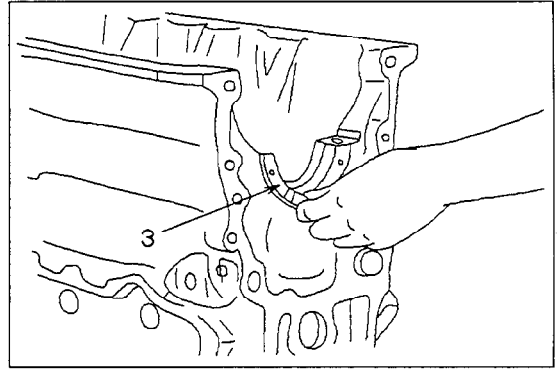
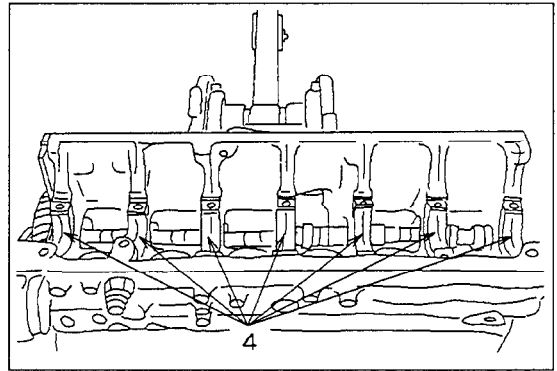


- 3) Remove upper thrust bearings (3) for crankshaft side.



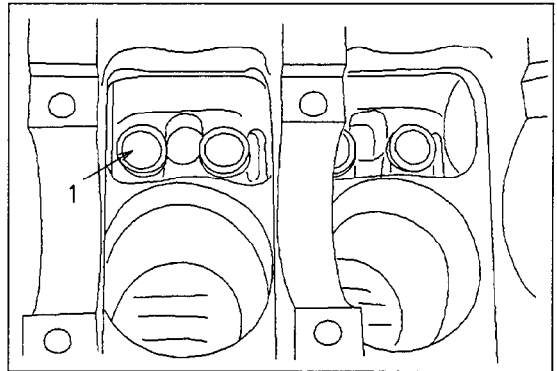
- 4) Remove upper bearings (4).
 ★ Mark the positions for assembly of the main bearing cap, main bearing and thrust bearing with a tag or felt pen. Keep in sets according to the cap number. Keep them in a safe place and be careful not to damage them.



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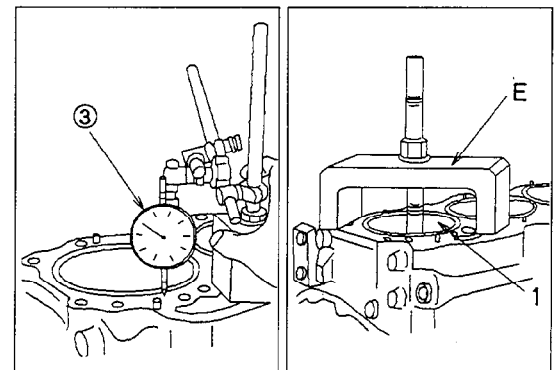
42. Tappets

Remove tappets (1).



43. Cylinder liner sleeve

- Before removing the cylinder liner sleeve if necessary using a dial gauge ③, measure the protrusion of the liner sleeve.
- Using liner puller E, remove cylinder liner sleeve (1).



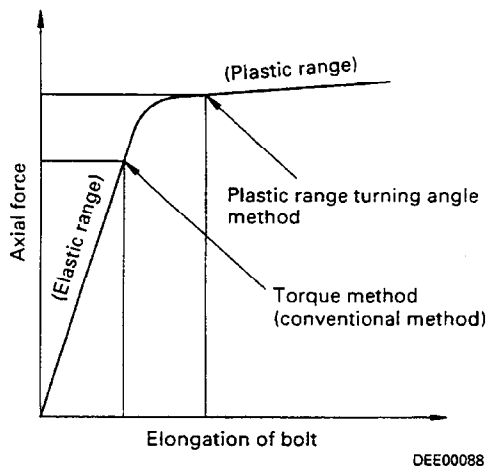
OVERALL ASSEMBLY

TIGHTENING BOLTS BY THE PLASTIC RANGE TURNING ANGLE METHOD

- Important bolts in the 140 Series engines are tightened by the plastic range turning angle method. In this method, special bolts are used. By being tightened to the load (plastic range) at which they begin to be permanently deformed, accurate and high tightening force can be obtained.

The most common method for tightening bolts is the torque control method. In this method, however, it is difficult to accurately control the tightening force because of the coefficient of friction.

- The plastic range turning angle method is based on the initial tightening torque and the turning angle.



- ★ Elongation exceeding the elastic range results in permanent deformation.
- Bolts to be tightened by the plastic range turning angle method in the 140 Series engines.
 - 1) Cylinder head mounting bolts
 - 2) Main cap mounting bolts
 - 3) Connecting rod cap mounting bolts
 - 4) Flywheel mounting bolts
- ★ In the plastic range turning angle method, the permanent strain remains in bolts after they are tightened. Therefore, the number of times that each bolt can be reused is limited. Observe the following precautions.
 - 1) Before tightening, measure the free length of bolt and check that bolt length exceeds tolerance limit or not. Do not reuse any bolt which has exceeded the tolerance limit.

Before tightening, measure the free length of bolt and check that bolt length exceeds tolerance limit or not.

- 2) If a bolt has been tightened in excess of the specified turning angle, loosen the bolt and measure the free length of bolt again.
 - 3) The tightening angle should be targeted at the standard value plus or minus tolerance.
- ★ Clean every part thoroughly and check the part for dents, flaws, and blowholes. When assembling the parts, make sure that none of the oil and water passages are blocked.

Preparation work

- Install adapter to the cylinder block, then raise it and place it on engine overhaul stand.
- Repair the cylinder block as follows before inserting the cylinder liners.
 - 1) Remove rust and scale from surfaces (A) and (B) with sandpaper until the machined surface is exposed.
 - 2) Polish portion (R) with No. 240 sandpaper to make surface (R) smooth.
 - 3) Polish portion (R) and (H) with No. 240 sandpaper to make them smooth. If portion (R) is square or burred, polish it with sandpaper or a scraper. Finish this portion to an especially smooth surface to protect the O-ring from damage.
 - 4) If the pitting in surface (B) is so rough that it cannot be repaired, replace the cylinder block.

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Special tools

	Part No.	Part Name	Q'ty
A	-	Engine stand	1
B	790-501-2000	Engine overhaul stand	1
	790-345-1070	Bracket	1
C	795-215-1711	Liner driver	1
D	-	Expander	1
E	795-102-2101	Valve pusher	1
F	-	Feeler gauge	1
G	-	Push tool for rear seal (A)	1
H	-	Push tool for rear seal (B)	1

Preparatory work

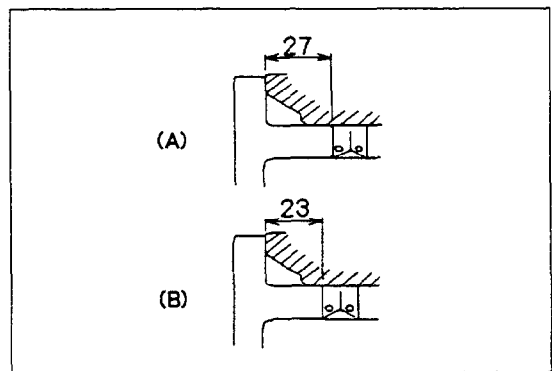
Install adapter plate on cylinder block, raise and set on engine overhaul stand **B**.

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1. Cylinder liner sleeve

- ★ When cylinder liners are disassembled, follow the next procedure.
- ★ For each cylinder, check that the mark of the cylinder liner and the stamped mark (S or M,L) on the top face of right side of the cylinder block are correctly coincide.

Block mark	Liner Part No.	Liner mark	
		Bottom	Top
S	6222-21-2210	S	I
M	6222-21-2220	M	II
L	6222-21-2230	L	III



- ★ Clean the press-fit surface of the cylinder liner and cylinder block thoroughly. (Completely remove the rust preventive oil from the liner)
- ★ Coat the press-fit surface of the cylinder liner and cylinder block thinly with engine oil (EO-30).

