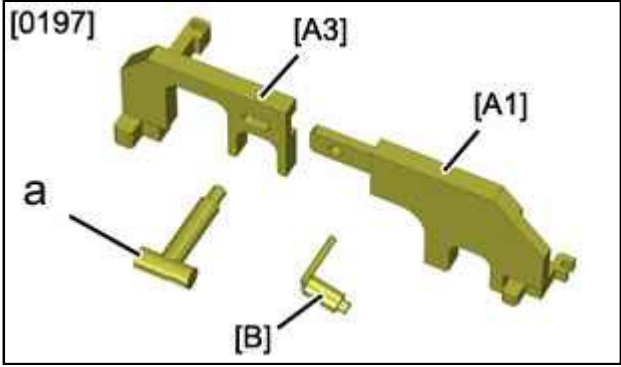


CHECKING : SETTING THE VALVE TIMING - EP ENGINE (INDIRECT INJECTION)

URGENT : Observe the safety and cleanliness recommendations ⓘ .

1. Tooling

tool	Reference	Designation
 <p>Figure : E5AB0K3T</p>	[0197]	Camshaft immobilisation and setting tool
	[0197-A1]	Exhaust camshaft immobilisation and setting tool
	[0197-A3]	Inlet camshaft immobilisation and setting tool
	-	"a" : Fixing bolt of the tools [0197-A1], [0197-A3]
	[0197-B]	crankshaft setting rod

2. Procedure for checking the setting

Checking the locking of the dephasers.

Placing of the setting tools.

Placing of the dummy tensioner.

Rotating the engine 2 turns.

Checking the valve timing :

- Setting correct = Refitting
- Setting not correct = Checking the wear

Checking the wear :

- Wear in conformity = Resetting
- Wear not in conformity = Replacing of the timing chain assembly

Re-setting the timing.

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

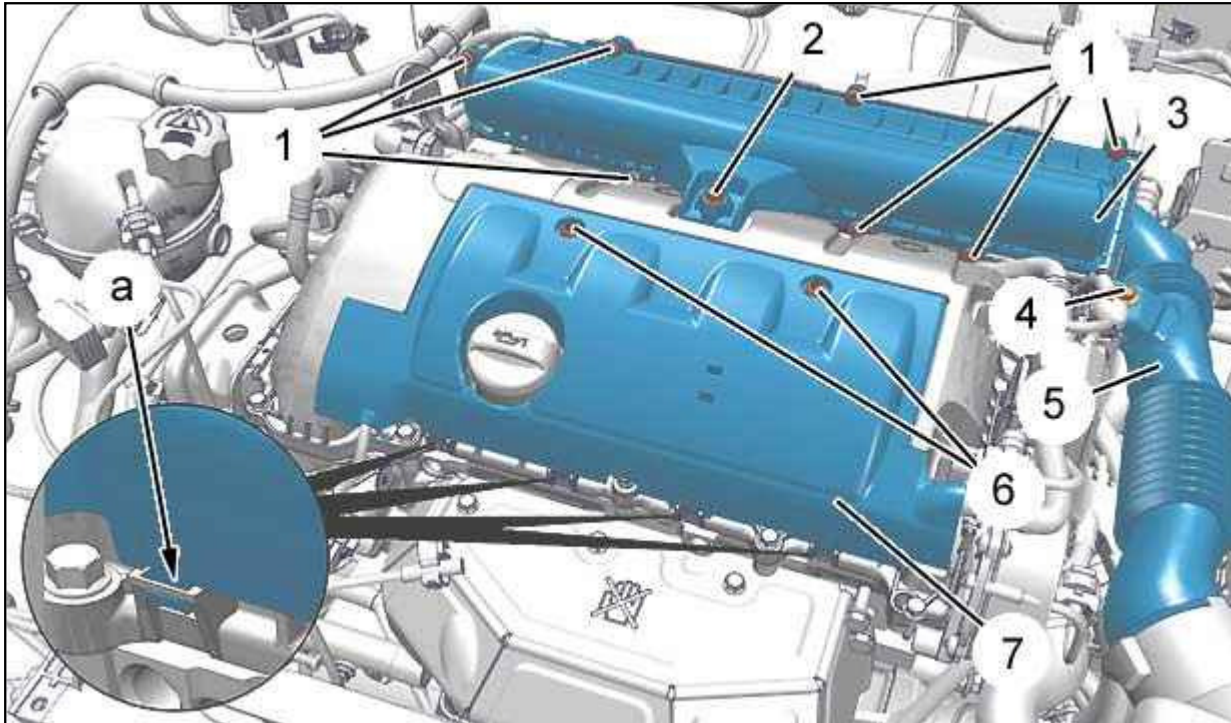


Figure : B1EM02RD

Remove :

- The bolts (1)
- The (2) bolt
- The air filter cover (3)
- The filter element
- The (4) bolt
- The air entry union (5)
- The bolts (6)

Unclip the engine style cover (7) (at "a").
Remove the engine style cover (7).

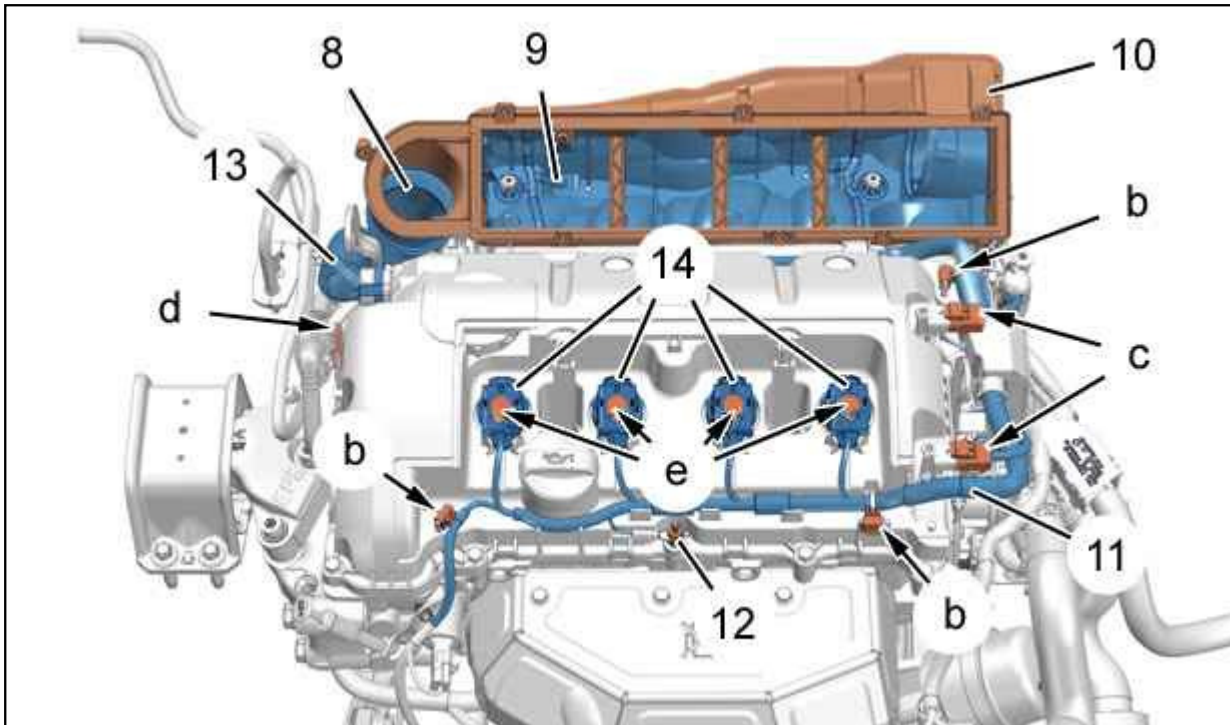


Figure : B1EG01ND

CAUTION : Seal the air inlet of the intake manifold ; Using plugs .

Remove :

- The air cleaner bracket (10)
- The air filter housing (9)
- The air union (8)
- The nut (12)

Unplug :

- The connectors of the camshaft position sensors (at "c")
- The connector is supplying the ignition coils (14) (at "e")

Remove the ignition coils (14).

Unclip :

- The engine harness (11) (at "b") ; Release
- The fuel pipes (at "d")

Uncouple the oil vapour re-induction pipe (13).

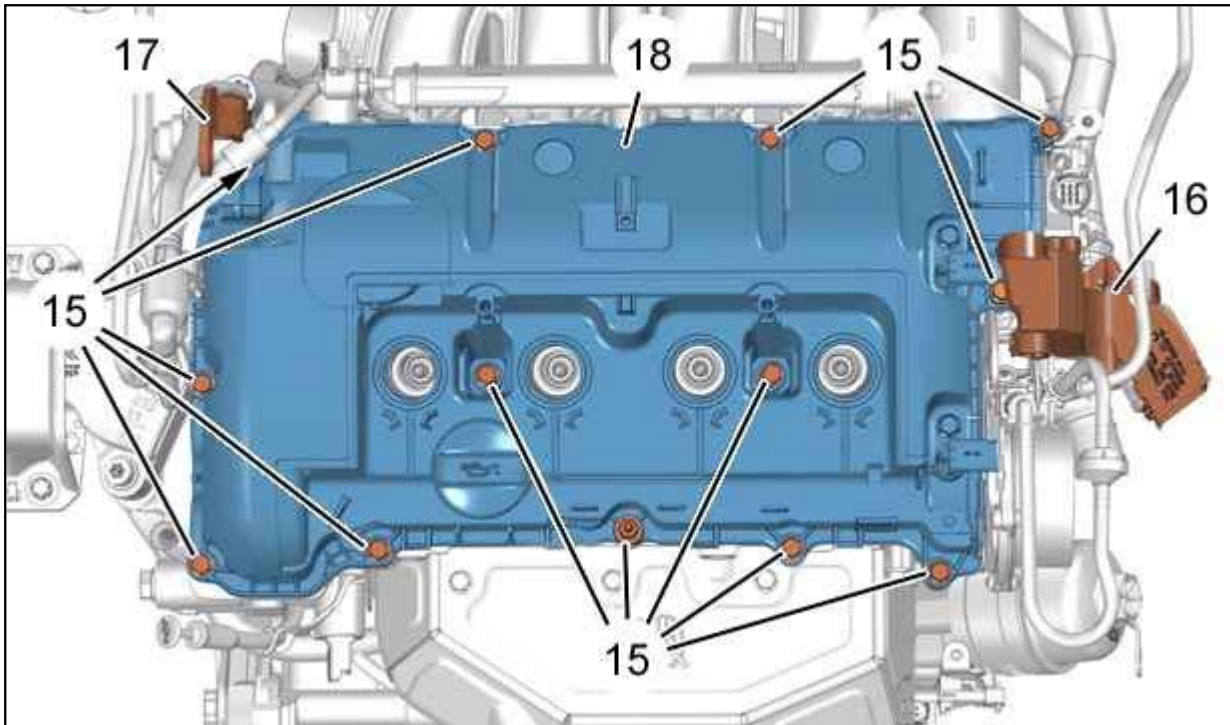


Figure : B1EG01OD

Lift the harness duct (16) and move into side.

Slacken the sling hook (17).

Remove :

- The bolts (15)
- The cylinder head cover (18)

4. Checking the dephased pulleys

4.1. Identification of the camshaft pulleys

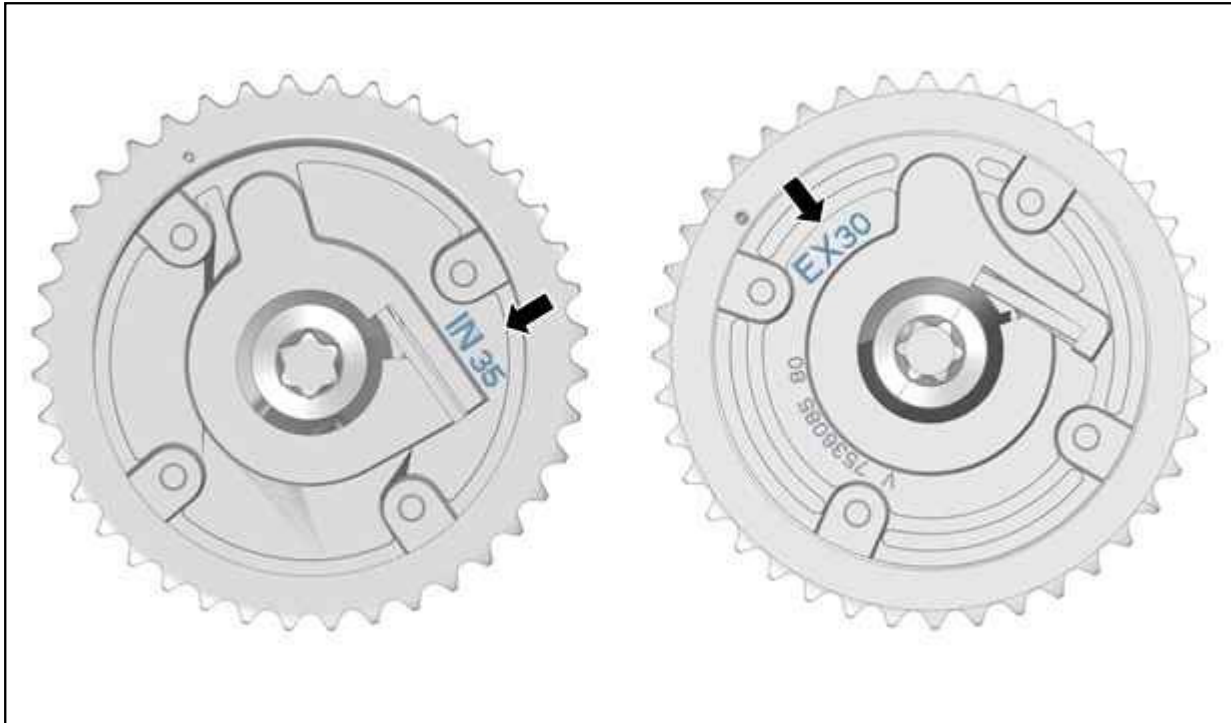


Figure : B1ED06XD

CAUTION : Note the position of the camshaft pulleys.

CAUTION : The two camshaft pulleys have different markings.

IN : Inlet.

EX : Exhaust.

4.2. Checking the locking of the dephasers

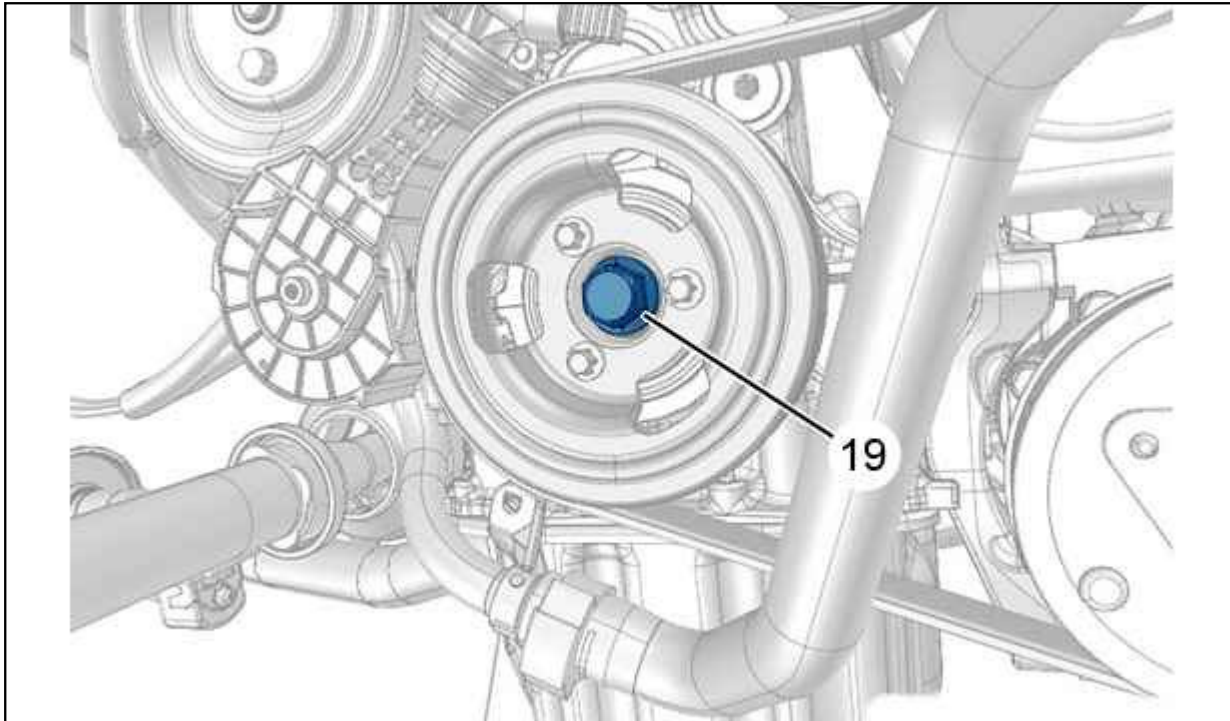


Figure : B1ED03UD

Rotate the engine 2 turns by means of the bolt (19) in order to lock the camshaft dephasers.

4.3. Locking the inlet camshaft dephaser

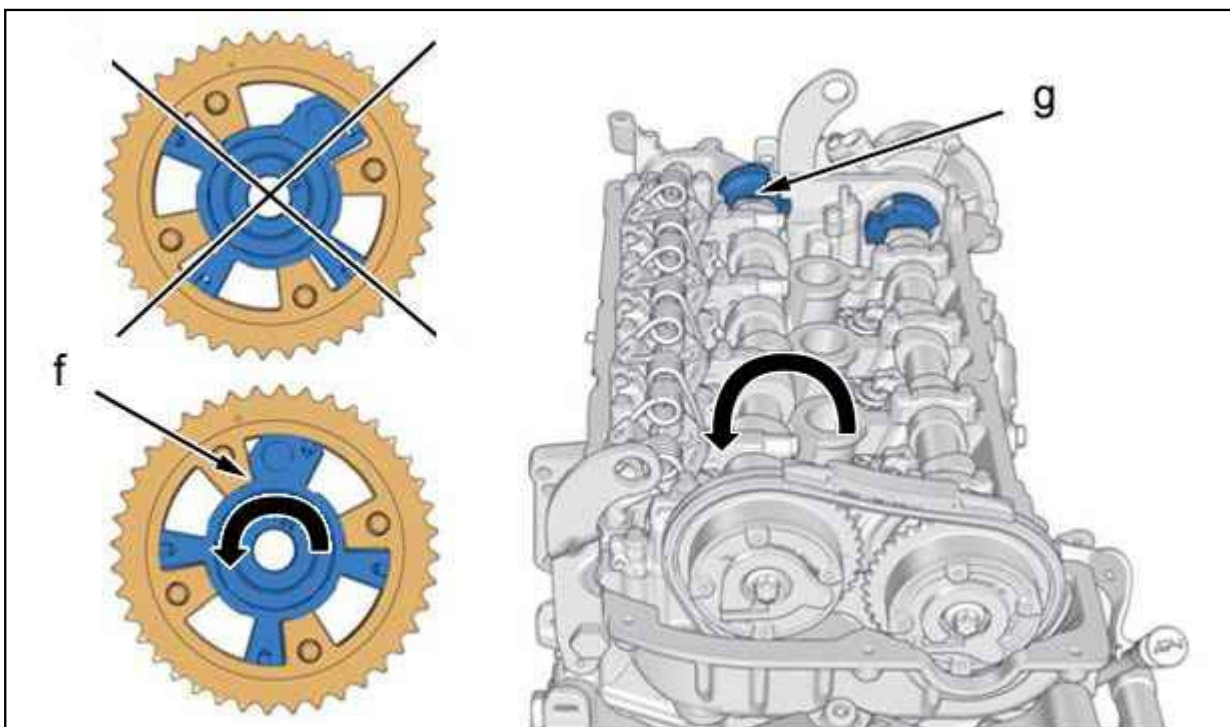


Figure : B1ED06ZD

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

Action the inlet camshaft anti-clockwise (at "g") as far as the inner stop (at "f") (maximum travel 35°).
Check that the dephaser remains locked and solid with the camshaft.

N.B. : The dephaser is locked when the pulley rotates at the same time as the camshaft In the event that the dephaser will not lock mechanically ; Replace the camshaft dephaser Dephaser viewed from the timing end.

4.4. Locking the exhaust camshaft dephaser

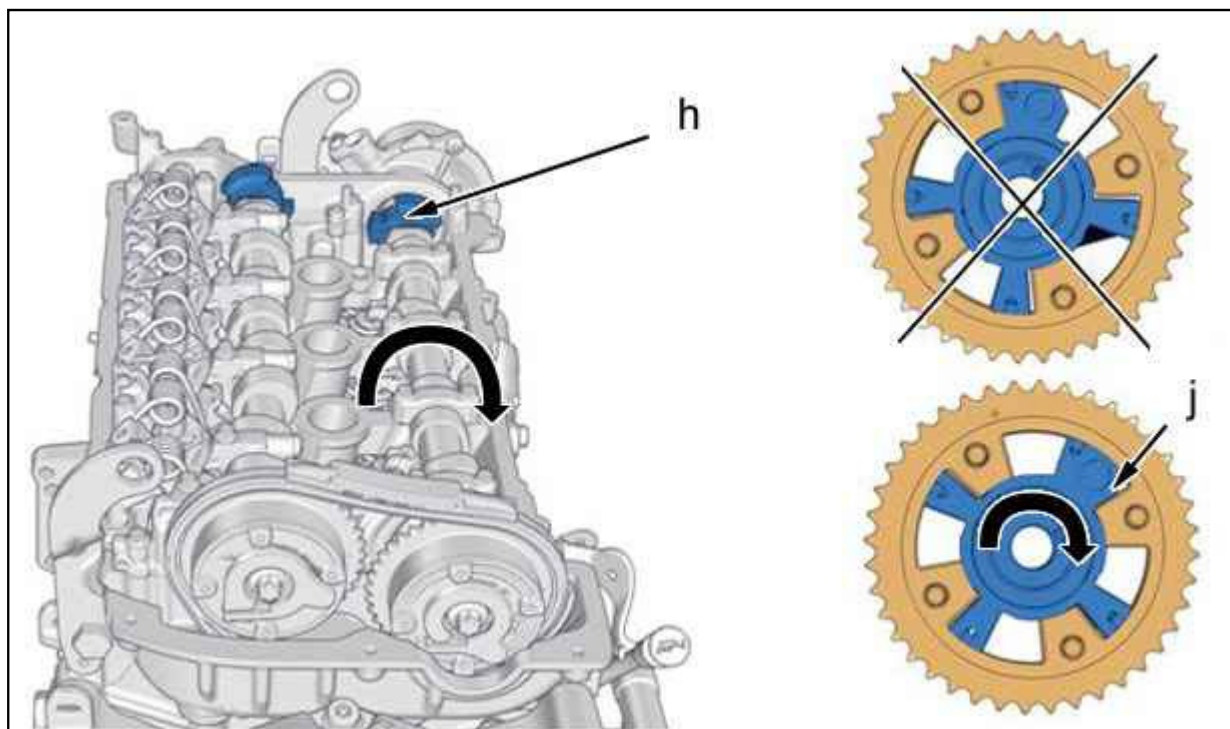


Figure : B1ED070D

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

Action the exhaust camshaft clockwise (at "h") as far as its internal stop (at "j") (maximum travel 30°).
Check that the dephaser remains locked and solid with the camshaft.

N.B. : The dephaser is locked when the pulley rotates at the same time as the camshaft In the event that the dephaser will not lock mechanically ; Replace the camshaft dephaser Dephaser viewed from the timing end.

5. Positioning the dummy timing chain tensioner

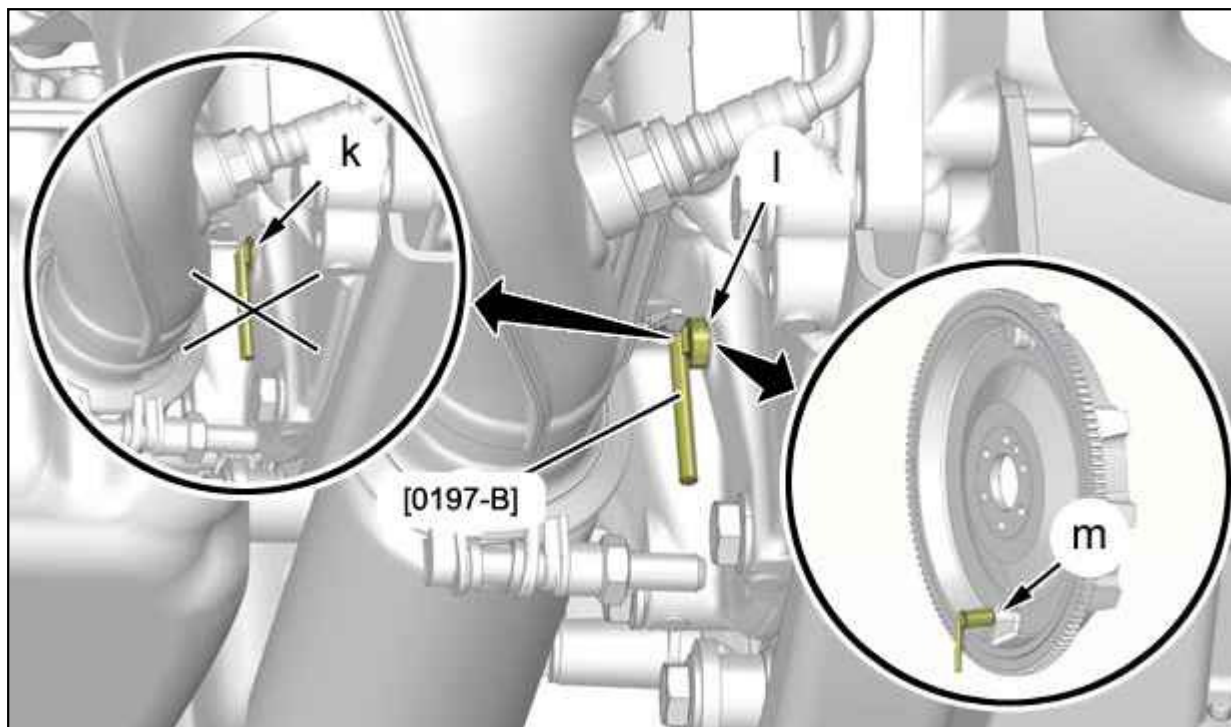


Figure : B1ED071D

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

Rotate the crankshaft by means of the bolt (19) in order to peg the engine flywheel ; Using tool [0197-B].

CAUTION : If the rod goes all the way into its recess (at "k"), the flywheel is not pegged (at "m") ; Repeat the operation for setting the timing.

Position the crankshaft setting pin [0197-B] in the hole "l" located on the crankshaft main bearing cap casing .
Turn the crankshaft clockwise using bolt (19) to the engine flywheel pinning position (at "m").
Peg the engine flywheel ; Using the pin [0197-B].

CAUTION : The anti-clockwise rotation should be done without hesitations and without forcing (Risk of slackening of the timing, crankshaft and oil pump pulleys).

Check that the engine is correctly pegged by trying to turn the bolt (19) in the anti-clockwise direction ; Using a pipe spanner.

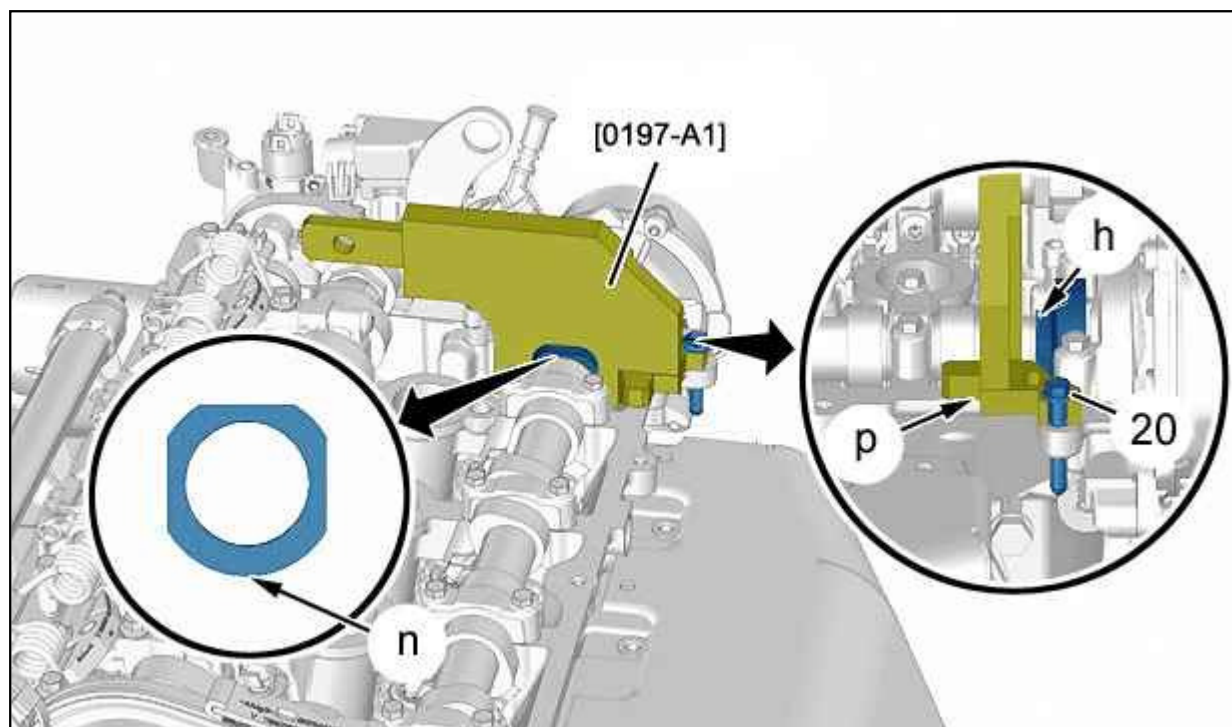


Figure : B1ED072D

Position the exhaust camshaft immobilisation tool [0197-A1].

CAUTION : The rounded contour of the pegging zone on the camshafts must be oriented downwards (at "n"), the 3 other flat zones receiving the setting tool.

N.B. : To facilitate the assembling of the tool [0197-A1], you can slightly rotate the exhaust camshaft (clockwise and anti-clockwise) (at "h") ; Using a 27 mm combination spanner.

CAUTION : The tool [0197-A1] must be firmly against the sealing face of the cylinder head (at "p"); no lifting of the tool is authorised.

Secure the tool [0197-A1] ; Using the screws (20).

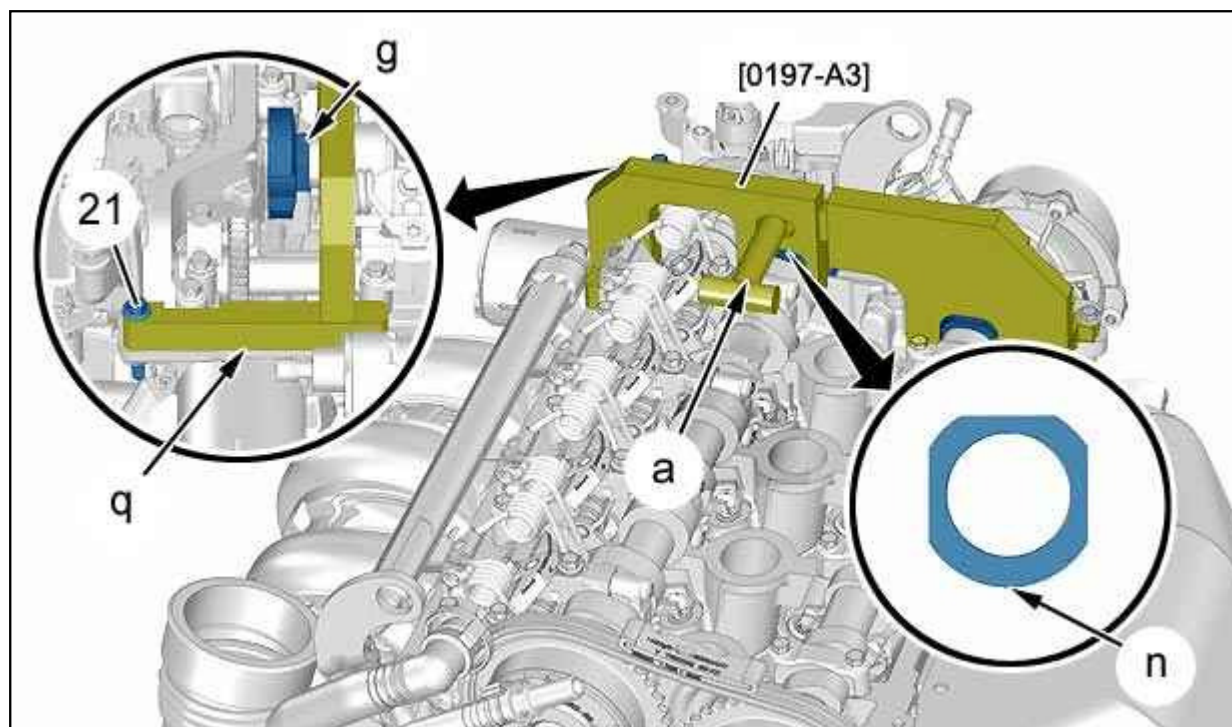


Figure : B1ED0B9D

CAUTION : The rounded contour of the pegging zone on the camshafts must be oriented downwards (at "n"), the 3 other flat zones receiving the setting tool.

Position the inlet camshaft immobilisation tool [0197-A3].

N.B. : To facilitate assembly of the tool [0197-A3], you can rotate the inlet camshaft slightly (clockwise and anti-clockwise) (at "g") ; Using a 27 mm combination spanner.

CAUTION : The tool [0197-A3] must be firmly against the sealing face of the cylinder head (at "q"); no lifting of the tool is authorised.

Secure the tool [0197-A3] ; Using the screws (21).

Assemble :

- The camshaft immobilisation tools [0197-A3], [0197-A1]
- The fixing bolt (a) for the tools [0197-A3], [0197-A1]

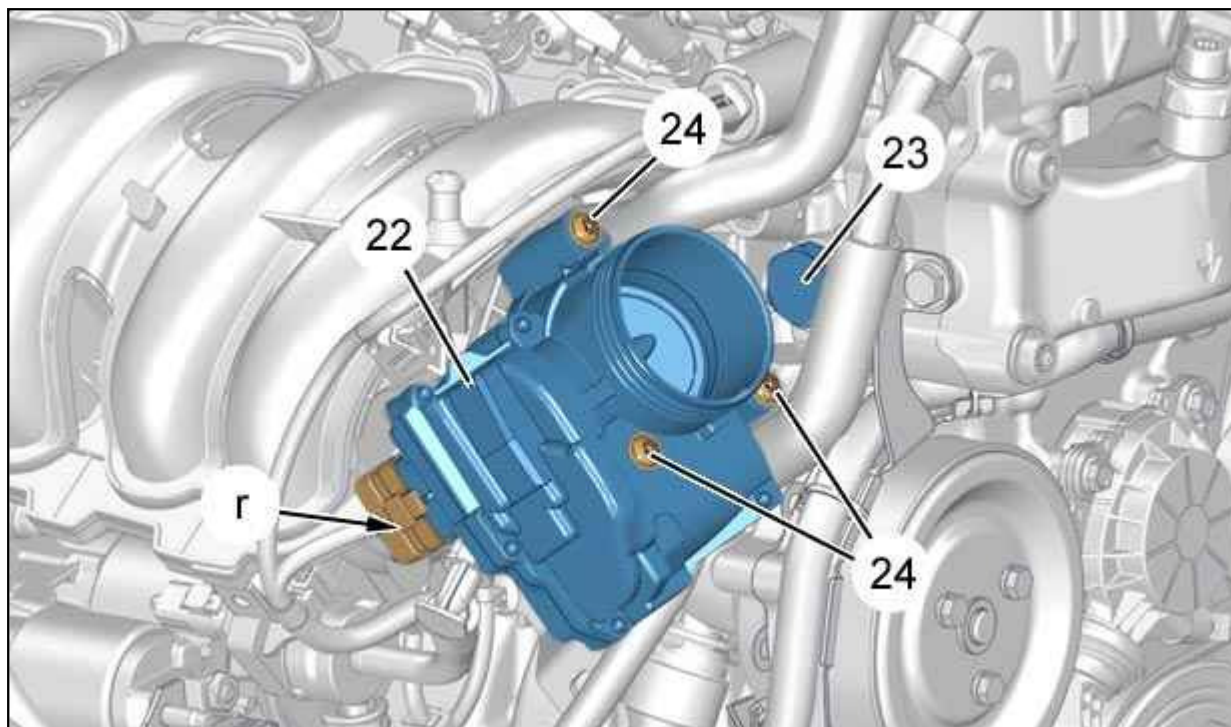


Figure : B1ED074D

CAUTION : Do not remove the timing chain tensioner (23) without the crankshaft and camshaft setting tools ; Risk of jumping a tooth on the timing chain.

Remove :

- The bolts (24)
- The throttle unit (22)

Disconnect the connector (at "r").

Remove the timing chain (23) tensioner .

Check the condition of the timing chain tensioner (23) ; Action the piston manually ; If the piston is seized, replace the timing chain tensioner (23).

5.1. Fitting the dummy timing chain tensioner

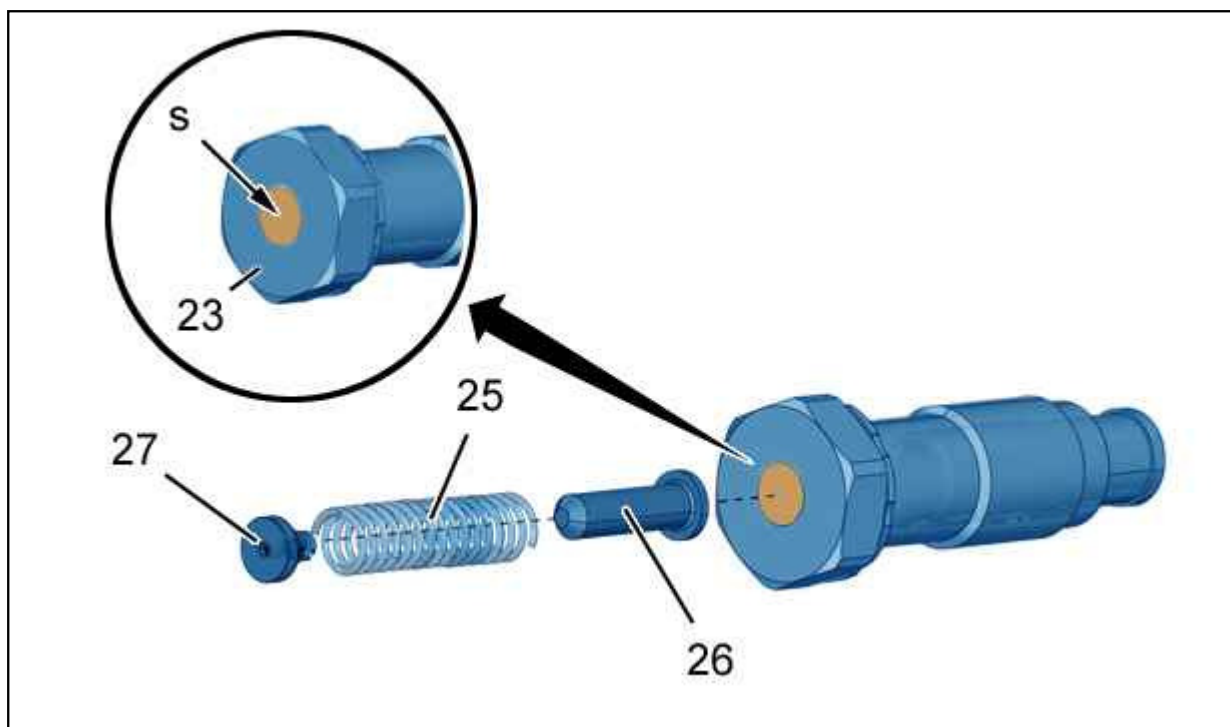


Figure : B1ED075D

CAUTION : It is essential to keep to the correct procedure for fitting the dummy timing chain tensioner ; Do not weld the piston on the tensioner ; Risk of overtensioning the timing chain.

Drill the old timing chain tensioner (23) to the diameter 10,75 mm (at "s").

N.B. : Release the ball valve (27) as necessary ; Using a pin drift.

Remove :

- The ball valve (27)
- The spring (25)
- The valve guide (26)

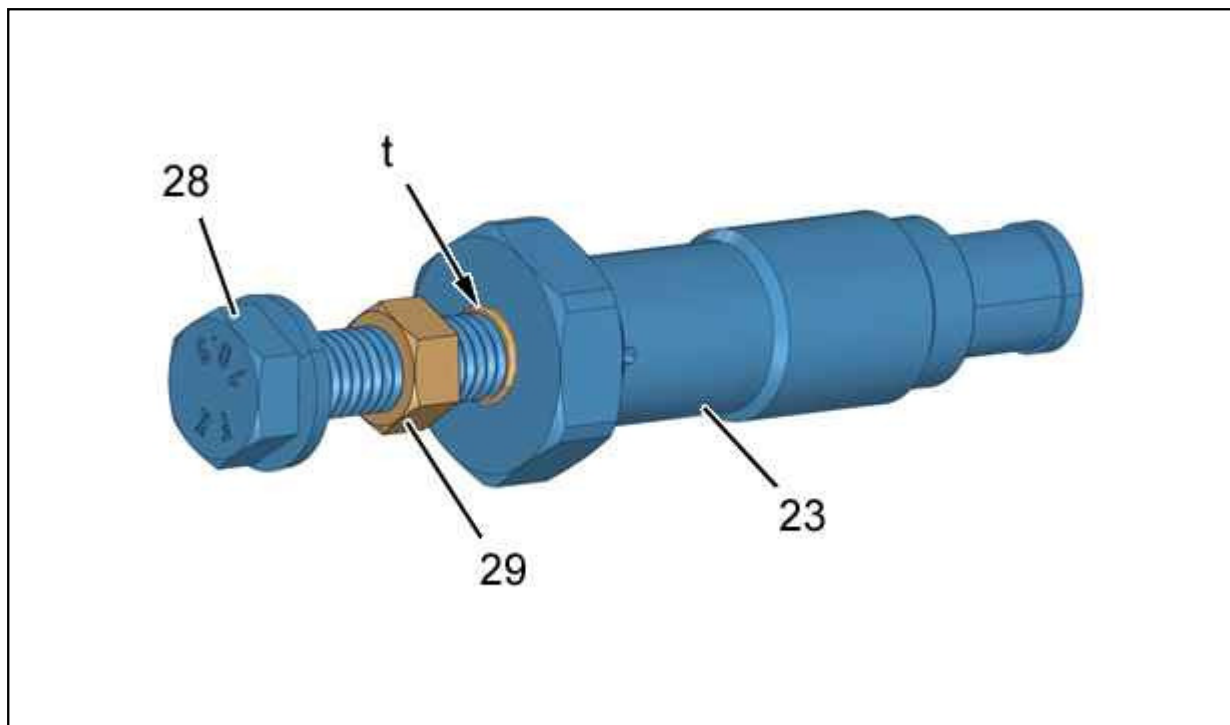


Figure : B1ED076D

CAUTION : Thoroughly clean the body of the timing chain tensioner (23) from any traces of swarf.

Fit a separate thread of the "helicoil" type, diameter M10 x 150 (at "t").

Do up :

- One nut M10 (29) on one bolt, or a screw or a threaded rod (28) diameter M10x150, length 100 mm
- The assembly (28), (29) on the body of the timing chain tensioner (23)

5.2. Checking the valve timing

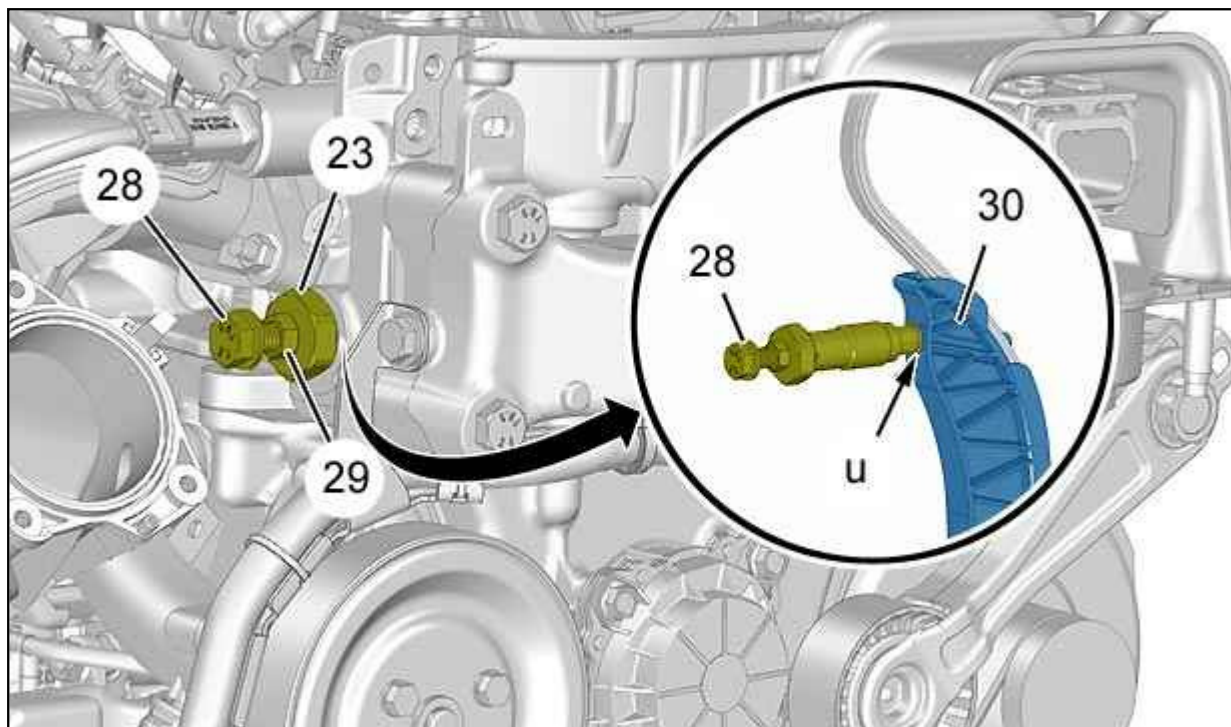


Figure : B1ED077D

CAUTION : Oil the threads of the bolt (28).

CAUTION : Adhere to the tightening torques.

Tighten the body of the dummy timing chain tensioner on the cylinder head (Without a seal).

Tighten the bolt (28) of the dummy timing chain tensioner until there is contact (at "u") with the chain tensioner guide (30) so as to prevent it from going backwards ; Tightening torque 0,06 m.daN, or hand-tighten (without a spanner) as much as possible.

Lock the assembly by means of a lock nut (29).

Remove :

- The fixing bolt (a) for the tools [0197-A3], [0197-A1]
- The camshaft sitting tools [0197-A3], [0197-A1]
- The crankshaft setting rod [0197-B]

Rotate the engine 2 turns by means of the crankshaft bolt (19), without any anticlockwise rotation.

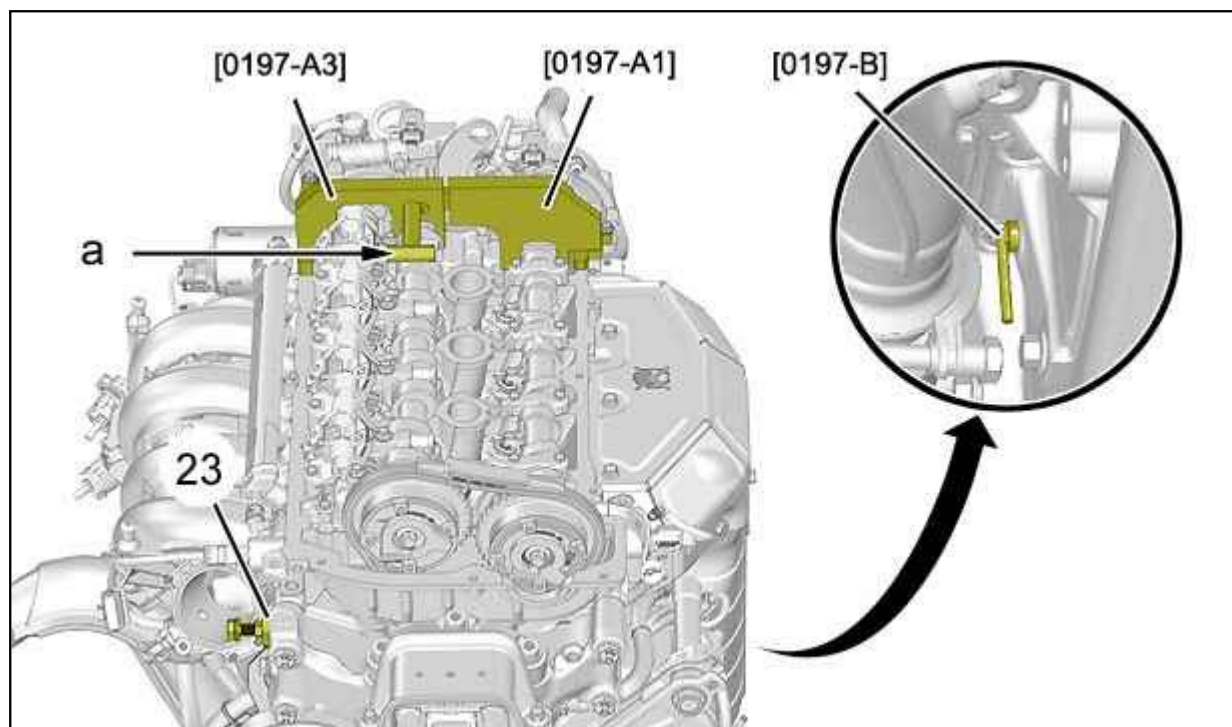


Figure : B1ED0BAD

CAUTION : No rotation of the camshafts, whether clockwise or anti-clockwise, is authorised using a mixed spanner of 27mm at "f" or at "g".

Fit (In order) :

- The crankshaft setting rod [0197-A3]
- The camshaft sitting tools [0197-A3], [0197-A1]
- The fixing bolt (a) for the tools [0197-A3], [0197-A1]

N.B. : If the tools [0197-A3] and [0197-A1] position themselves correctly, the timing is in conformity ; Go to the refitting stage.

CAUTION : If the engine number is lower than 198567 ; Replace : The 3 chain guides as well as the timing chain ; **Repeat the operations for removing-refitting the timing chain** ⓘ .

N.B. : If it is impossible to refit tools [0197-A3] and [0197-A1] because of the timing being offset, continue with the following operations.

5.3. Checking the wear of the timing chain assembly

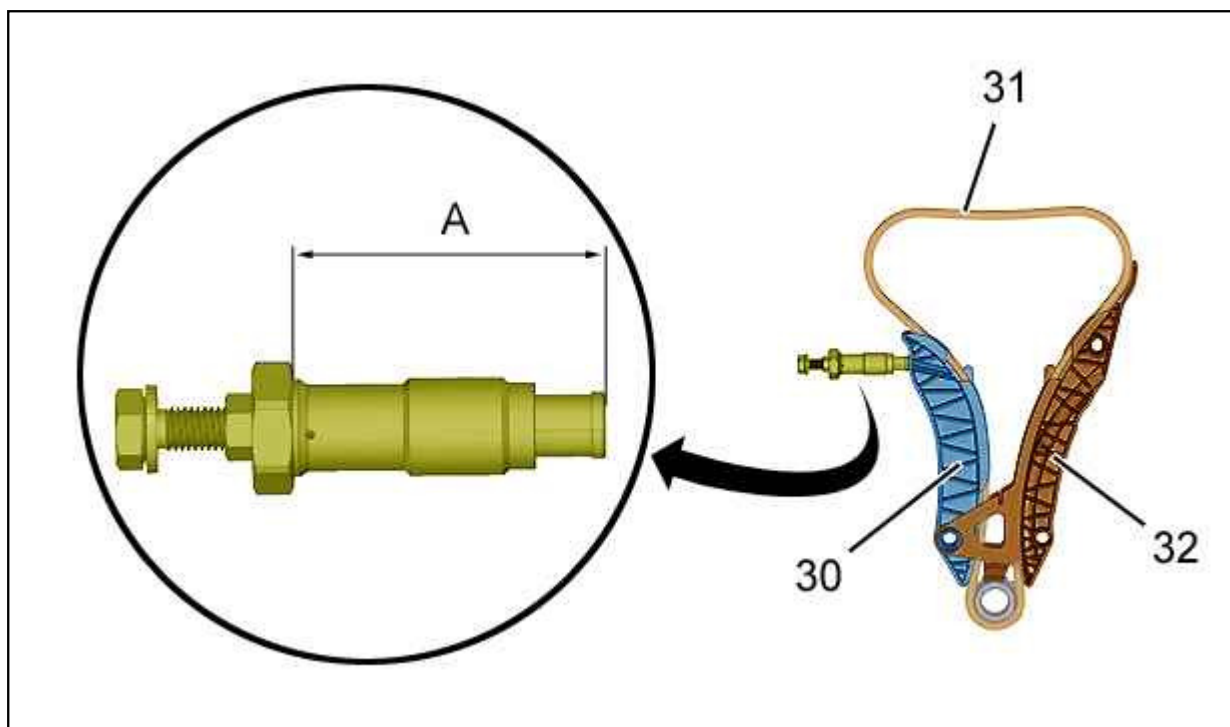


Figure : B1ED03WD

CAUTION : The timing chain may jump a tooth while you are removing the dummy chain tensioner, if the tools pegging the camshafts [0197-A3], [0197-A1] have been taken away.

Remove the dummy timing chain tensioner , noting down the dimension "A" between the contact face of the body of the timing chain tensioner and the extremity of the piston (Without a seal).

If the dimension is less than or equal to 73,5 mm : The timing chain assembly has no wear ; Continue the operations for resetting the timing chain.

If the dimension is greater than 73,5 mm ; Repeat the operations for removing-refitting the timing chain ; Replace :

- The timing chain (31)
- The guides (30), (32) of the timing chain
- The upper chain guide
- The timing chain (23) tensioner

5.4. Resetting : Timing chain

CAUTION : Adhere to the tightening torques  .

Refit the body of the dummy timing chain tensioner on the cylinder head (Without a seal).

Tighten the bolt (28) of the dummy timing chain tensioner until there is contact (at "u") with the chain tensioner guide (30) so as to prevent it from going backwards ; Tightening torque 0,06 m.daN, or hand-tighten (without a spanner) as much as possible.

Lock the assembly by means of a lock nut (29).

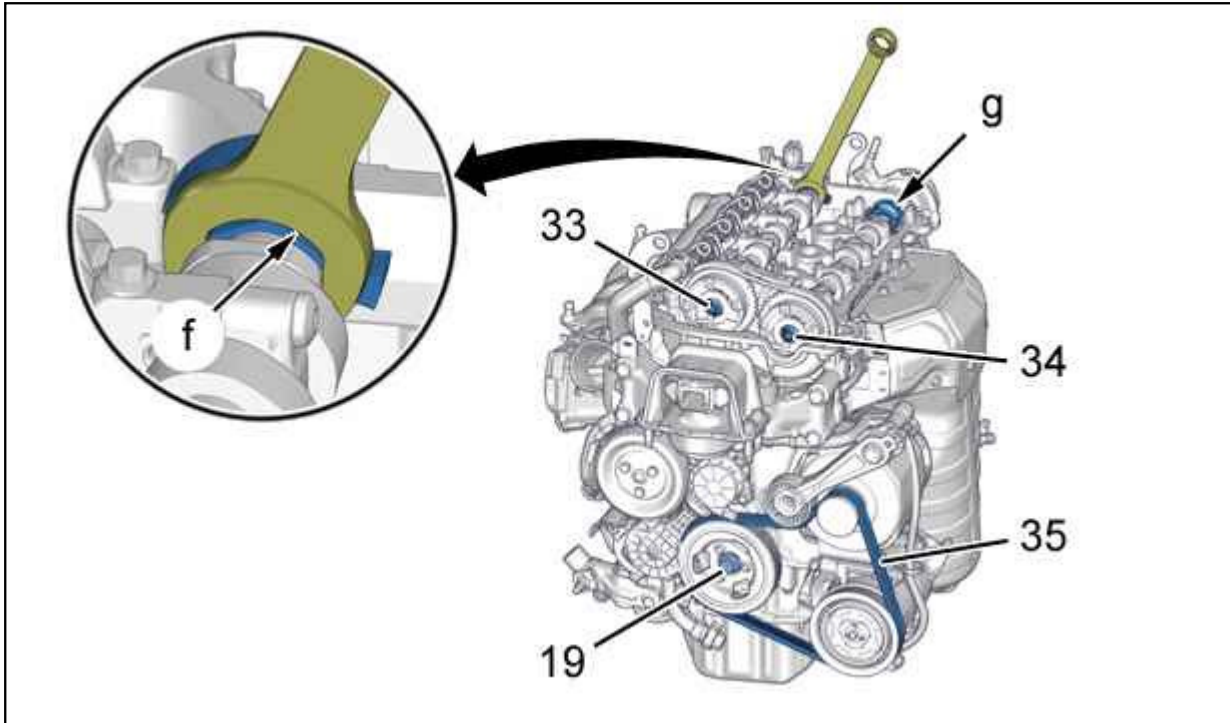


Figure : B1CD00AD

N.B. : If it is impossible to refit the tools [0197-A3], [0197-A1] ; Support the camshafts ; Using a 27 mm combination spanner (at "f", "g").

Remove :

- The securing bolt (33)
- The securing bolt (34)
- The accessories drive belt (35)
- The crankshaft pulley bolt (19)

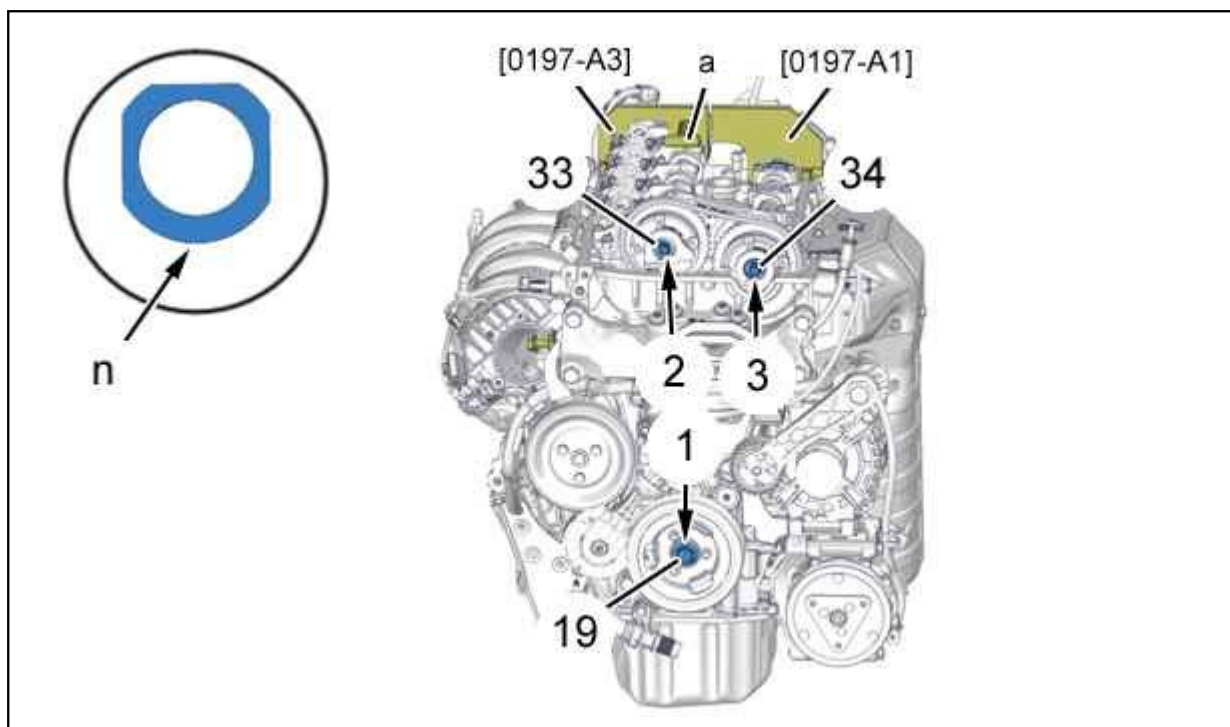


Figure : B1ED07RD

CAUTION : The rounded edge of the camshaft indexing has to be oriented downwards (at "n").

Fit : The camshaft sitting tools [0197-A3], [0197-A1].

Tighten : The tools [0197-A3], [0197-A1] ; Using screws (20) and (21).

Assemble :

- The tools [0197-A3], [0197-A1]
- The fixing bolt (a) for the tools [0197-A3], [0197-A1]

CAUTION : Replace the fixing screw (19) of the crankshaft pulley hub as well as the screws (33), (34) of the camshaft pulleys .

CAUTION : Degrease the contact faces of the pulleys on the camshafts before tightening the bolts (33), (34).

Fit :

- The (19) bolt (New)
- The (33) bolt (New)
- The (34) bolt (New)

CAUTION : Respect the tightening sequence indicated (*).

Tighten :

- The (19) bolt (New) (*)
- The (33) bolt (New) (*)
- The (34) bolt (New) (*)

Refit the ancillary belt (35).

6. Refitting

CAUTION : Adhere to the tightening torques .

Remove : The dummy timing chain tensioner .

Fit : The timing chain (23) tensioner .

N.B. : Replace the seal of the timing chain tensioner (23).

Remove :

- The fixing bolt (a) for the tools [0197-A3], [0197-A1]
- The camshaft immobilisation and setting tools [0197-A3], [0197-A1]
- The crankshaft setting rod [0197-B]

Connect the connector (at "r").

Fit :

- The throttle unit (22)
- The bolts (24)

N.B. : Clean the joint faces (Do not use a cutting or abrasive tool).

CAUTION : The seal faces should not show any traces of impacts or scratches Always replace all the seals.

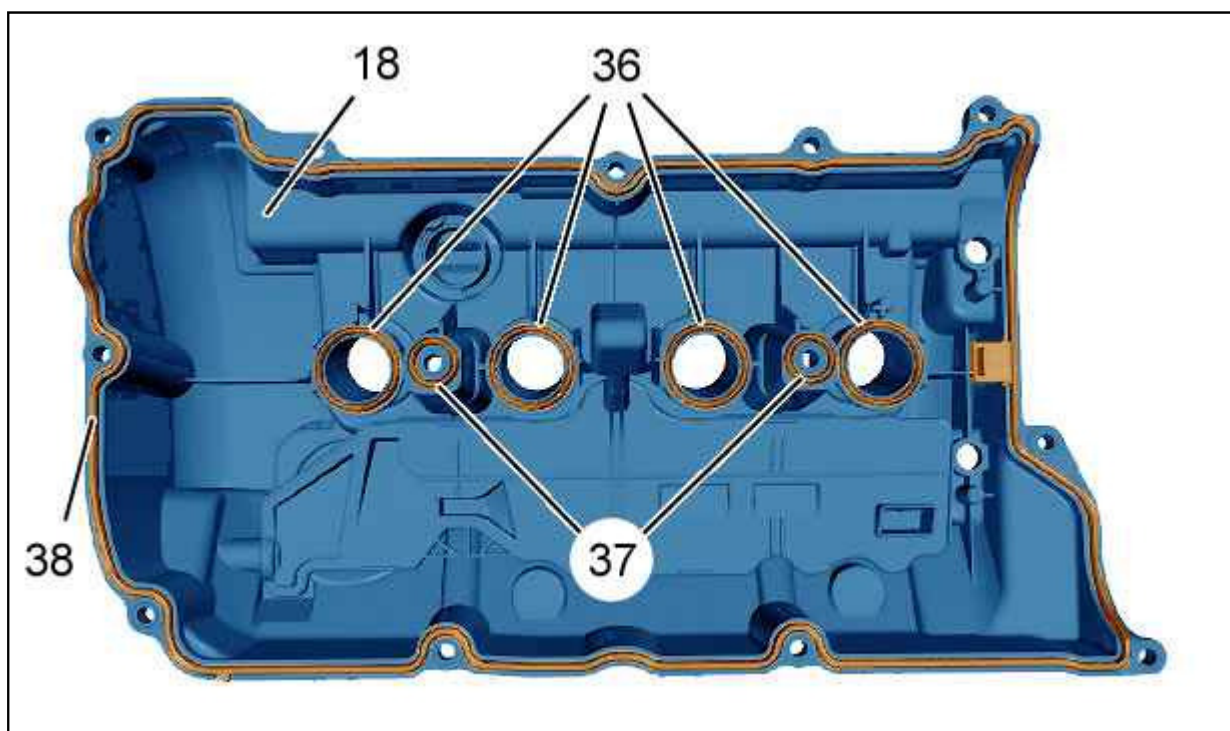


Figure : B1DD004D

Fit : Check the presence of the seals (36), (37), (38) (new).

Fit :

- The cylinder head cover (18)
- The bolts (15) of the cylinder head cover (18)
- The engine harness (11) duct (16)
- The ignition coils (14)
- The sling hook (17)

Clip in place :

- The engine harness (11) (at "b")
- The fuel pipes (at "d")

Connect :

- The connectors of the camshaft position sensors (at "c")
- The connector is supplying the ignition coils (14) (at "e")

Couple up : Crankcase breather hose (13).

Fit :

- The nut (12)
- The engine cover (7)
- The bolts (6)
- The air union (8)
- The air filter housing (9)
- The air cleaner bracket (10)
- The filter element
- The air filter cover (3)
- The bolts (1)
- The (2) bolt
- The air entry union (5)
- The (4) bolt
- 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.