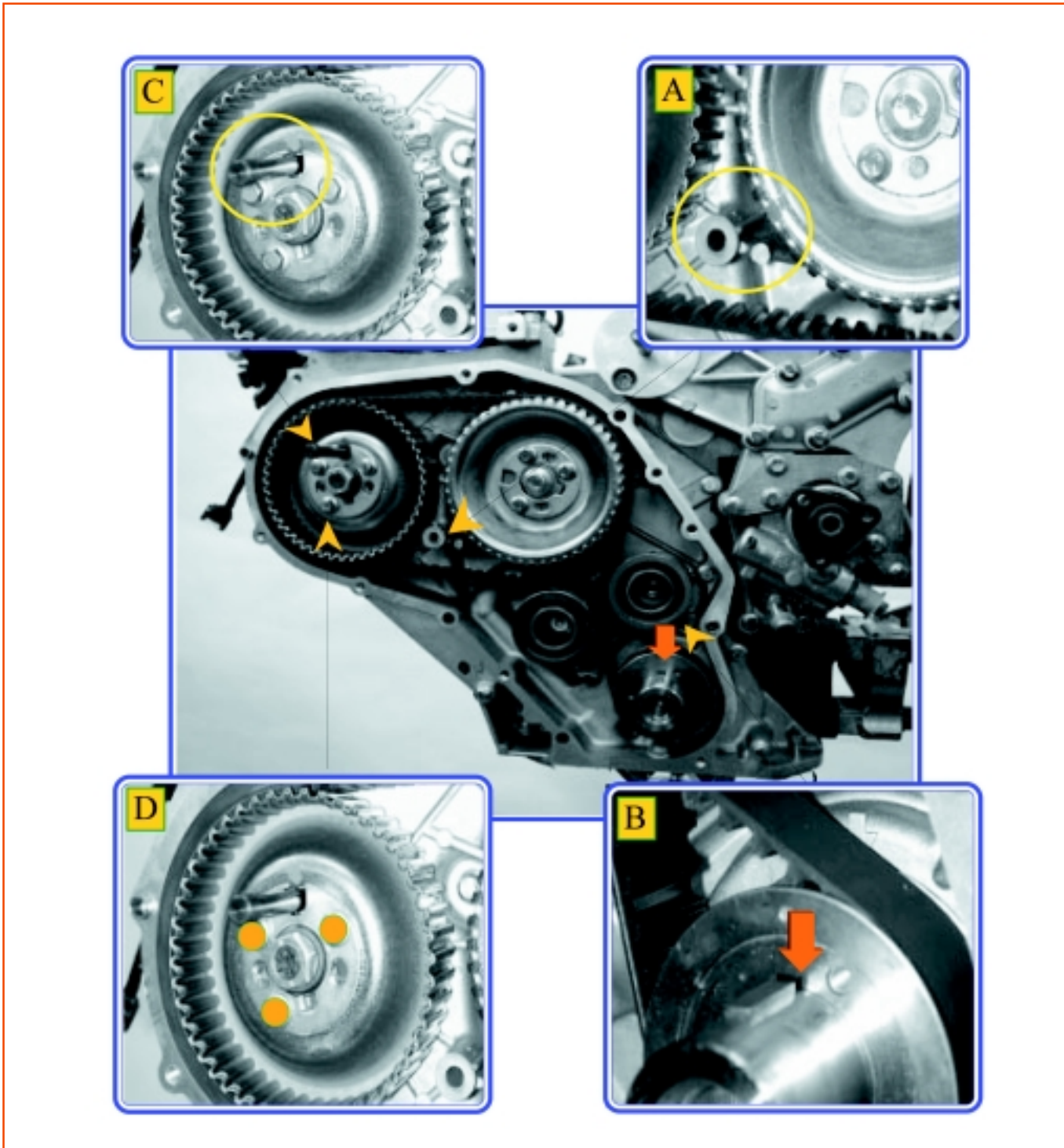


► **ENGINE TIMING**



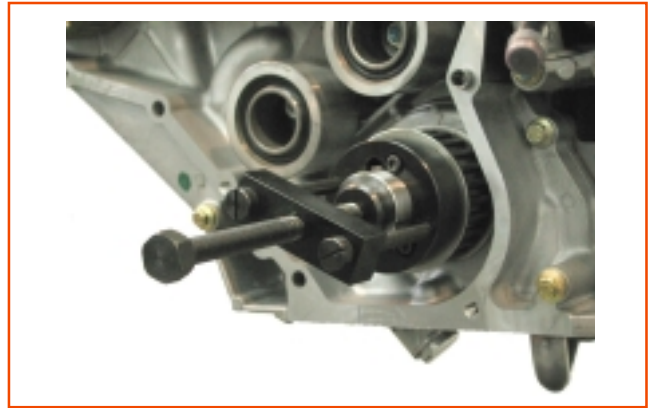
- A Camshaft pulley and timing housing
- B Crankshaft pulley and timing housing (gib upwards)
- C Fuel injection pump pulley and synchronizer pin
- D Loosen pulley bolts, to accommodate belt



## CRANKSHAFT GEAR

### Removal

1. Remove distribution belt, see DISTRIBUTION BELT - Removal.
2. Use tool nr. 8130628 if the crankshaft gear cannot be manually removed.
3. Remove "o" ring.



4. If necessary remove oil seal from timing housing.

### Installation

1. Lubricate the new crankshaft oil seal with clean engine oil.
2. With lip side forward, parallel install oil seal, using tool nr. 8130637.
3. Lubricate a new sealing "o" ring with Vaseline and position it on shaft, taking care to do not damage it with the gibs.
4. Install crankshaft gear, until the total touch, making sure "o" ring stay correctly seated. Use tool nr. 8130637.



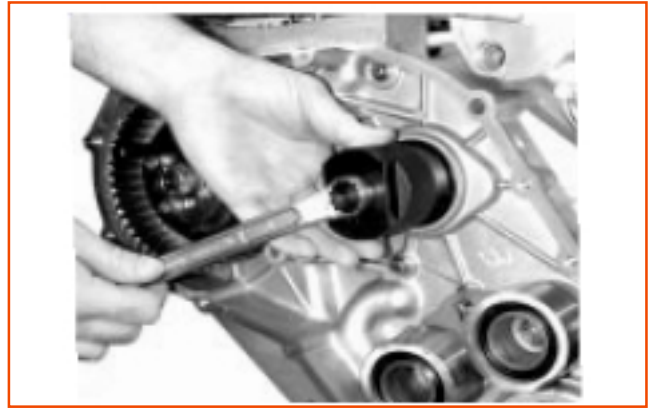
### CAMSHAFT PULLEY AND OIL SEAL COVER

#### Removal

1. Remove camshaft pulley central bolt.
2. Remove camshaft pulley.
3. Remove oil seal from timing housing, using tool nr. 8130640.

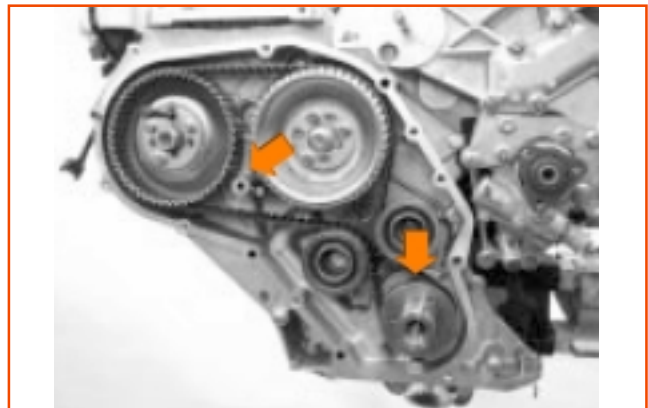
#### Installation

1. Lubricate the new camshaft seal with clean engine oil.
2. With the lip side forward, parallel install oil seal, using special tool nr. 8130639.



**Note:** Camshaft and injection pump pulleys are the same, but they are assembled in inverse way.

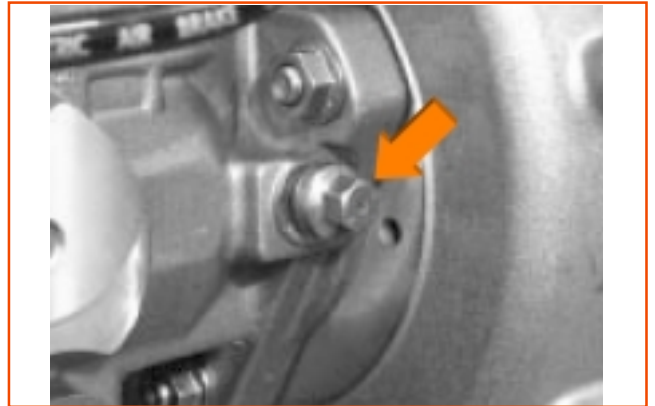
3. Reinstall pulley, positioning it so that the timing mark stay turned forward, tighten bolt according to specification.



## FUEL INJECTION PUMP PULLEY

### Removal

1. Follow distribution belt removal procedure, see DISTRIBUTION BELT - Removal, but only loosen tensor bolt and remove belt after the following steps.
2. Loosen the three pulley central bolts.
3. Remove pump limiter and retighten bolt to lock the pump.



4. Remove tool nr. 8130633 pin from pulley.
5. Remove the three bolts and then remove plate and pulley.

**Note:** It is important to assure that, once locked fuel injection pump, any attempt to turn pump cannot be made. Take care to do not allow crankshaft to be turned.

### Reinstallation

**Note:** Camshaft and injection pump pulleys are the same, even so they are assembled in inverse way.

1. Install pulley, positioning it in way that timing mark keep turned backwards.
2. Install plate and fix it with three bolts.
3. Install tool nr. 8130633 pin in fuel injection pump pulley and fit it in the pump flange.
4. Reinstall limiter to unlock pump.
5. Install distribution belt, see DISTRIBUTION BELT - INSTALLATION

**TIMING HOUSING****Removal**

1. Remove distribution belt and toothed pulleys, see DISTRIBUTION BELT - Removal.
2. Remove fuel injection pump, see FUEL INJECTION PUMP Removal.
3. Remove crankshaft gear, see CRANKSHAFT GEAR- Removal.
4. Remove oil pan, see ENGINE OIL PAN Removal.
5. Remove oil suction pipe.
6. Remove timing housing fixation bolts.
7. Remove timing housing with gasket.
8. Remove all gasket material from contact surfaces.

**Reinstallation**

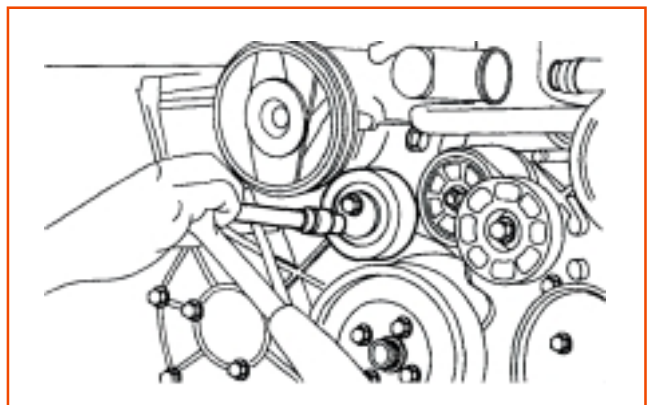
1. Install guide prisoners to position gasket.
2. Install a new gasket, on guide prisoners in engine block.
3. Align oil pump grooves with crankshaft grooves.
4. Install timing housing on the block, taking care to do not damage oil seal.
5. Fix bolts with correct length in the positions where guide prisoners were not installed.
6. Remove guide prisoners, installing on its places bolts with correct size.
7. Tighten all bolts according to specification.
8. Install oil suction pipe.
9. Install oil pan, see ENGINE OIL PAN Installation.
10. Reinstall fuel injection pump, see FUEL INJECTION PUMP Reinstallation.
11. Reinstall teeth pulleys, crankshaft gear and belt.

**Accessories moving belts**

**Note:** A new belt must be installed if tensor lever marks and housing spring are aligned.

**Removal**

1. Position a tool on the fixation bolt of the pump and alternator moving belt tensor.
2. Slowly release pulley tension on belt (counter clockwise).
3. Remove belt from pulley.
4. Free tensor.
5. Finish belt removal,
6. Loosen fixation bolt of air conditioning compressor moving belt tensor.
7. Remove belt from pulley handling it over the fan.



**Reinstallation**

1. Reinstall moving belts in the inverse order of removal.
2. Fix tensor bolt according to specification.

**Camshaft****Removal**

1. Remove timing housing, see TIMING HOUSING Removal.
2. Remove cylinder head.
3. Remove tappets and tappets rolls.
4. Loosen bolts and remove camshaft fixation plate.
5. Remove camshaft.

**Installation**

1. Reinstall in inverse order of removal tightening bolts according to specification.