

3-6 CRANKSHAFT AND CONNECTING ROD

a. Description

The forged single unit crankshaft is supported on five main plain bearings.

The large end of the connecting rod is split type with plain bearings and the small end has no bushing.

The main bearing and connecting rod large end bearings are made of tin alloy.

b. Disassembly

1. Remove the cylinder head, cylinder and cam chain tensioner in accordance with 3-3 b, page 32~35.

2. Remove the dynamo cover.

3. Unscrew the AC generator mounting bolt and remove the AC generator rotor using the rotor puller (Tool No. 07933-3000000). (Fig. 3-68)

4. Remove the starting motor reduction gear and the starting clutch gear. (Fig. 3-69)

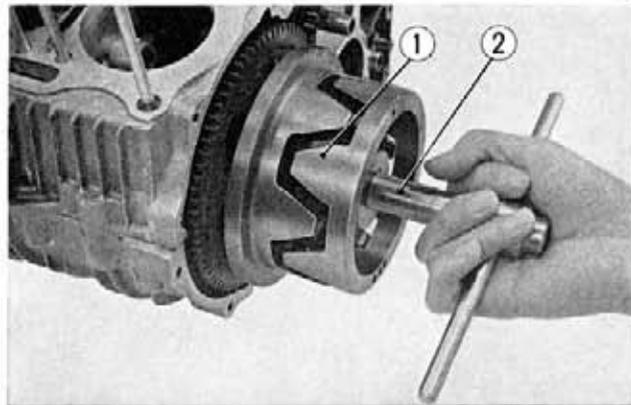


Fig. 3-68 ① A.C. generator rotor
② Rotor puller

5. Remove the gear shift arm, gear shift side plate, gear shift drum stopper and the gear shift positive stopper. (Fig. 3-70)

6. Remove the point cover and unscrew the 6 mm hex nut and remove the advancer shaft special washer. (Fig. 3-71)

7. Unscrew the three contact breaker assembly mounting screws and remove the contact breaker (Fig. 3-71).

8. Remove the spark advancer.

9. Remove the spark advancer shaft.

10. Remove the clutch in accordance with section 4-2 a on page 59.

11. Remove the counter shaft bearing holder. (Fig. 3-72)

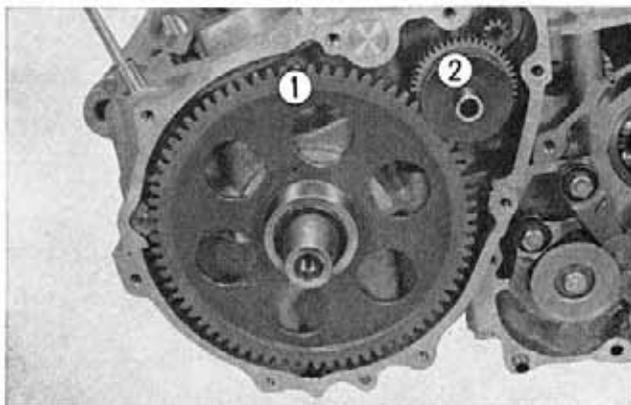


Fig. 3-69 ① Starting clutch gear
② Starting motor reduction gear

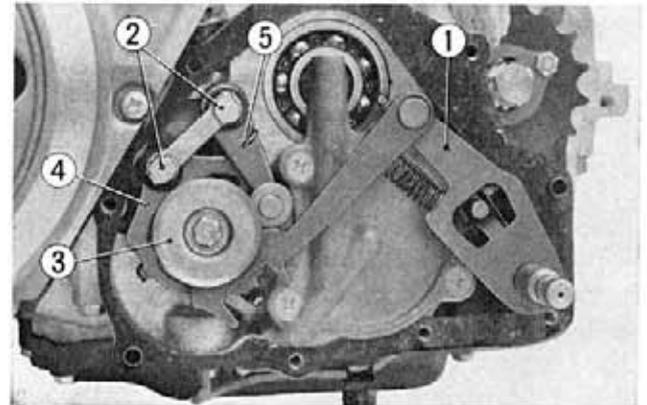


Fig. 3-70 ① Gear shift arm
② 6mm bolts
③ Gear shift side plate
④ Gear shift positive stopper
⑤ Shift drum stopper

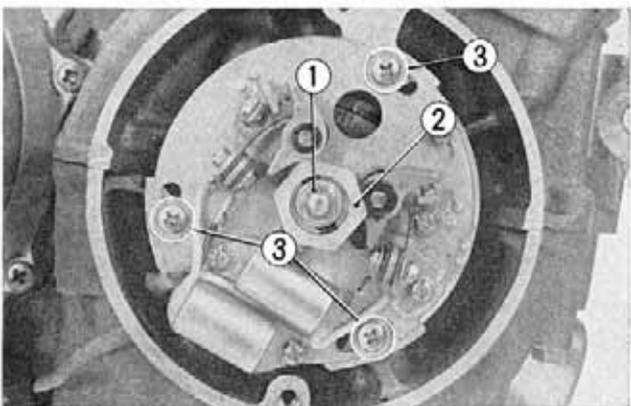


Fig. 3-71 ① 6mm hex. nut
② Advancer shaft special washer
③ Breaker assembly mounting screws

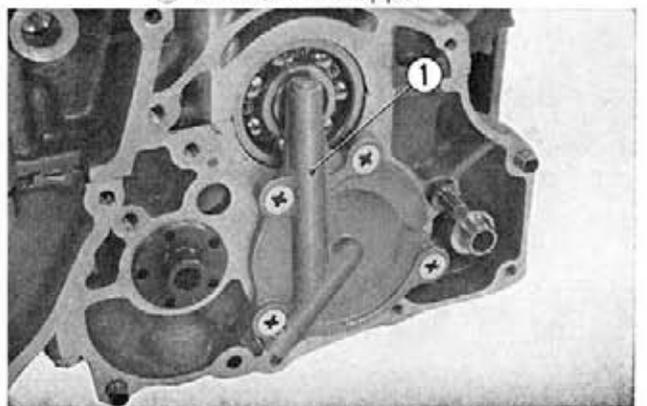


Fig. 3-72 ① Counter shaft bearing holder

12. Loosen the upper crankcase mounting bolts. (Fig. 3-73)
13. Unscrew the lower crankcase mounting bolts and separate the lower crankcase from the upper crankcase. (Fig. 3-74)
14. Raise the transmission mainshaft and remove the primary sprocket and then remove the primary chain from the primary sprocket. (Fig. 3-75)
15. Remove the crankshaft from the upper crankcase. (Fig. 3-76)
16. Unscrew the connecting rod cap mounting bolts and remove the bearing cap from the large end, and then remove the connecting rod from the crankshaft. (Fig. 3-77)

c. Inspection

1. Measuring the bend of the crankshaft.

Support both ends of the crankshaft on V blocks and check the run-out at the center journal by rotating the crankshaft and taking a reading with a dial gauge. The amount of run-out is $1/2$ of the true indicated reading (TIR) on the dial gauge. If the run-out is greater than 0.002 in. (0.05 mm), the crankshaft should be straightened with a press. (Fig. 3-78)

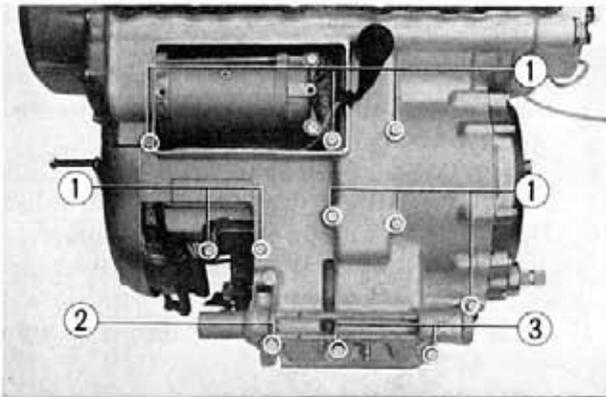


Fig. 3-73 ① 6mm bolts ② 10mm bolt ③ 8mm bolts

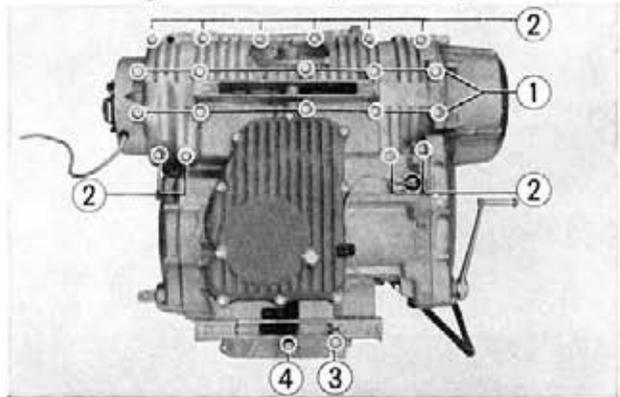


Fig. 3-74 ① 8mm bolts ② 6mm bolts ③ 10mm nut ④ 8mm nut

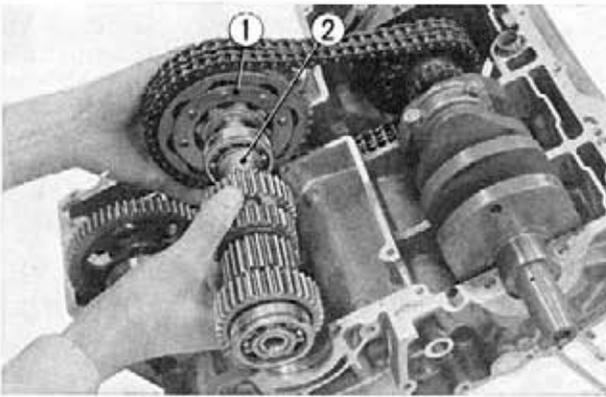


Fig. 3-75 ① Primary sprocket ② Transmission mainshaft

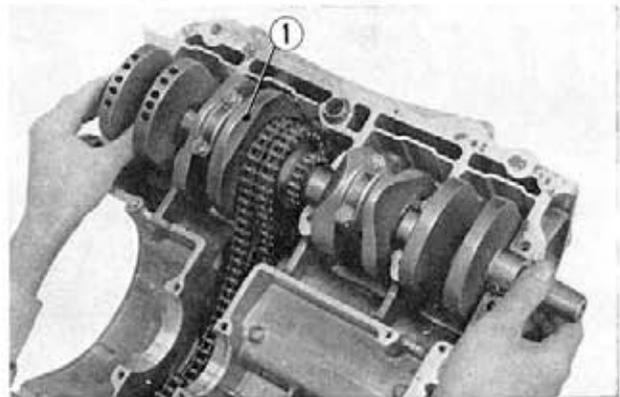


Fig. 3-76 ① Crankshaft

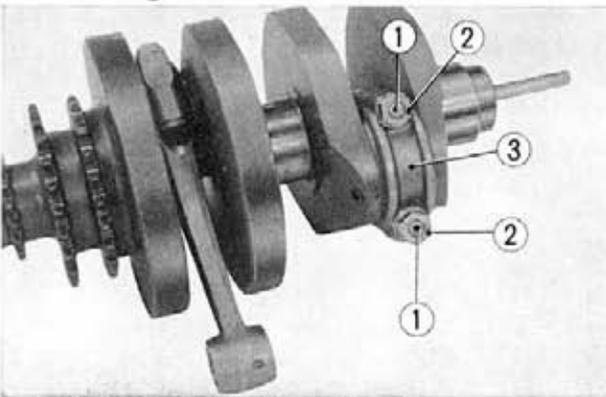


Fig. 3-77 ① Connecting rod bolts ② Connecting rod nuts ③ Connecting rod

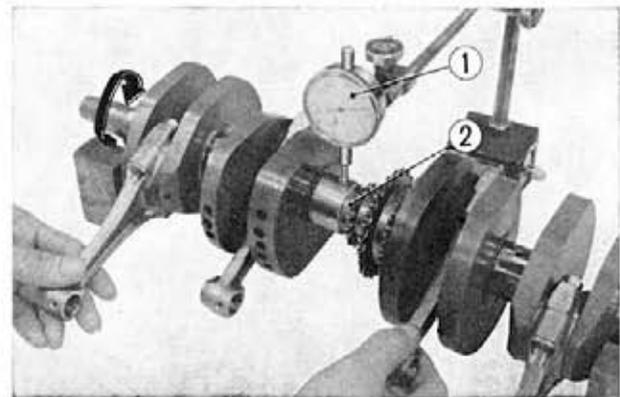


Fig. 3-78 ① Dial gauge ② Crankshaft

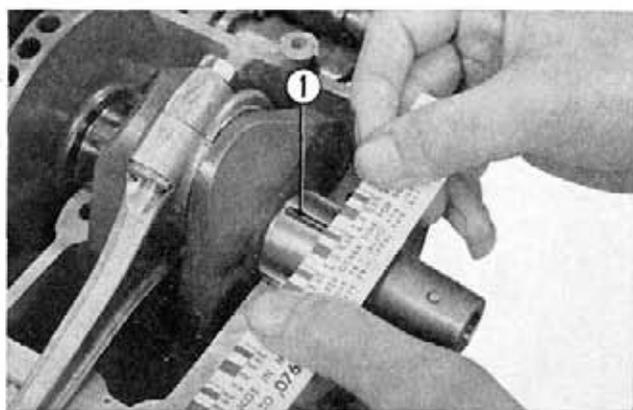


Fig. 3-79 ① Press gauge

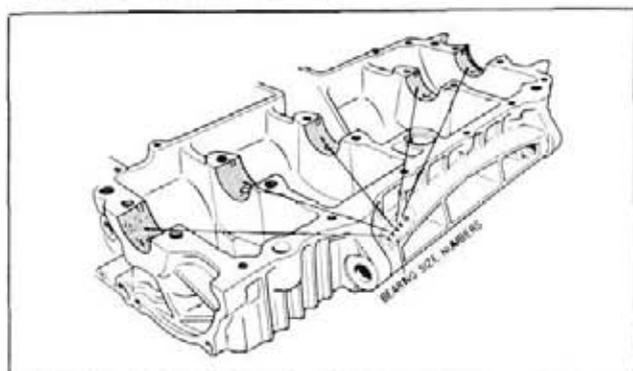


Fig. 3-80

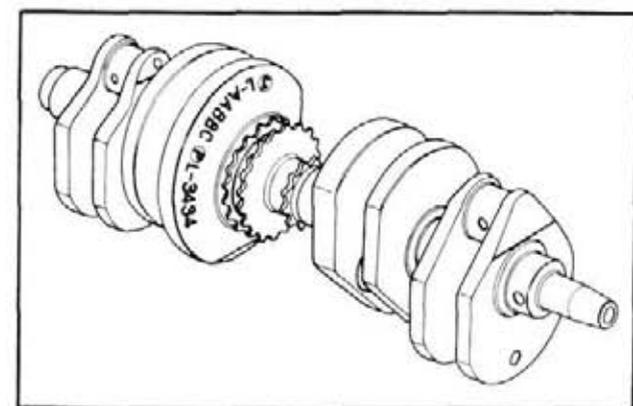


Fig. 3-81

2. Measuring the wear of the crankshaft journals

- a. Remove the crankshaft and clean the crankshaft journal.
- b. Cut the press gauge material to the length of bearing parallel to the crankshaft. Stay clear of the oil hole.
- c. Assemble the crankshaft, lower crankcase and torque down the mounting bolts. Next, disassemble the lower crankcase, and check the gauge which had been flattened by comparing it with the scale on the package of the press gauge. (Fig. 3-79)

Measure the gauge at the widest point; also note the different in width at both ends. If the bearing clearance is larger than **0.0032 in. (0.08 mm)**, the bearing should be replaced with new part.

The standard bearing clearance should be **0.0008~0.0018 in. (0.02~0.046 mm)**.

Note: 1. Do not turn the crankshaft while making this measurement.

2. The bearing must be replaced in set.

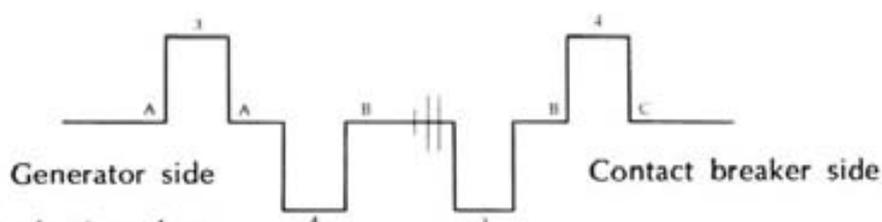
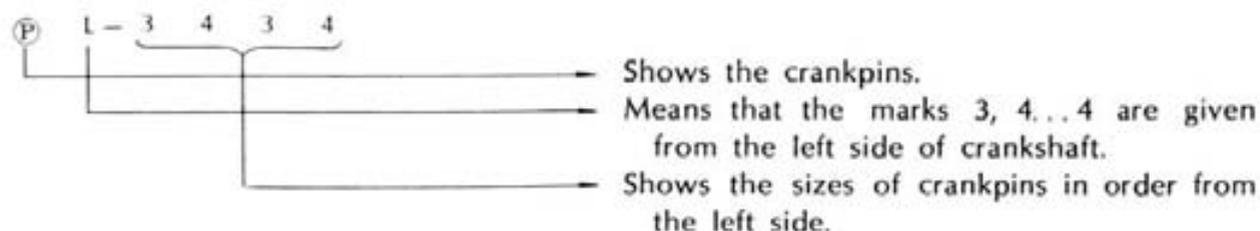
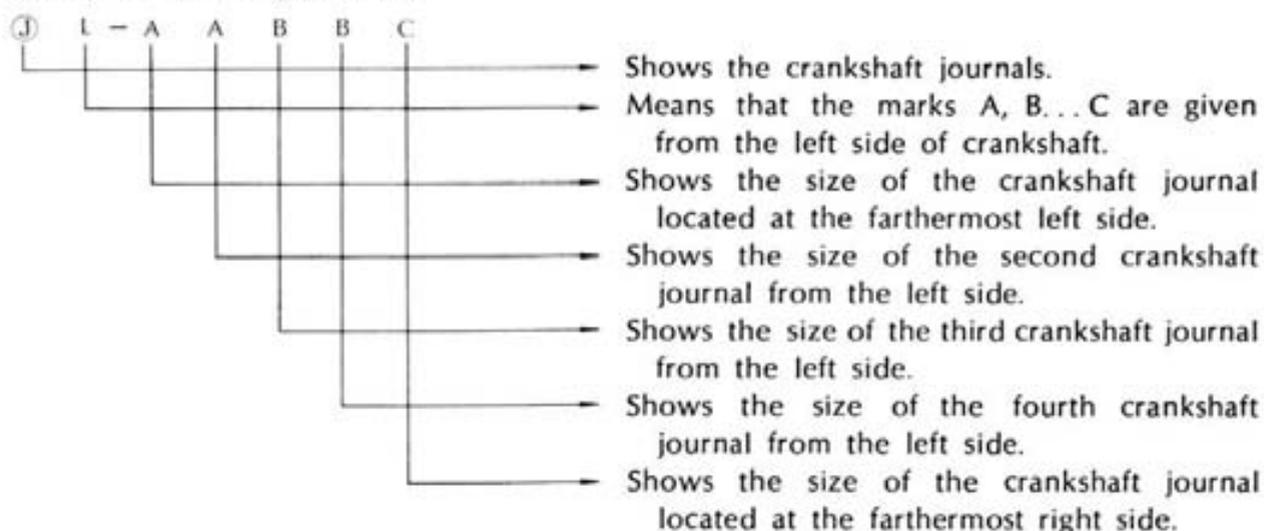
- d. The bearings are select fitted by the following procedures.

- There are alphabet letters stamped on the forward section of the upper crankcase hanger bolt inserts. The stamped letter indicates the bearing size. Bearings are numbered sequence, starting from the right side. (Fig. 3-80)
- Crankshaft Bearing

The type of bearings as explained here is applicable from the engine No. CB 750 E1015587 and thereafter.

The size marks of crankshaft journals were changed from \angle (I) \square (RO) \wedge (HA) and \equiv (NI) to A, B and C. These marks are stamped on the side of the crank weight on the drive sprocket side together with the crankpin size marks. (Fig. 3-81)

Description of stamped marks



Bearing metal selection charts

The bearing metals of crankshaft journals and crank pins are respectively available in four selective sizes. They are selective-fitted so that a proper oil clearance can be obtained. When replacing a bearing, select the bearing metal of the correct size according to the bearing metal selection charts below. As a rule, use the bearing metal having the same mark put on the metal used hitherto

Crankshaft Journal Bearing Metal Selection Table

Marking	Crankcase			Crankshaft			Bearing			
	A	B	C	A	B	C	Black	Brown	Green	Yellow
Dimension (mm)	39.000	39.008	39.016	36.000	35.995	35.990	1.5002	1.4998	1.4994	1.4990
	} 39.008	} 39.016	} 39.024	} 35.995	} 35.990	} 35.985	} 1.4998	} 1.4994	} 1.4990	} 1.4986
Oil clearance (μ)										
20-41		A			A		Yellow (13318-300-013)			
22-43		A			C		Green (13317-300-013)			
25-46		A			B		Yellow (13318-300-013)			
20-41		B			A		Green (13317-300-013)			
22-43		B			B		Green (13317-300-013)			
25-46		B			C		Brown (13316-300-013)			
20-41		C			A		Brown (13316-300-013)			
22-43		C			B		Brown (13316-300-013)			
25-46		C			C		Black (13315-300-013)			

- e. Check the respective journal for damage or uneven wear. If the journal is out-of-round or tapered in excess of **0.002 in. (0.05 mm)**, the crankshaft should be replaced with new part.
- f. When a new crankshaft is used as a replacement, select the proper size bearings referring to the selection table.
- g. When the bearing is mounted into the crankcase, the top of the bearing should be extended above the case mounting flange by **0.0027~0.0039 in. (0.068~0.098 mm)**.

Caution :

The shell of the bearing is very thin, therefore, care should be exercised that it is not damaged during installation. Bearing which is deeply scored, having a poor fit or when there is a large foreign object imbedded in the bearing, it should be replaced with a new bearing. Further, repairs of the listed below should not be attempted.

- a. Adjusting with a shim
 - b. Repairing with a scraper
 - c. Use of red or bluing to check the bearing contact.
 - d. Correcting the clearance by filing the connecting rod or the connecting rod cap.
 - e. Applying emery paper on the bearing surface in an attempt to correct the bearing.
4. Measuring the connecting rod bearing
(Method using micrometer and inside dial gauge)
- a. Accurately measure the crank pin diameter with the micrometer.
Take the measurement in both vertical and horizontal direction at the front, center and rear.
 - b. Assemble the bearing into the connecting rod and torque the cap to the specified value, **14.5 ft-lbs (2 kg-m)**, and measure the bearing inside diameter parallel to the rod at the front, center and rear locations.

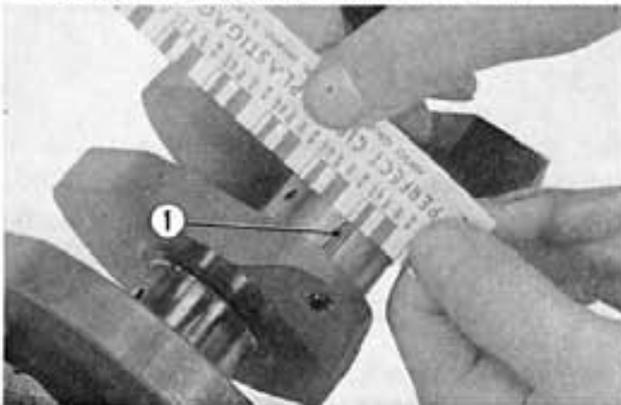


Fig. 3-82 ① Press gauge

(Press gauge method)

- a. Remove the connecting rod cap and clean all oil from the bearing and pin.
- b. Cut the press gauge to width of the bearing and place it on top and parallel to the pin, staying clear of the oil hole.
- c. Assemble the connecting rod on the crankshaft and torque the rod cap to the specified torque, **14.5 ft-lbs (2 kg-m)**.
- d. Disassemble the connecting rod bearing and measure the flattened gauge by comparing it to the scale on the package of the gauge. (Fig. 3-82)

The clearance is taken as the average value between the lowest and the highest readings. The standard bearing clearance is **0.0008~0.0018 in. (0.02~0.046 mm)**.

If the clearance is beyond **0.0032 in. (0.08 mm)**, the bearing should be replaced with new part.

- Numbers (3, 4, 5) are stamped on the side surface of the crank weight, this indicates the crank pin size. (Fig. 3-81)
- The numerical figures stamped on the connecting rod indicates the size of the connecting rod large end. Select the proper size bearing by referring to the table on the next page. The bearings are color coded on the end surface.



Fig. 3-83-1

Crank Pin Bearing Metal Selection Table

Marking	Connecting Rod			Crank Pin			Bearing			
	1	2	3	1	2	3	Black	Brown	Green	Yellow
Dimension (mm)	39.000	39.008	39.016	36.000	35.995	35.990	1.5002	1.4998	1.4994	1.4990
	} 39.008	} 39.016	} 39.024	} 35.995	} 35.990	} 35.985	} 1.4998	} 1.4994	} 1.4990	} 1.4986
Oil clearance (μ)										
20-43	1			3			Yellow (13218-300-013)			
22-43	1			5			Green (13217-300-013)			
25-46	1			4			Yellow (13218-300-013)			
20-41	2			3			Green (13217-300-013)			
22-43	2			4			Green (13217-300-013)			
25-46	2			5			Brown (13216-300-013)			
20-41	3			3			Brown (13216-300-013)			
22-43	3			4			Brown (13216-300-013)			
25-46	3			5			Black (13215-300-013)			

Connecting rods (Weight identification)

The connecting rods are carefully selected in weight to minimize the vibration of engine. The rods of the same weight should be used as a set. This marking method is applied to the engine No. E 1026594 and thereafter.

When replacing a connecting rod, select the connecting rod according to the following table, if any, on the old rod and then select the connecting rod bearing metal having the same fit mark on the old metal. The weight identification mark is as shown in Fig. 3-83-2.

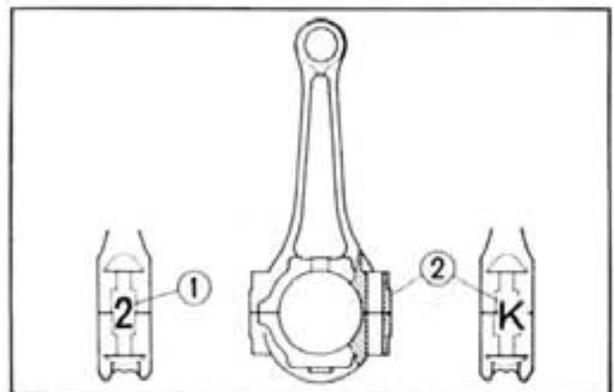


Fig. 3-83-2 ① Tolerance identification mark (Metal fit mark)
② Weight identification mark

Weight identification marks

Mark	Used parts	
	Mark	Parts No.
A B C D	D	13204-300-000
E F	F	13206-300-000
G H J K	H	12208-300-000