the circular inspection cover from the right crankcase cover (it may be very tight!).

15 Connect the timing light to either of the rear cylinder plug leads and start the engine. Aim the light at the index mark on the periphery of

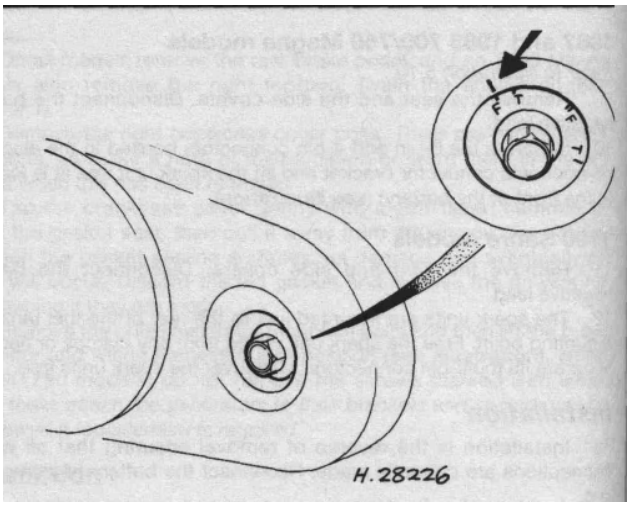


6.7 Timing marks are on alternator rotor on 1982 through 1986 models - F mark at idle (upper arrow) and full advance mark (lower arrow)

the cover aperture.
16 With the engine at idle speed, the F mark on the starter clutch body should align exactly with the cover index mark **(see illustration).**
17 Raise engine speed to 3,500 rpm to check the advance function. At this speed the index mark should lie between the two parallel lines to the left of the F mark. **Note:** Do *not run the engine any longer than necessary to complete this check.*
18 Stop the engine, then connect the timing light to either of the front cylinder plug leads. Carry out the same check as described in Steps 16 and 17, but note that the F mark and full advance lines for cylinders 2 and 4 should align with the index mark.
19 Stop the engine, disconnect the timing light and install the inspection cover.

All models

20 As already stated, there is no means of adjustment of the ignition timing on these machines. If the ignition timing is incorrect one of the ignition system components is at fault, and system must be tested as described in the preceding Sections of this Chapter.



6.16 Ignition timing F mark aligned with casing index mark on 1987 and 1988 700/750 models

Chapter 6
Frame, suspension and final drive

Note: *Unless specifically mentioned in this Chapter, the information given for the 1982 750 Sabre applies to the UK VF750S-C, and that for the 1987 and 1988 700/750 Magnas applies to the UK VF750C-H and C-J respectively.*

Contents

Specifications

Front forks

Air pressure	
1982 models.....	6 to 14 psi (0.41 to 0.97 Bars)
1983 through 1986 models.....	0 to 6 psi (0 to 0.41 Bars)
Spring free length	
1982 750 models.....	532 mm (20.94 in)
1983 through 1985 700/750 Sabre and 1983/84 700 and 750 Magna models.....	553 mm (21.75 in)
1985 through 1988 700/750 Magna models.....	472 mm (18.59 in)
1100 Sabre models.....	534 mm (21.02 in)
1100 Magna models.....	415 mm (16.33 in)
Spring service limit	
1982 750 models.....	521 mm (20.5 in)
1983 through 1985 700/750 Sabre and 1983/84 700	

and 750 Magna models	542 mm (21.3 in)
1985 through 1988 700/750 Magna models	464 mm (18.2 in)
1100 Sabre models	523 mm (20.6 in)
1100 Magna models	404 mm (15.9 in)
Fork tube runout	0.2 mm (0.008 in)

Oil capacity - per leg
- 1982 750 Sabre model
  - Right fork ..... 375 cc (12.7 US fl oz, 13.2 Imp fl oz)
  - Left fork..... 390 cc (13.2 US fl oz, 13.7 Imp fl oz)
- 1983 750 Sabre model
  - Right fork ..... 360 cc (12.2 US fl oz, 12.7 Imp fl oz)
  - Left fork..... 375 cc (12.7 US fl oz, 13.2 Imp fl oz)
- 1984 and 1985 700 Sabre models
  - Right fork ..... 340 cc (11.5 US fl oz, 12.0 Imp fl oz)
  - Left fork..... 360 cc (12.2 US fl oz, 12.7 Imp fl oz)
- 1982 750 Magna model
  - Right fork ..... 390 cc (13.2 US fl oz, 13.7 Imp fl oz)
  - Left fork..... 405 cc (13.7 US fl oz, 14.3 Imp fl oz)
- 1983 750 Magna model
  - Right fork ..... 420 cc (14.2 US fl oz, 14.8 Imp fl oz)
  - Left fork..... 447 cc (15.1 US fl oz, 15.7 Imp fl oz)
- 1984 700 Magna model
  - Right fork ..... 420 cc (14.2 US fl oz, 14.8 Imp fl oz)
  - Left fork..... 440 cc (14.9 US fl oz, 15.5 Imp fl oz)
- 1985 and 1986 700 Magna models
  - Right fork ..... 545 cc (18.4 US fl oz, 19.2 Imp fl oz)
  - Left fork..... 560 cc (18.9 US fl oz, 19.7 Imp fl oz)
- 1987 and 1988 700/750 Magna models ..... 415 cc (14.0 US fl oz, 14.6 Imp fl oz)
- 1100 Sabre models
  - Right fork ..... 470 cc (15.9 US fl oz, 16.5 Imp fl oz)
  - Left fork..... 495 cc (16.7 US fl oz, 17.4 Imp fl oz)
- 1100 Magna models
  - Right fork ..... 565 cc (19.1 US fl oz, 19.9 Imp fl oz)
  - Left fork..... 580 cc (19.6 US fl oz, 20.4 Imp fl oz)

Oil type..... ATF (Automatic Transmission Fluid)

Oil level (1100 Sabre models)
- Right fork..... 235 mm (9.25 in)
- Left fork..... 226 mm (8.90 in)

Rear shock absorber

Air pressure range (Sabre models)..... 0 to 57 psi (0 to 3.9 Bars)

Spring free length service limit (Magna models)
- 1982 and 1983 models..... 223 mm (8.8 in)
- 1984 model..... 219 mm (8.6 in)
- 1985 and 1986 models..... 221 mm (8.7 in)
- 1987 and 1988 models..... 240 mm (9.5 in)
- 1100 models..... 244 mm (9.6 in)

Final drive

Final drive unit oil capacity..... See Chapter 1

Driveshaft damper oil capacity
- 1985-on 700/750 Magnas and all 1100 Sabre models..... 50 cc (1.69 US fl oz, 1.76 Imp fl oz)
- All other 700/750 models and all 1100 Magna models..... 80 cc (2.7 US fl oz, 2.82 Imp fl oz)

Driveshaft damper oil type
- 1985-on 700/750 Magnas, 1984-on 1100 models..... SAE80 Hypoid gear oil
- All other 700/750 models and 1983 1100 Magna models
  - Above 5°C(41°F)..... SAE90 Hypoid gear oil, API GL-5
  - Below 5°C (41°F)..... SAE80 Hypoid gear oil, API GL-5

Torque settings	Nm	ft-lbs
Handlebar clamp bolts		
1982 through 1984 700/750 Magna models	20 to 30	14 to 22
1985 and 1986 700 Magna models	25 to 35	18 to 25
1987 and 1988 700/750 Magna models	24 to 30	17 to 22
1984 and 1985 700 Sabre models	Not available	
1100 Magna models	40 to 50	29 to 36
1100 Sabre models	30 to 40	22 to 29
Handlebar pinch bolts		
1982 and 1983 750 Sabre models	40 to 50	29 to 36
1983 1100 Magna model	25 to 30	18 to 22
Clutch and front brake master cylinder clamp bolts (1100 models)	10 to 14	7 to 10
Triple clamp pinch bolts		
Upper triple clamp	9 to 13	7 to 9
Lower triple clamp	45 to 55	33 to 40

Steering stem pinch bolt (1100 models)	18 to 30	13 to 22
Front forks		
Fork top bolt	15 to 30	11 to 22
Damper piston socket head bolt	15 to 25	11 to 18
Brace bolts	18 to 28	13 to 20
Front turn signal clamp bolt (1987 and 1988 700/750 Magna models)	9 to 13	7 to 9
Steering stem adjuster nut (see text)		
All 700/750 Sabre models, 1982 and 1983 700/750 Magna models	14 to 16	10 to 12
1984 700 Magna model	19 to 21	14 to 15
1985-on 700/750 Magna models	19 to 23	14 to 17
1100 Sabre models	20 to 22	14 to 16
1100 Magna 1983 model		
Initial torque	14 to 16	10 to 12
Final torque	10 to 12	7 to 9
1100 Magna 1984-on models		
Initial torque	19 to 23	14 to 17
Final torque	19 to 21	14 to 15
Steering stem top nut		
All 700/750 Sabre models, 1982 and 1983 750 Magna models	80 to 120	58 to 87
1984 through 1988 700/750 Magna models	90 to 120	65 to 87
1983 through 1985 1100 Magna models	80 to 120	58 to 87
All 1100 Sabre models and 1986 1100 Magna model	90 to 120	65 to 87
Shock absorber mounting bolt nuts/bolts		
700/750 Sabre models	38 to 48	28 to 35
1982 through 1986 700/750 Magna models	30 to 40	22 to 29
1987 and 1988 700/750 Magna models		
Upper nuts on both sides and lower bolt on right side	20 to 30	14 to 22
Lower nut on left side	30 to 40	22 to 29
1100 Sabre models	40 to 50	29 to 36
1100 Magna models		
Upper	40 to 50	29 to 36
Lower	30 to 40	22 to 29
Shock absorber linkage (700/750 Sabres) All except shock absorber lower mounting	60 to 70	43 to 51
Shock absorber linkage (1100 Sabre)	40 to 50	29 to 36
Swingarm left pivot shaft	90 to 120	65 to 87
Swingarm right pivot shaft	16 to 20	12 to 14
Swingarm right pivot shaft locknut*	100 to 130	72 to 94
Final drive unit-to-swingarm nuts	45 to 70	33 to 51

**Tighten using special tool*

General information

The double cradle-type frame incorporates a subframe which acts as the left front downtube and front crosstube or brace. This subframe is detachable to allow for engine removal, and also forms part of the cooling system, carrying coolant from the radiator to the water pump.

All models use telescopic, oil-damped, coil-sprung forks for front suspension. Those on 1982 through 1986 models are air-assisted and have anti-dive on the left fork. All 1100 Sabre models have a rebound damping adjuster on the right fork.

Rear suspension on Sabre models is by Honda's 'Pro-Link' system in which the swingarm acts on a gas/oil shock via a two piece linkage. Magna models have two conventional hydraulically-damped shock absorbers; those fitted to 1982 and 1983 750 models have aluminum reservoirs to aid cooling.

The swingarm pivots on tapered-roller bearings and carries the final driveshaft in its left side.

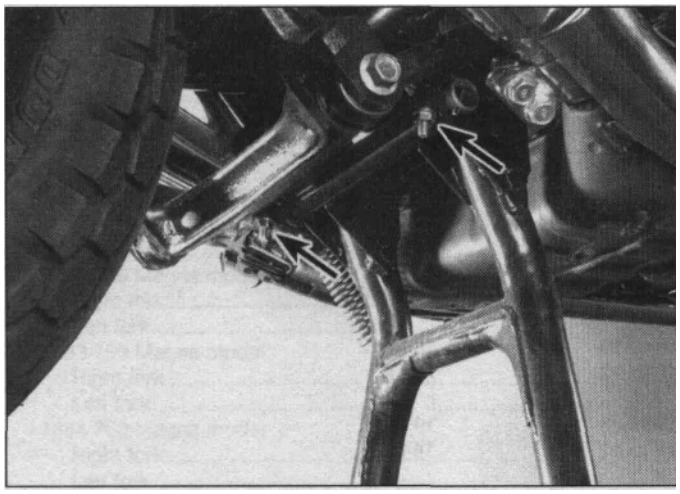
Final drive is by shaft. Drive is transmitted through the output gearcase, via the driveshaft, to the final drive unit in the rear wheel hub.

2 Frame - inspection and repair

1 The frame should not require attention unless accident damage has occurred. In most cases, frame replacement is the only satisfactory remedy for such damage. A few frame specialists have the jigs and other equipment necessary for straightening the frame to the required standard of accuracy, but even then there is no simple way of assessing to what extent the frame may have been over stressed.

2 After the machine has accumulated a lot of miles, the frame should be examined closely for signs of cracking or splitting at the welded joints. Corrosion can also cause weakness at these joints. Loose engine mount bolts can cause ovaling or fracturing of the mounting tabs. Minor damage can often be repaired by welding, depending on the extent and nature of the damage.

3 Remember that a frame which is out of alignment will cause handling problems. If misalignment is suspected as the result of an accident, it will be necessary to strip the machine completely so the frame can be thoroughly checked.



4.1 Main stand pivot pinch bolt locations (arrows)

3 Footpegs and brackets - removal and installation

Sabre *models*

Rider's footpegs

1 Remove the cotter pin (split pin) and washer, then slide out the pivot pin and remove the footpeg from its bracket along with its return spring.
2 To release the rubber from the footpeg, remove the bolt and collar and separate the ground plate from the bottom of the footpeg. Slide the rubber off the footpeg.
3 On 700/750 models, remove the single mounting bolt to release the bracket from the frame. The bolt also secures the gearshift lever on the left side.
4 On 1100 models, both footpeg brackets are held to the frame by the engine's lower rear mounting bolt. Remove the nut from the left bracket side and pull the bolt out from the right side; tap it free with a drift if stuck in place. Be careful to note the position of all mounting rubbers and ensure that they are returned to their original locations on installation. Tighten the bolt to the specified torque (see Chapter 2).

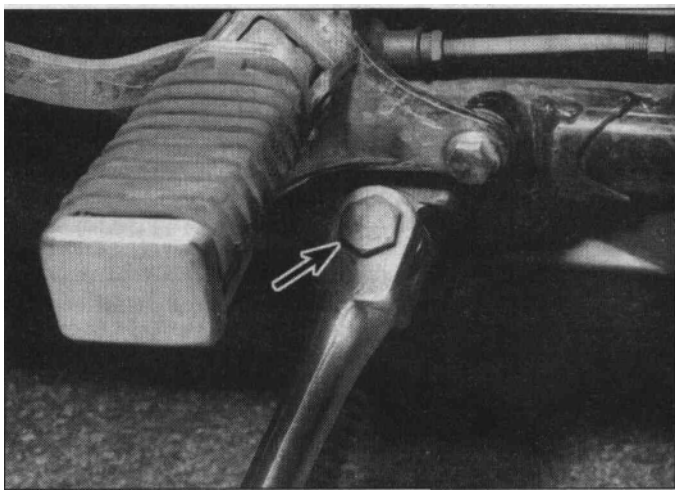
Passenger's footpegs

5 Remove the cotter pin (split pin) and washer, then slide out the pivot pin and remove the footpeg from its bracket. Slide the rubber off the footpeg.
6 If removing the right side footpeg bracket on 700/750 models, mark the relationship with the rear brake pedal to its shaft end, then remove its pinch bolt and pull the pedal off the shaft.
7 Each bracket is retained to the frame by two socket-head bolts. Support the mufflers from below and remove the bolt which retains them to the footpeg bracket. Pry out their trim caps and unscrew the socket-head bolts to release the brackets. Note that the bolts are of different length on the 110O's left bracket - the longer bolt is at the front.

Magna models

Rider's footpegs

8 Remove the cotter pin (split pin) and washer, then slide out the pivot pin and remove the footpeg from its bracket along with its return spring.
9 To release the rubber from the footpeg, remove the bolt and collar and separate the ground plate from the bottom of the footpeg. Slide the rubber off the footpeg.
10 Remove the two mounting bolts to release the bracket from the frame. On the left side remove the mounting bolt and sleeve to separate the left footpeg bracket and gearshift lever.



4.3 Side stand is retained to subframe by pivot bolt (arrow)

Passenger's footpegs

11 Remove the cotter pin (split pin) and washer, then slide out the pivot pin and remove the footpeg from its bracket. Slide the rubber off the footpeg.
12 On 1982 through 1986 models, each bracket is retained to the frame by two socket-head bolts. Support the mufflers from below and remove the bolt which retains them to the footpeg bracket. Pry out their trim caps and unscrew the socket-head bolts to release the brackets.

4 Side and center stands - removal and installation

Center stand

Refer to illustration 4.1

1 The center stand (fitted to models through 1986) is attached to the frame by a pivot shaft. Periodically, remove the cotter pin (split pin), loosen both pinch bolts and slide out the pivot shaft. Inspect the shaft for signs of wear and replace if necessary **(see illustration).** Apply a smear of grease to the shaft and fit it the motorcycle. Secure it with a new cotter pin (split pin). Tighten the pinch bolt nuts securely to clamp the shaft in position.
2 Make sure the return spring is in good condition. A broken or weak spring is an obvious safety hazard.

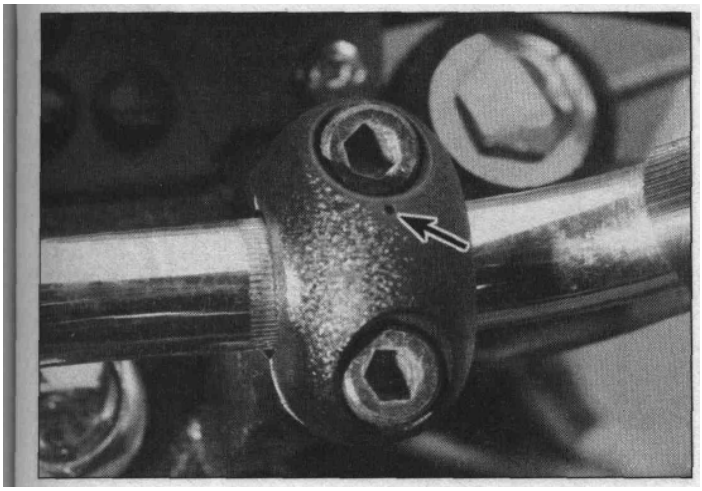
Sidestand

Refer to illustration 4.3

3 The sidestand is mounted on the subframe **(see illustration).** An extension spring anchored to the subframe ensures that the stand is held in the retracted position.
4 Make sure the pivot bolt is tight and the extension spring is in good condition and not over-stretched. An accident is almost certain to occur if the stand extends while the machine is in motion. Periodically check for wear of the stand rubber (see Chapter 1).

5 Handlebars - removal and installation

1 Look closely at how the cables and wiring harnesses are routed before removing the bars. It may be helpful to draw a simple diagram or take an instant photo to use as reference when reinstalling the controls.
2 Remove both rear view mirrors, then disconnect or cut any plastic ties that secure the wiring harnesses or cables to the bars.



5.34 Position handlebar clamps so that punch mark (arrow) is next to upper bolt on later Magnas

1982 and 1983 750 Sabre models

Right handlebar removal

3 Disconnect the wire from the front brake light switch.
4 Remove the screws from the right handlebar switch assembly and separate the upper and lower sections. Disconnect the throttle cables from the throttle grip; back off the adjuster or free them at the carburetors first to create enough cable slack.
5 Remove the two brake master cylinder mounting bolts and lift it off. Tie the assembly out of the way so that the master cylinder is not tipped or hanging upside down.
6 The right handlebar can now be removed by first loosening the handlebar pinch bolt and removing the snap-ring from the fork tube. Once it is disconnected from the fork leg, the throttle grip and right switch assembly can be slid off its end.

Right handlebar installation

7 Spread a light coat of grease over the handlebar end for the throttle to slide on. Slide the throttle grip and switch assembly onto the bars.
8 Install the right handlebar over the fork tube and position it correctly. Install the snap-ring and then tighten the pinch bolt to the specified torque.
9 Install the front brake master cylinder, noting the UP marking on its clamp. Fully tighten the upper bolt first, then the lower.
10 Connect the throttle cables to the throttle grip, then join the switch halves and tighten the screws securely; tighten those at the front first.
11 Reconnect the front brake switch wires and secure all wiring and hoses with new ties. Install the rear view mirror.
12 Check the throttle cable freeplay if the cables were disturbed (see Chapter 1).

Left handlebar removal

13 Disconnect the wires from the clutch switch.
14 Remove its screws and separate the two halves of the left handlebar switch. On later models, leave the choke cable outer connected to the switch lower half, but disconnect the inner cable from the choke lever.
15 Remove the two clutch master cylinder mounting bolts and lift off the master cylinder, noting that the master cylinder clamp will remain attached to the choke cable on early models. Tie the assembly out of the way so that the master cylinder is not tipped or hanging upside down.
16 On early models, there is no need to disconnect the choke cable outer from the clutch master cylinder clamp, just disconnect the inner cable from choke lever.
17 The left handlebar can now be removed by first loosening the handlebar pinch bolt and removing the snap-ring from the fork tube.
18 If replacing the left handlebar, the grip can be removed, if desired, by squirting some contact cleaner underneath it and then twisting it off. If stuck in place, cut it off with a sharp knife.

Left handlebar installation

19 If the left handlebar grip was removed, degrease the bar end with solvent and apply an adhesive to the bar end and inside of the new grip. Install the new grip and rotate it on the bar to distribute the adhesive. Allow time for the adhesive to set.
20 Install the left handlebar over the fork tube and position it correctly. Install the snap-ring and then tighten the pinch bolt to the specified torque.
21 Install the choke lever and reconnect the choke cable.
22 Install the clutch master cylinder, noting the UP marking on its clamp. Fully tighten the upper bolt first, then the lower.
23 Install the switch halves and tighten the screws securely; tighten those at the front first.
24 Reconnect the clutch switch wires and secure all wiring and hoses with new ties. Install the rear view mirror.
25 Check the choke cable freeplay if the cable setting was disturbed (see Chapter 4).

All Magna models and 1984-on Sabre models

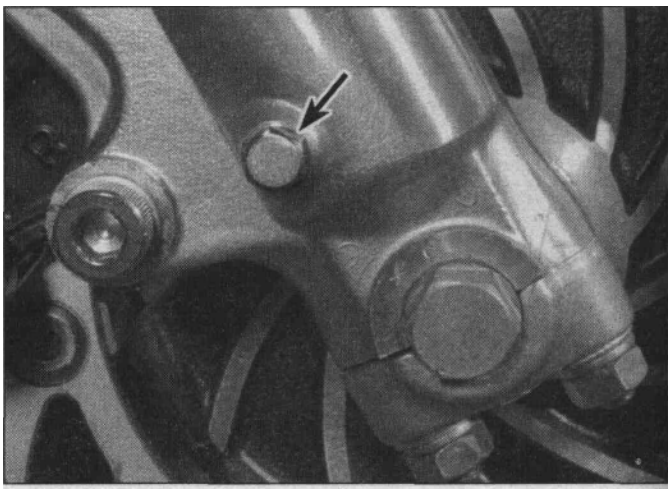
Removal

26 Disconnect the wires from the front brake light and clutch switches.
27 Remove the screws from the right and left handlebar switches and separate their halves. Disconnect the throttle cables from the throttle grip; back off the cable adjuster or disconnect them from the carburetors first to create enough cable slack. On later models, leave the choke cable outer connected to the switch lower half, but disconnect the inner cable from the choke lever.
28 Remove the two brake master cylinder mounting bolts and lift it off. Tie the assembly out of the way so that the master cylinder is not tipped or hanging upside down. Remove the clutch master cylinder in the same way.
29 On early models, there is no need to disconnect the choke cable outer from the clutch master cylinder clamp, just disconnect the inner cable from choke lever.
30 On 1983 1100 Magna models it is possible to detach each handlebar from the center section. To do so, remove the set screw from the rear of the handlebar and loosen the pinch bolt on the clamp. Pull the handlebar out of the center section clamp.
31 Unclip the plastic cover over the handlebar center section (where fitted). Remove the bolts securing the handlebar holders and lift them off. The handlebars can now be lifted off and the throttle grip slid off of the right end.
32 If the bars are to be replaced with new ones, the left grip can be removed, if desired, by squirting some contact cleaner underneath it and then twisting it off. If firmly stuck in place, cut it off using a sharp knife.

Installation

Refer to illustration 5.34

33 If the left handlebar grip was removed, degrease the bar end with solvent and apply an adhesive to the bar end and inside of the new grip. Install the new grip and rotate it on the bar to distribute the adhesive. Allow time for the adhesive to set.
34 Place the bars in position in the lower holders so that the punch mark on the bars is aligned with the upper surface of the lower holder. Install the upper holders, noting that later models will have punch marks near one of the bolt holes; position the clamps so that the punch marks are in the top/forward bolt hole locations **(see illustration).**
35 Install the bolts and tighten them to the specified torque. The top/forward bolts should be tightened first, followed by the lower/rear bolts. Clip the plastic cover over the handlebar center section (where fitted) and insert the caps over the bolts (where fitted).



6.2 Remove fork bolt caps to reveal air valves on 700/750 models

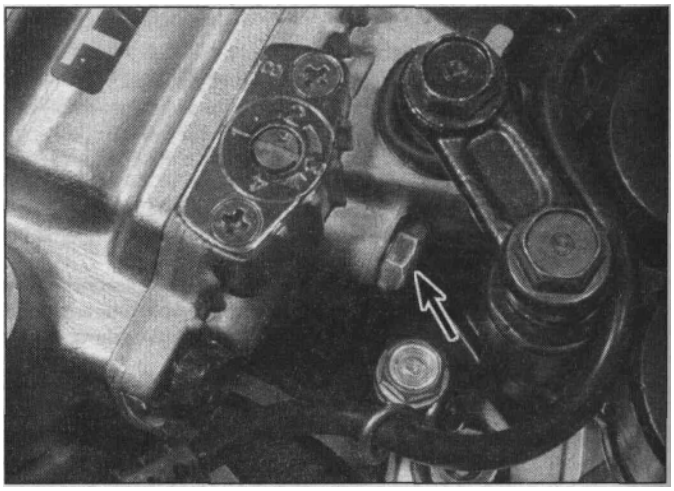
6.3a Fork oil drain plug is on side of slider ...

36 If the handlebars were detached from the center section on 1983 1100 Magna models, install them fully into the clamps and align the punch mark on each handlebar with the joint of the clamp. Install the set screw and tighten it securely. Apply a smear of grease to the clamp bolt and tighten it to the specified torque.
37 Install the choke lever and reconnect the choke cable.
38 Install the clutch and brake master cylinders, noting the UP marking on their clamps. The joint of the clamps should align with the punch mark on the handlebar to ensure that the reservoirs are positioned upright. Fully tighten the upper bolt first, then the lower, both to the specified torque.
39 Reconnect the throttle cables to the throttle grip, then join both switch halves, inserting the switch peg into the hole in the handlebar. Tighten the screws securely; tighten those at the front first.
40 Reconnect the clutch switch wires and front brake switch wires and secure all wiring and hoses with new ties. Install the rear view mirrors.
41 Check the choke cable freeplay (see Chapter 4) and throttle cable freeplay (see Chapter 1) if their settings were disturbed.

6 Forks - oil change

Refer to illustrations 6.2, 6.3a and 6.3b

1 Fork oil will degrade in time and although not specified as a maintenance item, it should be changed periodically to preserve its qualities.
2 On 1982 through 1986 models, with air-assisted forks, remove the valve cap(s) and depress the valve stem to release all air pressure **(see illustration).**
3 Have a jug ready to catch the fork oil as it escapes and place a piece of thick card against both sides of the tire for protection against oil spills. Dealing with one fork at a time, remove the drain plug and its sealing washer and catch the oil as it drains from the fork. The drain



plugs are situated in the outer face of each slider; the left fork plug on models with anti-dive is actually on the anti-dive housing **(see illustrations). Note:** *Remove the fork top bolts to assist oil flow and pump the fork gently up and down to expel as much oil as possible.*
4 Check the drain plug sealing washer and replace it if damaged.
5 Pour the specified amount of ATF into the fork tube (see Specifications), noting that the amount differs for right and left forks on models with anti-dive. Pump the forks up and down gently to distribute the oil.
6 On 1100 Sabre models a figure is given for fork oil level from the top of the fork tube. To check, remove the fork spring and pass a length of welding rod or straight rule down through the inner tube to measure the oil level. Add or remove oil until the level is correct.

6.3b ... except for anti-dive on left fork, where it is on anti-dive housing (arrow)

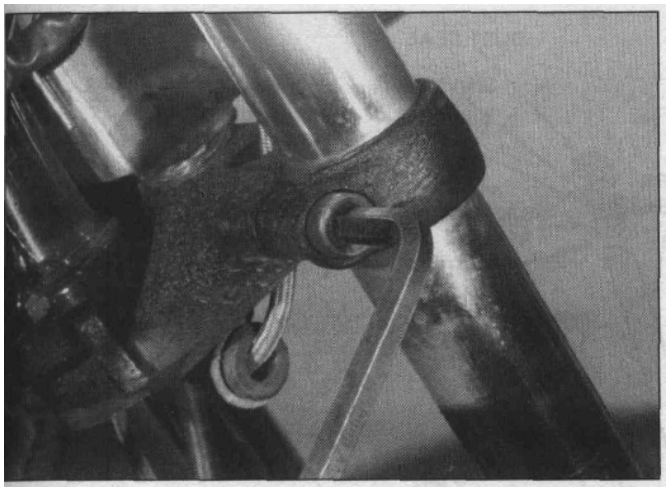
the spring with its closely-wound coils at the bottom.
7 On all models install the fork top bolts and tighten them to the specified torque. Refer to Section 8 when installing the 1100 Sabre's right side fork top bolt.
8 Set the air pressure on models with air-assisted forks (see Section 14).

7 Forks - removal and installation

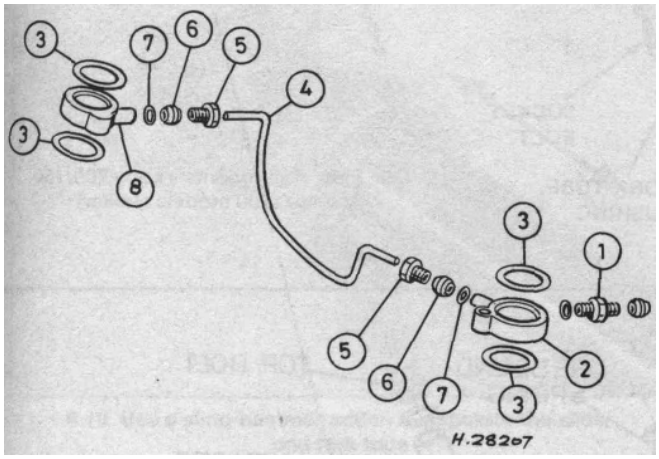
Removal

Refer to illustrations 7.8, 7.10a and 7. 10b

1 Remove the front wheel (see Chapter 7)
2 Detach both brake calipers and their mounting brackets from the forks and tie them out of the way so that there is no strain on their hydraulic hoses (see Chapter 7). **Note:** *Do not operate the brake lever while the calipers are removed. It is a good idea to slip a block of wood between the brake pads in each caliper to prevent movement in the event that the lever is operated.*
3 On 1100 models, remove the air valve cap at the top of the left fork (Sabres) or left fork air joint (Magnas) and depress the valve stem to expel air pressure from the forks.
4 Remove the front fender/mudguard (see Section 19).



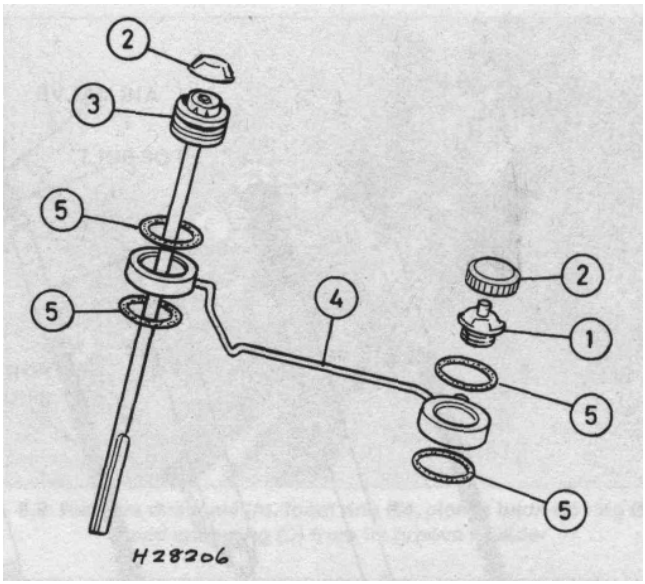
7.8 Loosen fork pinch bolts on upper and lower triple clamps to release forks



7.1 Ob Air link pipe and joints (1100 Magna models)

1	Air valve	5	Pipe unions
2	Left air joint	6	Seals
3	O-rings	7	O-rings
4	Air link pipe	8	Right air joint

5 On 1982 through 1986 models, pry out their trim caps and remove the four bolts from the fork brace, then lift the brace free.
6 Remove the bolts that attach the brake hose joint to the lower triple clamp on 700/750 Sabre models and secure it out of the way.
7 On 750 Sabre models, remove the pinch bolts from the handlebar clamps and the snap-rings from the fork tubes, then slide each handlebar off its fork tube. Place a pad over the fuel tank and tie or tape the handlebars together over the tank so that the brake and clutch master cylinders are kept as horizontal as possible to avoid leakage.
8 Loosen the upper and lower triple clamp pinch bolts and withdraw the fork tubes by pulling them down **(see illustration).** On 1987 and 1988 700/750 Magna models the front turn signal clamp pinch bolts should be loosened to allow the forks to slide through them. On 1100 models, the air joint stop ring will have to be carefully pried out of its groove in the fork tube and slid off the fork tube end before it can pass through the lower triple clamp. 9 If the forks are seized in the triple clamps, spray the area with penetrating oil and allow time for it to soak in before trying again. **Note:** *If the forks are to be disassembled, loosen their top bolts while they are*



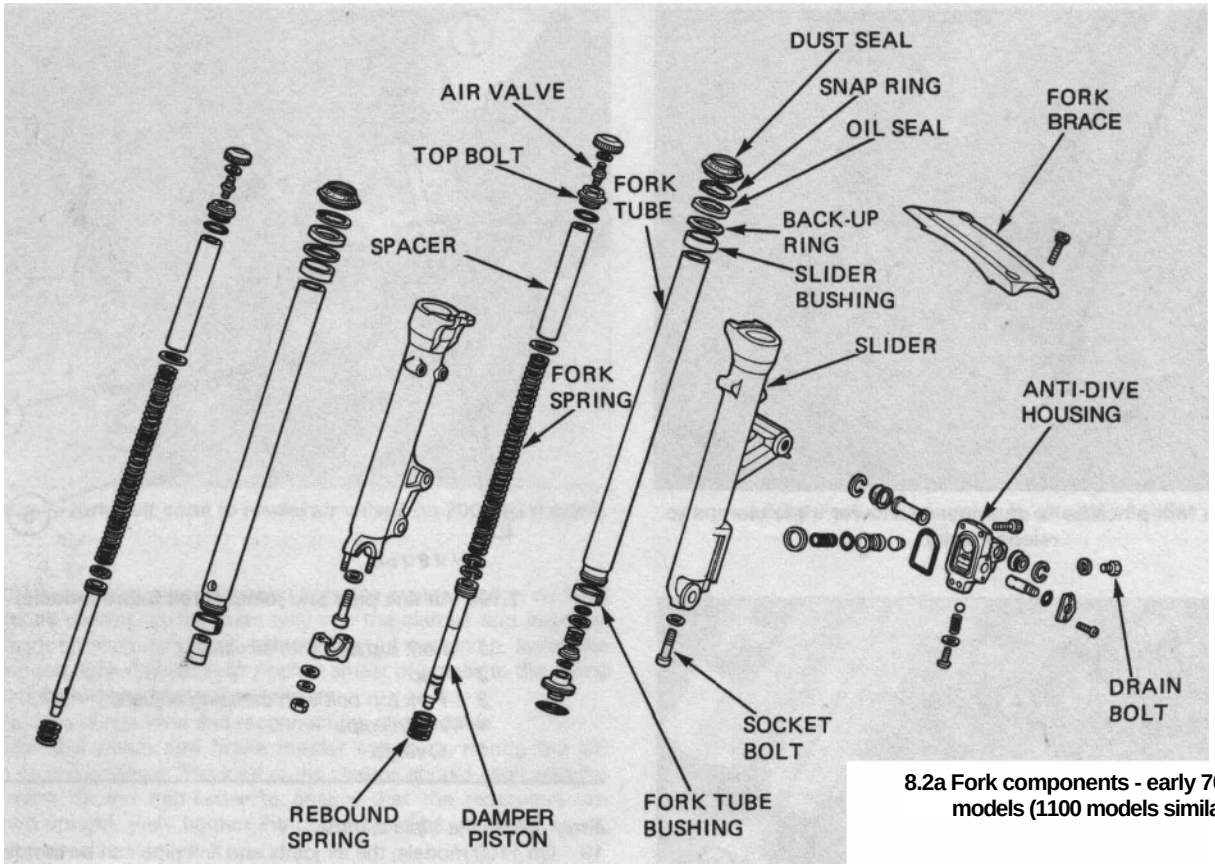
7.10a Air link pipe and joints (1100 Sabre models)

1 Fork top bolt with air valve
2 Cap
3 Fork top bolt with damping adjuster
4 Air link pipe
5 O-rings

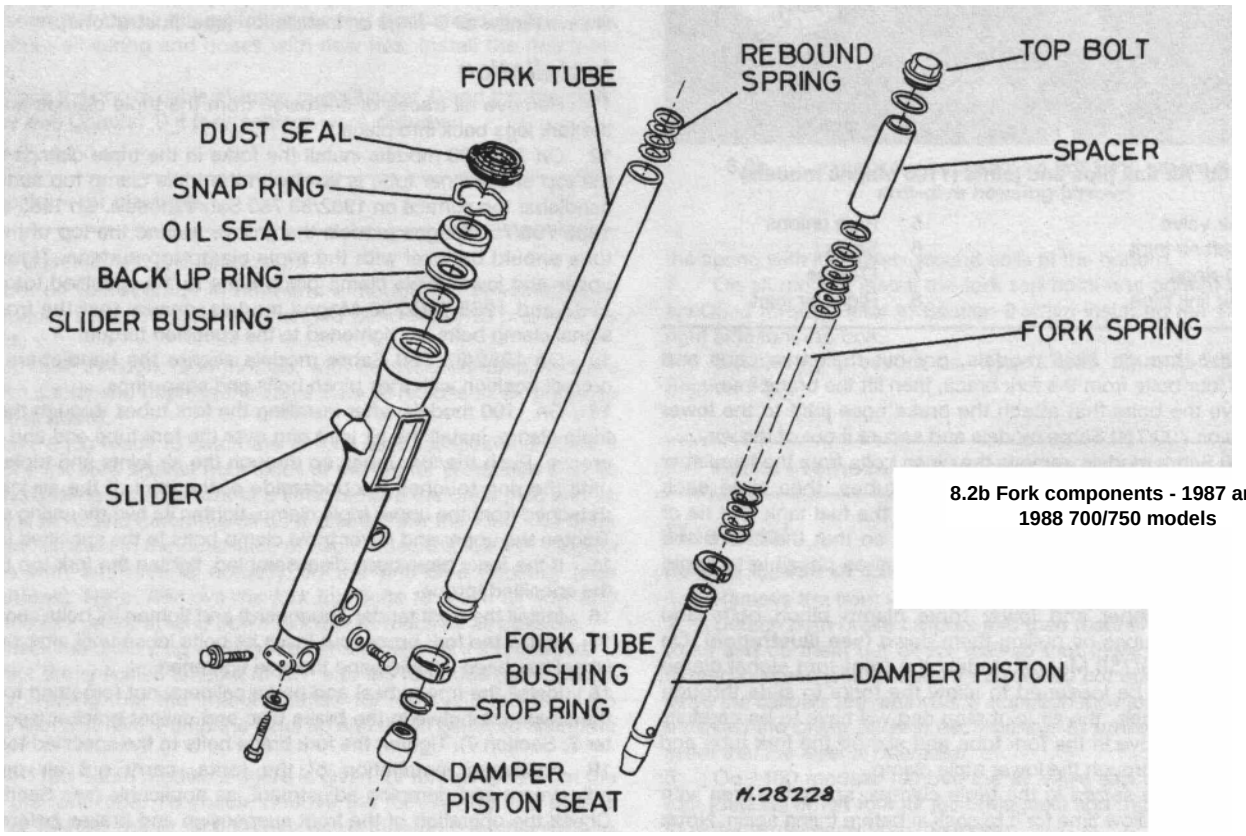
firmly held in the triple clamps.
10 On 1100 models, the air joints and link pipe can be removed from the motorcycle after removal of the handlebars on Sabre models, or after removal of the headlight unit and instruments on Magna models. It is retained to the upper triple clamp by two screws. If dismantled, always renew all O-rings on installation **(see illustrations).**

Installation

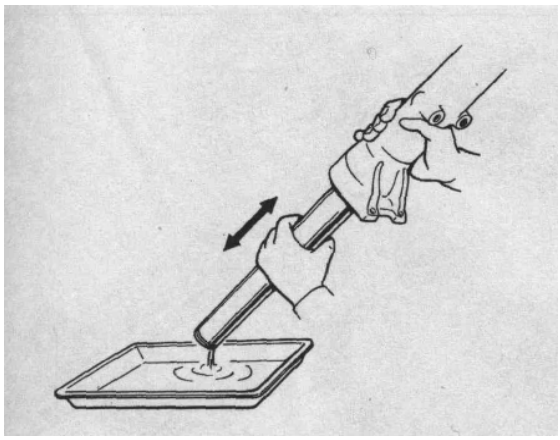
11 Remove all traces of corrosion from the triple clamps and slide the fork legs back into place.
12 On 700/750 models install the forks in the triple clamps so that the top of the inner tube is level with the triple clamp top surface, or handlebar top surface on 1982/83 750 Sabre models. On 1985 through 1988 700/750 Magna models the groove around the top of the inner tube should be level with the triple clamp top surface. Tighten the upper and lower triple clamp pinch bolts to the specified torque. On 1987 and 1988 700/750 Magna models, ensure that the front turn signal clamp bolts are tightened to the specified torque.
13 On 1982/83 750 Sabre models secure the handlebars in the correct position with their pinch bolts and snap-rings.
14 On 1100 models, after installing the fork tubes through the lower triple clamp, install the air joint ring over the fork tube end and into its groove. Push the fork tubes up through the air joints and triple clamp until the ring touches the underside of the joint. If the air joint was detached from the upper triple clamp, tighten its two mounting screws. Tighten the upper and lower triple clamp bolts to the specified torque.
15 If the forks have been disassembled, tighten the fork top bolts to the specified torque.
16 Install the front fender (mudguard) and tighten its bolts securely.
17 Install the fork brace, but leave its bolts loose until after the front wheel has been installed and the axle tightened.
18 Install the front wheel and brake calipers, not forgetting to check the clearance between the brake disc and caliper bracket (see Chapter 7, Section 7). Tighten the fork brace bolts to the specified torque.
19 Following installation of the forks, carry out air pressure adjustment and damping adjustment, as applicable (see Section 14). Check the operation of the front suspension and brakes before riding the motorcycle.

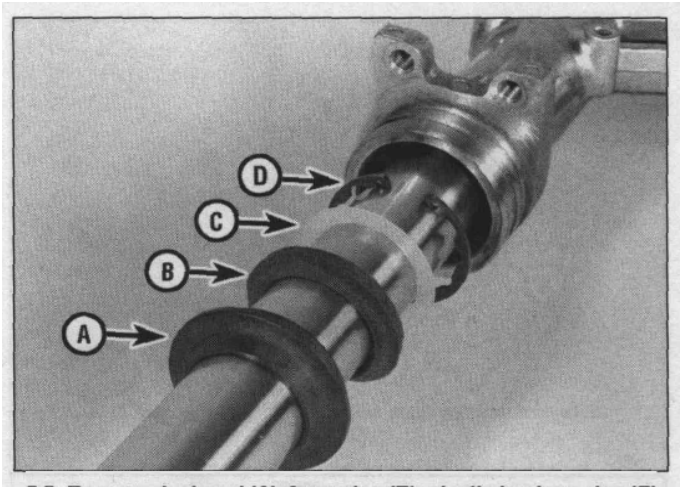


8.2a Fork components - early 700/750 models (1100 models similar)

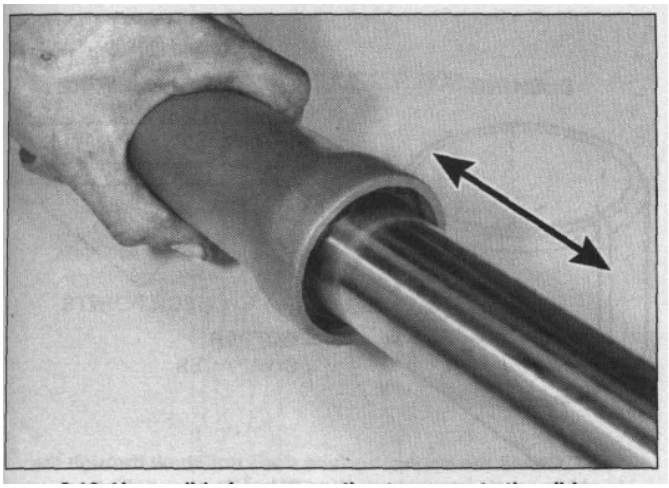


8.2b Fork components - 1987 and 1988 700/750 models



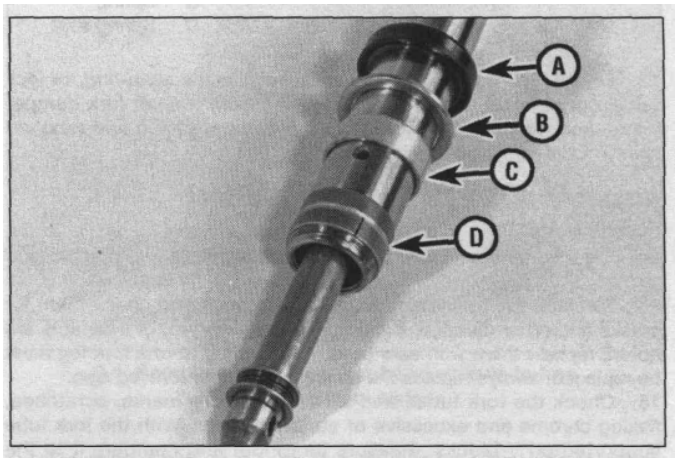


8.6 Use a pumping action to expel as much fork oil as possible



8.10 Use a slide-hammer action to separate the slider and fork tube

8.9 Remove dust seal (A), foam ring (B), plastic back-up ring (C) and snap-ring (D) from its groove in slider



8.12 Oil seal (A), back-up ring (B) and slider bushing (C) can be slid off the fork tube; don't remove fork tube bushing (D) unless worn

8 Forks - disassembly, inspection and reassembly

Disassembly

Refer to illustrations 8,2a, 8.2b, 8.6, 8.9, 8.10, 8.12 and 8.13

1 Remove the forks from the triple clamps (see Section 7).

2 Always dismantle the fork legs separately to avoid interchanging parts and thus causing an accelerated rate of wear. Store all components in separate, clearly marked containers **(see illustrations).**

3 Pry the plastic cap off the fork top bolt (if equipped). On 1982 through 1986 700/750 models, relieve the air pressure in the fork (if equipped) by depressing the valve stem. The air pressure will have been released when the forks were removed from the triple clamps on 1100 models.

4 Remove the fork top bolt; if it's tight, install the fork back into the triple clamps and tighten the triple clamp bolts to hold the inner tube while the top bolt is loosened. **Warning:** Note *that there is considerable spring pressure on the cap. While it is being unscrewed, sufficient pressure should be applied to keep it from popping out.* The top bolt O-ring should be replaced with a new one whenever the top bolt is removed. **Caution:** Do *not separate the damper adjustment rod from the fork top bolt on 1100 Sabre models.*

5 Pull out the spacer and spring seat, then withdraw the spring and make a note of which way up its closer-wound coils are installed.

6 Once the spring has been removed, the fork oil can be drained. Invert the tube to drain most of the oil, then grasp the fork slider and use a pumping action to force out the remainder of the oil **(see illustration).**

7 Support the slider in a vise using a thick towel or piece of wood to protect it, then remove the socket head bolt from the bottom of the slider. If you find that the damper piston rotates inside the inner tube and consequently the socket bolt cannot be loosened, temporarily reinstall the spring, spacer and fork cap. Have an assistant compress the fork while the socket bolt is loosened; this should hold the damper piston in position.

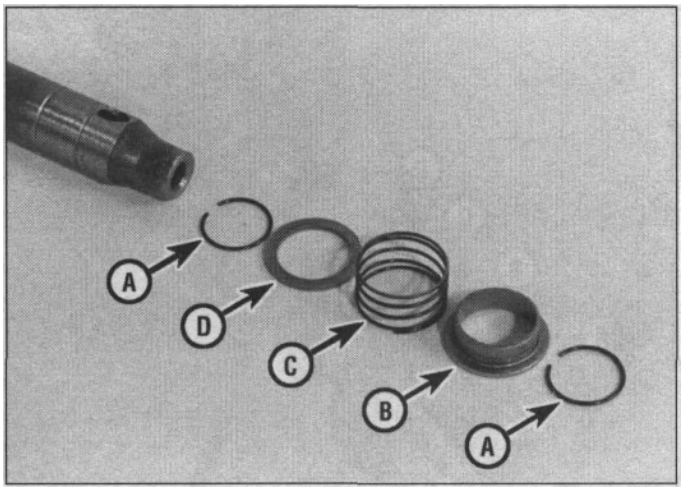
8 Invert the fork and let the damper piston and rebound spring slide out of the fork tube. On all 1982 through 1986 models, the left fork damper piston cannot be removed until the inner tube and slider have been separated.

9 Remove the dust seal from the area where the fork tube enters the slider, then remove the foam ring and plastic back-up ring (where fitted). Use a small flat-bladed screwdriver to ease the snap-ring out of its groove and remove it **(see illustration).**

10 Holding the slider with one hand and the fork tube with the other, withdraw the tube to full extension and move it in and out in a slide-hammer action **(see illustration).** This action will tap the slider bushing from the slider and allow the inner tube and slider to be separated.

11 The damper piston seat can be removed from the slider at this stage.

12 Slide the oil seal, back-up ring and slider bushing off of the fork tube **(see illustration).**



8.13 Oil lock valve components

A Snap-rings
B Valve
C Spring
D Spring seat

13 On all 1982 through 1986 models, remove the snap-ring, oil lock valve, spring, seat and second snap-ring from the left fork damper piston end **(see illustration).** Slide the damper piston and rebound spring out of the top of the inner tube.

Inspection

Refer to illustration 8.16 and 8.17

14 Clean all components with solvent and dry them with compressed air.

15 Measure the free length of the fork springs and check them for cracks and other damage. If the springs are sagged, or if defects are noted, replace them with new ones. If the spring in one fork leg must be replaced, always replace the spring in the other fork leg also.

16 Check the fork tubes and sliders for score marks, scratches, flaking chrome and excessive or abnormal wear. With the fork tube supported on V-blocks, measure its runout and compare it to the Specifications **(see illustration).** When using a dial indicator and V-blocks to measure runout, divide the indicator reading by half. If the tube is bent, do not try to straighten it. It must be replaced.

17 Visually inspect the slider and fork tube bushings for score marks and scratches. If the Teflon coating is worn so that the copper is visible over more than 3/4 of the bushing surface area, replace them with new ones **(see illustration).** If it's necessary to replace the fork tube lower bushing, pry it apart at the slit and slide it off. Make sure the new one seats properly.

18 Check the back-up ring for cracks and distortion **(see illustration 8.17).**

19 Inspect the damper piston rings; if they show signs of wear replace them. Pry them apart gently at the split in the ring to free them from their groove.

20 Refer to Section 9 for information on the anti-dive unit fitted to 1982 through 1986 models.

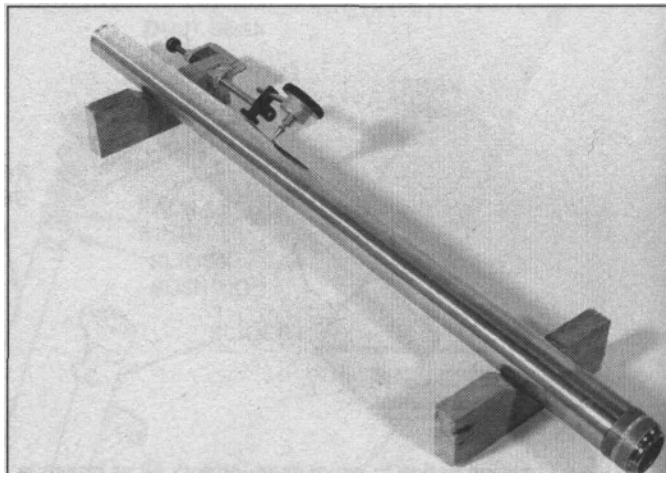
Reassembly

Refer to illustrations 8.25, 8.26 and 8.31

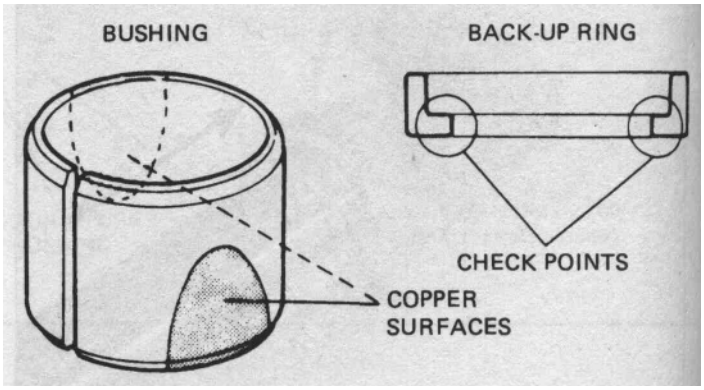
21 With the rebound spring in place on the damper piston, slide it down the fork tube so that its lower part protrudes from the bottom of the tube.

22 On the left fork of 1982 through 1986 models, install the snap-ring, spring seat, valve spring, oil lock valve and snap-ring on the lower part of the damper piston **(see illustration 8.13);** the snap-rings must engage the damper piston grooves.

23 Place the damper piston seat on the end of the damper piston and then slide the entire fork tube assembly into the slider. On 1987 and 1988 700/750 Magna models make sure the stop ring is in place in the



8.16 Fork tube runout check



8.17 Check the copper surface does not show through the bushing coating over more than 3/4 of its area (left); back-up ring check points (right)

damper piston groove before installing the seat. On 1100 Sabre models, the damper piston seat has a flat on its inside which must correspond with the flat on the end of the damper piston, and the cutout on its outer edge must align with the oil drain bolt in the side of the slider.

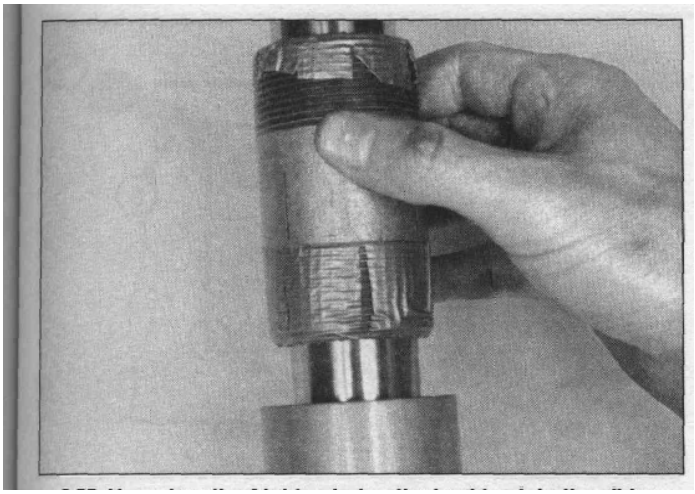
24 Mount the slider in the vise. Apply thread locking compound to the threads of the socket head bolt, install the bolt using a new sealing washer and tighten it to the specified torque. Again, if there is difficulty in tightening the bolt, temporarily insert the fork spring, spacer and fork cap to place pressure on the damper piston head and stop it rotating.

25 Place the slider bushing over the fork tube and rest it on the slider. To fit the bushing into its recess it will be necessary to use the Honda service tool or devise an alternative tubular drift. The best method is to use a length of tubing slightly larger in diameter than the fork tube. Place a large plain washer against the bushing and then tap it home using the tube as a form of slide hammer **(see illustration).** Take care not to scratch the tube during this operation; it is best to make sure that the fork tube is pushed fully into the slider so that any accidental scoring is confined to the area above the seal.

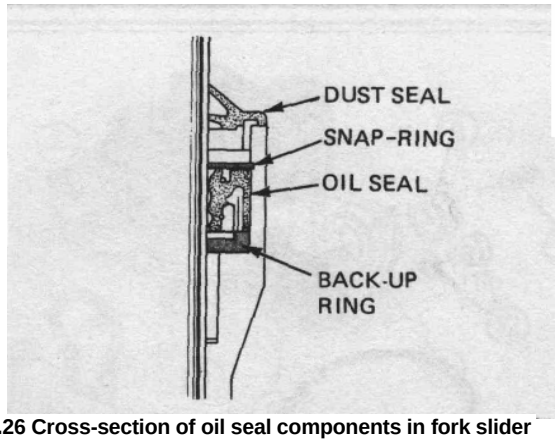
26 Install the back-up ring. Dip the new seal in automatic transmission fluid (ATF), then slip it over the fork tube (with the marks up) and drive it into position using the same method as for the slider bushing until the snap-ring groove is visible above the seal **(see illustration).**

27 Install the snap-ring with its radiused edge facing down. Be sure it is properly seated in its groove. **Note:** *Where plastic and foam rings were found under the dust seal on disassembly, these need not be reinstalled on 1100 models.* Press the dust seal into position in the top of the slider.

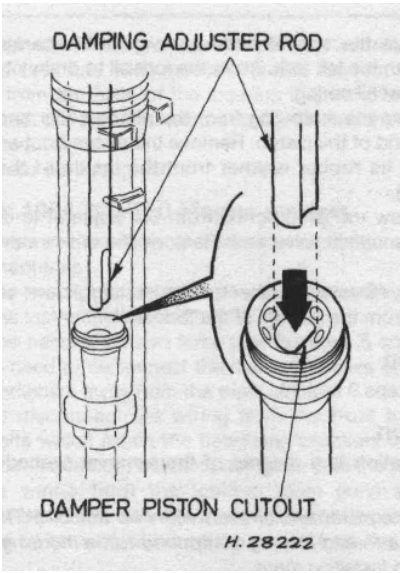
28 Mount the fork in the vise with the open end up and pour the



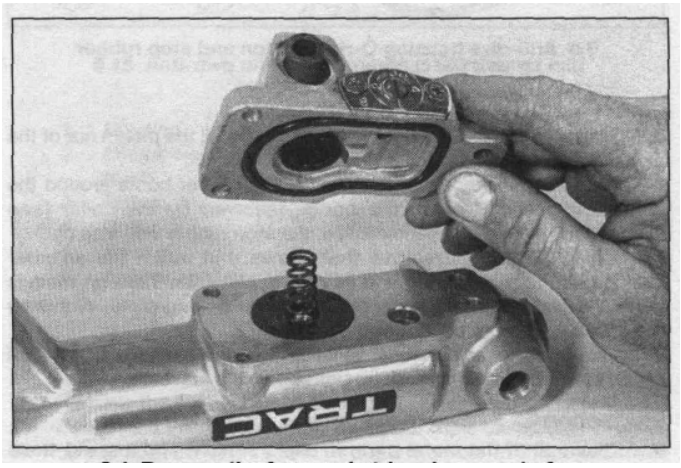
8.25 Use a length of tubing to tap the bushing into the slider



8.26 Cross-section of oil seal components in fork slider



8.31 Installing the damping adjuster rod on 1100 Sabres



9.4 Remove the four socket-head screws to free housing from slider

specified amount of ATF into the fork tube (see Specifications), noting that the amount differs for right and left forks on models with anti-dive.

29 On 1100 Sabre models a figure is given for fork oil level from the top of the fork tube. To check, hold the fork vertical and pass a length of welding rod or straight rule down through the inner tube to measure the oil level. Add or remove oil until the level is correct.

30 Install the fork spring in the same direction as noted on disassembly (on 1985 through 1988 700/750 Magna models its tapered end should face downwards, on 1100 Sabres the closely-wound coils should be at the bottom, on 700/750 Sabres, 1982 through 1984 700/750 Magnas and all 1100 Magnas the closely-would coils should be at the top). Install the spring seat and spacer into the fork tube.

31 Extend the fork fully and install the fork top bolt with a new O-ring. Use the bolt to compress the spring enough to start the bolt into its threads. On 1100 Sabre models, the shaped damping adjuster rod end must engage correctly with the cutout in the damper piston **(see illustration).**

32 Tighten the fork top bolt securely, leaving tightening to the specified torque until it is firmly clamped in the triple clamps.

33 Install the forks in the triple clamps (see Section 7). When fitting the plastic cap over the right fork top bolt on 1100 Sabre models, the cutouts on the inside of the cap must engage the tabs on the damping adjuster. When set in the No. 1 damping position, the lug on the fork cap bolt, punch mark on the damping adjuster and No. 1 on the cap should all be in alignment.

34 After installation pump the forks up and down to distribute the oil, check the anti-dive and damping adjuster settings and pressurize the forks with air (where applicable).

9 Anti-dive (TRAC) - removal and installation

1 The left fork on 1982 through 1986 models incorporates *a* Torque Reactive Anti-dive Control (TRAC) unit, which is designed to lessen front fork compression during braking.

2 If the forks are compressing excessively during braking, despite adjustments to the anti-dive device, or if fork oil is leaking from around the housing, the anti-dive assembly should be removed and serviced.

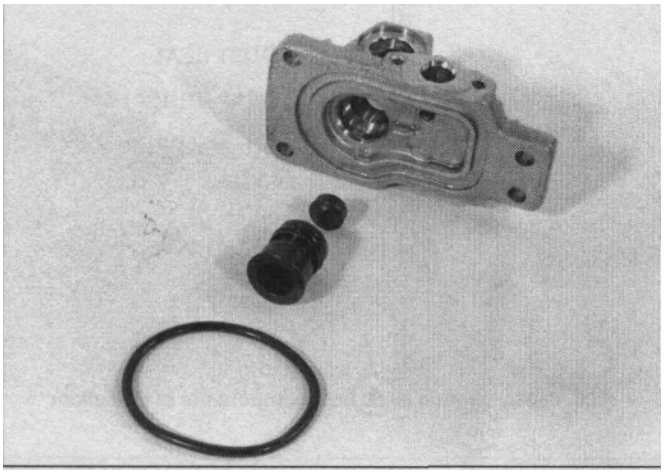
700/750 Sabres, 1100 Magnas and 1982 through 1984 700/750 Magnas

Refer to illustrations 9.4, 9.5, 9.6 and 9.12

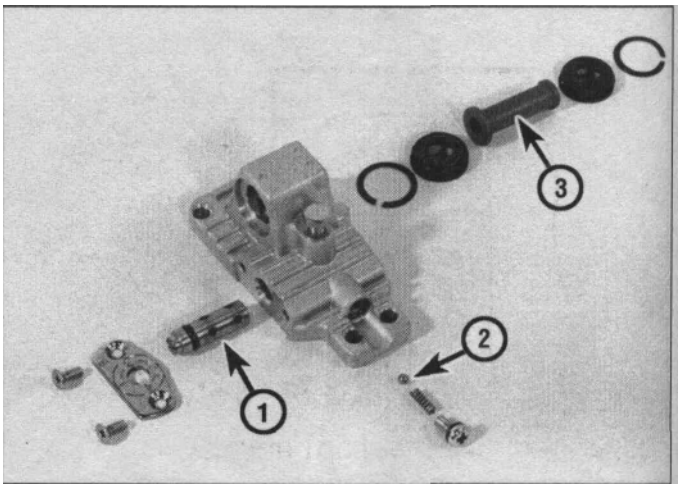
Removal

3 If the forks are on the motorcycle, first remove the left brake caliper and its bracket (see Chapter 7). For additional clearance, also disconnect the speed sensor (750 Sabres) or speedometer cable (all other models) and secure it out of the way.

4 Remove the four socket head screws and separate the anti-dive housing from the left fork **(see illustration).**



9.5 Anti-dive housing O-ring, piston and stop rubber



9.6 Anti-dive orifice valve (1), check valve (2) and pivot bolt collar (3)

5 Remove the spring and large O-ring, and pull the piston out of the housing **(see illustration).**
6 Remove the snap-rings that secure the rubber boots around the pivot bolt collar. Remove the boots, followed by the collar **(see illustration).** With the collar removed, the stop rubber will drop out.
7 On 1982 models remove the screws that retain the adjuster setting plate to the housing and lift off the plate. On 1983-on models remove the snap-ring to release the adjuster setting plate. Withdraw the orifice valve from the housing.
8 Finally, remove the check valve setting screw, valve spring and check ball from the bottom of the housing.

Inspection

9 Clean all of the metal parts in clean solvent and inspect them carefully for wear or damage. If there is deep scoring in the piston bore, replacement of the piston and housing will be necessary. Check the orifice to make sure it is not damaged or clogged. If compressed air is available, blow it out. Also use compressed air to blow out the passages in the housing.
10 The O-rings used on the piston, orifice and housing should all be replaced as a matter of course whenever they are removed.
11 Check the collar boots for hardening and damage. Replace them if necessary.

Installation

12 Installation is a reverse of the removal procedure, noting the following.

a) Coat the piston and all seals with new fork oil (ATF).
b) Apply a thread locking compound to housing screw threads prior to installing them.
c) Apply silicon grease to the pivot collar prior to inserting it into place and ensure the boots are correctly installed ***(see illustration).***
d) Following reassembly, move the collar back and forth to check the stroke of the piston; it should have 2.5 mm (0.10 in) of movement.
e) Refill the fork with the correct amount and type of new fork oil.
f) Set the anti-dive adjuster to the preferred setting (see Section 14).

1100 Sabres and 1985/86 700 Magnas

Removal

Refer to illustration 9.15

13 If the forks are on the motorcycle, first remove the left brake caliper and its bracket (see Chapter 7). For additional clearance, also disconnect the speed sensor (Sabre) or speedometer cable (Magna) and secure it out of the way.
14 Have a drain tray on hand to catch the fork oil which will emerge, then remove the socket head screws and separate the anti-dive housing from the left fork. Allow the fork oil to drain into the drain tray. Recover the coil spring.
15 Remove the snap-ring from the piston collar and slip the collar out of the end of the piston. Remove the piston boot and withdraw the piston and its rubber washer from the inside of the housing **(see illustration).**
16 Unscrew the grub screw from the adjuster knob, and pull the knob off the orifice valve end. Remove the orifice valve from the fork slider.
17 Finally, remove the check valve setting screw, valve spring and check ball from the bottom of the fork slider.

Inspection

18 See Steps 9 and 10.

Installation

19 Installation is a reverse of the removal procedure, noting the following.

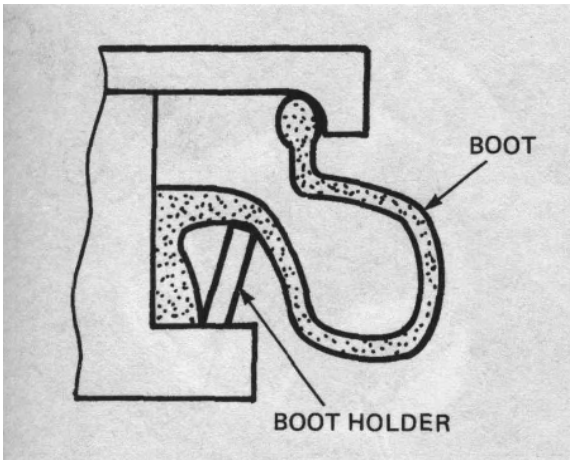
a) Coat the piston and all seals with new fork oil (ATF).
b) Apply a thread locking compound to the housing screw threads prior to installing them.
c) When the housing has been installed on the fork slider, check that the piston is able to move in and out without binding.
d) Refill the fork with the correct amount and type of new fork oil.
e) Set the anti-dive adjuster to the preferred setting (see Section 14).

10 Steering stem - removal and installation

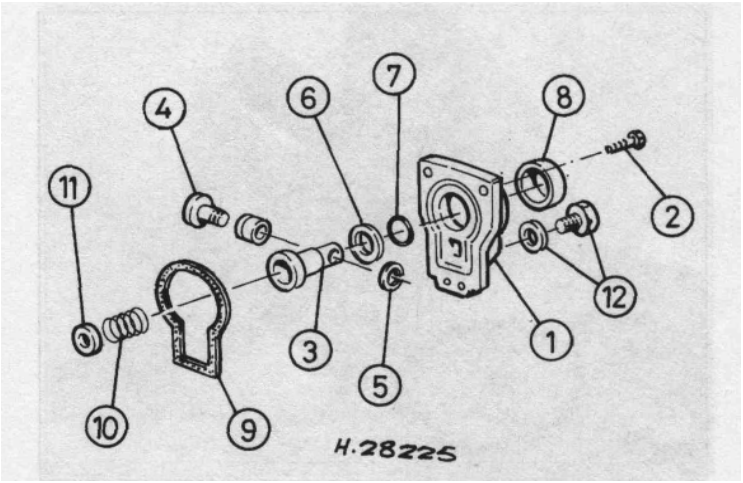
Removal

700/750 Sabre models

1 Remove the fuel tank (see Chapter 4).
2 Remove the headlight and headlight housing (see Chapter 8).
3 Remove the instruments and, on early models, the odometer panel (see Chapter 8).
4 Trace and disconnect the front turn signal wires, then remove the two bolts which retain the headlight/turn signal mount bracket to the upper triple clamp.
5 Remove the handlebars and forks (see Sections 5 and 7), noting that there is no need to disconnect the hydraulic hoses or wiring, just position the handlebars away from the triple clamp.
6 Trace the wiring from the ignition (key) switch and disconnect it at the block connector. Remove the two bolts on the underside of the switch and withdraw the switch from the upper triple clamp.
7 Disconnect all wires from the horn terminals, then remove the two



9.12 **Install pivot collar boot and boot holder (snap-ring) as shown**



9.15 Anti-dive unit components (1100 Sabres and 1985/86 700 Magnas)

bolts which retain the braking system three-way union to the lower triple clamp. On 1982 and 1983 models, remove the turn signal angle sensor screws from the base of the steering stem and withdraw the sensor; disconnect the wire connectors and withdraw the wiring from the top of the stem. 8 Refer to Steps 53 through 56.

1982 through 1984 700/750 Magna models

9 Remove the main fuel tank, or if less than half full raise it on its support (see Chapter 4).
10 Remove the headlight and headlight housing (see Chapter 8).
11 Remove the instruments (see Chapter 8).
12 Remove the handlebars and forks (see Sections 5 and 7), noting that there is no need to disconnect the hydraulic hoses or wiring, just position the handlebars away from the triple clamp.
13 Trace and disconnect the wiring from the front turn signals. Remove the bolts which retain the headlamp brackets to the upper triple clamp and remove both brackets complete with the turn signals.
14 Trace the wiring from the ignition main (key) switch and disconnect it at the block connector. Remove the two bolts on the underside of the switch and withdraw the switch from the upper triple clamp.
15 Remove the trim panel from the front of the lower triple clamp, and disconnect all wiring from the horn terminals. Remove the two nuts on the underside of the lower triple clamp and lift the braking system three-way union and horn assembly off the triple clamp.
16 Refer to Steps 53 through 56.

1985 and 1986 700 Magna models

17 Remove the fuel tank (see Chapter 4).
18 Remove the headlight and headlight housing (see Chapter 8).
19 Detach the instruments from the upper triple clamp (see Chapter 8).
20 Remove the handlebars and forks (see Sections 5 and 7), noting that there is no need to disconnect the hydraulic hoses or wiring, just position the handlebars away from the triple clamp.
21 Remove the horns and the cover between them, which houses the electrical connectors for the ignition main (key) switch, right and left handlebar switches. Disconnect the wiring connectors, then detach the Honda trim panel from the front of the lower triple clamp. Remove the two nuts from the underside of the brake hose three-way union, then detach the union and electrical connector backplate from the triple clamp.
21 Trace and disconnect the wiring from the front turn signals. Remove the bolts which retain the headlamp brackets to the upper triple clamp and remove both brackets complete with the turn signals.
22 Remove the two bolts on the underside of the ignition main (key) switch and withdraw the switch from the upper triple clamp.
23 Refer to Steps 53 through 56.

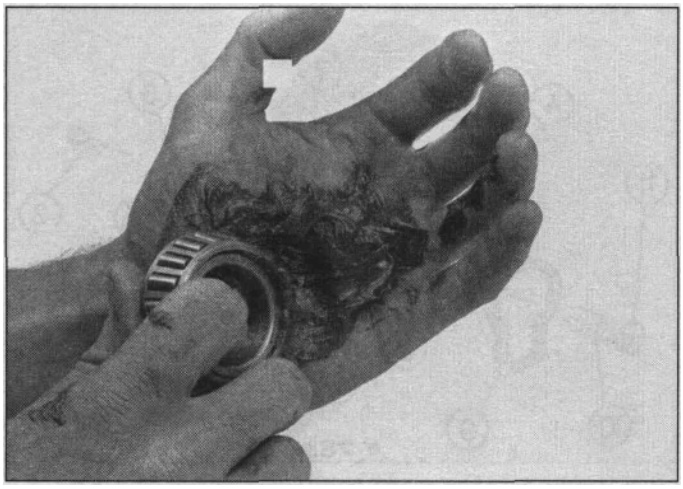
1	*Housing*	*7*	*O-ring*
2	*Socket-head screws (4 off)*	*8*	*Boot*
		9	*O-ring*
3	*Piston*	*10*	*Spring*
4	*Collar*	*11*	*Seal*
5	*Snap-ring*	*12*	*Oil drain plug and washer*
6	*Rubber washer*		

1987 and 1988 700/750 Magna models

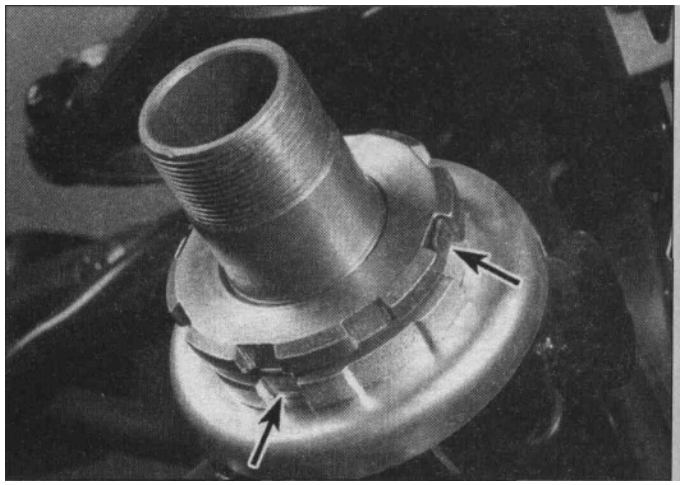
24 Remove the fuel tank (see Chapter 4).
25 Remove the headlight and headlight housing (see Chapter 8).
26 Detach the instruments from the upper triple clamp (see Chapter 8). Pull the speedometer cable through the hole in the lower triple clamp.
27 Remove the handlebars and forks (see Sections 5 and 7). Note that there is no need to disconnect the wiring or the clutch hydraulic hose; just position the handlebars away from the triple clamp. The front brake hydraulic hose passes through a hole in the lower triple clamp, and must be disconnected from the master cylinder and the hose passed through the triple clamp and released from its guide (see Chapter 7 for hose disconnection).
28 Trace and disconnect the front turn signal wires and remove the bolt which retains each light unit to the upper triple clamp.
29 Refer to Steps 53 through 56.

1100 Sabre models

30 Remove the fuel tank (see Chapter 4).
31 Remove the bolt on each side of the fusebox cover (just above the horns) and pull the cover forward. Disconnect the wiring from the horns and remove their mounting bolts to release them from the fusebox cover.
32 Remove the two screws from the front face of the fusebox, hinge the fuse mounting forward and disconnect the wiring connectors **from** the rear of the fusebox. Disconnect all wiring from the connector block frame and disconnect the connectors. Remove the two bolts which retain the connector mounting bracket and braking system three-way joint to the lower triple clamp.
33 Remove the headlight and headlight housing (see Chapter 8).
34 Detach the instruments from the upper triple clamp (see Chapter 8).
35 Remove the handlebars and forks (see Sections 5 and 7), noting that there is no need to disconnect the hydraulic hoses or wiring, just position the handlebars away from the triple clamp.
36 Remove the two screws which retain the fork air joint unions to the upper triple clamp.
37 Remove its screws and detach the turn signal system angle sensor and cancel unit from the base of the steering stem; disconnect



10.57 Work grease fully into the rollers or balls



10.61 The steering stem nut lockwasher tabs should be engaged in the slots of the locknut and adjuster nut (arrows)

the cancel unit wires and withdraw the wiring from the top of the stem.
38 Trace and disconnect the wiring from the front turn signals. Remove the bolts which retain the headlamp brackets to the upper triple clamp and remove both brackets complete with the turn signals.
39 Remove the two bolts on the underside of the ignition main (key) switch and withdraw the switch from the upper triple clamp.
40 Refer to Steps 53 through 56.

1100 Magna models

41 Remove the main fuel tank, or if less than half full raise it on its support (see Chapter 4).
42 Remove the single screw from the fusebox cover and remove the cover. Detach the wiring from the back of the horns and remove the central mounting bolt bracket to detach the horn assembly from the motorcycle.
43 Remove the wiring connector box cover, ease the connector holder frame out of position and disconnect all wiring connectors. Remove the two bolts from the back of the housing to release the housing from its mounting bracket and thread the wire connector ends out of the housing to free it.
44 Remove the headlight and headlight housing (see Chapter 8).
45 Detach the instruments from the upper triple clamp (see Chapter 8).
46 Remove the handlebars and forks (see Sections 5 and 7), noting that there is no need to disconnect the hydraulic hoses or wiring, just position the handlebars away from the triple clamp.
47 Remove the two screws which retain the fork air joint unions to the upper triple clamp.
48 Remove its screws and detach the turn signal system angle sensor from the base of the steering stem. Disconnect the wiring and withdraw it from the top of the stem. On 1985 and 1986 models, disconnect the wiring and withdraw the cancel unit.
49 Remove the nuts which retain the brake hose three-way union to the front of the lower triple clamp. Detach the union and the electrical connector box mounting bracket.
50 Trace and disconnect the wiring from the front turn signals. Remove the bolts which retain the headlamp brackets to the upper triple clamp and remove both brackets complete with the turn signals.
51 Remove the two bolts on the underside of the ignition main (key) switch and withdraw the switch from the upper triple clamp.
52 Refer to Steps 53 through 56.

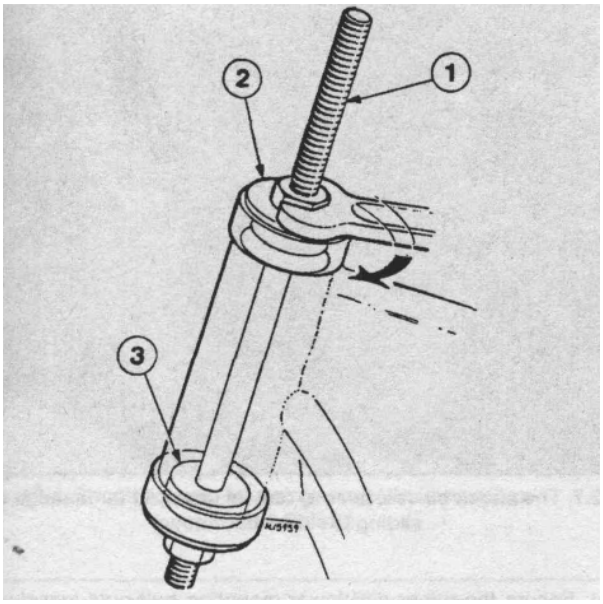
All models

53 Remove the steering stem nut and, where fitted, the plain washer. Also remove the steering stem pinch bolt on 1100 models. Lift off the upper triple clamp.
54 Two slotted nuts are used to secure the stem to the frame head. The bottom one is the adjuster nut for setting bearing preload. The top nut tightens down against a lockwasher to secure the bottom nut.
55 Knock the lockwasher tabs out of their slots in the upper nut, then remove the nut, lockwasher and lower nut. Lift the dust cover off the top of the steering stem and lift the top bearing inner race out, then lower the triple clamp and steering stem out of the frame. The top bearing assembly will remain in the frame, while the bottom bearing roller cage will come out with the stem.
56 Remove all traces of old grease from the bearings and races and check them for wear or damage as described in Section 11. The grease retainer and lower bearing race can be slid off the steering stem. Note: Do *not attempt to remove the outer races from the frame or the lower inner race from the steering stem unless they are to be replaced.*

Installation

Refer to illustrations 10.57 and 10.61

57 Pack the bearings with lithium-based grease by forcing it past the rollers. This is done by pressing the bearing against some fresh grease in the palm of the hand. In a scooping-type motion, continue to press the grease into the bearing until it comes out uniformly around the rollers and cage **(see illustration).** Coat the outer races with grease.
58 Carefully lift the steering stem into position and fit the-upper bearing and inner race. Apply grease to the underside of the dust seal and fit it to the steering stem. Install the slotted adjuster nut and tighten it to the specified torque using the Honda tool (Part No. 07716-0020400 for all 700/750 Sabre models and 1982/83 750 Magna models, or Part No. 07916-3710100 for 1984-on 700/750 Magna models and all 1100 models). Turn the steering stem lock-to-lock five times to seat the bearings. Repeat the tightening and seating sequence. **Note:** *It is important to check the feel of the steering afterwards as described below; if it is too tight re-adjust the bearings as described below.*
59 If the service tool is not available, tighten the adjuster nut hard using a conventional C-wrench to preload the bearings then adjust as follows.
60 Loosen the adjuster nut slightly until pressure is just released, then turn it slowly clockwise until resistance is just evident. The object is to set the adjuster nut so that the bearings are under a very light loading, just enough to remove any freeplay. **Caution:** *Take great* care *not to apply excessive pressure because this will cause premature failure of the bearings.*
61 Install a new tab lock washer with two opposite tabs turned down in the adjuster nut slots. Holding the adjuster nut still, hand tighten the top locknut down firmly against it, then tighten it more, but only until the washer tabs align with the slots in the locknut (no more than 90°). If the tabs don't line up, remove the top nut, turn it over and reinstall it.



11.6 Drawbolt arrangement for installing steering head bearing outer races

1 Long bolt or threaded bar
2 Thick washer
3 Guide for lower outer race

Once the tabs are lined up and the nut is tight, bend two opposite tabs up into the locknut slots **(see illustration).**

62 Place the upper triple clamp into position and install the steering stem washer (where fitted) and nut loosely. Temporarily fit the fork legs to align the triple clamps, then tighten the steering stem top nut, and pinch bolt on 1100 models, to the specified torque.

63 Installation is basically the reverse of the removal procedure with the following notes:

a) Do not tighten the steering stem nut until after the fork tubes have been inserted through both triple clamps. This will ensure that they are properly aligned.
b) Be sure to route all cables and wiring harnesses in their original positions. In particular on 1987 and 1988 700/750 Magna models, the front brake hydraulic hose and speedometer cable must pass through the holes in the lower triple clamp.
c) Refer to the appropriate Sections or Chapters for reinstallation of the various components. Refer to the appropriate wiring diagram at the end of this manual if in doubt about reconnecting any wiring.

64 Check that the steering head bearings are correctly adjusted as soon as the forks and front wheel are installed (see Chapter 1).

65 On 1987 and 1988 700/750 Magna models top up and bleed the front brake hydraulic system (see Chapter 7). On all models, check the operation of the brakes, suspension and controls before riding the machine.

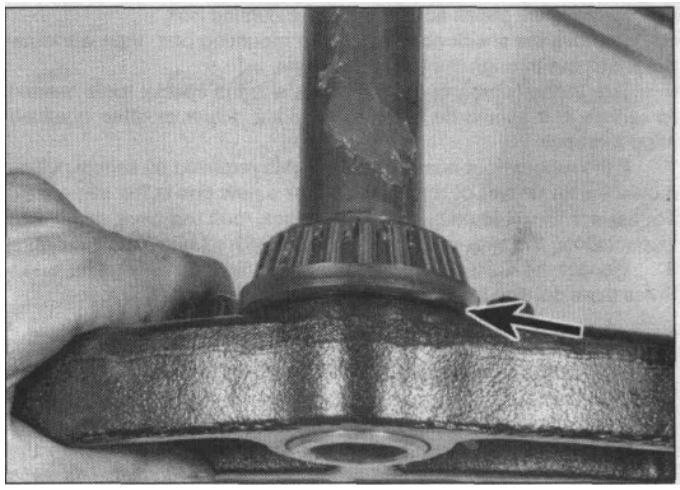
11 Steering head bearings - inspection and replacement

Inspection

1 Remove the steering stem as described in Section 10.

2 Remove all traces of old grease from the bearings and races and check them for wear or damage. The bearings will either be of the caged ball or caged tapered roller type, depending on the model.

3 The ball or roller bearing tracks of the races should be polished and free from indentations. Inspect the ball or roller bearings for signs of wear, damage or discoloration, and examine their retainer cage for signs of cracks or splits. If there are signs of wear on any of the above components both upper and lower bearing assemblies must be replaced as a set.



11.7 Work the lower bearing race and dust seal (arrow) off the stem if it needs replacing

Replacement

Refer to illustrations 11.6 and 11.7

4 The outer races are an interference fit in the steering head and can be tapped from position with a suitable drift. Tap firmly and evenly around each race to ensure that it is driven out squarely. It may prove advantageous to curve the end of the drift slightly to improve access.

5 Alternatively, the races can be removed using a slide-hammer type bearing extractor; these can often be rented from tool shops.

6 The new races can be pressed into the head using a drawbolt arrangement, or by using a large diameter tubular drift which bears only on the outer edge of the race **(see illustration).** Ensure that the drawbolt washer or drift (as applicable) bears only on the outer edge of the race and does not contact the race bearing surface.

7 To remove the lower bearing from the steering stem, use two screwdrivers placed on opposite sides of the race to work it free **(see illustration).**

8 With the lower bearing removed, lift off the dust seal. Inspect the seal for wear or damage and replace it if necessary.

9 Install the dust seal and slide on the new lower bearing. A length of tubing with an internal diameter slightly larger than the steering stem will be needed to tap the new race into position. Ensure that the drift bears only on the inner edge of the race and does not contact the bearing surface.

10 Slide the grease retainer onto the steering stem and install the steering stem as described in Section 10.

12 Rear shock absorber(s) - removal and installation

700/750 Sabre models

Removal

Refer to illustration 12.7

1 Place the motorcycle on its center stand.

2 Remove the seat and both side covers. Disconnect the battery (negative lead first). The shock absorber is removed from the top of the frame and removal of the toolbox and certain electrical components is necessary to provide access.

3 Disconnect and remove the regulator/rectifier unit, disconnect the fusebox and turn signal cancel unit wiring and pull off the coolant reservoir tank overflow/breather tube. Remove the single mounting screw from inside the toolbox, then slide the toolbox out together with the fusebox and cancel unit.

4 Remove the shock absorber lower mounting bolt.
5 Remove the shock absorber upper mounting bolt, then withdraw the shock out through the top of the frame.
6 Due to the complexity of the shock and the special tools needed to service it, it should be taken to a Honda dealer or other qualified shop for repair.
7 If the rubber boot needs replacing, it is removed by simply pulling it over the lower part of the shock. Install a new one in the same way. To inspect for oil leakage from the shock, pull the boot down and inspect along the seal, which will now be exposed **(see illustration).**
8 Inspect the bushings in the upper and lower mountings for wear. Press them out and install new ones using a drawbolt tool.

Installation

9 Installation is a reverse of the removal procedure, noting the following:

a) Apply molybdenum-disulfide grease to the bushings at both the upper and lower mounting positions. Install the collar in the top mounting bushing and fit the dust seal and washer to each side of it.
b) Secure the upper and lower mounting bolt nuts loosely, then tighten them to the specified torque when the suspension is in the normal working position.
c) Connect the negative lead last when reconnecting the battery.
d) Check the shock air pressure (see Section 14).

1100 Sabre models

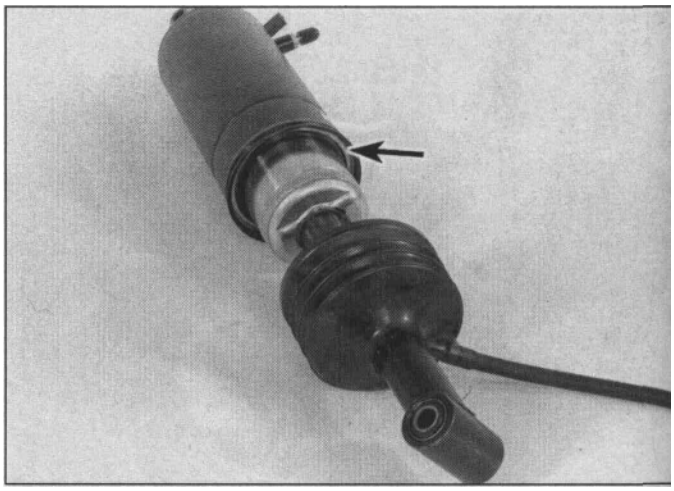
Removal

10 Place the motorcycle on its main stand.
11 Remove the seat and both side covers. Disconnect the battery (negative lead first) and remove it from its case. The shock absorber is removed from the top of the frame and removal of the toolbox and certain electrical components is necessary to provide access.
12 Disconnect the wiring from the spark units, stop and taillight sensor, regulator/rectifier unit, fuel pump and starter relay, then remove these components from the motorcycle (see the appropriate sections of Chapters 4, 5 and 8 for details). Disconnect the alternator wiring at the block connector.
13 Unlock the toolbox cover to free the shock air valve from its clamp. Remove its mounting screws and remove the toolbox/battery housing.
14 Disconnect the shock damping adjuster control knob from its frame mounting lug by loosening the nut on the rear of the knob, then disconnect the damping adjuster cable from the top of the shock; remove the cotter pin to free the cable end, then loosen the locknut to detach the cable from its bracket.
15 Remove the shock absorber lower mounting bolt.
16 Remove the shock absorber upper mounting bolt, then withdraw the shock out through the top of the frame.
17 All shock absorber components are available separately. However, disassembly requires the use of a suitable spring compressor and certain Honda special tools. It is therefore recommended that the unit be taken to a Honda dealer who will have the necessary service tools to dismantle it.
18 If the rubber boot needs replacing, release its wire retaining clip and pull it off the lower part of the shock. Install a new one in the same way. To inspect for oil leakage from the shock, pull the boot down and inspect along the seal, which will now be exposed **(see illustration 12.7).**
19 Inspect the bushings in the upper mounting for wear. Press the old bushing out and install a new one using a drawbolt tool. The lower bearing is part of the suspension linkage and can be inspected as described in the next Section.

Installation

20 Installation is a reverse of the removal procedure, noting the following: *a) Apply molybdenum-disulfide grease to the upper mounting*

bushing. Install the collar and fit the dust seal and washer to each side of it.



12.7 The shock oil seal (arrow) can be checked for leakage after sliding the dust boot down

b) Secure the upper and lower mounting bolt nuts loosely, then tighten them to the specified torque when the suspension is in the normal working position.
c) Connect the negative lead last when reconnecting the battery.
d) Check the shock air pressure and set the damping adjustment (see Section 14).

Magna models

Note: *Remove only one shock at a time so that the rear of the motorcycle does not drop. If both shock absorbers need to be removed at the same time, the rear of the machine can be kept in position by placing a block of wood between the top of the rear tire and the inside of the rear fender.*

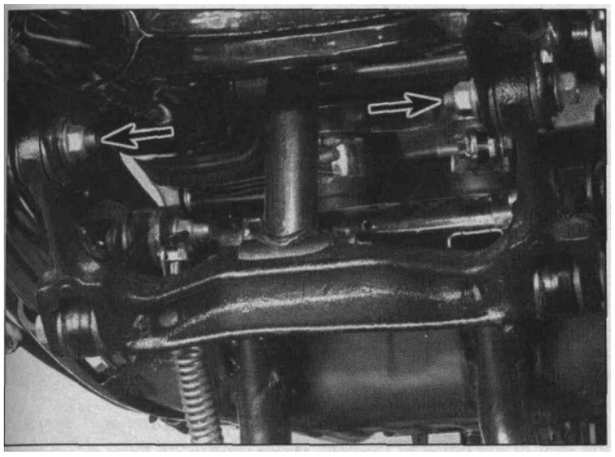
Removal

21 Place the motorcycle on its center stand. On models without a center stand, place a jack with wood block under the crankcase to raise the rear wheel off the ground; ensure that the motorcycle is securely supported.
22 Adjust shock preload to its softest position (see Section 14).
23 To gain access to the upper mounting on 1100 models, remove the seat (see Section 19) and the grab rail. If removing the left shock on 1100 models, remove the exhaust muffler (silencer) from the left side (see Chapter 4).
24 On later 700/750 models pry the cap off the upper mounting nut. On all models, remove the upper mounting nut and lower mounting nut or bolt.
25 Remove the shock absorber.
26 All shock absorber components are available separately. However, disassembly requires the use of a suitable spring compressor. It is therefore recommended that the unit be taken to a Honda dealer who will have the necessary service tools to dismantle it. A figure is given in the Specifications section of this Chapter for spring free length service limit. **Note:** *Shock absorbers should be replaced as a pair, otherwise uneven handling will result.*
27 Inspect the bushings in the mounting eyes for wear. Press the old bushings out and install new ones using a drawbolt tool.

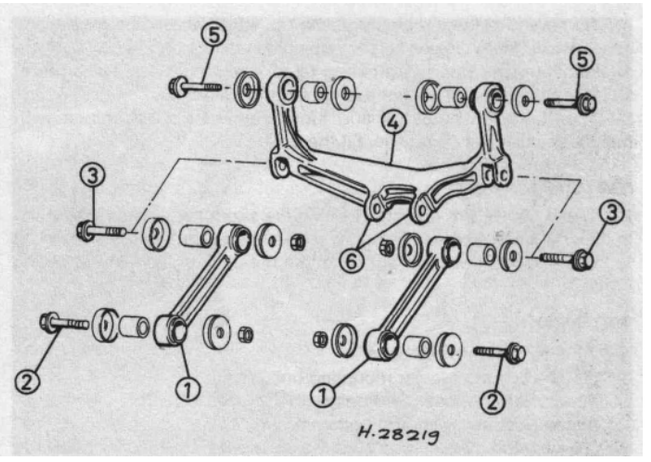
Installation

28 Installation of the shock absorber is the reverse of removal, noting the following:

a) Secure the shock absorber mounting nuts/bolts finger-tight on installation, then tighten them to the specified torque when the suspension is in its normal position.
b) Adjust the shock absorber spring preload to your preferred level (see Section 14).



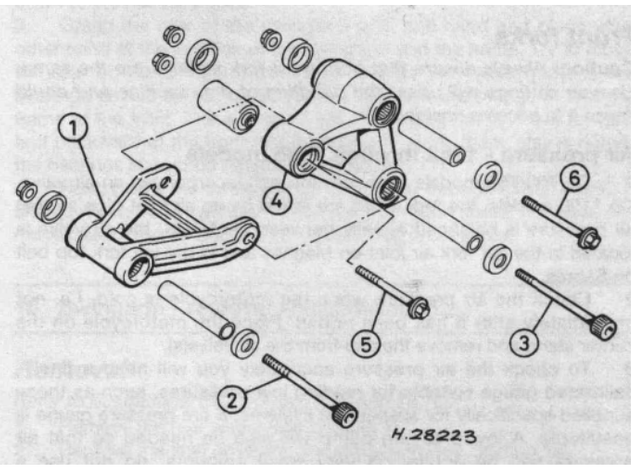
13.4 Shock linkage-to-swingarm bolts (arrows) on 700/750 Sabres



13.15a Shock absorber linkage (700/750 Sabres)

1 Shock links
2 Shock link-to-frame bolts
3 Shock link-to-shock arm bolts
4 Shock arm
5 Shock arm-to-swingarm bolts
6 Shock absorber mounting

13.15b Shock absorber linkage (1100 Sabres)



1 Shock link
2 Shock link-to-frame bolt
3 Shock link-to-shock arm bolt
4 Shock arm
5 Shock arm-to-shock absorber bolt
6 Shock arm-to-swingarm bolt

13 Rear shock absorber linkage (Sabre models) - removal, inspection and installation

Removal

700/750 models

Refer to *illustration 13.4*

1 Place the motorcycle on its center stand.
2 Remove the mufflers (silencers) to provide improved access to the linkage through-bolts (see Chapter 4).
3 Remove the shock absorber lower mounting bolt.
4 Remove the bolts that retain the shock linkage to the swingarm (see **illustration).**
5 Remove the bolts that retain the shock linkage to the frame and lift out the linkage.
6 Remove the two pivot bolts to separate the shock arm from the shock link.

1100 models

7 Place the motorcycle on its center stand.
8 Remove the mufflers (silencers) to provide improved access to the linkage through-bolts (see Chapter 4).
9 Remove the shock absorber lower mounting bolt.
10 Remove the shock arm-to-swingarm bolt.
11 Remove the shock link-to-frame bolt and lower the linkage from the motorcycle.
12 Remove the pivot bolt to separate the shock link from the shock arm.

Inspection

Refer to illustrations 13.15a and 13.15b

13 Thoroughly clean all components, removing all traces of dirt, corrosion and grease.
14 Inspect all components closely, looking for obvious signs of wear such as heavy scoring, or for damage such as cracks or distortion.
15 Pull the dust caps off to reveal the bearing or bushings in each pivot. Depending on the model, either plain bushings or needle roller bearings and inner sleeves will be fitted **(see illustrations).** On 1100 models, the shock absorber lower pivot on the shock arm is of the bonded-rubber type.
16 If the bearings or bushings are worn, check first with a Honda dealer whether they are available separately from the shock link or shock arm. Removal and installation should be done using a drawbolt tool to prevent damage to the housing and new bearing/bushing.
17 Obtain a long bolt or a length of threaded rod from a local engineering works or some other supplier. The bolt or rod should be about one inch longer than the combined length of either link, and one bearing. Also required are suitable nuts and two large and robust washers having a larger outside diameter than the bearing housing. In the case of the threaded rod, fit one nut to one end of the rod and stake it in place for convenience.
18 Fit one of the washers over the bolt or rod so that it rests against the head, then pass the assembly through the relevant

projecting end place the bearing/bushing, which should be greased to ease installation, followed by the remaining washer and nut.
19 Holding the bearing/bushing to ensure that it is kept square, slowly tighten the nut so that it is drawn into its bore.
20 Lubricate all bearings and inner sleeves and bushings with molybdenum-disulfide grease. Fit the dust caps.

Installation

21 If the shock arm and shock link were separated, install their pivot bolt(s), but secure only finger-tight at this stage. Couple the linkage up to the frame and swingarm, then tighten the pivot bolts in the following order:

700/750 models

Shock link-to-frame bolts Shock absorber lower mounting bolt Shock link-to-shock arm bolts Shock arm-to-swingarm bolts

1100 models

Shock link-to-frame bolt
Shock arm-to-swingarm bolt
Shock link-to-shock arm bolt
Shock absorber lower mounting bolt

22 Install all other components in a reverse of the removal procedure and check the operation of the rear suspension before riding the motorcycle.

14 Suspension - adjustments ***Front forks***

Caution: *Always ensure that both front fork settings are the same. Uneven settings will upset the handling of the machine and could cause it to become unstable.*

Air pressure - 1982 through 1986 models

1 On 700/750 models each fork top bolt incorporates an air valve. On 1100 models, the fork tubes are linked by an air joint pipe so that air pressure is balanced equally between each fork; the air valve is located in the left fork air joint on Magnas and in the left fork top bolt on Sabres.
2 Check the air pressure when the motorcycle is cold, i.e. not immediately after it has been ridden. Place the motorcycle on the center stand and remove the cap from the air valve(s).
3 To check the air pressure accurately you will need a finely-calibrated gauge suitable for reading low pressures, such as those supplied specifically for suspension systems; a tire pressure gauge is unsuitable. A low pressure pump will also be needed so that air pressure can be applied in very small amounts; do not use a compressor-powered air line because there is a risk of exceeding the maximum safe pressure and damaging the fork seals.
4 Set the pressure within the specified range (see Specifications), noting that on 700/750 models the pressure must be identical in each fork otherwise uneven handling will result.
5 Install the valve cap when adjustment is complete.

Rebound damping - 1100 Sabre only

6 Rebound damping is controlled by a knob at the top of the right fork which is linked to the fork damper piston by a slim rod. Three damping positions are available.
7 Perform damping adjustment after checking air pressure. The current setting is denoted by the number of the knob which aligns with the lug on the fork top bolt. Honda describes position 1 as being suitable for general or around town riding, position 2 for highway or winding road riding, and position 3 for rough road riding. Rotate the adjuster to make adjustment, aligning the selected position with the top bolt lug.

Anti-dive (TRAC) setting - 1982 through 1986 models

8 Anti-dive force is adjusted by the slotted head adjuster set in the side of the anti-dive housing (700/750 Sabres, 1100 Magnas and 1982 through 1984 700/750 Magnas) or by the knob on the front of the fork slider (1100 Sabres and 1985/86 700 Magnas).
9 Four settings are available. Honda describes position 1 as giving light anti-dive, position 2 medium, position 3 hard, and position 4 maximum anti-dive. Rotate the adjuster to make the adjustment, ensuring the chosen position aligns exactly with the index mark.

Rear shock absorber

Spring preload - all Magna models

10 Adjust using the hooked C-wrench supplied in the motorcycle's tool kit. The shocks have five preload positions, I, II, III, IV, V. Position is for light loading, whereas spring preload is increased in stages from 11 through V.
11 Hook the wrench into the holes in the spring lower seat and rotate the seat to the required position. **Note:** *Always set each shock to the same position.*

Rebound and compression damping - 1100 Magna models

12 Adjust rebound damping by rotating the stepped wheel at the top of each unit to one of the four positions. Two compression damping positions are available, adjusted via the small knob just below the spring lower seat.
13 In each case damping is increased the higher the number selected. It is essential that each shock is set to the same positions and that the rebound and compression positions suit the load carried and riding style (see below).

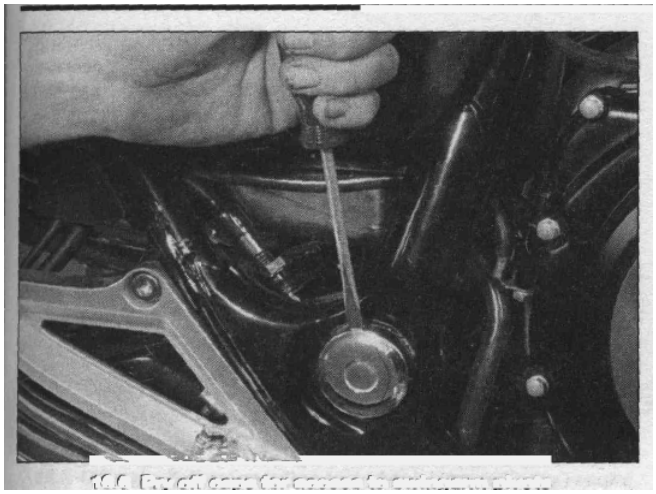
Rebound	Compression	Load/riding style
1	1	Solo/ordinary road use
2	1	Solo/highway or winding road use
3	1	Solo/rough road use
2	2	Solo or pillion/ordinary road use
3	2	Solo with pillion or load/highway or winding road use
4	2	Solo with pillion or load/rough road use

Air pressure - Sabre models

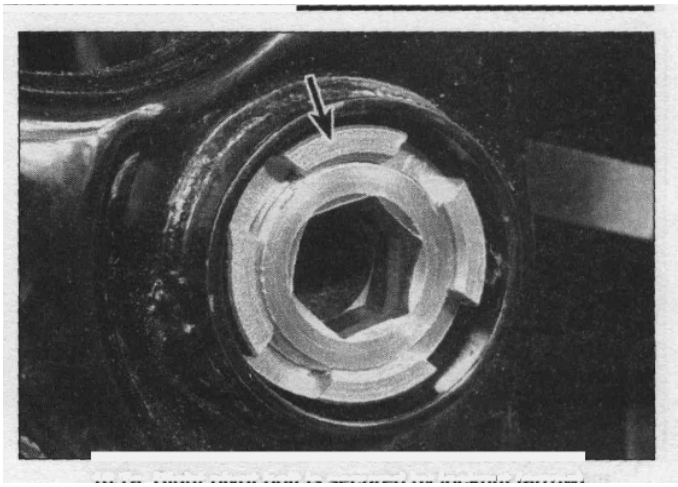
14 On 700/750 models remove the seat to gain access to the air valve set in the top of the shock body. On 1100 models, the shock body is linked to a remote air valve by a short hose; the air valye is clamped to the toolbox cover under the right side cover.
15 Remove the cap from the air valve and check the pressure. Note; *The shock must be cold for this check, i.e. do not check after the motorcycle has just been ridden.*
16 Adjust the air pressure within the range given in the Specifications section of this Chapter, noting that air pressure should be dependent on damping setting and load carried (see Step 19).

Rebound damping - Sabre models

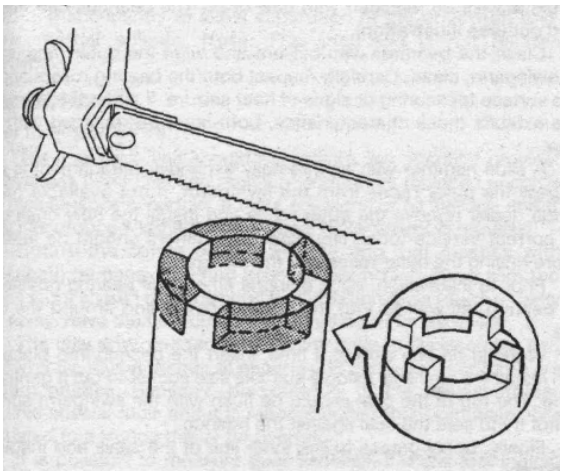
17 On 700/750 models remove the seat to gain access to the damping adjuster lever. It is situated on the top of the shock body, just above the air valve. Position 1 is with the lever pushed fully in, position 2 is out to the first notch, and position 3 out a further notch.
18 On 1100 models the rebound damping adjuster knob is situated at the top of the frame, under the right side cover. A short cable links the control knob to the top of the shock absorber.
19 Three settings are provided; Honda describes position 1 as being suitable for general or around town riding, position 2 for highway or winding road riding, and position 3 for rough road riding. The damping setting should be associated with rider load and shock air pressure, i.e. position 1 would suit rider-only load and no air pressure or low air pressure, whereas position 3 would suit maximum load and high or maximum air pressure.



16.6 Pry off caps for access to swingarm pivots

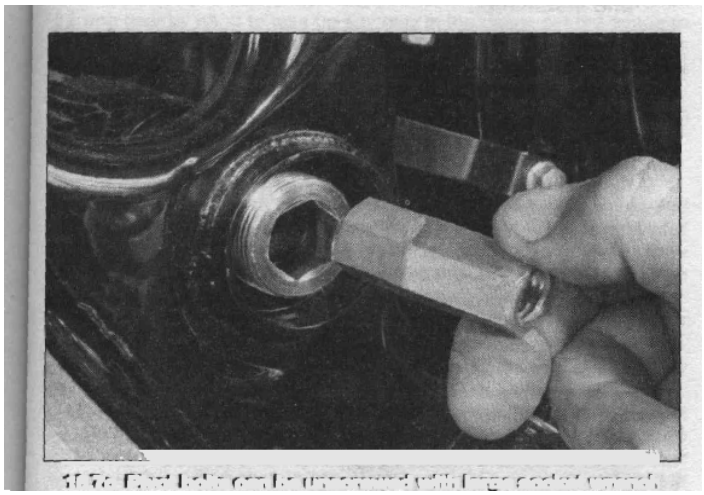


16.7a Right pivot bolt is secured by locknut (arrow)



16.7b A tool can be fabricated from a piece of tubing to engage slots of the locknut; be sure it's strong enough for the specified torque

16.7c Pivot bolts can be unscrewed with large socket wrench (Alien key) or hexagon adapter



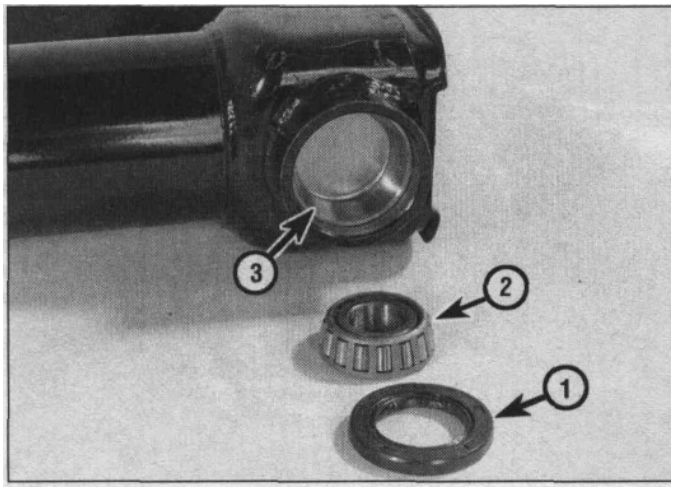
15 Swingarm bearings - check

1 Remove the rear wheel (see Chapter 7).
2 On Magna models remove both shock absorbers (see Section 12). On Sabre models remove the shock linkage-to-swingarm bolt(s). If the mufflers (silencers) do not leave enough clearance to remove these bolts, remove the lower shock absorber bolt and pivot the swingarm down to provide clearance.
3 Grasp the rear of the swingarm with one hand and place your other hand at the junction of the swingarm and the frame. Try to move the rear of the swingarm from side-to-side. Any wear (play) in the bearings should be felt as movement between the swingarm and the frame at the front. The swingarm will actually be felt to move forward and backward at the front (not from side-to-side). If any play is noted, the bearings should be replaced (see Section 17).
4 Next, move the swingarm up and down through its full travel. It should move freely, without any binding or rough spots. If it does not move freely, refer to Section 17 for servicing procedures.

16 Swingarm - removal and installation

Removal

Refer to illustrations 16.6, 16.7a, 16.7b and 16.7c
1 Remove the rear wheel (see Chapter 7).
2 Remove the final drive unit and driveshaft (see Section 18).
3 On Magnas, remove the shock absorber lower mounting nut/bolt on each side (see Section 12).
4 On Sabres, remove the shock absorber lower bolt. Then remove the bolt(s) that retain the shock linkage to the swingarm and lower the linkage.
5 Detach the brake backplate (early 700/750 models) or torque arm (other models) from the swingarm.
6 Pry off the swingarm pivot caps on both sides **(see illustration).**
7 Remove the pivot bolt locknut on the right side, using the Honda service tool (Part No. 07908-4690001) or fabricate a tool to fit the nut slots from a piece of tubing **(see illustrations).** Use of the service tool is advised because it provides a means of securing the locknut to the correct torque on installation.
8 Once the locknut is removed, use a socket wrench to remove first the right and then the left pivot bolts.
9 Lift the swingarm out and remove the rubber boot from its front. **Note:** *If there is insufficient clearance on Sabre models to remove the swingarm, remove the upper shock absorber bolt and have an assistant raise the shock and hold it tightly against its frame bracket. This should*



17.5 Swingarm bearings

1 Dust seal
2 Bearing inner race
3 Bearing outer race

provide enough clearance to carefully remove the swingarm between the lower part of the shock and the center stand.

10 Refer to the following Section for bearing replacement.

Installation

11 Ensure the boot is in position on the front of the swingarm (on 1100 models, its tab with the UP marking must be positioned accordingly). Position the swingarm in the frame and install both pivot bolts loosely. Tighten the left pivot bolt to its specified torque.

12 Tighten the right pivot bolt to its specified torque, then loosen it and retighten it to its specified torque. Next, move the swingarm up and down several times and recheck that the right pivot bolt is still tightened to its proper torque value.

13 Install the right pivot bolt locknut, tightening it finger-tight. Install the Honda service tool specified for removal of the nut, hold the pivot bolt in position with the socket wrench (Alien key) and tighten the locknut to the specified torque using a torque wrench on the service tool handle. **Note:** *It is important not to disturb the pivot bolt position while the locknut is tightened.*

14 Install the remaining components in a reverse of the dismantling procedure, taking note of the torque settings in this Chapter and Chapter 7. On 1100 models ensure that the brake hose is well secured with the clips on the swingarm.

15 Check the operation of the rear suspension before riding the motorcycle.

17 Swingarm - inspection and bearing replacement

Inspection

1 Thoroughly clean all components, removing all traces of dirt, corrosion and grease.

2 Inspect all components closely, looking for obvious signs of wear such as heavy scoring, and cracks or distortion due to accident damage. Any damaged or worn component must be replaced.

3 If the painted finish of the swingarm has deteriorated it is worth taking the opportunity to repaint the affected area, ensuring that the surface is correctly prepared beforehand.

Bearing replacement

Refer to illustration 17.5

4 With the seals still in place, gently spin the bearings with your finger, checking for any roughness or noise. These signs indicate the bearings need to be replaced with new ones.

5 Pry the seals out from both ends. Once removed, these seals should always be replaced with new ones. The bearings can then be lifted out **(see illustration).**

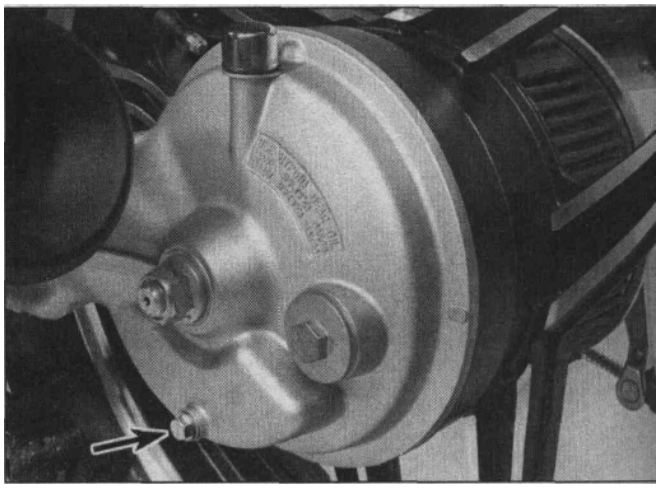
6 Clean the bearings with solvent and wipe the outer race, still in the swingarm, clean. Carefully inspect both the bearing rollers and the race surface for scoring or signs of heat seizure. If either the bearing or race exhibits these characteristics, both must be replaced with new ones.

7 A slide hammer with an internally expanding attachment is need to draw the outer races from the swingarm. If not available have a Honda dealer remove the outer races and install the new ones using the correct service tools. New grease retainers should be installed before driving the outer races into the swingarm.

8 Prior to installation, pack a liberal amount of bearing grease into the bearing, as well as into the bearing cavity and around the outer race.

9 Working on one side at a time, insert the bearing into place and then install the new seal using a suitable size socket to tap it gently into place. The top of the seal should be flush with the swingarm surface. Do not try to seat the seal against the bearing.

10 Finally, apply grease to the inner lips of the seals and install the swingarm.



18.3 Final drive unit oil drain plug (arrow)

18 Final drive unit and driveshaft - removal, inspection and installation

Removal

Refer to illustrations 18.3 and 18.5

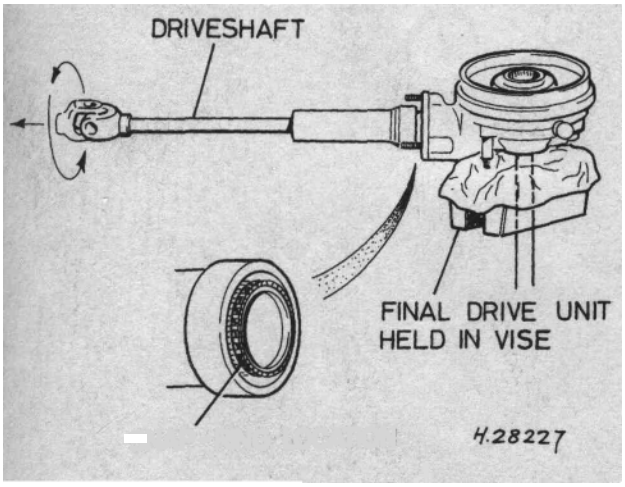
1 Remove the rear wheel (see Chapter 7).

2 On Magna models, remove the left shock absorber (see Section 12).

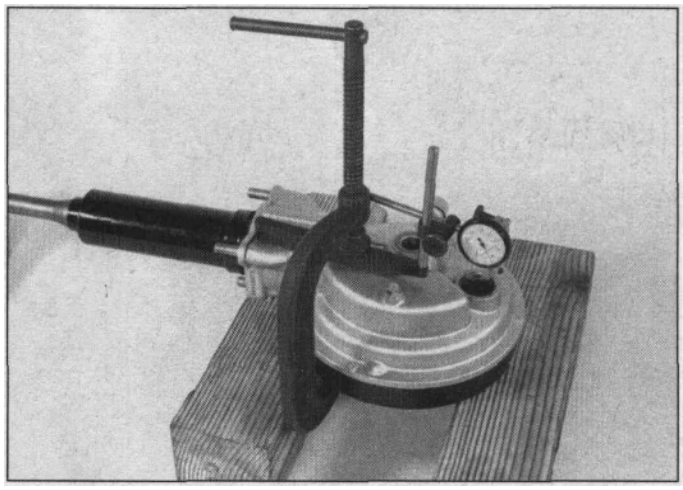
3 Remove the final drive unit drain plug and allow the oil to drain into a suitable container **(see illustration).**

4 Position a drain tray below the final drive-to-swingarm joint to catch any oil that escapes from the driveshaft damper case. Remove the three nuts that retain the final drive unit to the swingarm, then carefully withdraw the unit and driveshaft from the swingarm. This is made easier by supporting the swingarm at an angle parallel with the ground.

5 If the driveshaft remains in the swingarm when the final drive unit is removed, simply pull it out. **Note:** *A snap-ring was fitted to the damper cam splines at the manufacturing stage to aid production, and if not already removed, will prevent separation of the final drive unit and driveshaft by normal means.* If this occurs, install the rear axle through the final drive unit and mount the axle in a vise equipped with wood or soft jaws so that the drive unit uppermost. With the drive unit securely held, revolve the driveshaft in a circular motion while pulling it off the drive unit **(see illustration).** This action will serve to compress the



18.5 Driveshaft disconnection from final drive unit may require special technique if snap-ring is fitted to shaft end



18.10 Final drive unit ring gear backlash measurement

snap-ring sufficiently to allow separation of the driveshaft and final drive internal splines. **Note:** *The snap-ring is not needed for reassembly.*

Inspection

Refer to illustration 18.10

6 The final drive unit should not require any attention provided the oil level has been checked regularly and the oil replaced according to the maintenance schedule. If there are signs of oil leakage and the oil level has dropped significantly, oil seal replacement is required.

7 Rotate the pinion gear shaft (the one that meshes with the driveshaft) by hand. The ring gear splines (which mesh with the rear wheel stub) should rotate smoothly. If rotation feels rough or jerky or if it is noisy, have the final drive overhauled by a Honda dealer.

8 The final drive unit requires special tools to disassemble and setup correctly, plus a degree of expertise to carry out gear tooth contact pattern checks. Similarly, disassembly of the driveshaft damper requires special tools and it is recommended that both assemblies by entrusted to a Honda dealer for overhaul.

9 It is possible to measure gear backlash if a dial test indicator is available. To do so, set the final drive unit on blocks so that access is available to the ring gear from underneath.

10 Remove the oil filler plug and set up a dial gauge so that the tip is against the face of one of the ring gear teeth **(see illustration).** Turn the ring gear by hand to take up any play in the gears, set the gauge to zero and turn the ring gear gently to measure the backlash. It is recommended that this measurement be taken at 120° intervals on the ring gear.

11 Backlash should not exceed 0.3 mm (0.012 in) and all three readings should not differ by more than 0.1 mm (0.004 in).

Installation

12 Hold the driveshaft vertical, with its damper end uppermost and fill the damper housing with the specified amount and type of oil. Install the short coil spring in the end of the driveshaft and keeping the driveshaft upright, install the final drive unit on its end so that the driveshaft and final drive splines fully engage. Mesh the components together carefully to avoid damaging the damper oil seal. **Note:** *Later models may have a small hole in the final drive unit splined collar - if so, rotate the collar so that the hole is upwards (as installed on the motorcycle).*

13 Hold the driveshaft and final drive unit firmly together to prevent oil loss from the damper, and install the assembly into the swingarm so that the splines on the front end of the driveshaft fully engage those of the gearcase output shaft. **Note:** *Positioning the universal joint so that the front end of the driveshaft is horizontally aligned will help it engage the gearcase output shaft squarely.* With the final drive unit and swingarm faces perfectly joined, install the three nuts and secure them lightly; tighten to the specified torque after the rear wheel axle has been installed.

14 Install all other components in a reverse of the removal procedure, noting the following:

a) Tighten all fasteners to the specified torques, noting that the three final drive unit-to-swingarm nuts can be torqued after the rear axle is installed.

b) Refill the final drive unit with the correct type and amount of oil (see Chapter 1).

19 Bodywork and seat - removal and installation *Main*

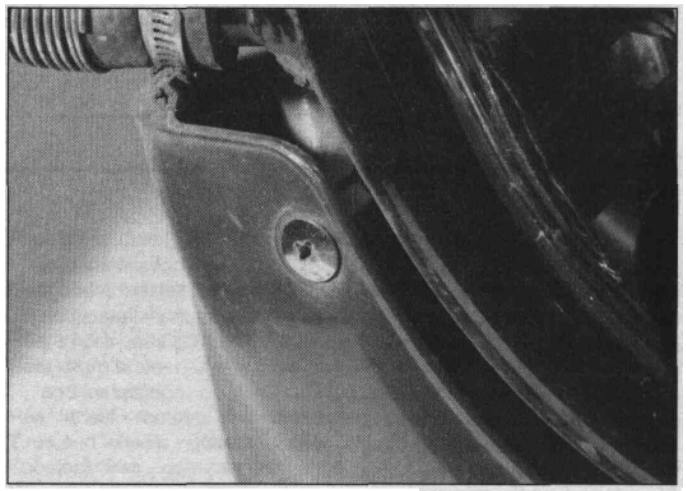
side covers

1 The side covers have three plastic pegs on their inner faces which locate in grommets set in the frame. Ease the cover pegs out of their grommets to remove the cover.

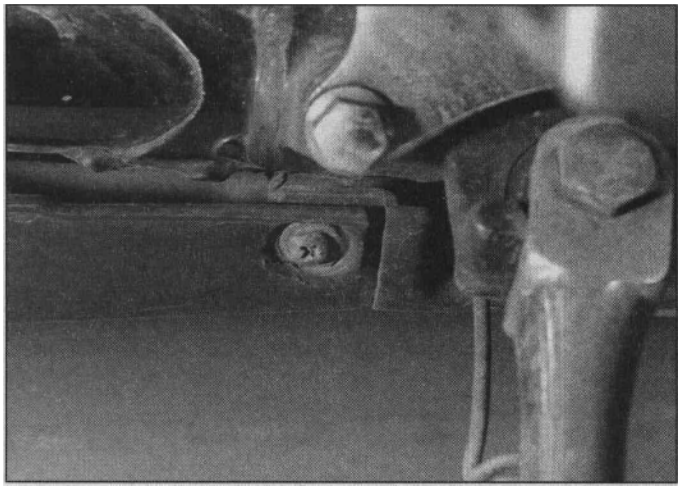
Belly fairing - 1987 and 1988 700/750 Magna models

Refer to illustrations 19.2a, 19.2b and 19.2c

2 The belly fairing is retained by four screws to the motorcycle's frame, two on each side **(see illustrations).** Each rear side section is



19.2a Belly fairing front section is retained by screw at front...

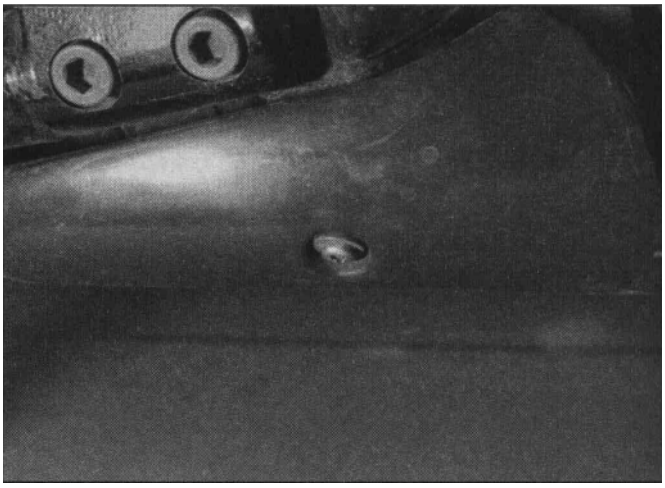


19.2b ... and at rear on each side

retained by a single screw at the rear; the front mounting is held by the main section rear screws **(see illustration).**

Front fender

3 Remove the front wheel (see Chapter 7).
4 From the inside of the front fender, remove the four bolts which retain it to the fork brace or fork slider (as applicable).
5 Installation is a reverse of removal, noting that any hose or cable guides must be returned to their original locations.



19.2c Rear section mounting screw

Seat

6 On 1987 and 1988 700/750 Magnas, the two-piece seat is retained by two bolts just beneath the seat strap buckles and a single bolt to the rear fender (mudguard).
7 On 1100 Sabre models, remove the side covers to access the two seat mounting bolts.
8 On all other models release the seat lock and disengage the seat prongs from the frame (the seat lock is set in the grab rail on later Magna models). From 1984 a two-part seat is fitted to 700/750 Magna models.

Chapter 7
Brakes, wheels and tires

Note: *Unless specifically mentioned in this Chapter, the information given for the 1982 750 Sabre applies to the UK VF750S-C, and that for the 1987 and 1988 700/750 Magnas applies to the UK VF750C-H and C-J respectively.*

Contents

Section

Specifications

Disc brakes

Brake fluid type	See Chapter 1
Disc thickness (front brake)	
New	
1986 700 Magna model	4.5 to 5.2 mm (0.18 to 0.20 in)
All other models	4.8 to 5.2 mm (0.19 to 0.20 in)
Service limit	4.0 mm (0.20 in)
Disc thickness (rear brake)	
New	
1986 1100 Magna model	7.1 to 7.7 mm (0.280 to 0.303 in)
Other 1100 models	6.9 to 7.1 mm (0.272 to 0.280 in)
Service limit	
1986 1100 Magna model	6.6 mm (0.26 in)
Other 1100 models	6.0 mm (0.24 in)
Disc maximum runout	0.3 mm (0.012 in)
Caliper bore ID	
Front (700/750 models)	
New	30.23 to 30.28 mm (1.1902 to 1.1921 in)
Service limit	30.29 mm (1.1925 in)
Front (1100 models)	
New	32.03 to 32.08 mm (1.2610 to 1.2630 in)
Service limit	32.09 mm (1.263 in)
Rear (1100 models)	
New	30.23 to 30.28 mm (1.1902 to 1.1921 in)
Service limit	30.29 mm (1.193 in)
Caliper piston OD	
Front (700/750 models)	
New	30.148 to 30.198 mm (1.1869 to 1.1889 in)
Service limit	30.14 mm (1.1866 in)
Front (1100 models)	
New	31.948 to 31.998 mm (1.2578 to 1.2598 in)
Service limit	31.94 mm (1.258 in)
Rear (1100 models)	
New	30.148 to 30.198 mm (1.1869 to 1.1889 in)
Service limit	38.090 mm (1.500 in)
Front master cylinder bore ID	
1982 through 1986 models	
New	15.870 to 15.913 mm (0.6248 to 0.6265 in)
Service limit	15.93 mm (0.6272 in)
1987 and 1988 700/750 models	
New	12.700 to 12.743 mm (0.500 to 0.5016 in)
Service limit	12.755 mm (0.502 in)
Front master cylinder piston OD	
1982 through 1986 models	
New	15.827 to 15.854 mm (0.6231 to 0.6242 in)
Service limit	15.82 mm (0.6228 in)
1987 and 1988 700/750 models	
New	12.657 to 12.684 mm (0.498 to 0.499 in)
Service limit	12.645 mm (0.498 in)
Rear master cylinder bore ID (1100 models)	
New	14.000 to 14.043 mm (0.5512 to 0.5529 in)
Service limit	14.06 mm (0.553 in)
Rear master piston OD (1100 models)	
New	13.957 to 13.984 mm (0.5495 to 0.5506 in)
Service limit	13.95 mm (0.549 in)

Drum brake

Brake shoe lining thickness	
New	4.9 to 5.0 mm (0.19 to 0.20 in)
Service limit	2.0 mm (0.08 in)
Brake drum ID	
1985-on Magna models	
New	180.0 to 180.3 mm (7.09 to 7.10 in)
Service limit	181 mm (7.13 in)
All other models	
New	160.0 to 160.3 mm (6.30 to 6.31 in)
Service limit	161 mm (6.34 in)

Wheels

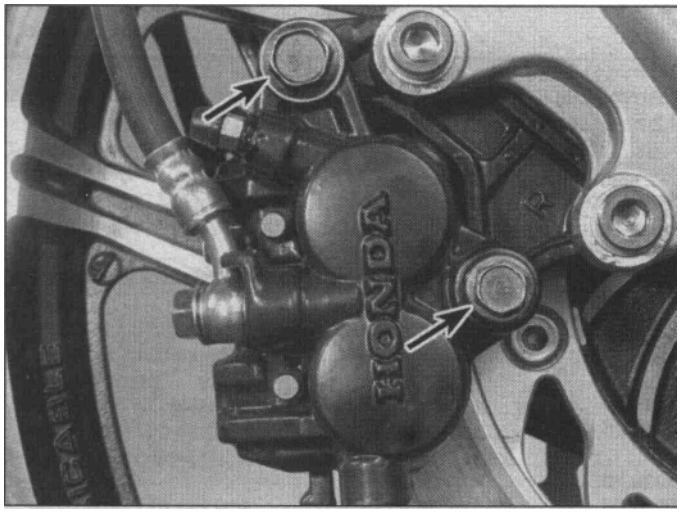
Maximum wheel runout (front and rear) Axial (side-to-side)	2.0 mm (0.08 in)
Radial (out-of-round)	2.0 mm (0.08 in)
Maximum axle runout (front and rear)	0.2 mm (0.01 in)

Tires

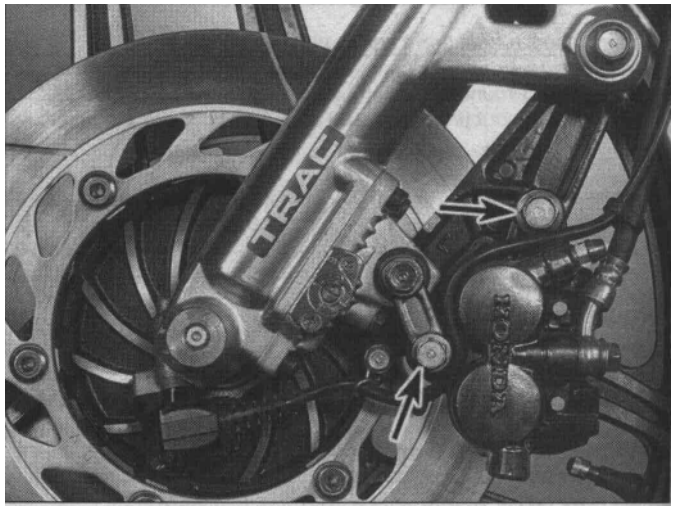
Tire pressures	See Chapter 1
Tire sizes	
Front	120/60VR17or120/60ZR17
Rear	160/60 VR 17 or 160/60 ZR 17

Torque settings	Nm	ft-lbs
Brake caliper-to-bracket bolts All Sabre models and 1982 through 1984 700/750 Magna models		
Upper bolt	25 to 30	18 to 22
Lower bolt	20 to 25	14 to 18
1985 and 1986 700 Magna models		
Upper bolt	30 to 40	22 to 29
Lower bolt	20 to 25	14 to 18
1987 and 1988 700/750 Magna models	25 to 30	18 to 22
1100.Magna models	Not available	
Front brake caliper bracket-to-fork slider bolts Upper bolt (to slider lug)		
All Sabres and 1982 through 1984 700/750 Magna models	30 to 40	22 to 29
1100 Magna and 1985/86700 Magna models	30 to 45	22 to 33
Lower bolt (to anti-dive unit)		
1100 Sabre models	10 to 14	7 to 10
1987 and 1988 700/750 Magna models	30 to 45	22 to 33
Brake disc retaining bolts		
1100 Sabre, 1983 through 1985 1100 Magna, 1982 through 1986 700/750 models	25 to 30	18 to 22
1986 1100 Magna, 1987 and 1988 700/750 models	37 to 43	27 to 31
Front master cylinder clamp bolts (1100 models)	10 to 14	7 to 10
Brake hose banjo bolts		
1985 and 1986 700 Magna and 1986 1100 Magna models	37 to 43	27 to 31
1100 Sabre models	25 to 40	18 to 29
All other models	25 to 35	18 to 25
Rear drum brake lever pinch bolt	24 to 30	17 to 22
Front wheel axle/axle nut	55 to 65	40 to 47
Front wheel axle pinch bolt(s) or nuts		
700/750 Sabre models	18 to 28	13 to 20
1982 through 1984 700/750 Magna models	15 to 25	11 to 18
1985 and 1986 700 Magna models	20 to 30	14 to 22
1987 and 1988 700/750 Magna models	18 to 25	13 to 18
1100 Sabre models	20 to 30	14 to 22
1100 Magna models	18 to 30	13 to 22
Rear wheel axle nut		
1985-on 700/750 Magna models	85 to 105	61 to 76
All other 700/750 models	60 to 80	43 to 58
1986 1100 Magna model	80 to 100	58 to 72
All other 1100 models	85 to 105	61 to 76

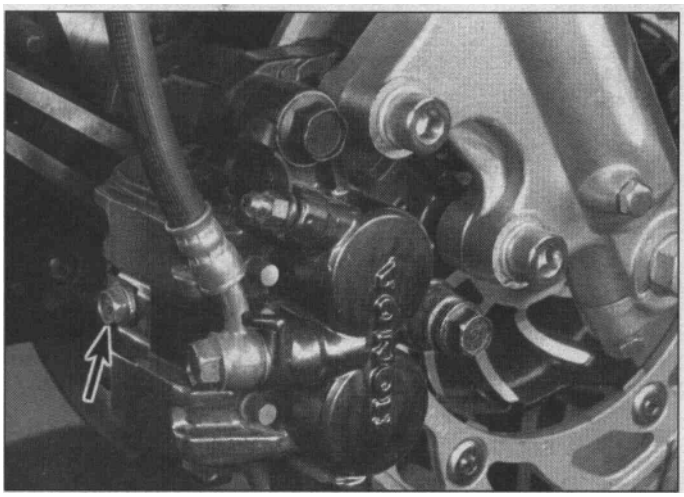
Rear wheel axle pinch bolt	20 to 30	14 to 22
Brake panel stop bolt	35 to 45	25 to 33
Brake panel-to-torque arm bolt	15 to 25	11 to 18
Final driven flange bolts (1983-on 700/750 Sabre models)	50 to 60	36 to 43



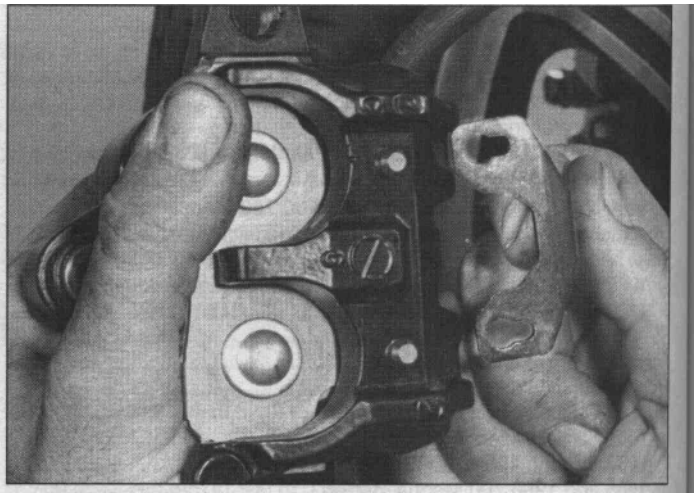
2.1 a Caliper body-to-bracket mounting bolts (arrows) on right side ...



2.1b … and on left side (arrows)



2.2a Remove the pad pin retainer plate bolt (arrow)..



2.2b ... disengage the plate from the pin grooves ...

General information

The models covered in this manual are fitted with cast aluminum wheels designed to accept tubeless tires. The rear wheel of 1987 and 1988 700/750 Magna models is of the disc type, with a removable cover on the left side.

The front brake is a hydraulically-operated twin disc on 1982 through 1986 models, and a single disc on 1987 and 1988 700/750 Magna models; in all cases twin-piston brake calipers are fitted. The rear brake is a rod-operated drum on 700/750 models and a hydraulically-operated disc on 1100 models.

Caution: *Disc brake components rarely require disassembly. Do not disassemble components unless absolutely necessary. If any hydraulic brake line is loosened, the entire system be disassembled, drained, cleaned and then properly filled and bled upon reassembly. Do not use solvents on internal brake components. Solvents will cause the seals to swell and distort. Use only clean brake fluid or alcohol for cleaning. Use care when working with brake fluid as it can injure your eyes and it will damage painted surfaces and plastic parts.*

2 Front brake pads - replacement

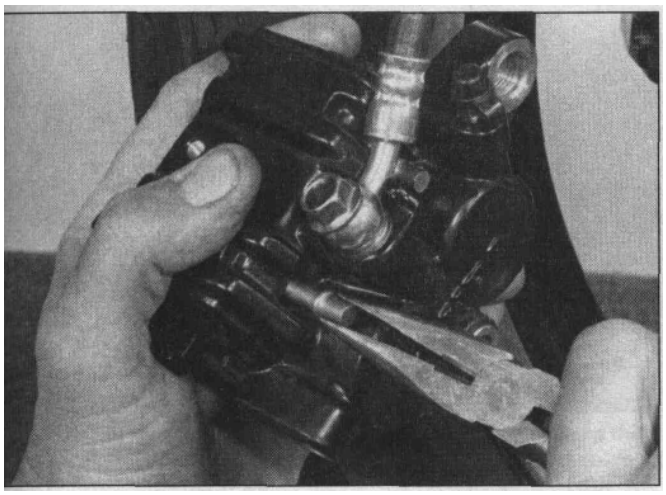
Warning: *When replacing the front brake pads on models with twin discs, always replace the pads in BOTH calipers - never just on one side. The dust created by the brake system may contain asbestos, which is harmful to your health. Never blow it out with compressed air and don't inhale any of it. An approved filtering mask should be worn when working on the brakes. Refer to illustrations 2.1a, 2.1b, 2.2a, 2.2b, 2.2c, 2.3, 2.4 and 2.11*

1 Remove the caliper body-to-bracket mounting bolts and slide the caliper off the disc, leaving the bracket attached to the fork slider (see **illustrations).** Support the caliper while it is removed so that no strain is placed on its hydraulic hose.

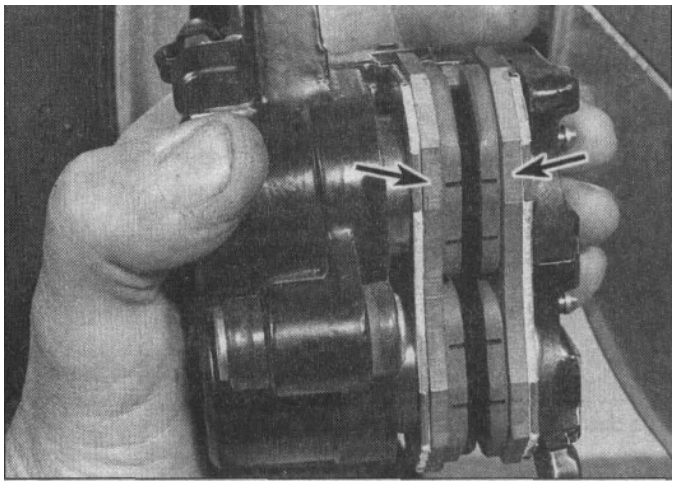
2 Remove the bolt that retains the pad pin retainer to the caliper, then disengage the retainer from the pins and pull both pins out of the caliper **(see illustrations).**

3 Lift out the brake pads **(see illustration).** The pad spring can be left in position in the caliper.

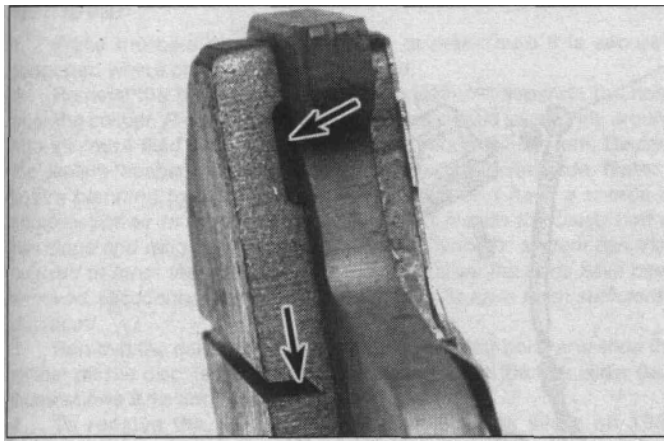
4 Inspect the surface of each pad for contamination and check that the friction material has not worn beyond its service limit groove, or



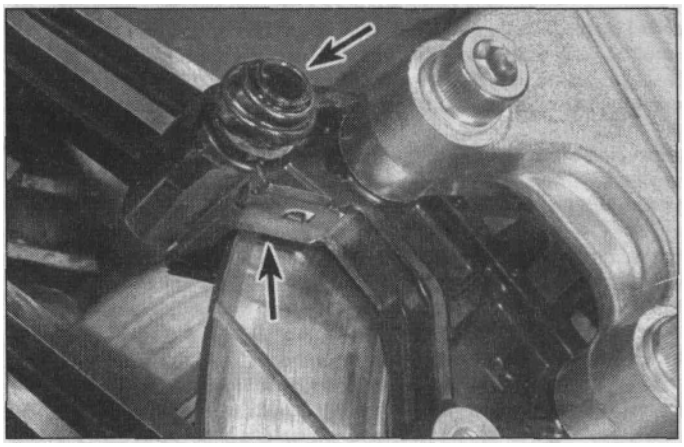
2.2c ... and pull the pins out with pliers



2.3 Lift the brake pads (arrows) out of the caliper



2.4 Brake pad service limit groove (lower arrow) and cutout (upper arrow)



2.11 Anti-rattle spring position (lower arrow). Upper mounting dust boot (upper arrow)

down to expose the cutout in the pad's rear edge; if worn down to this point or are approaching it, the pads must be replaced **(see illustration).** Similarly, if either pad is fouled with oil or grease, or heavily scored or damaged by dirt and debris, both pads must be replaced as a set. Note that it is not possible to degrease the friction material; if the pads are contaminated in any way they must be replaced.

5 If the pads are in good condition clean them carefully, using a fine wire brush which is completely free of oil and grease, to remove all traces of road dirt and corrosion. Using a pointed instrument, clean out the grooves in the friction material and dig out any embedded particles of foreign matter. Any areas of glazing may be removed using emery cloth.

6 Check the condition of the brake disc (see Section 4).

7 Remove all traces of corrosion from the pad pins. Inspect the pins and pad spring for signs of damage and replace if necessary. Also check the anti-rattle spring fitted to the top of the caliper bracket.

8 If installing new pads, push the pistons as far back into the caliper as possible using hand pressure only. Due to the increased friction material thickness of new pads, it may be necessary to remove the master cylinder reservoir cap, plate (where fitted) and diaphragm and syphon out some fluid.

9 Insert the pads into the caliper, ensuring the pad spring remains correctly positioned, so that the friction material of each pad is facing the disc. Insert one pad retaining pin making sure that it passes through the holes in both pads and into the caliper body, then hold both pads firmly against the rear of the caliper body to enable the remaining pin to be installed.

10 Install the pin retainer plate, pressing its slots into the pin grooves to lock them in place. Tighten the retainer plate screw securely.

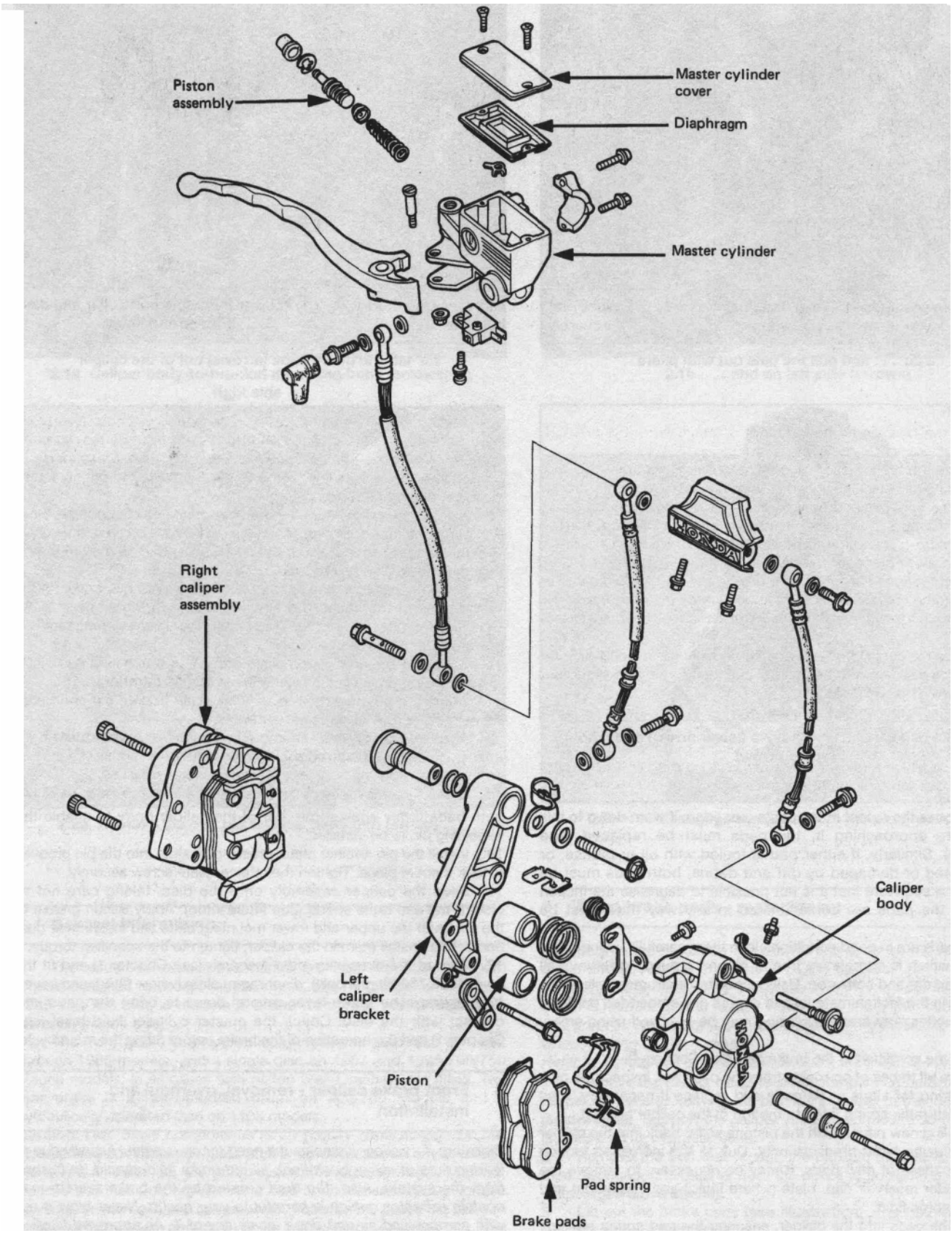
11 Slide the caliper assembly onto the disc, taking care not to disturb the anti-rattle spring **(see illustration).** Apply silicon grease to the shafts of the upper and lower mounting bolts and inside their dust boots, then install them in the caliper; tighten to the specified torque.

12 Top up the master cylinder reservoir (see Chapter 1) and fit the float (1988 750 Magna only), diaphragm, plate (where fitted) and cover.

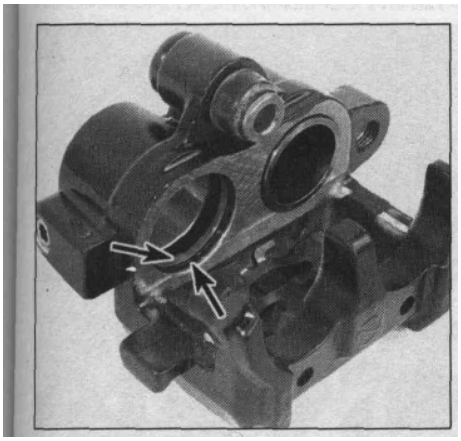
13 Operate the brake lever several times to bring the pads into contact with the disc. Check the master cylinder fluid level (see Chapter 1) and the operation of the brake before riding the motorcycle.

3 Front brake caliper - removal, overhaul and installation

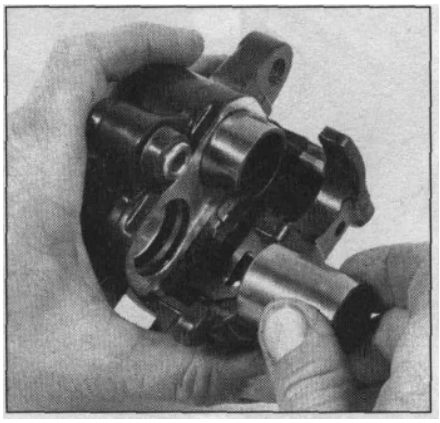
Warning: *If a caliper indicates the need for an overhaul (usually due to leaking fluid or sticky operation), all old brake fluid should be flushed from the system. A/so, the dust created by the brake system may contain asbestos, which is harmful to your health. Never blow it out with compressed air and don't inhale any of it. An approved filtering mask should be worn when working on the brakes. Do not, under any circumstances, use petroleum-based solvents to clean brake parts. Use clean brake fluid, brake cleaner or denatured alcohol only.*



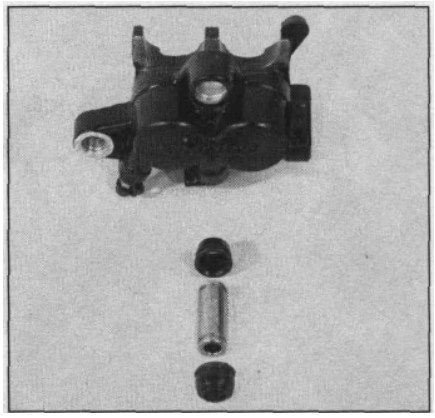
3.6 Front brake components (typical)



3.14 Piston seal (upper arrow) and dust seal (lower arrow) locations in caliper bore



3.16 Ensure that the pistons are inserted squarely into their bores



3.17 Lower mounting bolt collar and dust boot arrangement

Removal

1 Place the bike on its main stand, or make sure it is securely supported where only a side stand is fitted.

2 Remove the brake hose banjo fitting bolt and separate the hose from the caliper. Plug the hose end or wrap a plastic bag tightly around it to minimize fluid loss and prevent dirt entering the system. Discard the sealing washers; new ones must be used on installation. **Note:** *If you're planning to overhaul the caliper and don't have a source of compressed air to blow out the pistons, just loosen the banjo bolt at this stage and retighten it lightly. The bike's hydraulic system can then be used to force the pistons out of the body once the pads have been removed. Disconnect the hose once the pistons have been sufficiently displaced.*

3 Remove the caliper body-to-bracket mounting bolts and slide the caliper off the disc, leaving the bracket attached to the fork slider **(see illustrations 2.1 a and 2.1b).**

4 To remove the caliper bracket from the fork slider on 1982 through 1986 models, remove the two bolts which retain it to the slider lugs (right side) or the upper bolt which retains it to the slider lug and the lower bolt which retains it to the anti-dive housing (left side). Note the exact order and position of any collars, cable guides, washers and dust seals at each mounting. Slip the speedometer cable/sensor wire out of the wire guide on the left caliper bracket.

5 On 1987 and 1988 models, the caliper bracket is retained to the slider lugs by two chrome-headed bolts. Slip the speedometer cable out of the wire guide on the bracket.

Overhaul

Refer to illustrations 3.6, 3.14,3.16 and 3.17

6 Clean the exterior of the caliper with denatured alcohol or brake system cleaner **(see illustration).**

7 Remove the brake pads from the caliper body (see Section 2), then lift out the pad spring.

8 If the pistons weren't forced out using the bike's hydraulic system, place a wad of rag between the piston and caliper frame to act as a cushion, then use compressed air directed into the fluid inlet to force the pistons out of the body. Use only low air pressure to ease the pistons out and make sure both pistons are displaced at the same time. If the air pressure is too high and the pistons are forced out, the caliper and/or pistons may be damaged. **Warning:** *Never place your fingers in front of the pistons in an attempt to catch or protect them when applying compressed air, as serious injury could result. Keep each piston with its bore to ensure that they are not interchanged on reassembly (label them if necessary).*

9 Using a wooden or plastic tool, remove the dust seals from the caliper bores. If a metal tool is being used, take great care not to damage the caliper bores.

10 Remove both the piston seals in the same way.

11 Clean the pistons and bores with denatured alcohol, clean brake fluid or brake system cleaner. **Caution:** Do *not, under any circumstances, use* a *petroleum-based solvent to clean brake parts.* If compressed air is available, use it to dry the parts thoroughly (make sure it's filtered and unlubricated).

12 Inspect the caliper bores and pistons for signs of corrosion, nicks and burrs and loss of plating. If surface defects are present, the caliper assembly must be replaced. If the caliper is in bad shape the master cylinder should also be checked.

13 If the necessary measuring equipment is available, compare the dimensions of the caliper bores and pistons to those given in the Specifications Section of this Chapter, replacing any component that is worn beyond the service limit.

14 Lubricate the new piston seals with clean brake fluid and install them in their grooves in the caliper bores **(see illustration).**

15 Lubricate the new dust seals with clean brake fluid and install them in their grooves in the caliper bores.

16 Lubricate the pistons with clean brake fluid and install them in the caliper bores **(see illustration).** Using your thumbs, push the pistons all the way in, making sure they enter their bores squarely.

17 Carefully remove the outside dust boots from the lower mounting bolt hole in the caliper, then slip the collar out of the caliper body **(see illustration).** Check the condition of the dust boots and replace them if split or cracked. Check the condition of the dust boot situated between the caliper body and bracket on the upper mounting bolt.

18 Lay the pad spring in place in the caliper. Apply a very thin coat of silicon grease to the lower mounting bolt collar and slip it into the caliper body; install the dust boots on each side of the collar, making sure they are properly seated in the collar grooves.

19 Install the brake pads (see Section 2).

Installation

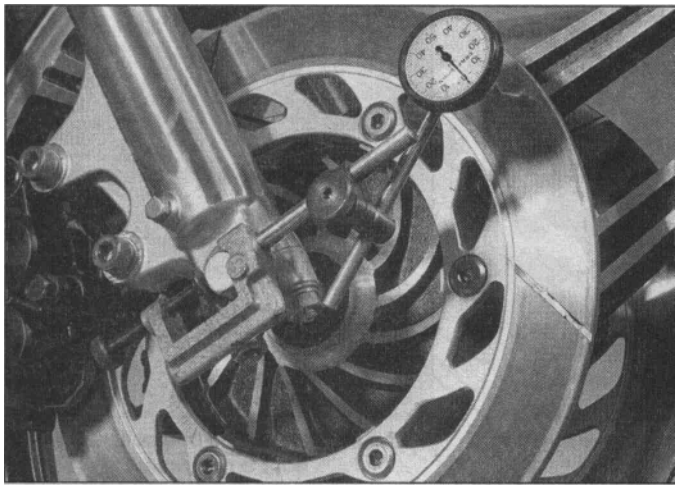
20 If removed from the fork slider, install the caliper bracket. Tighten the caliper bracket bolts to the specified torque (where given). Make sure that the anti-rattle spring is properly installed on the bracket **(see illustration 2.11).**

21 Install the caliper on the bracket, apply silicon grease to the shafts of the caliper mounting bolts and install them in the caliper; tighten them to the specified torque.

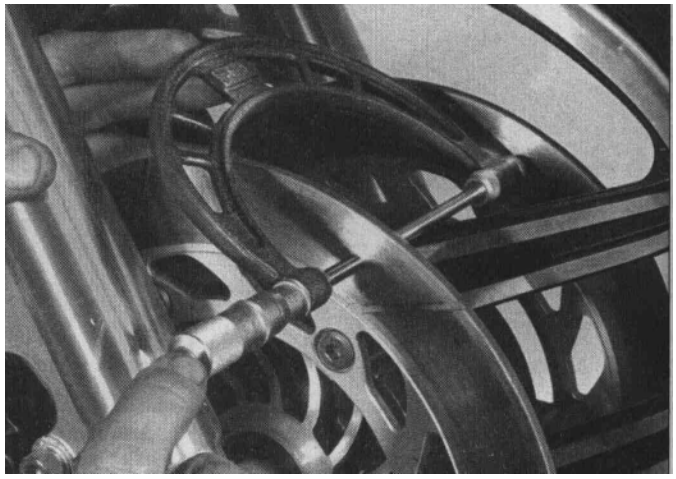
22 Connect the brake hose to the caliper, using new sealing washers on each side of the fitting. Tighten the banjo fitting bolt to the specified torque setting.

23 Fill the master cylinder with the recommended brake fluid (see Chapter 1) and bleed the hydraulic system as described in Section 11.

24 Check for leaks and thoroughly test the operation of the brake before riding the motorcycle.



4.3 Measuring disc runout



4.5 Measuring disc thickness

4 Front brake discs - inspection, removal and installation

Inspection

Refer to illustrations 4.3 and 4.5

1 Set the bike on its main stand. Where no main stand is fitted, support the bike securely under the crankcase so that the front wheel is raised off the ground.

2 Visually inspect the surface of the discs for score marks and other damage. Light scratches are normal after use and won't affect brake operation, but deep grooves and heavy score marks will reduce braking efficiency and accelerate pad wear. If the discs are badly grooved they must be machined or replaced.

3 To check disc runout, mount a dial indicator to a fork leg, with the plunger on the indicator touching the surface of the disc about 10 mm (1/2 inch) from the outer edge **(see illustration).** Rotate the wheel and watch the indicator needle, comparing your reading with the limit listed in this Chapter's Specifications.

4 If the runout is greater than allowed, check the hub bearings for play. If the bearings are worn, replace them and repeat this check. If the disc runout is still excessive, it will have to be replaced, although machining by a competent engineering shop may be a solution. Confirm your findings by removing the disc and checking it for warpage on a surface plate using feeler blades.

5 The disc must not be machined or allowed to wear down to a thickness less than the service limit, listed in this Chapter's Specifications (check also for wear limits stamped on the disc itself). The thickness of the disc can be checked with a micrometer **(see illustration).** If the thickness of the disc is less than the minimum allowable, it must be replaced.

Removal

6 Remove the wheel as described in Section 15. **Caution:** *Don't lay the wheel down and allow it to rest on either disc - the disc could become warped. Set the wheel on wood blocks so the disc doesn't support the weight of the wheel.*

7 Mark the relationship of the disc to the wheel, so it can be installed in the same position. Remove the bolts that retain the disc to the wheel. Loosen the bolts a little at a time, in a criss-cross pattern, to avoid distorting the disc.

8 Remove the disc and on 1982 through 1986 models recover the gaskets which are positioned between the disc and wheel pillars. On twin disc models, the discs should be marked L or R near one of the bolt holes to denote on which side of the wheel they are fitted; if no marks are found, make some with a felt marker.

Installation

9 On 1982 through 1986 models, position a new gasket on each of the wheel's disc mounting pillars. On early models the gaskets have a flat edge, which must face the cast flat on the wheel surface.

10 Install the disc on the wheel, aligning the previously applied match marks (if you're installing the original disc).

11 Install the bolts, ensuring the shims remain in position, and tighten them evenly and progressively to the specified torque. Clean off all grease from the brake disc(s) using acetone or brake system cleaner. If new brake discs have been installed, remove any protective coating from their working surfaces.

12 Install the wheel (see Section 15).

13 Operate the brake lever several times to bring the pads into contact with the disc. Check the operation of the brakes carefully before riding the motorcycle.

5 Front brake master cylinder - removal, overhaul and installation

1 If the master cylinder is leaking fluid, or if the lever does not produce a firm feel when the brake is applied, and bleeding the brakes does not help, master cylinder overhaul is recommended Before disassembling the master cylinder, read through the entire procedure and make sure that you have the correct rebuild kit. Also, you will need some new, clean brake fluid of the recommended type, some clean shop towels and internal snap-ring pliers. **Note:** *To prevent damage to the paint from spilled brake fluid, always cover the fuel tank when working on the master cylinder.*

2 **Caution:** *Disassembly, overhaul and reassembly of the brake master cylinder must be done in a spotlessly clean work area to avoid contamination and possible failure of the brake hydraulic system components.*

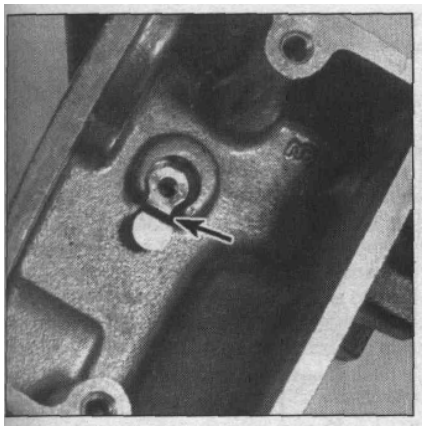
Removal

3 Loosen, but do not remove, the screws holding the reservoir cover in place.

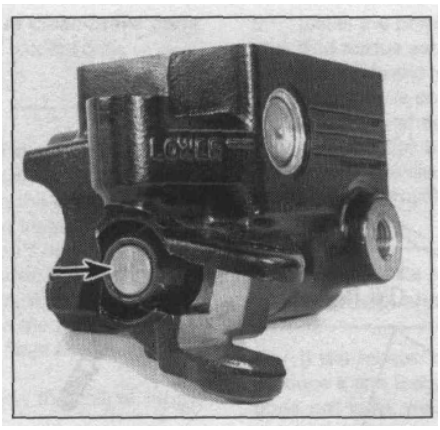
4 Disconnect the electrical connectors from the brake light switch.

5 Pull back the rubber boot, loosen the banjo fitting bolt and separate the brake hose from the master cylinder. Wrap the end of the hose in a clean rag and suspend the hose in an upright position or bend it down carefully and place the open end in a clean container. The objective is to prevent excessive loss of brake fluid, fluid spills and system contamination.

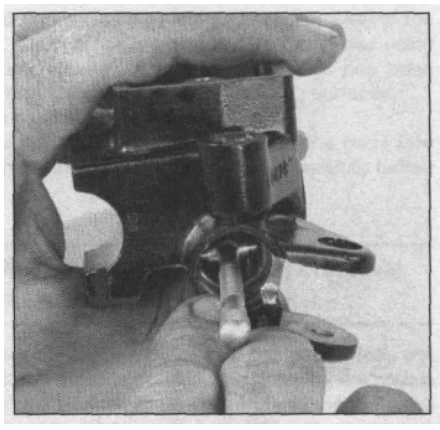
6 Remove the locknut from the underside of the brake lever pivot bolt, then unscrew the bolt and remove the brake lever.



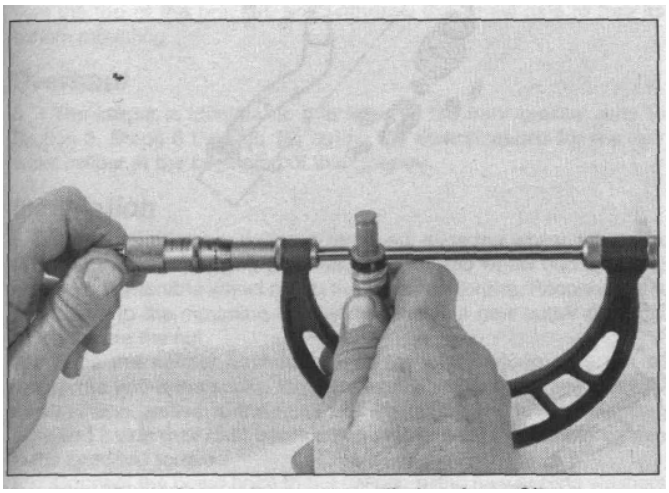
5.8 Location of port baffle in fluid reservoir base



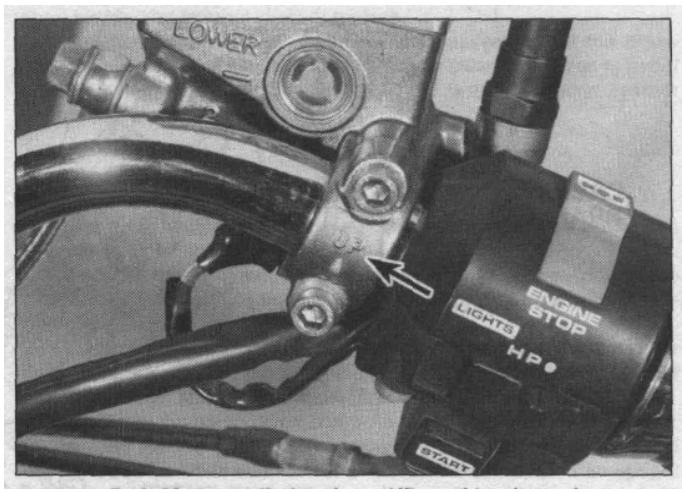
5.10 Master cylinder piston and dust boot location



5.14a Measuring master cylinder bore ID



5.14b Measuring master cylinder piston OD



5.19 Master cylinder clamp UP marking (arrow)

7 Remove the master cylinder mounting bolts and clamp to free the master cylinder from the handlebar. **Caution:** *Do not tip the master cylinder upside down or brake fluid will run out.*

Overhaul

Refer to illustrations 5.8, 5.*10, 5.14a and 5.14b*

8 Detach the reservoir cover and remove the plate (where fitted), rubber diaphragm, and on 1988 750 Magnas lift out the float, then drain the brake fluid into a suitable container **(see illustration 3.6).** Wipe any remaining fluid out of the reservoir with a clean rag. If the port baffle in the base of the reservoir was disturbed, ensure it is installed correctly **(see illustration).**

9 Undo the screw and remove the brake light switch.

10 Carefully remove the rubber dust boot from the end of the piston **(see illustration).**

11 Using snap-ring pliers, remove the snap-ring and slide out the piston assembly and the spring. Lay the parts out in the proper order to prevent confusion during reassembly.

12 Clean all of the parts with brake system cleaner (available at auto parts stores), isopropyl alcohol or clean brake fluid. **Caution:** *Do not, under any circumstances, use* a *petroleum-based solvent to clean brake parts.* If compressed air is available, use it to dry the parts thoroughly (make sure it's filtered and unlubricated).

13 Check the master cylinder bore for corrosion, scratches, nicks and score marks. If damage is evident, the master cylinder must be replaced with a new one. If the master cylinder is in poor condition, then the calipers should be checked as well.

14 If the necessary measuring equipment is available, compare the dimensions of the master cylinder bore and piston to those given in the Specifications Section of this Chapter, replacing any component that it is worn beyond the service limit **(see illustrations).**

15 The dust boot, piston assembly and spring are included in the rebuild kit. Use all of the new parts, regardless of the apparent condition of the old ones.

16 Before reassembling the master cylinder, soak the piston and the rubber cup seals in clean brake fluid for ten or fifteen minutes. Lubricate the master cylinder bore with clean brake fluid, then carefully insert the piston and related parts in the reverse order of disassembly. Make sure the lips on the cup seals do not turn inside out when they are slipped into the bore and ensure the spring is fitted the correct way around.

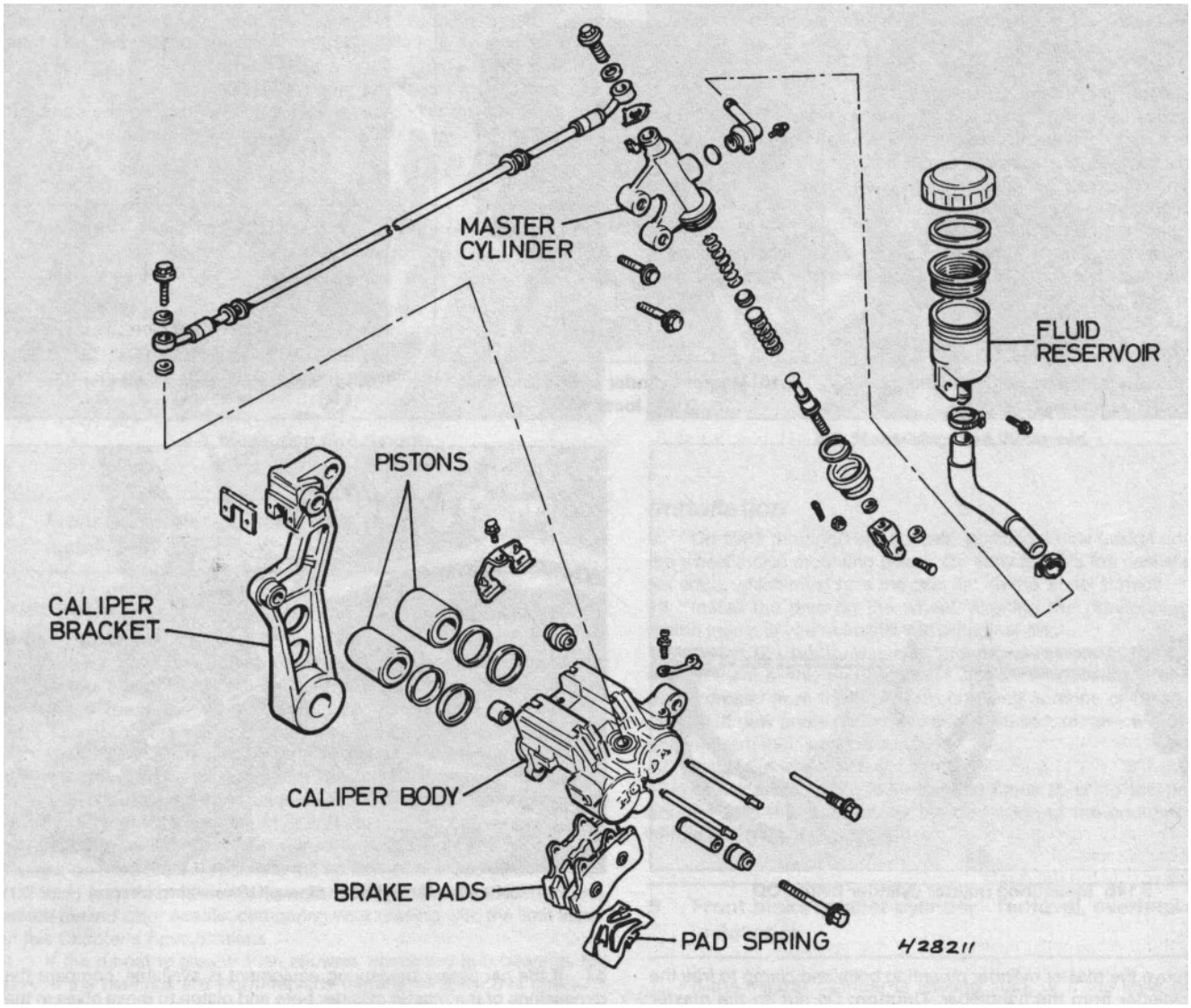
17 Depress the piston, then install the snap-ring (make sure the snap-ring is properly seated in the groove). Install the rubber dust boot (make sure the lip is seated properly in the piston groove).

18 Install the brake light switch and securely tighten its retaining screw.

Installation

Refer to illustration 5.19

19 Attach the master cylinder to the handlebar then fit the clamp making sure the 'UP' mark is facing upwards **(see illustration).** On Magnas and 1984-on Sabres, the joint of the clamp should align with the punch mark on the handlebar to ensure that the reservoir is positioned upright. On all models, fully tighten the upper bolt first, then the lower, both to the specified torque (where given).



6.2 Rear brake components (1100 models)

20 Connect the brake hose to the master cylinder, using new sealing washers. Tighten the banjo fitting bolt to the specified torque setting.
21 Install the lever and pivot bolt. Install the pivot bolt locknut and tighten it securely. Connect the brake light switch wiring.
22 Refer to Section 11 and bleed the air from the system. Check the operation of the front brake carefully before riding the motorcycle.

6 Rear brake pads (1100 models) - replacement

Warning: *The dust created by the brake system may contain asbestos, which is harmful to your health. Never blow it out with compressed air and don't inhale any of it. An approved filtering mask should be worn when working on the brakes. Refer to illustration 6.2*

1 Set the bike on its main stand.
2 Remove the caliper mounting bolts and slide the caliper off the disc, leaving its mounting bracket in place **(see illustration).**
3 The caliper is identical to that fitted to the front brakes and pad renewal can be performed as described in Section 2, Steps 2 through 10.
4 Slide the caliper assembly onto the disc, taking care not to disturb the anti-rattle spring fitted to the top of the mounting bracket. Apply silicon grease to the shafts of the upper and lower mounting bolts and inside their dust boots and install them in the caliper; tighten to the specified torque.
5 Top up the master cylinder reservoir (see Chapter 1) and fit the diaphragm, plate and cap.
6 Operate the brake lever several times to bring the pads into contact with the disc. Check the reservoir fluid level (see Chapter 1) and the operation of the brake before riding the motorcycle.

7 Rear brake caliper (1100 models) - removal, overhaul and installation

Warning: *If the caliper indicates the need for an overhaul (usually due to leaking fluid or sticky operation), all old brake fluid should be flushed from the system. Also, the dust created by the brake system may contain asbestos, which is harmful to your health. Never blow it out with compressed air and don't inhale any of it. An approved filtering mask should be worn when working on the brakes. Do not, under any*

circumstances, use petroleum-based solvents to clean brake parts. Use clean brake fluid, brake cleaner or denatured alcohol only.

Removal

1 Place the bike on its main stand.
2 Remove the brake hose banjo fitting bolt and separate the hose from the caliper. Plug the hose end or wrap a plastic bag tightly around it to minimize fluid loss and prevent dirt entering the system. Discard the sealing washers; new ones must be used on installation. Note: *If you're planning to overhaul the caliper and don't have a source of compressed air to blow out the pistons, just loosen the banjo bolt at this stage and retighten it lightly. The bike's hydraulic system can then be used to force the piston out of the body once the pads have been removed. Disconnect the hose once the pistons have been sufficiently displaced.*
3 Remove the caliper mounting bolts and slide the caliper off the disc.
4 If caliper bracket removal is required, ensure that the weight of the motorcycle is off the rear wheel. Disconnect the brake torque arm from the top of the bracket, and withdraw the wheel axle to free its bottom mounting.

Overhaul

5 The caliper is identical to that fitted to the front brakes; refer to Section 3, Steps 6 through 19, noting the Specifications for the rear brake caliper at the beginning of this Chapter.

Installation

6 If the mounting bracket was removed, slide the wheel axle back through its lower mounting point and through the wheel hub and final drive unit; tighten the wheel nut to the specified torque. Reconnect the torque arm to the mounting bracket and install a new cotter pin (split pin) to secure the nut.
7 Slide the caliper assembly onto the disc, taking care not to disturb the anti-rattle spring fitted to the top of the mounting bracket. Apply silicon grease to the shafts of the upper and lower mounting bolts and inside their dust boots and install them in the caliper; tighten to the specified torque.
8 Connect the brake hose to the caliper, using new sealing washers on each side of the fitting. Tighten the banjo fitting bolt to the specified torque.
9 Fill the master cylinder with the recommended brake fluid (see Chapter 1) and bleed the hydraulic system as described in Section 11.
10 Check for leaks and thoroughly test the operation of the brake before riding the motorcycle on the road.

8 Rear brake disc (1100 models) - inspection, removal and installation

Inspection

1 Refer to Section 4 of this Chapter, noting that the dial indicator should be attached to the swingarm.

Removal

2 Remove the wheel as described in Section 16. **Caution:** *Don't lay the wheel down and allow it to rest on the disc - the disc could become warped. Set the wheel on wood blocks so the disc doesn't support the weight of the wheel.*
3 Mark the relationship of the disc to the wheel, so it can be installed in the same position. Remove the bolts that retain the disc to the wheel. Loosen the bolts a little at a time, in a criss-cross pattern, to avoid distorting the disc then remove the disc.

Installation

4 Position the disc on the wheel, aligning the previously applied match marks (if you're reinstalling the original disc).
5 Install the bolts and tighten them evenly and progressively to the specified torque setting. Clean off all grease from the brake disc using acetone or brake system cleaner. If a new brake disc has been installed, remove any protective coating from its working surfaces.
6 Install the wheel as described in Section 16.
7 Operate the brake pedal several times to bring the pads into contact with the disc. Check the operation of the brake carefully before riding the motorcycle.

9 Rear brake master cylinder (1100 models) - removal, overhaul and installation

1 If the master cylinder is leaking fluid, or if the pedal does not produce a firm feel when the brake is applied, and bleeding the brakes does not help, master cylinder overhaul is recommended. Before disassembling the master cylinder, read through the entire procedure and make sure that you have the correct rebuild kit. Also, you will need some new, clean brake fluid of the recommended type, some clean shop towels and internal snap-ring pliers.
2 Caution: *Disassembly, overhaul and reassembly of the brake master cylinder must be done in a spotlessly clean work area to avoid contamination and possible failure of the brake hydraulic system components.*

Removal

Sabre models

3 Set the bike on its main stand. Remove the right side cover (see Chapter 6).
4 Remove the right muffler (silencer) from the exhaust system (see Chapter 4). Remove the right passenger footpeg bracket (see Chapter 6).
5 Disconnect the reservoir-to-master cylinder hose at the master cylinder end and catch the escaping brake fluid. Remove the reservoir mounting screw and remove the reservoir from the motorcycle.
6 Unscrew the banjo union bolt from the top of the master cylinder. Discard the sealing washers on each side of the fitting. Wrap the end of the hose in a clean shop towel and suspend the hose in an upright position or bend it down carefully and place the open end in a clean container. The objective is to prevent excessive loss of brake fluid, fluid spills and system contamination.
7 Remove the two master cylinder mounting bolts and tilt it backwards to gain access to the pushrod-to-brake pedal clevis link. If access if available to the cotter pin (split pin), washer and clevis pin, remove them to allow separation of the pedal and link, but if not, fully unscrew the master cylinder pushrod from the locknuts on the link. Remove the master cylinder from the motorcycle. **Note:** *If the pushrod and link are separated, it is advised to mark the pushrod threads with white paint or tape, level with the surface of the top locknut so that the link can be returned to its original position on installation.*

Magna models

8 Set the bike on its main stand. Remove the right side cover (see Chapter 6).
9 Remove the right passenger footpeg bracket (see Chapter 6).
10 Unscrew the banjo union bolt from the top of the master cylinder. Discard the sealing washers on each side of the fitting. Wrap the end of the hose in a clean shop towel and suspend the hose in an upright position or bend it down carefully and place the open end in a clean container. The objective is to prevent excessive loss of brake fluid, fluid spills and system contamination.
11 Extract the cotter pin (split pin), washer and clevis pin from the master cylinder pushrod link and detach the link from the brake pedal.
12 Remove the two master cylinder mounting bolts, followed by the reservoir mounting screw, then withdraw the master cylinder/reservoir from the motorcycle. Remove the reservoir cap, plate and diaphragm, then drain all fluid from it and loosen the reservoir-to-master cylinder hose clamps at either end to separate the two components.

Overhaul

13 Disengage the rubber dust boot from the bottom of the master cylinder. If the boot is split or damaged it must be replaced; on Magna models, this will necessitate removal of the clevis from the pushrod end (see Step 7).
14 Depress the pushrod and, using snap-ring pliers, remove the snap-ring. Slide out the piston assembly and spring. Lay the parts out in the proper order to prevent confusion during reassembly.
15 Clean all of the parts with brake system cleaner (available at auto parts stores), isopropyl alcohol or clean brake fluid. **Caution:** *Do not, under any circumstances, use a petroleum-based solvent to clean brake parts.* If compressed air is available, use it to dry the parts thoroughly (make sure it's filtered and unlubricated).
16 Check the master cylinder bore for corrosion, scratches, nicks and score marks. If damage is evident, the master cylinder must be replaced with a new one. If the master cylinder is in poor condition, then the caliper should be checked as well.
17 If the necessary measuring equipment is available, compare the dimensions of the master cylinder bore and piston to those given in the Specifications Section of this Chapter, replacing any component that it worn beyond the service limit.
18 A new piston and spring are included in the rebuild kit. Use them regardless of the condition of the old ones.
19 Before reassembling the master cylinder, soak the piston and the rubber cup seals in clean brake fluid for ten or fifteen minutes. Lubricate the master cylinder bore with clean brake fluid, then carefully insert the parts in the reverse order of disassembly, ensuring the tapered end of the spring is facing the piston. Make sure the lips on the cup seals do not turn inside out when they are slipped into the bore.
20 Depress the pushrod, then install the snap-ring (make sure the snap-ring is properly seated in the groove). Install the dust boot on the master cylinder. If the clevis was removed on Magna models, install the top locknut (using the previously made marks), clevis and bottom locknut; tighten the locknuts to secure the clevis.

Installation

21 Installation is a reverse of removal, noting the following:

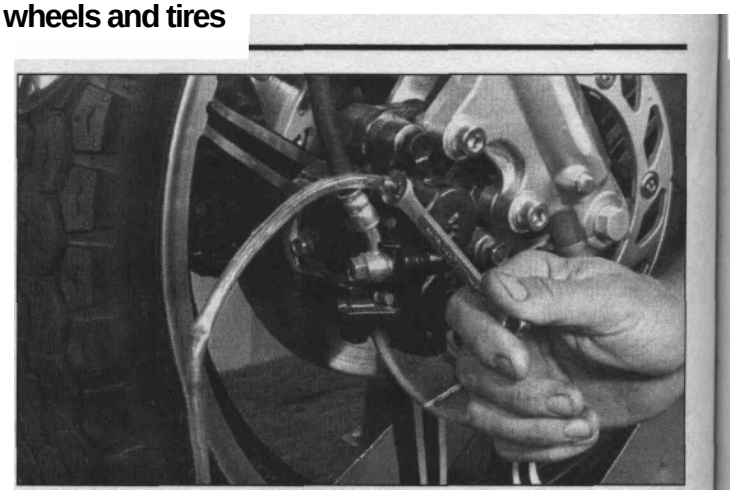
a) On Sabre models, tighten the top and bottom locknuts to secure the clevis on the pushrod (use the previously made marks to return it to its original position).
b) On Magna models, connect the clevis to the brake pedal, insert the clevis pin, washer and a new cotter pin (split pin); bend the cotter pin legs around the pin end to secure it.
c) Use new sealing washers on each side of the banjo union bolt and ensure the union butts against the cast lug on the master cylinder when tightened to the specified torque.
d) If the reservoir hose adaptor on the master cylinder body was disturbed, install it using a new O-ring. Ensure the reservoir hose is securely clamped to its unions.

22 Fill the fluid reservoir with the specified fluid (see Chapter 1) and bleed the system following the procedure in Section 11. Install the right side cover.
23 Check the brake pedal height and adjust it if necessary by altering the clevis position on the master cylinder pushrod (see Chapter 1). Check the operation of the rear brake carefully before riding the motorcycle.

10 Brake hoses - inspection and replacement

Inspection

1 Once a week, or if the motorcycle is used less frequently, before every ride, check the condition of the brake hoses.
2 Twist and flex the rubber hoses while looking for cracks, bulges and seeping fluid. Check extra carefully around the areas where the hoses connect with the banjo fittings, as these are common areas for hose failure.
3 Inspect the metal banjo union fittings connected to brake hoses.



11.5 Apparatus for bleeding the brakes

If the fittings are rusted, scratched or cracked, replace them. 4 Inspect the three-way hose joint fitted to the lower triple clamp of 1982 through 1986 models. If it shows signs of leakage or corrosion, drain the system and remove it for inspection. Refer to Chapter 6 *'Steering stem - removal and installation'* for details of removal of the three-way union.

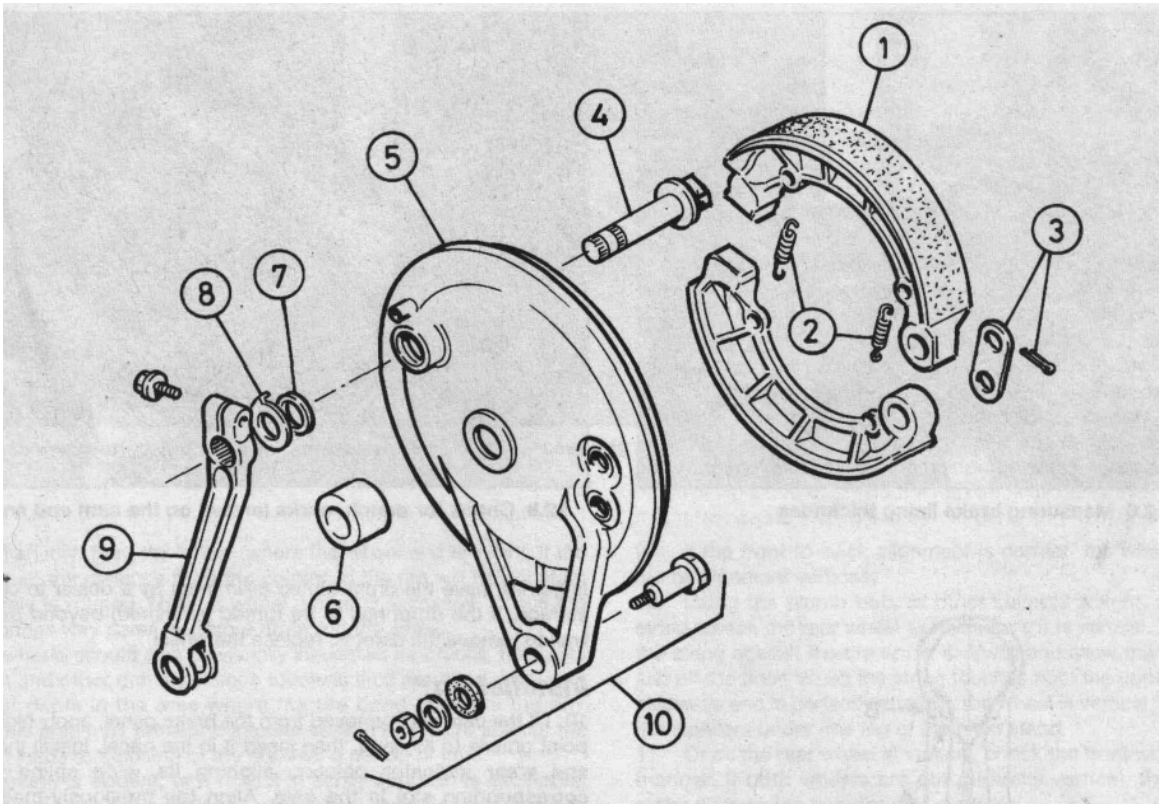
Replacement

5 The brake hoses have banjo union fittings on each end of the hose. Cover the surrounding area with plenty of shop towels and unscrew the banjo bolt on each end of the hose. Detach the hose from any clips that may be present and remove the hose. Discard the sealing washers.
6 Position the new hose, making sure it isn't twisted or otherwise strained, between the two components. Make sure the metal tube portion of the banjo fitting butts against or is located between the protrusions on the component it's connected to, if equipped. Install the banjo bolts, using new sealing washers on both sides of the fittings, and tighten them to the specified torque setting.
7 Flush the old brake fluid from the system, refill the system with the recommended fluid (see Chapter 1) and bleed the air from the system (see Section 11). Check the operation of the brakes carefully before riding the motorcycle.

11 Brake system bleeding

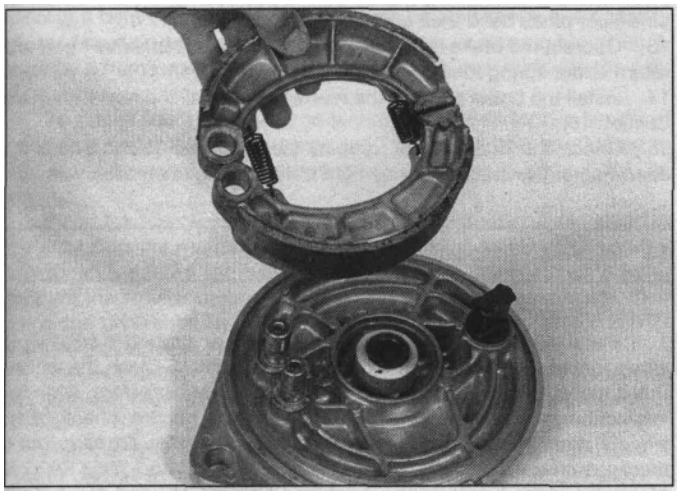
Refer to illustration 11.5

1 Bleeding the brakes is simply the process of removing all the air bubbles from the brake fluid reservoirs, the hoses and the brake calipers. Bleeding is necessary whenever a brake system hydraulic connection is loosened, when a component or hose is replaced, or when the master cylinder or caliper is overhauled. Leaks in the system may also allow air to enter, but leaking brake fluid will reveal their presence and warn you of the need for repair.
2 To bleed the brakes, you will need some new, clean brake fluid of the recommended type (see Chapter 1), a length of clear vinyl or plastic tubing, a small container partially filled with clean brake fluid, some shop towels and a wrench to fit the brake caliper bleeder valves.
3 Cover the fuel tank and other painted components to prevent damage in the event that brake fluid is spilled.
4 Remove the reservoir cap or cover, plate (where fitted), diaphragm and float (1988 750 Magna) and slowly pump the brake lever or pedal a few times, until no air bubbles can be seen floating up from the holes at the bottom of the reservoir. Doing this bleeds the air from the master cylinder end of the line. Install the reservoir cap/cover components loosely.
5 Attach one end of the clear vinyl or plastic tubing to the bleeder valve and submerge the other end in the brake fluid in the container **(see illustration).**



12.3 Rear drum brake components

1 *Brake shoes*
2 *Return springs*
3 *Retaining plate and cotter pins*
4 *Brake cam*
5 *Brake panel*
6 *Wheel spacer*
7 *Felt seal*
8 *Wear indicator plate*
9 *Brake lever*
10 *Torque arm connection components (later models)*



12.4 Remove the brake shoes and springs as a single unit

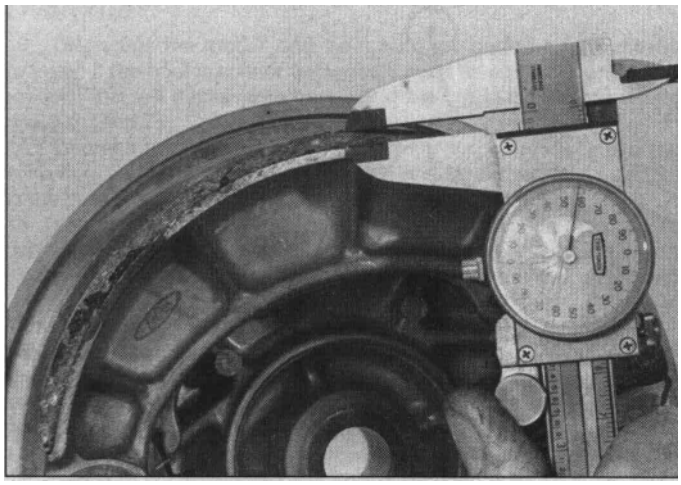
6 Remove the reservoir cap/cover components and check the fluid level. Do not allow the fluid level to drop below the lower mark during the bleeding process.
7 Carefully pump the brake lever or pedal three or four times and hold it in (front) or down (rear) while opening the caliper bleeder valve. When the valve is opened, brake fluid will flow out of the caliper into the clear tubing and the lever will move toward the handlebar or the pedal will move down.
8 Retighten the bleeder valve, then release the brake lever or pedal gradually. Repeat the process until no air bubbles are visible in the brake fluid leaving the caliper and the lever or pedal is firm when applied.
9 Install the reservoir cap or cover, wipe up any spilled brake fluid and check the entire system for leaks. **Note:** *If bleeding is difficult, it may be necessary to let the brake fluid in the system stabilize for a few hours (it may be aerated). Repeat the bleeding procedure when the tiny bubbles in the system have settled out.*

12 Rear drum brake (700/750 models) - removal, inspection and installation

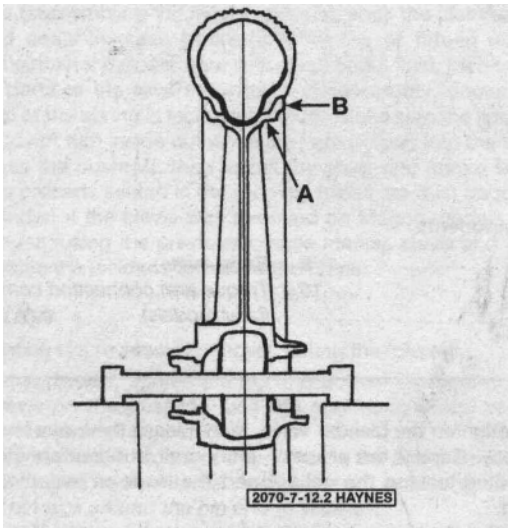
Warning: *The dust collected by the brake system may contain asbestos, which is harmful to your health. Never blow it out with compressed air and don't inhale any of it. An approved filtering mask should be worn when working on the brakes.*

Removal

Refer to illustrations 12.3 and 12.4
1 Before you start, inspect the rear brake wear indicator (see Chapter 1).
2 Remove the rear wheel (see Section 16) and lift the brake panel out of the hub.
3 Remove the cotter pins (split pins) from the pivot posts and lift off the retaining plate **(see illustration).**
4 Fold the shoes toward each other to release the spring tension. Remove the shoes and springs from the brake panel **(see illustration).**

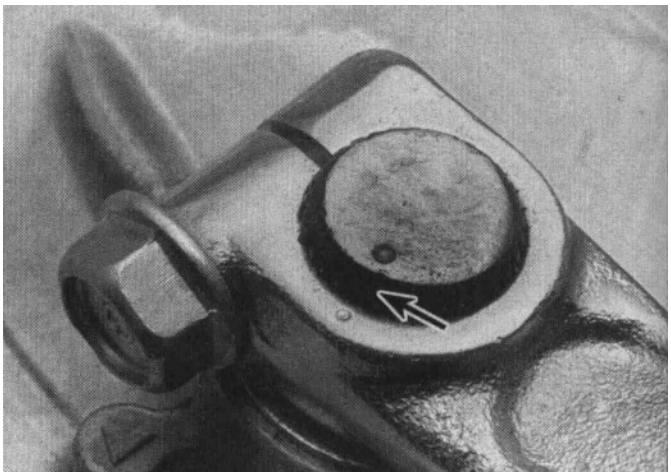


12.6 Measuring brake lining thickness



13.2a Use a dial indicator to measure wheel runout

A Radial runout *B Axial runout*



12.8 Check for punch marks (arrow) on the cam end and lever

fingernail, have the drum turned (skimmed) by a dealer to correct the surface. If the drum has to be turned (skimmed) beyond the service limit to remove the defects, replace the wheel.

Installation

10 If the cam was removed from the brake panel, apply high-melting point grease to its shaft, then insert it in the panel. Install the felt seal and wear indicator pointer, aligning its wide spline with the corresponding slot in the cam. Align the previously-made match marks, and install the brake lever on the cam splines. Install and tighten its pinch bolt to the specified torque.

11 Apply high-melting point grease to the shoe pivots and the cam.

12 Hook the springs into the shoe holes. Position the shoes in a V on the brake panel, then fold them down into position. Make sure the ends of the shoes fit correctly against the cam and over the pivot posts. Install the retaining plate over the pivot posts and fit new cotter pins (split pins); bend their ends around the posts.

13 Operate the brake lever and check that the shoes move freely and return under spring tension.

14 Install the brake panel in the rear wheel. Install the rear wheel (see Section 16).

15 Check the brake pedal freeplay (see Chapter 1) and check the operation of the brake and stop light before riding the motorcycle.

Inspection

Refer to illustrations 12.6 and 12.8

5 Check the linings for wear, damage and signs of contamination from road dirt or water. If the linings are visibly defective, replace them.

6 Measure the thickness of the lining material (just the lining material, not the metal backing) and compare with the service limit in this Chapter's Specifications **(see illustration).** Replace the shoes if the lining is near to or worn beyond the service limit.

7 Check the ends of the shoes where they contact the brake cam and pivot posts. Replace the shoes if there's visible wear at these points.

8 Check the brake cam and pivot posts for wear and damage. Look for punch alignment marks on the cam end and lever, and if none are found make your own, then remove the pinch bolt, lever, wear indicator pointer, felt seal and cam from the brake panel **(see illustration).**

9 Check the brake drum (inside the wheel hub) for wear and damage. Measure the diameter at several points with a brake drum micrometer. If the measurements are uneven (indicating that the drum is out-of-round) or if there are scratches deep enough to snap a

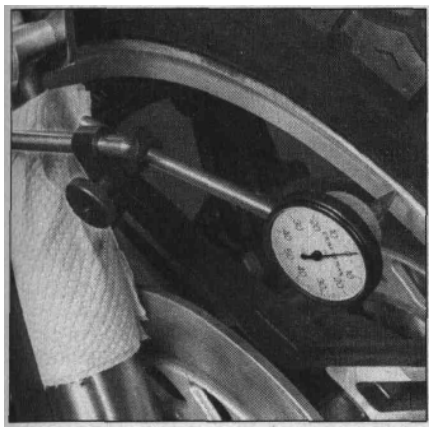
13 Wheels - inspection and repair

Refer to illustrations 13.2a, 13.2b and 13.2c

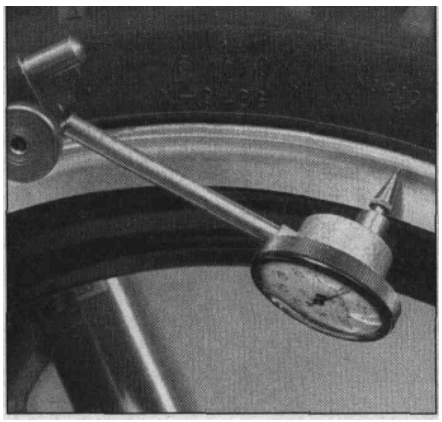
1 Place the motorcycle on the main stand, or support it securely in an upright position where only a side stand is fitted. Clean the wheels thoroughly to remove mud and dirt that may interfere with the inspection procedure or mask defects. Make a general check of the wheels and tires as described in Chapter 1. **Note:** *To carry out a thorough check of the rear wheel casting on 1987 and 1988 700/750 Magna models, remove the wheel* (see Section 16) *and remove the wheel cover from the left side; it is retained by three screws to the wheel hub.*

2 With the wheel being checked raised off the ground, attach a dial indicator to the fork slider or the swingarm and position its stem against the side of the rim **(see illustrations).** Spin the wheel slowly and check the side-to-side (axial) runout of the m, then compare your readings with the value listed in this Chapter's Specifications. In order to accurately check radial runout with the dial indicator, the wheel would have to be removed from the machine. With the axle clamped in a vise, the wheel can be rotated to check the runout **(see illustration).**

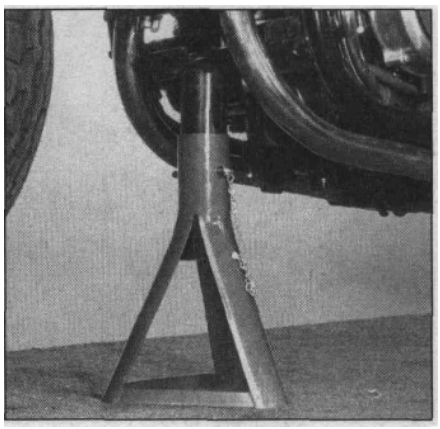
3 An easier, though slightly less accurate, method is to attach a stiff wire pointer to the fork slider or the swingarm and position the end a



13.2b Measuring axial runout



13.2c Measuring radial runout



15.1 Use a jackstand to raise the front wheel off the ground

fraction of an inch from the wheel (where the wheel and tire join). If the wheel is true, the distance from the pointer to the rim will be constant as the wheel is rotated. **Note:** *If wheel runout is excessive, check the wheel bearings very carefully before replacing the wheel.*

4 The wheels should also be visually inspected for cracks, flat spots on the rim and other damage. Since tubeless tires are fitted, look very closely for dents in the area where the tire bead contacts the rim. Dents in this area may prevent complete sealing of the tire against the rim, which leads to deflation of the tire over a period of time.

5 If damage is evident, or if runout in either direction is excessive, the wheel will have to be replaced with a new one. Never attempt to repair a damaged cast aluminum wheel.

14 Wheels - alignment check

1 Misalignment of the wheels, which may be due to a cocked rear wheel or a bent frame or triple clamps, can cause strange and possibly serious handling problems. If the frame or triple clamps are at fault, repair by a frame specialist or replacement with new parts are the only alternatives.

2 To check the alignment you will need an assistant, a length of string or a perfectly straight piece of wood and a ruler graduated in 1/64 inch increments. A plumb bob or other suitable weight will also be required.

3 Place the motorcycle on the main stand. Where no main stand is fitted, support the motorcycle securely under the crankcase so that it is vertical. Measure the width of both tires at their widest points. Subtract the smaller measurement from the larger measurement, then divide the difference by two. The result is the amount of offset that should exist between the front and rear tires on both sides.

4 If a string is used, have your assistant hold one end of it about half way between the floor and the rear axle, touching the rear sidewall of the tire.

5 Run the other end of the string forward and pull it tight so that it is roughly parallel to the floor. Slowly bring the string into contact with the front sidewall of the rear tire, then turn the front wheel until it is parallel with the string. Measure the distance from the front tire sidewall to the string.

6 Repeat the procedure on the other side of the motorcycle. The distance from the front tire sidewall to the string should be equal on both sides.

7 As was previously pointed out, a perfectly straight length of wood may be substituted for the string. The procedure is the same.

8 If the distance between the string and tire is greater on one side, or if the rear wheel appears to be cocked, first check the condition of the swingarm bearings (see Chapter 6). If the bearings are not worn, the swingarm or frame may be bent.

9 If the front-to-back alignment is correct, the wheels still may be out of alignment vertically.

10 Using the plumb bob, or other suitable weight, and a length of string, check the rear wheel to make sure it is vertical. To do this, hold the string against the tire upper sidewall and allow the weight to settle just off the floor. When the string touches both the upper and lower tire sidewalls and is perfectly straight, the wheel is vertical. If it is not, place thin spacers under one leg of the main stand.

11 Once the rear wheel is vertical, check the front wheel in the same manner. If both wheels are not perfectly vertical, the frame and/or major suspension components are bent.

15 Front wheel - removal and installation

Removal

Refer to illustrations 15.1, 15.9, 15.10 and 15.11

1 Place the motorcycle on its main stand, then raise the front wheel off the ground by tying down the rear of the machine or using a jackstand under the engine **(see illustration).** On models without a main stand, remove the belly fairing (see Chapter 6) and place a floor jack, with a wood block on the jack head, under the crankcase; raise the jack to lift the wheel off the ground.

Sabre models

2 On 1100 models and 1982/83 750 Sabres, remove its set screw and release the speedometer sensor unit from the left side of the axle. On 1984/85 700 Sabres, remove the set screw and withdraw the speedometer cable from the drive unit. Release its wiring or cable (as applicable) from the guide on the left caliper bracket.

3 Remove the two caliper bracket-to-fork slider bolts and withdraw the right caliper complete with its bracket from the slider. Support the caliper so that it does not hang by its hose. **Note:** *Place a wood or plastic wedge between the brake pads to prevent their accidental expulsion if the brake lever is operated.*

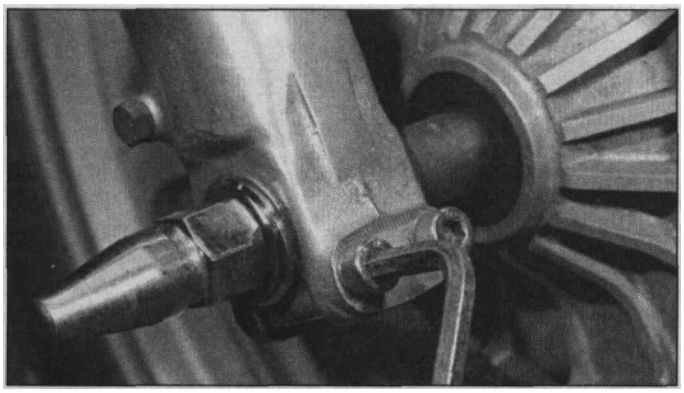
4 Loosen the axle clamp bolts (700/750) or axle pinch bolt (1100) **on** the right side, then unscrew and withdraw the axle from the right side.

1982 through 1986 Magna models

5 Remove its set screw and pull the speedometer cable out of the speedometer drive unit.

6 Remove the two caliper-to-caliper bracket bolts from each caliper and slide the calipers off the disc; support their hoses to prevent strain on them. **Note:** *Place a wood or plastic wedge between the brake pads to prevent their accidental expulsion if the brake lever is operated.*

7 Loosen the axle pinch bolt on the right side, then unscrew and withdraw the axle from the right side.



15.9 Axle clamp bolts on 1987 and 1988 700/750 Magnas

1987 and 1988 700/750 Magna models

8 Remove its set screw and pull the speedometer cable out of the speedometer drive unit.

9 Loosen the axle pinch bolts on the left, then right side, remove the axle nut from the right side and pull the axle out from the left side **(see illustration).** Lower the wheel out of the brake caliper.

All models

10 Remove the spacer from the right side of the wheel and the speedometer drive from the left side **(see illustration). Caution:** *Don't lay the wheel down and allow it to rest on one of the discs - the disc could become warped. Set the wheel on wood blocks so the disc doesn't support the weight of the wheel.* **Note:** *Do not operate the front brake lever with the wheel removed.*

11 If the axle is corroded, remove the corrosion with fine emery cloth. Set the axle on V-blocks and measure the runout with a dial test indicator; if runout exceeds the service limit, replace the axle **(see illustration).**

12 Check the condition of the wheel bearings (see Section 17).

Installation

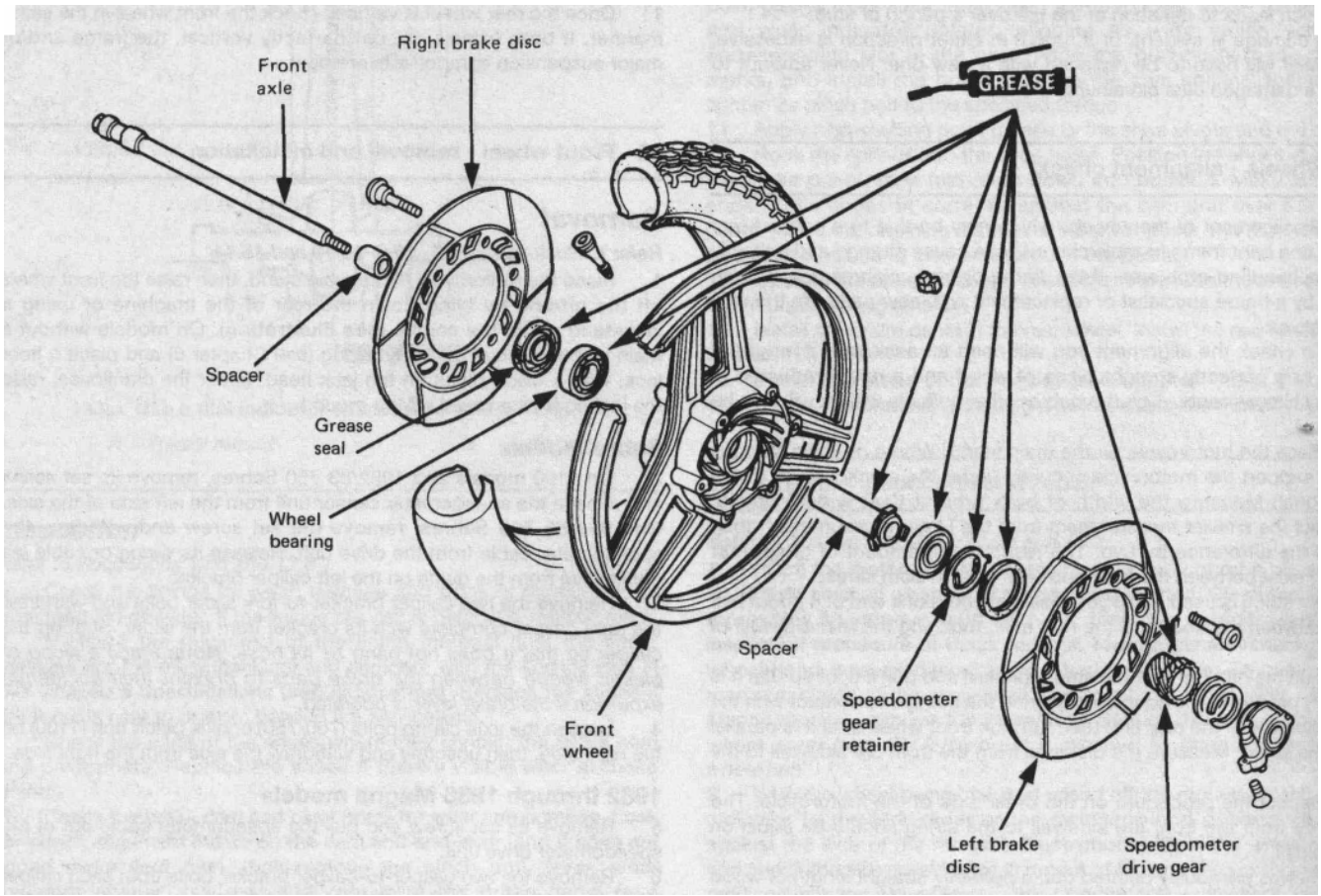
Refer to illustrations 15.14 and 15.16

13 Fit the speedometer drive unit to the left side wheel aligning its drive gear slots with the driveplate tabs. Install the spacer in the right side of the wheel.

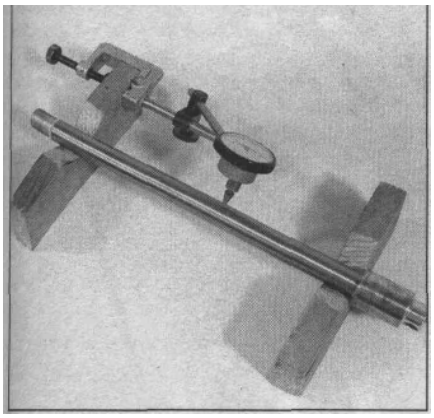
14 Maneuver the wheel into position. Apply a thin coat of grease to the axle. If the axle clamp was removed on 700/750 Sabre models, install it with its cast arrow facing forward, but leave its nuts loose at this stage **(see illustration).**

15 Lift the wheel into position, guiding the disc(s) between the brake pads on models where the calipers were not removed. Check that the right side spacer remains in place and position the speedometer drive unit so that its lug butts against the back of the cast lug on the left slider.

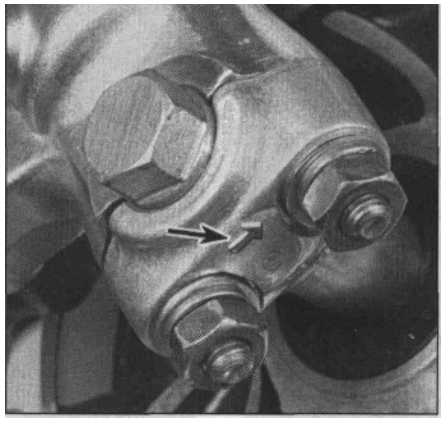
16 On 1982 through 1986 models, slide the axle into position from the right side and thread it into the threads of the left slider; tighten it to



15.10 Front wheel components

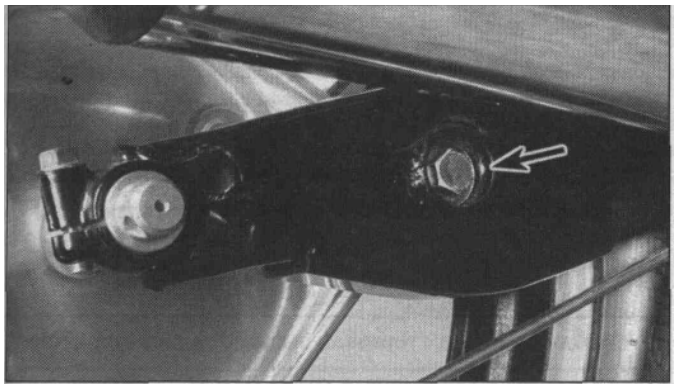


15.11 Measuring wheel axle runout

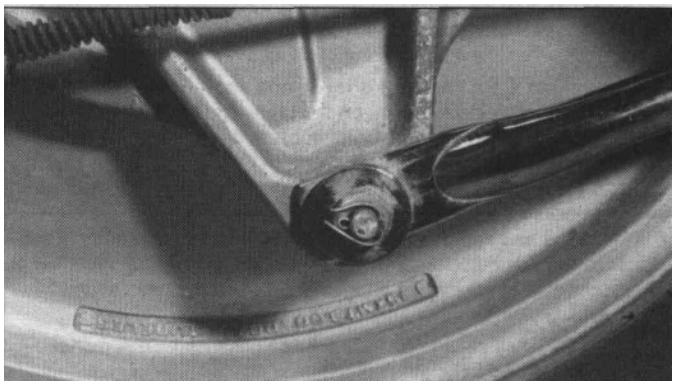


15.14 Arrow mark must face forward on 700/750 Sabre axle clamp

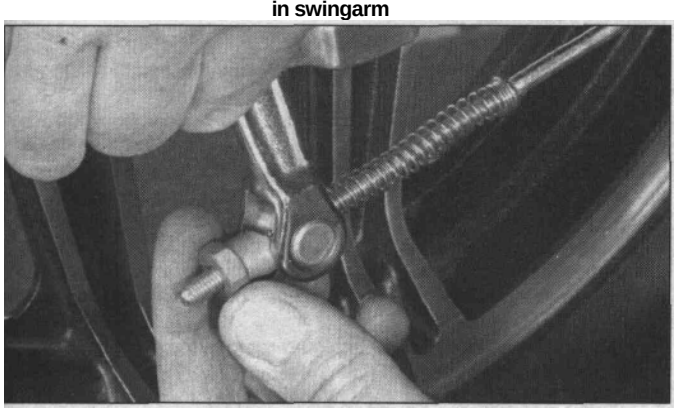
15.16 Measuring disc-to-caliper bracket clearance



16.3 Brake stopper bolt (arrow) is hidden behind cover in swingarm



16.4 Brake torque arm is retained to brake panel by split pin, nut and pivot bolt on 1985-on models



16.5 Fully unscrew the rear brake adjusting nut from the brake rod

the specified torque. If they were removed, install the calipers on the brake discs and tighten their mounting bolts to the specified torque. Using a 0.7 mm (0.028 in) feeler blade, measure the clearance between the right caliper bracket and the brake disc; if the clearance is less than the gauge thickness, pull the right slider outwards at the axle and leave it in place while the clamp or pinch bolts are tightened **(see illustration).** Tighten the pinch bolt or nuts to the specified torque, noting that on 700/750 models the forward nut on the clamp must be fully tightened, followed by the rear nut.

17 On 1987 and 1988 700/750 models, insert the axle from the left side, install the nut and tighten it to the specified torque.

18 Connect the speedometer cable or sensor to the drive unit and securely tighten its retaining screw. Loop the cable/wire through the wire guide on the left caliper bracket.

19 Remove the support from under the engine and rest the front wheel on the ground. Pump the front forks a few times to settle all components in position.

16 Rear wheel - removal and installation

Removal

700/750 models

Refer to illustrations 16.3, 16.4, 16.5 and 16.6

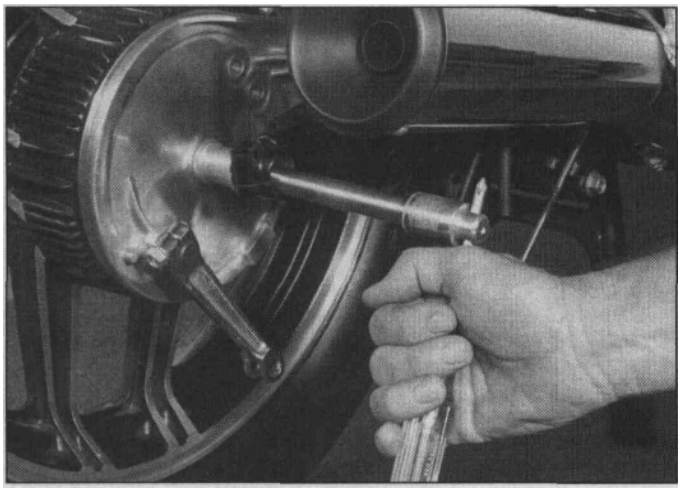
1 Set the bike on its main stand. On models without a main stand, place a floor jack, with a wood block on the jack head, under the rear of the engine and raise it so that the rear wheel is off the ground; support the bike securely using a jackstand.

2 Remove the rear axle nut on the left side of the wheel.

3 On Sabres and 1982 through 1984 Magnas, remove the plastic cover in the right side of the swingarm to gain access to the brake stopper bolt, then remove the bolt **(see illustration). Note:** *Hold the brake panel with your hand so the stopper bolt will come out freely.*

4 On 1985-on Magnas, remove the cotter pin (split pin), plain and rubber washers and pivot bolt from the brake torque arm end, and lower the torque arm away from the brake panel **(see illustration).**

5 While pushing forward on the rear brake lever to compress the spring, remove the rear brake adjusting nut and disengage the brake rod from the brake lever pivot trunnion **(see illustration).** Remove the



16.6 Use a bar through the axle head to pull it from position

pivot trunnion from the brake lever and thread the spring, pivot trunnion and adjusting nut back on the brake rod for safekeeping.

6 Loosen the axle pinch bolt located on the right side of the swingarm. Insert a screwdriver through the right end of the rear axle and pull the axle out **(see illustration).** Do not lose the spacer as the axle is withdrawn.

7 With the axle removed, pull the wheel (with the brake panel still in place) to the right, separating it from the final drive unit. Work it out toward the rear by passing it on the right side of the rear fender.

1100 models

8 Set the bike on its main stand.

9 Remove the rear axle nut on the left side of the wheel.

10 On Sabre models, remove the two caliper-to-bracket bolts and slip the caliper off the brake disc. Support it so that it doesn't hang by its hose.

11 Loosen the axle pinch bolt on the right end of the swingarm and withdraw the axle from the right side.

12 Pull the wheel to the right to separate it from the final drive unit. Work it out toward the rear by passing it on the right side of the rear fender. **Caution:** *Don't lay the wheel down and allow it to rest on the disc; it could become warped. Set the wheel on wood blocks so the disc doesn't support the weight of the wheel. Do not operate the brake pedal with the wheel removed.*

All models

13 If the axle is corroded, remove the corrosion with fine emery cloth. Set the axle on V-blocks and measure the runout with a dial test indicator; if runout exceeds the service limit, replace the axle **(see illustration 15.11).**

14 Check the condition of the wheel bearings (see Section 17).

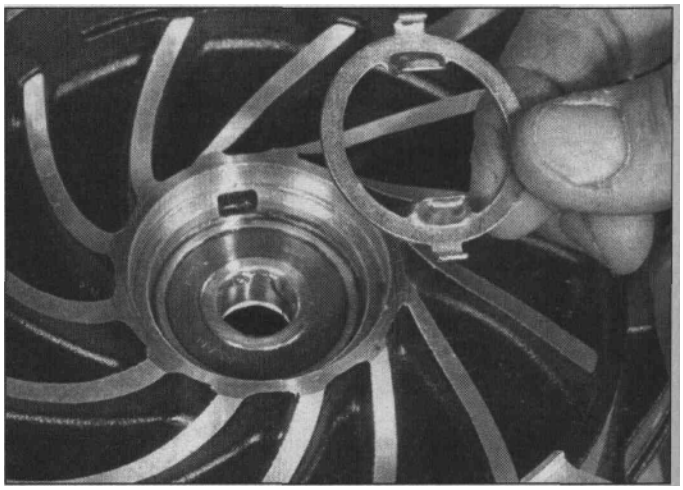
Installation

15 Installation is the reverse of the removal procedure, noting the following. **Note:** *Honda advise that the three final drive unit-to-swingarm nuts be loosened very slightly to ease axle installation.*

a) Apply multi-purpose grease (Honda specify type NLGI No. 2 grease with M_0S2 to the splines of the final drive flange attached to the left side of the hub.

b) Apply a thin coat of grease to the axle before installing it, then tighten its nut to the specified torque. Tighten the final drive-to-swingarm nuts to the specified torque (see Chapter 6 Specifications) once the axle has been installed.

e) Tighten the brake panel stop bolt (early 700175Os) or torque arm pivot bolt nut (later 700/750s) to the specified torque; install a new cotter pin (split pin) in the torque arm pivot bolt and bend its ends to secure the nut.



17.13 Speedometer driveplate tangs should fit in hub cutouts

d) Tighten the brake caliper bolts (1100 Sabre) to the specified torque.

e) Tighten the axle pinch bolt to *the specified torque.*

f) Adjust the rear brake freeplay on 700/750 models (see Chapter 1).

16 Operate the brake pedal to bring the pads back into contact with the disc on 1100 models. Check brake operation on all models before riding the motorcycle.

17 Wheel bearings - removal, inspection and installation ***Front wheel bearings***

Refer to illustration 17.13

Note: Always *replace the wheel bearings in pairs. Never replace the bearings individually.*

1 Remove the wheel (see Section 15),

2 Set the wheel on blocks so as not to allow the weight of the wheel rest on the brake discs.

3 Remove the speedometer drive unit and spacer from the wheel hub **(see illustration 15.10).**

4 Using a flat-bladed screwdriver, pry out the grease seal from the left side of the wheel, then withdraw the speedometer driveplate.

5 Pry out the grease seal from the right side of the wheel.

6 Using a metal rod (preferably a brass drift punch) inserted through the center of the hub bearing, tap evenly around the inner race of the opposite bearing to drive it from the hub. The bearing spacer will also come out.

7 Lay the wheel on its other side and remove the remaining bearing using the same technique.

8 If the bearings are of the unsealed type or only sealed on one side, clean them with a high flash-point solvent (one which won't leave any residue) and blow them dry with compressed air (don't let the bearings spin as you dry them). Apply a few drops of oil to the bearing. **Note:** *If the bearing is sealed on both sides don't attempt to clean it.*

9 Hold the outer race of the bearing and rotate the inner race - if the bearing doesn't turn smoothly, has rough spots or is noisy, replace it with a new one.

10 If the bearing checks out okay and was not damaged on removal from the hub, wash it in solvent once again and dry it, then pack the bearing with high-quality wheel bearing grease.

11 Thoroughly clean the hub area of the wheel. Install the bearing into the recess in the hub, with the marked or sealed side facing out. Using a bearing driver or a socket large enough to contact the outer race of the bearing, drive it in until it's completely seated.

12 Turn the wheel over and install the bearing spacer. Unless the

bearings are sealed on both sides, pack the remaining space no more than 2/3 full of high-melting point wheel bearing grease. Once the grease is packed in, driving the second bearing into place as described above.

13 Fit the speedometer driveplate to the left side of the wheel ensuring its locating tangs are correctly located in the hub slots **(see illustration).**

14 Install new grease seals, using a seal driver, large socket or a flat piece of wood to drive them into place.

15 Fit the speedometer drive unit to the left side of the wheel aligning its drive gear slots with the driveplate tabs. Install the spacer in the right side of the wheel. Clean off all grease from the brake disc(s) using acetone or brake system cleaner then install the wheel as described in Section 15.

Rear wheel bearings

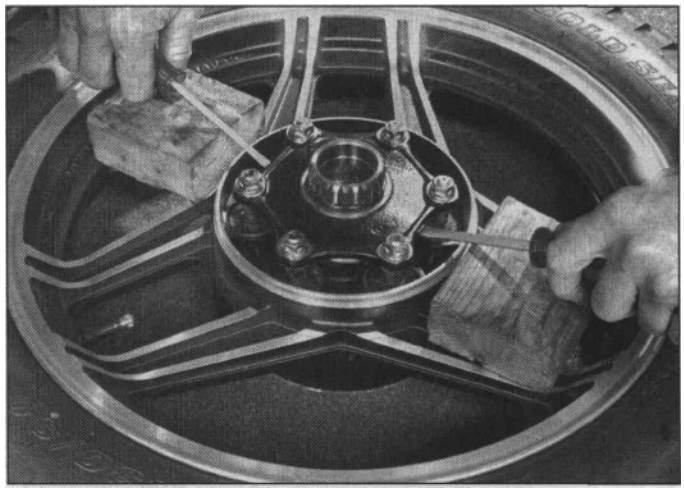
Note: *Always replace the wheel bearings in pairs. Never replace the bearings individually.*

Refer to illustrations 17.18a, 17.18b 17.19, 17.20, 17.22a, 17.22b and 17.22c

16 Remove the rear wheel (see Section 16). On 700/750 models, lift out the brake panel.

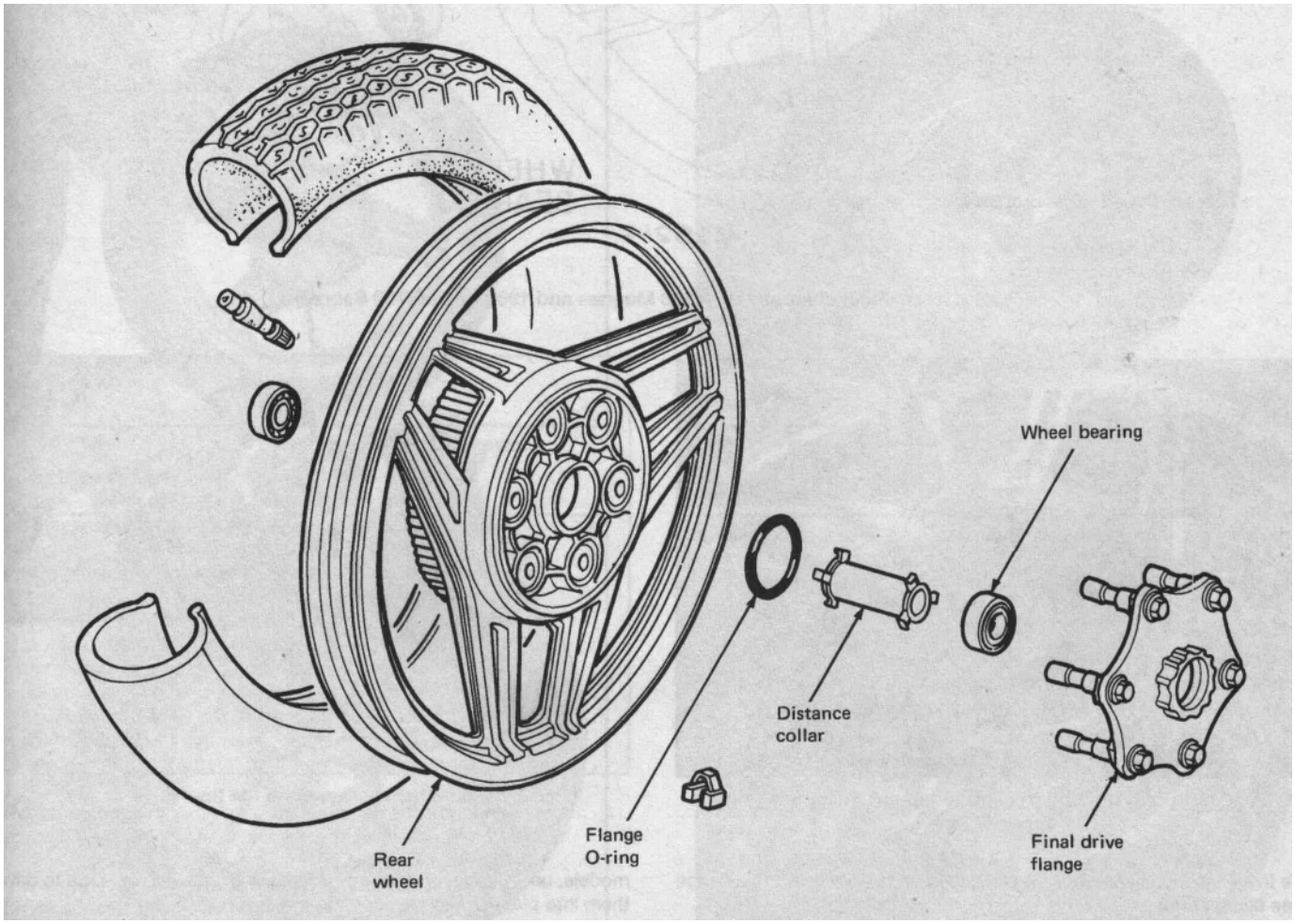
17 On 1100 models remove the brake disc (see Section 8) and pry out the spacer and grease seal on that side.

18 On 1100 Sabres, 700/750 Magnas and 1982 750 Sabres, lever the final drive flange out of the hub left side, leaving the rubber dampers in place in the wheel hub **(see illustrations). Caution:** *Do not attempt to unscrew the flange nuts - the posts are a press fit during manufacture and the nuts staked in place for security.*

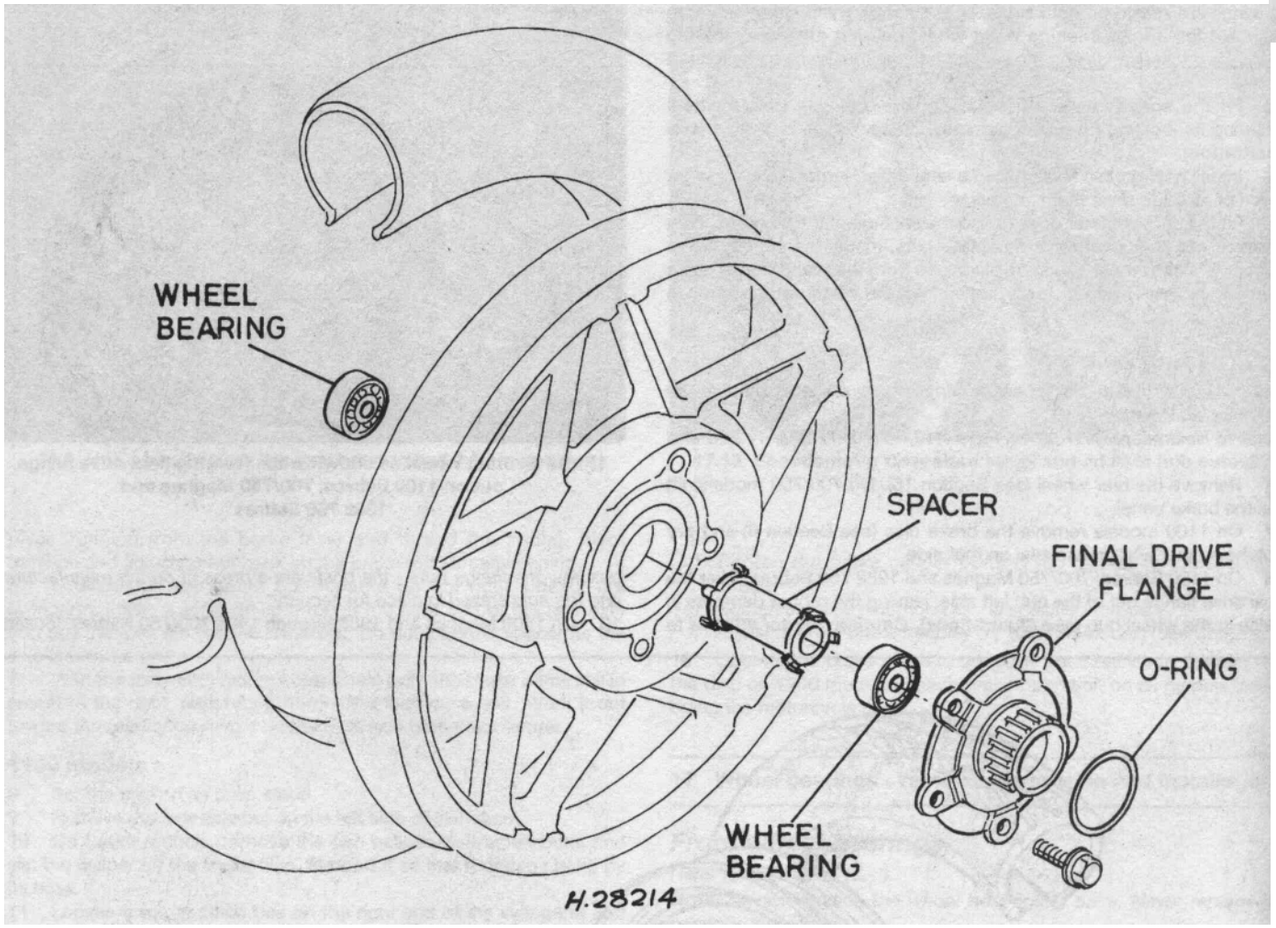


17.18a Protect wheel as shown when levering final drive flange out on 1100 Sabres, 700/750 Magnas and 1982 750 Sabres

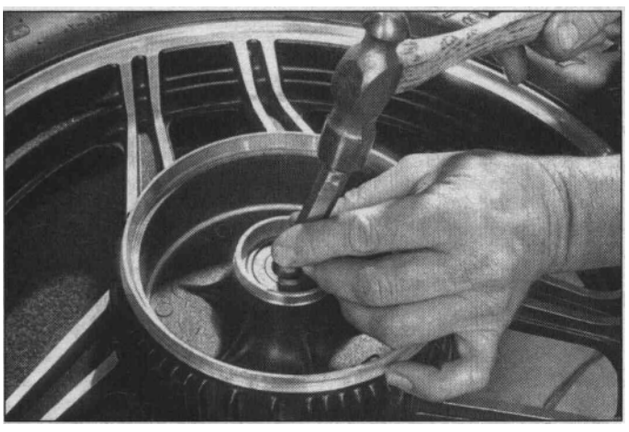
19 On 1100 Magnas and 1983 through 1985 700/750 Sabres, loosen



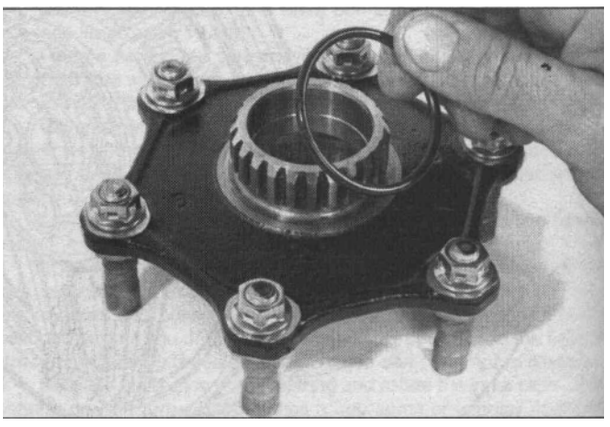
17.18b Rear wheel components (1100 Sabres, 700/750 Magnas and 1982 750 Sabres)



17.19 Rear wheel components (1100 Magnas and 1983-on 700/750 Sabres)



17.20 Pass a drift through the hub to tap out the bearing on the opposite side



17.22a Install a new O-ring on the final drive flange

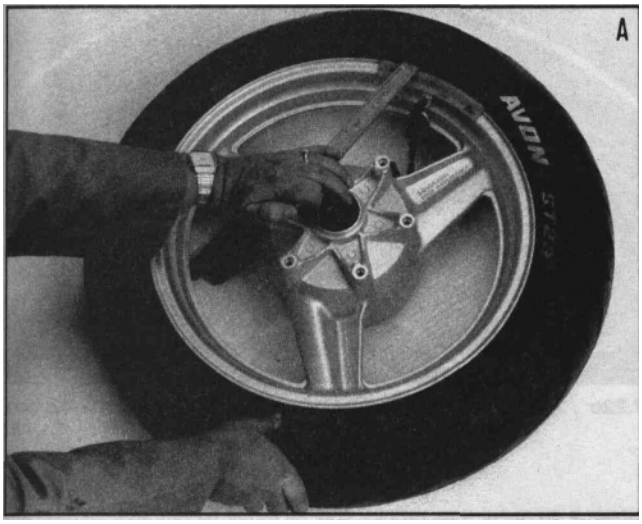
the five final drive flange bolts evenly, then lift out the final drive flange **(see illustration).**

20 Remove, inspect and install the bearings as described above in Steps 6 through 12 **(see illustration).**

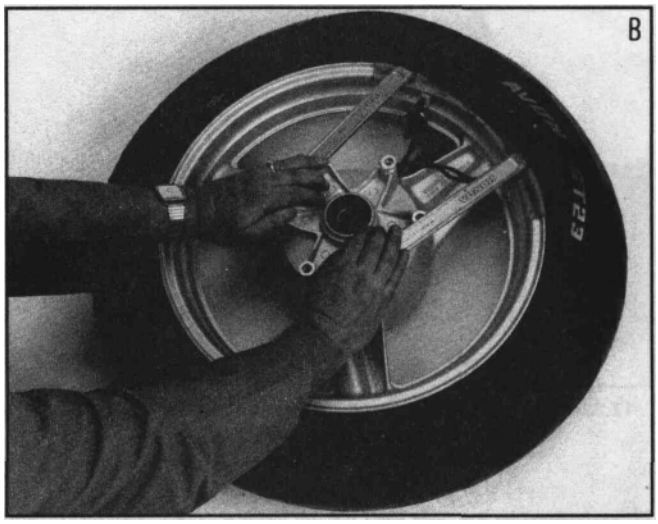
21 Install a new grease seal to the right side of the wheel on 1100 models, using a seal driver, large socket or a flat piece of wood to drive them into place. Fit the spacer into the seal.

22 Install a new O-ring on the final drive flange and apply a smear of grease to the O-ring. On 1100 Magnas and 1983-on 700/750 Sabres, install the drive flange to the wheel and tighten the bolts in a criss-

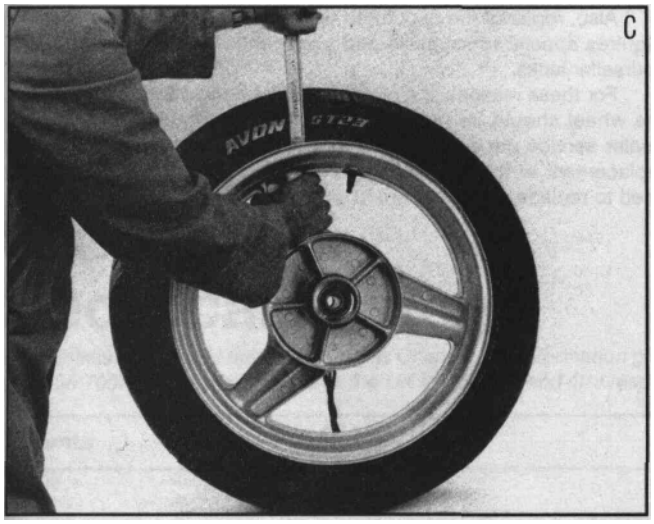
TIRE CHANGING SEQUENCE - TUBELESS TIRES



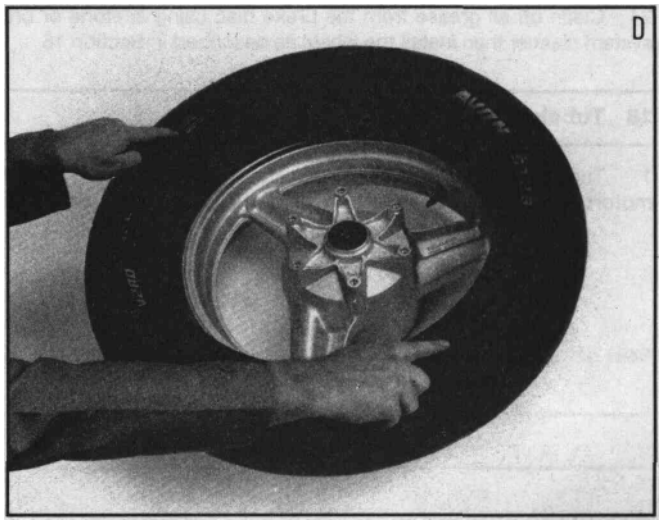
Deflate tire. After releasing beads, push tire bead into well of rim at point opposite valve. Insert lever next to valve and work bead over edge of rim.



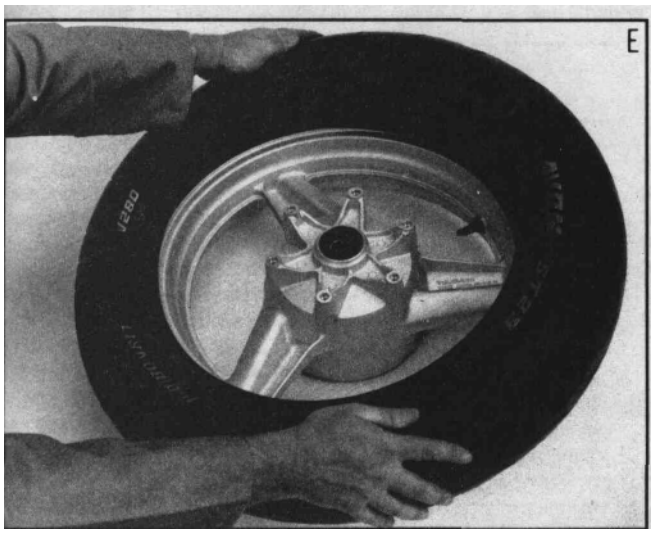
Use two levers to work bead over edge of rim. Note use of rim protectors.



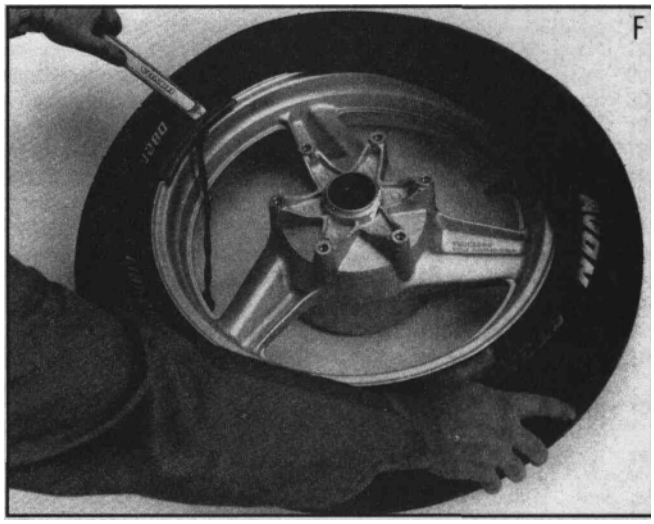
When first bead is clear, remove tire as shown.



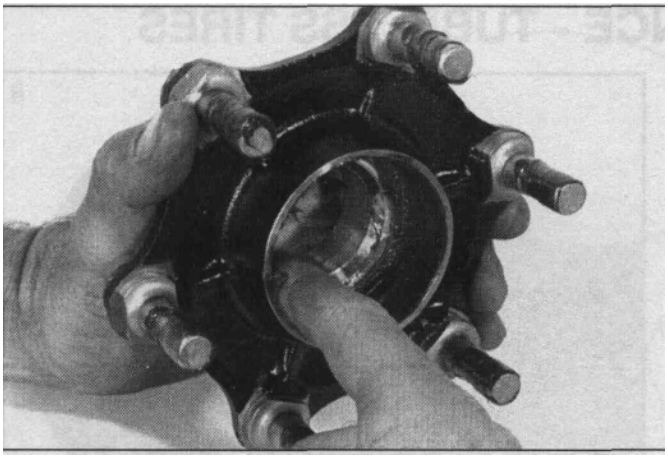
Before installing, ensure that tire is suitable for wheel. Take note of any sidewall markings such as direction of rotation arrows.



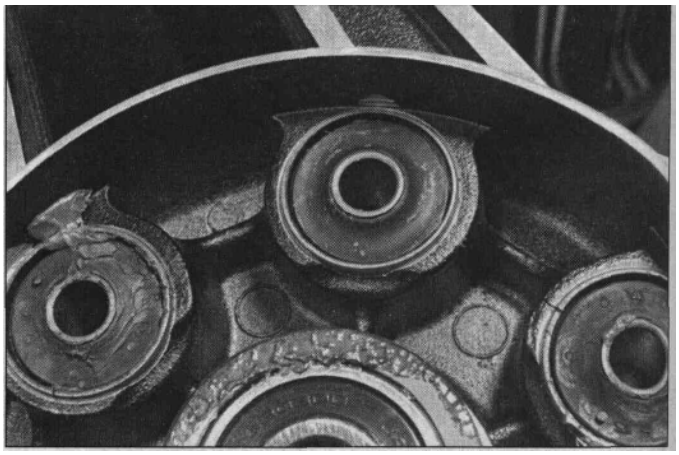
Work first bead over the rim flange.



Use a tire lever to work the second bead over rim flange.



17.22b Grease the flange posts and inner face on 1100 Sabres, 700/750 Magnas and 1982 750 Sabres ...



17.22c ... and insert the flange posts into the cush drive rubbers

cross pattern to the specified torque (where given). On 1100 Sabres, 700/750 Magnas and 1982 750 Sabres apply grease to the posts and install the drive flange **(see illustrations).**

23 On 1100 models, refit the disc to the rear wheel (see Section 8).

24 Clean off all grease from the brake disc using acetone or brake system cleaner then install the wheel as described in Section 16.

18 Tubeless tires - general information

1 Tubeless tires are used as standard equipment on this motorcycle. They are generally safer than tube-type tires but if problems do occur they require special repair techniques.

2 The force required to break the seal between the rim and the bead of the tire is substantial, and is usually beyond the capabilities of an individual working with normal tire irons.

3 Also, repair of the punctured tire and installation on the wheel rim requires special tools, skills and experience that the average do-it-yourselfer lacks.

4 For these reasons, if a puncture or flat occurs with a tubeless tire, the wheel should be removed from the motorcycle and taken to a dealer service department or a motorcycle repair shop for repair or replacement of the tire. The accompanying color illustrations can be used to replace a tubeless tire in an emergency.