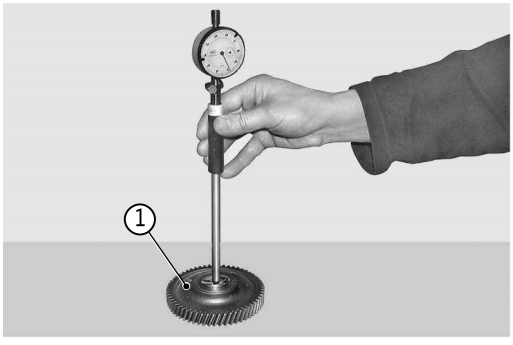
Timing gear checks

Use a dial bore gauge to check the diameter of the intermediate gear bush (1).

Renew the bush if its wear exceeds the limit permitted by "Technical data and dimensions".



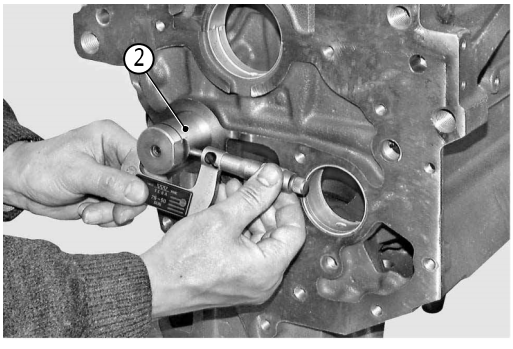
1.

Use a dial gauge to check the diameter of intermediate gear shaft (2).

If the measurement is less than the permissible value given in "Technical data and dimensions", renew the shaft.

NOTE

The shaft must always be renewed if it presents signs of seizure.



2.

3. Before timing the camshaft, check the backlash between the timing gears to reduce noise levels.

Permitted backlash:

0.05 ... 0.1 mm (0.0019 ... 0.0039 in.)

The correct backlash is obtained by fitting the intermediate gear chosen from among the three available sizes, each identified by a coloured dot:

Unit of measure:mm (in.)

Measured backlash	Gear to be installed	NOTES
0.05...0.10 (0.0019 -- 0.0039)	Red dot	Standard gear
0.11...0.13 (0.0043 – 0.0051)	Yellow dot	1st oversize gear *
above 0.13 (above 0.0051)	Green dot	2nd oversize gear *

* The oversize concerns the tooth width on the reference diameter.

Removing the shaft

To remove the shaft fit a bolt with a long nut and force between the shaft and internal wall.

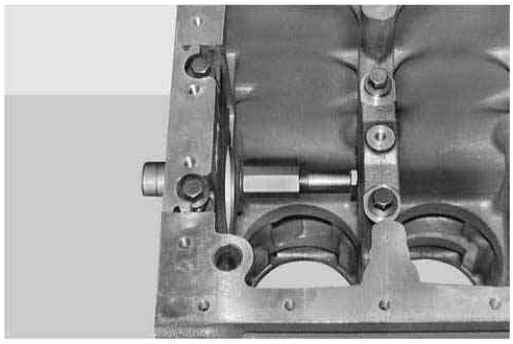
Before fitting the new shaft, clean the lubrication hole carefully; after installing the shaft in the engine block, close the oilway with the plug coated with sealant.

Plug: Loctite 242

The gear shaft must be fitted in the engine block exclusively using the method of prior cooling in liquid nitrogen.

NOTE

DO NOT use hammers, mallets or hydraulic jacks

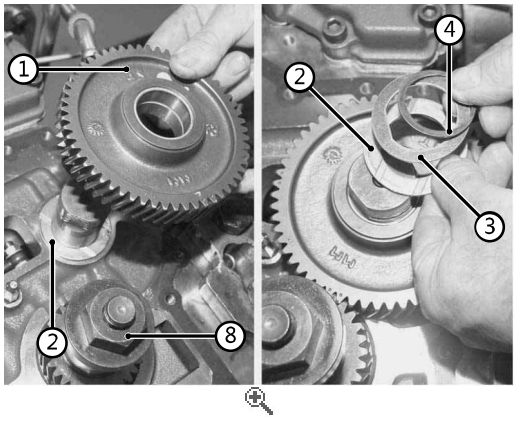


1.

T.$37.23.B0.04.04.00.01 - v1

Adjusting timing gears backlash

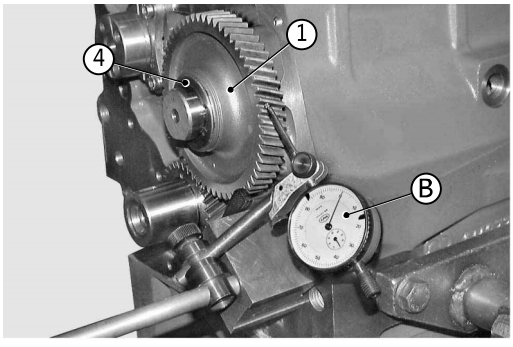
> **NOTE**
>
> Timing operations must be carried out on cylinder N° 1.



Temporarily install intermediate gear (1) complete with thrust bushes (2), thrust washer (3) and circlip (4).

1.

Position a dial gauge "B" on a magnetic stand with the contact point perpendicular to a tooth of the intermediate gear; preload the dial gauge by about 2 mm. (0.079 in.).

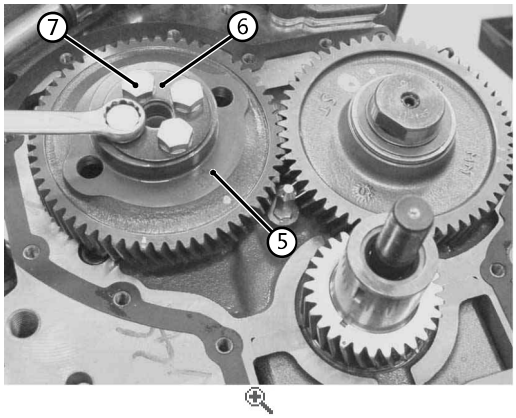


Turn intermediate gear (1) two and fro to check backlash between teeth.

> **NOTE**
>
> Make a note of the backlash value before proceeding with the following check.

2.

Fit camshaft gear (5), flange (6) and new screws (7).



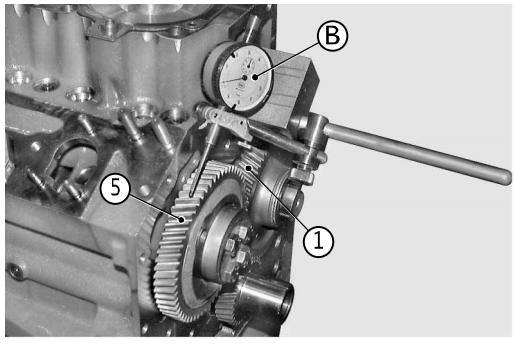
> **NOTE**
>
> Tighten the screws to a minimum torque of 10 Nm (7.4 lb.ft.) to ensure that the gear is pressed fully home onto the camshaft.

Tighten pulse wheel retaining screw (8) on the crankshaft.

> **NOTE**
>
> This screw is utilised to engage the wrench for subsequent precision rotations.

3.

Position dial gauge "B" with the contact point perpendicular to a tooth of the camshaft gear.



Drive intermediate gear (1) fully home and move camshaft timing gear (5) to and fro to check the backlash between the teeth.

> **NOTE**
>
> Make a note of the backlash.

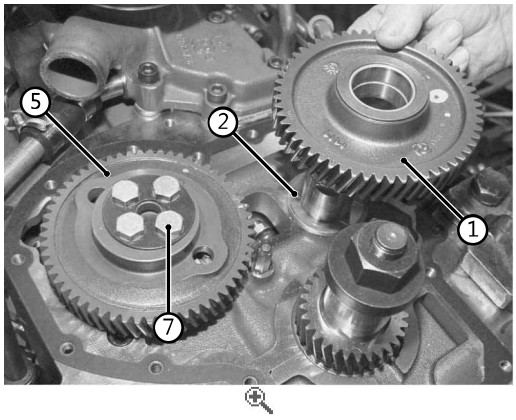
4.

5. Check the two backlash values measured against the permissible values given in "TECHNICAL DATA AND DIMENSIONS" and, if the measured values are not within the permissible limits, renew the intermediate gear with a replacement part that is capable of producing the optimal backlash values.

NOTE

The gears available for adjusting play are shown in "TECHNICAL DATA AND DIMENSIONS".

Remove intermediate gear (1) used for checking and leave inner thrust bush (2) in place.



NOTE

Ensure the thrust bush oil grooves are facing the gear.

Tighten gear (5) with screws (7) working in an alternate cross-wise sequence.

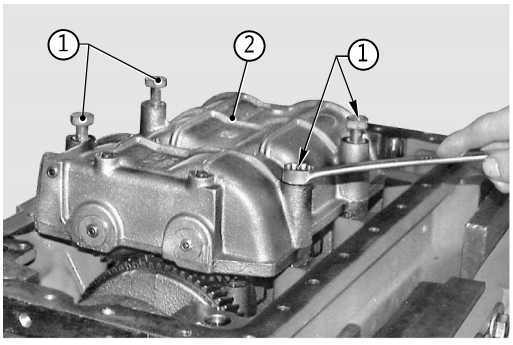
Screws: 50 4.5 Nm (36.8 3.3 lb.ft.).

6.

Counter-rotating weights

Removal of counter-rotating weights (4-cylinder version and if installed)

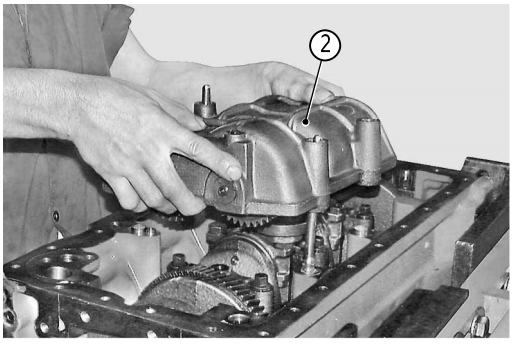
1. Loosen and remove screws (1) retaining counter-rotating weights assembly (2).



NOTE

Loosen the screws in a crosswise and alternate sequence.

2. Remove counter-rotating weights assembly (2).



NOTE

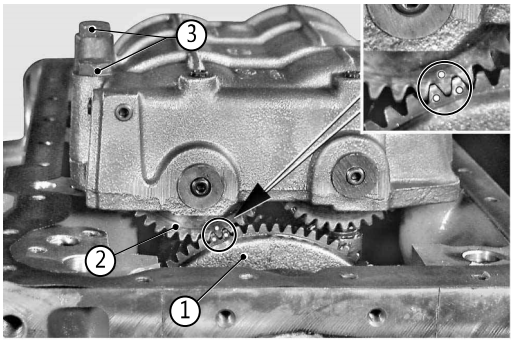
Recover shims, if any.

Counter-rotating weights assembly

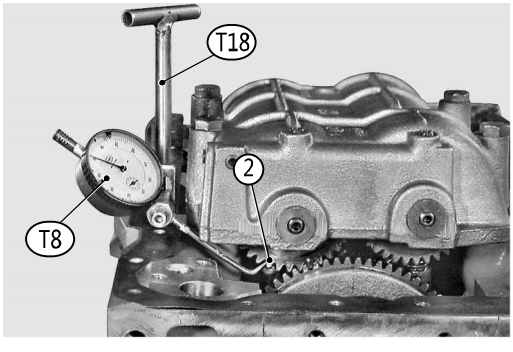
1. Mount the weights assembly after aligning the oilway pin.

Raise the assembly from the gear side; turn crankshaft (1) and balance shaft (2) of counter-rotating weights until matching the reference notches of the respective gears.

Secure the assembly with screws (3).



2. Position a dial gauge with contact point T8 (P/N 5.9030.888.0) installed on tool T18 (P/N 5.9030.886.0) resting alongside drive gear (2) and preload the gauge by about 2 mm.



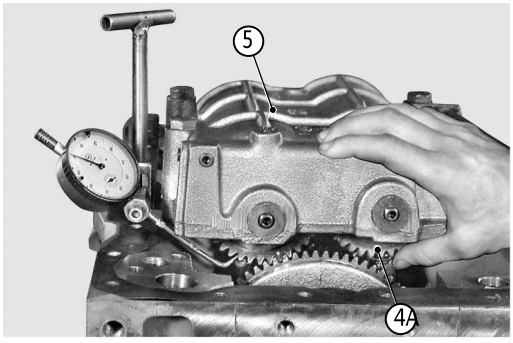
Manually turn driven gear (4) in both directions to check if backlash between teeth corresponds to the value indicated in "TECHNICAL DATA".

If necessary, add shims between the surface of the engine block and the 4 surfaces of the weights assembly (5) until the backlash is within the permissible range of tolerance.

Remove screws (3) securing the assembly, apply sealant and secure to the prescribed torque.

Screws: Loctite 242

Screws: 78 Nm (57.5 lb.ft.)



3.

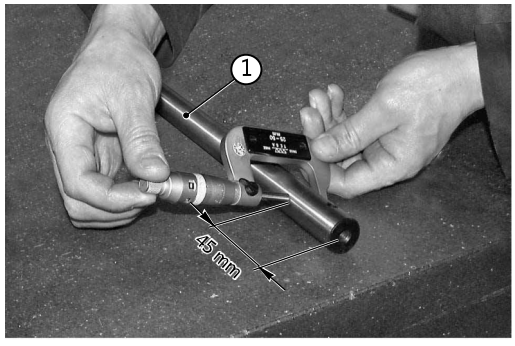
NOTE

Tighten alternate screws gradually in a cross-wise sequence.

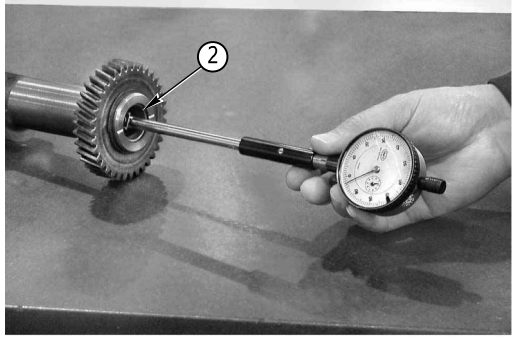
Counter-rotating weight checks

1. With a dial gauge, check the diameter of shafts (1) in the areas in which the counter-rotating weight bearings rotate.

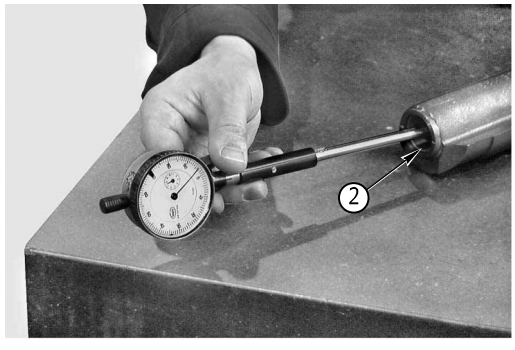
   If the values are lower than those indicated in "TECHNICAL DATA", renew the shafts.



2. With a dial bore gauge, check the diameter of counter-rotating weight bearings (2).

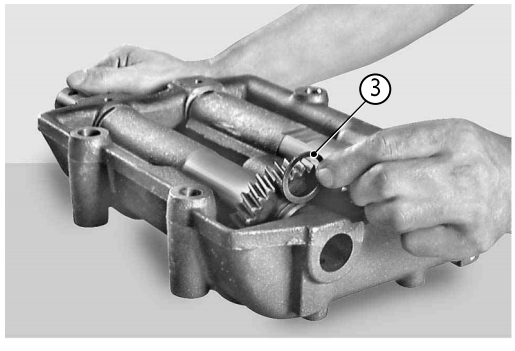


3. If wear exceeds the tolerance limits indicated in "TECHNICAL DATA", renew the bushes.



4. After assembling the counter-rotating weights unit and before securing the shafts, check that counter-rotating weights end float is within the tolerance limits indicated in "TECHNICAL DATA".

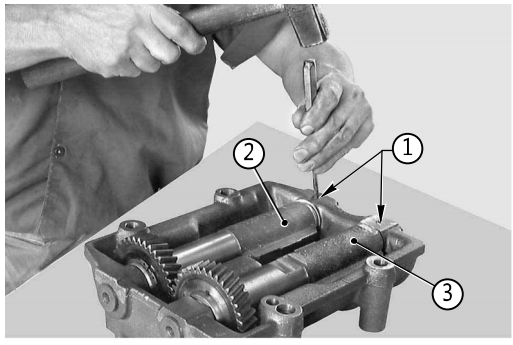
   If the end float exceeds the limit, renew thrust washers (3).



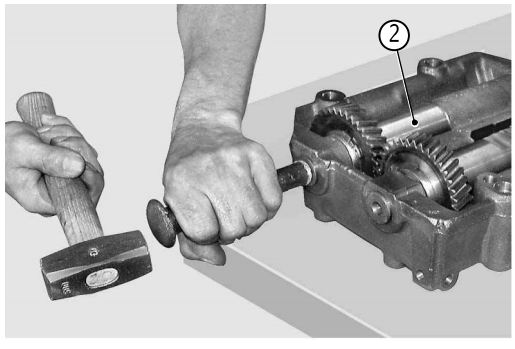
Overhaul of counter-rotating weights assembly

Disassembly

1. Using a pin punch, remove spring pins (1) securing shafts (2) and (3).

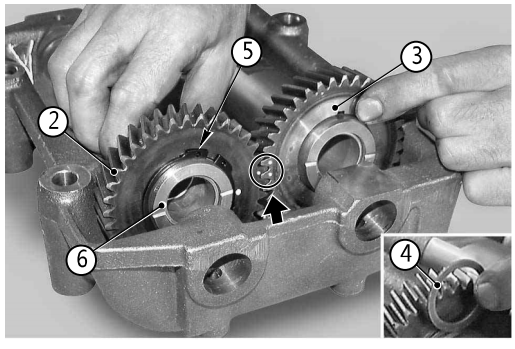


2. Use a soft metal drift (aluminium, copper, etc.) to remove weights support shafts (2) and (3).



3. Remove counter-rotating shafts (2) and (3) and recover front and rear clearance washers (4).

   Remove circlip (5) and remove gear (6) from driven shaft (2).



> **NOTE**
>
> Note that the reference of driven gear (2) is located between the marked teeth of the drive gear (3).

Installation

To assemble, follow the disassembly steps in reverse order.

Shafts (2) and (3): Molikote

> **NOTE**
>
> Check assembly timing between the drive gear and the driven gear.

Valves check

Measure the diameter of the valve stem with a micrometer gauge

NOTE

Measure the stem in several points and with readings taken at positions that are 90° apart.

NOTE

If the diameter is not within the prescribed tolerance limits, renew the valves. See "TECHNICAL DATA AND DIMENSIONS" for the tolerance values.

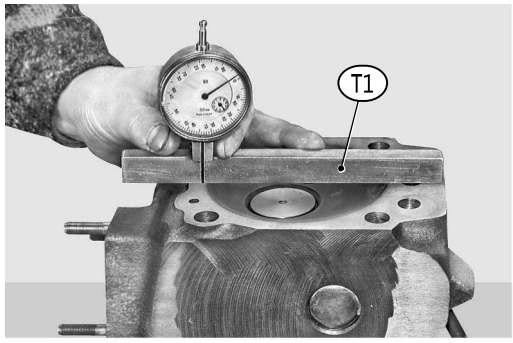
1.

T.$25.23.B0.05.00.00.01 - v1

Valve seats check

Using tool T1 (P/N 5.9030.433.0) and a dial gauge, check the recess of the valves with respect to the surface of the cylinder head.

If the recess of even a single valve is outside the tolerance values given in "TECHNICAL DATA AND DIMENSIONS", the valve seats and valves must be renewed by an authorised service centre.



1.

2. Check that valve seats and valves are in perfect condition and free of any dips or pitting in the sealing area.

   If the valve seats show signs of defects that cannot be removed by grinding, have the valve seats changed by an authorised service centre.

NOTE

The new valve seats are supplied already pre-machined; they do not require any form of operation after installation, which must be carried out only after cooling the seats in liquid nitrogen.

NOTE

For the valves recess values and checking of the valve seat angles, refer to "TECHNICAL DATA AND DIMENSIONS".

T.$25.23.B0.05.00.00.02 - v1

Thank you so much for reading.

Please click the “Buy Now!” button below to download the complete manual.

After you pay.

You can download the most perfect and complete manual in the world immediately.

Our support email:

ebooklibonline@outlook.com