

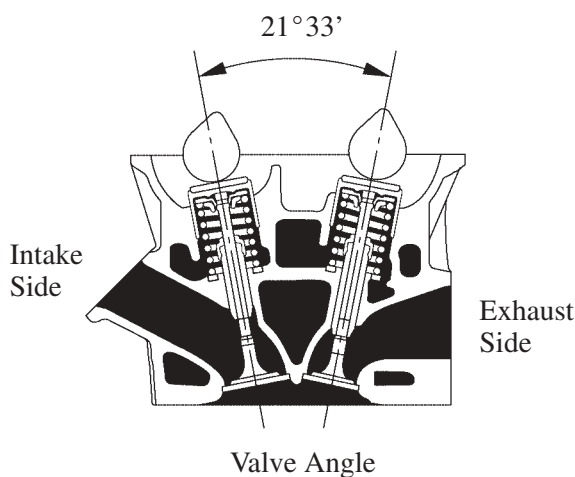
## ENGINE PROPER

### 1. Cylinder Head

- The cylinder head is made of aluminum and has intake and exhaust ports in a cross-flow arrangement. The intake ports are on the inside and the exhaust ports on the outside of the left and right banks respectively.
- The pitch of the intake and exhaust camshafts is shortened and the valve angle is narrowed to  $21^{\circ}33'$ .
- The left and right banks of cylinder heads are common in configuration.

#### NOTICE

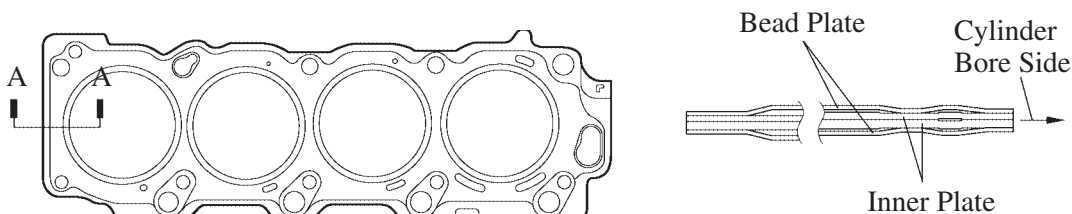
When the cylinder heads are disassembled for servicing, be sure to assemble each cylinder head to the correct right or left bank. The camshaft may seize if they are assembled incorrectly.



188EG05

### 2. Cylinder Head Gasket

The same type of (4-layer) steel laminate cylinder head gasket used in the previous 1UZ-FE engine on the LS400 is used in the new 3UZ-FE engine on the GS430, except that its shape has been slightly changed in accordance with the increased cylinder displacement of the new engine.

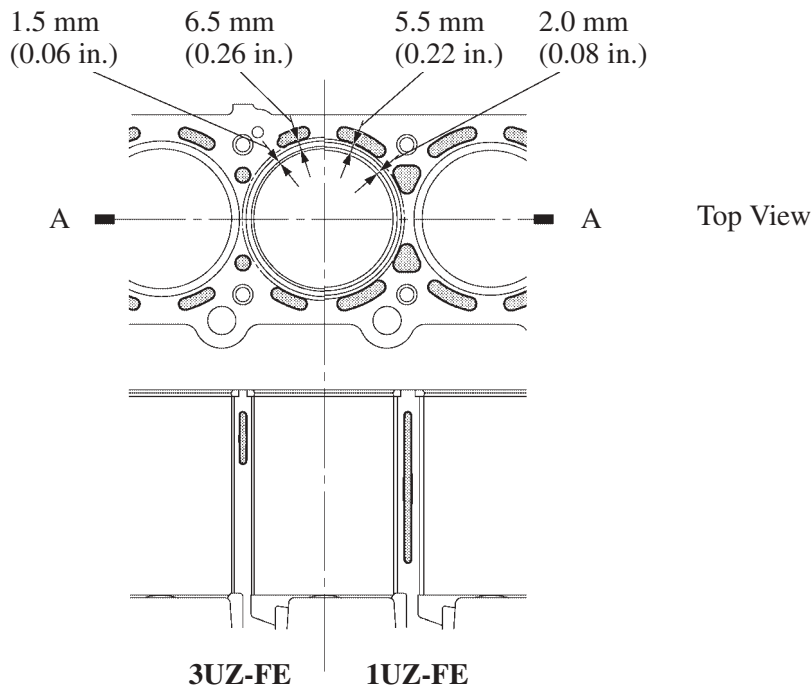
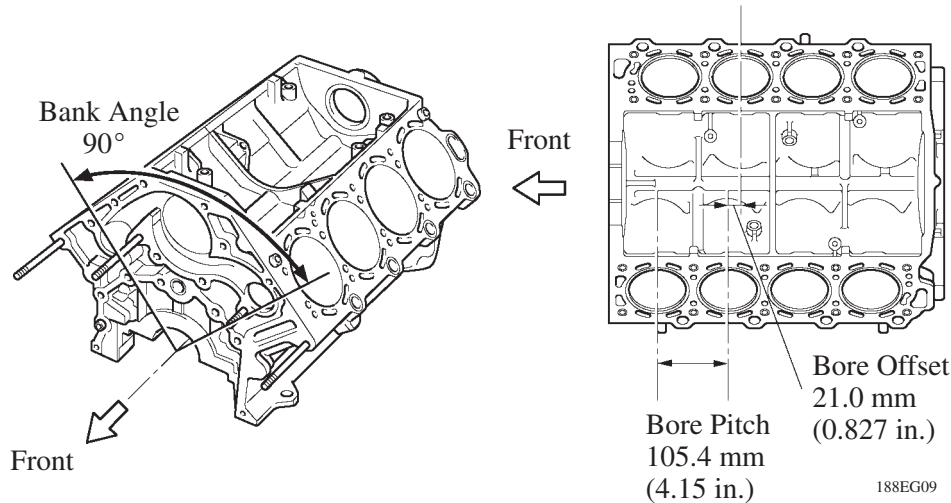


A – A Cross Section

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### 3. Cylinder Block

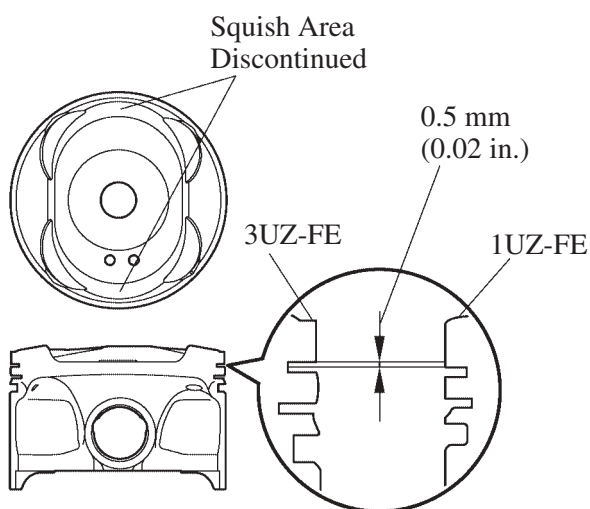
- The cylinder block has a bank angle of  $90^\circ$ , a bank offset of 21 mm (0.827 in.) and a bore pitch of 105.5 mm (4.15 in.), resulting in a compact block in its length and width even for its displacement.
- Light weight aluminum alloy is used for the cylinder block.
- In contrast to the previous 1UZ-FE engine on the LS400, the liner thickness in the new 3UZ-FE engine on the GS430 has been changed from 2 mm (0.08 in.) to 1.5 mm (0.06 in.) to achieve weight reduction and improved cooling performance. It is not possible to bore this liner due to its thinness. The thickness of the wall has been changed from 5.5 mm (0.22 in.) to 6.5 mm (0.26 in.), and the shape of the water passage between the bores has been optimized to improve both cooling performance and rigidity.



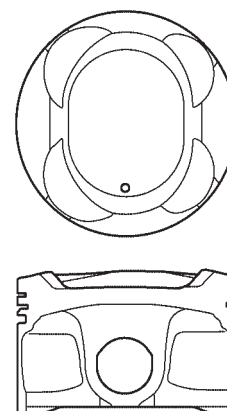
A – A Cross Section

#### 4. Piston

- The piston head portion has adopted a taper squish shape to improve the fuel combustion efficiency.
- The sliding surface of the piston skirt has been coated with resin to reduce the amount of friction loss.
- Full floating type piston pins are used.
- By increasing the machining precision of the cylinder bore diameter, the outer diameter of the piston has been made into one type.
- In contrast to the previous 1UZ-FE engine on the LS400, the placement position of the piston rings has been slightly raised in the new 3UZ-FE engine on the GS430 in order to reduce the area in which unburned fuel is likely to accumulate during the combustion process. Furthermore, the squish area in the thrust direction of the piston head has been discontinued and the combustion chamber has been made shallower in order to further improve the combustion efficiency, thus improving fuel economy.



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**3UZ-FE**

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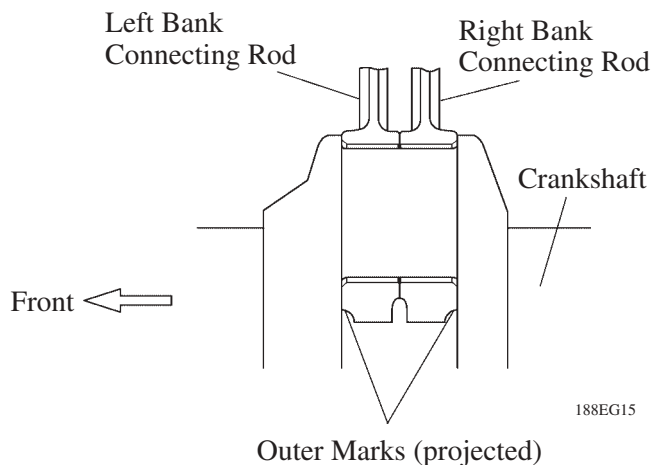
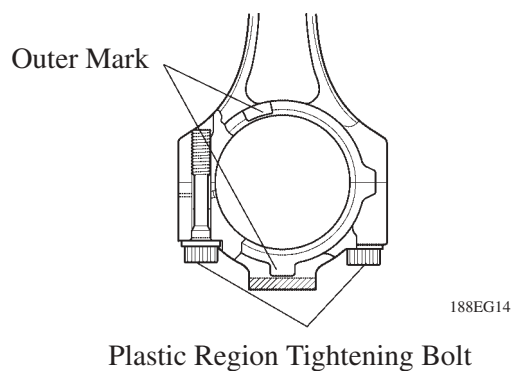
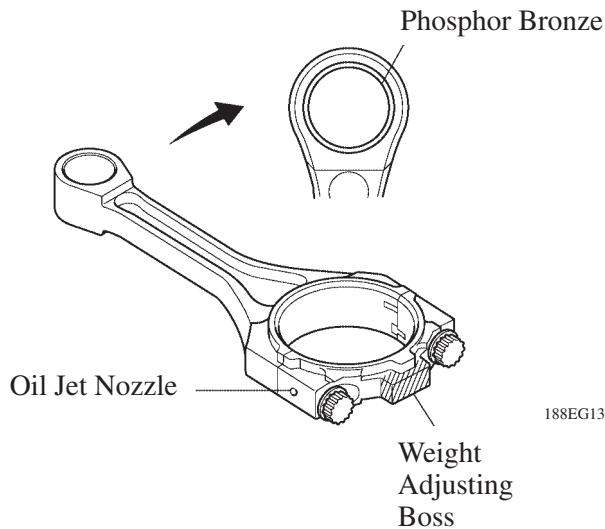
**1UZ-FE**

## 5. Connecting Rod

- The sintered and forged connecting rod is highly rigid and has little weight fluctuation.
- A weight-adjusting boss is provided at the big end to reduce fluctuation of weight and balance the engine assembly.
- In contrast to the previous 1UZ-FE engine on the LS400, the material of the inner surface of the bushing in the small end of the connecting rod in the new 3UZ-FE engine on the GS430 has been changed from lead bronze alloy to phosphor bronze alloy to reduce the lead quantity and to further improve the wear resistance.
- The connecting rod cap is held by plastic region tightening bolts.

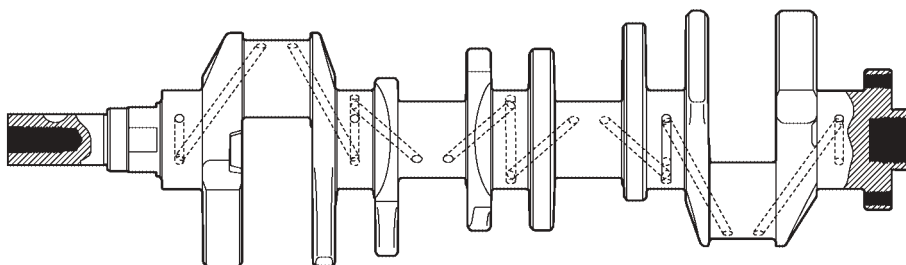
**NOTE:** When reusing the connecting rod cap bolts, if the diameter at the thread is less than 7.0 mm (0.275 in.), it is necessary to replace them with new ones.

- The connecting rods for the right and left banks are placed in opposite directions with the outer marks facing the crankshaft.



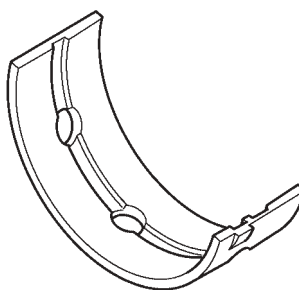
## 6. Crankshaft and Crankshaft Bearings

- A forged crankshaft with five main journals, four connecting rod pins and eight balance weights is used.
- Connecting rod pins and journals are induction-hardened to ensure an added reliability.



188EG16

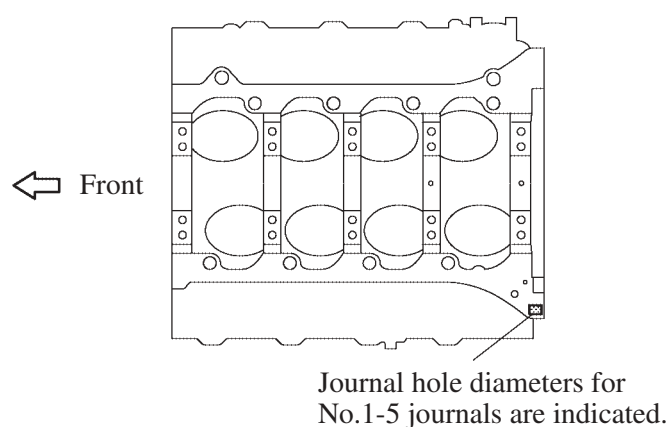
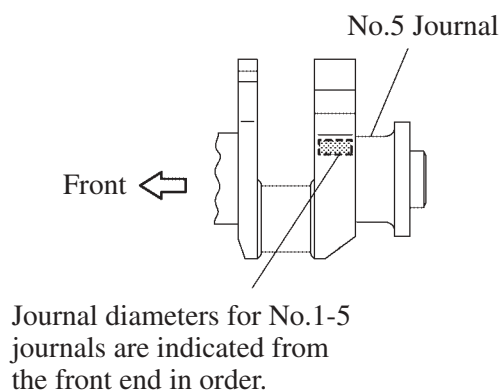
- In contrast to the previous 1UZ-FE engine on the LS400, the material of the sliding surface of the crankshaft bearing in the new 3UZ-FE engine on the GS430 has been changed from kelmet to aluminum alloy to discontinue the use of lead and to further enhance the engine's quiet operation.



188EG17

- Crankshaft bearings are selected carefully according to the measured diameters of the crank journal and cylinder block journal holes.

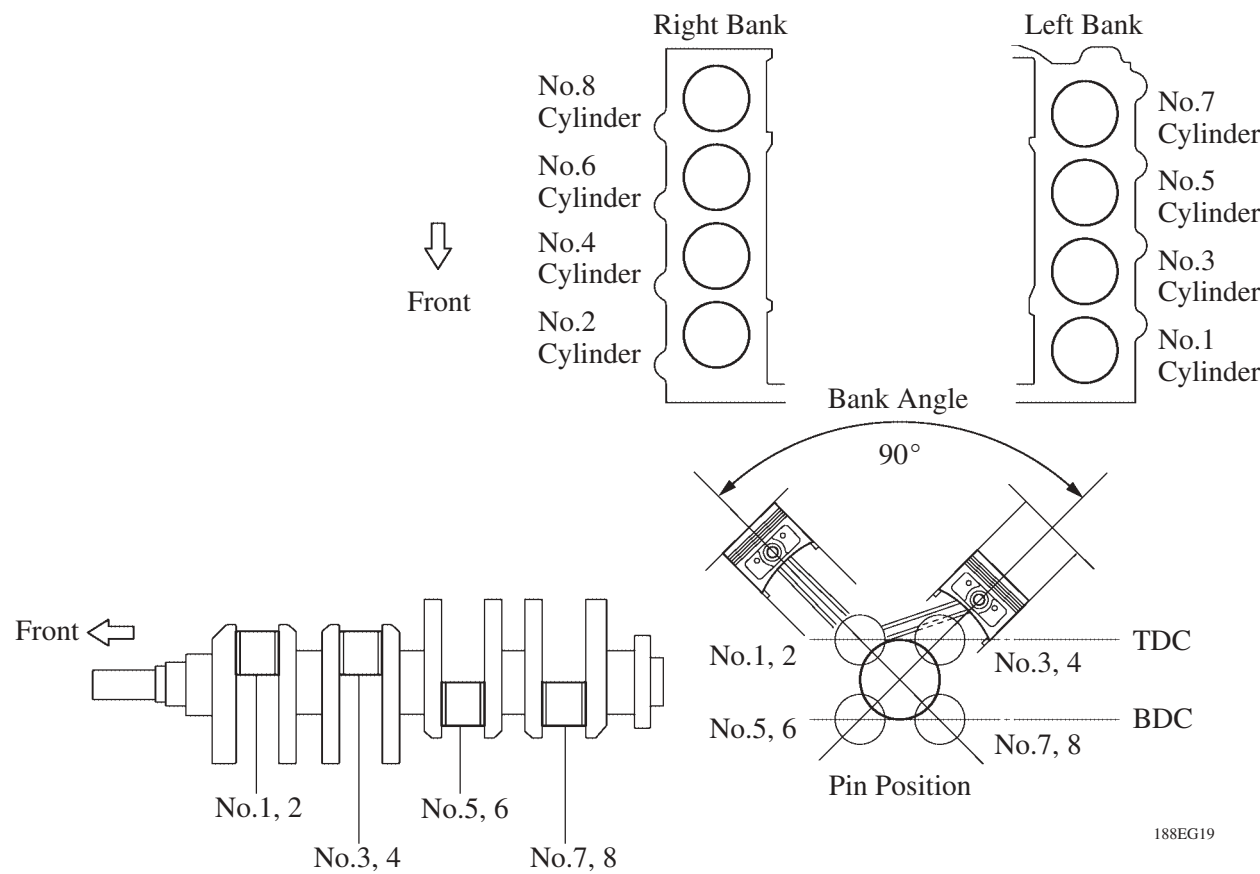
**NOTE:** The diameter of the crank journal and the cylinder block journal hole is indicated at the places shown below.



**Bottom view of cylinder block**

188EG18

**NOTE:** Numbers of the crankshaft and pistons are shown on the right side.



Crankshaft angles and engine strokes (intake, compression, combustion and exhaust) are shown in the table below. The firing order is 1–8–4–3–6–5–7–2.

