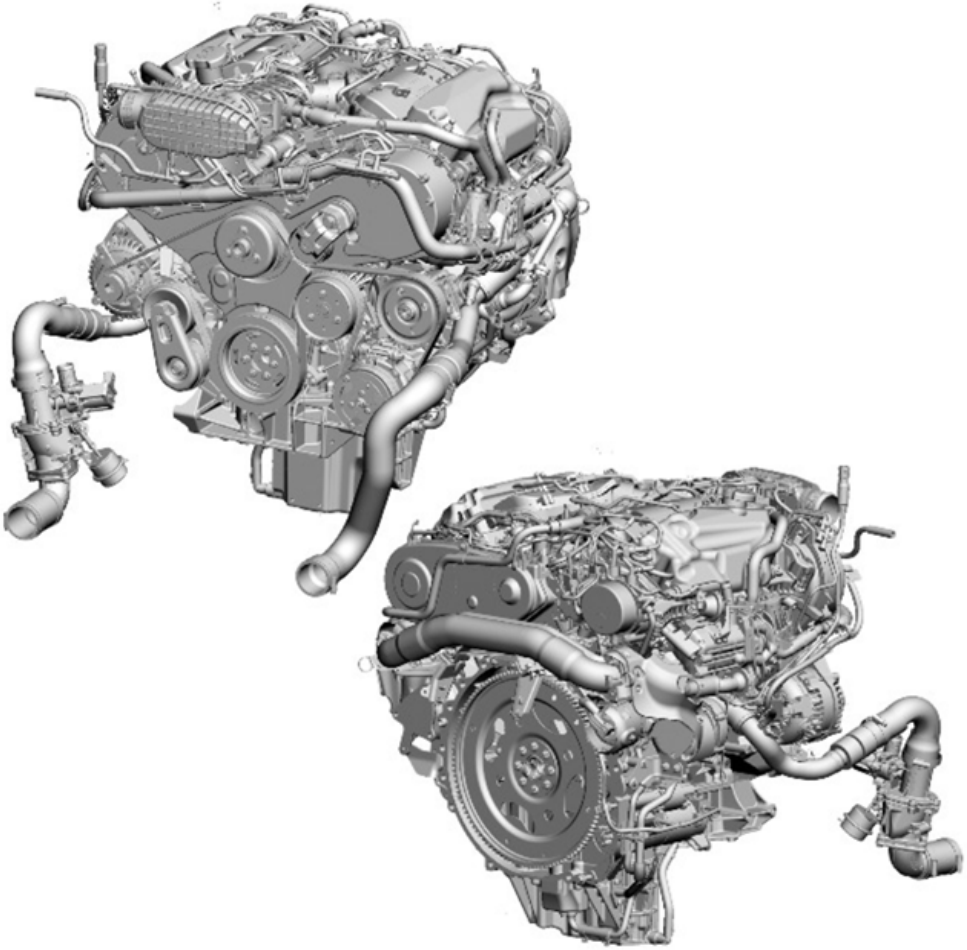


JLR 3.0L 24V DOHC V6 TC (PSA DT20C) Diesel Engine

ESSENTIAL REBUILD DATA

Engine - TDV6 3.0L Diesel -

Engine Data

Engine Description	Engine Capacity	Maximum Engine Torque (EEC) (SAE)	Maximum Engine Power (EEC) (SAE)	Compression Ratio	Bore	Stroke
60° "Vee" • 6 Cylinder • 24 Valves	2993 ccm	600 Nm at 2000 RPM	180 kW at 4000 RPM	16.1:1 ± 0.5	84	90

Engine Firing Order

Firing Order
1:4:2:5:3:6

Glow Plug

Specification
9X2Q-6M090-AC

Lubricants,Fluids,Sealers and Adhesives

Description	Specification
Engine oil (EUR)	5W/30 – WSS–M2C934–B
Engine oil (ROW)	5W/30 – WSS–M2C913–B or C
Sealant	WSE–M4G323–A5
Core plug and stub pipe retainer	WSK-M2G349-A7
Jaguar premium cooling system fluid	WSS-M97B44-D

Capacities

Description	Liters
Engine oil initial fill	6.75
Engine oil service fill with oil filter change	5.9

Cylinder Head and Valve Train

Item	Specification
Valve guide inner diameter (mm)	5.980 ± 0.010
Intake valve effective length (mm) (tip to gauge line)	94.99mm +/- 0.15
Exhaust valve effective length (mm) (tip to gauge line)	94.45mm +/-0.15
Valve stem to guide clearance intake diametrical (mm)	0.027 - 0.063
Valve stem to guide clearance exhaust diametrical (mm)	0.037 - 0.073
Valve head diameter intake (mm)	27.8mm +/-0.1
Valve head diameter exhaust (mm)	25.2mm +/-0.1
Intake valve face angle (degrees)	44 deg 52 min +/-7min30sec
Exhaust valve face angle (degrees)	44 deg 52 min +/-7min30sec
Valve stem diameter intake (mm)	5.935±0.008
Valve stem diameter exhaust (mm)	5.925±0.008
Valve spring free length (mm) - inlet	38.9mm
Valve spring free length (mm) - exhaust	38.9mm
Valve spring installed height (mm) - inlet	31.22mm
Valve spring installed height (mm) - exhaust	31.22mm
Camshaft lobe max lift intake (mm)	3.75187mm
Camshaft lobe max lift exhaust (mm)	3.80999mm
Camshaft journal to cylinder head bearing surface clearance diametrical (mm)	0.040-0.090
Camshaft journal diameter - all positions	26.015±0.015
Bearing diameter - all positions	25.950±0.010
Camshaft journal maximum run out limit (mm)	0.030mm
Camshaft journal maximum out of round (mm) - all journals	0.010mm

Cylinder Head Gasket

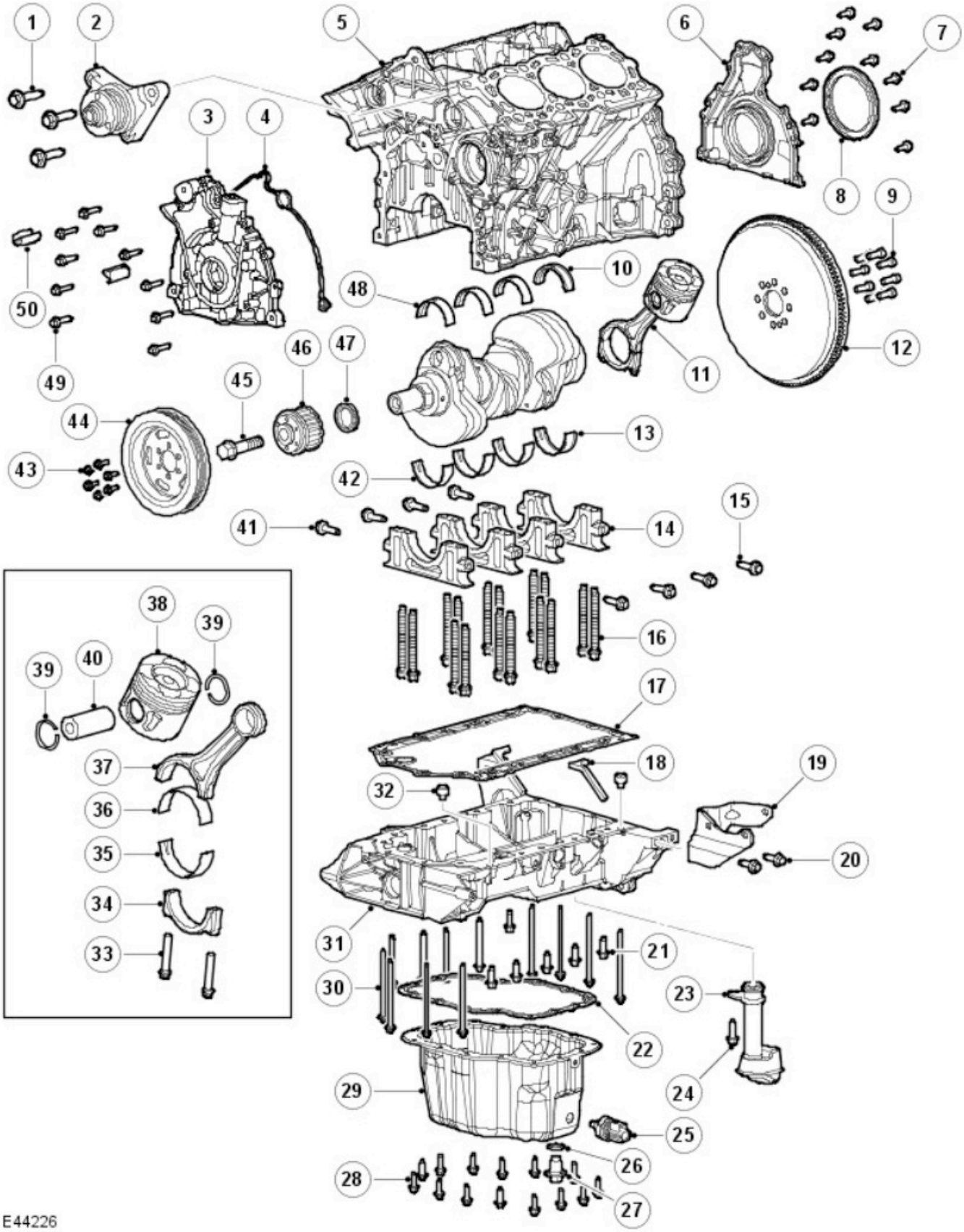
Identification	Gasket Thickness (mm)	Piston Protrusion (mm)
2	1.17	0.552 - 0.603
3	1.22	0.604 - 0.655
4	1.27	0.656 - 0.707
5	1.32	0.708 - 0.760

Torque Specification

• NOTE: A = refer to procedure for correct torque sequence

Description	Nm	lb-ft	lb-in
Piston cooling nozzle	10	7	-
Engine coolant drain plug	18	13	-
Cylinder head retaining bolts	A	-	-
Oil filter housing retaining bolts	10	7	-
Fuel injection pump cradle retaining bolts	23	17	-
Fuel injection pump to cradle retaining bolts	23	17	-
Fuel injection pump bracket to cradle retaining bolts	10	7	-
Fuel injection pump to bracket retaining bolts	10	7	-
Oil pump retaining bolts	10	7	-
Crankshaft rear oil seal housing retaining bolts	10	7	-
Oil pan retaining bolts M6	10	7	-
Oil pan retaining bolts M8	23	17	-
Oil pump pick up pipe retaining bolts	10	7	-

Description	Nm	lb-ft	lb-in
Engine oil level sensor retaining nuts	10	7	-
Crankshaft timing belt pulley retaining bolt	**A**	-	-
Crankshaft position sensor (CKP) retaining bolt	5	-	44
Timing chain tensioner retaining bolts	10	7	-
Camshaft bearing cap retaining bolts	**A**	-	-
Timing belt idler pulley retaining bolt	45	33	-
Fuel injection pump belt rear cover retaining bolts	10	7	-
Fuel injection pump sprocket retaining nut	50	37	-
Coolant outlet pipe retaining bolts	10	7	-
Coolant pump retaining bolts	10	7	-
Timing belt tensioner retaining bolt	26	19	-
Engine lifting eye bolts	23	17	-
Camshaft rear end accessory drive (READ) pulley hub retaining bolt	Stage 1 - 80 Stage 2 - 80 degrees	Stage 1 - 59 Stage 2 - 80 degrees	-
Camshaft front timing pulley hub retaining bolt	80 + 80°	59 + 80 °	-
Camshaft READ pulley retaining bolt	23	17	-
Camshaft front timing pulley retaining bolt	23	17	-
Fuel injection pump timing belt tensioner bolt	23	17	-
Camshaft position sensor (CMP) retaining bolt	10	7	-
Intake manifold / camshaft cover retaining bolts	10	7	-
Brake vacuum pump retaining bolts	23	17	-
Engine oil pressure (EOP) switch	14	10	-
Glow plug	11	8	-
Fuel rail retaining bolts	23	17	-
Fuel rail bracket retaining bolts	23	17	-
Fuel injector retaining bolts	**A**	-	-
High pressure fuel line union nuts	**A**	-	-
High pressure fuel line bracket retaining bolts	9	-	80
Turbocharger assembly to exhaust manifold retaining nuts	24	18	-
Exhaust manifold to cylinder head retaining nuts	**A**	-	-
Exhaust manifold heatshield retaining bolts	11	8	-
Turbocharger heatshield retaining bolts	11	8	-
Exhaust gas recirculation (EGR) valve retaining bolts M6	10	7	-
Accessory drive belt idler pulley bracket retaining bolts	83	61	-
Timing belt covers retaining bolts	10	7	-
Engine mount bracket to engine retaining bolts	115	85	-
Exhaust cross over pipe retaining nuts	24	18	-
Engine coolant inlet pipe retaining bolts	10	7	-
Coolant pump pulley retaining bolts	25	18	-
Crankshaft pulley/vibration damper retaining bolts	25	18	-
Throttle body retaining threaded stud	10	7	-
Wiring harness retaining nuts	10	7	-
Vacuum hose assembly retaining bolts	10	7	-
Flexplate retaining bolts	**A**	-	-
Accessory drive component bracket retaining bolts	23	17	-
Power steering pump retaining bolts	23	17	-
Generator retanining bolts	47	35	-
Accessory drive belt tensioner retaining bolt	47	35	-
Accessory drive belt idler pulley retaining bolt	47	35	-
Air conditioning compressor bracket retaining bolts	23	17	-
Air conditioning compressor retaining bolts	23	17	-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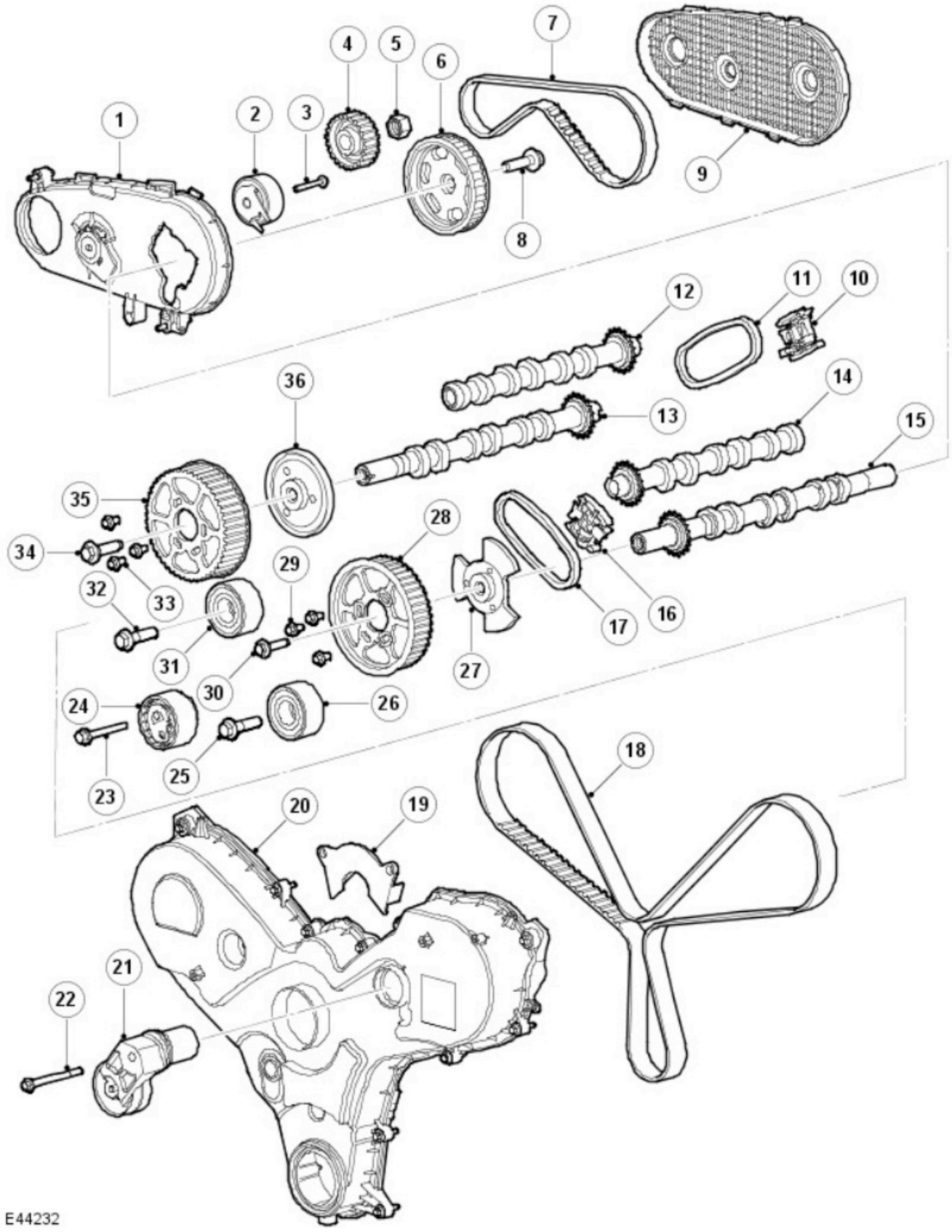
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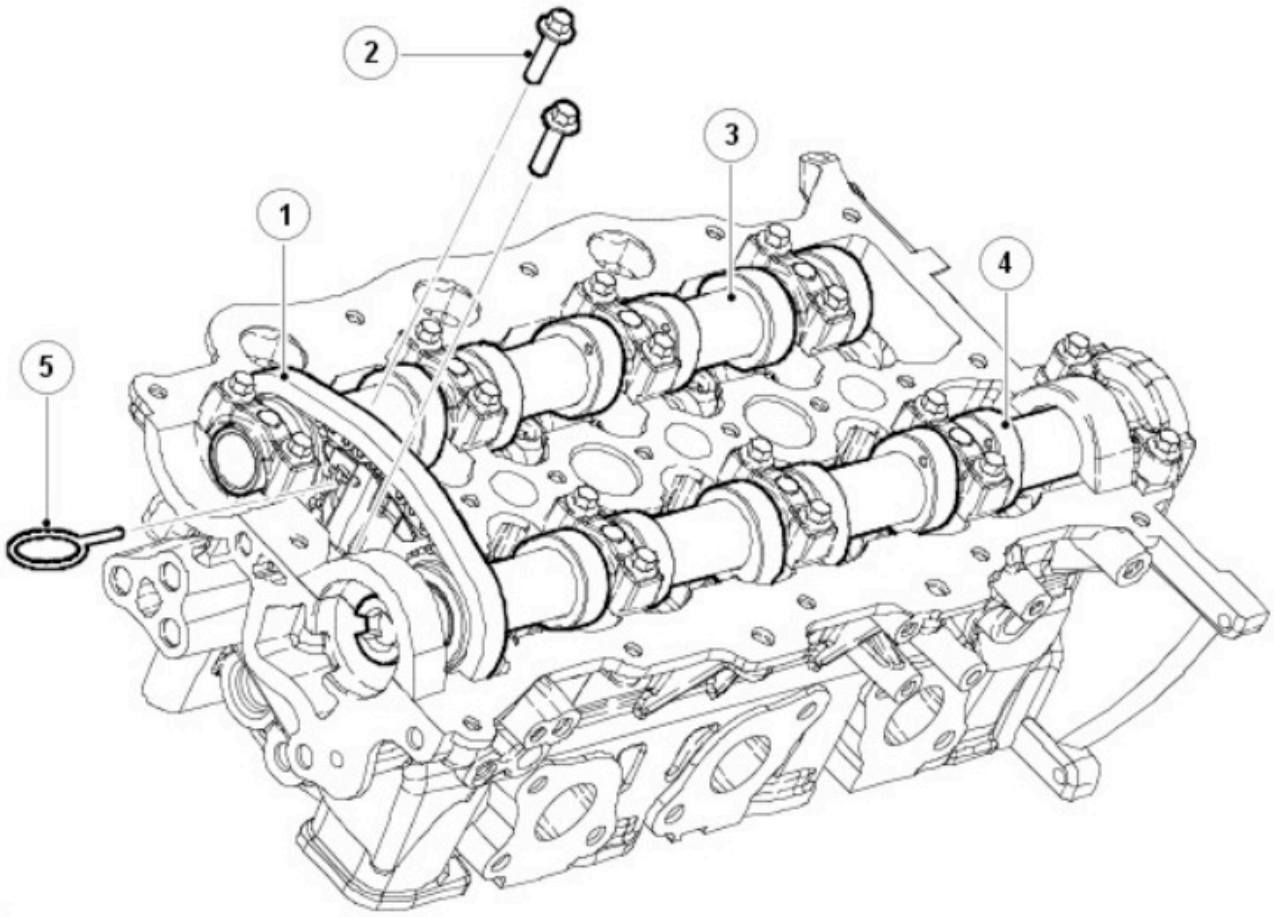

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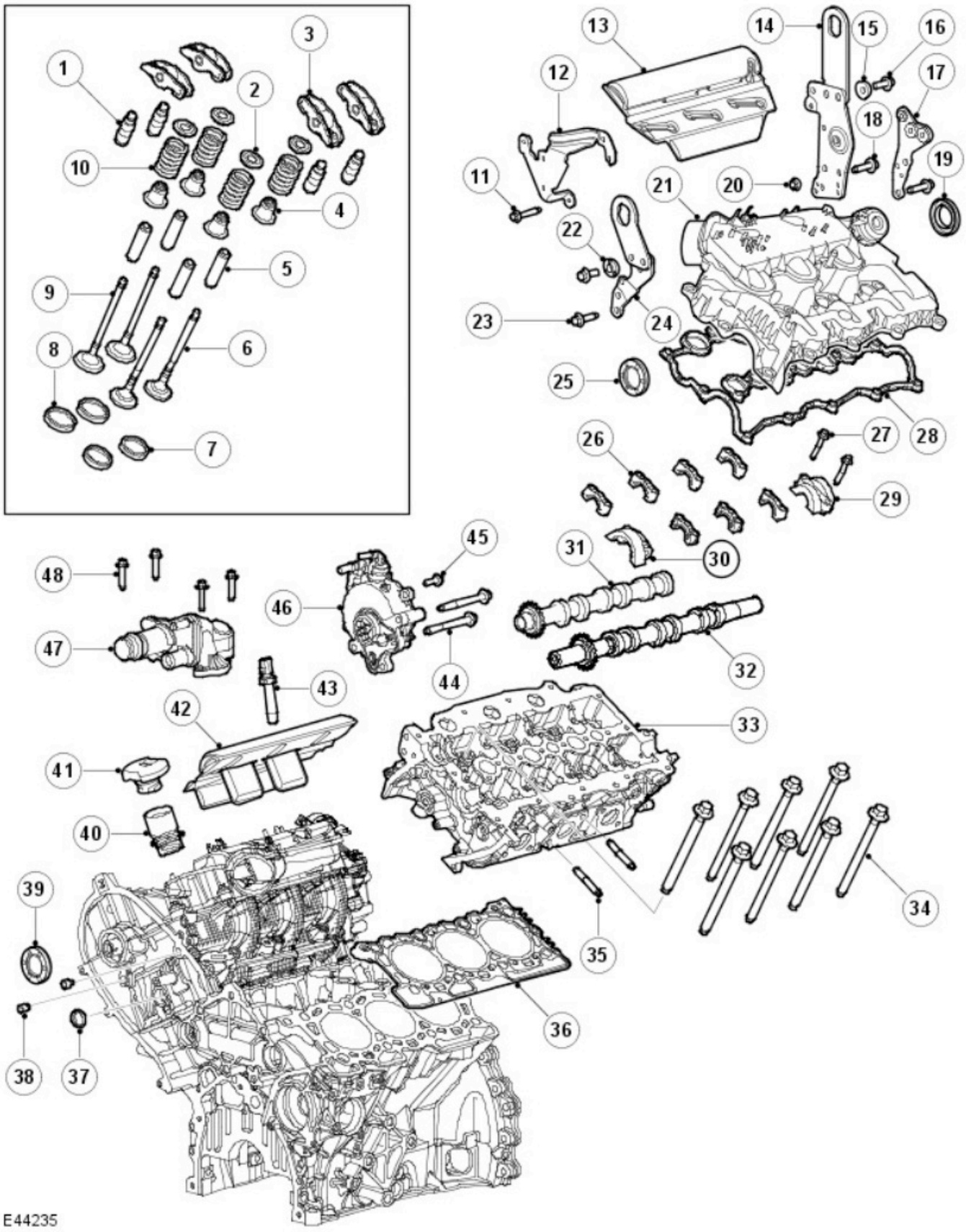
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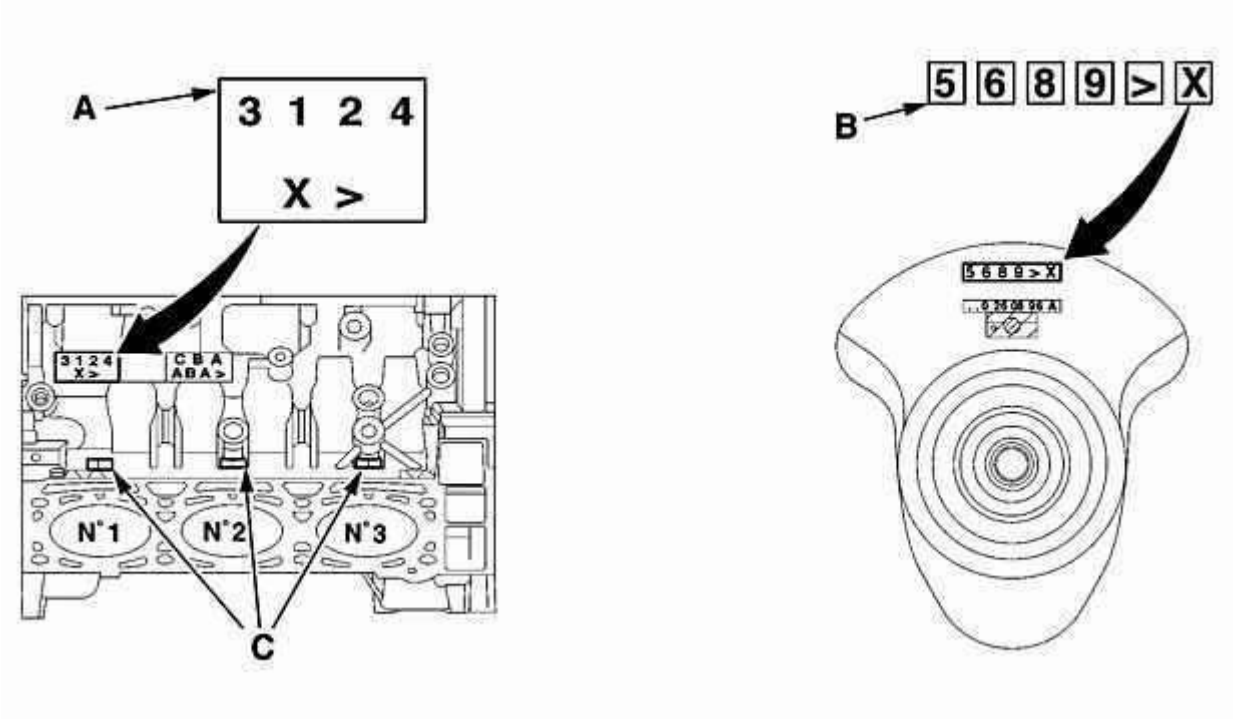
DT20C ENGINE

JLR 3.0L 24V DOHC V6 TC Diesel

MATCHING BEARING SHEELS

Markings on the cylinder block and Crankshaft enable matching.

1. Identification



The categories of bearing shells are given on the engine block (A), flywheel side, and on the crankshaft (B), timing side, in the form of codes.

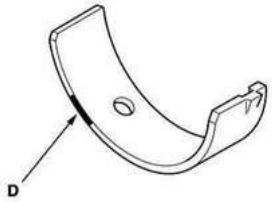
Zones (A) - (B):

- The first character corresponds to bearing no 1
- The second to bearing no 2
- So on
- The arrow indicates the timing side

Zone (C) :

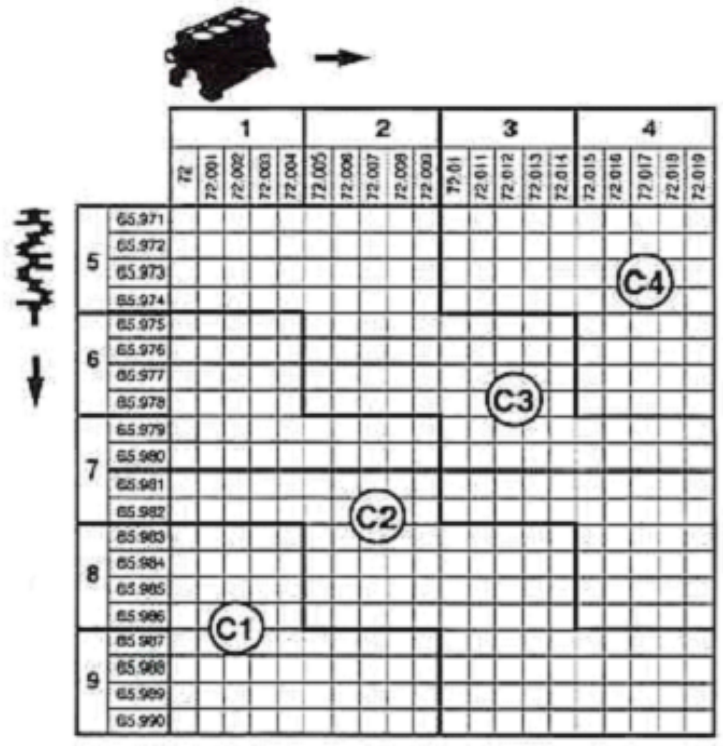
- Numerical marks of the corresponding cylinder.

2. Identification (Half shells)



A paint mark at (D) identifies the half shell grade.

3. Matching Table



If the first number of the crankshaft is "**5**" and that of the cylinder block is "**3**" : The half shell on the *main bearing cap no. 1* side will be of grade **C4**.

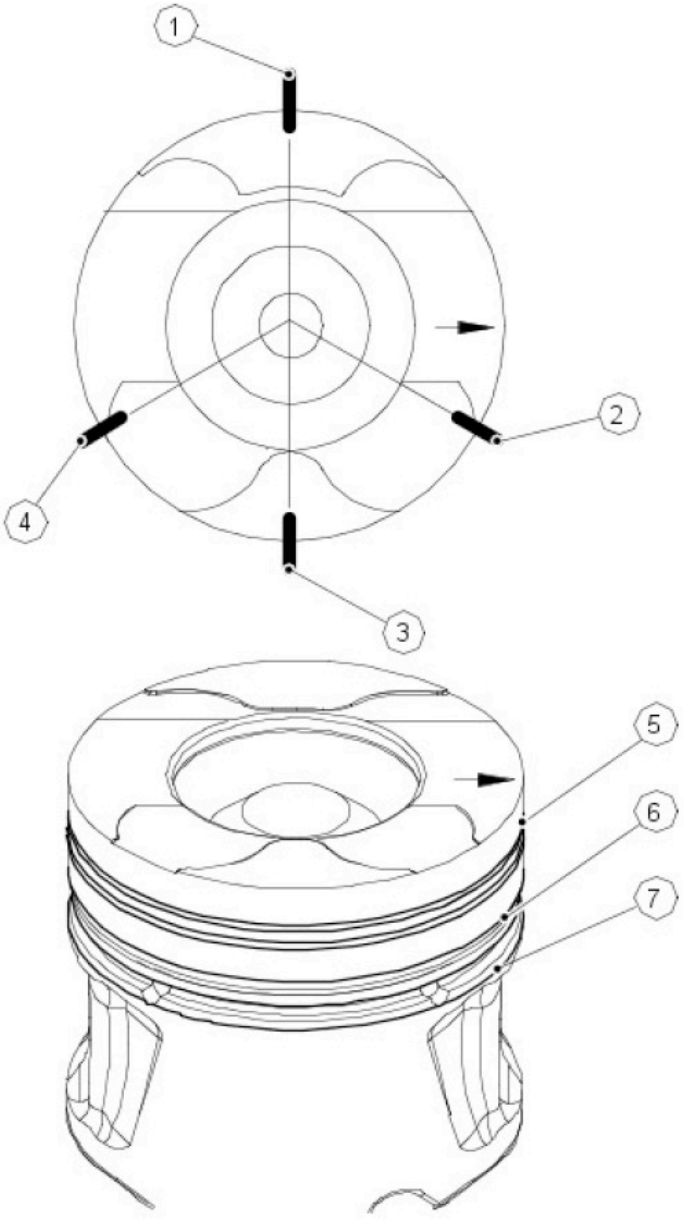
Dimensions (mm)	Nominal	Nominal	Nominal	Nominal
Half shells (Reference)	class C1 (Black)	class C2 (Blue)	class C3 (yellow)	class C4 (Red)
G	2,987 + 0,006 - 0	2,995 + 0,006 - 0	3,003 + 0,006 - 0	3,011 + 0,006 - 0

(DT20C ENGINE)

JLR 3.0L 24V DOHC V6 TC Diesel

PISTON RINGS POSITIONING

Piston Rings Positioning



1. Oil-control ring gap
2. Upper ring Gap
3. Oil-Control spring gap
4. Middle ring gap
5. Upper Ring
6. Middle ring
7. Oil-control ring

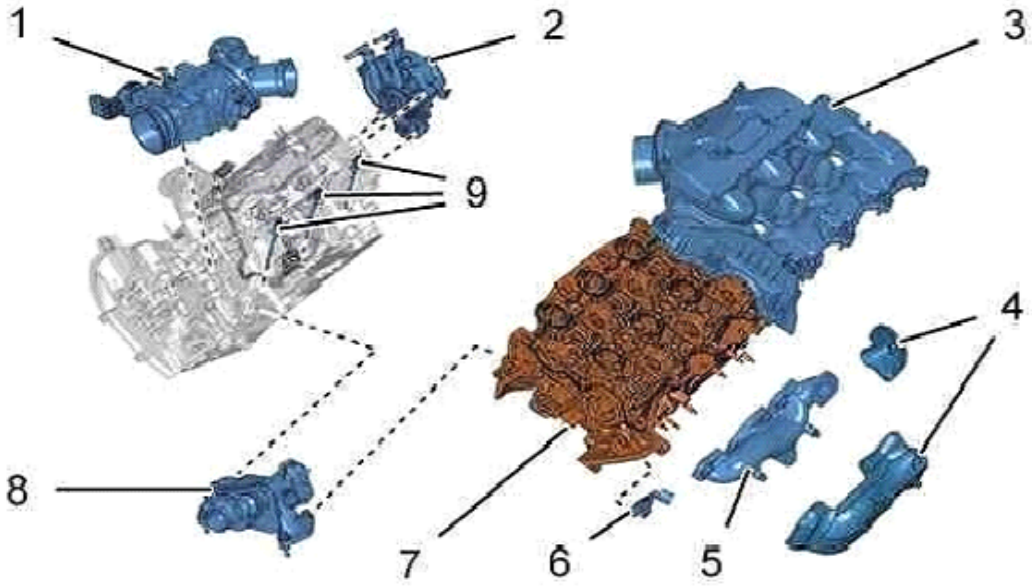
(DT20C ENGINE)

JLR 3.0L 24V DOHC V6 TC Diesel

TYPE TIGHTENING TORQUES & SEQUENCES

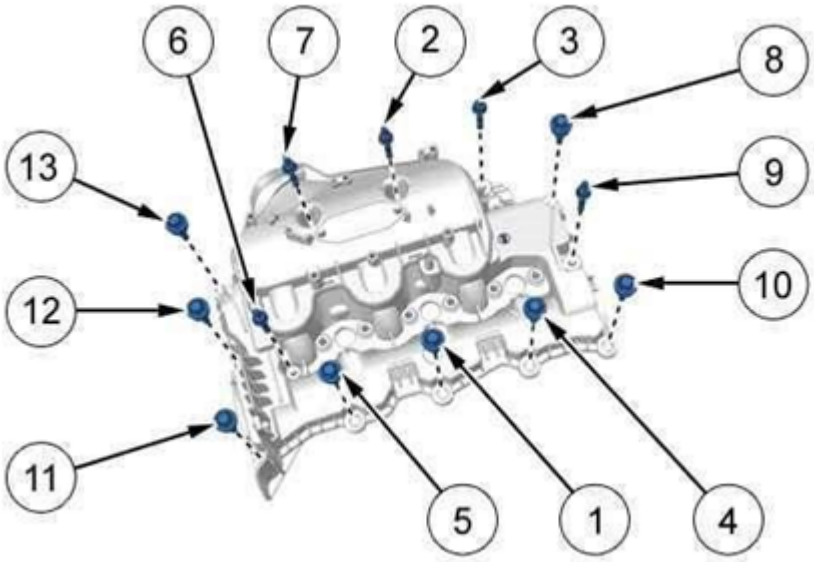
For the complete list of the tightening torques, please refer to the JLR Workshop Manual

1. Cylinder head



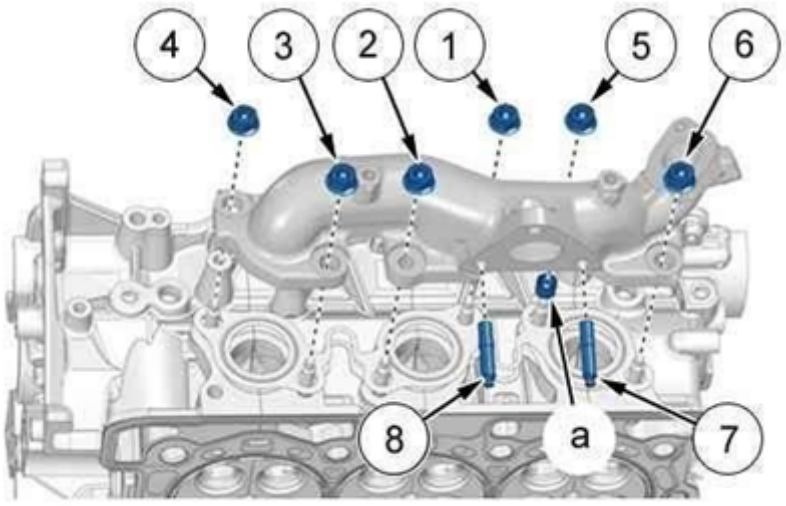
Reference	Designation	Tightening procedure
(1)	bolts - Throttle butterfly housing	Tightening torque to **9 Nm**
(2)	bolts - vacuum pump	Tightening torque to **23 Nm**
(3)	Inlet valve cover screws (*)	Tightening torque to **9 Nm**
	Inlet valve cover studs (*)	
(4)	bolts - Exhaust manifold heat shields	Tightening torque to **10 Nm**
(5)	studs - Exhaust manifolds	Tightening torque to **13 Nm**
	nuts - Exhaust manifolds (*)	Tightening torque to **28 Nm**
(6)	bolts - Cylinder reference sensor	Tightening torque to **9 Nm**
(7)	studs - Exhaust manifolds	Tightening torque to **13 Nm**
	Cylinder head bolts (*)	Pre-tighten to **20 Nm**
		Tightening torque to **40 Nm**
		Tightening torque to **80 Nm**
		Angular tightening to **180°**
(8)	Coolant outlet housing	Tightening torque to **9 Nm**
(9)	Pre-heater plugs	Tightening torque to **10 Nm**

1.1. Order of tightening : INLET VALVE COVER



(3) Inlet valve cover studs.

1.2 Order of tightening: EHXAUST MANIFOLD

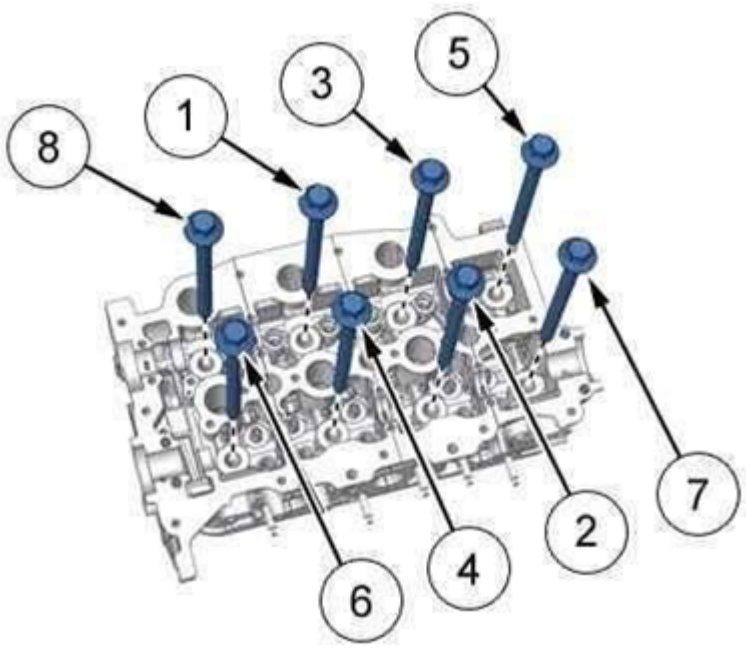


(5) Exhaust manifold studs.

Tightening procedure: Exhaust manifold nuts:

1. Offer the exhaust manifold up to the cylinder head with the centering device "**a**"
2. Tighten the 6 nuts (5) to **28 Nm** (From 1 to 6)
3. Tighten the 2 studs (5) to **13 Nm** (From 7 to 8)

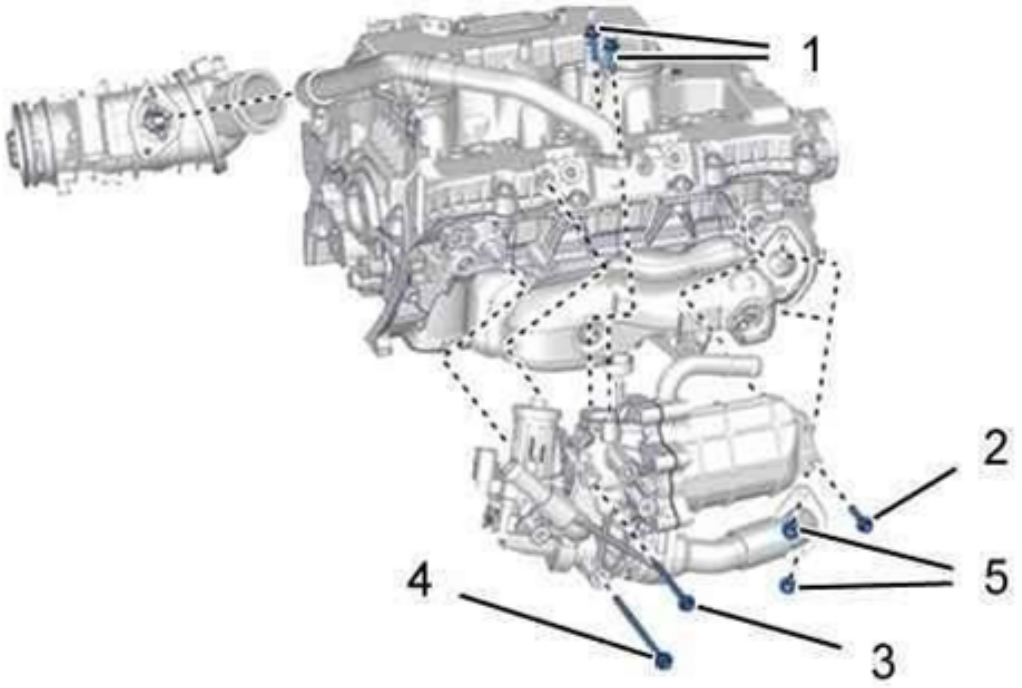
1.3. Sequence of tightening: CYLINDER HEAD BOLTS



Tightening procedure : Cylinder head bolts :

1. Pre-tighten the 8 bolts (7) to **20 Nm** (From 1 to 8)
2. Tighten the 8 screws (7) to **40 Nm** (From 1 to 8)
3. Tighten the 8 screws (7) to **80 Nm** (From 1 to 8)
4. Angle tighten the 8 bolts (7) to **180°** (From 1 to 8)

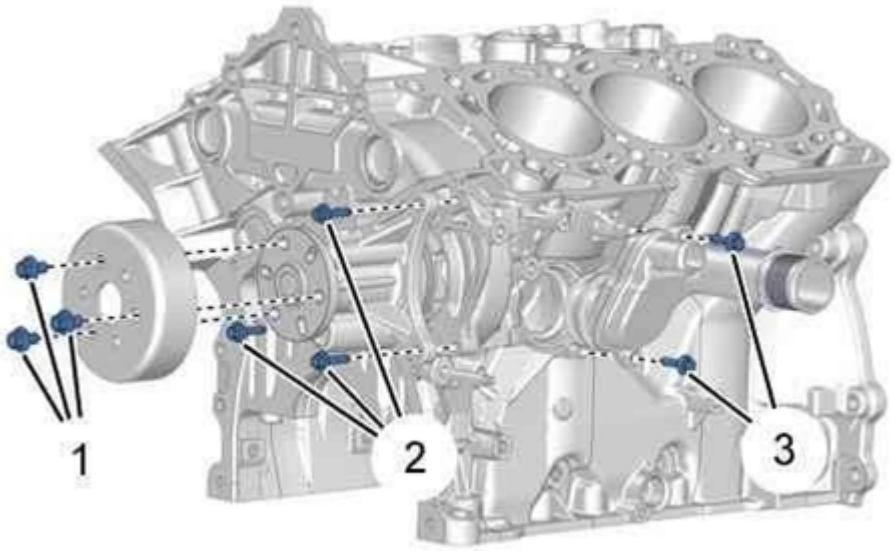
2. EGR (exhaust gas recycling) electro-valve



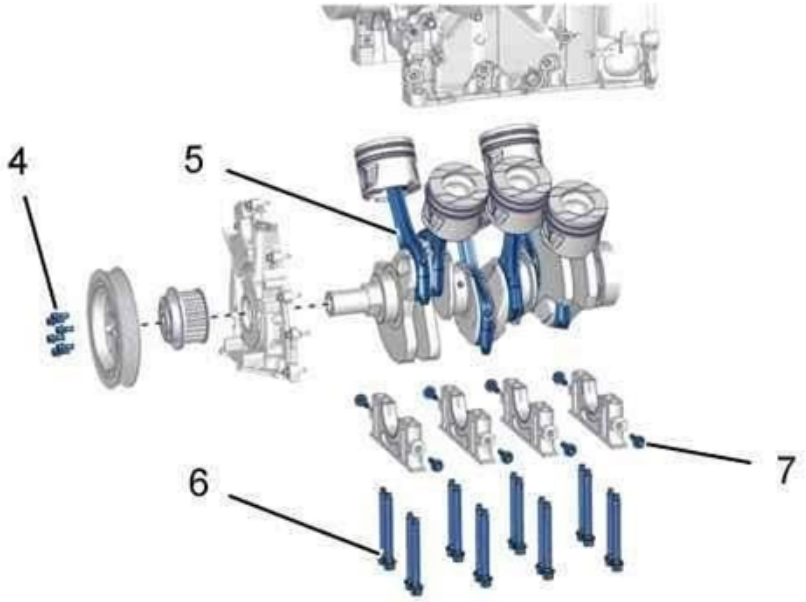
Reference	Designation	Tightening procedure
(1)	Output pipes from the exhaust gas recycling solenoid valve (E.G.R)	Tightening torque to **10 Nm**
(2)	Bolts M6x45 - Exhaust gas recycling solenoid valve (E.G.R) - Cylinder heads	Tightening torque to **10 Nm**
(3)	Bolts M6x80 - Exhaust gas recycling solenoid valve (E.G.R) - Cylinder heads	Tightening torque to **10 Nm**
(4)	Bolts M6x105 - Exhaust gas recycling solenoid valve (E.G.R) - Cylinder heads	Tightening torque to **10 Nm**
(5)	Bolts - Exhaust gas recycling solenoid valve (E.G.R) -Exhaust manifolds	Tightening torque to **10 Nm**

4. Cylinder block

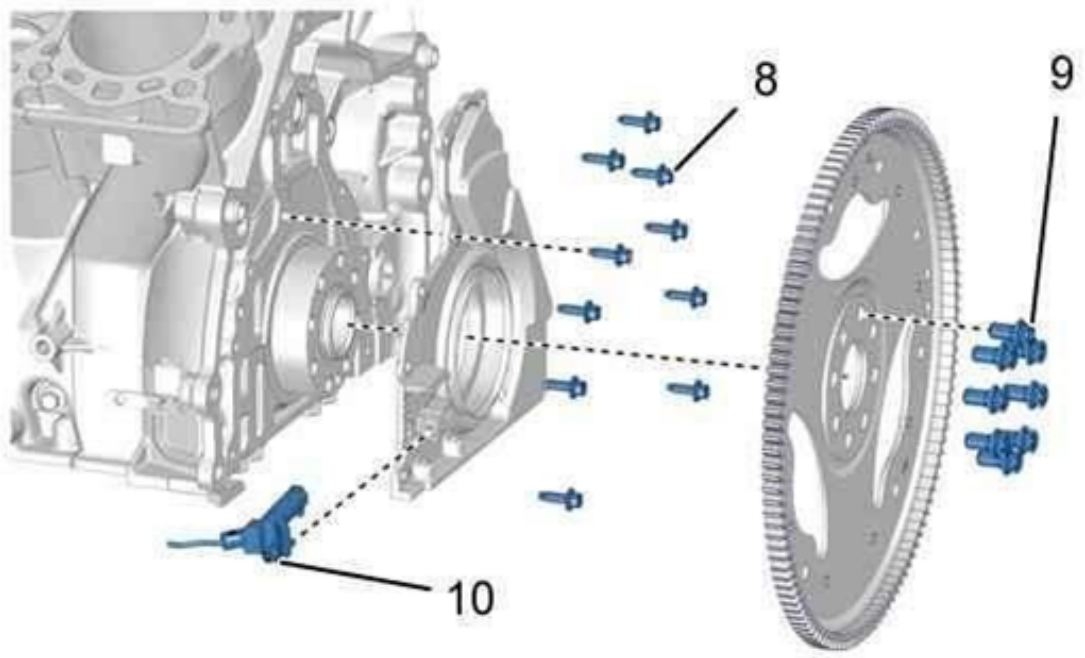
CAUTION: (*) Follow the tightening sequence.



Reference	Designation	Tightening procedure
(1)	Bolts - Water pump pulley	Tightening torque to **25 Nm**
(2)	Bolts - Coolant pump	Tightening torque to **10 Nm**
(3)	Water inlet housing	Tightening torque to **10 Nm**

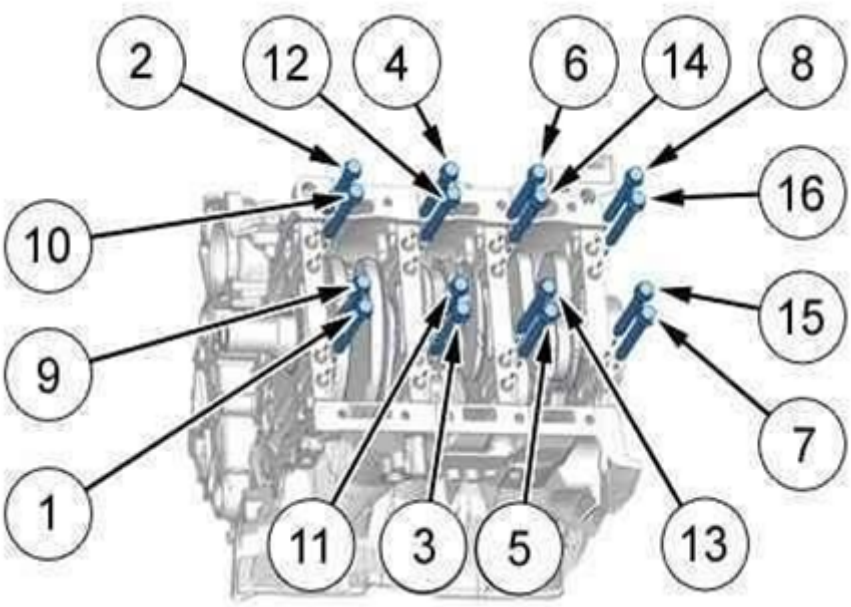


Reference	Designation	Tightening procedure
(4)	Bolts - Accessories drive pulley	Tightening torque to **25 Nm**
(5)	Conrod screws	Pre-tighten to **20 Nm**
		Angular tightening to **90°**
(6)	Crankshaft bearing caps fixing bolt (*)	Pre-tighten to **60 Nm**
		Tightening torque to **145 Nm**
		Angular tightening to **90°**
(7)	Bolts - Crankshaft main bearing cap casing (*)	Pre-tighten to **15 Nm**
		Tightening torque to **33 Nm**
		Angular tightening to **47°**



Reference	Designation	Tightening procedure
(8)	Closing plate fixing screws (Gearbox end) (*)	Tightening torque to **10 Nm**
(9)	Bolts – Starter gearwheel carrier(*)	Pre-tighten to **50 Nm**
		Angular tightening to **45°**
		Angular tightening to **45°**
(10)	Engine speed sensor	Tightening torque to **5 Nm**

4.1. Sequence of tightening the Crankshaft bearing caps fixing bolts (1 – 16)



CAUTION!!!

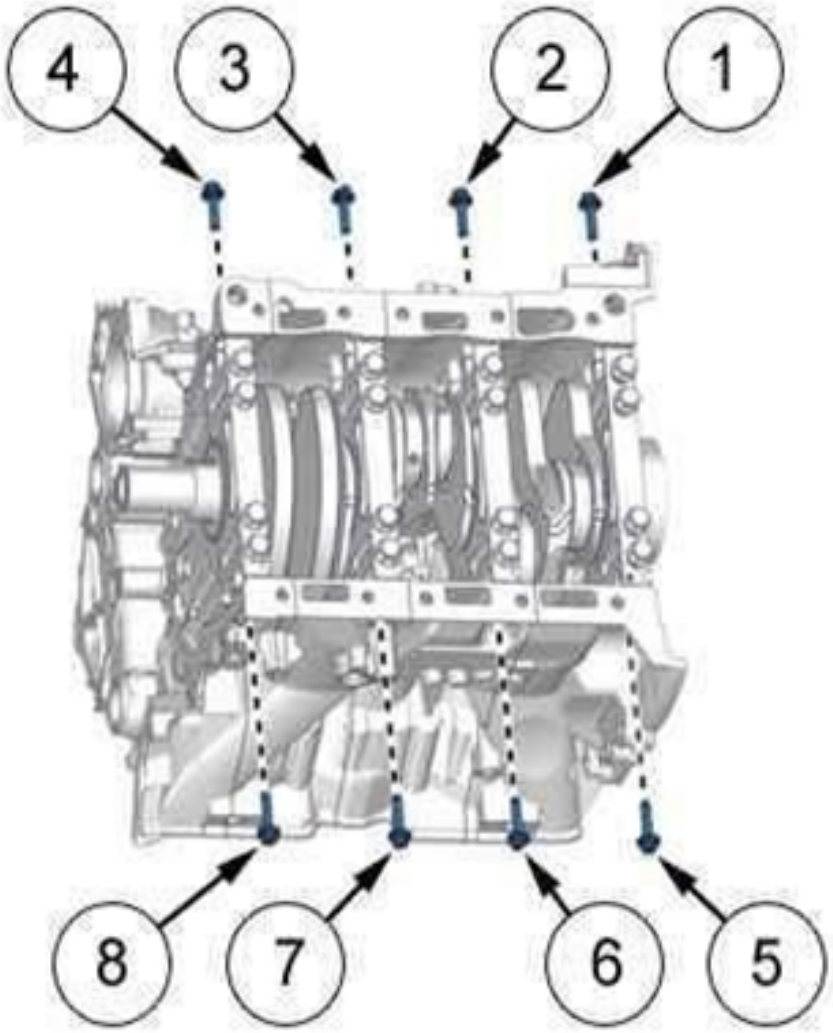
After each tightening check that the crankshaft turns freely in its bearings.

Tightening procedure :

CAUTION: (*) Follow the tightening sequence.

1. Pre-tighten the 16 bolts (6) to **60 Nm** (From 1 to 16)
2. Tighten the 16 screws (6) to **145 Nm** (From 1 to 16)
3. Angle tighten the 16 bolts (6) to **90°** (From 1 to 16)

4.2. Sequence of tightening the Crankshaft bearing cap housing fixing screws (1 - 8)

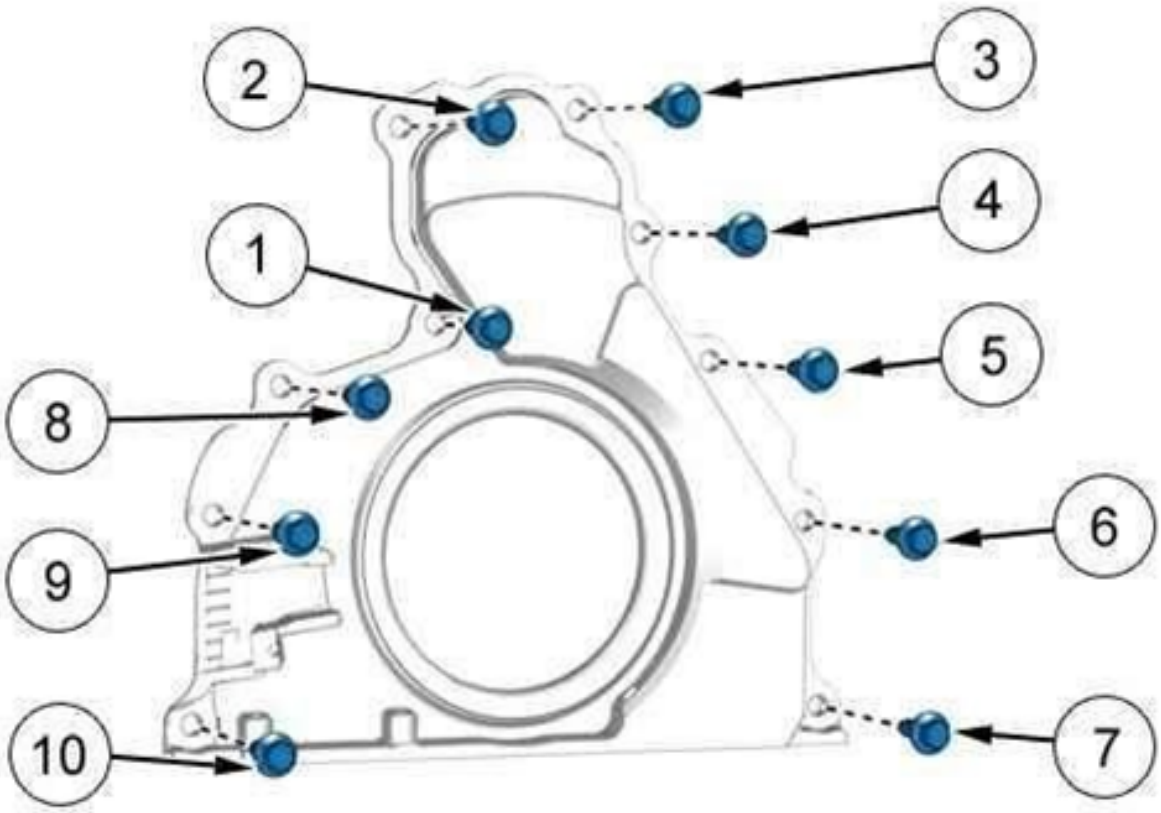


Crankshaft bearing cap housing fixing screws :

CAUTION: (*) Follow the tightening sequence.

1. Pre-tighten the 8 bolts (7) to 15 Nm (From 1 to 8)
2. Tighten the 8 screws (7) to 33 Nm (From 1 to 8)
3. Angle tighten the 8 bolts (7) to 47° (From 1 to 8)

4.3. Sequence of tightening the Closing plate (Gearbox End) bolts (1 - 10)

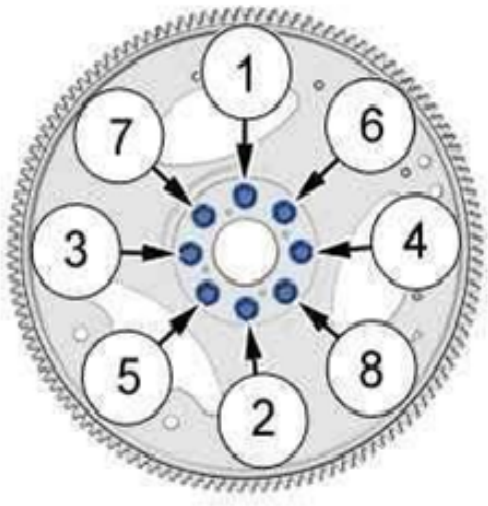


Tightening procedure :

CAUTION: (*) Follow the tightening sequence.

1. Tighten the bolt (8) by hand (1)
2. Tighten the 9 bolts (8) by hand (From 2 to 10)
3. Tighten the 10 screws (8) to **10 Nm** (From 1 to 10)

4.4. Sequence of tightening the Starter Gearwheel carrier bolts (1 - 8)



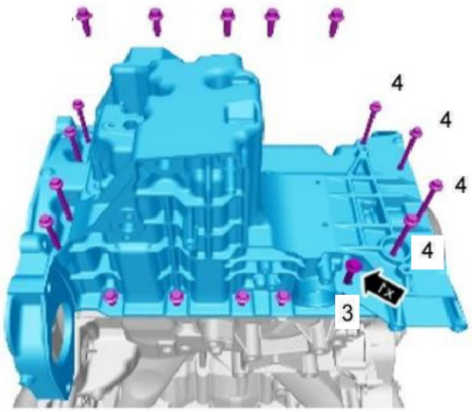
CAUTION: (*) Follow the tightening sequence.

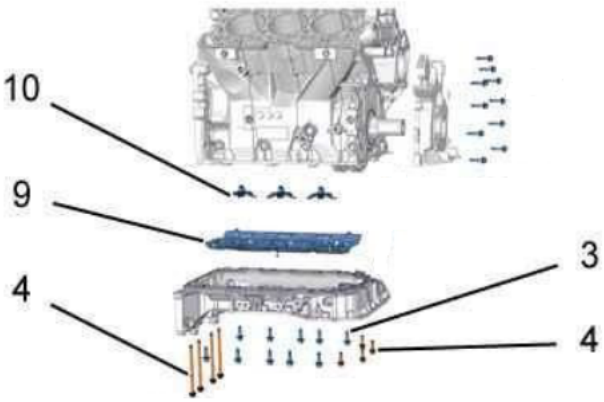
Reference	Designation	Tightening procedure
(1 - 8)	Bolts – Starter gearwheel carrier	Pre-tighten to **50 Nm**
		Angular tightening to **45°**
		Angular tightening to **45°**

5. Lubrication

CAUTION: (*) Follow the tightening sequence.

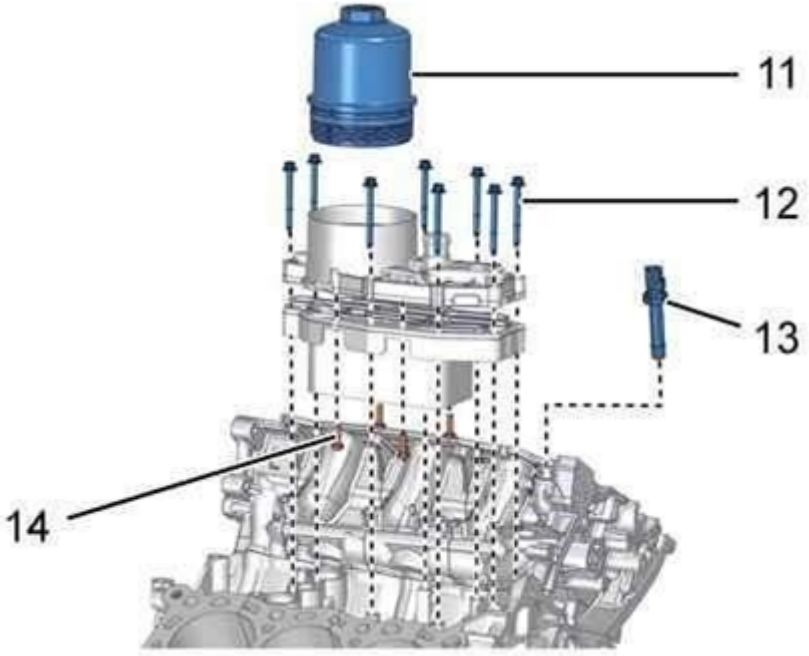
5.1 Sump





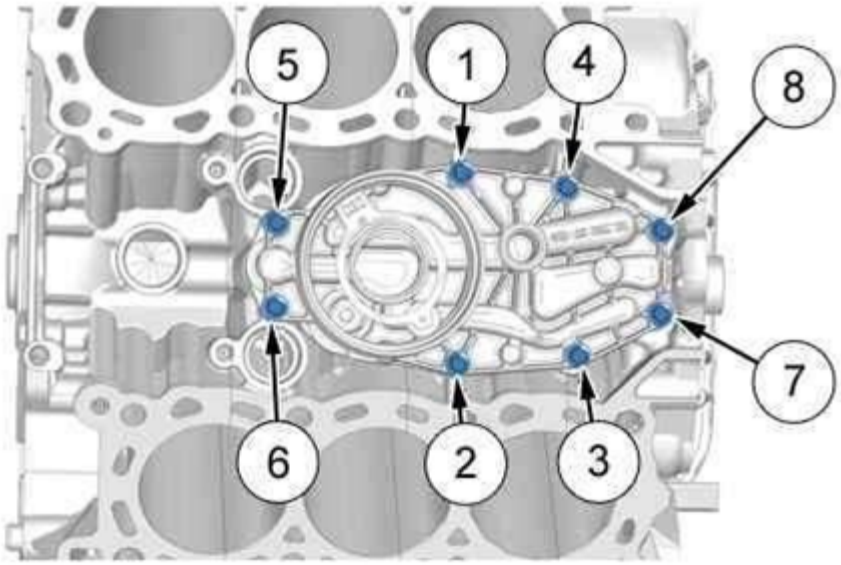
Reference	Designation	Tightening procedure
(3)	Bolts M8 - Engine sump	Pre-tighten to **10 Nm**
		Tightening torque to **23 Nm**
(4)	Bolts M6 - Engine sump	Pre-tighten to **4 Nm**
		Tightening torque to **10 Nm**
(7)	Drain plug	Tightening torque to **23 Nm**
(9)	Oil deflector (if present)	Tightening torque to **9 Nm**
(10)	Piston skirt spray jets	Tightening torque to **10 Nm**

5.2 Oil filter case - Cooler



Reference	Designation	Tightening procedure
(11)	Oil filter cover	Tightening torque to **25 Nm**
(12)	Bolts - Oil filter support	Tightening torque to **9 Nm**
(13)	Oil pressure sensor	Tightening torque to **13 Nm**
(14)	Bolts - Coolant/oil heat exchanger	Tightening torque to **9 Nm**

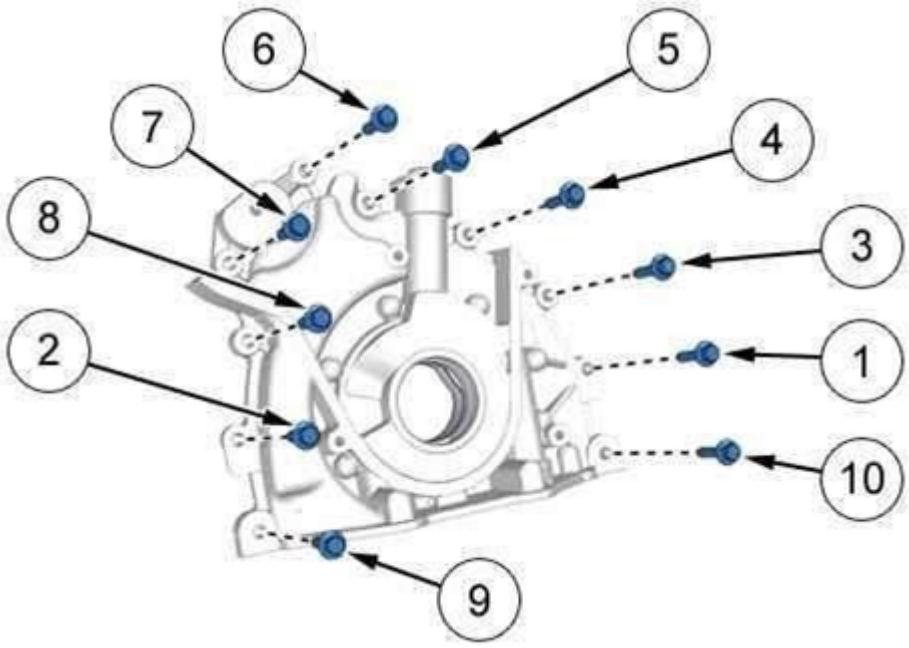
5.3 Oil filter case - Cover



CAUTION: (*) Follow the tightening sequence.

Reference	Designation	Tightening procedure
(1 - 8)	Bolts - Oil filter support (follow the order 1 ->8)	Tightening torque to **9 Nm**

5.3. Oil Pump (1 - 10)



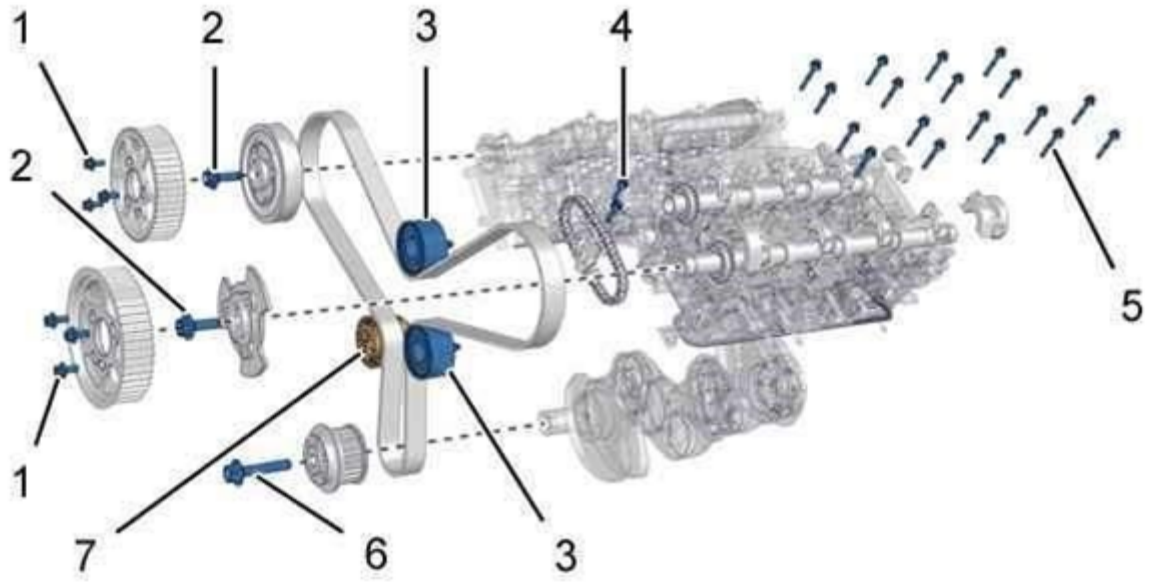
Tightening procedure:

CAUTION: (*) Follow the tightening sequence.

1. Tighten the 8 bolts (1) by hand (From 3 to 10)
2. Pre-tighten the 10 bolts (1) to **4 Nm** (From 1 to 10)
3. Tighten the 10 screws (1) to **10 Nm** (From 1 to 10)

6. Timing gear

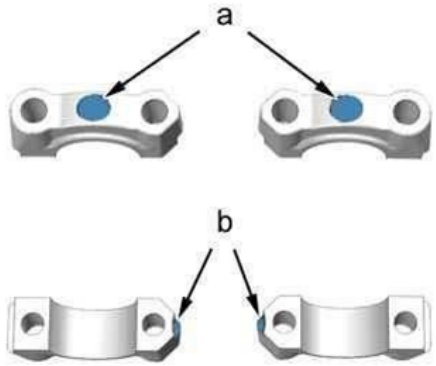
6.1. Tightening torques

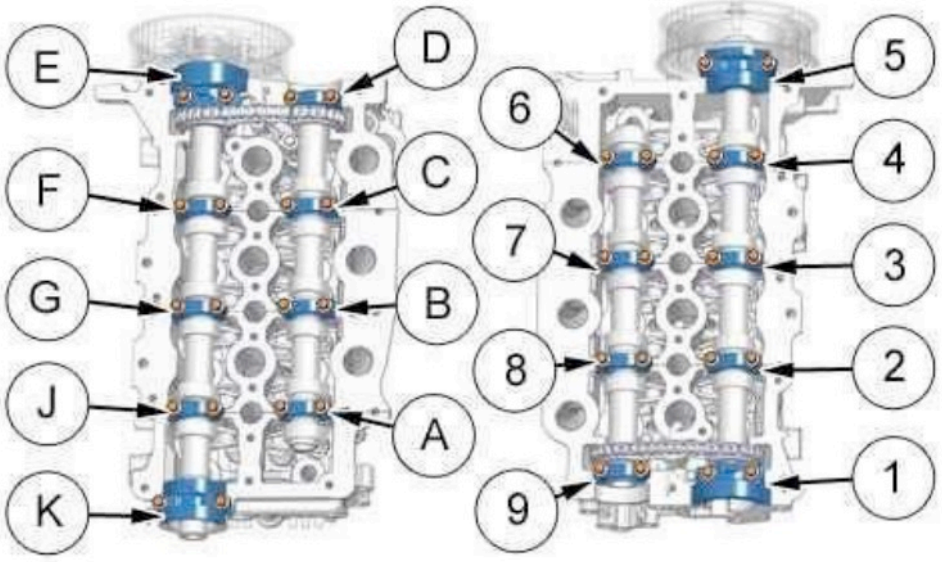


Reference	Designation	Tightening procedure
(1)	Bolts - Camshaft pulleys	Tightening torque to **23 Nm**
(2)	Camshaft pulley hub screws	Tightening torque to **80 Nm**
		Angular tightening to **90°**
(3)	Timing belt idler roller bolt	Tightening torque to **45 Nm**
(4)	Camshaft timing chain tensioner bolt	Tightening torque to **10 Nm**
(5)	Camshaft bearing bolts (*)	Pre-tighten to **5 Nm**
		Tightening torque to **10 Nm**
(6)	Screw fixing the timing pinion to the crankshaft	Tightening torque to **300 Nm**
		Angular tightening to **90°**
(7)	Timing belt tensioner roller bolt	Tightening torque to **26 Nm**

6.2. Sequence of tightening the bolts

CAUTION: The camshaft bearing caps are identified at "a" by a letter on the front cylinder head and a figure on the rear cylinder head and the notches "b" must point towards the centre of each cylinder head.





Tightening procedure : Camshaft bearing bolts :

CAUTION: (*) Follow the tightening sequence.

1. Pre-tighten the screws (5) of the camshaft bearing caps **by hand**, in the following sequence: 9, 8, 7, 6, 4, 3, 2, D, C, B, A, J, G and F
2. Pre-tighten the screws (5) of the camshaft bearing caps to **5 Nm**, in the following sequence: , 8, 7, 6, 4, 3, 2, D, C, B, A, J, G and F
3. Tighten the screws (5) of the camshaft bearing caps to **10 Nm**, in the following sequence: 9, 8, 7, 6, 4, 3, 2, D, C, B, A, J, G and F

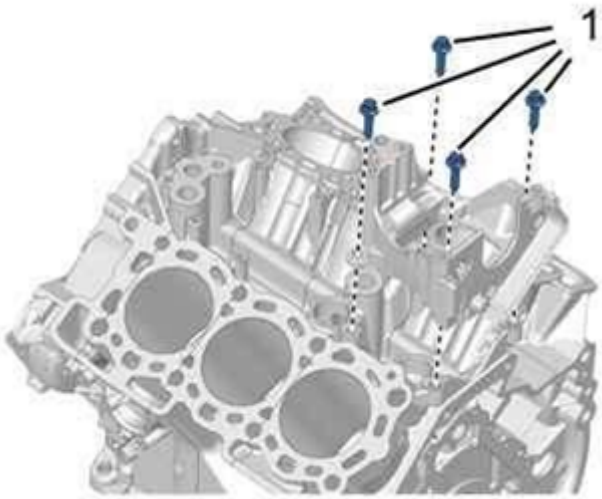
CAUTION: Place some sealing product LOCTITE 518 on the camshaft bearing caps 1, 5, E, K.

Refit the camshaft main bearing caps " 1", "5", "E" and "K":

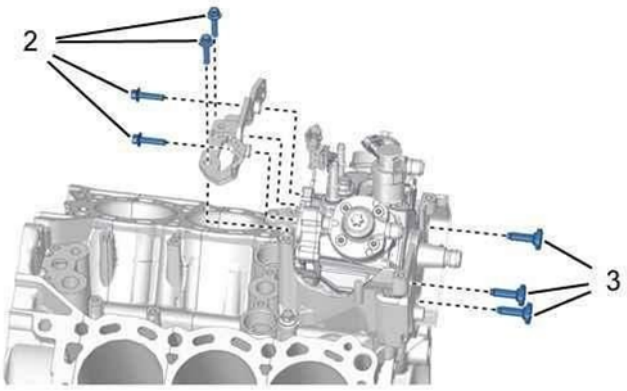
CAUTION: (*) Follow the tightening sequence.

1. Pre-tighten the screws (5) of the camshaft bearing caps **by hand**, in the following sequence: 1, 5, E and K
2. Pre-tighten the screws (5) of the camshaft bearing caps to **5 Nm**, in the following sequence: 1, 5, E and K
3. Tighten the screws (5) of the camshaft bearing caps to **10 Nm**, in the following sequence: 1, 5, E and K

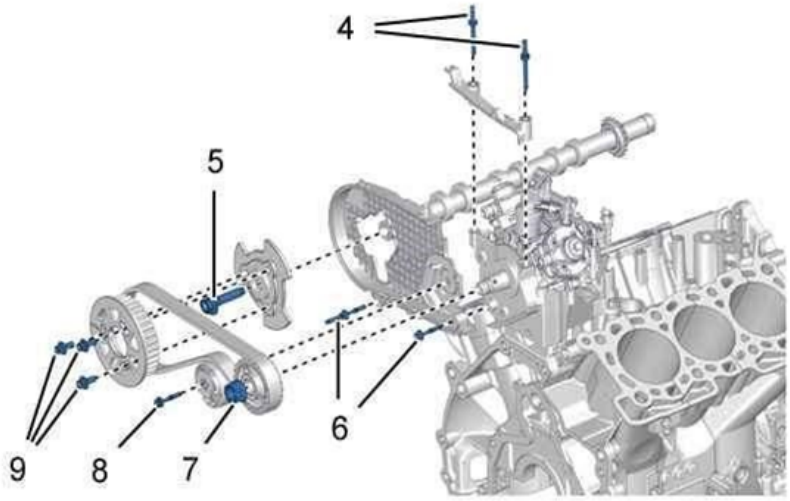
7. Injection system



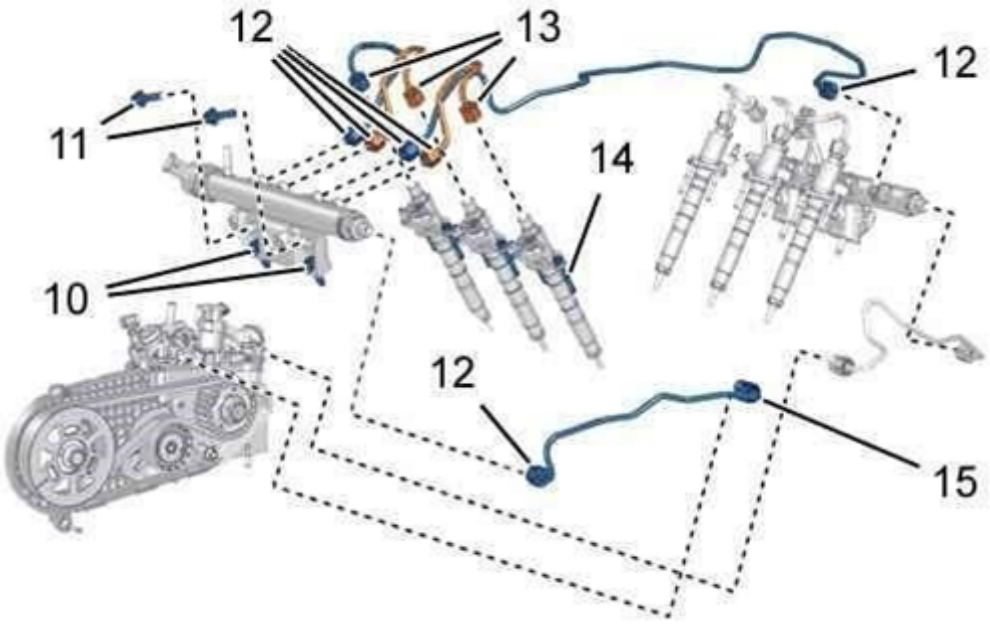
Reference	Designation	Tightening procedure (Nm)
(1)	bolts - Diesel injection pump bracket	Tightening torque to **23 Nm**



Reference	Designation	Tightening procedure
(2)	Bolts - Diesel injection pump bracket	Tightening torque to **10 Nm**
(3)	Bolts - Diesel injection pump on support	Tightening torque to **23 Nm**

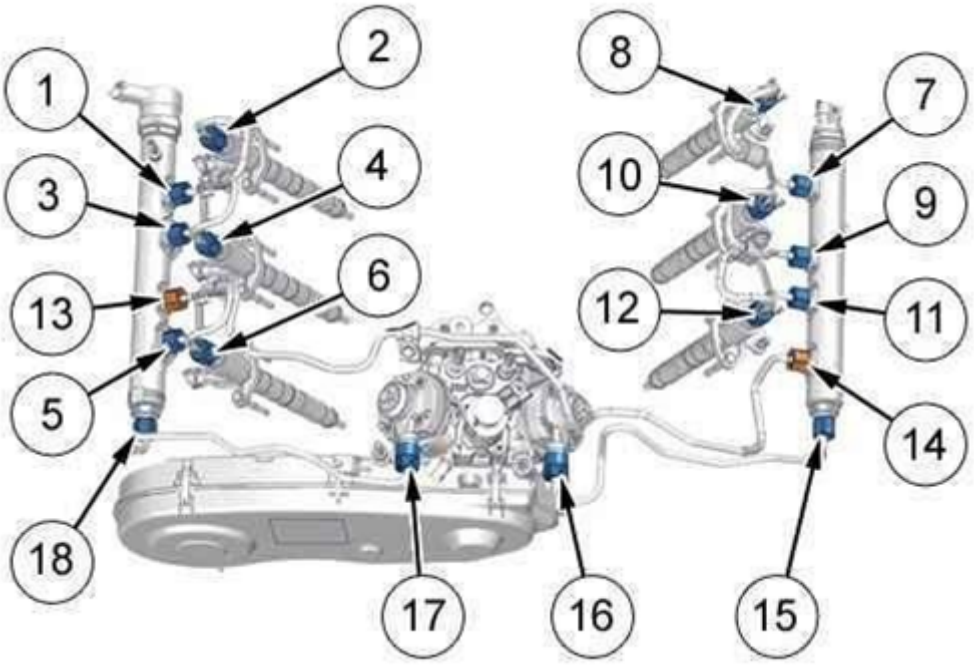


Reference	Designation	Tightening procedure
(4)	Cover screw	Tightening torque to **9 Nm**
(5)	Bolts - Hub of the diesel injection pump drive pulley	Tightening torque to **80 Nm**
		Angular tightening to **90°**
(6)	Cover screw	Tightening torque to **9 Nm**
(7)	Nut of the diesel injection pump pinion	Tightening torque to **50 Nm**
(8)	Bolts - Tensioner roller of the drive belt of the diesel injection pump	Tightening torque to **25 Nm**
(9)	Bolts - Drive pulley of the diesel injection pump	Tightening torque to **23 Nm**



Reference	Designation	Tightening procedure
(10)	bolts - Injection rail mounting - Cylinder head	Tightening torque to 23 Nm
(11)	bolts - Injection rail mounting - Fuel high pressure common injection rail	Tightening torque to 23 Nm
(12)	Fuel high pressure common injection rail unions (*)	Pre-tighten to 15 Nm
		Tightening torque to 30 Nm
(13)	Unions on diesel injectors (*)	Pre-tighten to 15 Nm
		Tightening torque to 30 Nm
(14)	bolts - Diesel injector fixing clamps	Tightening torque to 9 Nm
(15)	Unions on diesel injection pump (*)	Pre-tighten to 15 Nm
		Tightening torque to 30 Nm

7.2. Order of tightening : Union pipes (12), (13), (15)



Tightening procedure: High-pressure fuel supply unions :

1. Pre-tighten the unions (12) of the common rails (13) and the injectors by hand (From 1 to 12)
2. Pre-tighten the unions (12) of the common rails (13) and the injectors: to **15 Nm** (From 1 to 12)
3. Tightened the unions (12) of the common rails (13) and the injectors: to **30 Nm** (From 1 to 12)
4. Pre-tighten the unions (12) of the common rails by hand (13 and 14)
5. Pre-tighten the unions (12) of the common rails: to **15 Nm** (13 and 14)
6. Tightened the unions (12) of the common rails to **30 Nm** (13 and 14)
7. Pre-tighten the unions (12) of the common rails (15) and the diesel injection pump by hand (From 15 to 18)
8. Pre-tighten the unions (12) of the common rails (15) and the diesel injection pump : to **15 Nm** (From 15 to 18)
9. Tighten the unions (12) of the common rails (15) and of the diesel injection pump to **30 Nm** (From 15 to 18)