HONDA

CB750 & CB900 dohc Fours

749cc ~ 901cc. 1978 to 1984

OWNERS WORKSHOP MANUAL

Haynes

THE BOOK

Honda 750 & 900 dohc Fours Owners Workshop Manual

by Pete Shoemark

Models covered

CB750 K. 749cc. Introduced UK October 1978, US September 1979
CB750 K LTD. 749cc. Introduced US only January 1979
CB750 F. 749cc. Introduced UK February 1980, US January 1979
CB750 F2. 749cc. Introduced UK only February 1982
CB750 C. 749cc. Introduced US only October 1979
CB750 SC. 749cc. Introduced US only January 1982
CB900 F. 901cc. Introduced UK January 1979, US September 1981
CB900 F2. 901cc. Introduced UK only March 1981

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Finally, we would also like to thank the Avon Rubber Company who provided information on tyre fitting, and NGK Spark Plugs (UK) Limited, who furnished advice about sparking plug conditions.

About this manual

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

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

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

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

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

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

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

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

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

We take great pride in the accuracy of information given in this manual, but motorcycle manufacturers make alterations and design changes during the production run of a particular motorcycle of which they do not inform us. No liability can be accepted by the authors or publishers for loss, damage or injury caused by any errors in, or omissions from, the information given.

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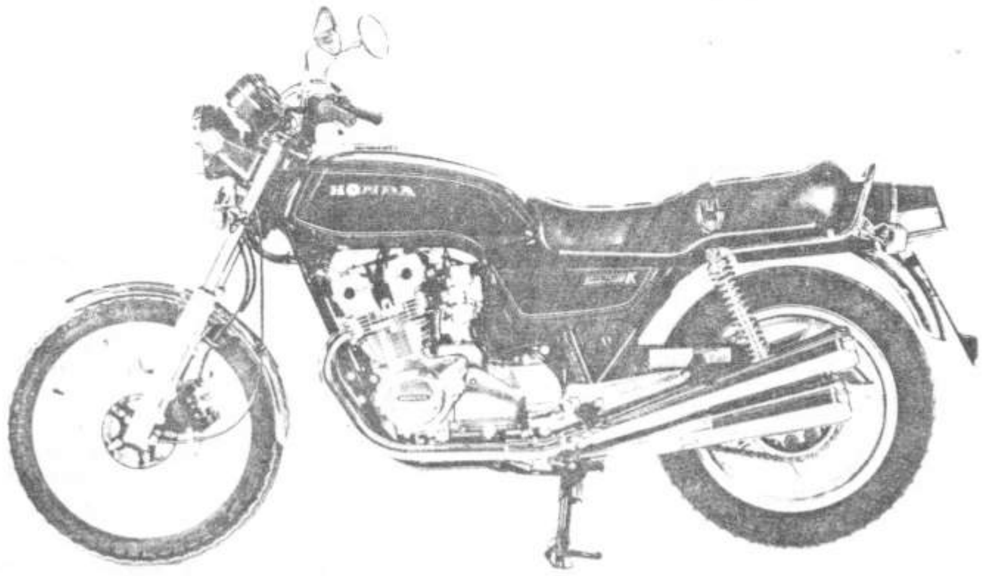
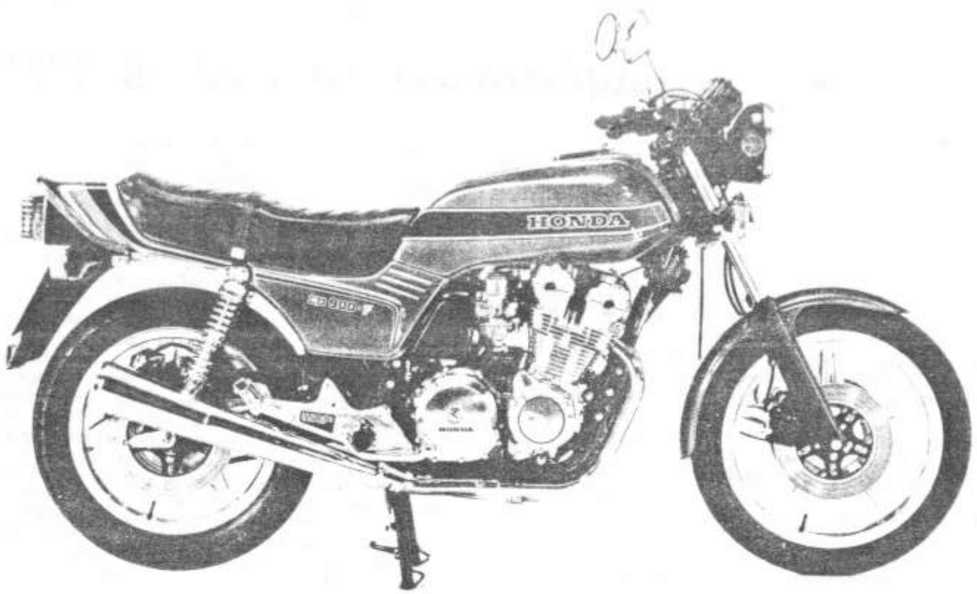


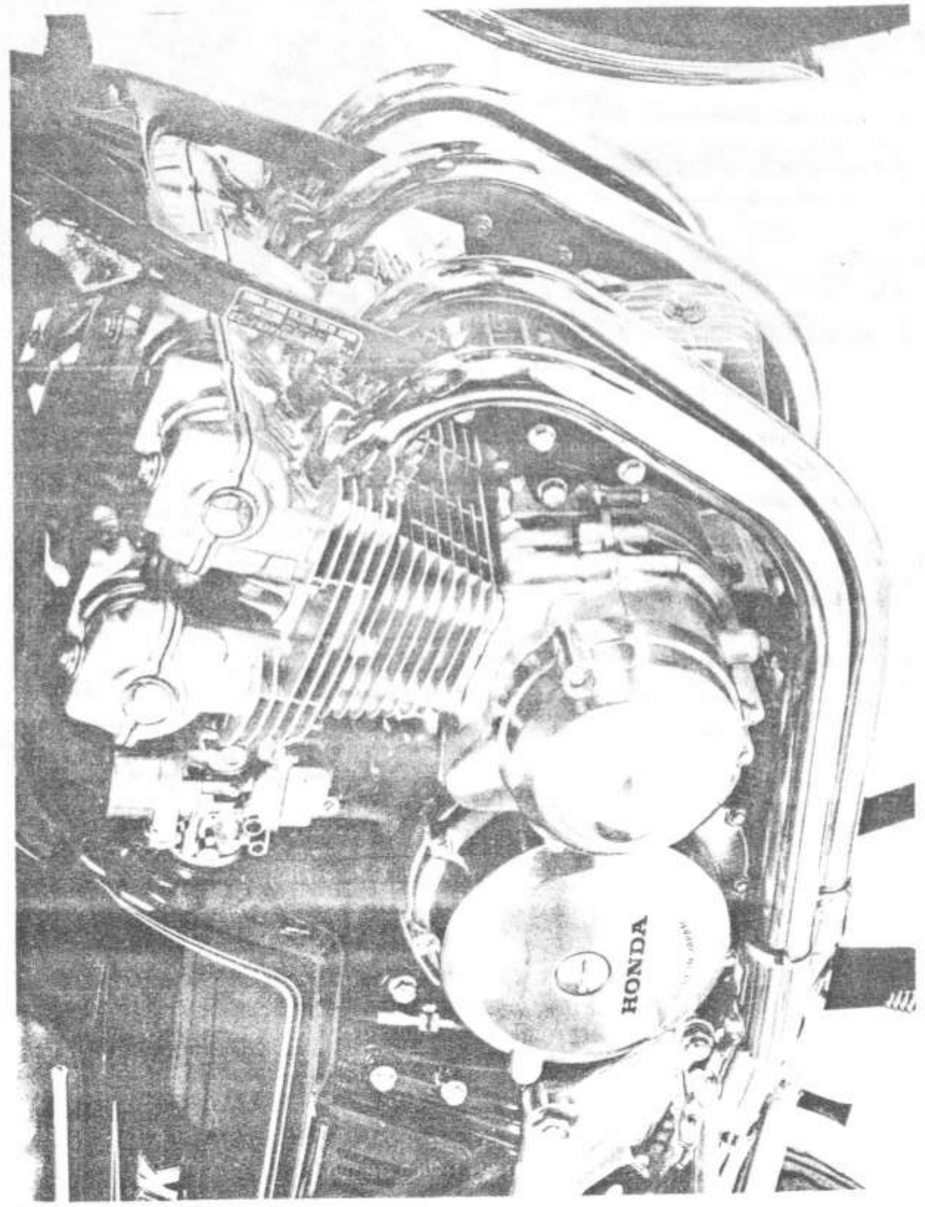
Left-hand view of the Honda CB750K

HONDA CB 750K - WIDOK Z LEWEJ STRONY



Right-hand view of the Honda CB900F

HONDA CB 900F - WIDOK Z PRAWEJ STRONY



Close-up of engine/gearbox unit of the Honda CB750K

ZESTAW NAPĘDOWY HONDY CB 750 K

Introduction to the Honda DOHC Fours

Although for many years manufacturers have produced what are virtually replicas of the 'Works' racing machines, for sale to the general public, it is true to say that no machine captured the interest of the motor cyclist so vividly as the first production version of the Honda 4 cylinder. Already a legend in racing circles, the Honda 4 had represented a serious challenge whenever it appeared in International events. With riders such as the late Bob MacIntyre, Jim Redman and Mike Hailwood, the 4 demonstrated its supremacy on frequent occasions, irrespective of whether the 125 cc, 250 cc, 350 cc or 500 cc version was raced. Even the previously unbeaten multi-cylinder Italian models no longer had things their own way and were hard put to continue racing under truly competitive terms.

At the end of 1967 Honda withdrew from racing and commenced work on a road-going version of their in-line 4, scaled up to 750 cc. Without question it was designed to be the number one 'Superbike'. In engine layout it followed the lines of the racing machines closely, a feature heightened by the use of four separate carburettors and four sets of exhaust pipes and silencers, two on each side of the machine. A speedometer calibrated up to 150 mph and a tachometer with the red band commencing at 8500 rpm completed the 'street race' effect, which led to such a peak of interest that over 61,000 Honda 750 cc 4's were sold **in the USA alone** in just over three years.

In Britain the 750 model was first imported during January 1970, designated the model CB750.

After a production run of almost ten years, the ubiquitous Honda four cylinder models had begun to show their age when compared with the dohc four cylinder models offered by the other Japanese manufacturers. This prompted the introduction of the new line of Honda fours, designed to take the configuration into the 1980s.

A completely new engine gearbox unit is fitted, featuring a dohc (double overhead camshaft), four-valve head. In addition, there are numerous detail refinements and a complete re-styling job.

The basic model of the range is the CB750K, a touring roadster version with the traditional four-into-four exhaust system. The CB750F is the sports version and reflects the popular 'Euro-style' integrated fuel tank, side panel and seat assembly. A less bulky four-into-two exhaust system adds to the image and subtracts from the weight. In Europe only, there is the CB900F, a larger capacity version of the above model, an identical chassis housing the more powerful engine.

The range is completed by the CB750K LTD (Limited Edition) and CB750C Custom models, each reflecting the current popularity of factory 'customised' motorcycles. These two models are similar in all major respects and are treated together in the text.

Model dimensions and weights

Overall length DŁUGOŚĆ CAŁKOWITA	CB750K:	2200 mm (87.4 in)
	CB750K LTD:	2290 mm (90.2 in)
	CB750C:	2300 mm (90.6 in)
	CB750F:	2195 mm (86.4 in)
	CB900F:	2240 mm (88.2 in)
Overall width SZEROKOŚĆ CAŁKOWITA	CB750K:	880 mm (34.6 in)
	CB750K LTD:	880 mm (34.6 in)
	CB750C:	919 mm (36.2 in)
	CB750F:	865 mm (34.1 in)
	CB900F:	795 mm (31.3 in)
Overall height WYSOKOŚĆ CAŁKOWITA	CB750K:	1160 mm (45.7 in)
	CB750K LTD:	1160 mm (45.7 in)
	CB750C:	1165 mm (45.9 in)
	CB750F:	1140 mm (44.9 in)
	CB900F:	1125 mm (44.3 in)
Wheelbase ROZSTAW OSI	CB750K:	1520 mm (59.8 in)
	CB750K LTD:	1520 mm (59.8 in)
	CB750C:	1526 mm (60.1 in)
	CB750F:	1520 mm (59.8 in)
	CB900F:	1515 mm (59.6 in)
Seat height WYSOKOŚĆ SIEDZENIA	CB750K:	800 mm (31.5 in)
	CB750K LTD:	785 mm (30.9 in)
	CB750C:	759 mm (29.9 in)
	CB750F:	810 mm (31.9 in)
	CB900F:	815 mm (32.1 in)
Ground clearance PRZEŚWIT	CB750K:	150 mm (5.9 in)
	CB750K LTD:	145 mm (5.7 in)
	CB750C:	129 mm (5.1 in)
	CB750F:	140 mm (5.5 in)
	CB900F:	150 mm (5.9 in)
Dry weight MASA (SUCHA)	CB750K:	233 kg (512 lb)
	CB750K LTD:	234 kg (516 lb)
	CB750C:	232 kg (511 lb)
	CB750F:	230 kg (507 lb)
	CB900F:	233 kg (512 lb)

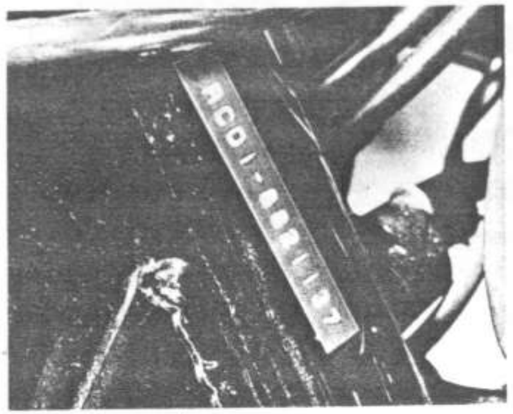
Ordering Spare Parts

When ordering spare parts for any Honda model it is advisable to deal direct with an official Honda agent, who should be able to supply most items ex-stock. Parts cannot be obtained from Honda (UK) Limited direct: all orders must be routed via an approved agent, even if the parts required are not held in stock.

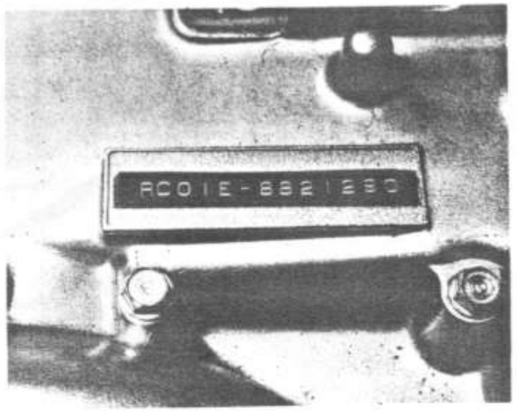
Always quote the engine and frame numbers in full, particularly if parts are required for any of the earlier models.

The frame number is located on the left hand side of the steering head and the engine number is stamped on the upper crankcase, immediately to the rear of the two left hand cylinders. Use only parts of genuine Honda manufacture. Pattern parts are available, some of which originate from Japan, but in many instances they may have an adverse effect on performance and/or reliability. Furthermore the fitting of non-standard parts may invalidate the warranty. Honda do not operate a 'service exchange' scheme.

Some of the more expendable parts such as spark plugs, bulbs, tyres, oils and greases etc., can be obtained from accessory shops and motor factors, who have convenient opening hours, charge lower prices and can often be found not far from home. It is also possible to obtain parts on a Mail Order basis from a number of specialists who advertise regularly in the motor cycle magazines.



Location of frame number



Location of engine number

Safety first!

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

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

Essential DOs and DON'Ts

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

DON'T suddenly remove the filler 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, exhaust or silencer without first ascertaining that it is sufficiently cool to avoid burning you.

DON'T allow brake fluid or antifreeze to contact the machine's paintwork or plastic components.

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

DON'T inhale dust – it may be injurious to health (see *Asbestos* heading).

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

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

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

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

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

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

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

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

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

DO use a barrier cream on your hands prior to undertaking dirty jobs – it will protect your skin from infection as well as making the dirt easier to remove afterwards; but make sure your hands aren't left slippery. Note that long-term contact with used engine oil can be a health hazard.

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

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

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

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

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

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

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

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

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

Asbestos

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

Fire

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

Always disconnect the battery earth (ground) terminal before working on any part of the fuel 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.

Note: *Any reference to a 'torch' appearing in this manual should always be taken to mean a hand-held battery-operated electric lamp or flashlight. It does* ***not*** *mean a welding gas torch or blowlamp.*

Fumes

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

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

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

The battery

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

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

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

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

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

Mains electricity and electrical equipment

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 earthed (grounded). Do not use such appliances in damp conditions and, again, beware of creating a spark or applying excessive heat in the vicinity of fuel or fuel vapour. Also ensure that the appliances meet the relevant national safety standards.

Ignition HT voltage

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

Routine maintenance

Periodical routine maintenance is essential to keep the motorcycle in a peak and safe condition. Routine maintenance also saves money because it provides the opportunity to detect and remedy a fault before it develops further and causes more damage. Maintenance should be undertaken on either a calendar or mileage basis depending on whichever comes sooner. The period between maintenance tasks serves only as a guide since there are many variables eg: age of machine, riding technique and adverse conditions.

The maintenance instructions are generally those recommended by the manufacturer but are supplemented by additional tasks which, through practical experience, the author recommends should be carried out at the intervals suggested. The additional tasks are primarily of a preventative nature, which will assist in eliminating unexpected failure of a component or system, due to wear and tear, and increase safety margins when riding.

All the maintenance tasks are described in detail together with the procedures required for accomplishing them. If necessary, more general information on each topic can be found in the relevant Chapter within the main text.

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

Weekly, or every 200 miles (320 km)

1 Tyres

Check the tyre pressures. Always check the pressure when the tyres are cold as the heat generated when the machine has been ridden can increase the pressures by as much as 8 psi, giving a totally inaccurate reading. Variations in pressure of as little as 2 psi may alter certain handling characteristics. It is therefore recommended that whatever type of pressure gauge is used, it should be checked occasionally to ensure accurate readings. Do not put absolute faith in 'free air' gauges at garages or petrol stations. They have been known to be in error.

Inspect the tyre treads for cracking or evidence that the outer rubber is leaving the inner cover. Also check the tyre walls for splitting or perishing. Carefully inspect the treads for stones, flints or shrapnel which may have become embedded and be slowly working their way towards the inner surface. Remove such objects with a suitable tool. The thing for getting stones out of horses hooves is ideal!

2 Battery

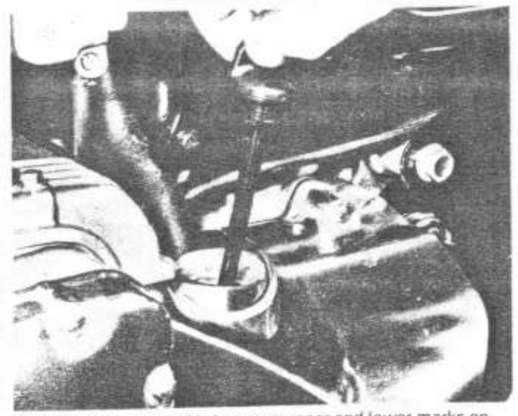
Check the electrolyte level in the battery and replenish, if necessary, with distilled water. Do not use tap water as this will reduce the life of the battery. If the battery is removed for filling, note the tracking of the battery breather pipe which should be replaced in the same position, ensuring that the pipe is not kinked or blocked. If the breather pipe is restricted and the battery overheats for any reason, the pressure produced may, in extreme cases, cause the battery case to fail and a liberal amount of sulphuric acid to be deposited on the electrical harness and frame parts.

3 Engine oil

Check the engine oil level by means of the dipstick incorporated in the filler plug which screws into the left-hand side of the crankcase. When taking the reading do not screw the plug into the casing; allow it to rest on the rim of the filler orifice. Replenish the engine oil with oil of the specified grade to the maximum level on the dipstick.

4 Electrical system

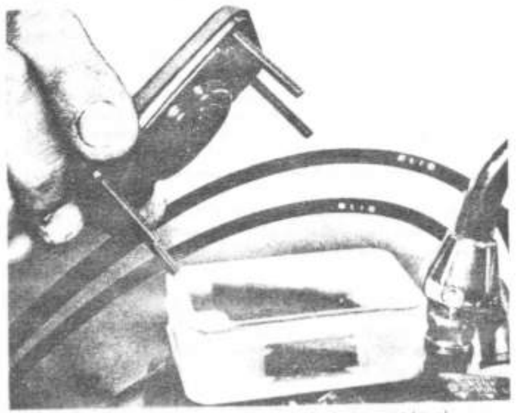
Check that the various bulbs are functioning properly, paying particular attention to the rear lamp. It is possible that one of the rear lamp or brake lamp filaments has failed but gone unnoticed. Check that the indicators and horn operate normally. Clean all lenses. If any of the fuses has blown recently, check that the source of the problem has been resolved and that the spare fuse has been renewed.



Correct engine oil level is between upper and lower marks on dipstick

5 *Brake fluid*

Check the hydraulic fluid level in the front brake master cylinder reservoir. Before removing the reservoir cap and diaphragm place the handlebars in such a position that the reservoir is approximately vertical. This will prevent spillage. The fluid should lie between the upper and lower lines on the reservoir body. Replenish, if necessary, with hydraulic brake fluid of the correct specification, which is DOT 3 (USA) or SAE-J1703. If the level of fluid in either of the reservoirs is excessively low, check the pads for wear. If the pads are not worn, suspect a fluid leakage in the system. This must be rectified immediately. In the case of machines fitted with a rear disc brake, check the fluid level as described above. The reservoir is located behind the right-hand side panel.



Top up brake fluid as necessary to maintain correct level

6 *Safety inspection*

Give the whole machine a close visual inspection, checking for loose nuts and fittings, frayed control cables and damaged brake hoses etc.

Monthly or every 600 miles (1000 km)

Complete all the checks listed under the previous maintenance interval heading and then carry out the following.

1 *Final drive chain: lubrication and adjustment*

The final drive chain is of the endless type, having no joining link in an effort to eliminate any tendency towards breakage. The rollers are equipped with an O-ring at each end which seals the lubricant inside and prevents the ingress of water or abrasive grit. It should not, however, be supposed that the need for lubrication is lessened. On the contrary, frequent but sparse lubrication is essential to minimise wear between the chain and sprockets. Honda recommend the use of SAE 80 or 90 gear oil for chain lubrication, but this will be of limited value due to the speed with which it is flung off. Conventional aerosol lubricants must be avoided because the propellant used will attack and damage the O-rings, but some of the newer types, such as PJL Blue Lable, are suitable for use on O-ring chains and are marked as such.

In particularly adverse weather conditions, or when touring, lubrication should be undertaken more frequently.

A final word of caution; the importance of chain lubrication cannot be overstressed in view of the cost of replacement, and the fact that a considerable amount of dismantling work, including swinging arm removal, will need to be undertaken should replacement be necessary.

Adjust the chain after lubrication, so that there is approximately 15-25 mm slack in the middle of the lower run. Always check with the chain at the tightest point as a chain rarely wears evenly during service.

Adjustment is accomplished after placing the machine on the centre stand and slackening the wheel nut, so that the wheel can be drawn backwards by means of the drawbolt adjusters in the fork ends.

The torque arm nuts and the rear brake adjuster (drum braked models) must also be slackened during this operation. Adjust the drawbolts an equal amount to preserve wheel alignment. The forks ends are clearly marked with a series of parallel lines above the adjusters, to provide a simple visual check.

2 *Brake wear*

Check that when applied, the rear brake wear indicator is within the usable range scale marked on the brake plate. The front disc brake pads should also be examined for wear, and to this end are marked with a red line denoting the maximum wear limit. If necessary, change the pads and/or brake shoes, referring to Chapter 5 for details. Look also for signs of staining on the friction material. This may be caused by leakage from the fork leg or from the caliper seals; in either case attention must be given to locating and rectifying the source of the leak.

3 *Wheel condition – wire spoked types*

Check the spoke tension by gently tapping each one with a metal object. A loose spoke is identifiable by the low pitch noise generated. If any spoke needs considerable tightening, it will be necessary to remove the tyre and inner tube in order to file down the protruding spoke end. This will prevent the spoke from chafing through the rim band and piercing the inner tube. Rotate the wheel and test for rim runout. Excessive runout will cause handling problems and should be corrected by tightening or loosening the relevant spokes. Care must be taken, since altering the tension in the wrong spokes may create more problems.

4 *Further maintenance checks*

The following areas should be given a cursory check, taking remedial action where required. Check the electrical system, plus the headlamp beam alignment. Check the various nuts, bolts and screws for security, tightening where necessary. Check the front and rear suspension for smooth operation. Check the steering head bearings for free play. Examine all control cables and hydraulic lines, renewing any which appear worn or frayed.

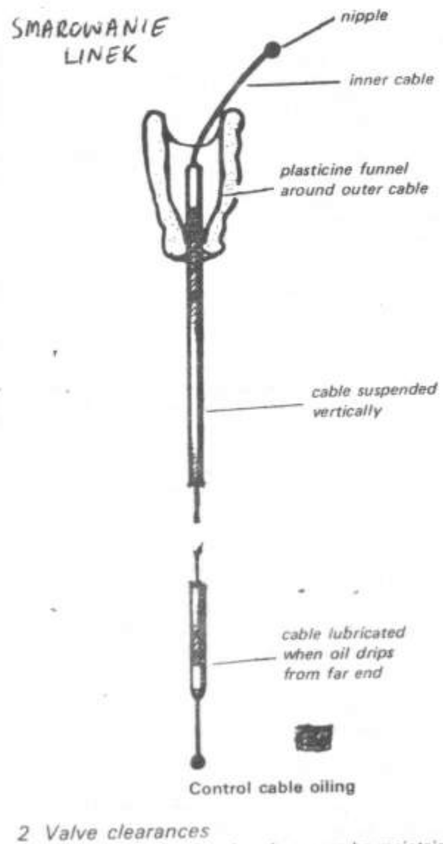
6 monthly or every 3600 miles (6000 km)

Complete all the checks in the preceding maintenance schedules and then carry out the following.

1 *Engine oil and filter renewal*

Run the engine until normal operating temperature is reached to ensure that the old oil drains quickly and completely. Place the machine on its centre stand and position a drain tray or bowl of about 1 gallon capacity beneath the sump drain plug. Release the drain bolt and filler plug, and allow the engine oil to drain.

Slacken the oil filter bolt and remove the filter housing and element. Note that some residual oil will be released, and some provision must be made to catch this. When all the oil has drained, clean the area around the drain plug and filter housing, and the inside of the filter bowl. Refit the drain plug and filter assembly. Fill the crankcase with 3.5 litre (6.0 Imp pint, 3.7 US quart) of the recommended engine oil, then run the engine for two or three minutes, checking for signs of leakage around the drain plug and filter. Stop the engine and check the oil level, adding oil where necessary to bring the level to maximum on the dipstick.



Control cable oiling

2 *Valve clearances*

It is important that valve clearances be maintained otherwise damage, or at best poor performance and noisy operation, will occur. To gain access to the camshafts, it will be necessary to detach the fuel tank and the H-shaped camshaft cover to expose the two camshafts and their associated components. Note that the engine should be **cold** during the clearance check.

Each valve is operated by a bucket-shaped follower which contains a shim to provide the correct clearance between it and the cam lobe. The gap should be measured with the peak of the cam lobe uppermost, at which point it should be possible to insert a feeler gauge between the bucket top and the cam lobe. The specified clearance is.

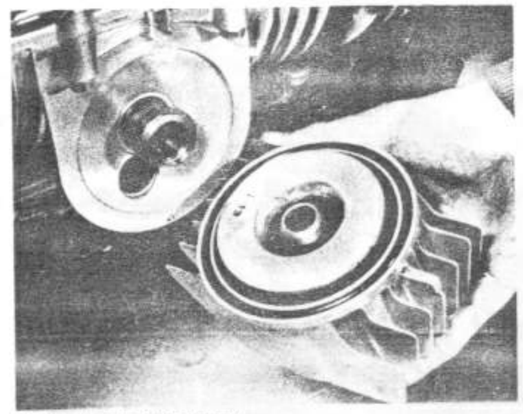
0.08 mm $^{+\ 0.05}_{-\ 0.02}$ (0.003 in $^{+\ 0.002}_{-\ 0.001}$)

for both the inlet and the exhaust valves. This gives a permissible range of 0.06 – 0.13 mm (0.002 – 0.005 in) in each case.

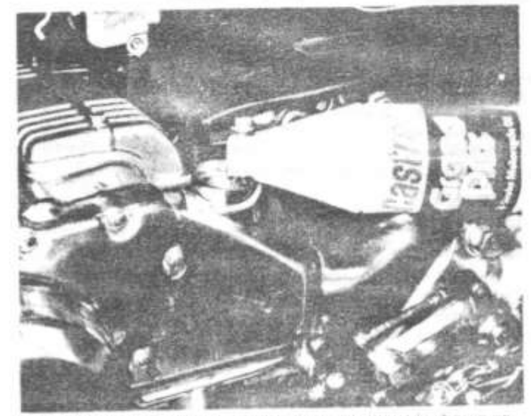
It will be necessary to set the camshafts in the correct position, as described below. Working from the right-hand side of the machine, turn the crankshaft slowly in a clockwise direction until the index mark on the exhaust camshaft end aligns with the front section of the gasket face. Check and note the clearance of the exhaust valves of cylinders 1 and 3.

Rotate the camshafts through 90°, by turning the crankshaft clockwise through 180°, then repeat the check on the inlet valves of cylinders 1 and 3.

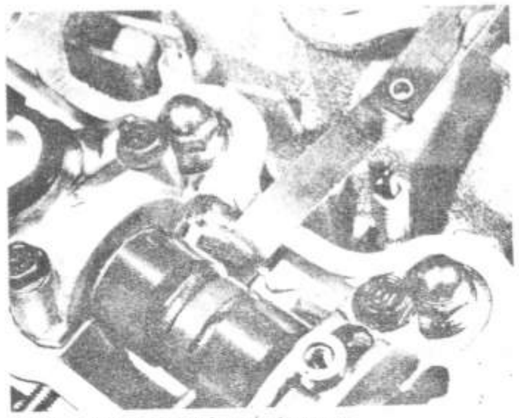
Turn the camshafts through another 90° and check the exhaust valves of cylinders 2 and 4. Finally, rotate the camshafts by a further 90°, and check the clearance of the inlet valves of cylinders 2 and 4.



Oil filter housing and element



Replenish engine with oil until the correct amount is shown on dipstick



Check valve clearances using a feeler gauge

Check the list of clearances against the specified clearance limits to see which, if any, require attention. Adjustment shims are available in 0.05 mm increments, from 2.30 mm to 3.50 mm. Thus if a clearance of 0.15 mm is found and the existing shim is 2.45 mm thick, it will be necessary to fit a 2.50 mm shim to bring the clearance within limits, to 0.10 mm.

To change the shims it will be necessary to keep the appropriate pair of cam followers depressed so that the shim(s) can be withdrawn from the recess in the cam follower top(s). It is strongly recommended that the Honda tool, No 07964–4220001 is purchased for this purpose, because it allows the job to be accomplished quickly and at no risk to the machine or operator. Turn the crankshaft until the valve in question is fully open, and insert the tool between the camshaft and the appropriate pair of valves. Turn the crankshaft through 360° to position the camshaft lobe clear of the valves.

Note that care must be taken not to rotate the crankshaft so far that the opposing pair of valves is opened. If this happens, the inlet and exhaust valve heads could meet, causing damage to both.

With the appropriate valve held open, the adjustment shim can be dislodged with a small screwdriver and lifted clear using tweezers or pointed-nose pliers. All but the No 2 cylinder exhaust valve shims can be removed from the sparking plug side of the camshaft. The latter must be removed from the front of the cylinder head.

The offending shim can now be measured with a micrometer, and the appropriate replacement fitted, having referred to the list of clearances made earlier. Do not forget to re-check the setting after the holding tool has been removed.

In the event that a new shim will not give the required clearance, it is likely that the valve seat and/or valve is in need of renewal. On no account attempt to grind down existing shims or pack them with sheet shim material in an attempt to save the cost of new shims. The risk of failure in service, and the consequent damage to the engine, makes this a very false economy. For details of shim sizes refer to the accompanying table of sizes.

3 *Cam chain tensioner adjustment*

The camshaft drive and connecting chains are tensioned by sprung blade assemblies mounted in the chain tunnnel and across the cylinder head. The tensioners are semi-automatic, adjusting to the correct tension when the lock nuts are released.

It may be noted that the procedure described here differs slightly from that given in the owners handbook. This is because a revised procedure has been found to give better results, and is now recommended by Honda for all models.

Camshaft drive chain

Start the engine and allow it to idle. Slacken both of the small domed nuts at the rear of the cylinder block to allow the tensioner to assume the correct position. Tighten the two nuts to lock the adjustment.

Camshaft connecting chain

With the engine idling, slacken the locknut and bolt at the front of the cylinder block by $\frac{1}{4}$ turn, to allow the horizontal tensioner to assume the correct position. Tighten the bolt carefully to hold the adjustment, taking care not to over-tighten it. Retighten the locknut.

If either chain remains noisy it is likely that it has stretched to the point where it requires renewal. Refer to Chapter 1 for details of the renewal procedure.

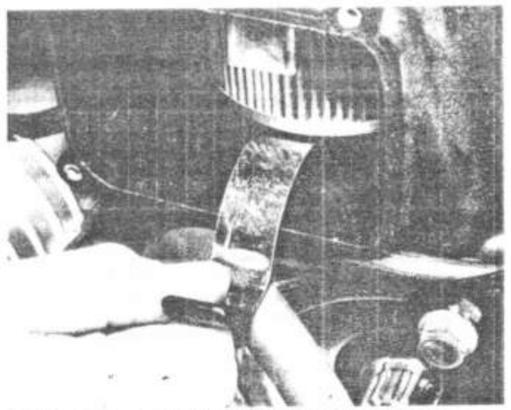
4 *Sparking plugs*

Remove, clean and adjust the sparking plugs. Carbon and other deposits can be removed, using a wire brush, and emery paper or a file used to clean the electrodes prior to adjusting the gaps. Probably the best method of sparking plug cleaning is by having them shot blasted in a special machine. This type of machine is used by most garages. If the outer electrode of a plug is excessively worn (indicated by a step in the underside) the plug should be renewed. Adjust the points gap on each plug by bending the outer electrode only, so that the gap is within the range 0.6 – 0.7 mm (0.024 – 0.028 in). Before replacing the plugs, smear the threads with graphited grease; this will aid subsequent removal. If replacement plugs are required the correct types are listed at the end of this Section.

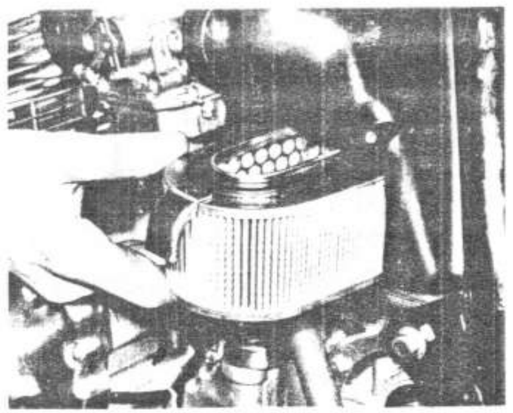
5 *Air filter cleaning*

Access to the filter is gained after removing the left-hand side panel. Remove the air cleaner casing cover by releasing the two screws which retain it. The element is secured by a leaf spring and can be removed after the latter has been pulled clear.

Tap the element gently to remove any loose dust and then use an air hose to remove the remainder of the dust. Apply the air current from the inside of the element only. If an air hose is not available, a tyre pump can be utilised instead. If the corrugated paper element is damp, oily or beginning to disintegrate, it must be renewed. Do not run the engine with the element removed as the weak mixture caused may result in engine overheating and damage to the cylinders and pistons. A weak mixture can also result if the rubber sealing rings on the element are perished or omitted.



Air filter can be removed by pulling the leaf spring clear ...



... and withdrawing the element

VALVE SHIM SELECTION CHART

STANDARD VALVE CLEARANCE = 0.08 $^{+0.05}_{-0.02}$ mm

EX ⇩

SHIM mm	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
PRESENT SHIM SIZE mm																									
GRUBOŚĆ UŻYTEJ PŁYTKI																									
SPECIFIED CLEARANCE												NO CHANGE REQUIRED													
2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45		
2.35	**2.40**	**2.45**	**2.50**	**2.55**	**2.60**	**2.65**	**2.70**	**2.75**	**2.80**	**2.85**	**2.90**	**2.95**	**3.00**	**3.05**	**3.10**	**3.15**	**3.20**	**3.25**	**3.30**	**3.35**	**3.40**	**3.45**	**3.50**		
2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50			
2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50				
2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50					
2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50						
2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50							
2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50								
2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50									
2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50										
2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50											
2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50												
2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50													
2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50														
3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50															
3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50																
3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50																	
3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50																		
3.20	3.25	3.30	3.35	3.40	3.45	3.50																			
3.25	3.30	3.35	3.40	3.45	3.50																				
3.30	3.35	3.40	3.45	3.50																					
3.35	3.40	3.45	3.50																						
3.40	3.45	3.50																							
3.45	3.50																								
3.50																									

EX ⇧

VALVE CLEARANCE mm
0.01–0.05
0.06–0.13
0.14–0.16
0.17–0.21
0.22–0.26
0.27–0.31
0.32–0.36
0.37–0.41
0.42–0.46
0.47–0.51
0.52–0.56
0.57–0.61
0.62–0.66
0.67–0.71
0.72–0.76
0.77–0.81
0.82–0.86
0.87–0.91
0.92–0.96
0.97–1.01
1.02–1.06
1.07–1.11
1.12–1.16
1.17–1.21
1.22–1.26
1.27–1.31

EXAMPLE
1. Measure valve clearance = 0.16 mm
2. Measure present shim size = 2.50 mm
3. Refer to chart. (See shaded columns)
4. Replacement shim size = 2.55 mm

NOTE
(1) Measure the valve clearance while the engine is cold.
(2) For shim replacement, see text.
(3) Measure old and new shims with a micrometer.
(4) The chart is for reference purpose only. After installing new shims, recheck the valve clearance and adjust if necessary. Before rechecking, rotate the camshafts several times to seat the shims in the lifters.
(5) If the shim thickness required exceeds 3.5 mm, there is carbon build-up on the valve seat. Remove the carbon and reface the seat.

Valve clearance shim selection chart

TABLICA DOBORU GRUBOŚCI PŁYTKI

6 *Carburettor adjustment*

The following points should be checked, and if necessary, adjusted. Note that adjustments should not be made by way of experimentation – if all is well, leave the carburettors alone. In practice it will be found that carburation adjustments are maintained with reasonable accuracy over quite long periods.

Run the engine to raise the temperature to normal, preferably by riding it for 10 – 15 minutes. Place the machine on its centre stand and allow the engine to idle. Check the idle speed, which should be 1000 ± 100 rpm. If necessary, move the throttle stop screw to bring the idle speed within limits.

Carburettor synchronisation requires the use of a vacuum gauge set. If this is not available, **do not** attempt adjustment, but take the machine to a Honda dealer to have this operation carried out.

If the vacuum gauge set is available, proceed as follows. Remove the dualseat and petrol tank so that access can be gained to the carburettors. Using a suitable length of feed pipe, reconnect the petrol tank with the carburettors, so that the petrol flow can be maintained. The petrol tank must be placed above the level of the carburettors. Connect the vacuum gauges to the engine.

Start the engine and allow it to run until normal working temperature has been reached. This should take 10 – 15 minutes. Set the throttle so that an engine speed of 1000 ± 100 rpm is maintained. If the readings on the vacuum gauges vary by more than 60 mm Hg (2.4 in Hg) it will be necessary to adjust the synchronising screws to bring the carburettors within limits. Note that if the readings on the gauges fluctuate wildly, it is likely that the gauges require heavier damping. Refer to the gauge manufacturer's instructions on setting up procedures.

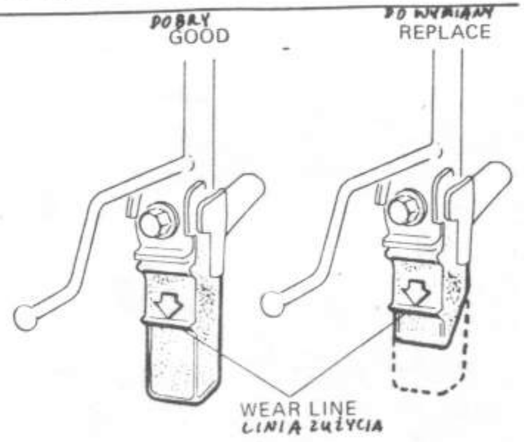
The No 2 carburettor (second from left) is regarded as the base instrument: that is, it is non-adjustable and the remaining three carburettors must be adjusted to it. Honda produce a special combined screwdriver and socket spanner for dealing with the synchronising screws (Part number 07908–4220100). Its use makes the procedure easier, but it is not essential. Slacken the locknut of the adjuster concerned, then turn the latter, noting the effect on the gauge reading. When the reading is as close as possible to that of the No 2 carburettor, hold the adjuster screw and retighten the locknut. Repeat the procedure on the remaining carburettors.

To check the operation of the throttle twistgrip and cables, turn the fuel supply off and allow the engine to idle until it stalls due to the lack of fuel. This will prevent subsequent flooding problems where accelerator pumps are fitted.

The throttle twistgrip should have about 2 – 6 mm free play measured at the inner, flanged, edge. Coarse adjustment can be made by moving the lower adjuster by the required amount. Further fine adjustment is made by means of the upper adjuster.

7 *Side stand: pad renewal*

The side stand is fitted with a rubber pad which will gradually wear down with use. Check the pad condition and renew it when it nears the raised wear line. The old pad can be released by removing the single retaining bolt and the new item fitted by reversing the dismantling sequence.



Checking side stand pad wear

Yearly or every 7200 miles (12000 km)

Carry out the operations listed in the previous Sections, then carry out the following.

1 *Renew the sparking plugs*

2 *Renew the air filter element*

In addition, the machine should be given a close visual examination, checking the numerous details not covered by the normal maintenance schedule. Check for signs of corrosion or rusting around the frame and cycle parts, taking the appropriate remedial action where required.

Additional routine maintenance

1 *Brake pads: examination and replacement*

The rate of brake pad wear is dependent on the conditions under which the machine operates, weight carried and the style of riding, consequently it is difficult to advise on specific inspection intervals. Whatever inspection interval is chosen bear in mind that the rate of wear will not be constant.

To check wear on the front brake pads examine the pads through the small window in the main caliper units. If the red mark on the periphery of any pad has been reached, both pads in that set must be renewed. The rate of wear of the two sets are similar so it is probable that they will require renewal at the same time in any case.

Check the rear brake pad wear after removing the plastic caliper cover from position. If the red tongues on the pads have closed together sufficiently that they are within the area marked red on the caliper, they must be renewed.

2 *Brake pad renewal*

Remove each brake set individually, using an identical procedure as follows:

Unscrew the two bolts that pass into the caliper body and secure the body to the support bracket. Lift the caliper body off the support bracket, still interconnected with the hydraulic hose.

Lift the old pads out. Install the new pads and also the shim which fits against the outer face of the outer pad. The shim must be fitted so that the arrow is in the forward-most position, pointing in an upward direction. Refit the caliper halves and replace the socket screws. It may be necessary to push the caliper cylinder piston inwards to give the necessary clearance. If required, the bleed screw on the caliper can be slackened at the same time as the piston is pushed inwards. This will allow a small amount of fluid to seep out and the piston to move. Place a rag around the bleed screw to prevent the fluid leaking onto the caliper unit. Operate the brake lever, after pad replacement, to check free movement of the pads and to allow the pads to self-adjust.

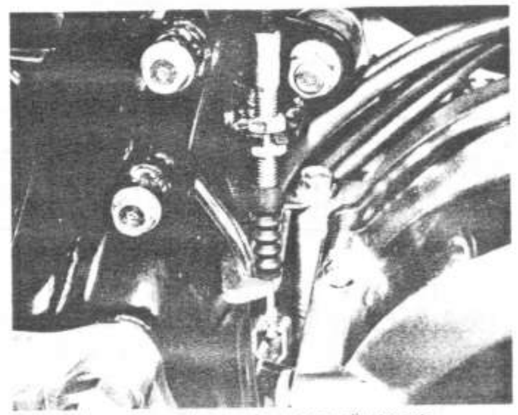
3 *Rear brake adjustment – drum brake models*

Adjustment of the rear brake should be carried out when required, the intervals being dependent on riding style and usage. The adjustment is carried out by turning the nut on the rear end of the brake operating rod. Precise adjustment is a matter of personal choice but it should be ensured that the brake does not bind when the foot pedal is in the fully returned position. A brake wear indicator is fitted to the brake actuating arm on the back plate. If, when the brake is applied fully, the arrow on the arm is in line with the cast-in index mark on the back plate, the brake linings are worn sufficiently to require renewal.

4 *Clutch adjustment*

In common with brake pad wear, clutch wear and the resultant necessary adjustment depends on operating conditions and the style of riding. Adjust the clutch, when necessary, as follows.

Check the clutch free play at the ball-end of the handlebar lever. The lever should move 10 – 20 mm ($\frac{3}{8}$ – $\frac{3}{4}$ in) before the clutch begins to lift. If the free play is incorrect, the cable may be adjusted by means of the adjuster screws at both ends of the cable. The lower adjuster is used for coarse adjustments and the upper adjuster for finer running adjustments. If the upper adjuster threads project more than 8 mm (0.3 in) from the lever stock, there is some danger of the adjuster breaking out of the stock boss. To prevent this, screw the adjuster in fully and then make the adjustment for free play only using the lower adjuster to take up the excess slack.



Clutch adjustment mechanism for coarse adjustments

Quick glance maintenance adjustments and capacities

Engine/transmission oil capacity	
Dry	4.5 litre (7.92 Imp pint/4.7 US quart)
At oil change	3.5 litre (6.00 Imp pint/3.7 US quart)
Sparking plug gap	0.6 – 0.7 mm (0.024 – 0.028 in)
Front fork oil capacity	
Dry	175 cc
At oil change	155 cc
Tyre pressures	
Front:	
CB750 K, LTD and F	28 psi (2.0 kg/cm²)
CB900 F	32 psi (2.25 kg/cm²)
Rear (solo):	
CB750 pre-1980 and F	32 psi (2.25 kg/cm²)
CB750 K 1980 and LTD	28 psi (2.0 kg/cm²)
CB900	36 psi (2.50 kg/cm²)
Rear (with more than 90 kg [200 lb] load):	
All models	40 psi (2.80 kg/cm²)

Recommended lubricants

Components	Lubricant
Engine/transmission	
General, all-temperature use	SAE 10W/40
Above 15°C (60°F)	SAE 30
–10° to + 15°C (15° – 60°F)	SAE 20 or 20W
Above –10°C (15°F)	SAE 20W/50
Below 0°C (32°F)	SAE 10W
Front forks	Automatic transmission fluid (ATF)
Chain	SAE 80 or 90 gear oil
General lubrication	Light machine oil
Wheel bearings	High melting point grease
Swinging arm	High melting point grease
Component lubrication during engine reassembly (see text)	Molybdenum disulphide grease

Tools and working facilities

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

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

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

To help the average owner to decide which tools are needed to carry out the various tasks detailed in this manual, we have compiled three lists of tools under the following headings: *Maintenance and minor repair*, *Repair and overhaul*, and *Specialized*. The newcomer to practical mechanics should start off with the simpler jobs around the vehicle. Then, as his confidence and experience grow, he can undertake more difficult tasks, buying extra tools as and when they are needed. In this way, a *Maintenance and minor repair* tool kit can be built-up into a *Repair and overhaul* tool kit over a considerable period of time without any major cash outlays. The experienced home mechanic will have a tool kit good enough for most repair and overhaul procedures and will add tools from the specialized category when he feels the expense is justified by the amount of use these tools will be put to.

It is obviously not possible to cover the subject of tools fully here. For those who wish to learn more about tools and their use there is a book entitled *Motorcycle Workshop Practice Manual* (Book no 1454) available from the publishers of this manual.

As a general rule, it is better to buy the more expensive, good quality tools. Given reasonable use, such tools will last for a very long time, whereas the cheaper, poor quality, item will wear out faster and need to be renewed more often, thus nullifying the original saving. There is also the risk of a poor quality tool breaking while in use, causing personal injury or expensive damage to the component being worked on.

For practically all tools, a tool factor is the best source since he will have a very comprehensive range compared with the average garage or accessory shop. Having said that, accessory shops often offer excellent quality tools at discount prices, so it pays to shop around. There are plenty of tools around at reasonable prices, but always aim to purchase items which meet the relevant national safety standards. If in doubt, seek the advice of the shop proprietor or manager before making a purchase.

The basis of any toolkit is a set of spanners. While open-ended spanners with their slim jaws, are useful for working on awkwardly-positioned nuts, ring spanners have advantages in that they grip the nut far more positively. There is less risk of the spanner slipping off the nut and damaging it, for this reason alone ring spanners are to be preferred. Ideally, the home mechanic should acquire a set of each, but if expense rules this out a set of combination spanners (open-ended at one end and with a ring of the same size at the other) will provide a good compromise. Another item which is so useful it should be considered an essential requirement for any home mechanic is a set of socket spanners. These are available in a variety of drive sizes. It is recommended that the ½-inch drive type is purchased to begin with as although bulkier and more expensive than the ¼-inch type, the larger size is far more common and will accept a greater variety of torque wrenches, extension pieces and socket sizes. The socket set should comprise sockets of sizes between 8 and 24 mm, a reversible ratchet drive, an extension bar of about 10 inches in length, a spark plug socket with a rubber insert, and a universal joint. Other attachments can be added to the set at a later date.

Maintenance and minor repair tool kit

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

Repair and overhaul toolkit

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

Plastic or rubber soft-faced mallet
Torx driver bits
Pliers – electrician's side cutters
Circlip pliers – internal (straight or right-angled tips are available)
Circlip pliers – external
Cold chisel
Centre punch
Pin punch
Scriber
Scraper (made from soft metal such as aluminium or copper)
Soft metal drift
Steel rule/straight edge
Assortment of files
Electric drill and bits
Wire brush (large)
Soft wire brush (similar to those used for cleaning suede shoes)
Sheet of plate glass
Hacksaw (large)
Valve grinding tool
Valve grinding compound (coarse and fine)
Stud extractor set (E-Z out)

Specialized tools

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

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

Care and maintenance of tools

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

Fastening systems

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

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

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

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

Standard torque settings

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

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

Chapter 1 Engine, clutch and gearbox

For modifications, and information relating to later models, see Chapter 7

Contents

Specifications

Note: *Specifications are given for the 900 model only where they differ from the 750 model*

Model	CB750	CB900F
Engine		
Type	Four-cylinder air-cooled dohc	Four-stroke
Bore	62 mm (2.44 in)	64.5 mm (2.54 in)
Stroke	62 mm (2.44 in)	69.0 mm (2.71 in)
Capacity	749 cc (45.67 cu in)	901 cc (54.9 cu in)
Compression ratio	9.0:1	8.8:1
Valve clearances (engine cold)		
Inlet and exhaust	0.06 – 0.13 mm (0.002 – 0.005 in)	

Valve timing		
Inlet opens at	5° BTDC at 1 mm lift, 58° BTDC at 0 lift	10° BTDC at 1 mm lift, 62° BTDC at 0 lift
Inlet closes at	35° ABDC at 1 mm lift, 101° ABDC at 0 lift	35° ABDC at 1 mm lift, 90° ABDC at 0 lift
Exhaust opens at	35° BBDC at 1 mm lift, 87° BBDC at 0 lift	40° BBDC at 1 mm lift, 93° BBDC at 0 lift
Exhaust closes at	5° ATDC at 1 mm lift, 72° ATDC at 0 lift	5° ATDC at 1 mm lift, 70° ATDC at 0 lift
Valve and springs		
Seat angle	45°	
Seat width	0.99 – 1.27 mm (0.039 – 0.050 in)	
Service limit	1.5 mm (0.06 in)	
Valve stem OD:		
Inlet valve	5.475 – 5.490 (0.2156 – 0.2161 in)	
Service limit	5.470 mm (0.2150 in)	
Exhaust valve	5.445 – 5.470 mm (0.2148 – 0.2154 in)	
Service limit	5.440 mm (0.2140 in)	
Valve guide ID:		
Inlet valve	5.500 – 5.515 mm (0.2165 – 0.2171 in)	
Service limit	5.540 mm (0.2180 in)	
Exhaust valve	5.500 – 5.515 mm (0.2165 – 0.2171 in)	
Service limit	5.540 mm (0.2180 in)	
Stem to guide clearance service limit:		
Inlet valve	0.07 mm (0.003 in)	
Exhaust valve	0.09 mm (0.004 in)	
Spring free length:		
Inlet (outer)	43.9 mm (1.73 in)	
Service limit	42.5 mm (1.67 in)	
Inlet (inner)	40.7 mm (1.60 in)	
Service limit	39.8 mm (1.57 in)	
Exhaust (outer)	43.9 mm (1.73 in)	
Service limit	42.5 mm (1.67 in)	
Exhaust (inner)	40.7 mm (1.60 in)	
Service limit	39.8 mm (1.57 in)	
Spring pressure at specified lengths:		
Inlet (outer)	12.6 – 14.6 kg @ 37.5 mm (27.78 – 32.19 lb @ 1.48 in)	
Service limit	12 kg (26.46 lb)	
Inlet (inner)	6.39 – 7.81 kg @ 34.5 mm (14.087 – 17.218 lb @ 1.36 in)	
Service limit	6.0 kg (13.23 lb)	
Exhaust (outer)	12.6 – 14.6 kg @ 37.5 mm (27.78 – 32.19 lb @ 1.48 in)	
Service limit	12 kg (26.46 lb)	
Exhaust (inner)	6.39 – 7.81 kg @ 34.5 mm (14.087 – 17.218 lb @ 1.36 in)	
Service limit	6.0 kg (13.23 lb)	

Cam followers and camshafts		
Cam follower OD	27.972 – 27.993 mm (1.1013 – 1.1021 in)	
Service limit	27.96 mm (1.101 in)	
Cam follower bore ID	28.000 – 28.016 mm (1.1024 – 1.1030 in)	
Service limit	28.04 mm (1.104 in)	
Cam follower to bore maximum clearance	0.07 mm (0.003 in)	
Camshaft overall height:	**750 models**	**900 model**
Inlet	37.000 – 37.160 mm (1.4567 – 1.4630 in)	37.420 – 37.580 mm (1.4732 – 1.4795 in)
Service limit	36.9 mm (1.45 in)	37.3 mm (1.47 in)
Exhaust	37.500 – 37.660 mm (1.4763 – 1.4827 in)	37.920 – 38.080 mm (1.4929 – 1.4992 in)
Service limit	37.4 mm (1.47 in)	37.8 mm (1.49 in)
Camshaft to bearing cap clearance:		
Cap A, E, F and L	0.040 – 0.082 mm (0.0016 – 0.0032 in)	
Service limit	0.13 mm (0.0051 in)	
Cap B, C, H and J	0.085 – 0.139 (0.0033 – 0.0055 in)	
Service limit	0.19 mm (0.0075 in)	
All remaining caps	0.062 – 0.109 mm (0.0024 – 0.0043 in)	
Service limit	0.16 mm (0.0063 in)	
Maximum camshaft run-out	0.05 mm (0.002 in)	

Camshaft chains		
Camshaft connecting chain length (see text)	175.70 – 175.92 mm (6.917 – 6.926 in)	
Service limit	177.1 mm (6.97 in)	
Camshaft drive chain length (see text)	309.05 – 309.35 mm (12.167 – 12.179 in)	
Service limit	311.8 mm (12.28 in)	
Cylinder head		
Maximum warpage	0.10 mm (0.004 in)	
Crankshaft		
Big end bearing axial clearance	0.05 – 0.20 mm (0.002 – 0.008 in)	
Service limit	0.3 mm (0.012 in)	
Big end bearing radial clearance	0.020 – 0.060 mm (0.0008 – 0.0024 in)	
Service limit	0.08 mm (0.003 in)	
Main bearing radial clearance	0.020 – 0.060 mm (0.0008 – 0.0024 in)	
Service limit	0.08 mm (0.003 in)	
Maximum crankshaft run-out	0.05 mm (0.002 in)	
Primary chain	**750 models**	**900 model**
Type	Hy-Vo	Hy-Vo
Length (see text)	129.78 – 129.98 mm (5.109 – 5.117 in)	139.3 – 139.5 mm (5.484 – 5.492 in)
Service limit	131 mm (5.16 in)	140.9 mm (5.55 in)
Cylinder block		
Standard bore size	62.000 – 62.010 mm (2.4409 – 2.4413 in)	64.500 – 64.510 mm (2.5393 – 2.5397 in)
Service limit	62.10 mm (2.445 in)	64.60 in (2.543 in)
Cylinder/piston maximum clearance	0.10 mm (0.004 in)	0.10 mm (0.004 in)
Ovality limit	0.10 mm (0.004 in)	0.10 mm (0.004 in)
Pistons and rings		
Piston OD	61.95 – 61.98 mm (2.439 – 2.440 in)	64.46 – 64.49 mm (2.538 – 2.539 in)
Service limit	61.90 mm (2.437 in)	64.40 mm (2.535 in)
Piston ring/groove clearance:		
Top	0.030 – 0.065 mm (0.0012 – 0.0026 in)	0.015 – 0.045 mm (0.0006 – 0.0018 in)
Service limit	0.09 mm (0.004 in)	0.09 mm (0.004 in)
Second	0.025 – 0.055 mm (0.0010 – 0.0022 in)	0.015 – 0.045 mm (0.0006 – 0.0018 in)
Service limit	0.09 mm (0.004 in)	0.09 mm (0.004 in)
Piston ring end gap:		
Top and second rings	0.10 – 0.30 mm (0.004 – 0.012 in)	0.15 – 0.30 mm (0.006 – 0.012 in)
Service limit	0.5 mm (0.020 in)	0.5 mm (0.020 in)
Oil ring (side rail)	0.3 – 0.9 mm (0.012 – 0.035 in)	
Service limit	1.1 mm (0.043 in)	
Gudgeon pin OD	14.994 – 15.000 mm (0.5903 – 0.5906 in)	
Service limit	14.98 mm (0.590 in)	
Gudgeon pin bore	15.002 – 15.008 mm (0.5906 – 0.5909 in)	
Service limit	15.05 mm (0.593 in)	
Gudgeon pin/piston clearance	0.04 mm (0.002 in) max	
Piston/bore clearance	0.10 mm (0.004 in) max	
Clutch	**750 models**	**900 model**
Type	Wet, multiplate	
No. of plates:		
plain	7	
friction	8	
Friction plate thickness:		
Type A	3.72 – 3.88 mm (0.146 – 0.153 in)	
Wear limit	3.4 mm (0.13 in)	
Type B	3.72 – 3.88 mm (0.146 – 0.153 in)	
Wear limit	3.4 mm (0.13 in)	
Plain plate max. warpage	0.3 mm (0.012 in)	
No. of springs	6	
Spring preload at specified length	16.6 – 18.4 kg/ 25.0 mm (36.60 – 40.57lb/ 0.98 in)	18.3 – 20.1 kg/ 24.4 – 25.6 mm (40.34 – 43.31 lb/ 0.96 – 1.01 in)

Service limit	14.9 kg/25.0 mm (32.85 lb/0.98 in)	17.0 kg/24.4 – 25.6 mm (37.48 lb/0.96 – 1.01 in)
Clutch spring free length	34.2 mm (1.35 in)	35.1 mm (1.38 in)
Service limit	32.8 mm (1.29 in)	33.9 mm (1.33 in)
	750 models	**900 model**
Gearbox		
Type	5-speed constant mesh	
Primary reduction ratio	2.381:1	2.041:1
Gearbox ratios:		
1st	2.533:1	
2nd	1.789:1	
3rd	1.391:1	
4th	1.160:1	
Top	0.964:1	1.000:1
Final reduction	2.533:1	2.588:1
Gear backlash	0.024 – 0.074 mm (0.0009 – 0.0029 in)	0.023 – 0.110 mm (0.0009 – 0.0043 in)
Service limit	0.12 mm (0.005 in)	0.15 mm (0.006 in)
Gearbox pinion bore internal diameter:		
Mainshaft 4th	28.020 – 28.041 mm (1.1031 – 1.1040 in)	
Service limit	28.06 mm (1.105 in)	
Mainshaft 5th	31.025 – 31.050 mm (1.2215 – 1.2224 in)	
Service limit	31.07 mm (1.223 in)	
Layshaft 1st	25.000 – 25.021 in (0.9843 – 0.9851 in)	
Service limit	25.06 mm (0.987 in)	
Layshaft 3rd	28.020 – 28.041 mm (1.1031 – 1.1040 in)	
Service limit	28.07 mm (1.105 in)	
Mainshaft 5th gear bush OD	30.950 – 30.975 mm (1.2185 – 1.2195 in)	
Service limit	30.93 mm (1.218 in)	
Layshaft 1st gear bush OD	24.959 – 24.980 mm (0.9826 – 0.9835 in)	
Service limit	24.93 mm (0.981 in)	
Layshaft 1st gear bush ID	22.000 – 22.021 mm (0.8661 – 0.8670 in)	
Service limit	22.06 mm (0.869 in)	
Mainshaft OD at 4th gear journal	27.959 – 27.980 mm (1.1007 – 1.1016 in)	
Service limit	27.93 mm (1.100 in)	
Layshaft OD:		
At 1st gear journal	21.987 – 22.000 mm (0.8656 – 0.8661 in)	
Service limit	21.93 mm (0.863 in)	
At 3rd gear journal	27.959 – 27.980 mm (1.1007 – 1.1016 in)	
Service limit	27.93 mm (1.100 in)	
Pinion to shaft/bush maximum clearance:		
Mainshaft 4th/shaft	0.10 mm (0.004 in)	
Mainshaft 5th/bush	0.12 mm (0.005 in)	
Layshaft 1st/bush	0.10 mm (0.004 in)	
Layshaft 1st bush/shaft	0.10 mm (0.004 in)	0.06 mm (0.002 in)
Layshaft 3rd/shaft	0.10 mm (0.004 in)	
Selector fork claw thickness	6.43 – 6.50 mm (0.253 – 0.256 in)	
Service limit	6.1 mm (0.24 in)	
Selector fork bore max ID	13.04 mm (0.513 in)	
Selector fork shaft OD	12.966 – 12.984 mm (0.5104 – 0.5112 in)	
Service limit	12.90 mm (0.508 in)	

Torque settings

Component	kgf m	lbf ft
Cylinder head cover	0.8 – 1.2	6 – 9
Camshaft bearing caps	1.2 – 1.6	9 – 12
Cylinder head	3.6 – 4.0	26 – 29
Camshaft sprocket bolts:		
750 models	2.2 – 2.6	16 – 19
900 models	1.8 – 2.0	13 – 15
Sparking plugs	1.2 – 1.6	9 – 12
Crankcase bolts	See Section 37	
Alternator rotor bolt	8.0 – 10.0	58 – 72
Primary shaft bolt	8.0 – 10.0	58 – 72
Clutch nut	4.5 – 5.5	33 – 40
Gearbox sprocket:		
750 models	5.0 – 5.4	36 – 39
900 models	4.5 – 5.5	33 – 40
Connecting rod nuts:		
750 models	3.0 – 3.4	22 – 25
900 model	3.2	23
Oil filter centre bolt	2.8 – 3.2	20 – 23
Oil pressure switch	1.5 – 2.0	11 – 14
Neutral switch	1.6 – 2.0	11 – 14
Sump drain plug	3.5 – 4.0	25 – 29
Automatic timing unit bolt	3.3 – 3.7	24 – 27
Starter clutch bolts	2.6 – 3.0	19 – 22
Engine mounting bolts	See Section 45	

1 General description

The engine unit forms the most significant aspect of Honda's large capacity four-cylinder range, and is designed to take a now traditional configuration into the 1980s. The units fitted to the various machines in the range are similar in design, having a number of features in common with the six-cylinder CBX engine unit.

The crankshaft is of one-piece construction and runs in five plain bearings. Similar plain big-end bearings support the forged connecting rods. Power from the crankshaft is transmitted through a broad Hy-Vo primary chain to a primary shaft mounted immediately behind the crankcase, where it is transferred through a rubber-and-vane shock absorber to the primary drive pinion and clutch. The right-hand crankshaft end supports the alternator assembly, whilst the starter clutch and CDI ignition reside at the left-hand end of the crankshaft.

Drive to the double overhead camshafts is by Hy-Vo chain from the crankshaft centre to the exhaust camshaft, with a second, smaller, Hy-Vo chain driving the inlet camshaft from the exhaust camshaft. As with most Honda designs, the camshafts are supported directly by the cylinder head material.

Each of the pent-roof combustion chambers carries two inlet and two exhaust valves, which lessens the reciprocating mass of the valve gear and permits greater inlet and exhaust gas flow for a given bore diameter.

Unlike the earlier sohc fours, the new engines feature wet sumps, these being V-shaped to centralise the mass of the oil and to reduce surging. The engine features a high-pressure lubrication system, the feed to the valve gear and camshafts being by means of a separate external feed pipe in preference to the older designs which employed the cylinder head studs as lubrication ducts. The main feed directs oil under pressure to the big-end and main bearing shells, the oil exiting through spray holes in the connecting rods to provide lubrication and cooling for the pistons and bores.

The clutch and gearbox are built in unit with the engine, sharing a common, horizontally-split casing. The clutch is of conventional multi-plate construction, and features one special composite friction plate designed to absorb backlash and transmission snatch by virtue of its resilient design.

The gearbox is of conventional 5-speed, constant mesh construction, the gears running in an oil bath which is shared with the clutch and primary drive.

It will be seen that the new type engine units are rather more than an update of the original four-cylinder unit. The adoption of new designs and materials have resulted in a unit which is both more powerful and cleaner in operation. It follows that the incidence of parts interchangeability between the sohc and dohc is almost negligible, and care must be taken when purchasing replacement parts.

2 Operations with the engine/gearbox unit in the frame

1 It is not necessary to remove the engine unit from the frame to carry out certain operations, although it may prove easier to do so if several tasks need to be undertaken simultaneously. The following components can be removed and/or serviced with the engine in position:

a) Cylinder head cover
b) Camshafts
c) Carburettors
d) Starter motor
e) Gearchange linkage
f) Alternator
g) CDI pickup assembly
h) Clutch

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

1 If attention to the major engine assemblies or internals is required, it will be necessary to remove the unit from the frame and carry out further dismantling on the workbench. Major areas requiring this action are as follows:

a) Cylinder head, block and pistons
b) Crankshaft assembly
c) Primary shaft and primary chain
d) Main and big-end bearings
e) Gear selector mechanism
f) Gearbox selectors and pinions
g) Gearbox bearings and seals
h) Crankcase castings

4 Access to engine/gearbox unit internals

1 The various internal components are housed within the horizontally-split crankcase halves. In order to gain access to these components, it will be necessary to remove the unit from the frame and to separate the crankcase halves, following the procedures detailed in subsequent sections of this Chapter. It follows that the crankcase halves must be reassembled before the unit can be installed in the frame. Crankcase separation will be a necessary precursor to work on items b) to h), listed in Section 3 of this Chapter.

5 Preparing the machine for engine removal

1 Before commencing work on engine removal, the machine should be carefully cleaned down to remove all traces of oil and road dirt. This will make subsequent operations a lot cleaner, and will avoid a lot of unnecessary mess in the workshop. Pay particular attention to the underside of the crankcases and the areas around the various mounting bolts, because these do not normally get cleaned as thoroughly as the rest of the machine.

2 Arrange the machine in the most convenient position in the workshop, allowing as much room as possible around it. Check that the chosen location is well lit, and that the floor area is clean. This will make it easier to retrieve lost nuts or washers should they be dropped. Few owners will possess the luxury of a workshop-type motorcycle ramp, but this can be improvised with a stout wooden bench about 18 inches high, or by using some stout wooden planks supported by crates or concrete blocks. Above all, make sure that any such arrangement is stable, because serious injury can result from a machine toppling over onto the owner. If necessary, the machine may be secured by ropes or tie-down straps for added security.

3 Gather together the necessary tools, some clean rags, and a drain tray or bowl. It is useful to obtain some small boxes so that small related parts can be kept together to aid ident-

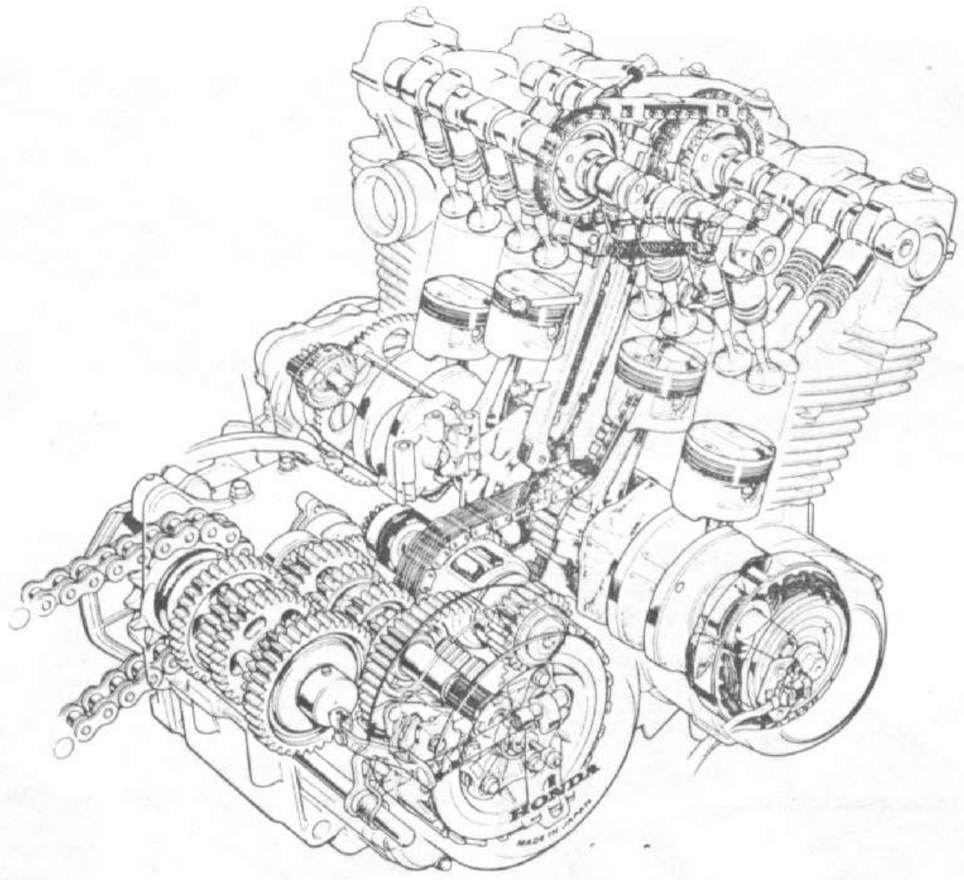


Fig. 1.1 Sectioned view of engine/gearbox unit
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ification. Cut-down plastic oil containers are ideal for this purpose, and also make useful drain trays. Before proceeding further, read through the appropriate Sections so that a good general idea of the procedure is gained.

6 Removing the engine/gearbox unit from the frame

1 With the machine set up as described in Section 5, place a bowl or drain tray of about 1 gallon capacity beneath the crankcase drain plug. Remove the plug and leave the oil to drain. If the engine is cold, this will take a considerable time, and can be left to its own devices whilst further dismantling is undertaken.

2 Turn the fuel tap to the off position, and check that there are no naked flames in the vicinity of the motorcycle before prising off the fuel feed pipe at the carburettor.

3 Release the seat latch, and hinge it upwards to gain access to the fuel tank fixing bolt. Slacken and remove the single bolt to free the rear of the tank. The tank can now be lifted and pulled rearwards to free the mounting rubbers at the front. Place the tank to one side in a position where it is not likely to get damaged.

4 The side panels should be released by pulling them free of their securing rubbers. As a safety precaution, release the battery leads, and preferably remove the battery from the machine to avoid accidental short circuits. Trace the CDI and alternator leads up from the engine, and separate them at the appropriate connection block.

5 Slacken the hose clips which secure the carburettors at the manifold adaptors and to the air cleaner hoses. The carburettor bank can now be disengaged from its mounting stubs and pulled clear. It may prove helpful to release the air cleaner case securing screws so that it can be pushed back clear of the carburettors. Once the carburettors have been moved about halfway out, the throttle cables should be released from the operating quadrant at the centre. This is accomplished by slackening the cable adjuster locknuts and setting the adjusters to give maximum free play. The nipples can then be slid out of the quadrant and the cables removed. The choke cable should be released in a similar fashion, and the overflow and vent pipes guided clear of the frame as the carburettor bank is pulled free.

6 Slacken the nuts which secure the exhaust clamps to their cylinder head studs, allowing the clamps and collet halves to drop clear of the head. The exhaust system can be removed in two sections, after the rear mounting bolts have been released. On the 750 models, the mounting bolts double as footrest securing bolts, whilst on the CB900F, two bolts secure the silencer to the alloy mounting plate. Note that the left-hand system on CB750K models may prove hard to disengage from the prop stand. The stand should be placed in the down position to aid the removal of the system.

7 The CB900F is equipped with an oil cooler mounted on the front down tubes. Trace the heavy armoured oil pipes down from the cooler to the crankcase unions, releasing the pipes from the engine unit. Take care not to damage the pipes by twisting them as the union bolts are released. Note that a small amount of residual oil will be released, and some provision must be made to catch this.

8 On all models, free the tachometer drive cable from the cylinder head cover by removing the single locking bolt which retains it. The cable should be pulled clear of the engine but need not be removed entirely.

9 Pull off the sparking plug caps, lodging them against the frame top tubes to prevent them from becoming fouled during engine removal. The leads are numbered one to four, number one cylinder being on the left-hand side when viewed from the riding position, and need no further marking. Leave the sparking plugs installed, because this will prevent the ingress of dirt into the cylinders.

10 Because the final drive chain is of the endless type, it will be necessary to slacken it off to permit the removal of the gearbox sprocket. Withdraw the split pin which secures the rear wheel spindle nut. Slacken the nut, and release the chain adjusters so that the wheel can be pushed forwards. If the machine is likely to be moved before the engine unit is refitted, temporarily re-tighten the wheel spindle nut.

11 Moving to the left-hand side of the machine, release the gearchange lever by removing its pinch bolt and drawing it off its splines (US models). European versions, including the UK models, employ a revised footrest position which necessitates the use of a short rear-set linkage between the gearchange lever and selector shaft splines. On these models, the linkage is secured by a pinch bolt to the selector shaft splines, whilst a circlip retains the lever to its pivot on the alloy footrest mounting plate.

12 The UK (European) CB900F, CB750K and the US CB750F feature alloy footrest plates to which the footrests, brake pedal, and on the European models, the gearchange lever are attached. The manufacturers recommend that the left-hand plate is removed to allow sufficient clearance for the left-hand rear engine casing to be removed. In practice this was found not to be essential, because there proved to be enough room to manoeuvre the casing around the plate. The right-hand plate must, however, be released to provide clearance for engine removal. This is secured by the swinging arm pivot shaft nut and the lower engine mounting bolt nut, both of which should be removed temporarily to allow the plate to be withdrawn. On rear drum brake models, it will be necessary to remove the brake pedal and operating rod, unless the latter is disconnected at the rear wheel and pulled through as the plate is removed. The rear brake switch operating spring must also be disconnected.

13 On rear disc brake models, release the two Allen bolts which secure the rear brake master cylinder to the alloy plate. The brake pedal should also be removed, after releasing its pinch bolt, and the plate lifted away.

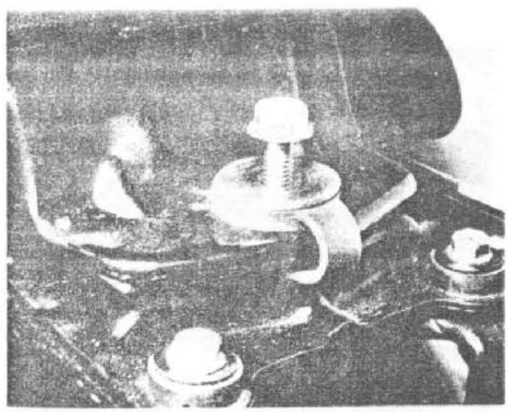
14 In the case of the remaining models, the rear brake pedal, gearchange lever and front footrests should be removed, these being attached in a similar manner to that described above, but without the alloy mounting plate. On all models, the left-hand rear engine casing can now be removed after releasing its retaining screws.

15 Slacken the central sprocket retaining bolt and pull the gearbox sprocket clear of its splines. The chain can be disengaged from the sprocket and left to hang against the upper rear mounting bolt whilst the sprocket is placed to one side. This single remaining bolt, which secures the chain guide plate, should be removed, leaving the plate attached to the upper rear mounting bolt alone.

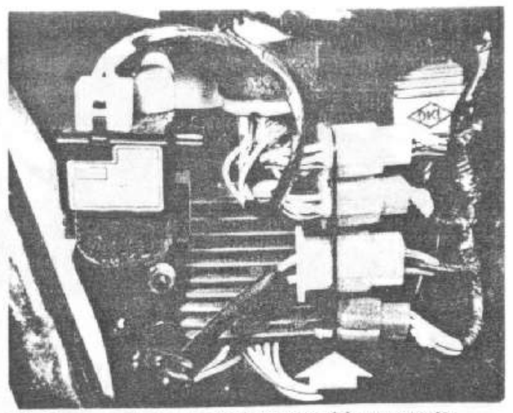
16 Before any attempt is made to release the engine mounting bolts, check carefully to ensure that all electrical and control cables have been disconnected and lodged in a position which will not impede removal. This applies equally to the various drain and breather pipes. The engine is both heavy and bulky, and will require at least two people to remove it in safety. Bearing in mind that the dry weight is around 200 lbs, a jack placed beneath the crankcase is almost essential. Position the jack so that the weight is taken off the mounting bolts, and use a piece of wood between the jack and the delicate sump fins.

17 The engine unit is secured by engine plates bolted to the front of the crankcase and by three long bolts at the rear and underside of the unit. These should be removed, ensuring that the engine remains supported safely by the jack. The front right-hand engine plate also serves to retain the front of the lower frame rail, which is removed to facilitate engine removal. The rear of the removable section is held by two bolts, which should now be released allowing the section to be lifted clear.

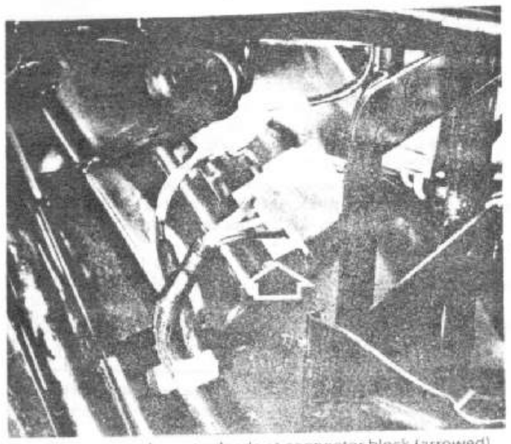
18 With one person on each side of the machine, grasp the engine unit firmly, and check that the weight can be taken comfortably before attempting to lift the unit clear. It was found to be advisable to carry out the lifting operation in two stages. First, the unit is lifted through the frame, and the left-hand side rested, whilst the person concerned moves round the frame. The unit can then be swung clear of the frame and placed on the workbench.

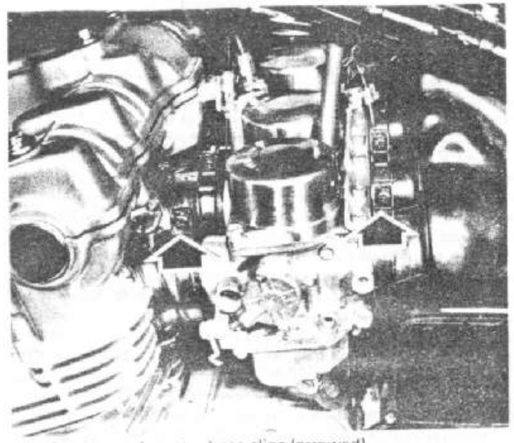


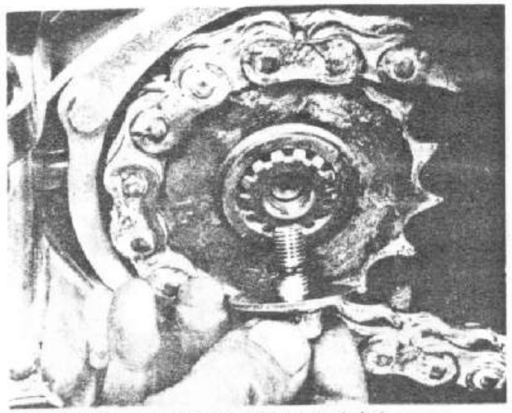
6.3 Rear of tank is held by rubber mounted securing bolt

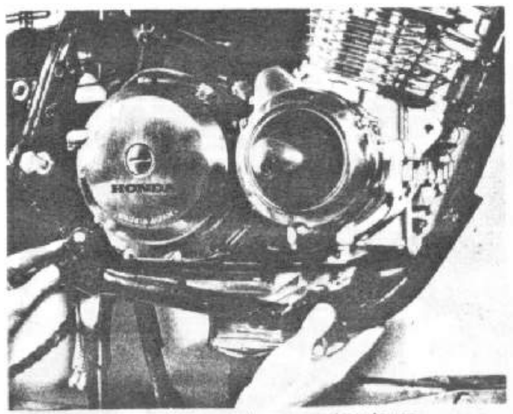


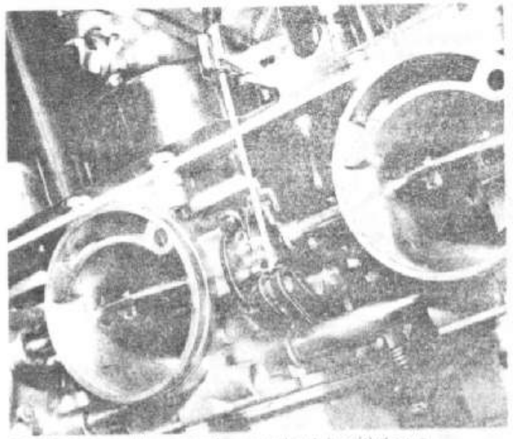
6.4a Remove side panel and disconnect pickup connector (arrowed)


6.4b Disconnect alternator leads at connector block (arrowed)

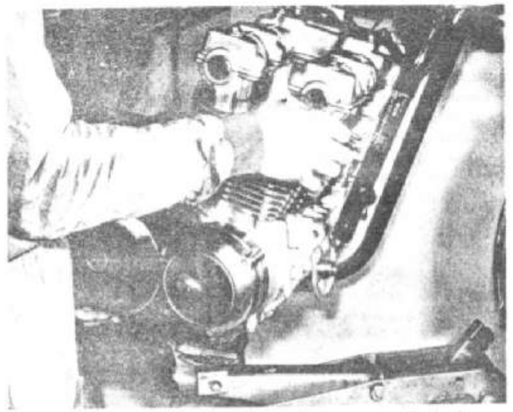

6.5a Slacken carburettor hose clips (arrowed)

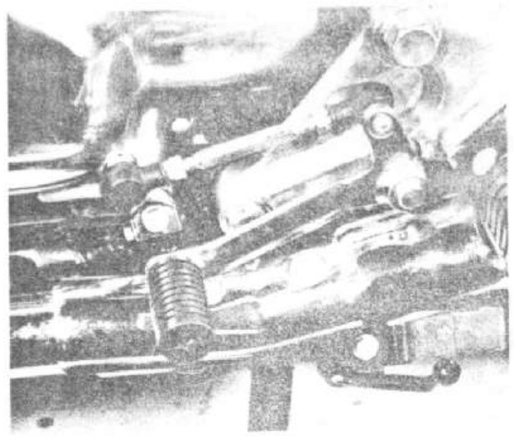

6.15 Gearbox sprocket is secured by a single bolt

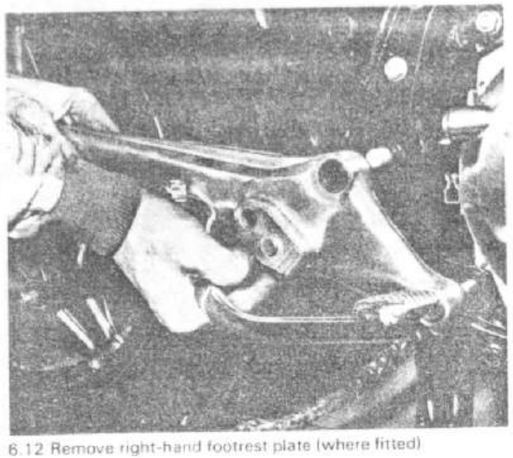

6.17 Lower frame section can be removed as shown


6.5b Release cables as carburettor bank is withdrawn


6.8 Tachometer cable is retained by a single bolt (arrowed)


6.18 Manoeuvre engine unit clear whilst supported by jack


6.11 Note rearset linkage fitted to UK models


6.12 Remove right-hand footrest plate (where fitted)

7 Dismantling the engine/gearbox unit: preliminaries

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

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

3 An assortment of tools will be required in addition to those supplied with the machine (see 'Working conditions and Tools' for details). Unlike owners of most Japanese machines, those working on the dohc Honda fours do not suffer unduly from the normal soft-headed cross-point screws. In most areas, small hexagon-headed screws are employed, these being much more robust. In view of this, an appropriate nut driver or box spanner will prove invaluable, in addition to the normal range of workshop tools.

4 Before commencing work, read through the appropriate section so that some idea of the necessary procedure can be gained. When removing the various engine components it should be noted that undue 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.

8 Dismantling the engine/gearbox unit: removing the cylinder head cover and camshafts

1 This operation can be tackled with the engine unit installed in the frame or removed for further dismantling. If still in position in the frame, it will be necessary to remove the fuel tank, sparking plug leads and tachometer drive cable before proceeding further. The sparking plugs should be left in position to prevent the ingress of dirt.

2 Remove the eight cylinder head cover retaining bolts, noting that those on the outer edges of the cover differ from the four central bolts. The cover can now be lifted away together with its seal. The seal can be left in position for re-use if it is undamaged.

3 The rear cam chain guide is secured by a total of three bolts, two of which also retain the short oil feed pipe. Remove the bolts and lift away the guide followed by the oil feed pipe and its sealing washers.

4 The camshaft bearing caps are each marked with an identification letter indicating its position on the cylinder head. These letters run from A to L, the letter I being omitted. The cap which incorporates the tachometer drive gearbox is mounted second from the left on the exhaust camshaft and is unmarked. Working from left to right (viewed from riding position) the cap positions and letters are as follows:

Cap position	*Marking letter*
Ex camshaft LH	*A*
Ex camshaft 1st from left (tachometer)	*Unmarked*
Ex camshaft 2nd from left	*B*
Ex camshaft 3rd from left	*C*
Ex camshaft 4th from left	*D*
Ex camshaft 5th from left	*E*
In camshaft LH	*F*
In camshaft 1st from left	*G*
In camshaft 2nd from left	*H*
In camshaft 3rd from left	*J*
In camshaft 4th from left	*K*
In camshaft 5th from left	*L*

5 When removing the caps, do so in the sequence indicated below. Note that the cap positions can be identified by the corresponding letter cast into the cylinder head immediately below the camshafts. The caps must always be refitted in the correct position.

6 Slacken the bolts which retain caps B, C, H and J. The caps can now be removed and placed to one side. If necessary, use the retaining bolts to dislodge the caps from the camshaft journals by pushing them to one side.

7 Pull off the soft black plastic oil pool caps from the four central cylinder head nuts. Release the rear cam chain guide attachment plate which is located between the two main camshaft sprockets. It is retained by one bolt at this stage, the other having been released when the guide was removed.

8 It will now be necessary to release the pressure from the two cam chain tensioners. Start by slackening the front (exhaust) cam chain tensioner locknut and bolt. This is located at the front of the cylinder head on one side of the cam chain tunnel. Once released, the slipper tensioner will bear upon the short chain connecting the two camshafts. To release pressure, use a large screwdriver to press on the **lower** run of the chain, thus forcing the tensioner back against spring pressure. Hold this position, and secure the tensioner by tightening the adjustment bolt. This should leave the connecting chain with a degree of slack.

9 The tensioner which operates on the crankshaft to exhaust camshaft chain is locked by the **lower** of two small domed nuts located in the centre of the rear face of the cylinder block. Slacken the nut, then moving to the top of the tensioner, visible between the camshaft sprockets, grasp the top section of the tensioner with pliers. Pull this upwards against spring pressure and secure the domed nut. Both cam chains should now be slack.

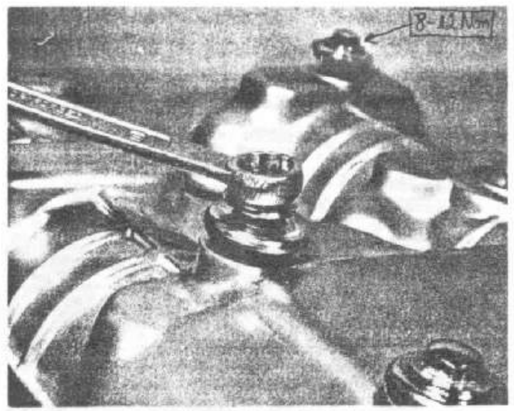
10 Release the circular inspection cover from the left-hand side of the unit to reveal the CDI pulser assembly. An aperture in the pulser backplate shows an index mark and sequence of timing marks. Using a socket or box spanner, turn the crankshaft until the 1.4T mark aligns with the index mark. If it proves difficult to turn the crankshaft, loosen or remove the sparking plugs to release cylinder compression. With the crankshaft set as described above, it will be noted that the lobes of both camshafts on No 1 cylinder face inwards, and that the slots in the camshaft end are parallel with the upper jointing face of the cylinder head.

11 Remove the G, K, F and L camshaft bearing caps and place these to one side, together with their locating dowels. The inlet camshaft can now be lifted clear of the cylinder head, disengaged from the connecting chain, and removed.

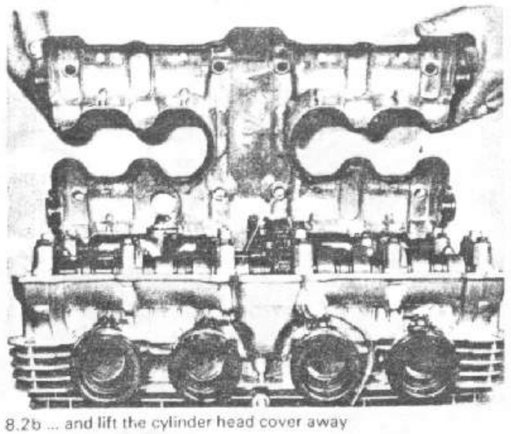
12 Moving to the exhaust camshaft, one of the two camshaft sprocket securing bolts will now be accessible, and can be removed. Turn the crankshaft anticlockwise until the second bolt appears, and cam lift is at its minimum on any one cylinder. The second bolt can now be released.

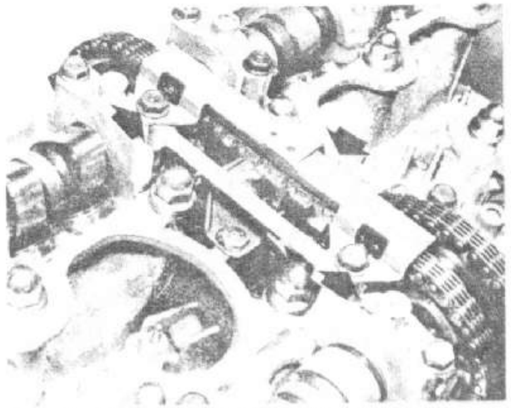
13 Release the remaining (D, unmarked, A and E) camshaft bearing caps. The exhaust camshaft can now be disengaged from the sprocket and coupling chain and removed. Release the sprocket from the drive chain, taking care not to allow the chain to fall down into the crankcase. Use a length of wire to retain the chain. It is wise to mark the Hy-Vo chains before removal so that if they are to be re-used they may be refitted to run in the same direction on the sprockets. Reversing the running direction of a partially worn chain is not recommended.

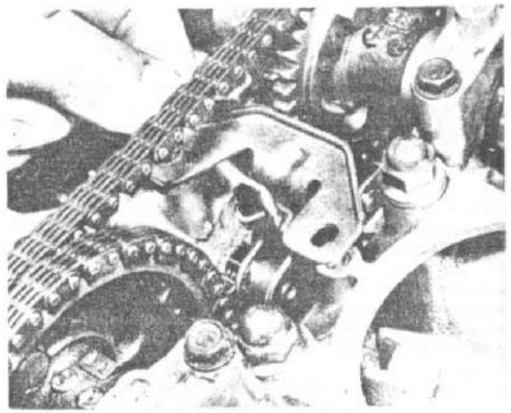
14 If it is wished to leave the valve shimming undisturbed, it is advisable to contrive some means of preventing the shims' escape. This is easily done by cutting two suitable lengths of wooden dowel or tubing to be used as dummy camshafts – an old broom handle being ideal for this purpose. The dummy shafts can then be clamped in place with the camshaft bearing caps until attention to the valves or shims is required. Alternatively, obtain small plastic bags for each of the sixteen valves, marking each bag according to the valve position, and place the cam follower and shim from each valve in the appropriate bag. It is essential that the followers and shims are refitted in their original locations.

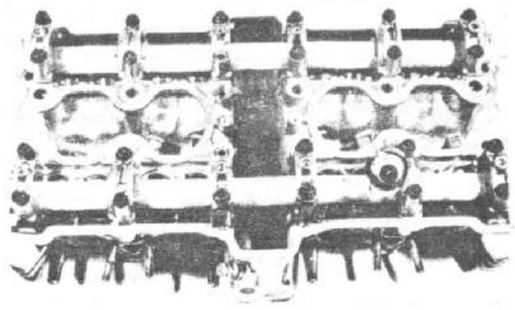


8.2a Remove the rubber-sealed securing bolts ...


8.2b ... and lift the cylinder head cover away


8.3 Guide plate and oil pipe should be removed (bolts arrowed)


8.7 Attachment plate is held by a single bolt


8.14 Dummy camshafts prevent loss of shims

9 Dismantling the engine/gearbox unit: removing the cylinder head

1 The cylinder head can be removed after the engine unit has been removed from the frame (see Section 6). Note that before the head can be removed, it will be necessary to remove the camshafts as described in Section 8 of this Chapter.

2 Release the external oil feed pipe which runs between the intake adaptors of cylinders 3 and 4. The pipe is secured at each end by a hexagon-headed union bolt. Care must be taken not to twist or fracture the oil pipe, and to prevent this the banjo union should be held with an open ended spanner while the bolt is released.

3 Remove the two rear tensioner lock nuts. These are disposed vertically between the 2nd and 3rd cylinders. Moving to the front of the unit, remove the two small bolts which secure the cylinder head to the barrel. These pass upwards into the head on either side of the camchain tunnel.

4 The cylinder head is retained by a total of twelve (12) domed nuts. Starting with one of the nuts nearest to the cam chain tunnel, slacken them in a diagonal sequence, moving each nut by a fraction of a turn to ensure that pressure is released gradually and evenly throughout the cylinder head casting. Failure to observe this precaution can lead to warpage of the cylinder head.

5 The cylinder head can now be lifted clear of the holding studs, whilst the cam chain is fed through the tunnel. If it proves difficult to break the joint between the cylinder block and head, tap gently around the jointing face with a hammer and a hardwood block. On no account attempt to lever the head off, because this will only result in damage to the delicate cooling fins or mating face of the head or block.

10 Dismantling the engine/gearbox unit: removing the cylinder block

1 Before the cylinder block can be removed, it will be necessary to remove the engine unit from the frame and then to dismantle the camshafts and cylinder head. The procedure for these operations is covered in Sections 6 to 9 inclusive. Note that there is insufficient frame clearance to allow the block to be removed with the engine installed in the frame.

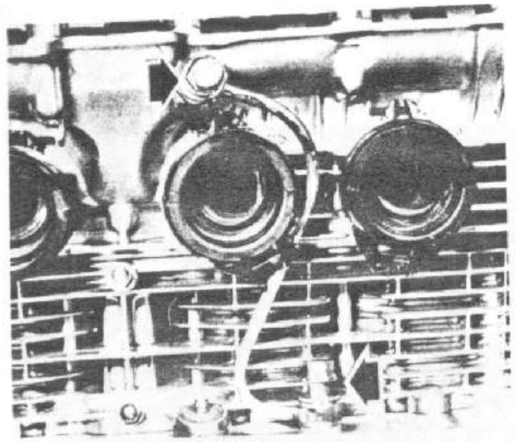
2 With the cylinder head removed as described in the previous section, the cam chain tensioner should be pulled clear of the cylinder barrel. It is located by two studs, the external domed nuts having been removed earlier. The cam chain guide at the front of the cylinder block should be lifted clear of its locating groove.

3 The cylinder block will now be retained by a single small bolt which passes down into the crankcase through the cylinder block flange. The bolt should be removed, being located at the front centre of the block.

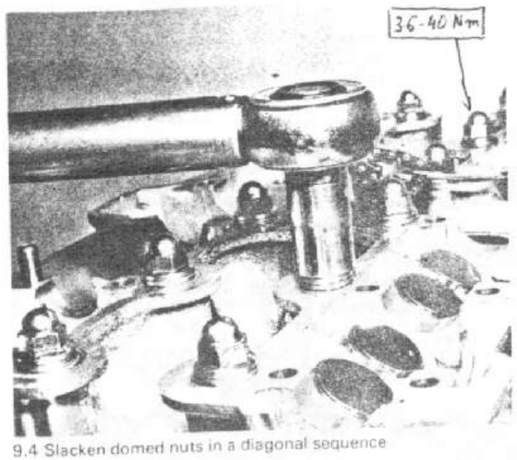
4 All being well, the block should now be free, and will draw upwards along the holding studs. If it is stuck by the gasket, try tapping around the joint using a hide mallet or a hammer and hardwood block. Take great care not to damage the cooling fins or castings. On no account use a screwdriver or other implement to lever the block free, because this will almost certainly result in damage, leading to oil leakage.

5 As the block comes free, take great care not to allow debris to fall into the crankcase, especially where it is not intended to separate the crankcase halves. As soon as there is room, stuff some clean lint-free rag into each crankcase mouth to catch any carbon, or in dire cases sections of piston ring, which may fall as the pistons are released.

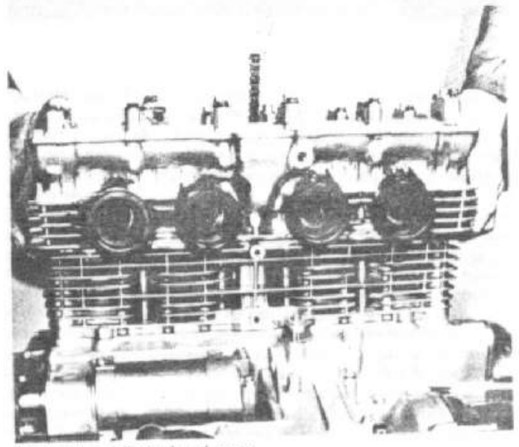
6 The pistons and connecting rods must be supported as they emerge, and prevented from falling against the crankcase. Once clear of all four pistons, the cylinder block can be placed to one side.



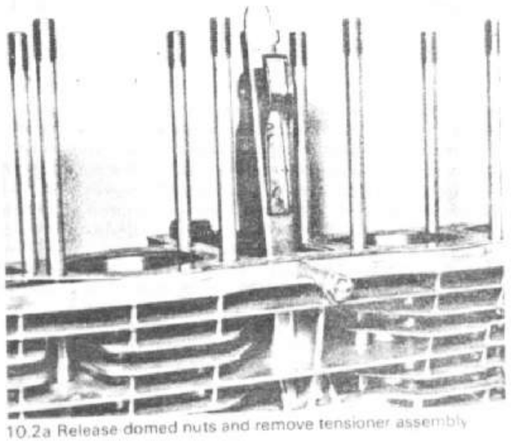
9.2 Remove the external oil feed pipe



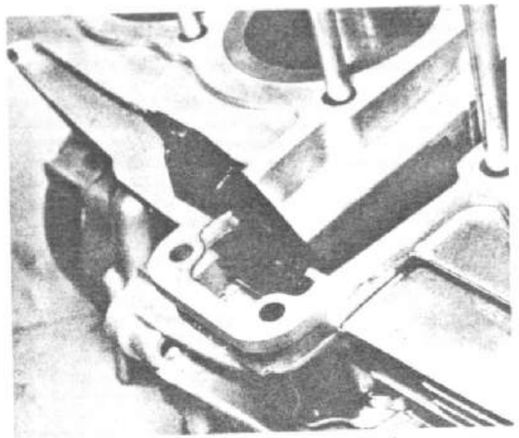
9.4 Slacken domed nuts in a diagonal sequence



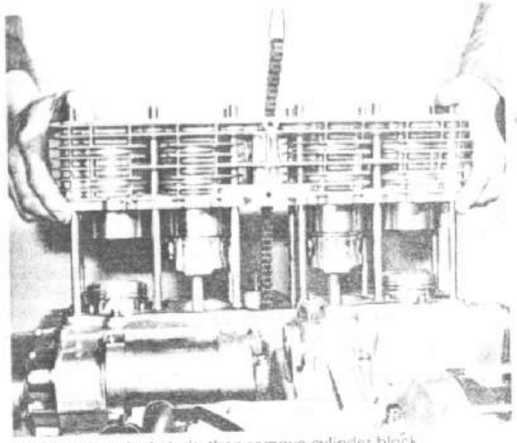
9.5 Lift the cylinder head away



10.2a Release domed nuts and remove tensioner assembly



10.2b Chain guide can be lifted away from tunnel



10.4 Release single bolt, then remove cylinder block

11 Dismantling the engine/gearbox unit: removing the pistons and piston rings

1 Remove the circlips from the pistons by inserting a screwdriver (or a piece of welding rod chamfered one end), through the groove at the rear of the piston. Discard them. Never re-use old circlips during the rebuild.

2 Using a drift of suitable diameter, tap each gudgeon pin out of position, supporting each piston and connecting rod in turn. **Mark each piston inside the skirt so that it is replaced in the appropriate bore.** If the gudgeon pins are a tight fit in the piston bosses, it is advisable to warm the pistons. One way is to soak a rag in very hot water, wring the water out and wrap the rag round the piston very quickly. The resultant expansion should ease the grip of the piston bosses on the steel pins.

3 Do not remove the piston rings at this stage; they should be left in place on the pistons until the examination stage.

12 Dismantling the engine/gearbox unit: removing the clutch assembly

1 The clutch assembly can be removed and replaced irrespective of whether the engine has been removed or is in the frame. No preliminary dismantling operations are necessary to gain access to the clutch or its operating mechanism, other than the disconnection of the clutch operating cable, removal of the rear brake pedal and draining the engine/transmission oil where the unit is installed in the frame.

2 The clutch cover is secured to the crankcase casting by a total of twelve hexagon-headed screws, and can be lifted away after these have been released. If the cover is stuck to the gasket, tap lightly around the joint with a soft faced mallet or a hardwood block and hammer.

3 Slacken the six bolts which retain the clutch release plate in a diagonal sequence, and lift the plate and springs away. The clutch release bearing and pushrod will remain in position in the centre of the plate.

4 The clutch centre is secured by a slotted nut, for which a special Honda tool, No 07716 – 0020100 is available. A similar tool can be made up in the workshop using a short length of thick-walled tubing. Clamp the tube in a vice, and use a hacksaw to cut slots as shown in Fig. 1.2. The shaded area can then be filed away to leave four projecting tangs. These can be used to engage the slots in the nut to facilitate removal.

5 It will be necessary to contrive some means of holding the clutch centre whilst the nut is removed. If the engine is in the frame, select top gear, and apply the rear brake or have an assistant hold the rear wheel. This will hold the centre via the gearbox and final drive chain.

6 If the engine unit is on the bench, an old drive chain can be wrapped around the gearbox sprocket and held with a self-locking wrench. Select top gear and use the wrench to prevent rotation of the clutch centre whilst the nut is removed. An alternative method is to refit the clutch springs with plain washers in place of the release plate. The clutch assembly can then be locked through the primary drive by passing a bar through one of the connecting rod eyes and resting each end on wooden blocks placed on each side of the crankcase mouth. Each method will work equally well. Before slackening the nut, remember to bend back the locking tab which retains it.

7 After the securing nut and tab washer have been removed, the entire clutch assembly can be slid off the end of the gearbox mainshaft without further dismantling. Leave the assembly undisturbed until further examination is required.

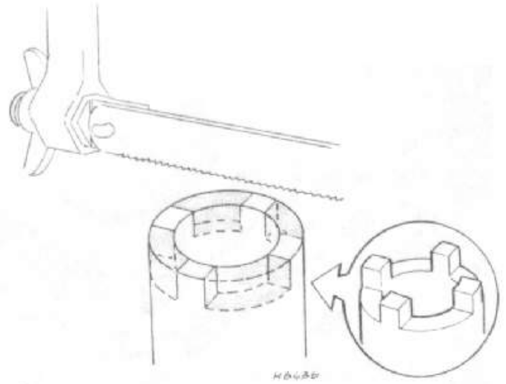
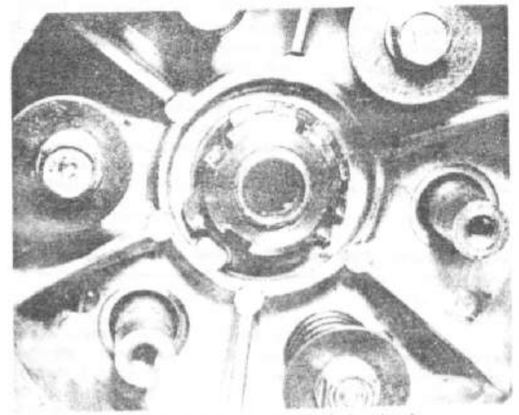
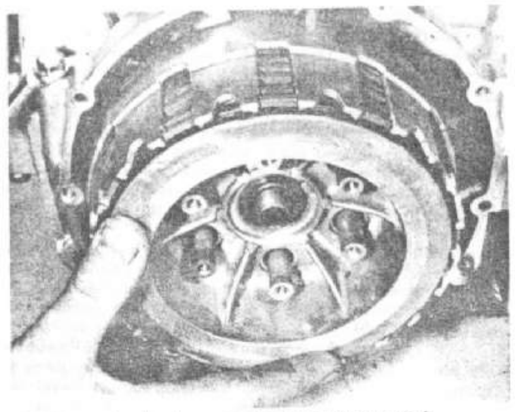


Fig. 1.2 Home-made clutch nut peg spanner
DOMOWEJ ROBOTY KLUCZ NAKRĘTKI SPRZĘGŁA



12.6 Use spring and plain washers to lock the clutch



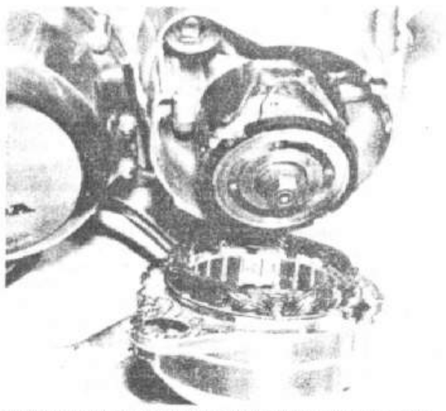
12.7 The entire clutch can now be removed from shaft

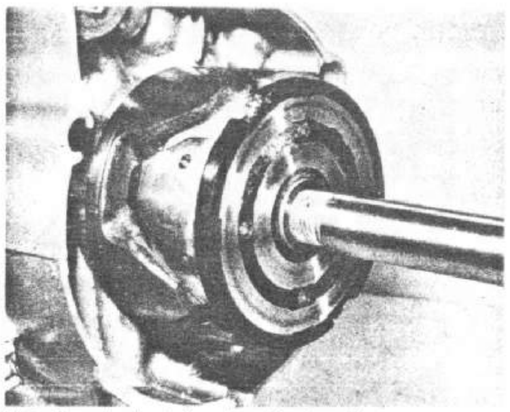
13 Dismantling the engine/gearbox unit: removing the primary drive pinion

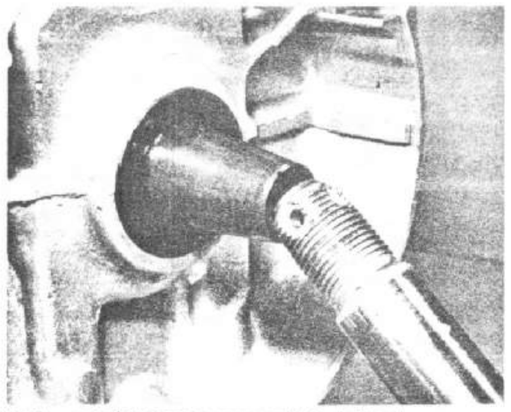
1 The primary drive pinion is attached to the end of the jackshaft, or primary shaft, and may be removed after dismantling the clutch as described in Section 12 of this Chapter. It should be noted that it is not necessary to remove the pinion to facilitate crankcase separation, and unless specific attention to this component is required, this Section may be ignored at this stage.
2 The primary drive pinion is in fact an assembly. The main pinion, having twenty four (24) teeth is splined to the protruding end of the primary shaft. A thin section outer gear fits against the primary drive pinion, and is held against it by pressure from a Belville washer. This outer gear is of the same diameter but has only twenty three (23) teeth, thus for every revolution of the complete assembly, the outer gear is forced to move by one tooth in relation to the primary drive pinion. As a result, any clearance or backlash between the primary gear teeth is taken up by the resistance of the outer gear.
3 To dismantle the above-mentioned assembly, slacken and remove the large Allen bolt which retains it to the primary shaft. Lift away the bolt, followed by the Belville washer. A large plain washer is fitted next, being located by a dowel pin to the primary drive pinion. The outer gear, primary drive gear and spacer can now be slid off the shaft.

14 Dismantling the engine/gearbox unit: removing the alternator assembly

1 The alternator assembly can be removed with the engine unit in or out of the frame. In the case of the former, it will be necessary to trace the braided generator output leads back to the area behind the right-hand side panel, where they should be released at the multi-pin connector.
2 Slacken and remove the three hexagon-headed screws which secure the alternator outer cover to the crankcase. The cover can be lifted away, together with the stator assembly and pickup brush holder.
3 It will be necessary to prevent crankshaft rotation whilst the rotor securing bolt is removed.
4 If the cylinder head and block have been removed, a bar can be passed through one of the connecting rod eyes, the ends resting against wooden blocks placed on each side of the crankcase mouth. Alternatively, if only the alternator requires attention and the unit is installed in the frame, select top gear and apply the rear brake to lock the entire power train.
5 After the rotor securing bolt has been removed it will be necessary to contrive some means of drawing the rotor off the crankshaft taper. The rotor boss is fitted with a large internal thread which is designed to accept a Honda rotor extractor, part number 07933 – 4250000. If this tool is not to hand, a suitable alternative can be found in the form of the rear wheel spindle. This has the correct thread and a taper which matches that of the crankshaft end. Screw the extractor or spindle into the rotor boss until a fair amount of pressure is applied. If this fails to break the taper joint, tap the head of the extractor or spindle until the rotor springs off. On no account should excessive force be used, nor should the rotor itself be struck.
6 It should be noted that the inner face of the rotor is recessed to provide clearance for the projecting boss which supports the right-hand crankshaft seal. It follows that the rotor must be removed prior to crankcase separation, and that it should not be fitted to the crankshaft end until the crankcase halves have been re-joined. The manufacturer advises that crankcase separation is possible with the rotor in position, but this was found to be impracticable.


14.2 Remove the alternator cover and stator assembly


14.5a Rear wheel spindle makes effective puller ...


14.5b ... note that taper engages neatly in shaft end

15 Dismantling the engine/gearbox unit: removing the starter motor

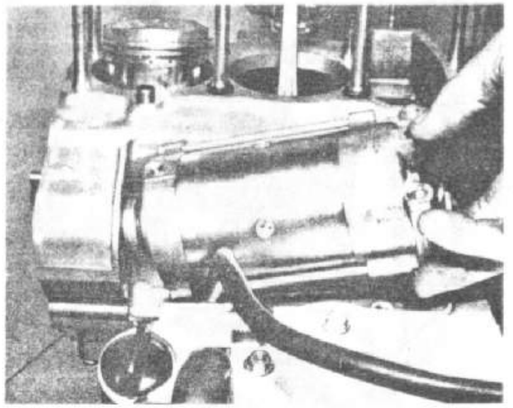
1 The starter motor resides in a well formed in the crankcase, immediately to the rear of the cylinder block. The motor can be removed with the engine unit installed in the frame or on the workbench. It is not essential to remove the motor to permit crankcase separation, but it is normal to do so during a full overhaul to permit full inspection of the crankcases and the motor itself. If the motor is to be removed with the engine installed, the following operations should be undertaken as a precursor.
2 Check that the ignition is switched off, then isolate the battery by disconnecting the negative (–) lead. Remove the right-hand side cover, and trace the heavy starter motor cable back to its terminal on the starter solenoid. Disconnect the cable and pull it through to clear the frame.
3 The starter motor is located beneath a pressed steel cover, which is retained by two hexagon-headed bolts. Remove the cover to expose the motor and its two retaining bolts. Release the bolts, then grasp the motor body and pull it to the right-hand side of the engine unit. The motor is sealed by a large O-ring where it enters the starter clutch and CDI pickup housing, and it may prove necessary to lever the motor back against the O-ring's resistance. This must be done very gently to avoid damage. Once freed, the motor can be lifted away, together with its feed cable.

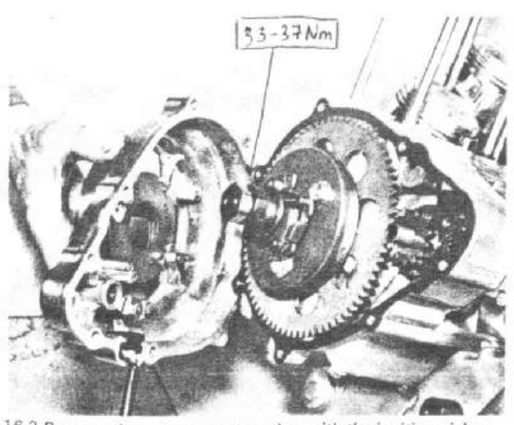
16 Dismantling the engine/gearbox unit: removing the CDI pickup and starter motor clutch

1 The CDI pickup assembly and starter motor clutch are housed beneath the left-hand engine outer cover. The various components may be removed with the engine removed from the frame or in position.
2 Release the left-hand outer cover by removing its eight retaining bolts. Note that it is not necessary to remove the circular inspection cover first. The cover will lift away complete with the CDI pickup stator. This need not be disturbed unless specific attention is required, and may be lodged clear of the starter clutch with the wiring intact. If the unit is to be dismantled completely, trace the CDI wiring back from the stator and free it from its guide clips. The cover can now be placed clear of the unit.
3 The CDI reluctor and automatic timing unit (ATU) assembly is secured to the crankshaft end by a single 8 mm bolt. Using a spanner on the flats provided, hold the ATU in position whilst its retaining bolt is removed. The assembly can now be pulled clear of the crankshaft end. Note the locating pin which engages in the back of the ATU. This precludes any possibility of fitting the unit in the wrong position at a later date.
4 The starter clutch can now be slid off the crankshaft end and placed to one side. It need not be dismantled further unless specific attention is required. An idler gear is fitted between the clutch and starter motor. This takes the form of a double gear pinion, and may be removed together with its support shaft simply by pulling it clear of the casing.

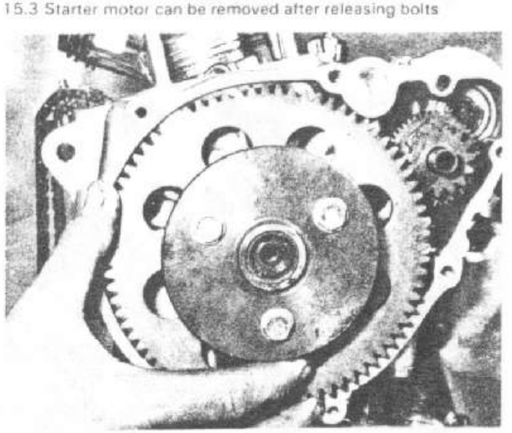
17 Crankcase separation: general information

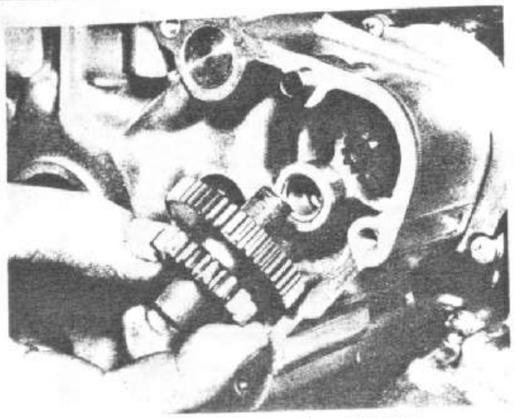
1 Crankcase separation is possible after the following operations have been carried out. Remove the engine/gearbox unit from the frame (see Section 6). Remove the cylinder head cover and camshafts (see Section 8). Remove the cylinder head (see Section 9). Remove the cylinder block (see Section 10). Remove the pistons (see Section 11). Remove the clutch assembly (see Section 12). Remove the alternator assembly (see Section 14). Remove the starter motor, idler pinion and clutch (see Sections 15 and 16). Remove the CDI pickup (see Section 16).
2 The manufacturer maintains that crankcase separation is feasible with the clutch, alternator and starter motor in position, but does not recommend this course of action. It was found that, in the case of the machine used for photographic purposes in this manual, the alternator rotor fouled the crankcase and prevented separation (see paragraph 6, Section 14).


15.3 Starter motor can be removed after releasing bolts



16.2 Remove the outer cover together with the ignition pickup


16.4a Release ATU and lift clutch away



16.4b Idler shaft and pinions can now be withdrawn

18 Dismantling the engine/gearbox unit: separating the crankcase halves

1 Start by removing the eight bolts which pass down from the upper crankcase half. These are all located around the rear section of the crankcase, behind the cylinder block gasket face. The bolts should be slackened in a diagonal sequence, turning each one by about ¼ turn until all pressure has been released. This will ensure that no undue pressure is placed on any one area, and will thus prevent any risk of warpage.

2 Turn the unit upside down, supporting it with blocks at the rear to keep it level. The unit can safely be supported by the cylinder block studs at the front, as long as they remain vertical and do not impose any lateral strain on the studs or the casting.

3 Remove the sump after releasing its fourteen holding bolts. Pull off the oil strainer, which is a push fit in the projecting nose of the distributor plate. The plate should be released next, this being retained by a total of six bolts. The separate oil pressure relief valve, located forward of the distributor plate, need not be disturbed at this juncture.

4 The crankcase halves are now secured by a total of twenty four bolts. These should be released in gradual stages, working in a criss-cross pattern to avoid any risk of warpage. Once all the bolts have been released the lower crankcase half can be lifted away. The jointing compound used on the mating surfaces may tend to make separation difficult. If this is the case, tap around the joint with a soft-faced mallet to help break the seal. If necessary, use a hammer and a hardwood block against the more substantial parts of the casing and carefully knock the lower crankcase upwards. Do not use levers between the mating surfaces of the crankcase halves. This will lead to damage of the surfaces and subsequent oil leakage.

19 Dismantling the engine/gearbox unit: removing the gearbox components, crankshaft and primary shaft

1 To gain access to the gearbox components, crankshaft assembly or the primary shaft, it is necessary to remove the engine unit from the frame (see Section 6) and to separate the crankcase halves (see Sections 17 and 18). As the lower crankcase half is removed it will be noted that the selector forks, drum and shaft remain in position, the remaining internal components staying in the inverted upper casing. The gear selector mechanism can be removed with the engine in the frame, if required, but attention to the selector drum, forks and support shaft will necessitate crankcase separation.

2 Disengage the selector shaft claw from the end of the selector drum by pulling it out against spring pressure. The shaft can now be pulled free of the lower crankcase half. Slacken and remove the shouldered pivot bolt which retains the selector drum detent lever. The return spring should now be released and the lever lifted away. Remove the bolt which retains the index plate to the selector drum end. The plate can be lifted away together with the small selector pins, the spacer and the inner plate.

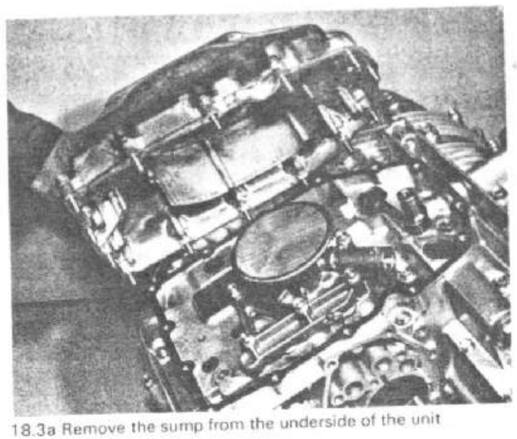
3 Release the bearing retainer plate which is secured by the location bolt for the selector shaft centring spring, and by a single countersunk screw. The latter will be staked into position and will probably require the use of an impact driver to release it.

4 The selector forks can be released by withdrawing the support shaft from the casing. Note the position of each fork prior to removal, and then refit them to the support shaft in the correct relative order to facilitate reassembly.

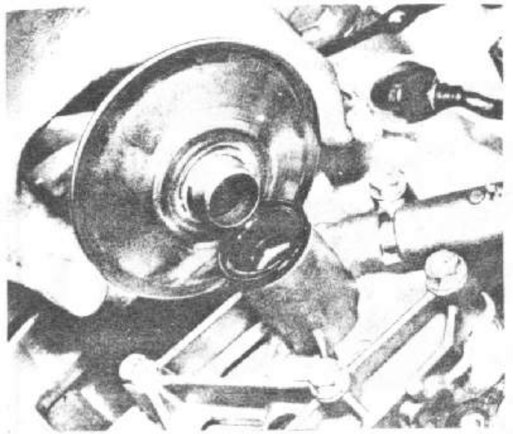
5 The selector drum can be withdrawn from the casing, together with its bearing, which is a light push fit in the casing bore. The neutral switch contact blade will remain on the end of the selector drum as it is withdrawn.

6 Moving to the upper casing half, attention can be turned to the gearbox shafts, crankshaft and primary shaft. If the gearbox pinions are suspected of being excessively worn, the backlash between each pair of gears can be measured at this stage, using a dial gauge (DTI) mounted on a suitable stand. Arrange the probe of the dial gauge to rest upon one of the gear teeth, then set the gauge at zero. Rock the pinion back and forth and note the extent of free play (backlash). This should not exceed 0.13 mm (0.005 in) on any pair of pinions. Any excessive clearance is indicative of wear, and may require renewal of the gears concerned.

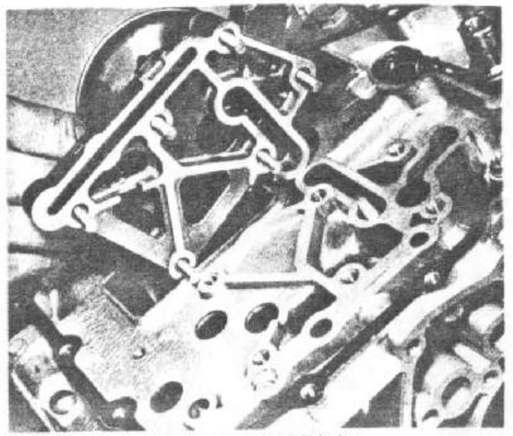
7 Lift the gearbox mainshaft and layshaft assemblies clear of the casing and place them to one side in their normal operating position until further attention or reassembly is due. The primary shaft should be lifted clear of the casing and disengaged from the primary drive chain. Mark the direction of normal travel of the primary chain before removal so that on reassembly it may be fitted to run in the same direction. Reversing the direction of travel of a partially worn Hy-Vo chain is not recommended. The crankshaft can now be lifted away and placed to one side. Check over both bare crankcase halves, and remove any dowel pins or half-rings which may have been left behind as the various shafts were removed. It is advisable to mark the various small parts to avoid confusion during reassembly.



18.3a Remove the sump from the underside of the unit

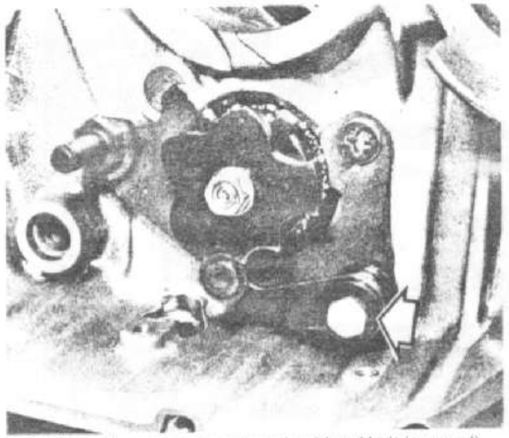


18.3b Oil strainer is a push-fit in distributor plate

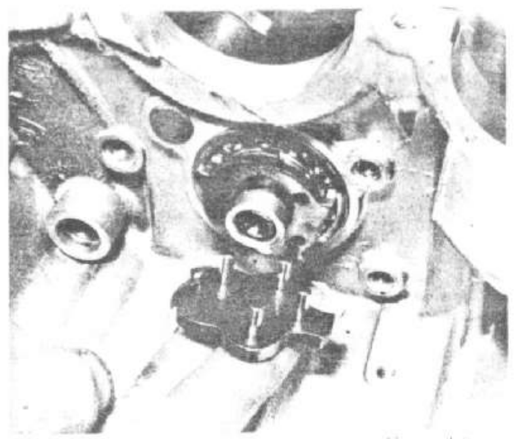


18.3c Distributor plate is secured by six bolts

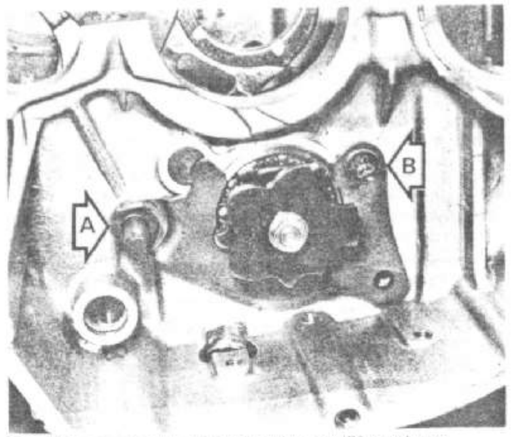
19.2a Disengage claw and withdraw selector shaft assembly (arrowed)



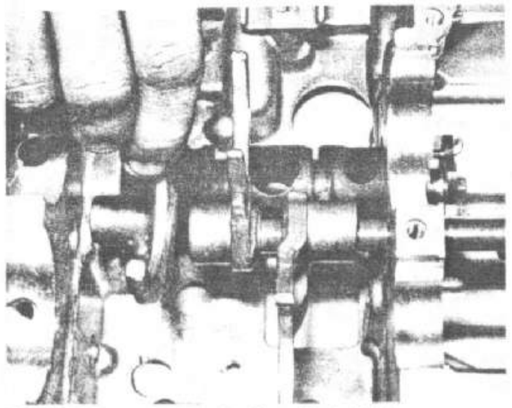
19.2b Detent lever is retained by a shouldered bolt (arrowed)



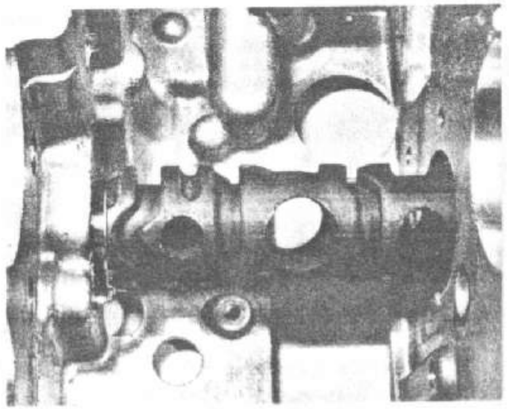
19.2c Dismantle the index plate, pins, spacer and inner plate



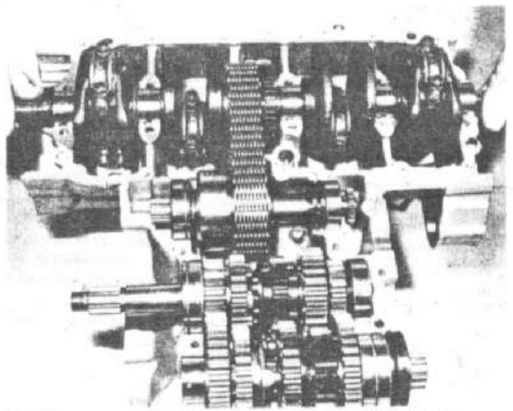
19.2d Remove location bolt (A) and screw (B) to release retainer plate



19.4 Withdraw support shaft to free selector forks



19.5 Withdraw selector drum from casing



19.7 Remove gearbox shaft, primary shaft and crankshaft

20 Examination and renovation: general

1 Before examining the parts of the dismantled engine unit for wear it is essential that they should be cleaned thoroughly. Use a petrol/paraffin mix or a high flash-point solvent to remove all traces of old oil and sludge which may have accumulated within the engine.
2 Examine the crankcase castings for cracks or other signs of damage. If a crack is discovered it will require a specialist repair.
3 Examine carefully each part to determine the extent of wear, checking with the tolerance figures listed in the Specifications section of this Chapter. If there is any question of doubt play safe and renew.
4 Use a clean lint free rag for cleaning and drying the various components. This will obviate the risk of small particles obstructing the internal oilways, and causing the lubrication system to fail.

21 Big-end and main bearings: examination and renovation

1 The Honda 750 and 900 dohc models are fitted with renewable shell-type plain bearings on the crankshaft main and big-end journals.
2 Bearing shells are relatively inexpensive and it is prudent to renew the entire set of main bearing shells when the engine is dismantled completely, especially in view of the amount of work which will be necessary at a later date if any of the bearings fail. Always renew the five sets of main bearings together.
3 Wear is usually evident in the form of scuffing or score marks in the bearing surface. It is not possible to polish these marks out in view of the very soft nature of the bearing surface and the increased clearance that will result. If wear of this nature is detected, the crankshaft must be checked for ovality as described in the following section.
4 Failure of the big-end bearings is invariably accompanied by a pronounced knock within the crankcase. The knock will become progressively worse and vibration will also be experienced. It is essential that bearing failure is attended to without delay because if the engine is used in this condition there is a risk of breaking a connecting rod or even the crankshaft, causing more extensive damage.
5 Before the big-end bearings can be examined the bearing caps must be removed from each connecting rod. Each cap is retained by two high tension bolts. Before removal, mark each cap in relation to its connecting rod so that it may be replaced correctly. As with the main bearings, wear will be evident as scuffing or scoring and the bearing shells must be replaced as four complete sets.
6 Replacement bearing shells for either the big-end or main bearings are supplied on a selected fit basis (ie; bearings are selected for correct tolerance to fit the original journal diameter), and it is essential that the parts to be used for renewal are of identical size.
7 Bearing shells should be selected in accordance with the size markings on both the connecting rod and crankshaft. See the following table of sizes:

			CRANKPIN O.D. CODE NO.		
			1	2	3
			35.992–36.000 mm	35.984–35.992 mm	35.975–35.984 mm
CONNECTING ROD I.D. CODE NO.	1	39.000–39.008 mm	E (Yellow)	D (Green)	C (Brown)
	2	39.008–39.016 mm	D (Green)	C (Brown)	B (Black)
	3	39.016–39.024 mm	C (Brown)	B (Black)	A (Blue)

BEARING INSERT THICKNESS:
A (Blue) : 1.502–1.506 mm (0.0591–0.0593 in)
B (Black) : 1.498–1.502 mm (0.0590–0.0591 in)
C (Brown) : 1.494–1.498 mm (0.0588–0.0590 in)
D (Green) : 1.490–1.494 mm (0.0587–0.0588 in)
E (Yellow): 1.486–1.490 mm (0.0585–0.0587 in)

Fig. 1.3 Big-end bearing shell selection table

8 The relevant crankpin OD (outside diameter) code will be found on the edge of alternate flywheels. In the case of the crankpin, it is the **numeral** (1, 2 or 3) that is required, whilst the main bearing journal OD code appears as a **letter** (A, B or C). The crankpin OD code is cross-referenced with the connecting rod code (1, 2 or 3) which is marked across the edge of the big-end eye. The main bearing OD code letter is cross-referenced to corresponding letters stamped at the rear of the crankcase (A, B or C), and will be found in the table below. Note that all crankshaft journals may also be checked by measuring with a micrometer. This method will permit the degree of wear and ovality to be assessed, by comparing the figures obtained with those indicated by the OD codes.

			MAIN JOURNAL O.D. CODE NO.		
			A	B	C
			35.992–36.000 mm	35.984–35.992 mm	35.975–35.984 mm
CASE I.D. CODE NO.	A	39.000–39.008 mm	D (Yellow)	C (Green)	B (Brown)
	B	39.008–39.016 mm	C (Green)	B (Brown)	A (Black)
	C	39.016–39.024 mm	B (Brown)	A (Black)	E (Blue)

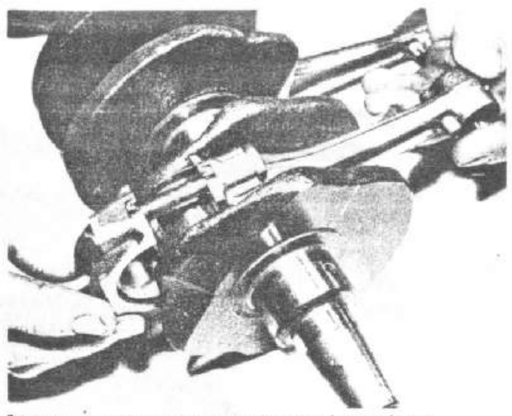
MAIN BEARING INSERT THICKNESS:
A (Black) : 1.498–1.502 mm (0.0590–0.0591 in)
B (Brown) : 1.494–1.498 mm (0.0588–0.0590 in)
C (Green) : 1.490–1.494 mm (0.0587–0.0588 in)
D (Yellow) : 1.486–1.490 mm (0.0585–0.0587 in)
E (Blue) : 1.502–1.506 mm (0.0591–0.0593 in)

Fig. 1.4 Main bearing shell selection table

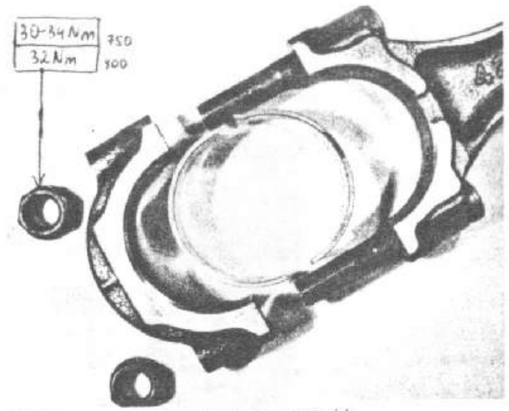
9 The bearing shell thickness for both the main and big-end journals is colour-coded. The shells themselves are marked with a dab of paint on one edge, the colours, and consequently the sizes, corresponding with those given in the tables above.

22 Examination and renovation: crankshaft assembly

1 If the main or big-end bearing shells are found to be worn, the crankshaft journals should be checked with the aid of a micrometer. The journal material will not normally wear at anything like the rate of the soft bearing shells, but if the engine has been run for some time with worn bearings, ovality may develop. The manufacturer does not specify any ovality tolerance, but as a rough guide, ovality of 0.05 mm (0.002 in) or more will warrant remedial action.
2 The crankshaft should be checked for run-out by supporting it between lathe centres or on V-blocks. Arrange a dial gauge (DTI) to rest upon the centre main bearing journal, then rotate the crankshaft through two complete revolutions, noting the range shown on the gauge. This figure should then be halved to give the actual run-out figure. The service limit for crankshaft run-out is 0.05 mm (0.002 in).
3 The journal surface should be checked carefully for signs of scoring or damage, particularly where badly worn bearing shells have been discovered. If the crankshaft assembly is out of limits or damaged in any way it will be necessary to renew it. The manufacturer does not operate a service exchange scheme or supply undersize bearing shells, so reconditioning by re-grinding the bearing surfaces is not practicable. In some instances, independent engineering companies may be able to re-work a damaged crankshaft.
4 The clearance between any set of bearings and their respective journal may be checked by the use of Plastigauge (press gauge). Plastigauge is a graduated strip of plastic material that can be compressed between two mating surfaces. The resulting width of the material when measured with a micrometer will give the amount of clearance. For example if the clearance in the big-end bearing is to be measured, Plastigauge should be used in the following manner.
5 Cut a strip of Plastigauge to the width across the bearing to be measured. Place the Plastigauge strip across the bearing journal so that it is parallel with the crankshaft. Place the connecting rod complete with its half shell on the journal and then carefully replace the bearing cap complete with half shell onto the connecting rod bolts. Replace and tighten the retaining nuts to the correct torque and then loosen and remove the nuts and the bearing cap. Without bending or pressing the Plastigauge strip, place it at its thickest point between a micrometer and read off the measurement. This will indicate the precise clearance. The original size and wear limit of the crankshaft journals and the standard and service limit clearance between all the bearings is given in the specifications at the beginning of this Chapter.
6 The crankshaft has drilled oil passages which allow oil to be fed under pressure to the working surfaces. Care must be taken to clean these out carefully, preferably by using compressed air.
7 When refitting the connecting rods and shell bearings, note that under no circumstances should the shells be adjusted with a shim, 'scraped in' or the fit 'corrected' by filing the connecting rod and bearing cap or by applying emery cloth to the bearing surface. Treatment such as this will end in disaster; if the



21.5 Remove big-end shells for examination as shown



21.6 The complete big-end bearing assembly

bearing fit is not good, the parts concerned have not been assembled correctly. This advice also applies to the main bearing shells. Use new big-end bolts too – the originals may have stretched and weakened.

8 Oil the bearing surfaces before reassembly takes place and make sure the tags of the bearing shells are located correctly. After the intitial tightening of the connecting rod nuts, check that each connecting rod revolves freely, then tighten to the specified torque setting. Check again that the bearing is quite free.

23 Primary shaft assembly and primary chain: examination and renovation

1 Power from the crankshaft is transmitted to the primary shaft by way of a Morse, or Hy-Vo, chain. The primary shaft is supported at each end by a journal ball bearing, and incorporates a rubber-and-vane type shock absorber. Power from the primary shaft is taken off by a pinion on the right-hand end. This acts as a primary drive pinion, conducting power to the clutch. If it is required that the primary pinion assembly be removed, refer to Section 13 of this Chapter for details.

2 The primary shaft bearings should be carefully washed out with petrol or a suitable cleaning solvent, then checked for wear or roughness by spinning them. Any rough spots or discernible radial play will indicate the need for renewal. The left-hand bearing can be removed after releasing the oil pump pinion circlip, the pinion and its small driving pin, followed by the bearing retaining circlip. The bearing should not prove too tight a fit on the shaft, and may often be removed by jarring the end of the shaft against a hardwood block.

3 The right-hand bearing can be removed after dismantling the primary pinion assembly, as described in Section 13. Do not omit to check the condition of the oil seal which is fitted to the left-hand shaft end. If the sealing lip appears marked or damaged it should be renewed as a matter of course.

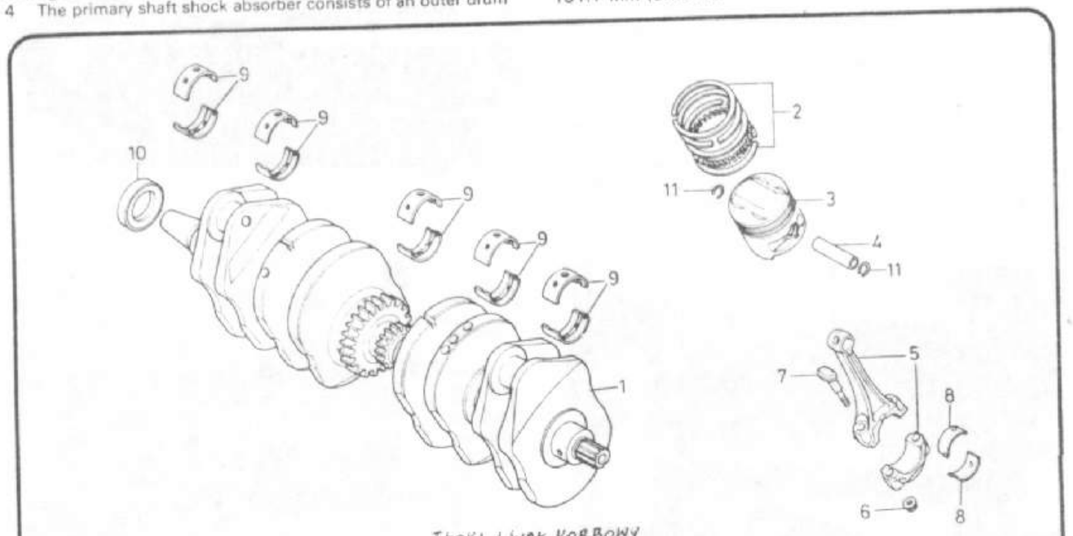
4 The primary shaft shock absorber consists of an outer drum with internal vanes which slides over similar vanes on the outside of a splined centre. Rubber damping blocks are fitted between each pair of vanes providing shock absorption in the event of snatch loadings in either direction. The assembly will not normally require attention until the rubber blocks become compressed after very high mileages have been covered.

5 The shock absorber body can be pulled off after the primary pinion and right-hand bearing have been removed. The two halves of the unit are secured by a circlip and plain washer at the right-hand end. Once these have been removed the centre of the unit can be driven out, displacing the damping blocks.

6 Check the rubbers for damage or compression. If the unit is in good condition, there will be no discernible free play when it is assembled, and the rubbers should make the two parts a tight fit. Any slackness will allow snatch loadings to be transferred to the clutch and gearbox, making the machine rather unpleasant to ride. The unit is reassembled in the reverse order of dismantling. If new rubbers prove to be a very tight fit, use a small amount of petrol as a lubricant. This will make assembly much easier, the petrol evaporating off soon afterwards.

7 The Morse type Hy-Vo primary chain is automatically tensioned by a hydraulic tensioner mechanism fed by the engine oil supply. This type of chain is very resistent to stretching, and very high mileages can normally be covered before renewal is necessary. The chain should be checked for wear whenever the engine is stripped for overhaul, following the procedure outlined below. If at or near the service limit, it is worthwhile renewing the chain in view of the considerable amount of dismantling work that will be required should it prove worn out in the near future.

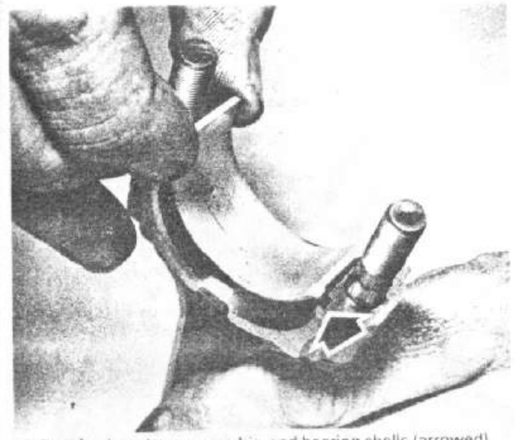
8 Assemble the chain around the crankshaft and primary shaft sprockets, anchoring the crankshaft against suitable stops on the workbench. Attach a spring balance to the primary shaft, and apply a tension of 36 kg (79 lb). With the chain under tension, measure the chain length as shown in Fig. 1.7. The nominal length is 129.78 – 129.98 mm (5.109 – 5.117 in). The chain must be renewed when it reaches the service limit of 131.1 mm (5.16 in).



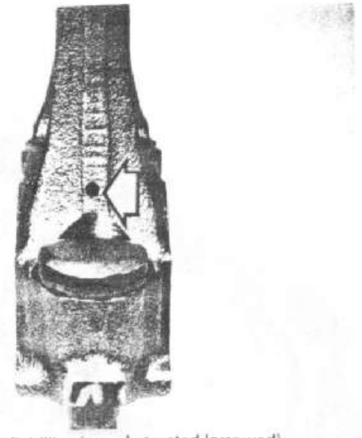
TŁOKI I WAŁ KORBOWY

Fig. 1.5 Piston and crankshaft assembly

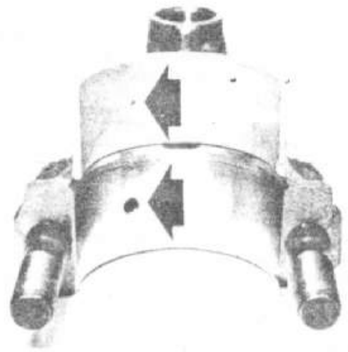
1 *Crankshaft*
2 *Piston ring set – 4 off*
3 *Piston – 4 off*
4 *Gudgeon pin – 4 off*
5 *Connecting rod – 4 off*
6 *Nut – 8 off*
7 *Bolt – 8 off*
8 *Big-end bearing shell – 8 off*
9 *Main bearing shell – 10 off*
10 *Oil seal*
11 *Circlip – 8 off*



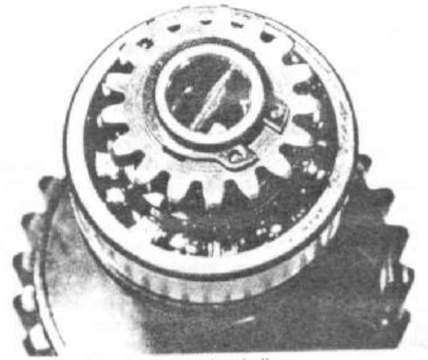
22.7a Note locating tang on big-end bearing shells (arrowed)



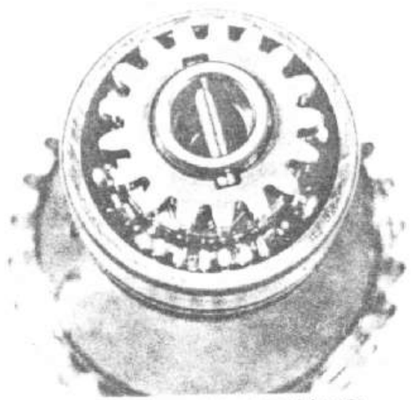
22.7b Check that oil drilling is unobstructed (arrowed) ...



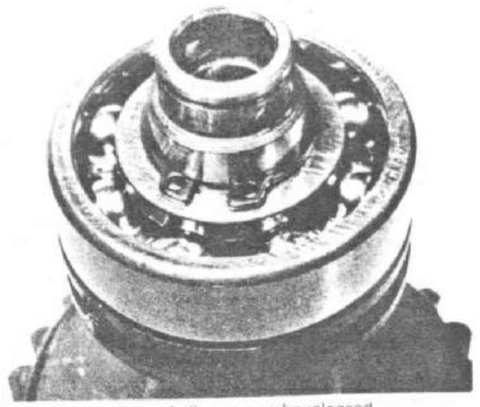
22.7c ... and that holes in con rod and shell align (arrowed)



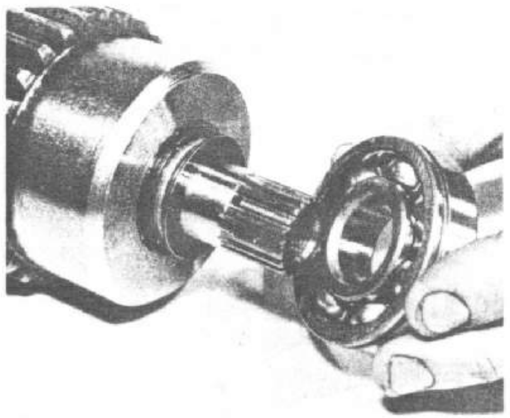
23.2a Oil pump pinion is secured by circlip



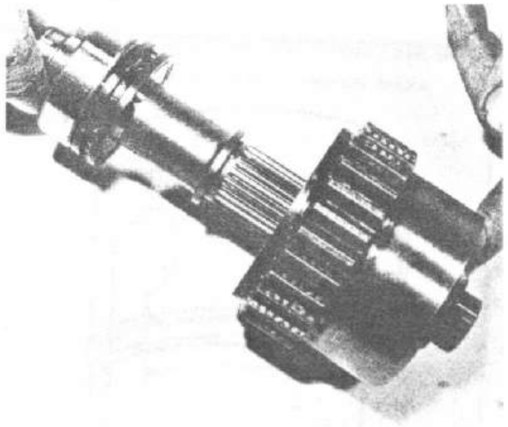
23.2b Lift the pinion clear and displace driving pin



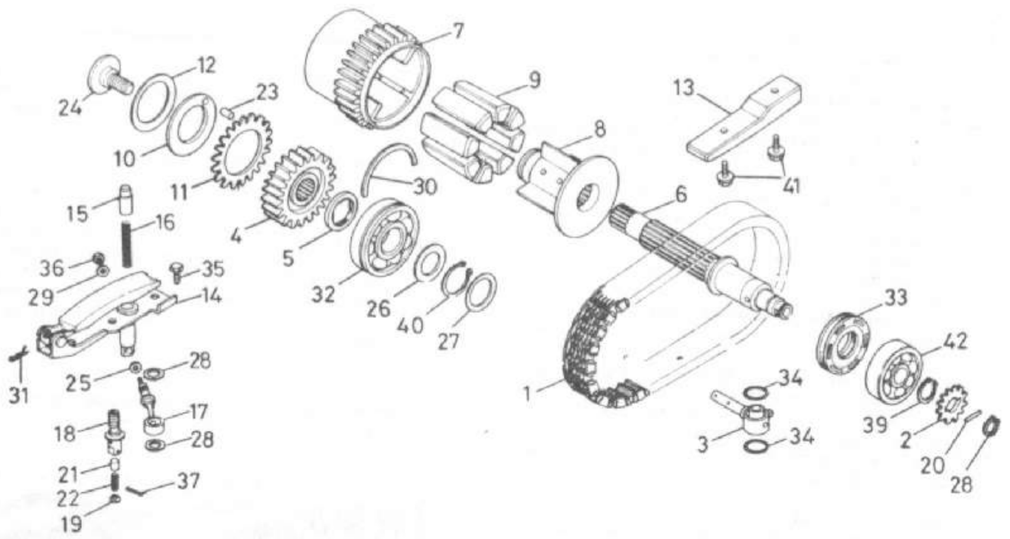
23.2c Bearing retaining circlip can now be released



23.2d Bearing is sliding fit on shaft end



23.5 Shock absorber can be removed from right-hand end



ELEMENTY PRZEKŁADNI PIERWOTNEJ

Fig. 1.6 Primary shaft assembly

1 *Primary chain*
2 *Oil pump drive pinion*
3 *Chain oil distributor*
4 *Primary drive pinion*
5 *Collar*
6 *Primary shaft*
7 *Shock absorber body*
8 *Shock absorber centre*
9 *Damping rubbers – 8 off*
10 *Side plate*
11 *Primary drive sub gear*
12 *Belville washer*
13 *Chain guide*
14 *Chain tensioner*
15 *Tensioner end piece*
16 *Tensioner spring*
17 *Tensioner pipe*
18 *Tensioner valve body*
19 *Stopper*
20 *Roller*
21 *Tensioner valve*
22 *Spring*
23 *Locating pin*
24 *Bolt*
25 *Washer*
26 *Thrust washer*
27 *Thrust washer*
28 *Washer – 2 off*
29 *Sealing washer*
30 *Bearing locating ring*
31 *R-pin*
32 *Ball bearing*
33 *Oil seal*
34 *Sealing washer – 2 off*
35 *Bolt – 2 off*
36 *Nut*
37 *Split pin*
38 *Circlip*
39 *Circlip*
40 *Circlip*
41 *Bolt – 2 off*
42 *Bearing*

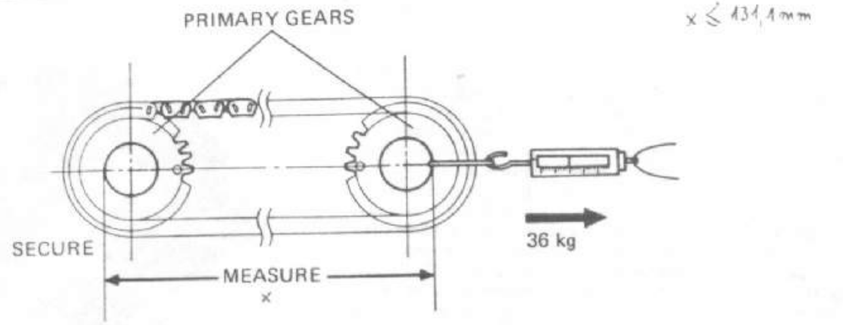


Fig. 1.7 Primary chain wear measurement
POMIAR STOPNIA ZUŻYCIA ŁAŃCUCHA SPRZĘGŁOWEGO

24 Oil seals: examination and replacement

1 Oil seal failure is difficult to define precisely. Usually it takes the form of oil showing on the outside of the machine, and there is nothing worse than those unsightly patches of oil on the ground where the machine has been standing. One of the most crucial places to look for an oil leak is behind the gearbox final drive sprocket. The seal should be renewed if there is any sign of a leak.

2 Oil seals are relatively inexpensive, and if the unit is being overhauled it is advisable to renew all the seals as a matter of course. This will preclude any risk of an annoying oil leak developing after the unit has been reinstalled in the frame.

25 Cylinder block: examination and renovation

1 The usual indication of badly worn cylinder bores and pistons is excessive smoking from the exhausts. This usually takes the form of blue haze tending to develop into a white haze as the wear becomes more pronounced.

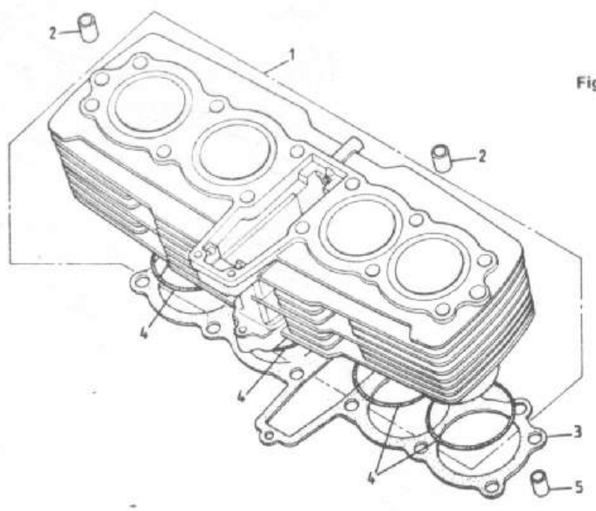
2 The other indication is piston slap, a form of metallic rattle which occurs when there is little load on the engine. If the top of the bore is examined carefully, it will be found that there is a ridge on the thrust side, the depth of which will vary according to the rate of wear which has taken place. This marks the limit of travel of the top piston ring.

3 Measure the bore diameter just below the ridge using an internal micrometer, or a dial gauge. Compare the reading you obtain with the reading at the bottom of the cylinder bore, which has not been subjected to any piston wear. If the difference in readings exceeds 0.1 mm (0.004 in) the cylinder block will require boring and honing to the next oversize.

4 If measuring instruments are not available, the amount of bore wear can be approximated as follows. Remove the rings from one piston (see the following Section), then slide it into its bore so that the crown is about ¼ in from the top. Measure the gap between the piston and the bore at 90° to the gudgeon pin boss. If the gap exceeds 0.10 mm (0.004 in) remedial action will be required.

5 If wear has necessitated re-boring, the work should be entrusted to a Honda Service Agent or to a competent engineering shop. Pistons are available in the standard bore size, with oversizes of +0.25, +0.50, +0.75 and +1.00 mm.

6 Make sure the external cooling fins of the cylinder block are free from oil and road dirt, as this can prevent the free flow of air over the engine and cause overheating problems.



BLOK CYLINDRÓW

Fig. 1.8 Cylinder block – early CB750K

1 *Cylinder barrel*
2 *Locating dowel – 2 off*
3 *Cylinder base gasket*
4 *O-ring – 4 off*
5 *Locating dowel – 2 off*

25.2 Note honing marks on new bore surface. Note O-ring (arrowed)

26 Pistons and piston rings: examination and renovation

1 If a rebore becomes necessary, the existing pistons and piston rings can be discarded because they will have to be replaced by their new oversizes.
2 Remove all traces of carbon from the piston crowns, using a blunt ended scraper to avoid scratching the surface. Finish off by polishing the crowns of each piston with metal polish, so that carbon will not adhere so rapidly in the future. Never use emery cloth on the soft aluminium.
3 Piston wear usually occurs at the skirt or lower end of the piston and takes the form of vertical streaks or score marks on the thrust side of the piston. Damage of this nature will necessitate renewal, if severe.
4 The piston ring grooves may become enlarged in use, allowing the rings to have a greater side float. If the clearance exceeds 0.09 mm (0.004 in) the pistons are due for replacement.
5 To measure the end gap, insert each piston ring into its cylinder bore, using the crown of the bare piston to locate it about 1 inch from the top of the bore. Make sure it is square in the bore and insert a feeler gauge in the end gap of the ring. If the gap is outside the wear limit, the ring(s) concerned must be renewed.

Piston ring end gap	
Nominal ring end gap	
Top and 2nd	*0.10–0.30 mm (0.004–0.012 in)*
Oil control	*0.30–0.90 mm (0.012–0.035 in)*
Wear limit	
Top and 2nd	*0.5 mm (0.020 in)*
Oil control	*1.1 mm (0.043 in)*

6 When refitting new piston rings, it is also necessary to check the end gap. If there is insufficient clearance, the rings will break up in the bore whilst the engine is running and cause extensive damage. The ring gap may be increased by filing the ends of the rings with a fine file, though this is not normally necessary with new rings of Honda manufacture.
7 The ring should be supported on the end as much as possible to avoid breakage when filing, and should be filed square with the end. Remove only a small amount of metal at a time and keep rechecking the clearance in the bore.
8 When dealing with piston rings it is advisable to attend to one piston at a time to preclude the risk of rings being refitted to the wrong piston. This would be undesirable as the rings will have bedded into a particular bore, and would allow compression leakage if fitted incorrectly. It will be noted that the two compression rings differ in that the top ring has a plain profile, whilst the second ring is tapered. Each ring is marked on one face and this should be arranged to face upwards when fitted. The oil control ring is built up from two scraper rails separated by an expander.
9 When installing the piston rings, or when removing sound existing rings for examination, care should be taken not to break them by spreading the ends too far apart. With a little experience the ring gap can be eased apart by hand, just enough to permit removal or fitting. Alternatively, three or four thin metal strips can be placed across the ring grooves and the rings slid on or off. (See the accompanying illustration).

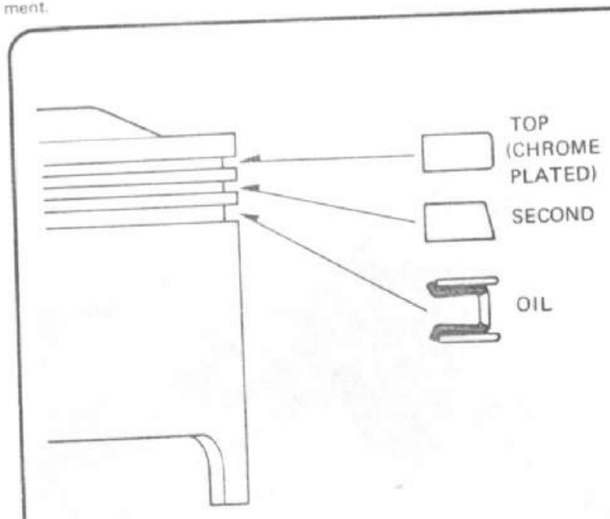


Fig. 1.9 Piston ring profiles
PRZEKRÓJ PIERŚCIENI TŁOK.

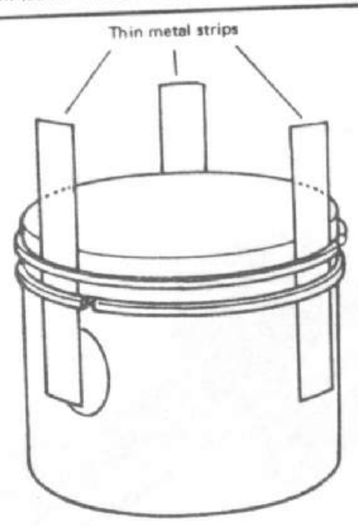


Fig. 1.10 Removing and replacing piston rings
ZDJĘCIE I WYMIANA PIERŚCIENI TŁOKOWYCH

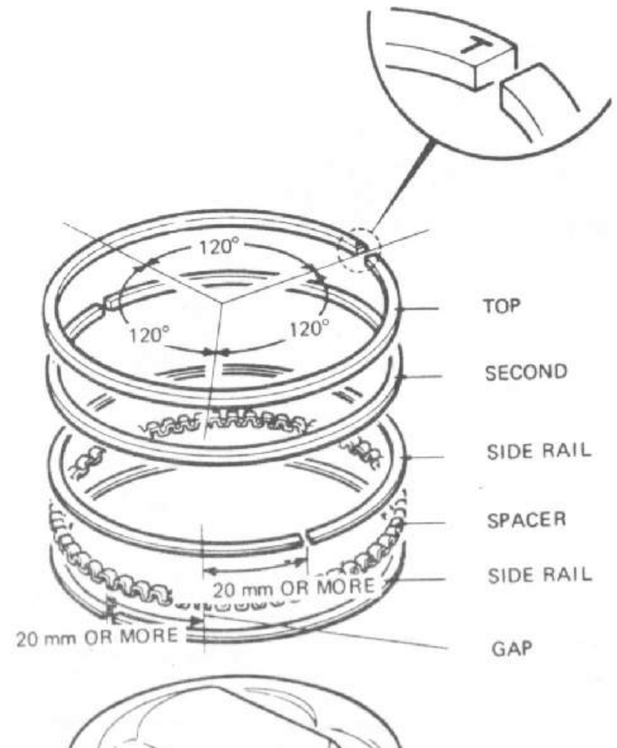
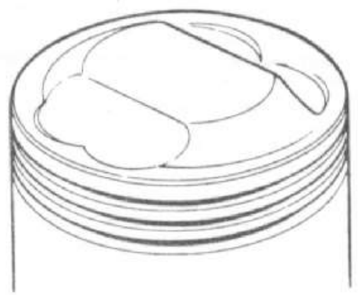


Fig. 1.11 Piston ring end gap positions
USTAWIENIE ZAMKÓW PIERŚCIENI TŁOKOWYCH



26.3 Check piston surface for scoring and wear

27 Cylinder head: examination and renovation

1 Remove all traces of carbon from the cylinder head using a blunt ended scraper (the round end of an old steel rule will do). Finish by polishing with metal polish to give a smooth shiny surface. This will aid gas flow and will also prevent carbon from adhering so firmly in the future.
2 Check the condition of the sparking plug hole threads. If the threads are worn or crossed they can be reclaimed by a Helicoil insert. Most motorcycle dealers operate this service which is very simple, cheap and effective.
3 Clean the cylinder head fins with a wire brush, to prevent overheating, through dirt blocking the fins.
4 Lay the cylinder head on a sheet of $\frac{1}{4}$ inch plate glass to check for distortion. Aluminium alloy cylinder heads distort very easily, especially if the cylinder head bolts are tightened down unevenly. If the amount of distortion is only slight, it is permissible to rub the head down until it is flat once again by wrapping a sheet of very fine emery cloth around the plate glass base and rubbing with a rotary motion.
5 If it proves possible to insert a 0.10 mm (0.004 in) feeler gauge between the glass plate and the cylinder head, the head is beyond the service limit for distortion and remedial action must be taken. If only just outside this limit it may be possible to have the gasket face machined flat, but great care must be taken if this action is chosen. Remember that the machining operation will have some effect on the compression ratio, and might result in the valves touching the piston at high speed. A specialist machinist should be sought for this type of work.

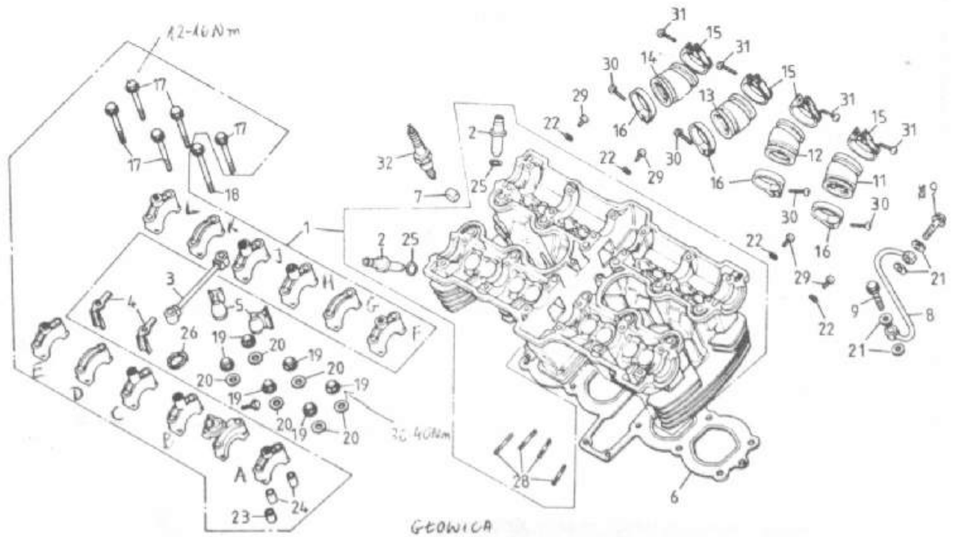


Fig. 1.12 Cylinder head components

1 Cylinder head assembly
2 Valve guide – 16 off
3 Oil transfer pipe
4 Oil deflector – 2 off
5 Oil deflector cap
6 Cylinder head gasket
7 Rubber damper – 8 off
8 Feed pipe
9 Banjo bolt
10 Banjo bolt
11 Carburettor stub
12 Carburettor stub
13 Carburettor stub
14 Carburettor stub
15 Clip – 4 off
16 Clip – 4 off
17 Bolt – 22 off
18 Bolt – 2 off
19 Domed nut – 12 off
20 Sealing washer – 12 off
21 Sealing washer – 4 off
22 Thrust washer – 4 off
23 Dowel pin
24 Dowel pin – 23 off
25 O-ring – 16 off
26 O-ring
27 Bolt
28 Stud – 8 off
29 Screw – 4 off
30 Screw – 4 off
31 Screw – 4 off 5x25
32 Sparking plug – 4 off

28 Valves, valve seats, and valve guides: examination and renovation

1 Remove the cam followers and shims, keeping them separate for installation in their original locations. Compress the valve springs with a valve spring compressor, and remove the split valve collets, also the oil seals from the valve guides, as it is best to renew these latter components. Care should be taken to avoid damage to the cam follower bores when using a valve spring compressor. A Honda service tool is available to protect the soft alloy from scoring (part number 07999 – 4220000). In the absence of this tool a strip of plastic or stout card may be used to line the bore during valve removal. Do not compress the springs more than is necessary to facilitate removal of the split collet halves.

2 As each valve and its associated parts is released, place it in a suitably marked bag or container to ensure that it is refitted in its correct location. If this precaution is not observed, compression leakage will be almost inevitable. When cleaning and examining these components deal with one valve assembly at a time, for the same reason.

3 Each valve should be cleaned prior to checking for wear. Carbon deposits should be removed from the top and underside of the head, taking care not to score the seating face or stem. Remove the heavy carbon deposits using a blunt ended scraper and then finish off with a fine emery paper. When cleaning the stem of the valve use only longitudinal strokes and not rotating strokes. The fine scoring caused by the emery paper may cause stress failure if it runs around the circumference of the valve stem. A highly polished finish is desirable because it reduces the rate of carbon build-up in the future.

4 Examine the valve seating face in conjunction with the valve seat in the cylinder head, looking for signs of pitting or burning. This is most likely to be found on the exhaust valves, because these lead an altogether more strenuous life than their inlet counterparts. If the machine has been maintained properly, there should be no more than a few minor marks on either face, but if severe damage is discovered, remedial action will be required. Small marks can be removed by lapping as described below.

5 Valve grinding is a simple task. Commence by smearing a trace of fine valve compound (carborundum paste) on the valve seat and apply a suction tool to the head of the valve. Oil the valve stem and insert the valve in the guide so that the two surfaces to be ground in make contact with one another. With a semi-rotary motion, grind in the valve head to the seat, using a backward and forward action. Lift the valve occasionally so that the grinding compound is distributed evenly. Repeat the application until an unbroken ring of light grey matt finish is obtained on both valve and seat. This denotes the grinding operation is now complete. Before passing to the next valve, make sure that all traces of the valve grinding compound have been removed from both the valve and its seat and that none has entered the valve guide. If this precaution is not observed, rapid wear will take place due to the highly abrasive nature of the carborundum paste.

6 In view of the number of valves used in these engines, it may be thought worthwhile purchasing one of the oscillatory valve lapping tools which have come onto the market in recent years. This device consists of a sealed gearbox having a driving spindle on one side and a rubber sucker on the other. Rotary movement from an electric drill chuck is converted to the correct to-and-fro motion at the sucker. These devices are well worth having if more than one or two valves are to be lapped. On no account fit the valve stems straight into a drill chuck and attempt grinding by that method, as this will quickly destroy the seat, valve and guide.

7 If a reasonable amount of lapping fails to produce the required unbroken seating area on both the valve and seat, the operation must be abandoned. Excessive lapping is time-consuming and will only result in a ruined valve seat. Examine the seating faces very closely. The attempt at lapping will have highlighted any pits, and a decision must now be taken on the best course of action. Honda advise that the valve should **not** be re-faced, and must therefore be renewed if damaged to the extent that lapping proves ineffective.

8 The valve seats may be re-cut to remove pitting or to compensate for poor seating or incorrect seat widths. Note that if new valve guides are to be fitted, the seats must be re-cut to suit, so check valve guide condition **before** the seats are re-cut. The valve seats are formed by cutting them at three angles to produce the correct seat width, which is nominally 0.99 – 1.27 mm (0.039 – 0.050 in). It should be noted that there is nothing to be gained by using an excessively large contact area, as this will lead to accelerated wear and pitting, and will impair gas flow through the engine.

9 The re-cutting operation requires the use of five separate cutters of various angles and diameters. These are shown in the accompanying diagram (Fig. 1.13), along with the appropriate Honda part numbers. The 32° and 60° cutters are used first, and the correct seating width is then obtained by using the 45° cutter. A word of caution is necessary here, since the valve seats will only accept a limited amount of cutting before they become unacceptably pocketed. When this happens, the seat is no longer usable, and as it is integral with the cylinder head this will require renewal. In view of this risk, and the cost of cutters (not to mention new cylinder heads) it is strongly recommended that any re-cutting is entrusted to a Honda Service Agent. The above information is therefore given for the benefit of owners having access to the required tools and the skill to use them safely.

10 The newly-cut seats should be carefully lapped to their respective valves as described in paragraphs 5 and 6 above. All being well, a perfect gas-tight joint should result. If not, it is likely that the seating face of the valve is unusable, and the valve must be renewed.

11 The amount of valve stem wear must be checked by measuring the stem with a micrometer. Check the stem in a number of positions, and note the smallest reading obtained. If this falls below the service limit, the valve must be renewed.

Valve stem service limit

Inlet	*Exhaust*
5.47 mm (0.215 in)	*5.44 mm (0.214 in)*

12 The internal diameter of the valve guides can be measured by using ball gauges or a suitable inside micrometer. The service limits for the guides are as follows.

Valve guide ID service limit

Inlet	*Exhaust*
5.54 mm (0.218 in)	*5.54 mm (0.218 in)*

13 The valve stem diameter figure should now be subtracted from the valve guide ID figure to give the amount of valve to guide clearance. This should not exceed 0.07 mm (0.003 in) for the inlet valve or 0.09 mm (0.004 in) in the case of the exhaust valve. If the total clearance exceeds this, check whether it can be brought within tolerance by fitting a new guide only. Failing this, a new guide and valve must be fitted. In either case, remember that the valve seat must be re-cut.

14 If the correct measuring equipment is not available, check for wear by placing the valve in its guide and attempting to rock the valve to and fro. Anything more than barely discernible play will be indicative of unacceptable wear. If present, take the cylinder head and valves to a Honda Service Agent for verification of wear.

14 The valve guides are an interference fit in the cylinder head, and will require a stepped drift and a certain amount of skill during the renewal operation. The stepped drift should have a spigot of similar size to the valve stem, whilst the larger diameter should be slightly less than that of the valve guide. Support the cylinder head on wooden blocks, so that the combustion chambers face upwards. The valve guide(s) can now be driven out of the head casting. The new component(s) can be fitted in a similar manner, noting that a new O-ring should be fitted beneath the head of each guide prior to its being fitted. Great care should be taken during both operations, as the soft alloy head casting and the guides themselves are easily damaged.

15 The guides must be reamed to size after fitting, using the Honda reamer, part number 07984 – 2000000, or equivalent to bring the ID to 5.500 – 5.515 mm (0.2165 – 0.2171 in). The valve seats must now be re-cut to the new guide as described in paragraphs 8 and 9 above.

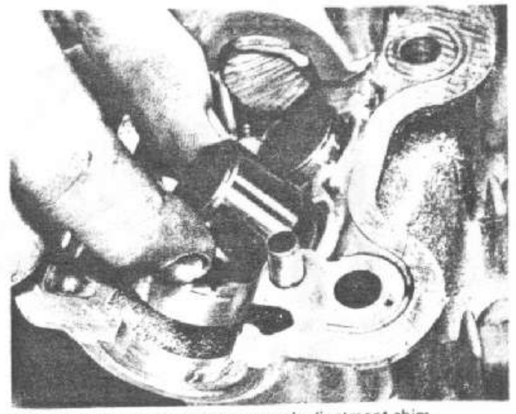
16 In view of the amount of skilled work involved in cylinder head reconditioning, some thought should be given to the alternative of entrusting the job to a Honda Service Agent. Bear in mind that some specialist equipment is needed, and is unlikely to warrant purchasing for a one-off job. Much of the cost involved is in the stripping and reassembly work which is a necessary precursor to overhaul. If this stage is undertaken at home, a good proportion of the total cost can be saved.

17 Before reassembling the valves, check the spring seats, springs and collet halves for signs of wear or damage. The valve springs will take a permanent set after very high mileages, and will eventually allow valve float to occur at high speeds. The free lengths of the springs should be measured with a vernier caliper and compared with the table below. Springs are relatively cheap when compared with the cost of rectifying the damage that would result from a valve head hitting a piston at high engine speeds – if in doubt, play safe and renew them.

Valve spring free length – wear limits

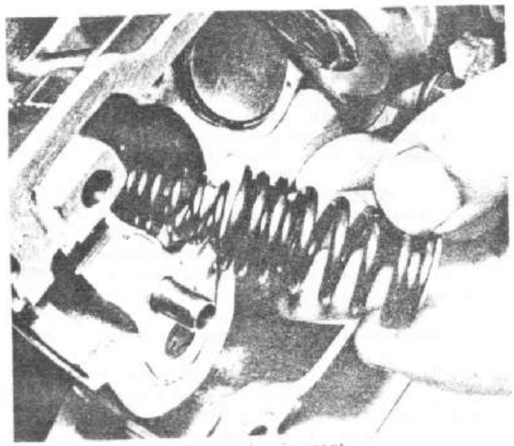
Inner	*inlet*	*39.8 mm (1.57 in)*
	exhaust	*39.8 mm (1.57 in)*
Outer	*inlet*	*42.5 mm (1.67 in)*
	exhaust	*42.5 mm (1.67 in)*

18 Reassemble the valve and valve springs by reversing the dismantling procedure. Fit new oil seals to each valve guide and oil both the valve stem and the valve guide, prior to reassembly. Take special care to ensure the valve guide oil seal is not damaged when the valve is inserted. On inspection it will be seen that the valve spring coils are more closely wound at one end of the spring than the other. When installing the springs

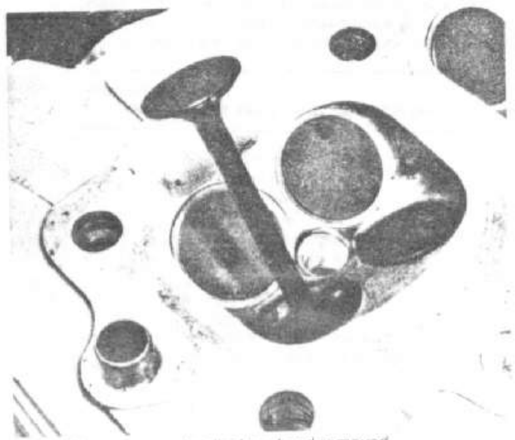


28.1a Remove the cam follower and adjustment shim

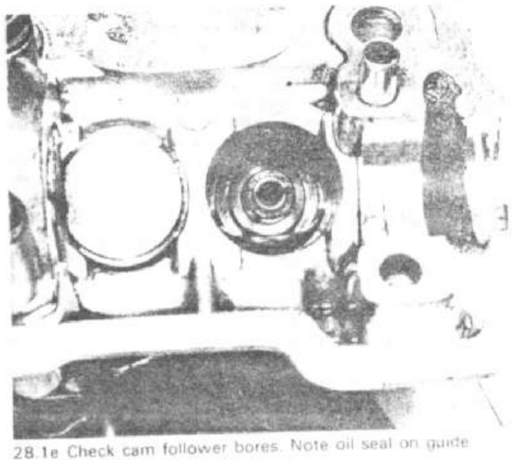
28.1b Compress the valve springs and free collet halves



28.1c Remove the springs and spring seat



28.1d Valve can now be displaced and removed



28.1e Check cam follower bores. Note oil seal on guide

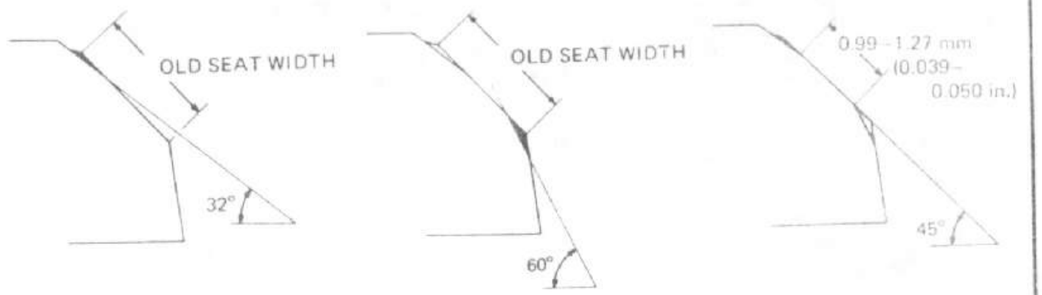
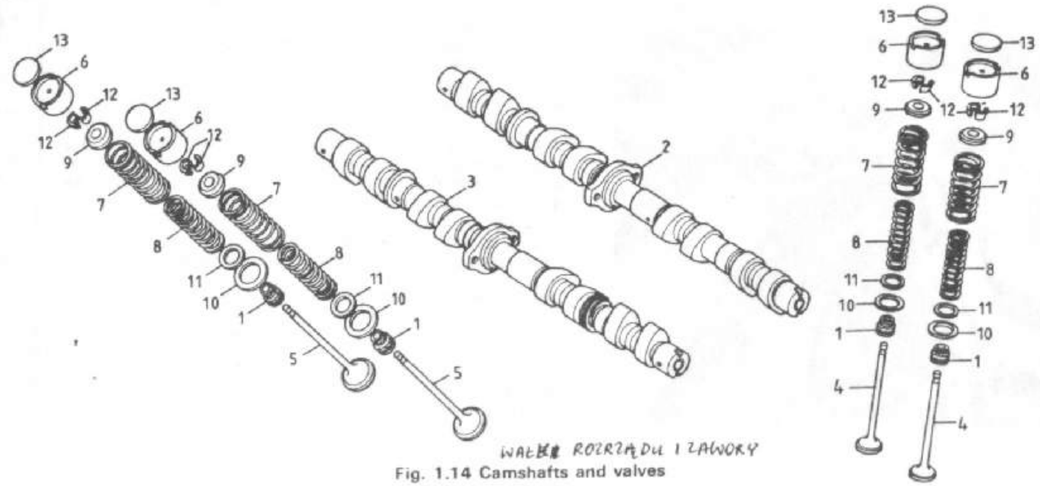


Fig. 1.13 Valve seat recutting angles

GNIAZDA ZAWOROW - REGENERACJA



WAŁKI ROZRZĄDU I ZAWORY

Fig. 1.14 Camshafts and valves

1 Oil seal – 16 off
2 Inlet camshaft
3 Exhaust camshaft
4 Inlet valve – 8 off
5 Exhaust valve – 8 off
6 Cam follower bucket – 16 off
7 Outer spring – 16 off
8 Inner spring – 16 off
9 Collar – 16 off
10 Spring outer seat – 16 off
11 Spring inner seat – 16 off
12 Collet – 32 off
13 Adjustment shim (pad) – 16 off

ensure that the close wound end faces the cylinder head. As a final check after assembly, give the end of each valve stem a sharp tap with a hammer, to make sure the split collets have located correctly.

29 Camshafts, cam followers and camshaft drive mechanism: examination and renovation

1 Examine the camshaft bearing surfaces for signs of wear or scoring. This type of damage should not occur, because the bearing surfaces are supplied with copious amounts of engine oil during normal running. If, however, the oil has not been changed regularly and the filter has been allowed to become blocked, the bypass system will circulate unfiltered oil carrying abrasive dirt particles to the bearings. The damage that this may cause will be most evident on the soft alloy bearing surfaces in the cylinder head and camshaft caps. Little can be done in these cases, except to renew the cylinder head, bearing caps and the camshafts if these are scored.

2 Camshaft runout can be checked by supporting each end of the camshaft on V-blocks and arranging a dial gauge to bear upon the centre bearing journal. Runout must not exceed 0.05 mm (0.002 in).

3 The clearance between the camshaft bearing surfaces varies along its length according to the table below. It can be measured by using plastigauge in the same way as described in Section 22 of this Chapter.

Camshaft bearing oil clearances

	Nominal	Service limit
Cap letter code		
A, F, E and L	0.040–0.082 mm (0.0016–0.0032 in)	0.13 mm (0.0051 in)
Unmarked (tachometer drive), G, D and K	0.062–0.109 mm (0.0024–0.0043 in)	0.16 mm (0.0063 in)
B, H, C and J	0.085–0.139 mm (0.0033–0.0055 in)	0.19 mm (0.0075 in)

4 The camshaft and bearing caps should be free from oil prior to measurement. Place a strip of plastigauge on top of each bearing surface, fit the caps in the correct order and tighten down to the recommended torque setting of 1.2 – 1.6 kgf m (9 – 12 lbf ft) in a diagonal pattern to preclude warpage. If the clearance(s) proves to be outside the service limit, check whether renewal of the camshaft(s) will suffice to bring it within limits. Failing this, camshaft and cylinder head renewal will be necessary.

5 Examine each of the camshaft lobes for signs of wear or scoring. A worn camshaft will show signs of flats developing on the peak of each lobe, and the degree of wear can be checked by measuring the lobe at its widest point. The service limit for the inlet camshaft lobes is 36.9 mm (1.45 in) whilst that of the exhaust camshaft lobes is 37.4 mm (1.47 in).

6 The camshaft lobes bear upon hard steel cam followers running in cylindrical bores above the valves and thus to the tops of the valve stems. Clearance between the cam and followers is adjusted by fitting pads of varying thicknesses between. Worn pads would lead to increased valve clearances, but this problem is overcome simply by renewing the pad(s) concerned. The procedure is covered in detail in Routine Maintenance at the front of the manual.

7 There is a small clearance between the cam follower and its bore to allow for lubricating oil. This should not pose a wear problem given regular oil and filter changes, but if wear is evident, the clearance can be checked by measuring the outside diameter of the cam follower and subracting this reading from the bore measurement.

Cam follower OD

Nominal	Wear limit
27.972–27.993 mm (1.1013–1.1021 in)	27.96 mm (1.101 in)

Cam follower bore ID

Nominal	Wear limit
28.000–28.016 mm (1.1024–1.1030 in)	28.04 mm (1.104 in)

Cam follower to bore – maximum clearance
0.07 mm (0.003 in)

8 If the clearance exceeds the maximum figure quoted above, calculate whether a new cam follower would bring it back within limits. In the event that this is inadequate, the only solution is to renew the cylinder head. Honda do not supply oversize followers, so this cannot be used as a less expensive alternative unless the services of a competent engineering works are available for the necessary precision machining.

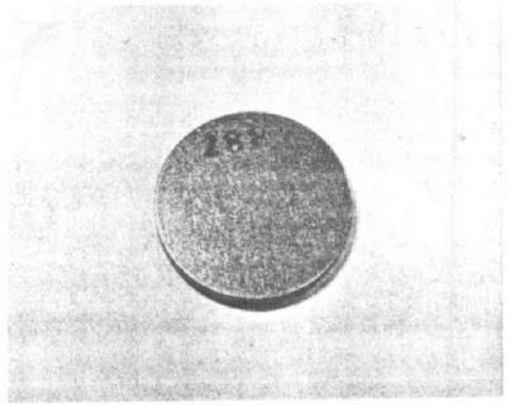
9 The camshafts are driven by two separate Hy-Vo chains. The first of these runs between the crankshaft and the exhaust camshaft, the second chain running between the exhaust and inlet camshafts. Spring-loaded tensioners are employed to compensate for chain stretch, a separate assembly being used for each chain.

10 The Hy-Vo type chains are well known for their resistance to stretching, but eventually some wear will take place, with the ultimate result that the tensioner(s) will be unable to compensate for the increased length. The chain lengths should therefore be checked whenever they are removed. If the chain is at or near the service limit it is advisable to renew it to avoid further dismantling work in the near future.

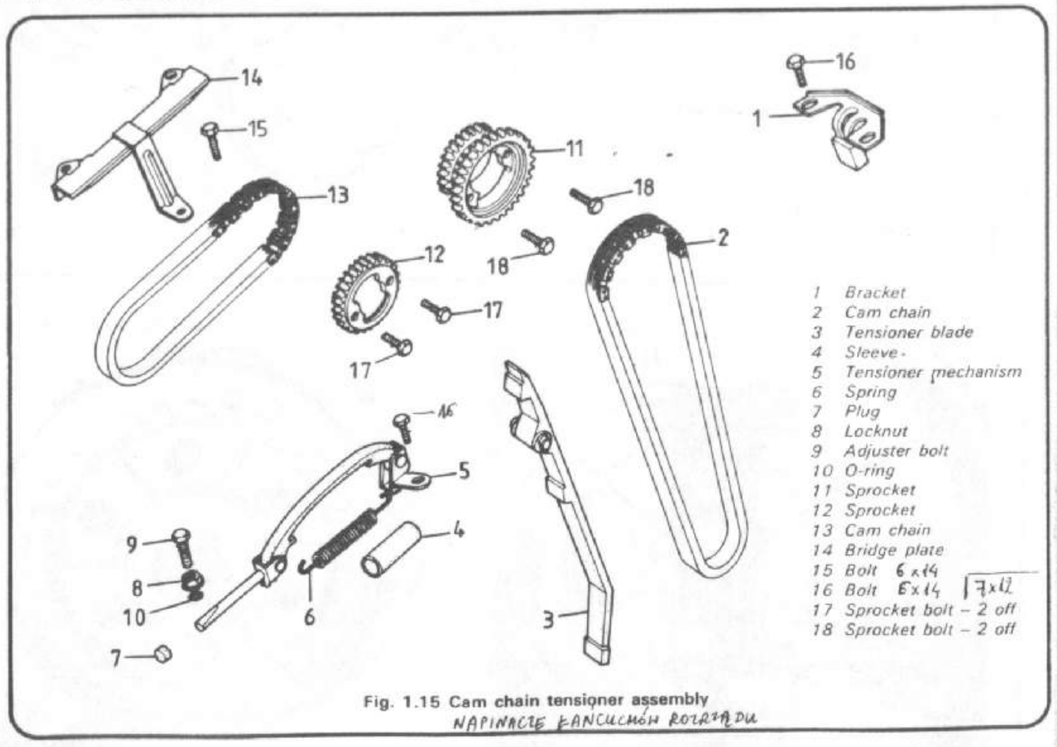
11 Arrange the longer of the two chains (crankshaft to exhaust camshaft) around the two camshaft sprockets, anchoring one of these at the workbench. Using a spring balance, apply a force of 13 kg (29 lb) and measure the distance shown in Fig. 1.16. If this exceeds 311.8 mm (12.28 in) the chain has passed the service limit and must be renewed.

12 The second, shorter chain (inlet camshaft to exhaust camshaft) is checked in exactly the same way, again with a force of 13 kg (29 lb). In this instance, the measured distance (shown in Fig. 1.16) must not exceed 177.1 mm (6.97 in). Do not forget to check the condition of the sprockets, renewing them along with their chains if worn or chipped.

13 The tensioner mechanisms consist of spring-loaded blades which take up any normal chain slack. Tension is set automatically by releasing the tensioner lock bolts when the engine is idling to allow the tensioner to assume its correct position, the bolts then being used to secure the setting. On a high mileage engine, wear in the cam chains and tensioners will allow a lot of mechanical noise to develop. If the engine was noisy prior to dismantling, despite attempts at tensioner adjustment, check the tensioners' fibre surfaces for wear. If these are deeply scored or damaged they should be renewed in conjunction with their corresponding chain guides. Note that a new tensioner assembly will not compensate for a worn-out chain.



29.6 Cam lobes bear on hard steel adjustment shims



1 Bracket
2 Cam chain
3 Tensioner blade
4 Sleeve
5 Tensioner mechanism
6 Spring
7 Plug
8 Locknut
9 Adjuster bolt
10 O-ring
11 Sprocket
12 Sprocket
13 Cam chain
14 Bridge plate
15 Bolt 6 x 14
16 Bolt 6 x 14
17 Sprocket bolt – 2 off
18 Sprocket bolt – 2 off

Fig. 1.15 Cam chain tensioner assembly

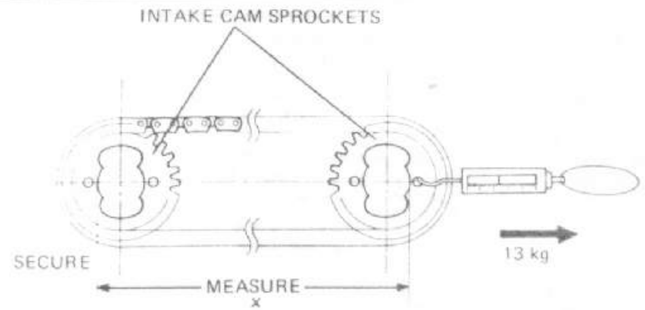


Fig. 1.16 Measuring the cam chain wear

30 Clutch assembly: examination and renovation

1 With the clutch removed as an assembly as described in Section 12 of this Chapter, further dismantling can take place on the workbench. Lift away the flanged clutch centre to expose the first friction plate. This differs from the remainder in having helical slots in the friction material, and must be fitted on the outside of the group with the slots facing the right way. Remove the plain and friction plates which follow. There is now a special spring plate which is in effect two plain plates with a spring arrangement between them to assist freeing and to absorb shocks. Lift away the remaining friction and plain plates, the clutch pressure plate, spacer and splined washer. This will leave the outer drum with its needle roller bearings.

2 After an extended period of service the clutch friction plates will wear sufficiently to allow clutch slip to occur under high loads. The friction plates should be checked for wear by measuring across the lining material using a vernier caliper. The nominal thickness is 3.72 – 3.88 mm (0.146 – 0.153 in). Renew the plate(s) when the wear limit of 3.40 mm (0.13 in) is reached.

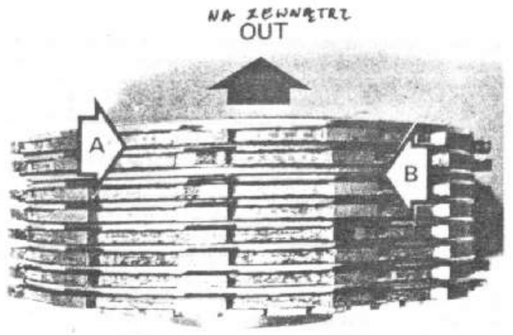
3 Clutch slip may also occur on plates within the service limits where the friction surface has become glazed. Glazing is caused by deposits of burnt oil generated by frequent clutch-slipping, and is often found on machines ridden consistently in heavy traffic. It is permissible to remove the glazing by judicious use of abrasive paper, asuming that this does not take the plates below their limit. If this fails to solve the problem, check the springs as detailed later in this Section.

4 Examine the plain plates for signs of overheating, which may have lead to them assuming a bluish colour. This again is indicative of a heavily used clutch, and may result in warpage. Place each plain plate on a surface plate or a sheet of plate glass and check for warpage using feeler gauges. If it is possible to insert a 0.3 mm (0.012 in) feeler gauge, the plate(s) must be renewed.

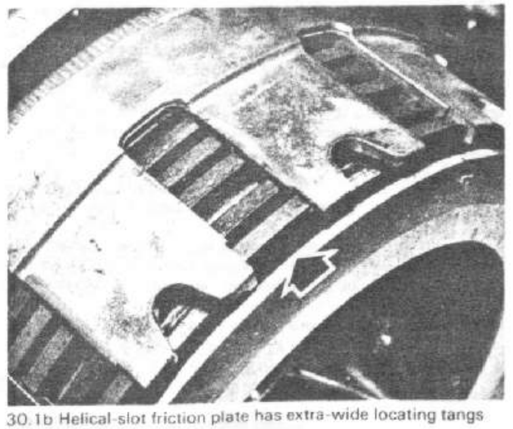
5 Examine the clutch assembly for burrs or indentation on the edges of the protruding tongues of the inserted plates and/or slots worn in the edges of the outer drum with which they engage. Similar wear can occur between the inner tongues of the plain clutch plates and the slots in the clutch inner drum. Wear of this nature will cause clutch drag and slow disengagement during gear changes, since the plates will become trapped and will not free fully when the clutch is withdrawn. A small amount of wear can be corrected by dressing with a fine file; more extensive wear will necessitate renewal of the worn parts.

6 A check of clutch spring condition can be made by measuring the free length. The nominal length is 34.2 mm (1.35 in) and the springs must be renewed when the service limit of 32.8 mm (1.29 in) is reached. If possible, check the spring preload at the specified length, as detailed in the Specifications.

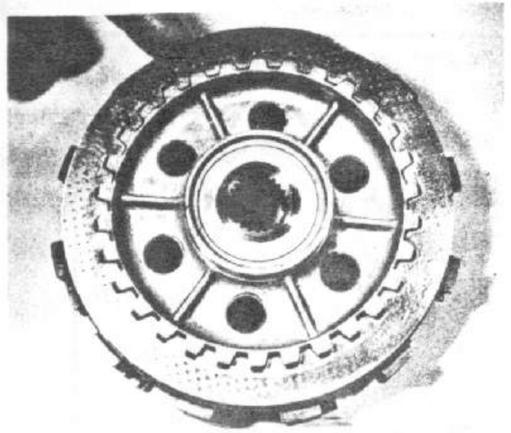
7 The clutch release mechanism consists of a cam-operated lever mounted on the inside of the clutch outer casing, and acting on the clutch release bearing via a mushroom-headed pushrod. The mechanism is relatively sturdy and is unlikely to require attention other than in the case of obvious breakage. The moving parts can be greased whenever the cover is removed for attention to the clutch.



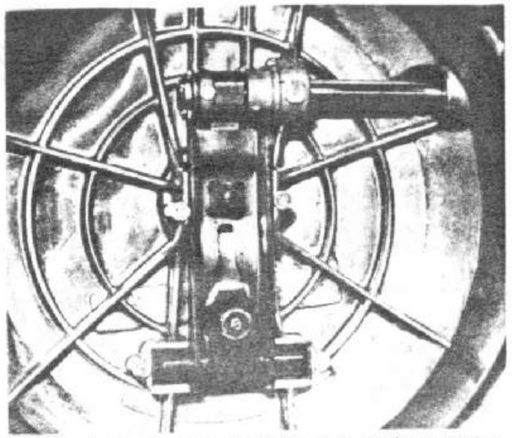
30.1a A: helical-slot friction plate. B: shock absorbing plain plate



30.1b Helical-slot friction plate has extra-wide locating tangs



30.5 Check for wear between plain plates and splines



30.7 The clutch release mechanism. It rarely requires attention

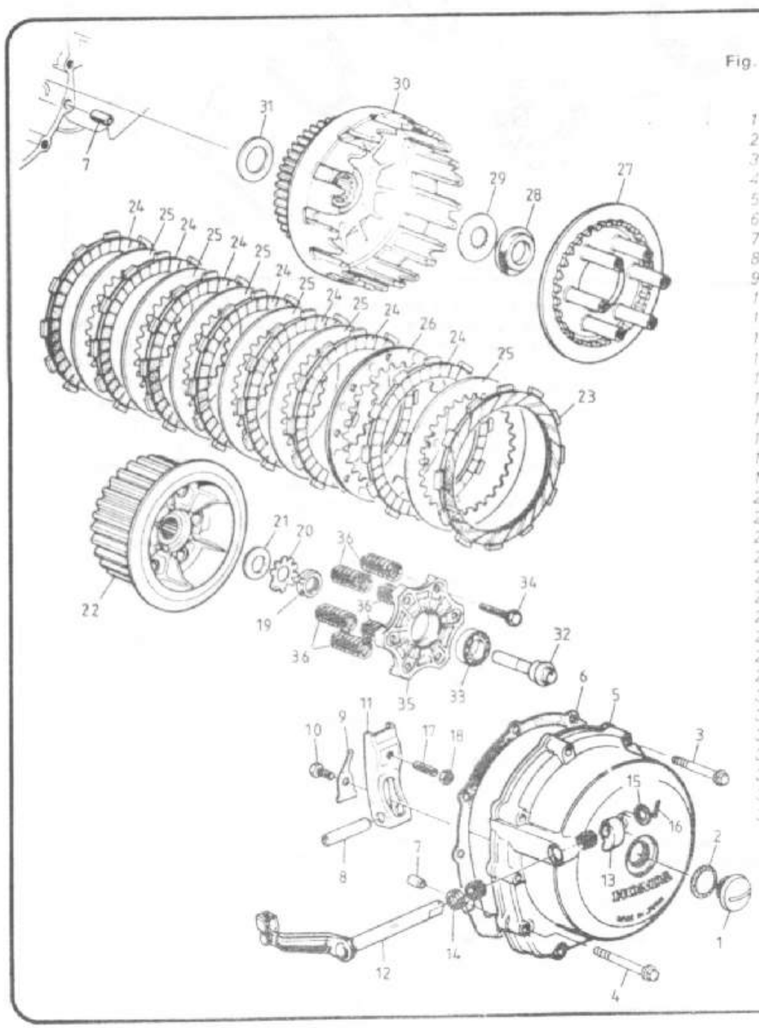


Fig. 1.17 Clutch – Early CB750K

1 Adjustment cap
2 O-ring
3 Bolt – 6 off
4 Bolt – 5 off
5 Clutch cover
6 Clutch cover gasket
7 Dowel pin – 2 off
8 Starter reduction gear shaft
9 Plate
10 Bolt 6 x 12
11 Adjusting lever
12 Operating lever
13 Lifter cam
14 Oil seal
15 Washer
16 Split pin
17 Adjusting screw
18 Lock nut
19 Nut
20 Tab washer
21 Washer
22 Clutch centre
23 Friction plate B
24 Friction plate A – 7 off
25 Plain plate A – 6 off
26 Plain plate B
27 Pressure plate
28 Collar
29 Splined washer
30 Outer drum
31 Thrust washer
32 Lifter guide
33 Bearing
34 Bolt – 6 off 6 x 25
35 Lifter plate
36 Spring – 6 off

31 Gearbox components: examination and renovation

1 Examine each of the gear pinions to ensure that there are no chipped or broken teeth and that the dogs on the end of the pinions are not rounded. Gear pinions with any of these defects must be renewed; there is no satisfactory method of reclaiming them. General wear will lead to backlash developing between the pairs of gears, and this is difficult to check visually. If suspected, check the backlash as described in Section 19.

2 Dismantle each of the gearbox shafts in turn, laying out the components in the order in which they were removed. In the case of the mainshaft (input shaft), the 1st gear pinion is integral, but the remaining gears can be removed after releasing the circlips and washers which secure them. The layshaft (output shaft) can be dismantled in a similar manner, leaving the second gear pinion and bearing in position.

3 Check the internal diameter of each gear pinion, comparing the readings obtained with the service limits listed below. An internal micrometer or vernier caliper will be required for this operation.

Gearbox pinion internal diameters – wear limits
Mainshaft 4th gear 28.06 mm (1.105 in)
Mainshaft 5th gear 31.07 mm (1.223 in)
Layshaft 1st gear 25.06 mm (0.987 in)
Layshaft 3rd gear 28.07 mm (1.105 in)

4 Check the various gear bushes for wear by measuring the internal diameter (ID) and outside diameter (OD). Renew if beyond the service limit shown below.

Gear bush ID and OD – wear limits
Mainshaft 5th gear (OD) 30.93 mm (1.218 in)
Layshaft 1st gear (OD) 24.93 mm (0.981 in)
Layshaft 1st gear (ID) 22.06 mm (0.869 in)

5 Measure the outside diameters of the mainshaft and layshaft in the positions indicated in Fig. 1.19. Compare the readings obtained with the service limits shown below.

Mainshaft and layshaft OD – wear limits
A and B 27.93 mm (1.100 in)
C 21.93 mm (0.863 in)

6 The clearance between each gearbox pinion and the relevant shaft or bush can be calculated from the above. In each case the clearance wear limit is 0.10 mm (0.004 in) with the exception of the mainshaft 5th gear to bush clearance; in this instance the service limit is 0.12 mm (0.005 in).

7 The gearbox bearings should be washed carefully in clean petrol and allowed to dry. The condition of the bearings can be checked by spinning them to highlight any roughness. Any discernible radial play is indicative of the need for renewal. Very slight axial play is normal and thus acceptable, but if excessive will require renewal. Inspect the bearing tracks and the balls or rollers. These will be unmarked and highly polished in a sound bearing, any surface defects indicate that the bearing is worn out. Retain any sound bearing, and lubricate it with oil to prevent corrosion forming prior to reassembly.

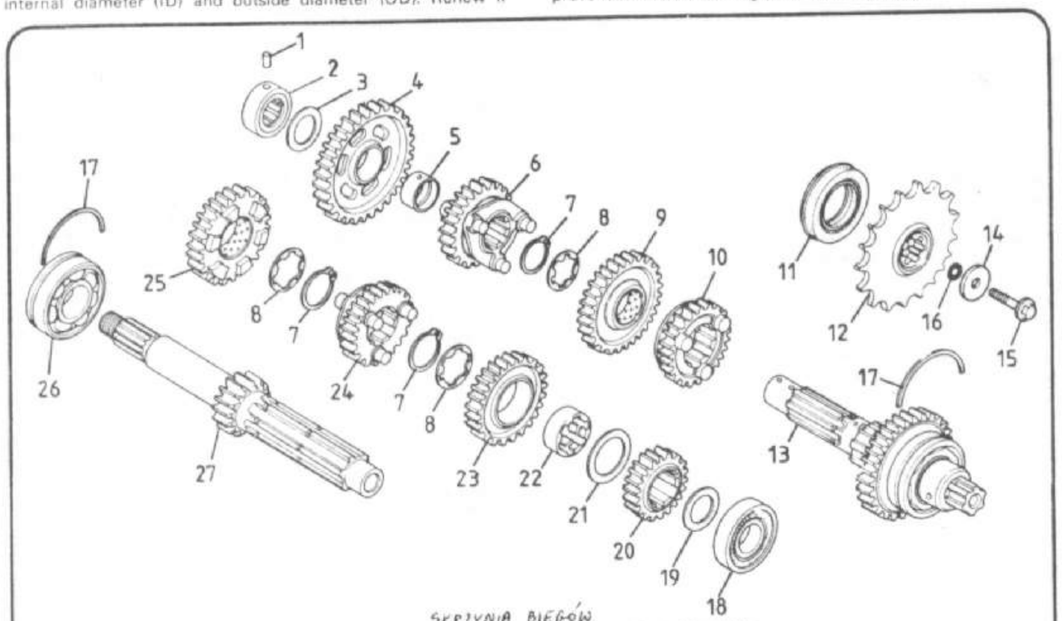


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Fig. 1.18 Gearbox components – Early CB750K

1 Pin
2 Needle roller bearing
3 Thrust washer
4 Layshaft 1st gear pinion
5 Bush
6 Layshaft 4th gear pinion
7 Circlip – 3 off
8 Splined thrust washer – 3 off
9 Layshaft 3rd gear pinion
10 Layshaft 5th gear pinion
11 Oil seal 40 x 62 x 13
12 Final drive sprocket
13 Layshaft
14 Washer
15 Bolt
16 O-ring
17 Bearing locating ring
18 Main bearing
19 Thrust washer
20 Mainshaft 2nd gear pinion
21 Thrust washer
22 Splined collar
23 Mainshaft 5th gear pinion
24 Mainshaft 3rd gear pinion
25 Mainshaft 4th gear pinion
26 Main bearing
27 Mainshaft

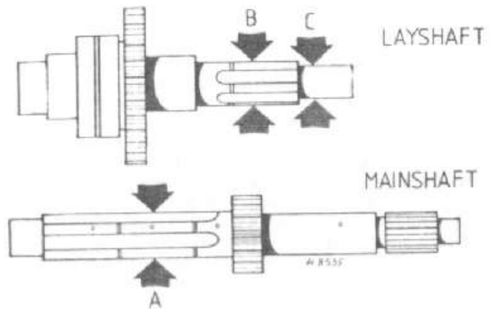
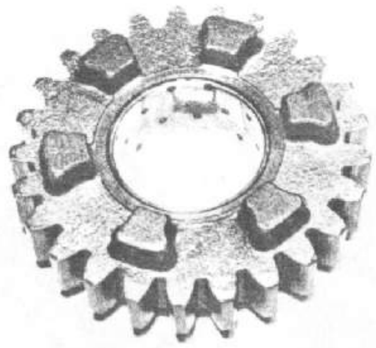
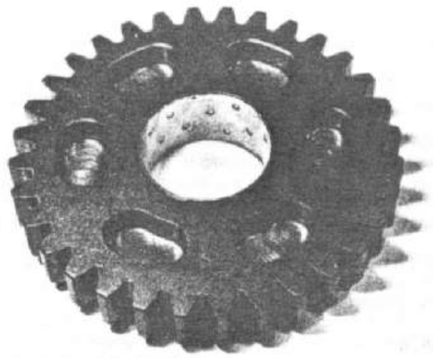


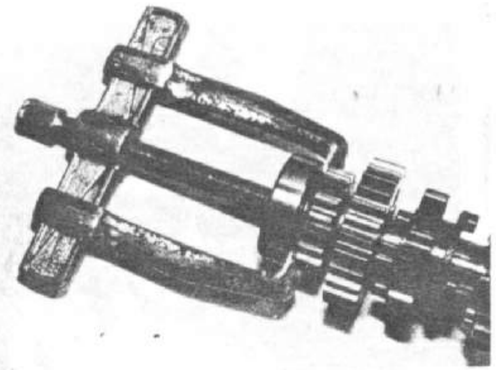
Fig. 1.19 Measuring gearbox shaft wear
Refer to text for details



31.1 Check pinion teeth for wear or chipping



31.4 Check pinion bushes for wear



31.7 Bearings may require puller to effect removal

32 Gear selector mechanism: examination and renovation

1 Examine the selector forks for wear, noting the surface finish around the fork ends where they engage with the gearbox pinions. Wear here is unlikely unless lubrication has been badly neglected, in which case scoring may be evident. The width of the fork should be measured for wear, renewal being necessary if the reading obtained is less than 6.1 mm (0.24 in). Check the internal bore measurement of each fork. This should not be greater than 13.04 mm (0.573 in).

2 The selector fork support shaft should be examined for signs of wear or scoring, and rejected if badly damaged. Check for straightness by rolling the shaft on a dead flat surface, such as a surface plate or a sheet of glass. If at all bent, the shaft should be renewed as it will seriously impair gear selection if refitted. The outside diameter of the shaft can be measured for wear if there is some doubt as to its condition. It must be renewed if worn to 12.90 mm (0.508 in) at any point. Check the fit of the shaft in its casing bore. It should normally be a light sliding fit. Excessive wear will allow movement, and thus sloppy gearchanging action. If the casing has become worn, it may be necessary to have it bored out and bushed. This should be left to a competent engineering company.

3 The selector drum is supported by a journal ball bearing at one end, the other end running directly in the casing. The bearing does not lead a demanding existence, and is unlikely to warrant attention during the normal life of the engine. The same can be said of the plain end, and neither will require more than a cursory inspection for wear or damage.

4 The selector drum tracks, on the other hand, are subjected to fairly high loadings at times, and may begin to wear after high mileages have been covered. The grooves should be examined in conjunction with the selector fork guide pins with which they engage. It is normal to find polished areas where pressure has been exerted, but most of the wear will take place on the comparatively small selector fork guide pin. It will be the latter component that is most likely to require renewal in cases where wear is severe.

5 The selector claw assembly conveys movement to the end of the selector drum by way of hardened steel pins. These components do not suffer from wear in normal circumstances, but should be checked, paying particular attention to the working surfaces. If the machine has shown a tendency to jump out of gear, check the detent mechanism, renewing the spring as a precaution.

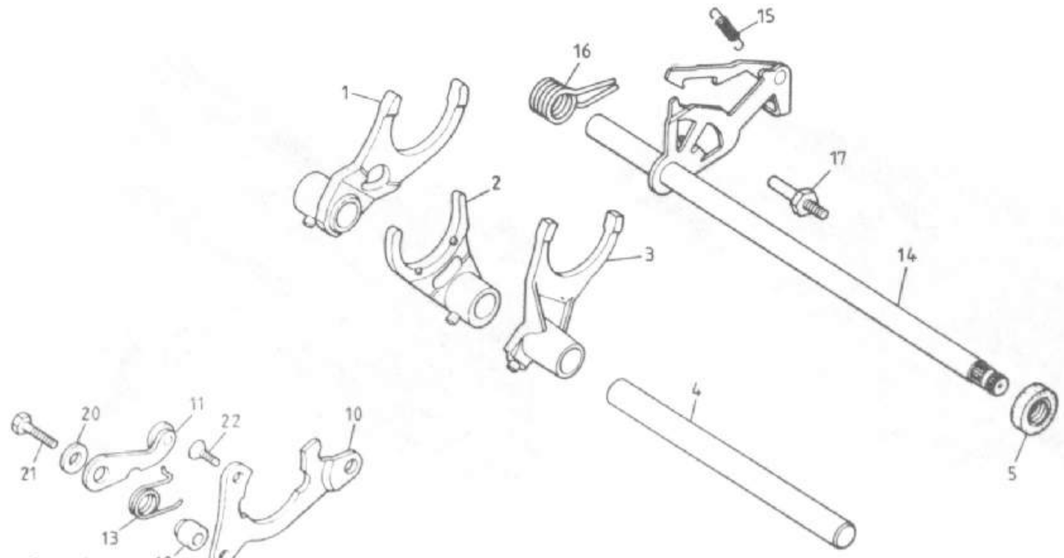


Fig. 1.20 Gearchange mechanism – Early CB 750K
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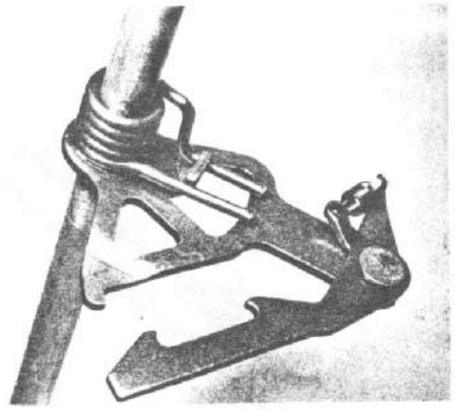
1	Right-hand selector fork	13	Return spring
2	Centre selector fork	14	Gear change shaft
3	Left-hand selector fork	15	Return spring
4	Selector fork rod	16	Return spring
5	Oil seal	17	Spring anchor
6	Change drum centre plate	18	Change drum
7	Change drum cam plate	19	Ball bearing
8	Collar	20	Washer
9	Collar	21	Bolt
10	Change drum retaining plate	22	Screw
11	Change drum stopper arm	23	Bolt 6 x 25
12	Collar	24	Change pin – 5 off



32.5 Examine selector claws for wear or damage

33 Engine reassembly: general

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

2 Make sure all traces of old gaskets have been removed and that the mating surfaces are clean and undamaged. One of the best ways to remove old gasket cement is to apply a rag soaked in methylated spirit or where necessary, a gasket cement solvent. This softens the cement allowing it to be removed without resort to scraping and the consequent risk of damage.

3 Gather together all the necessary tools and have available an oil can filled with clean engine oil. Make sure all new gaskets and oil seals are to hand, also all replacement parts required. Nothing is more frustrating than having to stop in the middle of a reassembly sequence because a vital gasket or replacement has been overlooked.

4 Make sure that the reassembly area is clean and that there is adequate working space. Refer to the torque and clearance settings whenever they are given. Many of the smaller bolts are easily sheared if over-tightened. Always use the correct size screwdriver bit for the crosshead screws and never an ordinary screwdriver or punch. If the existing screws show evidence of

maltreatment in the past, it is advisable to renew them as a complete set, using Allen screws in preference to cross-headed screws.

5 In addition to the above items, it will be necessary to obtain a tube of silicone rubber (RTV) jointing compound. This is used extensively in place of gaskets, particularly in the case of the crankcase joint. Also required is a can of molybdenum disulphide grease (Moly grease) for use as the initial lubricant whilst the main oil feed is first circulating.

34 Engine and gearbox reassembly: replacing the crankshaft and primary shaft

1 Check that all the bearing shells are laid out in the correct order, then refit them to their respective recesses. Ensure that the locating tang on each shell corresponds with the depression in which it engages. Ensure that each shell is firmly located before proceeding further. Apply a film of molybdenum disulphide grease to each of the main bearing surfaces.

2 Fit the camshaft chain and primary chain to their respective crankshaft sprockets, ensuring that the Hy-Vo chains are refitted in their original running directions. This, of course, does not apply if new chains are being fitted. Arrange the upper crankcase half on the workbench in the inverted position. The rear of the crankcase should be supported by suitable wooden blocks to present a level gasket surface.

3 Lower the crankshaft into position, ensuring that none of the bearing shells become displaced. Fit a new oil seal to the right-hand end of the crankshaft, having first lubricated its sealing lip with molybdenum disulphide grease. Apply one or two drops of Loctite or a similar sealant/adhesive to retain the seal.

4 Place the primary shaft through the primary chain, and then lower it in position. Check that the bearings locate properly, noting the half-ring which locates the right-hand bearing. **Do not** allow any form of sealant to get onto the primary shaft oil seal; this acts as part of the lubrication system, feeding oil to the primary shaft assembly.

5 Fit the large hollow dowel pins at each end of the crankcase. There are two of these; one at each end of the crankshaft, to the rear of the outer main bearings. Fit a new O-ring to the chain tensioner oil feed joint next to the primary drive chain.

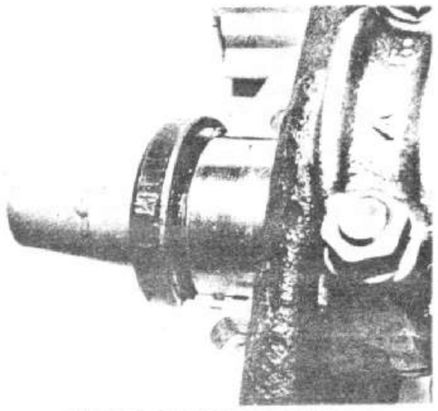
35 Engine and gearbox reassembly: rebuilding and fitting the gearbox mainshaft and layshaft assemblies

1 The gearbox shafts should be reassembled in the reverse order of the dismantling sequence. Reference should be made to the exploded view of the assembly and to the accompanying photographic sequence for details of the disposition of the various components. Although reassembly is generally straightforward, the following points should be noted.

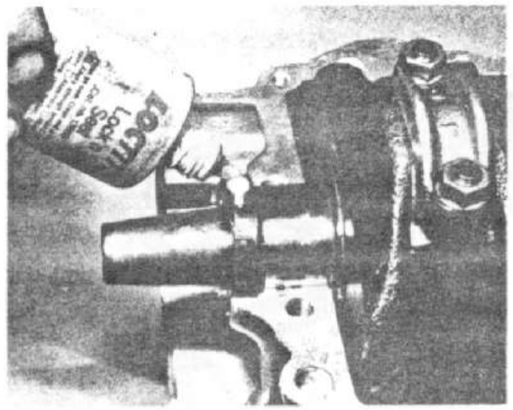
2 When fitting the mainshaft 5th gear bush, note that its oil hole must align with that of the mainshaft. A similar arrangement will be found in the case of the layshaft 5th gear pinion. An oil hole is provided to permit a lubrication feed from the shaft to the selector fork groove. Ensure that the holes align correctly. Check that the circlips seat squarely in their grooves, and that they are not slack when fitted. If in doubt, fit new circlips to preclude failure at a later date.

3 Fit a half-ring in the bearing support boss groove of the right-hand end of the mainshaft. A half-ring should also be fitted to the inner groove of the left-hand layshaft bearing boss. Note that the outer groove is provided as a means of location for the oil seal. Fit the dowel pin in position in the right-hand layshaft bearing boss.

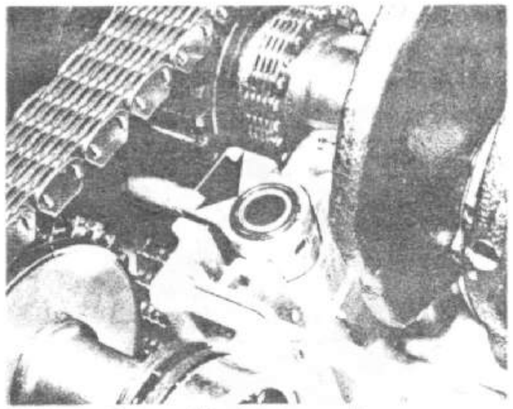
4 Fit a new, greased, oil seal to the right-hand end of the layshaft. The two assembled shafts can now be fitted into the casing. Check that the half-rings, dowel pin and oil seal locate properly, and that the gearbox pinions turn smoothly and evenly.



34.3a Lower crankshaft into position, ensuring that seal engages

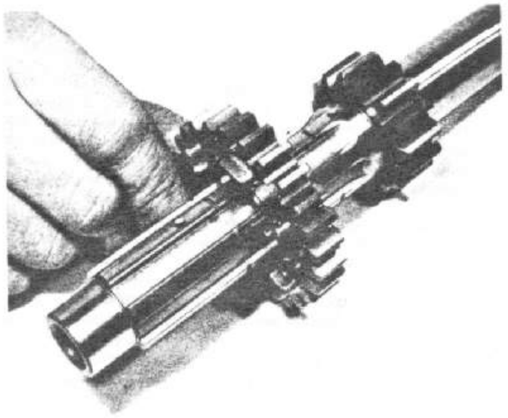


34.3b Use locking fluid to retain oil seal to casing

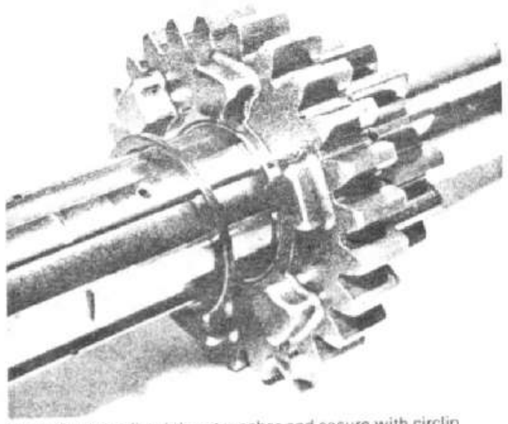


34.5 Fit new O-ring to oil feed joint (arrowed)

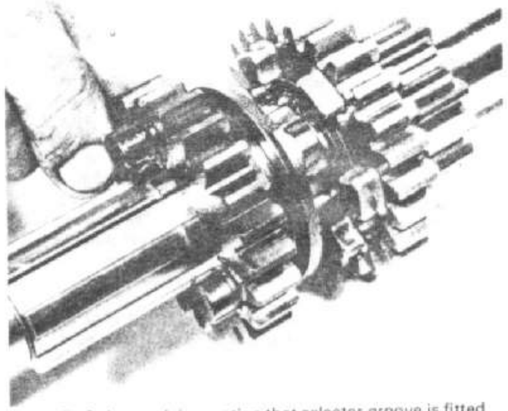
35.1a The gearbox mainshaft and 1st gear pinion



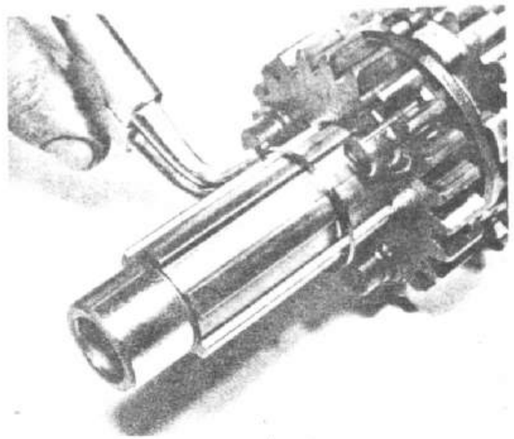
35.1b Fit the 4th gear pinion with dogs facing as shown



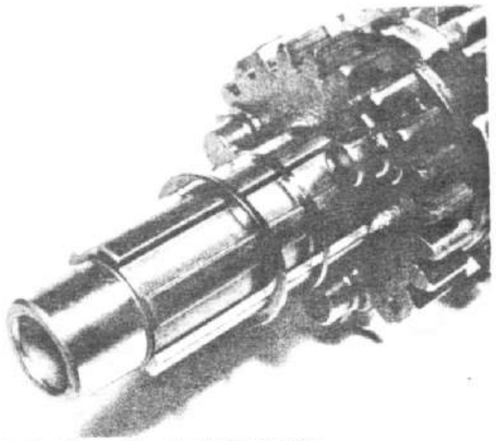
35.1c Fit the splined thrust washer and secure with circlip



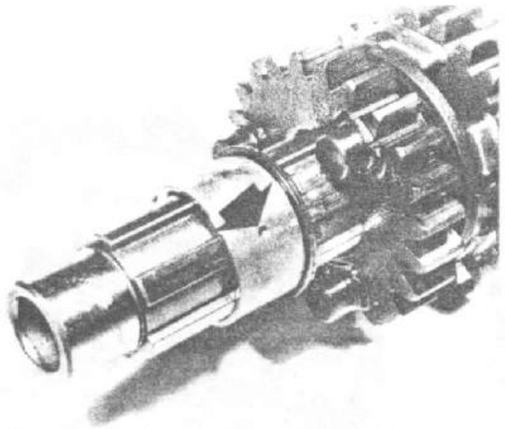
35.1d Fit 3rd gear pinion, noting that selector groove is fitted innermost



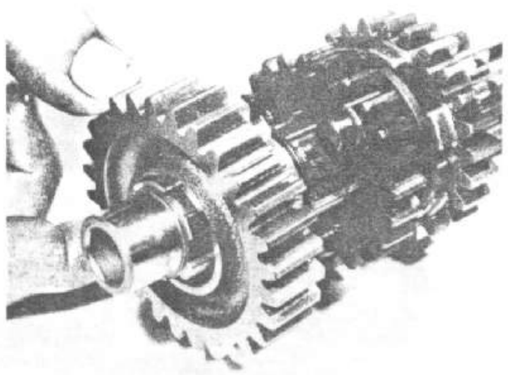
35.1e Place circlip in groove as shown ...



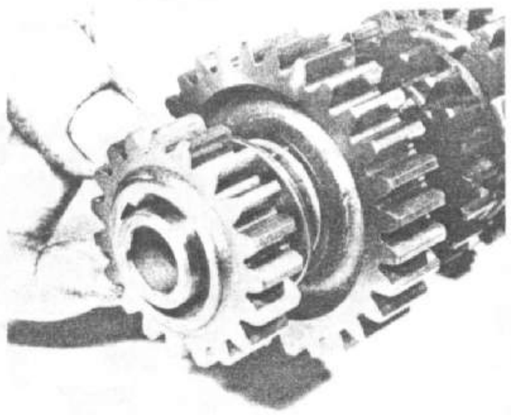
35.1f ... followed by splined thrust washer



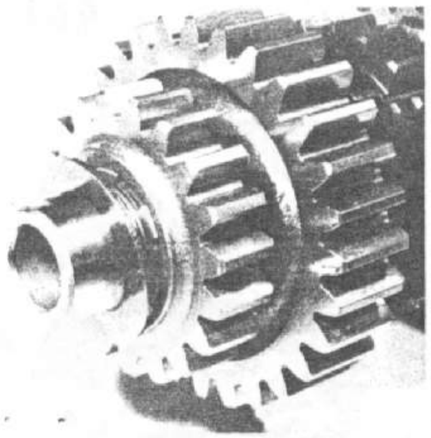
35.1g Fit 5th gear bush, ensuring that oil holes align



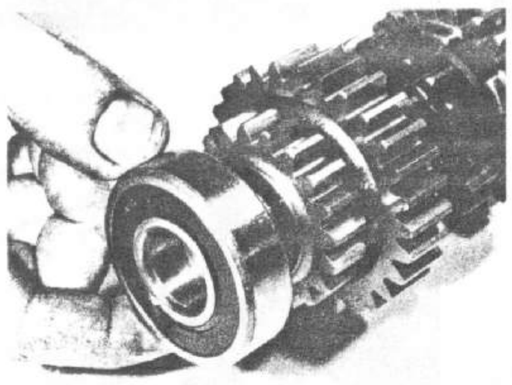
35.1h Fit the 5th gear pinion ...



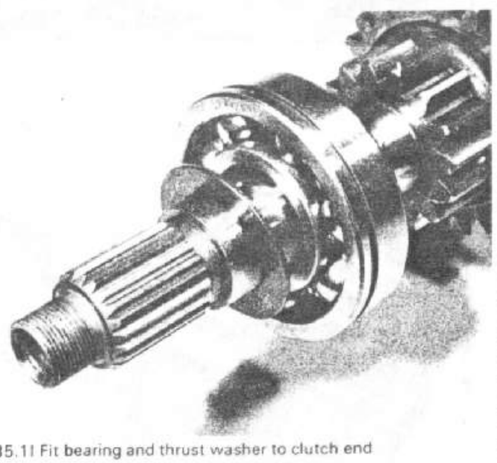
35.1i ... followed by thrust washer and 2nd gear pinion



35.1j Small diameter thrust washer is fitted as shown

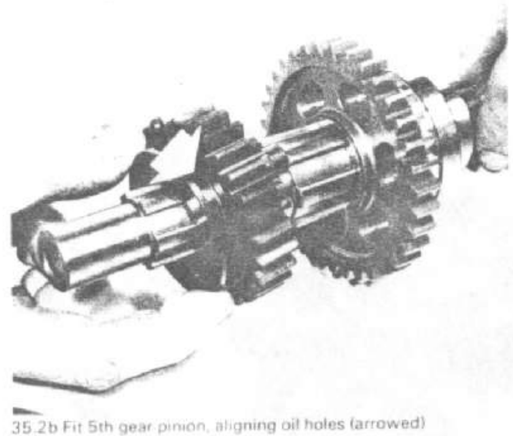


35.1k Bearing is fitted with sealed face outwards

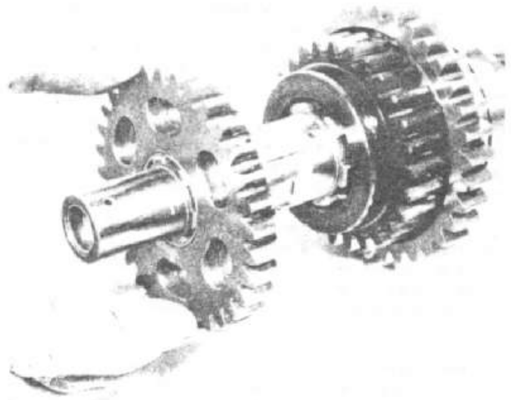


35.1l Fit bearing and thrust washer to clutch end

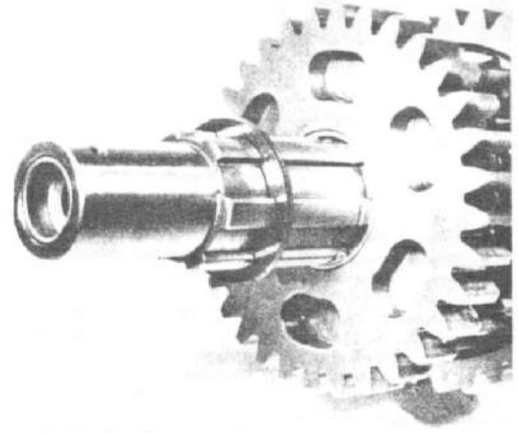
35.2a The gearbox layshaft and 2nd gear pinion



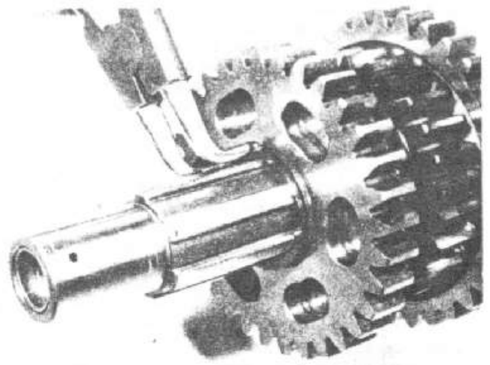
35.2b Fit 5th gear pinion, aligning oil holes (arrowed)



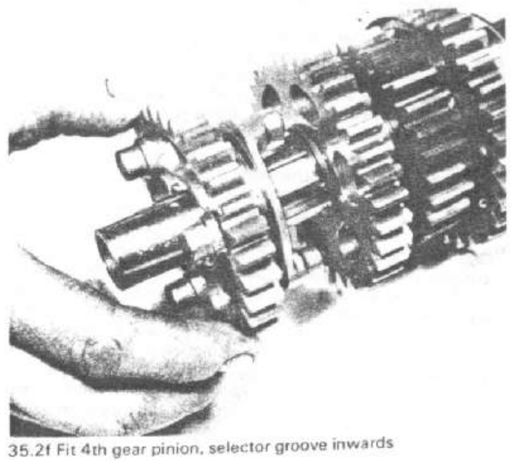
35.2c Fit 3rd gear pinion as shown



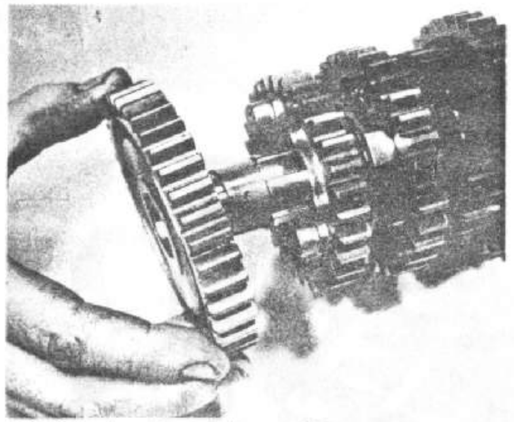
35.2d Fit splined thrust washer ...



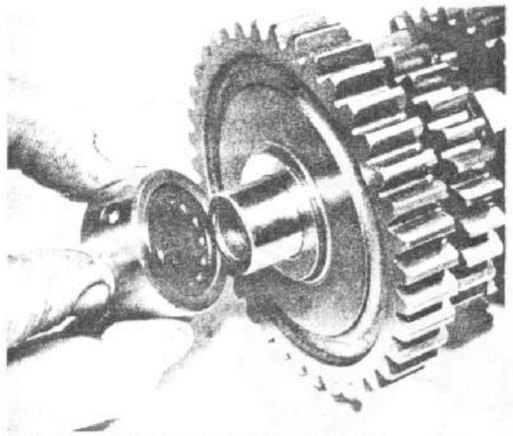
35.2e ... and secure with circlip



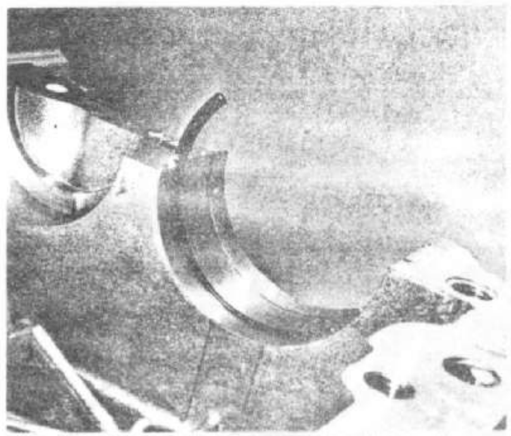
35.2f Fit 4th gear pinion, selector groove inwards



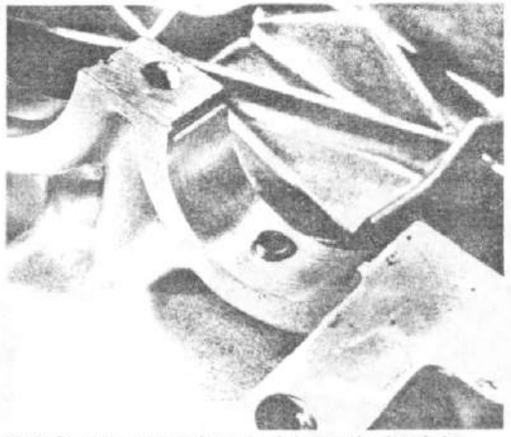
35.2g Fit bush and layshaft 1st gear pinion



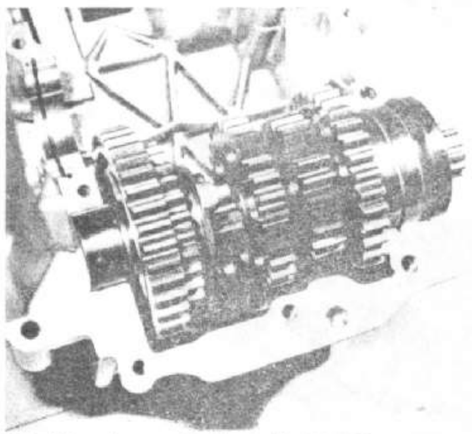
35.2h Needle roller bearing is fitted as shown



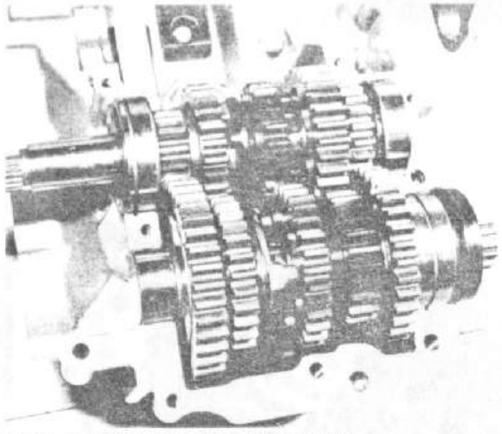
35.3a Fit half ring to right-hand mainshaft and left-hand layshaft bearing bosses



35.5b Right-hand layshaft bearing is located by dowel pin



35.4a Place the assembled layshaft in position ...



35.4b ... followed by the mainshaft assembly

36 Engine and gearbox reassembly: refitting the gear selector mechanism and primary chain tensioner

1 Fit the neutral switch contact to the end of the selector drum, then slide it into position via the larger bearing boss. Fit the selector fork support shaft, placing each of the three forks in position as the shaft is slid into place. Note that the forks differ in shape, and should be arranged as shown in Fig. 1.20.

2 Position the selector drum bearing retainer and secure it with a countersunk cross-head screw. This goes at the top right-hand corner when viewed from the end of the drum. The extreme left-hand end of the retainer is held by the selector claw centring spring anchor pin. This has a hexagon head with a small extension to engage with the spring ends. Note that a thread locking fluid should be used on both screws prior to fitting, and that the countersunk screw should be staked in position after tightening.

3 Fit the spacer to the end of the selector drum, then position the inner index plate. The latter has a number of holes, one of which is much closer to the centre than the remainder. This should engage with the locating pin in the end of the drum. Fit the four pins to the remaining holes, then offer up the outer index plate. Note that this cannot be fitted incorrectly because the pins are grouped asymetrically. Fit the central retaining bolt and tighten down firmly.

4 Assemble the detent lever, spacer and hairpin spring on the pivot bolt, then offer this up to the casing. The bolt occupies the remaining bearing retainer thread and serves as a means of retaining it and the detent assembly. Check that the detent lever roller engages with the cam profile on the outer index plate and that it is under spring pressure. Tighten the bolt to 1.0 – 1.4 kgf m (7 – 10 lbf ft).

5 Lubricate the selector drum tracks with engine oil, then check the assembly for free operation. Note that neutral can be found by positioning the drum so that the detent lever engages the smallest of the six depressions in the outer index plate. Check that the neutral switch contact is touching the switch contact pin.

6 Check that the gearchange lever shaft oil seal is in good condition. If in any doubt, renew it as a precaution against leakage. The seal lips should be coated with grease prior to fitting the shaft. Take care not to damage the seal with the shaft splines during installation. It is worth wrapping the splines with PVC tape to protect the seal at this stage. Slide the shaft into position, lifting the claw mechanism over the end of the index plate. Check that the centring spring engages with its anchor pin. Temporarily refit the gearchange lever and check that all five gear positions plus neutral can be selected.

7 If the primary chain tensioner has been removed for examination, it must be refitted at this stage. Place the tensioner assembly in position in the casing and fit its three retaining bolts. Fit the spring and plunger into their housing, then hinge the tensioner blade into place. On the outside of the casing, assemble the oil feed pipe and union to the top of the tensioner body. Refit the tensioner oil valve, taking care not to fracture the short oil feed pipe as it is tightened. It is important that the internal components of the tensioner body and oil valve are kept clinically clean during reassembly.

37 Engine and gearbox reassembly: joining the crankcase halves

1 Clean the crankcase mating faces with high flash-point solvent or methylated spirit to remove any residual grease spots or dust. Coat the lower casing half mating face with a silicone rubber (RTV) jointing compound, taking care not to obstruct any oilways.

2 **Important note:** On no account allow the jointing compound to get near the main bearing shells. A border of about $\frac{1}{8}$ in must be left clear to prevent the compound finding its way onto the bearing surface when the casing halves are joined. If this precaution is not observed the bearing oil feeds may become blocked, resulting in seizure. Similar care should be exercised when applying jointing compound in the vicinity of the oil jet in the lower casing half. Refer to Fig. 1.23 for details of jointing compound application.

3 Set the gear selector mechanism in the 1st gear position, and set the gearbox components to 1st gear by sliding the layshaft 4th gear into engagement with the layshaft 1st gear. The remaining gears should be left disengaged. Lubricate the mainshaft 3rd gear selector groove and each of the main bearings with molybdenum disulphide grease.

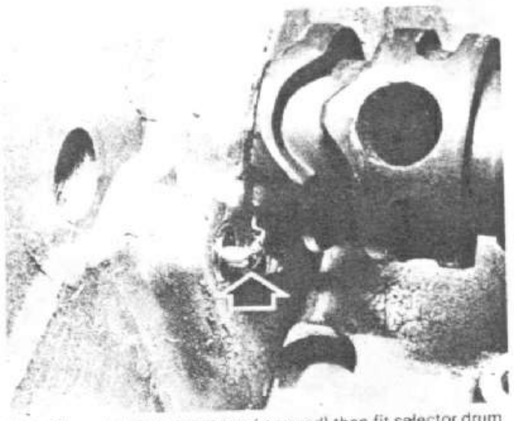
4 Carefully lower the lower crankcase half onto the inverted upper half, ensuring that the gear selector forks engage in their grooves. It was found that it is necessary to restrain the primary chain tensioner blade as the casing was lowered. This was accomplished by inserting a finger through the hole in the casing, and it proved possible to prevent the blade pivoting down, thus freeing the plunger and spring. For those possessing index fingers of the wrong shape or size, a piece of stiff wire bent at 90° at the end will do quite well. As soon as the tensioner blade is in contact with the primary chain it can be released.

5 The majority of the crankcase holding bolts are fitted from the underside of the unit, and these should be dropped into position. The ten bolts which also retain the crankshaft assembly should each have a plain washer fitted. Note that the threads of these bolts should be lubricated with a smear of molybdenum disulphide grease. The above-mentioned bolts, like most of the remainder are 8 mm, whilst a row of 6 mm bolts are fitted along the front edge. A single 10 mm bolt is located at the rear of the casing. Note the wiring clip which should be fitted beneath the head of the No 24 bolt.

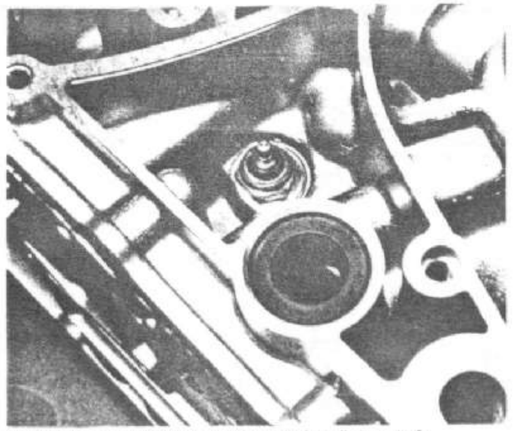
6 Refer to the tightening sequence shown in the accompanying illustration, and tighten each bolt down to about $\frac{1}{2}$ – $\frac{3}{4}$ of its recommended torque setting. Then go over each one again to bring it up to the full torque value. The torque settings are as shown below.

Crankcase torque settings

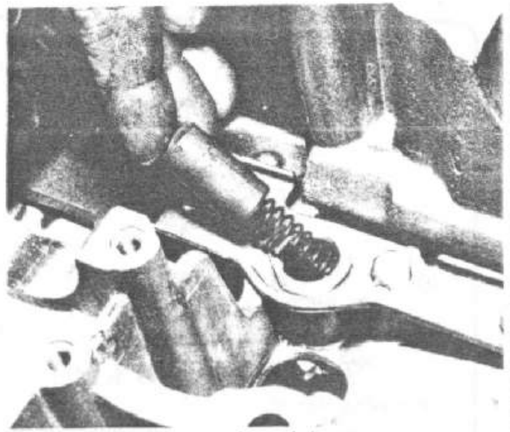
All 6 mm bolts: 1.0 – 1.4 kgf m (7 – 10 lbf ft)
All 8 mm bolts: 2.1 – 2.5 kgf m (15 – 18 lbf ft)
All 10 mm bolts: 4.5 – 5.0 kgf m (33 – 36 lbf ft)



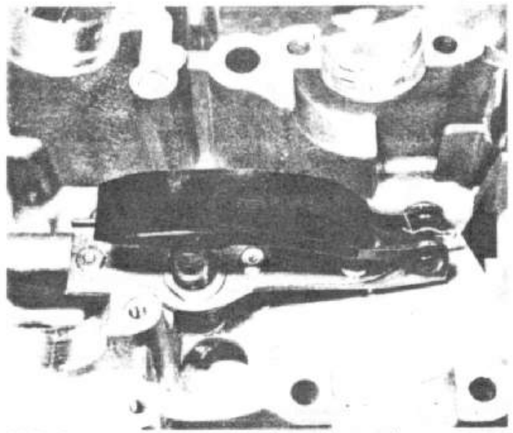
36.1 Fit neutral switch contact (arrowed) then fit selector drum



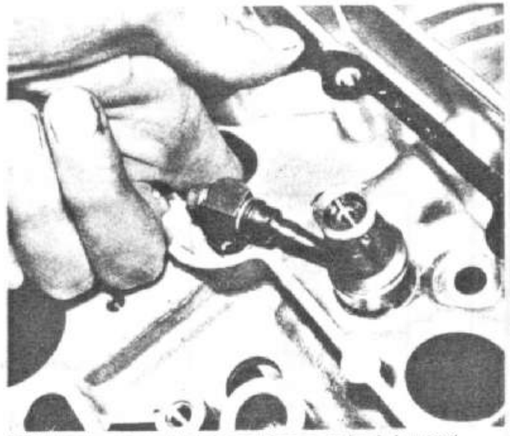
36.6 Renew seal if worn. Lubricate before fitting shaft



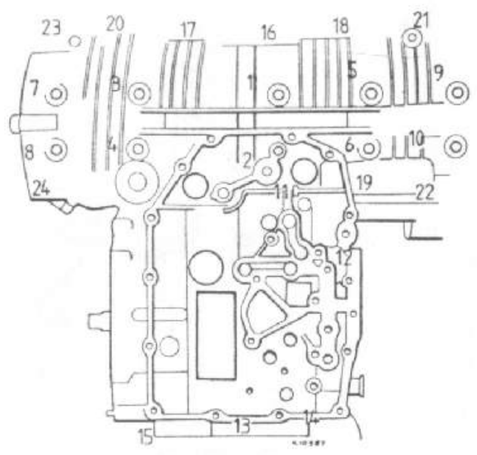
36.7a Assemble tensioner spring and plunger



36.7b Check that retaining clip is secure (arrowed)



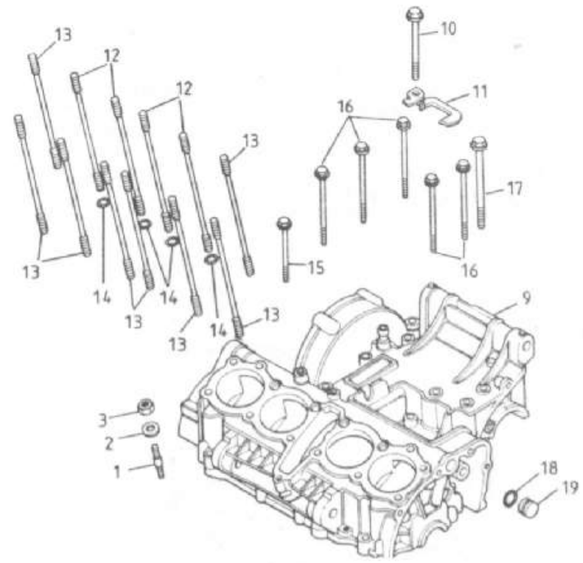
37.4 Hold tensioner blade in position as casing is lowered

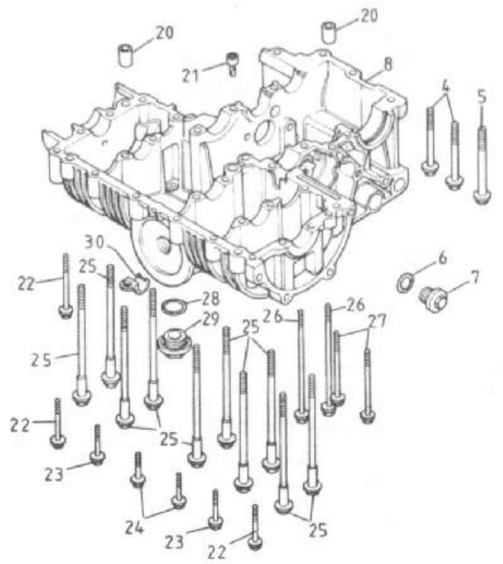


10 mm → 45-50 Nm
8 mm → 21-25 Nm
6 mm → 10-14 Nm

Fig. 1.21 Crankcase bolt tightening sequence

KOLEJNOŚĆ DOKRĘCANIA ŚRUB SKRZYNI KORBOWEJ





1 Stud
2 Washer
3 Nut 6 mm
4 Bolt – 2 off
5 Bolt
6 Sealing washer
7 Oilway plug
8 Lower crankcase
9 Upper crankcase
10 Bolt – 3 off 8x60
11 Shield plate
12 Stud – 4 off
13 Stud – 8 off
14 O-ring – 4 off
15 Bolt – 4 off
16 Bolt – 5 off 8x80
17 Bolt 8x83
18 O-ring
19 Plug
20 Dowel pin – 2 off
21 Oil control piece
22 Bolt – 4 off
23 Bolt – 2 off
24 Bolt – 2 off
25 Bolt – 10off
26 Bolt – 3 off
27 Bolt – 2 off
28 O-ring
29 Drain plug
30 Cable clip

Fig. 1.22 Crankcases – Early CB750K

KADŁUB

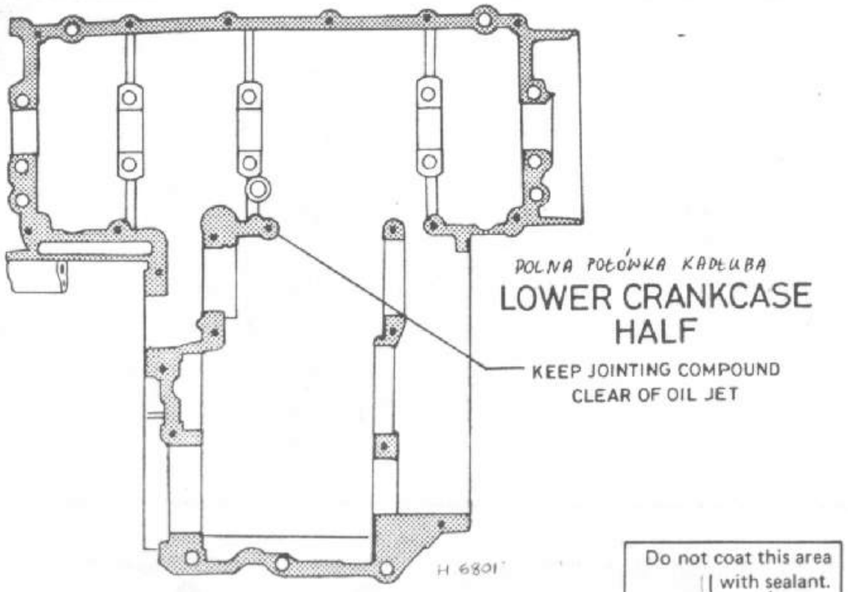


Fig. 1.23 Applying jointing compound to crankcase faces

38 Engine and gearbox reassembly: refitting the oil distributor plate and sump

1 Place the oil distributor plate on the underside of the crankcase and fit its six retaining bolts. Refit the oil strainer assembly, using a new sealing ring where required. Clean the sump (oil pan) gasket face, taking care not to scratch the surface. Position a new sump gasket, then offer up the sump itself. Tighten the 14 retaining bolts in a diagonal sequence to avoid any risk of distortion.

39 Engine and gearbox reassembly: refitting the primary drive pinion and clutch assembly

1 If the primary drive pinion assembly was removed during the engine overhaul it must be refitted **before** the clutch is installed. Fit the spacer to the end of the primary shaft, followed by the pinion, ensuring that the small locating dowel faces outwards. Assemble the large plain washer, noting that it should engage with the locating pin, followed by the Belville washer. Lock the crankshaft by the same method that was chosen during removal, then fit and tighten the large-headed Allen bolt. The bolt should be pulled down very tight. If a torque wrench is available with the appropriate hexagon key, a torque setting of 8.0 – 10.0 kgf m (60 – 72 lbf ft) should be used.
2 Place the plain thrustwasher over the projecting gearbox mainshaft end, followed by the clutch outer drum. It will be necessary to turn the crankshaft until the area of the primary drive pinion where the teeth on the inner and outer sections are in synchronisation meshes with the clutch drum's driven gear. Check that the caged needle roller bearings which support the drum are in position and are lubricated.
3 Fit the splined washer, followed by the spacing collar, noting that its smaller diameter faces outward. If the clutch pressure plate, centre and clutch plates are still assembled, they can now be fitted as a unit. Alternatively, proceed as follows.
4 Place the clutch friction and plain plates over the splined clutch centre, noting that the helically-grooved friction plate should be fitted first, with the groove inclined as shown in Fig. 1.17. This is followed by normal plain and friction plates, the second plain plate being the composite shock-absorbing plate described earlier in the Chapter. Refer to Fig. 1.17 for details of the assembly order. Note that it is almost impossible to assemble the clutch plates in the drum prior to fitting the clutch centre, as this would make alignment of the internal splines of the plain plates difficult.
5 Place the plain washer and tab washer in position, then fit the clutch centre securing nut finger tight. Using the method employed during dismantling, lock the clutch centre and tighten the slotted securing nut to a torque setting of 4.5 – 5.5 kgf m (33 – 40 lbf ft). Do not forget to bend up the tab washer.
6 Place the six clutch springs in position and offer up the clutch release plate. Fit the bolts in a diagonal sequence, tightening each one in turn to prevent distortion.

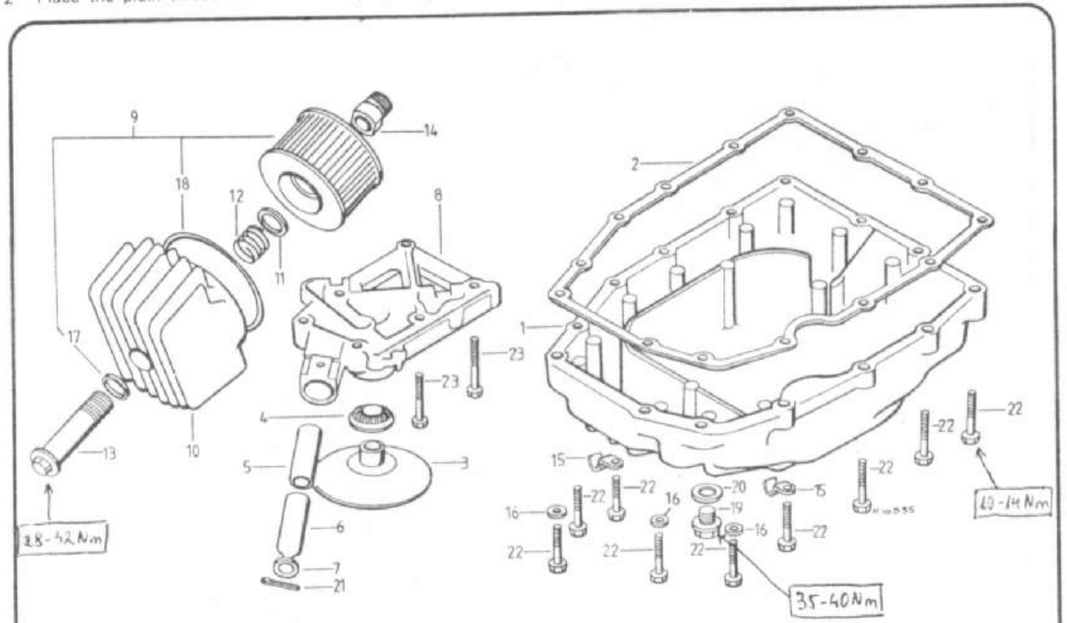
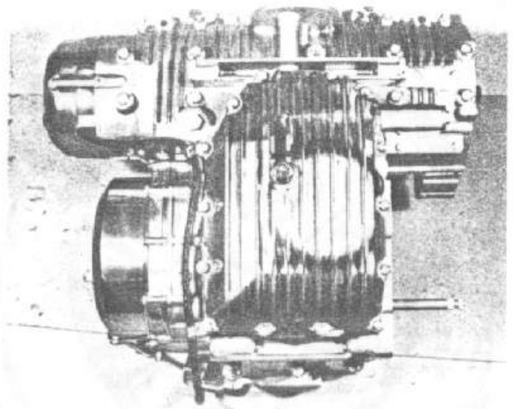
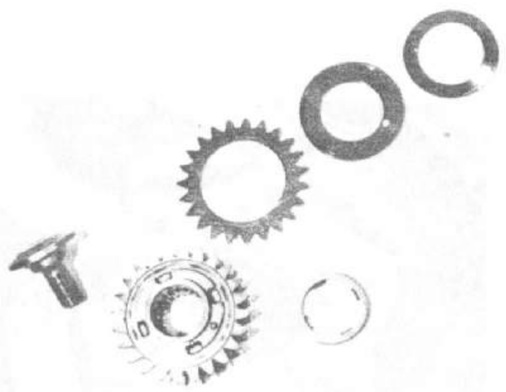


Fig. 1.24 Oil filter, distributor plate and sump
FILTR OLEJU, MISKA OLEJOWA I FILTR WSTĘPNY

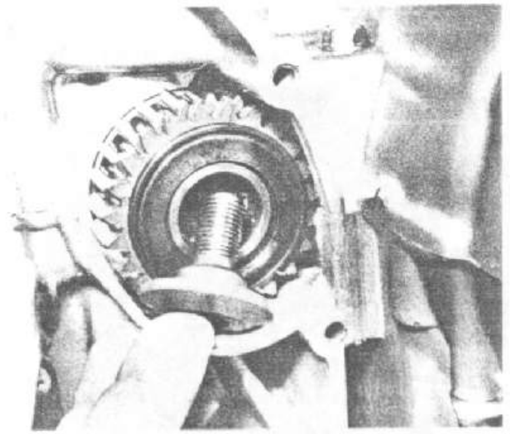
1 Sump pan
2 Gasket
3 Oil strainer
4 Seal
5 Pressure relief valve
6 Spring
7 Washer
8 Oil distributor
9 Oil filter assembly
10 Filter chamber
11 Washer
12 Spring
13 Bypass valve bolt
14 Adaptor
15 Clip – 2 off
16 Sealing washer – 3 off
17 O-ring
18 O-ring
19 Drain plug
20 Sealing washer
21 Split pin
22 Bolt – 14 off
23 Bolt – 6 off



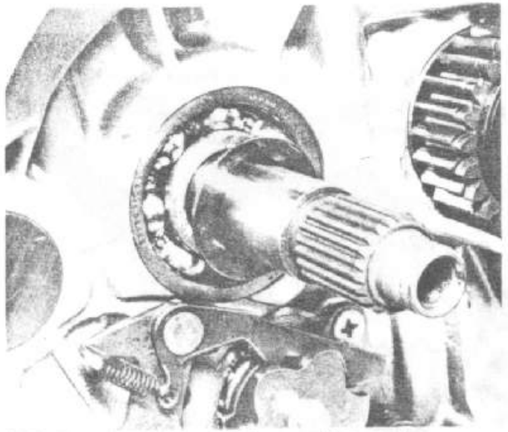
38.1 Refit sump, noting position of wiring guides



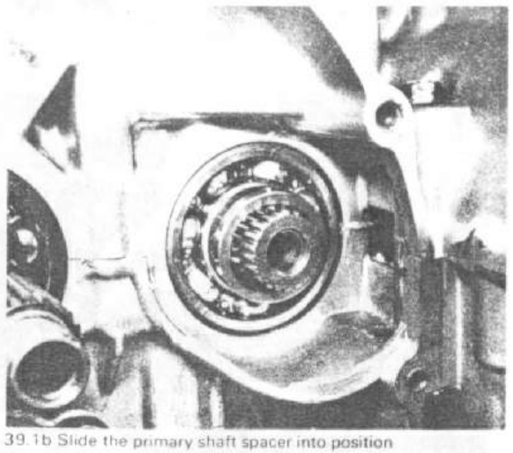
39.1a The primary drive pinion components



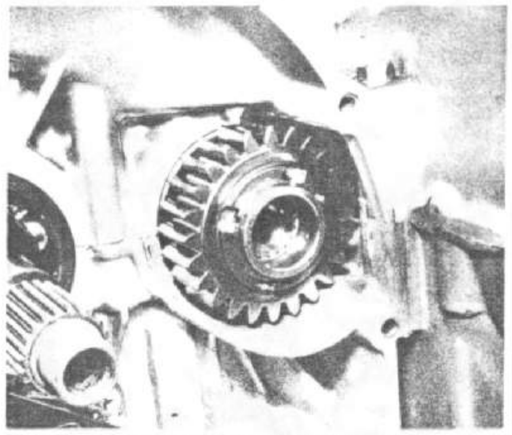
39.1f Fit Belville washer and secure with bolt



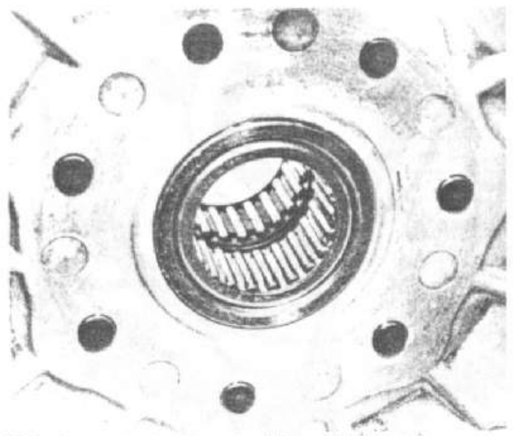
39.2a Place the plain thrustwasher over the projecting mainshaft



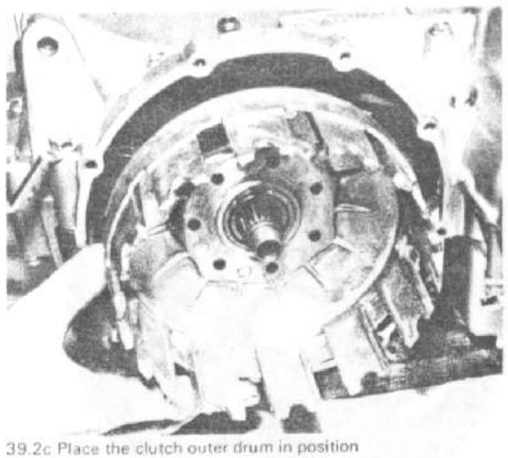
39.1b Slide the primary shaft spacer into position



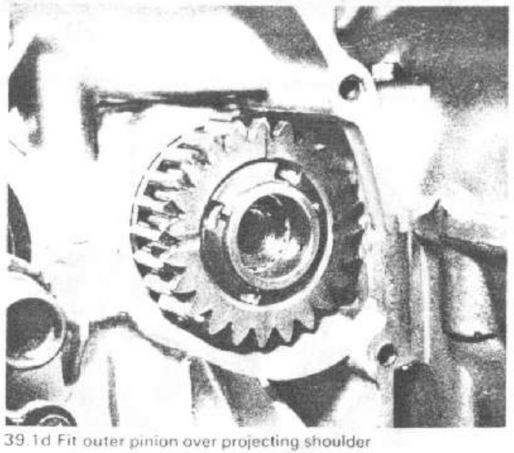
39.1c Place pinion over shaft (note locating dowel)



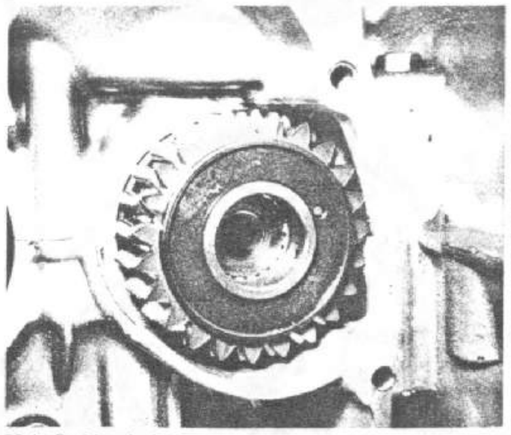
39.2b Clutch drum bearings should be well lubricated



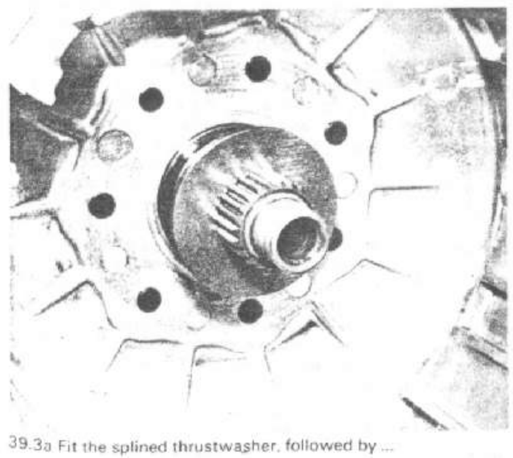
39.2c Place the clutch outer drum in position



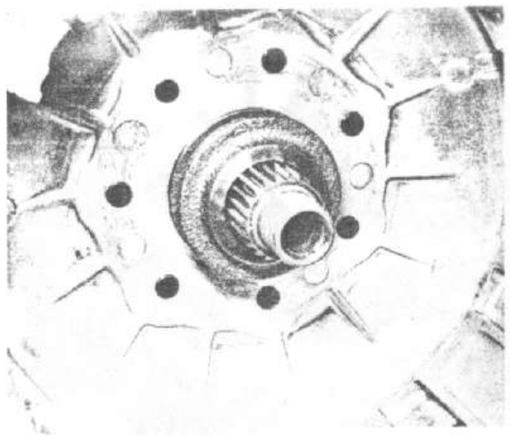
39.1d Fit outer pinion over projecting shoulder



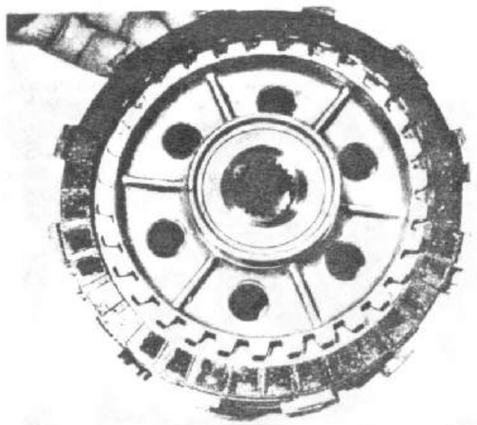
39.1e Position the large plain washer as shown



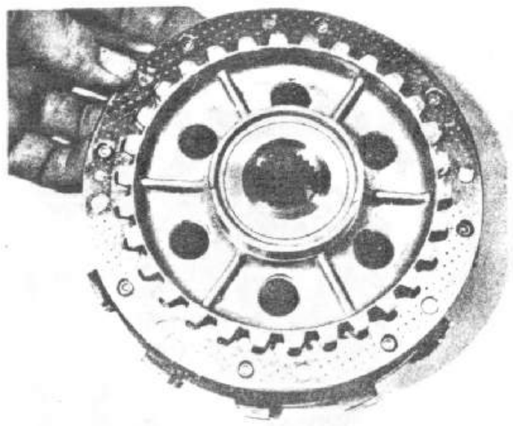
39.3a Fit the splined thrustwasher, followed by ...



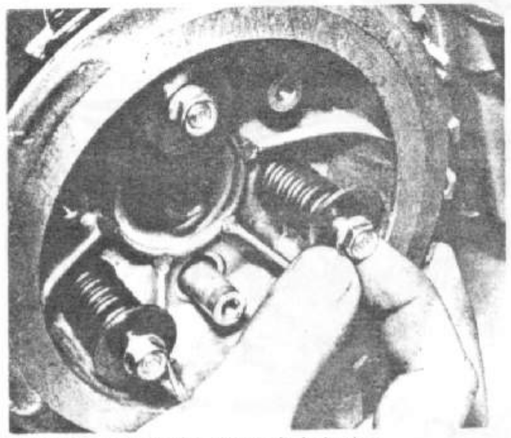
39.3b ... the stepped spacer as shown



39.4a Assemble the plain and friction plates on the clutch centre ...

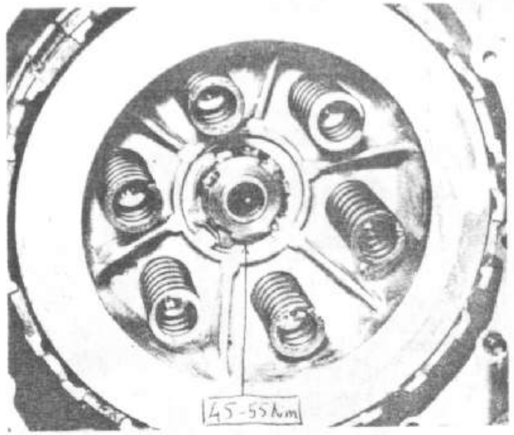


39.4b ... noting the position of the shock absorbing plate

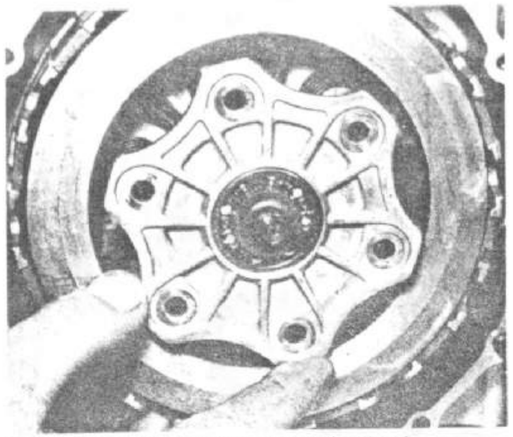


39.5a Use springs and washers to lock clutch ...

39.5b ... then fit tab washer and securing nut



39.6a Fit the remaining clutch springs ...



39.6b ... followed by the release plate and push rod

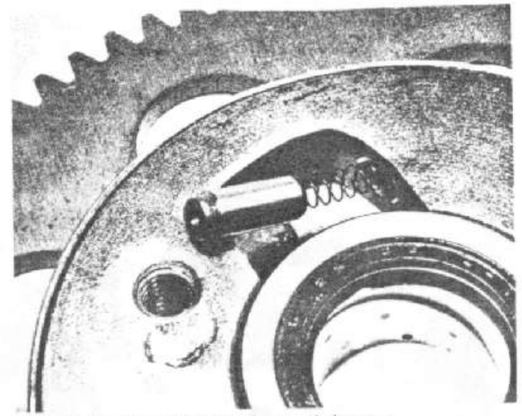
40 Engine and gearbox reassembly: refitting the starter clutch and automatic timing unit (ATU)

1 Check that the three clutch rollers are in position in the starter clutch body. If any have become displaced, fit the spring and plunger into its recess and hold it in position with a small screwdriver while the roller is fitted. Assemble the clutch body and starter driven gear, and check that the clutch operates normally.

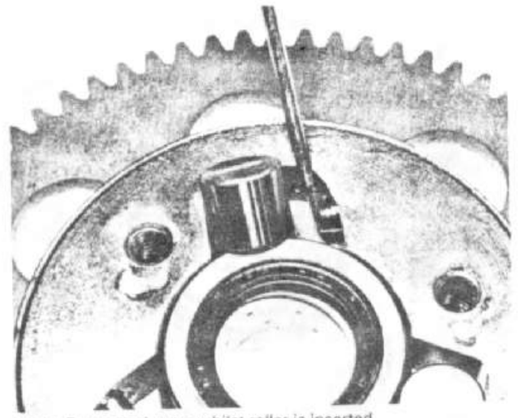
2 Install the starter idler gear and support pin in its recess in the crankcase. Fit the starter clutch and driven gear assembly to the end of the crankshaft, ensuring that the driven gear teeth mesh with those of the idler gear.

3 Offer up the automatic timing unit (ATU), ensuring that the locating pin at the rear of the unit fits into the slot in the shaft end. Hold the crankshaft by fitting a spanner on the large hexagon, then fit and tighten the securing bolt to a torque setting of 3.3 – 3.7 kgf m (24 – 27 lbf ft).

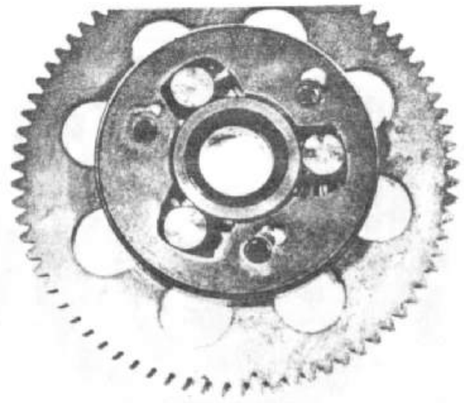
4 Using a new gasket refit the engine left-hand cover, complete with the CDI pickup stator, and tighten its retaining bolts; ensure that the wiring grommet is correctly located at the casing joint. Note that the circular inspection cover should not be refitted until the valve timing has been set as described in Section 44.



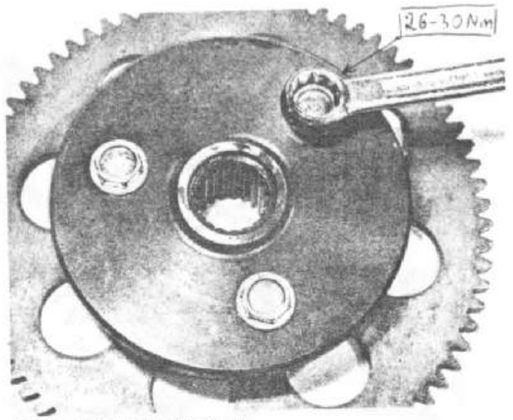
40.1a Fit the starter clutch springs and plungers



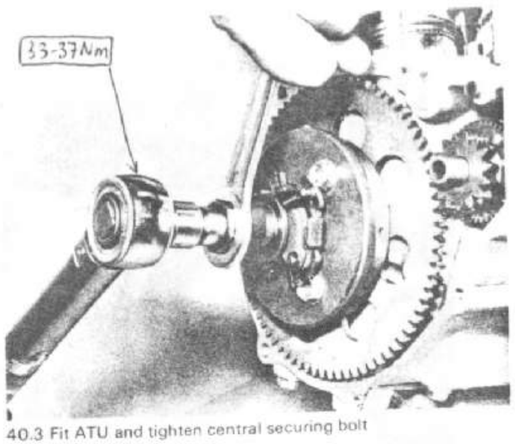
40.1b Depress plunger whilst roller is inserted



40.1c Check that clutch operates smoothly



40.1d Refit clutch cover plate



40.3 Fit ATU and tighten central securing bolt

41 Engine and gearbox reassembly: refitting the alternator

1 Check that the crankshaft taper and the corresponding tapered bore of the alternator rotor are free from contamination, then place the rotor in position. It will be necessary to prevent crankshaft rotation while the rotor retaining bolt is tightened, using the same method employed during removal. Fit the headed retaining bolt and tighten to 8.0 – 10.0 kgf m (58 – 72 lbf ft).

2 The outer cover carries the stator and brushes, and can now be refitted. Check that the brushes are in a serviceable condition prior to installation, referring to Chapter 6 for details. When the cover is in position, route the output lead through the guides on the crankcase.

42 Engine and gearbox reassembly: replacing the pistons and cylinder block

1 Before replacing the pistons, pad the mouths of the crankcase with rag in order to prevent any displaced component from accidentally dropping into the crankcase.

2 Fit the pistons in their original order with the 'IN' mark on the piston crown towards the rear of the engine.

3 If the gudgeon pins are a tight fit, first warm the pistons to expand the metal. Oil the gudgeon pins and small end bearing surfaces, also the piston bosses, before fitting the pistons.

4 Always use new circlips, never the originals. Always check that the circlips are located properly in their grooves in the piston boss. A displaced circlip will cause severe damage to the cylinder bore, and possibly an engine seizure.

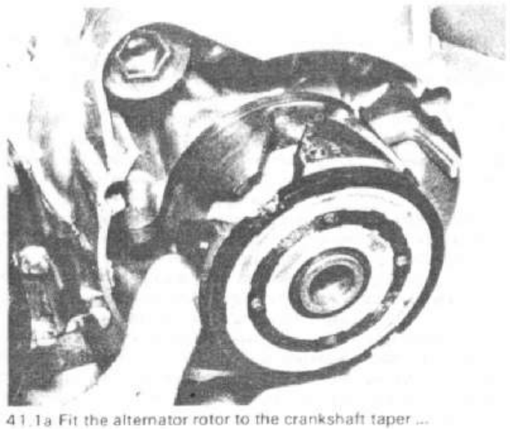
5 Place a new cylinder base gasket (dry) over the crankcase mouth. Note that an O-ring is fitted around the four inner rear cylinder head studs; larger holes in the gasket will indicate the correct position. Large diameter O-rings are fitted around each cylinder spigot where it protrudes from the cylinder block casting. Check that the two hollow dowel pins are in position in the crankcase face.

6 Before the cylinder block is fitted, it is essential that the camshaft chain tensioner assembly is in position. If it has been removed in the course of overhauling, reposition it in the camshaft chain tunnel and fit the two domed retaining nuts finger-tight.

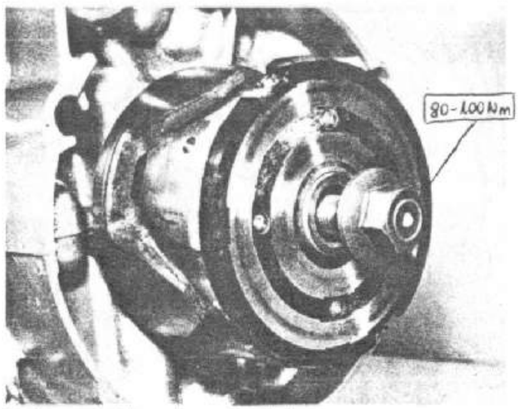
7 Carefully lower the cylinder block over the holding studs, using suitable wooden blocks to support it clear of the pistons whilst the camshaft chain is threaded through the tunnel between the bores. This task is best achieved by using a piece of stiff wire to hook the chain through, and pull it up through the tunnel. The chain must engage with the crankshaft drive sprocket.

8 The cylinder bores have a generous lead in for the pistons at the bottom, and although it is an advantage on an engine such as this to use a piston ring compressor, in the absence of this, it is possible to lead gently the pistons into the bores, working across from one side. Great care has to be taken not to put too much pressure on the fitted piston rings. When the pistons have finally engaged, remove the rag padding from the crankcase mouths and lower the cylinder block still further until it seats firmly on the base gasket.

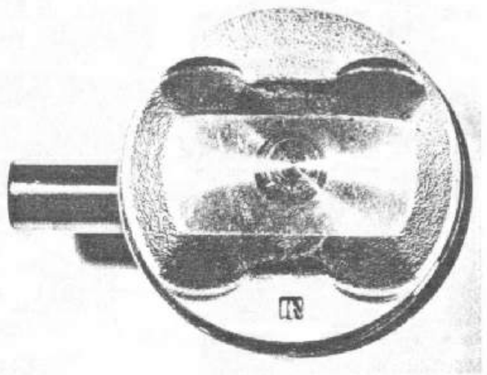
9 Take care to anchor the camshaft chain throughout this operation to save the chain dropping down into the crankcase. The chain should be kept reasonably taut to prevent it from bunching around the crankshaft sprocket. This is particularly important if the crankshaft is turned, as the chain will tend to jam if left to its own devices. Fit and tighten the single cylinder base nut which will be found at the front of the camshaft chain tunnel. If required, there are two Honda service tools which can be usefully employed during this stage of reassembly; a pair of piston support blocks (07958 – 2500001) and a pair of piston ring compressors (07954 – 4220000).



41.1a Fit the alternator rotor to the crankshaft taper ...

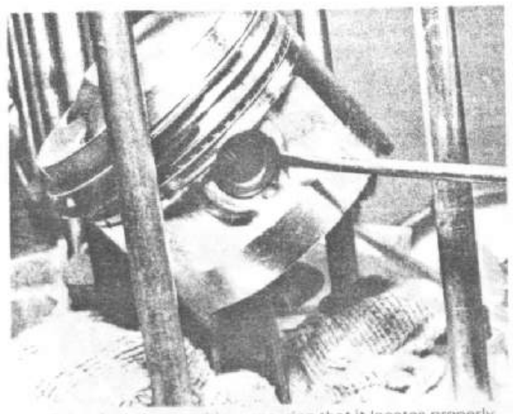


41.1b ... and tighten the securing bolt

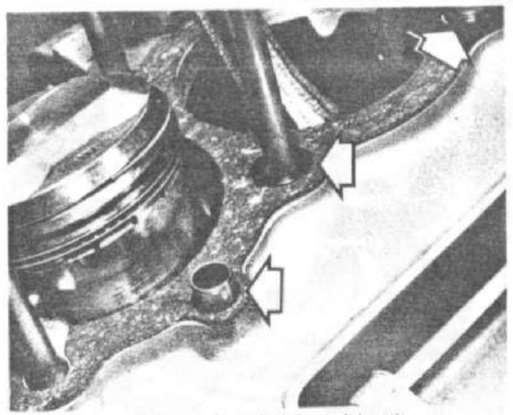


42.2 Check that 'IN' mark faces towards rear of engine

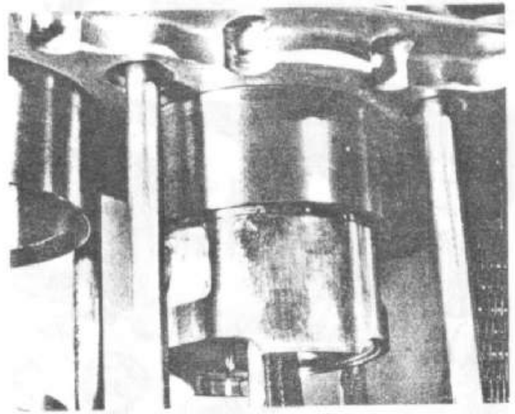
42.3 Warm the piston to ease the fitting of gudgeon pin



42.4 Ease circlip into position, ensuring that it locates properly



42.5 Fit new base gasket. Note O-rings and dowels



42.8 Check that rings enter bores squarely

43 Engine and gearbox reassembly: refitting the cylinder head

1 If the upper camshaft chain tensioner was removed during the overhaul, it should be refitted in the cylinder head prior to the installation of the latter. Once in position, depress the tensioner blade with the locking bolt slackened to achieve the tensioner's slackest setting, then re-tighten the bolt and locknut. Moving to the lower tensioner assembly in the cylinder barrel, tighten both domed locknuts, then slacken off the lower of the two. Grasp the top of the tensioner blade with pliers and pull it up against the spring pressure. Tighten the lower locknut to retain the setting.

2 Check that the cylinder head and block jointing faces are quite clean and free from traces of old cylinder head gasket. Fit the two dowel pins, and then install a new cylinder head gasket. The cylinder head gasket must be fitted with the wider (5 mm) edges of the individual cylinder periphery seals facing upwards. Lower the cylinder head into position, taking care to ensure that the camshaft chain is fed up through its central aperture. Check that the cylinder head seats squarely and that the dowels have located properly. If necessary, tap the top of the cylinder head using a soft-faced mallet to help seat it.

3 Fit the twelve cylinder head cap nuts, together with a plain washer beneath each one. Care should be exercised when securing the cylinder head, because it can easily become warped if uneven pressure is applied. The nuts should be tightened in a diagonal sequence, working from the centre outwards as shown in the accompanying illustration. Start by tightening the nuts to approximately half the final torque value, then go through the sequence once more to bring the nuts up to full pressure. The cylinder head nut torque setting is 3.6 – 4.0 kgf m (26 – 29 lbf ft).

4 Fit and tighten the two small bolts which pass upwards into the cylinder head from the camshaft chain tunnel flange. Fit the camshaft oil feed pipe in position at the rear of the cylinder block, noting that the pipe is routed between the carburettor adaptors of cylinders 3 and 4. Bear in mind that the well-being of the camshafts and valve gear is entirely dependent upon a reliable oil feed through this pipe, and for this reason the union sealing washers should be renewed as a precautionary measure even if they appear to be in good condition. Note also that the two union bolts differ in that the oil drillings are of different sizes. The bolt with the larger hole must be fitted to the upper union. When fitting the bolts, hold the unions with a self-locking wrench so that no strain is placed on the pipe itself as the bolt is tightened.

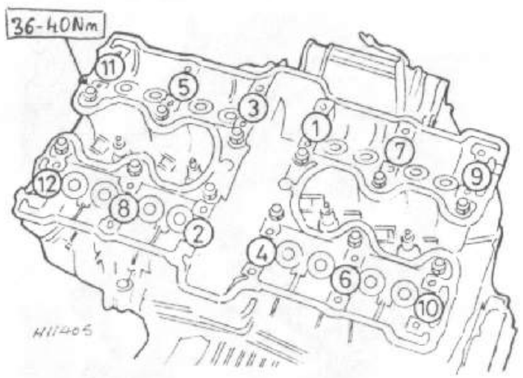
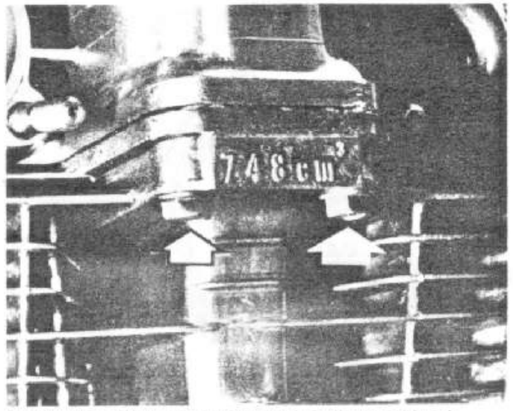


Fig. 1.25 Cylinder head nut tightening sequence
KOLEJNOŚĆ DOKRĘCANIA NAKRĘTEK GŁOWICY



43.4 Tighten the two small bolts at front of cylinder head

44 Engine and gearbox reassembly: refitting the camshafts and setting the valve timing

1 Install the cam followers and adjustment shims in their correct locations, if this has not been done already. The followers and bores should be lubricated with engine oil during installation. Lubricate the camshaft bearing faces with molybdenum disulphide grease.

2 Holding the camshaft chain taut to prevent it from bunching around the crankshaft sprocket, turn the crankshaft by means of the large hexagon on the ATU until the **1,4T** mark appears in the timing window. Line the timing mark up against the index line on the outer cover.

3 Fit the smaller camshaft connecting chain around the smaller section of the exhaust camshaft sprocket ensuring that it is installed to run in its original direction of rotation. The sprocket should now be fitted to the protruding end of the main camshaft chain, taking care not to move the crankshaft. Note that the sprocket has two alignment dots on its left-hand face; these should be arranged horizontally so that they are parallel to the gasket face.

4 Slide the exhaust camshaft (note tachometer drive as means of identification) through the centre of the sprocket, positioning the cam lobes for the No 1 (left-hand) cylinder so that they face horizontally towards the sparking plug. Fit the A and E camshaft bearing caps, securing them by fitting the bolts finger-tight. Note that the arrows on the caps **must** face forwards. At this stage, one of the camshaft sprocket mounting bolt holes should be accessible and in line with the camshaft's threaded hole. Fit a securing bolt, loosely at this stage.

5 Fit the D and the unmarked tachometer drive bearing caps, again with the bolts finger-tight. Note that the D bearing cap has a groove which locates the camshaft.

6 Turn the crankshaft through 360° (one complete revolution) so that the remaining sprocket mounting hole becomes accessible. Fit the second bolt and tighten it to the specified torque setting. Turn the engine through 360° once more, and tighten the first bolt to the same torque figure.

7 Complete the installation of the camshaft bearing caps, not forgetting the locating dowels fitted to each one. Note that each cap has an identification letter which indicates its position (see Section 8 of this Chapter for details). The bearing cap securing bolts should be tightened progressively in a diagonal sequence to a torque setting of 1.2 – 1.6 kgf m (9 – 12 lbf ft).

8 Set the camshaft chain tensioner by slackening the lower of the two cap nuts at the rear of the cylinder block. This will allow the tensioner to find its own setting, after which the nut can be re-tightened. Check that the **1,4T** mark is still aligned, then re-check that the cam lobes of No 1 cylinder are facing the sparking plug, and that the camshaft sprocket punch marks are parallel to the cylinder head gasket face. If the above checks prove that the exhaust camshaft is correctly timed in relation to the crankshaft, proceed as described below, otherwise re-set the timing until all of the marks align correctly.

9 If the inlet camshaft sprocket was not removed from the camshaft during dismantling or overhaul, loop the connecting cam chain around the sprocket and lower the assembly into position, ensuring that the No 1 cylinder cam lobes face towards the sparking plug and that the punch marks are parallel to the cylinder head gasket face.

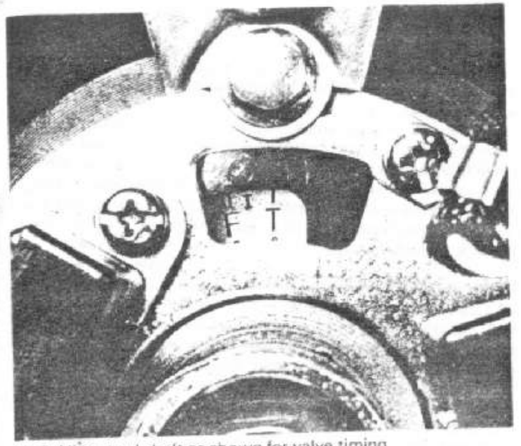
10 In cases where the sprocket was removed, fit the chain around the sprocket so that the punch marks lie parallel to the gasket face and in line with those of the exhaust camshaft sprocket. Fit the accessible sprocket bolt finger-tight.

11 Fit the inlet camshaft bearing caps (F, G, K and L) tightening the retaining bolts evenly in a diagonal sequence to 1.2 – 1.6 kgf m (9 – 12 lbf ft). Turn the crankshaft through 360° and fit the remaining camshaft sprocket bolt, tightening it to the specified torque setting; then turn the crankshaft another complete turn and secure the first sprocket bolt to the same torque value.

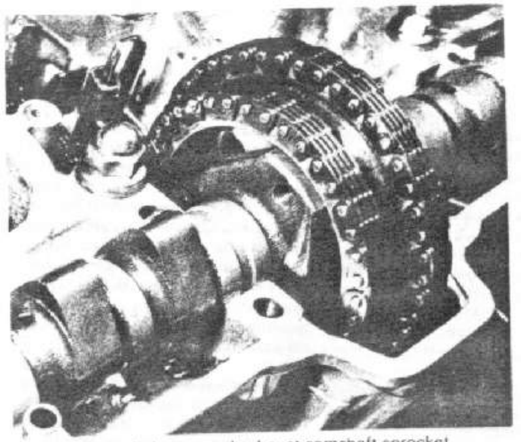
12 Set the connecting camshaft chain tension by slackening the locking bolt to allow the slack to be taken up. (Note that the chain tension should be re-checked after the engine has been started). Set up the crankshaft timing mark once more, and make a final check on the camshaft timing as described above.

13 Fit the black plastic oil deflector cap on each of the two cylinder head nuts nearest to the camshaft chain tunnel on the inlet side of the cylinder head. Fit the chain tensioner support plate, securing it with its right-hand mounting bolt only. Place the oil feed pipe and chain guide in position. These are retained by the inner bearing cap bolts to the right of the camshaft connecting chain, and by a single bolt on the left, the latter doubling as the means of holding the left-hand side of the support plate.

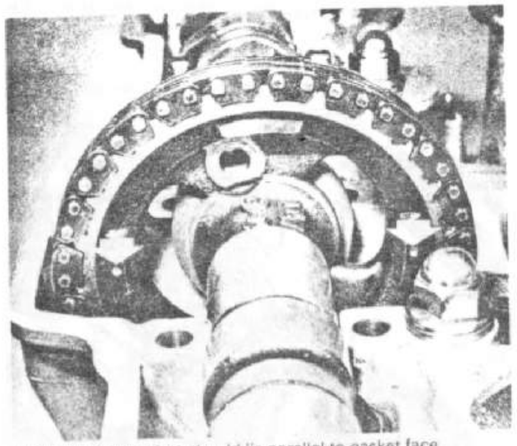
14 Prime the recesses around each valve with engine oil to provide lubrication when the engine is first started. Check the valve clearances as described in Routine Maintenance, and make any necessary adjustments before proceeding further. Check the cylinder head cover gasket for indentations or other damage. If it is in good condition, it can be re-used. Clean the gasket and gasket face, and apply a smear of RTV sealant in the angled areas formed by the semi-circular end plugs. The cover can now be refitted.



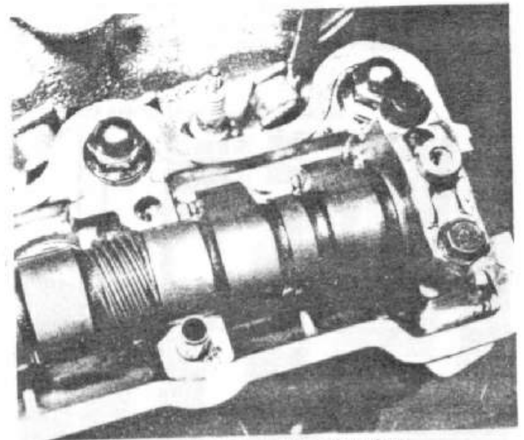
44.2 Align crankshaft as shown for valve timing



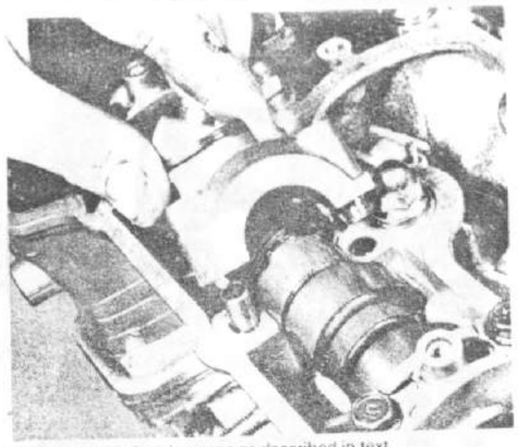
44.3a Fit cam chains around exhaust camshaft sprocket



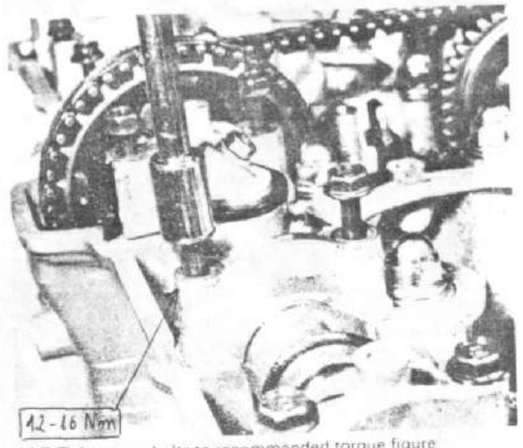
44.3b Alignment dots should lie parallel to gasket face



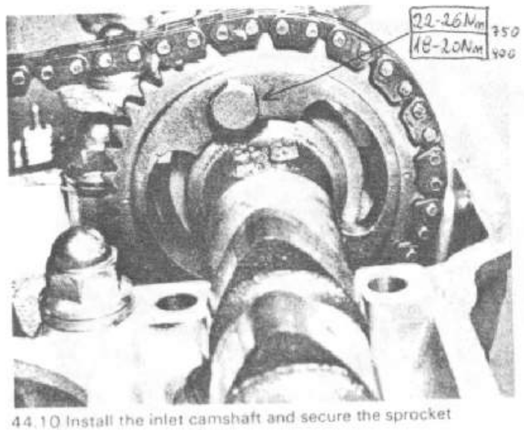
44.4 Cam lobes must face towards sparking plugs



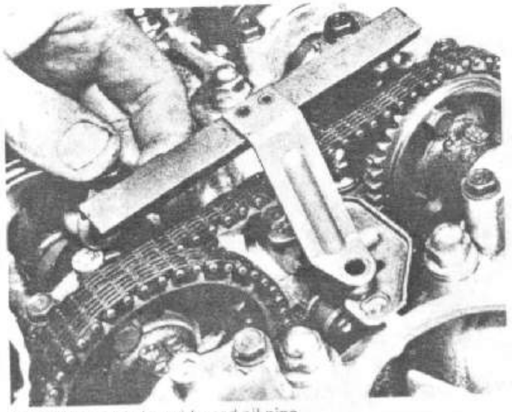
44.5 Assemble bearing caps as described in text

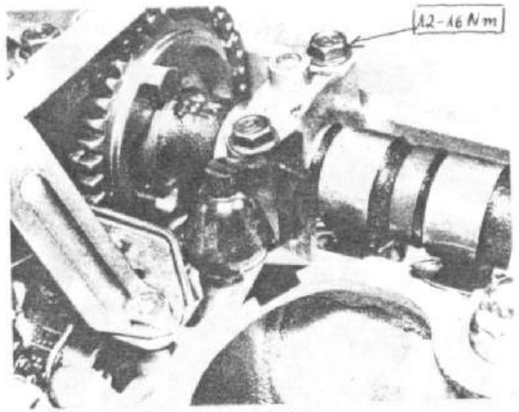


44.7 Tighten cap bolts to recommended torque figure



44.10 Install the inlet camshaft and secure the sprocket


44.13a Refit chain guide and oil pipe



44.13b Fit oil deflector caps as shown

45 Refitting the engine and gearbox unit into the frame

1 As mentioned during the engine removal sequence, the engine/gearbox unit is unwieldy, requiring at least two, or preferably three, people to coax it back into position. This is even more important during reassembly, as the unit must be offered up at the right angle, and then manoeuvred into position. Care must be taken not to damage the finish on the frame tubes, and it is worthwhile protecting these with rag or masking tape.

2 Needless to say, the unit should be fitted from the right-hand side of the frame, where the removable lower section permits clearance. Again, bear in mind that the engine/gearbox unit is both heavy and awkward to manoeuvre; do not take chances which might result in damage to the machine or the operator. Note that it is important that the oil filter and housing are left off until the engine is installed.

3 It is recommended that a trolley jack is used to facilitate installation. This will take the weight of the unit whilst the mounting bolts are refitted. Always use a wooden block between the crankcase and the jack. Fit the various mounting bolts and plates in position, as shown in the accompanying photographs, but do not tighten them until they are all in place. Bear in mind the various footrest/brake pedal arrangements featured on the different models, as described in the removal sequence (Section 6).

4 Once in position, the various bolts and nuts should be tightened to the values specified below.

Torque settings
8 mm 1.8 – 2.5 kgf m (13 – 18 lbf ft)
10 mm 3.0 – 4.0 kgf m (22 – 29 lbf ft)
12 mm 5.5 – 6.5 kgf m (40 – 47 lbf ft)

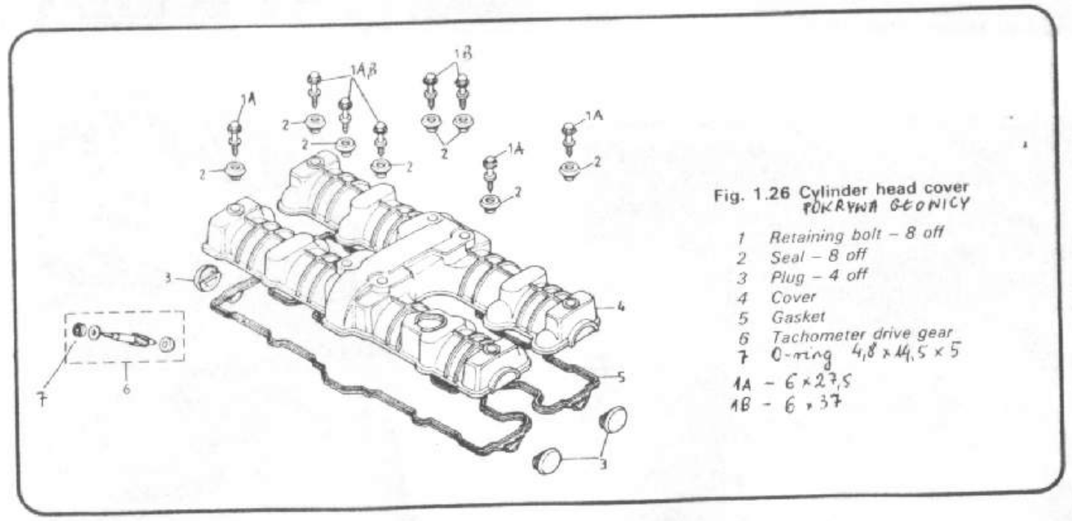


Fig. 1.26 Cylinder head cover
POKRYWA GŁOWICY
1 Retaining bolt – 8 off
2 Seal – 8 off
3 Plug – 4 off
4 Cover
5 Gasket
6 Tachometer drive gear
7 O-ring 4,8 x 41,5 x 5
1A – 6 x 27,5
1B – 6 x 37

46 Engine and gearbox unit installation: final assembly and adjustment

1 Place the final drive chain over the rear sprocket, and fit it over the splined end of the layshaft. Refit the bolt, tightening it to the specified torque setting. Lock the rear wheel by applying the rear brake whilst the nut is tightened. Knock over the locking washer to prevent the nut from slackening in use. Note that the chain guide plate should be in position at this stage (see photograph 45.2f). Do not omit to reset the drive chain tension by means of the rear wheel spindle adjusters.

2 If the oil pump was removed, it should be refitted at this stage using a new gasket. Make sure that the pump orifices and gasket faces are absolutely clean, and that the locating dowel is fitted to the lower right-hand mounting bolt. Refit the neutral switch lead clamp to the appropriate oil pump cover bolt (located nearest the centre of the cover's vertical column), then refit the cover and breather hose.

3 Connect the heavy duty starter motor cable to its terminal, and slide the protective rubber boot over the exposed connection. Fit the motor to its recess in the upper crankcase and fit the securing bolts. Reconnect the oil pressure switch lead. Refit the starter motor cover.

4 Refit the alternator and sprocket covers, ensuring that the output leads of the former are correctly routed and re-connected at their connector block. Refit the sparking plug leads, noting that they are numbered 1 to 4, 1 being the left-hand cylinder. Connect the tachometer drive cable at the cylinder head cover and secure the single locking bolt.

5 In the case of the CB900F model, refit the oil cooler assembly to the frame and refit the pipe unions to the underside of the crankcase. Reassemble the exhaust system in the reverse order of that described for removal, using a new sealing ring in each exhaust port.

6 Place the air cleaner casing loosely in position in the frame. The mounting bolts should be left slack until the carburettors have been fitted. Connect the throttle cables to the operating quadrant, and seat the cable outers against their respective stops. Adjust the throttle cable free play to give 2 – 6 mm measured at the flanged end of the throttle grip in relation to the adjacent switch housing. This adjustment can be carried out with the carburettors installed, but access will be easier at this stage.

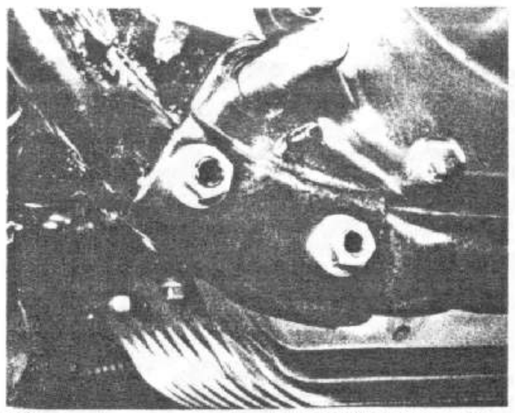
7 Manoeuvre the carburettor bank into position, displacing the air cleaner casing slightly to obtain sufficient clearance. Persuading the carburettors to engage in the rubber mounting stubs is not easy, and will demand a degree of patient manipulation with the aid of a small screwdriver. The operation is made easier if an assistant is available to deal with one side of the carburettor bank. Tighten the securing clips, then repeat the operation with the air cleaner hose connections. When the carburettor bank is back in place, reposition the air cleaner casing and tighten its mounting screws.

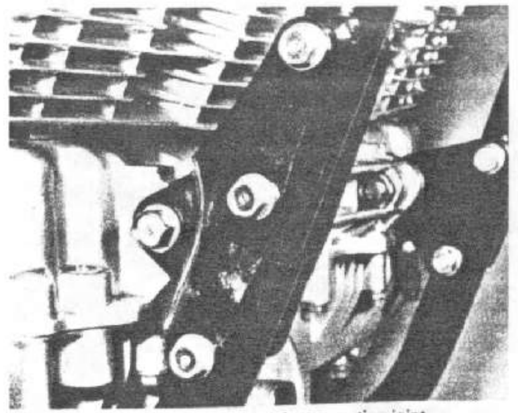
8 Trace and reconnect the CDI pickup leads, plus the alternator leads if these have not been fitted. Reconnect the battery leads and check that the electrical system functions properly. Pay particular attention to the rear brake light switch, which may be in need of adjustment, and to the oil pressure and neutral light switches.

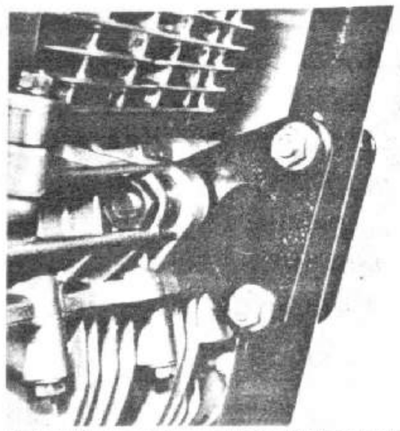
9 Refit the side panels, then slide the fuel tank into position, ensuring that the mounting rubbers at the front of the tank engage correctly. Secure the tank with the single bolt at the rear. Reconnect the petrol feed pipes to the carburettors, and check that the various drain and breather hoses are routed correctly.

10 Assemble the oil filter housing with a new filter element. Check that the O-ring is in sound condition, and renew if necessary. Tighten the filter housing bolt to 2.8 – 3.2 kgf m (20 – 23 lbf ft). Fill the crankcase with 4.5 litres (9.51/7.92 US/Imp pints) of SAE 10W/40 engine oil, noting that the oil level must be checked and topped up after the engine has been started and run for a few minutes.

11 Reconnect the clutch cable to the actuating arm on the outer cover. Set the cable adjuster to give 3/8 – 3/4 in (10 – 20 mm) free play measured at the lever end. Finally, check around the workbench area for any 'left-over' parts; these should be identified and refitted before attempting to start the newly-rebuilt engine.

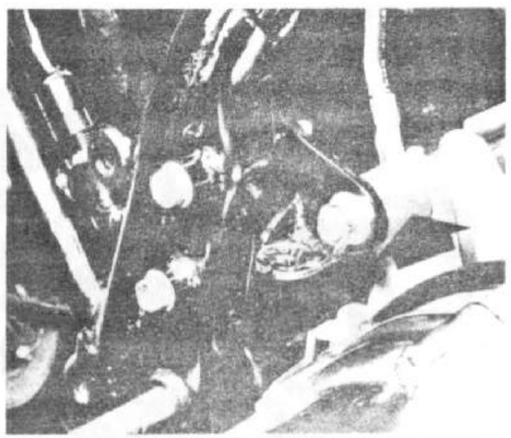

45.2a Rear lower mounting showing removable frame section


45.2b RH front mounting showing frame section joint

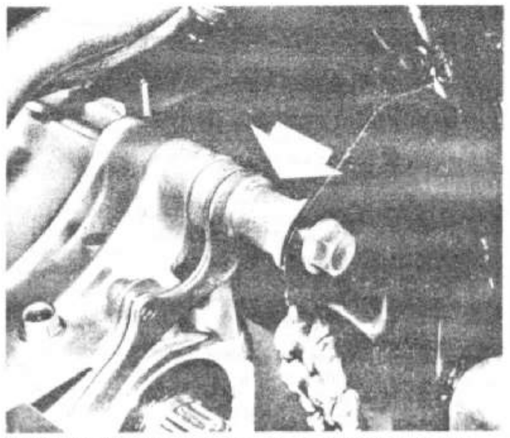


45.2c LH front mounting plates are fitted as shown

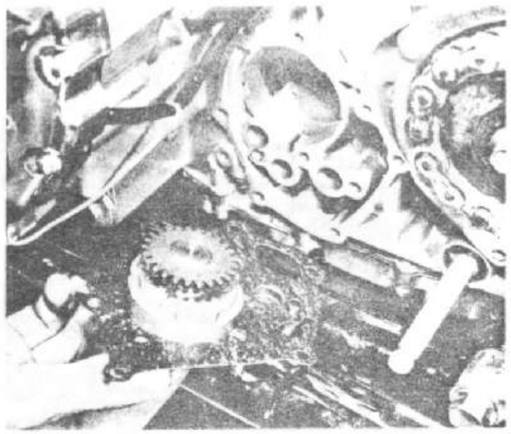
45.2d Through bolt is fitted on underside of unit (arrowed)



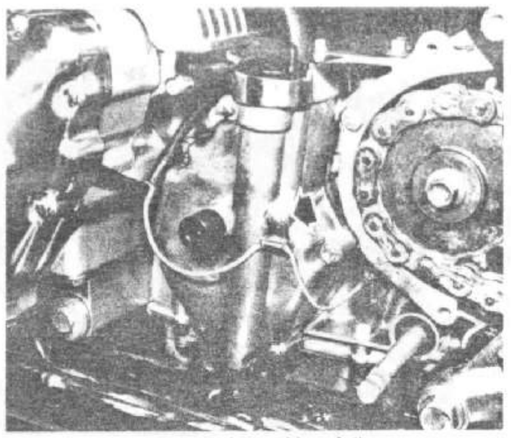
45.2e RH upper rear mounting – note earth lead and spacer (arrowed)



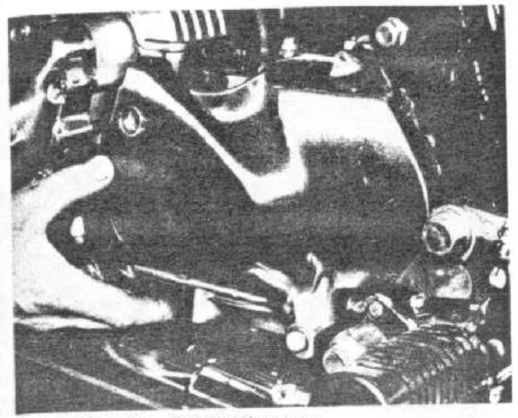
45.2f LH upper rear mounting – note chain guide and spacer (arrowed)



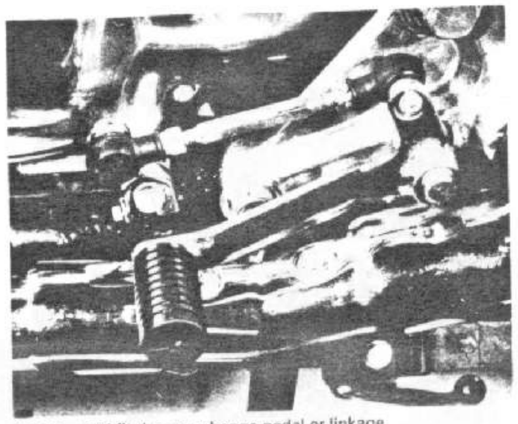
46.2a Fit the oil pump using a new gasket



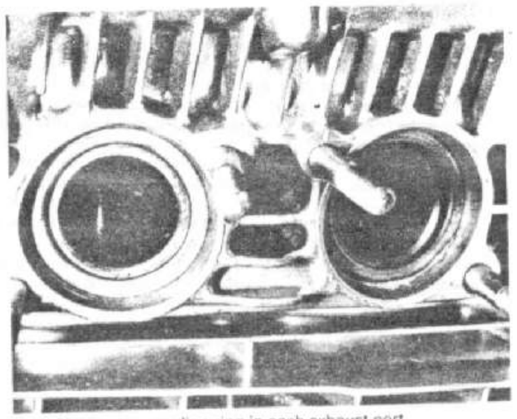
46.2b Fit oil pump cover, noting position of clip



46.4a Refit the gearbox sprocket cover ...



46.4b ... and fit the gearchange pedal or linkage



46.5 Place a new sealing ring in each exhaust port

47 Starting and running the rebuilt engine unit

1 Make sure that all the components are connected correctly. The electrical connectors can only be fitted one way, as the wires are coloured individually. Make sure all the control cables are adjusted correctly. Check that the fuse is in the fuse holder, and try all the light switches and turn on the ignition switch. Close the choke lever to start.

2 Switch on the ignition and start the engine by turning it over a few times with the electric starter, bearing in mind that the fuel has to work through the four carburettors. Once the engine starts, run at a fairly brisk tick-over speed to enable the oil to work up to the camshafts and valves. Check that the oil pressure warning lamp goes out after a few moments running.

3 Before taking the machine on the road, check that the brakes are correctly adjusted, with the required level of hydraulic fluid in the handlebar master cylinder.

4 Make sure the rear chain is correctly tensioned to 5/8 – 1 inch up and down play. Also that the front forks are filled with the correct amount of oil.

5 Check the exterior of the engine for signs of oil leaks or blowing gaskets. Before taking the machine on the road for the first time, check that all nuts and bolts are tight and nothing has been omitted during the reassembling sequence.

48 Taking the rebuilt machine on the road

1 Any rebuilt engine will take time to settle down, even if the parts have been replaced in their original order. For this reason it is highly advisable to treat the machine gently for the first few miles, so that the oil circulates properly and any new parts have a reasonable chance to bed down.

2 Even greater care is needed if the engine has been rebored or if a new crankshaft and main bearings have been fitted. In the case of a rebore the engine will have to be run-in again as if the machine were new. This means much more use of the gearbox and a restraining hand on the throttle until at least 500 miles have been covered. There is not much point in keeping to a set speed limit; the main consideration is to keep a light load on the engine and to gradually work up the performance until the 500 mile mark is reached. As a general guide, it is inadvisable to exceed 4,000 rpm during the first 500 miles and 5,000 rpm for the next 500 miles. These periods are the same as for a rebored engine or one fitted with a new crankshaft. Experience is the best guide since it is easy to tell when the engine is running freely.

3 If at any time the oil feed shows signs of failure, stop the engine immediately and investigate the cause. If the engine is run without oil even for a short period, irreparable engine damage is inevitable.

49 Fault diagnosis: engine

Symptom	Cause	Remedy
Engine will not start	Defective sparking plugs	Remove the plugs and lay them on the cylinder head. Check whether spark occurs when ignition is on and engine rotated.
	Faulty ignition system	See Chapter 3.

Engine runs unevenly	Ignition or fuel system fault	Check each system independently, as though engine will not start.
	Blowing cylinder head gasket	Leak should be evident from oil leakage where gas escapes.
	Incorrect ignition timing	Check accuracy and reset if necessary.
Lack of power	Fault in fuel system or incorrect ignition timing	Check fuel lines or float chambers for sediment. Reset ignition timing.
Heavy oil consumption	Cylinder block in need of rebore	Check bore wear, rebore and fit oversize pistons if required.

50 Fault diagnosis: clutch

Symptom	Cause	Remedy
Engine speed increases as shown by tachometer but machine does not respond	Clutch slip	Check clutch adjustment for free play, at handlebar lever, check thickness of inserted plates.
Difficulty in engaging gears, gear changes jerky and machine creeps forward when clutch is withdrawn, difficulty in selecting neutral	Clutch drag	Check clutch for too much free-play. Check plates for burrs on tongues or drum for indentations. Dress with file if damage not too great.
Clutch operation stiff	Damaged, trapped or frayed control cable	Check cable and renew if necessary. Make sure cable is lubricated and has no sharp bends.

51 Fault diagnosis: gearbox

Symptom	Cause	Remedy
Difficulty in engaging gears	Selector forks bent Gear clusters not assembled correctly	Replace with new forks. Check gear cluster for arrangement and position of thrust washers.
Machine jumps out of gear	Worn dogs on the ends of gear pinions	Renew worn pinions.
Gear change lever does not return to original position	Broken return spring	Renew spring.

Chapter 2 Fuel system and lubrication

For modifications, and information relating to later models, see Chapter 7

Contents

Specifications

	CB750K(Z)	CB750K LTD	CB750F	CB900F
Fuel tank				
Total capacity	20 litres (4.4/5.3 Imp/ US gallons)	20 litres (4.4/5.3 Imp/ US gallons)	20 litres (4.4/5.3 Imp/ US gallons)	20 litres (4.4/5.3 Imp/ US gallons)
Reserve capacity	5 litres (1.1/1.3 Imp/ US gallons)	5 litres (1.1/1.3 Imp/ US gallons)	4.5 litres 1.0/1.19 Imp/ US gallons)	4.5 litres (1.0.1.19 Imp/ US gallons)
Carburettors				
Make	Keihin	Keihin	Keihin	Keihin
Type	VB42A or VB42C	VB42A	VB42B	VB51A
Primary main jet	68	68	68	68
Secondary main jet	102	102	pre 1980; 98 1980 on; 100	98
Float level	15.5 mm (0.61 in)	15.5 mm (0.61 in)	15.5 mm (0.61 in)	15.5 mm (0.61 in)
Pilot screw setting	VB42A; 1½ turns out VB42C; 1¾ turns out	1½ turns out	pre 1980; 1½ turns out 1980 on; 1⅞ turns out	1½ turns out
Idle speed	1000 ± 100 rpm	1000 ± 100 rpm	1000 ± 100 rpm	1000 ± 100 rpm
Fast idle speed	2000 ± 500 rpm	2000 ± 500 rpm	2000 ± 500 rpm	1000–2500 rpm
Venturi diameter	30 mm (1.18 in)	30 mm (1.18 in)	30 mm (1.18 in)	32 mm (1.26 in)
Lubrication system				
Type	Wet sump, high pressure			
Filter	Pleated paper element, gauze sump strainer			
Oil capacity	4.5 litres (7.92 Imp pints, 4.7 US quarts) (3.5 litres, 6.00 Imp pints, 3.7 US quarts at oil changes)			
Nominal oil pressure	71 psi (5.0 kg cm² at 7000 rpm/80°C (176°F) Measured at oil pressure switch take off			78 psi/5.5 kg cm² at 7000 rpm 80°C (176°F)

Oil pump				
Type	Trochoid			
Delivery rate:				
Engine	41 litres per minute (72 Imp pints per minute, 43.4 US quarts per minute) at 7000 rpm			
Oil cooler	N/A	N/A	N/A	18 litres/32 Imp pints per minute at 7000 rpm
Inner/outer rotor clearance (max)	0.15 mm (0.006 in)			0.20 mm (0.0008 in)
Outer rotor/body clearance (max)	0.35 mm (0.014 in)			
Rotor end clearance (max)	0.10 mm (0.004 in)			

1 General description

The fuel system is comprised of a steel petrol tank from which fuel is fed by gravity to the four Keihin carburettors. The tap has three positions, giving a normal supply of petrol, an emergency reserve position and an off position. A gauze strainer is incorporated in the tap, to trap any foreign matter which might otherwise block the carburettor jets. The petrol tank filler cap incorporates a lock operated by the ignition key.

The four carburettors are interconnected by a linkage to ensure synchronisation. The two throttle cables are connected to a pulley mounted between the two control instruments, the throttles being opened and closed positively. The engine draws air in via a moulded plastic trunking which contains the air cleaner element.

The engine oil is contained in a sump formed at the bottom of the crankcase.

The gearbox is also lubricated from the same source, the whole engine unit being pressure fed by a mechanical oil pump that is driven off the crankshaft. The oil pump intake extends into the sump to pump the oil up to the engine. A screen at the pump inlet point prevents foreign matter from entering the pump before it can damage the mechanism. From the pump the oil passes to the oil filter to be cleaned. If the filter becomes clogged, a safety by-pass valve routes the oil around the filter. It is then routed through a passageway in which an oil pressure switch is mounted, and through an oil hole in the crankcase, from which point it is sent in three different directions. One direction is to the crankshaft main bearings and crankshaft pins. After lubricating the crankshaft parts, the oil is thrown out by centrifugal force and the spray lands on the cylinder walls, the pistons and gudgeon pins to lubricate those parts. The oil eventually drops down from all these points and accumulates in the bottom of the crankcase sump to be recirculated.

The second passageway for oil from the pump takes the form of an oil feed pipe which conveys oil up into the cylinder head. After passing through holes into the camshaft bearings, the oil flows out over the cams and down around the valve tappets to lubricate these areas. The oil returns to the sump via the oil holes at the base of the tappets, and the cam chain tunnel in the centre of the cylinder head and cylinder block.

A third branch of the system feeds oil to the gearbox mainshaft and layshaft, where the gearbox components are positively lubricated.

On CB900F models an oil cooler is fitted to keep the engine oil temperature down to an acceptable level. The oil cooler diverts a proportion of the oil leaving the pump through a pipe to the frame mounted cooler matrix. The cooled oil then returns to the sump, thus lowering the overall engine oil temperature.

2 Petrol tank: removal and replacement

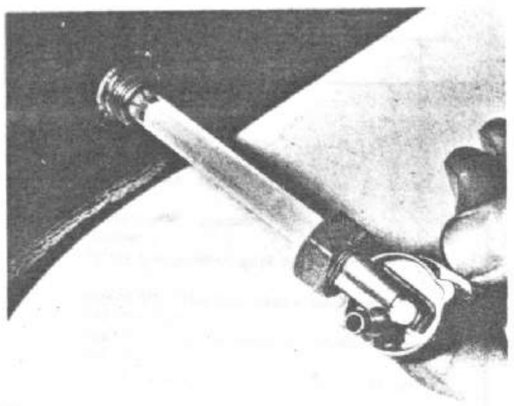
1 The petrol tank fitted to the Honda dohc 4-cylinder models is secured to the frame by means of a short channel that projects from the nose of the tank and engages with a rubber buffer surrounding a pin welded to the frame immediately behind the steering head. This arrangement is duplicated either side of the nose of the tank and the frame. The rear of the tank is secured by a single bolt that passes through a lip welded on to the back of the tank. The tank also has two rubber buffers on which it rests at the rear. A petrol tap is fitted with a reserve pipe that is switched over, when the fuel level falls below that of the main feed pipe.

2 The petrol tank can be removed from the machine without draining the petrol, although the rubber fuel lines to the carburettors will have to be disconnected. The dualseat must be lifted up to expose the mounting bolt at the rear of the tank, then the tank raised at the rear and pulled upwards and backwards to pull off the front rubbers. When replacing the fuel tank, lift at the rear and push down onto the front rubber buffers, then secure the bolt at the rear and reconnect the fuel lines.

3 Petrol tap and filter: removal, dismantling and replacement

1 It is not necessary to drain the petrol tank if it is only half or under half full, as the tank can be laid on its side on a clean cloth or soft material (to protect the enamel), so that the petrol tap is uppermost. The petrol pipe should be removed before unscrewing the petrol tap. The tap is released by slackening the gland nut which secures it to its mounting stub on the underside of the tank.

2 The gauze strainer can be removed for cleaning by pulling it upwards, clear of the main pickup pipe. No further maintenance is feasible, as parts are not available for the tap. In the event of malfunction it must be renewed. Do not forget that fuel leakage can be dangerous, and may be illegal in some parts of the world.



3.1 The fuel tap is secured to tank by a gland nut

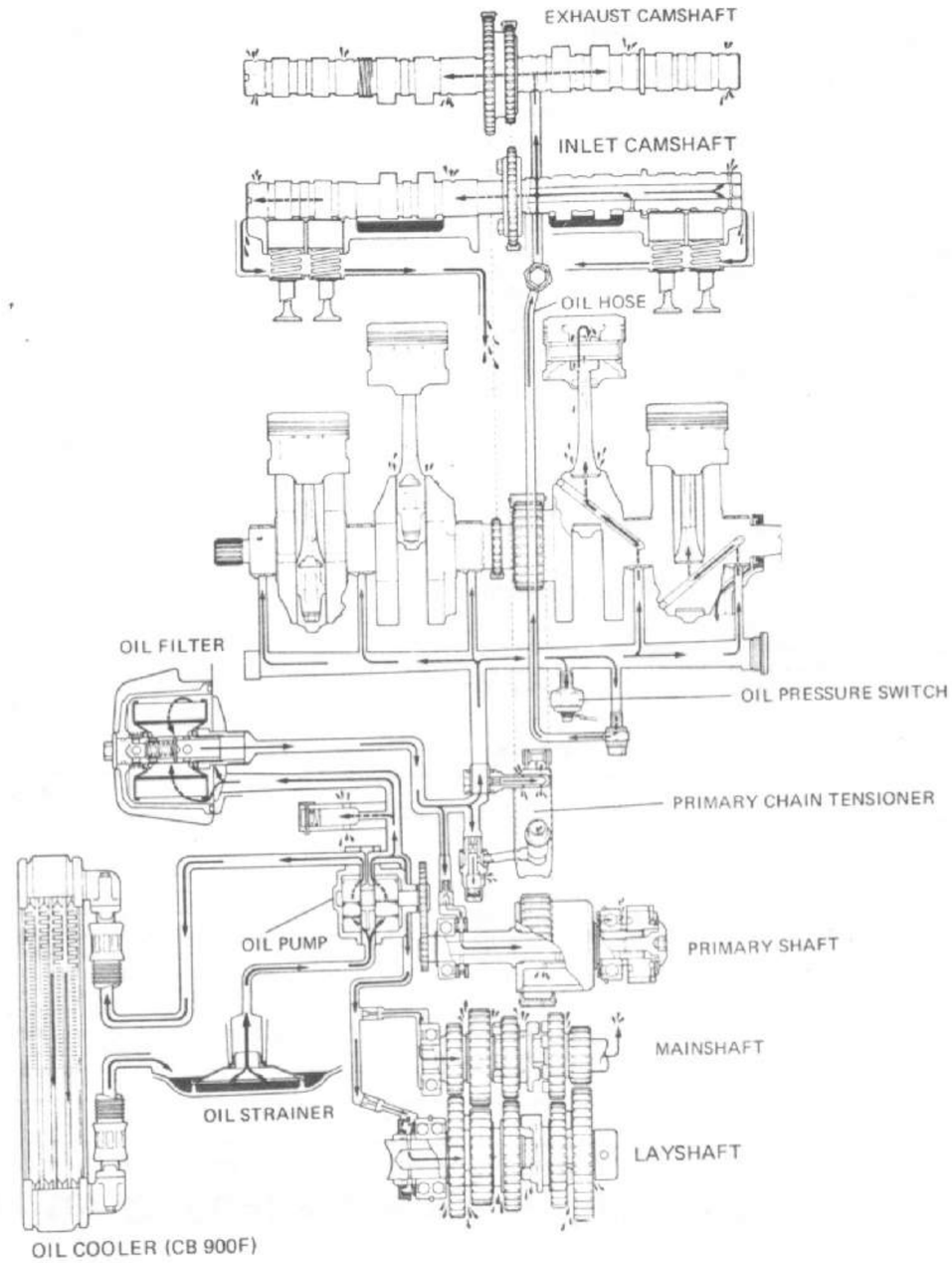


Fig. 2.1 Lubrication system UKŁAD SMAROWANIA

Note that oil cooler is fitted to CB900F models only.
CHŁODNICA OLEJU TYLKO DLA MODELU CB900F

4 Carburettors: removal and separation

1 The four constant depression (CD) carburettors are mounted on the cylinder head as an assembly, the individual instruments being connected by linkages and by mounting brackets. If overhaul proves necessary, a certain amount of work, such as attention to the float assembly and jets, can be carried out with the instruments in position, but because access is very restricted it is best to remove the complete bank so that work can be carried out on the bench.

2 Start by ensuring that the fuel tap is turned off, and remove the fuel pipe at the fuel tap end. Lift the seat and remove both side panels to provide access to the air cleaner casing. Slacken the hose clips which secure the carburettors to the air cleaner hoses, then release the single bolt which retains the top of the air cleaner casing. The casing can now be pulled rearwards to provide a small clearance between the hoses and the carburettors.

3 Slacken the carburettor mounting clips. With the aid of an assistant, where possible, pull the assembly rearwards to free the mounting stubs from the inlet adaptors. There is little clearance available for this operation, and a degree of careful manoeuvring will prove necessary. Once clear of the stubs, withdraw the carburettors sufficiently to permit access to the throttle and choke cables. These should be disconnected by slackening off the adjusters and locknuts to allow the inner cables to be released.

4 Further dismantling is dependent on the degree of overhaul anticipated; generally speaking, it is possible to attend to most areas of the instruments without separating them. Should complete dismantling prove necessary, bear in mind that a lot of work will be involved. Additionally, the manufacturer recommends that new choke valves, shafts and screws are fitted.

5 Start by unhooking the end of the relief spring, which is located between the No 3 and 4 carburettors. The spring is the lighter of the two fitted concentric to the choke shaft. Holding the synchronising screws with a screwdriver, slacken the locknuts of each one. Turn each screw slowly inwards, counting the number of turns required to seat it. Make a careful note of each figure so that the correct setting can be duplicated during reassembly. Unscrew each of the synchronising screws to release spring tension.

6 Release the front and rear mounting brackets, noting that the screws will probably be very tight, requiring the use of an impact driver to effect removal. Take great care not to damage the carburettors or the screw heads during this operation.

7 Carefully separate the assembly at the centre joint, leaving the carburettors as two pairs. Take care not to damage the fuel and air connecting pipes or the mechanical linkage.

8 Open the choke butterfly and carefully file off the staked ends of the securng screws, holding the carburettors so that the resulting metal filings fall out of the main bore. Remove and discard the securing screws, and lift the butterfly plates away. Release the fuel inlet T-piece retainer, which is held by one of the vacuum chamber screws. Carefully separate the two carburettors, with the same caution described earlier in this section.

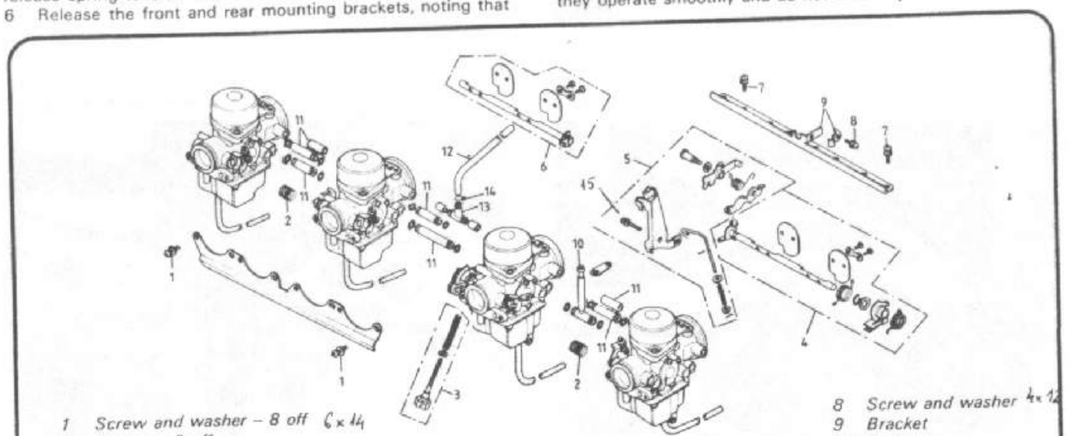
9 The linkage between the carburettors is best left alone unless it is absolutely essential that it is removed. If removal is unavoidable, make detailed sketches of the position of the various springs and levers as a guide during reassembly.

10 Disengage the fine relief spring from the choke shaft end, and withdraw the shaft. Remove the split pin from the end of the accelerator pump return spring rod, and remove the washer spring and spring seat. Unscrew the pivot bolt to release the fast idle arm, spring and accelerator pump lever and rod. Release the throttle quadrant by driving out the small pin which retains it to its shaft.

11 Reassembly is a direct reversal of the above sequences, noting the following points. The carburettors should be built up into pairs, and then joined at the centre. Ensure that new O-rings are used on the various connecting pipes and T-pieces, lubricating each one with a smear of engine oil.

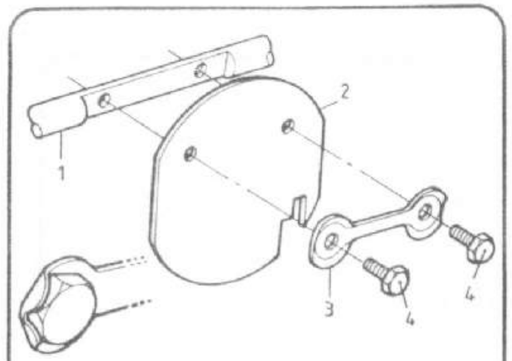
12 When fitting the throttle connecting links together, note that the forked arm must fit between the two plain washers, not directly against the spring, the larger of the two washers facing the spring. Fit the front and rear mounting brackets, tightening the screws progressively in a diagonal sequence to preserve carburettor alignment. Fit the thrust springs between the throttle link of each pair of carburettors. Fit the choke butterfly plates using the new screws with tabwashers. Lock the screws after tightening by bending up the locking tabs.

13 Set the synchronising screws to their original positions, then check that the distance between the throttle butterfly and the pilot bypass orifice is identical for each instrument. When all four butterflies are synchronised, tighten the adjuster locknuts. Check the operation of the linkages and levers, ensuring that they operate smoothly and do not bind or jam.



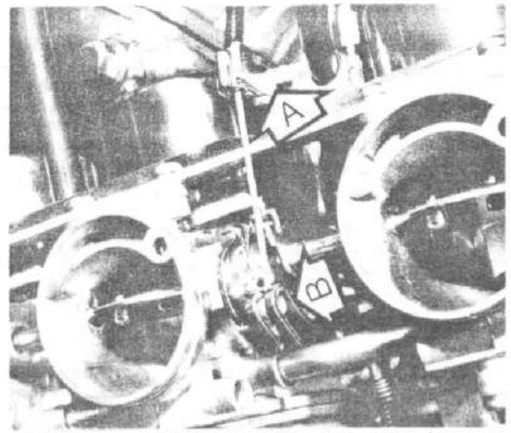
1 Screw and washer – 8 off 6 x 44
2 Spring – 2 off
3 Throttle stop screw
4 Choke assembly
5 Choke control assembly
6 Choke assembly
7 Screw and washer – 8 off 5 x 12
8 Screw and washer 4 x 12
9 Bracket
10 T-piece
11 Fuel transfer pipe
12 Fuel hose
13 T-piece
14 Clip
15 Screw 5 x 16

Fig. 2.2 Carburettor linkage
POŁĄCZENIA GAŹNIKÓW

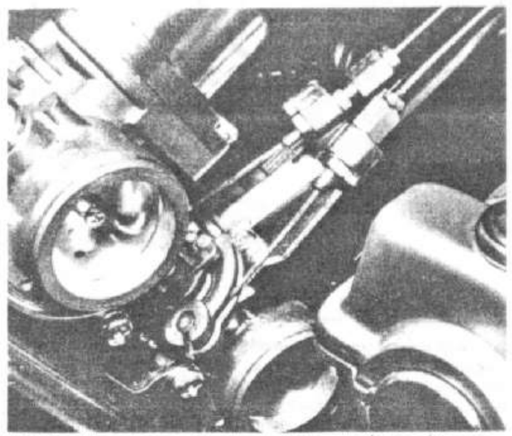


1 Choke linkage
2 Valve
3 Tab washer
4 Screw – 2 off

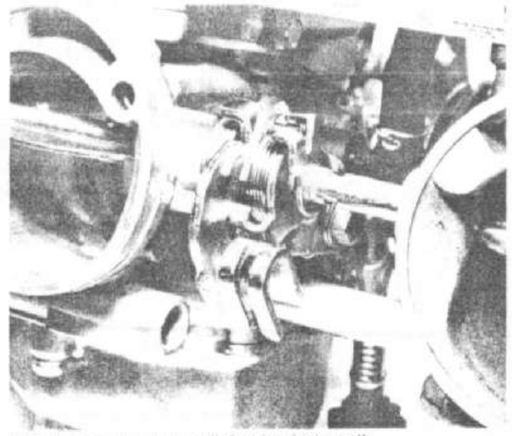
Fig. 2.3 Butterfly valve – Early CB750K
PRZEPUSTNICA SSANIA



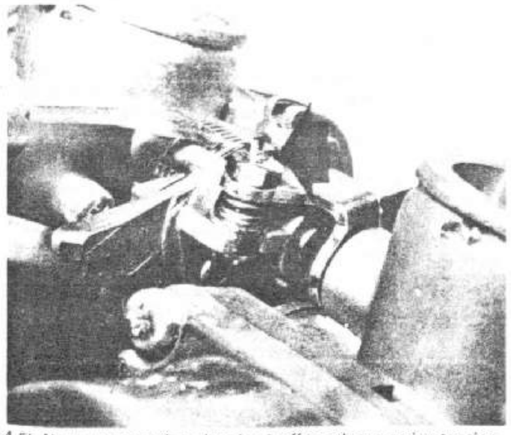
4.3a Slacken screw (A) to release cable, then unhook from lever (B)



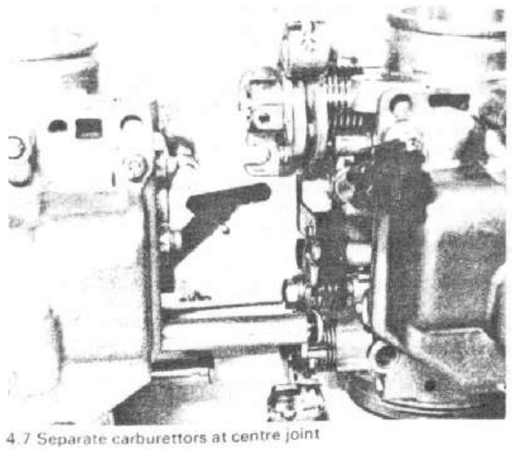
4.3b Throttle cables can be released after slackening adjusters



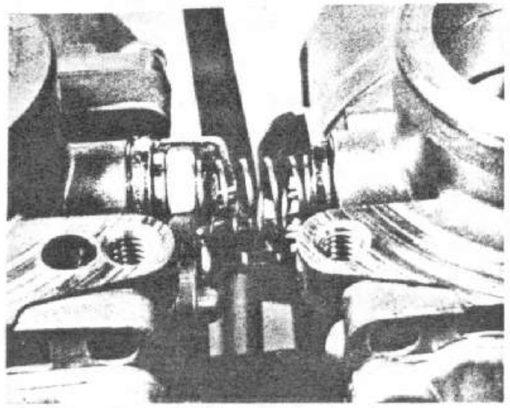
4.5a Release the choke relief spring (arrowed)



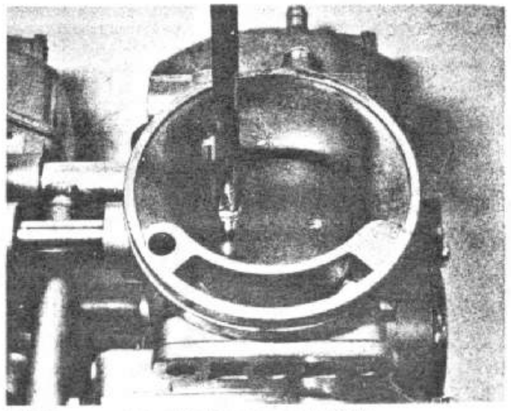
4.5b Note screw setting, then back off to release spring tension (arrowed)



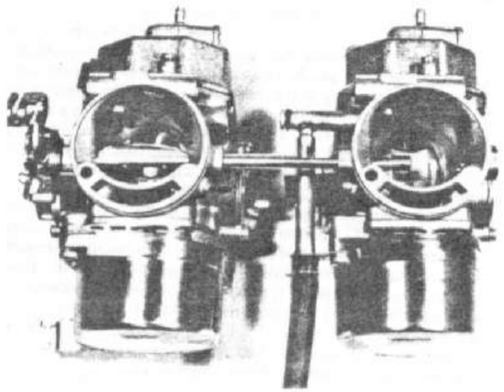
4.7 Separate carburettors at centre joint



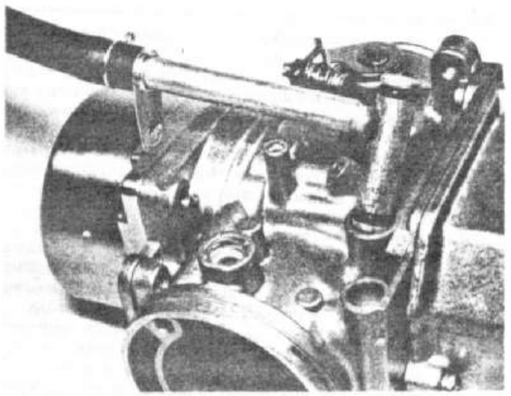
4.8a This small spring will drop free as carburettor pairs are separated



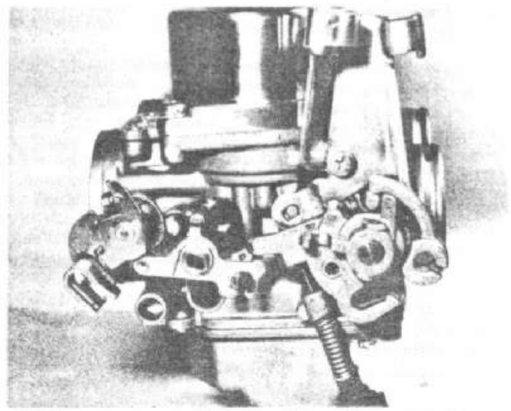
4.8b Remove choke plate from one carburettor



4.8c Draw instruments apart as shown



4.8d Fuel pipe is held by vacuum cylinder screw



4.10 Central carburettor linkages – US models have throttle pump

5 Carburettors: dismantling, examination and renovation

1 As mentioned previously, most of the normal overhaul jobs may be carried out with the instruments joined as a bank of four, thus avoiding a considerable amount of dismantling work. Note that where attention to the connecting linkages is required, it will be necessary to separate the instruments as described in Section 4.

2 Before any dismantling work takes place, drain out any residual fuel and clean the outside of the instruments thoroughly. It is essential that no debris finds its way inside the carburettors.

3 It is suggested that each carburettor is dismantled and reassembled separately, to avoid mixing up the components. The carburettors are handed and therefore components should not be interchanged.

4 Invert one carburettor and remove the three float chamber screws. Lift the float chamber from position and note the chamber sealing ring. This need not be disturbed unless it is damaged. The two floats, which are interconnected, can be lifted away after displacing the pivot pin. The float needle is attached to the float tang by a small clip. Detach the clip from the tang and store the needle in a safe place.

5 Prise out the rubber blanking plug to expose the slow jet for examination. Note that it is pressed into the carburettor body and cannot be renewed, and for the same reason cleaning can only be carried out by using compressed air in the jet passage. When unscrewing any jet, a close fitting screwdriver must be used to prevent damage to the slot in the soft jet material. Hold the secondary main jet holder with a small spanner and unscrew the secondary jet. The holder may then be unscrewed to release the needle jet which is a push fit and projects into the carburettor venturi. Unscrew the main jet from the final housing and then unscrew the main nozzle from the same housing.

6 Unscrew the retaining screws which hold the carburettor cap (piston chamber) and pull the cap from position. Remove the helical spring and the nylon sealing ring. Pull the piston up and out of its slider. The piston needle can be removed by unscrewing the plug in the top of the piston. The needle will drop out. The main air jet and secondary air jet are hidden below a plate, which is retained in the upper chamber by a single cross head screw. Remove the screw and plate. The two slow air jets are similarly positioned opposite the main air jets, but are not closed by a plate. None of these jets can be removed. They must be cleaned in place.

7 A diaphragm air cut-off valve is fitted to each carburettor to richen automatically the mixture on over-run, thus preventing backfiring in the exhaust system. The valve is located on the side of the main body, and thus will require separation of the instruments if attention is required. The cut-off valve is enclosed by a cover held on the outside of the carburettor body by two screws. Unscrew the screws holding the cover in place against the pressure of the diaphragm spring, and then lift the cover away. Remove the spring, and carefully lift out the diaphragm.

8 Check the condition of the floats. If they are damaged in any way, they should be renewed. The float needle and needle seating will wear after lengthy service and should be inspected carefully. Wear usually takes the form of a ridge or groove, which will cause the float needle to seat imperfectly. If damage to the seat has occurred the carburettor body must be renewed because the seat is not supplied as a separate item.

9 After considerable service the piston needle and the needle jet in which it slides will wear, resulting in an increase in petrol consumption. Wear is caused by the passage of petrol and the two components rubbing together. It is advisable to renew the jet periodically in conjunction with the piston needle.

10 Inspect the cut-off valve diaphragm for signs of perishing or perforation. Damage will be easily seen.

11 Before the carburettors are reassembled, using the reversed dismantling procedure, each should be cleaned out thoroughly using compressed air. Avoid using a piece of rag since there is always risk of particles of lint obstructing the internal passageways or the jet orifices.

12 Never use a piece of wire or any pointed metal object to clear a blocked jet. It is only too easy to enlarge the jet under these circumstances and increase the rate of petrol consumption. If the compressed air is not available, a blast of air from a tyre pump will usually suffice.

13 Do not use excessive force when reassembling a carburettor because it is easy to shear a jet or some of the smaller screws. Furthermore, the carburettors are cast in a zinc-based alloy which itself does not have a high tensile strength. Take particular care when replacing the throttle valves to ensure the needles align with the jet seats.

14 Do not remove either the throttle stop screw or the pilot jet screw without first making note of their exact positions. Failure to observe this precaution will make it necessary to re-synchronise the carburettors on reassembly.

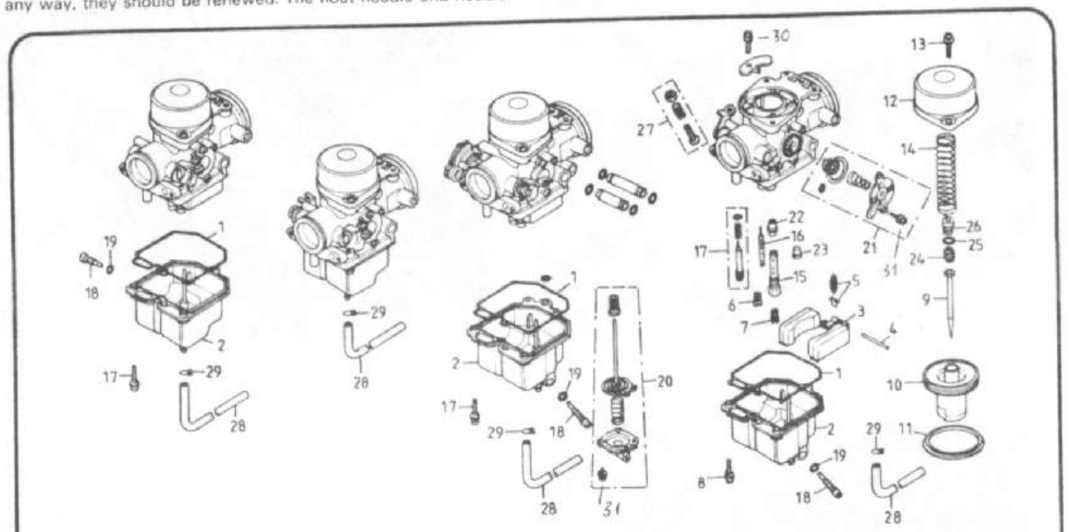
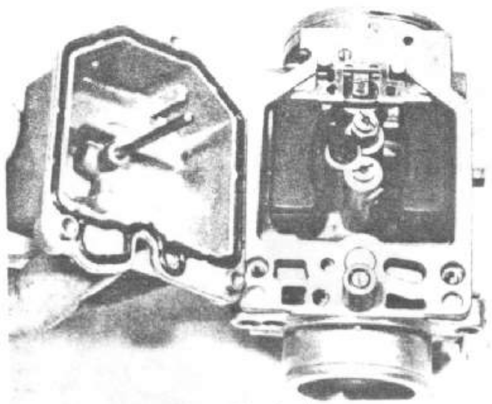


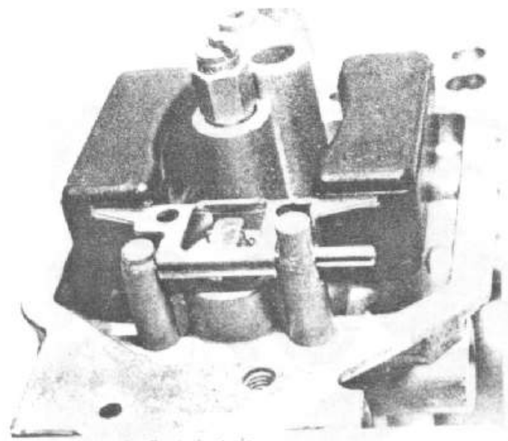
Fig. 2.4 Carburettor – Early CB750K

GAZNIK

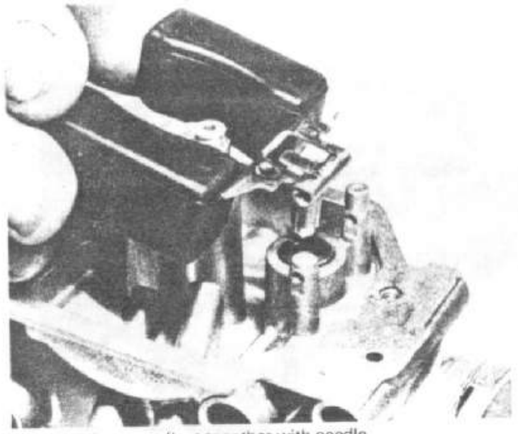
1 *Float chamber gasket – 4 off*
2 *Float chamber – 4 off*
3 *Float – 4 off*
4 *Float pivot pin – 4 off*
5 *Float needle assembly – 4 off*
6 *Primary main jet – 4 off #68*
7 *Secondary main jet – 4 off #162*
8 *Screw and washer – 16 off* $^{(98)}$ 4×16
9 *Jet needle – 4 off*
10 *Vacuum piston*
11 *Gasket – 4 off*
12 *Carburettor top – 4 off*
13 *Screw and washer – 8 off* 5×16
14 *Spring – 4 off*
15 *Needle jet holder – 4 off*
16 *Main nozzle – 4 off*
17 *Mixture adjusting screw – 4 off* 4×16
18 *Drain screw – 4 off*
19 *O-ring – 4 off*
20 *Accelerator pump*
21 *Air cut-off valve – 4 off*
22 *Needle jet – 4 off*
23 *Slow jet plug – 4 off*
24 *Needle seat – 4 off*
25 *Washer – 4 off*
26 *Needle retainer – 4 off*
27 *Synchronizing screw – 4 off*
28 *Drain pipe – 4 off*
29 *Clip – 4 off*
30 Screw 4×16
31 Screw 4×12



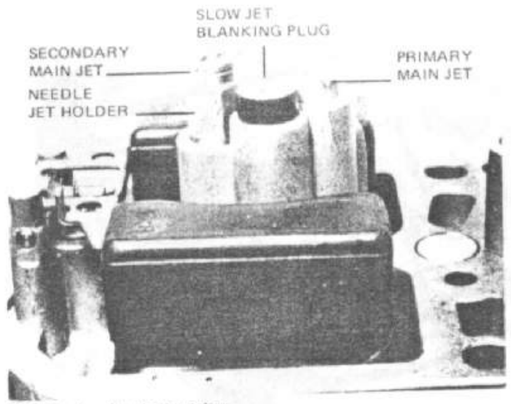
5.4a Release screws and lift float bowl away



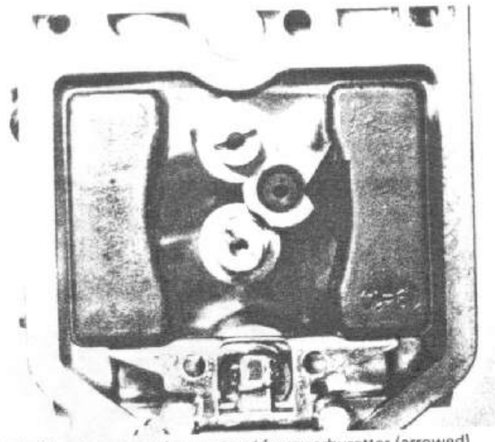
5.4b Displace the float pivot pin ...



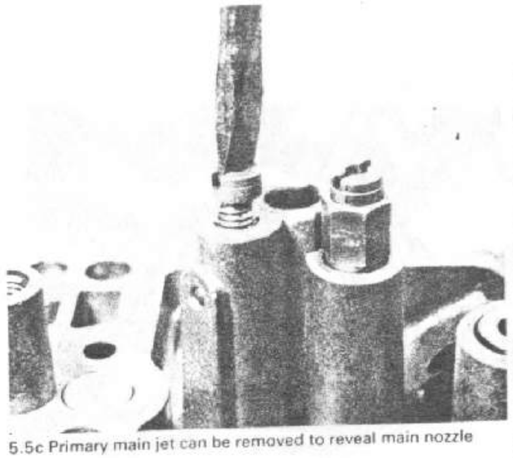
5.4c ... and remove float together with needle



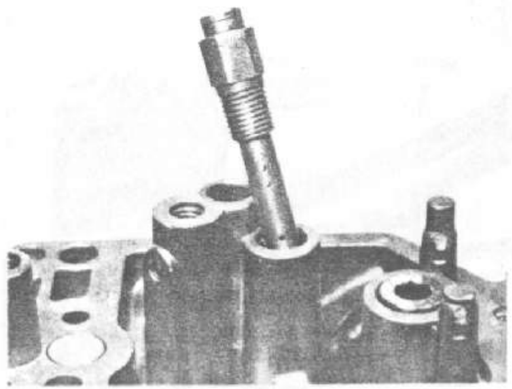
5.5a Carburettor jet location



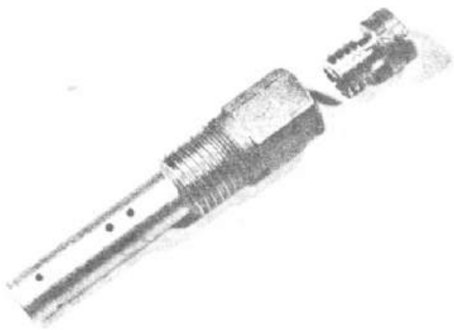
5.5b Slow jet cannot be removed from carburettor (arrowed)



5.5c Primary main jet can be removed to reveal main nozzle

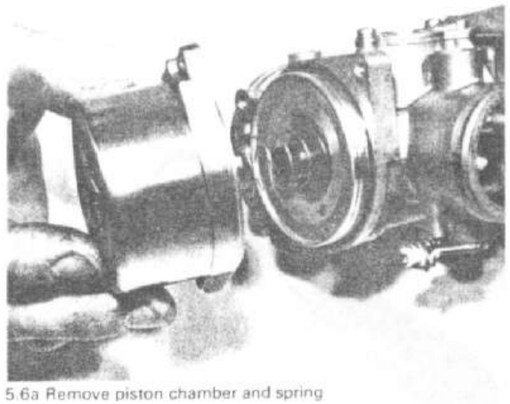


5.5d Secondary main jet is removed together with needle jet holder

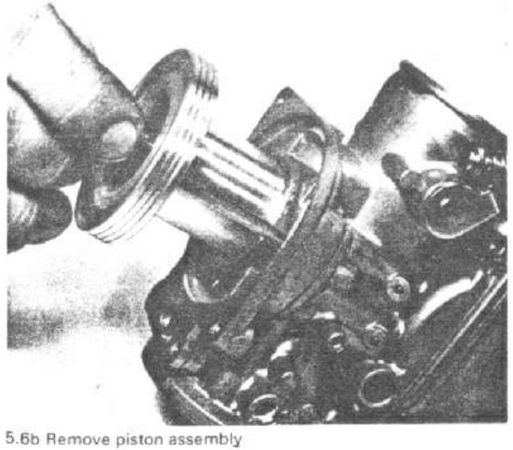


5.5e Secondary main jet can be removed for inspection

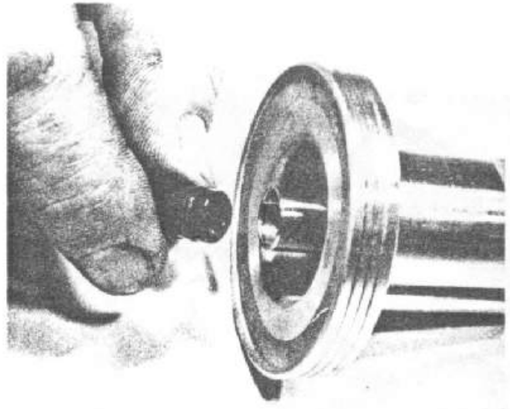
5.5f Jet sizes are marked – do not interchange them!



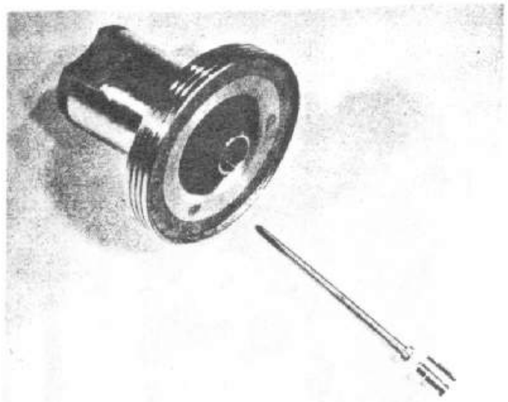
5.6a Remove piston chamber and spring



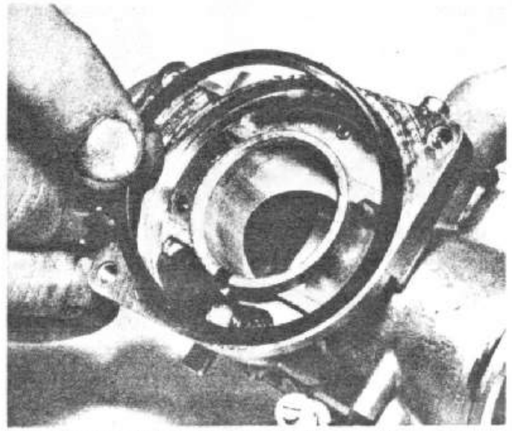
5.6b Remove piston assembly



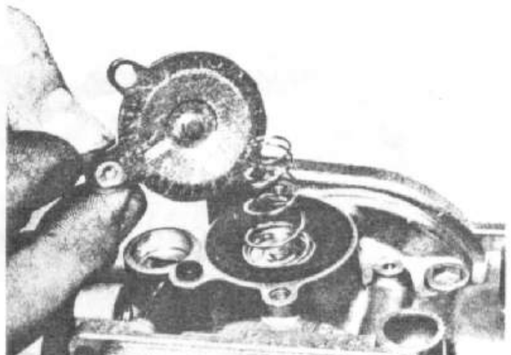
5.6c Prise out rubber blanking plug



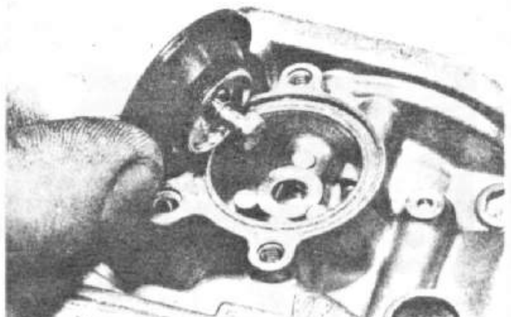
5.6d Needle is retained by large grub screw



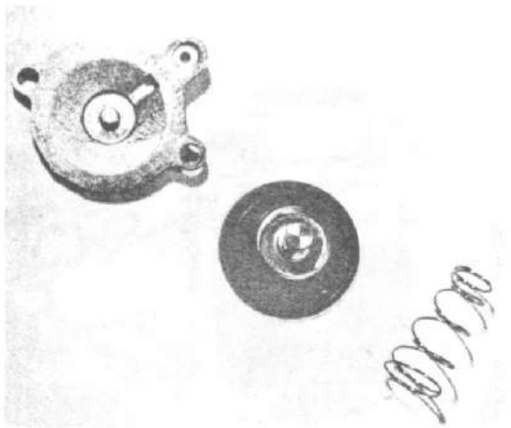
5.6e Damper ring should be renewed if compressed or worn



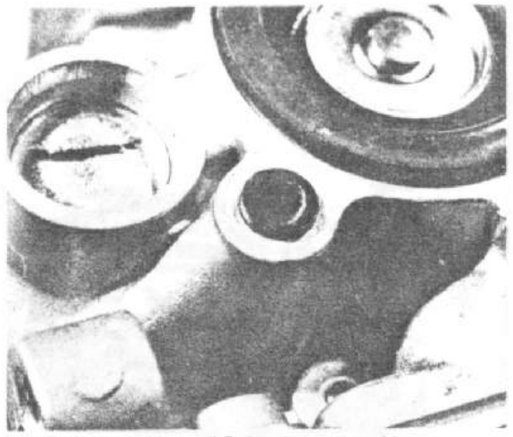
5.7a Air cut-off valve should be checked for damage



5.7b Remove diaphragm and check for splits

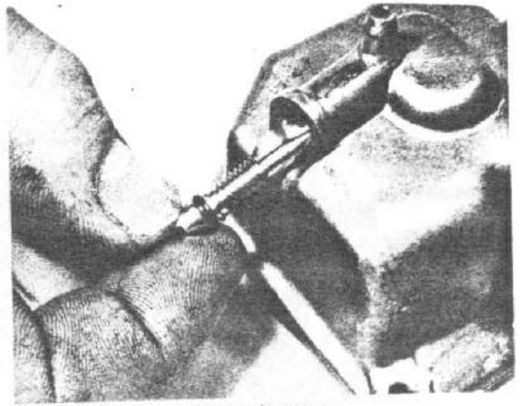


5.7c The air cut-off valve components



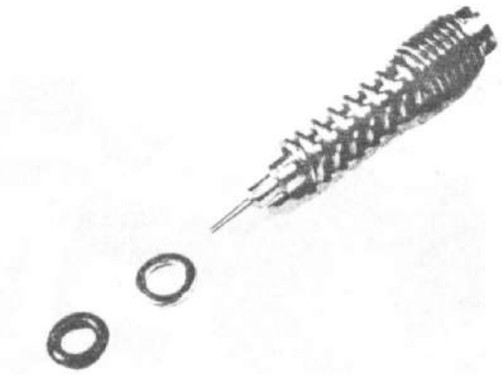
5.7d Do not omit this small O-ring during assembly

5.8a Check float needle tip – renew if marked or ridged

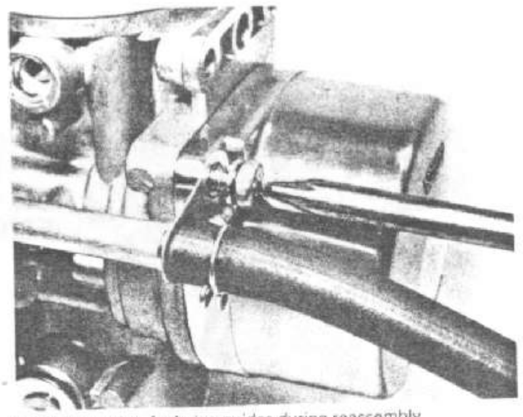


5.8b Float bowl has tapered drain screw

5.11a Pilot screw can be removed for cleaning and inspection



5.11b Pilot screw assembly – note arrangement for washer and O-ring



5.13 Remember fuel pipe guides during reassembly

6 Fast idle mechanism: adjustment

1 The fast idle mechanism takes the form of a pivoted arm mounted between the throttle and choke shafts on the No 2 carburettor. As the choke is operated, a cam on the choke shaft end bears upon the fast idle arm. Movement is transferred to the throttle stop, opening the throttle by a small amount to raise the cold start idle speed to 2000 ± 500 rpm.

2 When the system is off, ie with the throttle valves closed and the choke valves fully open, there should be a small clearance between the fast idle arm and the throttle stop. Measure the gap, which must be within the range 0.7 – 1.0 mm (0.03 – 0.04 in). Any adjustment can be made by carefully bending the forked end of the arm.

7 Accelerator pump: examination and adjustment

1 The US version of the CB750K is equipped with an accelerator pump mounted on the underside of the No 2 carburettor. Its purpose is to richen the mixture during acceleration, thus allowing the carburettor to be jetted for a weaker overall mixture to meet EPA emission requirements.

2 The pump is operated by a sprung rod connected to the

throttle cable quadrant. The rod is connected to a lever which terminates in a small metal tang. This depresses a rod to actuate the diaphragm pump. Fuel from the pump is fed by injection nozzles in each of the four instruments.

3 In the event of pump failure, the pump can be dismantled and checked in the same way as already described for the air cut-off valve (see Section 5.7). Little can go wrong with the pump apart from a cracked or perished diaphragm, but if the pump system is completely dry it may require priming to expel air.

4 The pump output is set up during manufacture but should be re-checked after the carburettors have been overhauled or the operating linkage has been disturbed. With the throttle valve closed, check the clearance between the accelerator pump rod and the operating tang. This should be 0.00 – 0.04 mm (0.00 – 0.016 in). Any necessary adjustment may be made by careful bending of the operating tang.

5 At the other end of the arm, the pump stroke is limited by a second tang which stops against the projecting lug on the carburettor body. The specified gap here is 3.1 – 3.3 mm (0.12 – 0.13 in). Once again, adjustment can be made by bending the tang.

8 Carburettors: synchronisation

1 For the best possible performance it is imperative that the carburettors are working in perfect harmony with each other. At any given throttle opening if the carburettors are not synchronised, not only will one cylinder be doing less work but it will also in effect have to be carried by the other cylinders. This effect will reduce the performance considerably. In the case of multi-cylinder engines especially, poor carburettor synchronisation will make the engine feel 'rough' and can induce backlash in the valve train or primary drive, thus giving the illusion of mechanical wear in these areas.

2 Synchronisation is carried out with the aid of vacuum gauges connected to the engine side of the carburettors. The gauges can take the form of mechanical clock-type instruments or a series of glass or plastic tubes, each containing a column of mercury. The latter type is often referred to as a mercury manometer. A suitable vacuum gauge set may be purchased from a Honda Service Agent, or from one of the many suppliers who advertise regularly in the motocycle press.

3 Bear in mind that this equipment is not cheap, and unless the machine is regarded as a long-term purchase, or it is envisaged that similar multi-cylinder motorcycles are likely to follow it, it may be better to allow a Honda dealer to carry out the work. The cost can be reduced considerably if a vacuum gauge set is purchased jointly by a number of owners. As it will be used fairly infrequently this is probably a sound approach.

4 If the vacuum gauge set is available, proceed as follows. Remove the dualseat and petrol tank so that access can be gained to the carburettors. Using a suitable length of feed pipe, reconnect the petrol tank with the carburettors, so that the petrol flow can be maintained. The petrol tank must be placed above the level of the carburettors. Connect the vacuum gauges to the engine.

5 Start the engine and allow it to run until normal working temperature has been reached. This should take 10-15 minutes. Set the throttle so that an engine speed of 1000 ± 100 rpm is maintained. If the readings on the vacuum gauges vary by more than 60 mm Hg (2.4 in Hg) it will be necessary to adjust the synchronising screws to bring the carburettors within limits. Note that if the readings on the gauges fluctuate wildly, it is likely that the gauges require heavier damping. Refer to the gauge manufacturer's instructions on setting up procedures.

6 The No 2 carburettor (second from left) is regarded as the base instrument; that is, it is non-adjustable and the remaining three carburettors must be adjusted to it. Honda produce a special combined screwdriver and socket spanner for dealing with the synchronising screws (Part number 07908-4220100). Its use makes the procedure easier, but it is not essential. Slacken the locknut of the adjuster concerned, then turn the latter, noting the effect on the gauge reading. When the reading is as close as possible to that of the No 2 carburettor, hold the adjuster screw and retighten the locknut. Repeat the procedure on the remaining carburettors.

9 Carburettors: idle adjustment

CB750 models

1 The engine idle speed should be checked and reset after the synchronizing operation has been carried out as described in the previous section. Before adjusting the carburettors a check should be made to ensure that the following settings are correct: contact breaker gap, ignition timing, valve clearance, sparking plug gaps, crankcase oil level. It is also important that the engine is at normal running temperature.

2 The pilot screws are fitted vertically in each carburettor, adjacent to the float bowl. These are set during assembly and should not be touched unless the carburettors have been overhauled. The master throttle stop screw is located at the centre of the carburettor bank and terminates in a knurled plastic knob. This should be set to give an idle speed of 1000 ± 100 rpm with the engine at normal temperature.

3 If consistent idling cannot be obtained by this method, and the carburettor synchronisation has been checked, it will be necessary to check and adjust the individual pilot screw settings. To do this accurately, a test tachometer calibrated in 50 rpm increments will be required. The machine's tachometer is not sufficiently accurate for the test. Connect the test tachometer according to the manufacturer's instructions and allow the engine to reach normal operating temperature. The adjustment stages are detailed below.

4 Set each pilot screw to its nominal setting (CB750 with VB42A carburettor: 1½ turns out, CB750 with VB42C carburettor: 1¾ turns out).

5 Set the master throttle stop control to give the prescribed idle speed of 1000 ± 100 rpm.

6 Unscrew each pilot screw by ½ turn. If engine speed rises by 50 rpm or more, turn the screws out by another ½ turn. Repeat until engine speed drops by 50 rpm or less.

7 Reset the idle speed using the master throttle stop control.

8 Turn the No. 1 carburettor pilot screw inwards until the engine speed drops by 50 rpm, then back it out by ⅜ turn for the VB42A and by ¼ turn in the case of the VB42C.

9 Correct the idle speed once more.

10 Carry out the sequence detailed in paragraphs 8 and 9 for the remaining carburettors.

11 The above sequence is not detailed for CB900F models, and in this case it must suffice to set the pilot screws to their nominal 1½ turns out. In most instances it will be sufficient to set the pilot screws on the CB750 models in the same way, assuming that a tachometer is not available. It follows that this simplified procedure will not produce such accurate results as those obtained by the methods described earlier.

10 Carburettor settings

1 Some of the carburettor settings, such as the sizes of the needle jets, main jets and needle positions, etc, are predetermined by the manufacturer. Under normal circumstances it is unlikely that these settings will require modification, even though there is provision made. If a change appears necessary, it can often be attributed to a developing engine fault.

2 Always err slightly on the side of a rich mixture, since a weak mixture will cause the engine to overheat. Reference to Chapter 3 will show how the condition of the sparking plugs can be interpreted with some experience as a reliable guide to carburettor mixture strength. Flat spots in the carburation can usually be traced to a defective timing advancer. If the advancer action is suspect, it can be detected by checking the ignition timing with a stroboscope.

11 Carburettors: adjusting float level

1 If problems are encountered with fuel overflowing from the float chambers, which cannot be traced to the float/needle assembly or if consistent fuel starvation is encountered, the fault will probably lie in maladjustment of the float level. It will be necessary to remove the float chamber bowl from each carburettor to check the float level.

2 If the float level is correct the distance between the uppermost edge of the floats and the flange of the mixing chamber body will be 15.5 mm (0.61 in).

3 Adjustments are made by bending the float assembly tang (tongue) which engages with the float tip, in the direction required (see accompanying diagram).

12 Exhaust system

1 Unlike a two-stroke, the exhaust system does not require such frequent attention because the exhaust gases are usually of a less oily nature.

2 Do not run the machine with the exhaust baffles removed, or with a quite different type of silencer fitted. The standard production silencers have been designed to give the best possible performance, whilst subduing the exhaust note to an acceptable level. Although a modified exhaust system, or one without baffles, may give the illusion of greater speed as a result of the changed exhaust note, the chances are that performance will have suffered accordingly.

13 Air filter: removing and cleaning the element

1 The air filter is housed in the plastic trunking to the rear of the carburettors. The element can be removed for cleaning after releasing the left-hand side panel to reveal the access plate. This is secured by two screws. The element itself is retained in the casing by a leaf spring arrangement. The filter is released by pulling the spring out of the casing.

2 The filter is of the pleated paper type and is supported by a metal framework. It can be cleaned by tapping it to dislodge any loose dust, and then blowing compressed air through from the inside. Check the paper surface for tears or contamination, renewing the element if it is excessively dirty or damaged.

3 On no account run the engine without the air cleaner attached, or with the element missing. The jetting of the carburettors takes into account the presence of the air cleaner and engine performance will be seriously affected if this balance is upset.

4 To replace the element, reverse the dismantling procedure. Give a visual check to ensure that the inlet hoses are correctly located and not kinked, split or otherwise damaged. Check that the air cleaner case is free from splits or cracks.

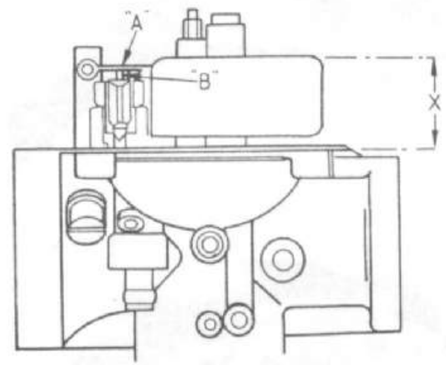


Fig. 2.5 Checking float level
POMIAR POZIOMU PŁYWAKA PALINA

A Float tongue
B Float valve

X = 15,5 mm

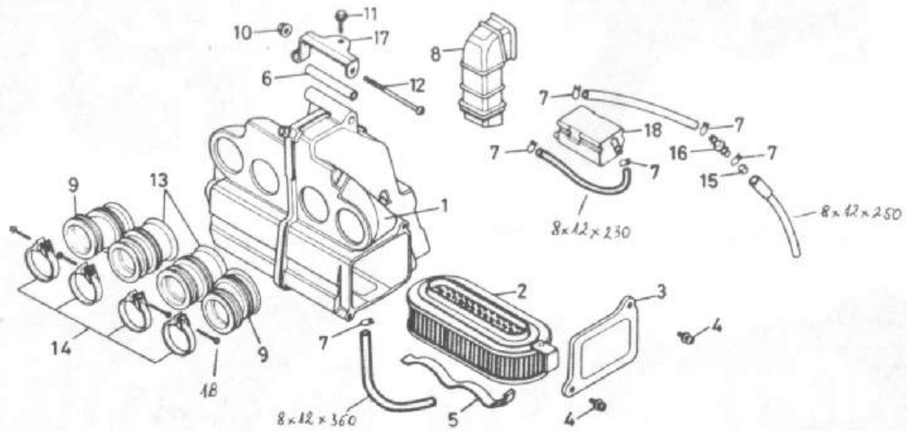


Fig. 2.6 Air cleaner – Early CB750K
FILTR POWIETRZA

1 Air cleaner case
2 Element
3 End cap
4 Screw and washer – 2 off 5x16
5 Spring
6 Distance spacer
7 Clip – 5 off
8 Duct
9 Outer air inlet hose – 2 off
10 Nut 6mm
11 Bolt 6x16
12 Screw
13 Inner air inlet hose – 2 off
14 Hose clamp – 4 off
15 Filter
16 Union
17 Case mounting bracket
18 Screw 5x25

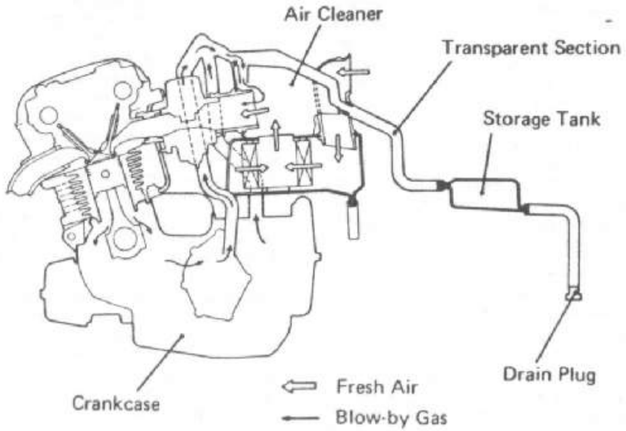


Fig. 2.7 Crankcase emission control system – USA models only
SYSTEM PRZEWIETRZANIA SKRZYNI KORBOWEJ

14 Engine lubrication

1 The engine shares a common lubrication system with the gearbox and primary transmission. Oil is picked up through a gauze strainer from the wet sump, and is drawn through the trochoidal oil pump. The pump is mounted externally on the left-hand side of the unit and is driven via gears from the primary shaft. Oil leaving the pump is controlled by a pressure relief valve which maintains a nominal pressure of 71 psi (5.0 kg cm^2) at 7000 rpm.

2 The oil splits into two routes at this juncture, one of which directs the lubricant to the gearbox shafts where the bearings and pinions receive direct pressure lubrication. The oil enters the shaft centres from the left-hand end via a double seal arrangement, and exits via holes in the shafts to the pinion centres.

3 The main engine oil feed is conducted to the engine oil filter at the front of the crankcase where any small impurities are removed by the resin-impregnated filter element. The central filter bolt incorporates a bypass valve which operates in the event that the filter element becomes choked. This allows the oil to continue to circulate, albeit unfiltered.

4 After leaving the filter, the main oil supply is fed to the crankshaft main bearings via an oil gallery in the crankcase casting. Drillings in the crankshaft route the oil to the big-end bearings. The emerging oil splashes serve to lubricate the pistons, cylinder walls and small-end bearing before running back to the sump.

5 A take-off point in the gallery conducts oil through an external pipe to the cylinder head, where the camshafts and valve gear are lubricated. Secondary feeds between the filter and oil gallery supply oil to the primary shaft and to the hydraulic primary chain tensioner. An oil pressure switch is mounted in the gallery to operate a warning light in the event of an oil system failure.

15 Oil pump: dismantling, examination and reassembly

1 The oil pump can be removed with the engine unit in or out of the frame. It is mounted on the left-hand side of the crankcase, and can be reached after the left-hand rear cover and the oil pump cover have been removed. It may prove necessary to remove the footrests and gearchange pedal where a rear-set linkage is not employed.

2 The pump is mounted within a cover, this being retained by seven bolts. Note the position of the neutral switch lead clip for reference during reassembly. The pump can be lifted away after its four mounting bolts have been released. Note that the two countersunk screws should not be touched at this stage.

3 Clean the pump body carefully to avoid any dirt entering the interior. Release the two securing screws and lift away the base plate. If it proves reluctant to move, it is likely that it is being held by the hollow dowel pin located in the lower right-hand mounting hole. This can be tapped out to free the base plate.

4 Displace the inner and outer rotor and remove the drive spindle and gear after withdrawing the small driving pin.

5 Wash all the pump components with petrol and allow them to dry before carrying out an examination. Before partially reassembling the pump for various measurements to be carried out, check the casing for breakage or fracture, or scoring on the inside perimeter.

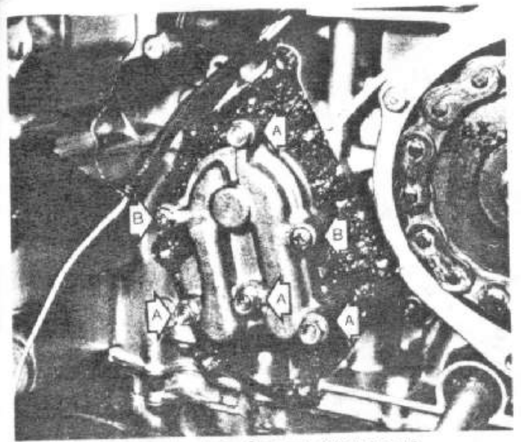
6 Reassemble the pump rotors and measure the clearance between the outer rotor and the pump body, using a feeler gauge. If the measurement exceeds the service limit of 0.35 mm (0.014 in) the rotor or the body must be renewed, whichever is worn. Measure the clearance between the outer rotor and the inner rotor, using a feeler gauge. If the clearance exceeds 0.15 mm (0.006 in) the rotors must be renewed as a set. It should be noted that one face of the outer rotor is punch marked. The punch mark should face away from the main pump casing during measurements and on reassembly. With the pump rotors installed in the pump body lay a straight edge across the mating surface of the pump body. Again with a feeler gauge measure the clearance between the rotor faces and the straight edge. If the clearance exceeds 0.10 mm (0.004 in) the rotors should be renewed as a set.

7 Examine the rotors and the pump body for signs of scoring, chipping or other surface damage which will occur if metallic particles find their way into the oil pump assembly. Renewal of the affected parts is the only remedy under these circumstances, bearing in mind that the rotors must always be renewed as a matched pair.

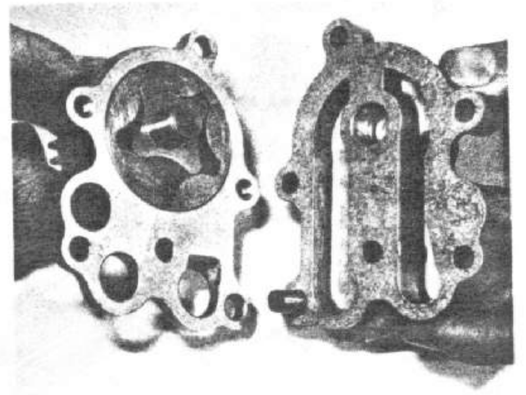
8 Reassemble the pump components by reversing the dismantling procedure. Remember that the punch marked face of the rotor must face away from the main pump body. The component parts must be ABSOLUTELY clean or damage to the pump will result. Replace the rotors and lubricate them thoroughly, before refitting the cover. Refit the hollow dowel before replacing the cover plate and tightening the screws.

9 Place a new gasket in position and offer the pump up so that the driven gear engages with the drive gear in the casing. Insert the hollow dowel pin. Fit and tighten evenly the screws.

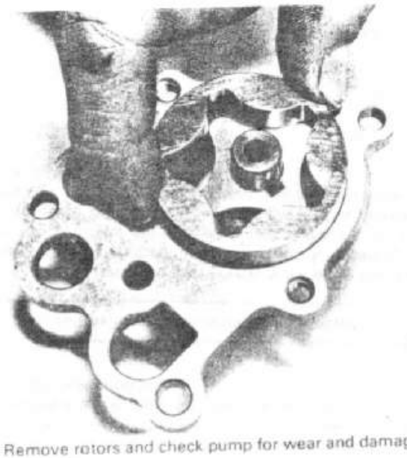
10 Install the oil pump cover, securing the neutral switch lead by means of the clamp. Assemble the remaining components (where relevant) by reversing the dismantling procedure.



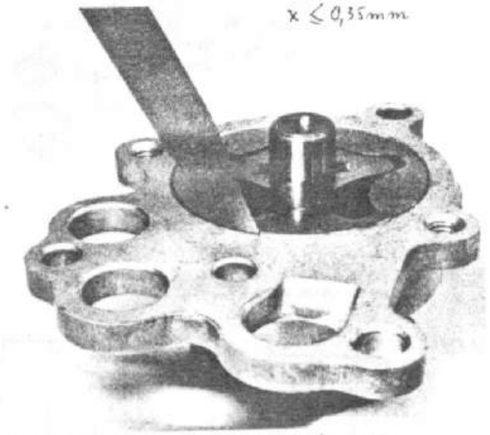
15.2 A: pump retaining bolts. B: pump cover screws



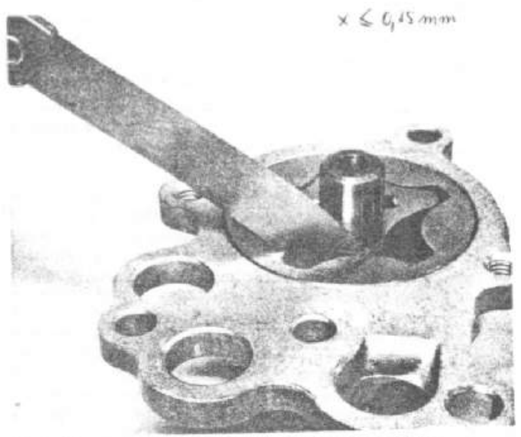
15.3 Release cover screws and separate pump body and cover



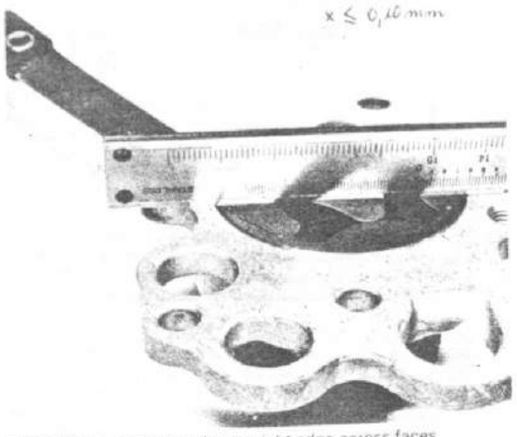
15.4 Remove rotors and check pump for wear and damage



15.6a Measure outer rotor to pump body clearance



15.6b Check clearance between inner and outer rotors



15.6c Check end float using straight edge across faces

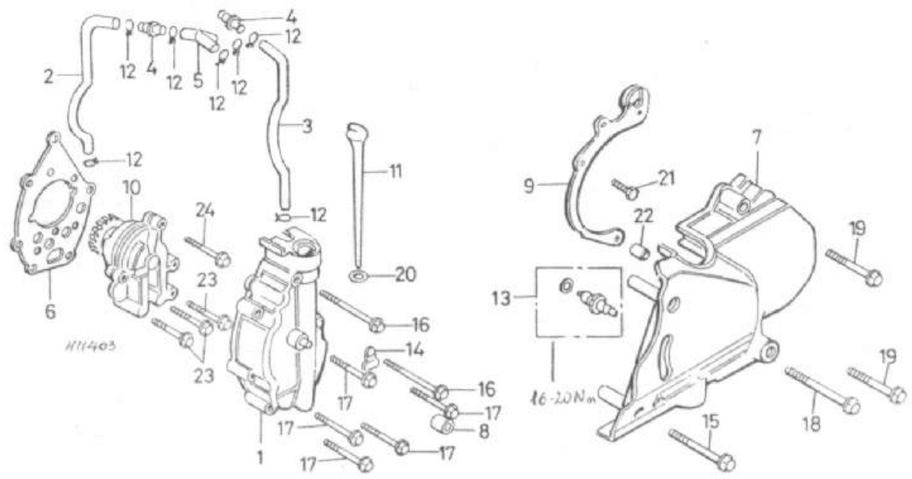


Fig. 2.8 Oil pump assembly
POMPA OLEJU

1 Oil pump cover
2 Breather hose
3 Breather hose
4 Union – 2 off
5 Y-piece
6 Gasket
7 Outer cover
8 Rubber stop
9 Guard
10 Oil pump
11 Filler cap/dipstick
12 Clip – 7 off
13 Neutral switch
14 Clip
15 Bolt
16 Bolt – 2 off
17 Bolt – 2 off
18 Bolt
19 Bolt – 2 off
20 O-ring
21 Bolt
22 Dowel pin – 2 off
23 Bolt – 3 off
24 Bolt

16 Oil strainer and pressure relief valves: location and cleaning

1 The oil strainer assembly and pressure relief valves are housed within the sump, and can be checked after the latter has been detached. Although not detailed in the routine maintenance schedule, it is worth cleaning the sump area occasionally because the nature of the sediment which collects in the sump will give an indication of the overall condition of the machine. If there is any suspicion of oil pressure failure, the relief valves should be checked first.

2 Remove the fourteen sump bolts, having first drained off the engine oil. Lift the sump away. The strainer and main relief valve form part of a unit which is bolted to the underside of the crankcase, and this can be detached if desired. The second relief valve is located forward of the main assembly, and is responsible for maintaining the correct pressure within the hydraulic chain tensioner. Both relief valves can be dealt with in a similar manner.

3 Detach the gauze strainer and flush it clean with petrol or a low flash-point solvent where available. Take note of any metallic particles found, because these can often be linked to unusual noises that may have been noticed. Bronze-coloured particles will indicate that a bush is wearing or breaking up, whilst greyish particles may be the result of wear in the main or big-end bearings, or in the casings. Obviously, any large pieces of metal will warrant further investigation.

4 The relief valves can be dismantled by releasing the split pin whilst depressing the spring with a suitable screwdriver. Release spring tension gradually to avoid the risk of damage or injury. Inspect the bore and plunger for wear, damage or contamination, cleaning or renewing the necessary parts as required. During reassembly, lubricate the plunger with oil, having made sure that the valve components are perfectly clean. When fitting the sump, use a new gasket where necessary. Tighten the sump bolts in a diagonal sequence to 1.0 – 1.4 kgf m (7 – 10 lbf ft).

17 Oil filter: renewing the element

1 The oil filter is contained within a semi-isolated chamber at the front of the crankcase. Access to the element is made by unscrewing the filter cover centre bolt, which will bring with it the cover and also the element. Before removing the cover, place a receptacle beneath the engine, to catch the engine oil contained in the filter chamber.

2 When renewing the filter element it is wise to renew the filter cover O-ring at the same time. This will obviate the possibility of any oil leaks. Do not overtighten the centre bolt on replacement; the correct torque setting is 2.8 – 3.2 kgf m (20 – 23 lbf ft).

3 The filter by-pass valve, comprising a plunger and spring, is situated in the bore of the filter cover centre bolt. It is recommended that the by-pass valve be checked for free movement during every filter change. The spring and plunger are retained by a pin across the centre bolt. Knocking the pin out will allow the spring and plunger to be removed for cleaning.

4 Never run the engine without the filter element or increase the period between the recommended oil changes or oil filter changes. Engine oil should be changed every 4000 miles, as should the filter element. Use only the recommended viscosity of oil.

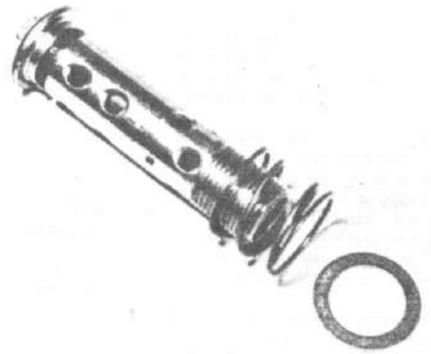
18 Oil pressure warning lamp

1 An oil pressure warning lamp is incorporated in the lubrication system to give immediate warning of excessively low oil pressure.

2 The oil pressure switch is screwed into the crankcase to the rear of the cylinder block. The switch is interconnected with a warning light on the lighting panel on the handlebars. The light should be on whenever the ignition is on but will usually go out at about 1500 rpm.

3 If the oil warning lamp comes on whilst the machine is being ridden, the engine should be switched off immediately, otherwise there is a risk of severe engine damage due to lubrication failure. The fault must be located and rectified before the engine is re-started and run, even for a brief moment. Machines fitted with plain shell bearings rely on high oil pressure to maintain a thin oil film between the bearing surfaces. Failure of the oil pressure will cause the working surfaces to come into direct contact, causing overheating and eventual seizure.

4 If low oil pressure is experienced, it can be checked by connecting a suitable gauge to the switch take-off. At normal operating temperatures, a reading of 5.0 kg cm^2 (71 psi) at 7000 rpm should be indicated. Any substantial drop in pressure should be investigated promptly if engine damage is to be avoided.



17.3 Check filter bypass valve/bolt for free movement

19 Fault diagnosis: fuel system and lubrication

Symptom	Cause	Remedy
Engine gradually fades and stops	Fuel starvation Sediment in filter bowl or float chamber	Check vent hole in filler cap Dismantle and clean
Engine runs badly. Black smoke from exhausts	Carburettor flooding	Dismantle and clean carburettor. Check for punctured float or sticking float needle
Engine lacks response and overheats	Weak mixture Air cleaner disconnected or hose split Modified silencer has upset carburation	Check for partial block in carburettors Reconnect or renew hose Replace with original design
Oil pressure warning light comes on	Lubrication system failure	Stop engine immediately. Trace and rectify fault before re-starting
Engine gets noisy	Failure to change engine oil when recommended	Drain off old oil and refill with new oil of correct grade. Renew oil filter element

Chapter 3 Ignition system

For modifications, and information relating to later models, see Chapter 7

Contents

Specifications

	750 models	900 model
Ignition system		
Type	Capacitor discharge ignition (CDI)	
Ignition timing – UK models		
Retarded	10° BTDC @ idle	10° BTDC @ idle
Advanced	30° BTDC @ 6000 rpm	28.5° BTDC @ 3100 rpm
Ignition timing – US models		
Retarded	10° BTDC @ 1000 rpm idle	
Advanced	40° BTDC @ 6000 rpm 36° BTDC @ 7400 rpm	

	750 models (UK)	750 models (US)	900 model
Sparking plugs			
Make	NGK or ND	NGK or ND	NGK or ND
Type	DR8ES-L X24ESR-U	D8EA or X24ES-U	DR-8ES X27ESR-U
Gap	0.6 – 0.7 mm (0.024 – 0.028 in)	0.6 – 0.7 mm (0.024 – 0.028 in)	0.6 – 0.7 mm (0.024 to 0.028 in)

Component	kgf m	lbf ft
Torque settings		
Automatic timing unit (ATU) bolt	2.1 – 2.5	15 – 18
Sparking plugs	1.2 – 1.9	9 – 14

1 General description

The Honda dohc models covered by this manual make use of capacitor discharge ignition (CDI) systems, in which the ignition timing and triggering is controlled electronically. As a result, the spark at the plugs is more powerful and is accurately timed. Because there are no mechanical aspects to the ignition system, wear does not take place, and thus the ignition timing will remain accurate unless disturbed, or in the rare event of component failure.

Like most four cylinder machines, the Honda dohc models employ what is effectively two ignition systems, each controlling two cylinders. This means that each time a spark is generated in one of the ignition coils, it is fed to two of the sparking plugs. Combustion will only take place in the cylinder which is under compression, leaving one spark wasted. This arrangement is known as the 'spare spark' system. It is important to remember this when dealing with ignition system faults, as these are most likely to be confined to one half of the system. The system can therefore be divided into that which relates to cylinders 1 and 4, and the corresponding equipment relating to cylinders 2 and 3.

The system is triggered by a reluctor mounted on the crankshaft end which rotates past two pickup coils or pulsers. The reluctor is analogous to the contact breaker cam in a conventional system. As the peak of the reluctor passes the pulser coil, it generates a small signal current. This current triggers the appropriate circuit in the ignition amplifier, or spark unit. The high voltage pulse from the amplifier feeds to the relevant coil, where its passage through the coil's primary windings induces the required high tension (HT) spark in the secondary windings. The reluctor continues to rotate, causing the same chain of events to take place in the remaining circuit.

For this range of models, Honda have chosen to retain a mechanical automatic timing unit (ATU) rather than opt for full electronic advance. As the engine speed rises, small weights on the ATU are thrown outwards against spring pressure. This movement is translated to the reluctor, which advances in relation to the crankshaft, thus providing an advanced spark for high speed running.

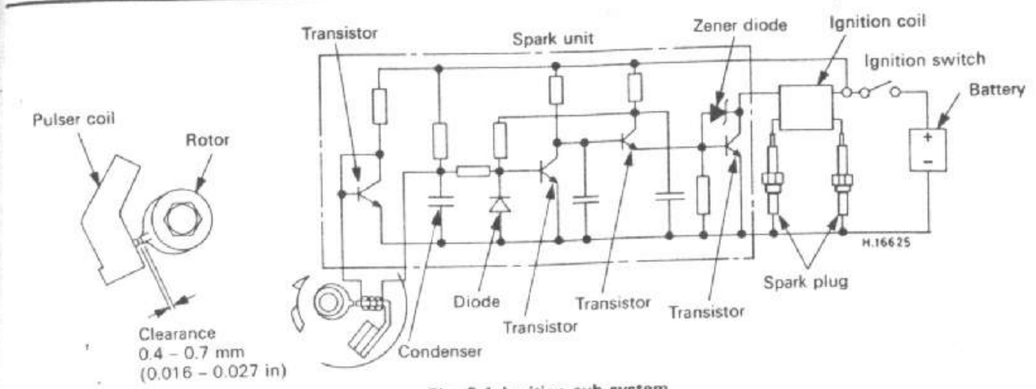


Fig. 3.1 Ignition sub-system

Note that the above system is effectively duplicated, each sub-system controlling a pair of spark plugs.

2 Electronic ignition system: testing

1 The CDI system, as mentioned previously, can be divided into two separate systems for most fault diagnosis purposes. Total failure of the entire system is unlikely, and trouble is usually confined to 1 and 4 cylinder or to 2 and 3 cylinders. In this case, it can be assumed that the system is functional up to the amplifier, or spark unit.

2 A preliminary check may be made as follows. Remove the sparking plugs from cylinders 1 and 2, remembering that these each represent one sub-system. Remove the inspection cover from the left-hand side of the unit to reveal the pulser coils and reluctor. Check that the engine kill switch and the main ignition switch are on.

3 Using a screwdriver with an insulated handle, bridge the gap between the reluctor and the metal core of one of the pulser coils. If the ignition circuitry is sound a spark will occur at the appropriate plug. Repeat the check with the remaining pulser and plug. If there is a defect in the system one of the plugs will fail to spark.

4 If no spark at all was found, attention should be turned to the ignition switch. Check that the switch operates properly, and that power is being fed to the ignition amplifier (spark unit). Ensure that the kill switch is at the 'run' position and has not shorted. If all seems well, and the remaining wiring connections are sound, it can be assumed that the amplifier is in need of attention. As it is unlikely that both pulsers, both coils or all four sparking plugs will have failed simultaneously, they can be ignored for the time being.

5 If one of the plugs failed to produce a spark in the above test, the system can be assumed to be sound up to the amplifier unit. The latter should be checked, followed by the pulser coil(s) and ignition coil(s).

6 With the ignition switched off, check the clearance between the steel core of the pulser coils and the raised section of the reluctor using feeler gauges. If the clearance is outside the range 0.4 – 0.7 mm (0.016 – 0.027 in) adjust the position of the pulser coil on the baseplate to bring it within this range.

3 Ignition amplifier (spark unit): testing

1 If preliminary checks have indicated a possible fault in the amplifier unit it should be tested as described below. Note that a dc voltmeter, or a multimeter set on the appropriate scale, will be required for the test. It is assumed that owners with access to this equipment will be conversant with its use. If this is not the case, the work should be entrusted to a Honda Service Agent or an Auto-electrician.

Test A

2 Trace the pulser leads back to the connector block behind the left-hand side cover. These terminate in a red 6-pin connector block which is mounted at the bottom of the connector bracket. Disconnect the pulser leads. Connect a multimeter, set on 0-50 volts dc, as follows. Attach the positive (+) probe to the blue wire at the white 4-pin connector. Connect the negative (–) probe of the multimeter to earth. Using a length of wire as a jump lead, connect one end to the blue lead with the white sleeve at the wiring harness side of the red 6-pin connector. Switch on the ignition, and flash the end of the jump lead to earth. This operation should result in the meter needle fluctuating between 12V and 0V if the unit is working correctly.

Test B

3 Repeat the above test sequence but this time with the positive multimeter probe connected to the yellow lead of the other white 6-pin connector, and the jump lead attached to the yellow/white sleeve lead at the red connector, thus testing the 2-3 cylinder amplifier unit. Similar results should be obtained in both tests. If the unit(s) prove faulty, they must be renewed since there is no practicable form of repair. Refer to the accompanying circuit diagram for details of the test connections.

4 Pulser coils: testing

1 The pulser coils can fail in two possible ways; either by an internal break in the windings (open circuit) or by an internal failure of the winding insulation (short circuit). A pulser in good condition will show a specific resistance reading when checked as described below.

2 Disconnect the pulser leads at the red 6-pin connector behind the left-hand side cover. Using an ohmmeter or a multimeter set on the resistance scale, measure the resistance between the yellow leads (2-3 cylinders) and then the blue leads (1-4 cylinders). In each case a resistance of 530 ± 50 ohms at 20°C (68°F) should be indicated. Open or short circuits will be indicated by infinite or zero resistance respectively. A defective pulser must be renewed – there is no satisfactory means of repair.

3 Measure the pulser coil/reluctor air gap, ie the clearance between the tooth of the reluctor and the tooth of the pulser coil (see Fig. 3.1 inset). The correct clearance should be 0.4 – 0.7 mm (0.016 – 0.027 in); slacken the retaining screws and move the coil accordingly if adjustment is required. Repeat the procedure on the other coil.

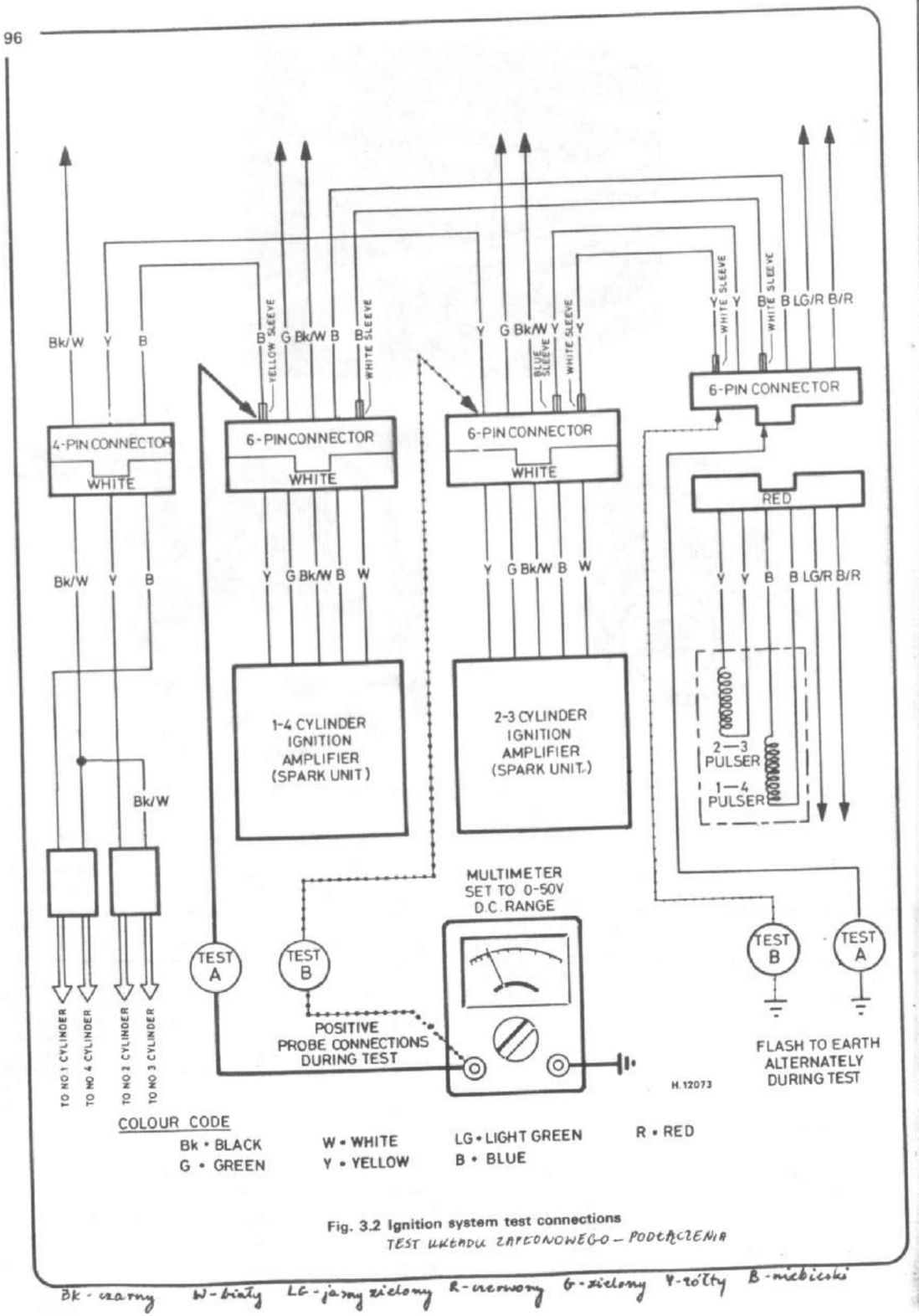
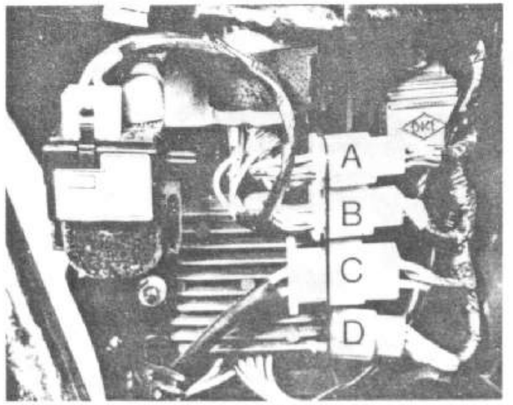


Fig. 3.2 Ignition system test connections

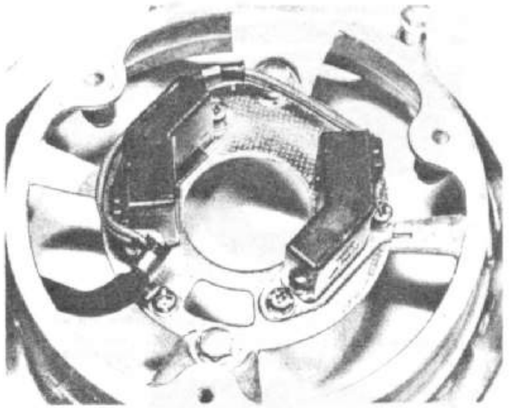
TEST UKŁADU ZAPŁONOWEGO – PODŁĄCZENIA

Bk - czarny W - biały LG - jasny zielony R - czerwony G - zielony Y - żółty B - niebieski



3.1 A: 1-4 spark unit connector B: 2-3 spark unit connector C: Coil connector D: Pulser connector (red)

3.2 Separate red connector during tests



4.1 Ignition pulser assembly

5 Automatic timing unit (ATU): examination

1 The automatic timing unit rarely gives rise to problems unless of considerable age or if neglect has allowed the pivots to become corroded. As CDI ignition is fitted attention to this area is likely to be far from frequent. Although not specified as a routine servicing task, it is worth checking the unit annually to reduce the chance of failure. Access to the unit is gained by removing the complete front left-hand engine casing, together with the ignition pickup assembly. The operation does not require that the ignition timing be lost.

2 The unit comprises spring loaded balance weights, which move outward against the spring tension as centrifugal force increases. The balance weights must move freely on their pivots and be rust-free. The tension springs must also be in good condition. Keep the pivots lubricated and make sure the balance weights move easily, without binding. Most problems arise as a result of condensation, within the engine, which causes the unit to rust and balance weight movement to be restricted.

3 The automatic timing unit mechanism is fixed in relation to the crankshaft by means of a dowel. In consequence the mechanism cannot be replaced in anything other than the correct position. This ensures accuracy of ignition timing to within close limits.

4 The correct functioning of the auto-advance unit can be checked when the engine is running by the use of a stroboscopic light. If a strobe light is available, connect it to the ignition circuit of the 1 and 4 cylinders as directed by the manufacturer of the light. With the engine running, direct the beam of light at the fixed timing mark on the crankcase, through the aperture in the base plate. At tickover the timing mark and the 1,4 F-I mark on the auto-advance unit should be precisely aligned. When the engine is running at 6000 rpm or above, the timing mark should align with two parallel lines which are marked on the automatic timing unit slightly in advance of the 'F' mark. The above test relies, of course, on the static ignition timing being correct.

5 If the unit proves to be faulty it must be renewed if cleaning and lubrication fails to effect a repair. No replacement parts are available to overhaul the unit.

6 Ignition coils: location and testing

1 Two separate ignition coils are fitted, each of which supplies a different pair of cylinders. The coils are mounted below the petrol tank, each side of the frame top tube.

2 If a weak spark, poor starting or misfiring causes the performance of the coils to be suspected, they should be tested by a Honda Service Agent or an auto-electrician who will have the appropriate test equipment.

3 It is unlikely that the coils will fail simultaneously. If intermittent firing occurs on one pair of cylinders the coils may be swopped over by interchanging the low tension terminal leads and the HT leads. If the fault then moves from one pair of cylinders to the other, it can be taken that the coil is faulty.

4 The coils are sealed units and therefore if a failure occurs, repair is impracticable. The faulty item should be replaced by a new component.

7 Ignition timing: checking

1 The ignition timing is set accurately at the manufacturing stage and in the normal course of events will maintain its accuracy for an indefinite period. In the event that the timing setting has been lost in the course of overhaul, it can be checked either statically or dynamically, as described below.

2 The timing is best checked dynamically, using a stroboscope timing lamp. Start by removing the pulser inspection cover. Following the maker's instructions, connect the timing lamp to No 1 cylinder's high tension lead. Start the engine and allow it to idle. If the lamp is directed at the timing aperture in the pulser base plate, it will be noted that it appears to 'freeze' the timing marks on the rotating ATU. At the normal idle speed of 1000 ± 100 rpm, the 1.4 F-I mark (the scribed line