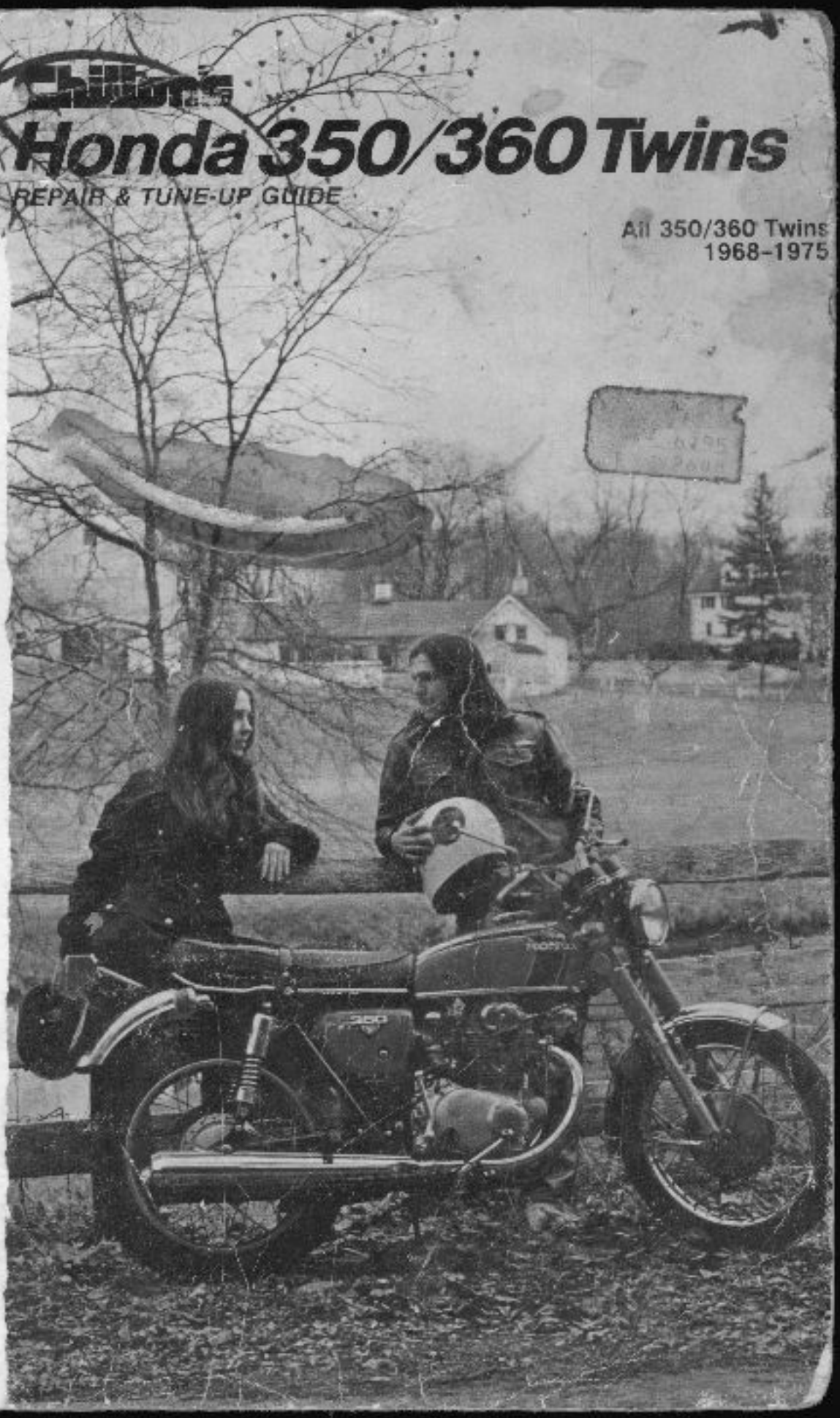
Chilton's

Honda 350/360 Twins

REPAIR & TUNE-UP GUIDE

All 350/360 Twins
1968–1975



CHILTON'S Repair and Tune-Up Guide

Honda 350/ 360 Twins

ILLUSTRATED

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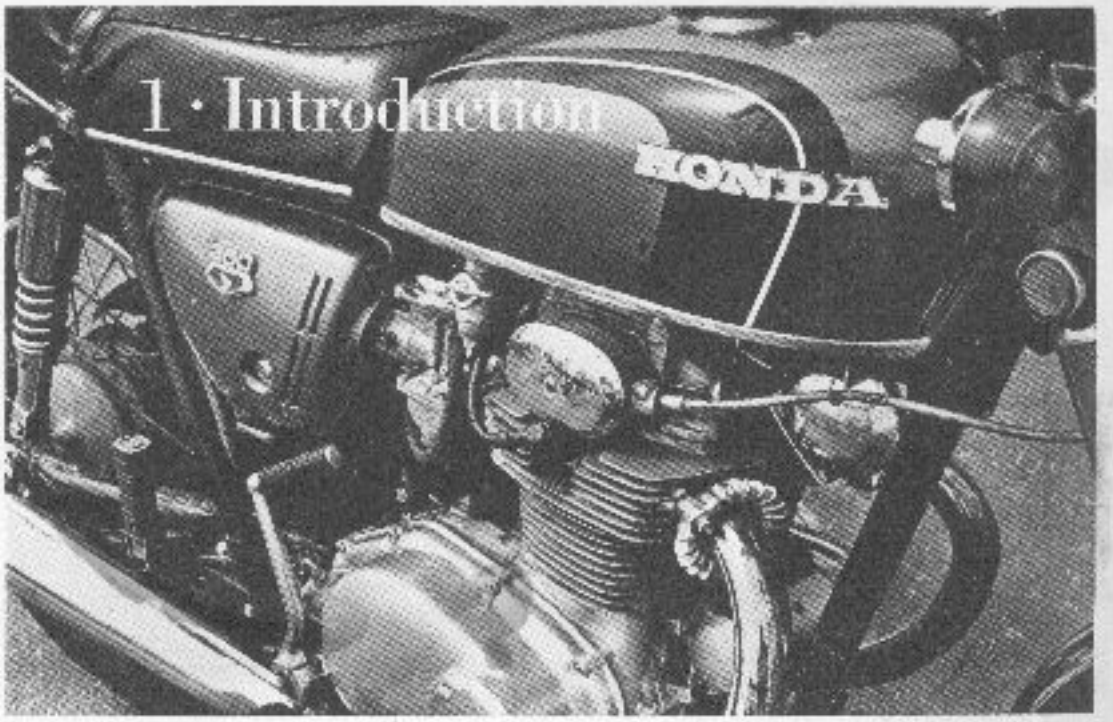
Contents



1 · Introduction

This volume is intended to serve as a guide to the maintenance and repair of Honda 350/360 twin-cylinder motorcycles produced from 1968 through 1975.

To properly service Honda 350/360s, or any other motorcycle, certain elements must be present. Among the most important of these are: a clean place to work, proper tools to do the job, and enough time to do it properly.

The tools needed, of course, will vary according to the type of job being undertaken. Even for routine maintenance, however, it is helpful to have more than just your machine's tool kit.

The average rider should have the following tools, of good quality, available to him:

a. An impact driver with phillips and slot head bits. This tool is almost a necessity if you are attempting to remove any of the numerous phillips head engine screws. These screws are put on very tightly to begin with, and may sometimes seize in the alloy engine case; most attempts to remove them without the aid of an impact driver will strip the screw heads. The impact driver should also be used when installing the screws for obvious safety reasons;

b. A set of metric open-end wrenches;

c. A set of metric socket wrenches;

d. Phillips and slot-head screwdrivers;

e. A torque wrench;

f. A set of feeler gauges;

g. A snap-ring pliers;

h. A plastic mallet.

This is, of course, only a start. The more complex the job, the more special equipment will be needed. For top end work, you should have a valve spring compressor. In addition, a micrometer and dial gauge are essential to measure critical piston and cylinder clearances.

Also have on hand a plentiful supply of clean rags, a solvent, and such items as emery cloth or sandpaper, as well as lubricants, grease, etc.

Before beginning any job, be sure to read the procedure thoroughly. This will not only tell you what special tools, if any, are required, but will allow you to purchase any non-reusable items such as gaskets or seals beforehand.

When actually working on the machine, it is essential that all parts which are removed are thoroughly cleaned, labeled where necessary so that they can be installed in their proper locations, and

CB350

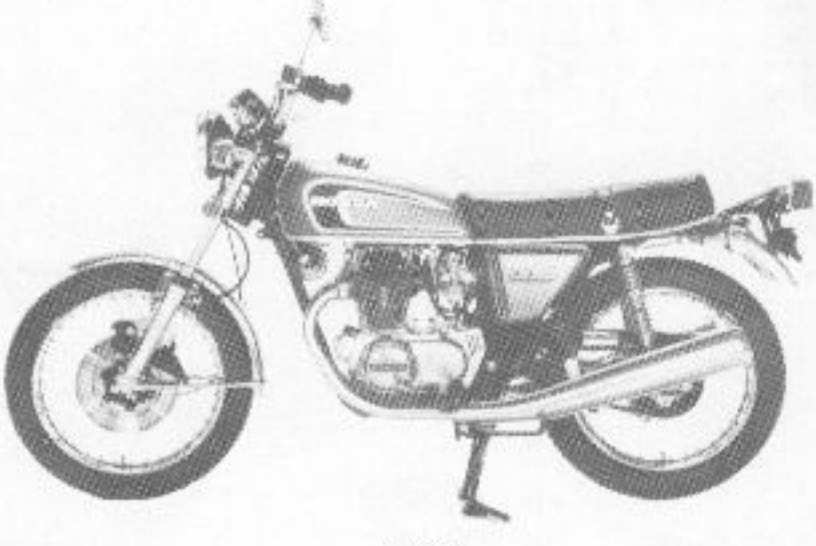
CL350

thoroughly lubricated with clean oil or grease where applicable.

In a properly maintained motorcycle, removal of various parts should be relatively easy, if the proper tool is used. The use of force to remove frozen or balky components is to be avoided. If you run into trouble in this type of situation, try penetrating oil to loosen the part, after first ensuring that you are using the proper removal procedure.

Whenever you must replace worn or

SL350



CB360

non-reusable parts, be sure to use only genuine Honda parts from your dealer. The use of replacement parts manufactured by other companies are often different from the original in subtle ways, if not in quality, and must therefore not be used.

SERIAL NUMBER LOCATIONS

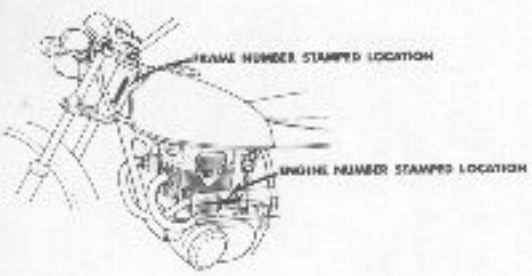
On all models, the frame number is located on the left-side of the steering head lug.

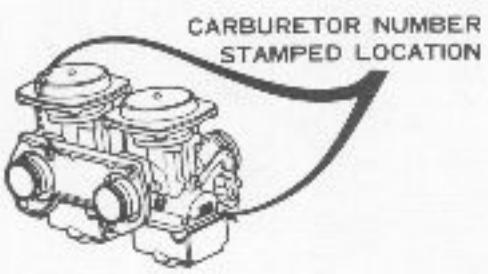
The engine serial number is located on the left-side of the engine, on top of the

CL360

crankcase. These numbers must be used when ordering replacement parts for the engine or frame. When ordering carburetor replacement parts, the carburetor setting number, located on the side of the carburetor, should be used to ensure that the replacement part is identical to the part originally installed.

When ordering parts, always supply the machine's "K" designation.





General Specifications
CB/CL350

	CB350 K3	CB350 K4-on	CL350 K3	CL350 K4-on
ENGINE				
Displacement (cc)	325			
Bore and stroke (mm/in.)	60 x 50.6/2.52 x 1.992			
Compression ratio	9.5 : 1			
Carburetion (Keihin)	25 mm CV type			

General Specifications (cont.)

	CB350 K3	CB350 K4-on	CL350 K3	CL350 K4-on
ENGINE				
Weight (lbs)	115.5	115.0	115.5	114.7
Valve train	Chain-driven, overhead camshaft			
CHASSIS				
Type	Semi-double cradle			
Suspension				
Front	Telescopic fork			
Rear	Swing arm—De Carbon shocks			
Tire size				
Front	3.00 x 18		3.00 x 19	
Rear	3.50 x 18		3.50 x 18	
Wheelbase (mm/in.)	1320/52			
Weight (kg/lb)	160/352.8	168.5/371.5	157/345.1	169/372.8
Overall length (mm/in.)	2010/79.2		2020/79.5	2025/79.7
Overall width (mm/in.)	775/30.5	776/30.2	830/32.7	
Overall height (mm/in.)	1075/42.3	1085/42.7	1090/42.9	
Ground clearance (mm/in.)	150/5.9	145/5.7	180/7.1	160/6.3
DRIVE TRAIN				
Clutch type	Wet, multi-plate type			
Gear ratios:				
1st	2.353			
2nd	1.639			
3rd	1.269			
4th	0.036			
5th	0.900			

General Specifications (cont.)

	CB350	CB350 K4	CL350	CL350 K4
DRIVE TRAIN				
Gear ratios:				
6th		—		
Primary reduction		3.714		
Final reduction	2.250		2.375	
ELECTRICAL SYSTEM				
Ignition		Battery and coil		
Starting system		Starter motor and kick		
Charging system		Alternator		
Battery (volt/amp hrs)		12/12		
Regulator		Pointless		

General Specifications
SL350

	SL350	SL350 K2-K3
ENGINE		
Displacement (cc)	325	325
Bore and stroke (mm/in.)	60 x 50.6/2.52 x 1.992	
Compression ratio	9.5 : 1	9.5 : 1
Carburetion (Keihin)	28 mm CV	PW 24
Weight (lbs)	115	103.5
Valve train	Chain-driven, overhead camshaft	
CHASSIS		
Type	Semi-double, cradle	Double cradle
Suspension		
Front	Telescopic fork	
Rear	Swing arm—De Carbon shocks	

General Specifications (cont.)

	SL350	SL350 K1-K2
CHASSIS		
Tire size:		
Front	3.25 x 19	3.00 x 21
Rear	4.00 x 18	4.00 x 18
Wheelbase (mm/in.)	1390/54.72	1400/55.1
Weight (kg/lb)	139/306.5	148/326
Overall length (mm/in.)	2110/83.07	2165/85.2
Overall width (mm/in.)	840/33.07	870/34.3
Overall height (mm/in.)	1145/45.08	1175/46.3
Ground clearance (mm/in.)	210/8.3	230/9.1
DRIVE TRAIN		
Clutch type	Wet, multi-plate type	
Gear ratios:		
1st	2.353	2.866
2nd	1.636	1.800
3rd	1.280	1.353
4th	1.036	1.035
5th	0.900	0.870
6th	—	—
Primary reduction	3.714	3.714
Final reduction	2.500	2.625
ELECTRICAL SYSTEM		
Ignition	Battery and coil	Battery and coil
Starting system	Starter motor and kick	Kick
Charging system	Alternator	

General Specifications (cont.)

	SL350	SL350 K1-K2
ELECTRICAL SYSTEM		
Battery (volt/amp hrs)	12/12	12/5
Regulator	Pointless	

General Specifications CB/CL360

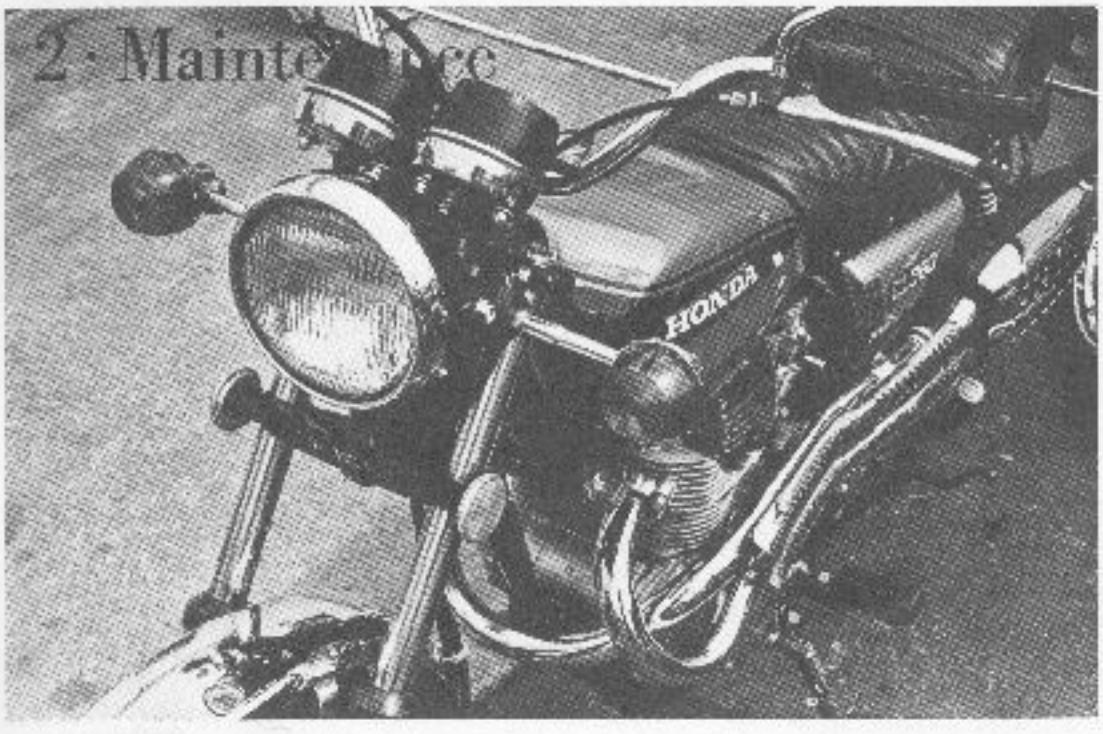
	CB360	CL360
ENGINE		
Displacement (cc)	356	
Bore and stroke (mm/in.)	67 x 50.6/2.638 x 1.992	
Compression ratio	8.5 : 1	
Carburetion (ID/dia.)	28 mm CV type	
Weight (lbs)	NA	NA
Valve train	Chain-driven, overhead camshaft	
CHASSIS		
Type	Semi-double cradle	
Suspension		
Front	Telescopic fork	
Rear	Swing arm—De Carbon shocks	
Tire size		
Front	3.00 x 18	3.00 x 18
Rear	3.50 x 18	3.50 x 18
Wheelbase (mm/in.)	1345/53.0	1345/53.0
Weight (kg/lb)	162/357	162/357
Overall length (mm/in.)	2040/80.3	2040/80.3
Overall width (mm/in.)	775/30.5	820/32.3

General Specifications (cont.)

	CB160	CL160
CHASSIS		
Overall height (mm/in.)	1125/44.3	1115/43.9
Ground clearance (mm/in.)	160/6.3	160/6.3
DRIVE TRAIN		
Clutch type	Wet, multi plate type	
Gear ratios:		
1st	2.500	
2nd	1.750	
3rd	1.375	
4th	1.111	
5th	0.965	
6th	0.866	
Primary reduction	3.714	
Final reduction	2.125	
ELECTRICAL SYSTEM		
Ignition	Battery and coil	
Starting system	Starter motor and kick	
Charging system	Alternator	
Battery (vol./amp hrs)	12/10	
Regulator	Printless	

— Not applicable
NA Not available

2 · Maintenance



Daily Inspection

Daily inspection does not have to involve more than a quick confirmation check of the bike and should take no more than a few seconds. Items to be checked before each ride include:

1. Operation of the lights—especially tail and brake lights;
2. Brake adjustment;
3. Engine oil level;
4. Drive chain free-play and lubrication.

In addition, the battery electrolyte level should be checked weekly, especially in warm weather when evaporation is most pronounced. Check the tire pressure (cold) and spoke condition at the same interval.

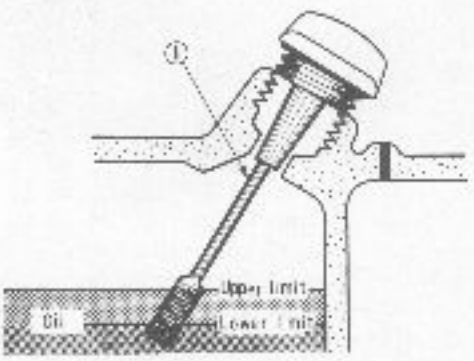
Lubrication

CHECKING OIL LEVEL

The oil level is checked with the dipstick incorporated into the filler cap. The filler cap is located in the right crankcase cover. To check the oil level:

1. Start the engine and allow it to warm up for a few minutes.
2. With the motorcycle on the center stand on level ground, remove the dipstick and wipe it clean.
3. Reinsert the dipstick, allowing the filler cap to rest on the top of the threads of its hole. The oil level should be between the maximum and minimum marks on the dipstick. If the level is below the minimum mark on the dipstick add enough oil through the oil filler hole to bring the level up to the maximum mark.

CAUTION: *Do not overfill.*



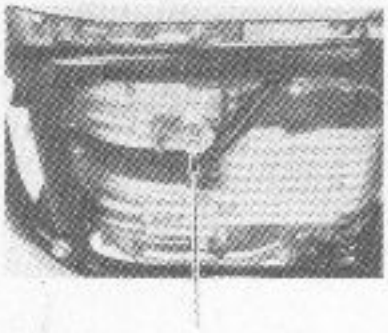
Maintain oil level between upper and lower dipstick marks. Note that the dipstick must rest on the threads when checking.

CHANGING OIL

The oil should be changed every 1,000 miles after the break-in period.

1. Allow the engine to run for a few minutes until it is close to operating temperature.

2. Remove the dipstick, then place a pan under the engine to catch the oil. Remove the drain plug from the sump, and allow the oil to drain for a minute or two, then kick the engine over a few times with the kick-starter (be sure that the key is off) to remove any oil remaining in the delivery system.



Oil drain plug location (360 shown)

3. Refit the drain plug and add 1½ qts of the correct grade of oil. Run the engine for a minute or two, then shut it off; wait one minute and check the oil level. Add oil as necessary to bring the level up to the maximum mark on the dipstick.

OIL FILTER

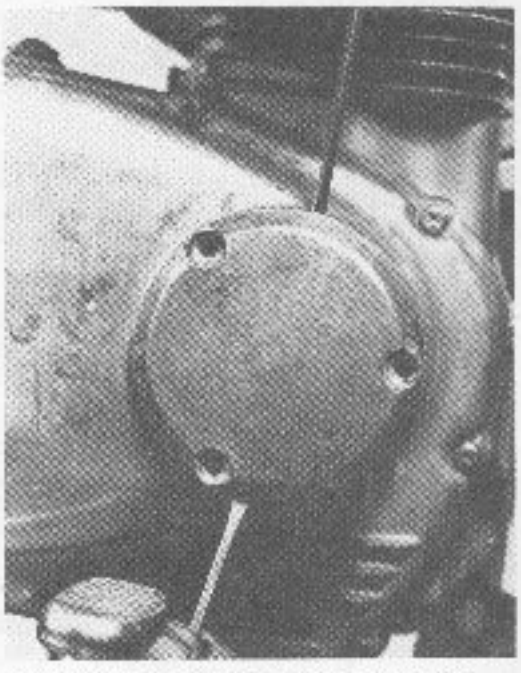
A centrifugal oil filter is used on all models. As the oil passes through the spinning filter, dirt particles are forced to the outside of the filter housing and the clean oil passes through the center of the filter into the right crankcase cover. The filter should be cleaned every 6,000 miles or 12 months.

1. Clean the oil filter in conjunction with an oil change. Drain the oil, but do not reinstall the drain plug.

2. 350 models only: Remove the three screws from the circular cover plate on the right crankcase cover. Remove the cover. Pry slots are provided for a small screwdriver.

3. 360 models only: Remove the right step bar, kick-starter lever, and right crankcase cover.

4. Remove the circlip from the oil filter. Screw a 6 mm (crankcase cover) screw into the center of the filter cap; this will pull the cap off.



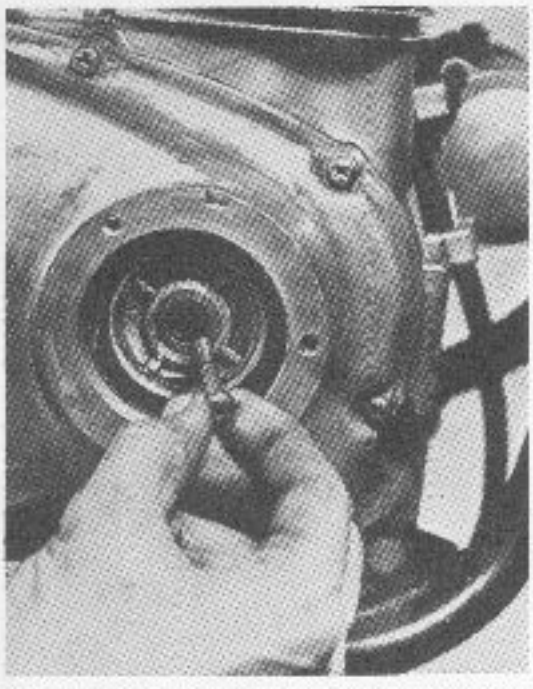
Removing the centrifugal oil filter cover (350)

Removing the filter rotor snap-ring

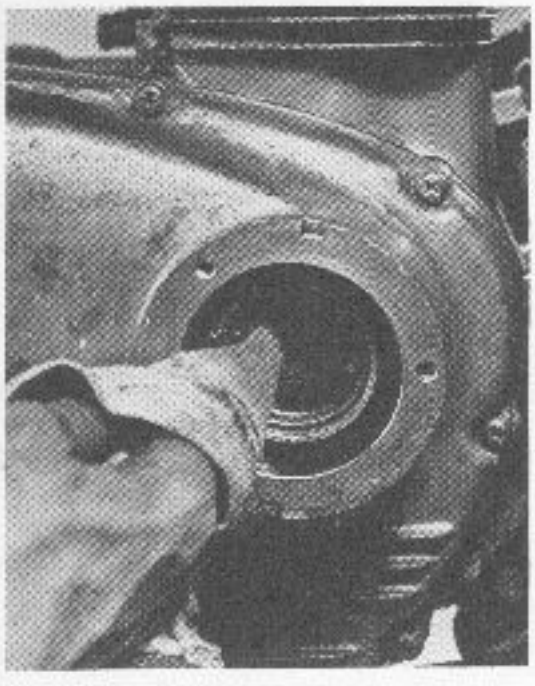
5. Clean the inside of the filter housing with a clean rag and solvent.

6. Clean the filter cap and cover plate (350) and dry thoroughly. Inspect the O-ring on the filter cap and replace it if damaged in any way.

Inspect the oil guide in the cover plate (350) or in the right crankcase cover (360). The guide should be free to move



The filter cap can be removed by threading a 6 mm (crankcase cover) screw into it



Cleaning out the filter

in and out, and have sufficient spring force behind it to hold it against the filter cap.

7. Install the filter cap with the vanes located in the grooves on the inside of the filter housing, and secure with the circlip.

Checking oil guide operation

8. On 350 models, install the cover plate using a new O-ring or gasket if necessary.

NOTE: *When installing the filter cover plate on 350 models be sure that the oil holes in the cover plate and the right crankcase cover line up.*

9. On 360 models, install the right crankcase cover, kick-starter lever, and right step bar.

FRONT FORKS

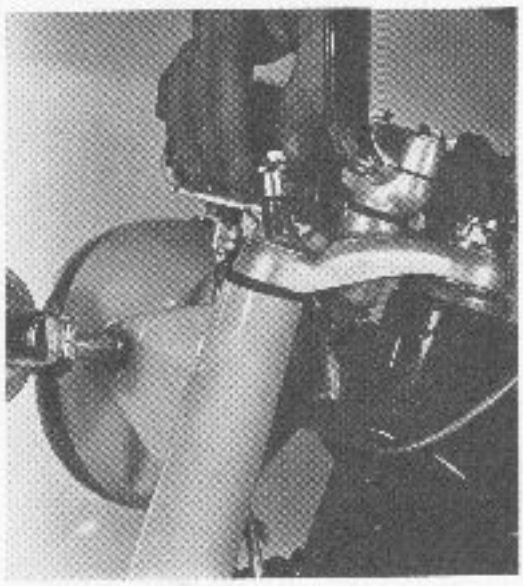
1. ATF is recommended for the front forks. If slightly stiffer damping characteristics are desired, use SAE 20 or SAE 30 oil.

2. Fork oil should be changed every 3,000 miles or once every 6 months.

3. To drain the fork oil, remove the drain plug at the lower portion of one of the fork sliders. Allow the oil to drain for several minutes into a suitable container, then pump the forks up and down several times. After most of the oil is expelled, turn the forks all the way to the right to completely drain the right fork leg, or all the way to the left for the left fork leg. Check the condition of the drain plug gasket. Replace it if necessary. Refit the drain plug and tighten it securely.

4. Repeat the procedure with the other fork leg. Look at the old oil, if it contains water or inordinate amounts of dirt, the fork seals should be replaced.

Removing the fork drain plug



Removing the fork filler cap

5. Support the front wheel off the ground. Remove the fork filler caps from the top of each fork leg; it may be necessary to remove the handlebar holders and place the handlebars out of the way. Loosening the upper triple clamp pinch-bolts (if fitted) may make removal easier. On models with internal fork springs, the front end of the motorcycle can be lowered to force the springs out of the fork tubes. Either move the spring to one side or remove it altogether to aid filling the forks.

6. Add the correct amount of ATF to each fork leg. Capacities for each model are given in the "Maintenance Data" chart at the end of this chapter.

NOTE: *Fork oil should be measured accurately, and added slowly. Both of these aims can be accomplished by using a baby bottle with the rubber nipple cut off to add oil to the forks. These are usually calibrated in cubic centimeters or ounces.*

7. Inspect the condition of the fork filler cap O-ring, and replace it if it is torn or cracked. Fit the caps and tighten them securely. Tighten the handlebars and pinch-bolts if they were loosened. Allow a moment for the oil to settle in the forks before operation.

8. After several miles of operation, check the area around the fork slider seals for leaks or seepage. Even a minimal amount would necessitate replacement of the seals. A coating of grime building up in this area over a period of time is also indicative of ineffective seals.

DRIVE CHAIN

No mileage interval is recommended for the drive chain since this will depend in large measure upon the type of lubricant used, riding habits, average speed, weather, and so on. However, some sort of lubricant must be applied at least every 200 miles. This should be considered the outside limit. It would be better to lubricate the chain more often.

Excellent lubricants developed specifically for motorcycle chains are on the market and these are highly recommended. Be sure to follow the manufacturer's instructions.

When applying the lubricant, direct it toward the edges of the chain plates as well as on the rollers.

At least every 2,000 miles, the chain should be removed from the motorcycle for cleaning. Brush off heavy deposits of dirt and grease with a stiff brush and solvent. Then soak the chain for several hours in light motor oil. Hang it up to drain. Check that each chain link can pivot freely. If there are any kinked or binding links, the chain should be re-

placed. Afterwards, refit the chain to the machine, lubricate it in the normal manner, and adjust the tension as described later in this chapter.

Alternate cleaning methods can also be used.

NOTE: *If for any reason the chain is removed from the motorcycle, replace the masterlink with a new one.*

CONTROLS AND CABLES

1. The throttle, clutch, front (drum) brake, and rear brake (SL350) cables should be lubricated either with a light or medium grade of motor oil or with the newer graphite or molybdenum-based lubricants sold for this purpose.

2. Disconnect the cable from the lever or twist-grip and dribble the lubricant down between the inner cable and the sheath until you think the lubricant is coming out of the other end. If you are using motor oil, a few drops of gasoline added to the cable first will make the surface of the cable slicker so that the oil will flow into the cable somewhat faster.

3. After lubricating the cables, apply some chassis grease to the exposed upper portion of each cable, and attempt to get some into the sheath. This will help prevent the entry of dirt and water.

4. A few drops of oil should be applied to the cable fitting in the clutch and front drum brake levers. Lack of lubricant here may cause a snatching feeling when the lever is pulled, and is due to the cable fitting binding in the lever.

5. After fitting the clutch and brake levers to their controls, readjust them, but try to arrange the slot in the threaded adjuster so that it points downward.

6. The throttle twist-grip should be taken apart and then the drum lubricated with a small quantity of chassis grease. Also, apply some to the portion of the drum which contacts the handlebar to ensure effortless throttle action.

7. A few drops of motor oil should be applied to the rear brake pivot. At more extended intervals, the brake cams should be lubricated with chassis grease. Disassembly of the brake plate is required (Refer to "Chassis," Chapter 8).

8. The tachometer and speedometer cables should be disconnected, removed from their sheaths, and smeared with a light coating of chassis grease. This should be done every 2,000 miles. Use very little lubricant on the portion of the cable closest to the instrument to avoid getting any inside the works.

Every 4,000 miles some chassis grease should be applied sparingly to the speedometer drive mechanism at the front wheel.

CHASSIS LUBRICATION

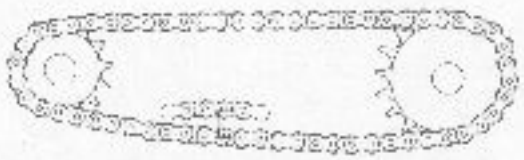
1. The swing arm pivot is fitted with two grease nipples. These should be lubricated with a good grade of chassis grease every 3,000 miles. Grease should be applied until some of it shows at either end of the swing arm.

2. Wheel and steering head bearings are lubricated with bearing grease. This should be done every 6,000 miles. Refer to the "Chassis" chapter for procedures.

Service Checks and Adjustments

DRIVE CHAIN

1. The chain should have about ¾ in. (20 mm) of total up-and-down free-play measured in the middle of the lower chain run.



Check chain free-play in the middle of the lower chain run

2. Before checking or adjusting the chain slack, the following conditions should be met:

a. The motorcycle should be placed on the center stand so that the rear wheel is off the ground;

b. The transmission should be placed in Neutral;

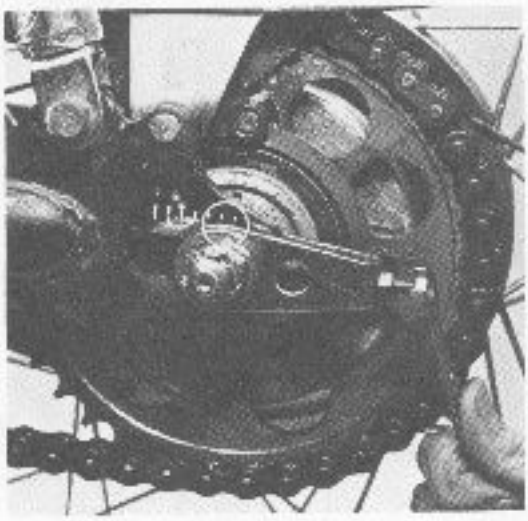
c. The chain should be clean and well-lubricated;

d. The chain should have been checked for any tight spots by slowly rotating the wheel and checking for variances in the chain tension at dif-

ferent points. If a tight spot exists, the chain tension should be adjusted to the prescribed free-play at the tight spot. Note, however, that such a condition is indicative of a worn chain and probably sprockets which should be replaced as soon as possible.

3. To adjust the chain, first back off the rear brake adjuster nut if a rod-operated brake is fitted.

4. Remove the axle nut cotter pin and loosen the axle nut several turns. Loosen the locknut on each chain adjuster bolt.

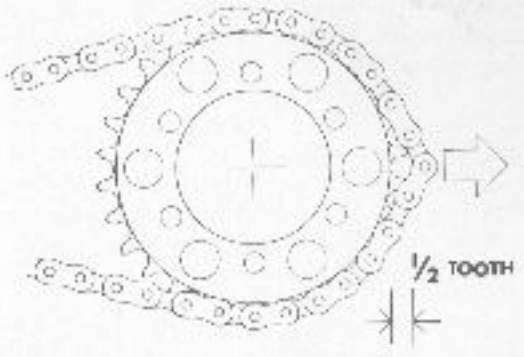


Adjusting chain free-play. Be sure that the adjuster (circle) indicates the same aligning mark on each side of the swing arm.

5. Turn each of the adjuster bolts in or out by equal amounts until the chain tension is approximately correct.

6. Check wheel alignment by means of the aligning marks inscribed on both sides of the swing arm. Be sure that both adjusters are lined up with the same mark on each side. If not, turn one of the adjuster bolts in or out so that alignment is achieved.

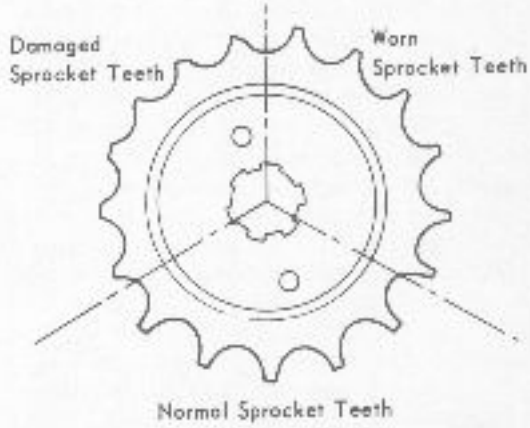
7. Tighten the axle nut and check the chain tension. The chain tension should also be checked with the weight of a rider sitting on the motorcycle when it is off the center stand; the chain should still have at least ½ in. of free-play. Correct if necessary. After adjustment is correct, torque the axle nut to the proper torque. A "Torque Specifications" chart is given at the end of Chapter 8. Fit a new cotter pin and tighten the adjuster locknuts.



Checking the chain for wear. If ½ of a sprocket tooth is visible when the chain is pulled off the sprocket, the chain should be replaced.

8. After correcting the chain tension, attempt to pull the chain off the rear wheel sprocket as shown in the illustration. If you can see more than ½ of the sprocket tooth at the point where this is done, the chain is worn to its limit and should be replaced as soon as possible.

9. If the chain is found to be worn, it is recommended that the condition of the countershaft and rear wheel sprockets be closely checked. Refer to the illustration of the countershaft sprocket. If the teeth are worn or hooked, both sprockets should be replaced as well as the chain. Note that a worn sprocket can ruin a good chain, and that a worn chain will wear out a set of sprockets in short order.



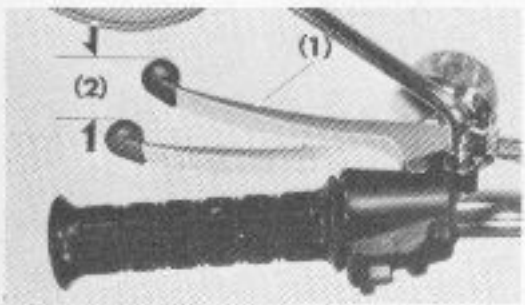
Inspect the sprockets for wear or damage

CLUTCH

Two adjustments are made to the clutch: cable adjustment and pushrod adjustment. Usually the pushrod need not be adjusted unless the clutch malfunc-

tions. Cable adjustment must always be maintained at the proper specification. If the cable has insufficient free-play, the clutch will slip and rapidly burn out; if it is too great, the clutch will not completely disengage.

Before adjusting the clutch, apply a few shots of chassis grease to the adjuster grease fitting and operate the clutch lever a few times to distribute the grease. The clutch cable should also be well-lubricated.



Clutch cable free-play is measured at the tip of the clutch lever

1. The clutch lever should be able to be moved 10–20 mm (0.4–0.8 in.) measured at the tip of the lever before the clutch begins to disengage. If clutch operation is not satisfactory after this adjustment is made, proceed as follows:
2. Loosen the locknut on the handlebar adjuster and screw the adjuster into the lever housing to give as much slack in the cable as possible.
3. Loosen the locknut on the cable adjuster located at the top of the left rear crankcase cover, and screw the adjuster into the crankcase cover.
4. Loosen the locknut on the pushrod adjuster located on the left rear crankcase cover. Screw the adjusting screw counterclockwise until a noticeable resistance is felt, then turn the adjusting screw clockwise ¼ turn. Tighten the locknut.
5. Back the cable adjuster on the crankcase out until there is approximately 10–20 mm (0.4–0.8 in.) of free-play measured at the tip of the lever. Tighten the locknut.
6. Minor adjustments can be made at the handlebar adjuster.
7. Use the handlebar adjuster to maintain the correct amount of free-play.

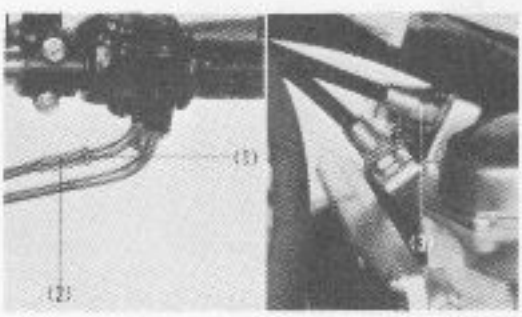
Adjusting the clutch

THROTTLE CABLE

The throttle cable free-play should be adjusted *after* the idle speed. This procedure is given in the "Tune-Up" chapter. The standard throttle cable free-play is 10–15° of grip rotation for all models. The cable should be well lubricated before attempting to adjust free-play.

360 Models

1. Loosen the locknut on the cable adjuster located near the twist-grip and screw the adjuster in to give the maximum amount of free-play.
2. Loosen the locknut on the lower adjuster. Turn the adjuster until there is approximately 10–15° of play at the twist-grip, then tighten the locknut.
3. Fine adjustment is accomplished with the adjuster near the twist-grip. Be sure to tighten all locknuts when the adjustment is correct. Check cable operation and free-play when the handlebars



Throttle cable adjusters (2 and 3) and locknut (1) (360)

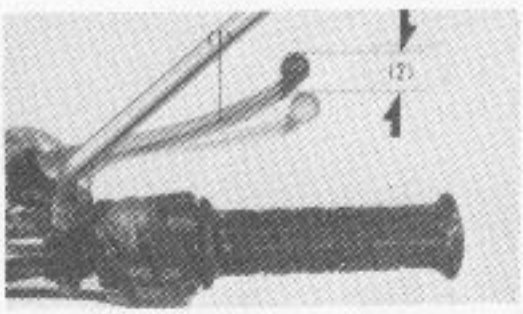
are cut hard right or left. If it changes, either the cable is too tightly adjusted or is binding somewhere.

350 Models

1. Cable free-play is adjusted with the adjuster near the twist-grip. Loosen the locknut on the adjuster and screw the adjuster in or out until free-play is correct. Tighten the locknut.

2. Check that the cable operates smoothly and maintains some free-play when the handlebars are cut all the way to the right or left. If the idle speed changes when this is done, the cable is either too tightly adjusted, or it is binding somewhere along its routing.

Adjusting the front drum brake with the brake plate adjuster



On front drum brakes, the brake lever should have about 1 in. of movement (measured at the end of the lever) before the linings contact the drum

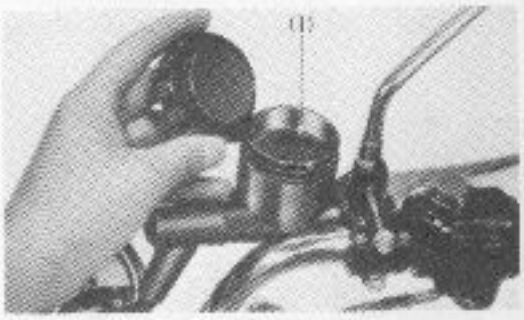
FRONT DRUM BRAKE

1. Use the cable adjuster on the brake plate to allow about 20-30 mm (0.8–1.2 in.) of handlebar lever free-play before the shoes contact the drum. This free-play is measured at the tip of the lever.

2. This free-play can be maintained as the shoes wear by using the adjuster at the handlebar lever.

DISC BRAKE

Disc brakes need no attention other than a periodic check of the fluid level and pad wear.



Maintain brake fluid level at the level line

1. After removing the reservoir cap and rubber diaphragm, check to see if the fluid is up to the level mark on the inside of the master cylinder. If the level is below the level mark, add enough DOT 3 brake fluid to bring the level up to the mark. Reinstall the diaphragm and the cap, and tighten securely.

2. Check the brake pad wear, and replace the pads in a set if either one is worn past the red limit line.

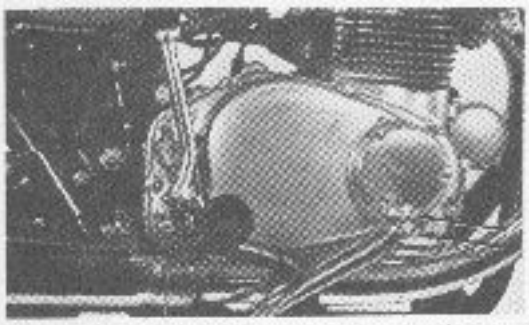
Refer to the "Chassis" chapter for brake system service procedures.

3. If the brake lever feels spongy, bleed the system. This procedure can also be found in the "Chassis" chapter.

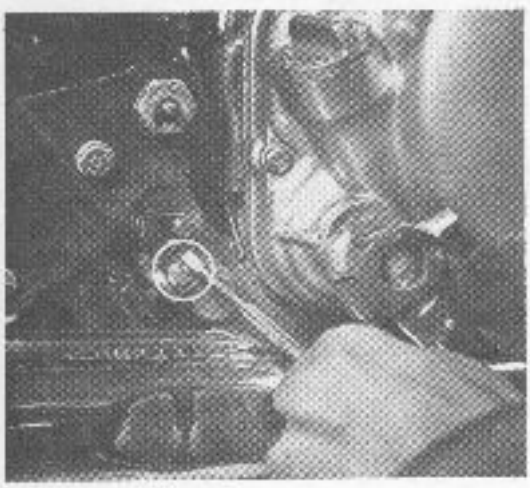
REAR BRAKE

Use the adjusting nut on the end of the cable or rod so that the brake pedal has 1

Rear brake adjuster nut (1)

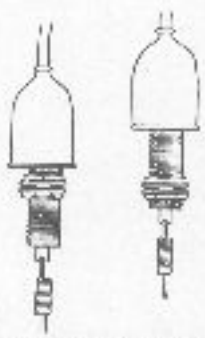


Rear brake pedal should have about 1 in. (25 mm) of free movement before the linings contact the drum



Adjusting pedal height

Adjusting the rear brake light switch



Rear brake light switch adjustments

in. of free-play before the shoes contact the drum. The pedal height can be adjusted with the stopper bolt.

Check pedal free-play with a rider on the machine.

BRAKE LIGHT SWITCH

The switches should be checked for operation after the brakes are adjusted. The rear brake light switch is mounted in a slotted bracket and secured by locknuts. Moving the switch up on the bracket allows the brake light to turn on sooner. Moving it down allows the light to turn on later. Do not turn the switch to adjust it as the wires will become twisted and may break. Generally, the brake light should come on just as the linings contact the drum.

TIRES AND WHEELS

1. Tire pressure should be maintained at the specifications shown in the "Maintenance Data" chart at the end of this chapter. Be sure to check tire pressure when the tires are cold. That is, if the machine has been sitting for at least three hours or has been ridden less than one mile. As the tires get hot, pressure will increase up to 10 psi or more over cold pressure.

2. Check the tires often for wear, dry-rotting of the sidewall or tread grooves, etc. Remove any pebbles or other foreign matter embedded between the grooves. Minimum acceptable tread depth is 2 mm (0.08 in.).

3. Spin each tire, making a visual check of the rim run-out. Methods of measuring run-out are discussed in "Chassis," Chapter 8.

4. Rotate the wheel while striking each spoke lightly with a screwdriver. Each one should emit a "ping" of approximately the same pitch.

5. A loose spoke will emit a dull sound. Such spokes should be tightened.

The nipple should not be turned more than two revolutions. To exceed this risks puncturing the tube with the end of the spoke.

6. If more than two adjacent spokes are found to be loose, the rim should be checked for run-out and trued if necessary. Refer to Chapter 8.

7. Occasionally, loosen the locknut on the valve stem. If the stem tilts to one side when this is done, it is a indication that the tire has slipped around the rim. To correct this condition, deflate the tire, loosen the locknut on the rimlock if one is fitted, push the rimlock up off the tire bead, and move the tire on the rim as required until the stem is straightened.

8. If a rimlock is fitted, check the locknuts for tightness.

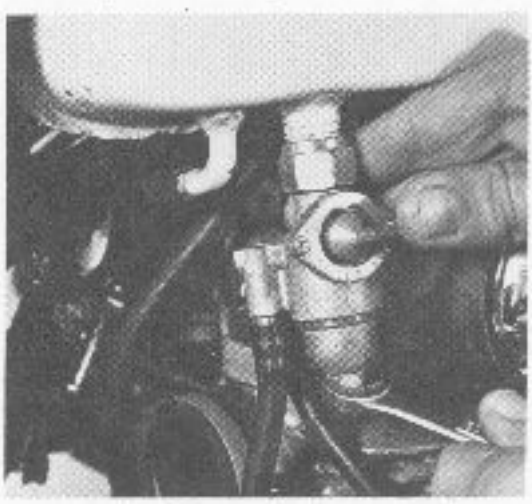
STEERING STEM BEARINGS

The steering stem bearings should be checked periodically and adjusted if necessary. Refer to the "Chassis" chapter.

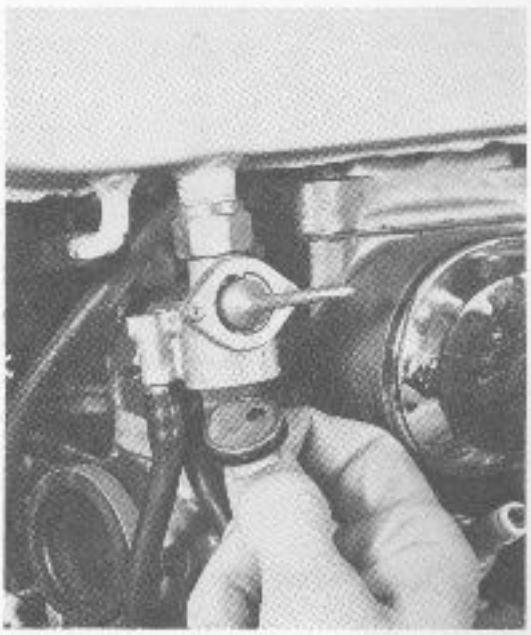
Fuel System

1. Fuel system maintenance involves cleaning the petcock and filter, cleaning or replacing the air cleaner, and cleaning the carburetors.

2. The carburetors should be removed, disassembled, and cleaned every 4,000 miles. The procedures are outlined in the "Fuel Systems" chapter.



Removing the fuel petcock sediment bowl



Removing the filter screen and O-ring

3. The petcock should be serviced every 3,000 miles. Shut the fuel off, then unscrew and remove the petcock sediment bowl. Take out the O-ring and fuel filter screen. Clean the parts in solvent and inspect the screen for any holes or other defects, replace it if it is damaged in any way. Inspect the O-ring for any cuts or cracks and replace it if necessary. Reinstall the filter screen, O-ring, and sediment bowl. Turn the fuel on and check for leaks. Refer to "Fuel Systems" if necessary.

Air Cleaner Service

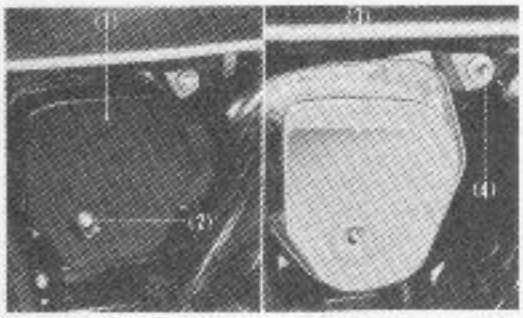
The air cleaner should be serviced or replaced every 1,500 miles or more often depending on conditions.

ALL EXCEPT SL350K1-K2

Removal

1. Open the seat. On CL models the exhaust system must be removed. Remove the right and left sidecovers.

2. Loosen the air cleaner connecting band. Remove the bolt running through the center of the air cleaners, and the air cleaner element mounting bolt.



Air cleaner cover (1), cover mounting bolt (2), element (3), and element mounting bolt (4)

3. Remove the air cleaner cover and the air cleaner element.

Cleaning

1. Tap the air cleaner to remove any loose dirt. Blow compressed air through the element from the inside out.
2. Inspect the element and connecting tube for any holes; replace any air cleaner found defective. An oil-impregnated element or one which cannot be cleaned sufficiently should also be replaced.
3. Inspect the area where the element is bonded to the mounting plate. If the bonding is cracked or separated replace the element.

Installation

1. Installation is in the reverse order of removal.
2. After installing the air cleaners, start the engine and check for any air leaks.

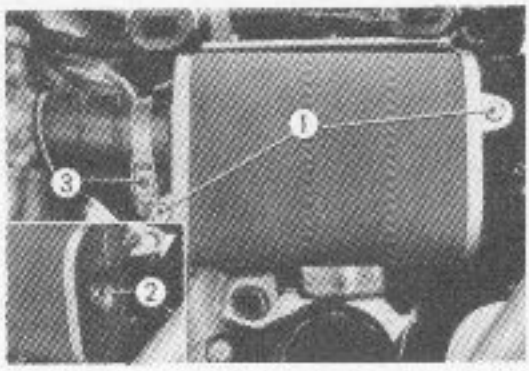
SL 350K1-K2

Removal

1. Remove the plastic sidecovers from both sides.
2. Remove the two mounting bolts, and loosen the connecting tube band. Remove the air cleaner.
3. Remove the bolt from the center of the back of the air cleaner and remove the element.

Cleaning

1. Once the air cleaner element is removed, it should be cleaned in a clean solvent such as kerosene.
2. When the air cleaner element has dried thoroughly, soak it in gear oil SAE 90 until it is fully saturated then wring off the excess oil.
3. Inspect the element for any damage, such as holes or a damaged case. Replace any air cleaner found defective.



Foam type element (SL models): air cleaner mounts (1), element mount (2), carburetor clamp screw (3)

Installation

1. Installation is in the reverse order of removal.
2. Start the engine and check for any air leaks. Any air leaks should be corrected as they can cause a lean mixture resulting in possible engine damage.

Battery

1. The electrolyte level should be checked often. It will be necessary to open the seat and remove the battery strap. Lift the battery up slightly to check the electrolyte level. Maintain the level between the marks. If low, add water only. Distilled water is recommended, although tap water which is reasonably free of chemical or mineral impurities can be used.
2. Battery state-of-charge can be checked with a hydrometer. Note the following:

Specific Gravity	Battery Capacity
1.260	100 percent
1.230	75 percent
1.200	50 percent
1.170	25 percent
1.140	almost none
1.110	dead

Checking battery state of charge

3. If a battery overflow tube is fitted, be sure that it is not clogged or pinched, and that it will release any overflow at a point below the engine or frame. This overflow (sulphuric acid) will remove chrome or paint in short order.

4. A low battery should be trickle-charged only. A battery should be charged if the specific gravity of any cell is below 1.200. When charging, disconnect the battery terminals (negative first). Remove the cell caps. After the battery has been charged, check the electrolyte level and top up if necessary. Wash off the outside of the battery case if it has been removed from the machine.

NOTE: *Charge the battery at 10% of the amp-hour rating (i.e., 1.2 amps for a 12 amp-hour battery.)*

5. Dirty or corroded battery terminals should be cleaned off with a solution of baking soda and water. Exercise care not to get the baking soda into the cells as it neutralizes the acid. Dry off the terminals and coat them with petroleum jelly.

Check that the ground cable has a clean, tight connection at the battery *and* at the frame.

6. When connecting the battery, double check that the connections are correct. The red or red/white wire is the positive side, and the green wire is negative.

7. If one cell seems to lose more water than the others, suspect a shorted cell. Check with a hydrometer.

8. If the battery will not hold a charge, check alternator output or loose battery posts. If the posts are loose, the battery must be replaced. Check that the battery case has not become impregnated with sulphuric acid; this is done by checking the case with an ohmmeter. Hold one probe against the case near the positive terminal and the other near the negative terminal; if there is continuity, the case is shorting the battery and the battery may have to be replaced. Clean the top of the case thoroughly with a solution of warm water and baking soda. If continuity still exists after this, the case is impregnated with acid; replace the battery.

9. Whitish sulfate deposits on the battery plates indicate that the unit will need replacement soon. This is a sign of battery age.

Storage

Depending upon the length of storage, some or all of the following precautions should be taken:

1. Drain the gasoline from the carburetor float bowl, and fuel lines.

2. For short term storage in an open area, fill the fuel tank to the top with gas to prevent condensation damage to the inside of the tank. If the machine is to be stored in a closed area, such as a basement, the fuel tank should be drained. Leave a bit of gas in the tank and add a cup or more of oil. Slosh this mixture around in the tank to coat the walls.

3. Change the oil.

4. Remove the spark plugs and add an ounce or two of motor oil to each of the cylinders. Turn the engine over by the kick-starter a few times to spread the oil over the cylinder walls. Add a bit more oil, and cover the plug holes with a piece

of clean rag. Repeat this step every few weeks.

5. Remove the battery from the machine and store in a warm, dry place. Trickle-charge the battery monthly.

6. Place a piece of business card soaked in oil between the points to retard oxidation of the contact surfaces. Be sure to clean the points thoroughly before restoring the machine to service.

7. Place a heavy coat of wax on all chrome or painted surfaces. Cover the machine with a breathable cover.

8. Support the machine vertically. Support the wheels off the ground, if possible.

Recommended Lubricants

Engine	General—All Temperatures SAE 10W-30 SAE 10W-40	
	Alternate SAE 30 SAE 20 or 20W SAE 10W	Above 91° F 32°–59° F Below 32° F
Forks	ATF SAE 30W	
Control Cables	10W-30 motor oil Graphite-base lubricant	
Tach, Speedo Cables	Light-duty, lithium-base grease	
Wheel Bearings	Waterproof, medium-weight bearing grease	
Steering Head Bearings	Waterproof, medium-weight bearing grease	
Swing Arm Pivot and Clutch Fitting	Waterproof, medium-weight chassis grease	

Maintenance Data

	CB350	CL350	SL350	CB360	CL360
Fuel Tank (gal)	3.2	2.4	2.4	2.7	2.4
Crankcase:					
After Disassembly (qt)	2.1	2.1	2.1	2.1	2.1
When Changing (qt)	1.6	1.6	1.8	1.6	1.6
Forks:					
After Disassembly (cc/oz)	①	②	165/6.5	160/5.4	160/5.4
When Changing (cc/oz)			170/6.23	135/4.8	135/4.6
Tire Pressure:					
Front (psi)	26	26	22	26	26
Rear (psi)	29	29	22	28	28

① CB350 to K3—200/6.75
185/6.5
CB350K4 and later—160/5.4
135/4.6

② CL350 to K3—200/6.75
185/6.5
CL350K4 and later—160/5.4
135/4.6

Periodic Maintenance Intervals

Daily
- Chain slack
- Cable adjustments
- Brake adjustment

Weekly
- Battery fluid level
- Spoke condition
- Oil level
- Tire pressure

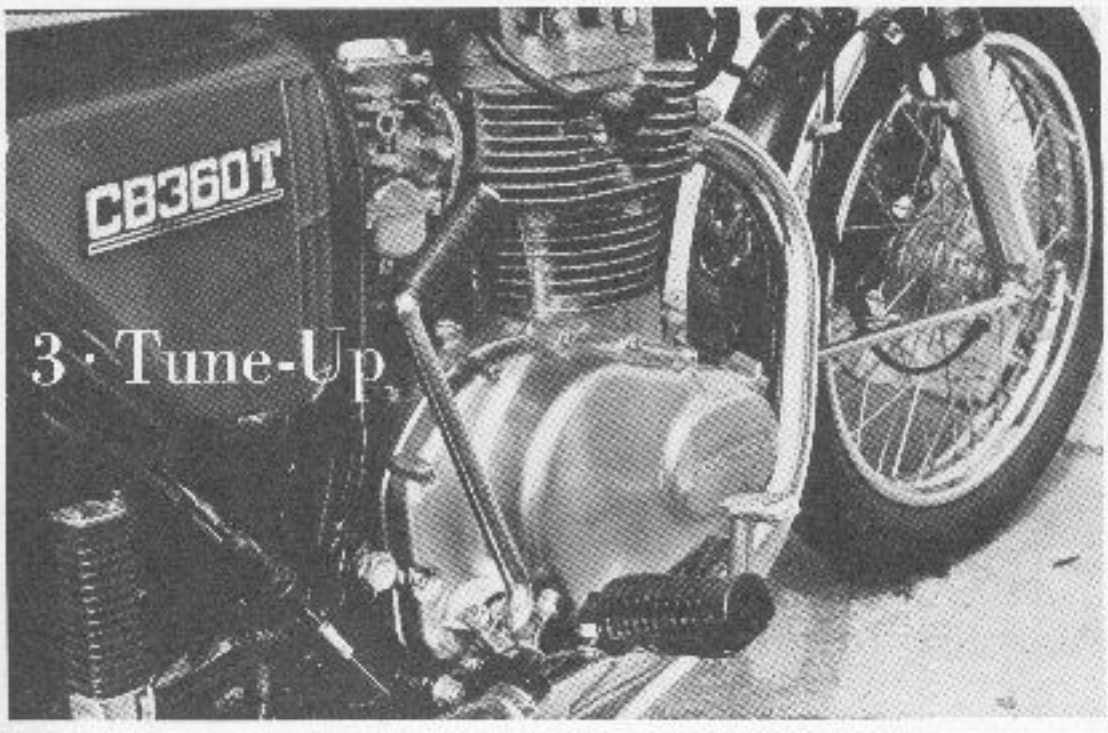
Every 1,000 miles
- Change engine oil
- Check disc brake fluid
- Adjust drive chain

Every 3,000 miles
- Clean, gap, or replace spark plugs
- Check and adjust clutch
- Clean or replace air filter
- Check ignition timing
- Clean, gap, or replace breaker points
- Clean fuel petcock
- Check carburetor operation
- Adjust cam chain tensioner
- Adjust valve clearance
- Lubricate swing arm pivot
- Lubricate cables and twist-grip
- Inspect fuel lines
- Inspect chain and sprocket condition
- Lubricate breaker point pads

Every 4,000 miles
- Grease speedometer drive mechanism
- Overhaul carburetors
- Inspect rims for run-out

Every 6,000 miles
- Clean oil filter
- Lubricate wheel bearings
- Lubricate steering head bearings
- Inspect brake shoes
- Change fork oil

Every 8,000 miles
- Flush and renew disc brake fluid



3 · Tune-Up

Generally, a tune-up should consist of the following operations:

a. A compression check;
b. Adjusting the cam chain;
c. Adjusting the valve clearance;
d. Cleaning and gapping (or replacing) the contact breaker points;
e. Checking or adjusting the ignition timing;
f. Cleaning and gapping (or replacing) the spark plugs;
g. Checking the carburetor float level;
h. Setting carburetor idle speed and idle mixture.

The type of equipment needed for the above operation will differ for the various models. You should have a thin points file, a set of feeler gauges, a wire brush, some emery cloth, and solvent, in addition to the normal hand tools.

For ignition timing, timing marks are provided on the alternator rotor. However, a device is needed to determine exactly when the points open (this is when the plug fires). For this purpose, a test light or a continuity light can be used. An ohmmeter can be used as well.

Alternately, an automotive-type strobe light can be used. The strobe light can be used to check the timing both at an idle and at full advance and therefore this "dynamic" method is considered the most accurate method of setting the ignition timing.

NOTE: *To be effective, a tune-up must be performed on a mechanically sound engine. Failure of a careful tune-up to restore lost power or performance may mean that engine components such as rings are worn, or that the valves are not properly seated.*

Compression Test

1. A compression check should be made before each tune-up since this will give a general idea as to engine condition.

2. The engine should be at operating temperature when checking compression.

3. Remove both spark plugs and insert the gauge into one of the spark plug holes. If the gauge is the "hold-in" type, use a bit of oil on the rubber tip to give a good seal.

4. Hold the throttle and choke wide open while kicking the engine over briskly. Note the compression reading

and repeat the procedure for the other cylinder.

5. Compression may vary according to the gauge tolerance, etc. However, both cylinders should be within 15 psi of one another and close to the standard specification of 170 psi.

6. If compression is too low, squirt a small quantity of motor oil into the cylinder and repeat the test. If compression does not increase, suspect worn, damaged, or improperly adjusted valves. If the compression does increase, the piston rings are worn, probably to the point where they should be replaced.

7. If compression seems to increase over a period of several tune-ups, the piston crown and combustion chamber are becoming carboned up and probably should be decarbonized.

8. If compression drops a significant amount over a period of several tune-ups, it is probable that some mechanical damage is being done, possibly a leaking air filter causing wear to the piston rings and cylinder, or lack of lubrication affecting any of the top end components.

Cam Chain Adjustment

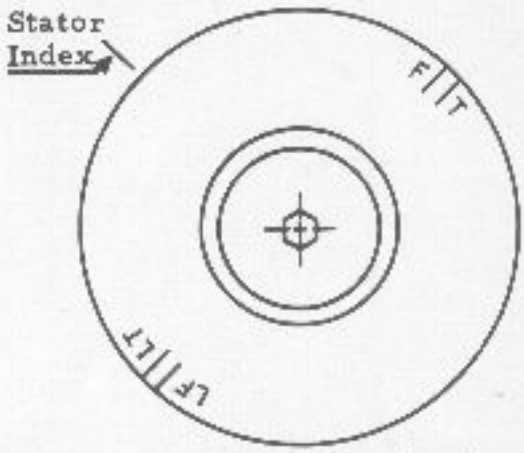
NOTE: *Early 350 models were equipped with an automatically-adjusting, hydraulic-type cam chain tensioner. No adjustment is possible. These early units can be replaced with the improved adjustable units found on later models with no internal engine modification.*

350 MODELS

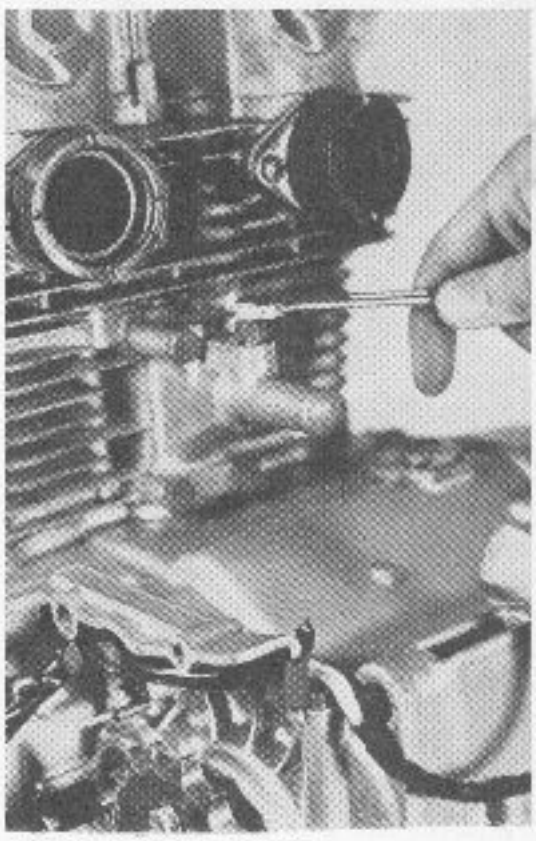
1. Remove the left exhaust valve cover and the alternator cover. Remove the spark plugs.

2. Turn the engine over counterclockwise using the rotor bolt until the left exhaust valve just begins to open, then turn the engine in the opposite direction (clockwise) to 90° after the top dead center (ATDC) for the left cylinder. Refer to the accompanying illustration.

3. Loosen the locknut on the tensioner setting bolt and back the setting bolt out a few turns, the tensioner will automatically adjust itself. Tighten the setting bolt and locknut.



The engine is properly set up for cam chain adjustment when the left piston is 90° past TDC of its compression stroke, as indicated by the action of the valves and the position of the alternator rotor marks



Adjusting the cam chain (350)

360 MODELS

1. Remove the stator cover and the left cylinder valve tappet covers. Remove the

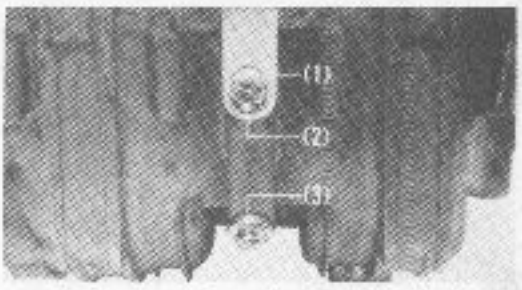
spark plugs. Using the rotor bolt, turn the crankshaft counterclockwise while watching the left cylinder intake tappet; when the tappet descends all the way and then starts to rise, line up the "I.T" mark on the rotor with the index mark on the stator. In this position the left cylinder is at top dead center (TDC) of the compression stroke. Turn the crankshaft another 90° (counterclockwise). The valves should all be closed in this position. This is the only position that the cam chain tensioner may be adjusted in.

2. Loosen the setting bolt locknut and back the setting bolt out a few turns, the tension will automatically be adjusted. Tighten the setting bolt and the locknut.

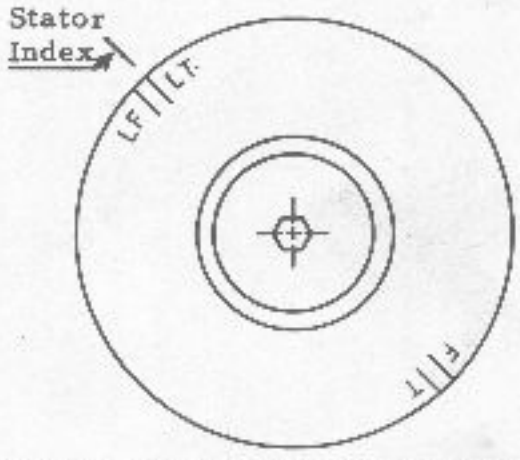
3. If after performing the adjustment outlined above, the cam chain still is excessively noisy, perform the adjustment as described below.

NOTE: *When listening for cam chain noise the valves should be adjusted properly so that tappet noise will not be confused with cam chain noise.*

4. Start the engine and as soon as the engine will idle with the choke off, perform the adjustment by removing the plunger cap. Loosen the setting bolt locknut and back out the setting bolt a few turns. Push the tensioner plunger in with a screwdriver until the cam chain is silent and, while maintaining pressure with the screwdriver, tighten the setting bolt and locknut. Do not use more pressure on the plunger than is necessary, as this will overtighten the chain and cause rapid wear of the cam chain and the tensioner components. Install the plunger cap.



Cam chain setting bolt (1), locknut (2), and plunger cap (3) (360)



Alternator rotor marks indicating that the left cylinder is at top dead center

Valve Adjustment

NOTE: *Valves must be adjusted when the engine is cold, preferably after sitting overnight.*

350 MODELS

1. Remove the alternator cover, intake and exhaust valve caps, and the point and tach drive housing covers.

2. Remove the spark plugs.

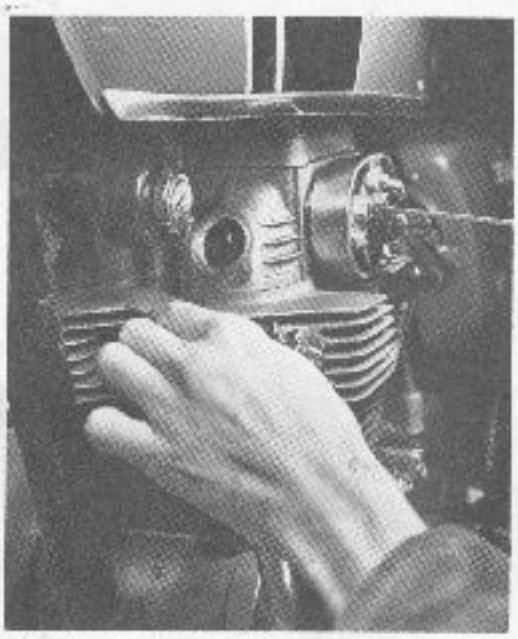
3. Turn the engine over slowly in the normal direction of rotation (the rotor will turn counterclockwise) while observing the left intake valve. When the valve goes down and begins to come up, continue turning the engine over until the "I.T" mark on the rotor lines up with the timing index mark on the stator.

4. The left piston should now be at top dead center (TDC) of the compression stroke with both valves closed. Check for clearance at both valves for the left cylinder. Each should have a slight amount of free-play. If they do not, the piston is at TDC on the exhaust stroke. Turn the rotor 360° and check again.

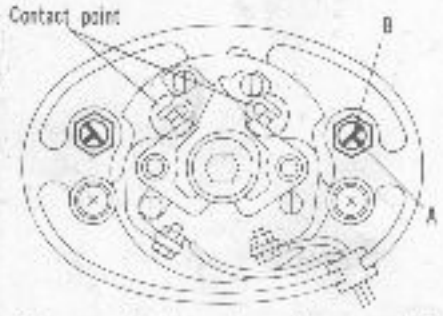
5. Valve clearance is 0.05 mm (0.002 in.) for the intake valves and 0.1 mm (0.004 in.) for the exhaust valves.

6. Slip the correct feeler gauge between the rocker arm and the valve stem. The feeler gauge should be a slip fit (a light drag) in a correctly adjusted valve.

7. If adjustment is necessary, loosen the locknut on the rocker arm shaft (in the point and tach drive housings) and turn the rocker arm shaft until the adjustment is correct. Tighten the locknut and recheck the adjustment.



Adjusting the valves (350)



The index marks (A) on the rocker arm shafts (B) must be pointing away from the center of the cylinder head (350)

NOTE: *Each rocker arm shaft has an indicator slot. This slot must face the front of the engine on the exhaust valves and to the rear of the engine on the intake valves.*

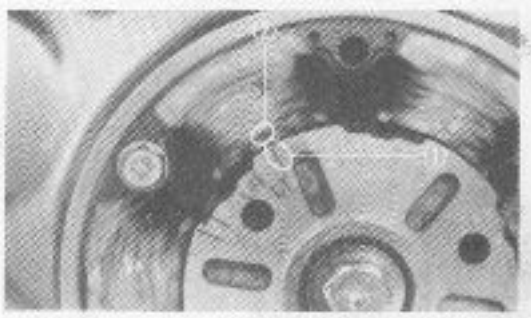
8. After completing the adjustment of the left cylinder turn the rotor counterclockwise 180° and align the "T" mark on the rotor with the timing index mark on the stator. The right piston should be at TDC of the compression stroke and clearance should exist at both valves; if not turn the rotor 360°. Repeat the adjusting procedure for the right cylinder. Be sure to recheck the adjustment after tightening the rocker arm shaft locknut. Also check that the indicator slot in the rocker arm shaft is facing away from the center of the engine.

360 MODELS

1. Open the seat and raise the rear of the fuel tank slightly.

2. Remove the spark plugs, alternator cover, and valve covers.

3. Turn the engine over slowly in the normal direction of rotation (counterclockwise) while observing the left intake valve. When the valve goes down and then starts to rise, continue turning the engine over until the "LT" mark on the rotor lines up with the timing index mark on the stator.

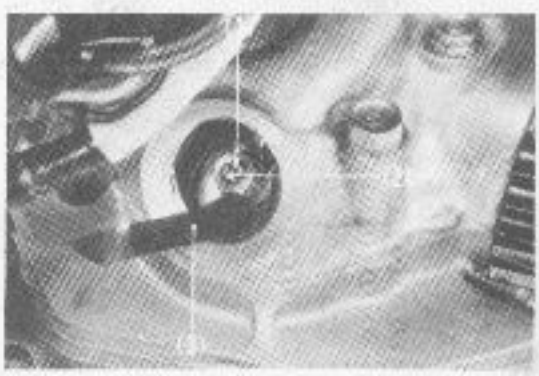


Left cylinder at top dead center when the rotor (1) and stator index mark (2) are aligned (360)

4. The left piston should now be at top dead center (TDC) on the compression stroke with both valves closed. Each valve should have a slight amount of freeplay. If they do not, the piston is at TDC on the exhaust stroke. Turn the rotor 360° and check again.

5. The correct valve clearance is 0.05 mm (0.002 in.) for the intake valves and 0.08 mm (0.003 in.) for the exhaust valves.

6. Slip the correct feeler gauge between the valve stem and the rocker arm adjuster. The feeler gauge should be a



Adjusting the valves. adjuster locknut (1), adjusting screw (2), and feeler gauge (3) (360)

slip fit (a slight drag) in a correctly adjusted valve.

7. If adjustment is necessary, loosen the adjuster locknut and turn the adjuster to effect adjustment. Tighten the locknut.

NOTE: *The adjustment may change when the locknut is tightened. Hold the adjuster steady while securing the locknut. Recheck the clearance afterwards.*

8. Turn the rotor 180° counterclockwise and line up the "T" mark on the rotor with the timing index mark on the stator. In this position both valves for the right cylinder should be closed. Adjust the valve clearance as described for the left cylinder above.

CAUTION: *Setting the valve clearance too tight is to be avoided. Too loose is preferable to too tight.*

Contact Breaker Points

LOCATION

1. The points are located in a case on the left-side of the cylinder head, and are operated off the camshaft. The timing advance mechanism is fitted behind the breaker point base plate.

INSPECTION

1. Remove the point cover, and make a visual inspection of the points.

2. Slight graying of the breaker point surfaces is normal.

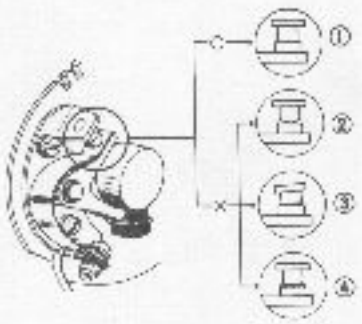
3. The breaker point surfaces should be inspected for pitting or a burned-looking condition.

4. If pitting is present, the point surfaces may be restored by running a thin, flat file through the points. Then clean them thoroughly by wiping them with a solvent. Remove any traces of solvent or solid particles by running a piece of business card or other piece of white paper through the points, until they no longer leave a mark on the paper.

NOTE: *A too vigorous use of the file will render the points unusable. Be certain that the points are well cleaned after filing. Never use sandpaper in place of a file.*

5. It is also possible to restore points to a serviceable condition by removing them from the machine and working the contact surfaces on an oilstone. However care must be taken not to remove too much metal.

6. If pitting or burning is severe, the points should be replaced. Refer to the "Replacement" section. The condenser should also be inspected; refer to Chapter 7, "Electrical System."



Breaker point condition: (1) points properly aligned and in good condition, (2) worn or burnt contact surfaces; (3) misalignment; (4) dirty contact surfaces

7. When closed the points should lie flat against one another as shown in the illustration. If they do not, adjust or replace them so that they do.

8. If an ohmmeter is available, check the resistance across the points when closed. Resistance should not exceed 0.1 ohm, or the points will have to be replaced.

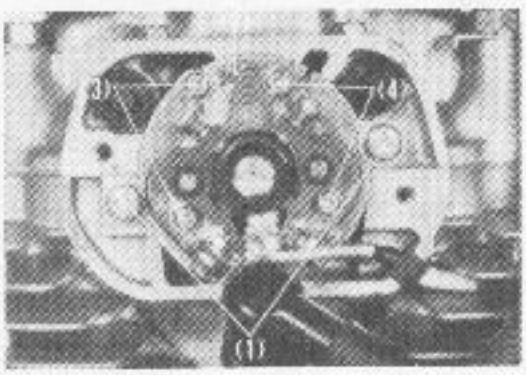
9. Disconnect the primary wire at the coil and check that the moving point is electrically insulated from the engine when the points are open (no continuity, infinite resistance). Inspect the insulating washer at the wire terminal. Check the point (primary) wire insulation. Ensure that the wires are not contacting the engine or frame at any place where it might cause a short. Also ensure that the wire terminal will not touch the point cover when it is installed. Be sure that the wires are properly routed through the rubber grommet at the points case and that the grommet is properly in place.

10. Check the fiber breaker point heel and replace the points if the heel is excessively worn.

11. After the points are cleaned, check the gap.

REPLACEMENT

1. If replacement of the points is necessary, this is easily accomplished by disconnecting the primary wire from the points, removing the two point securing screws, and taking off the points. Install the new points after thoroughly cleaning off the contact surfaces with a non-oily solvent, and adjust the gap. If a breaker plate assembly is purchased simply disconnect the yellow and blue point wires from the wiring harness and remove the two breaker plate screws. Install the new breaker plate and connect the primary wires. Clean the surfaces of the points and adjust the gap. Whenever the points are replaced, the ignition timing will have to be set.



Breaker plate screws (1), point securing screws (3 and 4), pry point (2) (360)

2. Apply a bit of grease to the breaker cam lubricating wick. Take care not to apply too much to avoid fouling the points.

GAPPING

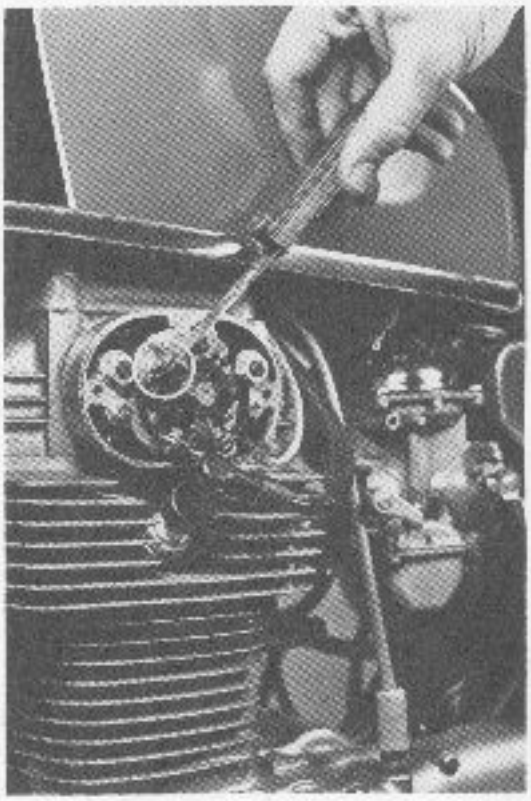
Gapping is necessary to compensate for wear of the contact surfaces due to electrical arcing and for wear of the breaker point fiber heel. As the heel wears, the points will open later relative to the rotation of the crankshaft, retarding the timing.

Points should be filed (if necessary) and cleaned before gapping.

1. Remove the alternator cover, and points cover.

2. Using the rotor bolt, turn the engine over until one set of points is open to their maximum gap.

3. With the proper feeler gauge, check the gap. The proper specification for all



Checking point gap

models is 0.3–0.4 mm (0.012–0.016 in.). The feeler gauge should be a slip fit between the points if they are correctly gapped.

4. If adjustment is necessary, loosen the two screws which secure the points to the base plate, and use a thin screwdriver at the pry slot provided to bring the gap to the proper specification.

NOTE: *Loosen the screws just enough to allow the points to be moved. If too loose, the points will snap shut instead of holding the adjustment.*

5. Tighten the screws and recheck the gap. It may change slightly when the screws are tightened.

6. Repeat the procedure for the other set of points.

7. If it is not possible to gap the points correctly, the fiber heel is evidently worn; the set of points should be replaced.

LUBRICATION

1. On all models it is necessary to lubricate the cam follower fiber heel and the pivot point of the contact breaker oc-

casionally. This minimizes wear and ensures that the timing will remain accurate for a longer period. A worn heel will retard the timing.

2. A small dab of grease (high melting point, if possible) should be applied to the lubricator wick so that the lubricator can distribute it onto the breaker cam. A drop of engine oil should be applied to the pivot point.

3. In both cases it is imperative that care be taken to keep the lubricant away from the points contact surface.

4. The lubricating wick should be adjusted so that it just contacts the breaker cam.

5. If the wick is missing the grease can be applied sparingly to the cam itself.

Ignition Timing

On all breaker point equipped engines, the spark plug fires at the instant the points open. The purpose of ignition timing, then, is to adjust the points so that they will open at the correct time relative to the piston position, which is usually expressed in millimeters before top dead center (BTDC) or in degrees of crankshaft rotation BTDC.

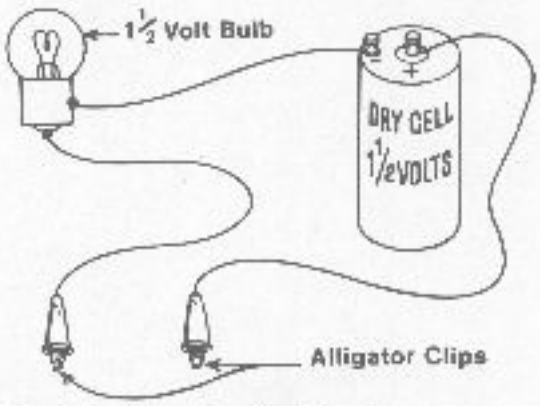
To properly time the engine, a device is therefore needed to determine the piston position, and another to find when the points open.

The alternator rotor is equipped with marks which indicate piston position when aligned with the stationary mark on the stator. "LT" is the left piston at top dead center, while "T" is the right piston at top dead center. "LF" is the firing point (without spark advance) for the left cylinder; "F" indicates the firing point for the right cylinder. An additional pair of marks for each cylinder indicates the firing point when the timing is fully advanced.

The moment of point opening can be checked in several ways.

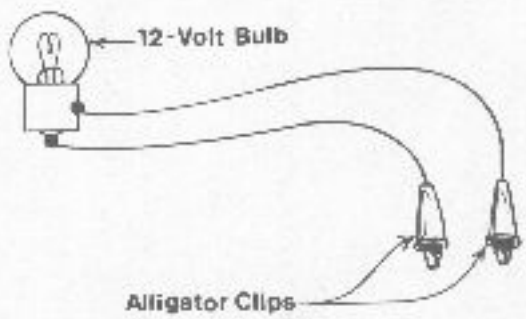
By far the easiest and most accurate method of ignition timing is the use of an automotive-type strobe light. This can be used on all models, and its chief advantage is that it allows the timing to be set at full advance, where it is most important. If a strobe light is available, refer to "Dynamic Timing" which follows.

If a strobe light is not available, timing can be accomplished using the rotor marks along with a test or continuity light, or an ohmmeter.



Continuity light with self-contained power source

A continuity light can be constructed according to the illustration, consisting of a battery, bulb, and two leads. The battery can be a flashlight dry cell, or a 6 or 12-volt battery with a suitable bulb. If this type of self-powered tester is used, the motorcycle's ignition is left OFF when checking timing. If the connections are correct, the bulb will go *out* when the points start to open.



A simple test light

A second type of tester need only be a bulb of system voltage (12v) with two leads attached. A headlight bulb can be used. This set-up requires that the motorcycle's ignition be *on* when checking the timing. When the points begin to open the light will go *on*.

An ohmmeter can also be used. Connect one lead to the points primary wire terminal and the other to a ground such

as the engine. Switch the meter to its lowest range. When the points are closed the resistance should be less than 0.1 ohm; at the instant the points begin to open, the ohmmeter needle will indicate high resistance. The ignition must be turned off when using an ohmmeter as feeding voltage through the meter will damage it.

Regardless of the type of tester used, the hookups are similar: one of the leads is grounded to the engine, the other is attached to the points primary wire terminal, the points spring, or to the primary wire itself.

NOTE: *Points must be cleaned and gapped before checking timing. Dirty points will cause inaccurate readings.*

The method of adjusting the timing is the same regardless of the type of equipment used. The *left* cylinder is set *first* and timing is adjusted by moving the base plate. The points on the left-side of the base plate are those for the left cylinder. After the left cylinder is correctly timed, the right cylinder can be checked, and adjusted if necessary. To adjust the right cylinder timing, the point gap is varied so that the points open at the instant the timing marks align. A change in the point gap of 1.0 mm (0.004 in.) will change the timing 10°. Increasing the point gap will advance the timing, while decreasing it will retard the timing.

If correct timing cannot be accomplished with both point gaps set in the correct range of 0.3–0.4 mm (0.012–0.016 in.), the points should be replaced.

DYNAMIC TIMING

1. Remove the alternator cover so that the timing marks are visible.

NOTE: *A white grease pencil or some paint can be used on the rotor and stator timing indicator marks to increase their visibility under the strobe light.*

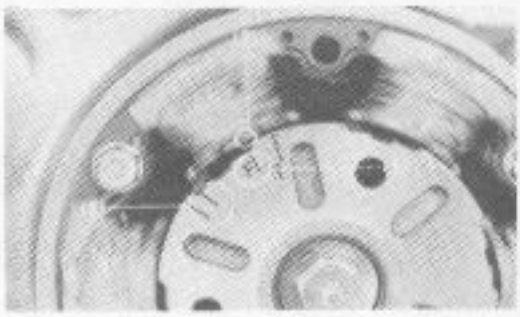
2. Hook up the timing light according to the manufacturer's instructions. Most lights use the vehicle's own battery as a power source.

3. Start the engine, aiming the light on the rotor. Note the following:

a. At idle, the "LF" (left cylinder) mark or the "F" (right cylinder) mark on the rotor should line up with the timing indicator on the stator, depending on which plug the strobe light is connected to;

b. As the revolutions increase, the "LF" or the "F" mark should be seen to move in a direction opposite that of the crankshaft rotation;

c. Finally, at full advance (about 3,200 rpm and above), the twin rotor marks must line up with the timing indicator mark on the stator.



Rotor timing marks: (1) firing point; (2) stator index; (3) full advance firing point

4. The full advance reading is the most important. If the rotor marks and the stator indicator do not align, proceed as follows:

5. Time the *left* cylinder *first*. Remove the points cover. Loosen the two screws which secure the breaker base plate just enough to allow the plate to be turned. Using a thin screwdriver applied at the pry point provided, rotate the plate in the direction necessary so that the timing marks align.

Rotating the plate clockwise advances the timing; rotating the plate counterclockwise retards the timing.

Tighten the base plate screws and recheck the timing.

6. Connect the timing light to the right cylinder and check the timing as for the left cylinder this time using the "F" mark on the rotor.

If the right cylinder timing is incorrect, loosen the two screws which secure the right-side points to the base plate. Open or close the point gap so that the timing marks align as the points open.

7. After the ignition timing is set, recheck the point gaps. Both must still be within the proper specification (0.3–0.4 mm/0.012–0.016 in.).

If either gap is not within this value, increase or decrease it as necessary so

that it is. Increase or decrease the other point gap by the same amount. Both must be within the given range.

After making any adjustment to the point gap, the timing will have to be readjusted.

If the gaps have been changed by equal amounts, it will only be necessary to adjust the timing by moving the base plate.

If proper ignition timing is not possible, replace both sets of points, since the fiber heels are probably worn.

STATIC TIMING

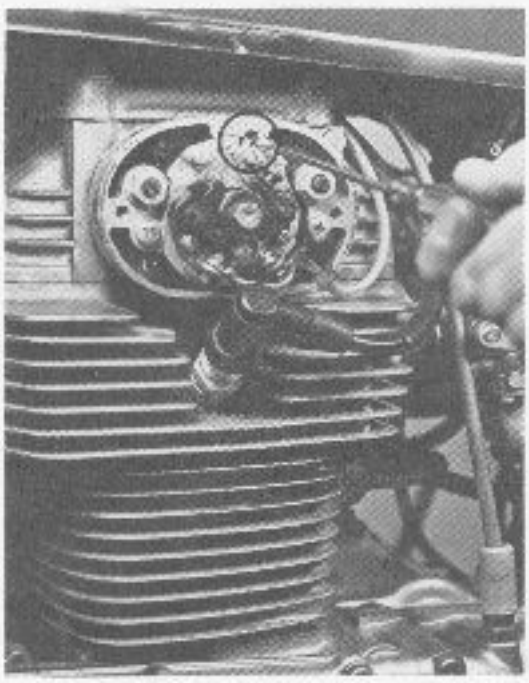
1. Remove the alternator cover, points cover, and the left intake valve cover.

2. Remove the spark plugs and hook up the tester as described previously.

3. Turn the engine over so that the left cylinder is on the compression stroke (the left intake valve will go down and come up). Turn the engine over slowly in the normal direction of rotation (counterclockwise). At the instant in which the "LF" mark on the rotor aligns with the index mark on the stator, the points should begin to open as indicated by the reaction of the test light or the meter.

4. If the points open before the marks align, the timing is too advanced. If they

Checking timing: point opening indicated by the reaction of the test light (static timing)



Adjusting ignition timing

open after the "LF" mark passes the index, the timing is too retarded.

5. If the timing is not correct, set the "LF" mark so that it is aligned with the index mark on the compression stroke. Loosen the two screws which secure the breaker base plate and rotate the plate until the light or meter indicates that the points have just opened. Tighten the base plate screws and recheck the timing.

6. After completing the timing for the left cylinder, connect the light or meter to the points for the right cylinder. Turn the rotor 180° counterclockwise until the "F" mark aligns with the index mark; at this point the right set of points should just open. If the timing is incorrect, align the "F" mark with the index mark and increase or decrease the point gap so that the points just open as indicated by the light or meter. Refer to steps 6 and 7 under "Dynamic Timing," above. Tighten the set screws and recheck the timing and the point gap for both cylinders. Note that both gaps must still be within specifications.

EMERGENCY TIMING

In the event that no type of timing light is available and the timing is suspected of causing trouble, the instant the points

open can be determined roughly by trapping a very thin piece of paper (such as cigarette paper) between the points. Tug at the paper gently while rotating the crankshaft. When the points open the paper will come free, and at this point the "I.F" or "F" timing mark on the rotor and the index mark on the stator should be aligned.

NOTE: *This is not as accurate as the use of a test light or a ohmmeter and should only be used when necessary.*

TROUBLESHOOTING

1. In the event that it is difficult to set the ignition timing, first check the condition of the breaker points and condenser. Replace them if in doubt, and be especially attentive to wear of the fiber heel. Check that the points are properly insulated and appearance is within the limits previously outlined under "Inspection."

2. If a stroboscopic timing light is used and ignition is erratic or cannot be set using the range of adjustment allowed, the points are either badly gapped, the fiber heel worn, or the timing advance mechanism is defective.

3. All models are fitted with spring-controlled timing advance weights which are fitted behind the points.

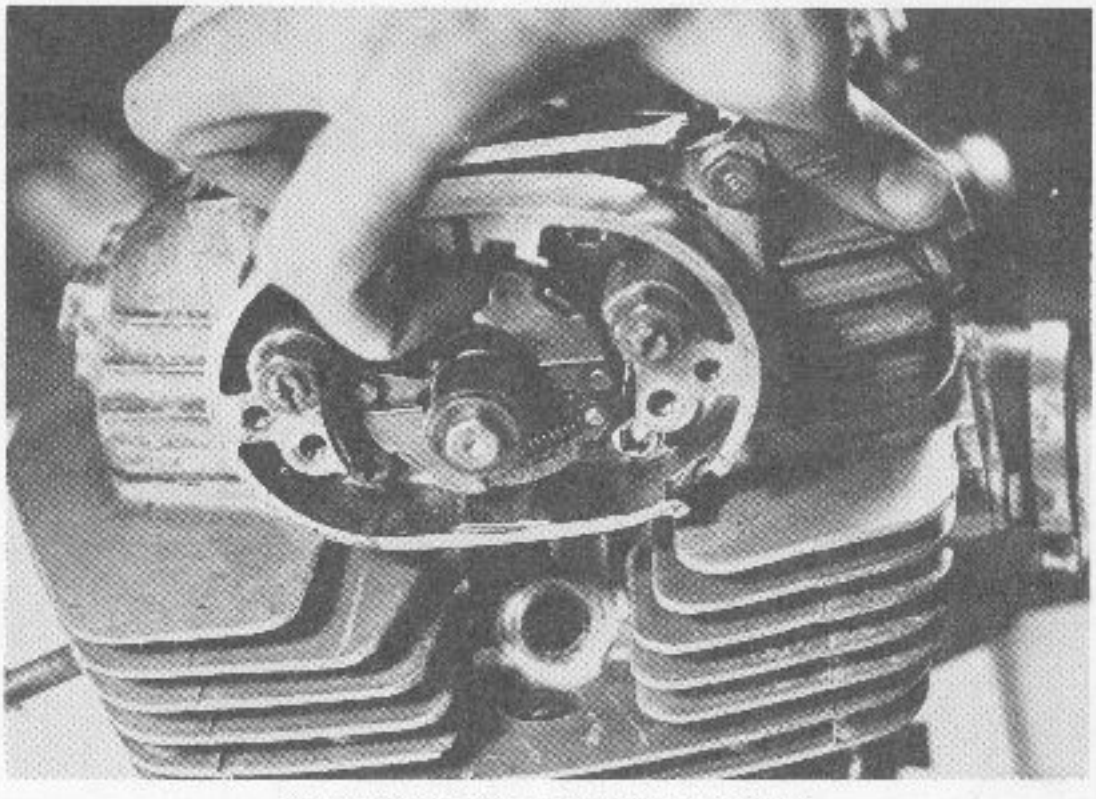
To check the operation of the advance mechanism, remove the breaker plate. Open the weights with your fingers, then release them. The weights should return by themselves.

If they do not, either the springs are weakened, or the weights are sticking. If the breaker cam does not turn very easily, it may be rusted. Defective advance mechanisms must be replaced if satisfactory operation cannot be obtained.

Spark Plugs

1. Spark plugs should be removed, cleaned, inspected, and gapped every 2,000–3,000 miles under normal conditions. Every 4,000–5,000 miles, the plug should be replaced regardless of apparent condition.

2. Clean old plugs with a wire brush, removing all deposits from the center

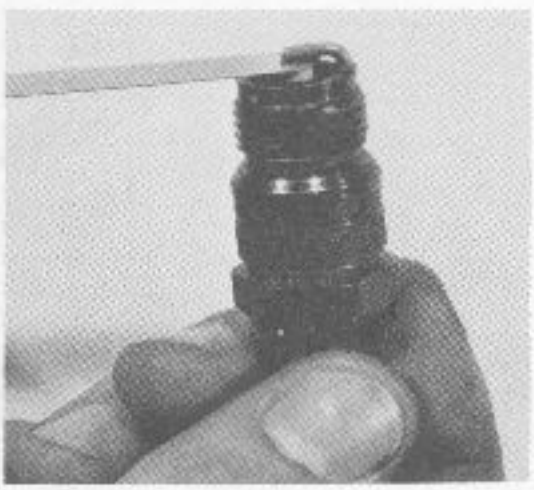


Checking timing advance unit for proper operation.

and side electrodes. Wash the plug thoroughly in a solvent after cleaning. If a commercial "plug cleaner" (sandblaster) is used, note that oily or oil-fouled plugs should not be cleaned with these devices as the oil will catch and hold the abrasive cleaning particles.

3. Check the condition of the center and side electrodes. Replace the plug if they are worn (rounded or partially melted). Use a points file to square off the center electrode.

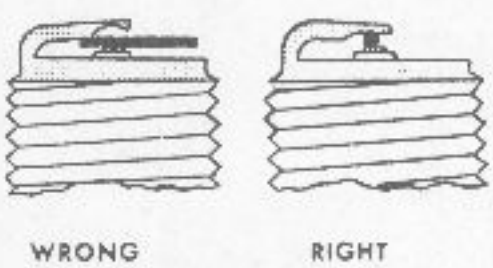
4. Replace the plug if there is a greenish tint on the electrodes indicating extremely high operating temperatures.



Setting plug gap

5. Check the plug gap with a wire-type feeler gauge. Proper gap for all models is 0.024–0.028 in. (0.6–0.7 mm). Adjust the gap, if necessary, by bending the side electrode. The feeler gauge should be a slip fit in a properly gapped plug.

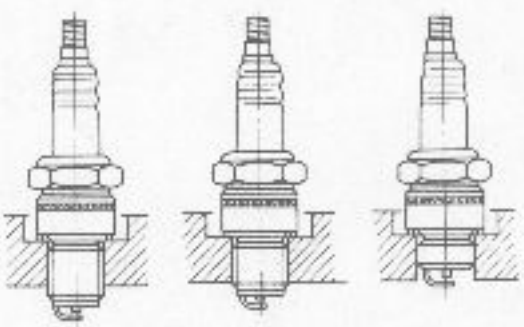
NOTE: *Although a blade-type feeler gauge can be used to gap new spark plugs, used plugs should be gapped with a wire-type feeler gauge as shown.*



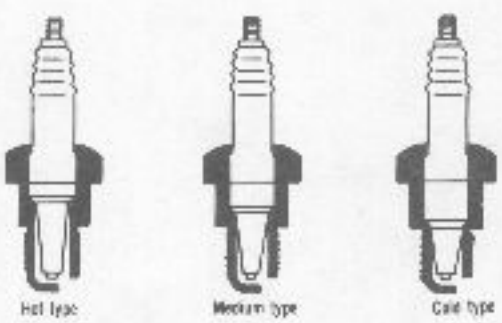
Used spark plugs should be gapped with a wire-type feeler gauge, as shown (right)

6. If new plugs are being fitted, be sure that they are the correct heat range and reach. The latter is very important. If the reach is too short, the spark will be partially shielded by the spark plug hole with adverse effects on the ignition process. In addition, the carbon will cover the lower plug hole threads, making it difficult or impossible to fit the correct plug later.

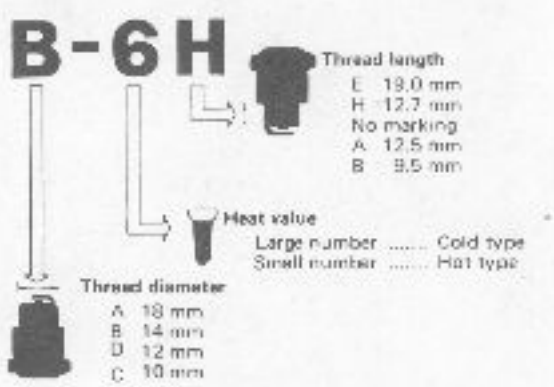
Heat range may be varied somewhat to suit riding conditions. The recommended heat range is suitable for average use.



Be sure that the correct reach plug (center) is fitted



Spark plug heat range is a function of the length of the center electrode insulation



NGK spark plug interpretation code

7. Before installing spark plugs, ensure that the copper washer is fitted. Coat the plug threads with a light coat of grease or a graphite or moly-based lubricant. Torque plugs to about 18 ft lbs. Do not overtighten.

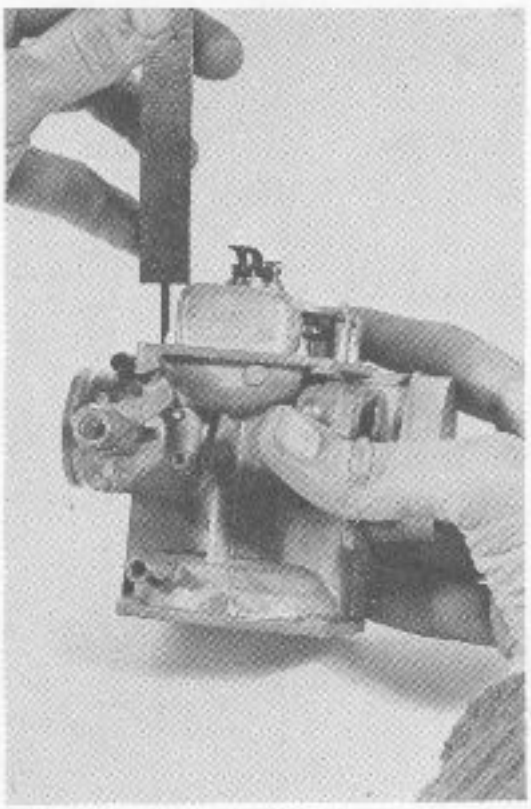
Carburetor

Three adjustments to be made to the carburetor are the float level, the idle mixture, and the idle speed. For the first of these, the carburetor must be removed from the motorcycle.

ADJUSTING FLOAT LEVEL

Generally, float level will not need adjustment unless the carburetor has been disassembled, fuel delivery problems have been noted, or considerable mileage has been covered.

1. Remove the carburetor from the motorcycle as outlined in the "Fuel Systems" chapter.



Checking float level

2. Remove the float bowl. Remove the float bowl gasket.

3. Float level is defined as the measured distance from the float bowl mating surface on the carburetor body (gasket removed) to the top of the floats, when the tang of the float arm is just touching the end of the float needle. A special gauge is available to check the float level although a vernier caliper can also be used.

4. With the carburetor held at about a 45° angle, gradually lower the floats until the tang of the float arm just touches the end of the float needle. The tang should not depress the needle, but just contact it. Measure the distance from the carburetor body to the top of the floats. Compare the reading with the proper float level for your machine as given in the "Carburetor Specifications" chart at the end of Chapter 6.

Bend the float tang to adjust float level

5. If the adjustment is necessary, bend only the float arm tang to raise or lower the float level.

6. Float level will not be correct if the needle is worn, or if there is foreign matter on the needle seat. Refer to "Fuel Systems" for more information.

IDLE SPEED AND MIXTURE

NOTE: *These items must be adjusted when the engine is at operating temperature.*

350 Models

1. Ensure that the throttle cable adjustment is approximately correct so that the cable has enough slack to allow the throttle plates or slides (SL 350) to be fully closed.

2. Screw the pilot screw in carefully until it bottoms lightly, then turn it out the number of turns shown in the "Tune-

Setting the pilot screw

Adjusting the throttle stop screw (350)

Up Specifications" chart at the end of this chapter.

3. Start the engine. When operating temperature is reached, unplug one spark plug lead and adjust the throttle stop screw for the other cylinder so that the engine idles as slowly as possible. Then turn the pilot screw in or out until the engine runs smoothly. It should not be necessary to vary the screw more than one half turn in either direction from the given setting.

4. Connect the spark plug lead and run the engine a few moments to allow the engine to clear out. Repeat Step 3 (above) for the other cylinder.

5. Connect both plug leads again and turn each throttle stop screw out by equal amounts until the proper idle is reached.

6. Check that the two carburetors are synchronized by opening and closing the throttle while watching the throttle stop screws. Both screws must begin to move at the same time when the throttle is opened. If one begins to move before the other, use the cable adjusters on the carburetors so that the movement of the stop screws is synchronized.

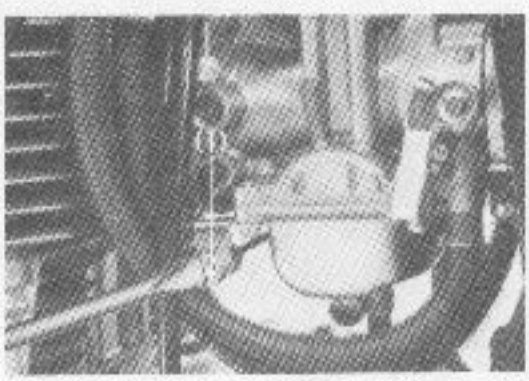
7. Snap the throttle open and closed several times to make sure that synchronization is maintained.

8. Adjust the throttle cable free-play using the adjuster near the twist-grip so that the throttle has 10–15° of free rotation before the stop screws begin to move.

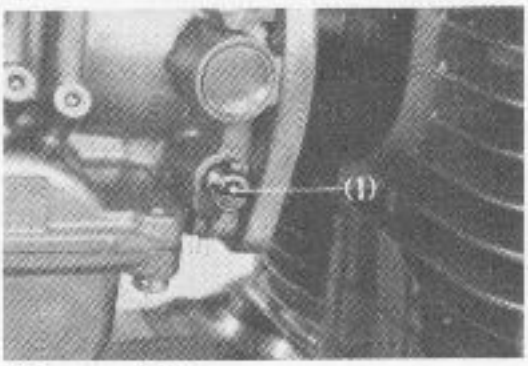
360 Models

1. Turn each pilot screw in carefully until it bottoms lightly, then turn each out 1 turn. Using the throttle stop screw, set the idle at 1,200 rpm. Turning the screw in will increase the idle speed.

2. Turn the pilot screw for one cylinder in or out until the highest idle speed is reached. Perform this operation



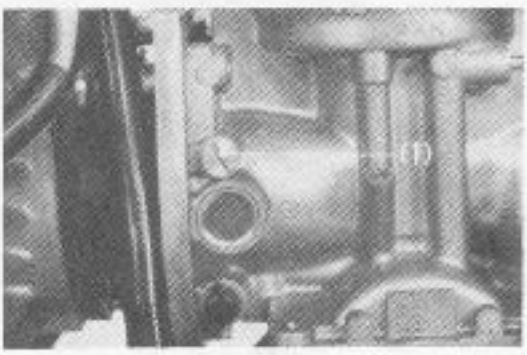
Throttle stop screw (1) (360)



Pilot screw (1) (360)

for the remaining cylinder. Reset the idle speed with the throttle stop screw if necessary.

3. If after performing the above operations the correct idle speed cannot be obtained or the exhaust pipe backpressure differs between the two cylinders, synchronize the carburetors as described below.

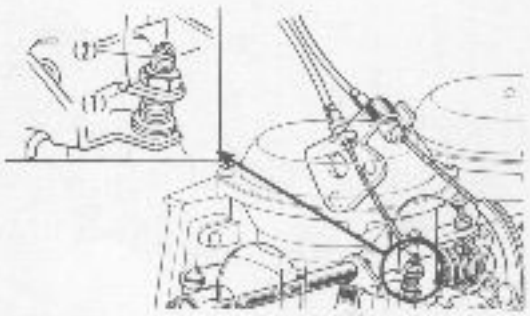


Vacuum gauge plug (1) (360)

4. Remove the fuel tank and connect it to the carburetors with longer fuel lines. The fuel tank must be higher than the level of the carburetors. Remove the plugs from the carburetors and install vacuum gauges in their place.

5. Start the engine and note the reading on the gauges. The difference in vacuum between the two cylinders should be less than 2 cm Hg, and both should be within the range of 16–24 cm Hg.

6. If the difference in vacuum between the two carburetors is greater than 2 cm Hg, loosen the locknut on the adjusting screw and turn the adjusting screw in or out until both carburetors are within 2 cm Hg of each other. When the adjustment is complete tighten the locknut and rev the engine up a few times. Recheck the gauges and readjust if necessary.



Adjusting screw (2) and locknut (1)

7. If the carburetors cannot be adjusted so that they are within 2 cm Hg of each other or if either carburetor is out of the range of 16–24 cm Hg, check the following:

a. Air leaks around intake manifold or air cleaner;
b. Ignition timing;
c. Tappet clearance;
d. Compression pressure;
e. Spark plug gap and condition;
f. Punctured carburetor diaphragm.

8. Repeat Steps 1 and 2 to adjust the pilot screw and idle speed.

Spark Plug Readings

Examination of the spark plugs can give an indication of the accuracy of your carburetor settings, whether the right plug is being used, and sometimes the general mechanical condition of the top end of the engine. Be advised however that it is easy to misread plugs, and this should not be the sole factor in determining what changes should be made.

1. To obtain plug readings, first adjust the tappets, ignition timing, and carburetor as described in the previous sections.

2. Clean and gap your plugs, or fit new ones. Use plugs of the recommended heat range.

3. Accelerate through at least three gears, running the engine close to the red line. This is best done up a slight incline. Then quickly shut off the throttle, pull in the clutch, and kill the engine as simultaneously as possible.

Normal

Oil-fouled

Carbon or cold-fouled

Overheated

Core-bridged

Splash-fouled: caused by installation of new plugs after a long-delayed tune-up

4. Remove the spark plugs and examine them for the following conditions:

a. A wet, black, and shiny deposit on the plug base, electrodes, and ceramic tip (around the positive electrode) indicates an oil-fouled plug caused by worn rings and pistons, loose valves, bad valve guide seals, weak spark, faulty ignition circuit, improper points gap, dirty points, improper timing (overly retarded), weak coil, or too cold a plug heat range;

b. A smooth, sooty, jet-black deposit indicates an excessively rich gas mixture, long periods of engine idling, or too cold a plug;

c. A very light brown, dry, blistered, or glassy-looking deposit indicates an overheated plug. This may be accompanied by cracks in the ceramic tip and is caused by an overly lean air-fuel mixture, an excessively high operating temperature, improper valve seating, advanced ignition timing, or a plug which is too hot. The deposit becomes a conductor when hot and causes irregular firing, especially at high rpm;

d. A plug with a milky or tan deposit indicates a well-balanced ignition and mixture. This type of deposit will not adversely affect performance if kept to a minimum, but no type of deposit should be allowed to build up. Both of the plugs should burn the same way. When in doubt about the condition of your plugs, it's best to replace them. This is the best rule for efficiency.

5. Plugs with electrodes worn or rounded either through excessive heat or normal wear must be replaced. Also, replace any plug if the ceramic insulator around the center electrode is cracked.

Spark Plug Heat Range

Plug heat range can and should be varied to suit individual riding habits. The standard plug should provide adequate performance for normal riding. Stop-and-go riding, especially at urban speeds, may require a plug one heat range hotter. This will be added insurance against plug fouling or loading up in traffic. Under no circumstances should a

plug more than one step hotter than the recommended plug be fitted.

If the machine is used primarily for high-speed touring or the like, it may benefit from the installation of a plug one heat range colder than normal. This will allow the plug tip temperature to remain in the safe zone even when the engine is under heavy loads. The chief disadvantage of the colder plug is that it may cause the engine to load up at low speeds.

Because most popular plugs in use today are designed to meet a variety of conditions, (i.e., they are wide heat range plugs), most riders will find that the standard plug will work with no trouble.

Tune-Up Specifications

	350	360
ENGINE		
Valve Clearance: (cold)		
Intake (in./mm)	0.002/0.05	0.002/0.05
Exhaust (in./mm)	0.004/0.10	0.003/0.09
Compression		
Pressure (psi)	170	170
Maximum variation (psi)	15	15
IGNITION		
Spark plugs		
Standard makes *	NGK/ND	NGK/ND
Type: standard	B8ES/W24ES	B8ES/W24ES
cold	B9ES/W27E	B9ES/W27E
hot	D7ES/W22ES	B7ES/W22ES
Gap (in./mm)	0.028–0.032/0.7–0.8	0.028–0.032/0.7–0.8
Point gap (in./mm)	0.012–0.016/0.3–0.4	0.012–0.016/0.3–0.4
Maximum advance (deg @ rpm) **	27°–33° @ 3000	NA
CARBURETION		
Idle speed (rpm)	1100	1200
Pilot screw opening	¼–1	1
Vacuum range, (in./cm Hg)	—	8.2–9.5/16–24
Uniformity (in./cm Hg)	—	0.78/2.0

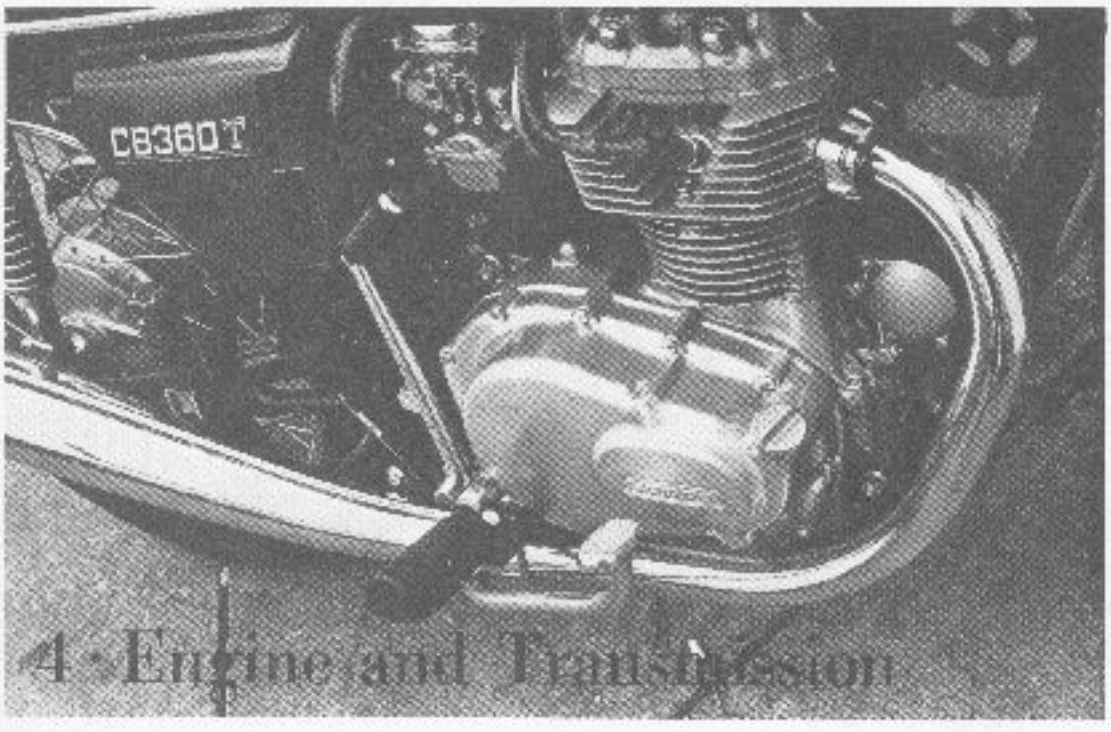
* Other reputable makes are also acceptable. Be sure to select plugs of the proper heat range, reach, and diameter.
** Includes initial (static) advance
— Not applicable
NA Not available

Spark Plug Comparison Chart

Thread Size	Heat Range	AC/K Standard Type	AC/K Projected Tip Type	Champion Y—Projected Type C—Gold Palladium Electrode	AC S—Projected Type	Detroit (ALL)	Buick	AC/K F—Projected Type	Auto Lite
14 mm	Hot ↑	B—4	BF—4	J14J, J14Y, UJ18Y J19J, J12J J11, J13J	C39, 48S 48, C47, C47W, M47 46, C46, M46	W14	W45T3 W142T3	FS20 FS30, FS45P	A8S AT11, AT16, AZ9, A9 AT8, A8XM
		B—6S	BF—6S	J13Y, UJ12Y, J11Y, J13Y J10Y, UJ10Y, J8, J8J J7, J7J, UJ6	45, C45, C45W, M47, 45S 44, C44, M44, M44B, 44S M044	W17	W172T3	FS50, FS55P FS70	A7, AT6, A42 AT4
		B—7S		J6, UJ6, J6J J7	43, C42-4, C43, 43S, MC42 M44C, M43	W22	W225T3	FS75	A3, AT3
		B—7C * B—77C *		J82R					A23
½ in. Reach	cold	B—8S B—8S B—10		J4, J4J, J61Y, J60R J2J, J67R	42, C42-1, M42 41	W24	W240T3	FS100 FS100-2	AT2 AT1 A9H
14 mm	hot ↑	B—4L		H10 H11 H10, H10J, H18Y	47L 45L, C45L, TC45L		W125T4	FA50, FA50H	AL11 AL9, ATL8 AL7, A7
⅝ in. Reach	↓ cold	B—6L		H8, H9J H14Y	43L, C43L, C43LY			FA70	ATL4, ATL3
14 mm	hot ↑	B—4H	BF—4H	L14, UL15Y, L10	46FF, 46FFS, 45FFS, 45FF	W8FF	W85T1	F20, F30	AE32, AE3
		B—7HS		L00	45F, M45FF	W14F	W145T1	F55P	
		B—6HS	BF—6HS	L86, L85, L03Y UL12Y, L88	44FFS, 44FF, M43FF 44F, 43F, 43FFS	W17F	W175T1, W175T7 W200T7, W200T35	F70, F65P F75	AF4, AE42 AE3, AE32
14 mm		B—7HS	BF—7HS	L7, L87Y, UL87Y L84, L82Y, UL82Y L7	42F, 42FF, 42FS M42FF, MC42F	W22F	W225T1, W225T43 W225T7	F80	AE3, AE32
		B—7HC * B—7HZ				W24F	W240T1, W240T16	F100	
		B—77HC *		L82R			W260T1		
		B—8HS		L4J, L84Y, L86Y			W270T18		AE303
		B—8HC * B—8HCS *		L60R, L3C			W280M1		
⅜ in. Reach	cold	B—8HS		L3C			W310T16		AE303
		B—9HC * B—9HCS *		L87R					
		RCHX ** B—10H							

14 mm ½ in. Reach	hot	B—4E	BP—4E	N21, N18Y	47XL, 48XLS	W9EP	W97T2, W127T2	FE20, FE30	AG9
		B—5ES	BP—5ES	N18	48N, 46XL, 45XLS	W14E	W145T2	FE50, FE45P	AG7, AG52
			BP—5ESL	N9, N14Y, N15Y		W14EP	W145T30, W180T2		AG5
		B—6ES	BP—6ES	N84, N88	45N, 45XL, C45XL	W17E	W175T2, W175T30	FE70, FT55P	AC4, AC42
				N8, N12Y, UN12Y	44N, 44XL, 44XLS	W20EP	W200T27, W200T30	FE75	AC3, AC32
		B—7ES	BP—7ES	N11Y, N10Y, N3	44XLS, 43XLS, 43N, 43XL	W22E, W22ES	W227T2, W230T30	FE90, FT65P	AC2, AC23
		B—7EC *		N6Y, N7Y					
		B—7EC *		N4					
		B—8ES	BP—8ES	N62R	C42N		W240T2, W240T28	FE100	
				N3, N3G	42XL, 42XLS	W24E, W24ES	W250P21, WG250T28	FE220	
		B—9ES/EV		N60E, N2	41XLS	W27E	W360T38, W585P21	FE350	
	cold	B—10E				W31E	W290M2, W300M3		AC701
14 mm Taper Seat	hot		BP—6FS	UBL13Y, BL11Y	46TS, 45TS, 44TS		WA225T40		AF52, AF42
	cold		BP—7FS	BL7Y, BL8Y	43TS, 45TS, 40TS		WA280T40		AF32
18 mm ¾ in. Reach	hot	D—4H							
		D—5HS				X17P	X177T1		
		D—6HS		P—8Y	S134FS	X20FS	X200T1	TW270	HF3
	cold	D—8HS		P—7	S132F	X24FS	X300T1	TW275	HF2
		D—10HS		P—6	S121F	X28FS	X330T1	TW280	HF1
18 mm ¾ in. Reach	hot	D—4F							
		D—6FS				X20E	X240T17		
		D—7E							
		D—7ES							
		D—8E		R—8Y		X22E, X22ES	X270T17		
		D—8ESL							
		D—8ES		R—6, R—8G	S123XL	X24E, X24ES	X300T2		
		D—10E							
	cold	D—10ES			S121XL				
18 mm ¾ in. Reach	hot	C—4H							
		C—6H		Z—10	S104F	U20FS	U175T1	T30	PR3
		C—7HS		Z—9		U22FS	U260T1	T70	
		C—8H				U24F		T90	
		C—10H		Z—8	S103F				
	cold								

* Competition type with short side electrode
** Surface-gap type for CDI systems



4 • Engine and Transmission

Service Notes

Engine work calls for extra caution due to the close tolerances you will be working with, and the fact that many engine components are susceptible to accidental damage through careless removal or installation methods.

1. It is important that no undue force be used when removing or installing engine parts. If a component resists removal, be sure that you are using the correct procedure and the right tool. Use a commercial parts loosener or penetrating fluid whenever necessary to help loosen frozen or rusted parts or fasteners.

2. All parts must be installed in their original locations. This will necessitate marking parts like pistons, rocker arms, valves, springs, etc., so that they can be reinstalled in their proper places.

3. All engine components should be cleaned thoroughly in a solvent after removal, dried, inspected, and then generously coated with fresh engine oil when installed.

NOTE: *After rebuilding any part of the engine, make sure that all components have some oil on them before starting the machine.*

4. Certain precautions should be taken after rebuilding an engine. If the engine has been removed from the frame, be sure that all mounting hardware is secured before operation. Check these again after the engine has been run for several miles and cooled.

5. If the top end has been disturbed, set the cylinder head torque to the proper specification. Adjust the cam chain and valves. After the engine has been operated for several miles, wait until it is cold and check these adjustments again. These items should be checked at 500 and 1,000 miles after the rebuild.

6. A rebuilt engine must be treated like a new one insofar as breaking in new parts is concerned. Generally, about 500 miles is sufficient to seat piston rings. Bearings should be given at least 1,000 miles before they can be considered broken in. The engine oil and filter should be changed after the first 500 and 1,000 miles. Lugging or over-revving the engine during this period is to be avoided. Allow the engine to warm up for several minutes before operation when starting from cold.

Most importantly, keep a close check on engine temperature for the first several miles after rebuilding.

The engines covered in this book are single overhead camshaft (SOHC) vertical twins with crankpins set 180° apart.

Before beginning service work on the engine, take some time to read each procedure. This will inform you of the need for any special tools or replacement parts such as gaskets and oil seals.

The following components can be removed for service and inspection with the engine in the frame.

360 MODELS

Cylinder head and components;
Cylinder and pistons;
Clutch and primary drive;
Oil pump and filter;
Starter motor and starter clutch;
Alternator;
Gearshift shaft.

350 MODELS

Clutch and primary drive;
Oil pump and filter;
Starter motor and starter clutch;
Alternator;
Gearshift shaft;
Cam chain tensioner.

Engine Removal and Installation

The following notes apply to all models:

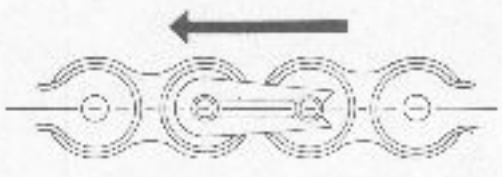
1. Drain the oil before removing the engine.

2. Degreasing and thoroughly cleaning the engine before removal is highly recommended. Be especially attentive to the cylinder base and the underside of the crankcase, and around mating surfaces.

3. When disconnecting the final drive chain, use pliers to remove the masterlink spring clip. Do not pry the clip off with a screwdriver or it will be distorted and then must be replaced.

4. Upon installation, install the spring clip with the closed end facing the direction of chain rotation.

5. Tighten all mounting bolts securely when the engine is installed, and recheck them for tightness after the engine has run for several miles and cooled off.



DIRECTION OF TRAVEL

Install the spring clip with the closed end facing the direction of chain rotation

350

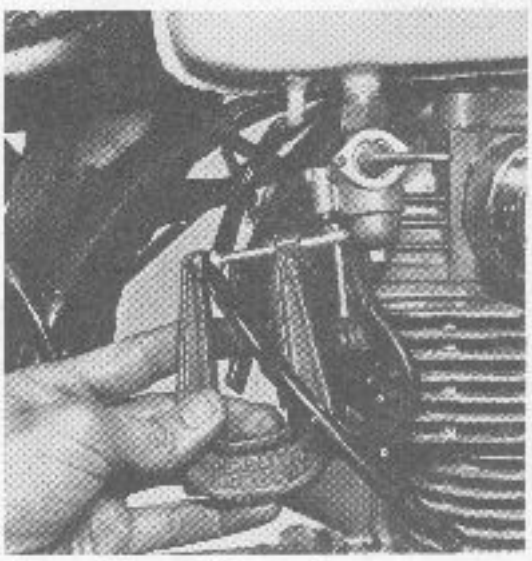
1. Remove the oil filler cap and drain the oil. When the oil is completely drained refit the filler cap and drain plug.

2. Remove the exhaust system.

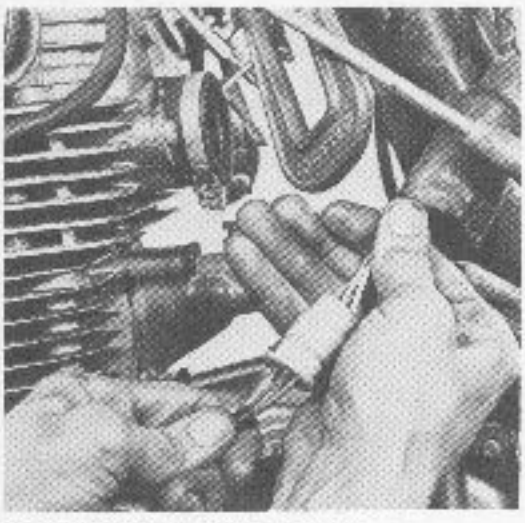
3. Open the seat and remove the battery. When disconnecting the battery always disconnect the negative terminal first, this will prevent shorting the battery to the frame when disconnecting the positive terminal.

4. Disconnect the starter motor cable (if fitted) from the solenoid.

5. Turn the fuel petcock to the off position and disconnect the fuel lines. Use two small C-clamps to pinch off the fuel balance tube and a spare piece of fuel line. Disconnect the balance tube from one side of the fuel tank, and plug the open side of the tank with the spare piece of pinched fuel line. Remove the tank from its rear mount by pulling back on the rubber strap while lifting up the



Closing off the tank balance tube



Disconnecting the alternator wiring

Disconnecting the tach cable from the engine

rear of the tank. Pull the tank up and back to remove it from the front mounts.

6. Disconnect the alternator leads from the wiring harness at the connector. Disconnect the yellow and blue breaker point leads from their connectors.

7. Remove the rear horn mounting bolt and loosen the front bolt, tilt the horn out of the way, as shown.

8. Disconnect the tachometer cable from the engine after removing the phillips head set screw.

9. Remove the stepbar (except SL models) and gearshifter. Remove the four screws from the countershaft sprocket cover and remove the cover with the clutch cable still attached. Take care not to lose the steel ball from the clutch release mechanism when removing the cover.

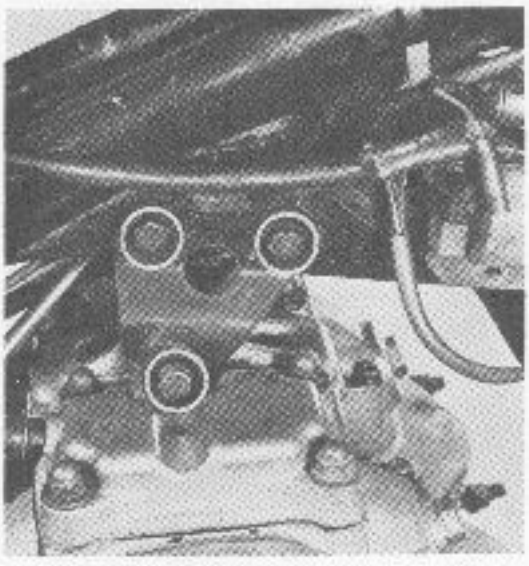
10. Remove the masterlink from the drive chain. Install the masterlink on one end of the chain for safekeeping.

11. Disconnect the brake rod from the brake pedal, remove the brake pedal pivot bolt, and the brake pedal.

12. Loosen the connecting bands holding the carburetors to the intake manifold and the air cleaners. Disconnect the choke band from the right carburetor. Remove the carburetors and disconnect the throttle cables. Refer to Chapter 6, "Fuel System." On SL models with direct con-

Move the horn out of the way before removing the engine

Disconnecting the brake rod



Top engine mount (350)

trol type carburetors, place the throttle slides in a plastic bag secured with a rubber band around the cable.

13. Disconnect the spark plug leads. Loosen the spark plugs.

14. Remove the three bolts from the top engine mount and remove the two mounting plates.

15. Remove the nuts from the lower engine mounting bolts. Remove the starter motor cable from the rear mounting bolts and remove all of the mounting bolts. Note that the battery negative cable will be completely disconnected when the nut is removed from the upper rear mount. It should be removed and placed in a safe place.

16. Remove the engine, lifting it out of the right-side of the frame.

17. Installation is the reverse of the removal procedures; however, note the following points:

a. The starter motor cable is held in place by two clamps fastened to the rear engine mounting bolts;

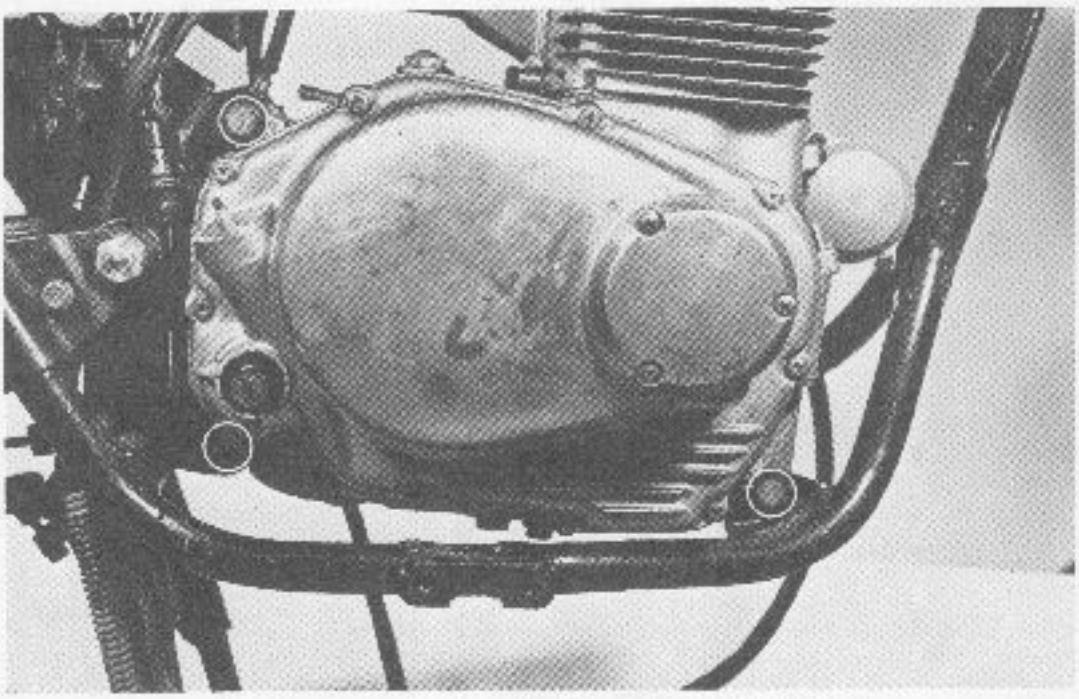
b. The battery negative cable is fastened to the upper rear mounting bolt on the right-side. Be sure to clean all dirt and paint from the frame so that the cable may make a good ground;

c. A spacer is fitted between the frame and the engine on the left front mount (CB, CL models);

d. When connecting the drive chain be sure that the opening in the masterlink spring clip is facing the opposite direction of chain rotation;

e. Install the mounting bolts from the right-side of the frame and the nuts from the left;

f. Check that the steel ball is still in



Battery negative cable (arrow) and lower engine mounting bolts

Spacer location (350)

place in the clutch release mechanism when installing the countershaft sprocket cover;

g. Adjust the throttle cables, rear brake, valve clearance, and ignition timing. Be sure that the drain plug is tightened and fill the sump with oil.

360

1. Remove the oil filler cap and drain the engine oil. When the oil has completely drained, refit the filler cap and the drain plug hand-tight.

2. Open the seat and remove the battery. When disconnecting the battery always disconnect the negative terminal first, this will prevent shorting the battery to the frame when disconnecting the positive terminal.

3. Disconnect the starter motor cable from the solenoid.

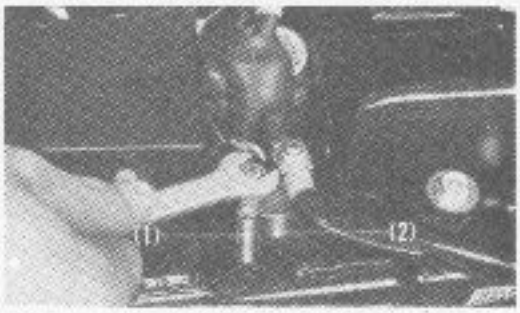
4. Turn the fuel petcock to the off position and disconnect the fuel lines from the petcock and remove the fuel tank.

5. Disconnect the yellow and blue breaker point leads from their connectors under the fuel tank.

6. Disconnect the tachometer cable from the engine after first removing the phillips head set screw.

7. Remove the exhaust system.

8. Remove the gearshifter pinch-bolt and pull the gearshifter from the shifter shaft. Remove the four screws from the countershaft sprocket cover and remove



Starter motor cable (1) and solenoid (2) (400 models shown)

Removing the countershaft sprocket bolts (1), locking plate (2), sprocket (3), and chain (4) (360)

the cover with the clutch cable attached. Take care not to lose the steel ball from inside the clutch release mechanism when the cover is removed.

9. Remove the two bolts from the countershaft sprocket. Turn the countershaft sprocket lockplate until the tabs on the inside of the lockplate line up with the slots on the countershaft, and remove the lockplate. Remove the countershaft sprocket and the chain from the countershaft.

10. Loosen the connecting bands holding the carburetors to the intake manifold and the air cleaner. Pull the carburetors straight back until they are free of the intake manifold and remove them from the left-side. Disconnect the throttle cables from the carburetors. Refer to Chapter 6, "Fuel System."

11. Disconnect the alternator wiring from the wiring harness at the connector between the air cleaners. Remove the spark plug leads from the spark plugs.

12. Disconnect the brake rod from the rear brake pedal. On CL models, remove the pinch-bolt from the pedal and pull the pedal off the shaft. On CB models, remove the bolt from the end of the pivot shaft and remove the shaft and the pedal.

Disconnecting the alternator wiring at the plastic connector (1)

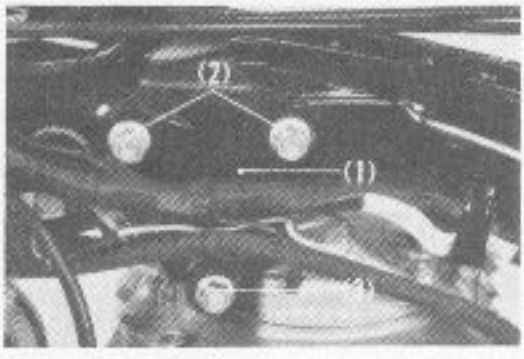
13. Remove the three bolts from the upper engine mount and remove the two mounting plates.

14. Remove the two bolts from the mounting plate at the upper right mount and the through-bolt. Remove the mounting plate.

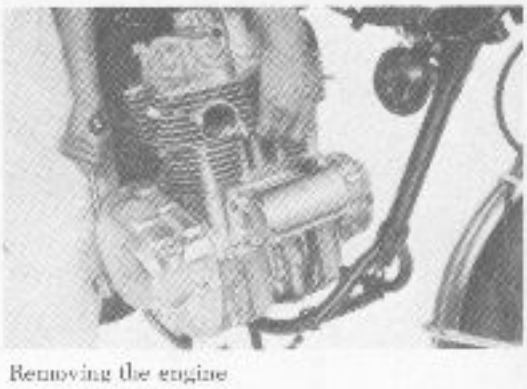
15. Remove the four front mounting bolts, three from the right-side and one from the left-side.

16. Remove the nuts from the lower rear mounting bolt and remove the bolt and the foot pegs.

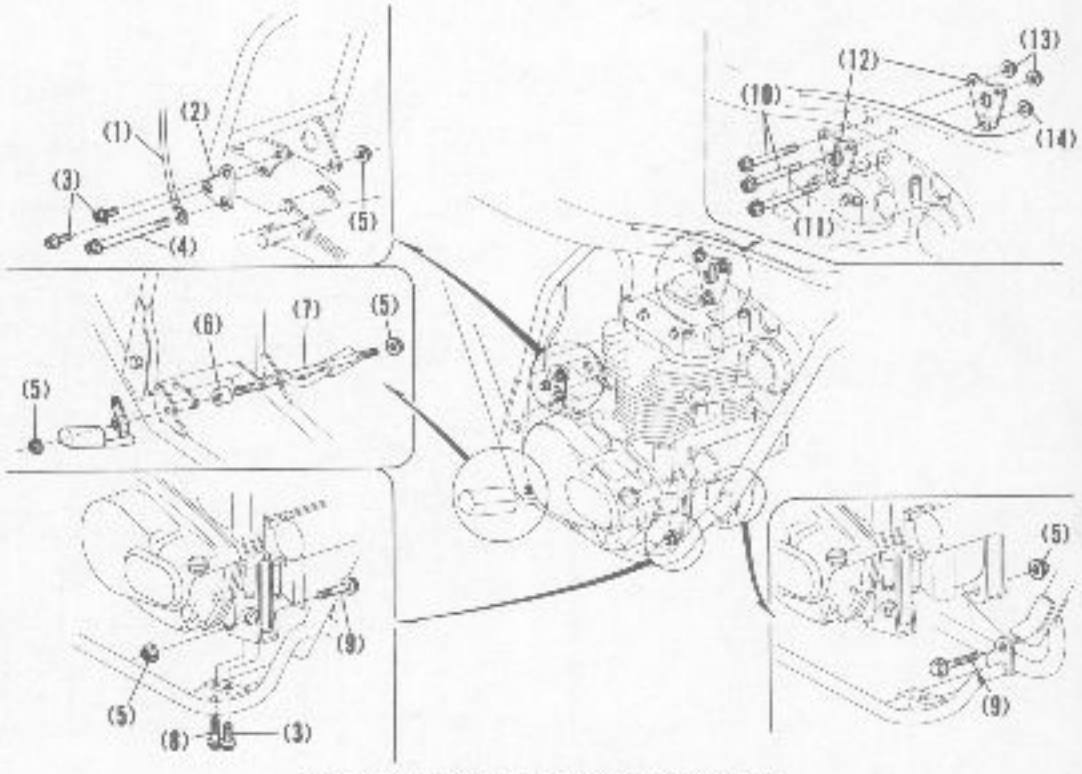
17. Remove the engine from the right-side.



Top mounting (360)



Removing the engine



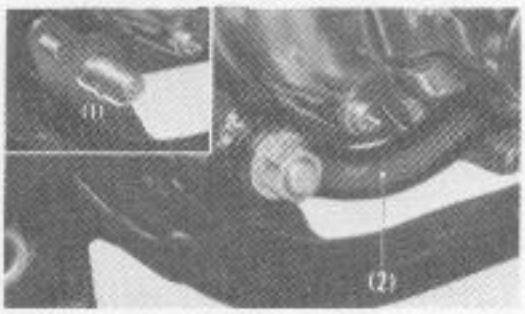
Engine mounting bolt and plate locations (360)

18. Installation is the reverse of the removal procedures. Note the following points:

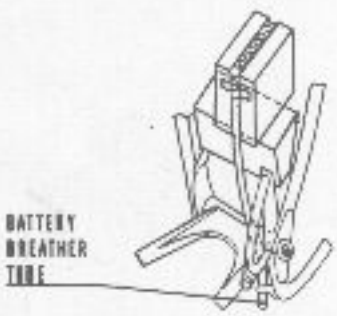
a. Install the engine in the frame from the right-side;

b. Install the mounting bolts and plates as shown;

c. The battery negative terminal is fastened to the upper rear engine mounting through-bolt. Scrape any rust or paint from the mounting plate before attaching the cable; this will ensure a good ground;



The lower mounting bolt (1) should be threaded equally into each nut; footpeg (2)



d. The lower rear mounting bolt should be threaded equally into each nut;

e. Connect the starter motor cable, and route the battery overflow tube as shown;

f. Before installing the countershaft sprocket cover, make sure that the steel ball is in place in the clutch release mechanism;

g. When connecting the fuel lines to the petcock, the right carburetor is connected to the rear outlet on the petcock and the left carburetor is connected to the forward outlet;

h. Adjust the throttle cable and clutch cable as described in the "Maintenance" chapter;

i. Adjust the valve clearance and ignition timing as described in the "Tune-Up" chapter;

j. When first starting the engine, remove one of the tappet covers and check for oil circulation to the head. Also check for air leaks around the carburetors.

Top End Overhaul

DISASSEMBLY

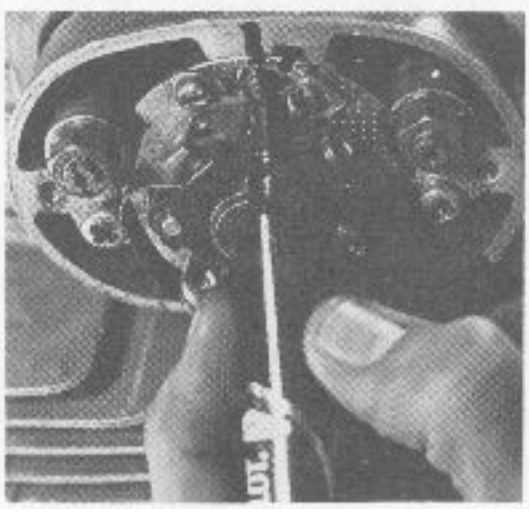
350

1. Remove the engine from the frame as described previously.

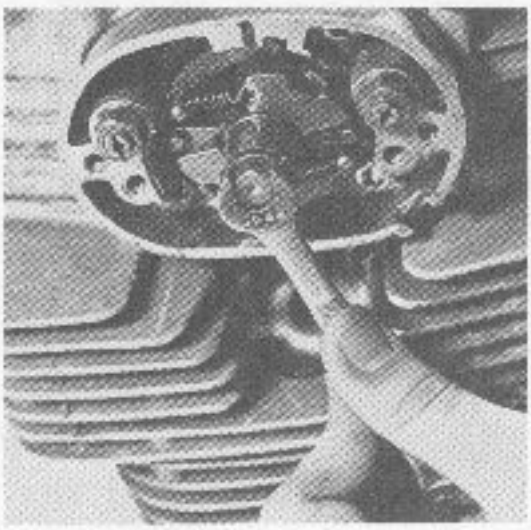
2. Remove the chrome covers from the point and tach drive housings. Remove the three phillips head securing screws from the alternator stator cover and remove the cover. Remove the spark plugs.

3. Remove the breaker plate after removing the two phillips head securing screws and disconnecting the yellow and blue leads from the wiring harness. The plate can be marked in relation to the point housing before removal for approximate setting of the ignition timing upon reassembly.

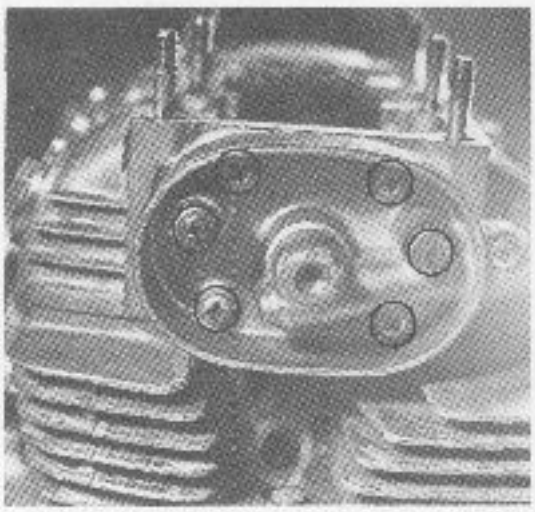
4. Remove the breaker cam bolt and washer from the left-side of the cam. Remove the spark advance unit from the left end of the camshaft; do this by looping a



Marking the breaker plate before removal to preserve timing



Removing the breaker cam bolt



Rocker arm shaft locknuts and tach drive housing mounting screws

piece of string behind the unit and pulling it off the camshaft.

CAUTION: *Note that if the* point cam *is removed from the advance unit it must be installed correctly with the weights fully open; it is possible to install the point cam 180° off, making proper ignition timing impossible.*

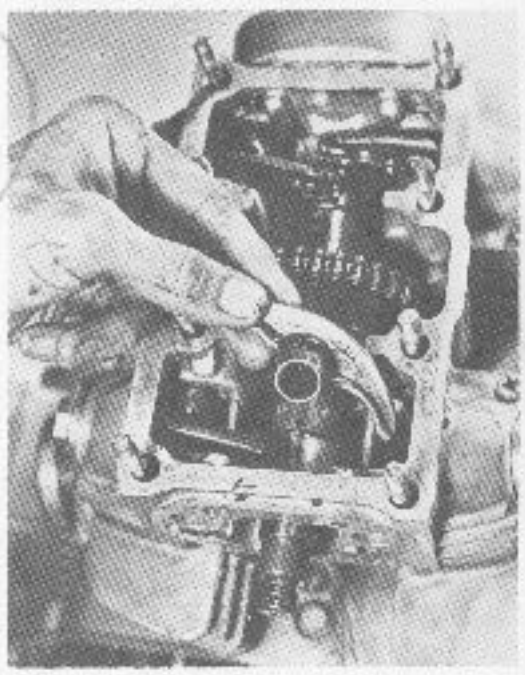
5. Loosen the eight cylinder head cap nuts ¼ turn at a time in an "X" pattern until they are all loose, then remove them and the washers beneath them. Remove the top cover, cover gasket, breather plate, and breather plate gasket from the cylinder studs.

6. Remove the four cam chain tensioner mounting bolts and remove the cam chain tensioner and gasket.

7. Using the rotor bolt, turn the engine over until all of the valves are closed. Remove the four locknuts and washers from the eccentric rocker arm shafts (note that these are special washers). Remove the four phillips head screws from the point and tach drive housings, and remove the housings, tapping around the sides with a plastic mallet if necessary to free them. Remove and discard the gasket.

8. Remove the rocker arm shafts and the rocker arms marking their position so that they can be installed in their original position upon reassembly.

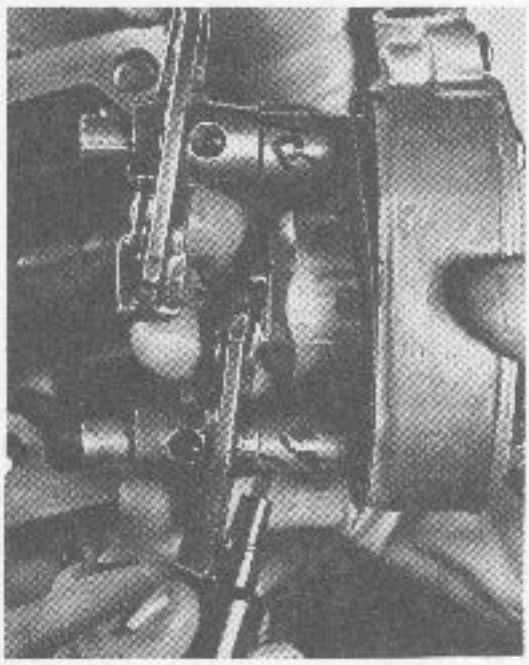
9. Temporarily install the point and tach drive housings, but do not install the mounting screws. Using the rotor bolt, turn the engine over until the "LT" mark



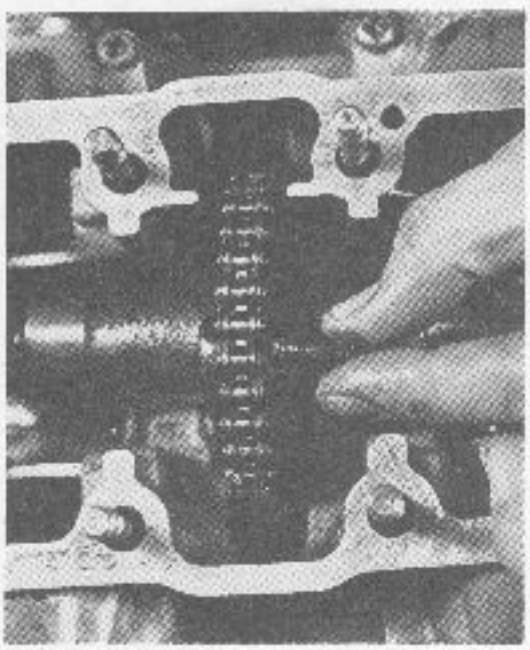
Removing a rocker arm

on the rotor is approximately 10° after TDC of the exhaust stroke (the exhaust lobe of the left cylinder should be facing the front of the engine) and remove the cam sprocket alignment bolt. Turn the crankshaft 360° so that the remaining cam sprocket bolt (shouldered sprocket setting bolt) can be removed.

10. Remove the point and tach drive housings. Slip the cam out from the right-side of the cam case with the "L" mark on the cam sprocket and the alignment pin



Mark the location of each rocker arm and shaft

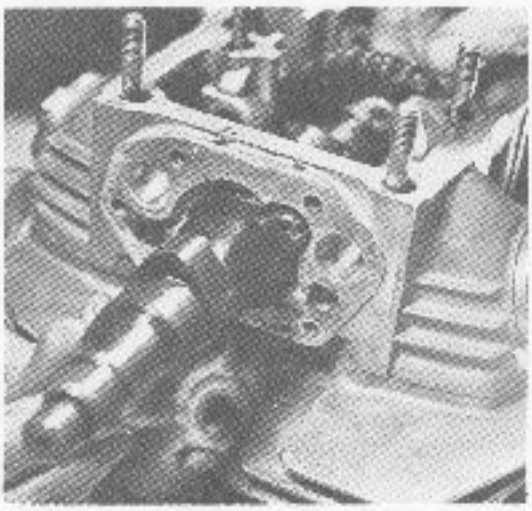


Removing the setting bolt

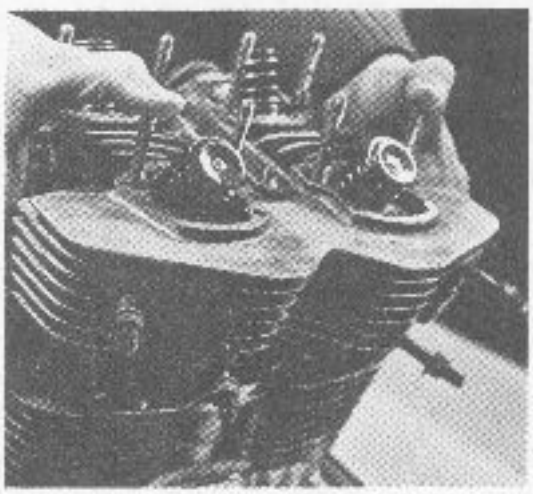
for the spark advance unit facing up. Slip a screwdriver through the sprocket to prevent it from falling through the head.

11. Remove the four phillips head screws from the cam case and remove the cam case and gasket.

12. Remove the two head set bolts located near the spark plug holes and lift



Removing the camshaft



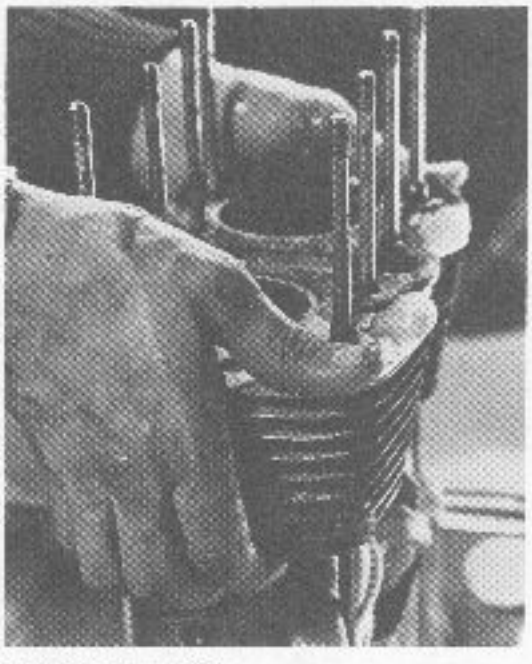
Removing the cylinder head

the head and head gasket off. Note the location of any dowel pins.

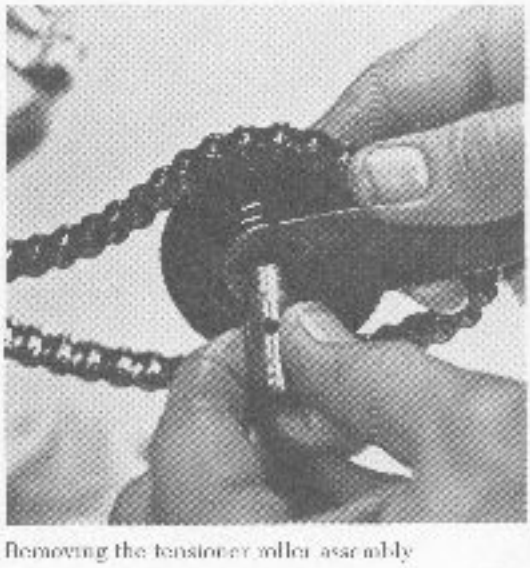
13. To remove the cylinders, hold the cam chain up and position the pistons so that they are at the same level. Lift off the cylinders, tapping around the base of the cylinder with a plastic mallet if necessary. Do not allow the pistons to fall against the crankcase.

CAUTION: *The cam chain tensioner roller located between the cylinders is held in place with two rubber pads. Once the cylinders are removed these are easily dropped into the crankcase.*

14. Carefully remove the cylinder base gasket and lift out the rubber pads from the cam chain tensioner roller with needlenose pliers. Slip out the roller pin



Removing the cylinders



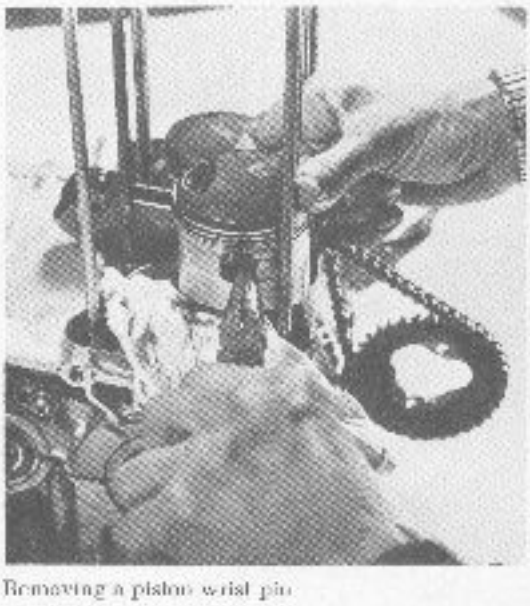
Removing the tensioner roller assembly

and remove the tensioner roller assembly.

15. Stuff a clean lint-free cloth into the crankcase under the pistons. Remove the circlip from the outside of each piston and push the wrist pin out from the inside. Remove the pistons and mark their location on the inside of the skirt.

CAUTION: *Do not strike the wrist pin to remove it as the connecting rod may be damaged if struck. If the wrist pin resists removal, heat the piston crown*

Removing a piston wrist pin circlip



Removing a piston wrist pin

Mark the pistons for location

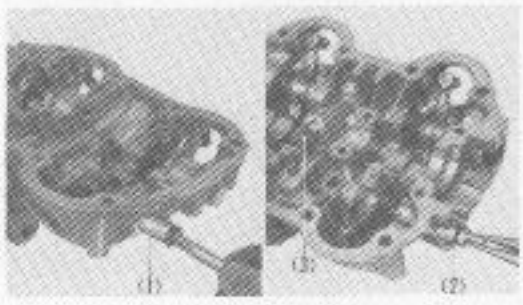
with a propane torch gently and evenly and then try to push out the pin. The wrist pin circlips once removed should be discarded and replaced with new ones upon reassembly.

360

The top end can be disassembled for inspection and service with the engine in the frame.

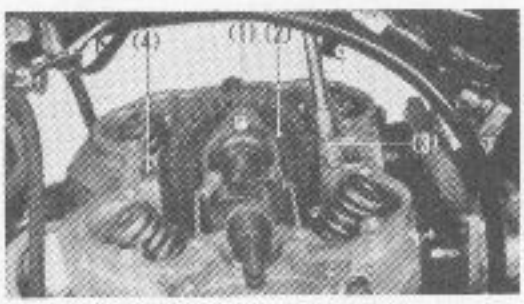
1. Open the seat and remove the fuel tank.
2. Remove the upper engine mounting plates after removing the three mounting bolts.
3. Remove the two phillips head screws from the point cover and remove the cover. Remove the breaker plate after removing the two securing screws and disconnecting the yellow and blue leads from the wiring harness.
4. Remove the spark advance unit from the end of the camshaft. This can be done by looping a piece of string around behind the advance unit and pulling the string. Note that the point cam is a part of the advancer unit, if the point cam is removed from the unit be sure that it is installed correctly. The point cam can be installed 180° off, making correct ignition timing impossible.
5. Remove the breather cover after removing the four mounting bolts.
6. Remove the spark plugs.
7. Disconnect the tachometer cable from the cylinder head cover after removing the phillips head set screw. Remove the tappet caps from the cylinder head cover.
8. Remove the three phillips head screws from the alternator stator cover and remove the cover. While watching the intake tappet for the left cylinder, turn the engine over with the rotor bolt until the intake tappet goes all of the way down and then rises. Continue turning the crankshaft until the "LT" mark on the rotor is 90° past the index mark on the stator. In this position the left cylinder should be 90° after top dead center (ATDC) of the compression stroke, and all of the valves should be closed.
9. Loosen the 14 cylinder head cover mounting bolts (6-6 mm, 8-8 mm) gradually and evenly in an "X" pattern until they are all loose (two are inside the

Removing the cylinder head cover (360)



Removing the rocker arm shafts (360)

breather cover), and then remove them. Remove the cylinder head cover working it out the left-side. Be sure not to lose the two dowel pins located between the cylinder head and the cylinder head cover. To inspect the rocker arms and the rocker arm shafts they will have to be removed from the cylinder head cover. To remove the rocker arm shafts from the right-side, unscrew the cap bolt from the cover and screw a 6 mm screw into the end of the shaft. Using the screw, pull the shaft out of the cover, the rocker arm and side spring can now be removed. To remove the rocker arm shafts from the left-side, pry out the rubber plug from the cover and pull the shafts out with a pair of needlenose pliers, remove the rocker arm and side spring.



Removing the tensioner holder (3) and tensioner slipper (4)

10. Remove the cam chain tensioner holder from the top of the cylinder head. Remove the tensioner slipper.

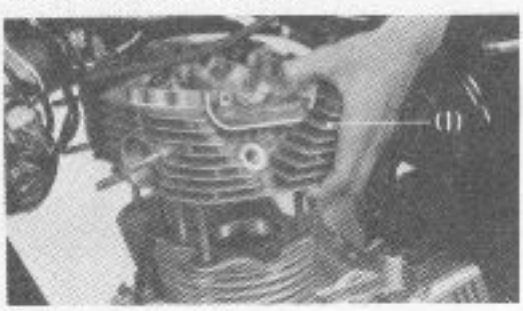
11. Using the rotor bolt, turn the engine over until one of the cam sprocket bolts is at the top of the sprocket, remove the bolt. Turn the crankshaft one complete turn (360°) and remove the remaining bolt.

12. Slip the cam chain off the sprocket and remove the cam and sprocket together. Take care not to let the thrust washers on the right-side of the cam fall into the engine. Slip a screwdriver through the chain to prevent if from falling through the head.

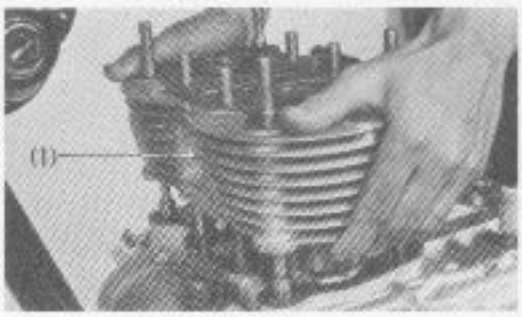
Remove the cam and sprocket (2 and 3) from the cam chain (1)

13. Remove the exhaust system and carburetors.

14. Remove the two 6 mm bolts located near either spark plug hole, then loosen the eight cylinder head nuts gradually and evenly in an "X" pattern until they are all loose, then remove them. Lift the head up and off the cylinder studs, tapping it around the bottom with a rubber mallet to break it loose if necessary. Remove the head gasket and the four dowel pins. If the cylinders are to remain in place, slip a screwdriver through the cam chain to prevent it from falling through the cylinders.



Removing the head (1)



Removing the cylinders (1)

15. Hold the cam chain up and position the pistons so that they are the same level in the cylinders. Lift the cylinders up and off the studs. Catch the pistons as the cylinders are removed so that they do not become damaged from hitting the crankcase. Remove the cylinder base gasket and the two dowel pins and stuff a clean lint-free cloth into the crankcase around the pistons.

16. Remove the wrist pin circlip from the outside of each piston, and push the wrist pin out from the inside.

CAUTION: *Do not strike the wrist pin to remove it as the connecting rod may be damaged in the attempt. If the wrist pin resists removal, gently heat the piston crown with a propane torch and then try to push the pin out. The wrist pin circlips once removed should be discarded and replaced with new ones upon reassembly.*

Removing a wrist pin circlip (1) with needlenose pliers (2). A rag (3) will prevent the circlips from dropping into the crankcase.

SERVICE AND INSPECTION

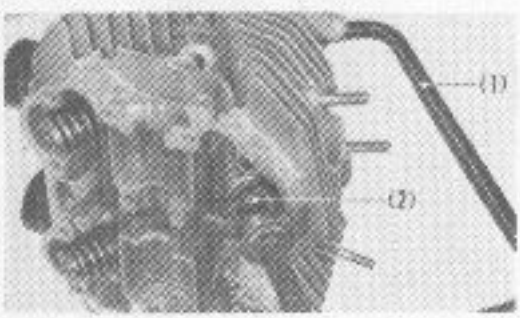
The service and inspection procedures given in the following text are applicable to all models with minor allowances for differences in construction. Specifications for individual models are given in the charts at the end of this chapter.

Cylinder Head

1. Check the valve seating efficiency by pouring a small amount of gasoline into each of the ports and allowing it to stand for about five minutes. If the valves are seated properly leakage into the combustion chamber will be minimal. If the gasoline leaks in quickly, the valves should be lapped.

2. Before removing the valves, the carbon should be removed from the combustion chamber. This can be done with a fine wire brush mounted in a electric drill. Be careful not to score the combustion chamber or the cylinder head mating surface.

3. If it is determined that the valves should be lapped, they can be removed after compressing the springs with a valve spring compressor and removing the valve keepers. Do not compress the springs more than is necessary to remove the keepers; to do so may damage the valve guide. Remove the keepers, valve spring retainers, valve springs, and the spring seat. The oil seal should be removed from the valve guide (360 models) and replaced with a new one upon reassembly. All parts removed should be marked so that they can be installed in the same position they were removed from; this is especially important for the valves.



Removing the valves with a spring compressor

4. Check the cylinder head for warpage by placing it on a flat surface such as a piece of plate glass and probing around the cylinder mating surface with a 0.05 (0.002 in.) feeler gauge. The head surface should be very flat (i.e., it should not be possible to slip the feeler gauge between the head and the glass). If the head is warped, it can be lapped by a machine shop or dealer. Be sure to have them remove only enough metal to rectify the warpage. If the warpage is slight, it can sometimes be remedied by putting a quantity of valve lapping paste or a sheet of emery cloth on a flat surface and working the head back and forth in a figure-eight motion until the mating surface is flat. Ensure that the head is cleaned up very thoroughly after this operation. Check the oil passages and the valve guides (if the valves have been removed) especially.

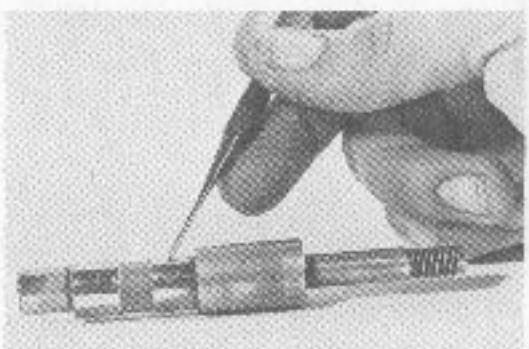
5. Check the condition of the exhaust flange studs. If any are bent or have broken or stripped threads, they should be replaced.

6. Check the condition of the exhaust pipe gasket in the exhaust port. The gasket should be able to form a good seal with the exhaust pipe. If the gasket appears to be damaged, pry it out and replace with a new one.

7. Check the condition of the spark plug hole. If the threads are covered with carbon they should be cleaned out by running the proper size tap through them. If the threads are broken or stripped the hole will have to be drilled out and retapped and a special insert installed; this operation is best entrusted to your dealer.

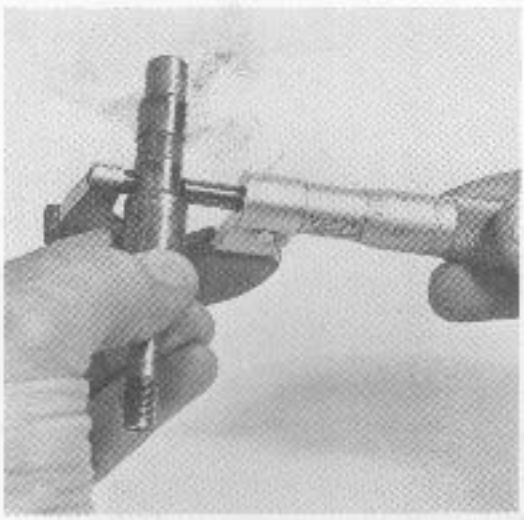
Valve Assembly

1. Check the condition of the rocker arm shafts for each of the rocker arms. The shafts should be free of obvious signs of wear, scoring, or blue discoloration. If damaged, they should be replaced.



Check the rocker arm shafts for wear or scoring

2. 350 models: Measure the diameter of the rocker arm shaft using a small micrometer. If the measured value is less



Checking shaft diameter with a micrometer

than 12.90 mm (0.508 in.), the shaft should be replaced.

3. 360 models: Measure the inside diameter of the rocker arm and the outside diameter of the rocker arm shaft. The difference between these two values (rocker arm-to-rocker arm shaft clearance) should not exceed 0.1 mm (0.0039 in.).

4. Check the inner bore of the rocker arm for scoring. Check the rocker arm cam follower pad for scoring pitting or signs of wear. Check both the pad and the bore for heat discoloration. Insert the rocker arm shaft into the rocker arm and check for vertical play. If any is evident, the rocker arm should be replaced. Any damage indicated by the checks above necessitate replacement of the rocker arm.

NOTE: *If any discoloration due to overheating is present, the lubrication system should be inspected, especially the oil passages in the cylinder and head.*

5. 360 models: Check the condition of the valve adjuster locknut and replace it if the edges are rounded off.

6. Lubricate the rocker arm and shaft with motor oil before installation.

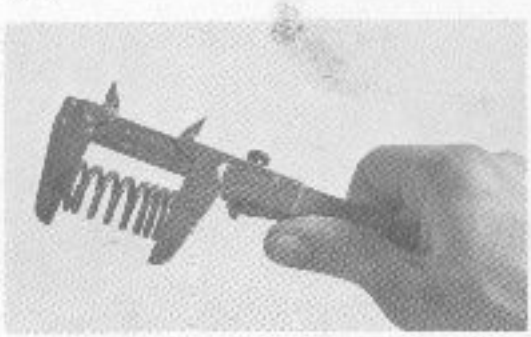
7. With a vernier caliper or a short steel rule, measure the free-length of both the inner and outer valve springs. Replace the springs in sets if any of the inner springs are less than 39.8 mm (1.5669 in.) or if any of the outer springs are less than 49.0 mm (1.929 in.).

8. When the valve springs are re-

Rocker arm inner bore must be smooth and featureless

Check the cam follower pad for pitting or discoloration

Check for excessive play of the shaft in the rocker arm



Measuring valve spring free length

moved, the valve should come right out of the guide. Any sticking or binding as the valve is removed will indicate that the valve stem or the guide is in bad condition.

9. Inspect the valve paying close attention to the condition of the edges of the valve head for pitting, burnt or broken edges, excessive carbon build-up, etc. A certain amount of carbon build-up on the valve face and on the top of the exhaust valve head is inevitable. These deposits should be carefully scraped off with a dull knife or with a wire wheel, and the valve finished with a fine emery cloth. Take care not to score the valve stem.

Carbon deposits, however, should not extend too far up along the exhaust valve stem. This would indicate a worn or cracked valve guide.

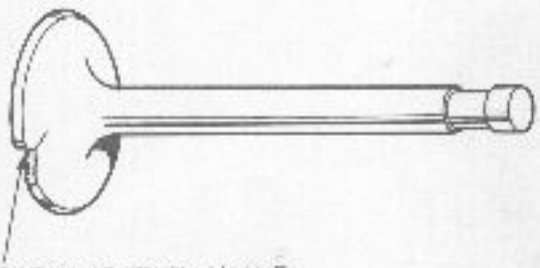
Wet oil on the back of the valve head is indicative of a worn guide (which must be replaced) or a bad valve seal (360).

10. Oil the valve stem with motor oil and insert it into its guide. Holding the valve away from its seat about ⅛ in., spin the valve stem with your fingers and watch the head of the valve. If the valve is hard to rotate or if the head of the valve wobbles, the valve is bent and must be replaced.

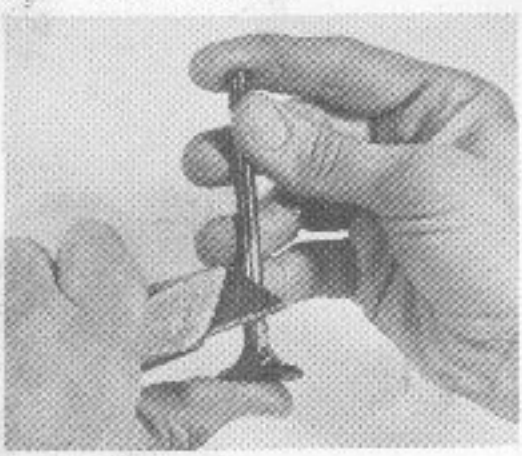
An engine will run with a bent valve; these valves even have a fair sealing ability occasionally, so close inspection is always imperative.

A bent valve must always be replaced and, if one is found it is wise to inspect the guide very carefully, as it is very likely to be cracked. Also inspect the piston crown very closely as it is likely that the valve was bent by hitting the piston. Often when this happens the ring grooves will be compressed and is an indication that a valve may be bent.

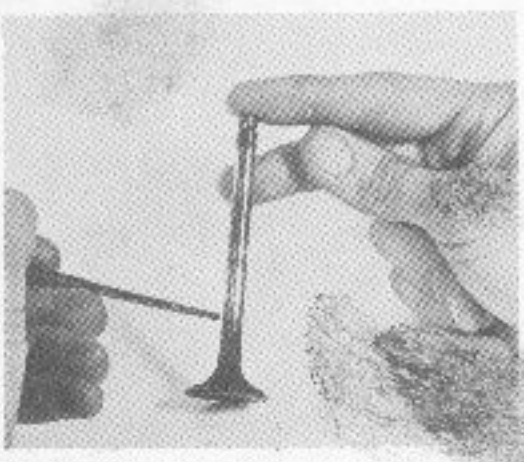
11. Check the diameter of the valve stem with a micrometer against the values given in the "Engine Specifications" charts at the end of this chapter. If a valve



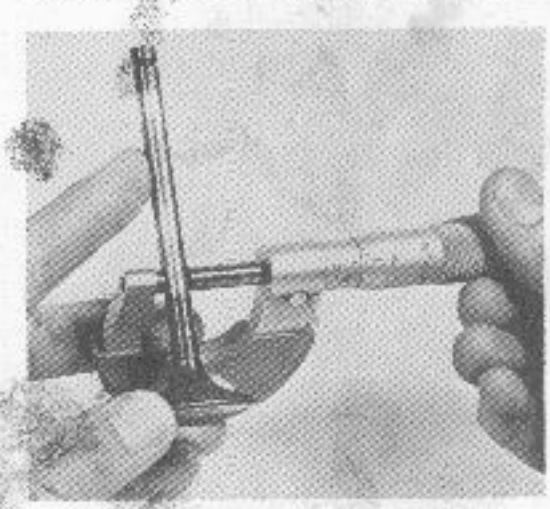
BADLY BURNT VALVE



Decarbonizing the valve



Carbon deposits should not extend too far up along the stem or a worn guide is indicated



Checking valve stem diameter

stem is smaller than the service limit, it should be replaced.

NOTE: *A new valve should always be lapped into its seat.*

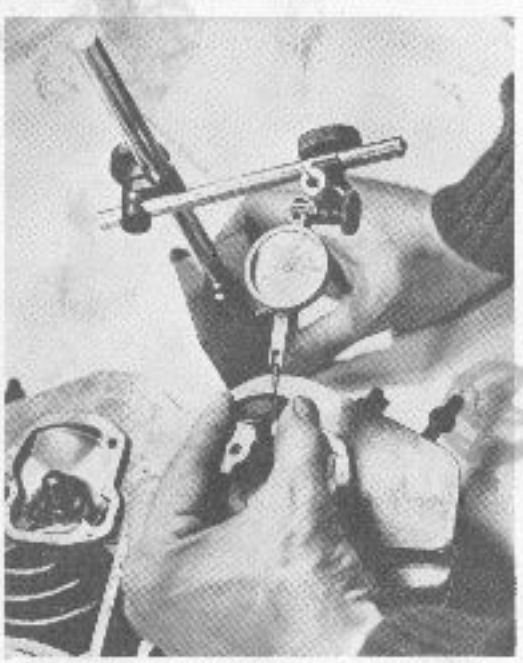
12. Inspect the end of the valve stem for a pit mark caused by the rocker arm. A small mark can be removed with an oilstone, however if much metal must be removed to obtain a flat surface, the valve must be replaced. Some valves are stellite-tipped. Grinding the stem to remove any identation is not recommended.

NOTE: *An indentation in the end of the valve stem will cause a false (low) reading when trying to adjust the valve clearance using a feeler gauge.*

When installing a new valve, it is recommended that the valve guide also be replaced.

13. A quick check of the operational worthiness of a valve guide can be done by pouring a small amount of motor oil on the valve stem and inserting it into its guide. Hold your finger over the end of the valve guide and pull the valve out until about ½ in. of the stem is left in the guide. When the valve is released it should be pulled back into the guide by suction.

14. If a dial gauge is available, the valve-to-valve guide clearance can be checked by coating the valve stem with oil and inserting it into the valve guide backwards, holding it about 1 in. out of the guide. Set the dial gauge on the head of the valve and measure the movement in two directions. If clearance exceeds the specification given for your model, the guide is probably worn and should be replaced.

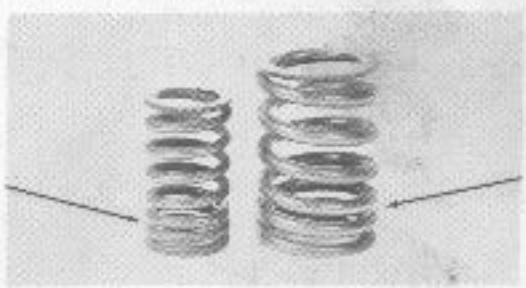


Checking for a worn valve guide

15. If the guides are worn, drive them out with a suitable drift. Replace with an oversized valve guide. The new guide must be installed straight in its seat. On 360 models, a new valve guide clip should be used. After driving in a new guide, it must be reamed to the proper specification.

NOTE: *After installing new valve guides, the valves must be lapped into their seats.*

Removing the valve guide



Valve springs must be installed with the close coils toward the head

16. Install the valve into its seat after coating the stem with engine oil. Install spring seat and oil seal (360). Install the inner and outer valve springs with the close coils of both springs facing down (toward the head). Springs are progressively wound. Compress the springs with a valve spring compressor so that the keepers may be installed. Do not compress the springs more than is necessary to install the keepers, to do so may damage the valve guide or the oil seal (360).

LAPPING

1. Valves should be lapped into their seats if the leakage test shows poor sealing, if the edges of the valve or the seat in the head are pitted, if the motorcycle has covered considerable mileage, or if new valves or guides are fitted.

2. Clean off all of the carbon build-up on the surface of the combustion chamber. Place three small dabs of valve lapping paste around the circumference of the valve head and place the valve into the guide. Be sure to coat the valve stem with oil before inserting it into the guide.

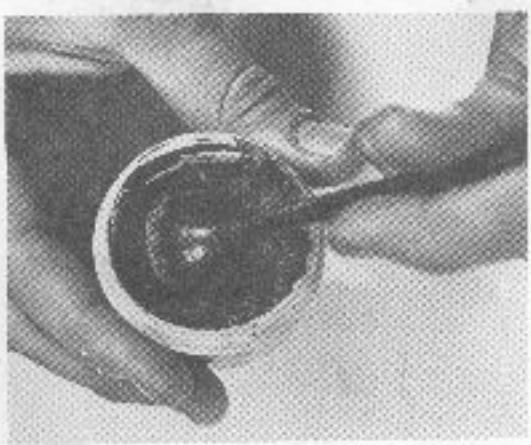
3. If you have a lapping tool, use it as the manufacturer directs. Usually, the tool will turn the valve back and forth while rotating it around the seat at the same time. Do not use excessive pressure during the operation.

If you do not have such a tool, a thick piece of fuel line placed over the valve stem works just as well. Turn the valve back and forth and rotate it to a new position every few seconds.

NOTE: *Check the condition of the valve face and seat frequently. When a smooth, even finish is evident, stop lapping. Excessive lapping may lead to a pocketed valve.*

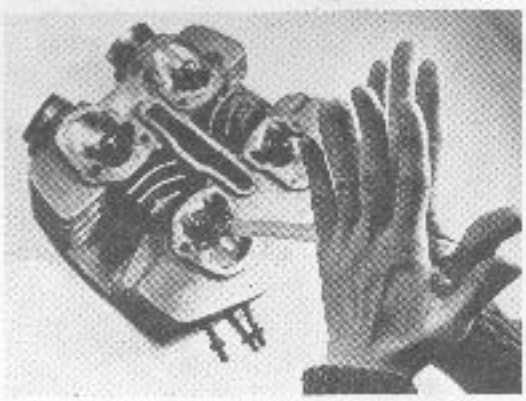
4. Remove the valve and clean it thoroughly. Remove any traces of lapping compound from the seat and the combustion chamber. Swab out the guide with a cotton swab soaked in a solvent. Squirt a little oil into the guide so that it may carry away any particles inside.

5. Check the width and condition of the valve seat. The seat should be about

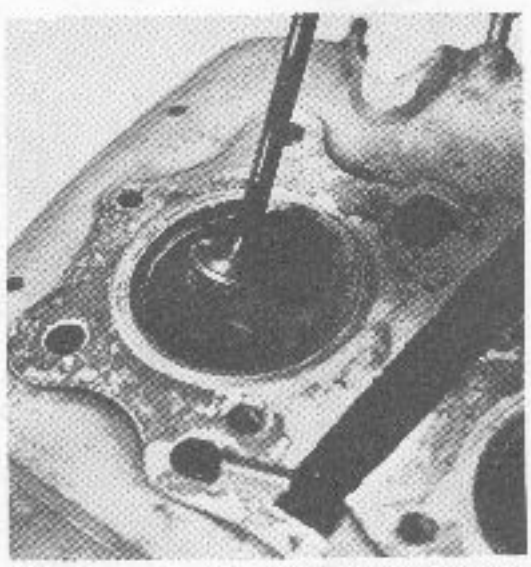


Applying valve lapping compound to the valve

A length of fuel line will serve in place of a lapping tool



Lapping the valve



Valve face and seat should be smooth when lapping is completed

1.0 mm (0.04 in.) wide, all the way around. If the seat width is too wide or too narrow, or if the seat width varies, or if pitting still remains, the seat must be recut and a new valve installed. This work should be entrusted to a experienced mechanic with the proper tools.

Camshaft Assembly

1. Carefully inspect the cam lobes for pitting, wear, scoring, or discoloration. Any imperfections would require replacement.

2. Check the cam bearing surfaces (journals) in the same fashion. Bearing surfaces should be without flaws.

3. 350 models: If a micrometer is available, check the diameter of the cam journals and replace the cam if found to be less than 21.920 mm (0.0863 in.).

4. Measure the height of each cam lobe and check the reading against the service limit for your model. If any lobe is worn past the service limit, the cam should be replaced.

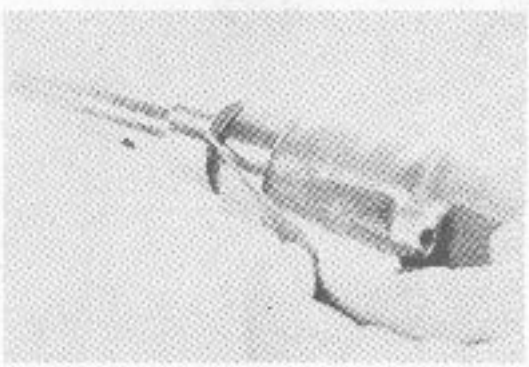
5. 350 models: Measure the inside diameter of the cam bearings in the tach drive and point housings. If found to be larger than 20.05 mm (0.868 in.), the housing should be replaced.

Inspect the small oil passage in the bearing and make sure that it is clear.

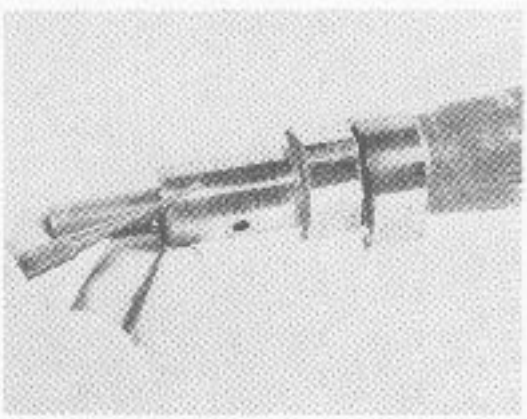
6. Make a visual inspection of the cam bearings in the head (360) or in the tach drive and point housings (350). They should be smooth and flawless. Run your finger across the surface of the bearing, if any flaw can be felt, the bearing or housings should be replaced.

7. Check the condition of the threads in the cam (for the cam sprocket) if they

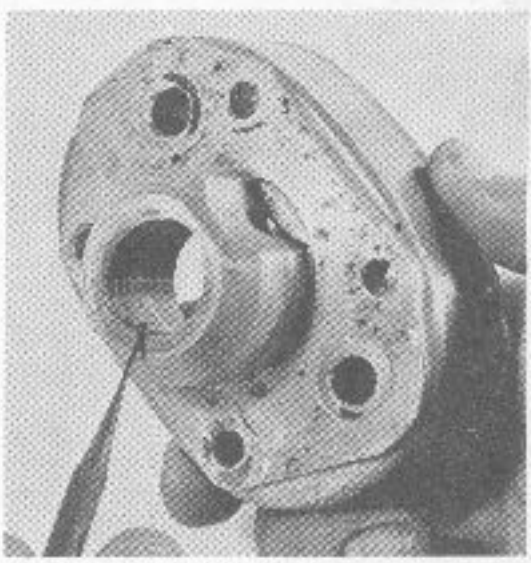
Measuring journal diameter



Check cam lobes for damage: pitting, discoloration, wear, etc.



Cam journals must not be scored such as this one is



Heavily scored cam bearings

are stripped or appear to be damaged the cam should be replaced.

8. Check the condition of the cam sprocket. Replace the sprocket if there is any wear or damage to the teeth. Check that the cam bolts' heads and threads are in good shape.

NOTE: *On 350 models it is recommended that the cam bolts be replaced with new ones upon assembly.*

9. Check the operation of the ignition timing advance assembly. Assuming that the advance assembly is in place, turn the breaker cam so that the advance weights are fully open. Release the breaker cam and the weights should return to the fully closed position. If they do not, suspect weak springs or sticking weights.

Cylinder and Piston

Under ideal conditions an internal combustion engine would have a perfectly cylindrical bore and "perfect circle" pistons with a diameter of a few thousandths of an inch smaller than the bore to allow for expansion. However, in actual practice, the bore is never perfectly circular due to machining tolerances.

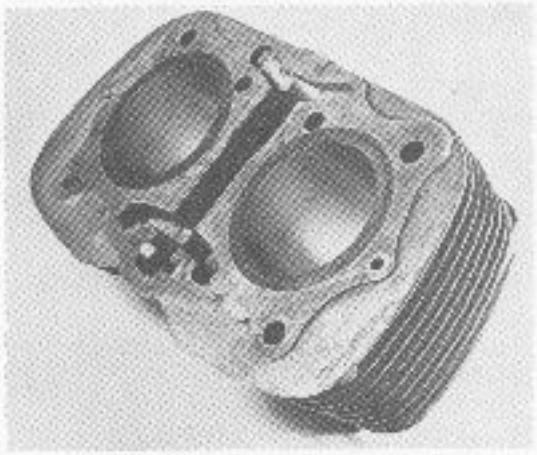
To further complicate matters, the pistons do not expand symmetrically when they are heated. The piston crown is subject to the greatest heat and, therefore, expands to a greater degree than the skirt. Further, the area of the piston in the vicinity of the wrist pin holes has thicker walls to support the pin and will show a greater expansion because of this than the front and rear of the piston.

To compensate for this, pistons are tapered inward from bottom to top and are also "cam turned," that is, made slightly ovoid in diameter.

When a piston expands during operation, it will assume a more cylindrical shape.

As might be expected, the cylinder bore is subject to uneven wear. After many miles, it may assume a tapered shape (tapering in from top to bottom) and may also become elliptical. The wear on the bore is usually greatest just below the top of the cylinder at the highest point the top compression ring reaches.

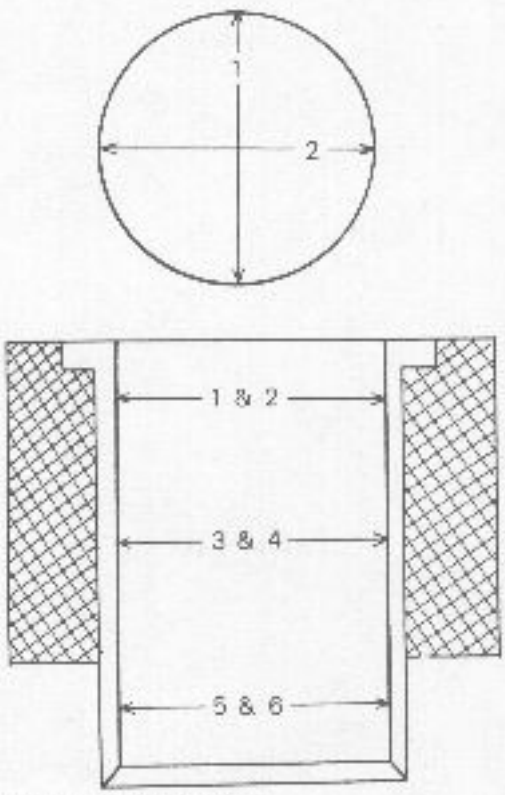
1. Make a visual inspection of the cylinder bore, noting any imperfections.



After boring and honing, the bores should have a smooth, even finish

The cylinder walls should be uniformly smooth.

2. With an inside micrometer, measure the diameter of the bore at the top, middle, and bottom parallel to the wrist pin. Then turn the micrometer 90° and measure the bore at the top, middle, and bottom perpendicular to the wrist pin (total of six measurements). If the cylin-



Bore measurement points

Scoring on this piston was caused by a seizure

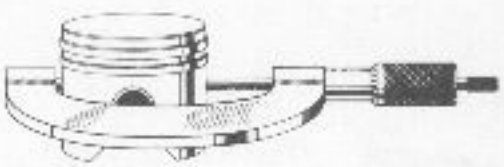
der is either larger than the service limit using the largest measurement obtained or has more taper than the service limit, (subtract the smallest measurement from the largest in a plane perpendicular to the wrist pin), the cylinder should be bored to the next oversize and a new oversize piston fitted.

3. Make a visual inspection of the piston. Scoring, scuffing, or seizure marks on the piston skirt can be removed with a fine grade of emery or crocus cloth, sanding in a crosshatch pattern, if not too severe. If the damage is severe, the piston must be replaced.

4. The rings must be free to move in the ring grooves. If they cannot, either they are carbon clogged (which necessitates replacing the rings and cleaning the grooves), or metal has been pushed into the grooves by seizure of the piston, or the piston crown has been collapsed from hitting a valve. In this event the piston and rings must be replaced.

Removing score marks from the skirt with emery cloth; produce a crosshatch pattern when sanding

5. Measure the piston at the bottom of the skirt perpendicular to the wrist pin. If the diameter is less than the service limit given in the "Engine Specifications" chart, the piston must be replaced. If this has happened, it is probable that the cylinder is worn as well and the solution is to have the cylinder bored out to the next oversize.



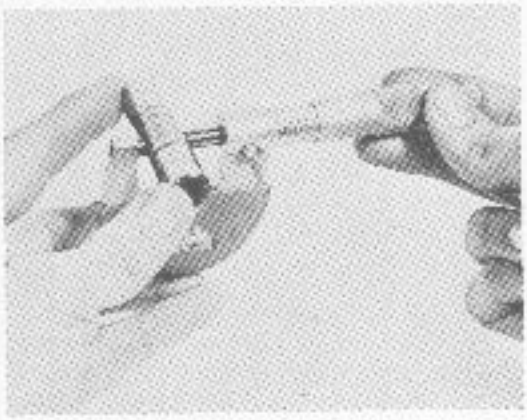
Measuring piston diameter

NOTE: *The piston and bore specifications in the "Engine Specifications" chart are for standard pistons. Oversize pistons have the oversize stamped on the piston crown. Oversize pistons are available in four oversizes from Honda (0.25, 0.50, 0.75, and 1.0 mm). New pistons come with the wrist pin and rings. If an oversize piston is needed due to a worn bore or worn or damaged pistons, obtain the piston first then take the piston and cylinders to your dealer or machine shop and have the cylinder bored so that the piston-to-cylinder wall clearance is 0.025–0.050 mm (0.001–0.002 in.).*

6. If an inside micrometer is available, measure the inside diameter of the wrist pin hole and compare the measured value to the service limit. The wrist pin should be a light slip fit into the holes. If too loose, the piston should be replaced.

7. Check the condition of the wrist pin. Measure the diameter of the wrist pin at three places along its length and compare the diameter with the standard specification for your model. If worn beyond the service limit or if the pin is discolored from overheating, it should be replaced.

8. The wrist pin rides directly on the connecting rod small end. Measure the inside diameter of the small end if possible and compare your findings with the



Checking wrist pin diameter

service limit given. If worn past the service limit, the connecting rod must be replaced, along with the crankshaft on 350 models. On 360 models, the crankshaft can be disassembled and assembled using a crankshaft press, this operation should only be done by a Honda dealer with the proper equipment.

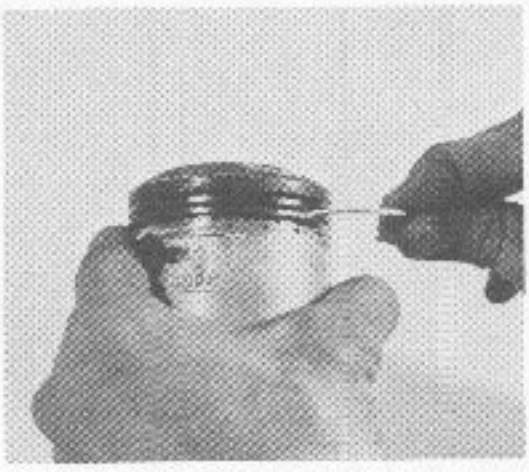
9. Although not as conclusive as a direct measurement, the condition of the wrist pin and the small end can be checked by inserting the wrist pin into the small end and checking for vertical movement. There should be no noticeable play. If there is noticeable movement in the pin, either it or the rod, or both, are in need of replacement. If the rod small end is discolored or scored, it may have to be replaced.

Check the connecting rods for a bent condition.

This can be accomplished by obtaining two small blocks of metal of exactly the same thickness. Place these pieces across the crankcase opening (from front to rear) below the small end. Place the wrist pin into the connecting rod, and lower it so that it rests on the blocks. The wrist pin must touch both blocks. If it does not, the con rod is bent and must be replaced.

10. Before installation, decarbonize the piston crown. Remove any carbon from the piston ring grooves with a piece of broken ring or a small screwdriver. Be careful not to scratch or widen the groove as this is done. Carefully check the cylinder, cleaning the bores thoroughly with an oil-soaked rag. Remove any traces of gasket material from the cylinder base and from the crankcase mating surface.

11. Be sure that all oil passages in the



Cleaning out the ring grooves with a piece of broken ring

cylinder are clear. Check the condition of the cam chain tensioner and guide roller (350) or the slipper (360). Replace them if the rubber is chipped, grooved, or otherwise damaged.

12. Replace the cylinder base O-rings. Check that any dowel pins or the O-rings fitted to the cylinder originally are in their proper places before installation.

Piston Rings

Three checks to be made to the piston rings are side clearance, ring thickness (350), and ring end-gap. These checks should be made to both new and used rings.

1. Piston ring side clearance is checked with the piston rings installed on the piston. Insert a feeler gauge blade

Checking ring side clearance

between the top of the ring and the top of the ring groove and check that the clearance is within the specification given at the end of this chapter for your machine. If the clearance is too large, the rings or grooves are worn. If too small, metal may have been pushed into the grooves due to a piston seizure. Check that the grooves are not just carboned up before replacing the piston. If new rings do not bring the clearance to the proper value, the piston must be replaced.

2. To remove the rings from the piston, spread the ends gently with the thumbs

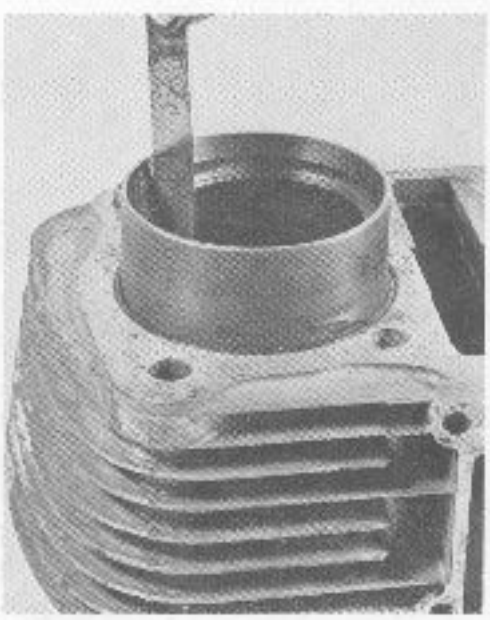
Removing a ring

Square the ring in the bore with the bottom of the piston

while lifting the opposite side up and off the piston or use a ring removal/installation tool. Decarbonize the ring grooves with a piece of broken ring or with a very small screwdriver.

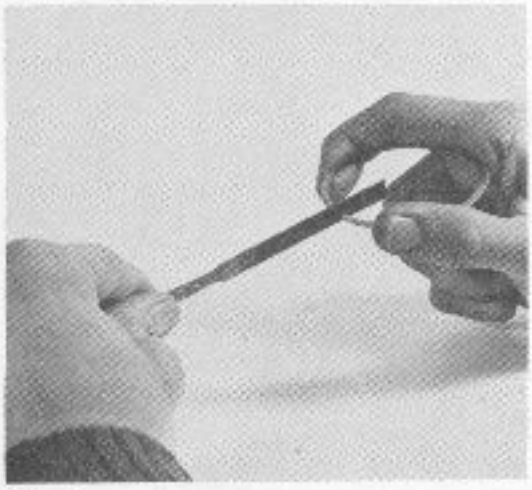
3. To check the ring end-gap, ensure first that the cylinder bore is not excessively worn. Place each ring, in turn, into the bottom of the cylinder and push it in about an inch using the piston crown to

Insert each ring into the bottom of the bore to check ring end-gap



Checking ring end-gap

align the ring in the bore. Measure the end-gap with a feeler gauge. If the end-gap is larger than the service limit, the rings must be replaced. If the measured end-gap of new rings is too large, the cylinder is worn and should be bored to the next oversize.



Filing ring ends

If new rings are fitted and the end-gap is too small, the ring ends must be filed. Hold the ring steady as illustrated, closing the ends over a thin, fine file. Do not squeeze the ring, as this is the easiest way to break it. A few strokes of the file will increase the end-gap.

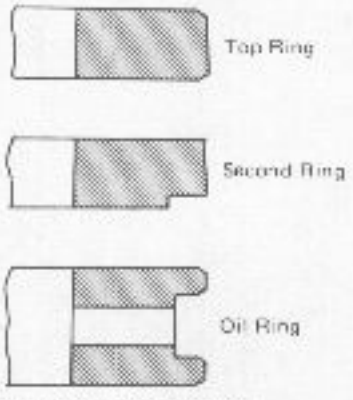
CAUTION: *Do not make more than a few strokes before checking the end-gap again. It is easy to remove too much metal.*

4. Roll each ring around its own groove and ensure that this can be done easily. If a ring sticks or binds in the groove, the piston must be replaced.

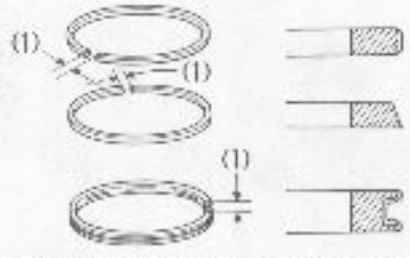
Roll the ring around its groove to check for fit

5. 350: Measure the thickness of each ring at three places. If the smallest measurement is below the service limit, the rings should be replaced.

6. Before installing the rings on the piston, first note that the two compression rings are not interchangeable. The wedge-shaped ring is the lower compression ring (360) or the stepped ring is the lower compression ring (350).



Cross-section of 350 piston rings



When installing the rings, space the end-gaps 120° apart (1); ring cross-sections show proper installation of 360 oc rings

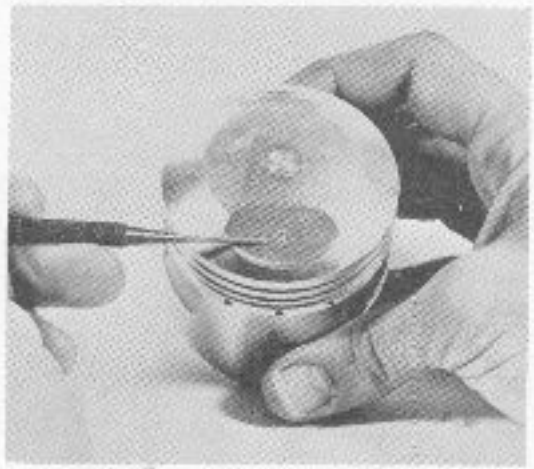
Also note that rings must always be installed so that the manufacturer's mark (the small letter near the end-gap) faces *up* when the rings are in place.

7. Arrange the ring end-gaps 120° apart with no end-gap located at a right angle (90°) to the wrist pin or in line with the wrist pin.

ASSEMBLY

350

1. Install a new wrist pin circlip into the left-side of the right piston and into the right-side of the left piston. The arrow stamped on the piston crown must face the front of the engine (exhaust side).



The arrow on the piston crown must point toward the exhaust port (350 shown)

2. Position the piston on the connecting rod so that the wrist pin holes line up with the connecting rod small end, and install the wrist pin after coating it with oil. Place a cloth under each piston to cover the hole in the crankcase, and install the remaining circlip.

Installing the rubber roller pin inserts

3. Install the lower cam chain roller into the cam chain, and then slip the tensioner over the cam chain and roller, then insert the roller pin through the center of the roller. Fit the tensioner assembly in place between the cylinders with the cutouts in the roller pin facing up. Apply a drop of gasket cement to the bottom of each of the rubber inserts and place an insert in each side of the roller pin.

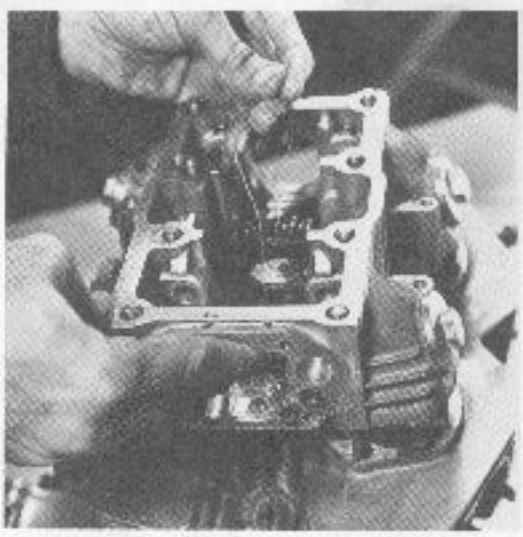
4. Carefully install the cylinder base gasket, when routing the cam chain through the center of the gasket do not lift the tensioner out of place as the rubber inserts may fall into the crankcase.

5. Position the pistons at the same level. Coat the piston skirt and rings with clean motor oil, also oil the cylinder walls. Slide the cylinders down over the cylinder studs and onto the pistons while an assistant compresses the rings as they enter the bore. Make sure that the ring end-gaps are still spaced 120° apart and the two dowel pins are located to the outside front studs.

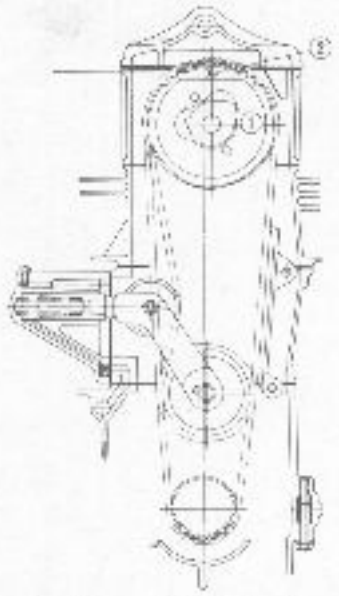
6. Using a piece of hooked wire, pull the cam chain up from between the cylinders. Install the cam chain sprocket into the cam chain so the "L" mark on the sprocket is on the left-side.

7. Make sure that the arrow on each piston is facing the front of the engine and the two dowel pins are located to the outside front studs. Install the head gasket placing a thin coat of oil on both sides of the gasket to ensure a good seal. Place the cylinder head into position and install the two 6 mm bolts, but do not tighten them to the proper torque until after the head is torqued properly.

8. Place the cam case gasket into position. Install the dowel pins on the outside rear studs and install the cam case. Tighten the four 6 mm mounting screws to 4.3-5.3 ft lbs in an "X" pattern a little at a time. Recheck the torque after the head is installed and torqued.



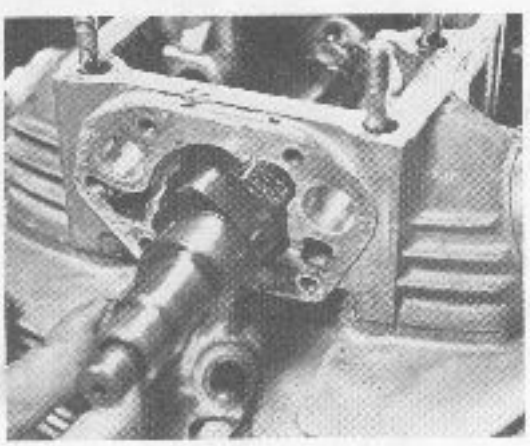
Installing the cam case while pulling the chain through



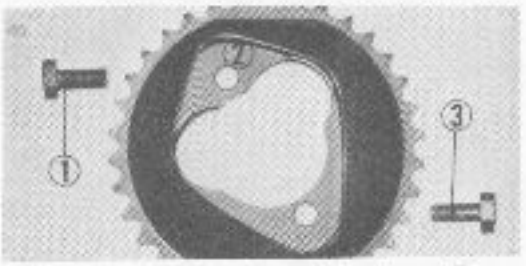
Correct valve timing: the "LT" mark on the alternator rotor is aligned with the stator index mark and the flat surface of the sprocket (1) rubber should be parallel with the upper surface of the cam case (2)

9. While holding the cam chain up, turn the engine over with the rotor bolt until the "LT" mark is aligned with the index mark on the stator. With the engine in this position, position the cam chain sprocket so that the "L" mark is at the top. The flat surface on the sprocket rubber damper should be parallel to the cam case mating surface.

10. Slip the cam into the cam case and through the sprocket. When installing the cam, the spark advance aligning pin should be on the top of the cam. When



Install the camshaft through the right-side of the cam case



Sprocket setting bolt (1), sprocket (2), and alignment bolt (3)

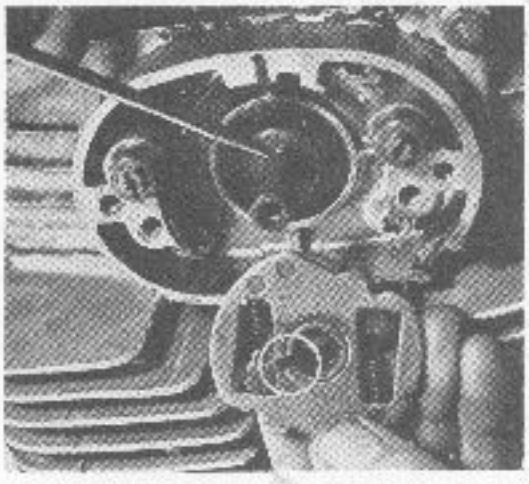
the cam is in place, install the cam sprocket setting bolt. There are two different sprocket bolts; their installation must not be reversed. The sprocket setting bolt is threaded full length and should be installed in the top of the sprocket when the "L" mark is up. Hold the cam up and turn the crankshaft 360°, this will position the sprocket so that the sprocket alignment bolt may be installed (this is a shouldered bolt).

NOTE: *These bolts should be replaced with new ones once removed. They should also be coated with thread locking compound before installing them.*

11. Install the rocker arm and shafts making sure that they are installed in their original positions. The cam lobes should all be facing down for easy installation of the rockers. Install the tach drive and point housings making sure to coat the inside of the bearings before installing them on the cam. Do not use force to install the housings, hand-pressure is all that is necessary if the cam is in the right position (all lobes facing down, 90° after TDC compression stroke left cylinder).

12. With clearance between all four rocker arms and the cam, set a dial gauge to the side of the cam sprocket and measure the cam side clearance. If the clearance is greater than 1.0 mm (0.04 in.), remove one of the side housings and install thrust washers until the clearance is within the standard specification of 0.2–0.6 mm (0.008–0.024 in.). Thrust washers are available from Honda in 0.1 and 0.2 mm sizes. Again check the side clearance with the side housing installed and properly torqued. Note that the side clearance can only be measured with both housings properly torqued.

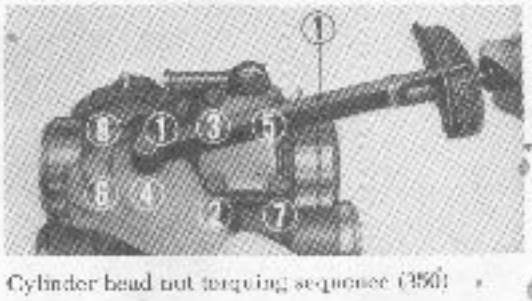
13. Install the spark advance unit, locating the pin on the camshaft to the slot



Engage the pin on the cam with the slot in the timing advance mechanism

in the advance unit. Install the breaker points making sure that there is a flat washer on each of the securing screws.

14. Push the tensioner pushrod into the tensioner housing and lock it there with the set bolt. Mount the tensioner in position on the rear of the cylinders with the four mounting bolts. Release the set bolt and the tensioner will automatically adjust itself. Tighten the set bolt and the locknut.



Cylinder head nut torquing sequence (350)

15. Install the breather plate gasket, breather plate, top cover gasket and top cover. Install a washer and capnut on each of the cylinder studs and tighten them gradually and evenly in an "X" pattern, starting from the inside and working out until the proper torque of 13–14.5 ft lbs is reached.

16. The remainder of assembly is in the reverse order of the removal procedures.

360

1. Install a new wrist pin circlip into the left-side of the right piston and into the right-side of the left piston. The arrow stamped into the piston crown must face the front of the engine (exhaust side).

2. Position the piston over the connecting rod so that the wrist pin holes are in line with the connecting rod small end. Coat the wrist pin with clean engine oil and insert it into the piston until it is centered between the wrist pin circlip grooves. Install the remaining circlips making sure that they are firmly seated in the grooves.

NOTE: *Placing a clean rag under the pistons when installing the circlips will prevent the circlips from falling into the crankcase in the event of a mishap.*

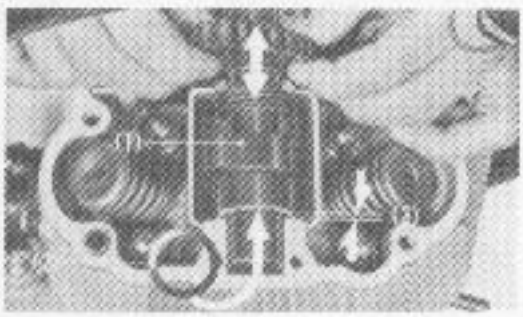
3. Install the cylinder base gasket and the two dowel pins. The dowel pins are located at the front of the engine around the outside cylinder studs.

4. Position the pistons at the same level and coat the piston skirt and rings with clean engine oil, also coat the cylinder walls with oil. Slide the cylinders down over the studs and onto the pistons while an assistant compresses the rings as they enter the bore. Make sure that the ring end-gaps are still spaced 120° apart and that no end-gap is located to the front or rear (90° from the wrist pin) of the cylinder.

Installing the cylinders using the factory ring compressors

5. Using a hooked piece of wire, pull the cam chain out from between the cylinders.

6. Before installing the head, check the camshaft side clearance. This is done by placing the cam in the head with a dial gauge fixed to one end and measuring the amount the cam can be moved sideways. If not within the standard specification

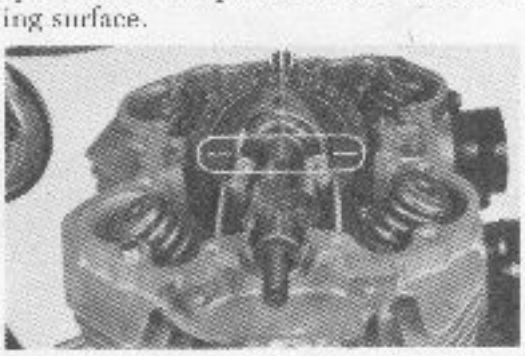


Installing camshaft thrust washers (2) to adjust side-play (3)

0.07–0.3 mm (0.003–0.012 in.), correct by installing thrust washers to the right-side of the cam. Thrust washers are available in two sizes: 1.0 and 1.1 mm.

7. Install the head gasket placing a light coat of oil on each side to ensure a good seal. Install a dowel pin to each of the four outside studs, and lower the head into position while pulling the cam chain through the center of the head.

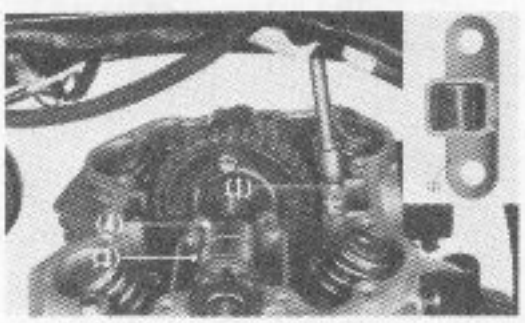
8. Hold the cam chain up and turn the crankshaft until the "LT" mark on the rotor is aligned with the index mark on the stator. With the crankshaft in this position install the cam sprocket so that the aligning marks on the sprocket are facing the left-side of the engine and are parallel to the cylinder head mating surface. Install the camshaft making sure that the thrust washers are in place on the right-side of the cam. Rotate the cam until the holes in the sprocket and cam align and install one of the securing bolts. Turn the crankshaft 360° and install the remaining sprocket securing bolt. Rotate the crankshaft 360° to the "LT" mark and check that the aligning marks on the cam sprocket are still parallel to the head mating surface.



After aligning the "LT" mark on the alternator rotor, install the cam sprocket so that the aligning marks (1) are parallel to the cylinder head mating surface

NOTE: *Coat the cam bolts with thread locking compound before installing them.*

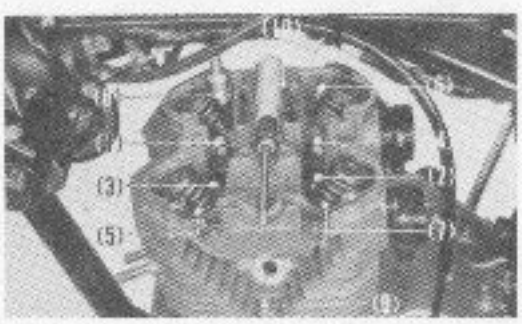
9. Install the cam chain guide to the front of the cylinder head. Install the tensioner slipper and the tensioner holder to the rear of the cylinder head. The narrow side of the holder must face the cam sprocket. Install the oil seal on the left-side of the camshaft.



Installing the cam chain tensioner holder

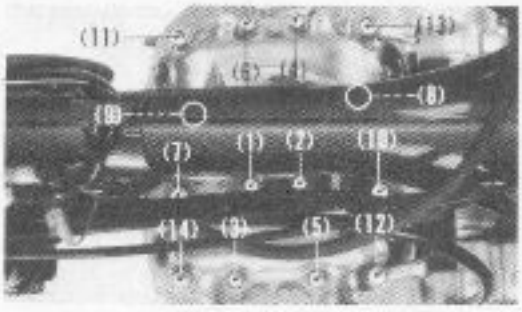
10. Torque the head nuts in the pattern shown in the accompanying illustration. Torque 10 mm nuts to 21.7–24.6 ft lbs and 6 mm bolts to 5.1–8.0 ft lbs. The bolts should be clean and lightly oiled to obtain accurate readings.

11. Using the rotor bolt, turn the engine over until all of the cam lobes are facing down. Pour oil over the cam, fill the oil baths with oil, and coat the cam bearings. Place a thin coat of sealing agent on the mating surface of the cylinder head cover. Take care that the sealer does not come in contact with the bearing surfaces.



Cylinder head tightening sequence

12. Install the cylinder head cover and tighten the bolts evenly and gradually, in the pattern shown in the accompanying illustration, until the proper torque is



Cylinder head cover tightening sequence

reached. Note that a cable clamp is fitted to the rear outside bolt on either side, and that bolts numbered 3, 5 in the illustration are fitted with a washer.

13. Install the spark advance unit on the end of the cam noting that the pin on the cam is fitted in the slot in the advance unit. Install the contact breaker points.

14. Adjust the cam chain tension, tappet clearance, ignition timing, and point gap as described in "Tune-Up," Chapter 3.

15. The remainder of assembly is in the reverse order of the removal procedures.

Crankcase Cover Components

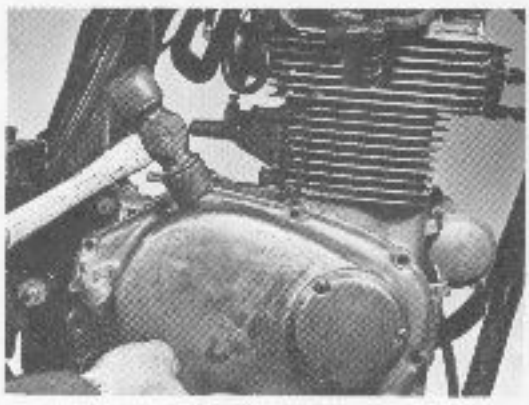
The following sections deal with removal, installation, and inspection procedures for those components located beneath the left and right crankcase covers.

These parts can be serviced with the engine in the frame.

Note the following points:

1. Always drain the oil before removing the right or left front crankcase covers. Place a drip pan beneath the cover before breaking the seal to catch any residue. If the cover resists removal, tap the top and sides with a plastic mallet to free it.

2. Always remove and install crankcase cover screws with an impact driver to prevent damage to the screw heads. Coat the threads with a bit of lubricant or anti-seize compound before installing to facilitate future removal.



Removing the right crankcase cover

3. New gaskets should always be used on the crankcase covers. Remove any traces of old gasket or gasket sealing compound from the cover and the crankcase mating surfaces.

4. Any oil seals fitted to the covers (such as kick-starter or gearshift shaft seals) should be carefully checked each time the cover is removed. If the lips of the seal are torn or damaged, or if the seal leaks, remove it by prying it out of the cover with a small screwdriver or hooked tool. Take care not to use the cover itself as a leverage point without protecting it from possible damage.

To install a new seal, press it in with a block of wood which will cover the entire seal. Be sure that the seal is driven straight in until flush with the outer surface of the case, and not cocked to one side. Grease the lips of the seal before inserting any shaft into it. Where the seal must pass over splines on a shaft, ensure that there are no sharp edges from damaged splines which may tear the seal.

5. During the disassembly procedure it may be necessary to keep the engine from turning over while a component is removed. There are several ways to do this. If the engine is in the frame, place the transmission in gear and apply the rear brake. If the engine has been removed from the frame, loop a length of old drive chain around the countershaft sprocket and secure the end in a vise. Engage the transmission and the engine will not turn over.

6. It is necessary to remove the centrifugal oil filter before the clutch housing can be removed. This requires a special wrench.

RIGHT CRANKCASE COVER COMPONENTS

The right crankcase cover houses the centrifugal oil filter, the clutch, oil pump, external shifter mechanism, and primary drive.

RIGHT CRANKCASE COVER

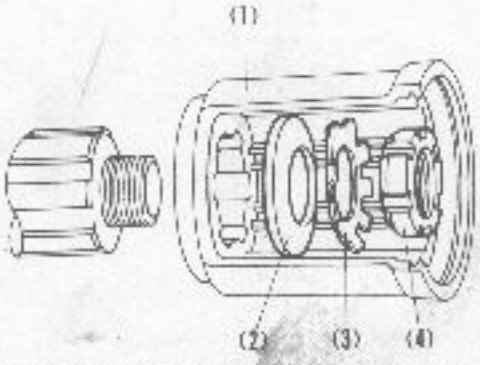
Removal and Installation

1. Remove the oil filler cap, the drain plug, and drain the engine oil.
2. Remove the kick-starter pinch-bolt and pull the kick-starter off its shaft.
3. Remove the right exhaust pipe (CB models).
4. Remove the right footpeg (360 models).
5. Remove the cover mounting screws (12 on 360 models, 10 on 350 models) and remove the cover.
6. Installation is in the reverse order of removal, however, note the following points:
   a. Install a new cover gasket;
   b. Be sure that the two dowel pins are in place between the cover and the crankcase.

CENTRIFUGAL OIL FILTER

Removal and Installation

1. Remove the snap-ring from the centrifugal oil filter. Screw a 6 mm screw or bolt into the filter cap and using the bolt pull the cap from the filter. A crankcase cover screw can be used. Remove the filter cap O-ring. Bend back the locktabs on the lockwasher and, holding the engine from turning over, unscrew the 16 mm locknut from the inside of the oil filter using the special Honda Tool No. 07916-283000 for 360 models, or Tool No. 07086-28301 for 350 models. Remove the oil filter housing, lockwasher, and spring washer.
2. To install the filter, install the filter housing on the end of the crankshaft. Install the cone shaped washer with the side marked "OUTSIDE" facing away from the engine. Install the tabbed lockwasher, fitting the slot in the large tab over a set of splines in the filter housing. This will keep the washer from turning. Install the filter locknut onto the crankshaft and tighten with the factory tool,



Oil filter housing (1), spring washer (2), lockwasher (3), and filter nut (4)

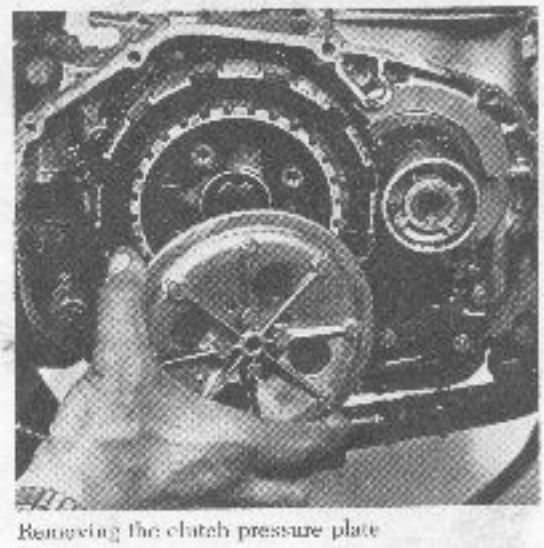
then bend the tabs on the washer into the slots in the filter nut.

3. Install the filter cap noting that the vanes on the cap must fit into the slots in the filter housing. Secure the cap in place with a snap-ring; be sure that the snap-ring is firmly seated.

CLUTCH AND PRIMARY DRIVE

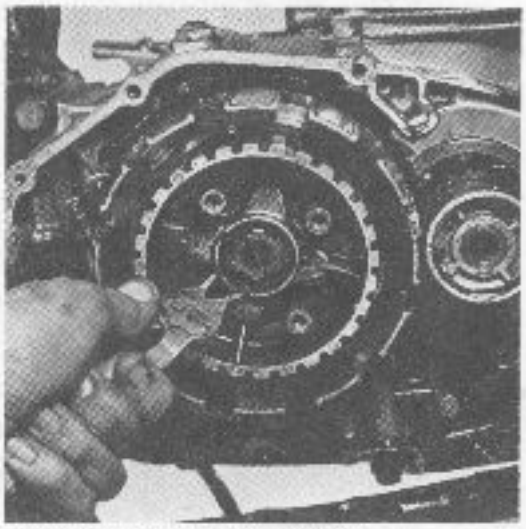
Removal and Installation

1. Remove the right crankcase cover as described previously.



Removing the clutch pressure plate

2. Remove the four clutch spring bolts, washers, and the clutch springs. Remove the clutch pressure plate, the lifter, and the pushrod.
3. Remove the friction and steel clutch plates. Remove the 25 mm snap-



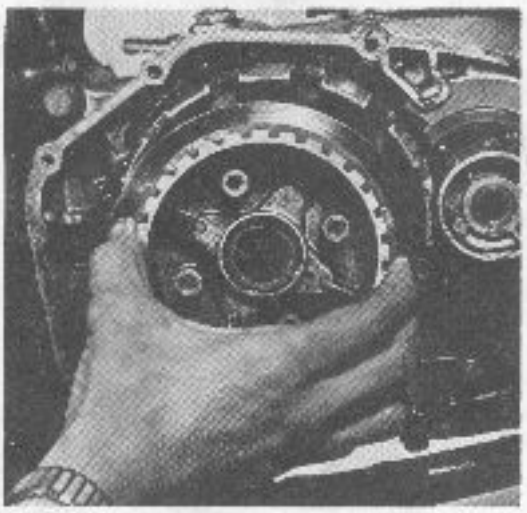
Removing the clutch hub snap-ring

ring from the center of the clutch hub and remove the hub. Remove the stop ring and remove the steel plate from the hub.

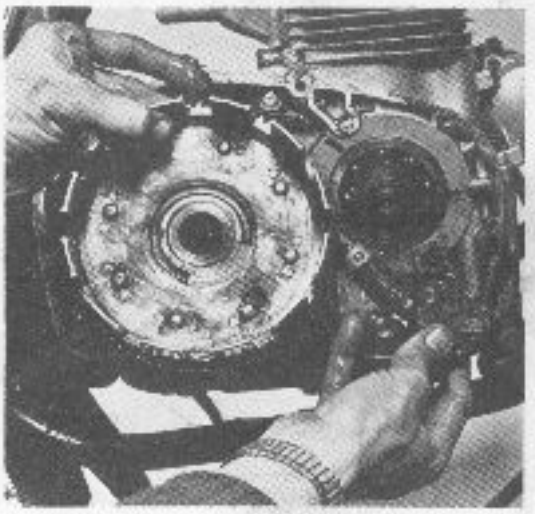
4. Remove the centrifugal oil filter as described previously. On 350 models, remove the outside primary gear. On 360 models, remove the oil pump idler gear and shaft.

5. 350 models: Bend back the lock-tabs on the oil pump set plate, and remove the three mounting bolts.

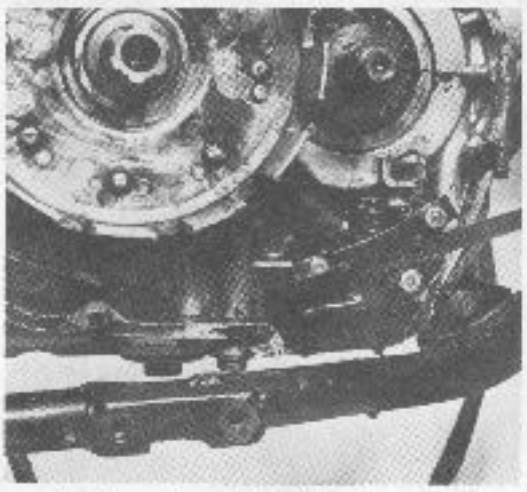
6. The clutch housing can now be removed. On 350 models, the oil pump is removed with the clutch housing. The primary gear on 360 models and the inside primary gear on 350 models can now be removed.



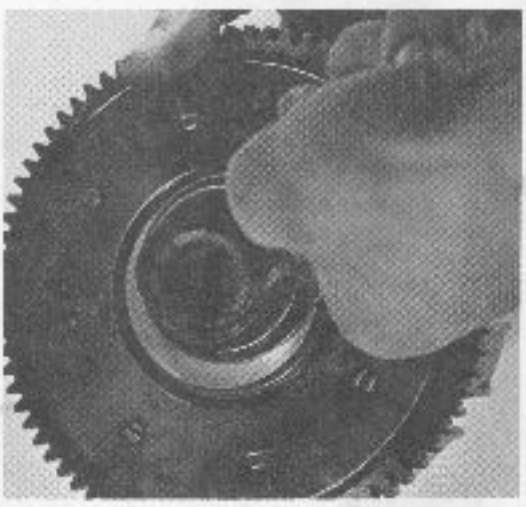
Removing the clutch hub



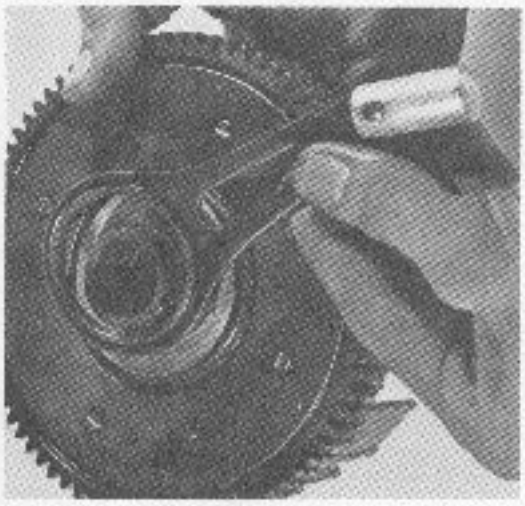
Removing the clutch housing and oil pump together (350)



Bending down the oil filter locktabs



Removing the connecting rod snap-ring



Removing the oil pump connecting rod

On 350 models to remove the oil pump connecting rod from the clutch housing, remove the snap-ring then lift off the side washer and the connecting rod. The piston can be removed from the connecting rod by pushing the piston pin out with a small drift.

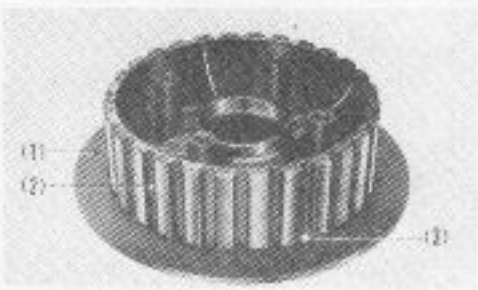
7. To install the clutch, install the primary gear to the end of the crankshaft. 350 models have two primary gears, install only the spacer and inside one at this time in that order.

8. 350 models: Install the oil pump connecting rod to the back of the clutch housing, install the side washer, fit the tab on the side washer into the hole in the clutch housing, and secure in place with the snap-ring. Fit the oil pump piston to the connecting rod and install the piston pin. Oil the piston and insert it into the bore in the oil pump. Install the clutch housing and the oil pump at the same time. Use a new gasket behind the oil pump.

9. Install the clutch housing (and oil pump on 350 models) slip the clutch pushrod through the center of the mainshaft. On 350 models, mount the oil pump with the three mounting bolts and bend the sides of the lockplate up against the flats on the heads of the bolts. Use a new lockplate if necessary.

10. Install the special steel plate on the clutch hub and secure in place with the stop ring.

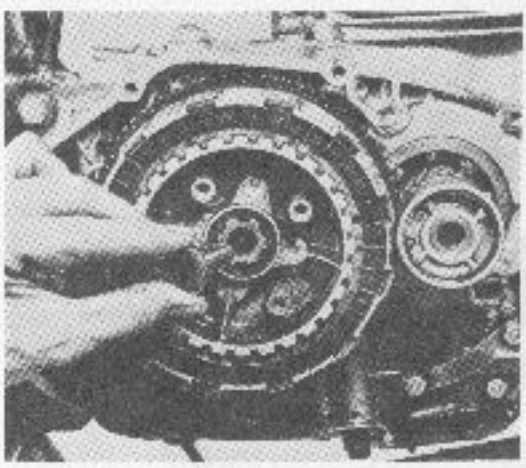
11. Install the clutch hub on the mainshaft and secure with a snap-ring. Install



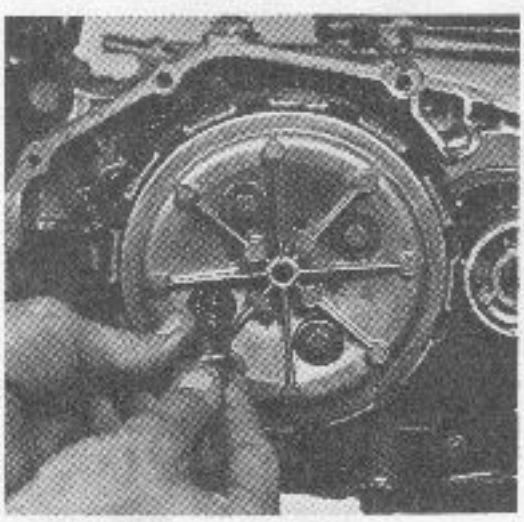
Special steel plate (1), clutch hub (2), and stop-ring (3) (360)

the clutch plates starting with a friction plate and then a steel plate, and so on until all the plates are in place. The top plate should be a friction plate.

12. Fit the pressure plate lifter to the center of the clutch hub, then install the pressure plate, clutch springs, washers,



Installing the pressure plate lifter



Installing the clutch springs and bolts

and bolts. Tighten the bolts gradually and evenly in an "X" pattern until they are tight.

13. Install the remaining primary gear on 350 models, then install the centrifugal oil filter. On 360 models, install the oil pump idler gear and shaft.

Inspection

NOTE: *Where necessary, refer to the specifications charts at the end of this chapter for wear limits and tolerances.*

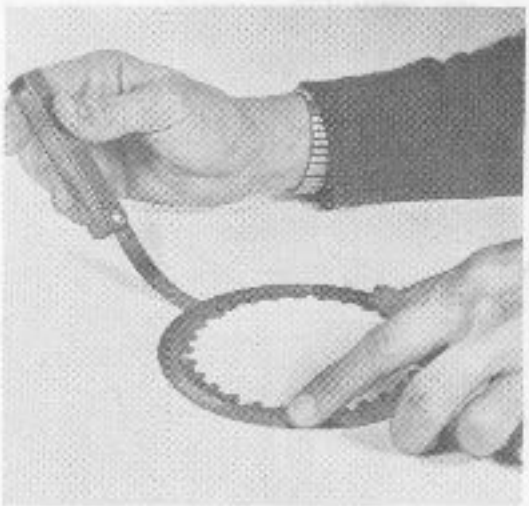
1. Check the condition of the clutch plates, both steel and friction plates. If the steel plates are discolored, or if either type is scored, replace the plates as a set.

2. Check the thickness of the friction plates with a vernier caliper. If any plate is below the service limit given, replace the set. Check the tabs on the friction plates which contact the housing for damage. Minor deformities can be removed with an oilstone, but removing too much metal will result in excessive clearance between the tabs and the housing and the resultant backlash in the clutch.

Checking friction plate thickness

3. Check the steel plates for warpage by placing them on a flat surface and attempting to slip a feeler gauge of the service limit thickness between the plate and the surface. Plates should be replaced as a set if warped.

4. Check the free-length of the clutch springs. These components should be replaced as a set if any of them have collapsed below the service limit.



Checking a steel plate for warpage

Measuring clutch spring free-length

5. Check the condition of the clutch pressure plate, and replace it if warped or cracked or deeply scored.

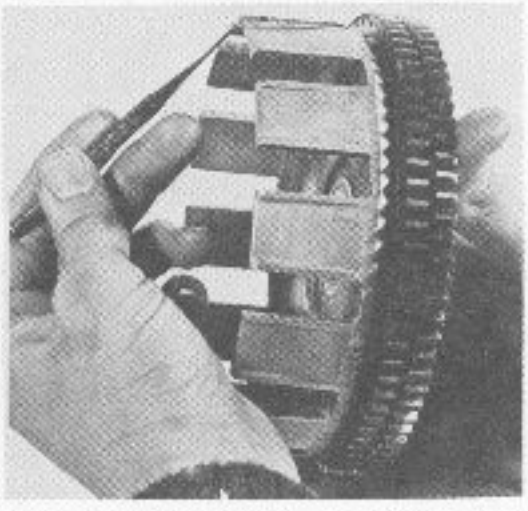
6. Check the condition of the housing gear, noting any worn or broken teeth. If the gear teeth appear worn, carefully inspect those of the primary drive gear. Gears which mesh should be replaced in pairs if either one is worn.

7. Place the clutch housing on its shaft and ensure that the housing does not have excessive axial play. The housing must turn freely, however.

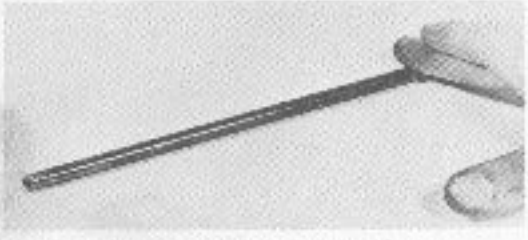
8. Check the condition of the clutch housing. Note any indented wear on the housing where the friction plates contact it. If the indentations are minor, they can be removed with an oilstone.

9. Roll the clutch pushrod on a flat surface to ensure that it is not bent. If bent, straighten or replace it.

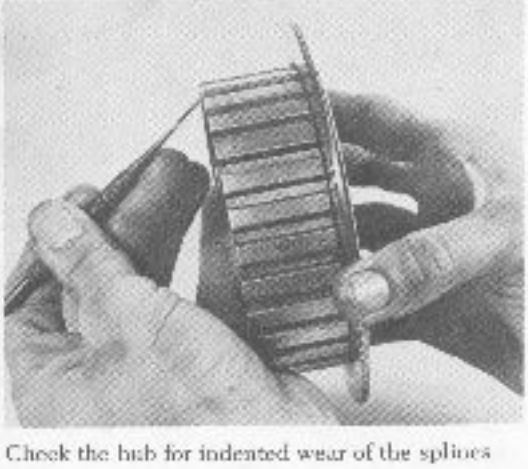
10. Inspect the clutch hub for in-



Check the clutch housing for indented wear caused by the plates



Checking the pushrod for a bent condition



Check the hub for indented wear of the splines

dented wear to the hub where the tabs on the steel plates contact it. If the damage is severe, the hub should be replaced.

OIL PUMP AND FILTER SCREEN

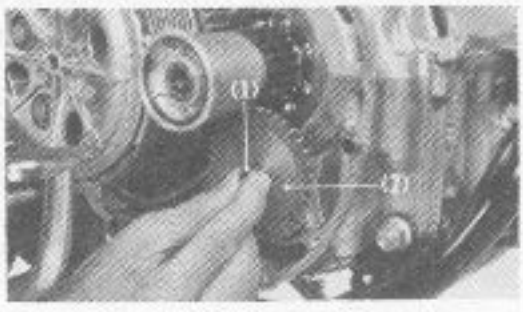
Removal and Installation

1. On 350 models, the oil pump and filter screen are removed and installed with the clutch housing. Refer to the preceding "Clutch Removal and Installation" section.

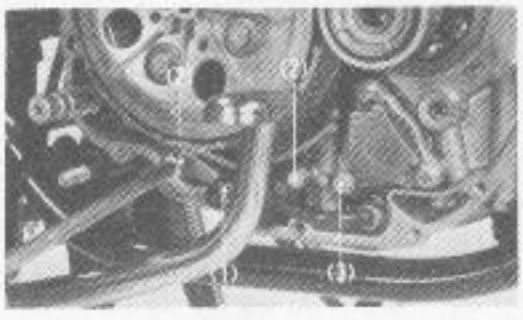
2. The following steps refer only to 360 models.

3. Remove the right crankcase cover as described previously.

4. Remove the idler gear and shaft.



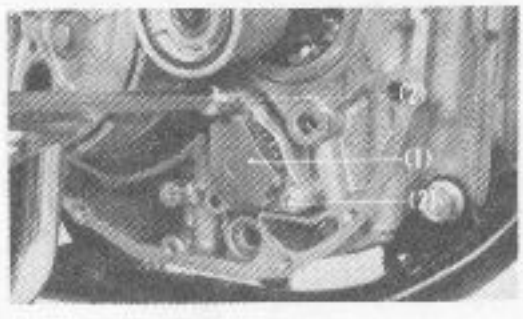
Removing the idler gear (2) and shaft (1) (360)



Oil filter screen (1) and mounting bolts (2 and 3) (360)

5. Remove the three mounting bolts from the oil filter screen and remove the screen. Remove the two remaining mounting bolts from the oil pump and remove the pump.

6. Complete inspection procedures for the oil pump and filter screen can be found in Chapter 5, "Lubrication System."



Oil pump (1) and mounting bolts (2) (360)

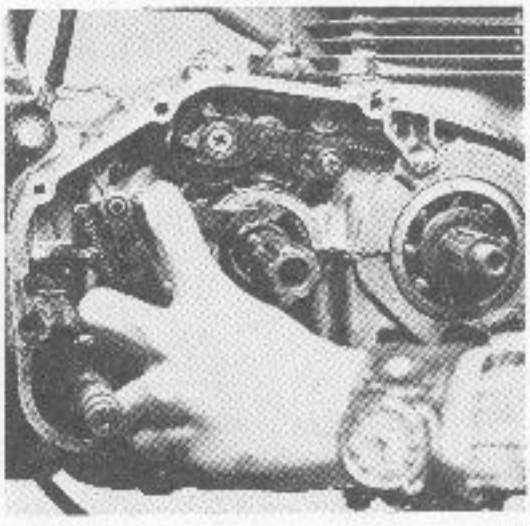
Oil pump O-rings (1) (360)

7. Install the oil pump and filter screen in the reverse order of removal, however, note that the two O-rings behind the pump must be in good condition. If in doubt as to their condition, replace them with new ones.

SHIFTER MECHANISM

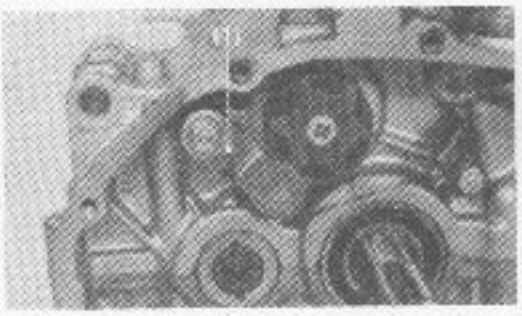
Removal and Installation

1. Remove the right crankcase cover and clutch as described previously.
2. Remove the shift lever pinch-bolt and pull the shift lever off the shift shaft.



Removing the shift arm

3. Pull the shift arm down to disengage it from the shift drum and pull the shift shaft out of the right-side. On 360 models, remove the bolt from the drum stopper and remove the stopper and spring. On 350 models, remove the two phillips head screws and their collars and remove the drum stopper and the spring.
4. To install, refit the drum stopper

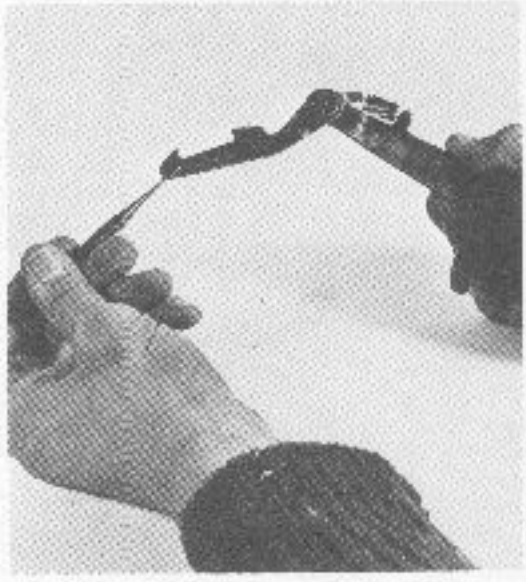


Shift drum stopper (360)

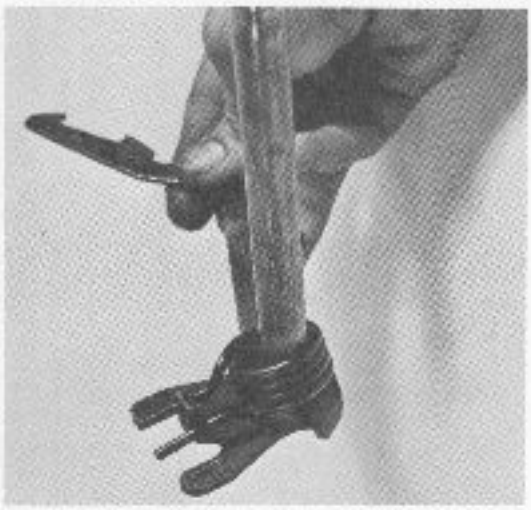
and install the mounting bolts. Do not overtighten the bolts. Coat the shift shaft with a light coat of grease and slip it through the right-side of the engine. Ensure that the fingers of the shift arm are in contact with the pins in the shift drum.
5. Refit the clutch and the right crankcase cover.

Inspection

1. Check that the collars on the drum stopper bolts are not crushed. If this has happened, replace them.
2. Check the splines on the gearshift shaft. If the splines are broken or torn to such an extent that it is difficult to properly secure the shift lever, replace the shaft.
3. Check the shift arm. Be sure that it is not bent. Check that the fingers of the shift arm are not worn or bent.
4. Check the condition of the springs in the shift linkage, especially the shift



Inspect the shift arm fingers



Shift lever return spring on shift arm

lever return spring. If any spring has lost its tension, or fails to hold its component properly, it must be replaced.

5. Check that the return spring pin is secure in the case.

6. Inspect the pins in the drum shifter. If broken, remove the phillips head screw and drum plate. Replace any broken pins.

LEFT CRANKCASE COVER COMPONENTS

The left crankcase cover houses the alternator, starter clutch, neutral switch, countershaft sprocket, and the clutch release mechanism.

LEFT CRANKCASE COVER

Removal and Installation

1. Remove the pinch-bolt from the shift lever and pull the lever off its shaft.

2. Remove the four mounting screws from the rear cover and remove the cover.

NOTE: *Take care not to lose the steel ball from the clutch release mechanism when the cover is removed.*

3. Disconnect the clutch cable from the clutch release mechanism inside the cover.

4. Before removing the front cover, drain the engine oil. Remove three stator cover mounting screws. Remove the stator cover.

5. Disconnect the alternator wiring from the wiring harness. On 360 models, remove the carburetor to reach the connector. Disconnect the neutral switch lead from the neutral switch.

6. Remove the crankcase cover. The stator can be removed from the cover once the three mounting screws are removed.

7. To install the covers, attach the stator to the front cover with the three mounting screws. Use a new gasket under the front cover. Be sure to install the two dowel pins under each cover.

CLUTCH RELEASE MECHANISM

1. To remove the clutch release mechanism from the cover, unscrew the adjuster locknut from the adjuster screw. Unhook the return spring from the inside of the cover and the release mechanism can be removed from the case.

2. Clean all of the parts in solvent.

3. Inspect the adjuster screw for damaged threads. Inspect the clutch adjusting cam and release lever for wear from the ball retainer.

4. Check the dust seal for condition. If it is cracked or torn or shows signs of age, it should be replaced.

5. Clean the boss in the case with solvent.

6. Grease all parts before installing them into the case. Be sure to install the flat washer under the adjuster locknut.

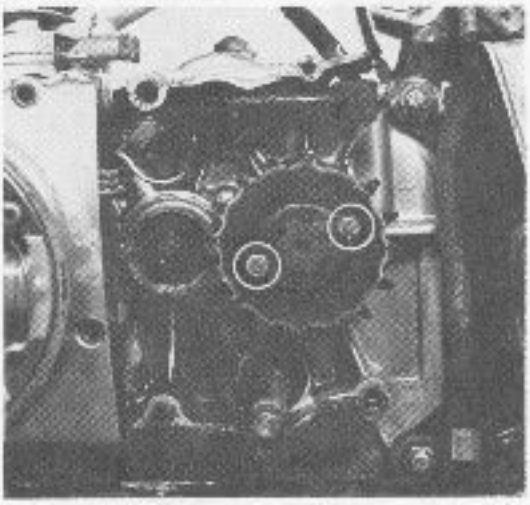
7. Installation is in the reverse order of removal.

Clutch release mechanism

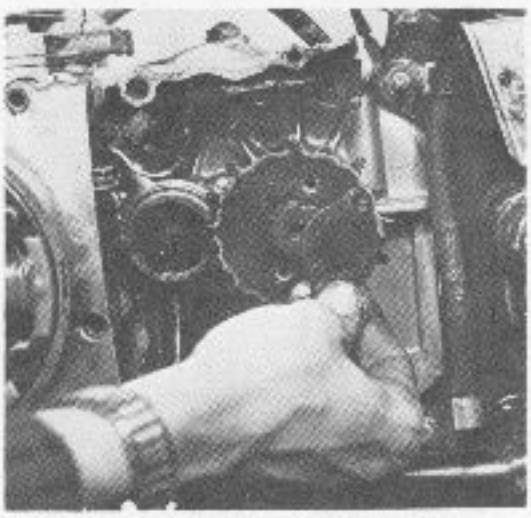
COUNTERSHAFT SPROCKET

1. Remove the left rear crankcase cover as described previously.

2. To remove the sprocket, remove the two bolts from the sprocket and rotate the lockplate until the tabs on the plate line up with the slots in the countershaft. Remove the lockplate.



Removing countershaft sprocket mounting bolts



Removing the sprocket lockplate

3. Either move the rear wheel forward in the swing arm or remove the masterlink from the chain, and pull the sprocket off the countershaft.

4. When refitting the sprocket, install the sprocket on the countershaft. If the masterlink has not been removed, refit the chain to the sprocket before installing the sprocket to the countershaft. Install the lockplate on the countershaft and rotate it until the holes in the sprocket line up with the holes in the lockplate. Install the two bolts and torque to 5.8–8.7 ft lbs.

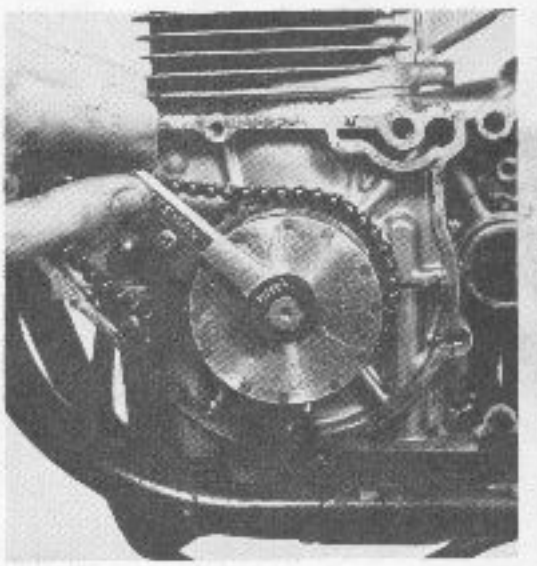
ALTERNATOR AND STARTER ASSEMBLY

Removal

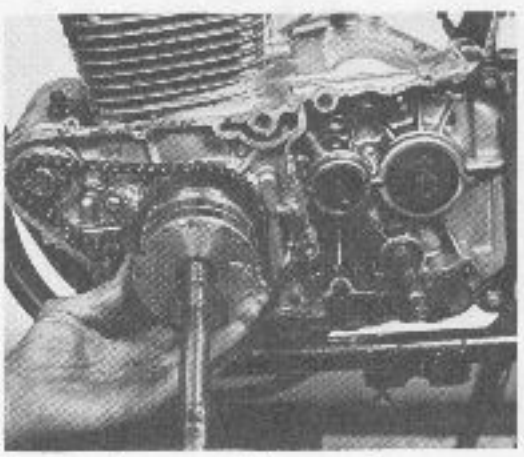
1. Remove the crankcase covers and stator as described previously.

2. Remove the rotor bolt while holding the engine from turning over.

3. Remove the alternator rotor using the factory rotor puller. In most cases the rear axle can be used in place of the puller; screw the axle into the center of the



Removing the rotor bolt



Removing the rotor with the rear axle

rotor until it is firmly seated. Slip a rod through the hole in the head of the axle and tap the rod with a hammer. If the rotor resists removal, use the factory puller. The starter clutch is removed with the rotor.

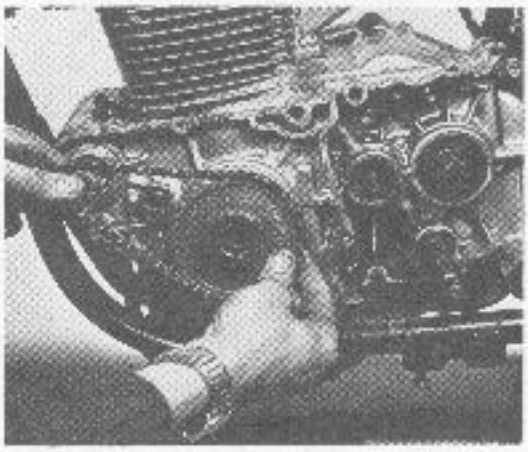
4. Remove the woodruff key from the taper on the crankshaft.

5. The starter clutch can be removed from the back of the rotor after removing the three phillips head screws. Remove the clutch side plate.

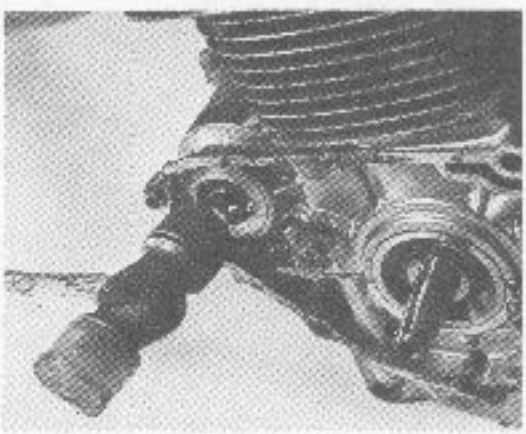
Removing the starter clutch from the alternator rotor

Check condition of the starter clutch and rollers

6. The starter motor chain can be removed by pulling off both sprockets and the chain at the same time.



Removing the starter sprockets and chain



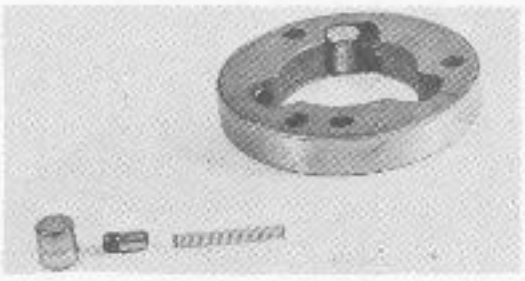
Removing the starter

7. Unbolt the starter motor from the front of the engine, disconnecting the starter motor cable at the motor, and remove the motor tapping the shaft lightly with a plastic mallet if necessary.

Inspection

1. For further inspection of the alternator rotor, stator, and starting motor, refer to Chapter 7, "Electrical System."

2. Check that the rollers in the starter clutch are free to move. Also check that they all have the same amount of spring tension on them. If any spring feels weak in relation to the others, replace it by removing the roller, spring cap, and spring. Replace the spring and install the cap and roller.



Starter clutch components

3. Inspect the clutch housing for any cracks. If found defective, it must be replaced.

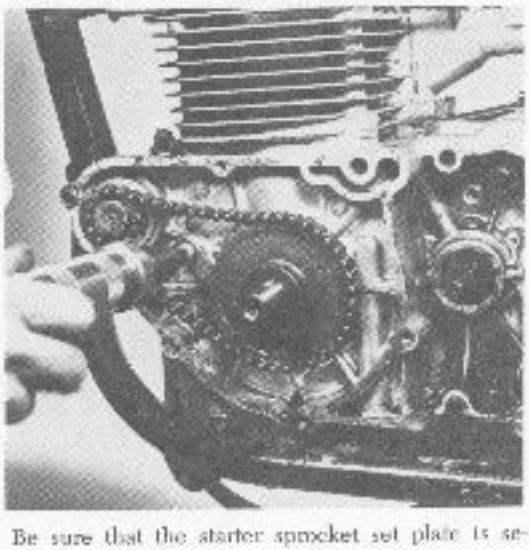
4. Inspect the surface of the starter sprocket where the rollers contact it. If badly scored, the sprocket and the rollers should be replaced.

5. Inspect the condition of the sprocket teeth. If they are hooked or appear to be worn badly, replace both sprockets and the chain.

Installation

1. Mount the starter motor on the front of the engine with the two mounting bolts.

2. Install the starter motor chain and the two sprockets at the same time. Install the starter sprocket setting plate.



Be sure that the starter sprocket set plate is secured

3. Mount the starter clutch on the rotor with the three screws. Be sure to install the side plate between the rotor and the clutch.

4. Install the woodruff key in the crankshaft and install the rotor lining up the slot in the rotor with the key in the crankshaft. Draw the rotor down on the crankshaft with the rotor bolt, never strike the rotor as this may affect the magnets.

Starter clutch side plate

5. Install the stator in the crankcase cover, then install the cover using a new gasket. Check that the rotor does not come in contact with the stator as the engine turns over. Install the stator cover and the rear cover.

Crankcase Components

To service the kick-starter, transmission, or the crankshaft, the crankcases will have to be separated. To service the kick-starter and transmission, the left and right crankcase covers and the components beneath them will have to be removed. Service to the crankshaft also necessitates the disassembly of the top end as the cam chain must be removed with the crankshaft.

SPLITTING THE CRANKCASES

1. Remove the engine from the frame.

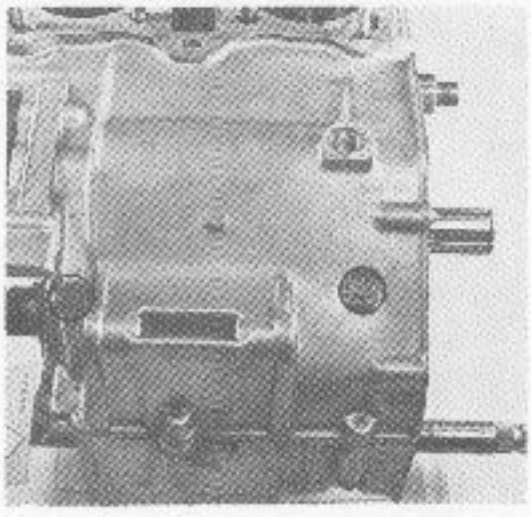
2. If the crankshaft is to be serviced, disassemble the top end as outlined previously.

3. Remove the right and left crankcase covers and the components beneath them.

NOTE: *Loosen the oil filter nut and the rotor bolt before removing the clutch.*

4. Remove the neutral stop bolt from the upper case after bending back the locktab. Remove the spring and ball beneath the bolt.

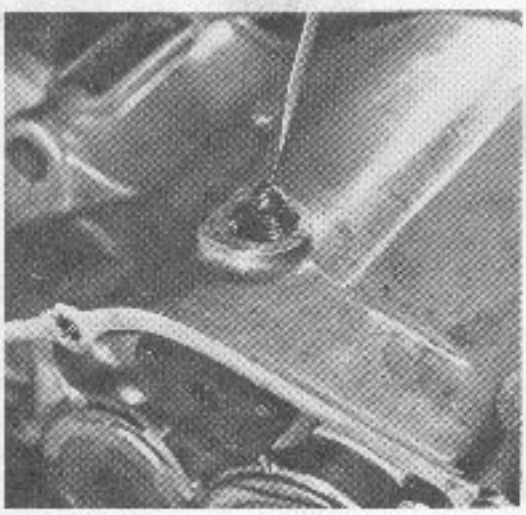
5. Remove the crankcase bolt(s) from the upper crankcase (1 on 360 models, 2 on 350 models). Turn the engine upside down and remove the remaining crankcase bolts from the lower crankcase. Remove the lower crankcase half, tapping around the mating surface with a plastic mallet to free the case half, if stuck. The crankshaft and the transmission will remain in the upper half.



Top crankcase bolts

Removing the shift drum neutral stop bolt

Splitting the crankcases



Removing the neutral stop ball with a magnetic screwdriver

KICK-STARTER

Removal

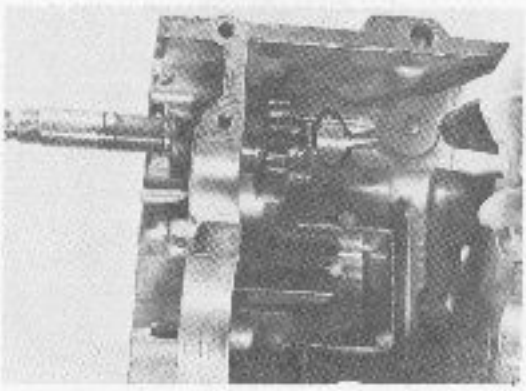
1. Split the crankcases as described previously.

2. Remove the washer, circlip, and return spring from the kick-starter shaft on the outside of the lower crankcase.

3. Remove the circlip from the inside of the shaft and remove the components from the shaft. Slip the shaft out of the case.

Inspection

1. Inspect the splines on the end of the kick-starter shaft. If they are damaged to the extent that the kick-starter lever cannot be properly fastened, the kick-starter shaft should be replaced.



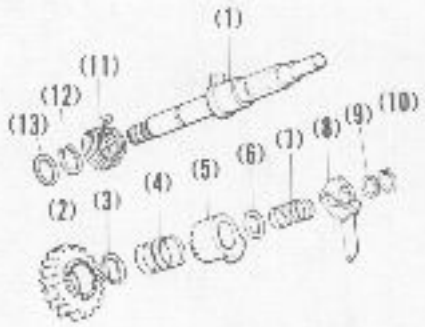
Removing the kick starter circlip (350)

2. Check the condition of all circlips. Replace any which are distorted.

3. Inspect the condition of the springs, replacing any which are weak or broken.

4. 350 models: Check that the kick gear rotates freely on the shaft gear. If the gear binds, it should be repaired or replaced.

5. 360 models: Inspect the condition of the ratchet teeth on the kick gear and the starter ratchet. If the teeth are worn or damaged, replace the kick gear and the ratchet.



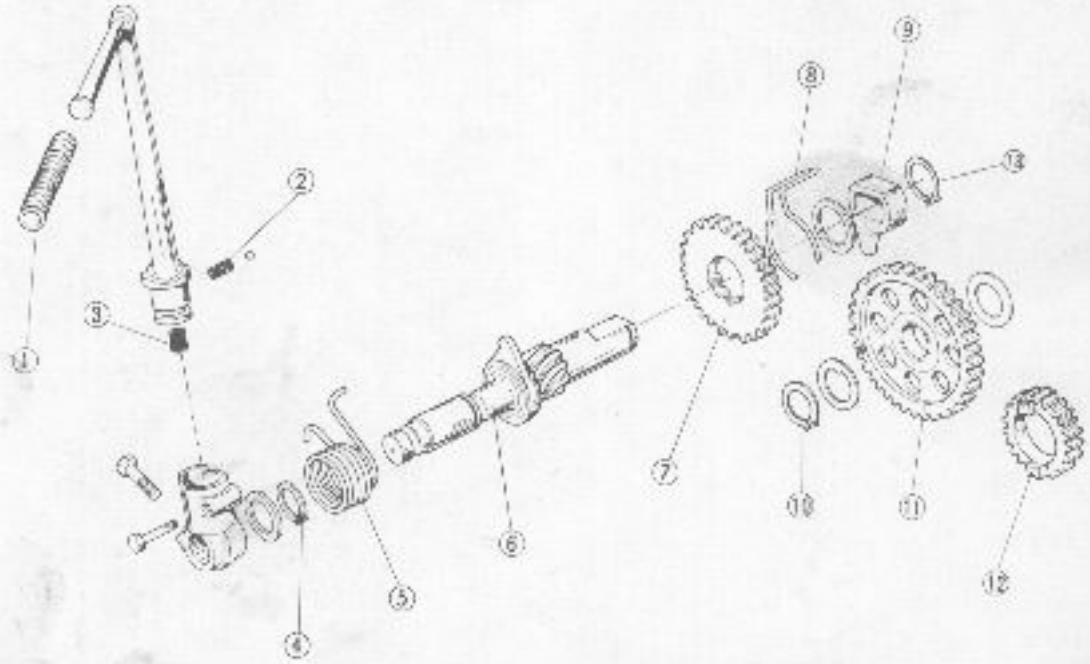
Kick starter components (360). Install in order shown

1. Kick-starter shaft
2. Kick-starter gear
3. Washer
4. Spring
5. Ratchet gear
6. Shim
7. Spring
8. Ratchet guide plate
9. Shim
10. Circlip
11. Return spring
12. Circlip
13. Shim

6. 360 models: Check that the starter ratchet moves freely on the shaft. If the ratchet binds, the ratchet and/or the shaft should be replaced.

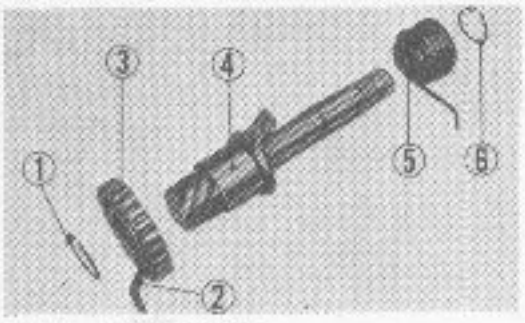
Installation

1. Install the shaft into the lower crankcase half. Install the components on



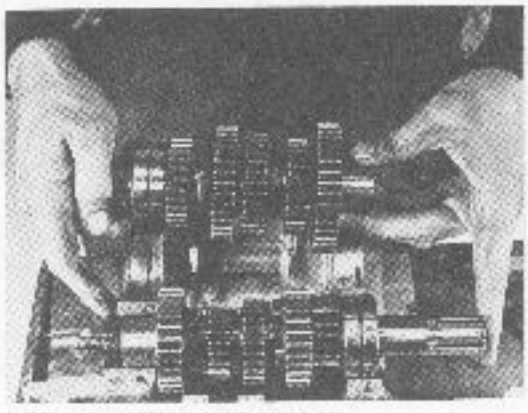
Kick starter assembly (SL350)

1. Rubber
2. Starter lever spring
3. Starter knuckle spring
4. Circlip
5. Return spring
6. Kick-starter shaft
7. Kick-starter gear
8. Friction spring
9. Shaft stopper
10. Circlip
11. Idler gear
12. Driven gear
13. Circlip

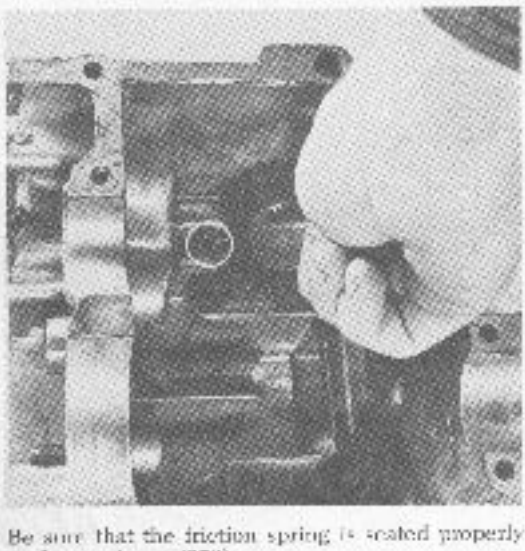


Kick-starter (CB/CL 350)

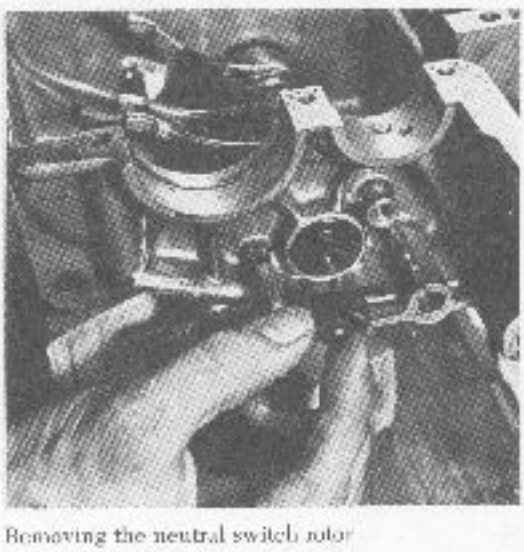
1. Circlip
2. Friction spring
3. Kick-starter gear
4. Kick starter shaft
5. Return spring
6. Circlip



Removing the transmission shafts



Be sure that the friction spring is seated properly in the crankcase (350)



Removing the neutral switch rotor

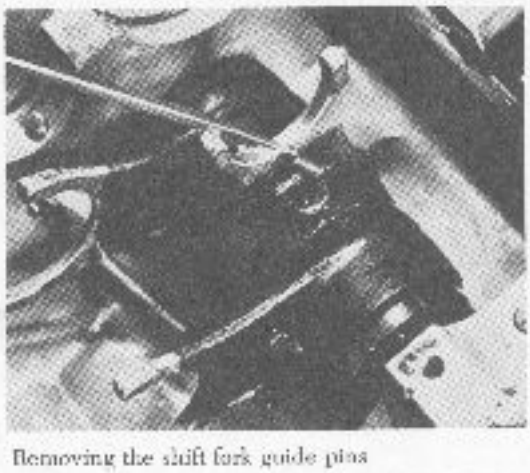
the shaft as shown in the accompanying illustration. Hold the shaft so that the stop on the shaft is against the stop in the lower crankcase when installing the internal components. Be sure that the ratchet guide plate (360 models) or the friction spring (350 models) is seated properly in the crankcase.

TRANSMISSION

Removal

1. Split the crankcases as described previously. The transmission shafts can be lifted out of the top case.

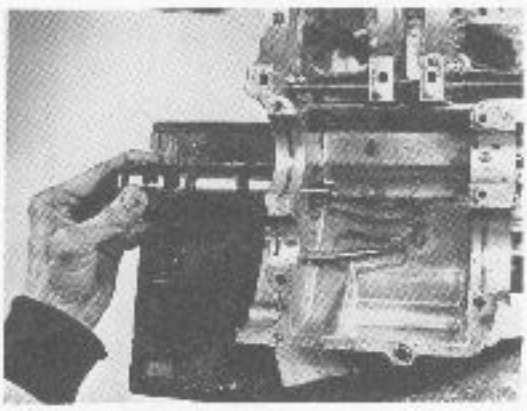
2. 350 models: Remove the neutral switch rotor and the drum stopper from the shift drum. Remove the guide pin clips and the guide pins from the shift forks. Mark the location of each shift fork



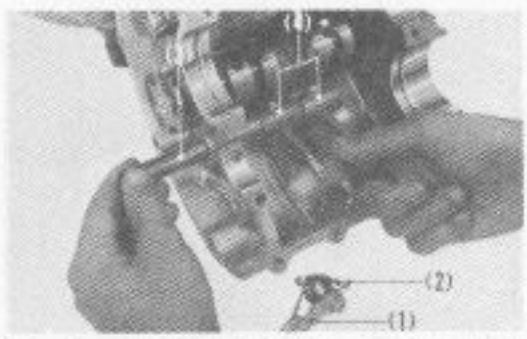
Removing the shift fork guide pins

(left, center, and right) and slide the shift drum out of the case from the right-side.

3. 360 models: Remove the shift drum stopper and stopper spring. Remove the



Removing the shift drum



Removing the shift fork shaft (3), and shift forks (4), drum stopper and spring (1 and 2) also shown

shift fork guide shaft after marking the location of the two shift forks (left or right), remove the forks taking care not to lose their guide pins. Remove the guide pin clip and guide pin from the remaining shift fork and slide the drum out the right-side of the case.

4. The transmission gears can be removed from their shafts after removing the circlips which secure them. All components should be carefully laid out in the order in which they are removed so that they can be installed in their proper locations.

Inspection

1. Check each of the gears for chipped, broken, or worn teeth. If any gear shows evidence of such damage, it should be replaced. In addition, the gear with which it meshes should be replaced as well, since it has undoubtedly been overstressed.

2. Check the inner splines on those gears so equipped, and replace the gear if the splines are worn or broken. Inspect the corresponding splines on the shaft. The shafts should be replaced if damaged.

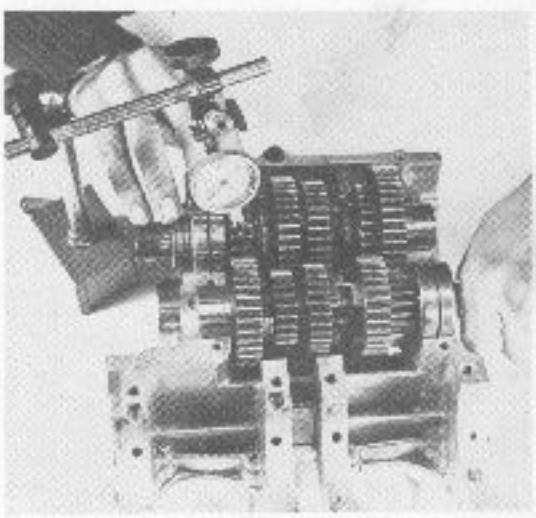
3. Inspect the engaging dogs on gears so equipped. The dogs must not be worn, chipped, or broken. Replace the gears if they are.

4. Inspect the transmission shafts for damage to the clutch housing or countershaft splines. Make sure that the shafts are not bent. Replace the shafts if necessary.

5. 350 models: Measure the inside diameter of all the gears without splines, then measure the diameter of the shafts on which they fit. Find the gear-to-shaft clearance from the difference in these measurements. The clearance should not exceed the service limit given at the end of this chapter.

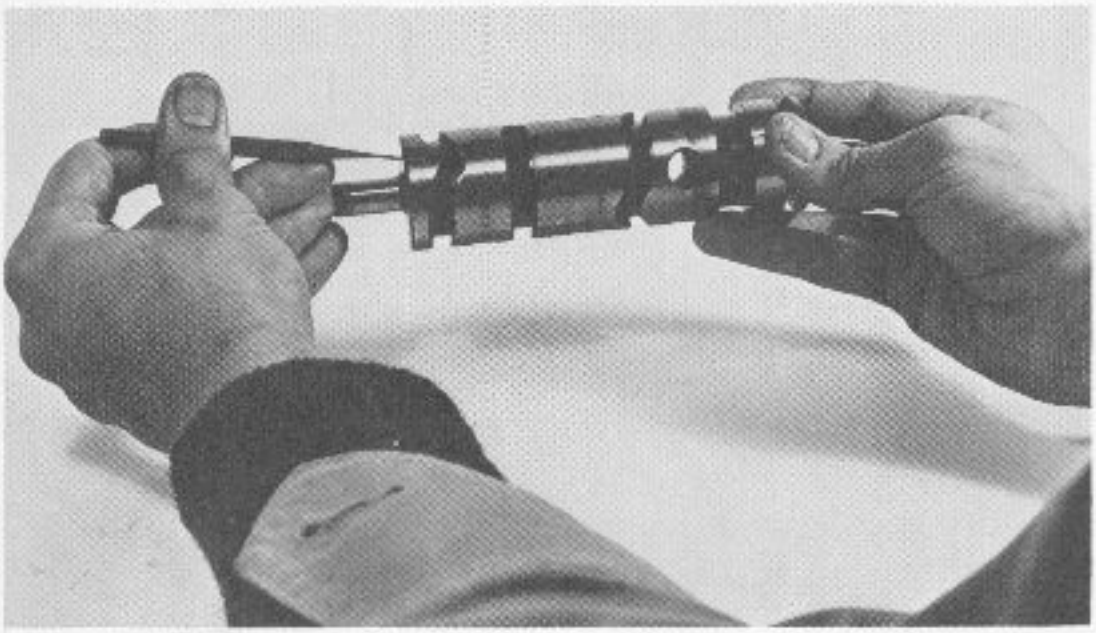
6. Replace any galled thrust washers. It is recommended that the thrust washers be replaced in any event. Transmission shaft circlips should always be replaced once they are removed.

7. Check all parts for heat damage (discoloration).



Checking gear backlash

8. Install the gear clusters in the neutral position, lock each mainshaft gear in turn, and check the corresponding countershaft gear for rotational movement (backlash) with a dial gauge as illustrated. Compare the gauge reading with the backlash specification for your model. If the backlash is excessive, both gears must be replaced.



Shift fork guide pin grooves

9. The shift drum itself should be inspected for wear to the shift fork guide pin grooves.

10. The shift fork shaft (360 models) should be inspected for wear in those areas on which the shift forks ride. Roll the shaft along a flat surface to check it for a bent condition. Replace the shaft if bent.

11. Check the shift forks themselves. Note any wear to the fork bore. Check the fingers for bends or for chipping or wear. Replace any fork on which such defects are noted.

12. Check the shift fork guide pins for wear, and replace them if damaged.

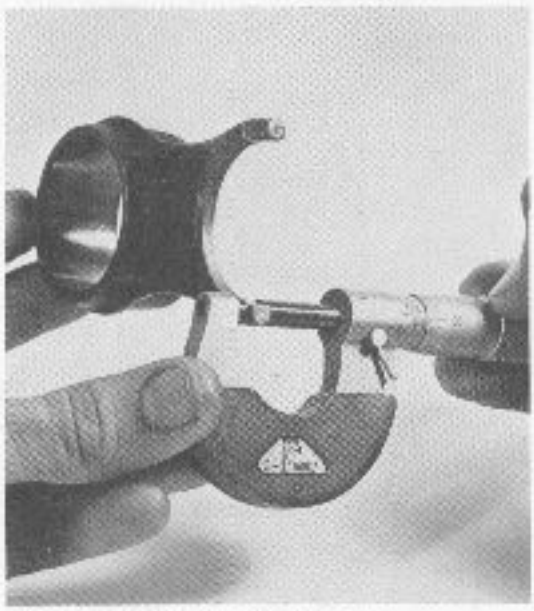
13. Check the shift drum dowel pins. Replace any broken, worn, or missing pins.

14. Measure the thickness of the shift fork fingers. If they are smaller than the service limit for your model, replace them.

15. Measure the outside diameter of the shift drum and compare the measured value to the service limit. Replace as necessary.

16. Measure the inside diameter of the shift fork and compare the measured value to the standard value. Replace if worn beyond the service limit.

17. 360 models: Measure the diameter of the shift fork shaft. If the measured value is less than the service limit, the shaft should be replaced.

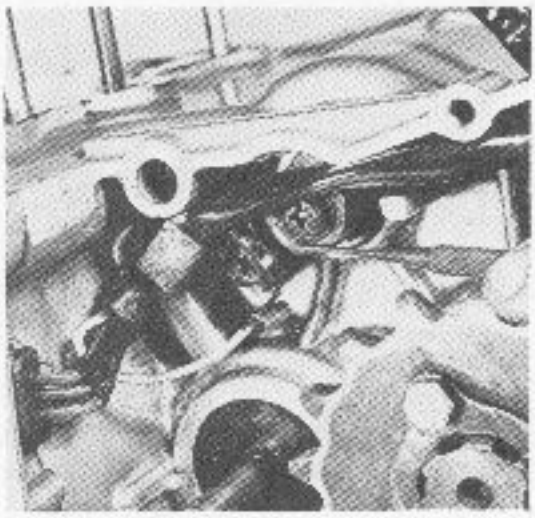


Checking shift fork finger width

18. Inspect the guide pin clips and replace them if they are distorted or weak.

Installation

1. Slip the shift drum into the upper crankcase; as the drum enters the case, install the shift fork(s). Be sure that the fork(s) are installed in the same position

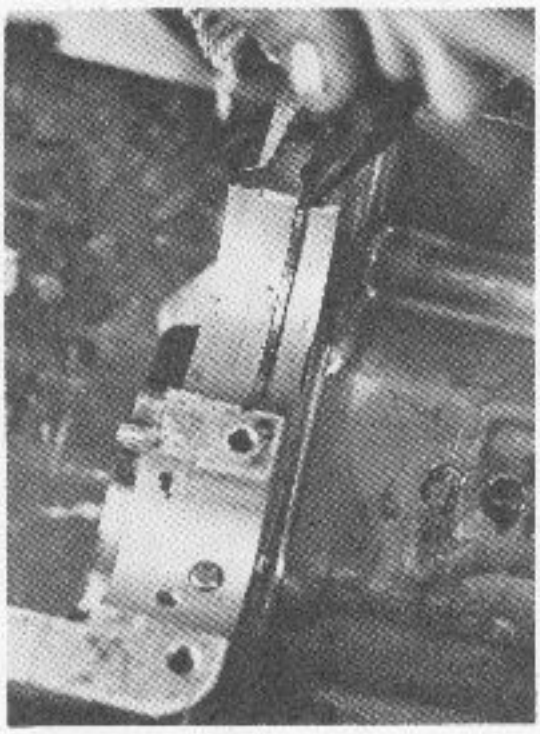


Neutral switch rotor in neutral position

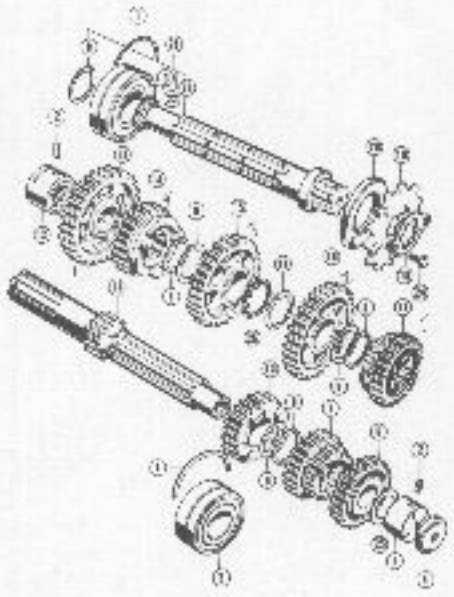
from which they were removed. Install the neutral switch to the end of the shift drum.

2. Position the shift drum in the neutral position (as seen by the neutral switch) and install the neutral stopper ball, spring, lockplate, and bolt. Bend the lockplate up against the flat on the head of the bolt.

3. 360 models: Install the shift fork shaft, inserting it through the shift



Transmission shaft bearing set ring

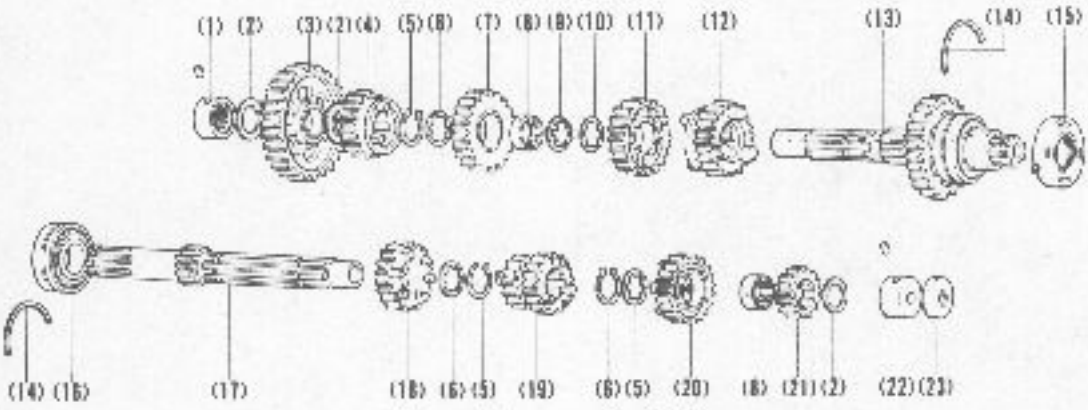


Transmission assembly (350)

1. Set ring
2. Dowel pin
3. Ball bearing
4. Oil seal
5. Needle bearing
6. Mainshaft fifth gear
7. Mainshaft second and third gear
8. Circlip
9. Thrust washer
10. Mainshaft fourth gear
11. Mainshaft
12. Needle bearing
13. Countershaft first gear
14. Countershaft fourth gear
15. Countershaft third gear
16. Countershaft second gear
17. Countershaft fifth gear
18. Lockplate
19. Countershaft sprocket
20. Oil seal
21. Countershaft (complete)
22. O-ring
23. Countershaft
24. Bolt
25. Thrust washer
26. Lockwasher
27. Thrust washer

forks as it enters the case. Install the guide pins and check that they fit into the grooves in the shift drum.

4. Assemble the mainshaft and the countershaft as shown in the accompanying illustration. Install the transmission shafts in the upper case. Be sure that the shift forks are fitted to the proper gears. Be sure that the bearings are fitted to the set ring or the locating pins. When properly fitted the bearings should sit flush in the case.



Transmission assembly (360)

1. Needle bearing
2. Thrust washer
3. Countershaft first gear
4. Countershaft fifth gear
5. Snap ring
6. Thrust washer
7. Countershaft third gear
8. Splined bushing
9. Lockwasher
10. Thrust washer
11. Countershaft fourth gear
12. Countershaft sixth gear
13. Countershaft
14. Set ring
15. Oil seal
16. Ball bearing
17. Mainshaft
18. Mainshaft fifth gear
19. Mainshaft third and fourth gears
20. Mainshaft sixth gear
21. Mainshaft second gear
22. Needle bearing
23. Oil seal

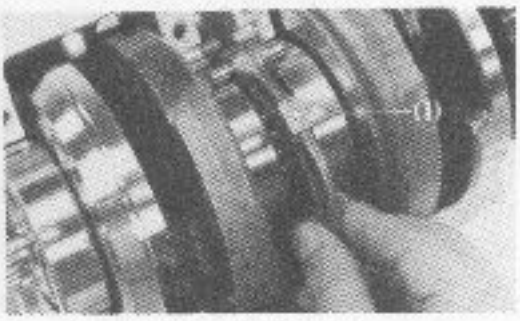
3. The remainder of assembly is in the reverse order of removal.

CRANKSHAFT

Removal

1. Remove the top end and split the cases as described previously.

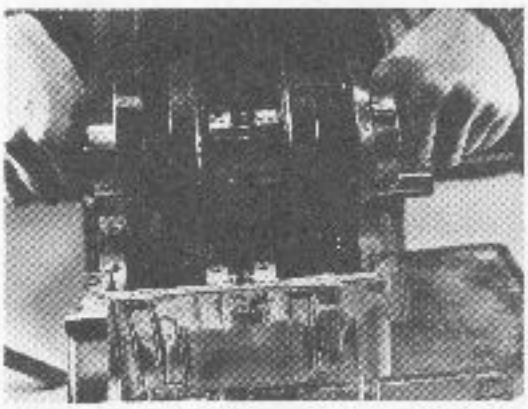
2. 360 models: Remove the cam chain tensioner arm and lift out the crankshaft and cam chain together.



Cam chain tensioner arm (1) (360)

3. 350 models: Loosen the four main bearing cap bolts gradually and evenly until they are all loose and then remove them. Lift the crankshaft and cam chain out of the case together.

CAUTION: *Do not lose the main bearing locating pins when the crankshaft is removed.*

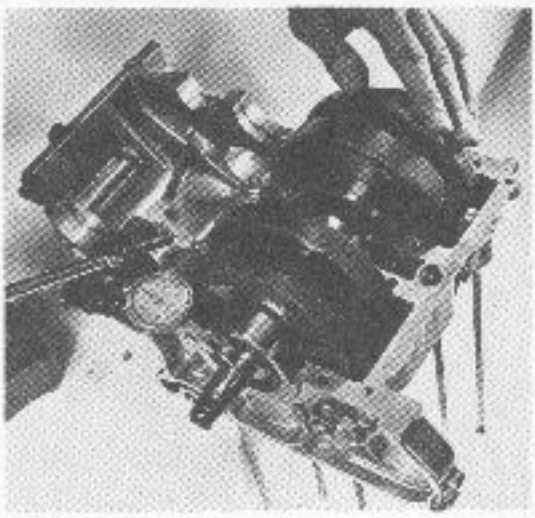


Removing the crankshaft

Inspection

1. Mount the crankshaft center main bearings in a set of V-blocks, and measure the run-out of the crankshaft with a dial gauge. Measurements should be taken at either end of the crankshaft and on each of the flywheels. If the run-out exceeds the service limit, the crankshaft should be replaced.

2. With the crankshaft supported at both ends, mount a dial gauge to the top of each main bearing in turn. Attempt to move the outer race up and down. The measurement on the dial gauge is the total radial clearance. If the clearance exceeds the service limit, the crankshaft should be replaced.



Checking crankshaft run-out

3. With the crankshaft firmly supported, fix a dial gauge to the bottom of the connecting rod, and measure the up and down play. The dial gauge will indicate the amount of radial clearance of the rod bearing. If the clearance exceeds the service limit, the crankshaft should be replaced.

4. Using a feeler gauge, measure the side clearance of the connecting rod. If the side clearance is beyond the service limit, replace the crankshaft.

5. With an inside micrometer, measure the bore of the connecting rod small end. If the bore is found to exceed the service limit, the connecting rod and the crankshaft should be replaced.

6. Rotate each of the main bearings. They should be smooth and silent. If rough or noisy, they should be replaced.

Installation

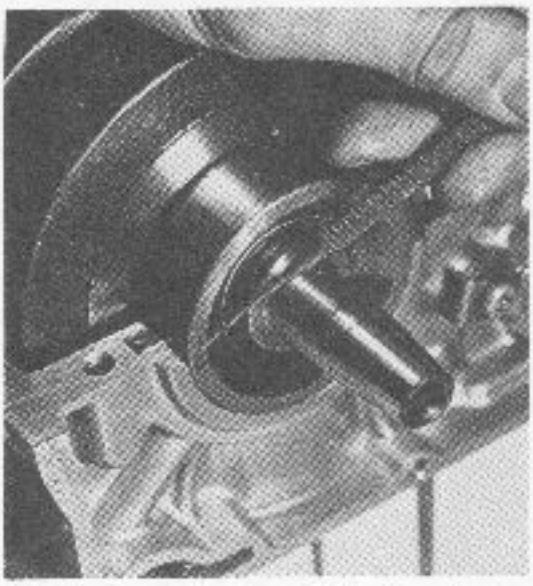
1. Fit the cam chain to the sprocket on the crankshaft.

2. Fit the crankshaft into place. Be sure that the bearing locating pins are properly seated in the upper crankcase half.

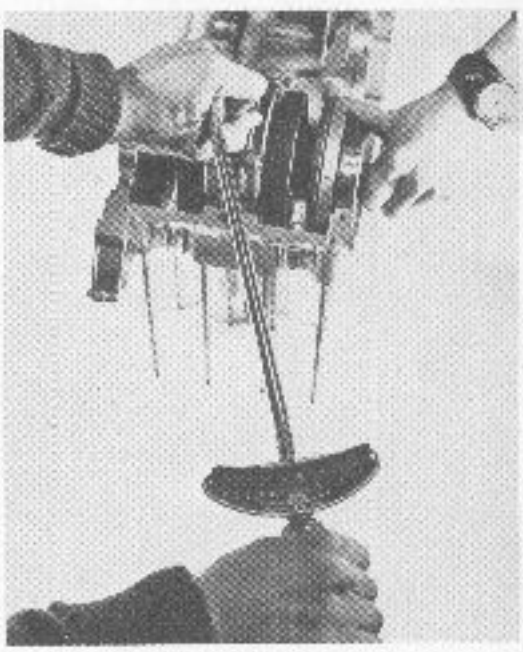
3. 360 models: Install the cam chain tensioner arm.

4. Install the main bearing cap (350) and tighten the four bolts gradually and evenly in an "X" pattern until the proper torque of 15.9–17.4 ft lbs is reached.

5. Assemble the crankcases and the top end.



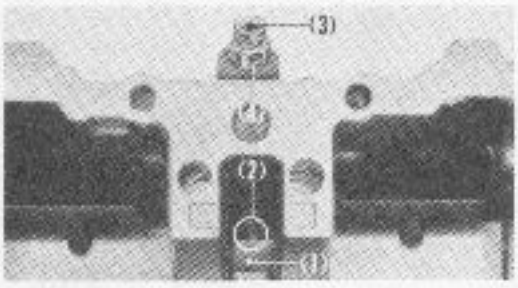
Seat the bearing locating pins into the cut-out in the case



Tighten the center main bearing cap bolts in an "X" pattern (350)

360 CAM CHAIN TENSIONER

The cam chain tensioner can be removed from the lower case by loosening the setting bolt and pulling the tensioner push bar and springs from the inside. When installing the tensioner push bar, the mark on the pad must face up. Push the push bar in to compress the springs and tighten the setting bolt.



Mark (2) on tensioner push bar (1) must face upward (360)

ASSEMBLING THE CRANKCASES

1. The crankcase mating surface must be clean and free of any scratches. Minor repairs can be made with an oilstone.

2. Apply a thin coat of sealing compound to the crankcase mating surface. Be careful not to get any of the sealer on the bearings or inside surface of the crankcase.

3. Install the lower case. Make sure that the cases mate properly before installing the crankcase bolts. If they do not, check that all of the bearing locating pins are in place.

4. Install the crankcase bolts and tighten them evenly and gradually in an "X" pattern, starting from the inside and working out.

5. Install the crankcase cover components and the top end as described previously.

Engine Specifications

350

Item	Standard (mm/in.)	Service Limit (mm/in.)
Camshaft side clearance	0.2–0.6/0.008–0.024	1.0/0.04
Camshaft lobe diameter	36.959–36.896/1.451–1.453	36.68/1.444
Camshaft journal diameter	21.928–21.960/0.864–0.865	21.92/0.863
Camshaft bearing ID	22.00–22.021/0.866–0.867	20.05/0.858
Rocker arm shaft diameter	12.853–12.986/0.510–0.511	12.96/0.508
Max head warpage	—	0.05/0.002
Valve seat width	1.0–1.5/0.040–0.051	2.0/0.08
Valve-to-valve guide clearance		
Intake	0.01–0.037/0.0004–0.0014	0.05/0.0031
Exhaust	0.03–0.055/0.0013–0.0022	0.06/0.0035
Valve stem diameter		
Intake	6.975–6.960/0.2746–0.2752	6.955/0.2738
Exhaust	6.955–6.970/0.2738–0.2744	6.955/0.2730
Valve spring free length		
Outer spring	49.0/1.929	47.8/1.882
Inner spring	39.8/1.567	38.3/1.517

Engine Specifications (cont.)

350

Item	Standard (mm/in.)	Service Limit (mm/in.)
Cylinder bore	64.01–64.02/2.5201–2.5205	64.1/2.524
Max cylinder taper	0.005/0.0002	0.05/0.002
Out-of-round	0.005/0.0002	0.05/0.002
Piston diameter	63.97–63.99/2.5185–2.5193	63.9/2.51
Piston ring side clearance		
Top ring	0.030–0.060/0.0012–0.0024	0.18/0.007
Second ring	0.015–0.045/0.0006–0.0018	0.185/0.0065
Oil ring	0.010–0.045/0.0004–0.0018	0.170/0.0067
Ring end-gap	0.2–0.4/0.008–0.016	0.8/0.032
Piston ring thickness		
Top ring	1.460–1.475/0.057–0.058	1.435/0.0564
Second ring	1.457–1.490/0.058–0.059	1.435/0.0564
Oil ring	2.475–2.480/0.097–0.098	2.430/0.096
Wrist pin hole diameter	15.002–15.008/0.5906–0.5909	15.08/0.5937
Wrist pin diameter	14.994–15.000/0.590–0.5906	14.96/0.5890
Oil pump bore	16.000–16.018/0.630–0.631	16.1/0.634
Oil pump piston diameter	15.955–15.970/0.628–0.629	15.930/0.627
Clutch		
Friction disc thickness	2.62–2.78/0.031–0.110	2.3/0.906
Steel plate warpage	0.15/0.006	0.3/0.012
Spring free-length	31.9/1.256	30.5/1.20
Crankshaft run-out		
Shaft	0.02/0.0008	0.05/0.006
Counterweight	0.10/0.004	0.3/0.012
Main bearing radial play	0.012–0.020/0.0005–0.0008	0.05/0.002

Engine Specifications (cont.)

350

Item	Standard (mm/in.)	Service Limit (mm/in.)
Connecting rod		
Big end radial play	0.004–0.012/0.0002–0.0005	0.05/0.002
Big end side clearance	0.07–0.33/0.0028–0.0130	0.60/0.023
Small end bore	15.018–15.031/0.591–0.592	15.07/0.593
Transmission gear backlash		
1st, 2nd	0.044–0.153/0.0017–0.0052	0.2/0.008
3rd, 4th, 5th	0.048–0.11/0.0018–0.0055	0.2/0.008
Gear-to-shaft clearance		
M4, M5	0.02–0.062/0.0008–0.0024	0.1/0.0039
C1	0.02–0.054/0.000–0.002	0.1/0.0039
C2, C3	0.01–0.084/0.0016–0.002	0.1/0.0047
Shift fork thickness		
A (fitted to C4, C5)	4.93–5.0/0.94–0.197	4.6/0.181
B (fitted to M2, M3)	5.93–6.0/0.233–0.236	5.6/0.22
Fork bore diameter	40.0–40.025/1.575–1.576	40.075/1.577
Gearshift drum OD	39.35–39.975/1.5689–1.5738	39.9/1.571

Engine Specifications

350

Item	Standard (mm/in.)	Service Limit (mm/in.)
Camshaft side clearance	0.07–0.3/0.0028–0.012	Must be within standards
Camshaft lobe diameter		
Intake	40.314/1.587	40.1/1.579
Exhaust	40.339/1.588	40.1/1.579
Rocker arm-to-shaft clearance	0.016–0.061/0.0006–0.0024	0.1/0.004

Engine Specifications (cont.)

360

Item	Standard (mm/in.)	Service Limit (mm/in.)
Max head warpage	——	0.3/0.012
Valve seat width	1.0–1.3/0.04–0.05	2.0/0.08
Valve-to-valve guide clearance		
Intake	0.01–0.035/0.0004–0.0014	0.08/0.003
Exhaust	0.03–0.05/0.0012–0.0020	0.09/0.0035
Valve stem diameter		
Intake	6.975–6.990/0.2746–0.2752	6.955/0.2738
Exhaust	6.955–6.970/0.2738–0.2744	6.935/0.2730
Valve spring free-length		
Outer spring	49.0/1.93	47.8/1.88
Inner spring	39.8/1.50	39.3/1.57
Cylinder		
Bore	67.01–67.02/2.6382–2.6386	67.1/2.6417
Max taper	0.005/0.0002	0.05/0.002
Out-of-round	0.005/0.0002	0.05/0.002
Piston diameter	66.87–66.99/2.6366–2.6374	66.85/2.6319
Piston ring side clearance		
Top ring	0.02–0.06/0.0008–0.0024	0.15/0.0059
Second ring	0.02–0.06/0.0008–0.0016	0.15/0.0059
Oil ring	0.010–0.045/0.0004–0.0018	0.15/0.0059
Piston ring end-gap		
Top ring	0.2–0.4/0.0079–0.0157	0.8/0.0315
Second ring	0.15–0.35/0.0059–0.0138	0.75/0.0295
Oil ring	0.2–0.4/0.0079–0.0157	0.8/0.0315
Wrist pin hole diameter	16.002–16.008/0.6300–0.6302	16.05/0.6319

Engine Specifications (cont.)

350

Item	Standard (mm/in.)	Service Limit (mm/in.)
Wrist pin diameter	15.994–16.00/0.6297–0.6299	15.9/0.6260
Oil pump		
Outer rotor to-pump body clearance	0.15–0.21/0.0059–0.0083	0.35/0.0138
Radial clearance of outer rotor	0.02–0.08/0.0008–0.0032	0.1/0.0039
Clutch		
Friction disc thickness	2.62–2.78/0.1031–0.1035	2.5/0.5055
Steel plate warpage	0.1/0.0039	0.2/0.0079
Spring free-length	31.25/1.2305	29.7/1.1693
Crankshaft run-out		
Shaft	0.05/0.002	Below 0.1/0.0039
Counterweight	0.1/0.004	Below 0.1/0.0039
Connecting rod		
Big end radial play	0.004–0.012/0.0002–0.0005	0.05/0.0020
Big end side clearance	0.07–0.53/0.0028–0.0130	0.60/0.0238
Small end ID	15.016–15.034/0.5912–0.5919	15.07/0.5933
Gearshift fork to-drum		
clearance (A and B)	0.05–0.22/0.0020–0.0087	0.3/0.118
ID of gearshift fork		
Fork A	13.000–13.018/0.5118–0.5125	12.95/0.5098
Fork B	40.000–40.025/1.5748–1.5759	40.075/1.0798
Shift fork width		
Fork A and B	5.93–6.00/0.2335–0.2362	5.5/0.2165
OD of shift fork guide shaft	12.957–12.984/0.5101–0.5112	12.9/0.5079
OD of gearshift drum	39.950–39.975/1.5374–1.5384	39.9/1.5709

Engine Specifications (cont.)

360

Item	Standard (mm/in.)	Service Limit (mm/in.)
Kick-starter pinion-to-shaft clearance	0.04–0.082/0.0016–0.0032	0.1/0.004
Thickness of cam chain tensioner slipper (at center)	4.0/0.1575	3.0/0.1181
Thickness of cam chain guide (at center)	6.1–6.3/0.2402–0.2480	5.0/0.1969

Engine Torque Specifications

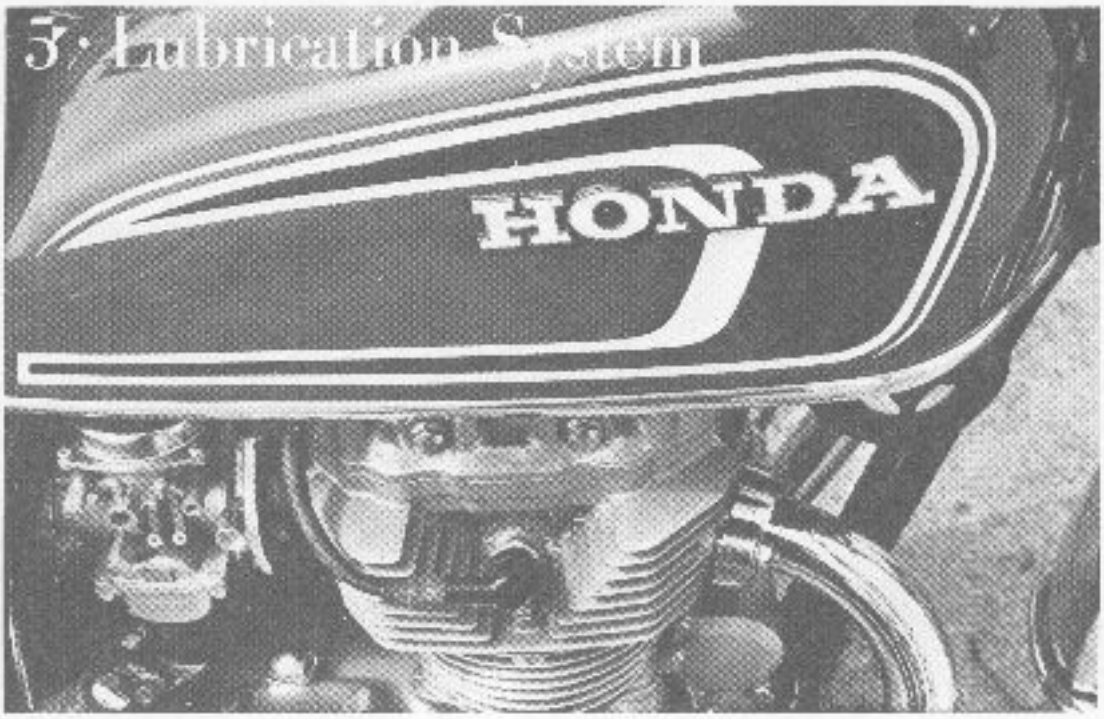
350

Item	Thread Diameter (mm)	Torque (ft lbs)
Crankcase cover screws	6	5–8
Cam case screws	6	4.5–5.2
Cylinder head nuts	8	13–14.5
Cylinder head screws	6	5–8
Oil filter locknut	16	22–23
Main bearing cap bolts	8	16–17.5
Alternator mounting bolt	8	16–17.5
Crankcase mounting bolts	6	7–9
	8	15–17

360

Crankcase cover screws	6	5–8
Cylinder head bolts	6	5–8
	10	22–25
Camshaft sprocket bolts	7	13–15
Alternator mounting bolt	8	22–25
Oil filter locknut	16	32–39
Crankcase mounting bolts	6	7–9
	8	15–17

3. Lubrication System



All Honda 350/360 models are of the wet sump-type. This means that the oil supply is contained in the crankcase sump rather than in an external oil tank. The 350 models have a plunger-type pump driven from the clutch housing by way of a connecting rod. The 360 models use a trochoid-type pump driven off the primary gear by way of an idler gear. Before entering the pump, the oil passes through an oil filter screen to remove any large particles. The oil is further filtered through a centrifugal oil filter before being pumped under pressure to the cylinder head, crankshaft assembly, and transmission shafts.

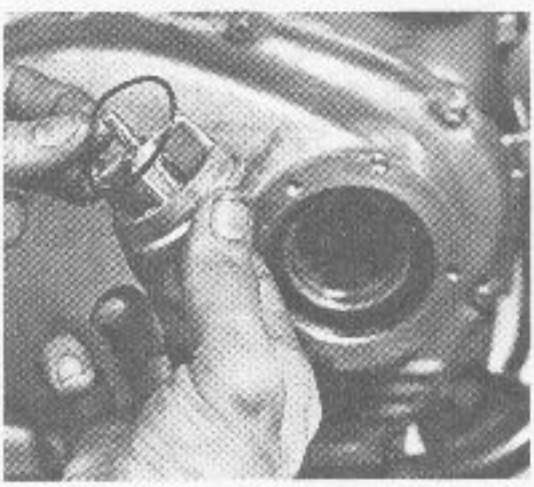
Centrifugal Oil Filter

REMOVAL

1. Remove the right crankcase cover.
2. Remove the snap-ring from the filter cap. Screw a 6 mm screw into the center of the cap and, using the screw, pull off the cap.
3. Hold the crankshaft from turning by placing the transmission in gear and applying the rear brake. Bend back the tabs on the lockwasher and remove the special 16 mm locknut using the factory tool (Tool No. 07916-2830000). Remove the tabbed lockwasher, and the filter housing.

INSPECTION

1. Clean all parts in clean solvent and allow to dry.
2. Inspect the snap-ring. It should be replaced if it is distorted or is a loose fit in the filter housing.
3. Inspect the filter cap O-ring. If it is deformed, torn, or cracked, it must be replaced.



Filter cap O-ring

4. Check the 16 mm locknut for condition. If the slots on the outside of the nut are badly damaged or the threads are chipped or stripped, the nut should be replaced.

5. Check the condition of the tabs on the lockwasher, if they are weak or missing, the washer must be replaced.

6. Inspect the condition of the cone-shaped washer. If the washer appears to be flat, it should be replaced.

INSTALLATION

1. Install the filter housing on the crankshaft, then install the cone-shaped washer, lockwasher, and locknut.

NOTE: *On 360 models and late model 350s, one side of the cone-shaped washer is marked "OUTSIDE." This side must face away from the engine. If the washer is not marked, the concex side should face away from the engine. It is recommended that this washer be replaced with a new one whenever it is removed. When installing the tab lockwasher, the slot in the large tab must fit over the splines inside the filter housing.*

When installing the locknut, be sure that the chamfered side is facing the engine.

2. Tighten the locknut to 32.6–39.7 ft lbs for 360 models and 21.7–23.1 ft lbs for 350 models. Bend the tabs on the lockwasher into the slots in the filter nut.

3. Install the filter cap and O-ring. Be sure that the vanes of the filter cup are fitted into the slots in the filter housing. Be sure that the circlip is firmly seated.

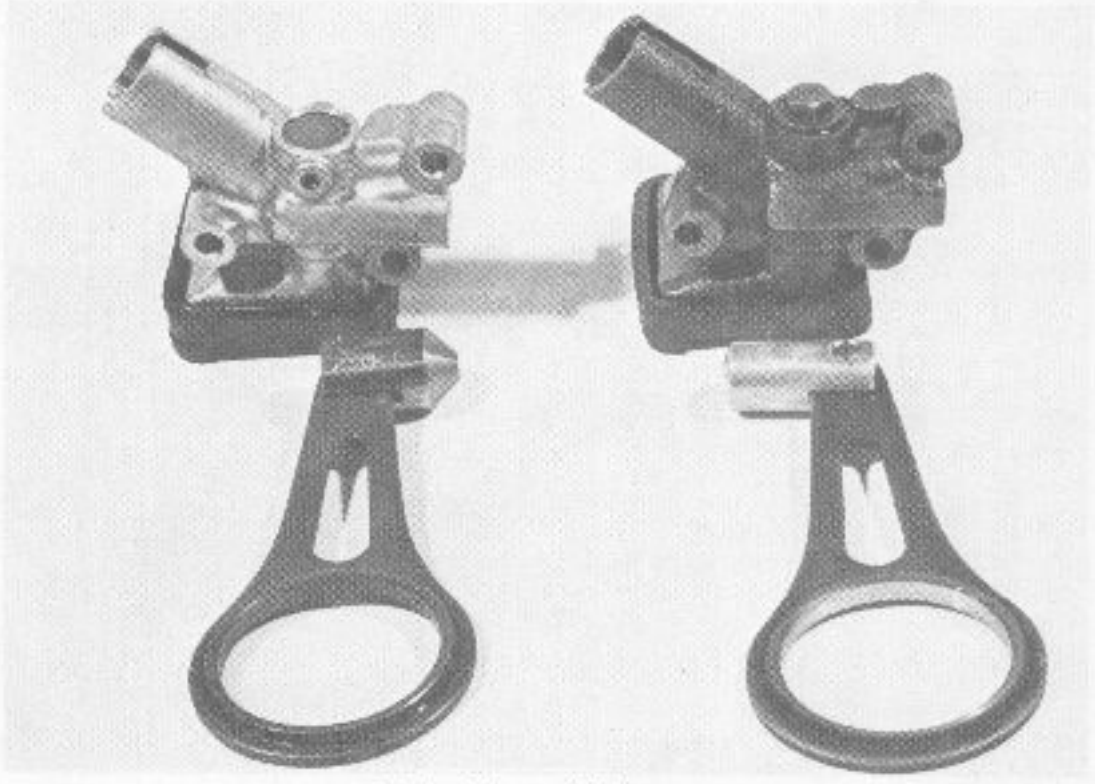
Oil Pump and Filter Screen

350 MODELS

On 350 models, the oil pump and filter screen are removed and installed with the clutch housing. Refer to Chapter 4.

Inspection

NOTE: *CB/CL350K3,K4 and SL350K1,K2 were equipped with a larger oil pump than the early models. A new pump assembly can be installed on the early models to provide better*



Early and late model oil pumps

lubrication. However, if this is done, be sure to install new crankcase cover gaskets, as they were also modified. The new pump can be identified by the alloy pump body and steel piston. The early pump body was a steel casting with an alloy piston. Note that if this modification is made the entire pump assembly must be changed.

1. Inspect the bore in the oil pump. If it is scored, the pump housing and piston should be replaced.

2. Check the condition of the pump piston. If it is scored, it should be replaced.

Check the pump piston for scoring (350)

3. CB/CL350,K1,K2/SL350: If a micrometer is available, measure the diameter of the pump piston. If found to be less than 15.930 mm (0.627 in.), the piston should be replaced.

4. CB/CL350,K1,K2/SL350: With an inside micrometer, measure the pump bore if found to be larger than 16.1 mm (0.634 in.), the pump housing and piston should be replaced.

5. Remove the suction valve bolt from the top of the pump (if fitted), and the steel ball beneath it. If the ball shows signs of wear, the pump should be replaced.

6. Remove the filter screen from the bottom of the pump and wash in clean solvent. Inspect the screen for any puncture marks. If the screen mesh is broken to any extent, the screen must be replaced.

7. Check the oil pump gasket for condition. If defective in any way, it must be replaced. It is recommended that this gasket be replaced regardless of apparent condition.

8. Inspect the condition of the mounting bolt lockplate and replace it if the tabs are fatigued.

360 MODELS

Removal and Installation

1. Remove the right crankcase cover. Refer to Chapter 4 if necessary.

2. Remove the idler gear and shaft.

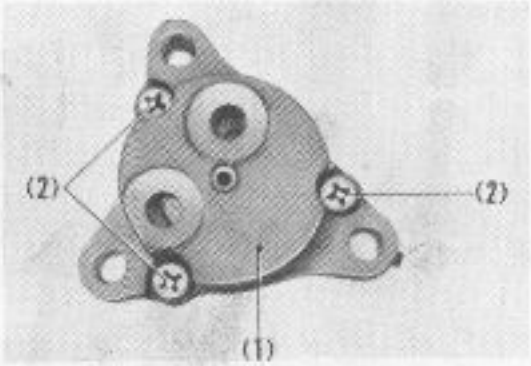
3. Remove the three mounting bolts from the oil filter screen, and remove the screen. Remove the two remaining mounting bolts from the oil pump and remove the pump.

4. Install the oil pump and filter in the reverse order of removal, however, note that the two O-rings behind the pump must be in good condition. If in doubt as to their condition, replace them with new ones.

Disassembly

To disassemble the pump, remove the three phillips head screws from the rear of the pump and pull the pump halves apart.

NOTE: *It is not recommended that the pump be disassembled. If the pump is suspected of being defective, it should be replaced as a unit rather than making an effort to repair it.*



Disassemble the pump (1) by removing the three screws (2) (360)

Inspection

1. Inspect the condition of the oil pump drive gear and idler gear. If any teeth are chipped, broken, or missing, replace the gears and inspect the primary gear for the same damage.

2. Measure the clearance between the

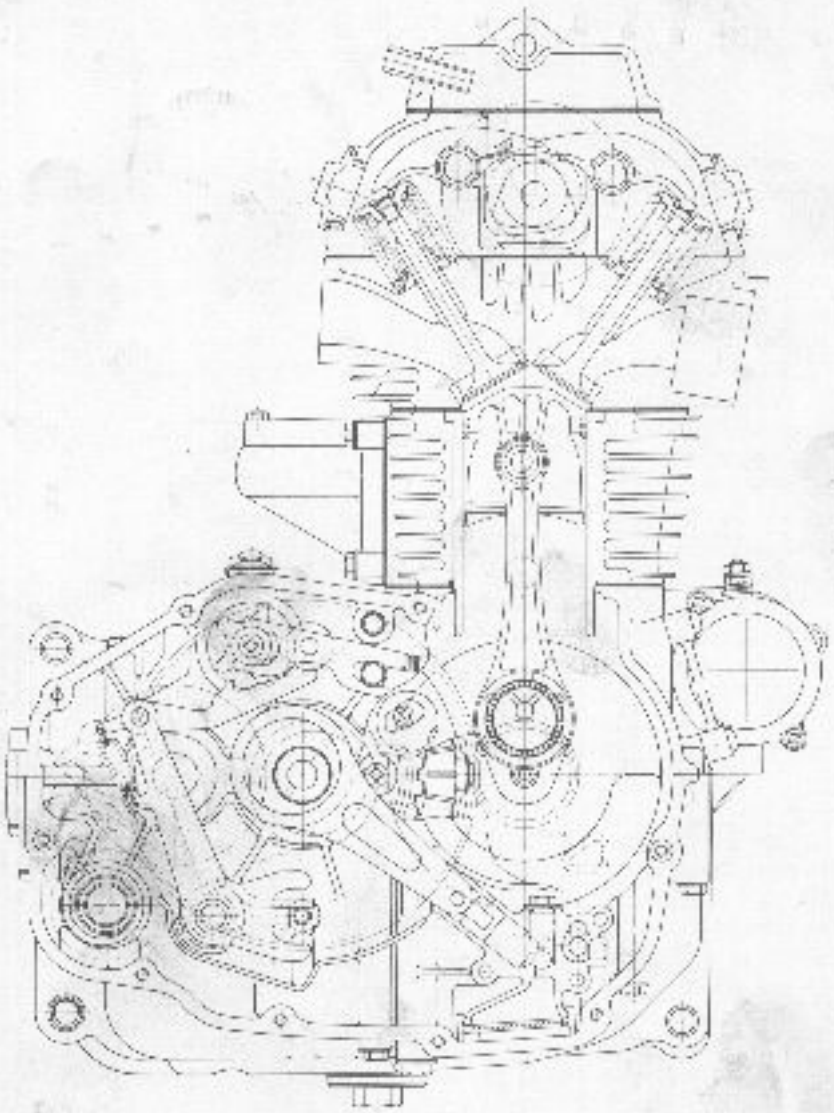
two rotors. If the clearance exceeds the service limit, replace the pump.

3. Measure the side clearance of the rotors. If the side clearance exceeds the service limit given at the end of this chapter, replace the pump.

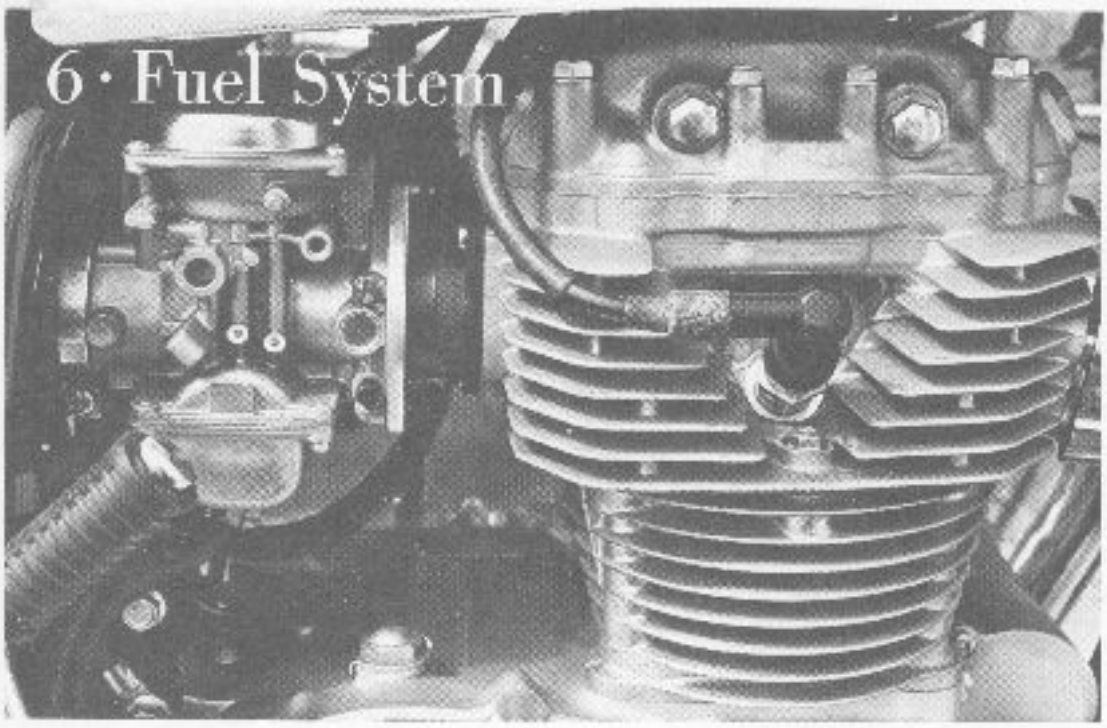
Oil Pump Specifications

CB/CL350, K1, K2/SL350

Item	Standard Value (mm/in.)	Service Limit (mm/in.)
Oil pump bore diameter	15.008–16.018/0.650–0.631	16.1/0.634
Oil pump piston diameter	15.905–15.970/0.625–0.628	15.990/0.627
	CB/CL360	
Oil pump outer rotor-to-pump body clearance	0.15–0.21/0.0059–0.0083	0.35/0.0138
Radial clearance at oil pump outer rotor	0.03–0.08/0.0012–0.0032	0.1/0.0039



6 · Fuel System



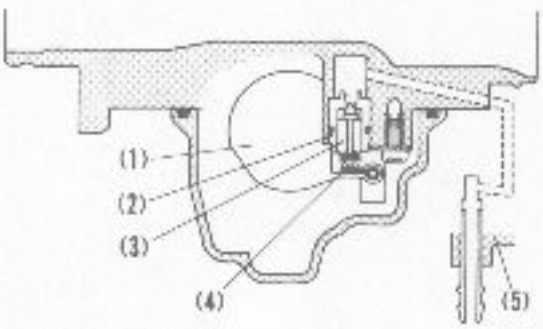
With the exception of SL350 K-models, the carburetors used on 350/360 Hondas are of the constant-velocity type. The SL350 K-models are equipped with two direct-control type carburetors. The different types can be easily identified by the throttle cable connection. In the direct-control type carburetor, the throttle cable enters the carburetor top; while in the constant-velocity type (CV) carburetor, the throttle cable connects to a lever at the side. Both types are manufactured by Keihin.

The following description of the operational theory of the carburetor may be of some aid in pinpointing carburetor malfunctions.

Operational Description

The function of the carburetor is to meter an fuel-air mixture into the combustion chamber in amounts which vary according to engine speed. The ratio of air-to-fuel is usually maintained at 15 to 1 (by weight) at atmospheric pressure at sea level (14.7 psi).

Basically, a carburetor consists of a float bowl, a fuel nozzle, and a venturi



Float assembly

1. Float
2. Needle seat
3. Needle
4. Float tang
5. Fuel inlet passage

tube. Fuel from the gas tank flows into the float bowl in amounts monitored by the float. The float is connected to a needle, and when the fuel reaches a preset level, the float presses the needle into its seat, stopping the fuel flow. Then, as the gas is consumed by the engine, the float drops proportionally to allow more fuel to enter the bowl. In actual operation, the float rarely closes off the fuel supply completely (except when the engine is shut off or for several moments at idle), but reaches a balance in which the amount of fuel consumed matches that entering the float bowl.

It is important that the fuel level in the float bowl be maintained at the proper level, or the engine will receive a lean or rich mixture as the motorcycle accelerates, brakes, or banks.

It is the difference in pressure between the float bowl (at atmospheric pressure) and the pressure in the venturi above it which causes the fuel to rise through the fuel nozzle into the air flowing through the venturi. The fuel nozzle in this case is either the main jet or the pilot jet. The venturi is basically an air funnel which is narrower in the center than it is at the ends. When air rushes through it, pulled by the suction of the downward moving piston through the open intake valve, a low-pressure area is created in the narrow section of the venturi. The higher the rpm of the engine, the faster the air moves through the venturi, and the greater the pressure drop in the narrow section. This narrow section is actually the area of the throttle slide; thus the slide allows the venturi size to vary. Since the fuel in the float bowl is at atmospheric pressure and the venturi above the main jet is a low-pressure area, the fuel is forced up through the jet into the air flowing through the venturi in an effort to equalize the pressure. The amount of fuel is metered by the main jet, and the air by the size of the venturi.

Of course, in actual practice, carburetors are not quite that simple. The basic unit described above makes no provisions for throttle control, cold weather starting, or the varying needs of the engine.

The operation of a practical carburetor can best be described by dividing it into five circuits, and the components which control each one.

The carburetor casting is drilled with a number of air and fuel passages. Among these are: the primary air passage which is drilled from the front of the carburetor just beneath the intake to the needle jet. The air drawn through this passage helps to atomize the fuel passing through the needle jet before it enters the carburetor venturi.

The pilot air passage is located alongside the primary air passage. The air passing through this passage is metered by the pilot air screw and provides air for the idle and low-speed operation.

The pilot outlet is a very small drilling which can be seen on the engine side of the throttle slide bore. The air and fuel mixture for idling pass through this passage and then to the engine.

Other metering devices and jets are described in the following sections.

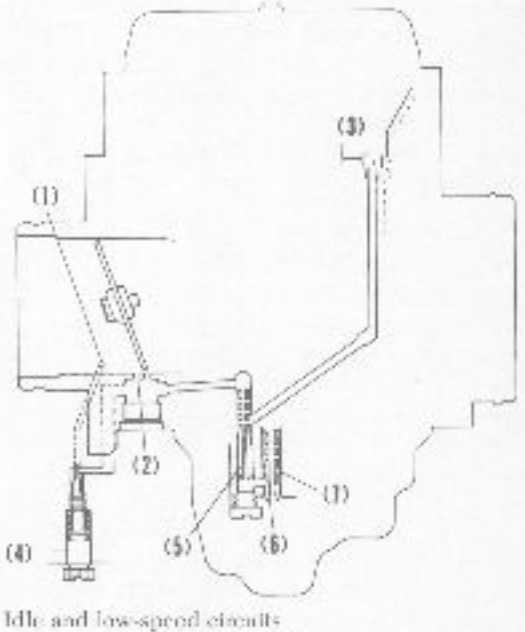
DIRECT-CONTROL CARBURETOR

Starting Circuit
(0 Throttle Opening)

When the choke lever is operated, a plate closes off the mouth of the venturi and a low-pressure area drawn in through the pilot air passage is mixed with fuel from the pilot jet. This produces a rich mixture needed for cold weather starting.

Idle Circuit
(0–⅛ Throttle Opening)

At idle and under normal operating conditions, the engine requires very little fuel and air. It does require, however, more accurate metering than pure venturi action can provide while the engine is still turning over slowly and intake air velocity is low.



Idle and low-speed circuits

1. Pilot outlet
2. By-pass
3. Slow air jet
4. Pilot screw
5. Primary jet
6. Primary main jet
7. Main nozzle

The circuit consists of a pilot air passage, pilot jet, and the throttle slide. Fuel is provided from the float bowl through the pilot jet and passage. The pilot air passage serves a very important function, even though it doesn't provide most of the air feed for mixing. It is actually an adjustable needle valve, and the amount of air it lets through can be changed to compensate for atmospheric conditions.

In operation, descending piston suction creates a low-pressure area behind the throttle slide. To equalize this low-pressure, air rushes through the pilot air passage in amounts determined by the pilot air screw, and mixes with fuel from the pilot fuel jet. This mixture is bled into the carburetor's intake tract through the pilot outlet. The incoming air under the throttle slide atomizes and delivers the mixture to the combustion chamber.

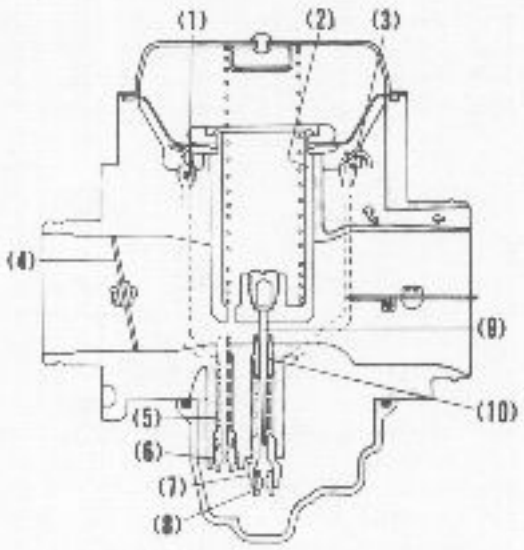
Low-Speed Circuit (⅛–¼ Throttle Opening)

This circuit uses the same components as the idle circuit. There is, however, an increase in the airflow as the throttle slide rises, and in the fuel flow as the needle begins to come out of the needle jet. This effects a transition to the mid-range circuit, since the increases in fuel and air delivered by the carburetor venturi and the needle jet overshadow the smaller amounts coming from the pilot outlet, eventually eliminating the idle circuit from the metering system.

Mid-Range Circuit (¼–¾ Throttle Opening)

In this circuit, air is supplied by two sources: the venturi and the primary air passage. Fuel is supplied by the float bowl and metered by the needle jet and needle. The needle jet is located above the main jet and works in conjunction with the needle which is suspended from the throttle slide. The primary air passage air serves to atomize the fuel being drawn through the needle jet.

In operation, the needle jet and needle work together to supply a corresponding amount of fuel as the throttle slide is raised and venturi action takes effect. The needle is tapered so that, as it is lifted, more fuel is allowed to pass through the needle jet.



Mid-range circuit

1. Primary air jet
2. Throttle slide
3. Secondary air jet
4. Throttle plate
5. Main nozzle
6. Primary main jet
7. Needle jet holder
8. Secondary main jet
9. Needle
10. Needle jet

High-Speed Circuit (¾–Full Throttle)

This circuit is close to that described for the basic carburetor. The needle has lifted out of the needle jet, and therefore no longer controls the amount of fuel, and the throttle slide has been raised high enough so that it has minimal control over the amount of air intake.

Venturi action takes over completely. The amount of air sucked into the combustion chamber is determined by the size of the venturi and the amount of fuel is determined by the size of the main jet. The only other component which still has a significant effect is the primary air passage which continues to aid fuel atomization.

It should be understood that the operating ranges of the various metering circuits overlap somewhat, and there is a gradual, rather than an abrupt, transition from one to another as the throttle is operated.

This description should also explain

why it is fruitless to make random changes in carburetor settings without first determinging the nature of the problem, and the range in which it occurs.

CONSTANT-VELOCITY CARBURETOR

The constant-velocity carburetor is basically the same as the direct-control type carburetor, except that the throttle twistgrip is not connected directly to the throttle slide. Instead, in the CV carburetor, the throttle grip and cable are connected to a butterfly valve located between the intake manifold and throttle slide. As the throttle butterfly is opened, the manifold vacuum evacuates air from the top of the slide chamber through a passage in the slide. Consequently, on demand from the engine, the slide is raised and more air is admitted, and the tapered needle is proportionally lifted out of the jet tube to admit more fuel.

The term "constant-velocity" (or constant vacuum) refers to the speed of the air passing over the main jet tube and the vacuum in the carburetor throat (between the butterfly and slide), which remains constant due to the movement of the piston in relation to the vacuum. As the engine demands more air and the manifold vacuum increases, the slide responds by lifting in proportion to the vacuum. Thus the carburetor air speed and vacuum remain constant, because an increase in vacuum means an increase in slide lift, which in turn increases the amount of air passing through the carburetor by altering the size of the air passage (venturi), and compensating for the increased engine demands with a larger flow of air. A constant vacuum indicates a constant-velocity, and vice versa.

The only other basic differences between the direct-control type of carburetor and the CV type is that the pilot screw controls the amount of fuel entering the system from the float bowl instead of the air as in the direct-control type. The CV carburetor also has two main jets (primary and secondary) with the needle jet and needle above the secondary main jet. The primary main jet functions mainly in low-range operation.

Carburetor Overhaul

DIRECT-CONTROL TYPE

Removal and Installation

1. Unscrew the carburetor cap and pull the throttle slide assembly out of the carburetor. If the slide assembly is to be disassembled, see the procedure below. If not, place a small plastic bag around the assembly to keep dirt out, and place it out of the way. Note that mishandling the assembly may necessitate replacement of the slide or needle.

2. Turn the fuel supply off at the petcock, and disconnect the fuel line from the carburetor.

3. Remove the float bowl drain plug, and drain off any gas in the float bowl. Disconnect any overflow or breather tubes.

4. Loosen the intake manifold and air cleaner connecting bands. Remove the carburetor.

5. Installation is in the reverse order of the above, but the following points should be noted:

   a. Lubricate the throttle slide if desired with a molybdenum or graphite lubricant. Insert it into the carburetor with the slide cutaway facing the air cleaner. Be sure that the slot in the slide is engaged with the tab in the carburetor body;

   b. Be sure that the slide goes in easily, and especially that the needle enters the needle jet. Do not push or force the slide into place. If resistance is noted, it is probable that the needle is cocked to one side and is not entering the needle jet;

   c. Tighten the carburetor cap and check throttle operation. The slide must move freely up and down. The throttle return spring must have enough tension to snap the slide to its fully closed position if the throttle is opened and released;

   d. Connect the fuel line from the right carburetor to the rear outlet on the petcock, and the fuel line from the left carburetor to the front outlet on the petcock. Secure the fuel lines in place with a spring clip;

e. Turn the fuel on and check for leaks. Start the engine and check for air leaks around the intake manifold and the air cleaner.

Disassembly

1. If disassembly of the throttle slide components is desired, compress the return spring against the carburetor cap, disengage the cable from the slide, take out the spring clip, needle and clip.

2. With the carburetor upside down, flip up the retainer and separate the float bowl from the carburetor body. Do so carefully to avoid damage to the float.

3. Push out the float pivot pin with a small drift, and remove the float. Remove the float needle from its seat. Unscrew the seat itself.

4. Using a small screwdriver, remove the main jet, pilot jet, pilot air screw, and throttle stop screw.

5. Unscrew the main jet holder using the correct size wrench. The needle jet can now be removed from above the main jet holder.

Inspection

1. Clean all metal parts in carburetor cleaner or a suitable solvent, and blow dry.

2. Use air pressure to blow out the air and fuel passages in the carburetor body and the fuel passages in the jets.

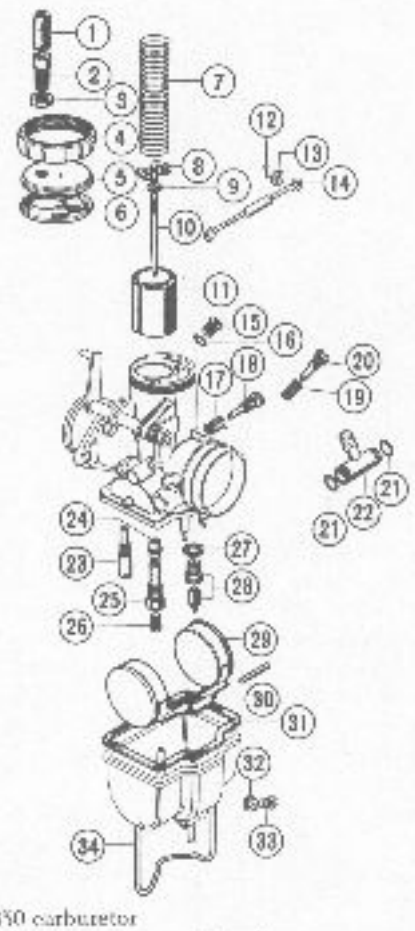
CAUTION: *Never attempt to clear blocked jet passages by inserting anything into the jet bore. Clear by blowing through with air pressure only.*

3. Inspect the carburetor body for any vibration or stress cracks.

4. Check the condition of the throttle slide. The slide should be free of score or wear marks. Minor scoring can be removed with fine emery cloth. The slide should be a light slip-fit in the carburetor bore. Note any binding or excessive play as the slide is moved in the bore. Binding may be caused by a warped carburetor body; excessive play by a worn slide or bore. Check the bore for vertical score marks caused by throttle slide action. Serious scuffing of either slide or body may be due to a sticking slide: a condition which must be remedied.

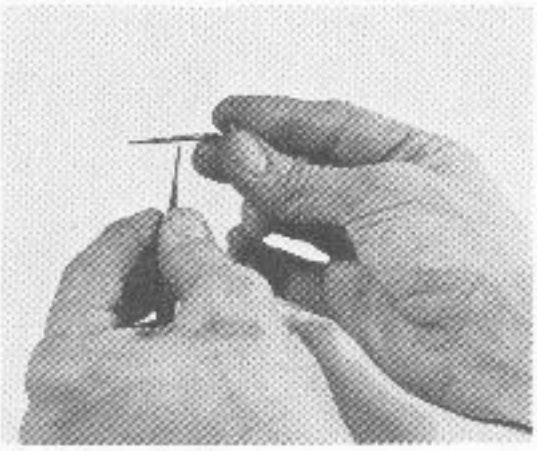
The slide must be able to move freely in the carburetor body, but if it is too loose, it should be replaced. A throttle slide should last at least four years under normal running conditions. The slide will wear out more quickly if the machine is used in extremely dusty conditions, or if there is a leak in the filtration system.

5. Inspect the needle jet and the needle. The needle must be free of nicks or score marks along its tapered portion.



SF350 carburetor

1. Rubber cap
2. Cable adjuster
3. Locknut
4. Cap
5. Top
6. Rubber gasket
7. Slide return spring
8. Needle retaining clip
9. C-clip
10. Needle
11. Slide
12. Cotter pin
13. Float washer
14. Choke linkage rod
15. Plug
16. Flat washer
17. Air screw spring
18. Air screw
19. Throttle stop screw spring
20. Throttle stop screw
21. O ring
22. T connector
23. Low speed jet
24. Main jet tube
25. Main jet holder
26. Main jet
27. Flat washer
28. Needle and seat assembly
29. Float
30. Float hinge pin
31. Float bowl gasket
32. Flat washer
33. Drain plug
34. Float bowl clip



Check the needle for wear

More often, however, these components will need to be replaced because of normal wear. As the throttle slide moves up and down while the machine is in operation, the needle is rubbing against the jet. Eventually, these components will wear enough to cause a noticeable rich running condition in the mid-throttle range. If this occurs, both the needle and the jet should be replaced. If the components are more than four years old, new ones should be fitted before attempting to tune the carburetor, or taking remedial action to correct a rich condition (such as lowering the needle).

6. Carefully inspect the floats. If brass floats are fitted, shake the float close to your ear; listen for any gasoline trapped inside. If the float assembly leaks, or if any puncture is noted, replace it; do not attempt repairs.

7. Check that both floats are at exactly the same level, with one not twisted higher or lower than the other. If this is the case, the floats have been mishandled, and must be replaced.

Inspect the tip of the float needle and the needle seat for dirt or corrosion. Check the needle tip for wear. If worn, the needle should be replaced.

If there is any corrosion or deposits evident on the needle or needle seat, the deposits must be removed, or the parts replaced.

NOTE: *Do not attempt to clean the needle or needle seat by lapping one against the other.*

To check the efficiency of the float needle valve, proceed as follows:

a. With the carburetor assembled except for the float bowl, connect it to its fuel line;

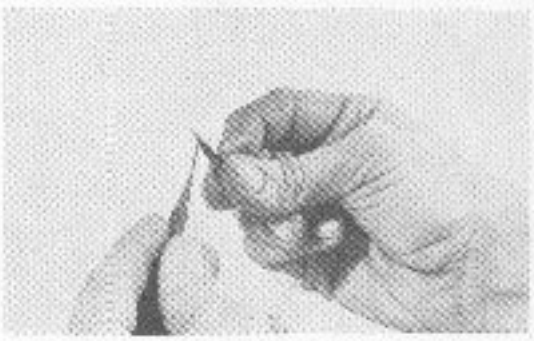
b. Place a number of dry rags beneath the carburetor, and hold it upright (in its normal operating position) with one hand;

c. With the other hand, gently raise the float assembly until the float needle is seated. Have an assistant turn the fuel petcock on;

d. If the needle and seat are in good condition and forming a good seal, no gasoline will flow out of the carburetor;

e. If a leak is noted, replace the needle and seat.

CAUTION: *While performing this test, be sure that adequate precautions are taken in the event of spillage.*



Pilot air screw taper must be smooth

The float level should be checked prior to assembly. Refer to Chapter 3.

8. Check that the tapered portion of the pilot air screw is smooth and clean. Replace it if it is crushed or blunted.

Assembly

Assembly is basically the reverse of the disassembly procedures, but note the following points:

1. Float bowl gaskets and jet O-rings should always be replaced with new ones. Other O-rings and fiber gaskets should be carefully inspected and replaced if less than perfect in condition. Check O-rings for tears and cracks; fiber gaskets for a crushed condition.

2. Exercise care when installing jets, they are made of soft brass and are easily damaged if overtightened. Install the needle jet, main jet holder, main jet, pilot jet, and float needle seat.

3. Install the float needle into its seat.

Hold the floats in place and install the pivot pin. Install the float bowl.

4. Assemble the throttle slide.

5. Install the pilot air screw, turning it in until lightly seated, then backing it out the proper number of turns as listed in the chart at the end of this chapter.

6. After completing assembly, install the carburetor on its manifold.

7. Check for fuel or air leaks; make final adjustments to the throttle stop and pilot air screws.

CONSTANT-VELOCITY TYPE

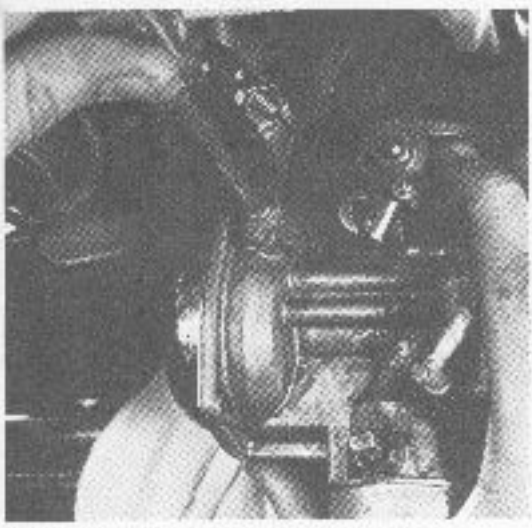
Removal and Installation

350 Models

1. Turn off the fuel supply at the petcock and drain the float bowls. Disconnect the fuel lines at the petcock. Remove the fuel tank.

2. CL Models: Remove the exhaust system.

3. Remove the plastic sidecovers and the air cleaners.



Removing the cable adjuster bracket (350)

4. Loosen the connecting bands which hold the carburetors to the intake manifold. Remove the left carburetor from the intake manifold and loosen the choke band pinch-bolt, and slip the band off the shaft. Remove the cable stay and disconnect the cable from the throttle lever. Remove the right carburetor and disconnect the throttle cable in the same manner.

5. Installation is in the reverse order of the above, however, note the following points:

a. Connect the throttle cables before mounting the carburetors;

b. Mount the right carburetor first, then connect the choke band as the left carburetor is installed;

c. Connect the fuel line from the right carburetor to the rear outlet on the petcock, and the fuel line from the left carburetor to the front outlet. Secure the fuel lines in place with a spring clip;

d. Turn the fuel on and check for leaks. Start the engine and check for air leaks around the intake manifold and air cleaner.

360 Models

1. Turn the fuel supply off at the petcock and drain the float bowls. Disconnect the fuel lines at the petcock and remove the fuel tank.

2. CL Models: Remove the exhaust system.

3. Loosen the connecting bands which secure the carburetors to the intake manifold and air cleaner. Pull the carburetors back toward the air cleaners until they are free of the intake manifold, then remove them by lowering them out from the left-side.

4. Disconnect the throttle cables from the cable stay. Loosen the choke band pinch-bolt and remove the choke band from the left carburetor.

5. Remove the carburetors from the mounting plate after removing the four mounting screws.

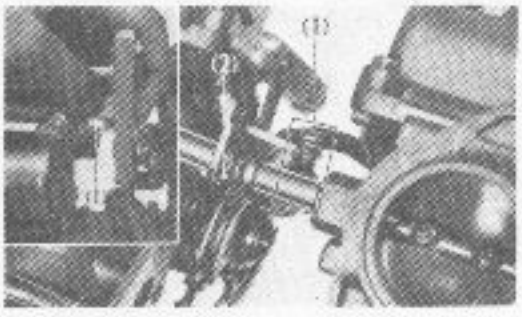
6. Installation is in the reverse order of the above, but note the following points:

a. Connect the choke band to both carburetors, tighten the pinch-bolt and bend the locktab up against the nut on the pinch-bolt;

b. Set the throttle lever to the stop screw and install the coil spring as shown in the accompanying illustration;

c. Mount the carburetors on the mounting plate with the four mounting screws;

d. Connect the throttle cables with the throttles fully closed. The closing cable is connected to the lower cable stay and the opening cable is connected to the top cable stay. Mount the



Set the throttle lever to the stop screw (1) and install the spring (2)

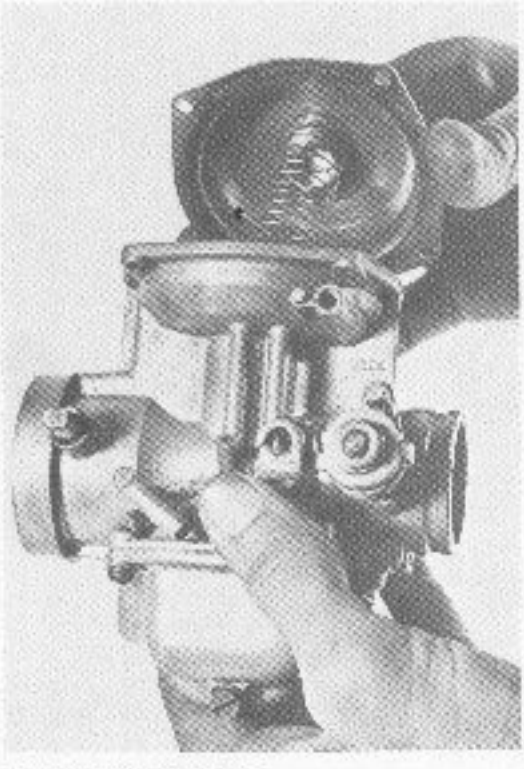
carburetor assembly on the engine. Adjust the cables and secure them in place with the locknuts;

e. Connect the fuel lines to the petcock. The right carburetor is connected to the rear outlet on the petcock, the left carburetor is connected to the front outlet.

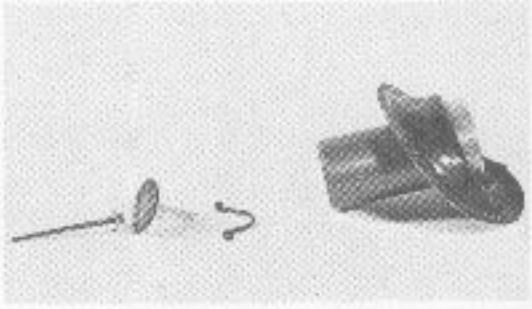
Disassembly

ALL MODELS

1. Remove the four top cover screws and remove the top cover. Very carefully lift out the return spring and the throttle slide. If the needle is to be removed from the slide, unscrew the needle holder (360 models) or remove the spring retainer (350 models), and remove the needle.



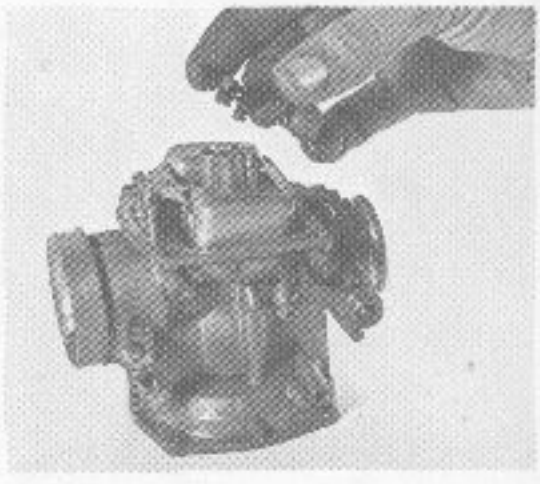
Removing the top cover



Slide components (350 shown)

2. Turn the carburetor upside down and remove the four float bowl screws and carefully remove the float bowl.

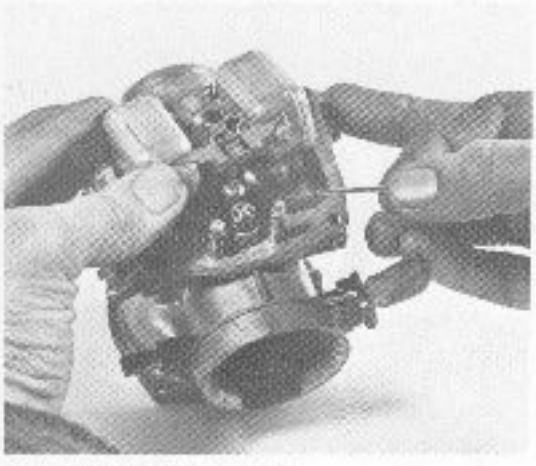
3. Remove the primary and secondary main jets. On 350 models, these are held in place with a retainer, while on 360 models, they unscrew.



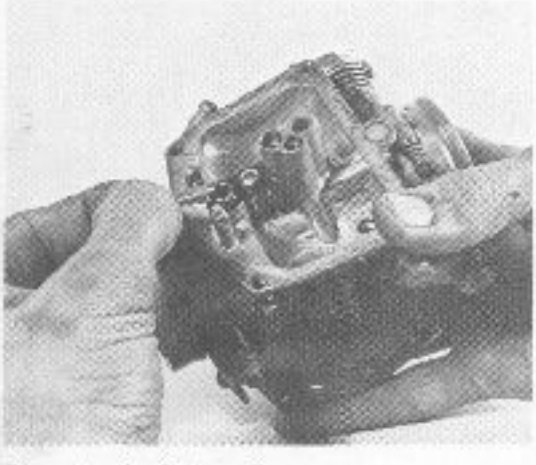
Removing the primary and secondary main jets and spring retainer (350 shown)

4. Using a small drift, push out the float pivot pin and remove the float. Note that on 360 models, the float needle is removed with the float; on 350 models, the float needle can be lifted from the needle seat.

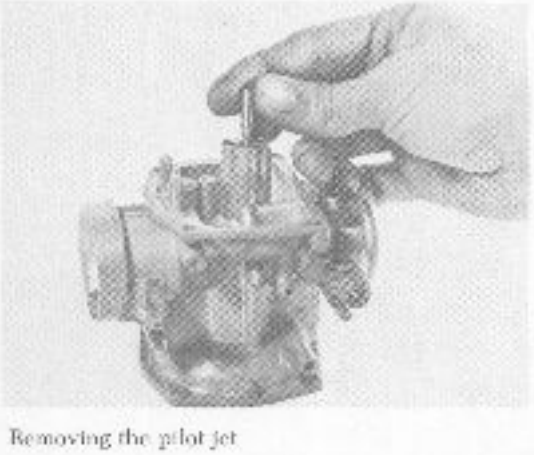
5. 360 models: Using a small wrench, unscrew the jet holder from the carburetor body, and push the needle jet out from the inside of the carburetor. The main nozzle located in front of the needle jet can also be pushed out of the carburetor body.



Removing the float assembly



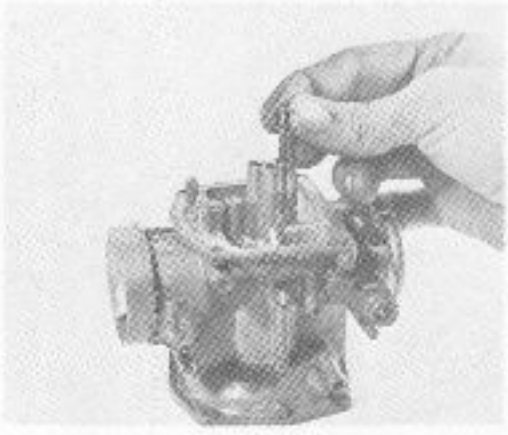
Removing the float needle



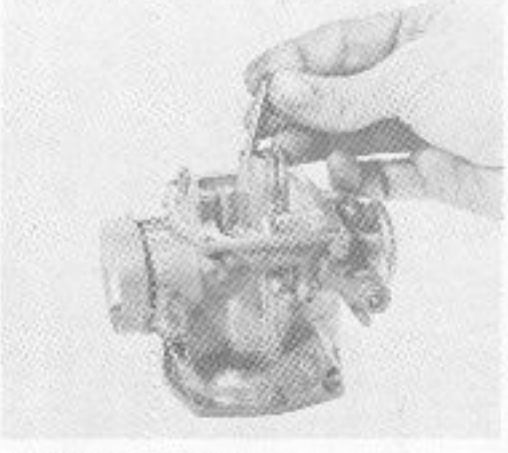
Removing the pilot jet

6. Unscrew the pilot jet from the carburetor.

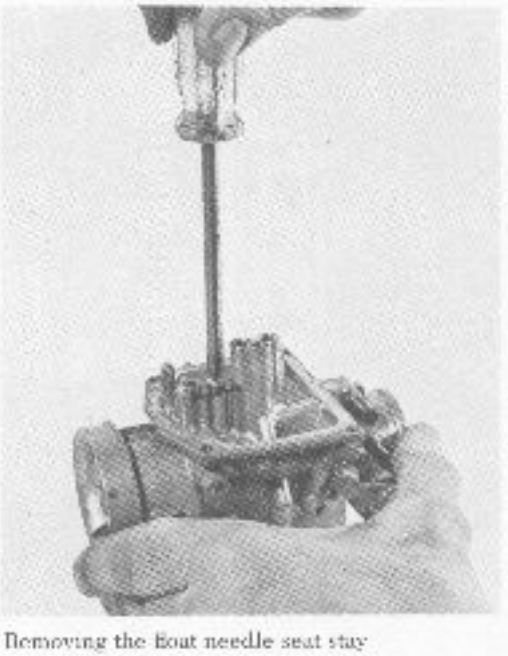
7. 350 models: Using a small wooden dowel, push the needle jet and main nozzle out of the carburetor.



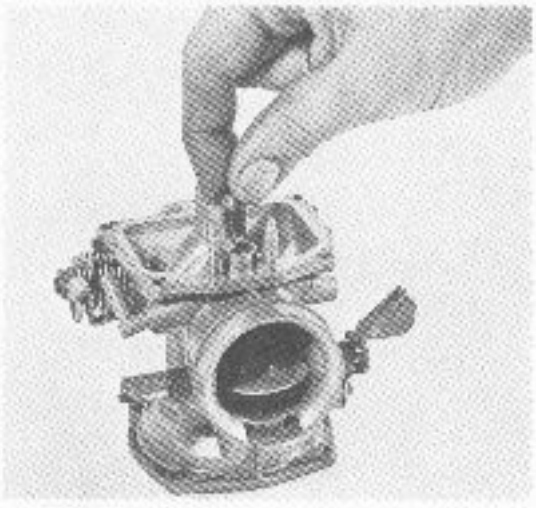
Removing the main nozzle



Removing the needle jet



Removing the float needle seat stay



Removing the needle seat

8. Remove the phillips head set screw from the float needle seat stay and remove the needle seat by lifting it out.

9. Unscrew the pilot screw.

Inspection

1. Clean the carburetor body and float bowl in a carburetor cleaner or solvent and dry thoroughly.

2. Use compressed air to blow air and fuel passages clear.

3. Clean all fuel jets in the same manner.

CAUTION: *Do not insert anything into the jet passages to clear them; use air pressure only.*

4. Inspect the carburetor body for any vibration or stress cracks.

5. Check the condition of the throttle slide. Smooth movement of the slide on the carburetor body is imperative. If the slide sticks or binds at any point from full closed to wide open, replace it.

6. Inspect the needle jet and the needle. The needle must be free of nicks or score marks along its tapered portion. More often, however, these components will need to be replaced because of normal wear. As the throttle slide moves up and down while the machine is in operation, the needle is rubbing against the jet. Eventually, these components will wear enough to cause a noticeable rich running condition in the mid-throttle range. If this occurs, both the needle and the jet should be replaced. If the components are more than four years old, new ones should be fitted before attempting to tune the carburetor.

7. Carefully inspect the floats. If brass floats are fitted, shake the float close to your ear; listen for any gasoline trapped inside. If the float assembly leaks, or if any puncture is noted, replace it; do not attempt repairs.

8. Inspect the tip of the float needle and the needle seat for dirt or corrosion. Check the needle tip for wear. If worn, the needle should be replaced.

If there is any corrosion or deposits evident on the needle or needle seat, the deposits must be removed, or the parts replaced.

NOTE: *Do not attempt to clean the needle or needle seat by lapping one against the other.*

To check the efficiency of the float needle valve, proceed as follows:

a. With the carburetor assembled except for the float bowl, connect it to its fuel line;

b. Place a number of dry rags beneath the carburetor, and hold it upright (in its normal operating position) with one hand;

c. With the other hand, gently raise the float assembly until the float needle is seated. Have an assistant turn the fuel petcock on;

d. If the needle and seat are in good condition and forming a good seal, no gasoline will flow out of the carburetor;

e. If a leak is noted, replace the needle and seat.

CAUTION: *While performing this test, be sure that adequate precautions are taken in the event of spillage.*

The float level should be checked prior to assembly. Refer to Chapter 3.

9. Check that the tapered portion of the pilot screw is smooth and clean. Replace it if it is crushed or blunted.

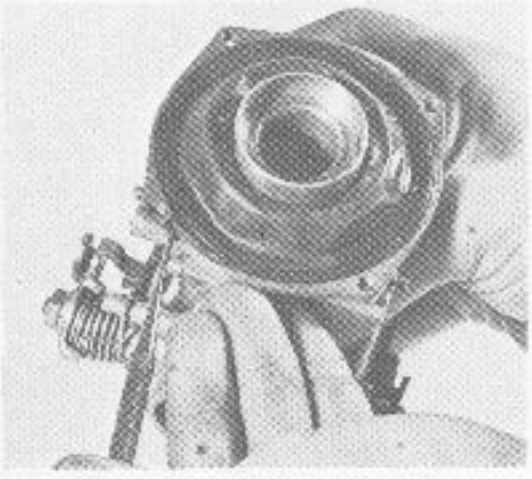
10. Inspect the float bowl for a warped gasket surface, or stress cracks (especially around the screw holes).

11. Check the condition of the throttle slide diaphragm. If ripped, the diaphragm and slide must be replaced.

Assembly

Assembly is basically the reverse of the disassembly procedures, but note the following points:

1. Float bowl gaskets and jet O-rings



Fit the tab on the diaphragm into the slot in the body

Removing the petcock O-ring

should always be replaced with new ones. Other O-rings and fiber gaskets should be carefully inspected and replaced if less than perfect in condition. Check O-rings for tears and cracks; fiber gaskets for a crushed condition.

2. Exercise care when installing jets, they are made of soft brass and are easily damaged.

3. Install the pilot screw, turning it in until lightly seated, then back it out the proper number of turns as listed in the chart at the end of this chapter.

4. Fit the tab on the diaphragm into the slot in the body.

5. Tighten the float bowl and top cover screws evenly and in an "X" pattern in order to prevent distortion.

Fuel Petcock and Lines

CLEANING

1. Unscrew and remove the sediment bowl, take out the O-ring, and filter screen.

2. Clean the metal parts in solvent. Check that the filter screen is not punctured, and that the O-ring is not torn or otherwise damaged.

3. Run a little gas through the petcock to flush out any dirt. Catch the gas in a suitable container. Turning the petcock to "Reserve" for a few seconds should remove the better part of any water or dirt in the bottom of the fuel tank.

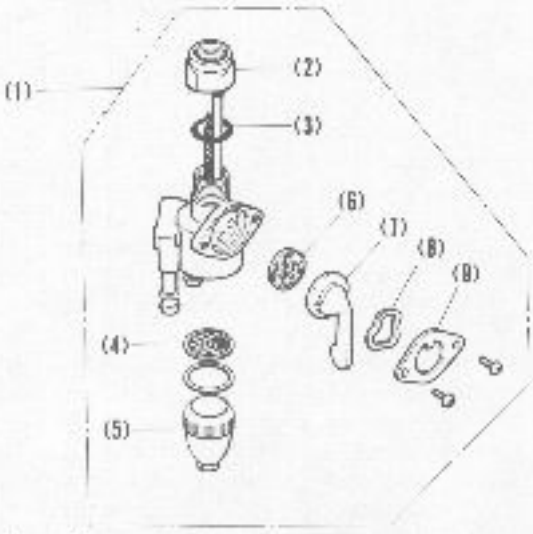
4. Check petcock operation in all positions. There must be no fuel flow when the petcock lever is turned to the "Stop" position.

5. Install the filter screen, O-ring, and sediment bowl in that order. Check for leaks before operating the motorcycle.

DISASSEMBLY

At somewhat extended intervals, the petcock should be removed from the fuel tank and cleaned.

1. Drain the fuel tank completely. Dis-



Petcock components

1. Petcock assembly
2. Nut
3. O-ring
4. Filter screen
5. Sediment bowl
6. Lever gasket
7. Lever
8. Lever spring
9. Set plate

connect the fuel lines from the petcock. Remove the sediment bowl, O-ring, and filter screen.

2. Unscrew the nut which holds the petcock to the fuel tank, and remove the petcock.

3. Remove the two screws from the fuel lever setting plate, and remove the setting plate, lever spring, lever, and gasket.

INSPECTION

1. Clean all metal parts in solvent and blow dry. Clean the filter screens thoroughly, or replace them if there is evidence of punctures or damage.

2. Inspect the O-rings for damage and replace if any is noted, or if leakage was evident in the petcock. Check the gaskets for a crushed or cracked condition. Inspect the lever spring cracks or fatigue.

3. Inspect the fuel lines for cracks or abrasion damage. Replace if any sort of fault is noted.

ASSEMBLY

1. Install the fuel valve gasket, lever, lever spring, and setting plate. Secure with the two screws.

2. Be sure that the petcock O-ring or gasket is in place and install the petcock on the fuel tank. Install the sediment bowl filter screen, O-ring, and sediment bowl.

3. Be sure that the fuel lines are firmly secured at their connections and the safety circlips are in place.

Fuel Tank

1. Check that the breather hole in the gas cap is clear of foreign matter.

2. There is little else that can go wrong with the gas tank, except if the motorcycle has been stored for a considerable length of time. The inside of the tank should be bathed with a gas/oil mixture before storing. This will leave an oil film on the walls of the tank to inhibit the formation of rust. This, or the use of a gasoline with moisture preventive additives, are the best rust prevention measures.

If the tank becomes rusted within, measures must be taken to remove as much of it as possible or recurrent clogging of the petcock filter will occur.

Remove and drain the tank, and remove the petcock. Plug the petcock hole. Add a handful of small nuts and bolts to the tank along with a quantity of gasoline. Shake the tank vigorously for several minutes, then drain off the gas and flush the tank. Repeat the procedure until rust particles are no longer coming out of the tank.

Be sure that the tank is flushed out thoroughly afterwards.

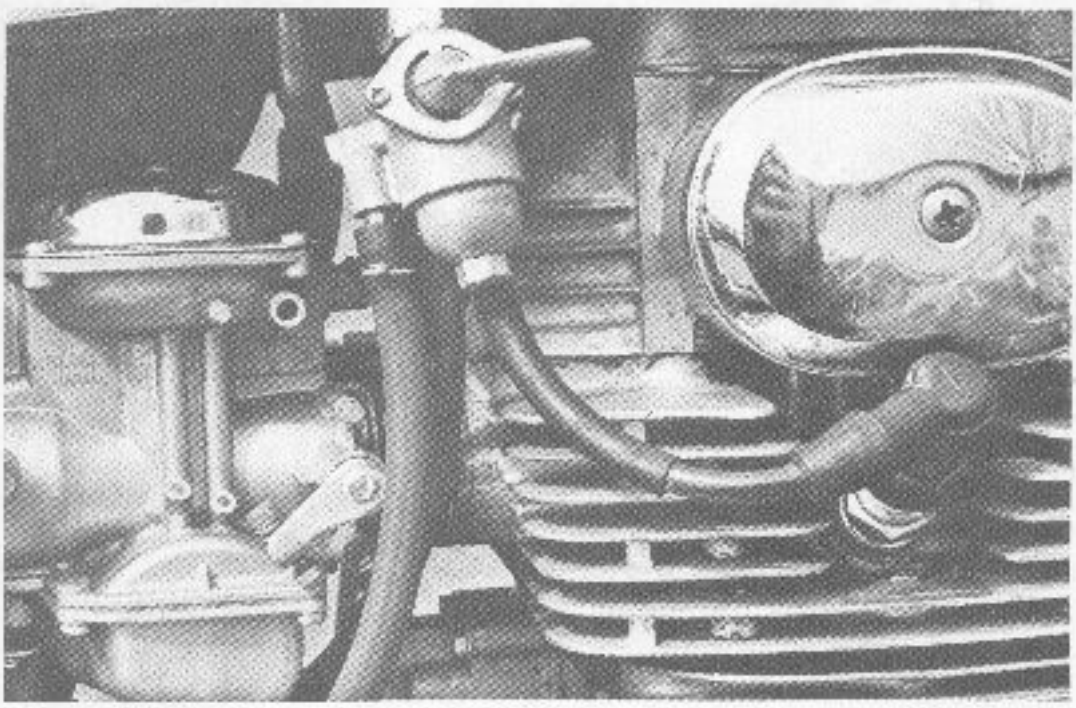
Carburetor Specifications

Item	CB/CL350 Engine No. 1000001–1025167	CB/CL350 Engine No. 1043765–1063275	CB/CL360 Engine No. 1085273– and later	SL350	CB360	CL360
Setting Mark	350-A	3-C	3-D	A	745B	747B
Venturi Bore	28 mm	28 mm	28 mm	24 mm	28 mm	28 mm
Main Jet primary	#60	#70	#70	#120	#68	#68
secondary	#115	#110	#105	—	#68	#68
Air Jet primary	#50	#150	#150	#150	#150	#150
secondary	#50	#50	#50	—	#50	#50

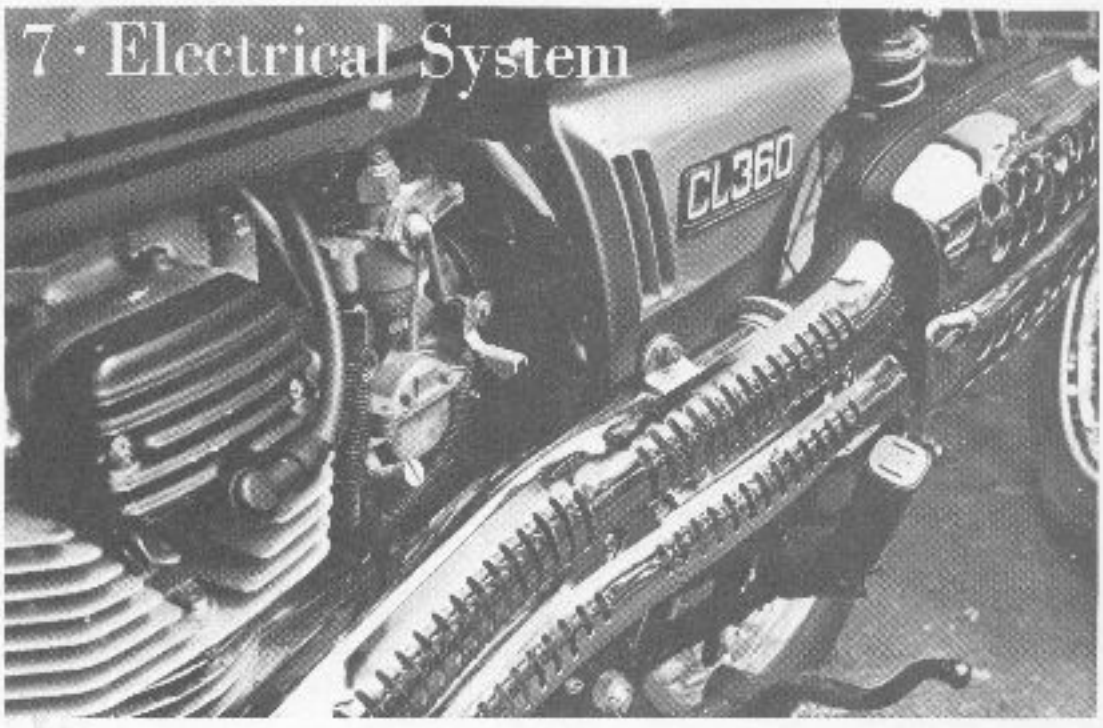
Carburetor Specifications

Item	CB/CL350 Engine No. 1666661– 1845184	CB/CL350 Engine No. 1945185– 2085278	CB/CL350 Engine No. 2085279– and later	SL250	CB160	CL250
Pilot Air Jet	#90	#90	#90	—	#85	#85
Needle Jet	—	—	—	2.515 mm	—	—
Slide Cutaway	—	—	—	2.5	—	—
Pilot Jet	#38	#35	#35	#40	#35	#35
Pilot Screw (turns out)	¾ ± ¼	1 ± ⅛	1 ± ⅛	1 ± ⅛	1	1
Float Level (mm/in.)	19/0.75	21/0.83	25/1.05	26/1.06①	18.5/0.73	18.5/0.73

① SL350 K1-K2—25/0.98
— Not applicable



7 · Electrical System



The same type of electrical system is used on all models covered in this manual.

Ignition is by means of battery-and-coil, the battery also being used to power the lights and accessories.

Battery charging is accomplished by means of an alternator with a permanently-magnetized rotor. Alternator output (AC) is changed to direct current (DC) by the rectifier, and excess alternator output is grounded by the pointless voltage regulator.

Most of the electrical tests described in this chapter can be carried out with an ohmmeter or continuity light, although a voltmeter and ammeter are required for alternator output and regulator tests.

A continuity light, consisting of a small bulb, battery, and leads is very handy to have and can often be used in place of an ohmmeter. While the results obtained with a continuity light are not always conclusive, it can help trace troubles.

NOTE: *The following precautions should be observed when carrying out electrical system tests.*

1. Be positive that battery connections are not reversed. This will burn out the rectifier almost immediately.

2. Be certain that all electrical connections are noted before disconnecting them, so that they may be reconnected properly.

3. If the battery is being charged in the motorcycle, the battery terminals *must* be disconnected, or the voltage regulator may be damaged.

4. Never disconnect the battery while the engine is running.

5. Check battery condition first, before carrying out any other charging system checks.

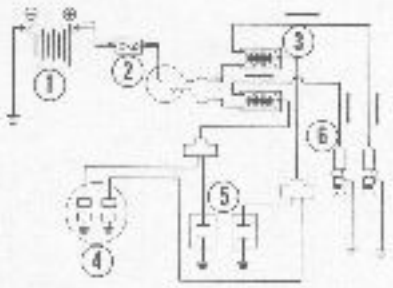
Operational Description

IGNITION CIRCUIT

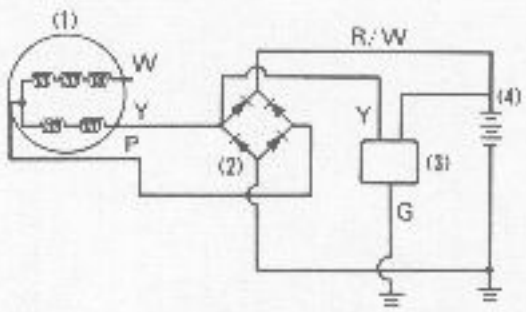
The ignition circuit consists of the battery, breaker points, condensers, ignition coils, spark plug leads, and caps.

The ignition circuit for each cylinder is independent of the other, except for the common power source (the battery).

The contact breakers are mounted on a plate and are opened and closed by a breaker cam on the left-side of the camshaft. The circuit is completed by the ignition coils and condensers mounted beneath the gas tank. The ignition coils consist of two windings of wire around an



Ignition circuit components : (1) battery, (2) fuse, (3) ignition coils, (4) points, (5) condensers, (6) spark plugs



Charging circuit components: (1) alternator, (2) rectifier, (3) regulator, (4) battery

iron core. The primary winding has 200–300 turns of enameled copper wire around the core, and the secondary winding about 10–20,000 turns of somewhat finer wire around the core, and is connected directly to the high-tension (spark plug) lead.

When the ignition switch is turned on, current from the battery flows through the coil primary winding, and through the points (assuming that they are closed) to ground. As the engine is turned over by the electric or kick-starter, the breaker cam opens the points.

When the points open, the current from the battery ceases to flow; the magnetic field which this current had produced around the coil's primary winding collapses rapidly, and by the phenomenon known as "electromagnetic induction" an extremely high-voltage is produced in the coil's secondary winding—sufficiently high to jump an air gap and fire the spark plug.

A condenser is wired in parallel with each set of points to prevent the current flow from jumping across them as they are beginning to open.

CHARGING CIRCUIT

The charging system consists of the alternator, rectifier, voltage regulator, and the battery.

The alternator stator is comprised of six windings of wire around the poles of a laminated iron core. The rotor is a permanently magnetized unit bolted to the left-side of the crankshaft. As the engine turns over, the magnetic field of the rotor passes through the coil windings inducing a current flow in them. The output is proportional to engine rpm.

Alternator output is alternating current which must be changed to direct current in order to charge the battery. This is accomplished by a full-wave rectifier which consists of four selenium or silicon diodes.

The voltage regulator maintains the rectified alternator output at approximately 13–16 volts across the battery. Any excess output is grounded by the regulator.

Ignition Circuit Tests

1. Troubleshooting the ignition system is made somewhat easier by the fact that the components for the two cylinders are completely independent.

2. If there is a no-spark condition at *both* cylinders, the trouble will be in the battery, fuse, or wiring connections. Check the 15A fuse (located near the battery) first. If this fuse is blown, none of the electrical components will function.

If the fuse is satisfactory, check the battery state-of-charge. Although a low battery may not operate the electric starter, it does not require a very high state-of-charge to spark the plugs, turning the engine over with the kick-starter.

Check the battery terminal connections, then the ignition circuit connections, ignition switch, etc.

3. In the event of hard starting, misfiring, or cutting out, first check the carburetors. Be sure that the fault is electrical before replacing any components. Be sure that all connections are clean, dry, and tight. Wiring plugs and connectors often accumulate dirt or water, and sometimes work loose. Check these first, then proceed as follows:

4. In the event of the above troubles, or a no-spark condition at one cylinder, the plug, plug cap, lead, coil, condenser, or points for that cylinder may be defective.

5. Remove the spark plug, clean it thoroughly, or replace it with a new one; gap the plug to 0.7–0.8 mm (0.028–0.032 in.). Connect it to its cap, and ground it against the cylinder head. Kick the engine over briskly. The spark produced should be thick and blue.

6. If there is no spark, or if the spark is weak and yellow, repeat the test using a piece of metal, such as a nail, inserted into the spark plug cap and held about ⅛ in. away from the cylinder. If the spark is healthy, the problem was the spark plug; if not, check the condition of the points. Inspect, clean, and gap the points or replace them if they are badly pitted or worn as outlined in the "Tune-Up" chapter. If excessive arcing or sparking at the points is noted while the machine is running, the problem may be the condenser. A defective condenser will also cause new points to wear out quickly.

If new points have just been installed, a no-spark condition can be caused by damaged or improperly installed insulating washers on the points wire terminal. Check the points as outlined in Chapter 3.

7. If the problem is not in the points or the spark plug, the spark plug cap should be checked. Noise suppressor caps are fitted, which are designed to eliminate radio interference and provide a hotter spark by means of a resistor in the cap. Sometimes the resistor breaks down, and the cap then becomes an open circuit. Remove the cap from the spark plug lead, and ground the end of the lead against the cylinder head. If a fat, blue spark is produced when the engine is kicked over, the problem was the cap. Replace it with a new one.

8. If the cap checks out okay, carefully inspect the cable itself. Check for dirt or grease, cuts or cracks in the insulation, moisture, etc. If the lead is damaged, it must be replaced. This also involves replacing the coil.

9. If the trouble has not been pinpointed, the ignition coil windings should be checked for continuity, using an ohmmeter.

a. Disconnect the two low-tension coil leads (blue or yellow and black/white) and check for continuity between them. This is a check of the primary winding. If there is no continuity, replace the coil;

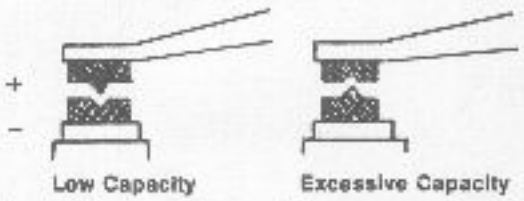
b. Check for continuity across the coil's blue or yellow low-tension lead and the high-tension (spark plug) lead. Resistance may be very high, but continuity must exist. This checks the secondary winding.

Even if continuity is present in the coil windings, it is possible that the coil is still defective. Replacing the coil temporarily with one which is known to be serviceable is recommended.

10. The condenser can be checked if a capacitance tester is available. Condensers should have a capacitance of approximately 0.25 mf. Checking with a "megger" (high-voltage ohmmeter) should yield a resistance of 5m ohms or better at 1,000v. Replace the condenser if it fails either test.

NOTE: *After testing, ground the condenser lead against the case to discharge it.*

As noted above, sparking at the points, or points which pit or burn rapidly would indicate a defective condenser. Bad condensers will cause mounds and matching depressions on the points, as illustrated.



A defective condenser will cause mounds and matching pits on the contact surfaces

11. If the trouble is a misfire, and the tests above do not pinpoint the problem, check the condition and operation of the automatic timing advance unit as outlined in Chapter 3.

Charging Circuit

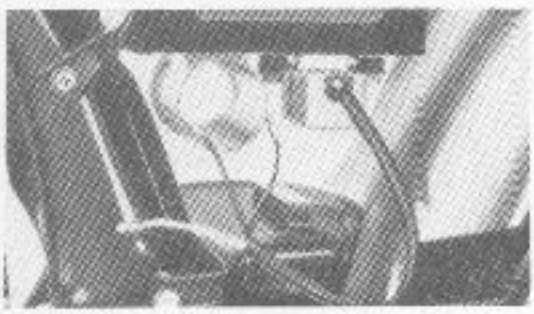
1. In the event that the battery overcharges, check the battery itself, and the voltage regulator.

2. If the battery discharges quickly, or fails to hold a charge, check the battery, the regulator, rectifier, and alternator.

3. Checks for battery condition are outlined in Chapter 2, "Maintenance." For other components, consult the following.

VOLTAGE REGULATOR

A bad voltage regulator may cause the battery to go dead, or may overcharge it causing electrolyte loss, short light bulb life, etc. The regulator is located beneath the battery box, and is rubber mounted. It can be tested with an ohmmeter, continuity tester, or ammeter.



Voltage regulator location

1. If the battery goes dead, disconnect the three regulator leads (yellow, green, and black).

2. With an ohmmeter or continuity light, check for continuity between the yellow lead and the green lead. Check for continuity between the yellow lead and the motorcycle frame.

There must not be continuity in either case. If there is, the regulator must be replaced.

3. If an ammeter is available, connect it in series with the battery positive wire. Start and run the engine at more than 2,000 rpm. If the ammeter indicates that the battery is discharging, disconnect the regulator yellow lead and repeat the test. If the battery now shows that it is receiving a charge, the regulator must be replaced. If no change is noted, proceed with the rectifier and alternator tests which follow.

4. If the battery overcharges, check as follows:

Assuming that the battery is in good condition and *fully* charged, start the engine and connect a good voltmeter across the battery terminals. Run the engine at 4,000 rpm. The voltage across the battery should increase to between 14–15 volts, but not more. If the meter reads more than 15 volts, the regulator must be replaced.

NOTE: *This test will not be valid unless the battery is fully charged. To check this, run the engine until the voltage stabilizes, then disconnect the regulator black lead. If the voltage increases, the results of the test were valid.*

5. When mounting the regulator, be sure that the rubber dampers are in place. The regulator could be damaged by excess vibration.

RECTIFIER

The rectifier is located behind the battery (350) or under the battery case.

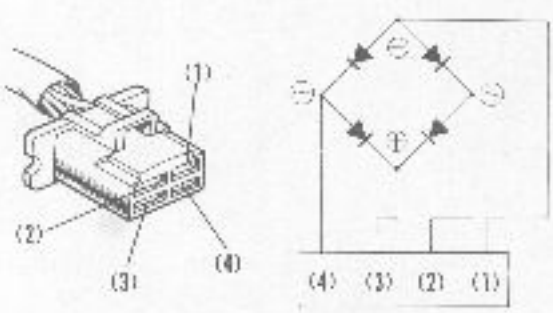
The rectifier should be checked in the event of insufficient battery charging. Tests can be carried out with a continuity light or a standard (low-voltage) ohmmeter.

CAUTION: *Do not apply high-voltage to the rectifier.*

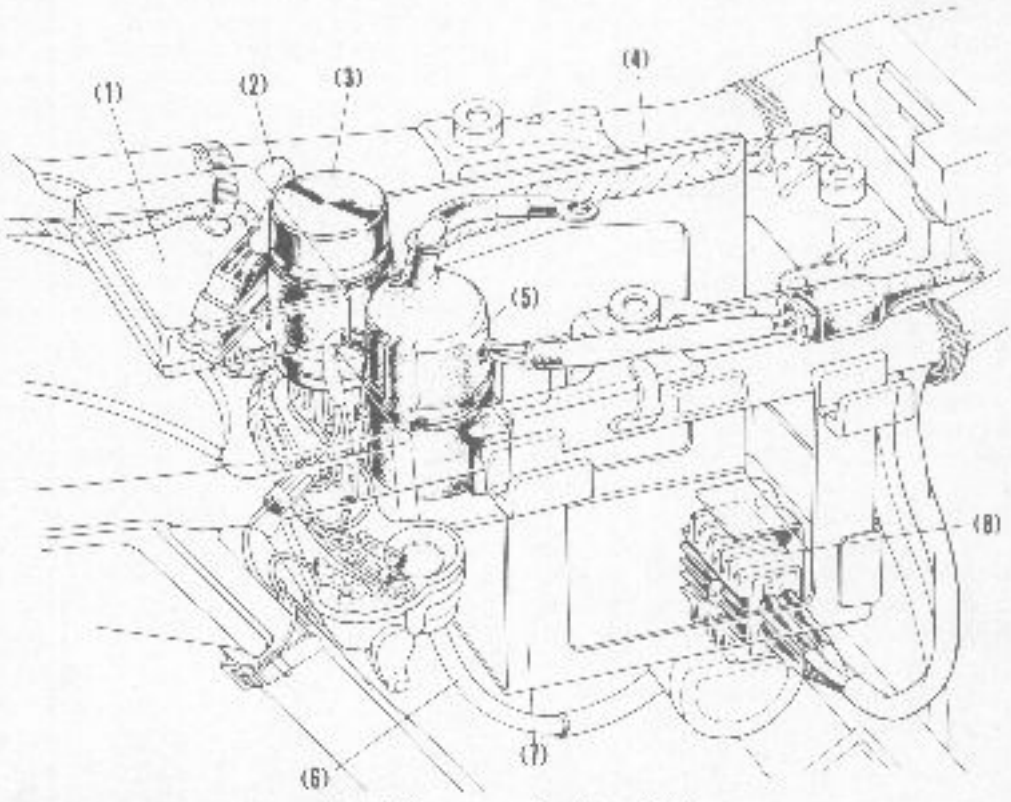
1. Disconnect the leads and remove the rectifier from the machine.

2. The test involves testing current flow through the rectifier in both directions. As noted in the "Operational Description," the rectifier consists of four diodes. When in working condition, a diode will pass current in one direction only.

If the diode passes current in both directions, or in neither direction, it is defective. If any of the diodes is defective, the rectifier must be replaced.

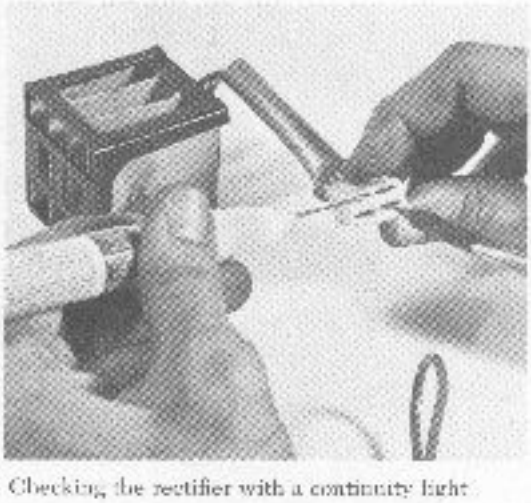


Rectifier wires: (1) green, (2) red/white, (3) yellow, (4) pink



Electrical component locations (360)

1. Fuse box
2. Fuse box leads
3. Flasher relay
4. Wiring harness
5. Starter switch
6. Starter motor cable
7. Battery case
8. Rectifier



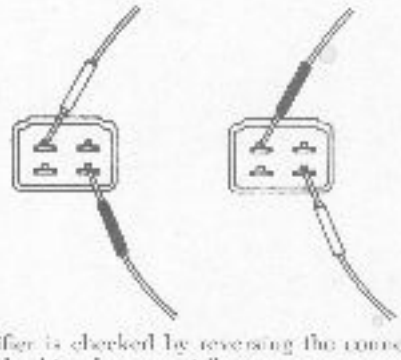
Checking the rectifier with a continuity light

3. Connect the negative lead of the tester to the green wire, and the positive lead to the yellow, red/white, and pink wires in turn.

In each case, note whether or not there is continuity.

NOTE: *On an ohmmeter, "continuity" will be indicated by a resistance of 5–40 ohms. "No continuity" by a resistance of 100 or more ohms.*

4. Now reverse the tester connections, connecting the positive tester lead to the



Rectifier is checked by reversing the connections and checking for current flow

green wire, and the negative to each of the others in turn.

In every case, the reaction of the tester must be the opposite of the first test; i.e., if the first test showed continuity between two leads, reversing the tester connections must show no continuity.

Current flow in both, or in neither direction, for any two leads indicates that the rectifier must be replaced.

ALTERNATOR

The alternator should be checked in the event of low or no battery charging not attributable to the other components.

1. A dynamic output test can be carried out if a voltmeter and ammeter are available. The battery *must* be fully charged or the test may be invalid.

Hook up the voltmeter across the battery terminals, disconnect the battery red/white lead and connect it to the ammeter. Connect the other side of the ammeter to the battery positive terminal.

Disconnect the black regulator lead.

Start the engine and compare the voltmeter and ammeter readings with lights off and lights on (high-beam) at the given rpm.

If the readings are not within 10% of the given specifications, the alternator should be replaced.

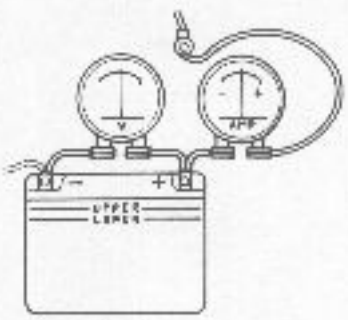
NOTE: *The alternator should not be excessively hot when this test is carried out.*

2. Using an ohmmeter or continuity tester, a static stator test can be carried out.

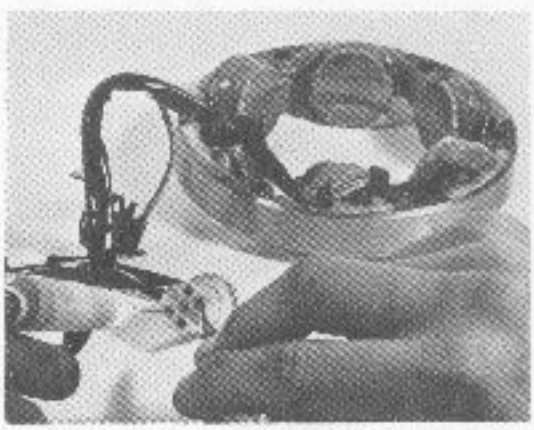
Disconnect the alternator wiring at the plastic connector.

Check for continuity between the white, the yellow, and the pink leads. Continuity must exist, or the stator assembly has a broken wire and it must be replaced.

Check for continuity between the yellow lead and the stator core. If continuity exists, there is a short, and the stator must be replaced.



Alternator output set-up



Checking stator continuity

Alternator Charging Specifications

	350	360
Beginning of Charging (12.6v)		
lights off	under 1400 rpm	under 1550 rpm
high-beam on	under 2000 rpm	under 2100 rpm
5000 rpm		
lights off	14.8v/1.5–2.5A	14.8v/1.2A (min)
high-beam on	14.8v/1.3–2.5A	14.8v/1.2A (min)
10,000 rpm		
lights off	15.5v/4A (max)	15.5v/4A (max)
high-beam on	15.5v/4A (max)	15.5v/4A (max)

Starter Motor

1. If the starter motor spins when the button is pushed, but the engine does not, the starter clutch is defective. Refer to "Engine and Transmission," Chapter 4, for starter clutch removal and inspection procedures.

2. If the warning lights dim when the starter button is pushed, but the engine and starter do not turn over, the battery may be too low, or the starter may be defective.

3. If nothing happens when the starter button is pushed, either the starter solenoid is defective, or there is a loose wire in the electric starter circuit.

REMOVAL AND DISASSEMBLY

1. Disconnect the lead at the starter motor.

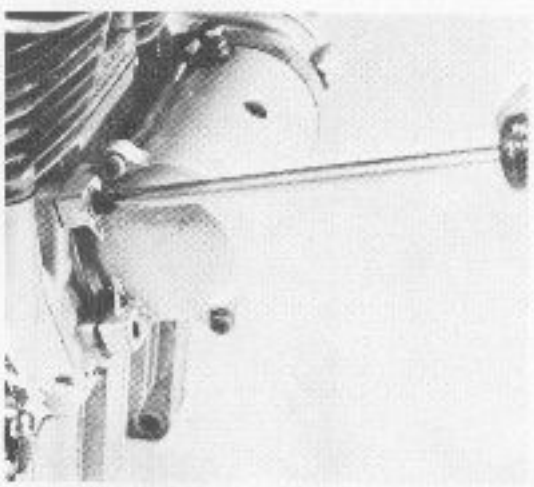
2. Remove the alternator cover, both sections of the left crankcase cover, and disconnect the neutral switch lead.

3. Remove the alternator rotor, using either the special puller, or the rear axle as outlined in Chapter 4.

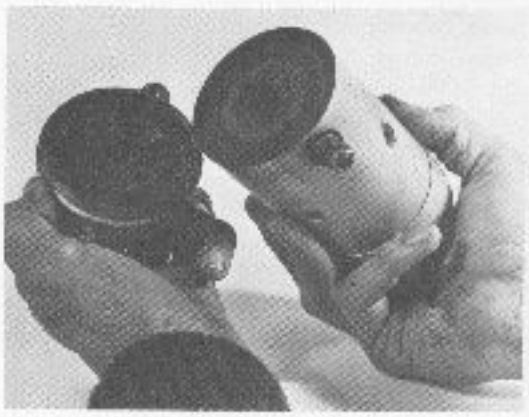
4. Remove the starter sprocket setting plate (secured by a phillips screw), and remove the two sprockets and chain together.

5. Remove the two screws which secure the starter motor, and tap the starter out of the case.

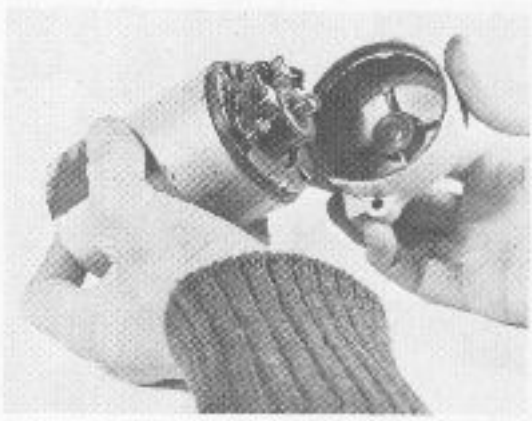
6. To disassemble the starter, remove the two long phillips screws and remove the end plates.



Removing the starter mounting screws



Removing the starter drive side end-plate



Removing the brush side end-plate

Disconnecting the brush leads

NOTE: *Exercise caution when removing the output side end plate as this contains the reduction gears.*

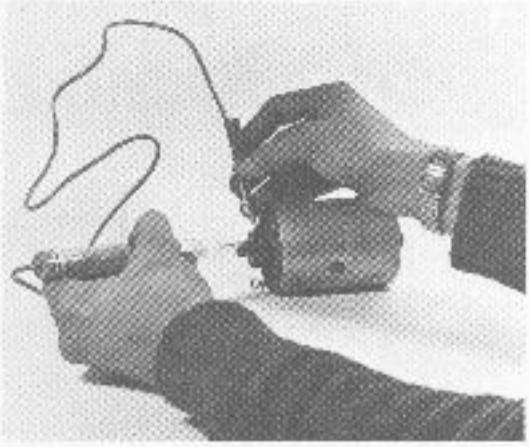
7. Disconnect the starter carbon brush leads (2) and remove the brush mounting plate.

Disassembly past this point is not necessary.

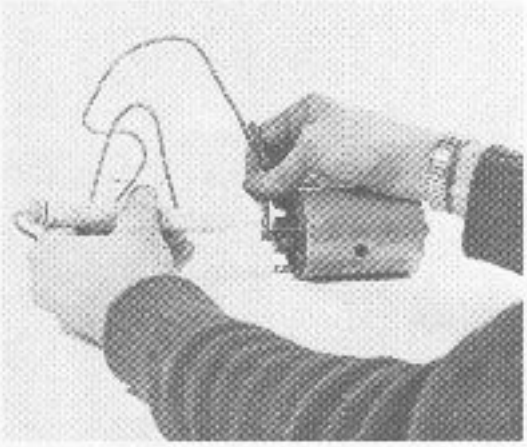
INSPECTION

1. Use an ohmmeter or continuity tester to check the starter motor.

2. Check for continuity between each of the commutator segments. There must be continuity between all of them. If there is a dead spot, the starter must be replaced.



Checking for continuity between each of the commutator segments

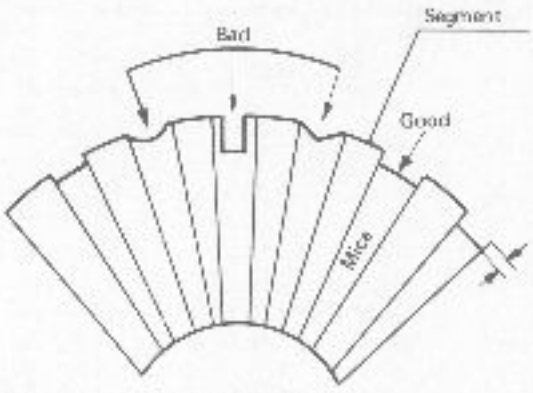


Checking for continuity between the commutator and the armature core

3. Check for continuity between the armature core and the commutator; there must be none. If continuity exists, the starter must be replaced.

4. Check for continuity between the starter lead terminal and the brush leads. Continuity must exist or the starter must be replaced.

5. Measure the length of each carbon brush. Replace them if either is less than 7.5 mm (0.3 in.).



Commutator groove condition

6. Clean the commutator surface thoroughly with a solvent. Check that there is no scoring on the commutator surface. The mica insulation should undercut the commutator segments by at least 0.3 mm (0.012 in.). If less than this, the mica should be undercut using a piece of a hacksaw blade or the like. Be sure to clean the commutator surface thoroughly after this operation. Remove any sharp edges.

ASSEMBLY AND INSTALLATION

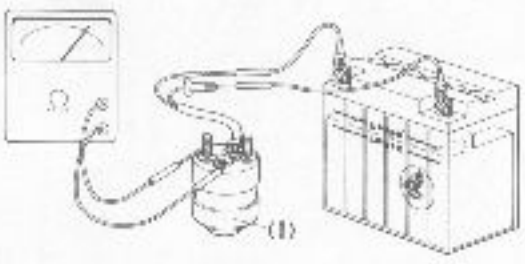
1. Reverse the above procedures. Be sure that the output side O-rings are in place.

Installing the drive side O-ring

2. After assembling the starter, check that the armature will turn without excessive binding.

STARTER SOLENOID

1. The starter switch (or solenoid) can be checked by disconnecting the high-tension lead from the starter motor, and pushing the starter button. The starter



Checking the starter switch (1)

switch should click when the button is pushed.

2. If it does not, use an ohmmeter or continuity light to check for continuity across the switch's primary leads (black and yellow/red). If continuity does not exist, replace the switch.

3. Connect a fully charged 12-volt battery to the primary leads, then check for continuity across the starter switch high-tension leads as illustrated. If there is no continuity, replace the switch.

Electrical Switches

All electrical switches are easily checked with an ohmmeter or self-powered continuity light after disconnecting the switch leads at the plastic connectors.

IGNITION SWITCH

1. With the key turned to the first position, check for continuity between the black and red leads. If continuity does not exist, replace the switch.

2. With the key in the first position, continuity must exist between the brown and the brown/white leads.

Checking the ignition switch (1)

3. With the key in the second position, continuity must exist between the red and brown leads.

CLUTCH SWITCH

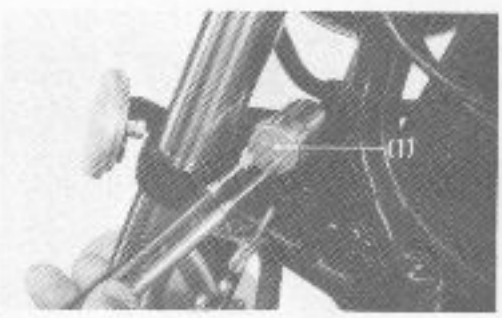
1. Late models have a clutch starter switch incorporated into the clutch lever holder to prevent operation of the electric starter when in gear with the clutch engaged.

2. Check for continuity between the green and green/red switch leads. Continuity should exist only when the clutch is disengaged.

BRAKE LIGHT SWITCHES

1. Check for continuity across the front brake light switch terminals. Continuity should occur when the brake lever has moved 5–10 mm (0.2–0.4 in.), measured at the tip of the lever.

2. Check for continuity between the black and green/yellow leads to check the rear brake light switch. Continuity should occur when the brake pedal has moved about 25 mm (1 in.). This switch is adjustable.



Checking the front brake light switch (1)

KILL BUTTON

1. The kill button should show no continuity between the black and the black/white leads when in either "off" position. When in the "run" position, there must be continuity.

NEUTRAL SWITCH

1. Remove the left crankcase cover. With the transmission in Neutral, check for continuity between the switch and the crankcase. There should be continuity.

2. When the transmission is in gear, there should be no continuity.

HORN

1. If the horn will not function, connect a 12-volt battery directly to the horn terminals. If the horn does not sound, it is defective.

2. If the horn does sound, check the horn button by disconnecting the light green lead and check for continuity between the lead and ground, which should be present when the horn button is pushed.

HEADLIGHT SWITCH (LATE-TYPE)

1. There are five headlight switch leads and there should be no continuity between them when the switch is "off."

2. When the switch is "on," continuity must be present between the yellow and yellow/white leads, and between the black, brown/blue, and black/red leads.

HEADLIGHT SWITCH (EARLY-TYPE)

1. When the switch is "off," there should not be continuity between the leads.

2. When the switch is in the high-beam position (H), there should be continuity between the yellow/white and the yellow leads and between the black, blue, and brown/white leads.

3. When the switch is in the low-beam (L) position, there must be continuity between the yellow/white and yellow leads, and between the black, white, and brown/white leads.

DIMMER SWITCH

On late models with a separate dimmer switch on the left handlebar:

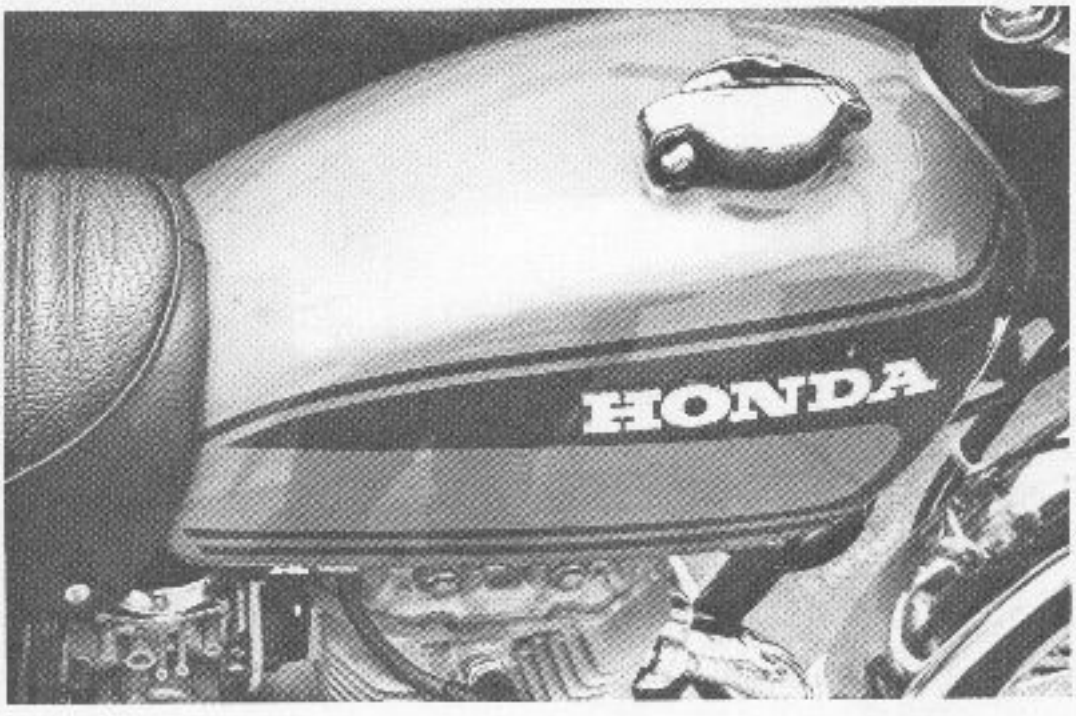
1. In the high position, there must be continuity between black/yellow and blue wires.

2. In the low-beam position, there must be continuity between the black/yellow and the white wires.

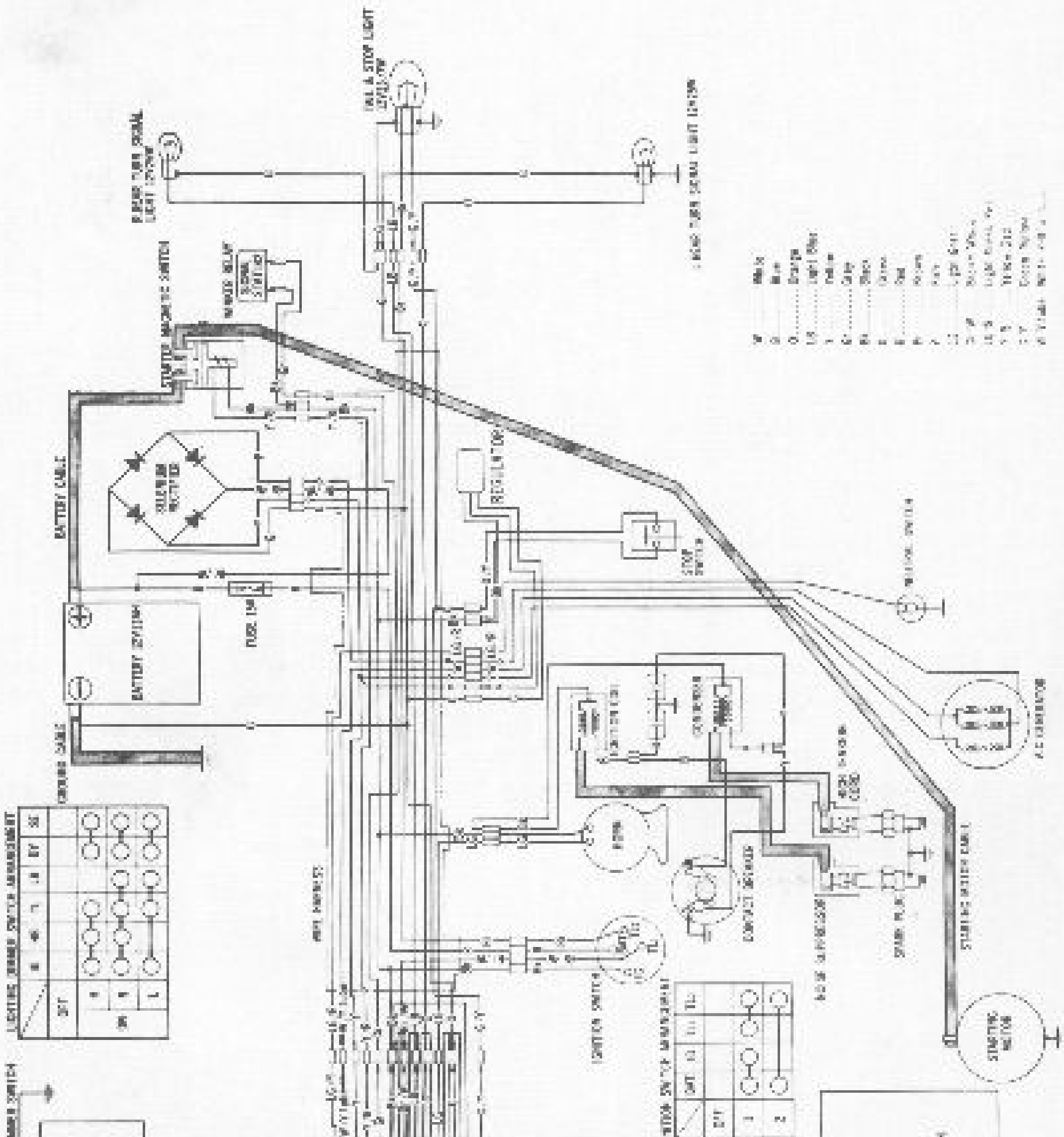
TURN SIGNAL SWITCH

1. When the left-hand turn signal is activated, there will be continuity between the gray lead and the orange lead.

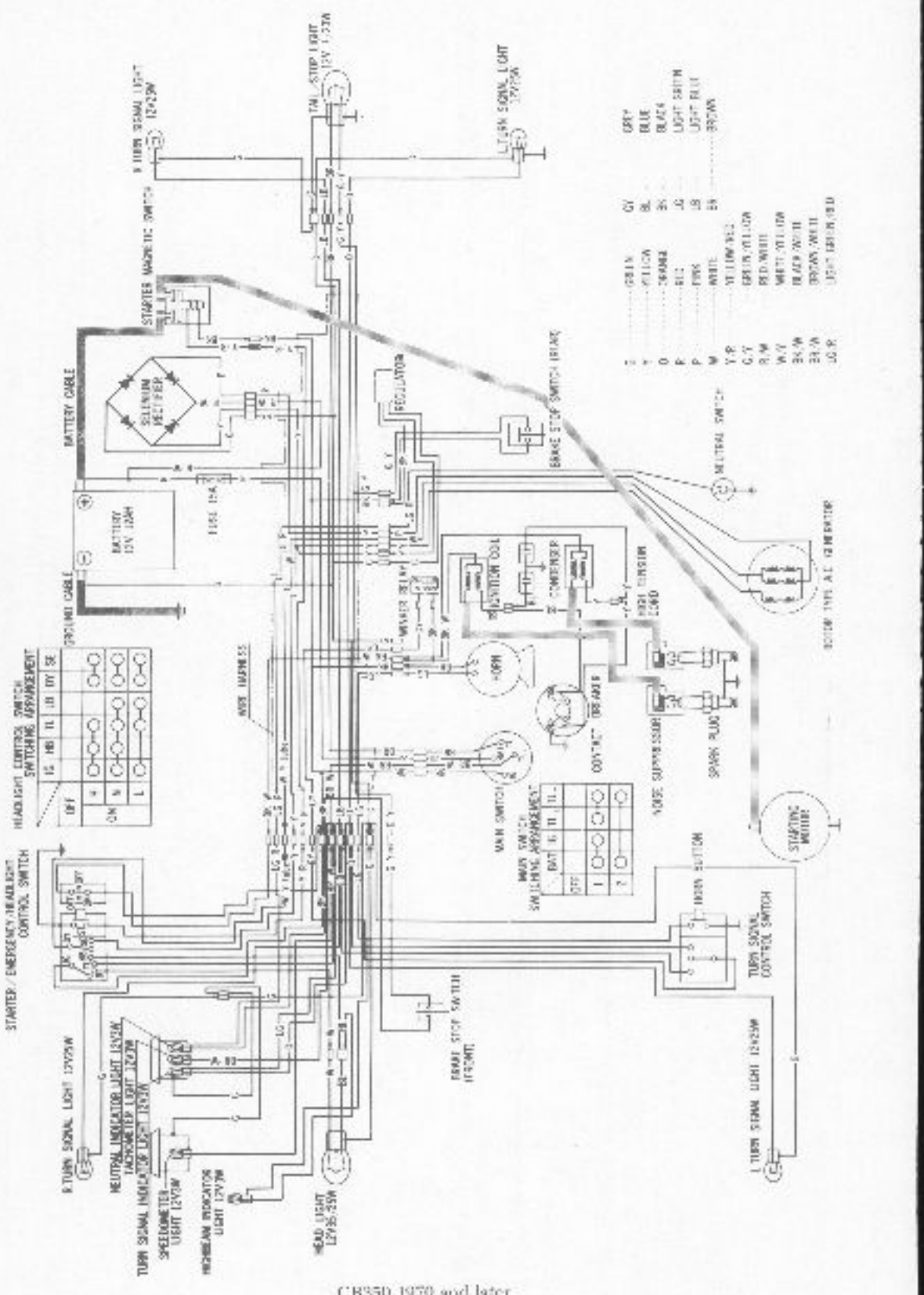
2. When the right-hand switch is activated, continuity will exist between the gray lead and the light blue lead.



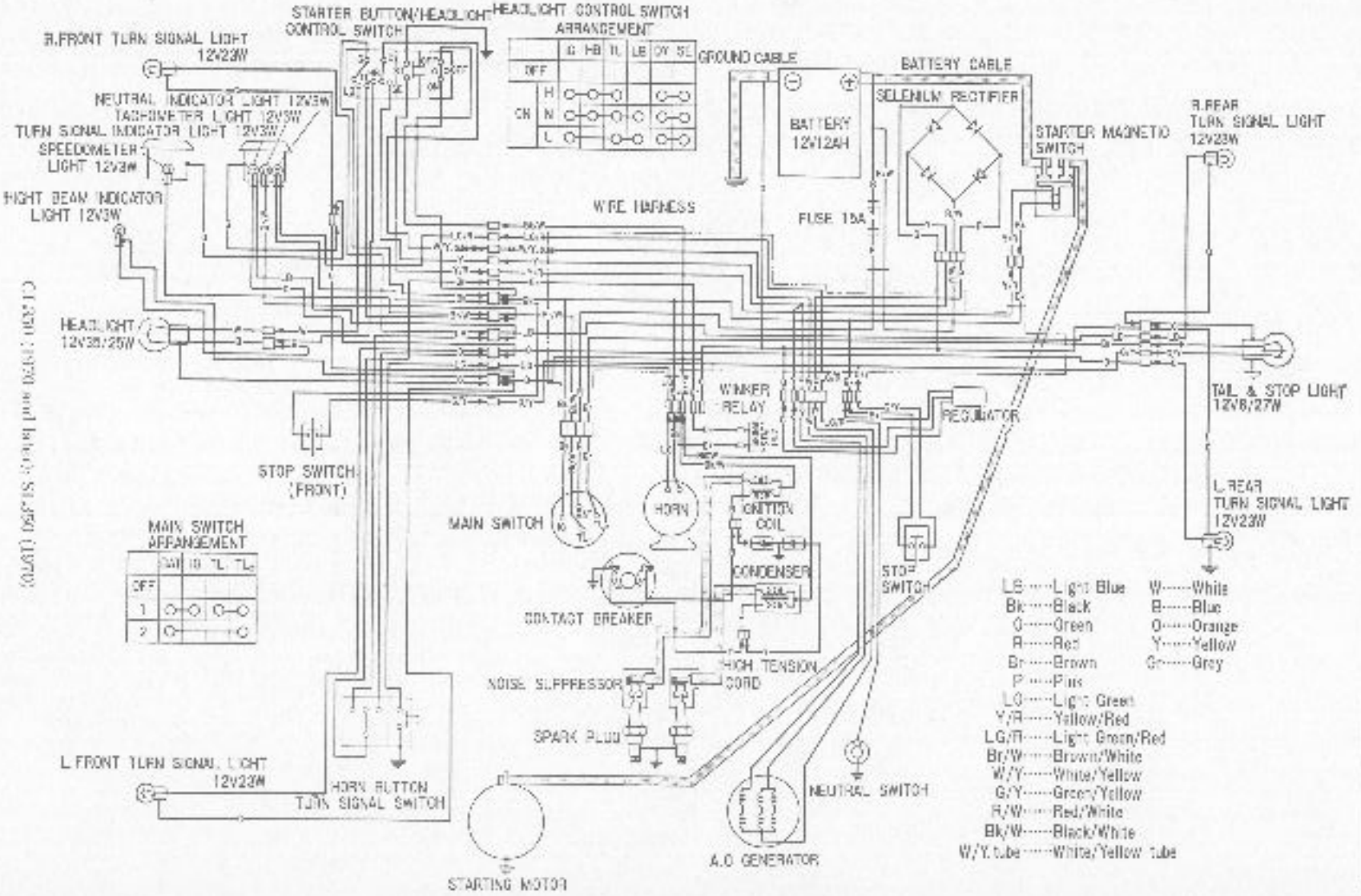
Wiring Diagrams

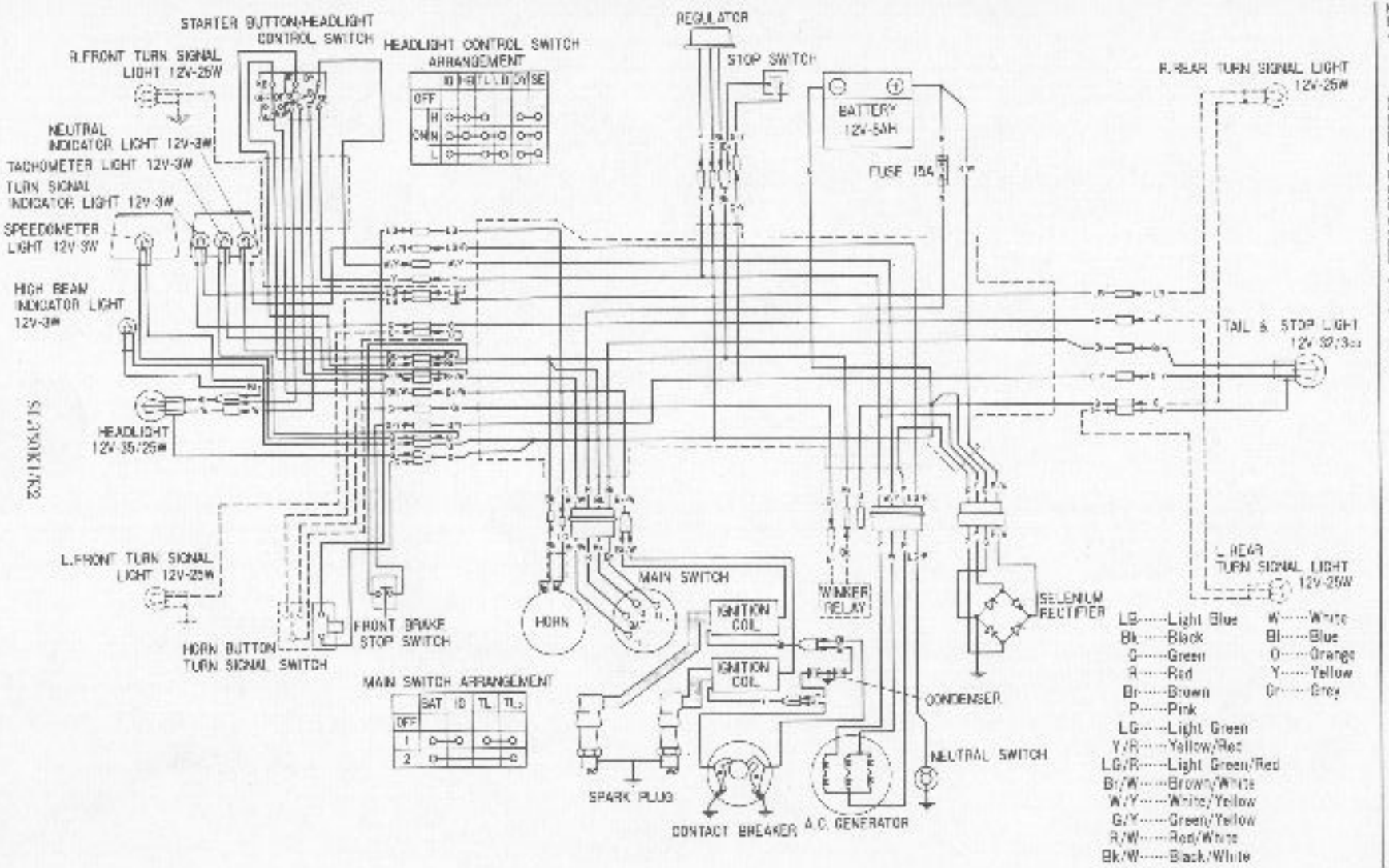


CB/CL350 1968–69



CB350 1970 and later


STARTER BUTTON/HEADLIGHT CONTROL SWITCH
HEADLIGHT CONTROL SWITCH ARRANGEMENT
R.FRONT TURN SIGNAL LIGHT 12V23W
NEUTRAL INDICATOR LIGHT 12V3W
TACHOMETER LIGHT 12V3W
TURN SIGNAL INDICATOR LIGHT 12V3W
SPEEDOMETER LIGHT 12V3W
HIGHT BEAM INDICATOR LIGHT 12V3W
HEADLIGHT 12V35/25W
STOP SWITCH (FRONT)
MAIN SWITCH ARRANGEMENT
MAIN SWITCH
HORN
WINKER RELAY
IGNITION COIL
CONDENSER
CONTACT BREAKER
NOISE SUPPRESSOR
SPARK PLUG
HIGH TENSION CORD
L.FRONT TURN SIGNAL LIGHT 12V23W
HORN BUTTON
TURN SIGNAL SWITCH
STARTING MOTOR
A.C GENERATOR
NEUTRAL SWITCH
GROUND CABLE
BATTERY CABLE
BATTERY 12V12AH
SELENIUM RECTIFIER
STARTER MAGNETO SWITCH
WIRE HARNESS
FUSE 15A
REGULATOR
STOP SWITCH
R.REAR TURN SIGNAL LIGHT 12V23W
TAIL & STOP LIGHT 12V8/27W
L.REAR TURN SIGNAL LIGHT 12V23W
LB……Light Blue
Bk……Black
G……Green
R……Red
Br……Brown
P……Pink
LG……Light Green
Y/R……Yellow/Red
LG/R……Light Green/Red
Br/W……Brown/White
W/Y……White/Yellow
G/Y……Green/Yellow
R/W……Red/White
Bk/W……Black/White
W/Y tube……White/Yellow tube
W……White
B……Blue
O……Orange
Y……Yellow
Gr……Grey


STARTER BUTTON/HEADLIGHT CONTROL SWITCH
HEADLIGHT CONTROL SWITCH ARRANGEMENT
REGULATOR
STOP SWITCH
R.FRONT TURN SIGNAL LIGHT 12V-25W
NEUTRAL INDICATOR LIGHT 12V-3W
TACHOMETER LIGHT 12V-3W
TURN SIGNAL INDICATOR LIGHT 12V-3W
SPEEDOMETER LIGHT 12V-3W
HIGH BEAM INDICATOR LIGHT 12V-3W
BATTERY 12V-5AH
FUSE 15A
R.REAR TURN SIGNAL LIGHT 12V-25W
TAIL & STOP LIGHT 12V 32/3cp
HEADLIGHT 12V-35/25W
L.FRONT TURN SIGNAL LIGHT 12V-25W
HORN BUTTON TURN SIGNAL SWITCH
FRONT BRAKE STOP SWITCH
HORN
MAIN SWITCH
IGNITION COIL
IGNITION COIL
WINKER RELAY
SELENIUM RECTIFIER
L.REAR TURN SIGNAL LIGHT 12V-25W
MAIN SWITCH ARRANGEMENT
CONDENSER
NEUTRAL SWITCH
SPARK PLUG
CONTACT BREAKER
A.C. GENERATOR
LB……Light Blue
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G……Green
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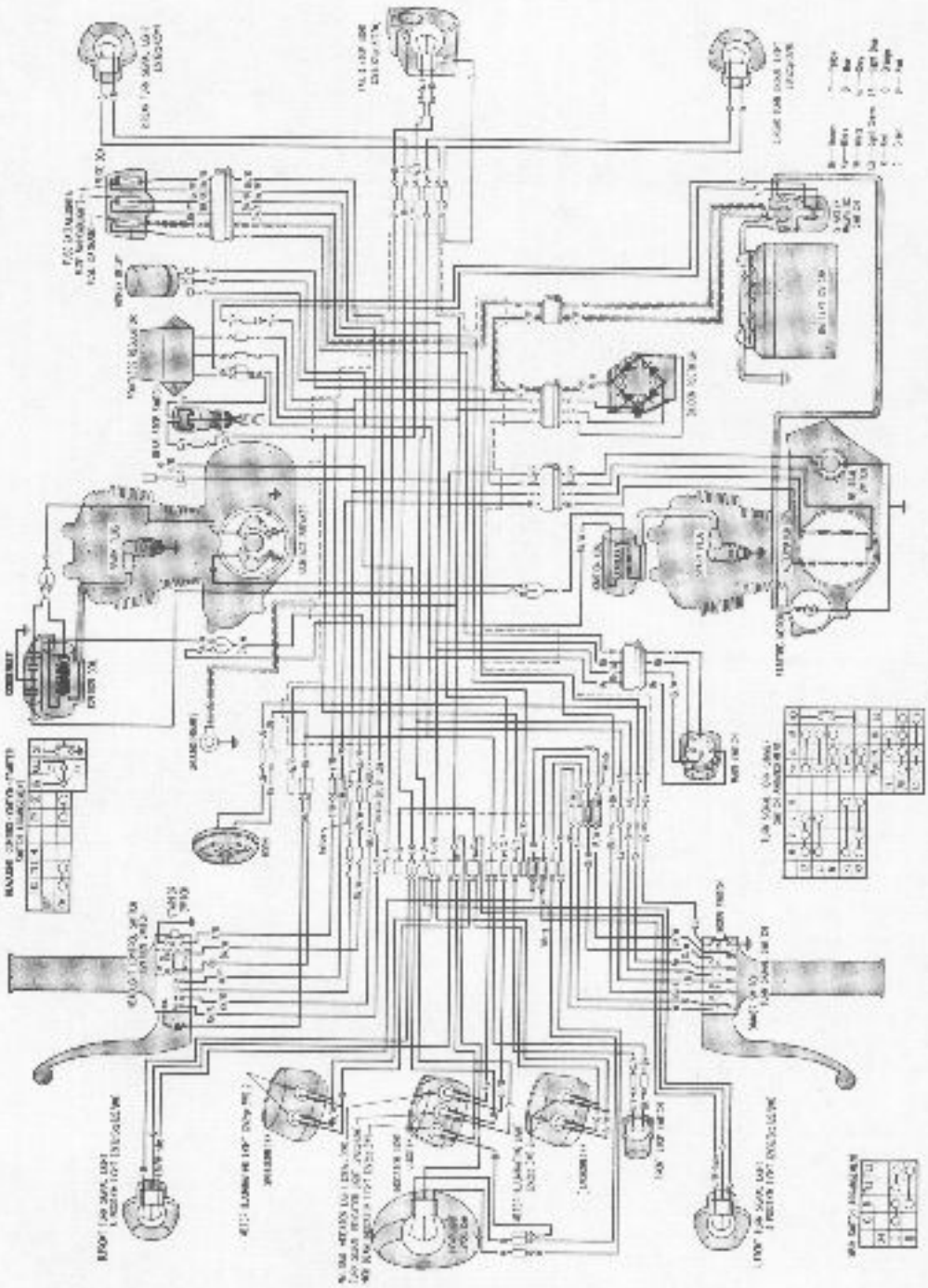
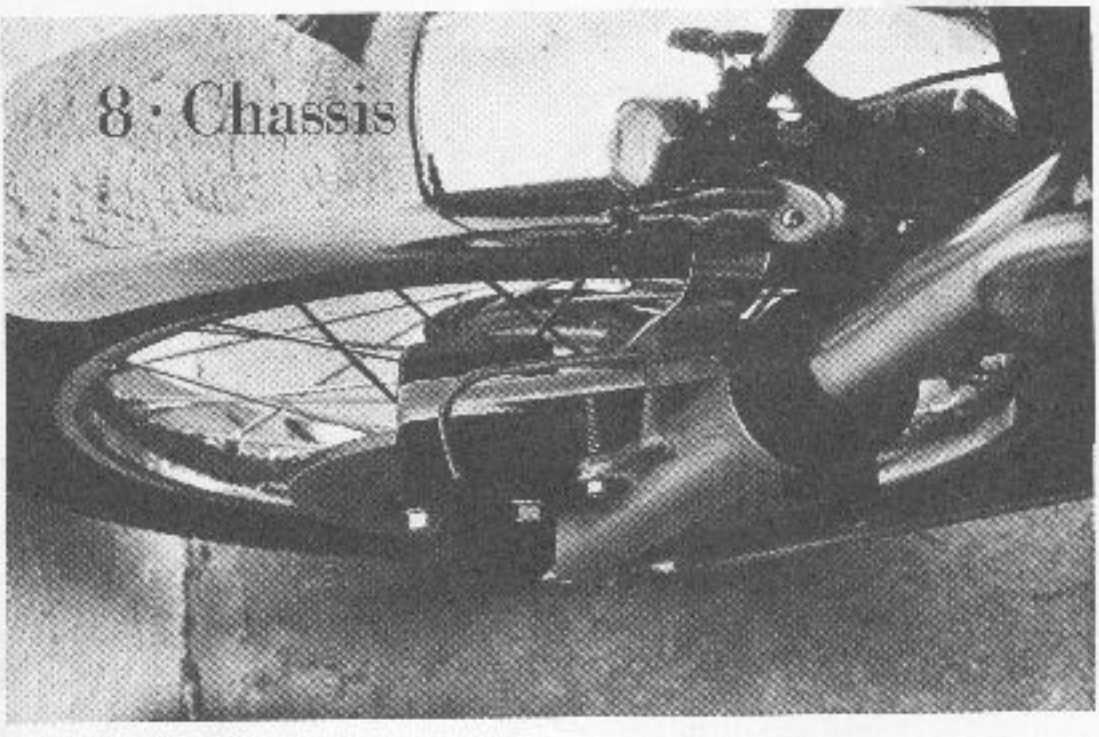
Bk/W……Black/White
W……White
Bl……Blue
O……Orange
Y……Yellow
Gr……Grey



CB4CL360

8 · Chassis



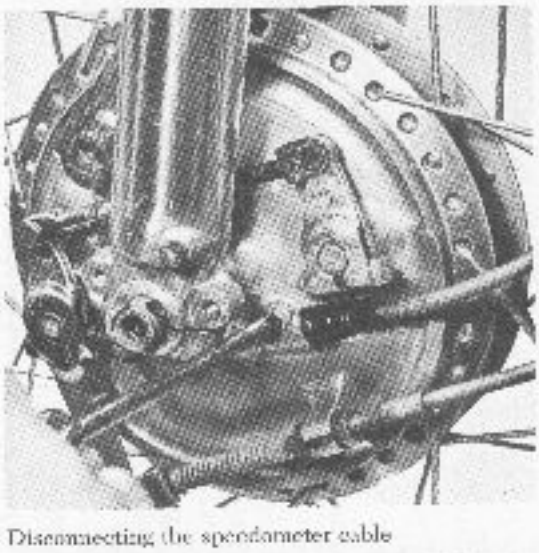
Wheels, Hubs, and Brakes

REMOVAL AND INSTALLATION

Front

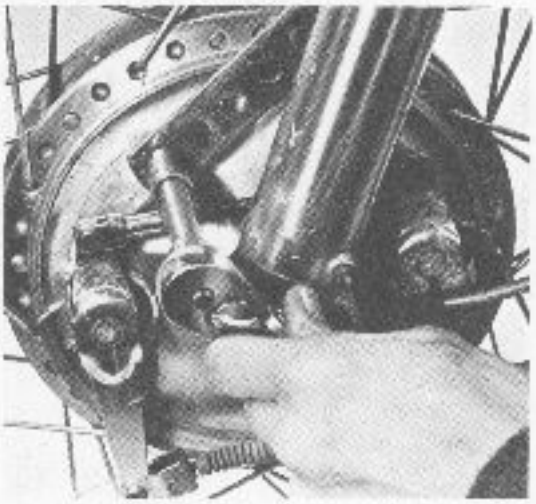
DRUM BRAKE

1. Place the motorcycle on the center stand, and place a support under the engine to raise the front wheel at least 2 in. off the ground.
2. Disconnect the speedometer cable from the brake plate after removing the phillips head set screw.
3. Screw the locknut off the front brake cable adjuster, and run the adjuster in to give as much slack in the cable as possible.
4. Remove the cotter pin from the brake lever on the brake plate. Then pull the lever back by hand and disconnect the brake cable from the lever and the brake plate.
5. Remove the bolt securing the brake anchor to the front hub.
6. Remove the two nuts, plain washers, and lockwashers from each axle cap. Remove the caps. The front wheel can now be removed.
7. To install, hold the wheel in place and install the axle caps, plain washers, lockwashers, and nuts in that order.

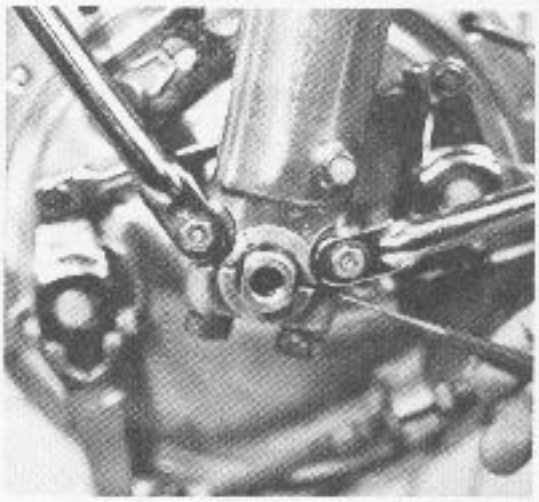


Disconnecting the speedometer cable

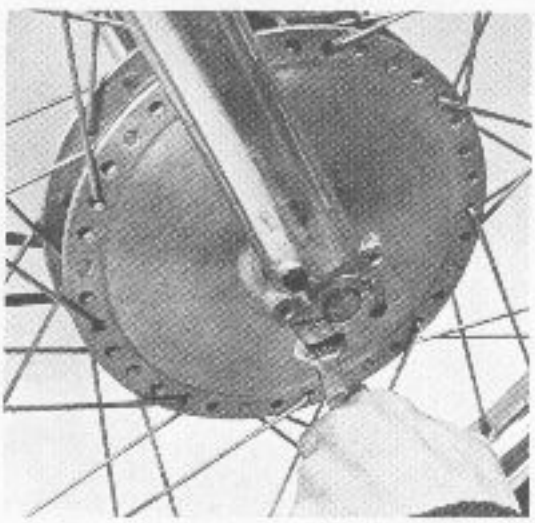
Disconnecting the front brake cable



Disconnecting the brake anchor at the brake plate



Cap should touch fork at front with space at rear



Removing the axle caps

CAUTION: *The axle caps are machined unevenly (one side is slightly higher than the other) the high side MUST face the front. The front bolt should also be tightened first so that a small gap exists between the bottom of the fork slider and the axle cap at the rear. If in doubt which side is the high side, place a straightedge across the top of the cap, the high side should be apparent.*

8. Connect the speedometer cable to the brake plate, and secure it in place with the phillips head set screw.

9. Bolt the brake anchor to the brake plate. Connect the brake cable to the brake lever and then to the brake plate. Adjust the cable free-play to 10–20 mm (0.6–0.8 in.) with the cable adjuster on the brake plate.

Disc Brake

1. Place the motorcycle on the center stand, and place a support under the engine to raise the front wheel at least 2 in. off the ground.

2. Disconnect the speedometer cable from the speedometer drive housing after removing the phillips head set screw.

3. Remove the two nuts, plain washers, and lockwashers from each axle cap. Remove the caps. The front wheel can now be removed.

CAUTION: *Do not squeeze the brake lever when the front wheel is removed. This will force the piston in the caliper out.*

4. To install, hold the wheel in place with the speedometer drive housing facing slightly down and to the rear, and install the axle caps, plain washers, lockwashers, and nuts in that order.

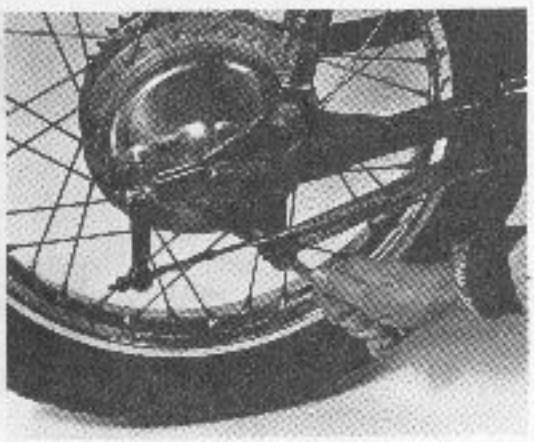
CAUTION: *The axle caps are machined unevenly (one side is slightly higher than the other) the high side MUST face the front. The front bolts should also be tightened first starting on the disc side so that a small gap exists between the bottom of the fork slider and the axle cap at the rear. If in doubt which side is the high side, place a straightedge across the top of the cap, the high side should be apparent.*

5. Connect the speedometer cable to

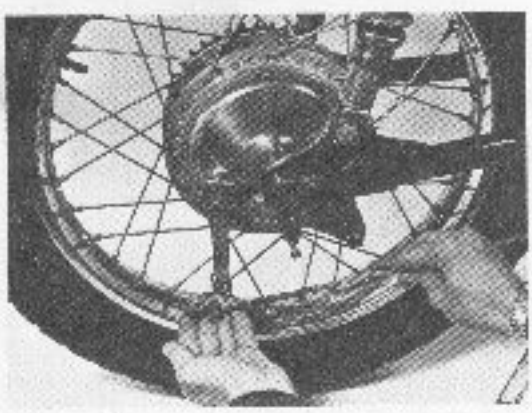
the speedometer drive housing, and secure it in place with the phillips head set screw.

Rear

1. Place the motorcycle on its center stand so that the rear wheel is off the ground.
2. Remove the mufflers (CB models only).
3. Remove the cotter pin, nut, lockwasher, and plain washer from the brake anchor bolt, and separate the brake anchor from the brake plate.
4. Remove the rear brake adjusting nut, depress the brake pedal, and separate the brake rod from the brake lever. Place the clevis pin, spring, and adjusting nut on the brake rod for safekeeping.



Disconnecting the rear brake anchor at the brake plate

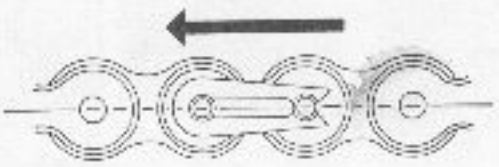


Brake rod components

5. Remove the cotter pin from the rear axle nut. Remove the axle nut and flat washer.
6. Remove the masterlink from the drive chain. Place the masterlink on the end of the chain for safekeeping. If the chain doesn't have a masterlink, loosen the chain adjuster locknuts and run the adjusters in. Move the wheel forward in the swing arm and slip the drive chain off the rear sprocket once the axle is removed. This can be done for either type of chain and does not require removal of the masterlink.
7. Pull the axle out from the right-side and remove the wheel assembly from the swing arm.

NOTE: *Place the wheel spacers on the axle in the order that they are removed, and screw the axle nut on the axle for safekeeping.*

8. To install the wheel: wrap the drive chain around the rear sprocket. Hold the wheel in place and slip the axle in place from the right-side. Be sure that the wheel spacers are in their correct locations. If the masterlink was removed, place both ends of the chain on the rear sprocket and install the masterlink as shown with the open end of the spring clip facing opposite the direction of rotation.



Install the spring clip with the closed end facing the direction of chain travel

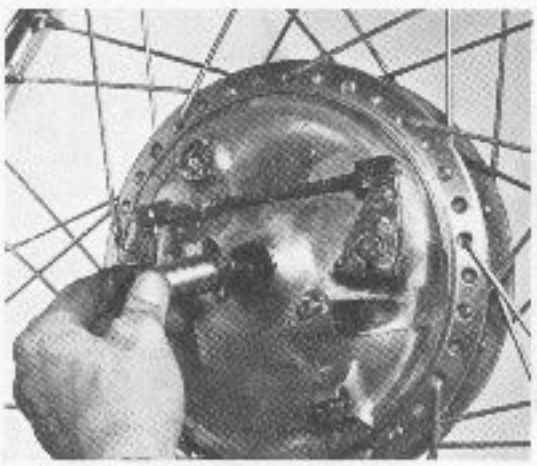
9. Turn the axle nut on finger-tight. Adjust the drive chain slack: the slack, measured midway between the sprockets, should be about ¾ in. Refer to "Maintenance," (Chapter 2), if necessary.
10. Secure the brake anchor to the brake plate with a plain washer, lockwasher, nut, and a new cotter pin in that order.
11. Slip the brake cable or brake rod through the fitting in the brake lever and screw on the adjusting nut. Adjust the cable so that the brake pedal has 1 in. of free-play before the brake shoes contact the drum.
12. Tighten the axle nut to the proper

torque. The proper torque for your model can be found in the "Chassis Torque Specifications" chart at the end of this chapter. Then back the nut off until a slot in the axle nut is lined up with a hole in the axle. Secure the axle nut in place with a new cotter pin.

DRUM BRAKE SERVICE

All models use a single-leading shoe rear brake, while, a twin-leading shoe is used on the front. Hondas use brakes in which the lining is bonded to the brake shoe. Lining and shoe, therefore, are purchased and replaced as a single unit.

1. Remove the wheel from the motorcycle. On the front wheel, unscrew the axle. Remove the brake plate from the hub.



Removing the front axle nut

2. Brakes can be inspected on the brake plate.

3. Inspect the lining for wear. There should be at least 0.1 in. (2.5 mm) of lining material left (measured at the linings thinnest point) or the shoes must be replaced.

4. Inspect the linings for grooves or scoring. These may be caused by particles of dirt which have entered the drum. If badly scored, the shoes should be replaced. If scoring of the shoes is evident, the drum should be inspected for the same type of damage.

Be sure that there is no oil or grease present on the linings. Oil-impregnated linings must be replaced. If the linings show this condition, determine the source of the lubricant: defective wheel bearing oil seals, excessive chain lube, etc.

5. If the linings are usable, rough up the surface with coarse sandpaper. Then clean the linings with alcohol or laquer thinner. Clean the brake drum with the same solvent.

6. To disassemble the brake plate, remove the cotter pin(s) and washer(s) from the brake pivot(s). Grasp each shoe and fold them toward the center of the brake plate. They may be installed in the same manner.

Sanding a brake lining

Removing the cotter pin from the brake pivot

Removing the shoes from the plate

Removing the brake lever from the cam

7. Remove the brake springs. Remove the brake lever pinch-bolt(s) and pull the lever(s) off the splined brake cam(s).

NOTE: *The plurals refer to the twin-leading shoe brakes.*

8. Push the brake cam(s) out of the brake plate from the outside using hand-pressure or if necessary by tapping with a plastic mallet. Remove the plain washer and dust seals from the brake plate.

9. Check that the brake lever pinch-bolts are not bent. This can easily happen if they are overtightened. Replace any bolts in this condition. Inspect the brake lever splines and replace the lever(s) if these are worn or stripped.

10. Inspect the splines on the brake cam(s). These should be in good condition. Check that the brake cam(s) are not bent and that they can rotate freely in the brake plate passage. If it will not, use a fine grade of sandpaper on the camshafts and the surface of the brake plate passage.

11. Clean the cam(s) thoroughly in a solvent to remove any old grease, rust, or corrosion. Use sandpaper or emery cloth to polish the cams. Clean off any residue; before reassembly, smear the cams with chassis grease.

12. Inspect the brake plate for cracks or fractures, and replace it if necessary.

13. On twin-leading shoe brakes, the brake plate linkage should be checked.

Remove corrosion from the brake cams

The connecting rod is secured to each brake lever by a clevis pin and cotter pin. These pins can be removed after the cotter pins are taken off. They should be checked for wear, especially on high mileage machines, and replaced if necessary.

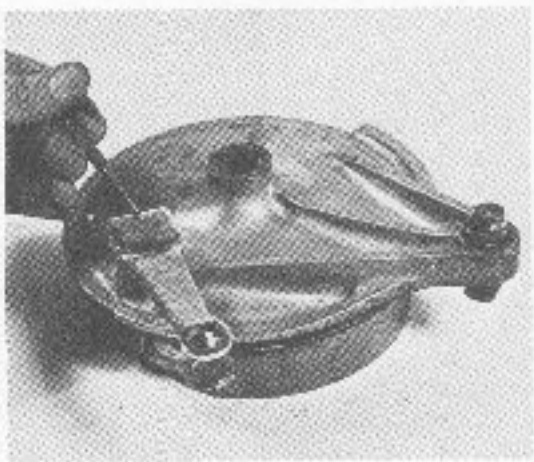
14. Check the condition of the brake springs, noting any twisted or fatigued hooks. Replace any broken, rusted, or old springs with new ones.

15. Clean all parts thoroughly with a suitable solvent, making a special effort to remove the dust and built-up dirt from the backing plate.

16. When reassembling the hub, note the following points:

a. Ensure that the brake cams are lubricated with chassis grease;

b. The use of new dust seals is recommended;



When installing the brake lever, line up the punch marks on the cam and lever

c. Lubricate the brake shoe pivot points with a little grease.

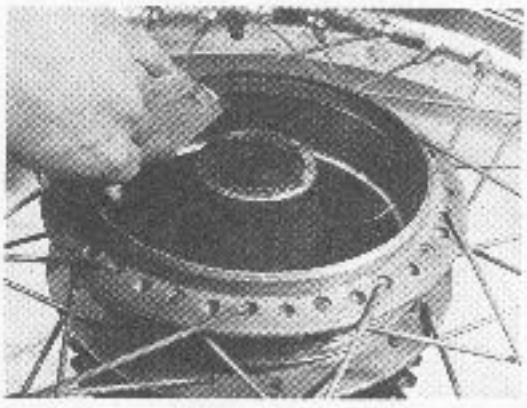
d. Install the shoes as on removal. Hook them together with the springs, and fold them down over the brake cam(s) and pivot(s). Install new cotter pins to the pivot points;

e. When installing the brake lever on the brake cam, be sure that the punch marks on the lever and cam align.

Brake Drums

1. Upon disassembly of the hub, inspect the brake drum surface for condition. The drums must be clean and free from score marks or rust.

2. Rust can be removed from the drum surface with sandpaper. Polish the surface until it is shiny, then clean it thoroughly.



Sand the brake drum until the surface is clean and shiny

3. Alcohol or lacquer thinner can be used to remove dirt or deposits from the drum.

4. The drum should be checked for concentricity. An out-of-round condition is usually noticeable as an on-off-on feeling when the brake is applied while riding. With the wheel assembly mounted on the machine, spin the wheel while applying the brake very lightly. The rubbing noise of the brakes against the drum should be heard for the entire revolution of the wheel.

5. An out-of-round condition and most scoring can be removed by having the drum turned on a lathe. This operation should be entrusted to a qualified specialist with the proper equipment. Usually, the tire and wheel bearings will have to be removed so that the wheel can be chucked to the lathe. If the rim needs to be trued, have this done before any work on the drum is performed, as the action of the spokes while truing the rim may further aggravate the drum warpage.

Before beginning a project of this sort, it is advisable to consult your dealer.

DISC BRAKE SERVICE

When handling disc brake fluid, observe the following cautions:

a. Brake fluid absorbs moisture very quickly, and then becomes useless. Therefore, never use fluid from an old or unsealed container;

b. Brake fluid will quickly damage paint. Place a protective cover on the gas tank;

c. Use only DOT #3 brake fluid.

Flushing

The brake system should be flushed out every 8,000 miles, or once a year.

1. Attach a length of vinyl tube, about 4 mm in diameter, to the bleed screw on the brake caliper and put the other end into a small container.

2. Remove the master cylinder cap, and the diaphragm. Loosen the bleed screw about ½ turn. Pull the brake lever slowly to the handgrip, then tighten the bleed screw. Release the lever. Repeat until the master cylinder is almost empty.

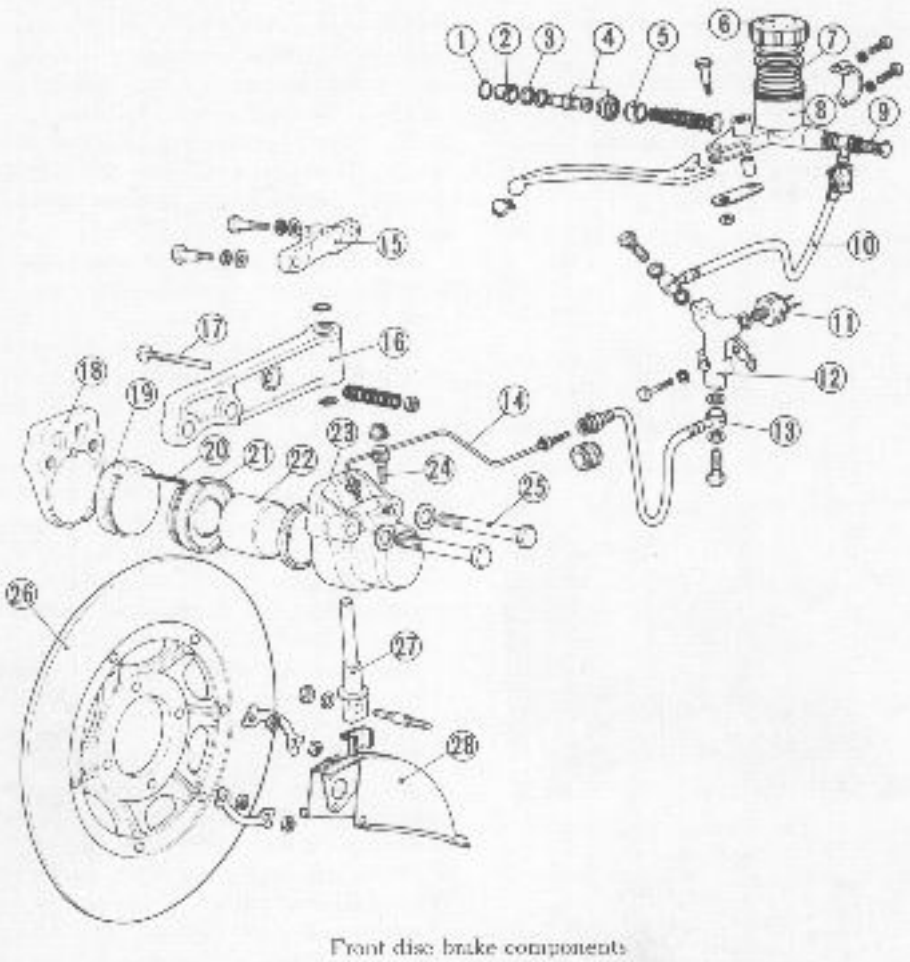
3. Add new brake fluid to the master cylinder and continue squeezing and releasing the brake lever slowly until the new fluid begins to come out of the vinyl tube. Bleed the system as outlined below.

Bleeding

1. Needed for this operation are a torque wrench, a small cup, and a vinyl tube with an inside diameter of 4 mm.

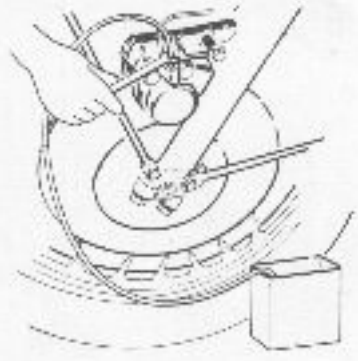
2. Be sure that the reservoir is topped up. After checking the reservoir level, replace the diaphragm and cap.

3. Connect the vinyl tube to the bleed screw on the caliper, making sure that it is a tight fit; then insert the other end of the tube into a small container with several inches of brake fluid in it. Be sure



Front disc brake components

1. Boot clip
2. Boot
3. Internal circlip
4. Piston
5. Primary cup
6. Oil cup cap
7. Diaphragm
8. Master cylinder
9. Oil bolt
10. Front brake hose
11. Stop switch
12. 3-way joint
13. Front brake hose
14. Front brake pipe
15. Caliper holder joint
16. Caliper holder
17. Caliper adjust bolt
18. Caliper half (inner)
19. Pad (inner)
20. Cotter pin
21. Pad (outer)
22. Piston
23. Caliper half (outer)
24. Bleeder valve
25. Caliper securing bolts
26. Front brake disc
27. Caliper holder
28. Disc cover



Bleeding the disc brake

that the end of the tube is below the level of the fluid in the container.

4. Apply the brake lever *slowly* several times, then hold it ON.

5. While holding the brake lever on, loosen the bleed screw. The brake lever will be pulled toward the handgrip. Close the bleed screw **BEFORE** the lever bottoms out on the handgrip.

6. Repeat the procedure until the fluid issuing from the lower end of the tube is completely free of air bubbles.

NOTE: *During the operation, keep a check on the reservoir fluid level,*

maintaining it near its normal position.

7. Tighten the bleed screw to 4.5–6.7 ft lbs.

8. Top up the reservoir to the level line.

Pad Replacement

1. Both pads should be replaced as a set when either pad is worn past the red limit line.

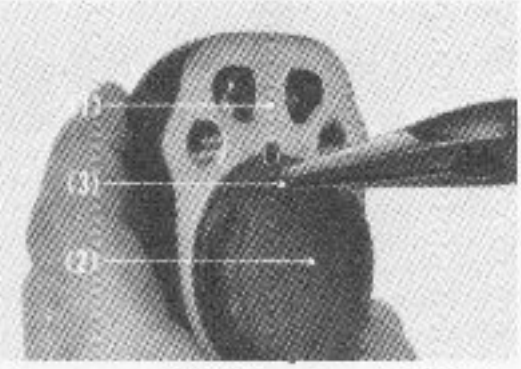
2. Disconnect the brake line from caliper A and cover the open end with the rubber bleeder cap, which will keep out dirt or foreign matter.

To remove the caliper halves for replacement of the pads, disconnect the brake line (1), remove the setting bolts (2), and remove the caliper halves (3 and 4)

3. Loosen the caliper setting bolts about ¼ turn.

4. Remove the front wheel. Now the caliper setting bolts can be removed, and the two caliper halves can be separated from the caliper pivot arm.

5. To remove pad B (the pad closest to the wheel) from caliper B, remove the cotter pin from the top of the pad.



To remove pad B (2) from caliper B (1), first remove cotter pin (3)

6. To remove pad A (piston pad) from Caliper A, hold the caliper with the pad facing down, and tap the caliper lightly on top. The pad should fall out.

7. When installing pads, apply a small amount of silicon grease to the sides of the pad, and to the center of the back of the pad.

CAUTION: *Avoid getting any grease or oil on the braking surface of the pad.*

8. Install pad B into Caliper B and secure with a new cotter pin. Install pad A into caliper A with the slot in the pad facing the top of the caliper.

9. Install the two caliper halves to the caliper pivot arm and tighten the two setting bolts.

NOTE: *Fitting new pads in the place of a set which were considerably worn will cause the fluid level to rise. The excess fluid will be forced out of the inlet passage when the front wheel is mounted and the piston is forced back into the caliper.*

10. Install the front wheel taking care to locate the disc between the pads. It may be necessary to turn the caliper adjusting screw clockwise to fit the wheel. The piston pad may have to be forced back in the caliper. With the wheel in place connect the brake line and check that the setting bolts are tightened to the proper torque of 9–12 ft lbs. Adjust the caliper and bleed the system.

NOTE: *After installing new pads, avoid hard application of the brake for at least 50 miles.*

Caliper Adjustment

1. The caliper should be adjusted whenever the pads are replaced.

2. Place the motorcycle on the center stand, and place a support under the engine to raise the front wheel off the ground.

Caliper adjusting screw (1), and locknut (2)

3. Using a 10 mm socket, loosen the adjuster screw locknut. With a small screwdriver turn the adjusting screw clockwise until the wheel rotates freely, then rotate the adjusting screw counterclockwise until the fixed pad (pad B) just contacts the disc.

4. Turn the adjusting screw another ½–1 turn clockwise so that there is a small clearance between pad B and the disc. Tighten the locknut.

CALIPER ASSEMBLY

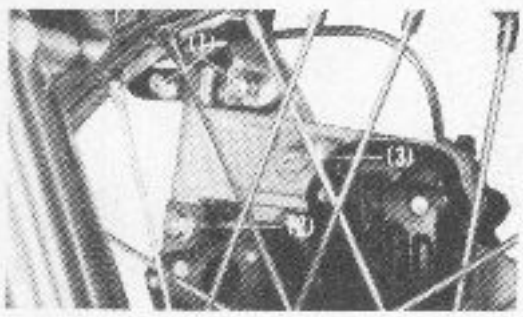
Removal and Disassembly

NOTE: *A compressed air supply will be necessary to remove the piston from the caliper.*

1. Remove the front wheel.

2. Disconnect the hydraulic brake line from the caliper, and fit the rubber cap from the bleeder valve onto the end of the brake line to prevent dirt from entering the system.

3. Remove the caliper adjusting screw locknut from the adjusting screw and unscrew the adjusting screw from the right-side. Remove the adjusting screw spring.



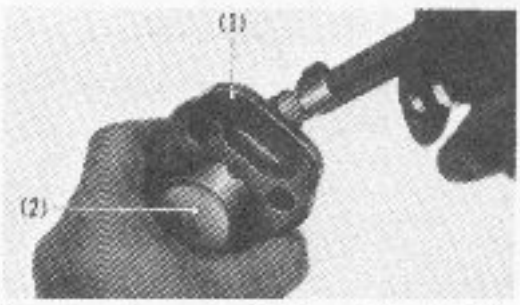
Caliper mounting bolts (1 and 2), and adjusting screw (3)

4. Remove the three mounting bolts which secure the caliper pivot arm to the left fork slider. Remove the mud guard and the caliper assembly. The pivot shaft can be pulled from the pivot arm.

NOTE: *The two caliper halves can be removed from the pivot arm and disassembled without removing the pivot arm or the front wheel. To remove the caliper halves in this manner, see the section under "Pad Replacement."*

5. To disassemble the caliper, remove the two setting bolts from the caliper and separate the two caliper halves from the caliper pivot arm. Remove the two pads as described under "Pad Replacement."

6. Remove the piston from caliper A by blowing compressed air into the fluid inlet passage.



Removing caliper piston (2), from caliper A (1), by blowing compressed air into the fluid inlet passage

7. The piston seal can be removed from caliper A using a wood or plastic tool. However, note that if the cylinder walls are scored while removing the seal, the caliper half will have to be replaced.

Inspection

1. Check pad wear. If either pad is worn past the red limit line, it must be replaced.

2. Measure the inside diameter of the caliper cylinder bore and the outside diameter of the piston. Compare the measured value with the service limit given at the end of this chapter; if either part is worn beyond its service limit, it must be replaced.

3. Check the bore in Chapter A for scoring. If scoring is evident, the caliper half should be replaced.

4. Check the piston for scoring; replace it if scoring is evident.

5. Check the pivot shaft for wear, also check the pivot arm for wear at the pivot points. Replace as necessary.

6. Check the condition of the two pivot shaft O-rings. If they are torn or cracked they should be replaced with new ones.

Assembly and Installation

Since it is imperative that no dirt or foreign matter be allowed to enter the hydraulic system, assembly should take place in a clean area preferably on a sheet of white paper.

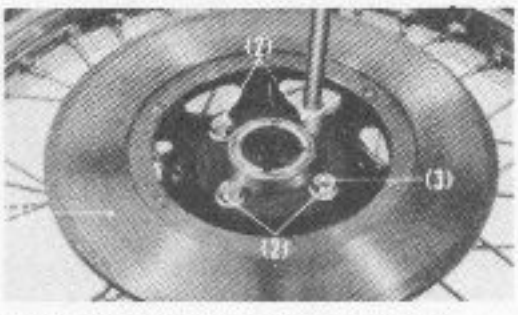
Clean and lubricate all internal brake parts with fresh DOT 3 brake fluid before assembly.

Use only genuine Honda replacement parts when replacing any parts in the brake system.

1. Install the pivot shaft into the pivot arm. Be sure to apply some grease to the pivot points. Note that an O-ring is fitted to either side of the pivot arm.
2. Mount the pivot arm to the left fork slider with the three mounting bolts. Install the adjusting screw, spring, and locknut.
3. Install the piston seal into the caliper using a wood or plastic tool. Take care not to score the cylinder bore. Installing a new seal is recommended.
4. Install the piston into the caliper half, then install the piston pad. Install the fixed pad to caliper B and secure it with a new cotter pin.
5. Install the two caliper halves to the pivot arm, and torque the setting bolts to 9–12 ft lbs.
6. Mount the front wheel. Bleed the brake as described under "Bleeding". Adjust the caliper as described under "Caliper Adjustment".

BRAKE DISC

1. Check the disc for run-out by securing a dial gauge to the fork slider. If the run-out is 0.3 mm (0.0118 in.) or more, remove the disc and check it for warpage. Maximum warpage is 0.3 mm (0.0118 in.) If the disc is not warped, suspect the wheel bearings.
2. Measure the thickness of the disc. Minimum allowable thickness is 6.0 mm (0.236 in.)
3. To remove the disc, remove the front wheel, bend down the locking tabs on the disc securing nuts, and remove the nuts.
4. When installing the disc, care should be taken to tighten the bolts evenly and gradually until the proper torque of 13–16.6 ft lbs is reached. Ensure that the locking tabs are bent up against the flats on the disc bolts.



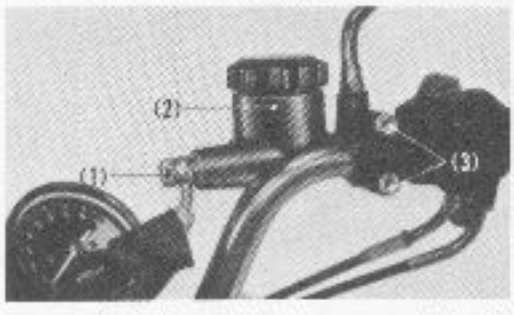
Disc (1), locking tabs (2), securing nuts (3)

MASTER CYLINDER

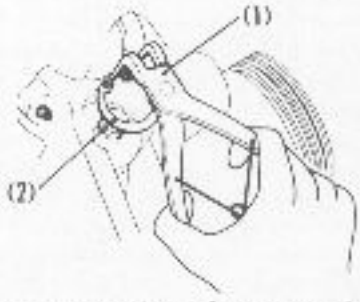
Removal and Disassembly

NOTE: *Be very careful when removing and replacing the master cylinder or refilling the reservoir. Brake fluid can remove paint or damage plastic in seconds and therefore should be handled with care.*

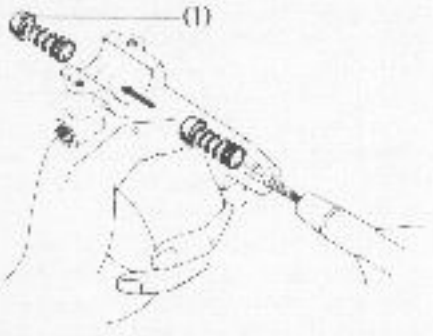
1. Place a cloth underneath the connection to absorb any spilled fluid and disconnect the brake line from the master cylinder. Cover the open end of the brake line with a plastic bag secured with a rubber band to prevent dirt from entering the brake system.
2. Remove the two mounting bolts and remove the master cylinder from the handlebar. Unscrew the reservoir cap and discard the brake fluid.
3. Remove the brake lever by unscrewing the pivot bolt.
4. Carefully remove the boot and 18 mm snap-ring.
5. Remove the piston, check valve, return spring, and primary cup by blowing compressed air into the brake line fitting



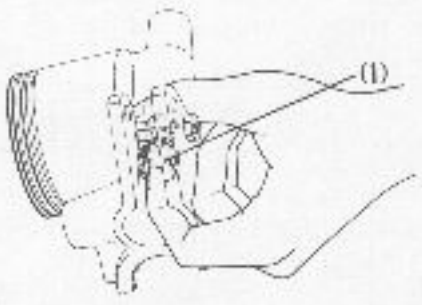
Master cylinder banjo bolt (1), master cylinder (2), and mounting bolts (3)



Removing snap-ring (2), with snap-ring pliers (1)



Removing the primary cup (1) with compressed air



Installing primary cup (1)

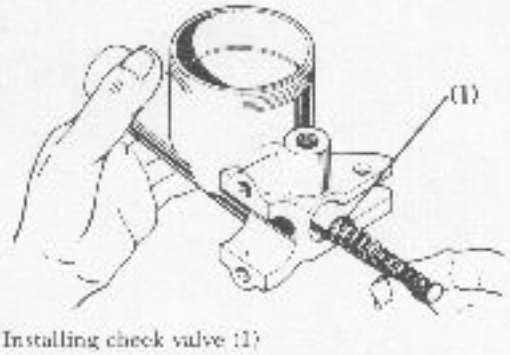
or by carefully pushing it out with a wooden dowel.

Inspection

1. Clean all components in clean brake fluid.
2. Check the master cylinder bore for signs of wear, grooves, scoring, etc.
3. Check the piston for scoring or grooves.
4. Replace the primary cup with a new item each time it is removed.
5. Replace any rubber items which show signs of wear or age, cracks, brittle condition, etc.

Assembly and Installation

1. Coat all internal brake parts with fresh brake fluid, including the bore in the master cylinder.



Installing check valve (1)

2. Install the return spring to the check valve and install them into the master cylinder. Be sure that the check valve is facing the correct direction.
3. Install the primary cup after lubricating it with fresh brake fluid.

NOTE: *Make sure that the primary cup does not turn sideways during installation.*

4. Install the piston assembly and 18 mm snap-ring. Install the boot and brake lever.
5. Mount the master cylinder on the handlebar. Connect the brake line and torque the banjo bolt to 24–29 ft lbs. Fill the reservoir with fresh brake fluid and bleed the system as previously described.

NOTE: *Be sure that there is a joint washer on either side of the brake line where it is bolted to the master cylinder.*

WHEEL BEARINGS

Removal of the wheel bearings necessitates removing the hub oil seals. These must be replaced with new ones upon reassembly.

Disassembly

1. Remove the wheel. For the front wheel remove the axle, side collar, and brake plate (drum brakes), or the speedometer drive housing (disc brakes). On the rear wheel, remove the brake plate and any side collars.
2. Remove any dust covers, or dust seals. Unscrew the bearing retainer, if fitted (all rear wheels; sprocket side and disc brake, disc side).
3. Pry out the oil seal. An oil seal is fitted to the disc side on disc brake wheels and on the side opposite the brake plate on wheels fitted with a drum brake. Use a small screwdriver, or, preferably, an elbow-shaped tool to remove the oil seal.
4. Remove the wheel bearings by reaching through the center of the hub with a long drift and tapping one of the bearings evenly around its circumference until it is removed. Be careful not to turn the bearing sideways in its seat on removal as there is danger of causing damage to the hub.

Removing bearing retainer (350 shown)

Removing wheel bearing

3. When either bearing is removed, the spacer tube can be remove from the hub. After removing the spacer tube, remove the other bearing in the same manner as the first.

NOTE: *On some models, especially high mileage machines, the hub should be heated gently with a propane torch in the vicinity of the bearing bosses to facilitate removal.*

Inspection

1. Clean the bearings and spacer tube in a suitable solvent, removing all of the old grease. At this point, it would be wise to clean out the hub as well.

2. Check the bearing busses in the hub for scuffs, cracks, or distortion. If they are in any way damaged, the hub must be replaced.

3. Check the condition of the spacer tube, and replace it if damaged.

4. Bearing condition is very important. Check the balls themselves for pitting, wear, or rust.

5. Apply a few drops of light oil to the bearing and spin it. The bearing must rotate smoothly and freely. Any roughness or binding in rotation will necessitate a new bearing.

6. Note that the bearings must be replaced in pairs.

Assembly

Assembly is in the reverse order of disassembly; however, note the following points:

1. Obtain a good grade of wheel bearing grease (such as Lithium or Moly) to lubricate the wheel bearings.

2. Pack the wheel bearings until they are completely filled.

Installing wheel bearing. The sealed surface must face away from the hub.

3. Place a small amount of wheel bearing grease to the inside of the hub and drive one of the bearings into its seat. Install the retainer if so equipped. Install the spacer tube and drive the other bearing into its seat. The sealed surface of the bearing must face the outside of the hub.

NOTE: *When a bearing retainer is fitted, the bearing closest to the retainer*

should be installed first. Then install and tighten the retainer, spacer tube, and the other bearing.

4. Replace all of the oil seals with new ones.

TIRE AND TUBE

Removal and Replacement

1. After removing the wheel from the motorcycle, take out the valve core, and remove the valve stem nuts. If a rimlock is fitted, remove the nut. If the same tire is to be refitted, mark the direction of rotation and valve stem location.

2. Walk around the tire to break the tire bead away from the rim. This may be necessary on high mileage tires.

3. Liberally coat the tire bead (both sides) with a soapy lubricant such as commercial dishwashing liquid or a soap-and-water solution.

4. Two or three tire irons are needed. These should be specifically designed for the purpose at hand; never use screwdrivers or any other instrument with sharp ends.

5. Step on the tire at any spot, and use the tire irons to lever the tire off the rim directly opposite the point on which you are standing.

6. Continue until one bead is off the rim; pull out the tube. Remove the rimlock. Then turn the wheel over, and lever the other bead off the rim if the tire is to be replaced.

7. Check the tube for leaks and patch or replace as needed.

8. Using a steel wire brush, remove any rust deposits from the rim.

9. Check the tire for condition. Tires with cuts, damaged beads, etc. should be replaced.

10. When remounting the tire note the following: most tires have a small painted mark on the sidewall; this must be aligned with the valve stem. Also note the direction of rotation molded onto the sidewall. Direction of rotation on some tires may vary depending on whether the tire is mounted on the front or rear wheel.

11. Fit the rim band to the rim. After levering one bead onto the rim, install the rimlock, insert the tube into the tire; place the valve stem through the hole in the rim, and replace the valve stem nut. Be certain that the tube is not twisted or pinched.

12. Carefully lever the other bead onto the rim. Inflate the tube, then check the aligning mark on the tire. This thin line is molded into the sidewall and will appear just above the edge of the rim. Note that it should be equidistant from the rim all around the tire. If it is not, the tire is not properly seated on the rim (most likely due to rust on the rim); this can sometimes be remedied by thoroughly lubricating the rim with a soapy lubricant and temporarily overinflating the tube until the tire is seated.

WHEEL RIMS AND SPOKES

1. Every few weeks, or more often if the machine is ridden hard, check the rims and spokes for general condition.

2. Support the wheels off the ground, and spin them slowly. Tapping a screwdriver on the spokes as they go by is one method of assuring that all of the spokes are secure. The spokes should emit a "ping" when struck. Loose spokes will emit a dull sound. Tighten an occasional loose spoke by turning the nipple one or two turns.

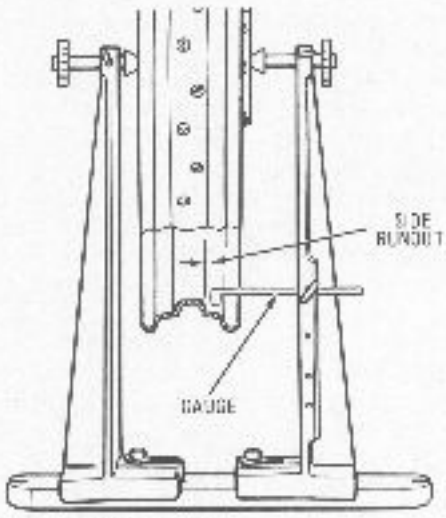
CAUTION: *Do not turn any nipple more than two turns. To do so may allow the end of the spoke to puncture the tube.*

3. If more than one spoke in a given area of the wheel is loose, the wheel should be removed and trued. If any spoke is broken, it should be replaced as soon as possible, and the rim trued.

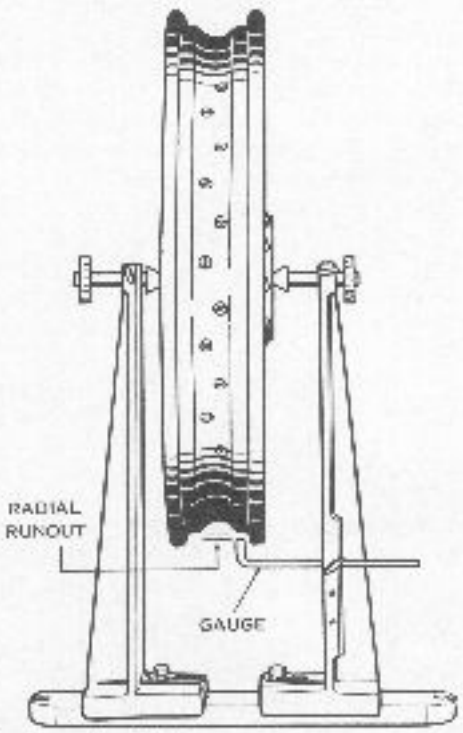
4. Assuming that the wheel bearings are in good condition, rim run-out and concentricity can be checked with the wheel mounted on the machine.

With the aid of a pointer securely mounted wherever convenient so that it contacts the side of the rim, spin the rim and notice any run-out (or side movement). This should not exceed 2 mm (0.08 in.), or the wheel must be removed and trued.

5. Concentricity may be checked in much the same manner, only the pointer should be positioned to measure the up-and-down movement of the rim. Check this at both the rim and at the top of the tire tread. Once again, any reading in excess of 2 mm (0.08 in.) will necessitate having the wheel removed and trued.



Checking rim side run-out



Checking rim radial run-out

NOTE: *Truing or lacing rims should be entrusted to a dealer with the proper equipment and experience.*

WHEEL BALANCING

Wheel balancing should be done on a wheel stand. Balancing the wheels on the machine is not recommended due to the resistance imposed by dragging brake pads or (rear) chain. The tube and tire must be in place and properly inflated.

Spin the wheel slowly several times in succession, marking the lowest point on the wheel each time it stops. If the wheel stops at one particular point each time, this is the heaviest part. Attach a balance weight around the nipple of a spoke directly opposite this heavy point. Repeat the procedure, noting each time where the wheel stops, and attaching balance weights accordingly.

The wheel should not stop at any particular point if it is balanced correctly.

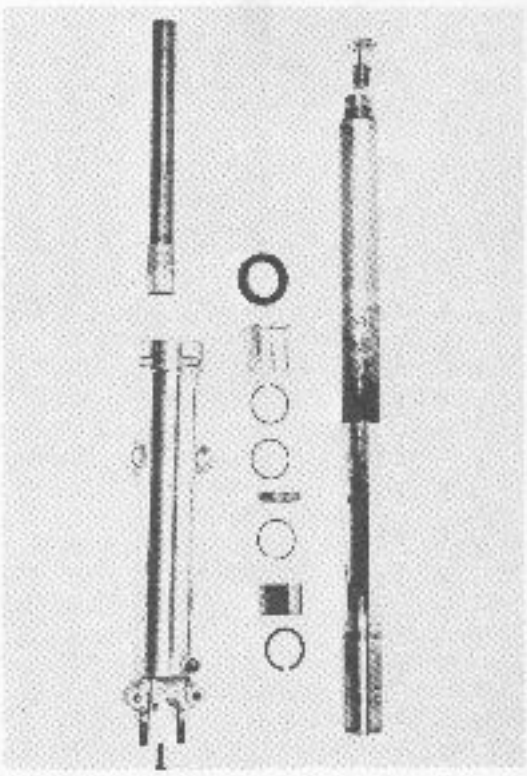
Wheels should be balanced each time the tire is removed or replaced.

Front Forks

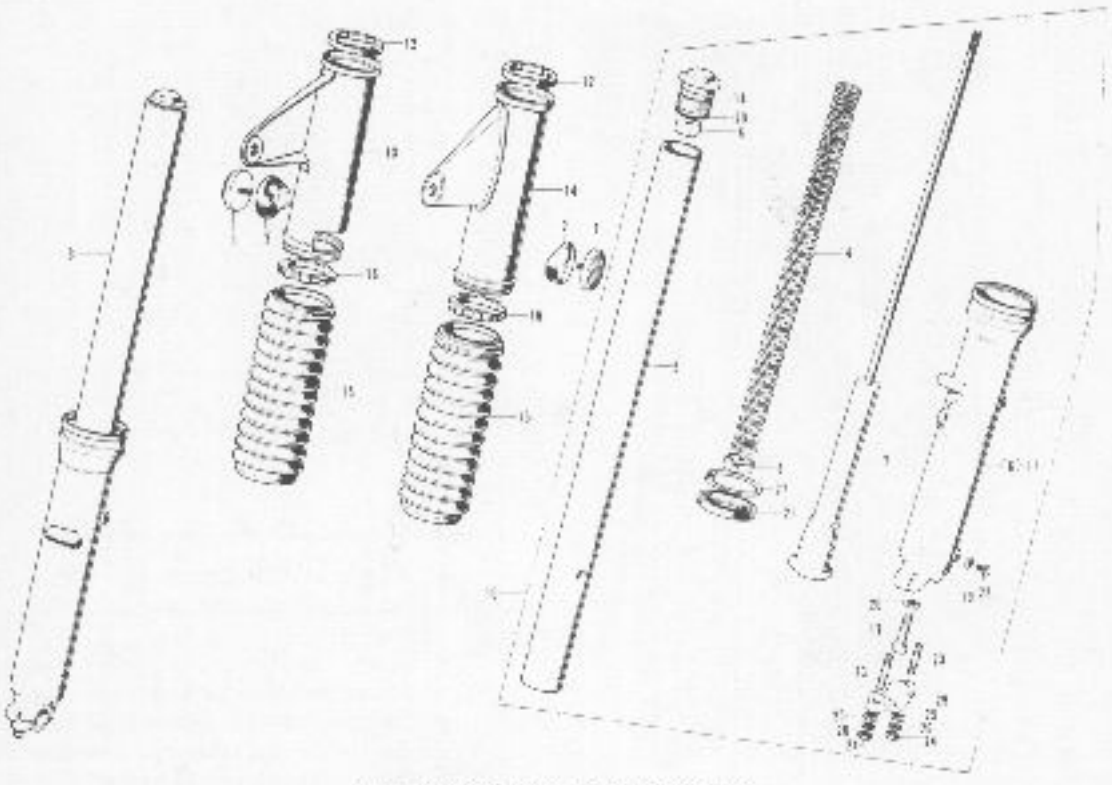
REMOVAL AND DISASSEMBLY

Two basic types of front forks are used: internal or external fork springs.

1. Remove the front wheel and fender.
2. On disc brake models remove the three caliper mounting bolts and adjust-



Early model 350 front forks



Late model 350 front forks (CL shown)

1. Reflector
2. Reflector base
3. Fork leg (right)
4. Fork spring
5. Fork tube
6. Fork slider
7. Damper
8. Spring seat
9. Damper rod nut
10. Fork assembly (left)
11. Fork slider
12. Bush
13. Headlight mount (right)
14. Headlight mount (left)
15. Fork boot
16. Bush
17. Fork slider allen bolt
18. Fork filler cap
19. Drain plug washer
20. Allen bolt washer
21. Oil seal
22. Drain plug
23. Axle cap stud
24. Axle caper
25. Washer
26. Lockwasher
27. Circlip
28. O-ring
29. Axle cap

ing screw from the left fork slider, and lift the caliper away from the fork leg.

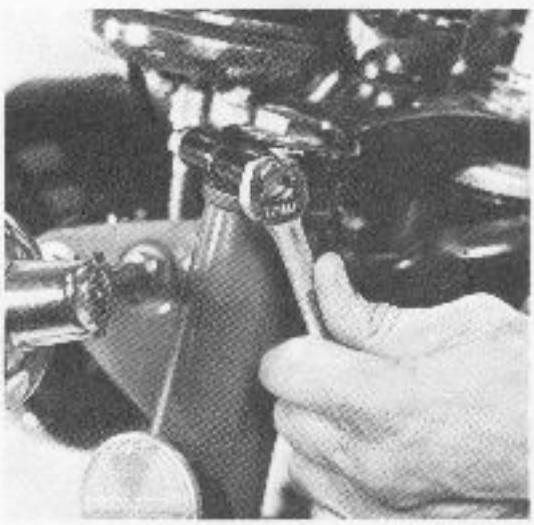
CAUTION: *Do not allow the caliper to hang by the brake line. Tie it out of the way with some string or wire.*

3. Loosen the fork filler caps as they may be difficult to remove once the fork leg is removed from the motorcycle.

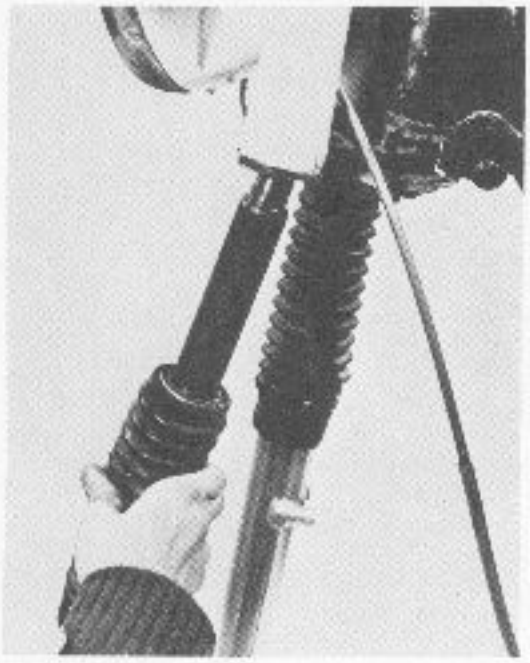
4. On 360 models, remove the emblem from the lower triple clamp.

5. Loosen the pinch-bolts on the upper triple clamp (if fitted) and then loosen the pinch-bolts on the lower triple clamp. Remove the fork legs one at a time by pulling them down.

NOTE: *From this point disassembly and inspection refers to one fork leg, but applies to both.*



Loosening the upper triple clamp pinch-bolts



Removing a fork leg

6. Remove the fork filler bolt from the top of the fork leg. Remove the spring (350 to K3, 360) and invert the fork over a container to drain off the oil.

7. Remove the rubber boot (if fitted). With an impact driver remove the screw from the bottom of the slider. Remove the circlip at the top of the slider, and separate the slider from the fork tube.

8. New oil seals should always be used once the slider has been separated from the tube. Pry out the old seal with a screwdriver, but be careful not to score the slider surface.

Slider screw must be removed with an impact driver

On early model forks, remove the circlip to remove the damper components

9. On early model forks with the damper components on the fork tube: remove the circlip at the bottom of the fork tube and take off the damper components. Use a new circlip upon assembly.

INSPECTION

1. Inspect the fork tubes for bends as might have been incurred in an accident. Replacement is recommended rather than attempting to straighten bent fork tubes.

2. Check that the surface of the tube on which the slider components move are smooth and free of rust or scoring. Minor rusting should be removed with fine emery cloth.

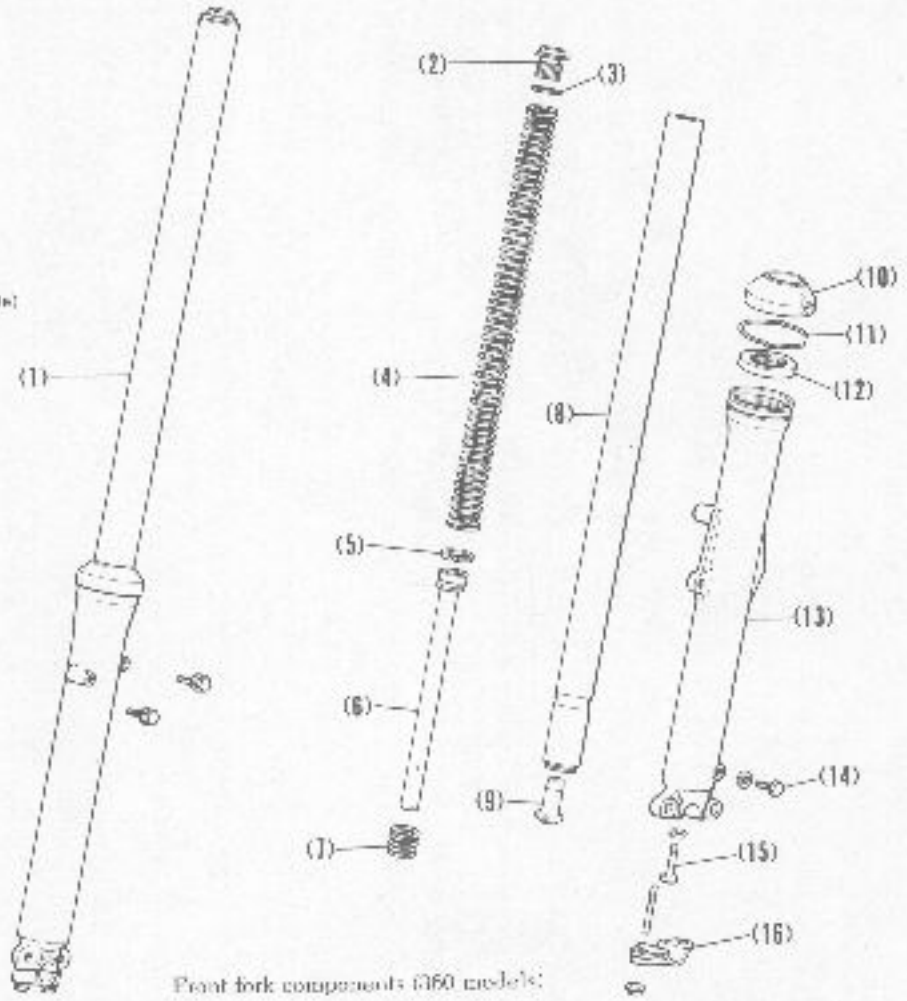
3. Check the spring condition; check that the spring heights are equal and that they are within the length specifications given at the end of this chapter. If either spring is compressed more than 0.25 in., both should be replaced.

4. Check that the damper rod (where fitted) is straight and that all damper components are clean.

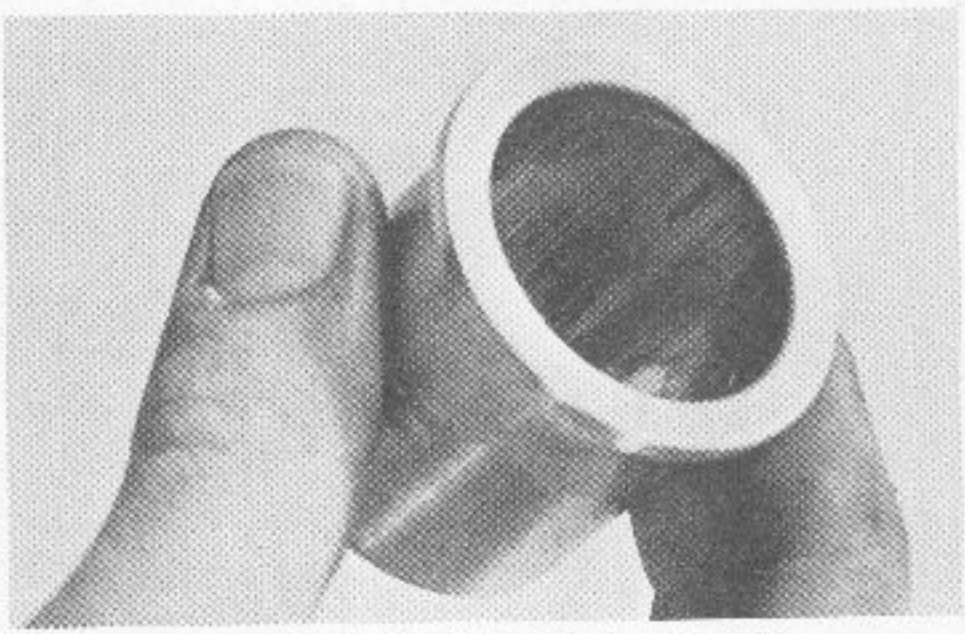
5. On early-type forks, check the slider bushing for scoring or wear, and replace it if damaged.

6. Replace the fork filler cap O-rings if they are not in good condition.

7. Clean all metal parts thoroughly in a solvent and lubricate them lightly with fork oil before assembly.



Front fork components (060 models)



Inspect the inside of the slider bushing for scoring or wear

ASSEMBLY AND INSTALLATION

Assembly is in the reverse order of disassembly. Note the following points.

1. On the early-type forks the oil seal must be placed on the fork tube before the damper components, and then inserted in the slider with the fork tube.

On early model fork, assemble the damper components on the inner tube and then insert the inner tube into the slider

2. On the later model forks the oil seal can be driven into the slider before the fork tube is inserted. Use the old seal on top of the new one to drive it in, then remove the old seal.

3. Refit the circlip, being sure that it is properly seated. The use of a new circlip is recommended.

4. Fill the forks with the correct grade and quantity of oil and install the filler caps. Install the fork legs into the triple clamps. Tighten the lower triple clamp pinch-bolts and then check that the filler cap is tight. Tighten the upper triple clamp bolts (if fitted).

5. Adjust the brake caliper (if fitted) after assembly is complete.

Handlebar

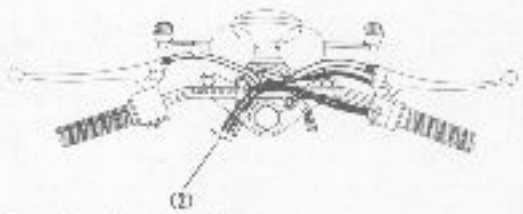
DISASSEMBLY

1. On models with a disc brake remove the master cylinder by unscrewing the two clamp bolts.

2. Disconnect the front brake cable (drum brakes) at the lower end by loosening the locknut on the cable adjuster on the brake plate. Screw the adjuster in to increase the amount of cable free-play. Remove the cotter pin from the brake lever and pull the lever back by hand, slip the cable end pin up and out of the brake lever.

3. Remove the brake (drum brake) and clutch cables from the handlebars by loosening the adjuster locknut and screwing the adjuster into the lever housing. Line up the slots in the adjuster screw and the locknut with the slot in the lever housing. Pull the lever back to the handlebar and pull the cable sheath out of the adjuster as the lever is released. Remove the cable end pin from the lever.

4. To disconnect the clutch cable from the lower end, remove the gearshift lever and chain cover. Screw the adjuster on the chain cover in to increase the amount of cable free-play. Disconnect the cable from the clutch release mechanism in the chain cover.



Route the throttle cables (2), as shown

5. To remove the throttle cable(s) from the twist-grip, unscrew the phillips head screws from the bottom of the throttle cable housing. Lift up the top of the housing and disconnect the throttle cable(s) from the twist-grip. To replace the cable(s), disconnect the cable from the carburetor and route the new cable as shown.

6. The electrical wiring for the horn, starter motor switch, dimmer switch, turn signals, and kill switch can be discon-

nected either in the headlight shell (350 models) or under the fuel tank (360 models).

7. Remove the handlebars by unscrewing the four bolts from the handlebar holders (two bolts on each holder). Mark the front of each holder before it is removed so that they can be installed in the same direction.

INSPECTION

1. Check the handlebar for a bent condition. It is recommended that a bent handlebar be replaced as straightened handlebars will be weakened and may break under extreme use.

2. Check that the brake, clutch, and throttle cables are not frayed at the ends. Replace any cable in this condition.

3. Check that the cables move freely in their sheaths. Replace any cable with a bent or kinked sheath.

ASSEMBLY

1. Install the electrical switches on the handlebar pulling the wires through the center of the handlebars using a lead of wire or string fastened to the longest wire.

2. Mount the handlebars on the upper triple clamp, and install the handlebar holders, with the punch mark on the handlebars aligned with the top of the lower holder.

CAUTION: *The handlebar holders are machined unevenly (one side is slightly higher than the other); the high side must face the front. The high side (front) on some models can be identified by a punch mark on the top of the holder. If in doubt which side is the high side, place the holder on a straightedge, the high side should be apparent.*

Tighten the front bolt first, so that the upper and lower holder are touching in the front and a small gap is left at the rear.

3. Connect the cables to the controls. When installing the twist-grip into the housing, be sure that the cable tensioner is correctly installed.

4. The remainder of assembly is in the reverse order of disassembly.

5. Check the operation of all controls before riding the motorcycle.

Steering Stem Assembly

BEARING ADJUSTMENT

On models equipped with a friction steering damper, the damper should be loosened (counterclockwise) as much as possible so that it does not interfere with the bearing movement while checking or adjusting the bearing. If an oil damper is fitted, remove it from the steering stem.

1. The steering stem bearings are uncaged #8 balls. They are adjusted by means of a ring nut beneath the upper triple clamp.

2. To check bearing adjustment, support the front wheel off the ground. Grasp the tip of the front fender, place your other hand beneath the lower triple clamp at the frame lug.

3. Attempt to move the fork by pulling up on the tip of the fender. If play or movement can be felt at the lower triple clamp, the bearings are adjusted too loosely or are worn.

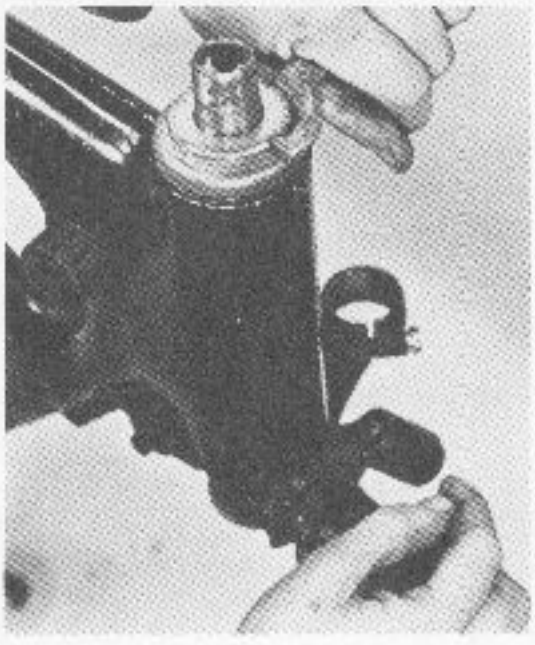
4. Turn the forks slowly from lock-to-lock. Movement should be smooth, silent, and effortless. If any binding or uneven movement is felt, the balls and races are either too tightly adjusted or they are worn. If the steering feels uniformly stiff, the bearings are too tightly adjusted. If any noise is noted, the bearings are damaged or some are missing.

5. With the front wheel off the ground, release the front forks from a few degrees off the centered position. The fork should fall freely to either side of their own weight. If they will not, the bearings are too tightly adjusted, the steering stem is bent, the races are extremely worn, or some of the bearings are missing.

6. To adjust the bearings, remove the front wheel, front forks, handlebars, and the upper triple clamp. The bearings are adjusted by means of the adjuster nut under the upper triple clamp.

7. Tighten or loosen the adjuster nut a little at a time until the steering stem adjustment conforms to that outlined above. Temporarily install the forks, upper triple clamp, and the steering stem nut to check the adjustment.

8. If proper adjustment is not possible, the bearings and races will probably need to be replaced.

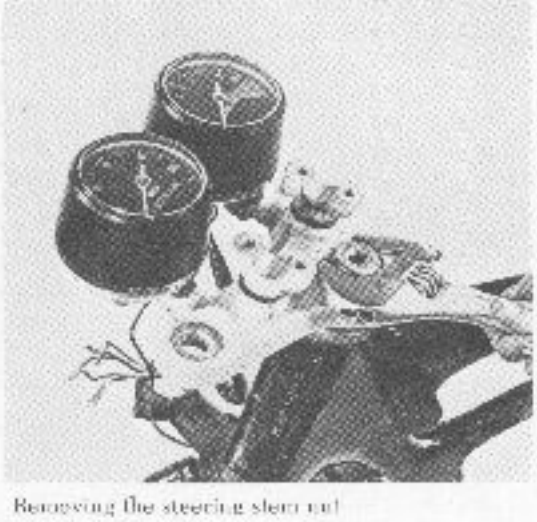


Adjusting the steering bearings with the Honda pin wrench

REMOVAL

1. Remove the front wheel, front forks, and handlebars. If a friction steering damper is fitted, remove it by removing the two cotter pins from under the lower triple clamp, and unscrewing the damper rod and removing the friction plates. If an oil shock damper is fitted, unbolt it from the lower triple clamp.

2. Unscrew the steering stem nut and disconnect the speedometer and tachometer cables from their instruments. Remove the upper triple clamp.

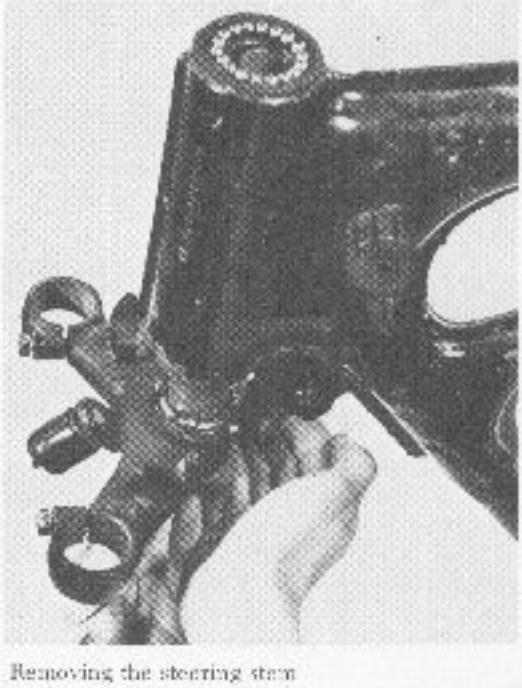


Removing the steering stem nut

3. Disconnect the wiring inside the headlight shell, and remove the headlight shell and the fork ears.

4. Loosen the steering stem adjuster nut with a pin wrench, then hold the steering stem up while unscrewing the adjuster nut the rest of the way off. Remove the steering stem top cone race and the ball bearings from the top race.

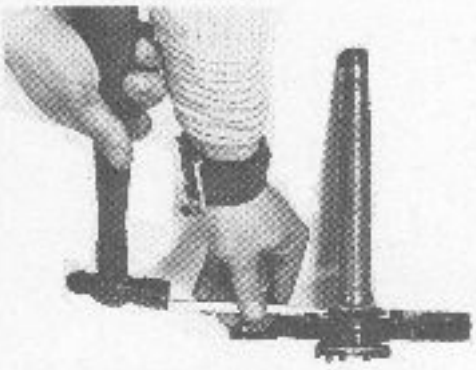
Removing the adjuster nut



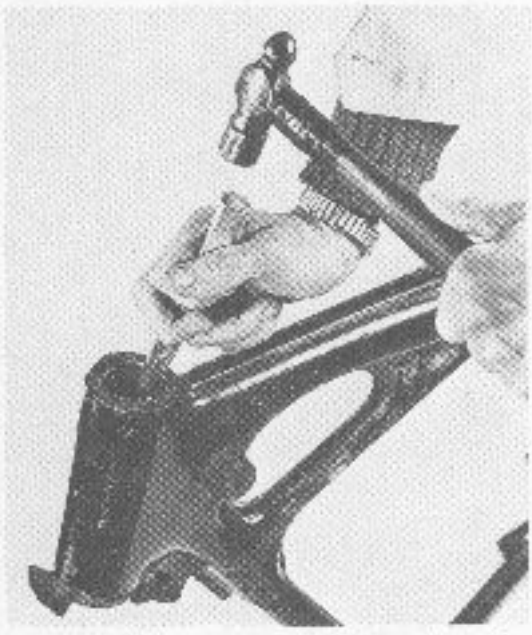
Removing the steering stem

5. Carefully pull the steering stem out from the bottom. Some of the ball bearings from the lower race will probably fall out at this time so be prepared for this.

6. Remove the bottom cone race, dust seal, and dust seal washer from the steering stem if they are to be replaced. These will have to be pried off with a chisel, therefore only remove them if necessary.



Removing the lower cone race



Removing the bearing races in the frame lug with a hammer and punch

7. The bearing races in the frame lug are a press-fit and should not be removed unless replacement is necessary. If replacement is necessary, the old races can be removed by reaching through the frame lug with a suitable punch and tapping the race evenly around its circumference to remove it from the inside of the frame lug. Be sure that the race does not become cocked in its seat upon removal.

New races are installed with a suitable sized bearing driver; i.e., one which will drive the race squarely into its seat. Be certain that the race goes straight in.

These races can also be installed using a block of hard wood of sufficient size to cover the race in place of a bearing driver.

INSPECTION

1. Wash the ball bearings in a suitable solvent.

2. Clean all of the old grease from the bearing race surfaces, steering stem, and frame lug.

Inspect the bearing races for any imperfections

3. Inspect the bearing race surfaces. They must be clean and smooth. That is free from any cracks, scoring, rust, or indentations. Run your finger around each of the bearing races. Note any roughness or ripples on the race surface. If any imperfections are noted, both the sets of races and all of the balls must be replaced.

4. Check the balls themselves for rust, pitting, scoring, or flat spots. If the balls are found to be defective in any way, the balls and both sets of races must be replaced.

NOTE: *Balls and races must always be replaced in a set as worn races will destroy new balls and worn balls will destroy new races.*

5. Check the dust seal for condition and replace if torn or cracked.

6. Check the steering stem for cracks or a bent condition; this is especially important if the bike has been involved in a spill.

INSTALLATION

1. Install the dust seal washer, dust seal, and lower cone race on the steering stem. Use a good grade of bearing grease to coat the bottom cone race and the upper race in the frame lug.

2. Embed 18 balls into the grease of the top frame lug and 19 balls into the grease of the lower cone race.

3. When the balls are in place, slip the steering stem through the frame lug and hold it in place while refitting the top cone race and threading on the adjuster nut.

Installing the upper cone race

4. Tighten the adjuster nut all of the way by hand, rotating the steering stem to work the grease into the balls.

5. Tighten the adjuster nut until the steering stem turns freely, but has no play.

6. Install the fork tubes, headlight assembly, and upper triple clamp, flat washer, and steering stem nut. Check that the stem moves freely to the steering lock of its own weight when released from 5°–10° off center; if not check for:

a. Steering bearings too tight;

b. Bent steering stem;

c. Worn races or balls.

7. Install the front fender, front wheel, and handlebars.

Rear Shock Absorbers

No service to the rear shock is possible. In the event of oil leaks, bent or broken plunger shaft, dented or otherwise damaged case, the shock absorber must be replaced.

If the shock absorbers are somewhat old, and one fails in the course of normal usage, it would be a good idea to replace both shocks to insure equal damping characteristics.

CAUTION: *Do not attempt to disassemble the rear shocks. Gas is under high pressure.*

To check a shock which is removed from the machine, place the bottom end on the ground and use the weight of your body to compress it as much as possible. Release one shock and note the rebound behavior. If the shock returns quickly at first, then slowly returns to the normal length, it is serviceable. If it returns to its normal length all at once, it should be replaced.

Swing Arm

ALL MODELS

Inspection

1. Disconnect the chain. Remove the rear wheel and sprocket assembly.

Swing arm components (350)

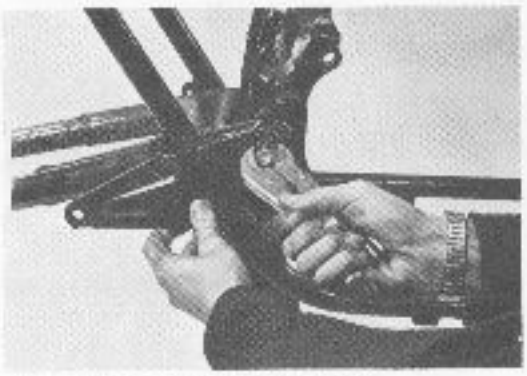
2. Remove the shock absorbers and chain guard.

3. Measure the distance between the top and bottom shock absorber mounts on both sides. The two measurements must be identical, or the swing arm will have to be replaced or fixed.

4. Check that the rear wheel mounting plates are parallel.

5. Grasp the legs of the swing arm and attempt to move it from side-to-side. Any noticeable side-play will indicate that the swing arm bushings in the frame need replacement.

The swing arm is most likely to be damaged if the machine is operated for any length of time with a broken or otherwise defective shock absorber.



Removing the swing arm pivot bolt

Removal and Installation

1. 360 models: Proceed as above. Then unscrew the swing arm pivot bolt nut, and pull out the pivot bolt.

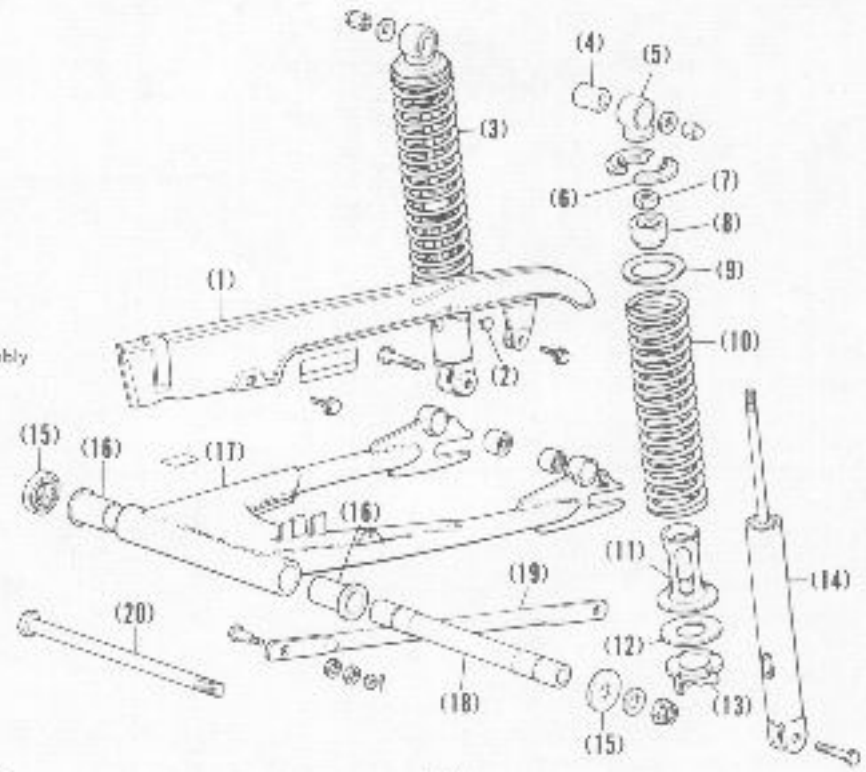
2. 350 models: Proceed as above. Then remove the shifter linkage. Remove two 6 mm bolts and one 8 mm bolt from each of the side plates. Remove the nut from the pivot bolt and remove the pivot bolt and the two side plates.

3. Remove the swing arm.

4. The swing arm should be inspected for cracks or fractures, especially around the welds.

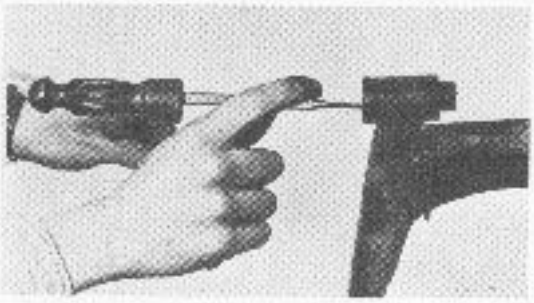
5. After removing the swing arm, the dust seals and the swing arm bushings can be replaced. This should be done every 10,000 miles or more often depending on how the machine is used, or if the bushings are worn.

6. Using a small drift, push the center

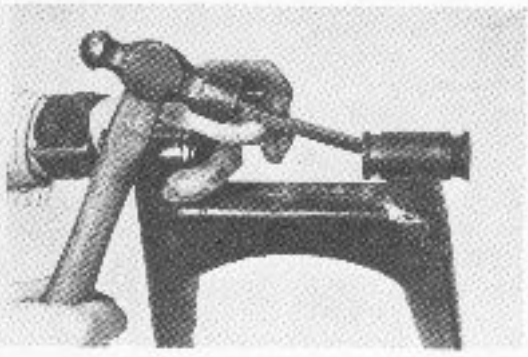


1. Chain guard
2. Plug
3. Shock absorber assembly
4. Bushing
5. Top mount
6. Split collar
7. Locknut
8. Damper
9. Upper spring seat
10. Spring
11. Spring guide
12. Spacer
13. Spring adjuster
14. Damper
15. Dust seal
16. Swing arm bushing
17. Swing arm
18. Center collar
19. Brake anchor
20. Swing arm pivot bolt

Swing arm components (360)



Removing the center collar from the swing arm (350)



Removing the swing arm bushings (350 shown)

collar out of the swing arm. Remove the bushings, tapping them out with a long drift and hammer. Once the bushings are removed, they should be replaced.

7. Lubricate the new bushings and both the inside and outside of the inner collar with a good chassis grease. Press in one bushing, refit the inner collar and install the other bushing.

8. Install the two inner dust seals and swing arm on the machine. Install the two outside dust seals and side plates (350). After tightening the swing arm pivot shaft nut, move the swing arm up and down to ensure that movement is smooth and effortless.

Frame

The frame should be inspected periodically for cracks or fractures, especially if

Installing swing arm bushings

the bike has been used in rough country, competition, or has been involved in a spill.

Areas to be scrutinized carefully are the engine and swing arm mounting lugs, the steering lug, and the rear shock absorber mounting lugs.

Minor fractures are sometimes indicated by cracks in the paint which will be directly above the frame crack, although cracked paint does not always indicate frame damage.

Excessive vibration in operation, or serious deterioration in handling are other signs which may indicate a damaged frame.

Any frame service should be carried out by an experienced specialist.

In the event that the frame is bent or badly broken, it must be replaced.

Chassis Specifications

	CB/CL350 K1, K2, K3, SL350	CB/CL350 K4-on	SL350, K1, K2	CJ/CL360
Wheels				
Rim run-out max (in./mm)	0.08/2.0	0.08/2.0	0.08/2.0	0.08/2.0
Wheel Bearings				
Front				
Axial run-out max (in./mm)	0.004/0.1	0.004/0.1	0.004/0.1	0.004/0.1
Radial run-out max (in./mm)	0.002/0.05	0.002/0.05	0.002/0.05	0.002/0.5
Rear				
Axial run-out max (in./mm)	0.004/0.1	0.004/0.1	0.004/0.1	0.004/0.1
Radial run-out max (in./mm)	0.002/0.05	0.002/0.05	0.002/0.05	0.002/0.05
Brakes				
Front drum brake				
Drum ID max (in./mm)	7.17/183	7.17/182	7.17/182	7.17/182
Lining thickness min (in./mm)	0.1/2.5	0.1/2.5	0.1/2.5	0.1/2.5
Lever free-play (in./mm)	0.8/20	0.8/20	0.8/20	0.8/20
Rear drum brake				
Drum ID max (in./mm)	6.38/162	6.38/162	6.38/162	6.338/161
Lining thickness min (in./mm)	0.1/2.5	0.1/2.5	0.1/2.5	0.1/2.5
Pedal free-play (in./mm)	1/25	1/25	1/25	1/25
Front Suspension				
Spring free-length min (in./mm)	7.72/196	18.378/416	NA	18.425/468.0
Tilt max (deg)	2.5	2.5	2.5	2.5
Sliding bushing OD (in./mm)	1.472/37.385	—	—	—

Chassis Specifications (cont.)

	CB/CL350 K1, K2, K3, SL350	CB/CL350 K4-on	SL350 K2, K3	CB/CL360
Front Suspension				
Damper piston OD min (in./mm)	——	1.2944/32.875	1.2944/32.875	NA
Slider ID max (in./mm)	1.484/37.680	1.3063/33.18	1.3063/33.18	1.3047/33.139
Steering				
Caster angle	63°①	63°	58° 40'	62.5°
Trail (in./mm)	3.35/85②	3.35/85②	5.8/148	3.6/92
Rear Suspension				
Suspension travel (in./mm)	NA	3.6/91.0	NA	3.1/77.6
Spring free-length min (in./mm)	6.902/175.3	7.480/190	9.54/217	8.1732/207.6
tilt max (deg)	2.5	2.5	2.5	2.5
Swing arm pivot bushing ID max (in./mm)	0.795/20.18	0.795/20.18	0.795/20.18	0.8543/21.7

① SL350—62°
② CL350—3.74/95
SL350—4.33/110

—— Not applicable
NA Not available

Disc Brake Specifications

Measurement	Standard (in./mm)	Service Limit (in./mm)
ID of caliper cylinder	1.5032–1.5039/38.18–38.20	1.5045/38.215
OD of caliper piston	1.5006–1.5032/38.115–38.18	1.5002/38.105
ID of master cylinder	0.5512–0.5529/14.000–14.043	0.5534/14.055
OD of master cylinder piston	0.5495–0.5506/13.957–13.984	0.5488/13.940
Thickness of disc	0.2717–0.2795/6.9–7.1	0.2362/6.0
Disc run-out	0.002/0.05	0.0118/0.3
Pad-to-disc clearance	0.002/0.05	0.006/0.15

Chassis Torque Specifications

350

Component	Thread Diameter (mm)	Torque (ft lbs)
Front brake anchor	10	13–18
Steering stem nut	24	50–65
Upper triple clamp-to-front forks	8	13–17
Handlebar holder	8	13–18
Lower triple clamp-to-front forks	8	13–18
Spokes Front wheel Rear wheel	——	1.1–1.5
Swing arm pivot bolt	14	38–50
Front axle nut	12	40–47
Front fork axle caps	8	19–24
Engine mounting bolts	8 10	19–24 29–40
Rear axle nut	16	58–72
Rear sprocket nuts	10	44–50
Rear brake lever pinch-bolt	8	13–18
Rear brake anchor	8	13–18
Rear suspension	10	22–29
Foot rest	10	29–39
Gearshift and kick-starter levers	6	6–7
Seat band	6	6–7

Chassis Torque Specifications

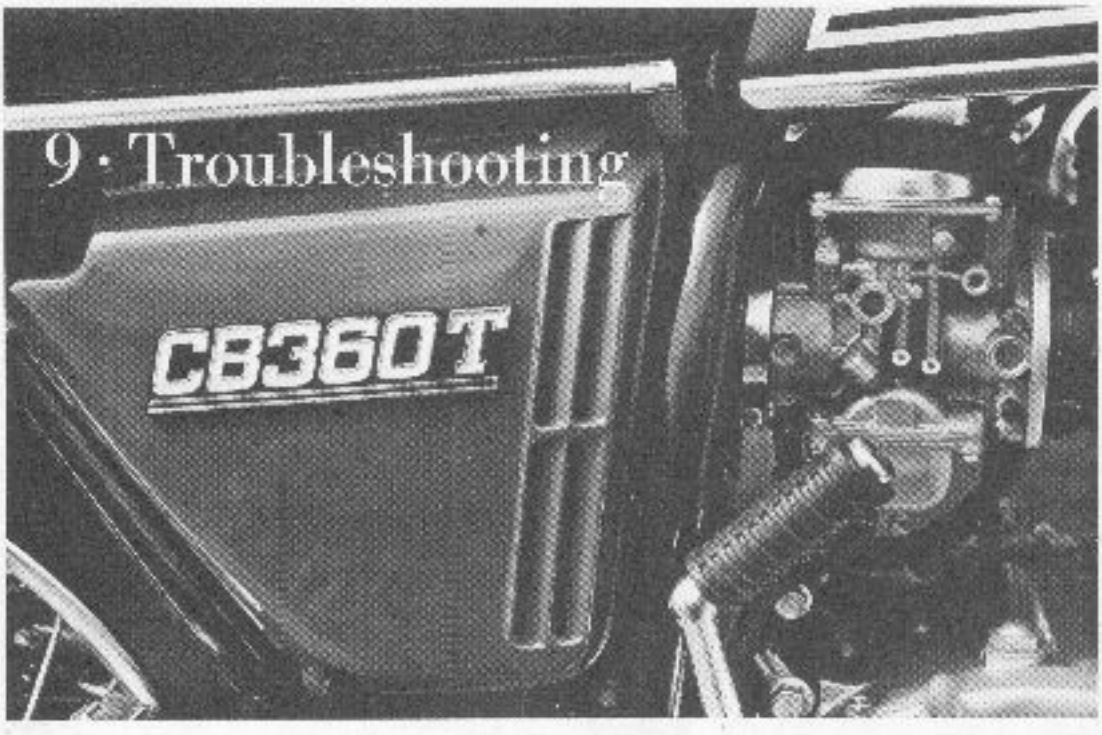
350

Component	Thread Diameter (mm)	Torque (ft lbs)
Front brake anchor	10	13–18
Steering stem nut	24	58–87
Upper triple clamp pinch-bolts	8	13–17
Lower triple clamp pinch-bolts	8	13–18
Fork filler cap	16	50–59
Front fork axle caps	8	13–18
Front axle nut	12	40–47
Handlebar holder	8	13–18
Engine mounting bolts	10	25–32
Swing arm pivot nut	14	40–50
Upper rear shock mount	10	25–32
Lower rear shock mount	10	25–32
Rear axle nut	16	58–72

Disc Brake Torque Specifications

Component	Thread Diameter (mm)	Torque (ft lbs)
Master cylinder banjo bolts	——	24.6–28.9
Front brake disc nuts	8	13.0–16.6
Brake line joint	6	5.8–7.2
Brake hose joint	——	4.3–7.2
Master cylinder bolt	6	5.7–7.2
Caliper mounting bolts	——	24.6–28.9

9 · Troubleshooting



There are certain steps which, if followed, can transform the art of troubleshooting into an exact science. Random efforts often prove confusing, so a logical method should be adopted. Troubleshooting is nothing more than a systematic process of elimination, tracing back and checking various components until the fault is found. In most cases, this takes very little time and very few special tools are required.

Before you start, try to determine if this is a new problem, or one that's been coming on gradually. If you are an aware rider, you'll know whether or not performance has been diminishing, and consulting the troubleshooting guide in this section may provde an immediate answer. Also, whenever a problem shows up just after work has been done on the bike, check those areas that were involved first, regardless of the nature of the work.

When troubleshooting the engine, you will be concerned with three major areas: the ignition system, the fuel system, and compression pressure. The engine needs spark, fuel, and compression to run, and it will be your job to determine which of these it lacks and why. Let's say that your engine won't start one morning, but it was running fine the night before. The most obvious thing to check first, but which is often overlooked, is the fuel supply. Keep in mind that even if there is gas in the tank, a low supply can sometimes make starting hard. Check to see if you have fuel at the carburetors by removing the float bowls or bowl drain plugs. If so, you can be pretty sure that it is not a lack of fuel which is preventing the engine from starting.

As far as compression is concerned, there are only very few conditions that will cause a sudden loss of compression, and such an occurrence will happen only while the engine is running. You should be able to tell if you have normal compression simply by the way the engine sounds and feels as it is cranked over. Or, if you have the spark plugs out, cover the plug holes with your finger and kick the engine over. If the pressure forces your finger off the holes, there should be enough compression for the engine to start. Of course, the most accurate way to check compression is by using a compression gauge.

So, you have found that the engine has relatively normal compression and is getting fuel. The final area of investigation is the electrical system. Check to see if you are getting spark to the cylinders by removing the plug leads and inserting a

metal object such as a nail into the plug connectors. Using a folded cloth as insulation, hold the nail about ⅜ in. from the engine and crank the engine over with the ignition on. If you have a fat blue spark, remove and check the spark plugs. If not, trace the ignition system back with a test light used to check electrical continuity. Start by checking for electricity at the points while they are open. If you have juice there, the problem lies in the coils, spark plug wires, or the wire between the coil and points. If you find that there is no supply of electricity to the coils, start looking for loose connectors in the wire between the coils and ignition switch. Speaking of connectors, whenever you have a problem with the electrical system, they are the first things that you should examine.

All of the above can be considered troubleshooting the engine to get it running, not troubleshooting to cure running faults. Once you have found the general location of the trouble, it is usually quite simple to make pinpoint checks or temporarily substitute new parts to determine exactly where the problem lies. The most important thing to remember is to try to remain rational and approach the troubleshooting procedure logically.

Troubleshooting an engine which is running badly is often a little bit trickier than trying to determine why an engine won't start. You will still be involved with the compression, fuel system, and electrical system of your engine, but the problems will be more subtle and harder to detect. It pays here, if you are making adjustments or fine-tuning, to make *one adjustment at a time, thoroughly check the results, and record the findings.* Otherwise, you will confuse yourself, ruin the results of one adjustment with another, and accomplish nothing (or worse).

Engine Troubleshooting

Problem	Possible Cause	Inspection/Remedy
Abnormal engine noise (top end)	Excessive tappet clearance	Adjust. Refer to Chapter 3.
	Piston knock due to worn cylinder	Inspect and have cylinder bored if necessary. Refer to Chapter 4.
	Excessive carbon build-up in combustion chamber	Decarbonize. See Chapter 4.
	Worn wrist pin or con rod small end	Inspect and replace if necessary. Refer to Chapter 4.
	Misadjusted or worn cam chain	Adjust. Replace if adjustment does not quiet the chain.
	Worn cam or crankshaft sprocket	Inspect. Refer to Chapter 4.
	Pinging or spark knock	Timing too advanced; See Chapter 3. Low quality gasoline; drain and refill tank with fresh gas.
Abnormal engine noise (bottom end)	Rumble at idle developing into whine at higher rpm: crankshaft main bearings worn or damaged	Inspect and replace if necessary; refer to Chapter 4.
	Knock, especially noticeable at idle, increasing with rpm: worn con rod big end bearing	Refer to Chapter 4.
Noisy Transmission	Worn gears	Inspect and replace if necessary. Refer to Chapter 4.
	Worn transmission shaft splines	Inspect; replace if necessary. Refer to Chapter 4.

Engine Troubleshooting (cont.)

Problem	Possible Cause	Correction/Remedy
Noisy Transmission	Worn primary gear	Inspect primary gear. See Chapter 4.
	Noisy clutch	See below.
Engine fails to start (no spark at plugs)	Ignition switched off	Turn on ignition.
	Kill button switched off	Reset.
	Battery dead	Charge battery.
	Blown fuse	Check fuse and replace if necessary.
	Loose or corroded battery terminals	Clean and secure connections.
	Spark plugs too old, worn or fouled	Clean or replace plugs.
	Spark plugs wet	Kick engine over after removing plugs to clear it. Blow plugs dry.
	Plug gap incorrect	Set to correct gap.
	Points wires disconnected; loose or corroded snap connectors	Check wiring; clean and tighten wire connectors.
	Points incorrectly gapped, pitted, worn or dirty	Inspect points. Replace or clean and adjust gap. Refer to Chapter 3.
	Spark plug cap resistors defective	Replace spark plug caps.
	Plug leads dirty, damaged, wet, or defective	Replace leads and coils.
	Ignition coils defective	Replace.
	Condenser defective	Replace.
	Points grounding out against point plate	Inspect. Check that the point wire is insulated.
	Damaged insulators at points terminal	Replace.
Spark at one plug	Defective, worn, dirty, or fouled spark plug	Switch the nonfunctioning plug to the other lead. If spark is evident, the plug is not at fault. If no spark, replace the plug.
	Defective resistor spark plug cap	Replace.
	Defective, cracked, wet or dirty plug lead	Replace along with coil.
	Dirty, misadjusted, pitted or burned breaker points	Replace.
	Breaker point wire disconnected, broken, snap connector loose or corroded, insulation torn	Check point wiring; clean and secure connector.
	One set of points grounding out against point cover or mounting plate. Damaged insulators on point wire terminal	Check point assemblies, refer to Chapter 3.
	Defective condenser	Replace.
	Defective ignition coil	Replace.

Engine Troubleshooting (cont.)

Problem	Possible Cause	Inspection/Remedy
Engine fails to start (has spark at plugs)	Lack of fuel	Make sure petcock is on; check for fuel in the tank.
	Fuel starvation: fuel lines clogged, petcock or filter dirty; vent in gas tank cap closed up; carburetor float valve closed off	Check for fuel at the float bowl and then back through the system. Refer to Chapter 6.
	Carburetor adjustments incorrect	Adjust. Refer to Chapter 3.
	Ignition timing incorrect	Adjust. Refer to Chapter 3.
	Incorrect valve adjustment	Adjust. Refer to Chapter 3.
	Carburetor float punctured	Replace. Refer to Chapter 6.
	Low compression: worn rings or cylinder; bent or poorly seated valves; broken or worn valve guides	Inspect top end. Refer to Chapter 4.
	Low compression due to blown head gasket, warped head	Rebuild. Refer to Chapter 4.
	Incorrect valve timing	Reset. Refer to Chapter 4.
Engine is hard to start	Worn, dirty, or improperly gapped plugs, or plugs too cold	Clean or replace and gap plugs or replace with correct heat range.
	Points dirty, pitted, or out of adjustment	Clean or replace and gap points.
	Carburetor idle settings wrong; pilot air or fuel passages clogged	Adjust idle settings (Chapter 3) or clean carburetor (Chapter 6).
	Battery low	Recharge or replace battery.
	Ignition timing out of adjustment	Adjust. Refer to "Tune-Up," Chapter 3.
	Valves adjusted incorrectly	Adjust valves. Refer to Chapter 3.
	Spark plug leads cracked or dirty	Replace plug leads.
	Loss or intermittently grounded wires at coil, points, or connectors	Check all connections and condition of wiring.
	Defective coils or condensers	Replace.
	Worn or improperly seating valves	Perform top end overhaul; inspect and lap valves. See Chapter 4.
	Low compression due to worn or damaged top end components	Overhaul top end. See Chapter 4.
Engine starts but refuses to run	Fuel feed problem	Check fuel supply; check fuel petcock, lines, carburetor for blocked passages; check gas tank cap vent.
	Spark plugs too cold or worn	Replace plugs with proper heat range plugs.
	Valve clearance incorrect	Set valve clearance. Refer to Chapter 3.
	Ignition timing incorrect	Adjust. See Chapter 3.
Engine idles poorly	Carburetor idle adjustments incorrect	Adjust idle circuit. See Chapter 3.

Engine Troubleshooting (cont.)

Problem	Possible Cause	Inspection/Remedy
Engine idles poorly	Spark plugs worn, dirty, or gap too wide	Clean or replace and gap plugs.
	Spark plugs too cold	Fit the proper heat range plugs.
	Breaker point gaps incorrect	Adjust. See Chapter 3.
	Ignition timing incorrect	Adjust. Refer to Chapter 3.
	Valves improperly adjusted	Adjust. See Chapter 3.
	Water in carburetors	Drain float bowls and gas tank if necessary and fill with fresh gas.
	Carburetor float levels wrong	Adjust. Refer to Chapter 3.
	Air leaks at manifolds	Determine cause and rectify.
	Leaking valves	Lap valves. See Chapter 4.
	Worn valves, valve guides, valve seats	Check valve train. See Chapter 4.
	Weak spark	Check coils and condensers.
	Petcock clogged	Clean.
	Float bowl fuel level too low	Check float height. Refer to Chapter 3.
Engine misfires when accelerating	Loose or intermittent connections in the ignition circuit	Check all connections; make sure that they are clean and tight.
	Ignition timing incorrect	Adjust. Refer to Chapter 3.
	Gas tank cap vent clogged	Clean.
	Water in float bowls	Drain and refill with fresh mixture.
	Carburetor main jet clogged	Remove and clean.
	Ripped carburetor diaphragm	Replace.
	Air leaks at carburetor manifolds	Determine cause and remedy.
	Defective ignition coils or condensers	Replace.
	Carburetor settings wrong	Take plug readings and rejet carbs if necessary.
	Very low or dead battery	Recharge or replace battery.
Engine surges or runs unevenly at steady throttle openings	Carburetor fault: mixture too lean, erratic fuel flow	Remove and inspect carburetors; see Chapter 6.
	Air leaks at carburetor manifolds	Determine cause and remedy.
	Valves improperly adjusted	Adjust. Refer to Chapter 3.
Engine breaks up or misfires while running	Battery very low or dead	Recharge or replace battery. See Chapter 2.
	Loose or intermittent connections in the ignition circuit	Check and secure connections.
	Battery terminal come adrift	Clean and secure battery connections.
Poor low-speed operation	Incorrect ignition timing	Adjust timing. Refer to Chapter 3.
	Carburetor idle circuit poorly adjusted	Adjust pilot screws and idle speed. See Chapter 3.

Engine Troubleshooting (cont.)

Problem	*Possible Cause*	*Inspection/Remedy*
Poor low-speed operation	Spark plug gap too great or plugs too cold	Use correct heat range and gap to proper specifications. See Chapter 3.
	Poor breaker point contact	Clean or replace breaker points
	Valves improperly adjusted	Adjust. See Chapter 3.
	Carburetor fault	See below.
Poor high-speed operation	Ignition timing too retarded	Adjust timing. Refer to Chapter 3.
	Spark plug gap too small	Adjust gap. See Chapter 3.
	Plugs too cold	Fit plugs of the correct heat range. See Chapter 3.
	Carburetor diaphragm torn	Replace.
	Carburetor float level too low	Adjust float level. See Chapter 3.
	Partially blocked fuel lines or petcock	Clean.
	Dirty air cleaner	Clean or replace element.
	Weak breaker point arm spring	Replace points.
	Defective ignition coils or condensers	Replace.
	Weakened valve springs	Inspect springs. Refer to Chapter 4.
	Incorrect valve timing	Reset. Refer to Chapter 4.
Loss of power	Incorrect valve adjustment	Adjust tappets. Refer to Chapter 3.
	Clogged or dirty air cleaner	Clean or replace the element.
	Incorrect ignition timing	Adjust. Refer to Chapter 3.
	Dirty carburetors	Clean. See Chapter 6.
	Valves not seating	Lap valves. Refer to Chapter 4.
	Valve springs weakened	Replace. Refer to Chapter 4.
	Rings or cylinder worn	Refer to Chapter 4
	Valve timing incorrect	Refer to Chapter 4.
	Carburetor float level incorrect	Adjust. Refer to Chapter 3.
	Spark plug gap incorrect	Adjust. Refer to Chapter 3.
	Engine or muffler carbon choked	Decarbonize. See Chapter 4.
	Exhaust pipe broken or loose	Secure or replace.
Engine overheats	Insufficient engine oil	Top up.
	Too lean a mixture	See carburetor section below.
	Timing too advanced	Adjust. Refer to Chapter 3.
	Oil pump defective; oil passage blocked	Refer to Chapter 5.
	Engine carbon choked	Decarbonize. See Chapter 4.
Engine backfires or kick-starter kicks back	Timing too advanced	Adjust. Refer to Chapter 3.
	Advance unit stuck	Lubricate; check for free movement.
Popping at muffler after shutting off throttle	Air leaks in muffler	Secure clamps or nuts.
	Mixture too lean	Adjust idle circuit and float level. Check for air leaks.

Engine Troubleshooting (cont.)

Problem	Possible Cause	Inspection/Remedy
Exhaust smoke accompanied by oil consumption	Too much oil in engine	Set to correct level.
	Worn rings or bore	Refer to Chapter 4.
	Worn valve guides or seals	Replace.
	Scored cylinder	Bore to oversize. Refer to Chapter 4.
Black smoke from exhaust pipes	Engine carboned up	Decarbonize. Refer to Chapter 4.
Piston seizure	Low oil level	Maintain oil at proper level.
	Engine overheating due to too advanced ignition timing, insufficient tappet clearance, stuck valves	Check settings. Refer to Chapter 3.
	Insufficient oil	Check oil pump. Refer to Chapter 5.
Burned valves	Clearances adjusted too tightly	Replace valves; check guides; maintain adjustment as described in Chapter 3.
	Timing too retarded	Adjust. See Chapter 3.
Bent valves or broken valve guides	Valve hitting piston because of incorrect valve timing, overrevving the engine, or weak valve springs	Check top end components. Refer to Chapter 4.
Bad connecting rod bearings	Insufficient or contaminated oil	Check oil, filter, and oil pump.
	Overrevving engine	Abide by tachometer red line.
	Extended use of the engine with ignition timing too advanced, high-speed misfire, etc.	Refer to Chapter 4.
Bad crankshaft bearings	Insufficient or contaminated oil	Refer to Chapter 2.
	Overrevving engine	Abide by tachometer red line.
	Extended use of the motorcycle with one weak or misfiring cylinder	Refer to Chapter 4.
Worn cam lobes or bearings	Insufficient or contaminated oil	Maintain oil at proper level; change filter when directed.
	Failure to allow engine sufficient warm-up	Allow at least one minute of warm-up when starting cold engine.
	Defective oil pump or clogged oil passages in engine	Refer to Chapters 4 or 5.
Worn cylinder and rings	Damaged or leaking air cleaner	Replace element; secure connections.
	Low oil level or contaminated oil	Maintain oil at proper level; change oil and filter at proper intervals.
	Defective oil pump	Refer to Chapter 5.
	Failure to allow engine sufficient warm-up	Allow at least one minute for warm-up when starting cold engine.

Clutch and Transmission Troubleshooting

Problem	*Possible Causes*	*Inspection/Remedy*
Clutch slips	Clutch improperly adjusted	Adjust. Refer to Chapter 2.
	Clutch springs weaks or damaged	Replace. Refer to Chapter 4.
	Clutch springs not correctly secured	Tighten spring bolts.
	Friction discs worn or oil-impregnated	Check disc width and condition. Replace if necessary. Refer to Chapter 4.
	Friction discs warped	Inspect and replace discs if necessary. See Chapter 4.
	Clutch cable has insufficient play	Adjust cable as described in Chapter 2.
Clutch drags	Clutch cable or clutch improperly adjusted	Adjust cable and clutch as described in Chapter 2.
	Friction discs gummy	Replace friction discs. Refer to Chapter 4.
	Steel plates warped	Replace. See Chapter 4.
	Uneven spring tension	Check springs and replace as a set if necessary.
	Transmission oil too heavy for climate, or dirty	Change oil.
Clutch noisy	Clutch hub bearing worn	Replace. Refer to Chapter 4.
	Clutch housing gear worn or damaged	Inspect and replace if necessary. Refer to Chapter 4.
	Excessive clearance between disc tabs and housing	Refer to Chapter 4.
	Worn or damaged clutch or mainshaft splines	Replace if necessary. Refer to Chapter 4.
Transmission grinds when shifting or shifting is difficult	Clutch improperly adjusted	Adjust. Refer to Chapter 2.
	Engine oil too heavy for temperature	Drain and refill with correct grade of oil.
	Worn or damaged shift forks, fork pins, shift drum, shift lever, shift arm	Inspect all components. Refer to Chapter 4.
	Mainshaft or countershaft bearings worn or shafts bent	Inspect shafts and bearings. Refer to Chapter 4.
Excessive gear noise	Insufficient lubricant in engine	Check level and refill to proper level.
	Gears worn (excessive backlash)	Inspect all gears. Refer to Chapter 4.
	Worn transmission shaft bearings	Inspect and if necessary replace bearings. Refer to Chapter 4.
Shift lever does not return	Weak or broken return spring	Inspect spring and replace if necessary.
Transmission will not shift	Clutch dragging	Check adjustment and condition of clutch assembly.
	Bent shift forks	Inspect and replace shift forks.
	Broken shifter return spring	Replace.

Clutch and Transmission Troubleshooting (cont.)

Problem	Possible Causes	Inspection/Remedy
Transmission jumps out of gear	Worn transmission gear engaging dogs	Inspect gears and replace if damaged. Refer to Chapter 4.
	Worn or bent shift forks or shift drum	Inspect and replace if necessary.
	Worn splines on countershaft or mainshaft	Inspect and replace if necessary.
	Bent gearshift shaft or damaged shift arm	Inspect components and replace if necessary.
	Worn or broken gear teeth	Inspect gears and replace any damaged or worn gears. See Chapter 4.
	Weak shift drum stopper spring	Replace. Refer to Chapter 4.

Carburetor Troubleshooting

Problem	Possible Causes	Inspection/Remedy
Carburetor floods repeatedly	Float set too high	Adjust. Refer to "Tune-Up," Chapter 3.
	Float needle sticking	Remove float bowl and clean needle and seat.
	Float needle or seat worn or damaged	Replace as necessary.
	Float sticking due to misalignment	Correct. Refer to Chapter 6.
	Fuel petcock left open with engine shut off	Shut off the fuel after you stop engine.
	Float punctured	Replace. Refer to Chapter 6.
Idle mixture too lean	Pilot jet too small	Replace with larger jet.
	Worn throttle slide	Replace.
	Pilot screw out of adjustment	Set as described in Chapter 3.
Idle mixture too rich	Pilot jet too large	Replace with smaller jet.
	Dirt or foreign matter in idle passage	Dismantle and clean carburetor. Refer to Chapter 5.
	Pilot screw out of adjustment	Set as described in Chapter 3.
Lean mixture at sustained mid-range speeds	Needle or main jet clogged	Remove and clean jets.
	Intake manifold air leak	Refer to Chapter 6.
Lean mixture at sustained high-speeds	Main jet too small	Replace with larger jet.
	Main jet clogged	Remove and clean.
	Float level too low	Remove float and adjust height.
Lean mixture during acceleration	Jets clogged	Remove and clean. Refer to Chapter 6.
	Damaged or worn throttle slide	Replace.
	Float level too low	Adjust float height. Refer to Chapter 6.

Carburetor Troubleshooting (cont.)

Problem	Possible Causes	Inspection/Remedy
Lean mixture throughout throttle range	Fuel filters clogged or dirty	Remove and clean. Refer to Chapter 6.
	Gas cap vent blocked	Blow clear.
	Damaged or worn throttle slide	Replace.
	Air leaks at carb manifold	Refer to Chapter 6.
Rich mixture at sustained mid-range speeds	Air cleaner dirty	Clean or replace.
	Main jet too large	Replace with smaller jet. Refer to Chapter 6.
	Carburetor flooding	See above.
Rich mixture at sustained high-speeds	Main jet too large	Replace with smaller size jet. Refer to Chapter 6.
	Carburetor flooding	See above.
	Air cleaner dirty	Replace or clean.
Rich mixture throughout throttle range	Carburetor flooding	See above.
	Air cleaner dirty	Replace or clean.

Chassis Troubleshooting

Problem	Possible Causes	Inspection/Remedy
Drive chain noise	Chain slaps due to excessive play or whines due to insufficient play	Adjust as described in "Maintenance," Chapter 2.
Excessive vibration	Engine mounting bolts loose	Secure mounting bolts.
	Broken frame	Replace frame or have damage rectified by competent welder.
	Drive chain badly worn, unlubricated, or too tight; worn sprockets	Replace, lubricate, or adjust drive chain, replace sprockets.
	Loose spokes	Tighten spokes; have rim trued as soon as possible.
	Rims out-of-true	Have rims trued.
	Wheels unbalanced, especially front wheel	Balance wheels.
	Loose axle nuts	Tighten.
	Worn or loose steering head bearings	Adjust or replace bearings as necessary. Refer to Chapter 8.
	Crankshaft bearing failure	Inspect and replace if necessary. Refer to Chapter 4.
Poor front fork operation	Weak, collapsed, or broken fork springs	Inspect and replace. See Chapter 8.
	Insufficient oil in forks	Refill with correct amount.
	Too much oil in forks	Drain and refill with correct amount.
	Oil of wrong viscosity being used	Use higher or lower viscosity oil to stiffen or weaken fork action.

Chassis Troubleshooting (cont.)

Problem	Possible Causes	Inspection/Remedy
Poor front fork operation	Noisy fork operation	Check oil level.
	Excessive clearance in slider bushings	Replace. See Chapter 8.
	Bent fork tubes	Replace. See Chapter 8.
	Dirty or contaminated fork oil	Change oil.
	Worn or leaky seals as evidenced by dirt in the fork oil or leaking around the seals	Replace oil seals. Refer to Chapter 8.
Uncertain or wobbly handling	Worn or improperly adjusted steering head bearings	Adjust or replace the bearings. Refer to Chapter 8.
	Low tire pressure	Inflate to recommended pressure.
	Worn or defective rear shocks (insufficient damping), or weak rear shock springs; springs not properly adjusted for load	Replace rear shocks; replace or adjust springs.
	Loose spokes	Tighten spokes; have rim trued as soon as possible.
	Rims out-of-true	Have rims trued.
	Loose axle	Secure axle nut and axle mounting hardware.
	Worn swing arm bushings	Replace. Refer to Chapter 8.
Heavy or stiff steering	Low front tire pressure	Inflate to recommended pressure.
	Steering head bearings too tightly adjusted	Adjust as described in Chapter 8.
	Steering damper too tightly adjusted	Loosen damper.
	Steering stem bent	Replace. Refer to Chapter 8.
	Steering stem ball bearings unlubricated or damaged	Replace bearings and races. Refer to Chapter 8.
Pull to one side	Unequal suspension spring tension	Replace springs.
	Bent front fork or axle	Replace.
Brakes do not hold (drum brakes)	Brake linings worn, glazed, wet, or oil-impregnated	Replace linings. Refer to Chapter 8.
	Brake drums scored or damaged	Replace or have drum turned down on a lathe.
	Brakes not properly adjusted	Adjust.
Brake squeal (drum brakes)	Dirt on the linings or brake drum	Remove and clean the linings and drum. Refer to Chapter 8.
	Worn or damaged brake linings	Replace.
	Linings glazed or hardened	Replace.
Brakes give on-off-on feeling when applied (drum brakes)	Braking on rough road surface	None.
	Drum warped out-of-round	Have drum turned down on a lathe.

Chassis Troubleshooting (cont.)

Problem	Possible Causes	Inspection/Remedy
Loss of braking power, lever travel is excessive (hydraulic disc brake)	Master cylinder low on fluid	Refill to correct level.
	Air in the brake lines	Bleed lines. Refer to Chapter 8.
	Brake lines leaking fluid	Check lines, especially at the caliper and master cylinder connections. Replace any worn, cracked, or damaged brake lines.
	Piston seal O-ring leaks	Replace O-rings. See Chapter 8.
Loss of braking power, lever travel is normal (hydraulic disc brake)	Distorted disc	Check disc run-out and replace it if excessive.
	Distorted, worn, or contaminated brake pads	Replace pads.
Brake squeal (hydraulic disc brake)	Glazed pads	Lightly sand the pads and avoid heavy use of the brake for at least 50 miles to bed in the pads. Alternatively, fit new brake pads.
	Extremely dirty pads	Remove pads. Check for foreign matter embedded in them. Replace with new pads if necessary.
Brake shudder (hydraulic disc brake)	Warped disc	Check run-out and replace disc if necessary.
	Distorted brake pads	Replace.
	Oil or brake fluid impregnated brake pads	Replace.
	Loose disc mounting bolts	Tighten.
Scored disc (hydraulic disc brake)	Dirt or foreign matter trapped in brake pads	Replace disc and pads. Refer to Chapter 8.

Electrical Troubleshooting

Problem	Possible Causes	Inspection/Remedy
Battery does not charge	Defective battery	Test each cell. Replace if shorted cell(s) are evident. Refer to Chapter 2.
	Battery electrolyte level low	Top up.
	Broken or shorting wires in charging circuit	Check continuity and condition of insulation of all wires.
	Loose or dirty battery terminals	Clean terminals and secure connections.
	Defective voltage regulator	Test and replace if necessary. Refer to Chapter 7.
	Defective alternator	Replace.
	Defective rectifier	Replace.
Excessive battery charging	Defective battery (shorted plates)	Replace battery.
	Voltage regulator not properly grounded	Secure.
	Regulator defective	Replace. Refer to Chapter 7.

Electrical Troubleshooting (cont.)

Problem	Possible Causes	Inspection/Remedy
Unstable charging voltage	Intermittent short	Check wiring for frayed insulation.
	Dirty regulator points	Clean.
	Defective key switch	Replace.
	Intermittent coil in alternator	Replace.
Electric starter spins, but engine does not	Broken starter clutch	Replace.
Starter does not turn over, but warning lights dim when starter button is pushed; or engine turns over slowly	Low battery, or battery connections loose or corroded	Charge or replace battery; clean and tighten terminals.
	Starter armature bushings worn	Replace starter.
Clicking sound when starter button is pushed; engine does not turn over	Battery low or terminals loose or corroded	Charge or replace battery; clean and tighten connections.
	Defective starter solenoid	Replace.
Nothing happens when starter button is pushed	Loose or broken connections in the starter switch or battery leads	Check switch connections; check battery terminals; clean and tighten battery leads.
Engine turns over slowly when starter button is pushed (cold weather)	Low or dead battery	Recharge or replace battery.
	Engine oil too heavy	Use correct viscosity oil.
Turn signal will not light	Burned out bulb; disconnected wire	Replace; check wiring connections.
Turn signal will not flash	Low battery	Charge or replace battery.
Speed of flasher varies with engine rpm	Low battery	Charge or replace battery.
	Defective flasher unit	Replace.
No spark or weak spark	Defective ignition coil	Replace.
	Defective spark plug	Replace.
	Plug lead or wires damaged or disconnected	Check condition of lead and wires, check all connections.
Breaker points pitted or burned	Defective condenser	Replace points and condenser.
Carbon-fouled spark plugs	Mixture too rich	Adjust carburetors; check air cleaner.
	Plugs too cold for conditions	Use hotter plugs.
	Idle speed set too high	Adjust carburetors.
Oil-fouled spark plugs	Worn rings, cylinder, valve guides, or seals	Refer to Chapter 4.
Spark plug electrodes burned or overheated	Spark plugs too hot for conditions	Use colder plugs.
	Engine overheating	See above.

Electrical Troubleshooting (cont.)

Problem	Possible Causes	Inspection/Remedy
Spark plug electrodes burned or overheated	Ignition timing incorrect	Adjust. Refer to Chapter 3.
	Mixture too lean	See above.

Battery Troubleshooting

Problem	Probable Causes	Inspection and Remedy
Sulfation		
The electrode plates are covered with white layer or in spots.	Charging rate is too small or else excessively large. The specific gravity or the mixture of the electrolyte is improper. Battery left in a discharged condition for a long period (left with the switch turned on). Exposed to excessive vibration due to improper installation. During cold season when motorcycle is left stored, the wiring should be disconnected.	When stored in a discharged condition, the battery should be recharged once a month even when the motorcycle is not used. Check the electrolyte periodically and always maintain the proper level 0.400-0.512 in. (10-13 mm) above the plates.
Self-discharge		
Battery discharges in addition to that caused by the connected load.	Dirty contact areas and case. Contaminated electrolyte or electrolyte excessively concentrated.	Always keep the casing clean. Handle the replenishing fluid with care.
Discharge rate large		
Specific gravity, gradually lowers and around 1.1, the turn signal lamp and horn no longer function.	The fuse and the wiring is satisfactory; the loads such as turn signal lamp, and horn do not function. In this condition the motorcycle will operate but with prolonged use, both the + and - plates will react with the sulfuric acid and form lead sulfide deposits (sulfation) making it impossible to recharge.	When the specific gravity falls below 1.200 (20° C; 68° F), the battery should be recharged immediately. When the battery frequently becomes discharged while operating at normal speed, check generator for proper output. If the battery discharges under normal charge output, it is an indication of overloading; remove some of the excess load.
High charging rate		
The electrolyte level drops rapidly but the charge is always maintained at 100 percent and the condition appears satisfactory.	The deposit will heavily accumulate at the bottom and will cause internal shorting, causing damage to the battery.	Check to assure proper charging rate. When an overcharge condition exists with the proper charging rate, place an appropriate resistor in the charging circuit (keep the lights on when riding), or replace the battery.
Specific gravity drops		
Electrolyte evaporates	Shorted Insufficient charging Distilled water overfilled Contaminated electrolyte	Perform specific gravity measurement. If the addition of distilled water causes a drop in specific gravity, add sulfuric acid and adjust to proper specific gravity.

Appendix

Conversion Table

To change			*Multiply*			
cc	⟶	cu in.	cc	×	0.0610	= cubic inches
cc	⟶	oz (Imp)	cc	×	0.02816	= ounces (Imperial)
cc	⟶	oz (U.S.)	cc	×	0.03381	= ounces (U.S.)
cu in	⟶	cc	cu in.	×	16.39	= cubic centimeters
ft-lb	⟶	in. lbs	ft-lb	×	12	= inch pounds
ft-lb	⟶	kg-M	ft-lb	×	0.1383	= kilogram-meters
gal (Imp)	⟶	liter	Imp gal	×	4.546	= liters
gal (U.S.)	⟶	liter	U.S. gal	×	3.785	= liters
in	⟶	mm	in	×	25.40	= millimeters
kg	⟶	lbs	kg	×	2.205	= pounds
kg-M	⟶	ft lbs	kg-M	×	7.233	= foot-pounds
kg/sq cm	⟶	lbs/sq in	kg/sq cm	×	14.22	= pounds/square inch
km	⟶	mi	km	×	0.6214	= miles
lb	⟶	kg	lb	×	0.4536	= kilograms
lb/sq in	⟶	kg/sq cm	lb/sq in.	×	0.0703	= kilograms/square centimeter
liter	⟶	cc	liter	×	1,000	= cc
liter	⟶	oz (U.S.)	liter	×	33.81	= ounces (U.S.)
liter	⟶	qt (Imp)	liter	×	0.8799	= quarts (Imperial)
liter	⟶	qt (U.S.)	liter	×	1.0567	= quarts (U.S.)
mi	⟶	km	mi	×	1.6093	= kilometers
mm	⟶	in	mm	×	0.03937	= inches
qt (Imp)	⟶	liter	Imp qt	×	1.1365	= liters
qt (U.S.)	⟶	liter	U.S. qt	×	0.9463	= liters

Conversion—Millimeters to Decimal Inches

mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
1	.039 370	31	1.220 470	61	2.401 570	91	3.582 670	210	8.267 700
2	.078 740	32	1.259 840	62	2.440 940	92	3.622 040	220	8.661 400
3	.118 110	33	1.299 210	63	2.480 310	93	3.661 410	230	9.055 100
4	.157 480	34	1.338 580	64	2.519 680	94	3.700 780	240	9.448 800
5	.196 850	35	1.377 949	65	2.559 050	95	3.740 150	250	9.842 500
6	.236 220	36	1.417 319	66	2.598 420	96	3.779 520	260	10.236 200
7	.275 590	37	1.456 689	67	2.637 790	97	3.818 890	270	10.629 900
8	.314 960	38	1.496 059	68	2.677 160	98	3.858 260	280	11.032 600
9	.354 330	39	1.535 430	69	2.716 530	99	3.897 630	290	11.417 300
10	.393 700	40	1.574 800	70	2.755 900	100	3.937 000	300	11.811 000
11	.433 070	41	1.614 170	71	2.795 270	105	4.133 848	310	12.204 700
12	.472 440	42	1.653 540	72	2.834 640	110	4.330 700	320	12.598 400
13	.511 810	43	1.692 910	73	2.874 010	115	4.527 550	330	12.992 100
14	.551 180	44	1.732 280	74	2.913 380	120	4.724 400	340	13.385 900
15	.590 550	45	1.771 650	75	2.952 750	125	4.921 250	350	13.779 500
16	.629 920	46	1.811 020	76	2.992 120	130	5.118 100	360	14.173 200
17	.669 290	47	1.850 390	77	3.031 490	135	5.314 950	370	14.566 900
18	.708 660	48	1.889 760	78	3.070 860	140	5.511 800	380	14.960 600
19	.748 030	49	1.929 130	79	3.110 230	145	5.708 650	390	15.354 300
20	.787 400	50	1.968 500	80	3.149 600	150	5.905 500	400	15.748 000
21	.826 770	51	2.007 870	81	3.188 970	155	6.102 350	500	19.685 000
22	.866 140	52	2.047 240	82	3.228 340	160	6.299 200	600	23.622 000
23	.905 510	53	2.086 610	83	3.267 710	165	6.496 050	700	27.559 000
24	.944 880	54	2.125 980	84	3.307 080	170	6.692 900	800	31.496 000
25	.984 250	55	2.165 350	85	3.346 450	175	6.889 750	900	35.433 000
26	1.023 620	56	2.204 720	86	3.385 820	180	7.086 600	1000	39.370 000
27	1.062 990	57	2.244 090	87	3.425 190	185	7.283 450	2000	78.740 000
28	1.102 360	58	2.283 460	88	3.464 560	190	7.480 300	3000	118.110 000
29	1.141 730	59	2.322 830	89	3.503 903	195	7.677 150	4000	157.480 000
30	1.181 100	60	2.362 200	90	3.543 300	200	7.874 000	5000	196.850 000

To change decimal millimeters to decimal inches, position the decimal point where desired on either side of the millimeter measurement shown and reset the inches decimal by the same number of digits in the same direction. For example, to convert 0.001 mm into decimal inches, reset the decimal behind the 1 mm (shown on the chart) to 0.001; change the decimal inch equivalent (0.039" shown) to 0.000039".

Conversion—Common Fractions to Decimals and Millimeters

Inches			Inches			Inches		
Common Fractions	*Decimal Fractions*	*Millimeters (approx.)*	*Common Fractions*	*Decimal Fractions*	*Millimeters (approx.)*	*Common Fractions*	*Decimal Fractions*	*Millimeters (approx.)*
1/128	.008	0.20	11/32	.344	8.73	43/64	.672	17.07
1/64	.016	0.40	23/64	.359	9.13	11/16	.688	17.46
1/32	.031	0.79	3/8	.375	9.53	45/64	.703	17.86
3/64	.047	1.19	25/64	.391	9.92	23/32	.719	18.26
1/16	.063	1.59	13/32	.406	10.32	47/64	.734	18.65
5/64	.078	1.98	27/64	.422	10.72	3/4	.750	19.05
3/32	.094	2.38	7/16	.438	11.11	49/64	.766	19.45
7/64	.109	2.78	29/64	.453	11.51	25/32	.781	19.84
1/8	.125	3.18	15/32	.469	11.91	51/64	.797	20.24
9/64	.141	3.57	31/64	.484	12.30	13/16	.813	20.64
5/32	.156	3.97	1/2	.500	12.70	53/64	.828	21.03
11/64	.172	4.37	33/64	.516	13.10	27/32	.844	21.43
3/16	.188	4.76	17/32	.531	13.49	55/64	.859	21.83
13/64	.203	5.16	35/64	.547	13.89	7/8	.875	22.23
7/32	.219	5.56	9/16	.563	14.29	57/64	.891	22.62
15/64	.234	5.95	37/64	.578	14.68	29/32	.906	23.02
1/4	.250	6.35	19/32	.594	15.09	59/64	.922	23.42
17/64	.266	6.75	39/64	.609	15.48	15/16	.938	23.81
9/32	.281	7.14	5/8	.625	15.88	61/64	.953	24.21
19/64	.297	7.54	41/64	.641	16.27	31/32	.969	24.61
5/16	.313	7.94	21/32	.656	16.67	63/64	.984	25.00
21/64	.328	8.33						

Tap Drill Sizes

National Fine or S.A.E.		
Screw & Tap Size	Threads Per Inch	Use Drill Number
No. 5	44	37
No. 6	40	33
No. 8	36	29
No. 10	32	21
No. 12	28	15
1/4	28	3
5/16	24	I
3/8	24	Q
7/16	20	W
1/2	20	29/64
9/16	18	33/64
5/8	18	37/64
3/4	16	11/16
7/8	14	13/16
1 1/8	12	1 5/64
1 1/4	12	1 9/64
1 1/2	12	1 25/64

National Coarse or U.S.S.		
Screw & Tap Size	Threads Per Inch	Use Drill Number
No. 5	40	38
No. 6	32	36
No. 8	32	29
No. 10	24	25
No. 12	24	17
1/4	20	8
5/16	18	F
3/8	16	5/16
7/16	14	U
1/2	13	27/64
9/16	12	31/64
5/8	11	17/32
3/4	10	21/32
7/8	9	49/64
1	8	7/8
1 1/8	7	63/64
1 1/4	7	1 7/64
1 1/2	6	1 11/32

Decimal Equivalent Size of the Number Drills

Drill No.	Decimal Equivalent	Drill No.	Decimal Equivalent	Drill No.	Decimal Equivalent
80	.0135	53	.0595	26	.1470
79	.0145	52	.0635	25	.1495
78	.0160	51	.0670	24	.1520
77	.0180	50	.0700	23	.1540
76	.0200	49	.0730	22	.1570
75	.0210	48	.0760	21	.1590
74	.0225	47	.0785	20	.1610
73	.0240	46	.0810	19	.1660
72	.0250	45	.0820	18	.1695
71	.0260	44	.0860	17	.1730
70	.0280	43	.0890	16	.1770
69	.0292	42	.0935	15	.1800
68	.0310	41	.0960	14	.1820
67	.0320	40	.0980	13	.1850
66	.0330	39	.0995	12	.1890
65	.0350	38	.1015	11	.1910
64	.0360	37	.1040	10	.1935
63	.0370	36	.1065	9	.1960
62	.0380	35	.1100	8	.1990
61	.0390	34	.1110	7	.2010
60	.0400	33	.1130	6	.2040
59	.0410	32	.1160	5	.2055
58	.0420	31	.1200	4	.2090
57	.0430	30	.1285	3	.2130
56	.0465	29	.1360	2	.2210
55	.0520	28	.1405	1	.2280
54	.0550	27	.1440		

Decimal Equivalent Size of the Letter Drills

Letter Drill	Decimal Equivalent	Letter Drill	Decimal Equivalent	Letter Drill	Decimal Equivalent
A	.234	J	.277	S	.348
B	.238	K	.281	T	.358
C	.242	L	.290	U	.368
D	.246	M	.295	V	.377
E	.250	N	.302	W	.386
F	.257	O	.316	X	.397
G	.261	P	.323	Y	.404
H	.266	Q	.332	Z	.413
I	.272	R	.339		

Service Record

Date/Mileage	Service	Next Due

THE LIFE OF THE PARTY IS DEAD.

He killed himself.

He didn't mean to. But he had lost control of his drinking. And after the party, he lost control of his driving and killed himself.

Now his friends shake their heads and stare at the ground and wonder why. But the sad fact is his friends weren't friends. His friends let him die.

They knew he didn't drink only at parties. They knew he was a problem drinker. And still, they let him drive.

Last year, problem drinkers were responsible for 19,000 highway deaths. If one of your friends has a drinking problem, there are many ways you can help him. But first you must help him stay alive.

If you are really his friend, don't help him drink.

If he has been drinking, don't let him drive. Drive him yourself. Call a cab. Take his car keys. Everything you think you can't do, you must do.

We were lucky this time. The life of the party killed only himself.

Write Drunk Driver, Box 2345, Rockville, Maryland 20852.

WHEN A PROBLEM DRINKER DRIVES, IT'S YOUR PROBLEM.

$6.95

CHILTON'S
REPAIR & TUNE-UP GUIDE FOR

Honda 350/360 Twins

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All 350 models since 1968
360 models through 1975

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