

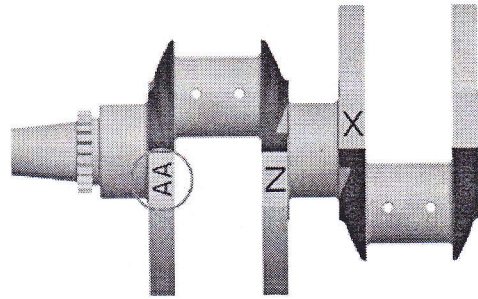
Selecting connecting rods

SELECTING CRANKSHAFTS AND CONNECTING RODS IN RELATION TO BALANCING CLASS

On engines equipped with crankshafts with NON extractable sprockets, from engine number:

- from V4 TY 13676 onwards

crankshafts and connecting rods have been introduced which are matched with each other in relation to their balancing class. The class is easily identifiable as it is marked on the component itself.



The permitted crankshaft-connecting rod balancing class combinations are listed in the following table:

CRANKSHAFT-CONNECTING ROD BALANCING CLASSES

Crankshaft balancing classes	Balancing class combinations for alternator side connecting rod pair	Balancing class combinations for primary drive side connecting rod pair
AA	AA+AA / **ZZ+BB**	AA+AA / **ZZ+BB**
BB	BB+BB / **AA+CC**	BB+BB / **AA+CC**
CC	CC+CC / **BB+DD**	CC+CC / **BB+DD**
DD	DD+DD / **CC+EE**	DD+DD / **CC+EE**
EE	EE+EE / **DD+FF**	EE+EE / **DD+FF**
FF	FF+FF / **GG+EE**	FF+FF / **GG+EE**

** balancing class pairing usable as an alternative to the first choice **

CAUTION

WHEN REPLACING A CRANKSHAFT WITH NO IDENTIFIABLE BALANCING CLASS (ON ENGINES PRIOR TO THE INTRODUCTION OF THE MODIFICATION), A CLASS "CC" CRANKSHAFT MAY BE USED.

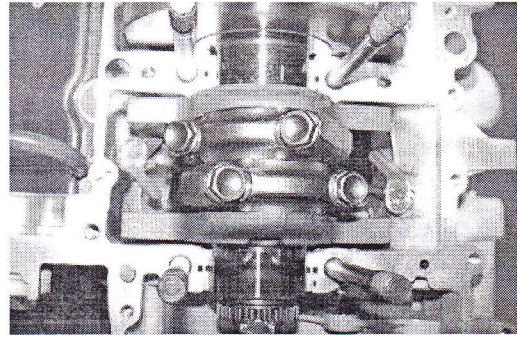
CAUTION

WHEN REPLACING CONNECTING RODS WITH NO IDENTIFIABLE BALANCING CLASS (ON ENGINES PRIOR TO THE INTRODUCTION OF THE MODIFICATION), CLASS "DD" CONNECTING RODS MAY BE USED.

If a selection class of connecting rods is fit on the crankshaft that is not class D - D, it is not a problem.

It is essential, for proper crankshaft balance, that if one connecting rod is replaced the other one fit on the same crank pin must also be replaced:

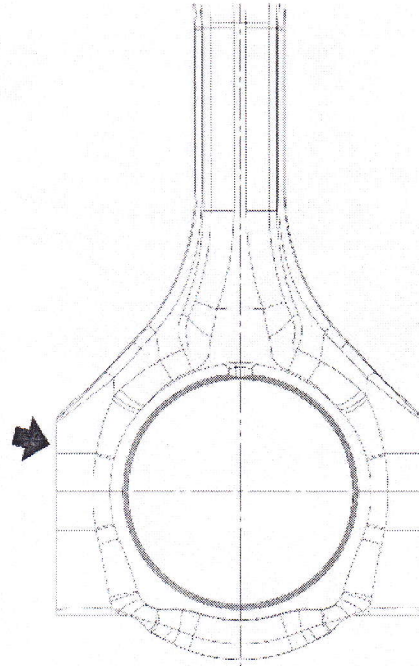
- if the piston 1 connecting rod is replaced, the one relative to piston 2 must also be replaced and vice versa;
- if the piston 3 connecting rod is replaced, the one relative to piston 4 must also be replaced and vice versa;



The connecting rod class is stamped on its left side, viewed from the front, from the side with the bevelling on the big end hole.



ONLY ONE CONNECTING ROD SELECTION CLASS IS SPECIFIED FOR REPLACEMENT PARTS, INDICATED WITH THE LETTERS D-D.



Bushing selection

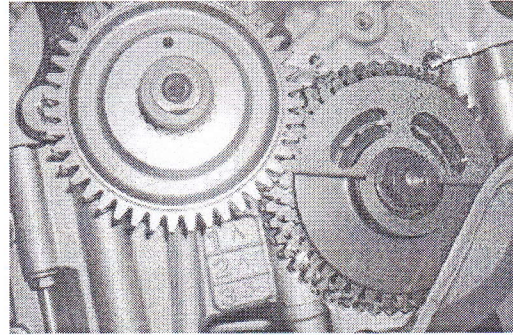
CRANKSHAFT BUSHINGS

CRANKCASE CATEGORY

Three crankcase classes are available (A - B- C) which differentiate in the diameter of the hole in the bearings.

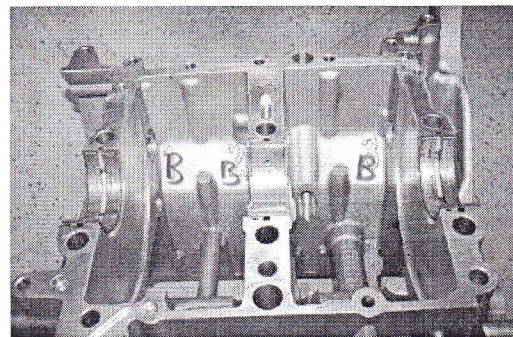
The category is marked on the crankcase, on the right side, in the area below the crankshaft.

Different classes of bearings can be used (e.g.: A - B - C or B - B - C or A - B - A ...).



A number that indicates the position of the main journal is stamped on the crankcase:

1. flywheel side;
2. central;
3. clutch side



CRANKCASE CATEGORY

Specification	Desc./Quantity
Class A	Bushing seat diameter 52.023 - 52.018 mm (2.0481 - 2.0479 in)
Class B	Bushing seat diameter 52.018 - 52.013 mm (2.0479 - 2.0477 in)
Class C	Bushing seat diameter 52.013 - 52.008 mm (2.0477 - 2.0475 in)

SHAFT CATEGORY

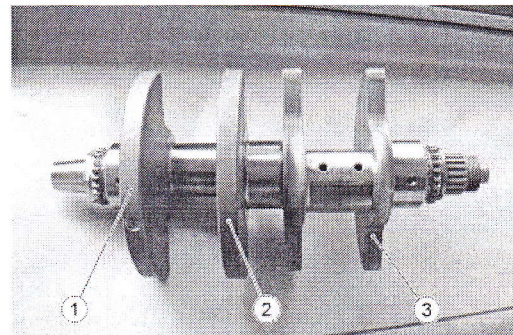
The three crankshaft main journals

1. flywheel side;
2. central;
3. clutch side

they are each selectable in two pairs of classes, A- B (up to engine No. 3990) or C-D-E (from Engine No. 3991).

The class is stamped on the flat face of the counterweight, as shown in the image.

The three main journals may have different classes to each other according to the type of cou-



pling (e.g. A - B - A or B - B - A etc.) o (e.g.: C - D
- E or D - C - C etc.)

CRANKSHAFT CATEGORY UP TO ENGINE No. 3990

Specification	Desc./Quantity
Class A	Main journals - diameter: 46,005 - 46,000 mm (1,8112 - 1,8110 in)
Class B	Main journals - diameter: 46,000 - 45,995 mm (1,8110 - 1,8108 in)

CRANKSHAFT CATEGORY FROM ENGINE No. 3991

Specification	Desc./Quantity
Class C	Main journals - diameter: 46,008 - 46,003 mm (1,8113 - 1,8111 in)
Class D	Main journals - diameter: 46,003 - 45,998 mm (1,8111 - 1,8109 in)
Class E	Main journals - diameter: 45,998 - 45,993 mm (1,8109 - 1,8107 in)

Once the categories below are checked:

1. crankcase;
2. flywheel side main journal;
3. centre main journal;
4. clutch side main journal.

Choose the bushings used for assembly from the following table

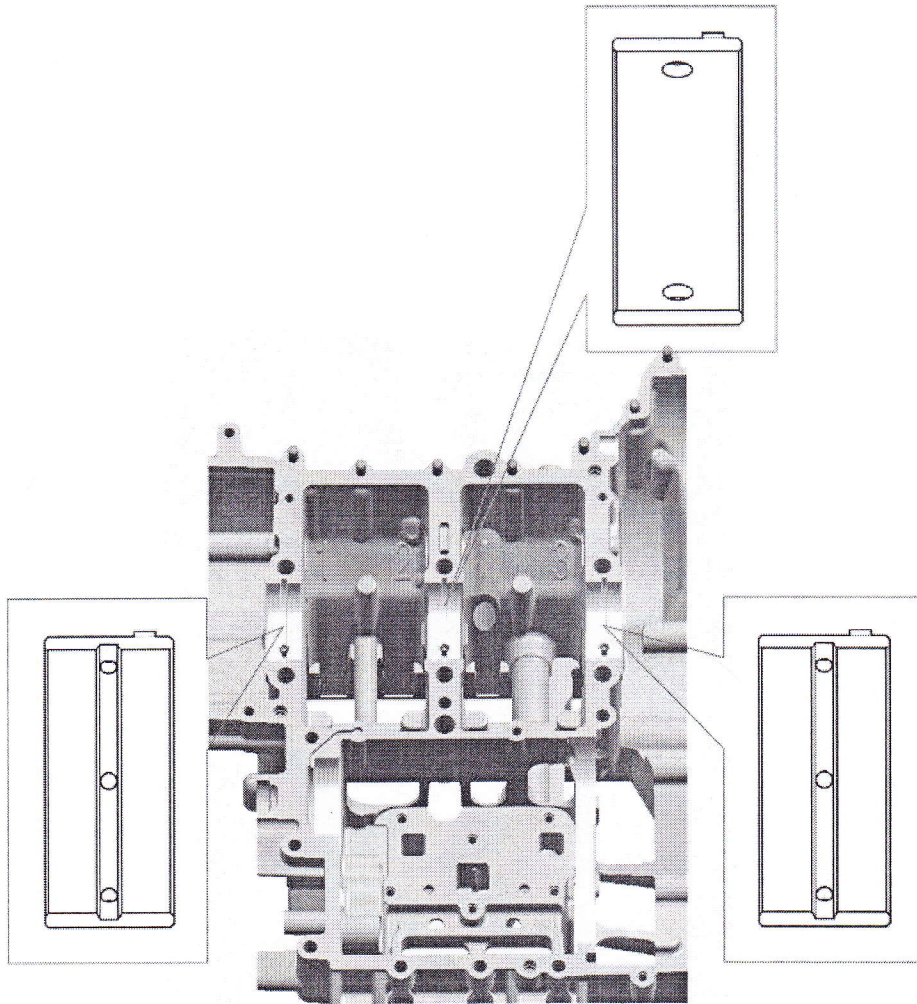
CRANKSHAFT BUSHINGS UP TO No. 3990

Crankshaft main journal	Class A crankcase	Class B crankcase	Class C crankcase
Class A main journal	Bushing (blue)	Bushing (blue)	Bushing (red)
Class B main journal	Bushing (yellow)	Bushing (blue)	Bushing (blue)

CRANKSHAFT BUSHINGS FROM No. 3991

Crankshaft main journal	Class A crankcase	Class B crankcase	Class C crankcase
Class C main journal	Bushing (blue)	Bushing (red)	Bushing (red)
Class D main journal	Bushing (blue)	Bushing (blue)	Bushing (red)
Class E main journal	Bushing (yellow)	Bushing (blue)	Bushing (blue)

The flywheel side and clutch side main bearings are different from the central ones and therefore, so are the respective replacement part numbers.



CRANKSHAFT BUSHINGS - CONNECTING RODS

Three types of semi-bushing are available:

- Blue
- Red
- Yellow

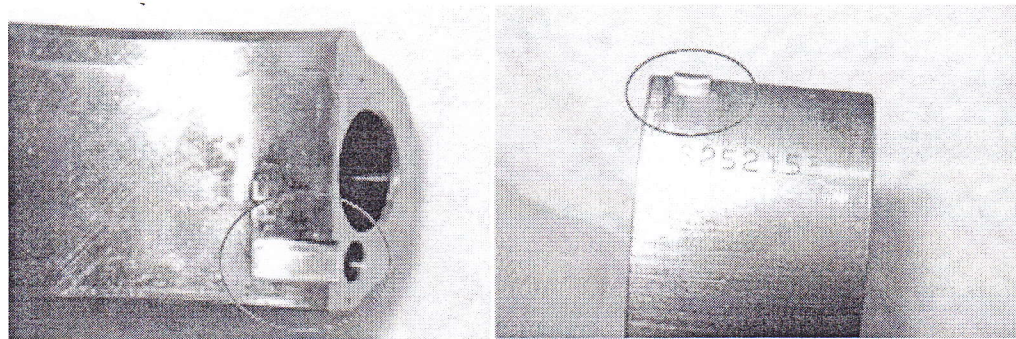
There are no dimension classes for the crank pins or the connecting rods. As a result, only the two semi-bushing combinations are possible:

- ➔
1. BLUE - BLUE (recommended solution)
 2. YELLOW - RED (if combination 1 is not possible)

In combination 2, the YELLOW semi-bushing must be installed on the connecting rod shank and the RED semi-bushing must be installed on the cap.

CRANKSHAFT BUSHING REPLACEMENT PROCEDURE

When replacing the big end bushings, make sure that the tang of the semi-bushing is correctly housed in the corresponding notch in the connecting rod shank or cap



Bearing fitting

BALANCING COUNTERSHAFT BEARING INSTALLATION

FLYWHEEL-SIDE

- Heat up the crankcase to 150°C (302°F).
- Prepare the following tools:

Specific tooling

020364Y 25 mm Adaptor

020359Y 42 x 47 mm punch

020376Y Adapter handle

- Position the new bearing with its groove on the outside diameter facing outward with respect to the crankcase. In this way it will be possible to install the bearing retainer in the groove.



- Using the suitable tools, fit the bearing in the crankcase until tool stops

