

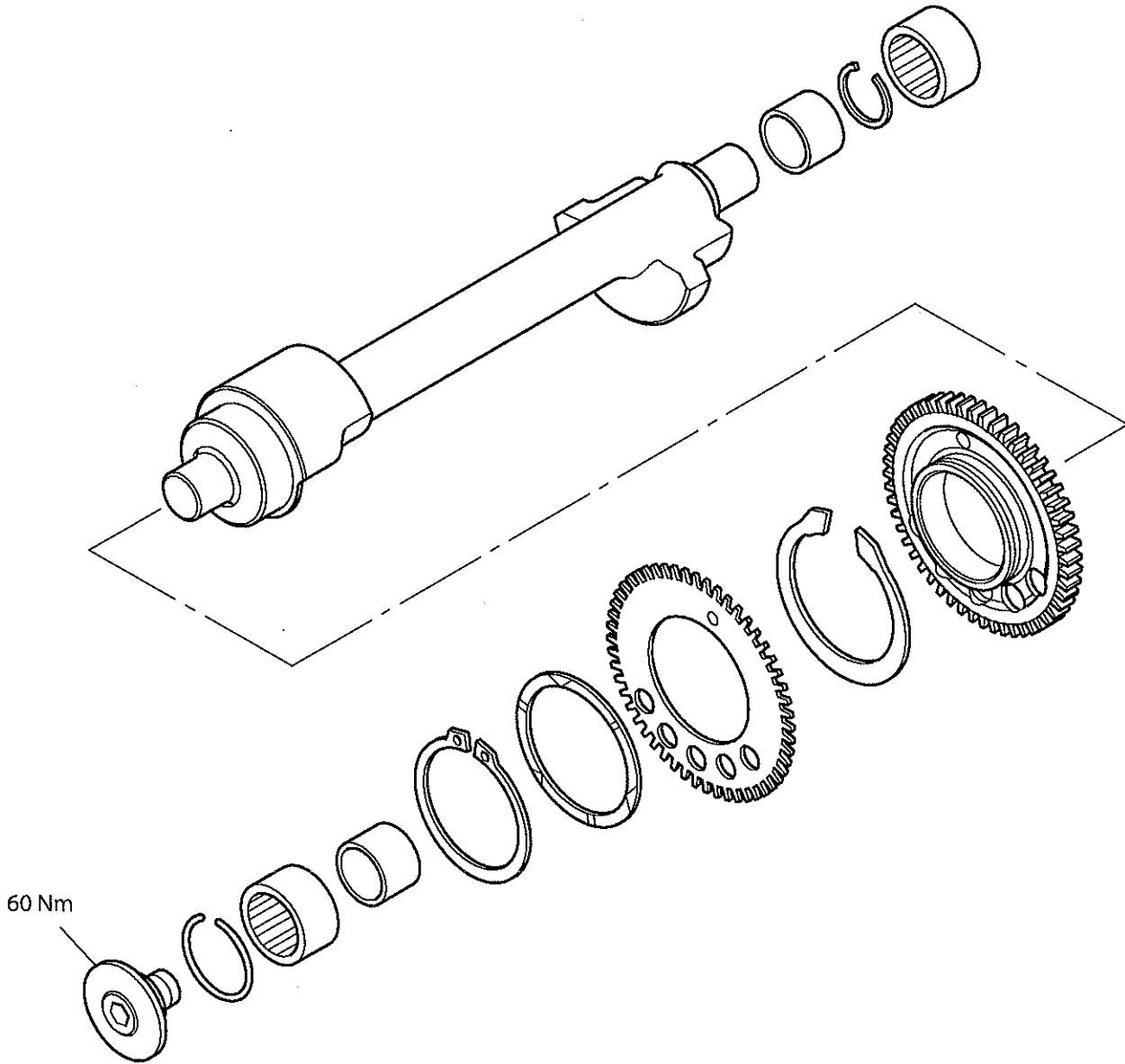
# 6 Balancer

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# Balancer

## Exploded View - Balancer Shaft



## Balancer

The balancer is fitted to control 'pulsing' within the engine. Without any form of balancer, the engine would 'pulse' each time the crankshaft rotated. This 'pulsing' would be felt as a vibration which would amplify as the engine speed was increased.

The balancer has the effect of a pair of counterbalance weights which create an equal amount of energy in the opposite direction, and at the same time as that produced by the crankshaft, pistons and connecting rods. Because the opposing pulses occur at the same point of crankshaft rotation, and are of an equal magnitude, a state of equilibrium or balance is reached.

The balancer shaft is hollow and also functions as the centrifugal breather.

## Removal

1. Separate the crankcase halves (see page 5-4).
2. With the crankcase halves separated, lift out the balancer shaft complete with the shaft bearings/circlips.

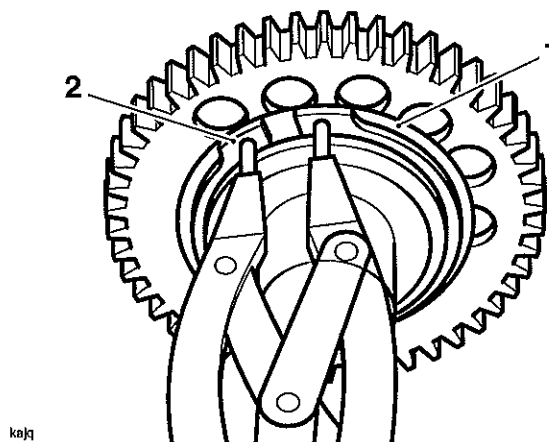
### Note:

- **As the shaft is released from the crankcase, the backlash eliminator gear will spring out of alignment with the crankshaft.**
3. To remove the left hand bearing, slide the bearing, circlip and bearing sleeve from the balancer shaft.
  4. To remove the right hand bearing, remove the bolt and slide the circlip, bearing race and inner ring from the shaft.

## ! Caution

When removing the circlip, always ensure that the area where the breather seal runs does not become scratched or damaged. A damaged seal track will cause oil to be ejected from the engine.

5. To strip the backlash eliminator from the drive gear, release the circlip and remove the wave-washer, backlash gear and spring.



1. Wave washer
2. Circlip

## Inspection

1. Inspect all gears for chipped or missing teeth.
2. Inspect all bearings for signs of overheating (blue discolouration), seized or damaged rollers, and any other damage.
3. Ensure the breather tube in the centre of the shaft is not blocked by oil, debris etc.
4. Inspect the backlash spring for deformities, damage etc.
5. Inspect the gear teeth for overheating (blue discolouration).

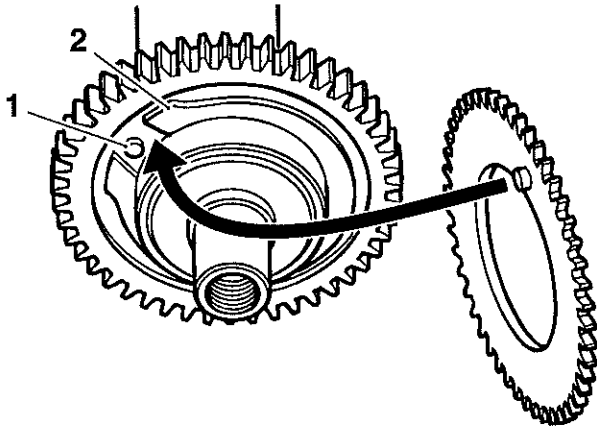
### Note:

- **Signs of blue discolouration on the gear centre are due to the manufacturing process and must be disregarded.**

# Balancer

## Assembly/Installation

1. If the backlash gear was disassembled, fit the backlash spring to the balancer drive gear, positioning the spring ends on either side of the peg.
2. Fit the backlash gear, ensuring its peg is located clockwise of the balancer gear peg and also between the spring ends.
3. Fit the wave washer and secure all components in position with the circlip.



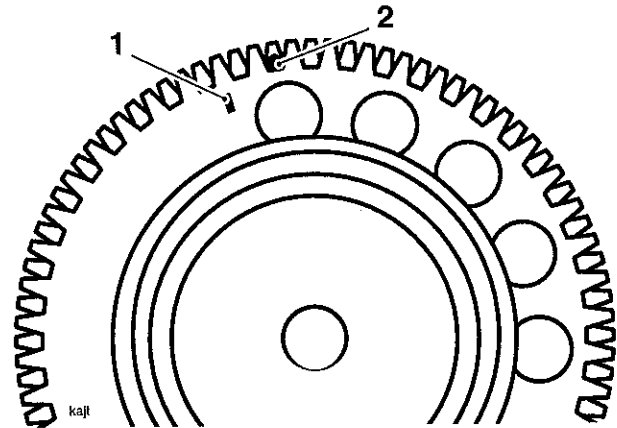
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1. Wave washer
2. Circlip

4. Lubricate and fit the right hand bearing and circlip to the shaft.
5. Apply Threebond TB1305 locking compound to the threads of the balancer bearing bolt.
6. Fit the bolt and tighten to **60 Nm**.
7. Lubricate and fit the left hand bearing and circlip.

### Note:

- Prior to installation in the crankcase, it is essential that the markings on the backlash eliminator and drive gears are brought into alignment against the tension of the spring. This will facilitate correct positioning of the balancer in relation to the crankshaft when both are installed in the crankcase.

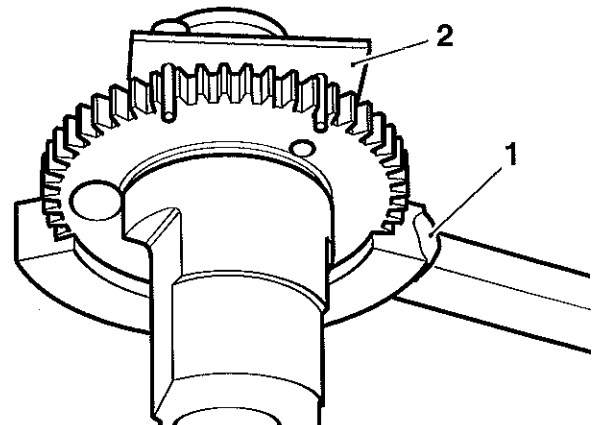


1. Backlash gear line
2. Drive gear dot

8. Using tool T3880016, bring the backlash and drive gear marks into alignment against the backlash spring.

### Note:

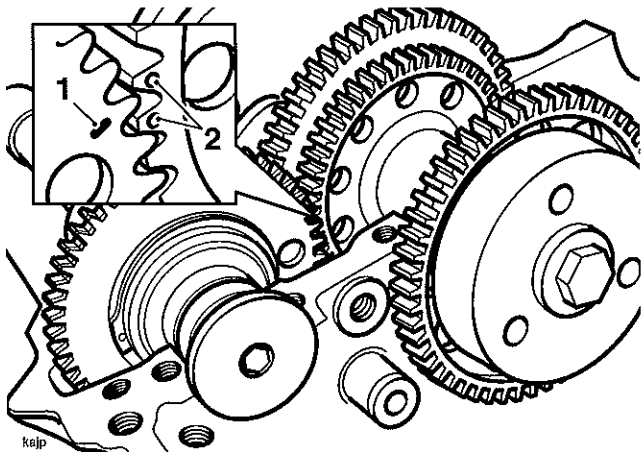
- When in alignment, the line on the backlash gear must be located directly above the drive gear tooth marked with a dot.
  - Since the drive gear dot cannot be seen when the backlash gear is in alignment, always mark the dot-marked gear tooth with chalk in order that it can always be identified.
9. Secure the backlash gear in position with the fixture supplied with the tool by placing the fixture pegs across two gear teeth (ensure that the fixture will not be in the way when assembling the balancer to the crank).



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1. Tool T3880016
2. Securing fixture

10. With the drive and backlash eliminator gears still correctly aligned, locate the balancer to the crankcase aligning the balancer gears and crankshaft as shown in the illustration below while ensuring that the bearing circlips locate correctly in their corresponding grooves in the crankcase.

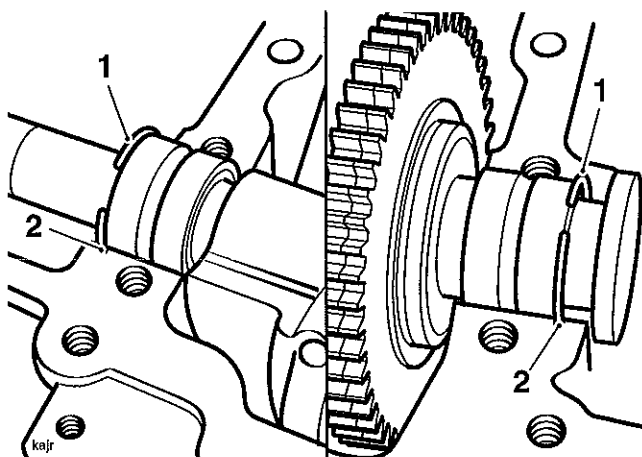


1. Balancer backlash and drive gear markings
2. Crankshaft markings



## Caution

If the balancer and crankshaft are not correctly aligned, severe engine vibration will occur leading to damage to components.



1. Circlips
2. Crankcase Circlip Grooves

11. Remove the securing fixture.
12. Check that the balancer and crankshaft are correctly aligned before continuing to assemble the crankcase halves.

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