

## HONDA 250 AND 305 CC MODELS

MODEL	C72 & CA72	CB72	CL72	C77 & CA77	CB77	CL77
Displacement—cc	247	247	247	305	305	305
Bore—MM	54	54	54	60	60	60
Stroke—MM	54	54	54	54	54	54
Number of cylinders	2	2	2	2	2	2
Ignition—	C-7HS or D-8HS		D-8HS	C-7HS or D-8HS		D-8HS
Spark plug type NGK	C-7HS or D-8HS		D-8HS	C-7HS or D-8HS		D-8HS
Electrode gap—mm	0.6-0.7	0.6-0.7	0.6-0.7	0.6-0.7	0.6-0.7	0.6-0.7
Inch	0.024-0.028	0.024-0.028	0.024-0.028	0.024-0.028	0.024-0.028	0.024-0.028
Point gap—mm	0.3-0.4	0.3-0.4	0.3-0.4	0.3-0.4	0.3-0.4	0.3-0.4
Inch	0.012-0.016	0.012-0.016	0.012-0.016	0.012-0.016	0.012-0.016	0.012-0.016
Valve clearance (cold)						
Intake—mm	0.1	0.1	0.1	0.1	0.1	0.1
Inch	0.004	0.004	0.004	0.004	0.004	0.004
Exhaust—mm	0.1	0.1	0.1	0.1	0.1	0.1
Inch	0.004	0.004	0.004	0.004	0.004	0.004
Electrical system voltage	12	12	12	12	12	12
Battery terminal grounded	Negative	Negative	Negative	Negative	Negative	Negative
Tire size—front	3.25 x 16	2.75 x 18	3.00 x 19	3.25 x 16	2.75 x 18	3.00 x 19
Rear	3.25 x 16	3.00 x 18	3.50 x 19	3.25 x 16	3.00 x 18	3.50 x 19
Tire pressure—						
Front—kg/cm <sup>2</sup>	1.96	1.79 (1.99*)	1.82 (2.10*)	1.96	1.79 (1.99*)	1.82 (2.10*)
Psi	28	25.6 (28.4*)	26 (30*)	28	25.6 (28.4*)	26 (30*)
Rear—kg/cm <sup>2</sup>	2.25	1.99 (2.30*)	2.03 (2.17*)	2.25	1.99 (2.30*)	2.03 (2.17*)
Psi	32	28.4 (32.7*)	29 (31*)	32	28.4 (32.7*)	29 (31*)
Rear chain free play—mm	13-19	13-19	13-19	13-19	13-19	13-19
Inch	½-¾	½-¾	½-¾	½-¾	½-¾	½-¾
Number of speeds	4	4	4	4	4	4

\*Increase tire pressure for high speed or heavy loads.

Illustrations courtesy of American Honda Motor Co., Inc.

## MAINTENANCE

**SPARK PLUG.** Recommended spark plugs for normal use are NGK type C-7HS or Champion Z-6-MC in

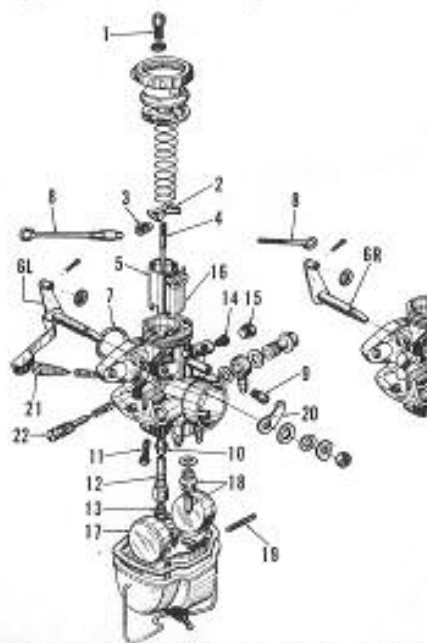


Fig. HN8-1—Exploded view of typical carburetor. Models with one carburetor are similar. Adjusting screws (21 & 22) are on other side of right carburetor.

- |                       |                         |
|-----------------------|-------------------------|
| 1. Cable adjuster     | 12. Jet holder          |
| 2. Needle clip plate  | 13. Main fuel jet       |
| 3. Clip               | 14. Power air jet       |
| 4. Valve needle       | 15. Plug                |
| 5. Throttle slide     | 16. Choke plate         |
| 6L. Left choke shaft  | 17. Float               |
| 6R. Right choke shaft | 18. Fuel inlet valve    |
| 7. "O" ring           | 19. Float pin           |
| 8. Choke rod          | 20. Choke link          |
| 9. Power jet          | 21. Idle mixture needle |
| 10. Needle jet        | 22. Idle speed screw    |
| 11. Idle fuel jet     |                         |

10mm heads; NKG type D-8HS or Champion P-7-MC in 12mm heads.

Spark plug electrode gap should be 0.6-0.7mm (0.024-0.028 inch) for all models.

**CARBURETOR.** Models C72, CA72, C77 and CA77 use one carburetor, all other models use two carburetors (Fig. HN8-1).

Idle fuel mixture is controlled by adjustment of the air bleed screw (21) and idle speed at screw (22). Normal setting for idle mixture needle (21) is 1½-1¾ turns open.

Fuel mixture at intermediate speed is controlled by adjusting position of the needle (4) in relation to the throttle slide. Raising the needle by placing the clip (3) in a lower notch on the needle will richen the mixture.

Fuel mixture at high speed is controlled by the size of the main jet (13). One check for proper jet size is to slightly close the choke when operating the cycle at full throttle; if speed increases, the main jet is too small. A loss in speed would indicate either a correct size jet or a jet that is too large.

To check for proper float level, measure the distance from bottom side of float to gasket surface of carburetor body when holding float so that it just contacts needle valve in closed position. On PW 22 carburetors (250cc models), this distance should be 26.5mm (1.043 inches). On model PW 26 carburetors (305cc models), distance measured should be 22.5mm (0.885 inch). Bend tab on float lever that con-

tacts needle valve to adjust float level. Note: Needle valve (fuel inlet valve) is spring loaded and any pressure such as weight of float resting against needle valve may result in incorrect measurement of float level.

On two carburetors, it is necessary to synchronize throttle valve (5) to open valves for both carburetors the same amount. Adjuster (1) at top of each carburetor is used to set both valves at same position with throttles fully open. With throttles closed, idle stop screws (22) should be set to stop both throttle valves at same position, length of choke rod (8) can be changed to open and close choke plates (16) evenly.

## IGNITION AND ELECTRICAL

Two types of engines are used. Type I uses a crankshaft with crankpins set 180 degrees apart and an independent ignition system for each cylinder (Fig. HN8-3). The 180 degree firing results in higher top speed and lower torque. Type II uses a crankshaft with both crankpins set at same position, one dual coil and one set of ignition points as shown in Fig. HN8-5. The 360 degree firing results in higher torque and lower top speed. Touring models (C and CA) are usually Type II. Models CB72, CL72, CB77 and C177 are usually Type I.

All models are equipped with battery ignition; however, the generator will supply sufficient current that the engine can be started with the kick starter if battery is low or dead.

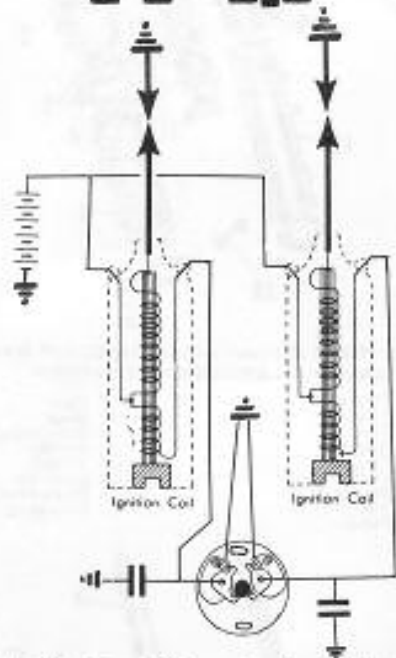
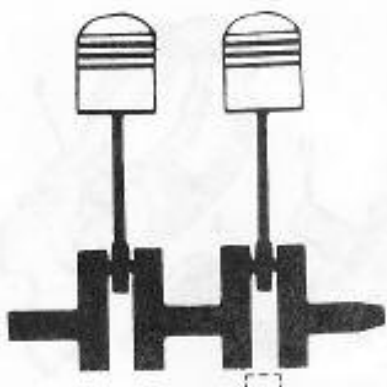
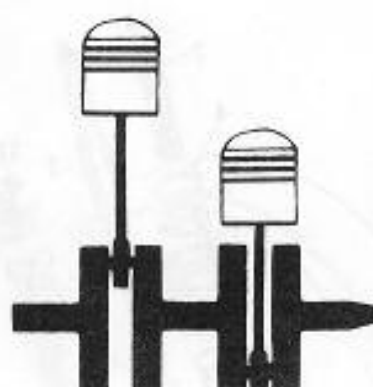


Fig. HN8-3—The ignition system for Type I engines includes two coils and two breaker points. The 180 degree crankshaft is shown above.

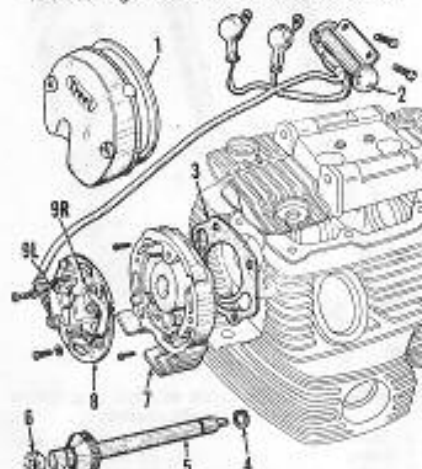


Fig. HN8-4—Exploded view of Type I ignition breaker points assembly. The automatic ignition advance mechanism is between the valve camshafts.

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| 1. Breaker cover                  | 8. Breaker plate assembly          |
| 2. Condenser                      | 9L. Left cylinder ignition points  |
| 3. Gasket                         | 9R. Right cylinder ignition points |
| 4. Snap ring                      |                                    |
| 5. Ignition cam shaft             |                                    |
| 6. Oil seal                       |                                    |
| 7. Cylinder head right side cover |                                    |

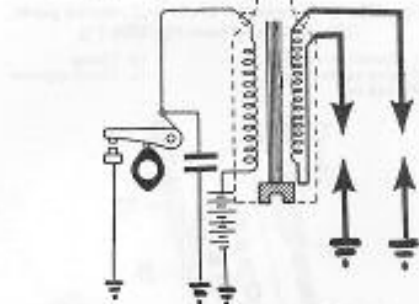


Fig. HN8-5—The ignition system for Type II engines uses one set of ignition points and a special coil. Both crankpins are on same plane resulting in alternate (360 degree) firing and high torque.

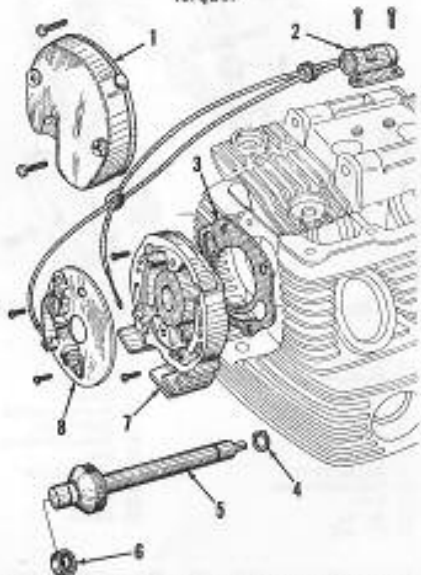


Fig. HN8-6—Exploded view of Type II ignition breaker assembly. The automatic ignition advance mechanism is between the valve camshafts. Refer to Fig. HN8-4 for legend.

The breaker contact points are accessible after removing cover (1—Fig. HN8-4 or HN8-6). Adjust breaker point gap to 0.3-0.4mm (0.012-0.016 inch). Condenser (2) is mounted on cylinder head cover. Condenser capacity should be 0.21-0.27 mfd.

To check or adjust ignition timing, proceed as follows: Remove breaker contact cover (1—Fig. HN8-4 or HN8-6) and adjust point gap to 0.35mm (0.014 inch). Remove generator cover

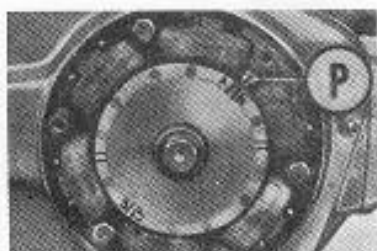


Fig. HN8-7—The generator rotor is marked with F for top dead center, P for static ignition timing and two lines for full advanced timing. On Type I engines, left cylinder marks (LT, LF and two lines) are opposite the right cylinder marks.

and turn engine until timing mark "F" on generator rotor is aligned with pointer (P—Fig. HN8-7) on generator stator. Breaker points should then be just starting to open. If not, loosen breaker plate mounting screws and rotate breaker plate in slotted holes until points are just starting to open.

On Type I engines, check the ignition timing for the left cylinder using the LF mark on generator rotor (Fig. HN8-7). Timing can be synchronized by changing point gap within the range of 0.3-0.4mm (0.012-0.016 inch).

Full advanced ignition timing can be checked using a running timing light and the two marks ahead of "F" mark on generator rotor.

**VALVE SYSTEM.** The valves are actuated by a chain driven camshaft located in the cylinder head via rocker arms. Valve clearance should be set for each cylinder with piston at TDC (Fig. HN8-7) on compression stroke. Clearance between rocker arm and valve stem with engine cold should be 0.10-0.15mm (0.004-0.006 inch) for both inlet and exhaust.

The camshaft drive chain tension should be set by first loosening locknut and tension lock screw (28—Fig. HN8-20). With screw (28—Fig. HN8-20). With screw (28) loose, proper tension will be set by the tension spring (20). Retighten lock screw and locknut.

**LUBRICATION.** Engine and gear box are lubricated by high detergent motor oil contained in the crankcase. Use heavy duty SAE 30 motor oil in temperatures above 60° F. (15° C.) and SAE 20 oil in temperatures below 60° F. Oil capacity is approximately 1 quart. Full oil level is indicated by a notch on dipstick that is attached to oil filler cap. Check oil by inserting dipstick into filler opening until cap touches crankcase; do not screw cap into place when checking oil level.

Engine is equipped with a gear type oil pump (Fig. HN8-9) driven by a gear (G—Fig. HN8-24) on the crankshaft assembly. Oil is filtered by a centrifugal unit that is driven by a chain and

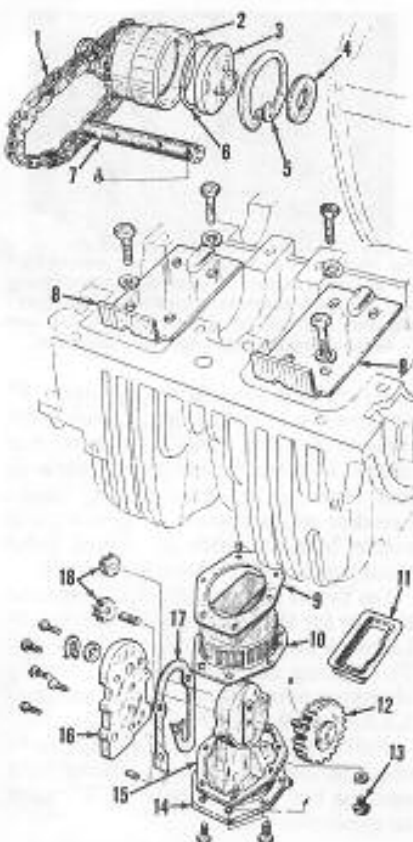


Fig. HN8-9—Exploded view of oil pump and centrifugal oil filter unit.

- |                           |                          |
|---------------------------|--------------------------|
| 1. Oil filter drive chain | 10. Screen               |
| 2. Oil filter housing     | 11. Oil receiver         |
| 3. Filter cover           | 12. Pump drive gear      |
| 4. Washer                 | 13. Crankcase drain plug |
| 5. Snap ring              | 14. Pump base            |
| 6. "O" ring               | 15. Gasket               |
| 7. Filter shaft           | 16. Pump cover           |
| 8. Oil separator plates   | 17. Gasket               |
| 9. Gasket                 | 18. Pump gear set        |

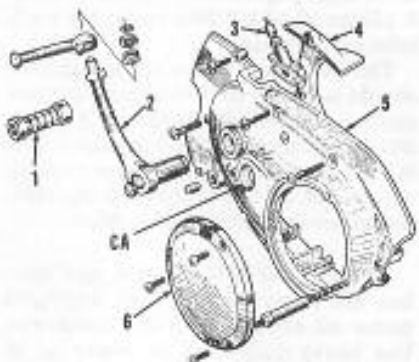


Fig. HN8-11—Crankcase cover and related parts.

- |                     |                         |
|---------------------|-------------------------|
| CA. Clutch adjuster | 4. Drive sprocket cover |
| 1. Pedal pad        | 5. Crankcase cover      |
| 2. Kick starter arm | 6. Plate                |
| 3. Clutch cable     |                         |

sprocket (4) from engine crankshaft. The centrifugal oil filter can be serviced after removing cover (17—Fig. HN8-26) from clutch housing. The oil screen (10—Fig. HN8-9) can be cleaned after draining oil and removing the oil pump assembly from crankcase.

**CLUTCH CONTROLS.** The clutch is operated by a lever on the handle-

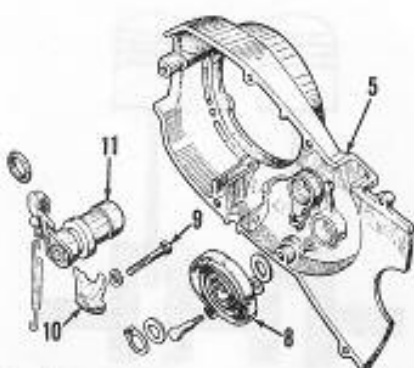


Fig. HN8-12—Crankcase cover and related parts. (View reversed from Fig. HN8-11).

- |                        |                     |
|------------------------|---------------------|
| 5. Crankcase cover     | 10. Clamp           |
| 8. Kick starter spring | 11. Clutch adjuster |
| 9. Lock bolt           |                     |

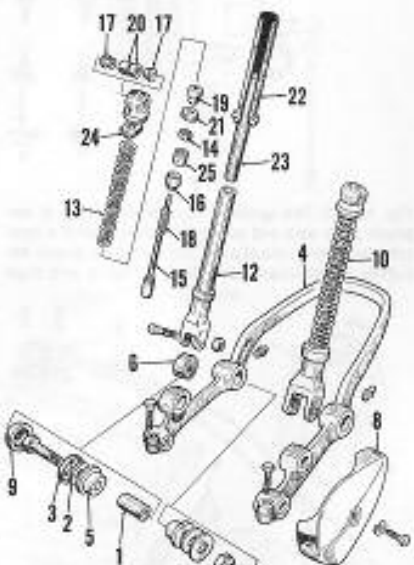


Fig. HN8-13—Exploded view of front suspension used on C and CA models.

- |                     |                    |
|---------------------|--------------------|
| 1. Spacer           | 15. Rod            |
| 2. Dust seal        | 16. Rod guide      |
| 3. Cover            | 17. Spacer         |
| 4. Suspension arm   | 18. Rebound spring |
| 5. Bushing          | 19. Rubber stop    |
| 6. Bushing          | 20. Rubber bushing |
| 8. Cover            | 21. Nut            |
| 9. Rubber cover     | 22. Spring guide   |
| 10. Suspension unit | 23. Inner tube     |
| 12. Tube            | 24. Locknut        |
| 13. Spring          | 25. Collar         |
| 14. Oil seal        |                    |

bars via a cable (3—Fig. HN8-11). Clutch lever should have 20-30mm (13/16-1 3/16 inch) free play. If not, loosen capscrew (9—Fig. HN8-12) and turn adjuster (11) in or out as required to provide proper free play of lever; then, retighten capscrew (9). The location of the clutch adjuster is shown at CA—Fig. HN8-11.

Small adjustments can be accomplished at cable adjuster on ends of cable.

**SUSPENSION.** Refer to Figs. HN8-13, HN8-14, HN8-15 and HN8-16 for exploded views of the units used. On CB models (CB72 and CB77), the different types of front suspension can be

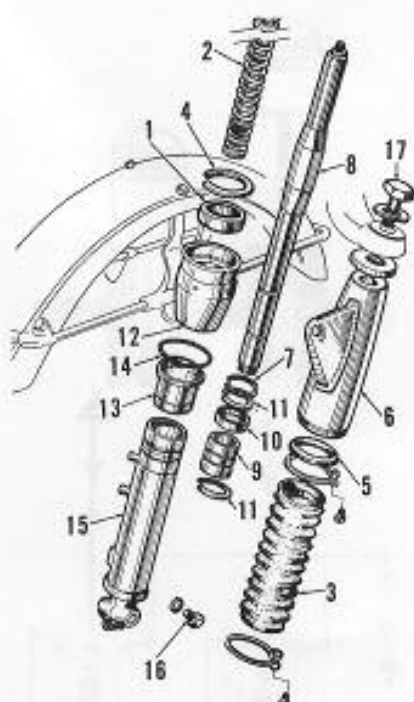


Fig. HN8-14—Exploded view of early CL front suspension unit. Early CB models are similar.

- |              |                  |
|--------------|------------------|
| 1. Oil seal  | 10. Valve        |
| 2. Spring    | 11. Rings        |
| 3. Boot      | 12. Seal housing |
| 4. Snap ring | 13. Bushing      |
| 5. Dust seal | 14. "O" ring     |
| 6. Cover     | 15. Lower case   |
| 7. Snap ring | 16. Drain screw  |
| 8. Pipe      | 17. Filler screw |
| 9. Piston    |                  |

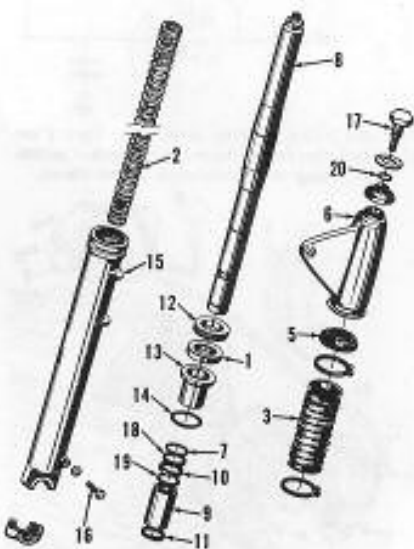


Fig. HN8-15—Exploded view of front suspension unit used on late CL models.

- |                      |                       |
|----------------------|-----------------------|
| 1. Oil seal          | 12. Seal retainer nut |
| 2. Spring            | 13. Bushing           |
| 3. Boot              | 14. "O" ring          |
| 4. Dust seal         | 15. Lower case        |
| 5. Cover             | 16. Drain screw       |
| 6. Rebound stop ring | 17. Filler screw      |
| 7. Pipe              | 18. Snap ring         |
| 8. Piston            | 19. Snap ring         |
| 9. Valve             | 20. "O" ring          |
| 10. Snap ring        |                       |

identified by the lower case. On models with aluminum lower case (15—Fig. HN8-14), each unit contains 200cc of

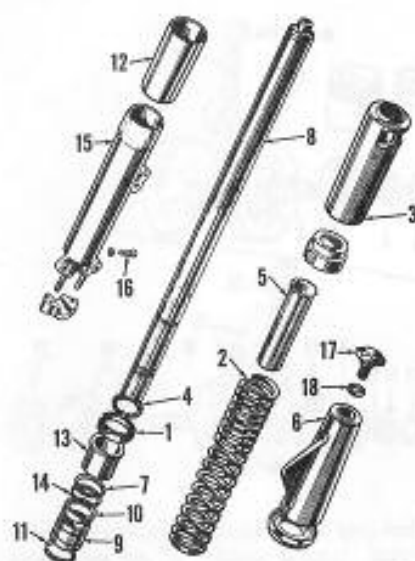


Fig. HN8-16—Exploded view of front suspension used on late CB models.

- |                      |                  |
|----------------------|------------------|
| 1. Oil seal          | 10. Valve        |
| 2. Spring            | 11. Snap ring    |
| 3. Cover             | 12. Lower cover  |
| 4. Snap ring         | 13. Bushing      |
| 5. Spring guide      | 14. Snap ring    |
| 6. Cover             | 15. Lower case   |
| 7. Rebound stop ring | 16. Drain screw  |
| 8. Pipe              | 17. Filler screw |
| 9. Piston            | 18. "O" ring     |

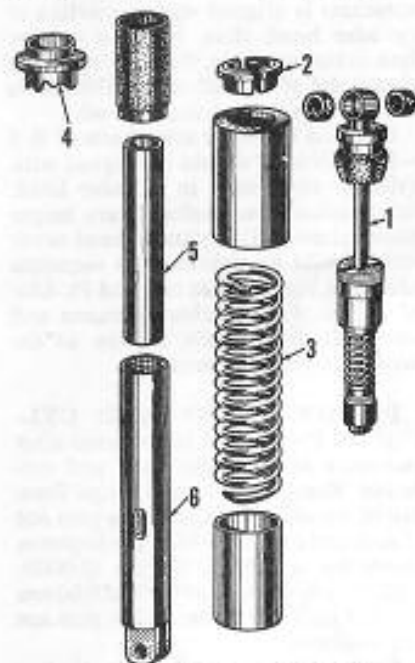


Fig. HN8-17—Exploded view of adjustable rear suspension unit used on CB and CL models.

- |                          |                                   |
|--------------------------|-----------------------------------|
| 1. Damper piston and rod | 4. Lower spring seat (adjustable) |
| 2. Spring seat           | 5. Cylinder                       |
| 3. Spring                | 6. Damper case                    |

oil and approximately 15cc will cling to internal parts when draining. On models with steel lower case (15—Fig. HN8-16), each unit contains 215-225cc of oil and approximately 15cc will cling to internal parts when drained. Each suspension unit contains 270-280cc of oil on CL models (CL72 and CL77) and

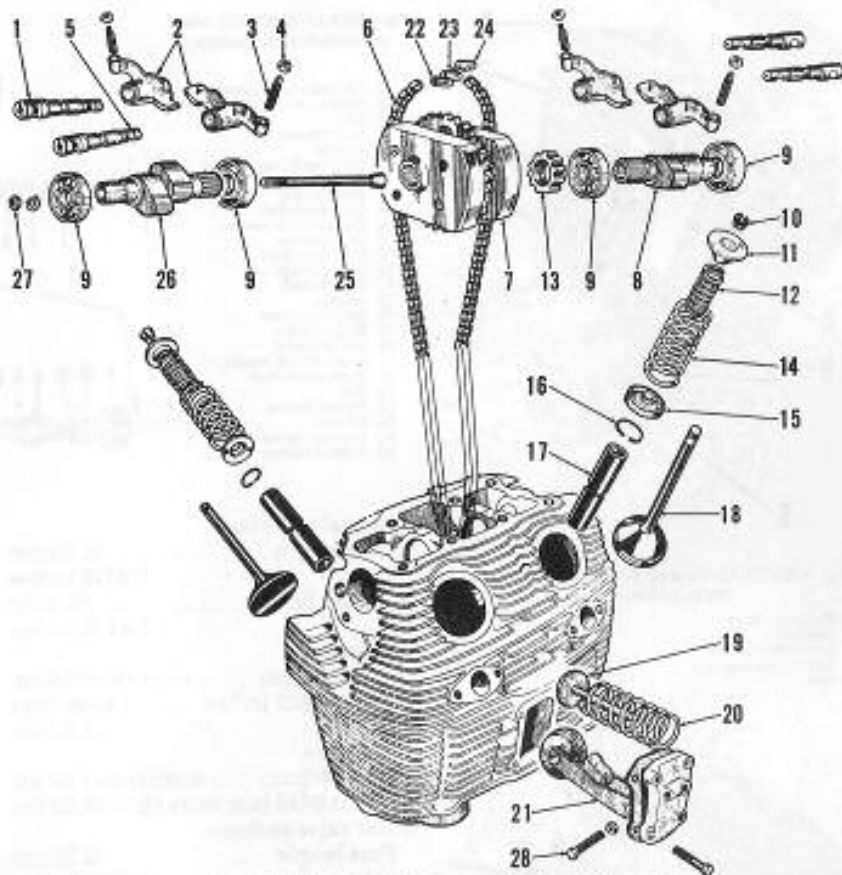


Fig. HN8-20—Exploded view showing camshaft and valve system.

- |                             |                        |                     |                              |
|-----------------------------|------------------------|---------------------|------------------------------|
| 1. Exhaust rocker arm shaft | 7. Camshaft flywheel   | 15. Spring cup      | 23. Plate                    |
| 2. Rocker arm               | 8. Right camshaft      | 16. Snap ring       | 24. Master link              |
| 3. Adjusting screw          | 9. Ball bearing        | 17. Valve guide     | 25. Expansion bolt           |
| 4. Lock nut                 | 10. Valve keepers      | 18. Valve           | 26. Left camshaft            |
| 5. Inlet rocker arm shaft   | 11. Spring retainers   | 19. Plunger         | 27. Nut                      |
| 6. Timing chain             | 12. Inner valve spring | 20. Spring          | 28. Chain tension lock screw |
|                             | 13. Camshaft locknut   | 21. Chain after use |                              |
|                             | 14. Outer valve spring | 22. Clip            |                              |

approximately 15cc of oil will cling to internal parts if drained. Automatic transmission fluid (ATF) or similar fork oil should be used. Fill with recommended amount of oil if suspension is serviced after disassembly.

The rear suspension units on some models are adjustable as shown in Fig. HN8-17. Be sure that both units are set to the same position.

### REPAIRS

**CYLINDER HEAD, CAMSHAFT AND VALVES.** The overhead camshaft assembly is supported in the cylinder head in four ball bearings. Refer to Fig. HN8-20 for exploded view of the cylinder head assembly.

First, remove cylinder head cover plate and turn engine until master link of timing chain is at top. Remove the chain tensioner assembly (19, 20 and 21) and disconnect master link. Be careful not to drop clip (22), side plate (23) or link (24) inside engine and tie a wire to each end of timing chain to keep chain from dropping into crankcase. The cylinder head assembly can

then be removed. Remove the breaker point cover (1—Fig. HN8-4 or HN8-6), breaker plate (8) and right cylinder side plate (7). Remove the left cylinder side plate (10—Fig. HN8-22). Remove the valve covers, loosen the locknuts (4—Fig. HN8-20) and back-off adjusting screws (3). The rocker arm shafts (1 and 5) and rocker arms (2) can then be removed. Loosen locknut (13) on right side of the sprocket assembly (7) and drive the right camshaft (8), bearings (9) and distributor shaft (5—Fig. HN8-4 or HN8-6) assembly from cylinder head. Loosen the hex nut (27—Fig. HN8-20) from outer end of left camshaft (26), tap end of lock bolt (25) until bolt is loose and drive the left camshaft, bearings and lock bolt from cylinder head. Lift out the sprocket assembly (7).

Valve seat and face angle	.....	45°
Inlet valve stem—		
guide clearance	.....	0.01-0.03mm 0.0004-0.0012 inch
Exhaust valve stem—		
guide clearance	.....	0.03-0.05mm 0.0012-0.0020 inch

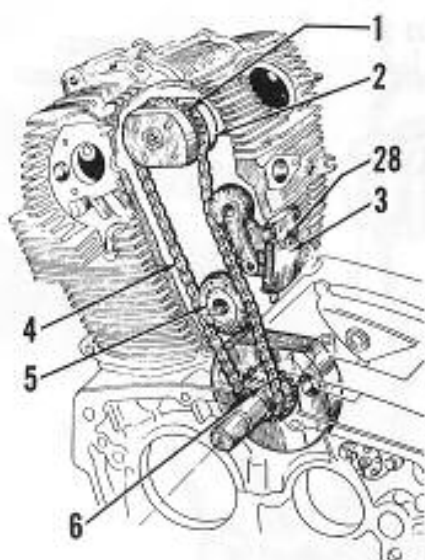


Fig. HN8-21—Cut-away view showing timing chain arrangement.

- |                              |                              |
|------------------------------|------------------------------|
| 1. Camshaft drive sprocket   | 4. Timing chain              |
| 2. Camshaft flywheel         | 5. Lower idler               |
| 3. Timing chain spring idler | 6. Crankshaft sprocket       |
|                              | 28. Chain tension lock screw |

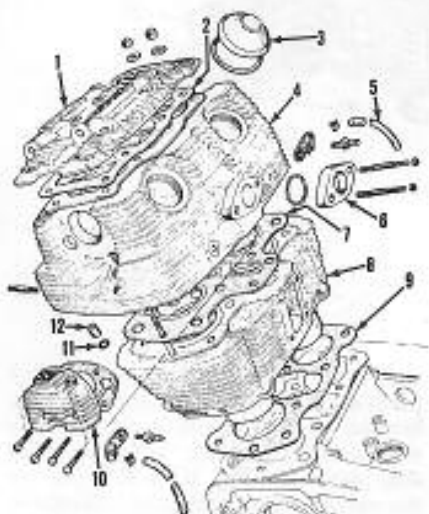


Fig. HN8-22—Exploded view of cylinder, cylinder head and related parts.

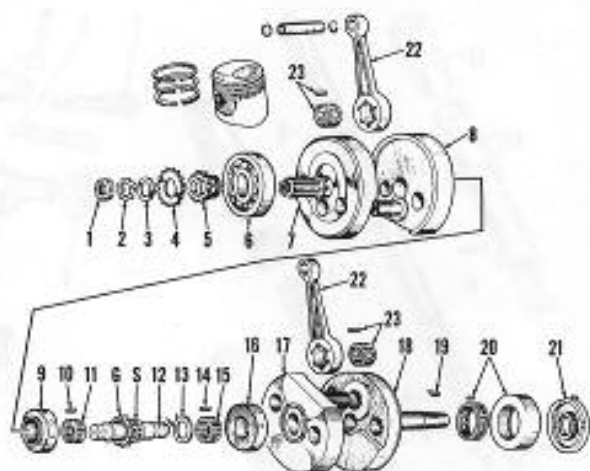
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|-------------------------|----------------|
| 1. Cover plate          | 7. Gasket      |
| 2. Gasket               | 8. Cylinder    |
| 3. Cap                  | 9. Gasket      |
| 4. Cylinder head        | 10. Side cover |
| 5. Air vent tube        | 11. O-ring     |
| 6. Carburetor insulator | 12. Dowel pin  |



Fig. HN8-23—Cylinder head cover stud nuts should be tightened in sequence shown. Direction (F) is front (exhaust) side of engine.

Fig. HN8-24—Exploded view of crankshaft assembly.

- |                                |
|--------------------------------|
| G. Oil pump drive sprocket     |
| S. Timing chain sprocket       |
| 1. Nut                         |
| 2. Lock washer                 |
| 3. Washer                      |
| 4. Oil filter drive sprocket   |
| 5. Transmission drive sprocket |
| 6. Ball bearing                |
| 7. Left crankshaft             |
| 8. Center crank weight         |
| 9. Bearing race                |
| 10. Bearing rollers            |
| 11. Bearing cage               |
| 12. Center shaft               |
| 13. Washer                     |
| 14. Bearing rollers            |
| 15. Bearing cage               |
| 16. Bearing race               |
| 17. Center crank weight        |
| 18. Right crankshaft           |
| 19. Key                        |
| 20. Roller bearing             |
| 21. Oil seal                   |
| 22. Connecting rods            |
| 23. Roller bearings            |



Inner valve spring—	
Free length .....	37.54mm 1.4776 inches
wear limit .....	36.0mm 1.4173 inches
Pressure	
@ 31.5mm .....	more than 6.0 kg.
@ 1.2402 inches .....	more than 13.23 lbs.
Pressure	
@ 24.5mm .....	more than 16.0 kg.
@ 0.9646 inch .....	more than 35.28 lbs.
Outer valve spring—	
Free length .....	43.36mm 1.7071 inches
wear limit .....	42.0mm 1.6535 inches
Pressure	
@ 34.5mm .....	more than 15.0 kg.
@ 1.3583 inches .....	more than 33.07 lbs.
Pressure @ 24.5mm .....	more than 32.0 kg.
@ 0.9646 inches .....	more than 70.56 lbs.

If valve guides are broken, or are worn to extent that new valves will not restore valve stem clearance to specified limits, renew the valve guides. Valve guides are replaceable by heating cylinder head in furnace to 300 degrees C (500° F.).

Reinstall camshaft assembly by reversing the removal procedures and observing following steps: Place sprocket assembly in cylinder head with lock nut to right side of head. Both the right and left camshafts and the sprocket assembly have master splines, but when installing the right camshaft, be sure that punch mark or red line on outer end of distributor shaft is aligned with the punch marks on flat faces of sprocket counterweights. Tighten the locknut on right side of sprocket assembly and the hex nut on outer end of left camshaft after the camshafts are in place. Remove the cover plate from right crankcase cover and, while

holding the timing chain, turn engine until timing mark "T" on generator rotor is aligned with pointer (P—Fig. HN8-7) on generator stator. With ends of timing chain even, install cylinder head assembly threading timing chain through cylinder head, using wires previously attached to chain. Turn camshaft until punch marked tooth of sprocket (mark is on right face of sprocket) is aligned with centerline of cylinder head; then, reinstall master link in timing chain. Note: Be sure that closed end of clip (22—Fig. HN8-20) is towards direction of chain travel.

Cut-outs in rocker arm shafts (1 & 5—Fig. HN8-20) should be aligned with cylinder stud holes in cylinder head. Inlet rocker arm shafts (5) are larger than exhaust (1). Cylinder head cover nuts should be tightened in sequence shown in Fig. HN8-23 to 14-16 Ft.-Lbs. of torque. Adjust valve clearance and camshaft drive chain tension as described in previous section.

**PISTON, RINGS AND CYLINDER.** Pistons can be removed after removing the cylinder head and cylinder. Remove the snap rings from piston bosses and push piston pins out of rods and pistons. Piston pin to piston clearance is 0.000-0.012mm (0.0000-0.0005 inch) with wear limit of 0.05mm (0.0019 inch). Oversize piston pins are not available.

Each piston is equipped with two compression rings and one oil ring. Place manufacturer's mark on ring to top of piston when reassembling. Check piston rings against the following specifications:

#### PISTON RING SIDE CLEARANCE

	Recommended	Maximum
Top ring ..	0.045-0.07mm	0.15mm
	0.0018-0.0028 inch	0.0059 inch
2nd ring ..	0.01-0.04mm	0.1mm
	0.0004-0.0016 inch	0.004 inch
Oil ring ..	0.01-0.04mm	0.1mm
	0.0004-0.0016 inch	0.004 inch

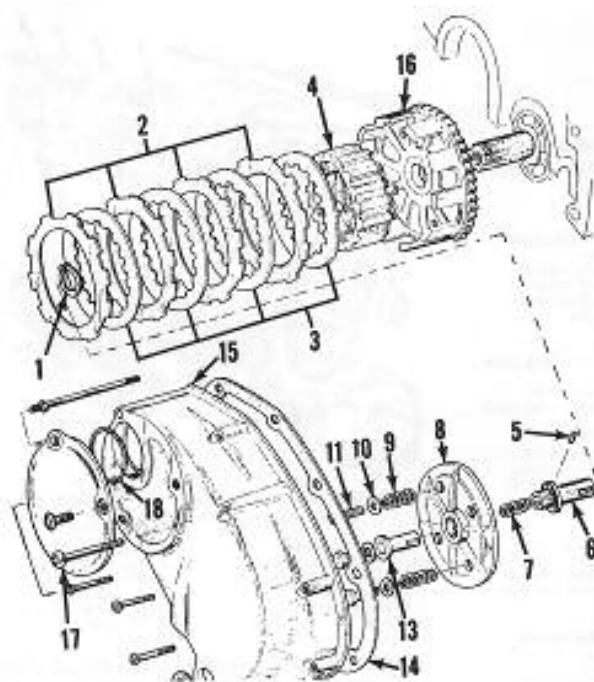


Fig. HNS-26—Exploded view of multiple disc wet clutch assembly used on C and CA models. Four friction discs (2) are used on 250cc models, five are used on 305cc models.

1. Snap ring
2. Friction disc
3. Clutch plates
4. Clutch hub
5. Pin
6. Clutch release link
7. Spring
8. Pressure plate
9. Clutch springs
10. Spring retainers
11. Spring bolts
12. Oil seal
13. Oil guide
14. Gasket
15. Clutch cover
16. Clutch drive housing
17. Cover plate
18. O ring
19. Stop rings (2 used)
20. Inner clutch plate

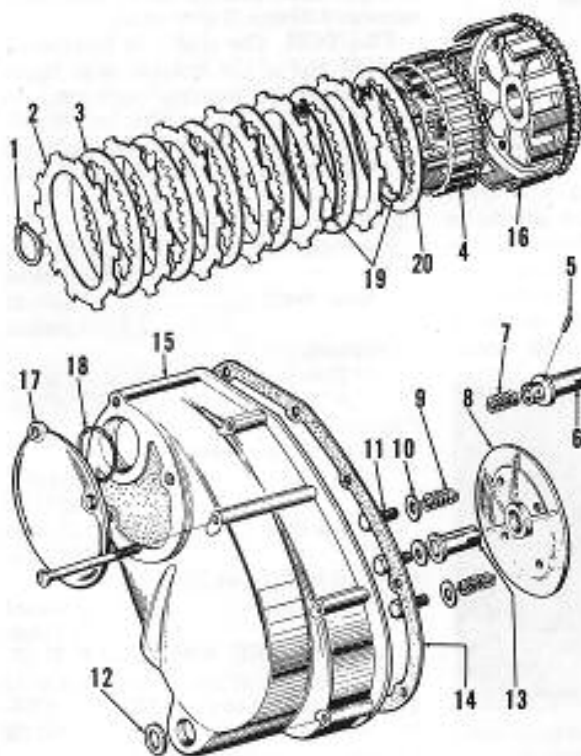


Fig. HNS-27—Exploded view of clutch assembly typical of CB and CL models. Six friction discs (2) are used on all models.

**PISTON RING END GAP**

	Recommended	Maximum
Top ring ..	0.15-0.35mm 0.006-0.014 inch	0.6mm 0.024 inch
2nd ring ..	0.15-0.35mm 0.006-0.014 inch	0.6mm 0.024 inch
Oil ring ..	0.1-0.3mm 0.004-0.012 inch	0.8mm 0.031 inch

Recommended clearance of piston skirt to cylinder bore is 0.03mm (0.0012 inch) when measured at right angle to piston pin. Pistons are cam

ground. Wear limit is 0.06mm (0.0024 inch). Pistons are available in standard size and three oversizes. Install pistons with arrow stamped on dome of piston toward front (exhaust).

Rebore or renew cylinder if taper or out-of-round condition is 0.05mm (0.002 inch) or more. Standard cylinder diameter for 250 cc displacement engines is 54.00-54.01mm (2.126-2.1264), and for 305 cc displacement engines is 60.00-60.01mm (2.3622-2.3626 inch).

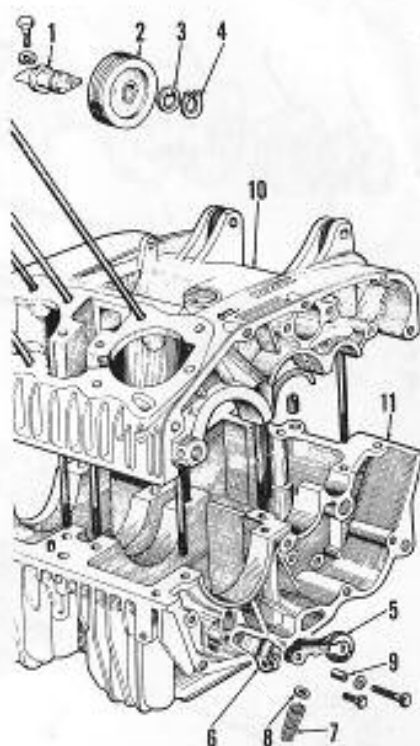


Fig. HNS-30—Crankcase assembly and related parts.

1. Idler shaft
2. Timing chain idler
3. Washer
4. Snap ring
5. Primary chain tension roller
6. Spring holder
7. Tension spring
8. Washer
9. Spacer
10. Crankcase upper half
11. Crankcase lower half

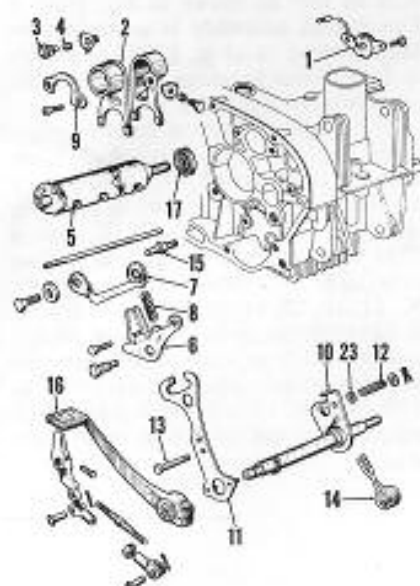


Fig. HNS-31—Exploded view of gear change drum and related parts.

1. Neutral switch
2. Shift forks
3. Fork guide pins
4. Roller
5. Shift drum
6. Stop guide
7. Shift drum step
8. Spring
9. Drum retainer
10. Shifter shaft
11. Shift arm
12. Spring
13. Pin
14. Return spring
15. Return spring pin
16. Shift pedal
17. Oil seal

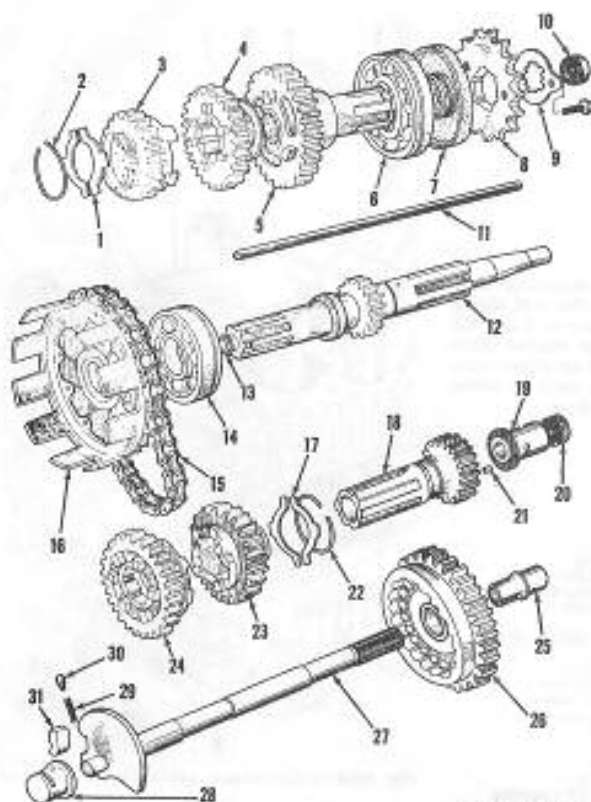


Fig. HN8-32—Exploded view of transmission gears.

1. Gear retaining plates
2. Snap ring
3. Main shaft 2nd gear
4. Main shaft 3rd gear
5. Main shaft 4th gear
6. Ball bearing
7. Oil seal
8. Sprocket
9. Sprocket retaining plate
10. Oil seal
11. Clutch release rod
12. Transmission main shaft
13. "O" ring
14. Ball bearing
15. Clutch drive chain
16. Clutch drive housing
17. Gear retaining plates
18. Counter shaft
19. Bushing
20. Oil seal
21. Bearing rollers (12)
22. Snap ring
23. Countershaft 3rd gear
24. Countershaft 2nd gear
25. Bushing
26. 1st gear
27. Kick starter spindle
28. Bushing
29. Spring
30. Plunger
31. Starter pawl

**CRANKSHAFT AND CONNECTING RODS.** The parts comprising the crankshaft assembly are shown in Fig. HN8-24. Crankpins are at 360° (aligned) as shown in Fig. HN8-5 or at 180° as shown in Fig. HN8-3. Crankshaft assembly is supported by ball bearing (6—Fig. HN8-24) at left end and roller bearings (10, 14 and 20) at center and right end.

The crankcase halves must be separated to remove the crankshaft. Connecting rods, crankpins and center main bearings are removed by pressing crankshaft apart. Crankshaft should **NOT** be disassembled. The connecting rods (22 & 23), center main bearing (9, 10, 11, 12, 13, 14, 15 & 16) and crankshaft counterweights (7, 8, 17 & 19) are available only as a complete assembly. Maximum eccentricity at ends is 0.03mm (0.0012 inch) with crankshaft supported on the two center main bearings.

Connecting rod bearing running clearance should be 0.0-0.008mm (0.0-0.0003 inch) with maximum allowable clearance of 0.05mm (0.002 inch). Connecting rod side (axial) play should be 0.07-0.33 mm with maximum allowable side play of 0.5 mm (0.020 inch).

End play of crankshaft in center and right main (roller) bearings should be 0.006-0.014mm (0.0002-0.0006 inch);

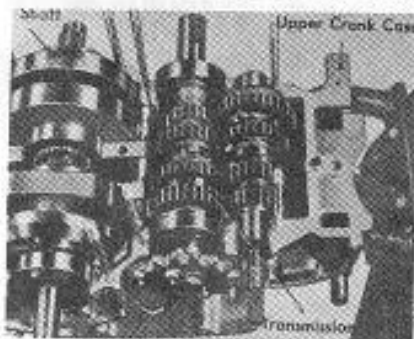


Fig. HN8-33—View of crankshaft and transmission gears assembled in upper crankcase.

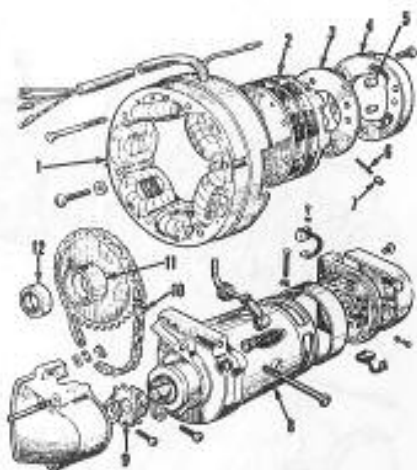


Fig. HN8-35—Exploded view of AC generator (alternator) and starter drive parts.

1. Generator stator
2. Generator rotor
3. Starting clutch cover
4. Starting clutch
5. Clutch rollers
6. Spring
7. Roller plunger
8. Starter motor
9. Drive sprocket
10. Starter chain
11. Starter clutch hub
12. Oil seal

renew complete crankshaft assembly or right main bearing (20) if clearance exceeds 0.05mm (0.002 inch).

**CLUTCH.** The clutch is located on the left end of the transmission input shaft. Refer to previous paragraph in **MAINTENANCE** section for adjustment procedure. Refer to Fig. HN8-26 or HN8-27 and the following specifications.

Clutch springs (9)—

Free length	33.4mm
	1.315 inches
wear limit	32.4mm
	1.2756 inches

Pressure

@ 25mm	more than 13.6 kg.
@ 0.9843 inch	more than 29.99 lbs.

Friction discs (2)—

Minimum thickness	
(C & CA)	4.4mm
	0.1732 inch
(CB & CL)	2.5mm
	0.0984 inch

Discs (2) and plates (3)—

Warpage limit	0.04mm
	0.015 inch

**CRANKCASE AND GEAR BOX.**

The transmission gears and associated parts are shown in Figs. HN8-31, HN8-32 and HN8-33. Refer to Fig. HN8-33 for assembled view.