

**REMOVING - REFITTING : TIMING CHAIN - EP ENGINE ( INDIRECT INJECTION)****URGENT : Observe the safety and cleanliness recommendations** ⓘ .**1. Tooling**

tool	Reference	Designation
<p>Figure : E5AB0K2T</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]	Immobilisation pin / crankshaft setting rod
	[0197-E]	Timing chain retention bracket

**2. 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

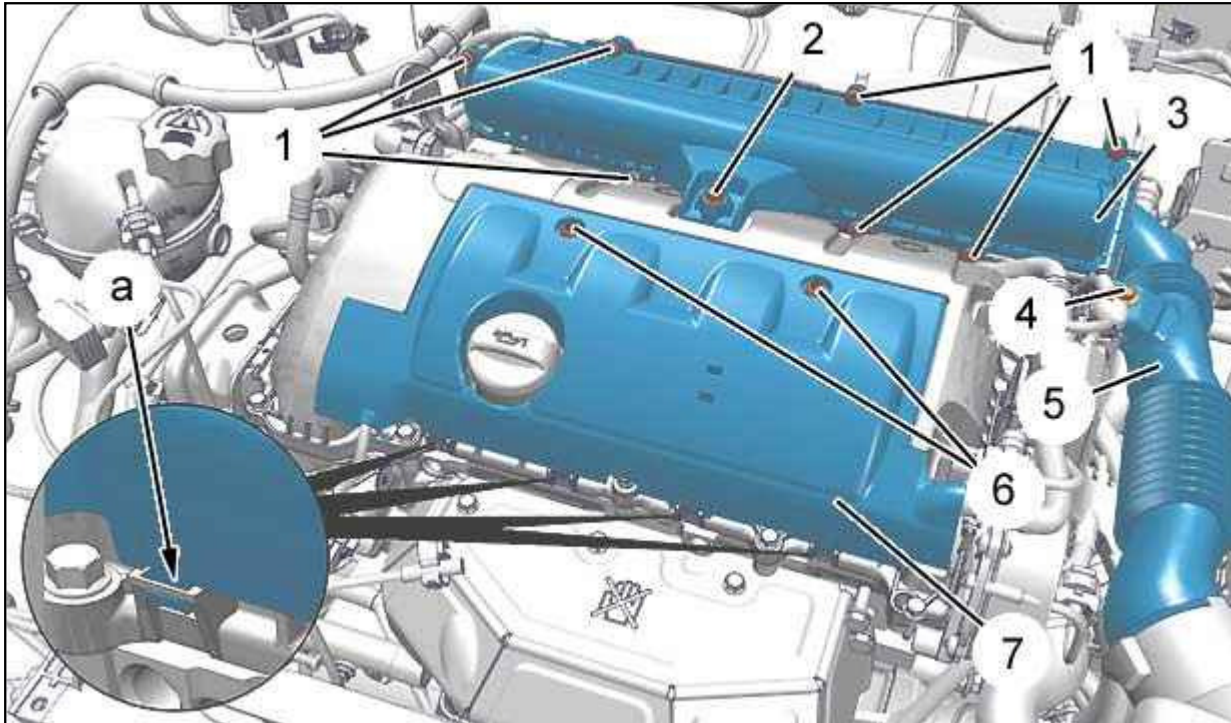


Figure : B1EM02RD

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) ( as "a").  
Remove the engine style cover (7).

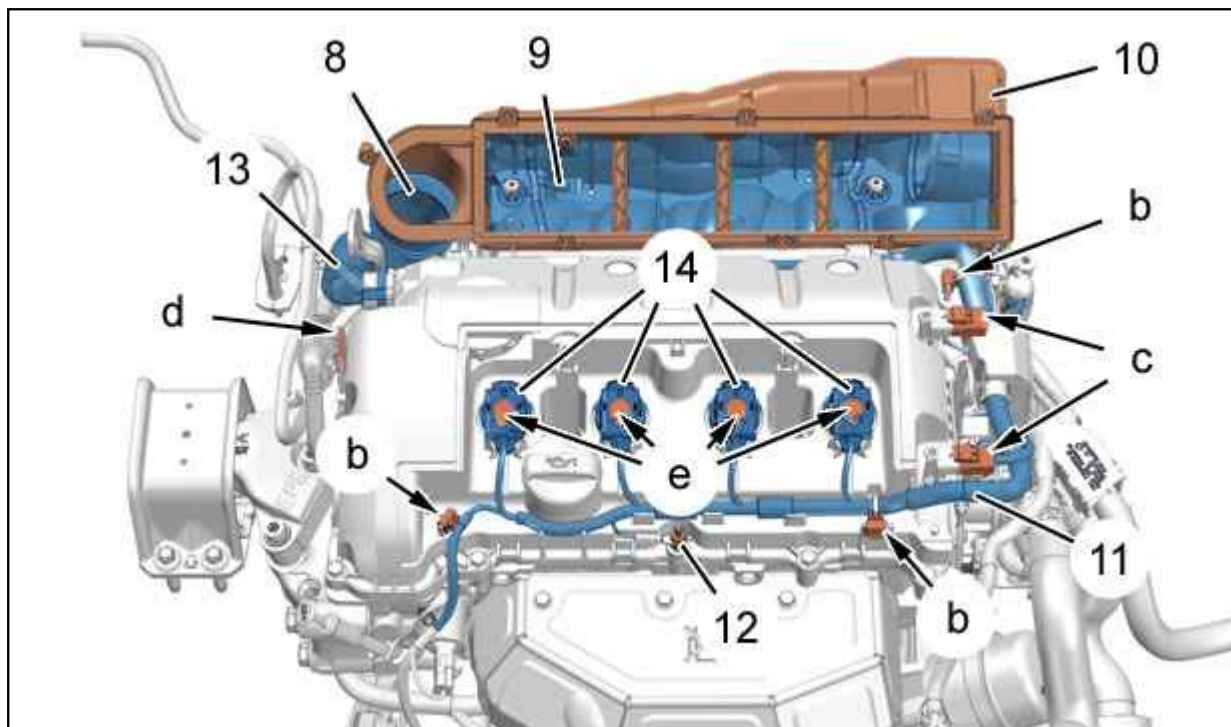


Figure : B1EG01ND

**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 ( as "c")
- The connector is supplying the ignition coils (14) ( as "e")

Remove the ignition coils (14).

Unfasten and move aside :

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

Uncouple : Crankcase breather hose (13).

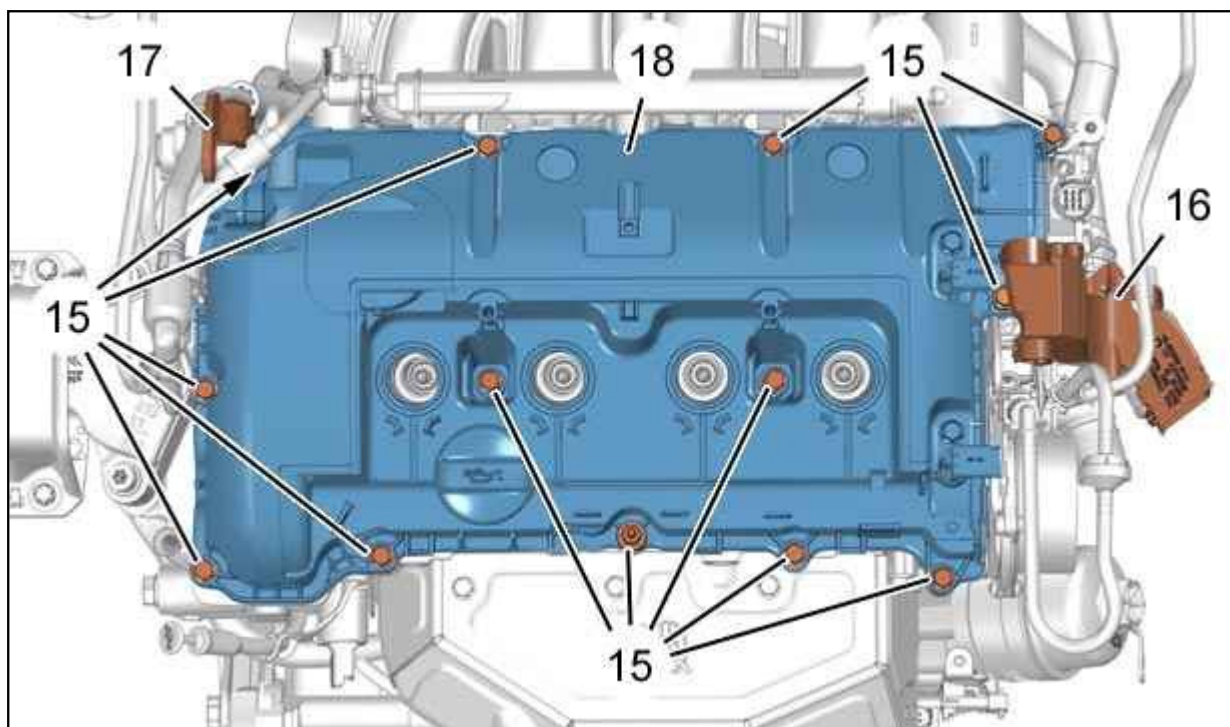


Figure : B1EG01OD

Lift the harness duct (16) and move into side.  
Slacken the sling hook (17).

Remove :

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

### 3. Checking the dephased pulleys

#### 3.1. Identification of the camshaft pulleys

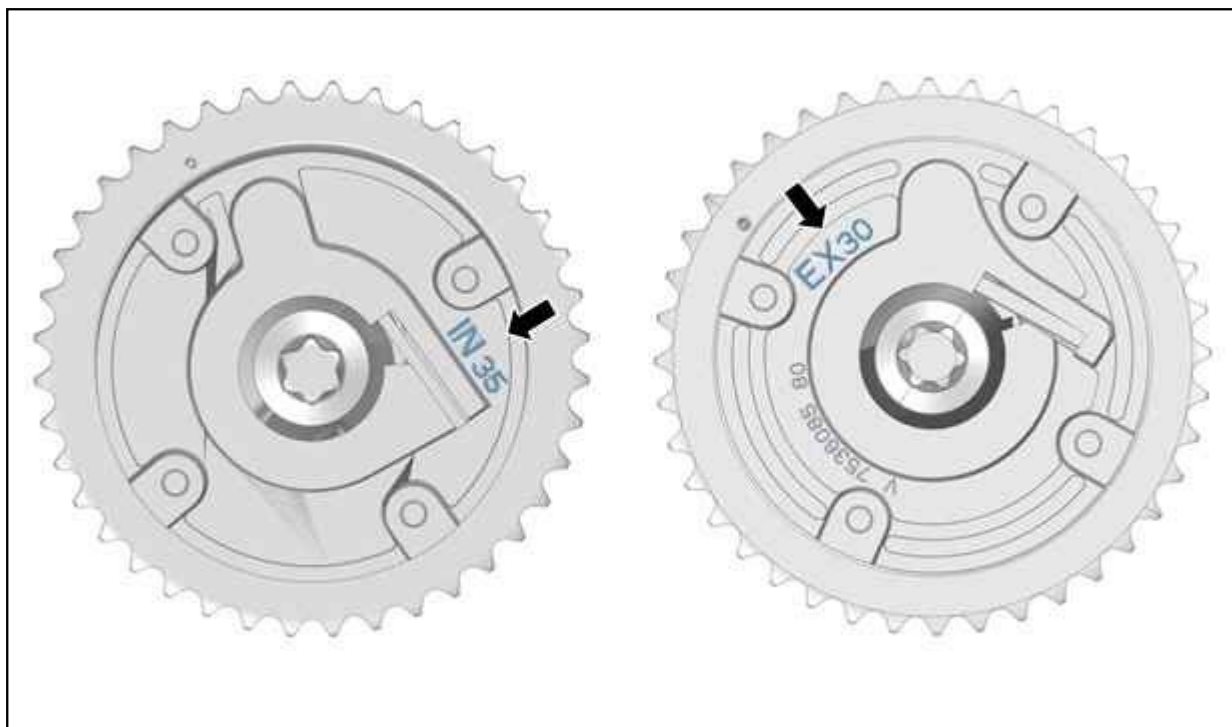


Figure : B1EG0HXD

**CAUTION** : Note the position of the camshaft pulleys.

**CAUTION** : The two camshafts and the two camshaft pulleys have different markings.

IN : Inlet.

EX : Exhaust.

### 3.2. Checking the locking of the dephasers



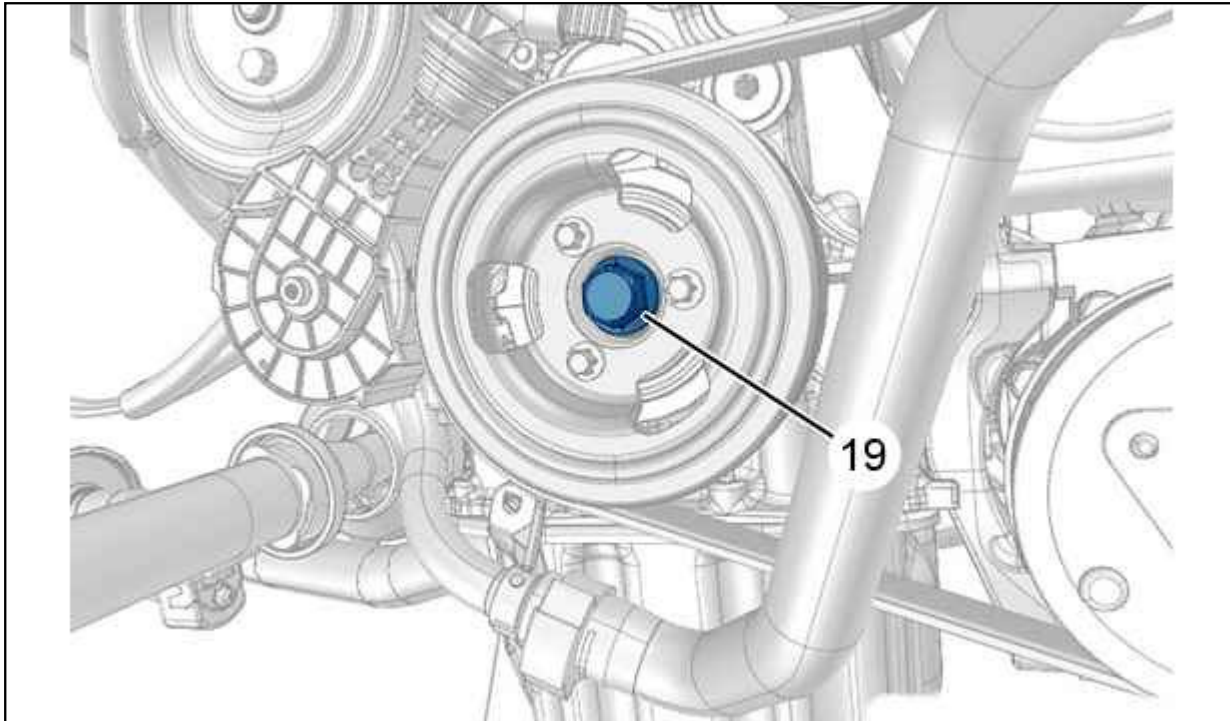


Figure : B1ED03UD

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

### 3.3. Locking the inlet camshaft dephaser

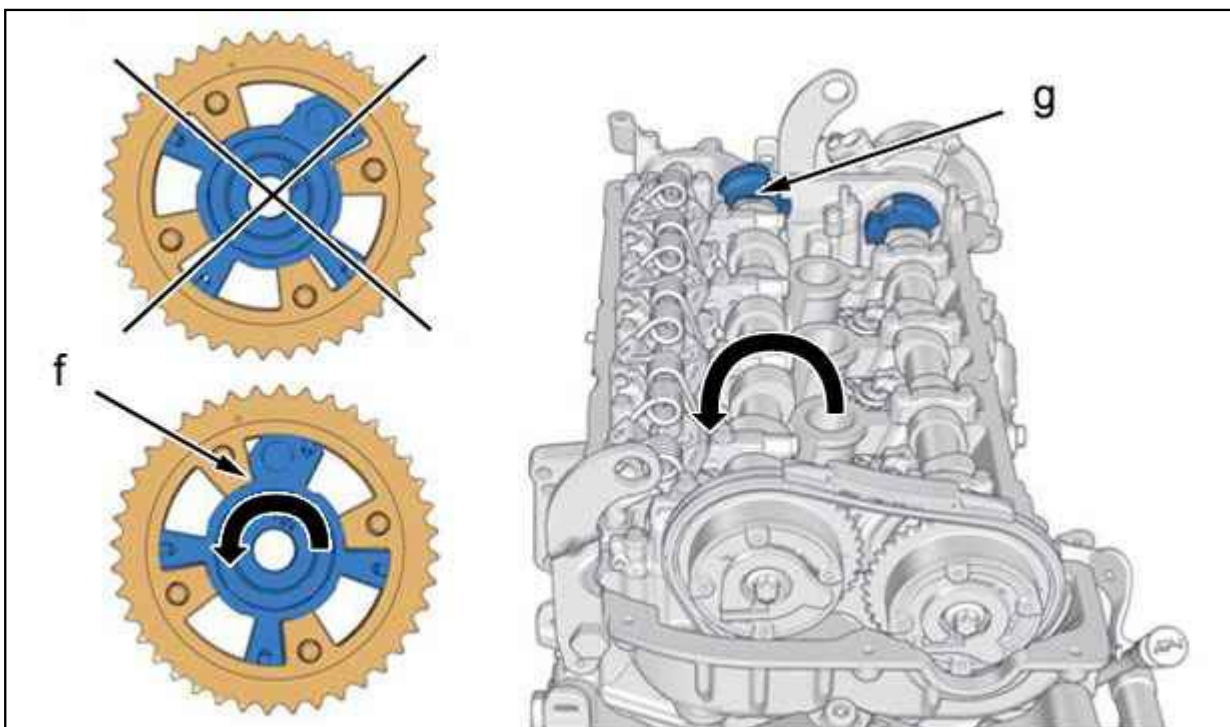


Figure : B1EG0HZD

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

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

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

**N.B. :** In the event that the dephaser will not lock mechanically ; Replace the camshaft dephaser.

**N.B. :** Dephaser viewed from the timing end.

### 3.4. Locking the exhaust camshaft dephaser

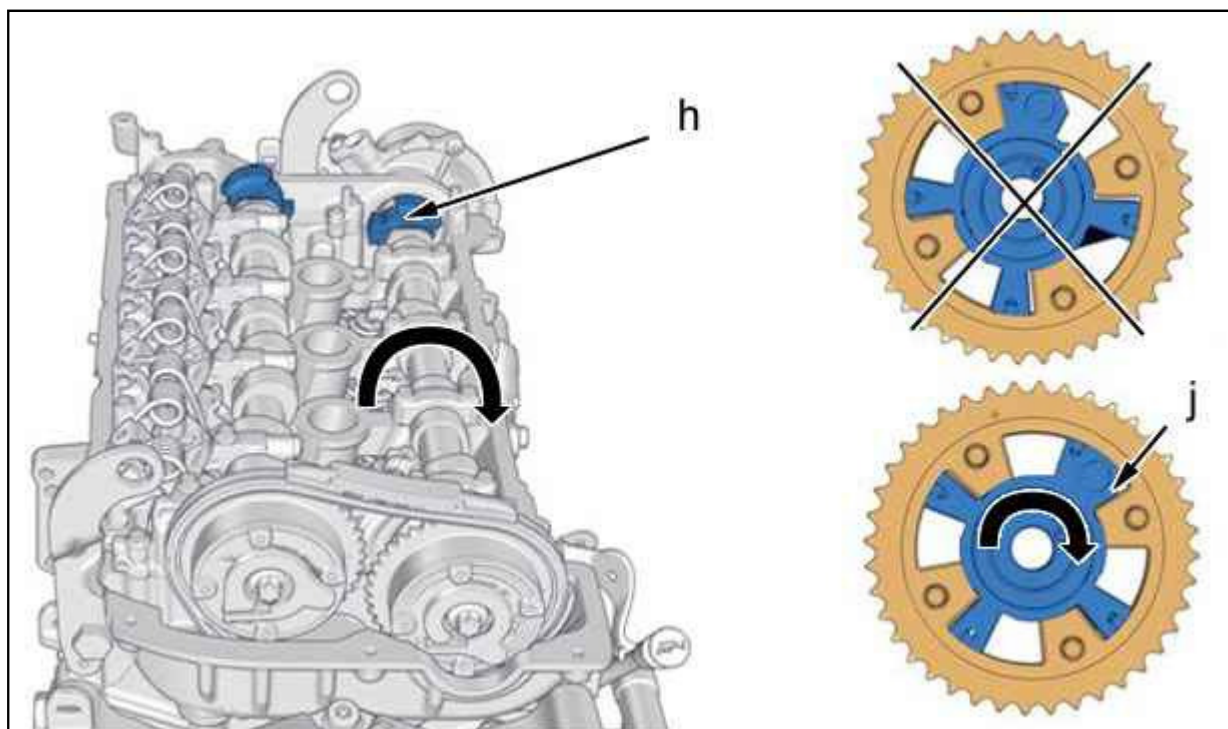


Figure : B1EG0I0D

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

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

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

**N.B. :** In the event that the dephaser will not lock mechanically ; Replace the camshaft dephaser.

**N.B. :** Dephaser viewed from the timing end.

### 4. Positioning the dummy timing chain tensioner

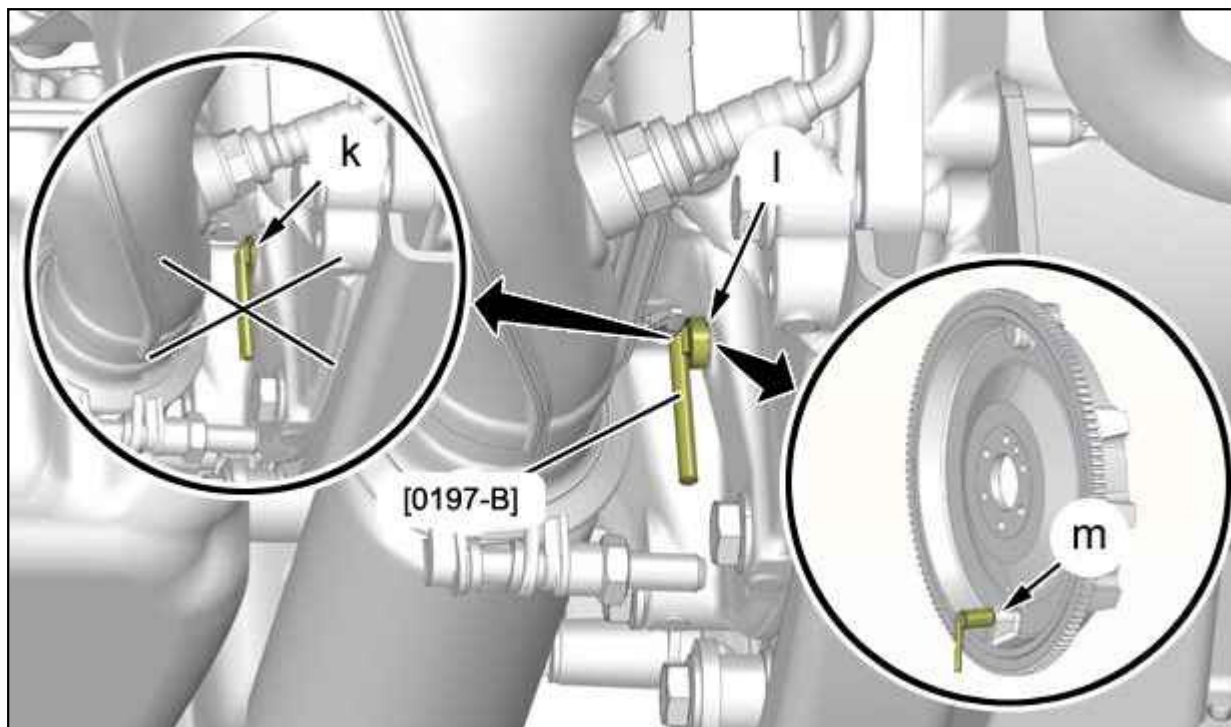


Figure : B1EG011D

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

**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 ( as "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.



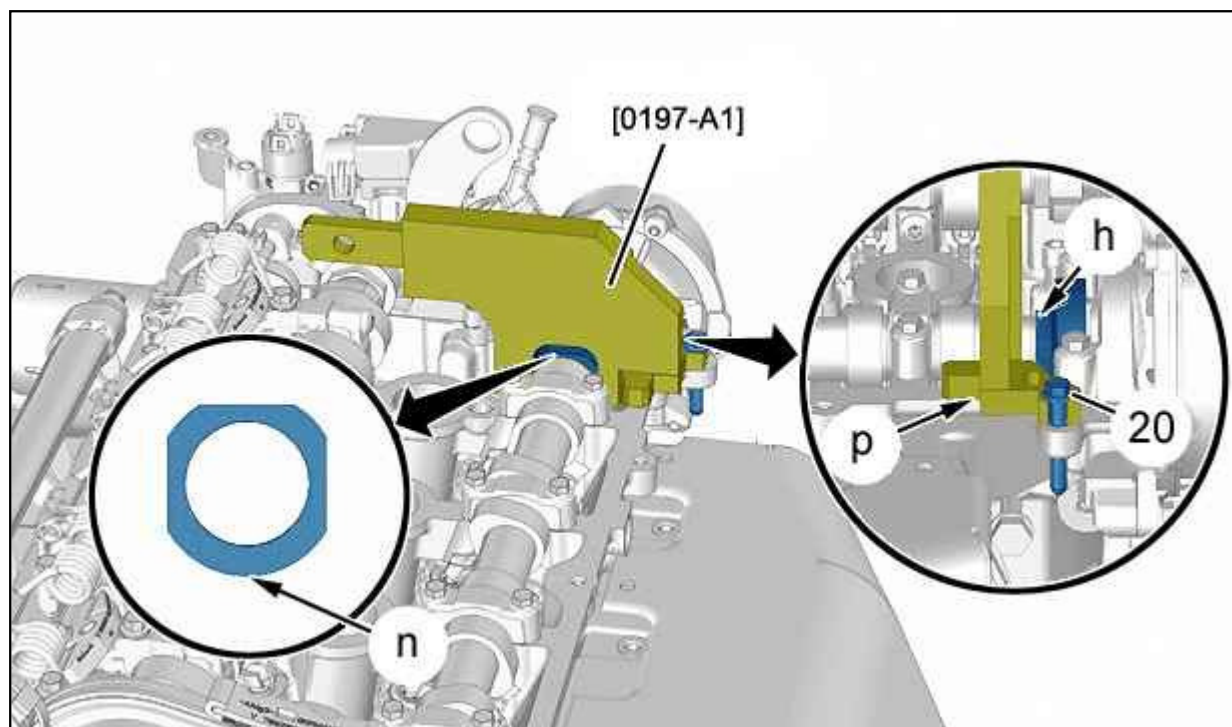


Figure : B1EG0I2D

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) ( as "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).

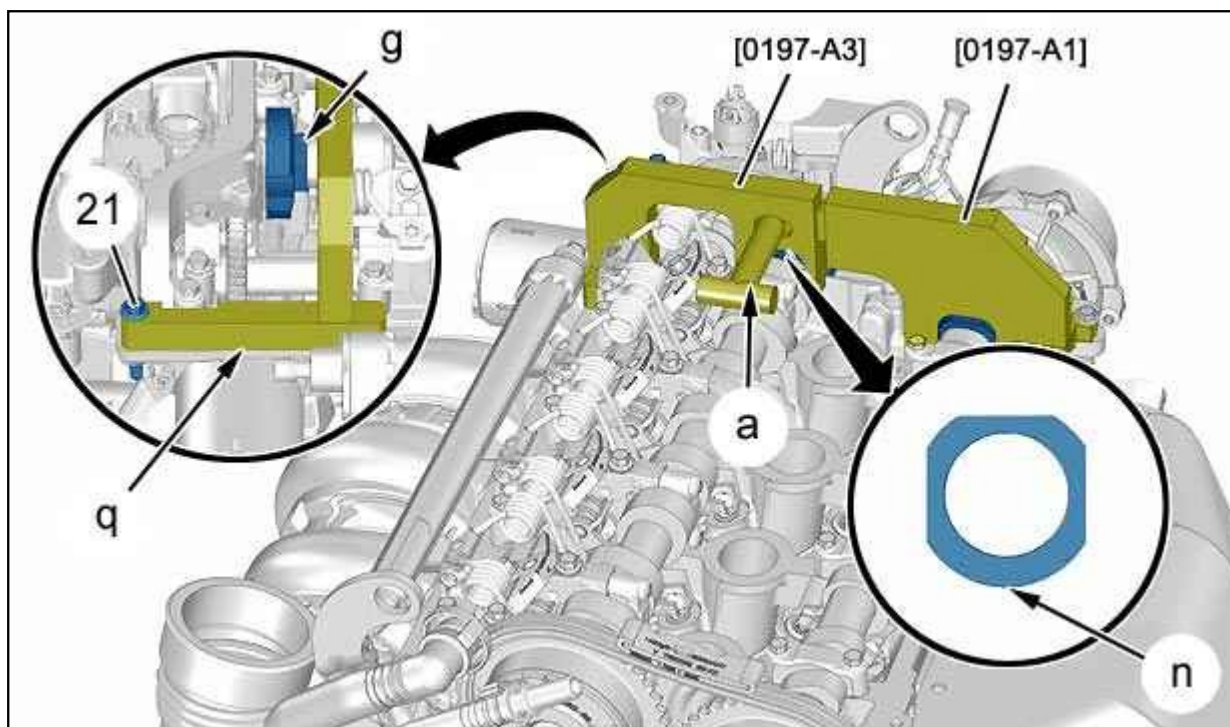


Figure : B1EG0T0D

**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) ( as "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]

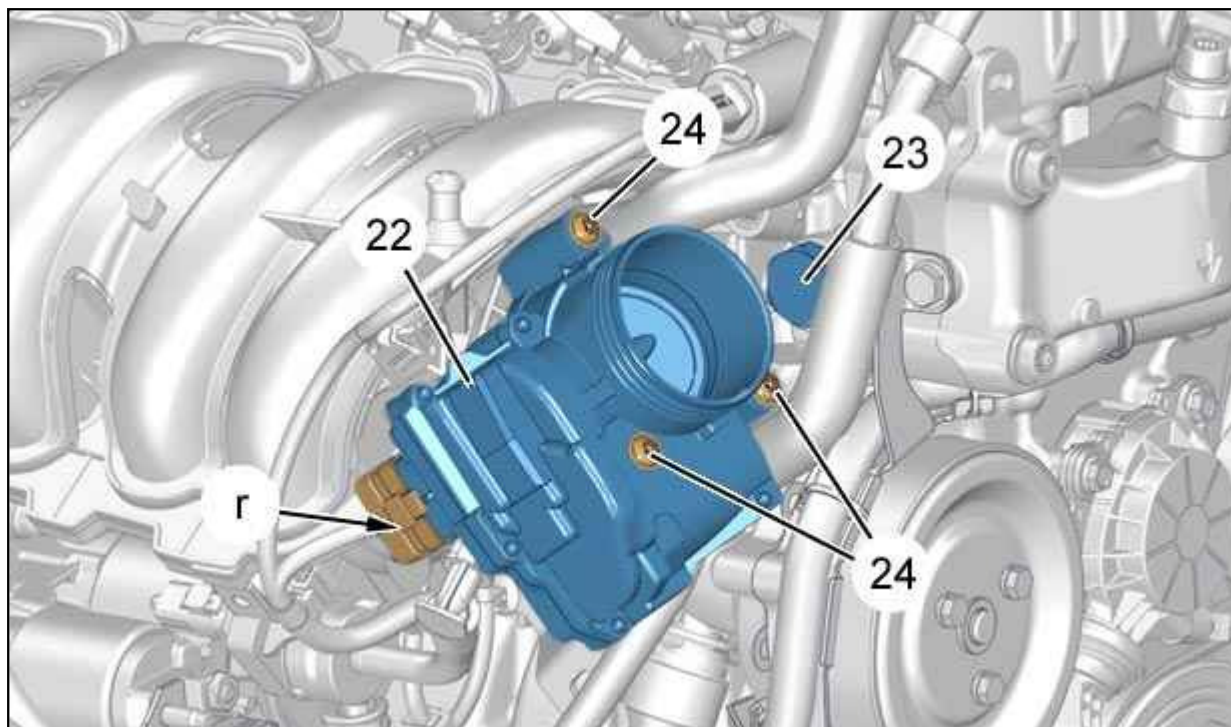


Figure : B1EG0I4D

**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.

Disconnect the connector ( as "r").

Remove :

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

#### **4.1. Fitting the dummy timing chain tensioner**

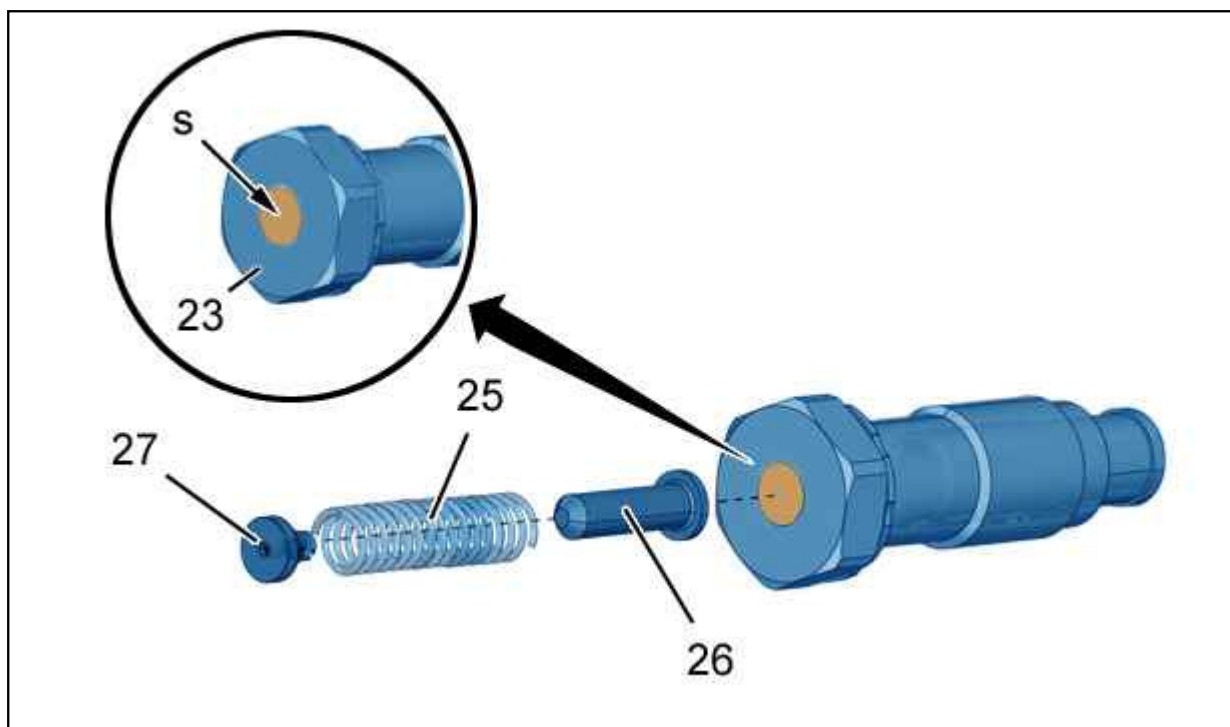


Figure : B1EG0I5D

**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 (at "s") to a diameter of 10,75 mm.

**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)

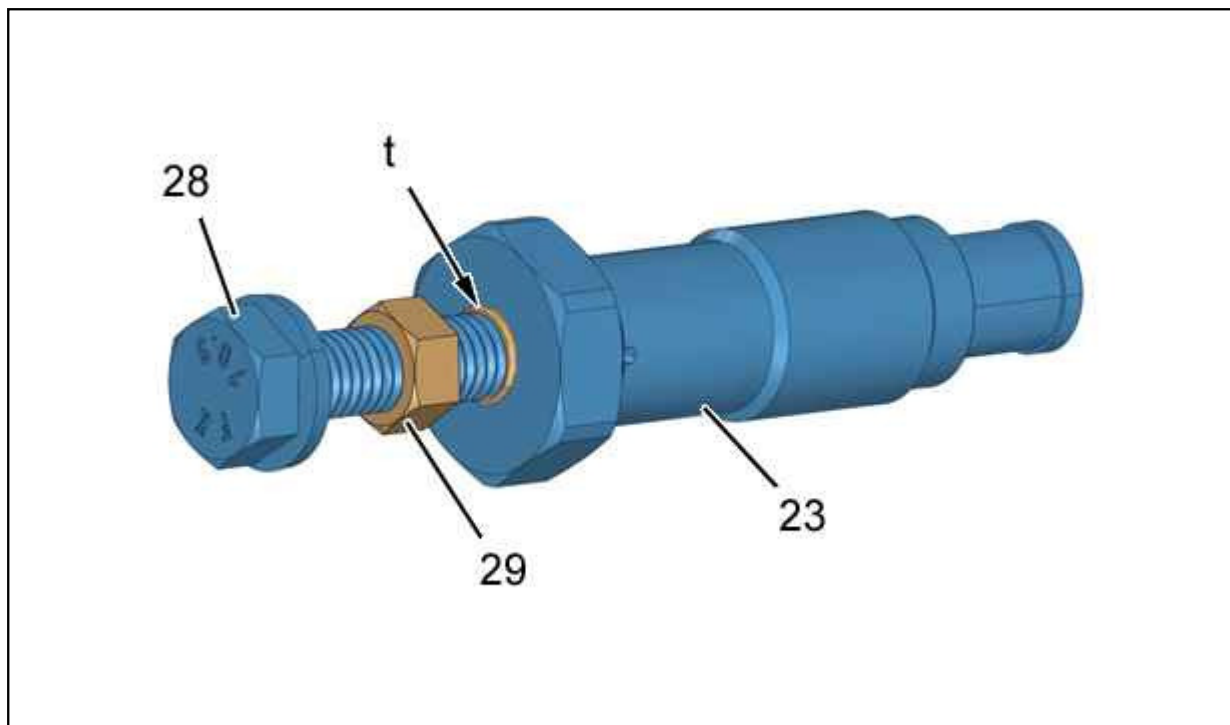


Figure : B1EG0I6D

**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 M10x150 (at "t").

Do up :

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

## 4.2. Checking the wear of the timing chain assembly



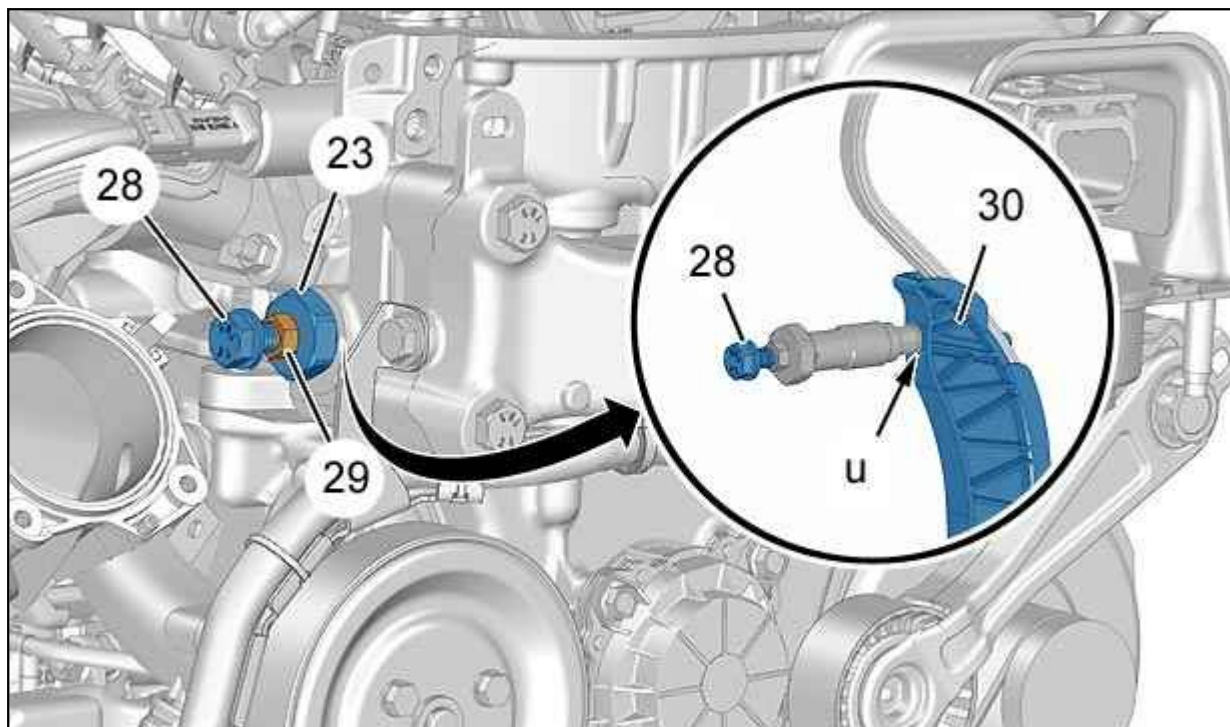


Figure : B1EG017D

**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).

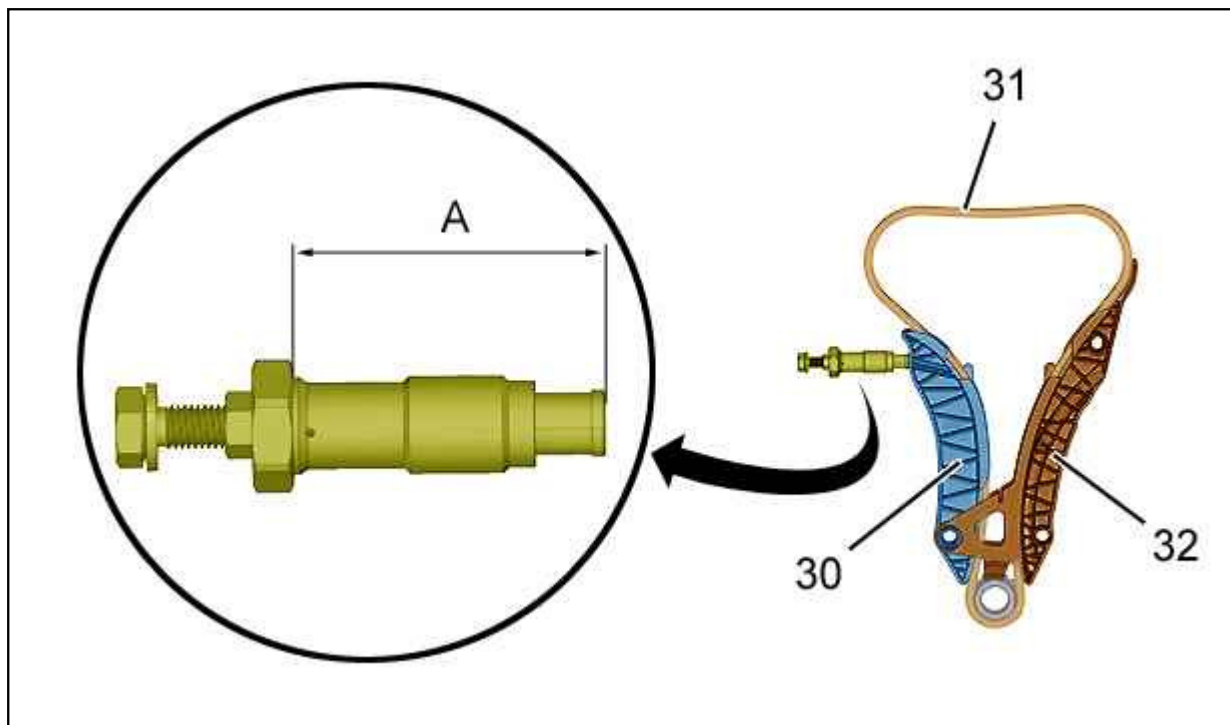


Figure : B1ED03WD

**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 ; Replace :

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

## 5. Removing : Timing chain

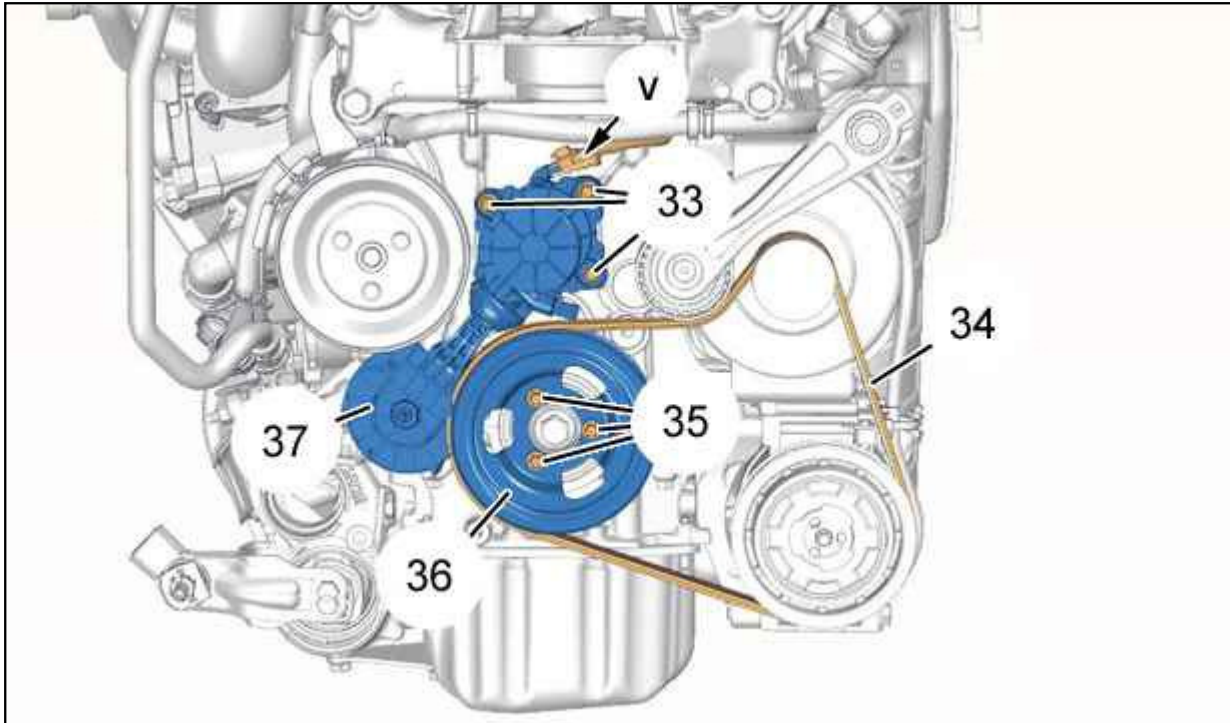


Figure : B1EG0I9D

Disconnect the connector ( as "v") (according to equipment).  
 Unlock the water pump friction drive wheel by pulling on tab .

Remove :

- The accessories drive belt (34)
- The mountings (33)
- The friction wheel (37)
- The bolts (35)
- The ancillary drive pulley (36)

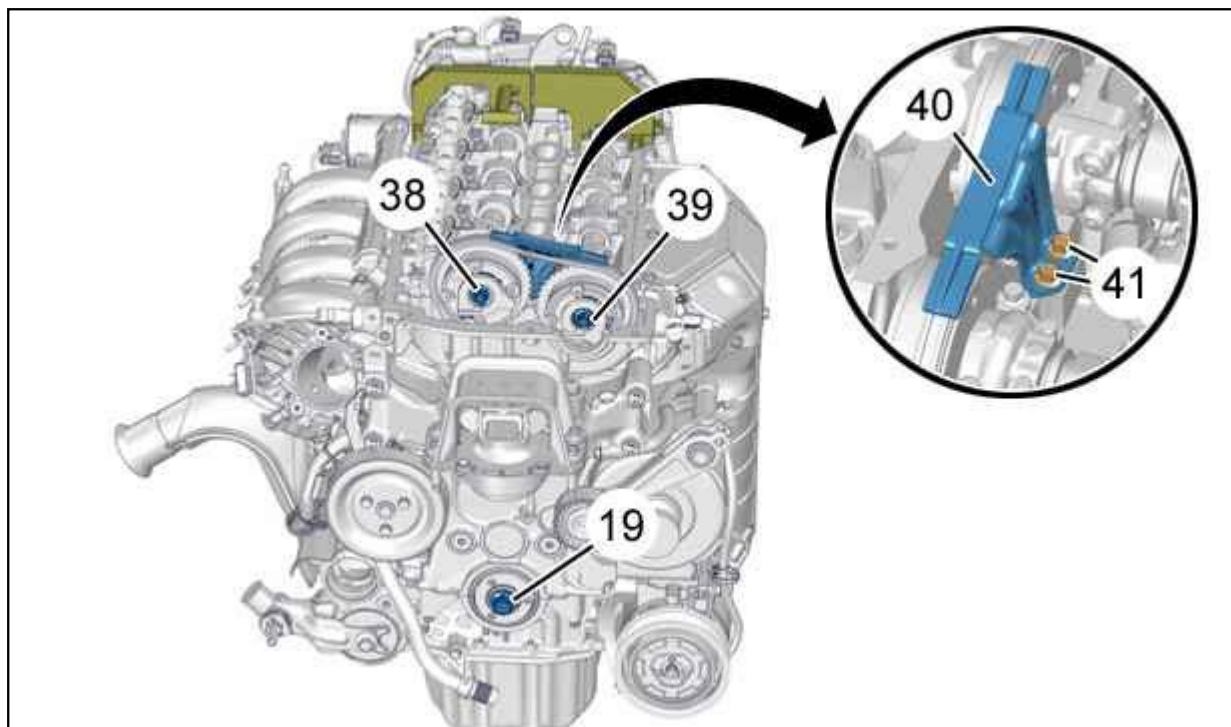


Figure : B1EG0DJJD

Unscrew :

- The securing bolts (38), (39)
- The securing bolt (19)

Remove :

- The 2 bolts (41)
- The upper chain guide (40)

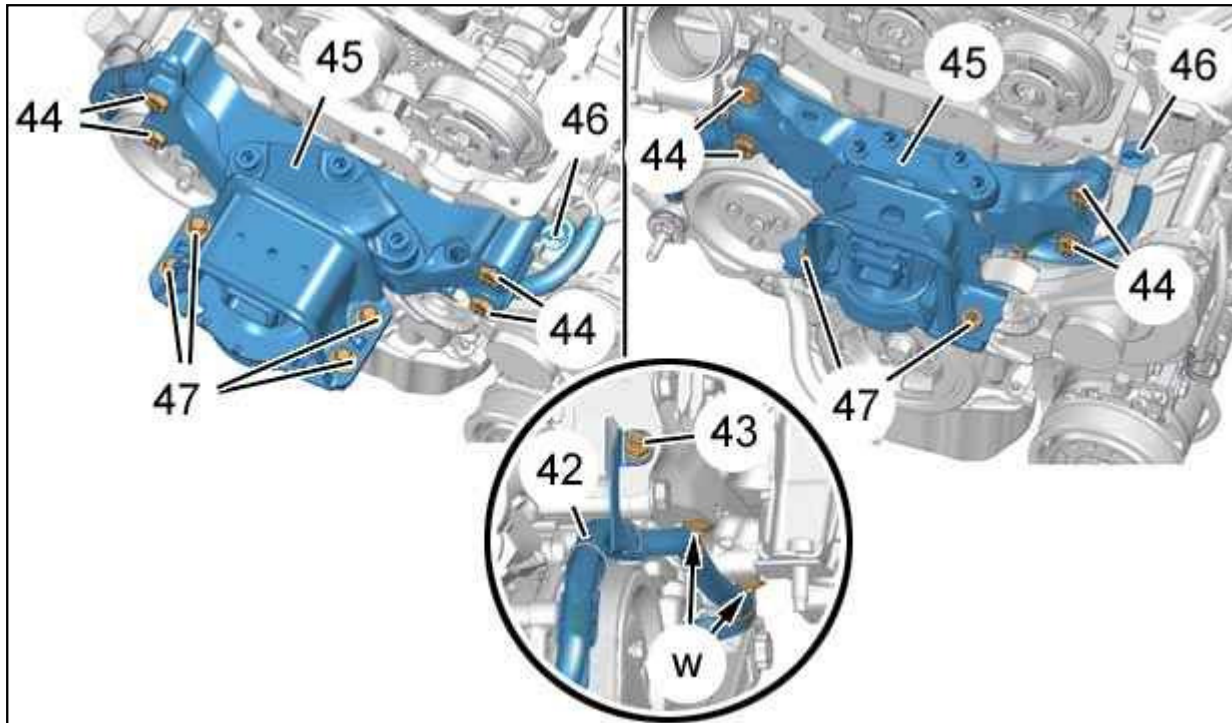


Figure : B1EG0IBD

Remove bolts (43).

Unfasten and move aside : The supply harness (42) ( as "w").

Support the engine under the sump .

Remove (according to the assembly operations) :

- The dipstick (46)
- The bolts (47)
- The bolts (44)
- The engine mounting assembly (45)



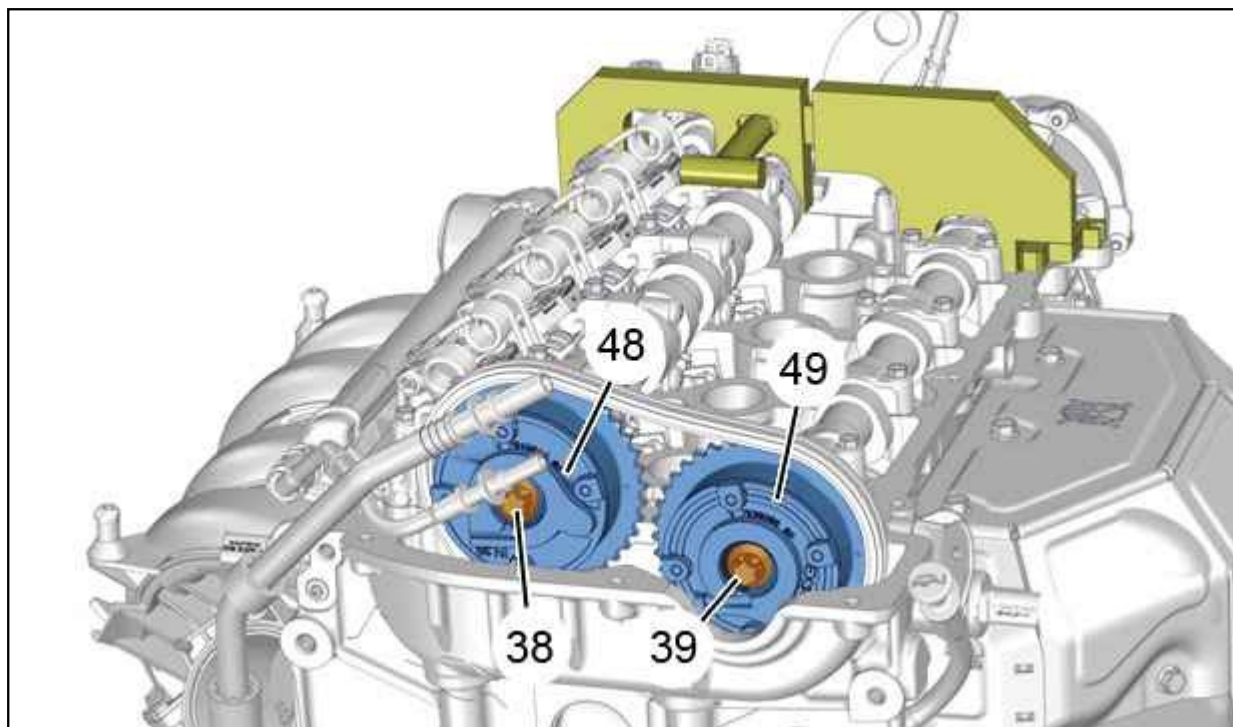


Figure : B1EG0DLD

Remove :

- The securing bolt (38)
- The inlet camshaft pinion (48)
- The securing bolt (39)
- The exhaust camshaft pinion (49)

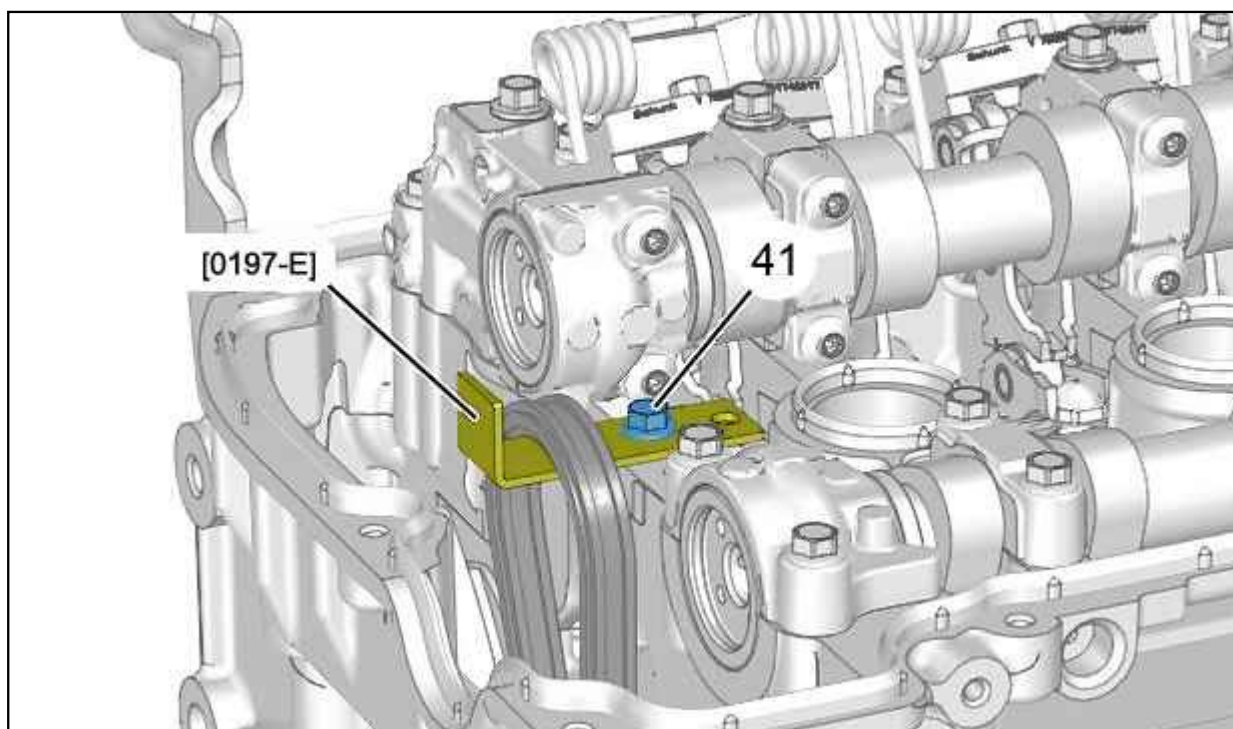


Figure : B1EG0FJD

Fit the tool [0197-E] ; Using a bolt (41).

Hold : The timing chain ; Using tool [0197-E].

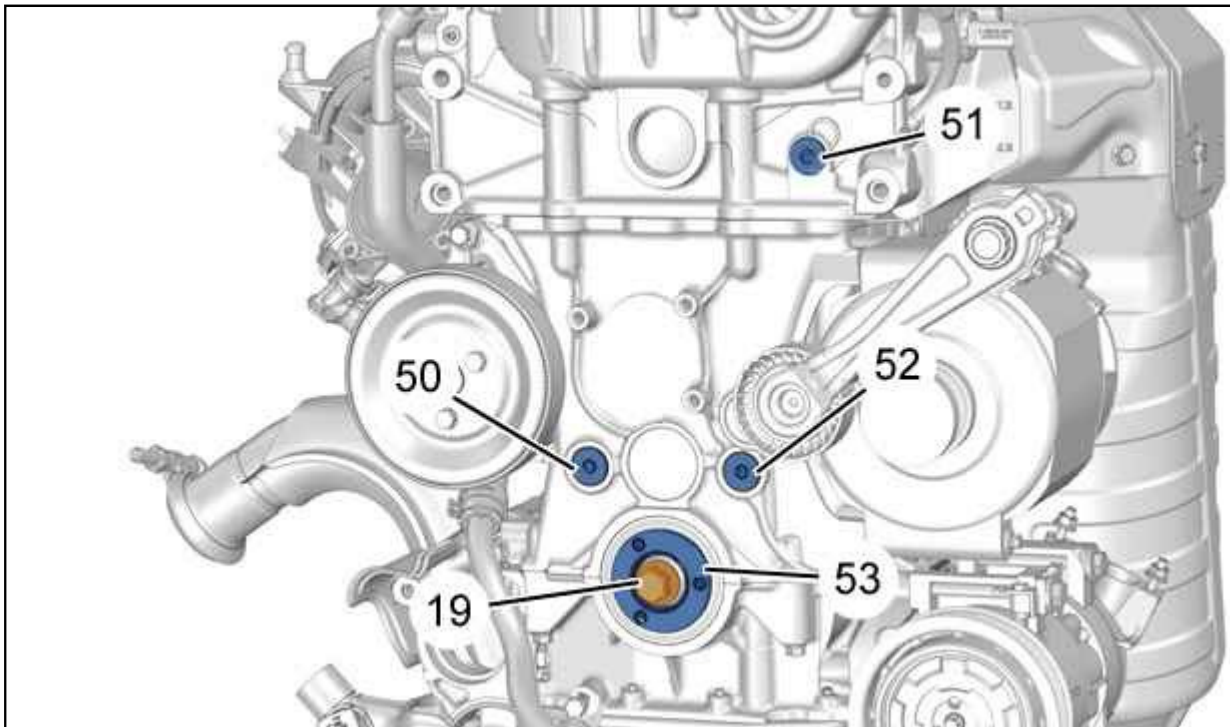


Figure : B1EG0DND

Remove :

- The (50) bolt
- The (51) bolt
- The (52) bolt
- The (19) bolt
- The crankshaft hub (53)

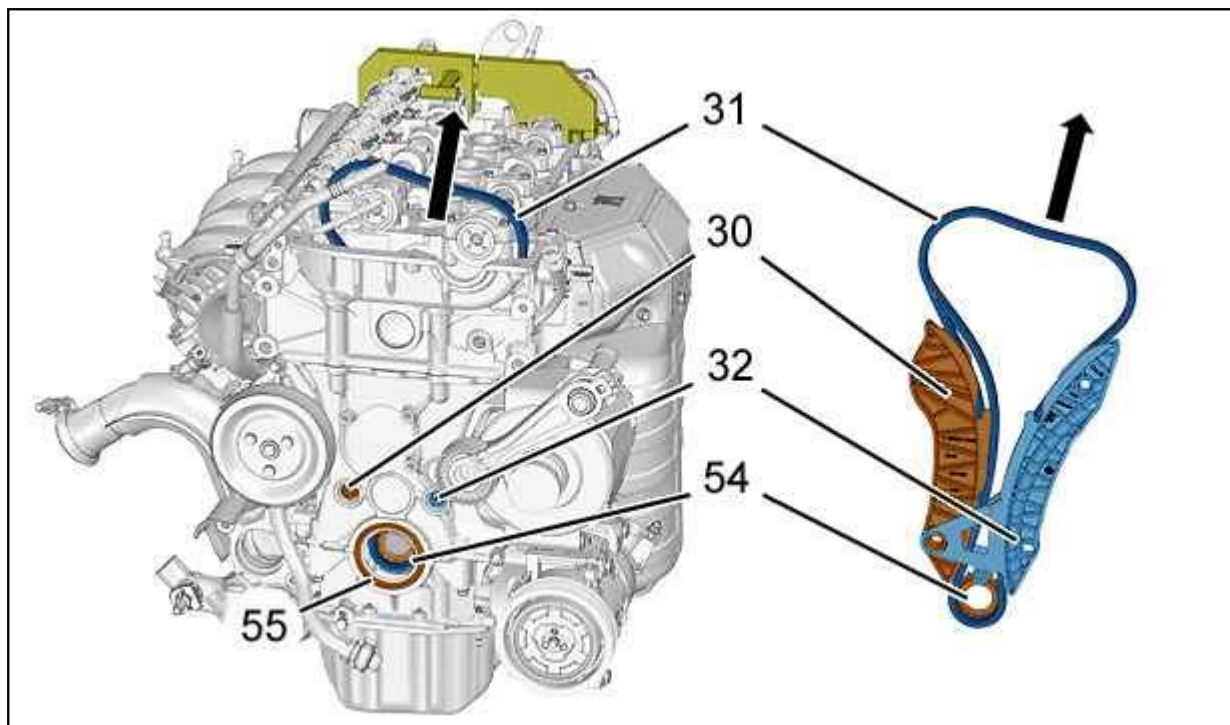


Figure : B1EG0DOD

Remove : The timing chain assembly (31) (Following the arrow) :

- Timing chain tensioner guide (30)
- Fixed guide (32)
- Crankshaft gear (54)

Remove the sealing ring (55).

## 6. Refitting

**CAUTION** : Adhere to the tightening torques ⓘ .

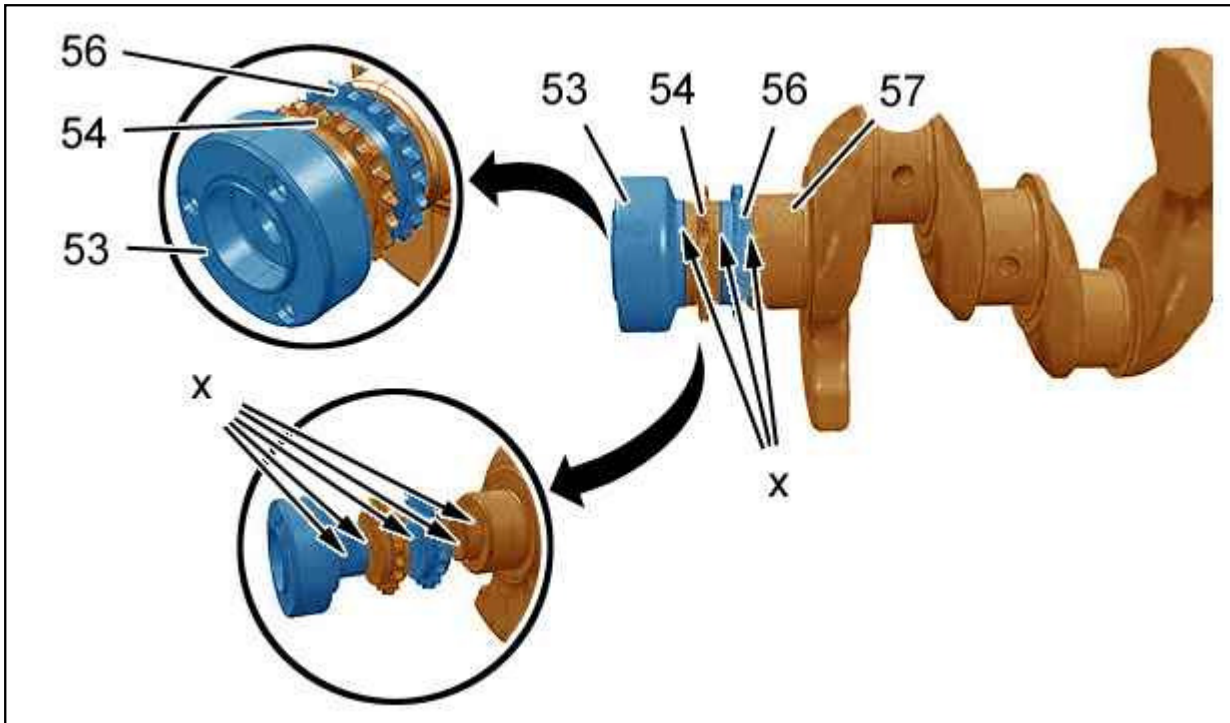


Figure : B1EG0IDD

**CAUTION** : Clean then degrease : The contact faces ( as "x" ) : Before assembling and tightening ; Using a dry product of brake cleaner type.

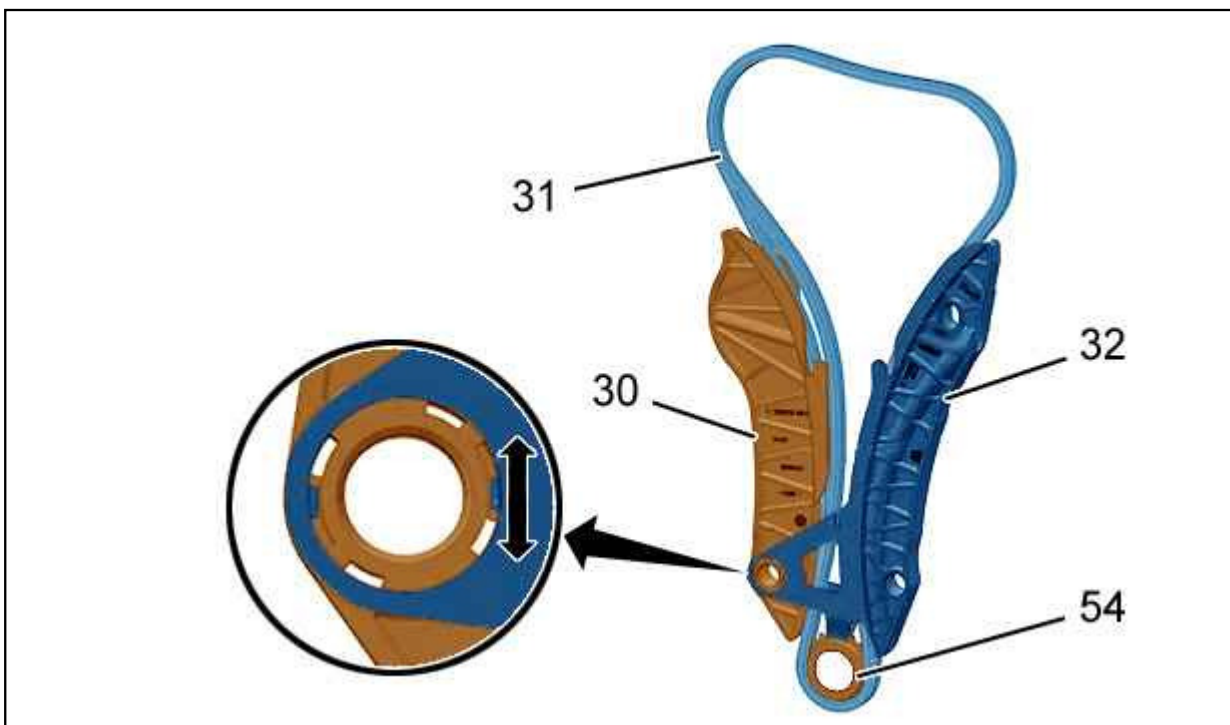


Figure : B1EG0DQD

Always replace the ring seal (55).



Assemble :

- The tensioner guide (30)
- The fixed guide (32)
- The timing chain (31)
- The timing gear (54)

Off up the timing chain (31) tension guide (30) fixed guide (32) and timing gear set (54) from above the cylinder head.  
Position the timing chain (31) on the support tool [0197-E].

Assemble the timing gear (54) onto the crankshaft (57).

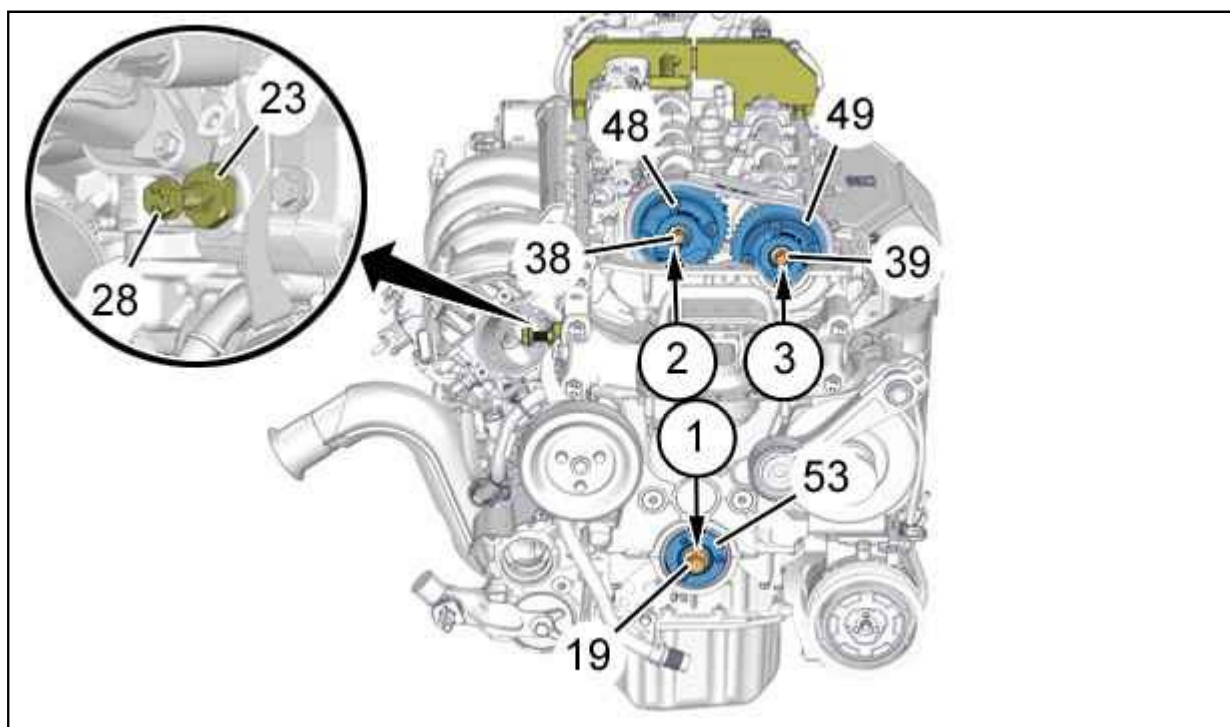


Figure : B1EG0DRD

Fit :

- The crankshaft hub (53)
- The bolt (19) (new)

**CAUTION :** Replace : The fixing bolt (19) for the crankshaft pulley hub and the fixing bolts for the camshaft pulleys (38), (39).

**CAUTION :** Degrease the contact faces of the pulleys on the camshafts before tightening the bolts (38), (39).

Fit :

- The inlet camshaft pinion (48) ; Fit the chain on the pinion (48)
- The securing bolt (38) (new)
- The exhaust camshaft gear (49) ; Fit the chain on the pinion (49)
- The securing bolt (39) (new)
- The (50) bolt
- The (51) bolt
- The (52) bolt
- The upper chain guide (40)
- The 2 bolts (41)

Remove the tool [0197-E].



Tighten :

- The (50) bolt
- The (51) bolt
- The (52) bolt
- The dummy timing chain tensioner (on the cylinder head)

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

Fit :

- The engine mounting assembly (45)
- The bolts (44)
- The bolts (47)
- The dipstick (46)

Remove the support under the sump .

Clip in place : The supply harness (42) ( as "w").

Refit screw (43).

**CAUTION :** Respect the tightening sequence indicated (\*).

Tighten to the specified torque :

- The (19) bolt (New) (\*)
- The securing bolt (38) (new) (\*)
- The securing bolt (39) (new) (\*)

**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 .

**CAUTION :** In the event of the timing chain tensioner being seized or having a tight spot ; Replace : The timing chain tensioner (23).

Fit : The timing chain (23) tensioner .

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

Replace : The crankshaft hub sealing ring (53).

Fit :

- The ancillary drive pulley (36)
- The 3 bolts (35)

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]

Fit :

- The friction wheel (37)
- The mountings (33)
- The accessories drive belt (34)

Lock : The coolant pump friction wheel .

Reconnect :

- The connector ( as "v") (according to equipment)
- The connector ( as "r")

Fit :

- The throttle unit (22)
- The bolts (24)
- The cylinder head cover (18)
- The bolts (15) of the cylinder head cover
- The engine harness (11) duct (16)
- The ignition coils (14)

Retighten the sling hook (17).

Clip in place :

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

Connect :

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

Couple the oil vapours recirculation pipe (13).

Fit :

- The nut (12)
- The air union (8)
- The air filter housing (9)
- The air cleaner bracket (10)
- The engine cover (7)
- The bolts (6)
- 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

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

Connect the battery.