

TIGHTENING TORQUES : EP ENGINES (INDIRECT INJECTION)

1. Engine top

1.1. Cylinder head

CAUTION : Follow the tightening sequence.

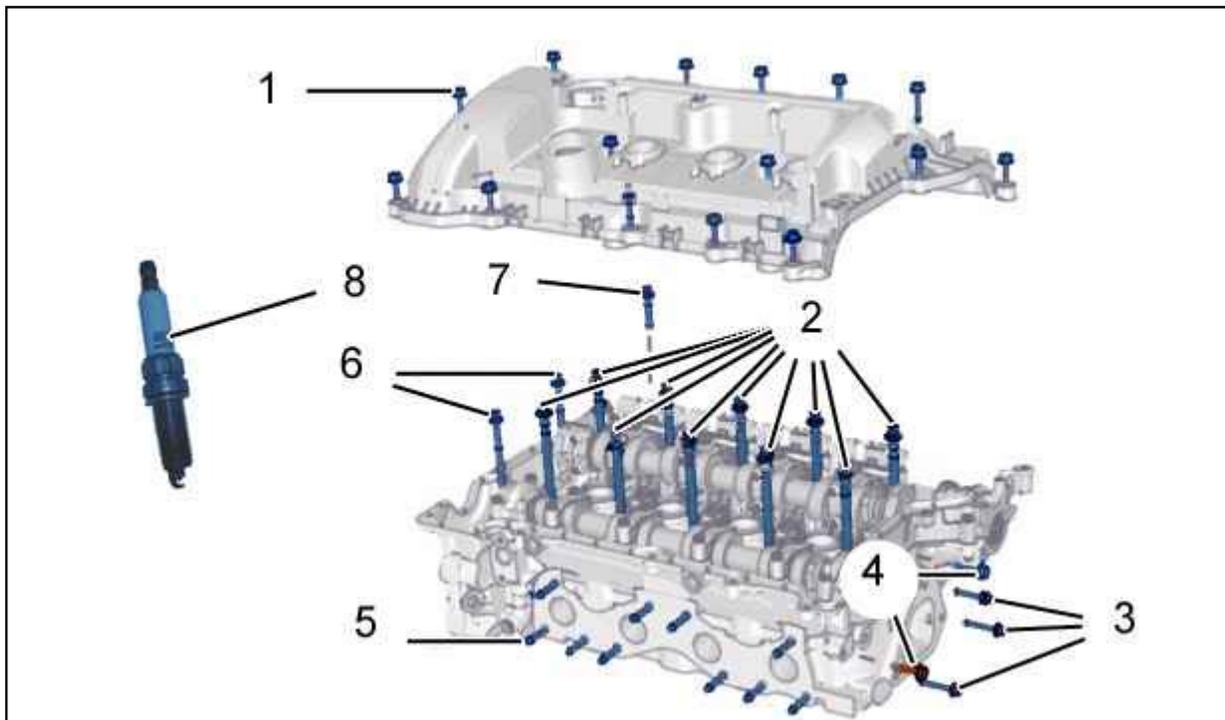


Figure : B1DM0EWD

Reference	Designation	Tightening torques
(1)	fixing screws : Cylinder head cover	0,9 daNm
(2)	Cylinder head bolts (*)	Pre-tighten to 3 daNm Angular tightening to 90° Angular tightening to 90°
(3)	fixing screws : Coolant outlet housing	1 daNm
(4)	fixing screws : vacuum pump	0,9 daNm
(5)	Exhaust manifold fixing studs	1,5 daNm
(6)	Cylinder head bolts / Cylinder block (*)	Pre-tighten to 1,5 daNm Angular tightening to 90° Angular tightening to 90°
(7)	Cylinder head bolts / Cylinder block (*)	2,5 daNm Angular tightening to 30°
(8)	Spark plugs	2,3 daNm
(*) Follow the tightening sequence		

1.2. Order of tightening : Cylinder head

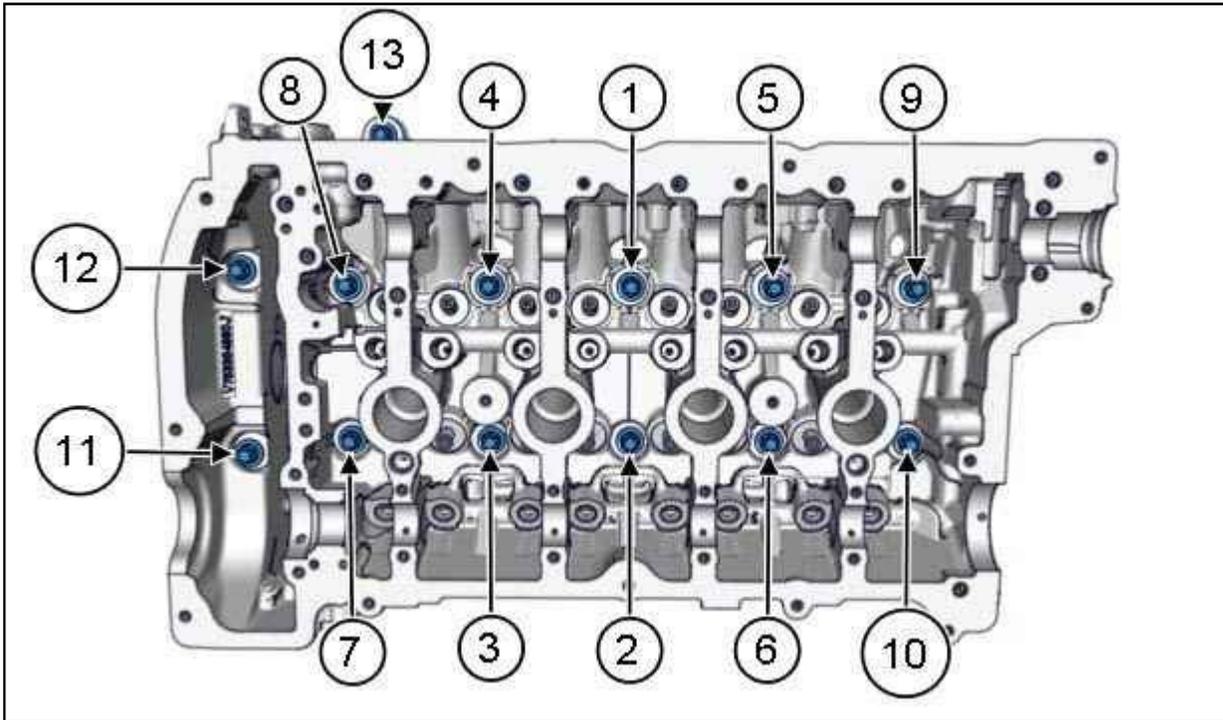


Figure : B1DM03ED

(2) Cylinder head bolts.

1.3. Supply : Air inlet manifold ; Throttle butterfly housing

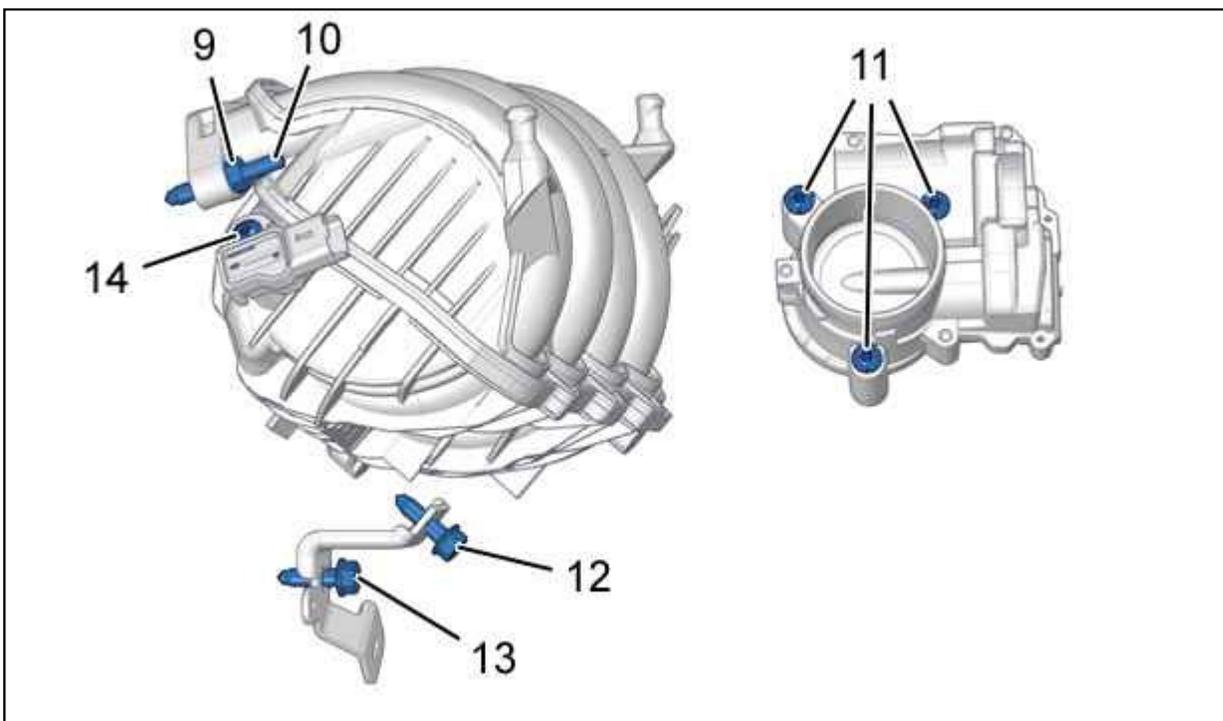


Figure : B1BB0SUD

Reference	Designation	Tightening torques
(9)	Mounting nut : Air inlet manifold (*)	2 daNm
(10)	Fixing studs : Air inlet manifold	1,5 daNm
(11)	Throttle housing fixing bolts / Air inlet manifold (New)	1 daNm
	Throttle housing fixing bolts / Air inlet manifold (Re-used)	0,8 daNm
(12)	Support fixing screws / Air inlet manifold	0,8 daNm
(13)	Support fixing screws / Cylinder block	2 daNm
(14)	fixing screws : Air pressure sensor	1 daNm
(*) Follow the tightening sequence		

1.4. Order of tightening : Air inlet manifold

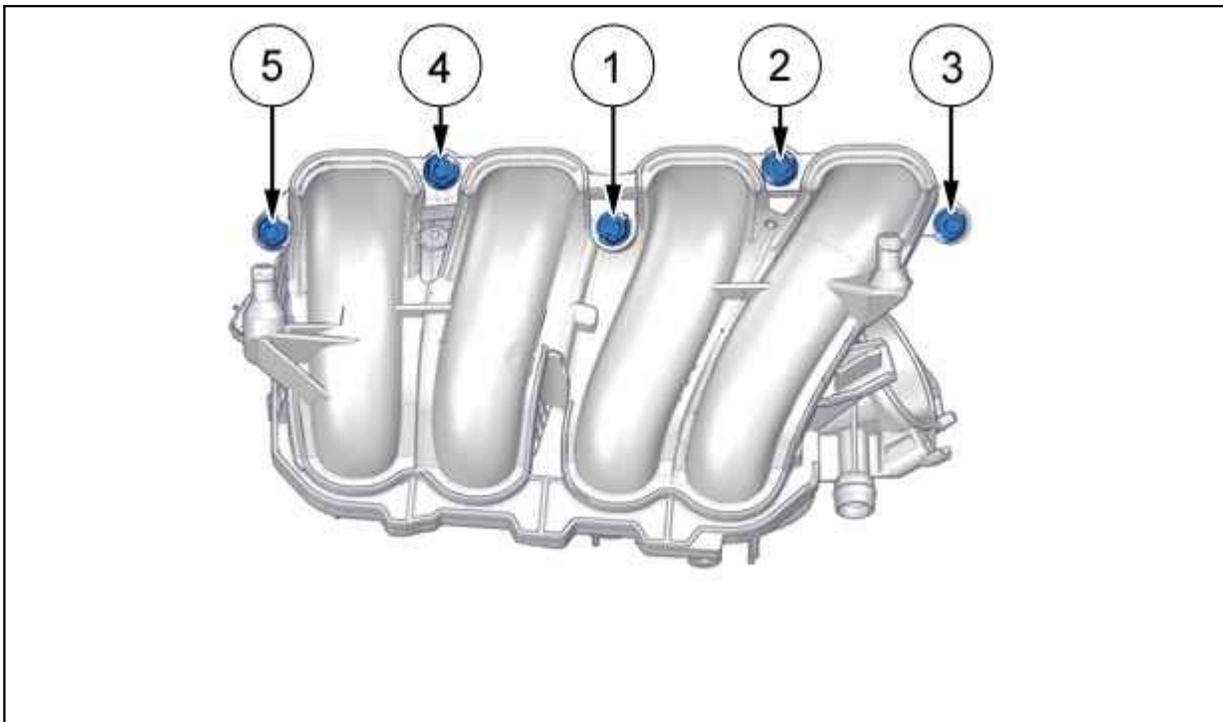


Figure : B1BB0SVD

(9) Mounting nut : Air inlet manifold.

2. Under engine

CAUTION : Follow the tightening sequence.

2.1. Cylinder block

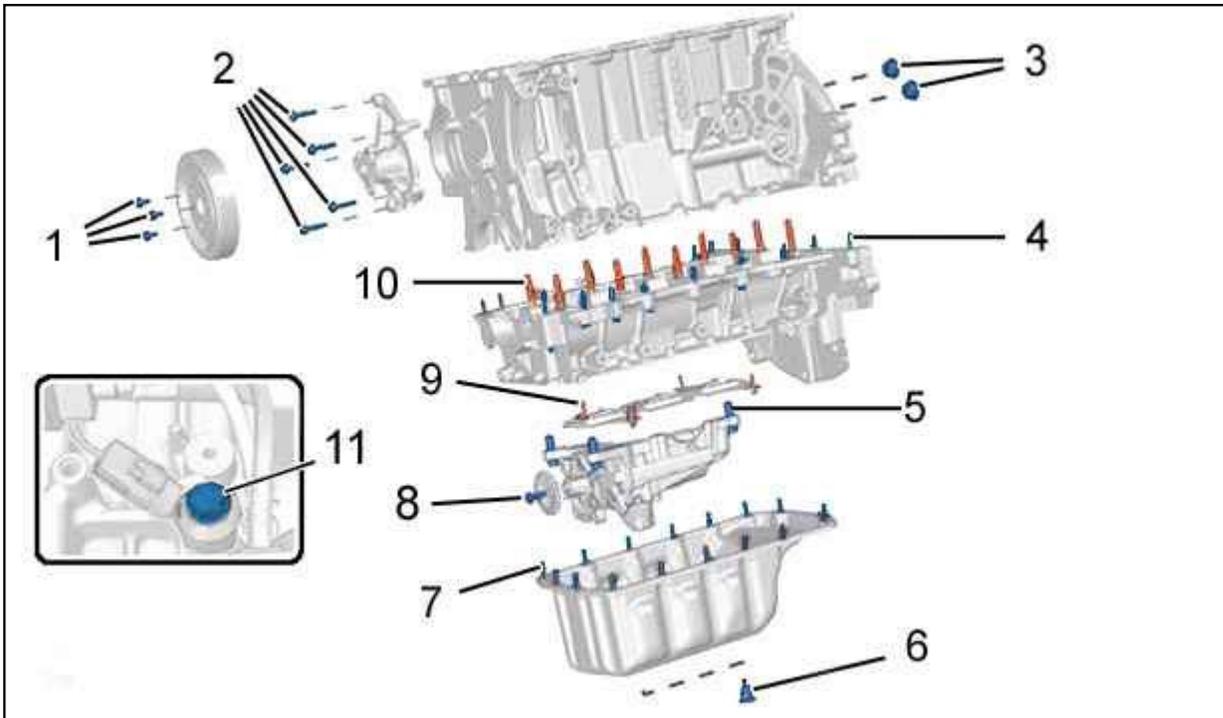


Figure : B1BB0SHD

Reference	Designation	Tightening torques
(1)	fixing screws : Water pump pulley	0,8 daNm
(2)	fixing screws : Coolant pump / Cylinder block	0,9 daNm
(3)	Oil gallery caps on cylinder block	3,5 daNm
(4)	bolts : Crankshaft main bearing cap casting (*)	0,9 daNm
(5)	fixing screws : oil pump (*)	Pre-tighten to 1 daNm
		Tightening torque to 2,5 da.Nm
(6)	drain plug	3 daNm
(7)	fixing screws : Lower oil sump	1,2 daNm
(8)	fixing screws : Pinion of the oil pump	0,5 daNm
		Angular tightening to 90°
(9)	Anti-surge plate fixing bolt	1 daNm
(10)	bolts : Crankshaft bearing (*)	Pre-tighten to 3 daNm
		Angular tightening to 150°
(11)	Knock sensor	2 daNm
(*) Follow the tightening sequence		

2.2. Order of tightening : oil pump

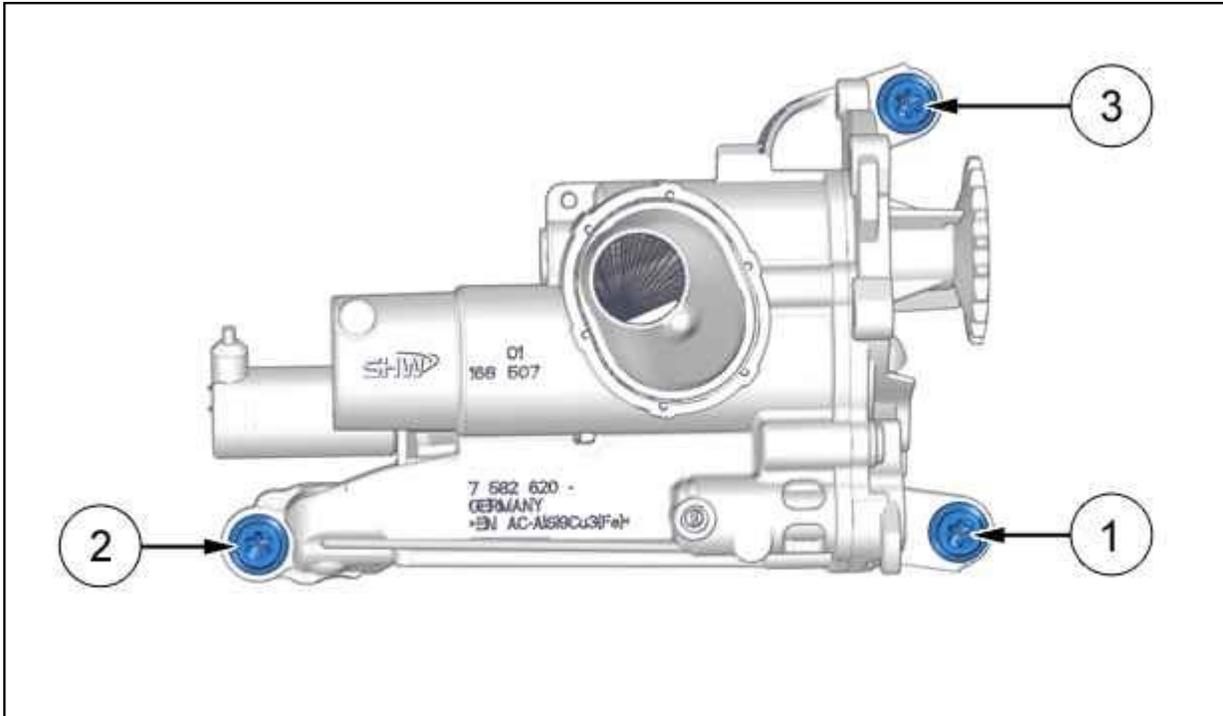


Figure : B1BB015SP0

(5) fixing screws : oil pump.

2.3. Order of tightening : Crankshaft main bearing cap casting

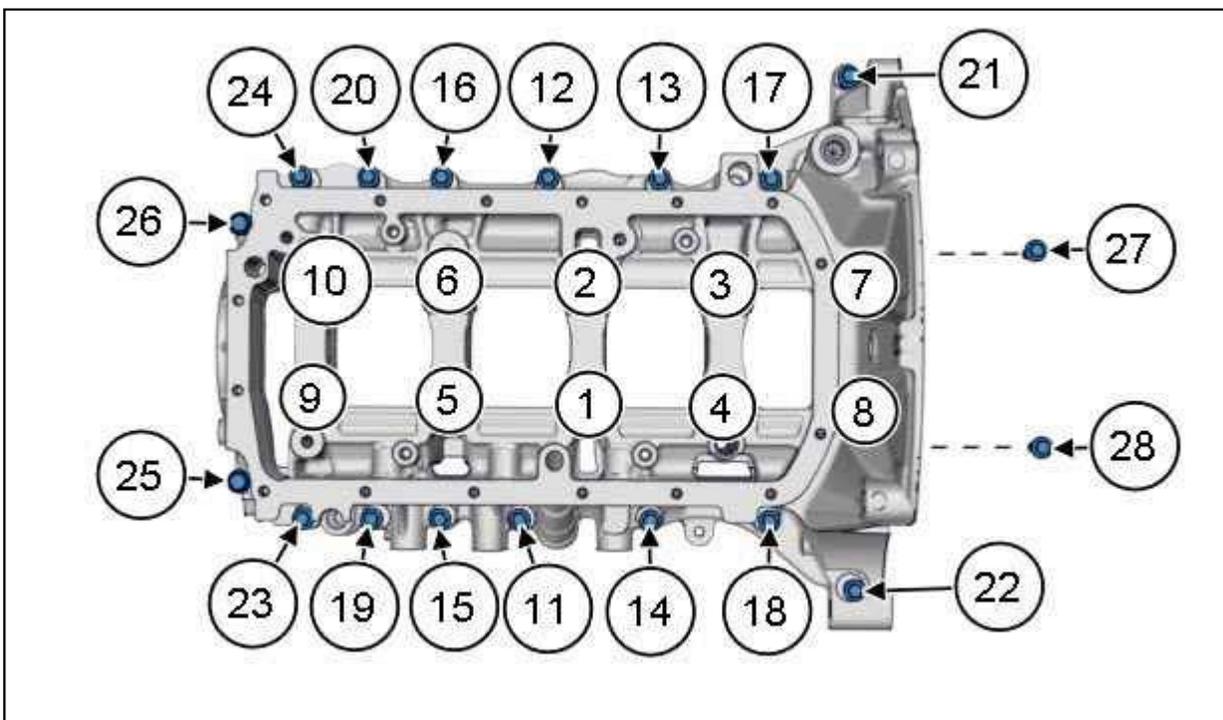


Figure : B1DM03HD

(4) Crankshaft bearing cap housing fixing screws.

(10) Crankshaft bearing cap fixing screws.

2.4. Reciprocating gear

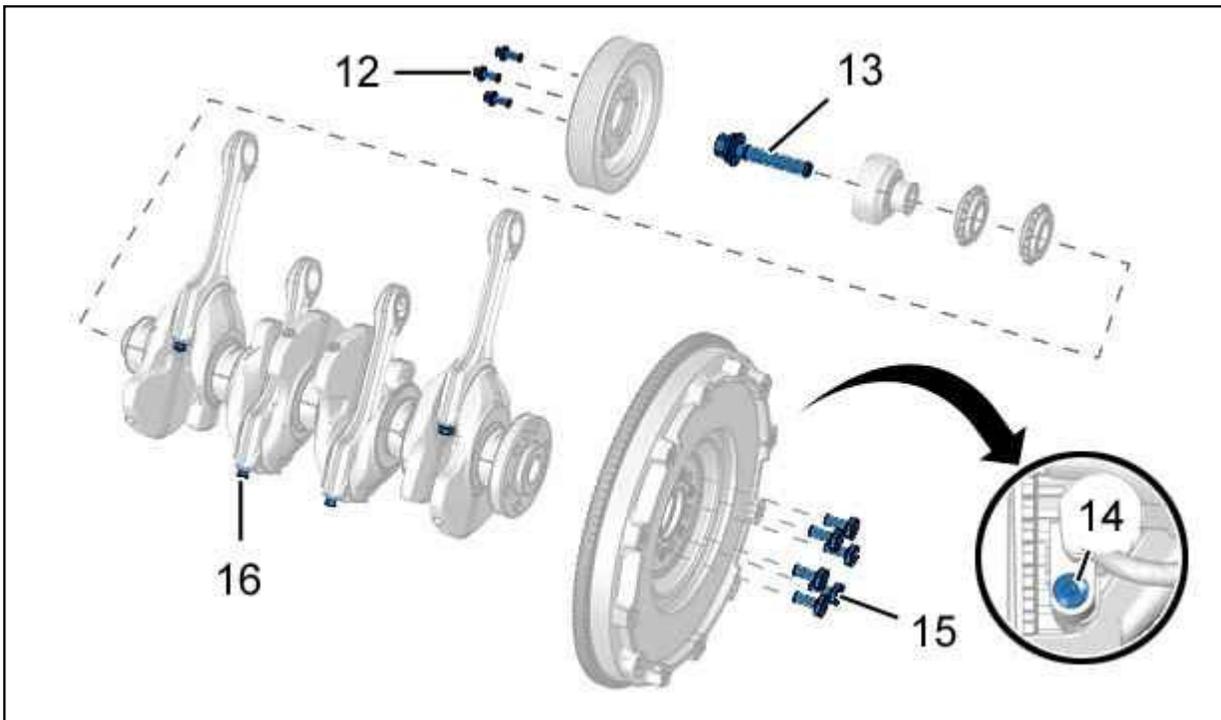


Figure : B1BB0SYD

Reference	Designation	Tightening torques
(12)	fixing screws : Accessories drive pulley	2,8 daNm
(13)	fixing screws : Crankshaft gear	Tightening torque to 5 da.Nm Angular tightening to 180°
(14)	Engine speed sensor	0,5 daNm
(15)	fixing screws : Engine flywheel (*)	Pre-tighten to 0,8 daNm
		Tightening torque to 3 da.Nm Angular tightening to 90°
	fixing screws : Automatic gearbox panel (*)	Pre-tighten to 0,8 daNm
		Tightening torque to 3 da.Nm Angular tightening to 90°
(16)	bolts : Big end caps	Pre-tighten to 0,5 daNm
		Tightening torque to 1,5 da.Nm
		Angular tightening to 130°
(*) Follow the tightening sequence		

2.5. Order of tightening - Engine flywheel / Automatic gearbox panel

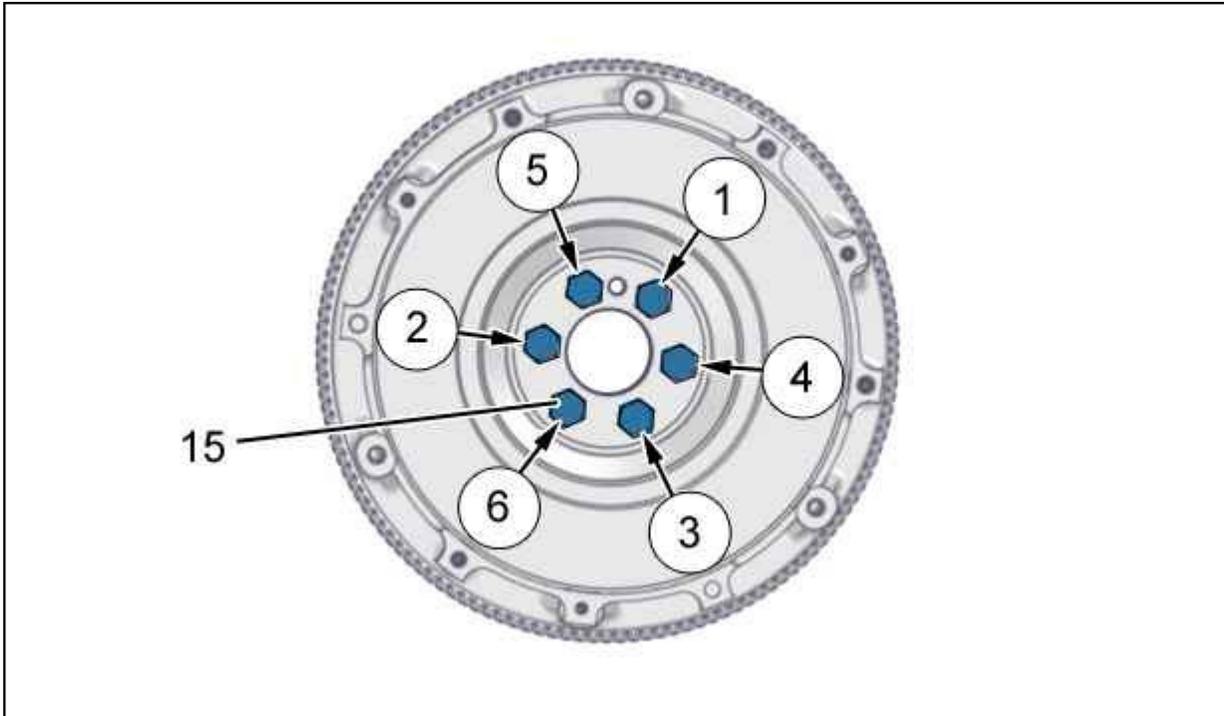


Figure : B1BB0SZD

(15) Flywheel bolts.

3. Lubrication

3.1. 1st assembly

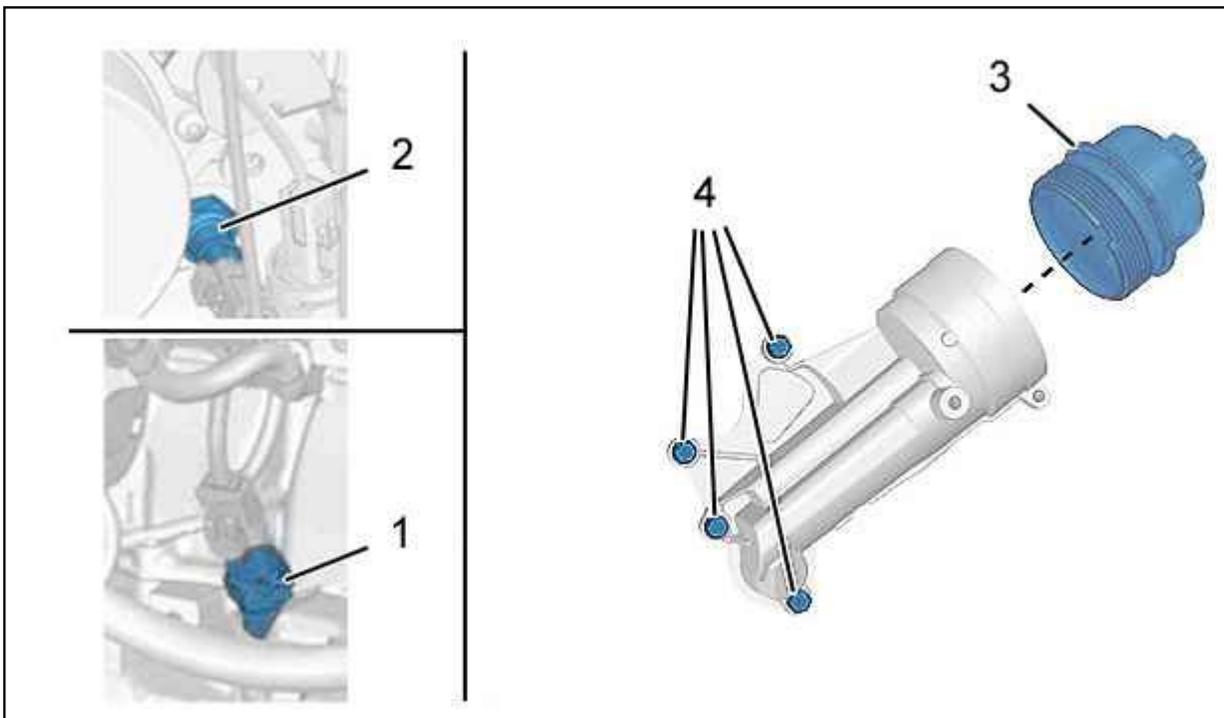


Figure : B1BB0T0D

Reference	Designation	Tightening torques
(1)	Engine oil temperature and level sensor	2,7 daNm
(2)	Oil pressure sensor (on the cylinder head)	2 daNm
(3)	Oil filter cover	2,5 daNm
(4)	fixing screws : Oil filter support / Cylinder block	1 daNm

3.2. 2nd assembly

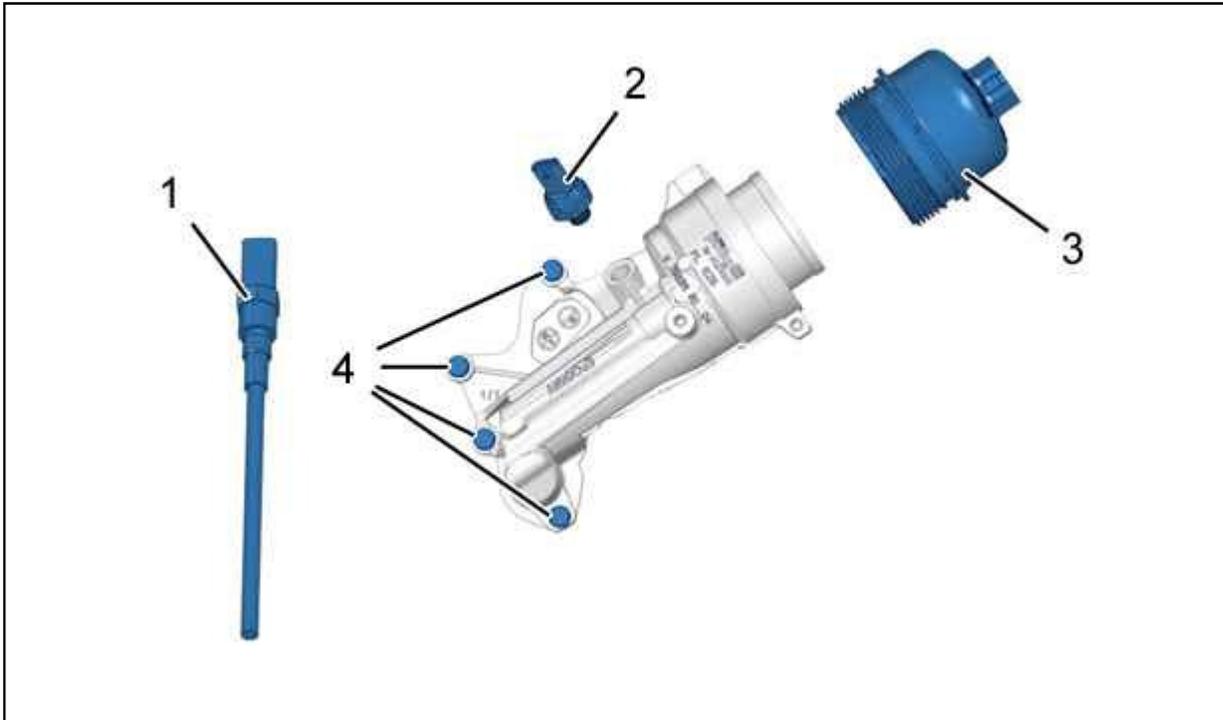


Figure : B1FB014D

Reference	Designation	Tightening torques
(1)	Engine oil temperature and level sensor	2,7 daNm
(2)	Oil pressure sensor	2 daNm
(3)	Oil filter cover	2,5 daNm
(4)	fixing screws : Oil filter support / Cylinder block	1 daNm

4. Timing gear

CAUTION : Follow the tightening sequence.

4.1. Camshafts

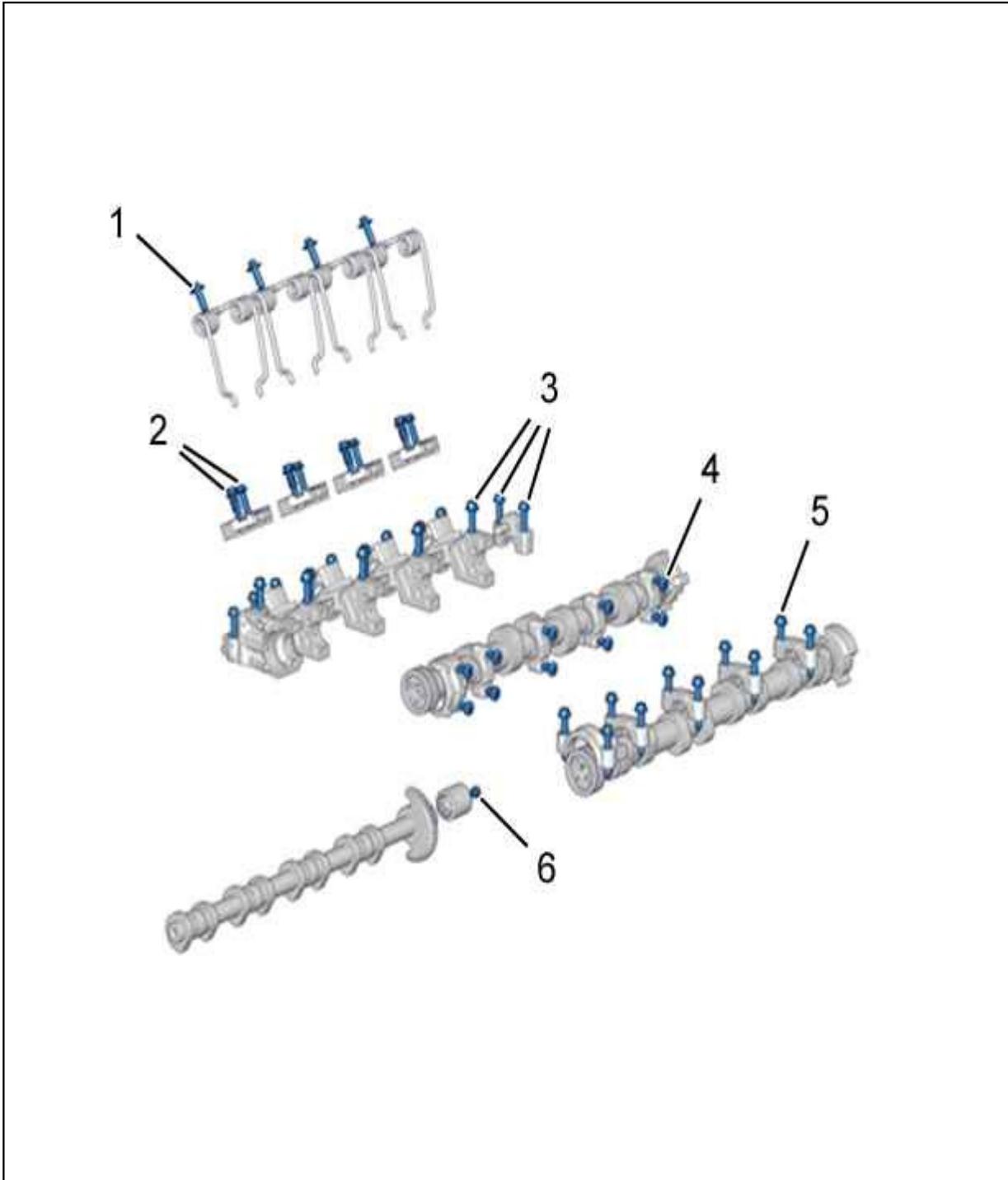


Figure : B1EB00HP

Reference	Designation	Tightening torques
(1)	Variable lift spring bolt	1 daNm
(2)	Slider bolts (*)	Pre-tightening to 0,5 da.Nm
		Angular slackening of 90°
		Tighten to 1 da.Nm
(3)	Bolts of the main bearings of the eccentric shaft/Induction camshaft (*)	1 daNm

(4)	fixing screws : Inlet camshaft main bearing caps (*)	1 daNm
(5)	fixing screws : Exhaust camshaft main bearing caps (*)	1 daNm
(6)	Eccentric shaft target fixing bolt	0,9 daNm
(*) Follow the tightening sequence		

4.2. Order of tightening : Sliders

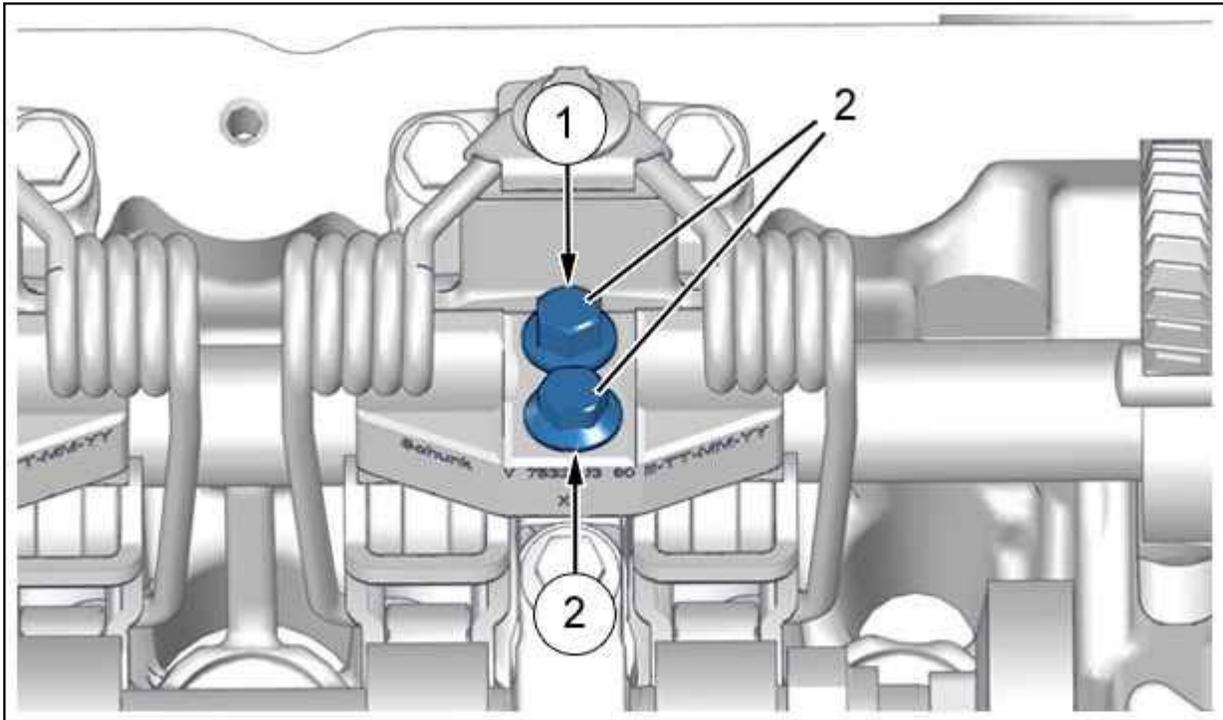


Figure : B1EB00ID

(2) Slider bolts.

4.3. Order of tightening : Main bearings of the eccentric shaft/Induction camshaft

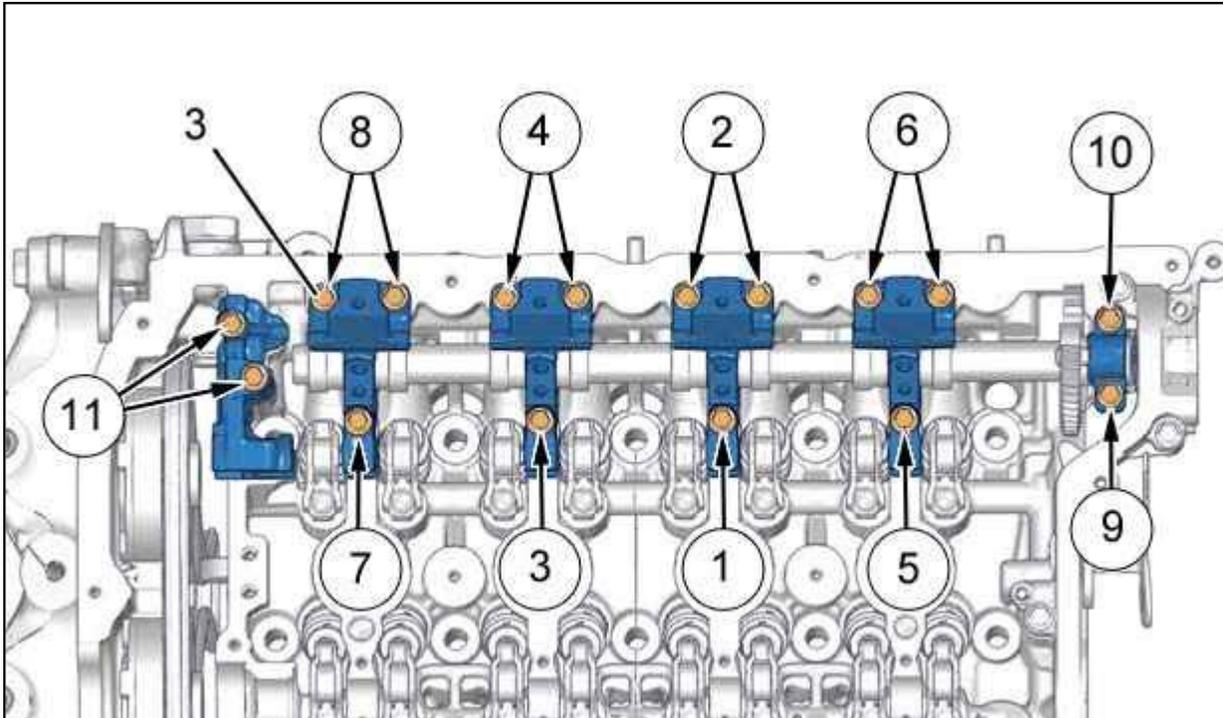


Figure : B1EB00JD

(3) Bolts of the main bearings of the eccentric shaft/Induction camshaft.

4.4. Order of tightening : Inlet camshaft main bearing caps

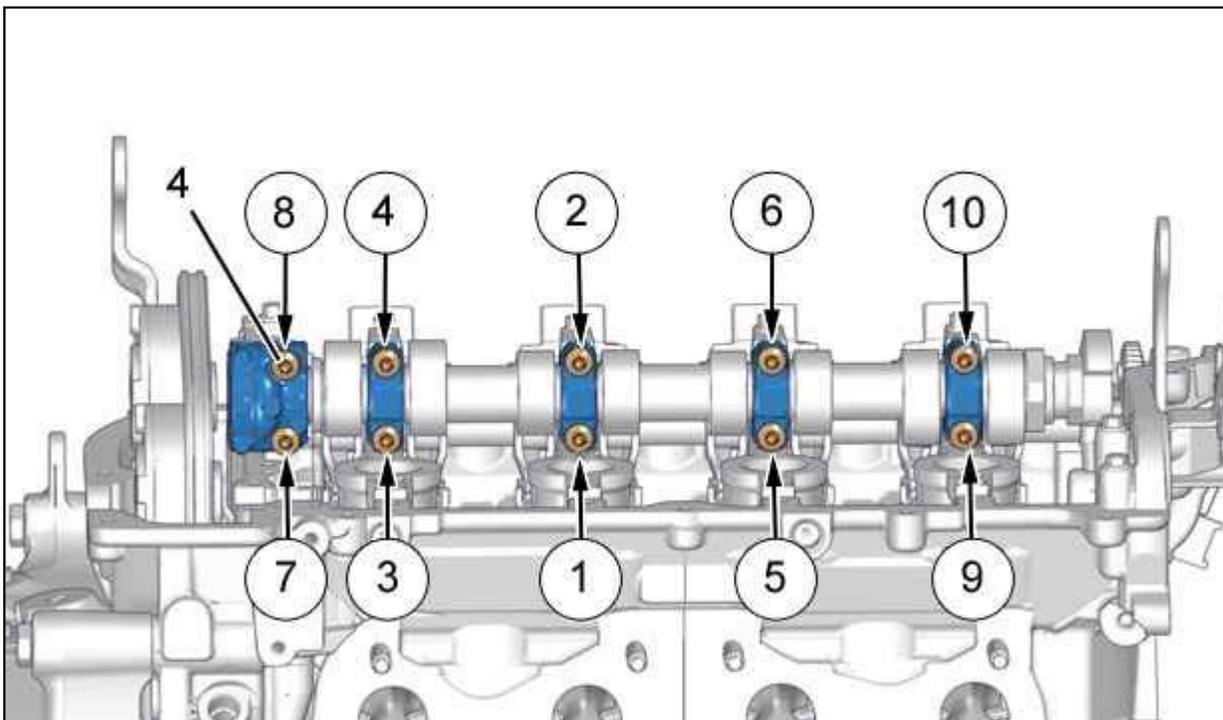


Figure : B1EB00KD

(4) Inlet camshaft main bearing cap bolts.

4.5. Order of tightening : Exhaust camshaft main bearing caps

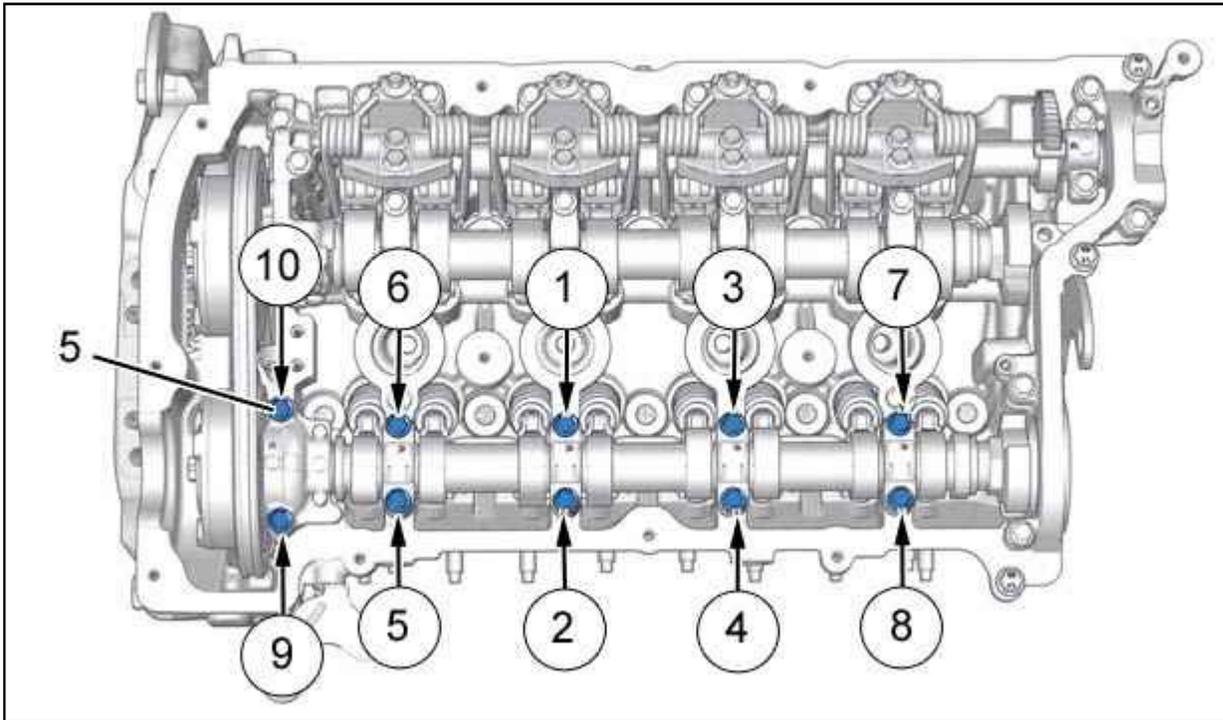


Figure : B1EB00LD

(5) Exhaust camshaft main bearing cap bolts.

4.6. Timing controls

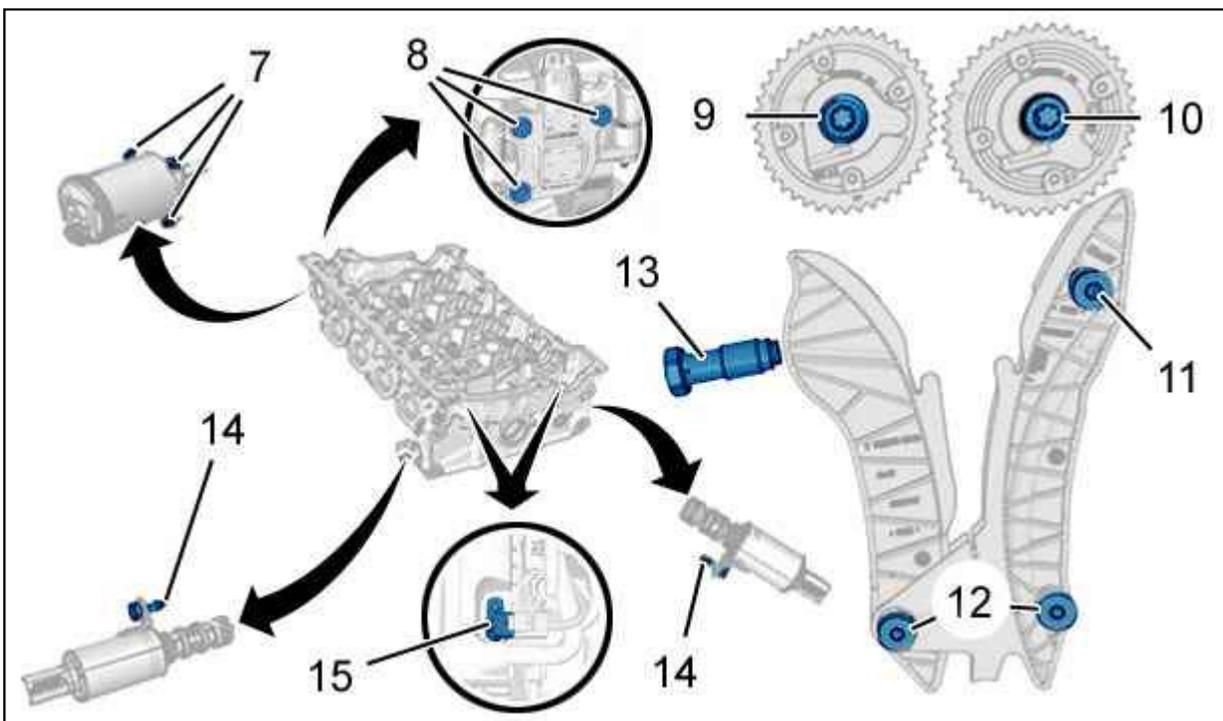


Figure : B1BB0T4D

Reference	Designation	Tightening torques
(7)	fixing screws : Variable timing actuator (*)	0,8 daNm
(8)	Position sensor (Eccentric shaft)	0,8 daNm
(9)	fixing screws : Inlet gear	Tightening torque to 2 da.Nm Angular tightening to 180°
(10)	fixing screws : Exhaust gear	Tightening torque to 2 da.Nm Angular tightening to 180°
(11)	Top fixing screw : Fixed guide	2,5 daNm
(12)	Bottom fixing screw : Guides	2,4 daNm
(13)	Timing chain tensioner	7,5 daNm
(14)	fixing screws : Piloting electrovalves (Timing gear)	0,9 daNm
(15)	Cylinder reference sensor (inlet camshaft)	0,8 daNm
	Cylinder reference sensor (exhaust camshaft)	0,8 daNm
(*) Follow the tightening sequence		

4.7. Order of tightening : Variable lift actuator

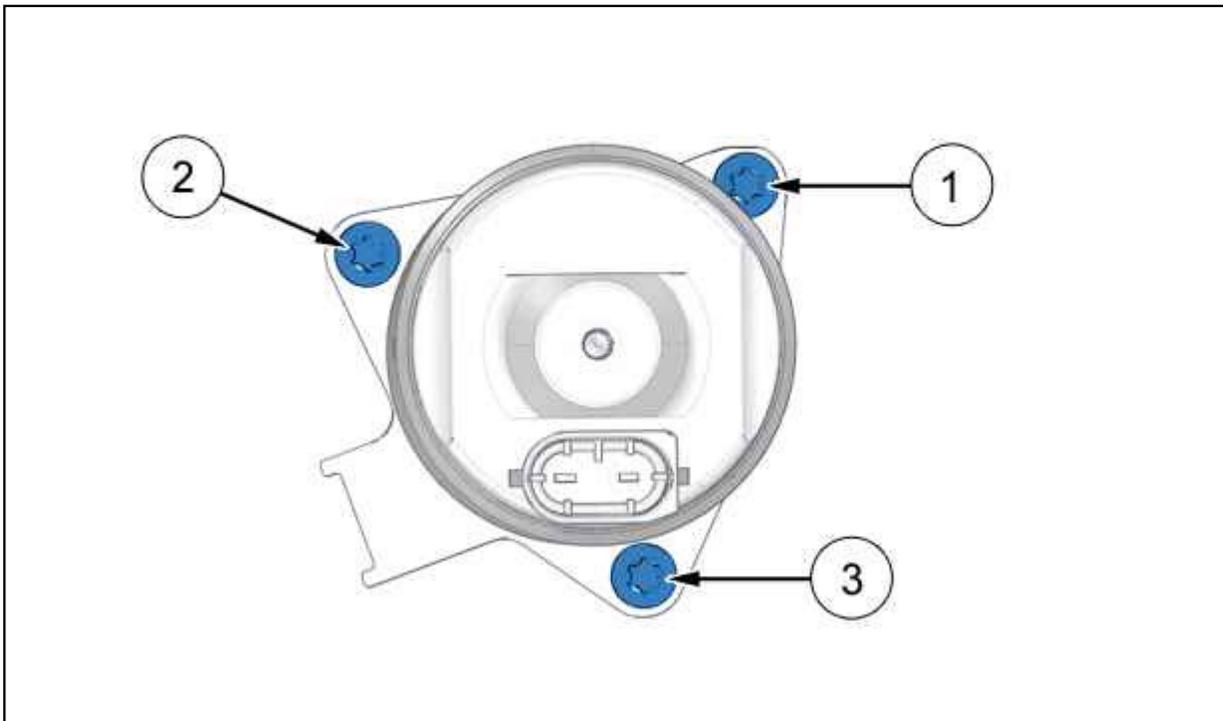


Figure : B1BB0T5D

(7) Variable lift actuator screws.

5. Fuel supply

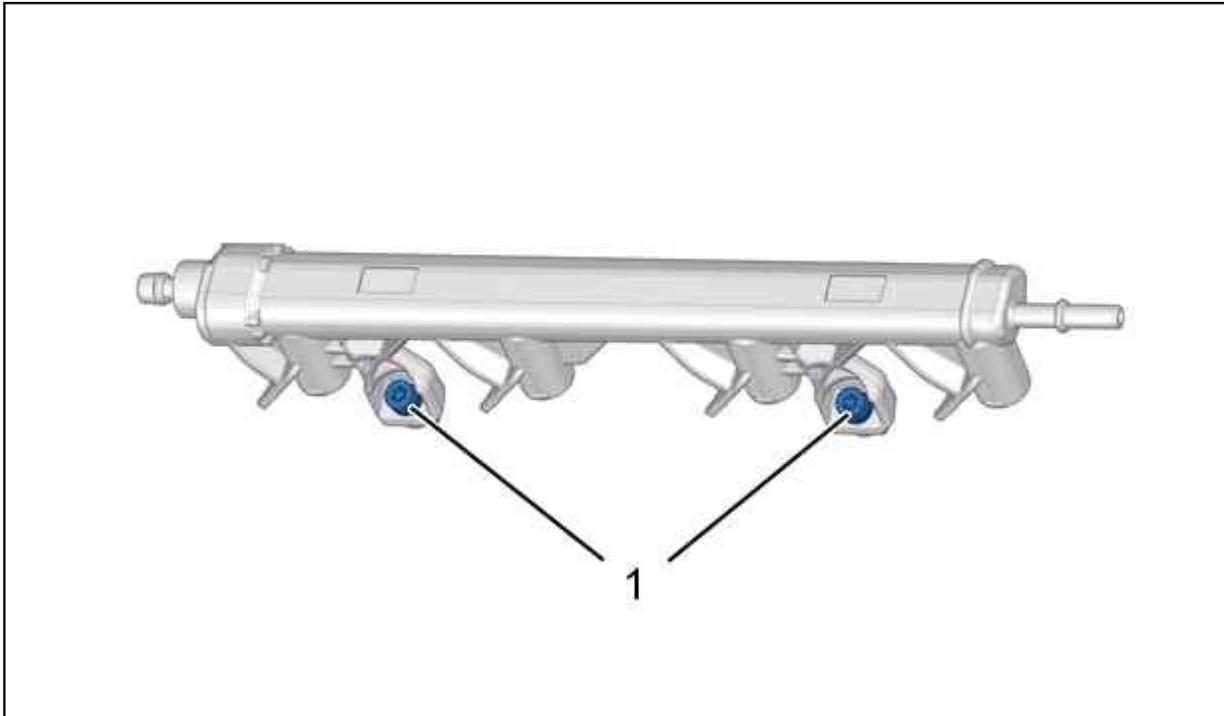


Figure : B1BB0T6D

Reference	Designation	Tightening torques
(1)	fixing screws : Injectors rail	0,8 daNm

6. Accessories

6.1. Alternator

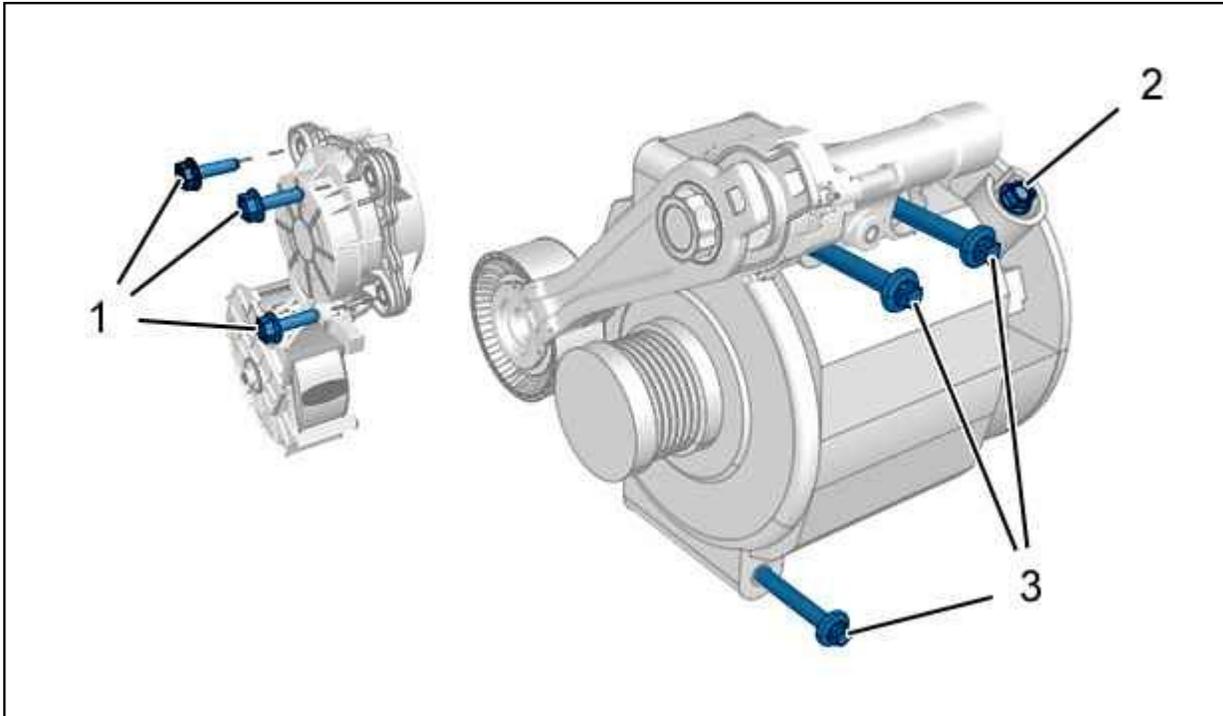


Figure : D1AB005D

Reference	Designation	Tightening torques
(1)	fixing screws : Coolant pump friction wheel	0,8 daNm
(2)	nut: Alternator supply harness	1,6 daNm
(3)	fixing screws : Alternator / Roller tensioner	2 daNm

6.2. Starter

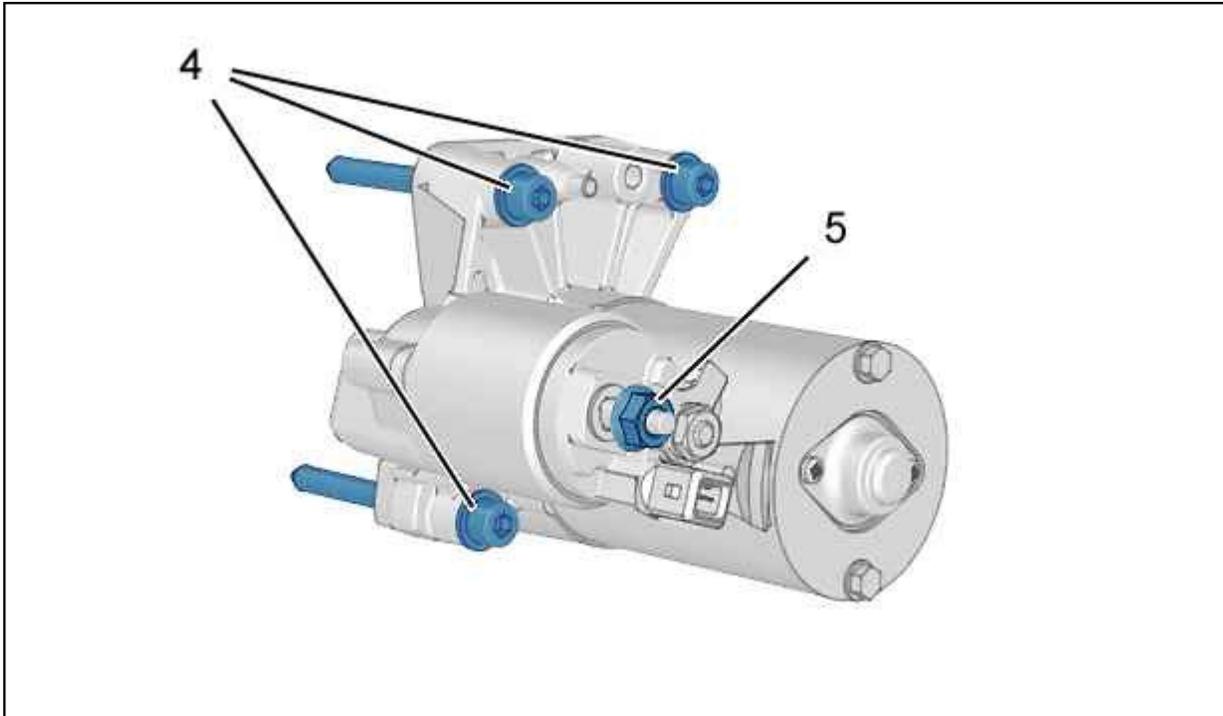


Figure : D1BB00CD

Reference	Designation	Tightening torques
(4)	fixing screws : Starter	2 daNm
(5)	nut: Starter supply harness	1,6 daNm

6.3. Air conditioning compressor

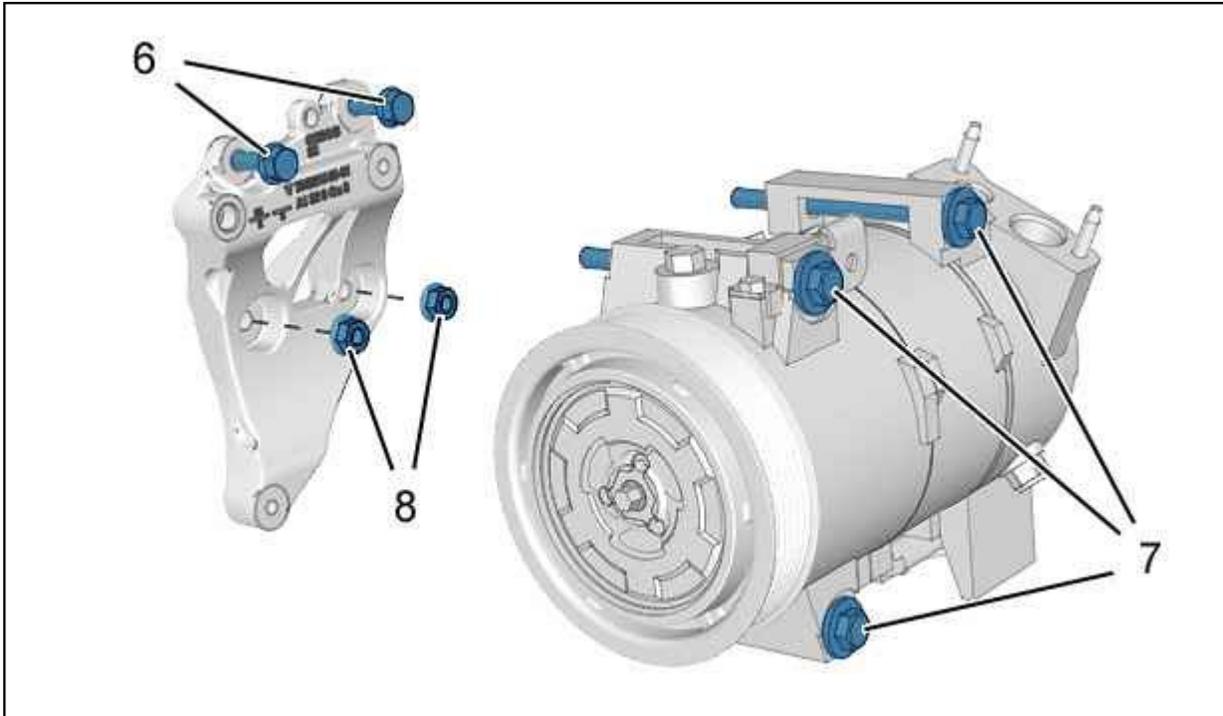


Figure : C5HB00QD

Reference	Designation	Tightening torques
(6)	Support fixing screws / Cylinder block	2 daNm
(7)	fixing screws : Air conditioning compressor / support	2,4 daNm
(8)	Support fixing nuts / Cylinder block	2 daNm