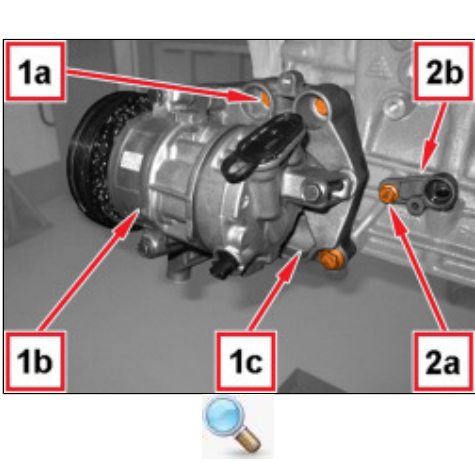
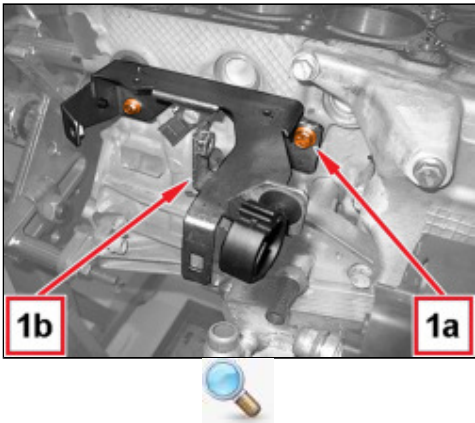


191 - Giulietta 1750 Turbo Benzina ENGINE - DISMANTLING AND REASSEMBLY FOLLOWING OP.1004E10 - WASH AND CHECK DISMANTLED COMPONENTS - REFITTING CYLINDER HEAD AND OIL SUMP - DOES NOT INCLUDE OPERATIONS ON CYLINDER HEAD AND AUXILIARY UNITS 1004E20

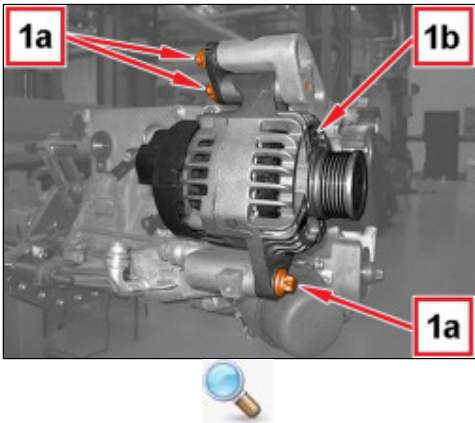


Removing ([Refitting](#))

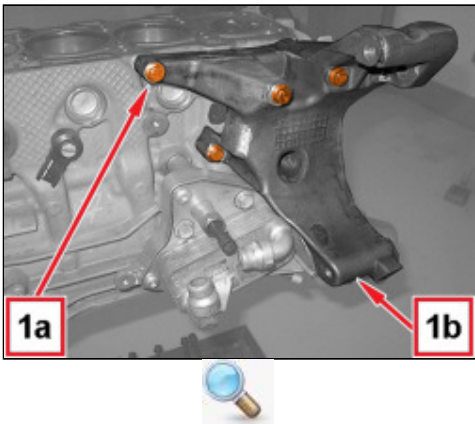
1. Undo the bolts (1a) and remove the air conditioning compressor (1b) complete with support (1c).
2. Undo the screw (2a) and remove connector (2b) for the turbocharger engine oil return pipe.



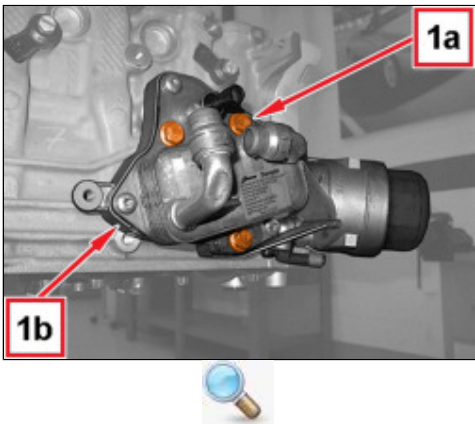
1. Undo the screws (1a) and remove the wiring-holding bracket (1b).



1. Undo the screws (1a) and remove the alternator (1b).

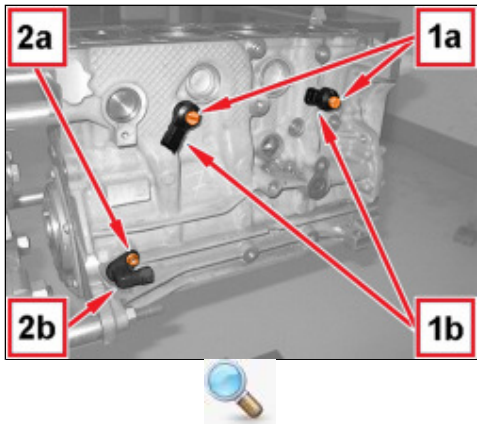


1. Undo the screws (1a) and remove the alternator mounting (1b).

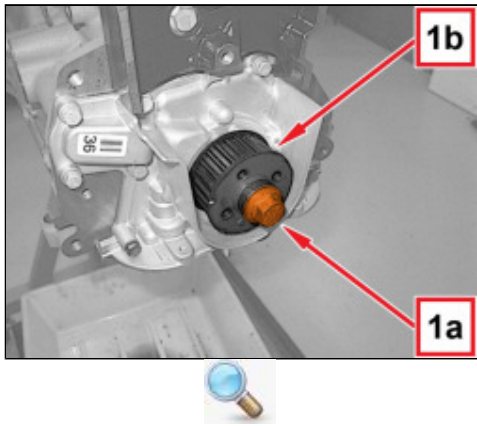


1. Undo the screws (1a) and remove the engine oil filter-heat exchanger mounting (1b).

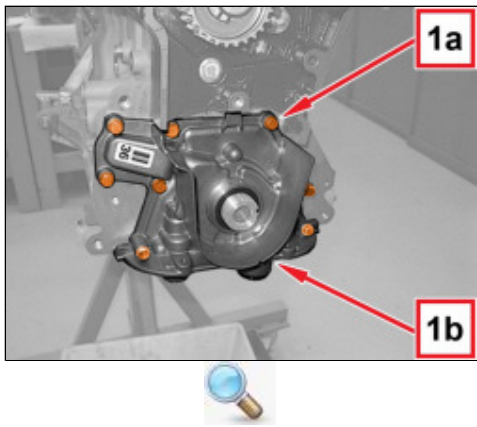
1. Undo bolts (1a) and remove knock sensors (1b).



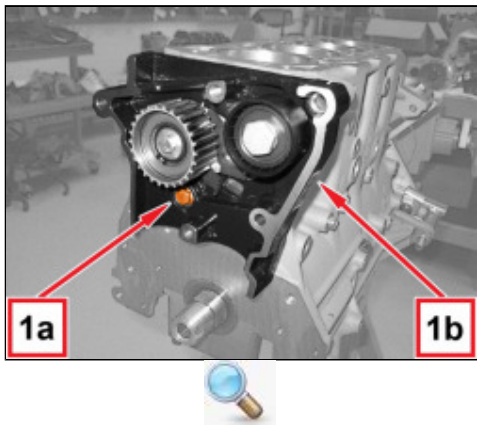
2. Undo bolt (2a) and remove rpm sensor (2b).



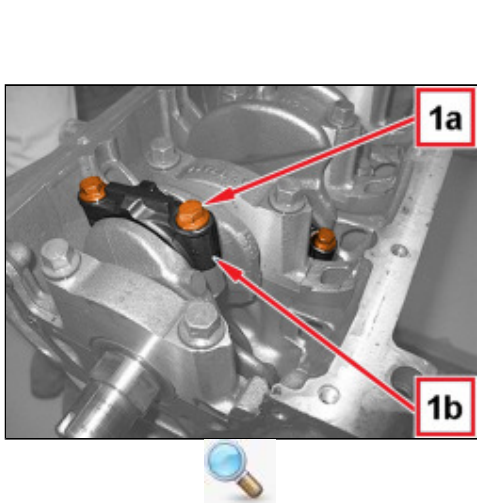
1. Undo the left-handed screw (1a) and remove the toothed timing drive pulley (1b), using the flange fitted on the crankshaft for counter-torque.



1. Undo the bolts (1a) and remove the crankshaft oil seal front cover (1b).

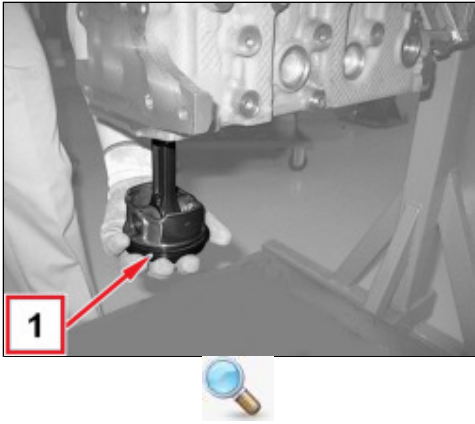


1. Undo bolts (1a) and remove timing drive belt tensioner assembly support (1b).



- Rotate the crankshaft with the tool fitted previously until the cylinder concerned is at B.D.C.
1. Undo bolts (1a) and remove connecting rod cap (1b) complete with lower connecting rod half bearing.

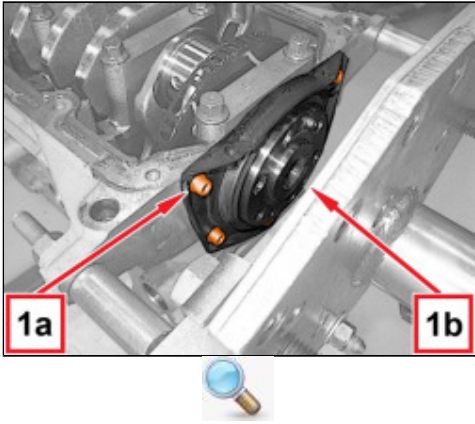
1. Remove the connecting rod-piston assembly complete with upper connecting rod half bearing.



- Carry out the same operations to remove the pistons and connecting rods for the remaining cylinders.
- Remove the tool.

Tool	Description	Function	Validity
1860815000	Flange	Crankshaft rotation	1750 Turbo Petrol

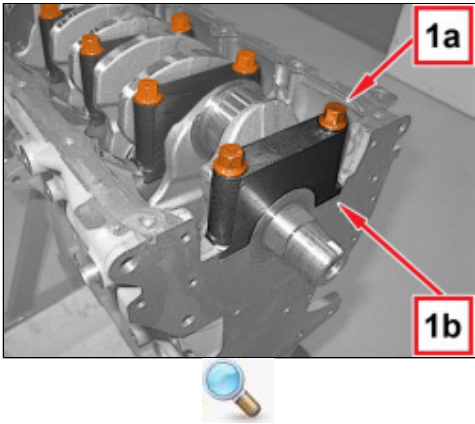
1. Undo the screws (1a), then remove the flywheel side oil seal cover (1b).



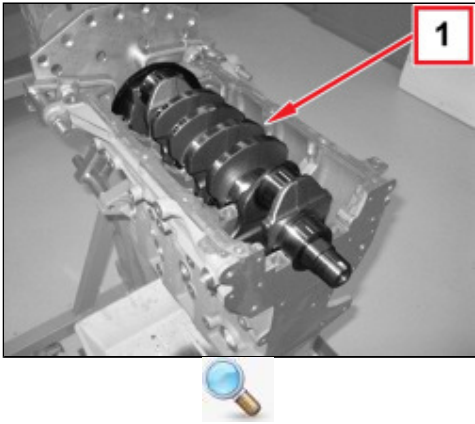
- Check that the crankshaft end float corresponds to the prescribed figures using a magnetic base and dial gauge.

Size	Value	Validity
Crankshaft end float (mm)	0.059 ÷ 0.221	1750 Turbo Petrol

1. Undo the bolts (1a) and remove the connecting rod caps (1b).

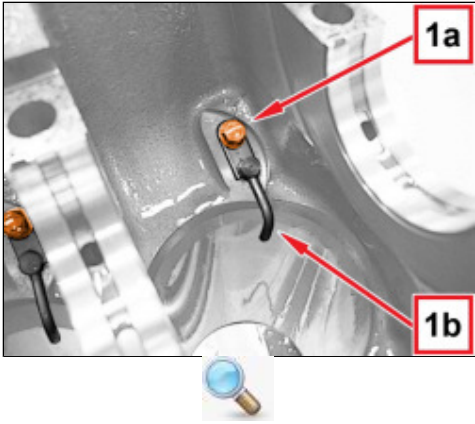


- Remove the lower main half-bearings.

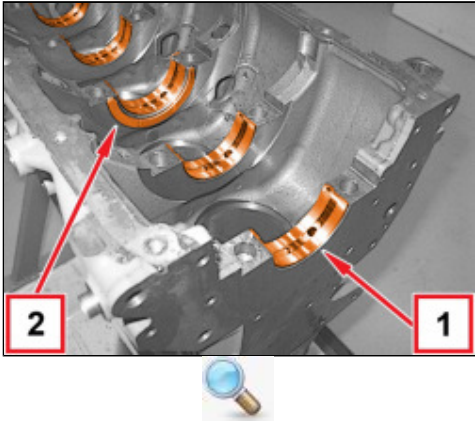


1. Remove the crankshaft.

1. Undo the bolts (1a) and remove the jets (1b) from the crankcase.



1. Remove the upper main half-bearings.
2. Remove the thrust half-washers.



- Remove the engine block from the support tools, then place on a workbench.

[Op. 1028H60 SET OF PISTONS, GUDGEON PINS AND RINGS - REPLACE PISTONS AND CONNECTING RODS AT THE BENCH - INCLUDES ALIGNMENT AND BALANCING](#)

[Op. 1084B18 ENGINE OIL PUMP, REMOVED - CHECK AT THE BENCH](#)

- Drill and remove the water/oil sealing plugs from the engine block to allow for washing the ducts.

 Refitting ([Removing](#) )

- Wash the dismantled components.

- Fit the water/oil sealing plugs in the engine block using suitable fitting tools.

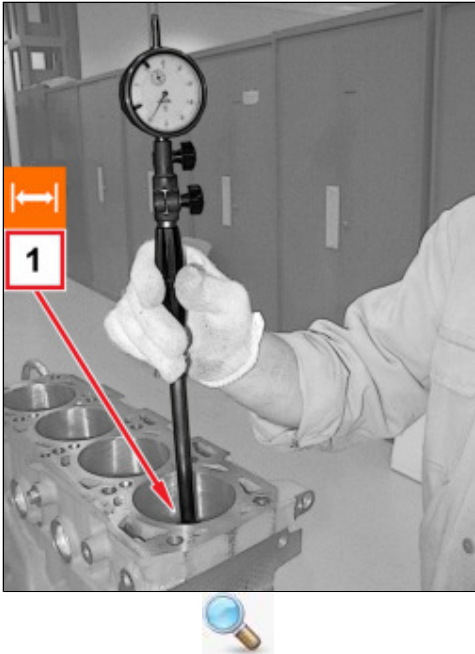
- Lubricate all the mechanical coupling components with engine oil.

- Check that the cylinder head support surface does not have cracks or surface grooves.

- Check that the flatness of the cylinder head support surface is within the prescribed limits; if this is not the case, regrind the cylinder head support surface.

Size	Value	Validity
Engine cylinder head lower surface flatness (mm)	< 0.1	1750 Turbo Petrol

1. Measure the cylinder liner diameter.



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Size	Value	Validity
Cylinder liner inner diameter - Grade A (mm)	83.000 ÷ 83.010	1750 Turbo Petrol
Size	Value	Validity
Cylinder liner inner diameter - Grade B (mm)	83.010 ÷ 83.020	1750 Turbo Petrol
Size	Value	Validity
Cylinder liner inner diameter - Grade C (mm)	83.020 ÷ 83.030	1750 Turbo Petrol

- Check that the taper of the cylinder liners is within the prescribed limits.

Size	Value	Validity
Cylinder liner taper (mm)	0.01	1750 Turbo Petrol

- Check that the ovality of the cylinder liners is within the prescribed limits.

Size	Value	Validity
Cylinder liner ovality (mm)	< 0.05	1750 Turbo Petrol

- If the cylinder liner measurements are not within the prescribed limits, ream the cylinder liners following the prescribed oversizes.

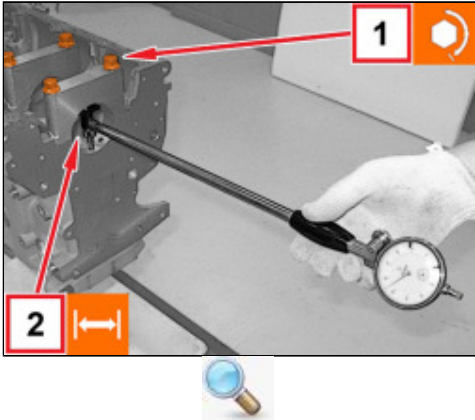
 If reaming, ensure all the liners have the same oversize.

Size	Value	Validity
Cylinder liner inner diameter oversize (mm)	0.1	1750 Turbo Petrol

- Temporarily fit the main bearing caps.

 The main bearing caps have progressively numbered references (from one to four starting from the front of the engine) which define the fitting position.

1. Tighten the main bearing cap screws to the prescribed torque using a suitable tool for angular tightening.



Component	Fastening	Ø	Value (daNm)	Validity
Bearing caps	Screw	M12	1.9 ÷ 2.1 + 100°	1750 Turbo Petrol

2. Check that the diameter of the main journal seats is within specified limits.

Size	Value	Validity
Main journal seat diameter (mm)	56.705 ÷ 56.718	1750 Turbo Petrol

- Check that there are no deposits or blockages in the crankshaft lubrication ducts.

- Check that the diameter of the main journals is within the prescribed limits.

Size	Value	Validity
Main journal diameter - Grade A (mm)	52.994 ÷ 53.000	1750 Turbo Petrol
Size	Value	Validity
Main journal diameter - Grade B (mm)	52.988 ÷ 52.994	1750 Turbo Petrol
Size	Value	Validity
Main journal diameter - Grade C (mm)	52.982 ÷ 52.988	1750 Turbo Petrol

- If the diameter of the main journals is not correct, they should be reground to the prescribed undersize.

Size	Value	Validity
Main journal diameter undersize (mm)	0.127	1750 Turbo Petrol

 Main journal undersizes higher than the value mentioned will adversely affect the structural resistance of the crankshaft (following contact between the tool and rolled connectors). As far as the above is concerned, if the regrounding requires undersizes greater than 0.127 mm, then the crankshaft must be replaced and a new one ordered from the Parts Dept. The half-bearings used for undersizes of more than 0.127 mm should no longer be ordered from the Parts Dept. (even if the number is still quoted).

- Check that the diameter of the crankpins is within the prescribed limits.

Size	Value	Validity
Crankpin diameter - Grade A (mm)	48.238 ÷ 48.244	1750 Turbo Petrol
Size	Value	Validity
Crankpin diameter - Grade B (mm)	48.232 ÷ 48.238	1750 Turbo Petrol
Size	Value	Validity
Crankpin diameter - Grade C (mm)	48.226 ÷ 48.232	1750 Turbo Petrol

- If the diameter of the crankpins is not correct, they should be reground to the prescribed undersize.

Size	Value	Validity
Crankpin diameter undersize (mm)	0.127	1750 Turbo Petrol

 Crankpin undersizes higher than the value given will adversely affect the structural resistance of the crankshaft (following contact between the tool and rolled connectors). As far as the above is concerned, if the regrounding requires undersizes greater than 0.127 mm, then the crankshaft must be replaced and a new one ordered from the Parts Dept. The half-bearings used for undersizes of more than 0.127 mm should not be ordered from the Parts Dept. (even if the number is still quoted).

- Check the main bearings, noting that the half-bearings should not be adapted. Replace them if scoring or signs of binding are noted following the prescribed grade.

Size	Value	Validity

Main journal half-bearings - Grade A (red) (mm)	1.831 ÷ 1.837	1750 Turbo Petrol
Size	Value	Validity
Main journal half-bearings - Grade B (blue) (mm)	1.836 ÷ 1.844	1750 Turbo Petrol
Size	Value	Validity
Main journal half-bearings - Grade C (yellow) (mm)	1.843 ÷ 1.849	1750 Turbo Petrol
Size	Value	Validity
Main journal half-bearings oversize thickness - Category A (brown) (mm)	1.894 ÷ 1.900	1750 Turbo Petrol
Size	Value	Validity
Main journal half-bearings oversize thickness - Category B (green) (mm)	1.899 ÷ 1.907	1750 Turbo Petrol
Size	Value	Validity
Main journal half-bearings oversize thickness - Category C (black) (mm)	1.906 ÷ 1.912	1750 Turbo Petrol

- Fit the half-bearings, making sure they are scrupulously clean.

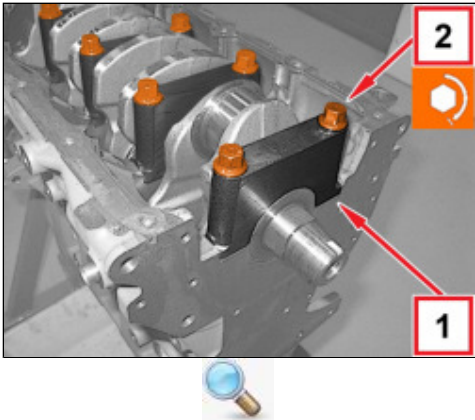
 If the crankshaft has been ground, fit new oversize half-bearings to restore the initial tolerance conditions.

- Fit the crankshaft into its seat on the crankcase.

- Fit the calibrated wire (plastigage) for measuring the main journal backlash.

 Check one journal at a time, without rotating the crankshaft.

1. Fit the main bearing caps complete with half-bearings.



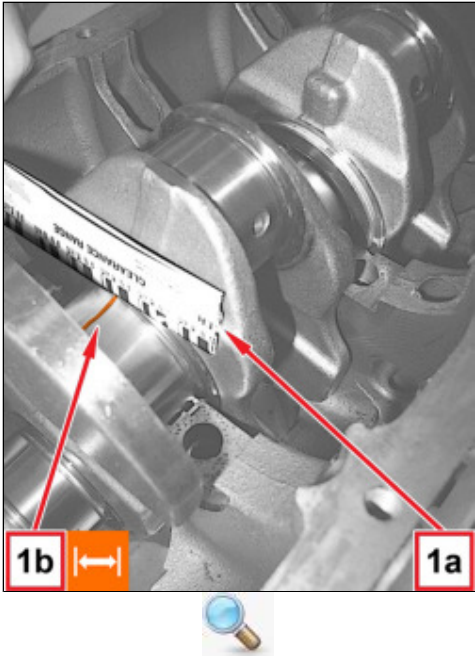
 The bearing caps have progressively numbered references (from zero to four starting from the front of the engine) which define the fitting position.

2. Tighten the main bearing cap bolts to the recommended torque using the angular tightening tool.

Component	Fastening	Ø	Value (daNm)	Validity
Bearing caps	Screw	M12	1.9 ÷ 2.1 + 100°	1750 Turbo Petrol

1. Remove the main bearing caps fitted previously and, using the suitably graduated measuring instrument (1a), measure the clearance shown by the calibrated wire (1b).

Size	Value	Validity
Clearance between main bearings - main journals no. 1-2-4-5 (mm)	0.031 ÷ 0.051	1750 Turbo Petrol



Size	Value	Validity
Clearance between main bearings - main journal no. 3 (mm)	0.040 ÷ 0.061	1750 Turbo Petrol

 If the figure measured is outside of the tolerance, replace the main half-bearings with ones of the correct size and category.

- Measure the clearance for all the bearings, being careful to take the measurements one at a time without moving the crankshaft at all.

- Check that the small end bush bore diameter is within the prescribed limits; if not, replace the worn connecting rod.

Size	Value	Validity
Small end bush inner diameter (mm)	22.012 ÷ 22.020	1750 Turbo Petrol

- Check that the bore of the gudgeon pin housing in the pistons corresponds to the recommended figures; if not, replace the piston complete with sealing rings, gudgeon pin and bushes.

Size	Value	Validity
Gudgeon pin outer diameter (mm)	22.004 ÷ 22.008	1750 Turbo Petrol

- Check that the outer diameter of the piston pins is within the prescribed limits; if not, replace the worn piston pins.

Size	Value	Validity
Gudgeon pin outer diameter (mm)	21.995 ÷ 22.000	1750 Turbo Petrol

- Fit the sealing rings in the cylinder liner and check that the opening between the ends is within the prescribed values; if this is not the case, replace the retaining rings.

Size	Value	Validity
Cylinder compression 1st sealing ring gap (mm)	0.20 ÷ 0.30	1750 Turbo Petrol
Size	Value	Validity
Cylinder compression 2nd sealing ring gap (mm)	0.40 ÷ 0.60	1750 Turbo Petrol
Size	Value	Validity
Engine piston oil scraper ring gap (mm)	0.20 ÷ 0.50	1750 Turbo Petrol

- Check that the outer diameter of the pistons corresponds to the prescribed figures; if not, replace the piston complete with sealing rings and piston pin.

Size	Value	Validity
Piston outer diameter -Grade A (mm)	82.966 ÷ 82.980	1750 Turbo Petrol
Size	Value	Validity
Piston outer diameter - Grade B (mm)	82.976 ÷ 82.990	1750 Turbo Petrol
Size	Value	Validity
Piston outer diameter - Grade C (mm)	82.986 ÷ 83.000	1750 Turbo Petrol
Size	Value	Validity
Piston outer diameter oversize (mm)	0.1	1750 Turbo Petrol

 Measure perpendicular to the gudgeon pin axis, 7 mm from the lower edge of the skirt.

- Check that the seats for piston rings in the piston are within the prescribed limits.

Size	Value	Validity
Sealing ring seat in piston - 1st groove (mm)	1.230 ÷ 1.250	1750 Turbo Petrol
Size	Value	Validity
Sealing ring seat in piston - 2nd groove (mm)	1.220 ÷ 1.240	1750 Turbo Petrol
Size	Value	Validity
Sealing ring seat in piston - 3rd groove (mm)	2.010 ÷ 2.030	1750 Turbo Petrol

- Check that the thickness of the sealing rings and oil sealing ring is within the recommended limits.

Size	Value	Validity
Cylinder compression 1st sealing ring thickness (mm)	1.170 ÷ 1.190	1750 Turbo Petrol
Size	Value	Validity
Cylinder compression 2nd sealing ring thickness (mm)	1.170 ÷ 1.190	1750 Turbo Petrol
Size	Value	Validity
Engine piston oil scraper ring	1.850 ÷ 2.000	1750 Turbo Petrol

thickness (mm)		
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- Check that the axial clearance between the first-second ring and the housing in the piston corresponds to the recommended figures.

Size	Value	Validity
Cylinder compression 1st sealing ring end float (mm)	0.040 ÷ 0.080	1750 Turbo Petrol
Size	Value	Validity
Cylinder compression 2nd sealing ring end float (mm)	0.030 ÷ 0.070	1750 Turbo Petrol

- Check that the end float between the oil scraper ring and the housing in the piston corresponds to the prescribed figures.

Size	Value	Validity
Engine piston oil scraper ring end float (mm)	0.010 ÷ 0.180	1750 Turbo Petrol

- Fit the caps on the connecting rods and secure them by tightening the screws to the prescribed torque.

Component	Fastening	Ø	Value (daNm)	Validity
Connecting rod caps	Screw	M9	2.4 ÷ 2.6 + 60°	1750 Turbo Petrol

- Check that the big end diameter is within the recommended limits; if not, replace the connecting rods.

Size	Value	Validity
Big end inner diameter (mm)	51.354 ÷ 51.366	1750 Turbo Petrol

[_ Op. 1028H60 SET OF PISTONS, GUDGEON PINS AND RINGS - REPLACE PISTONS AND CONNECTING RODS AT THE BENCH - INCLUDES ALIGNMENT AND BALANCING](#)

[_ Op. 1084B18 ENGINE OIL PUMP, REMOVED - CHECK AT THE BENCH](#)

- Check that there are no signs of seizing on the flywheel ring gear teeth; if this is not the case, replace it.

- Replace the engine block on the overhaul stand using the mounting bracket.

Tool	Description	Function	Validity
1871000000	Overhaul stand	Engine overhaul	1750 Turbo Petrol
Tool	Description	Function	Validity
1871000000	Bracket	Positioning engine on overhaul stand	1750 Turbo Petrol

- Refit the jets in their housings in the engine block and secure them using the screws.

- Refit the thrust half-washers in their seats on the third main bearing.

- The main journal half-bearings fitted on the crankshaft have been selected for their optimum fitting clearance.

 The crankshaft supplied by the Parts Dept. comes without half-bearings or "standard" size main journals and crankpins; the half-bearings to be fitted must therefore be selected according to the grade of each of the new

crankshaft's main journals and crankpins.

- To select main journal half bearings, measure as follows: the numerical code stamped on the toothed wheel; the paint mark, if present, next to the main journals.

- Below is an example of the identification of main journal grades:

1 - Crankpin identification numerical code: the number on the left refers to the first timing side bearing; the final "N" is not relevant for 4-cylinder engines.

2 - Main journal identification numerical code: the first number on the left refers to the first timing side bearing; the final "N" is not relevant for 4-cylinder engines.

3 - Series of numbers (if present), in groups of two digits, which indicate the dimensions (in thousandths) of the main journals: the first two numbers on the left refer to the first journal, timing side.

 Only use the codes that relate to the key; all other codes on the toothed wheel should not be used.

To identify the main journal grade, refer to the numerical reference code 2 in the key.

In the example, the numbers 11111N indicate that all five journals are Grade A (red) as indicated below.

A further method for identifying the grade of the bearings is to read reference 3 (if present) in the diagram.

In the example, the number 94 (first on the left) corresponds to the dimensions (52.994) of the first timing side journal which indicates Grade A (red); the same method should be applied for the other groups of two digits for the same reference 3 (97 -95 -95 -94).

MAIN JOURNAL IDENTIFICATION

Main journal grade A (normal), diameter 52.994 - 53.0000 mm, RED paint mark, numerical code 1 (94 00)*

Main journal grade B (normal), diameter 52.982 - 52.994 mm, BLUE paint mark, numerical code 2 (88 94)*

Main journal grade C (normal), diameter 52.982 - 52.998 mm, YELLOW paint mark, numerical code 3 (82 88)*

Main journal grade D (0.127 mm undersize), diameter 52.867- 52.873 mm, BROWN paint mark, numerical code 6 (67 73)*

Main journal grade E (0.127 mm undersize), diameter 52.861 - 59.867 mm, GREEN paint mark, numerical code 7 (61 67)*

Main journal grade F (0.127 mm undersize), diameter 52.855 - 52.861 mm, BLACK paint mark, numerical code 8 (55 61)*

(*) Last two numbers (thousandth part) of the main journal dimensions.

If using a crankshaft where the maximum undersize for the bearings is 0.127 mm through grindings, the grade should be selected through the measurement of the diameter of the bearing using the above as a reference.

Having defined the grade and the colour of each new or reground crankshaft pin, it is necessary to select the thickness or the pair of the pins, which should be the same colour as the corresponding pin; the pair of half-bearings required can be ordered from the Parts Dept. by quoting the order number.

The above is designed to guarantee the optimum operational clearances for all pins.

As a final clarification, in general, the clearance between the main journal and the half-bearing, produced through the selection method described above, should be min. 0.031 - max. 0.051 mm; this figure can be measured, as part of the final check, using the calibrated wire (Plastigage).

- Refit the upper main bearing half-bearings in their seats in the engine block.

- Place the crankshaft in its housing in the crankcase.

- Place the bearing caps complete with lower half-bearings in position.

 The bearing caps have progressively numbered references (from zero to four starting from the front of the engine) which define the fitting position.

- Tighten the main bearing cap bolts to the recommended torque using the angular tightening tool.

Component	Fastening	Ø	Value (daNm)	Validity
Bearing caps	Screw	M12	1.9 ÷ 2.1 + 100°	1750 Turbo Petrol

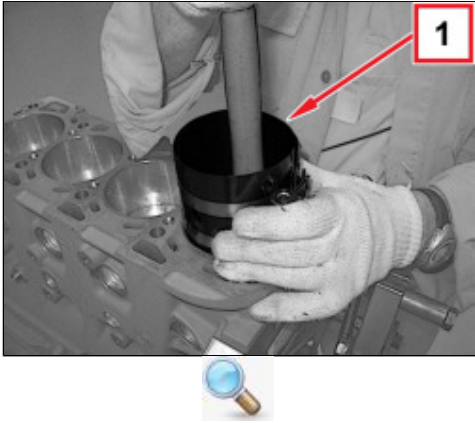
- Fit the tool.

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Tool	Description	Function	Validity
1860815000	Flange	Crankshaft rotation	1750 Turbo Petrol

- Rotate the crankshaft with the tool fitted previously until the cylinder concerned is at B.D.C.

1. Refit the piston-connecting rod assembly in position complete with half-bearing using a suitable tool. Make sure that the arrow marked on the piston crown is facing the timing side.



-  The piston-connecting rod assemblies must be fitted on the engine block so that the drain on the piston skirt is aligned with the oil jet on the engine block.
-  For the selection of the connecting rod half-bearings, follow the procedure described previously for the main half-bearings according to the grades listed below.

Size	Value	Validity
Crankpin half-bearings - Grade A (mm)	1.536	1750 Turbo Petrol
Size	Value	Validity
Crankpin half-bearings - Grade B (mm)	1.539	1750 Turbo Petrol
Size	Value	Validity
Crankpin half-bearings - Grade C (mm)	1.542	1750 Turbo Petrol
Size	Value	Validity
Rod half-bearings oversize - Category A (brown) (mm)	0.127	1750 Turbo Petrol
Size	Value	Validity
Rod half-bearings oversize - Category B (green) (mm)	0.127	1750 Turbo Petrol
Size	Value	Validity
Rod half-bearings oversize - Category C (black) (mm)	0.127	1750 Turbo Petrol

- Carry out the same operations to fit the pistons and connecting rods for the remaining cylinders.
- Test the crankpin clearance by applying the calibrated wire (plastigage) to measure the crankpin installation clearance.
- Place the connecting rod caps complete with half-bearings in their seats.

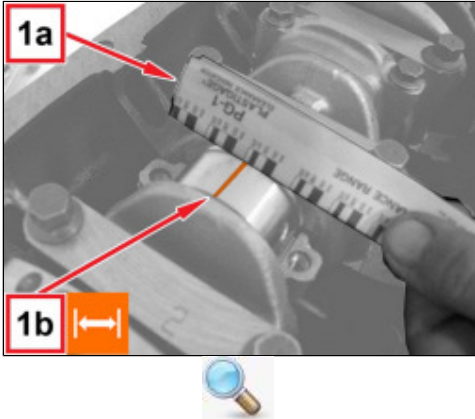
-  Fit the connecting rod caps so that the number stamped on each rod faces toward the same side as the number stamped on the big end (inlet side).

- Tighten the screws to the prescribed torque, using the angular tightening tool.

Component	Fastening	Ø	Value (daNm)	Validity
Connecting rod caps	Screw	M9	2.4 ÷ 2.6 + 60°	1750 Turbo Petrol

- Undo the nuts and remove the connecting rod caps with the half-bearings fitted previously.

1. Use an appropriate graduated measuring tool (1a) to measure the clearance indicated by the calibrated wire (1b).



Size	Value	Validity
Clearance between connecting rod bearings - crankpin bearings (mm)	0.030 ÷ 0.056	1750 Turbo Petrol

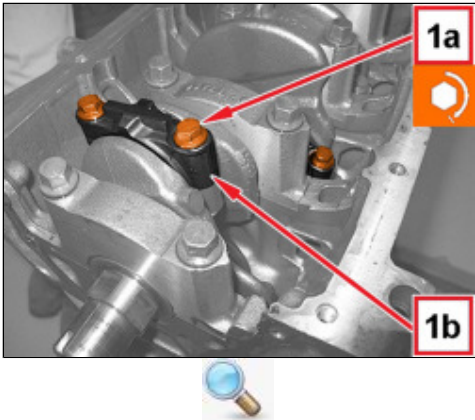
- If the value measured is not within the prescribed figures, replace the connecting rod bearings.

- Carry out this test on all the crankpins, one at a time, without ever turning the crankshaft.

- Place the connecting rod cap complete with half-bearing in position and secure it by partially tightening the screws.

 Fit the connecting rod caps so that the number stamped on each rod faces toward the same side as the number stamped on the big end (inlet side).

1. Tighten bolts (1a) of connecting rod caps (1b) to the recommended torque using the angular tightening tool.

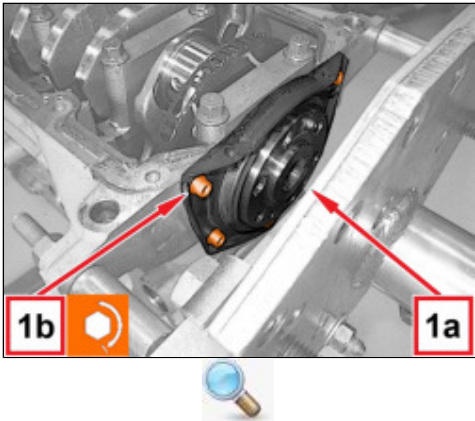


Component	Fastening	Ø	Value (daNm)	Validity
Connecting rod caps	Screw	M9	2.4 ÷ 2.6 + 60°	1750 Turbo Petrol

- Remove the tool.

Tool	Description	Function	Validity
1860815000	Flange	Crankshaft rotation	1750 Turbo Petrol

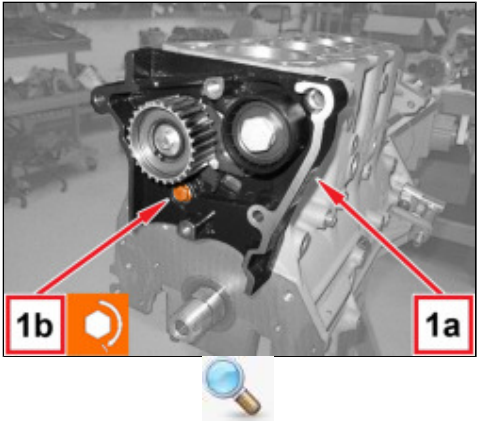
1. Place the flywheel side cover (1a) in its housing and secure it tightening the bolts (1b) to the recommended torque.



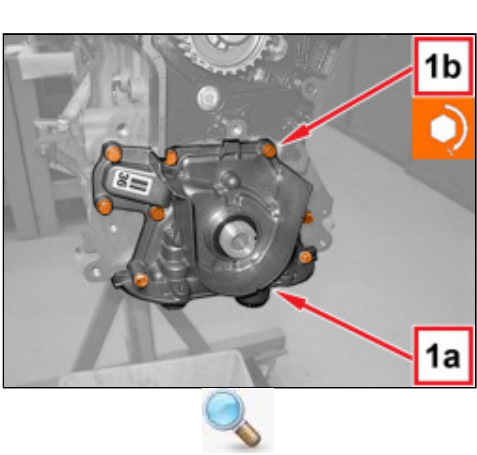
Component	Fastening	Ø	Value (daNm)	Validity
Flywheel side oil seal cover	Screw (to be replaced)	M6	0.8 ÷ 1.0	1750 Turbo Petrol

1. Refit timing drive belt tensioner mount (1a) in its housing and secure it tightening bolts (1b) to the recommended torque.

Component	Fastening	Ø	Value (daNm)	Validity

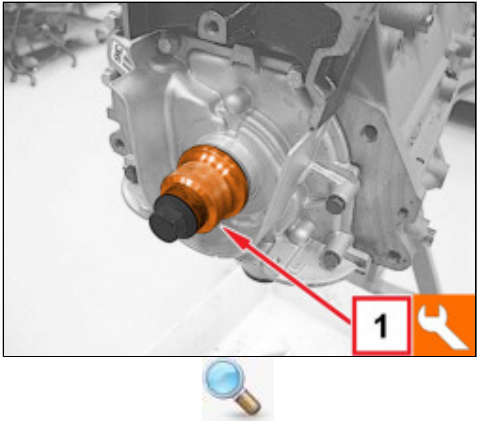


Timing belt tensioners support	Screw	M10	4.5 ÷ 5.5	1750 Turbo Petrol
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1. Place crankshaft oil seal front cover (1a) in position complete with gasket and tighten bolts (1b) to the recommended torque.

Component	Fastening	Ø	Value (daNm)	Validity
Crankshaft oil seal front cover	Screw (to be replaced)	M6	0.8 ÷ 1.0	1750 Turbo Petrol

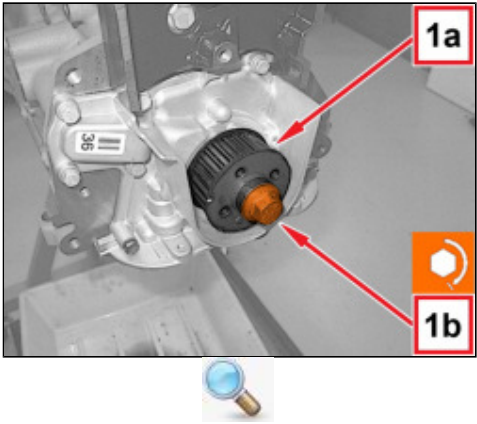


1. Refit the new sealing ring in position on the crankshaft front oil seal cover using the tool shown.

Tool	Description	Function	Validity
2000004100	Fitting tool	Fitting crankshaft front oil seal	1750 Turbo Petrol

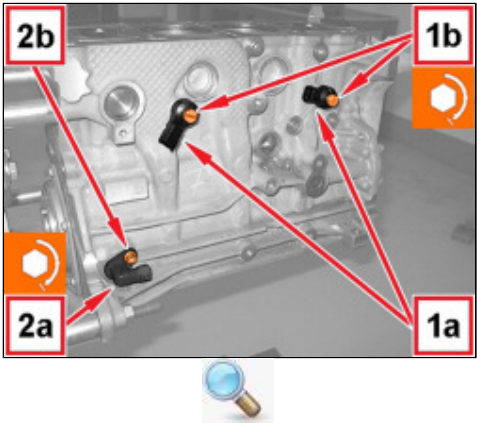
- Fit the tool for the crankshaft rotation, to be used as counter-torque to tighten the drive toothed pulley fastening screw.

Tool	Description	Function	Validity
1860815000	Flange	Crankshaft rotation	1750 Turbo Petrol



1. Position toothed timing drive pulley (1a) in its housing and secure it tightening left hand thread bolt (1b) to the recommended torque.

Component	Fastening	Ø	Value (daNm)	Validity
Toothed drive pulley	Left hand screw	M16	21.0 ÷ 23.0	1750 Turbo Petrol



1. Place the detonation sensors (1a) in position and tighten the screw (1b) to the prescribed torque.

Component	Fastening	Ø	Value (daNm)	Validity
Knock sensor	Screw (to be replaced)	M8	2.2 ÷ 2.7	

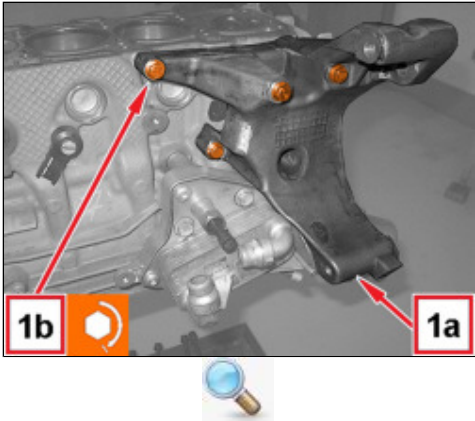
2. Place the rpm sensor (2a) in position and tighten the screw (2b) to the prescribed torque.

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Component	Fastening	Ø	Value (daNm)	Validity
Rpm sensor	Screw	M6	0.8 ÷ 1.0	

- Place the engine oil filter-heat exchanger mounting in position complete with new O-rings and tighten the screws.

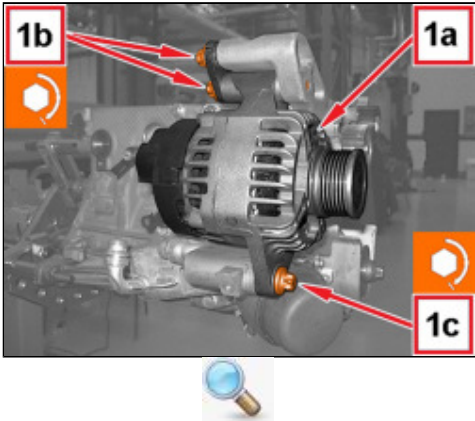
1. Place the alternator mounting (1a) in its housing and tighten the screws (1b) to the prescribed torque.



Component	Fastening	Ø	Value (daNm)	Validity
Alternator mounting	Screw	M8	2.2 ÷ 2.7	

 The upper screw M8x110, on the timing side is pre-treated with sealant and must therefore always be replaced.

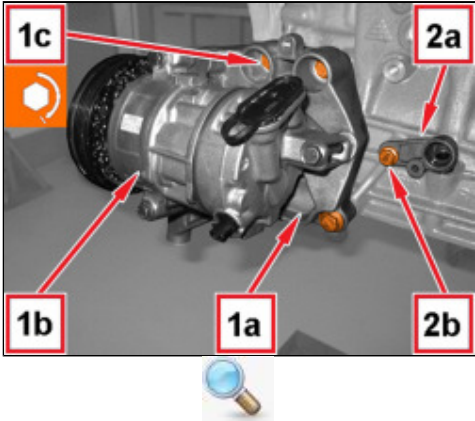
1. Place alternator (1a) in position and tighten bolts (1b) and (1c) to the recommended torque.



Component	Fastening	Ø	Value (daNm)	Validity
Alternator	Screw	M12	6.3 ÷ 7.7	
Component	Fastening	Ø	Value (daNm)	Validity
Alternator reaction bracket	Screw	M10	4.5 ÷ 5.5	

- Place the wiring mounting bracket in position and tighten the screws.

1. Place the air conditioning compressor mounting (1a) in its housing complete with compressor (1b) and tighten the screws (1c) to the prescribed torque.



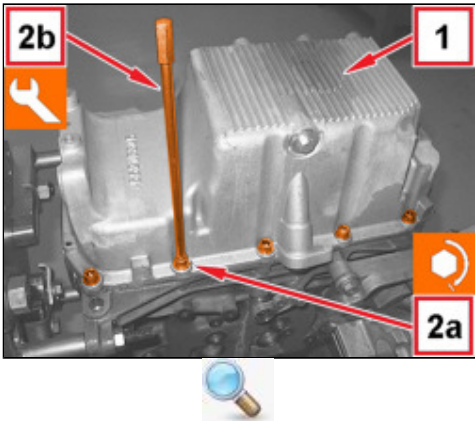
Component	Fastening	Ø	Value (daNm)	Validity
Compressor support	Screw	M10	4.5 ÷ 5.5	1.4 Turbo Petrol 1.6 JTDM 2.0 JTDM 1750 Turbo Petrol

2. Place the connector (2a) for the turbocharger oil return pipe in position and tighten the relevant screw (2b).

- Apply silicone sealant to the entire perimeter of the engine oil sump.

1. Place the engine oil sump in its housing.

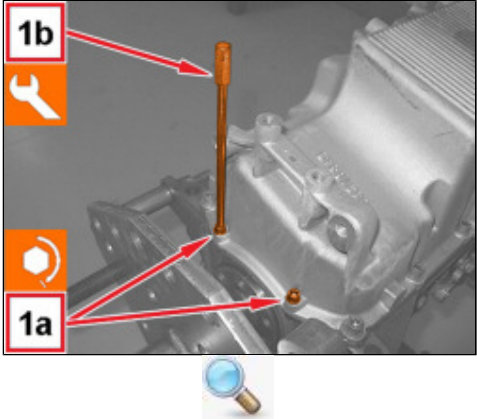
2. Tighten side bolts (2a) fixing the oil sump to the recommended torque using tool (2b).



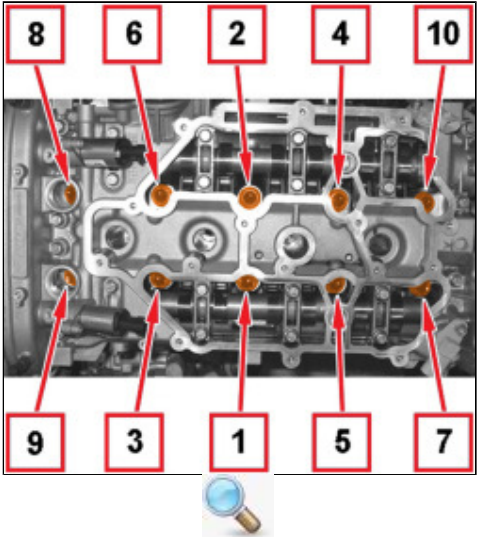
Component	Fastening	Ø	Value (daNm)	Validity
Engine oil sump	Side screws	M8	2.2 ÷ 2.7	1750 Turbo Petrol
Tool	Description	Function	Validity	
1860834000	Key	Loosen/tighten upper cylinder head screws Loosen/tighten	1750 Turbo Petrol	

		crankcase sump side screws	
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1. Tighten the front and rear bolts (1a) fixing the oil sump to the recommended torque using the tool (1b).



Component	Fastening	Ø	Value (daNm)	Validity
Engine oil sump	Timing side and gearbox side screws	M6	0.8 ÷ 1.0	1750 Turbo Petrol
Tool	Description	Function		Validity
1860833000	Key	Loosen/tighten the screws securing the crankcase sump, timing side and gearbox side		1750 Turbo Petrol



 Rotate the crankshaft so that the piston crown is under the crankcase surface, to avoid any interference with the valves during cylinder head assembly.

- Fit a new gasket for cylinder head and the locating bushes.
- Place the cylinder head on the crankcase so that locating bushes match; tighten the screws to the prescribed torque, following the order shown in the figure.

 Tighten the screw to a torque of 2.0 daNm, tighten to 4.0 daNm and then make an angle tightening of 90° + 90° + 90°.

Component	Fastening	Ø	Value (daNm)	Validity
Cylinder head	Screw	M10	4.0 + 90° + 90° + 90°	1750 Turbo Petrol

- Place the pipe duct retaining pins in position on the cylinder head and tighten.
- Undo the crankcase front cover lower screw shown in the figure.
- Temporarily fit the crankshaft timing tool.

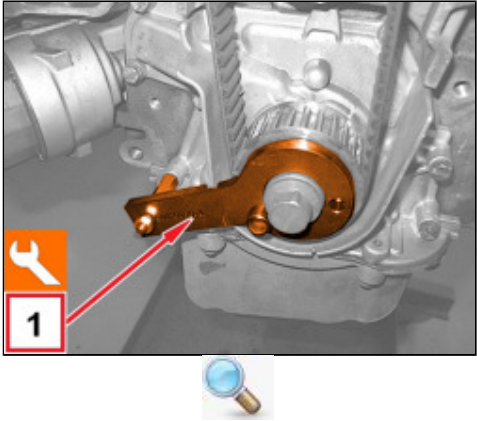
 The crankshaft must be rotated, using small movements, to allow the locating dowel on the timing drive pulley to be inserted in the opening in the tool.

Tool	Description	Function	Validity
2000003000	Template	Engine tuning	1750 Turbo Petrol

- Remove the crankshaft timing tool and install the toothed timing control belt.

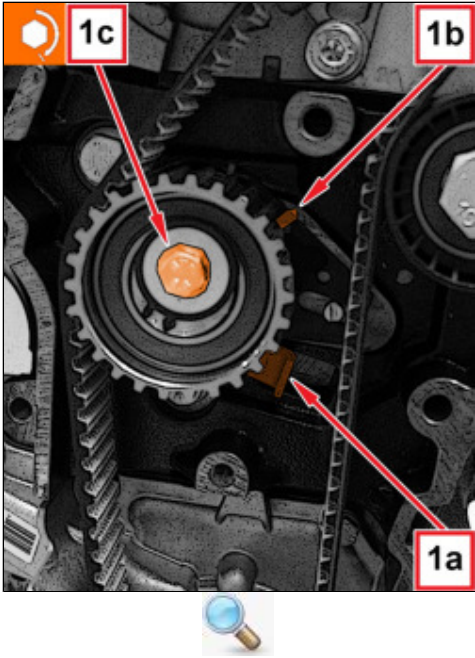
Tool	Description	Function	Validity
2000003000	Template	Engine tuning	1750 Turbo Petrol

1. Fit the crankshaft timing tool.



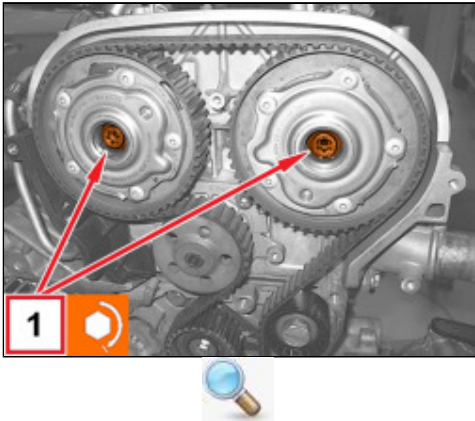
Tool	Description	Function	Validity
2000003000	Template	Engine tuning	1750 Turbo Petrol

1. Use a screwdriver for leverage on the spring (1a) until the tensioner reference (1b) is in a position of maximum tension. Then tighten the screw (1c) to the prescribed torque.



Component	Fastening	Ø	Value (daNm)	Validity
Timing control moving tensioner	Screw	M8	2.3 ÷ 2.8	1750 Turbo Petrol

1. Tighten the pulley/phase transformer fixing screws to the prescribed torque.



Component	Fastening	Ø	Value (daNm)	Validity
Driven toothed pulley with phase transformer	Screw	M12	5.9 ÷ 6.1 + 25° +/- 2°	1750 Turbo Petrol

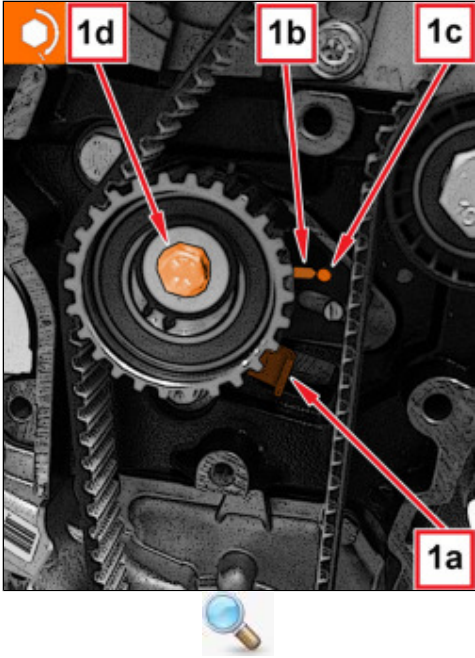
- Remove the timing tools fitted previously.

Tool	Description	Function	Validity
2000003000	Template	Engine tuning	1750 Turbo Petrol
Tool	Description	Function	Validity
2000033500	Templates	Engine tuning	1750 Turbo Petrol

- Turn the crankshaft through two revolutions to settle the timing control toothed belt.

- Loosen the screw fixing the toothed timing control belt moving tensioner.

1. Lever up spring (1a) with a screwdriver until the pointer of tensioner (1b) is aligned with hole (1c) and then tighten bolt (1d) to the specified torque.



Component	Fastening	Ø	Value (daNm)	Validity
Timing control moving tensioner	Screw	M8	2.3 ÷ 2.8	1750 Turbo Petrol

- Turn the crankshaft through two revolutions to settle the timing control toothed belt.

- Recheck the engine timing by refitting the timing tools.

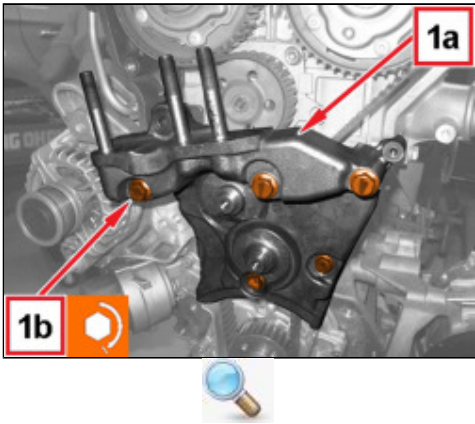
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Tool	Description	Function	Validity
2000003000	Template	Engine tuning	1750 Turbo Petrol
Tool	Description	Function	Validity
2000033500	Templates	Engine tuning	1750 Turbo Petrol

- Remove the previously installed timing tools and tighten the new lower fixing screw for the crankcase front cover to the prescribed torque.

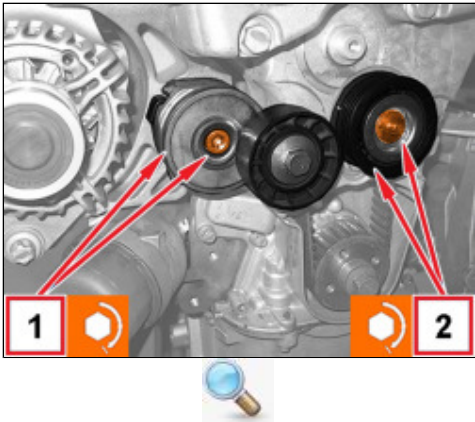
Component	Fastening	Ø	Value (daNm)	Validity
Crankshaft oil seal front cover	Screw (to be replaced)	M6	0.8 ÷ 1.0	1750 Turbo Petrol

- Screw in the protective covers for the phase transformer/pulley fastening screws with new O-rings.
1. Refit the timing side power unit rigid support (1a) and tighten the screws (1b) to the prescribed torque.



Component	Fastening	Ø	Value (daNm)	Validity
Timing side power unit rigid support to engine block	Screw	M8	2.3 ÷ 2.8	1750 Turbo Petrol

1. Position the auxiliary drive belt moving tensioner in its housing and tighten the bolt to the recommended torque.

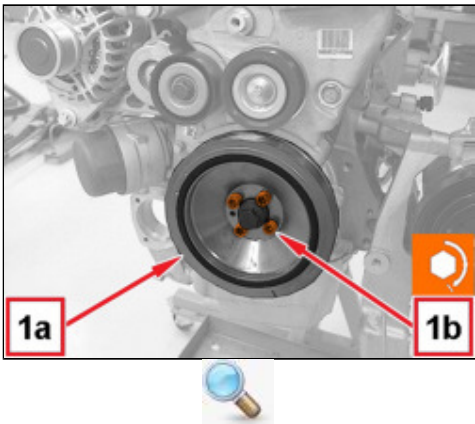


Component	Fastening	Ø	Value (daNm)	Validity
Engine component single belt moving tensioner	Screw	M10	4.5 ÷ 5.5	1750 Turbo Petrol

2. Position the auxiliary drive belt fixed tensioner in its housing and tighten the bolt to the recommended torque.

Component	Fastening	Ø	Value (daNm)	Validity
Engine component single belt fixed tensioner	Screw	M10	5.0	1750 Turbo Petrol

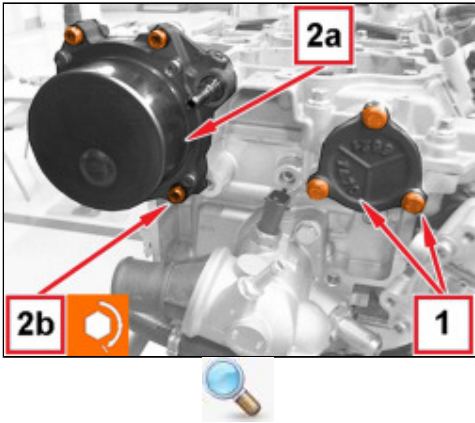
- Fit the timing drive belt protective covers and tighten the screws.
1. Place the service pulley (1a) in position and tighten the screws (1b) to the prescribed torque.



Component	Fastening	Ø	Value (daNm)	Validity
Service pulley on crankshaft	Screw	M8	2.7 ÷ 3.3	1750 Turbo Petrol

- Fit the auxiliary drive belt using the automatic tensioner.
- Remove the tool for the crankshaft rotation.
- Place the engine oil heat exchanger coolant supply pipe in position, connect the quick connectors and tighten the intermediate band fixing screw.
- Place the engine oil heat exchanger coolant outlet pipe in position, connect the quick connector and tighten the intermediate band fixing screw.
- Place the pump coolant return connector back in position and connect the quick connector.

- Place the camshaft seal plug in position, on the intake side, with gasket then tighten the relevant screws.
- Place the vacuum unit complete with gasket back in position and tighten the screws to the prescribed torque.



Component	Fastening	Ø	Value (daNm)	Validity
Vacuum unit	Screw	M8	1.8 ÷ 2.2	

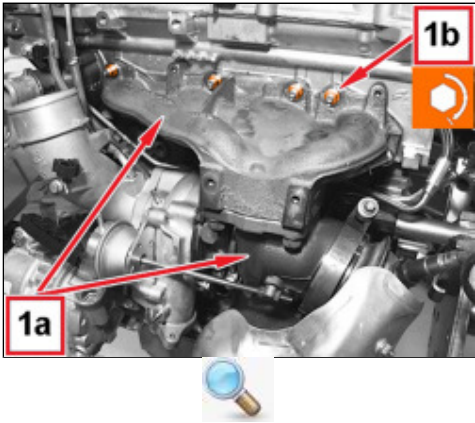
- Position the tappet cover with the new seal and insert the screws without tightening.
- Position the ignition coils and insert the screws without tightening.
- Tighten to the prescribed torque the screws fastening the tappet cover and the ignition coils according to the sequence shown in the figure.



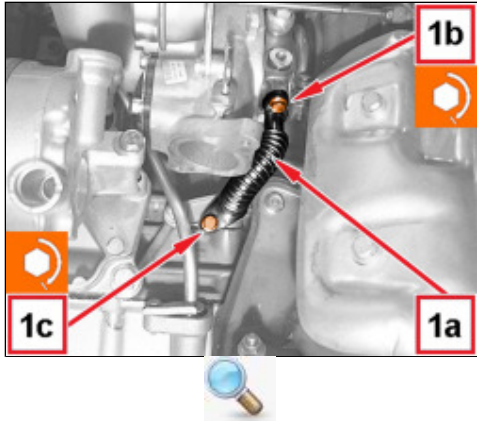
Component	Fastening	Ø	Value (daNm)	Validity
Tappet cover	Screw	M6	0.7 ÷ 0.9	1750 Turbo Petrol
Component	Fastening	Ø	Value (daNm)	Validity
Ignition coils	Screw	M8	0.7 ÷ 0.9	

- Place the supercharging air by-pass valve control pipe in position and tighten the screws.
- Place the engine oil dipstick tube back in its housing and fasten it with the bolts.
- Place the exhaust manifold gasket in its housing.

Place the exhaust manifold in position, with turbocharger and catalytic converter (1a), then tighten the relevant nuts (1b).

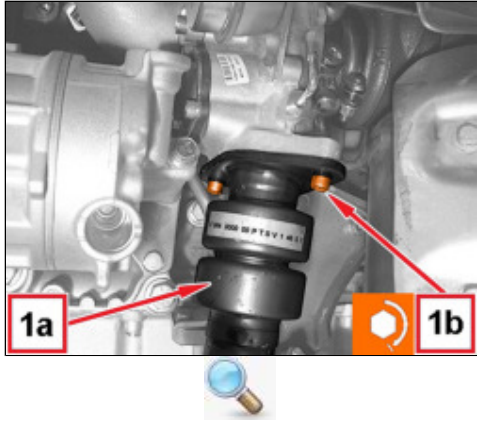


- Tighten the screws securing the catalytic converter mounting bracket.
- Connect the pipe for the turbocharging air by-pass valve to the valve, then tighten the relevant band.
- Press to fit duct and pipes.
- Connect the engine oil vapour intake pipe to the pipe, and tighten the band.
- Connect the turbocharging air by-pass valve control pipe to the pipe and tighten the band.
- Connect the turbocharging air by-pass valve control pipe to the intake chamber and tighten the band.
- Connect the oil vapour pipes to the separator and tighten the bands.
- 1. Place the turbocharger engine oil return pipe (1a) in position and tighten the screws (1b) and (1c) to the prescribed torque.

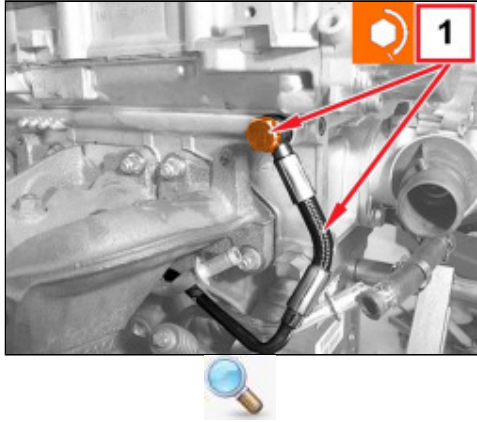


Component	Fastening	Ø	Value (daNm)	Validity
Engine oil supply pipe to turbocharger	Screw	M6	0.8 ÷ 1.0	1750 Turbo Petrol
Component	Fastening	Ø	Value (daNm)	Validity
Engine oil return pipe from turbocharger	Screw	M8	2.3 ÷ 2.8	1750 Turbo Petrol

1. Place the heat exchanger air delivery pipe in position (1a) and tighten the screws (1b).



1. Tighten the connector for the turbocharger engine oil supply pipe, cylinder head side, to the prescribed torque.



Component	Fastening	Ø	Value (daNm)	Validity
Engine oil supply pipe to turbocharger - cylinder head extension side	Connector	M12	2.2 ÷ 2.7	1750 Turbo Petrol

- Place the degassing pipe in position and tighten the screw for the corresponding bracket.
- Connect the degassing pipe to the thermostat and tighten the band.
- Connect the coolant return and delivery pipes to the turbocharger, tighten the bands and the screw of the corresponding bracket.
- Refit the turbocharger intake fuel vapour delivery pipe and tighten the relevant screws.
- Connect the quick connector for the turbocharger intake fuel vapour delivery pipe, one-way valve side.
- Place the exhaust manifold heat partition back in its housing and tighten the bolts.
- Refit the wiring and close the intermediate clips.
- Secure the electrical connections for the injectors.
- Connect the electrical connection for the flywheel side knock sensor.
- Connect the electrical connection for the timing side knock sensor.
- Connect the earth lead to the alternator and tighten the nut.
- Connect the electrical connection for the engine oil pressure switch.
- Connect the electrical connection for the rpm sensor.
- Connect the electrical connection for the fuel vapour solenoid valve.
- Connect the electrical connection for the fuel pressure regulator.
- Refit the wiring and close the relevant clips.
- Connect the electrical connection for the fuel pressure sensor.
- Fit the bracket in its housing and secure it using the bolts.

- Attach the electrical connection for the air pressure sensor and close the clips for the wiring.
- Place the wiring in position, close the clip and attach the electrical connection for the timing sensor, intake side.
- Connect the electrical connection for the throttle body.
- Attach the electrical connection for the engine coolant sensor.
- Place the wiring duct in position and tighten the relevant screws.
- Connect the electrical connection for the exhaust side timing sensor.
- Connect the electrical connections for the ignition coils.
- connect the earth lead and tighten the screw.
- Connect the electrical connection for the phase transformer solenoid valve, exhaust side.
- Connect the electrical connection for the phase transformer solenoid valve, intake side.
- Connect the air conditioning compressor electrical connection.
- Place the engine lifting bracket in position, exhaust side, and tighten the screw.
- Place the engine lifting bracket in position, alternator side, and tighten the screw.
- Place the water pump coolant return pipe in position, close the clip and tighten the band.
- Connect the turbocharger outlet sleeve and tighten the relevant band.
- Tighten the drain plug in the crankcase sump to the prescribed torque.

Component	Fastening	Ø	Value (daNm)	Validity
Engine oil drain plug	Plug	M18	1.8 ÷ 2.2	1750 Turbo Petrol

 When the refitting of the power unit is completed, refill the engine lubrication system.

[Op. 1004D40 ENGINE - POSITION ON STAND AND REMOVE](#)