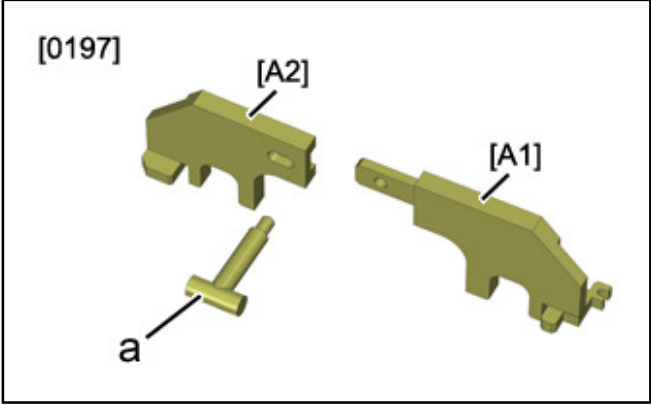



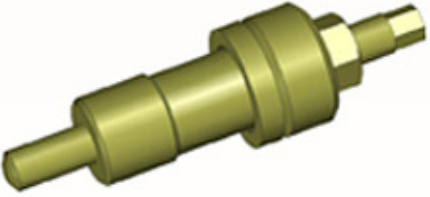

CHECK : SETTING THE VALVE TIMING - EP ENGINE (DIRECT INJECTION)

EP6DTS INJECTION OR EP6DT INJECTION

URGENT : Observe the safety and cleanliness recommendations  .

1. Tooling

tool	Reference	Designation
 <p>Figure : E5AB11ST</p>	[0197]	Camshaft immobilisation and setting tool
	[0197-A2]	Inlet camshaft immobilisation and setting tool
	[0197-A1]	Exhaust camshaft immobilisation and setting tool
	-	"a" : Fixing bolt of the tools [0197-A1], [0197-A2]
 <p>Figure : E5AB11PT</p>	[0197-BZ]	crankshaft setting rod

<p>[0197-M]</p>  <p>Figure : E5AB11QT</p>	[0197-M]	Dummy timing chain tensioner
<p>[1376-A]</p>  <p>Figure : E5AB11RT</p>	[1376-A]	Inclinometer

Necessary equipment :

- Metrology set square (Type SAM E100)
- Torque screwdriver (Type Facom A.301MT)

2. Procedure for checking the setting

Check of the locking of the dephased pulley  .

Timing : **Crankshaft**  .

Measurement of the inlet camshaft setting angle using the inclinometer [1376-A]  :

- Setting correct : Fit the cylinder head cover
- Setting not correct : Check of the lengthening of the chain

Measurement of the lengthening of the chain  :

- Lengthening correct : Repeat the procedure "setting the timing"
- Lengthening not correct : Repeat the procedure "removal-refitting of the timing" replacing the components indicated

Refitting of the cylinder head cover  .

3. Removing

Place the vehicle on a two-post ramp.

Disconnect the battery.

Remove :

- The front right wheel
- The protective panel under the engine
- The front right mud shield

- The cylinder head cover

4. Check of the locking of the dephased pulley

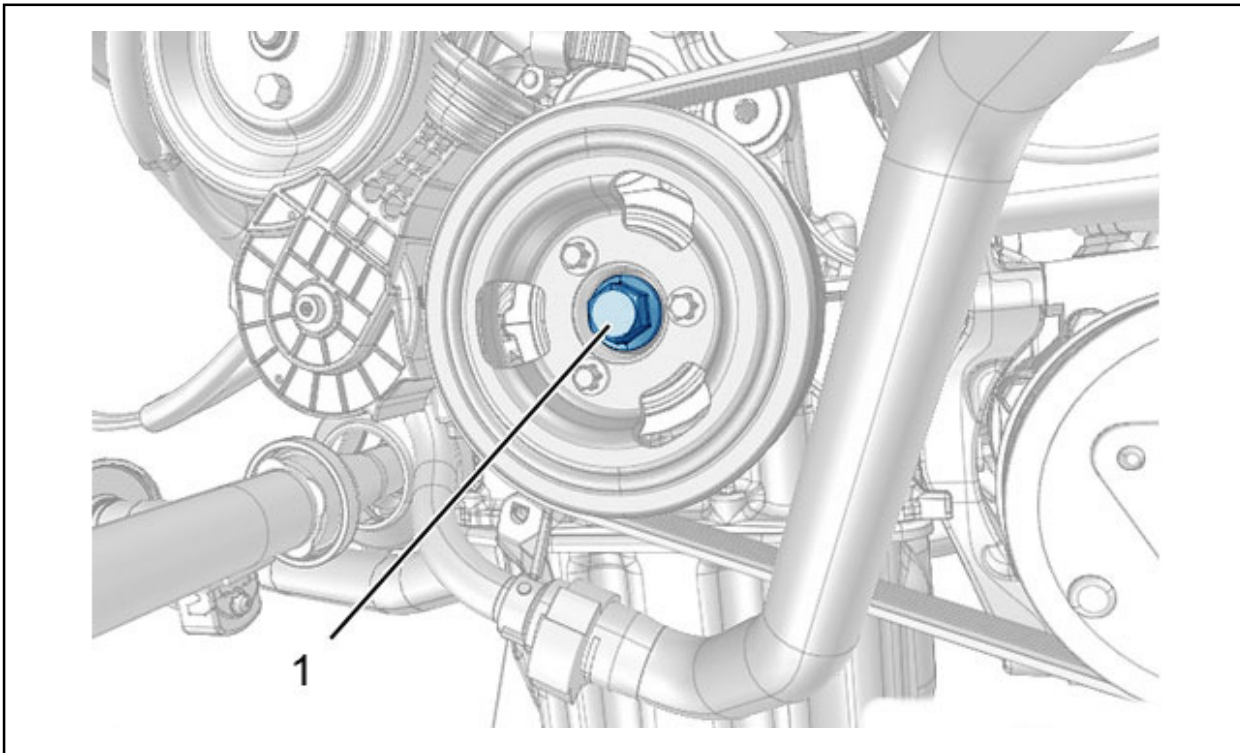


Figure : B1ED0BFD

Make 2 engine revolutions by means of the screw (1) so as to lock the camshaft dephaser.

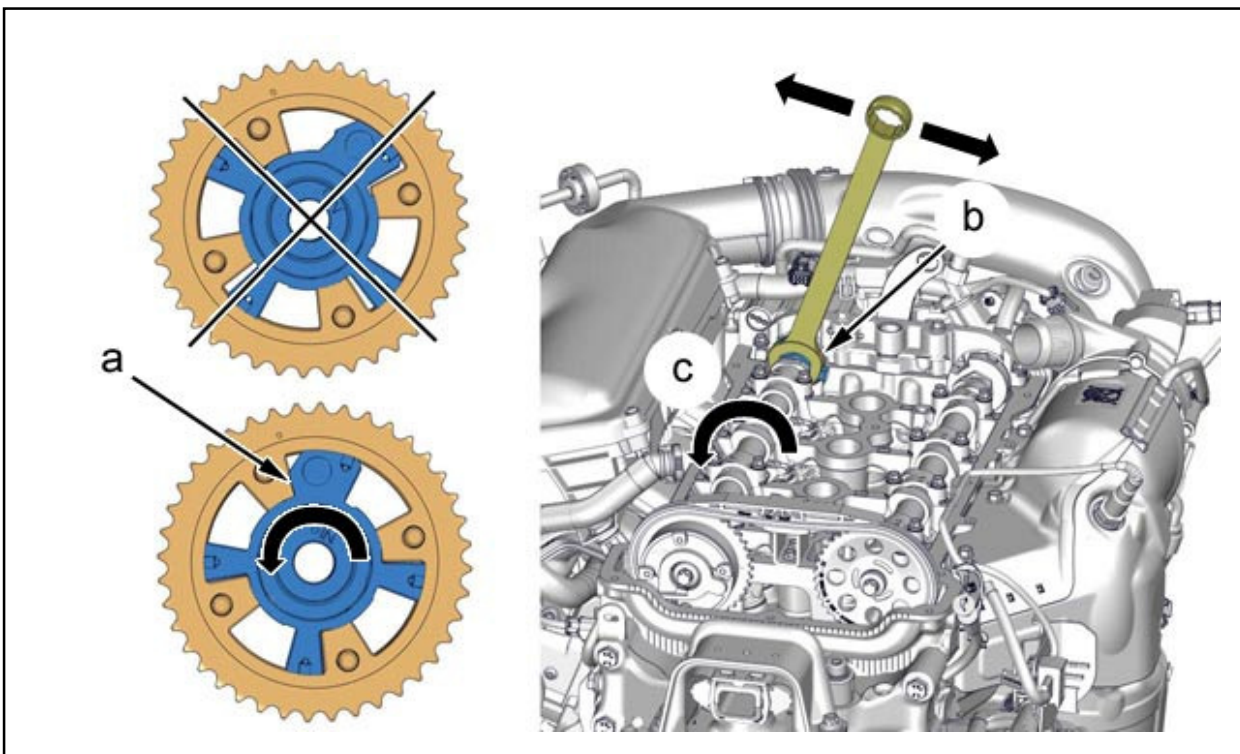


Figure : B1ED0BGD

CAUTION : Do not make the engine turn via the camshafts.

N.B. : The dephaser is locked when the pulley rotates at the same time as the camshaft.

Check that the dephaser remains locked and solid with the camshaft by moving the camshaft gently in the 2 directions ("b").

If this is not the case, turn the inlet camshaft anticlockwise in the direction of the arrow (at "c") to the internal stop of the dephaser (at "a") (maximum travel 35°).

N.B. : In the event that the dephaser will not lock mechanically ; Replace the camshaft dephaser (Dephaser viewer from the timing end).

5. Timing : Crankshaft

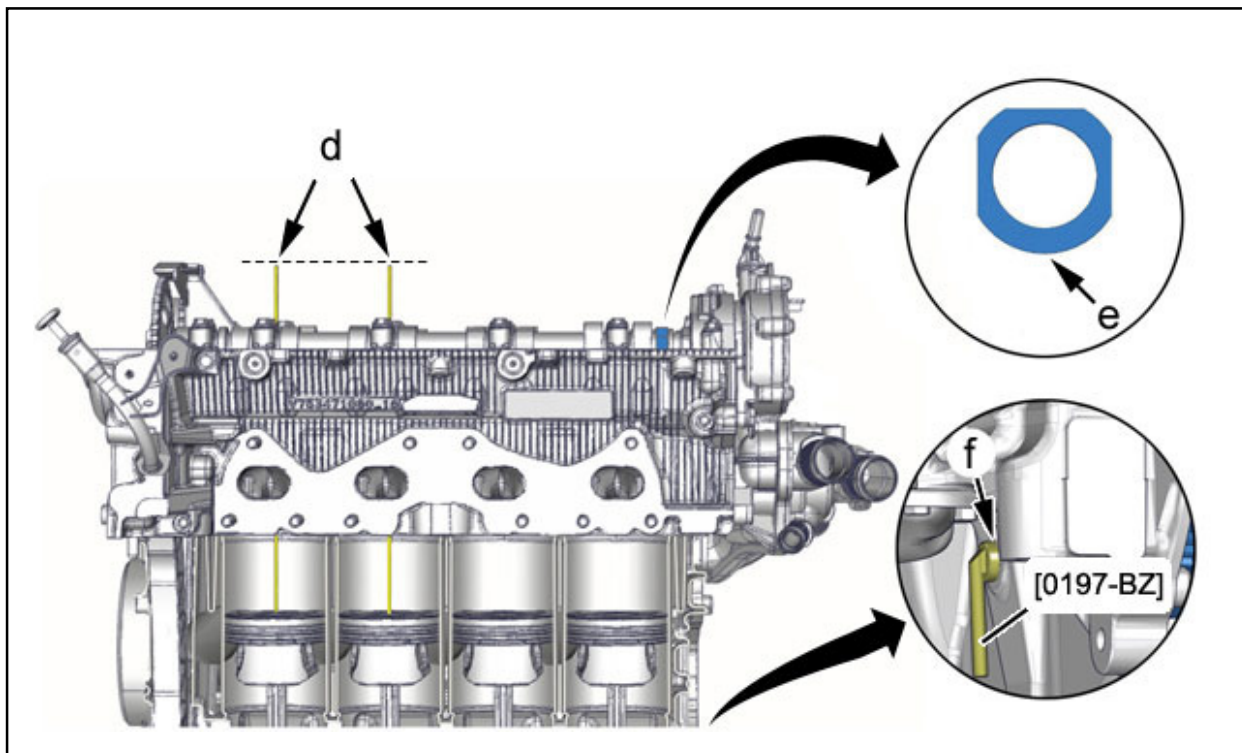


Figure : B1ED0BKD

CAUTION : When the engine is pegged, the pistons are in mid-travel.

Remove : The 2 ignition spark plugs.

Turn the crankshaft clockwise using bolt (1) to the engine flywheel pinning position : The rounded edge of the camshaft indexing has to be oriented downwards (at "e").

CAUTION : Check the position of the pistons at mid travel using 2 gauges of identical length ("welding rod" type) (a "d") ; The rods must protrude by the same length.

Position the rod [0197-BZ] in the location (at "f") situated on the crankshaft main bearing caps casting.

Peg the engine flywheel (at "f") ; Using the pin [0197-BZ].

Check that the engine is pinned correctly by trying to turn the bolt (1) clockwise and anticlockwise ; Using a pipe spanner

CAUTION : If the pinning hole is passed, never go backwards; turn the engine clockwise again through 2 revolutions.

6. Measurement of the inlet camshaft setting angle

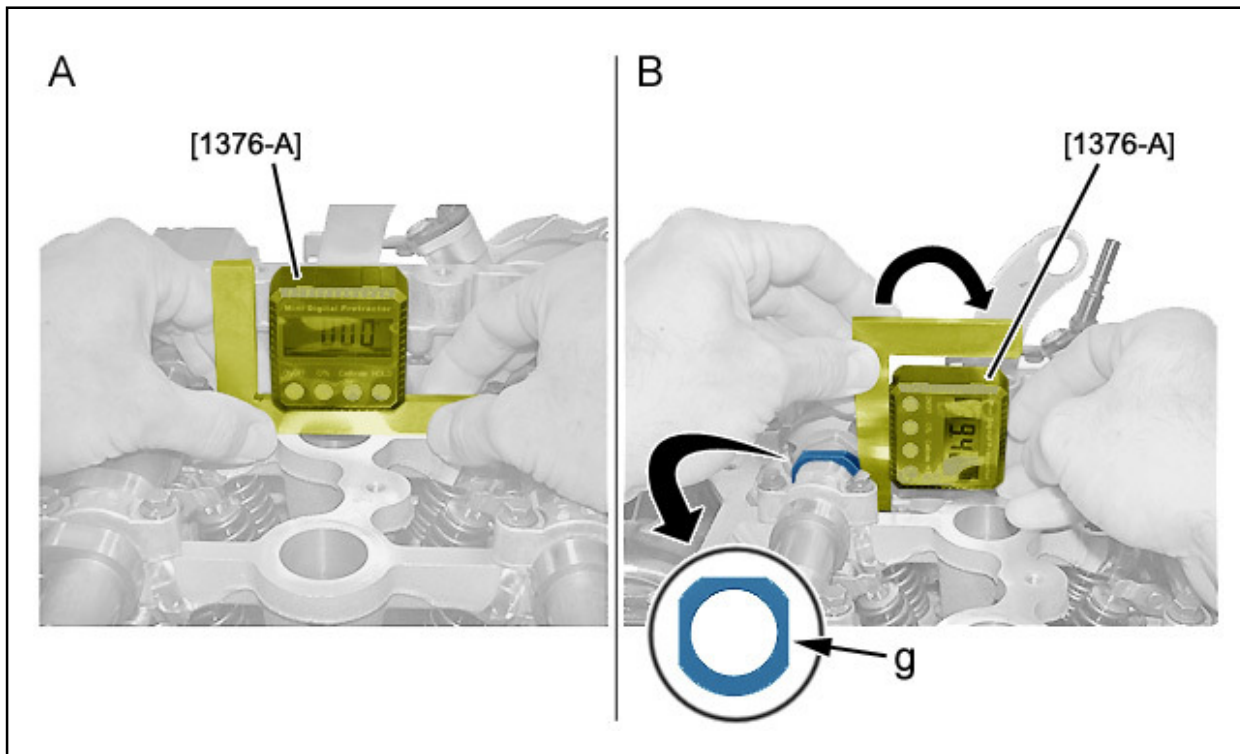


Figure : B1ED0BND

Measurement A : Position the set square type SAM E100 on the cylinder head between the inlet and exhaust main bearings of cylinder n°1.

Place the inclinometer [1376-A] on the set square and calibrate the zero by pressing the "Calibrate" button.

Measurement B : Tilt the inclinometer and the set square by 90° clockwise and set the assembly flush on the vertical plane of the inlet camshaft indexing zone (at "g").

CAUTION : Do not change reference face; do not turn the inclinometer/set square assembly in the opposite direction.

Read the angle given :

- New engine <10 000 miles : [89° ; 91°]
- Engine run in >10 000 miles : [87.9° ; 90.5°]

If the measurement is not within the ranges above, the setting is not correct ; Go to stage : "Measurement of the lengthening of the chain".

If the measurement is within the ranges above, the setting is correct ; Remove the engine flywheel setting rod ; Refit.

CAUTION : Follow the instructions for refitting the cylinder head cover (chapter 8).

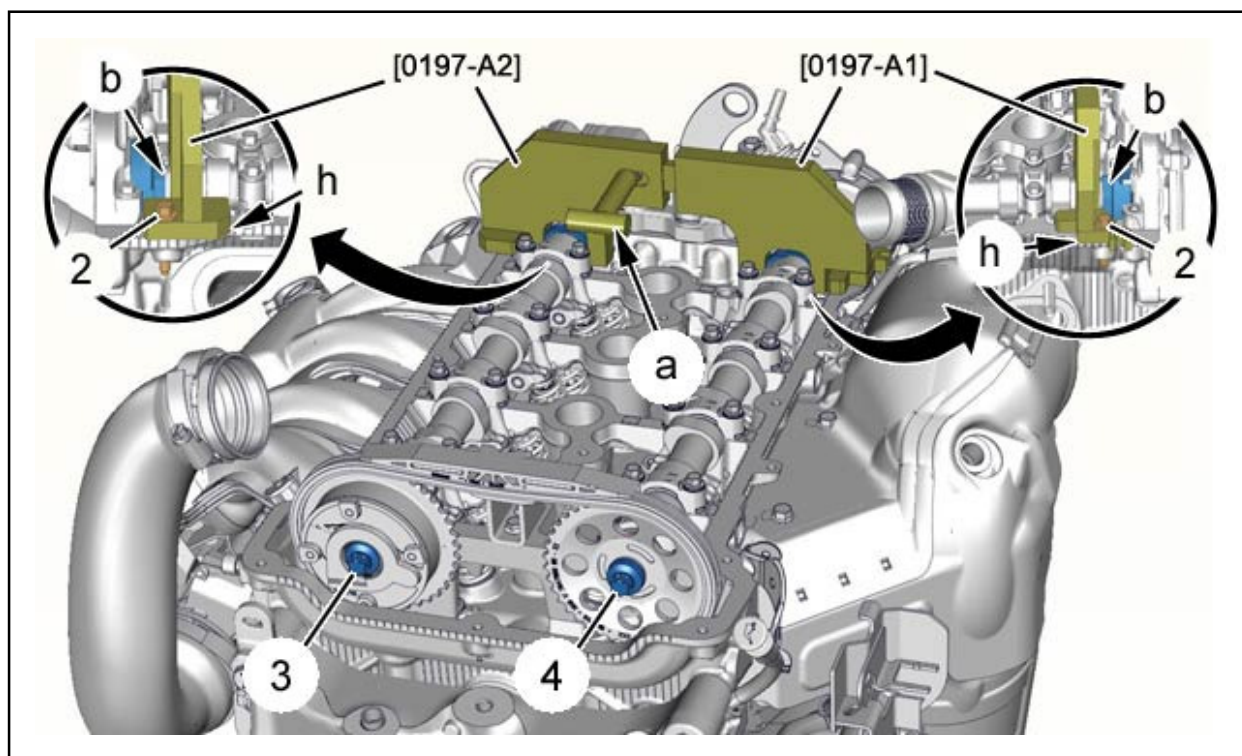


Figure : B1ED0BOD

Position : The camshaft sitting tools [0197-A1], [0197-A2].
 Slacken the tools [0197-A1], [0197-A2] ; Using the bolts (2).
 The tools must be firmly flush on the cylinder head (at "h").

N.B. : To facilitate assembling of the setting tools, rotate the camshafts slightly (clockwise and anti-clockwise) (at "b")
 Using a 27 mm combination spanner.

Assemble : The tools [0197-A1], [0197-A2] ; Using the fixing bolt (a).
 Slacken the camshaft pulley screws (3), (4).

CAUTION : Tighten the bolts (3) , (4) ; slacken them by 90 ° ; the pulleys must be free to rotate but flush.

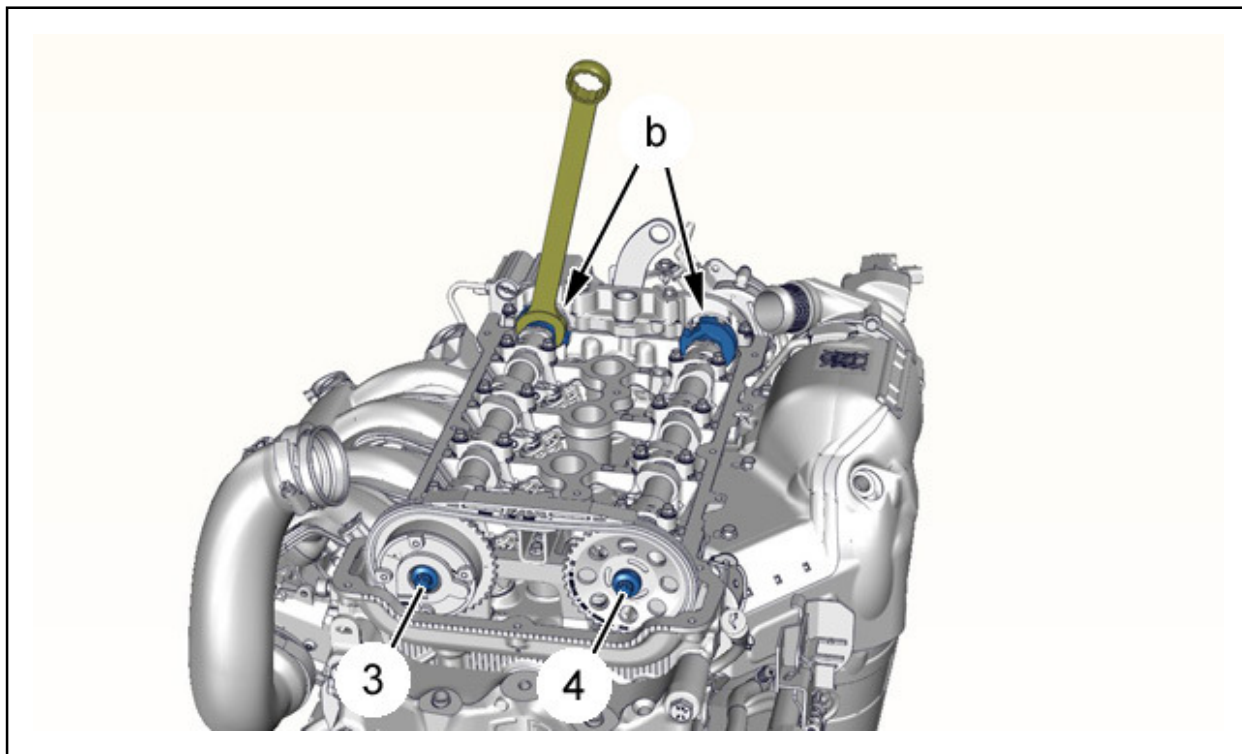


Figure : B1ED0BUD

If the camshaft setting tools [0197-A1], [0197-A2] cannot be fitted ; Support the camshafts ; Using a 27 mm combination spanner (at "b").

N.B. : Operations requiring two operators.

Slacken the camshaft pulley screws (3), (4).

CAUTION : Tighten the bolts (3) , (4) ; slacken them by 90 ° ; the pulleys must be free to rotate but flush.

7.2. Removing : Timing chain tensioner

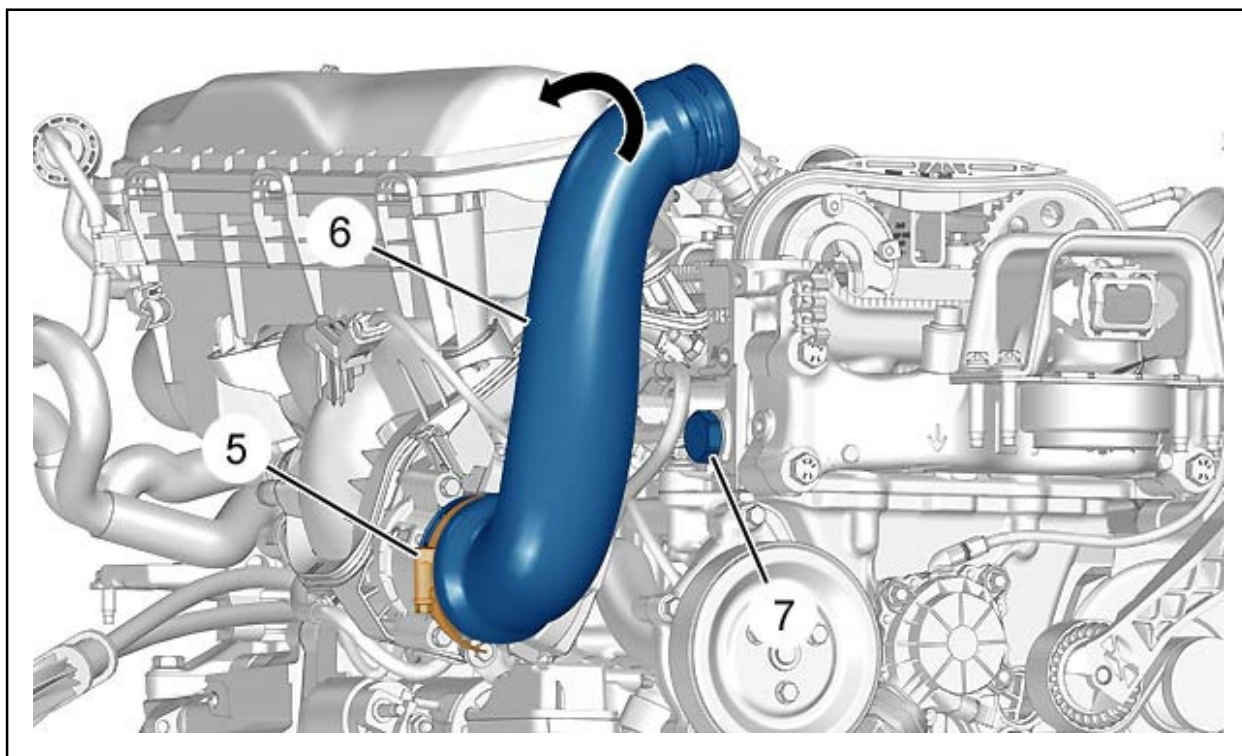


Figure : B1ED0BVD

CAUTION : Do not remove the timing chain tensioner (7) without having pegged the crankshaft and the camshafts
Risk of jumping a tooth on the timing chain.

Slacken the clip (5).

Pivot : The air entry union (6).

CAUTION : Protect the ancillary drive belt and pulleys against splashes of oil when removing the chain tensioner (7).

Remove : The timing chain tensioner (7).

Check the condition of the timing chain tensioner ; Action the piston manually ; If the piston is seized, replace the timing chain tensioner (7).

CAUTION : If the engine number is lower than 42987 ; Replace : The timing chain (7) tensioner (Marking on the new tensioner V7 597 895 80).

7.3. Fitting the dummy timing chain tensioner

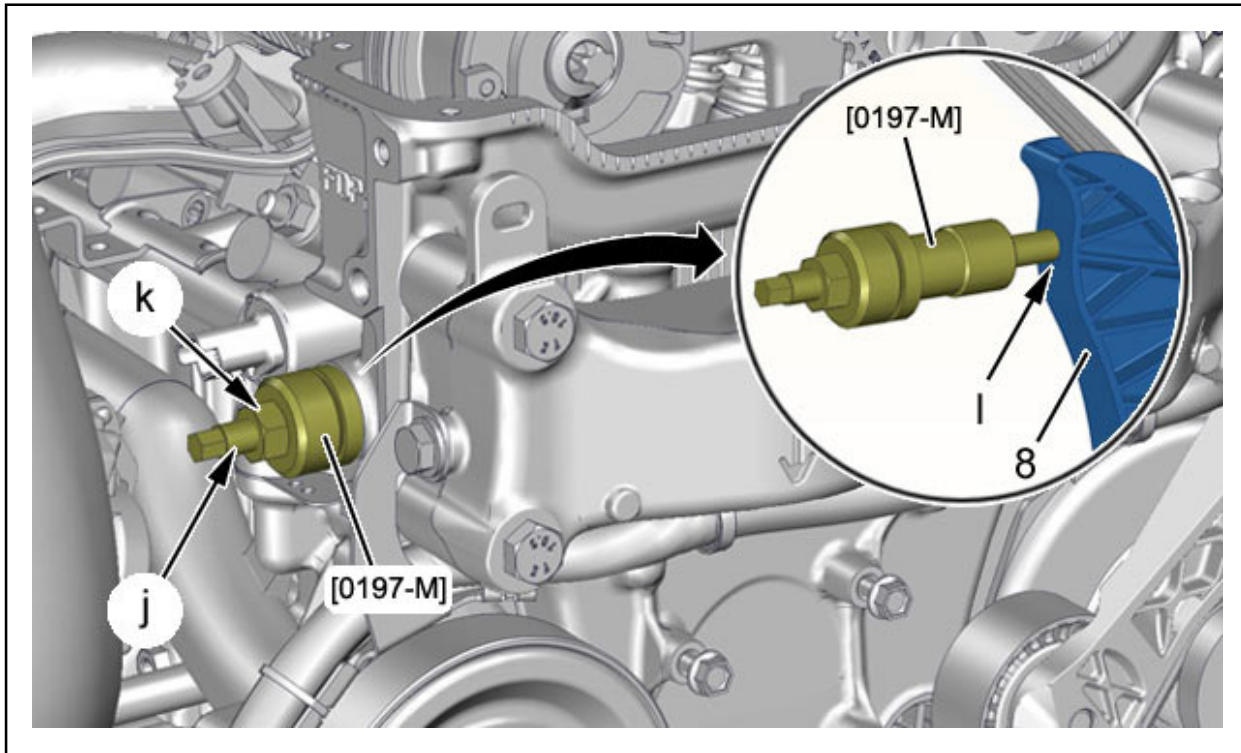


Figure : B1ED0BWD

CAUTION : Oil the threads of the bolt ("j").

Tighten the body of the dummy timing chain tensioner [0197-M] on the cylinder head .
 Tighten bolt ("j") of the dummy timing chain tensioner to the specified torque until it comes into contact (at "l") with the chain tensioner guide (8); Tightening torque : 0,06 daNm.
 Lock the assembly by means of a lock nut ("k").

7.4. Checking the wear of the timing chain assembly

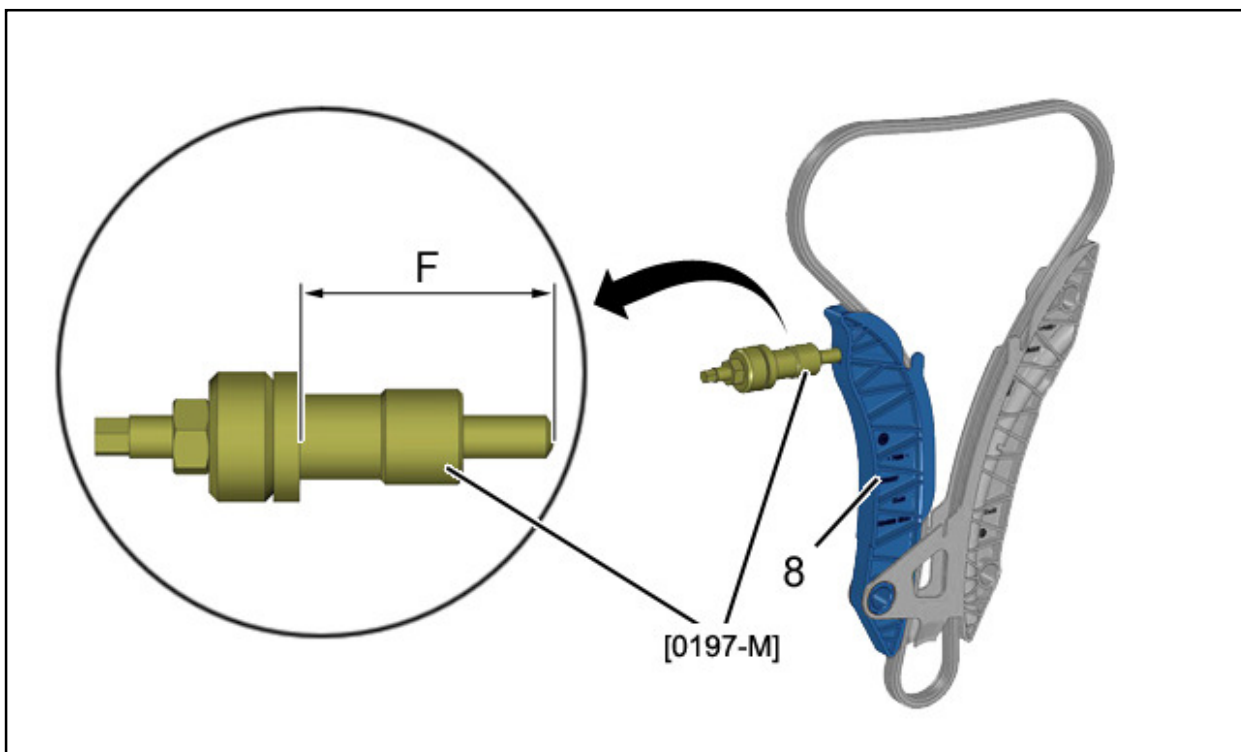


Figure : B1ED0DGD

CAUTION : The timing chain may jump a tooth while you are removing the dummy chain tensioner, if the tools pegging the camshafts [0197-A1], [0197-A2] have been taken away.

Remove the dummy timing chain tensioner and read the dimension "F" between the bearing face of the body of the timing chain tensioner [0197-M] and the end of the bolt ("J").

If the dimension is less than or equal to 68 mm : The timing chain assembly has no wear ; Apply the repair procedure : Setting the valve timing.

If the dimension is greater than 68 mm ; Apply the procedure "removal-refitting of the timing chain" with its replacement.

N.B. : In the 2 cases, refit the dummy timing chain tensioner [0197-M].

8. Refitting : Cylinder head cover (If setting correct)

CAUTION : Adhere to the tightening torques .

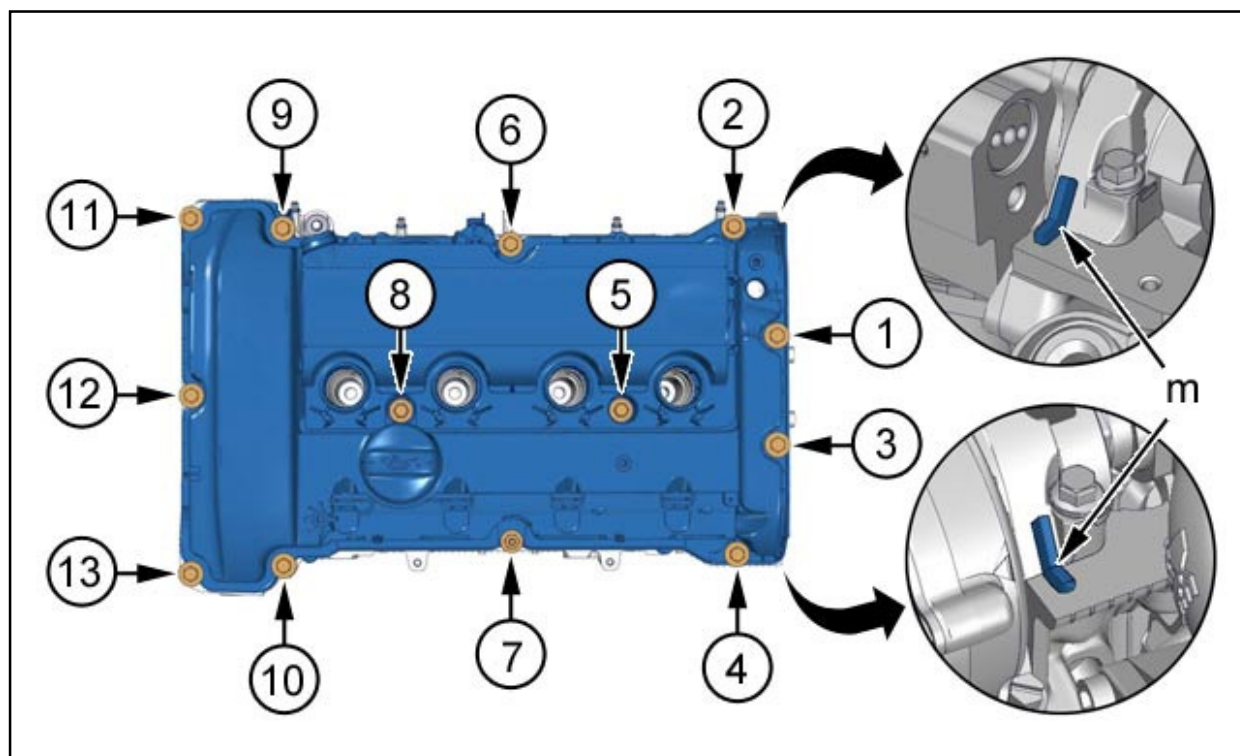


Figure : B1ED0C2D

CAUTION : Systematically replace the seal of the valve cover .

Clean the sealing face on the valve cover ; Using a clean cloth.

Clean the old sealing beads (at "m").

Apply a sealing bead 20 mm long and 5 mm wide (at "m") on each side of the double bearing.

Fit :

- The cylinder head cover with a new seal
- The bolts (Cylinder head cover)

CAUTION : Tighten the cylinder head cover bolts in the order shown.

Fit :

- The front right mud shield
- The protective panel under the engine
- The front right wheel

- The vehicle to its wheels

CAUTION : Perform the operations to be carried out following reconnection of the battery.

Connect the battery.