

WORKSHOP MANUAL



MANUAL SUPPLEMENT

Alfa 75



DIREZIONE ASSISTENZA TECNICA



FOREWORD

*This manual complements the basic **Alfa 75** manual. In addition to specific topics related to the model in question, procedures that have been modified with respect to the basic version, are included in this manual. Slight changes, however, have only been mentioned and should be referred to in the basic text.*

Alfa 75



Means that, in the quick reference index, corresponding Groups are not dealt with specifically in this manual. For these groups refer to basic manual.

QUICK REFERENCE INDEX

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	CLUSTER AND ELECTRONIC INSTRUMENTS	GR 43
	BODY - SHEET METAL PANELS	GR 49
	DOORS	GR 55
	BONNET AND BOOT LID	GR 56
	INTERNAL TRIMMING	GR 66
	EXTERNAL TRIMMING	GR 75
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(*) For the groups emphasized the reference to model **Alfa 75** applies, except for specific topics not available at time when going to press.

GROUP 00

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(*) As per **Alfa 75**

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(▲) As per **Alfa 90**

WEIGHTS AND LOADS

		Model	
			
Weights and loads			
Max weight allowed	kg (lb)	1545 (3406)	
Kerbweight	kg (lb)	1120 (2489)	
Useful load	kg (lb)	425 (936)	
Max gross weight per axle allowed	kg (lb)	Front	850 (1873)
		Rear	990 (2182)
Max towing gross weight	kg (lb)	1200 (2645)	
Max vertical load on tow hook	kg (lb)	60 (132)	
Seating capacity		Front	2
		Rear	3

WHEELS AND TYRES

		Model	
			
Rims and tyres			
Rims		5 1/2 J x 14" (1)	6 1/2 J x 14" (2)
Tubeless tyres		195/60 VR14	
Inflating pressure (3) [kg/cm ² (p.s.i.; bar; kPa)]	N	A	2.0 (28.4; 1.96; 186.1)
		P	2.0 (28.4; 1.96; 186.1)
	C	A	2.2 (31.2; 2.15; 215.7)
		P	2.2 (31.2; 2.15; 215.7)

A: Front
P: Rear

N: With reduced load and normal speed
C: At full load and high speed
V: up to 230 km/h (143 mi./h)

(1) Rims with 4 securing screws.
(2) Rims with 5 securing screws.
(3) Pressures measured on cold tyres.

CAUTION:

The wheels nut must be tightened to 98 N·m (10 kg·m; 72.3 ft·lb)

MODEL IDENTIFICATION

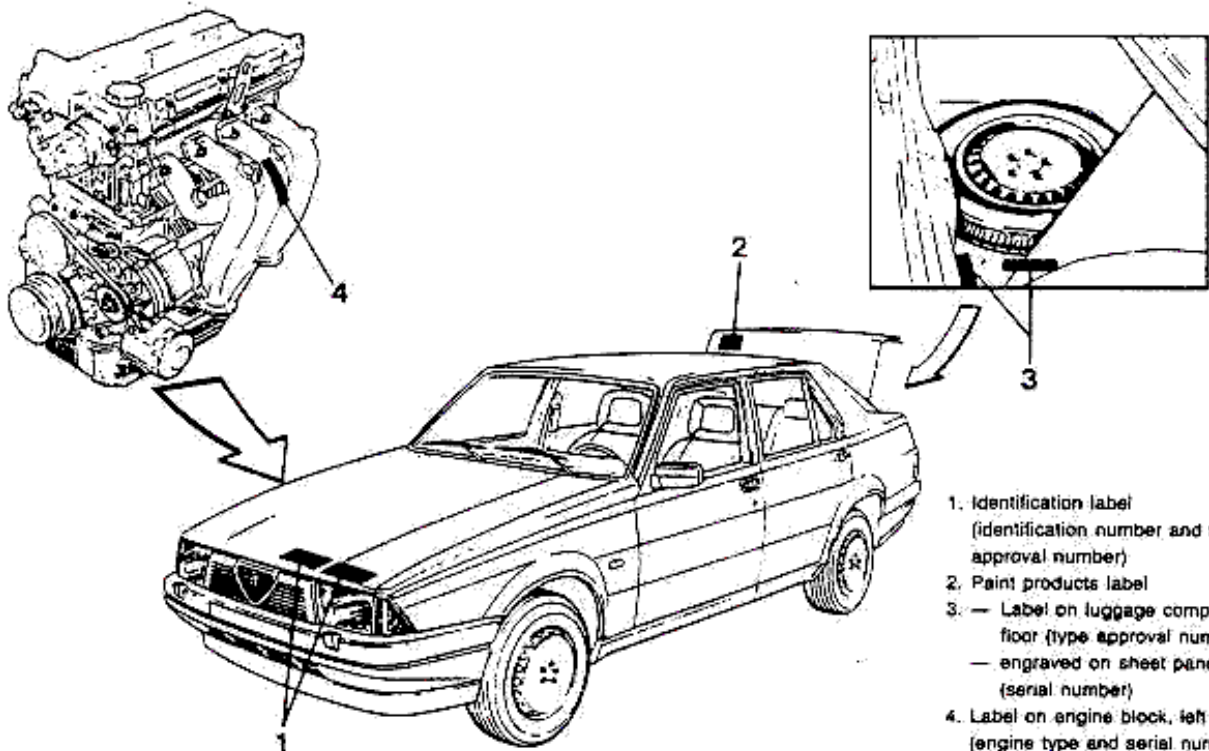
(Except Switzerland, Sweden, Australia)

Model		75 Twin Spark 2.0	
Body		4 - door saloon	
Drive		LH	RH
Identification No.		161.220	161.230
Chassis No.	Type approval No.	162.B4	
		162.B40	
	Serial No.	from 00.001.001	from 03.001.001
Engine No.	Type and serial No.	062.24 from 000.001	

SERVICE AND IDENTIFICATION DATA

IDENTIFICATION LABELS

(Except Switzerland, Sweden, Australia)



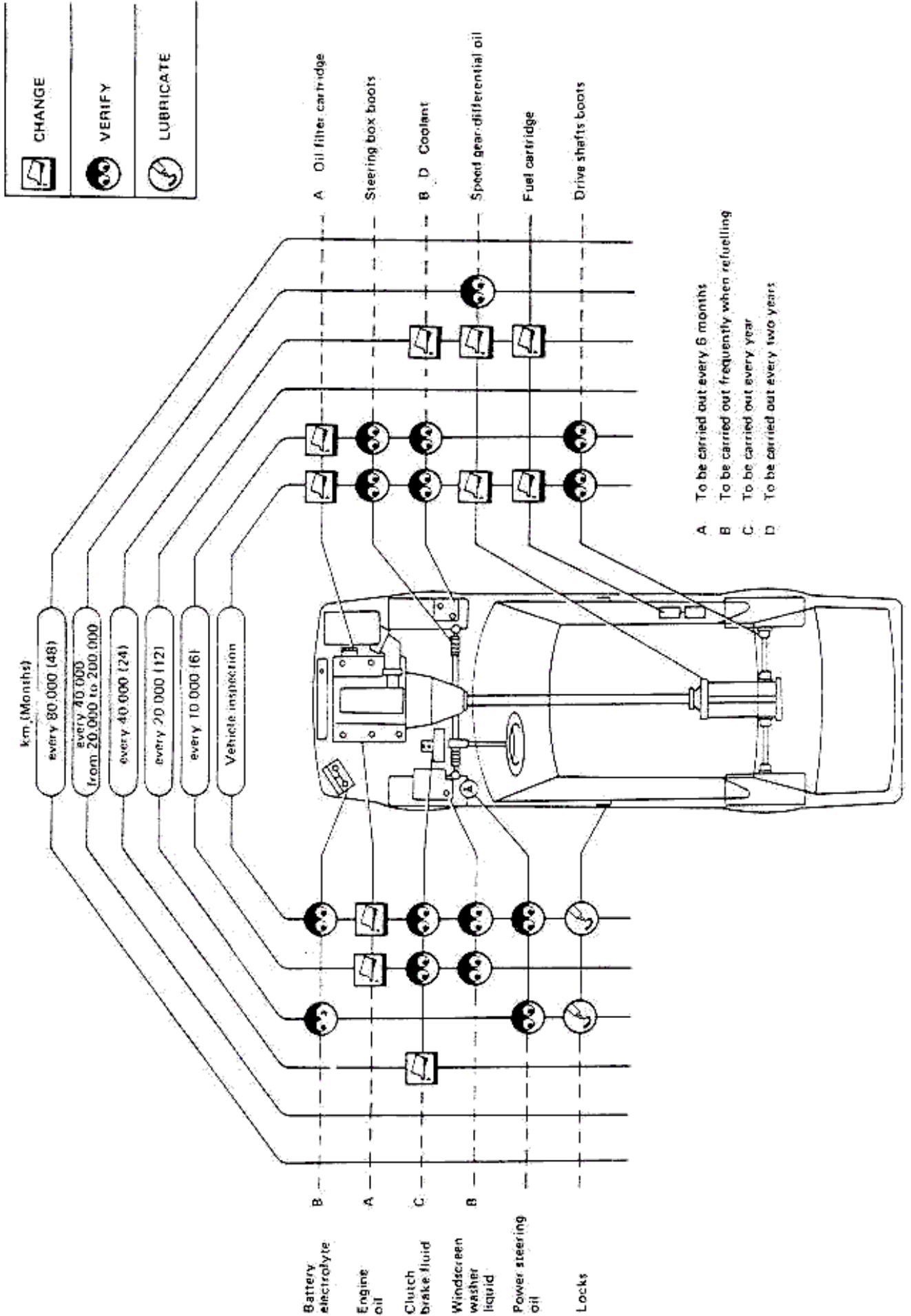
1. Identification label (identification number and type approval number)
2. Paint products label
3. — Label on luggage compartment floor (type approval number)
— engraved on sheet panel (serial number)
4. Label on engine block, left rear side (engine type and serial number)

VEHICLE MAINTENANCE SCHEDULE

(Except Switzerland, Sweden, Australia)

No.	OPERATION	A (1)	km/1000											Notes									
			10	20	30	40	50	60	70	80	90	100	110		120	130	140	150	160	170	180	190	200
1	Change engine oil and filter - check lubrication system tightness	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(2)
2	Change speed gear - differential oil	X			X																		
3	Check speed gear - differential oil level		X																		X		
4	Check (and top up if necessary) the level of windscreen washer/wiper and headlight washer liquid-verify the system functioning	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(3)
5	Check brake and clutch fluid levels	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
6	Change brake and clutch fluid				X																		
7	Check power steering oil level	X	X		X																		
8	Check antifreeze mixture level and verify cooling system tightness	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(3)
9	Change antifreeze mixture and verify cooling system tightness				X																		(5)
10	Check bolts and nuts tightening	X																					
11	Check front wheel toe-out, adjust if necessary	X																					
12	Check good conditions of drive shaft and steering box boots	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
13	Make sure of good conditions of power brake vacuum intake hose and check braking system	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14	Check brake pads wear degree - replace if necessary		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(6)
15	Check hand-brake travel - adjust if necessary	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
16	Check tyre pressure	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(3)
17	Check bolts, air intake and exhaust manifolds, oil-pan and front-cover retaining screws for proper tightening	X																					
18	Tightening of cylinder head nuts	X																					
19	Check accelerator cable - adjust if necessary	X																					
20	Check valve clearance and adjust if necessary. Check valve timing and make sure camshaft drive chain is properly stretched	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
21	Check good condition of alternator drive belt tensioning, air conditioner compressor, power steering pump - adjust if necessary	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

FLUIDS AND LUBRICANTS LAYOUT



RECOMMENDED FUEL AND LUBRICANTS


FLUIDS AND LUBRICANTS

As per the corresponding model except for the table referring to the types of oil employed which should be modified as follows:

Type	Application	Classification	Name			Notes
			AGIP	IP	Other	
OIL	Engine - 01	SAE S E ASTM S E API SF	Sint 2000 SAE 10W50	SINTIAX SAE 10W40		Ambient temperature —18 to 40°C (—0.4 to 104°F)
	Gearbox - Differential 13 - 17	SAE J 306 a API GL-5	Rotra SX SAE 75W90	Pontiac HDS SAE 75W90		Ambient temperature —40 to 150°C (—40 to 302°F)
	Front suspension - 21	SAE J 306 a API GL-5	Rotra SX SAE 75W90	Pontiac HDS SAE 75W90		Ambient temperature —40 to 150°C (—40 to 302°F)
	Steering box/wheel - 23	DEXRON B	ATF DEXRON B 11297	DEXRON FLUID B 11297		
	Air conditioner - 80				SUNISO 4 G SUNISO 5 DS	

APPROXIMATE REFILL CAPACITIES

(Except Switzerland, Sweden, Australia)

Approximate refill capacities		Model		
Fuel tank		l (Imp.gall)	49 (10.8)	
Fuel reserve		l (Imp.gall)	8 (1.76)	
Engine oil sump	kg (lb)	With filter	5 (11)	
		Without filter	4.5 (9.9)	
Camshaft support sumps (*)		kg (lb)	0.415 (0.91)	
Gearbox - differential oil		kg (lb)	2.05 (4.52)	
Power steering system oil		kg (lb)	0.8 (1.76)	
Coolant	Min T -30°C (-22°F)	Concentrated antifreeze	1 (Imp.gall)	1.2 (0.26)
		Distilled water	1 (Imp.gall)	6.8 (1.50)
		Antifreeze ready to use	1 (Imp.gall)	8 (1.76)
	Min T -45°C (-49°F)	Concentrated antifreeze	1 (Imp.gal)	2.65 (0.57)
		Distilled water	1 (Imp.gall)	5.35 (1.19)
		Antifreeze ready to use	1 (Imp.gall)	8 (1.76)

(*) Replacement to be carried out only in the case of disassembly. The indicated oil quantity is for reference only, fill the sumps up to capacity

ENGINE MAINTENANCE

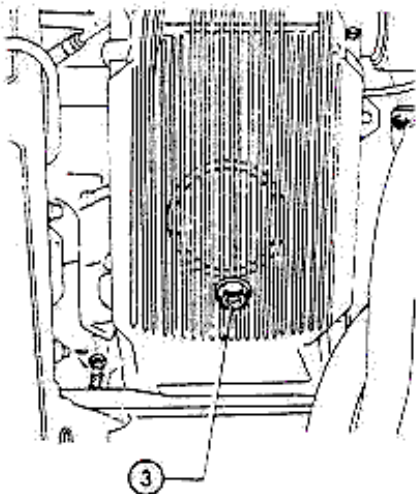
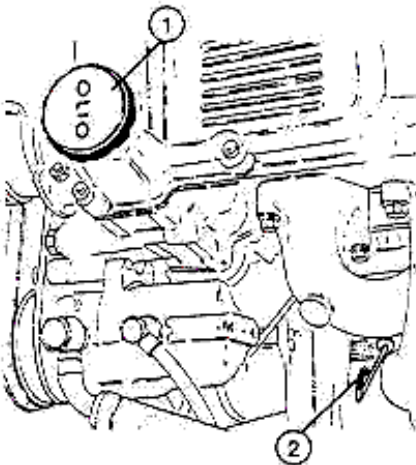
ENGINE MAIN MECHANICAL UNIT

REPLACEMENT ENGINE OIL AND OIL FILTER - CHECK OF LUBRICATION CIRCUIT TIGHTNESS

a. With the engine hot remove oil filler plug (1), extract the oil dipstick (2) and unscrew plug (3) from the oil sump. Let the oil drain completely for at least 15 minutes.

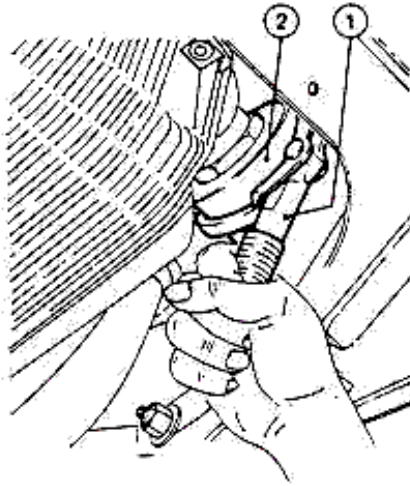
WARNING:

- A milky oil is caused by the leaking of coolant into the oil. Establish the causes and take corrective action.
- Excessively low oil viscosity is due to dilution by fuel.



1. Oil filler plug
2. Oil dipstick
3. Oil drain plug

b. Using the appropriate wrench (1) free filter (2). Remove it by working from under the vehicle.



1. Wrench
2. Oil filter

c. When all the oil has been drained clean and tighten the drain plug with its gasket on the oil sump.
 d. Moisten the gasket of the new filter with oil then tighten filter fully.
 e. Refill the engine with oil of the recommended type and quantity.

ENGINE OIL

Type: AGIP SINT 2000 10W50
 IP SINTIAX 10W40

Quantity	5.0 kg (11 lb)
Sump at max level	4.5 kg (9.9 lb)
Filter capacity	0.5 kg (1.1 lb)
Difference between max and min level on dipstick	1.150 kg (2.53 lb)
Cylinder head support sumps (*)	0.415 kg (0.914 lb)

(*) Refilling to be carried out for each support sump when disassembling.

f. Check oil level by means of the dipstick
 g. Re-insert filler plug and start the engine, letting it idle for about 2 minutes.
 h. Check for lubricant leaks. If necessary, replace or tighten any item with poor oil seal.

i. Switch off the engine and wait for a few minutes.
 j. Remove the dipstick and clean it; insert the dipstick again, remove it, and verify that oil level reaches the MAX reference mark.

CAUTION:

The oil level check is to be carried out with the vehicle parked on a level surface

TIGHTENING OF CYLINDER HEAD NUTS

1. During first freemaintenance

a. Remove the timing cover: procedure as per paragraph «Check and Adjustment of Valve Clearance» step 1.
 b. With engine cold rotate nuts one turn, one at a time, in the sequence indicated in the figure. Moisten the surfaces between washer and nut with oil and tighten to prescribed torque.

T: Tightening torque
 86 to 88 N·m
 (8.8 to 9 kg·m)
 63.4 to 64.9 ft·lb

c. Re-fit the timing cover by proceeding in the reverse order.

2. When reassembling the cylinder head

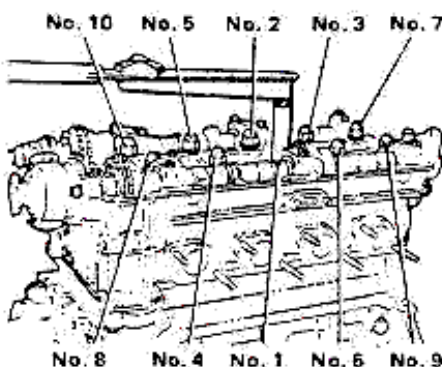
a. Lubricate washer, nut and threads with engine oil and, with engine cold, gradually tighten the nuts to the prescribed torque in the sequence indicated in the figure.

T: Tightening torque
 77 to 79 N·m
 (7.9 to 8.1 kg·m)
 56.8 to 58.3 ft·lb

b. Bring the engine to normal running temperature and tighten, without slackening, the nuts to the prescribed torque in the sequence shown in the figure.

T : Tightening torque
 82 to 89 N·m
 (8.4 to 8.5 kg·m
 60.5 to 61.2 ft·lb)

c. After about 1,000 km (621 mil.) proceed, with cold engine, as indicated in step 1.

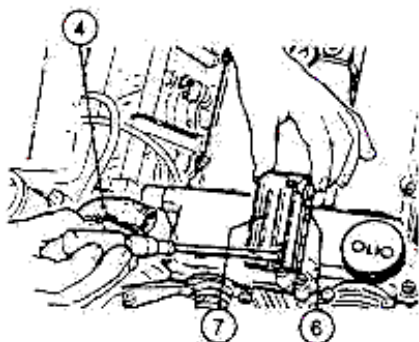
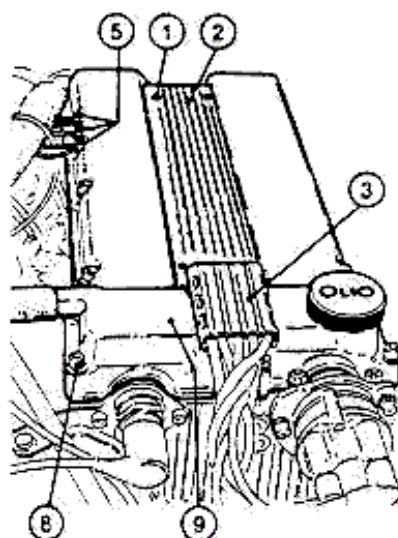


CHECK AND ADJUSTMENT OF VALVE CLEARANCE

The following operations must be carried out when the engine is cold.

1. Removal of timing cover

- Disconnect the negative battery terminal.
- Unscrew four screws (1) and remove spark plug cover (2).
- Remove spark plug cable connector plate (3) and disconnect the cables from the spark plugs.
- Disconnect oil vapour outlet hose (4) from the timing cover.
- Disconnect injection ground cables (5) removing the three retaining screws holding them to the timing cover.
- Unscrew screws (6) and remove spark plug cable housing (7).
- Unscrew thirteen screws (8) and remove timing cover (9) together with its gaskets and retaining half rings.

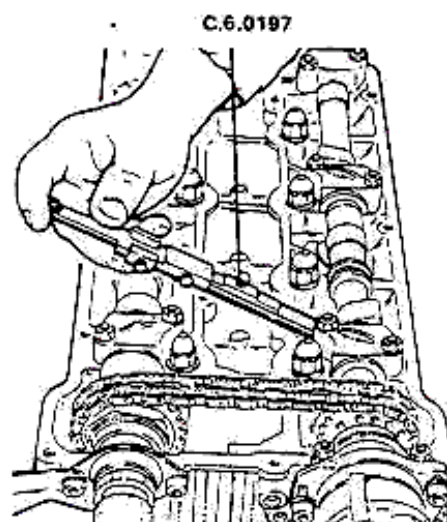


- Screws
- Spark plug cover
- Spark plug cable connector plate
- Oil vapour outlet hose
- Injection ground cables
- Screws
- Plug cable housing
- Screws
- Timing cover

2. Valve clearance measurement

- Clean the spark plug seats, remove the spark plugs and plug the holes to prevent the entry of any foreign matter.
- On a cold engine, use feeler gauge C.6.0197 to check that the clearance between the rest position radius of the cams and the top of the cups is within the prescribed range.

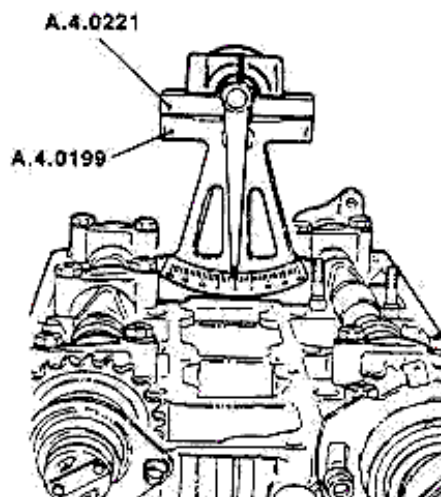
Valve clearance (on cold engine)	
Intake:	0.400 to 0.450 mm (0.0157 to 0.0177 in)
Exhaust:	0.450 to 0.500 mm (0.0177 to 0.0197 in)



c. If the clearance is not within the specified tolerances, proceed with adjustment as described in step 3 below.

3. Valve clearance adjustment

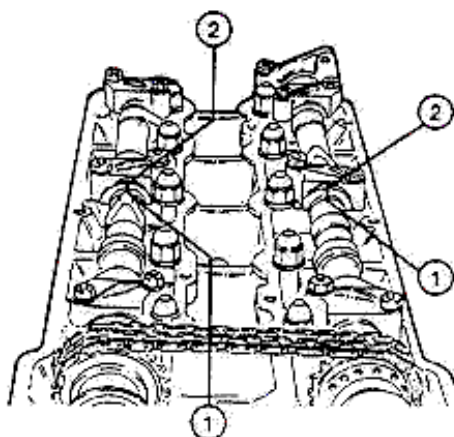
- Rotate the crankshaft until camshaft notches (1) are aligned with relevant cap notches (2).
- In order to make sure that the position of the cap notches is as required, remove the caps and measure the relevant angles using tool A.4.0199, with the special support A.4.0221.



Camshaft cap position angle

Intake camshaft cap:	+2°40'
exhaust camshaft cap:	-13°15'

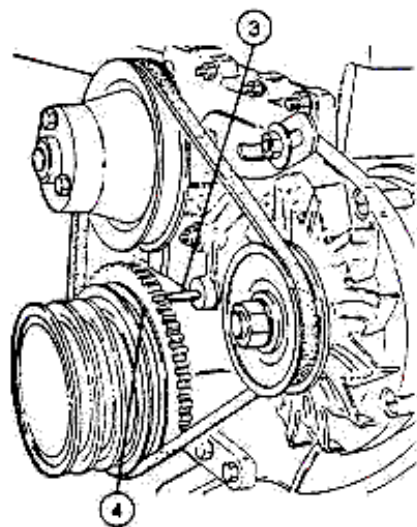
- Should the notch angle not correspond to the required value, correct this by cutting a new notch at the current angle on the cap.
- Replace the camshaft caps, rotate the crankshaft until the notches on the camshafts align with the new ones on the relative caps.



- 1. Camshaft notches
- 2. Cap notches

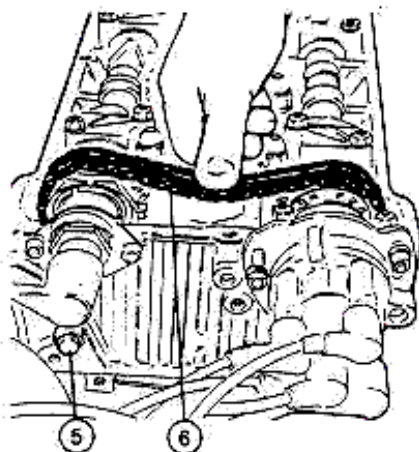
NOTE:

This position shall correspond to the alignment of fixed index mark (3) on the water pump and reference notch (4) marked on the crankshaft pulley (with piston no. 1 at T.D.C. during the explosion stroke).



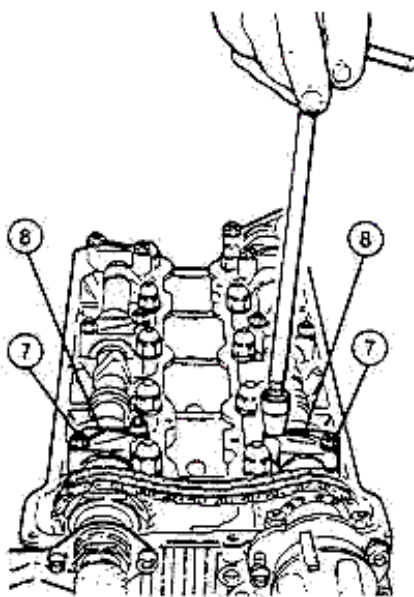
- 3. Fixed index mark
- 4. Pulley notch

- b. Slacken chain tightener securing screw (5).
- c. Compress camshaft drive chain (6) from top to bottom in order to overcome the chain-tightener spring tensile load. Lock the chain-tightener in this position.



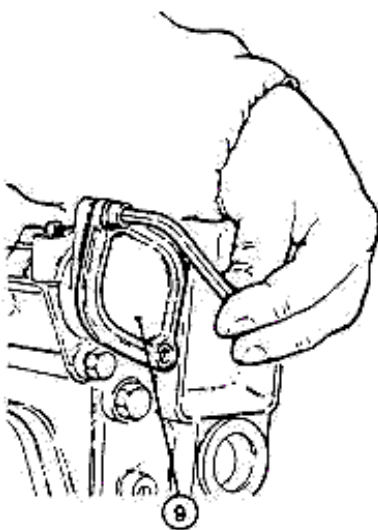
- 5. Chain-tightener securing screw
- 6. Camshaft drive chain

- d. Slacken nuts (7) and remove camshaft caps (8) taking care not to move the chain in relation to the gears.



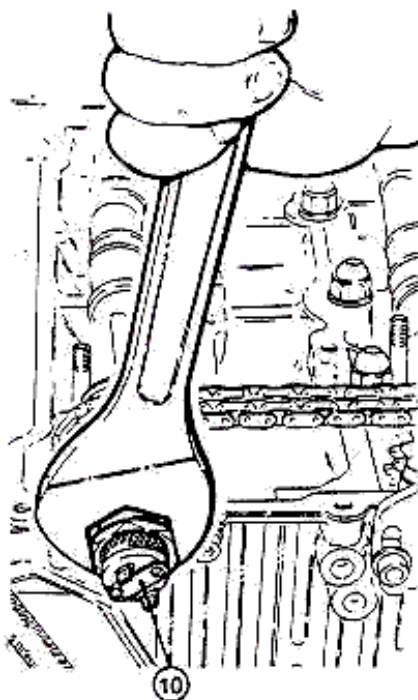
- 7. Cap securing nuts
- 8. Camshaft caps

- e. Remove rear cover (9) from the exhaust-side camshaft journal bearing.



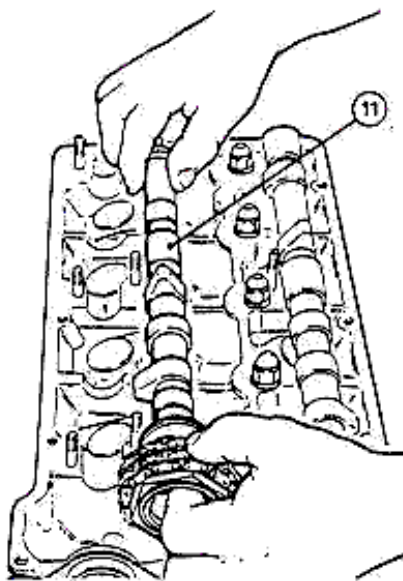
- 9. Rear cover

- f. Remove the rubber protection and disconnect the supply cables to timing-variator solenoid (10). Remove the solenoid by unscrewing it.



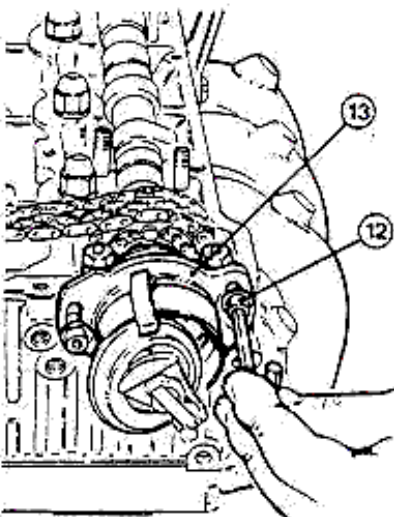
- 10. Timing-variator solenoid

g. Remove air-intake-side camshaft (11) together with its chain and place it on the central part of the head, taking care not to move the chain in relation to the gears.



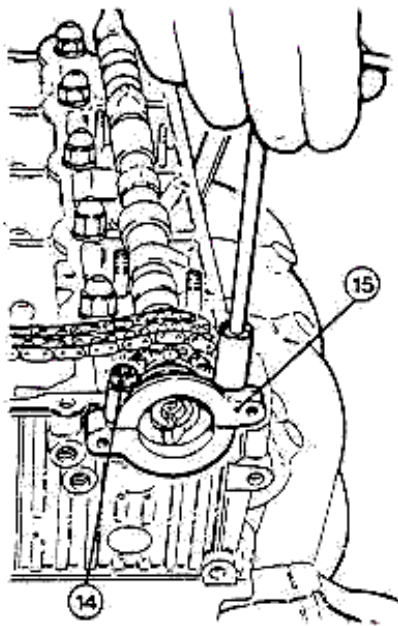
11. Air-intake-side camshaft

h. Unscrew retaining screws (12) and remove distributor (13).



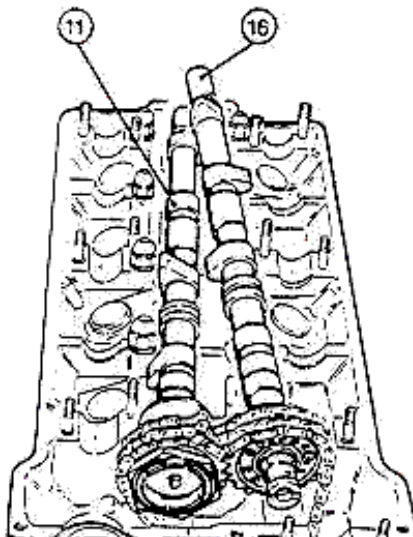
12. Distributor retaining screws
13. Distributor

i. Remove two bolts (14) and remove distributor support flange (15).



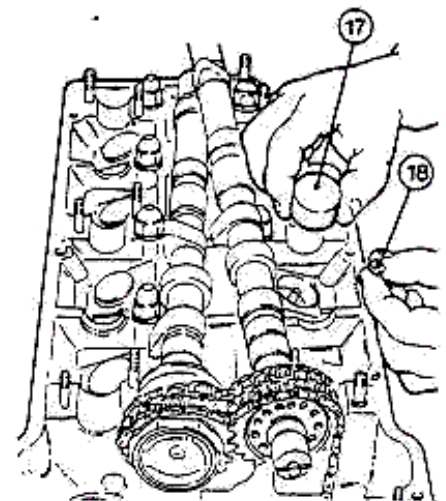
14. Flange securing bolts
15. Distributor support flange

j. Remove exhaust-side camshaft (16) together with its chain, place it on the central part of the head, taking care not to move the chain in relation to the gears.



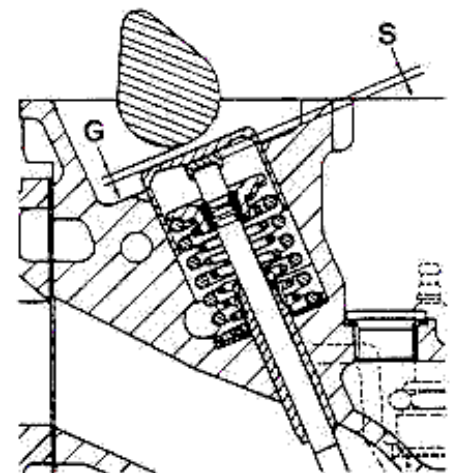
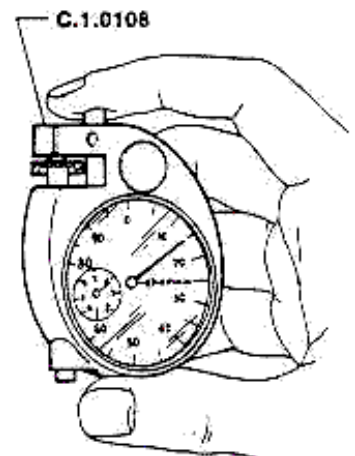
11. Air-intake-side camshaft
16. Exhaust-side camshaft

k. Withdraw valve cup (17) and valve-clearance adjusting pad (18).



17. Valve cup
18. Adjusting pad

l. Using feeler gauge C.1.0108, measure thickness S. Select a new properly thick pad. A range of 1.3 mm to 3.5 mm (0.051 to 0.138 in) thick pads [with increments of 0.025 mm (0.0010 in)] is available.

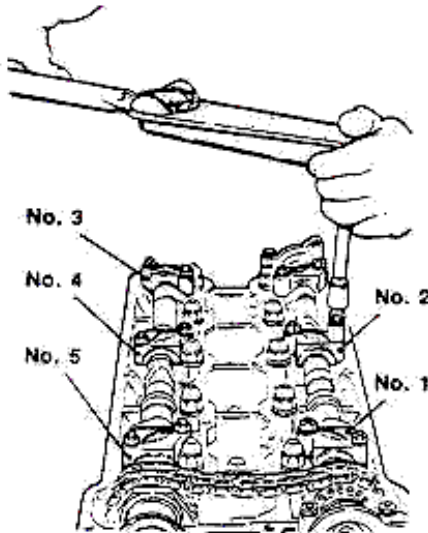


G. Valve clearance
S. Adjusting-pad thickness

m. Refit valve cup (after lubricating it with engine oil), camshafts and chain.

n. Refit the distributor support flange and the camshaft caps following the numbering marked on them.

T : Tightening torque
Nuts securing camshaft caps
(In oil)
20 to 25 N·m
(2.0 to 2.5 kg·m)
14.7 to 18.4 ft·lb)



o. Install rear cover (9) onto the exhaust-side camshaft journal bearing.
p. Install the timing variator solenoid on the support flange. The distance between timing variator control valve and the solenoid moving core must be 0.1 to 0.4 mm (0.004 to 0.016 in).
q. Tighten the locking nut to the prescribed torque

T : Tightening torque
Nut securing solenoid
12.7 to 14.7 N·m
(1.2 to 1.4 kg·m)
8.7 to 10.1 ft·lb)

r. Fit the ignition distributor without tightening its retaining screws.
s. Proceed to the tensioning of the chain, re-check valve clearance and then carry out distribution timing (see paragraph «Check of Timing System and Control Chain Tensioning».)
t. Carefully position the retaining half rings and the gaskets between the head and the timing cover.
u. Refit the timing cover proceeding in reverse order as against removal.

Tighten the timing cover securing screws to their correct torque:

T : Tighten torque for timing cover securing screws:
10 to 14 N·m
(1.0 to 1.4 kg·m)
7.4 to 10.3 ft·lb)

CHECK OF TIMING SYSTEM AND CONTROL CHAIN TENSIONING

1. Check of timing system control chain tensioning

a. Remove timing system cover (refer to: «Check and Adjustment of Valve Clearance» step 1.).
b. Loosen the chain tightener securing screw.
c. Engage the 5th speed, move vehicle forward and, keeping the chain stretched, lock the securing screw of chain tightener.
d. Carefully position the rear retaining half rings and the gaskets between the head and the timing cover.
e. Refit the timing cover proceeding in reverse order as against removal. Tighten the timing-cover securing bolts to the torque scheduled:

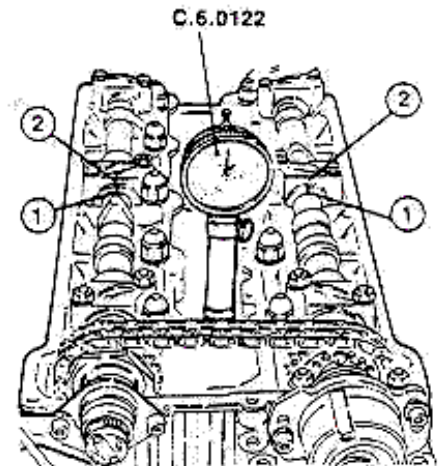
T : Tightening torque for timing-cover securing bolts
10 to 14 N·m
(1.0 to 1.4 kg·m)
7.4 to 10.3 ft·lb)

2. Distribution timing

The check shall be carried out with correct valve clearance and properly stretched camshaft control chain.

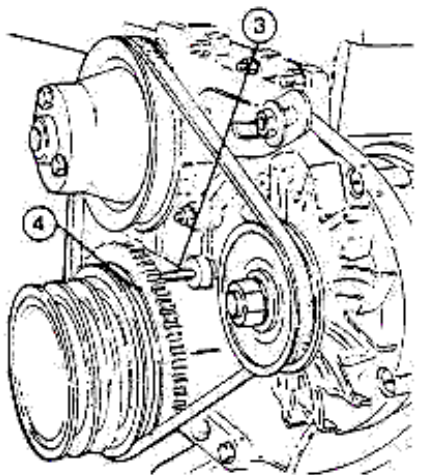
a. Remove the timing cover (see paragraph «Check and Adjustment of Valve Clearance» step 1.).
b. Clean the spark plug seat of the first cylinder, remove a spark plug and insert tool C.6.0122, fitted with comparator, into the spark plug support hole.
c. Engage the highest speed and move vehicle until comparator needle rotation inversion is detected (piston No. 1 at T.D.C. with valves closed).

d. Ensure that camshaft notches (1) are aligned with cap notches (2) when the cams of cylinder No. 1 are turned outwards. Checking the correct alignment of the cap notches refer to «Check and Adjustment of Valve Clearance», step 3.



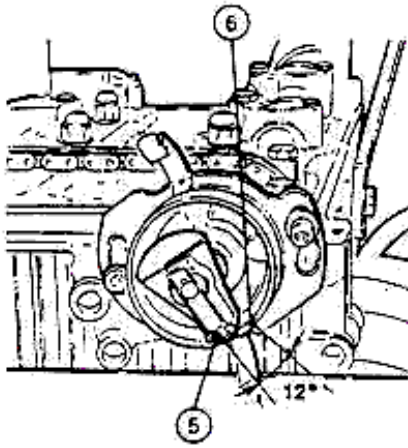
1: Camshaft notches
2: Cap notches

e. Make sure that fixed index mark (3) on the water pump and reference notch (4) marked on the crankshaft pulley and on the toothed wheel are aligned.



3: Fixed index mark
4: Crankshaft-pulley and toothed-wheel notch

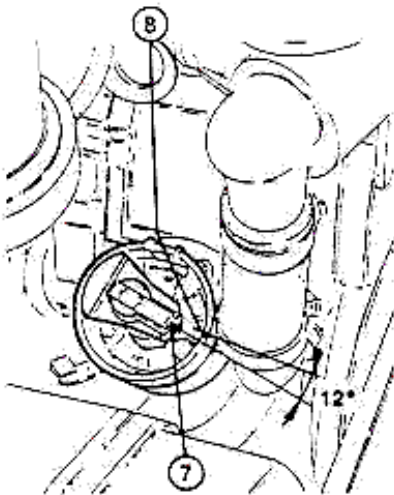
f. Ensure that centre line (5) of the ignition-distributor revolving brush on the cylinder head is correctly positioned as against distributor-skirt reference notch (6) as shown in the figure.



12° equal to a distance of
5 to 6 mm (0.20 to 0.24 in)

5. Centre line, distributor brush
6. Reference notch on distributor skirt

g. Ensure that centre line (7) of the ignition-distributor revolving brush on the front engine cover is correctly positioned as against reference notch (8) on the distributor skirt, as shown in the figure.



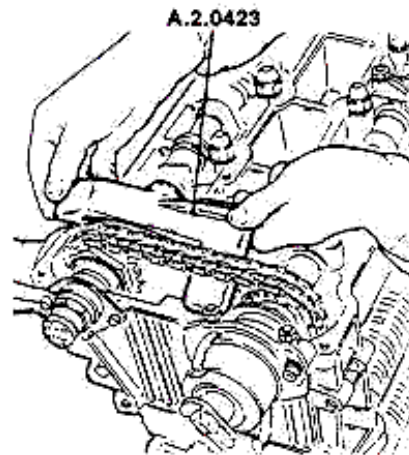
12° equal to a distance of
5 to 6 mm (0.20 to 0.24 in)

7. Centre line, distributor brush
8. Reference notch on distributor skirt

h. If the notches on the camshafts are not aligned with the notches on the relevant caps, proceed as follows:

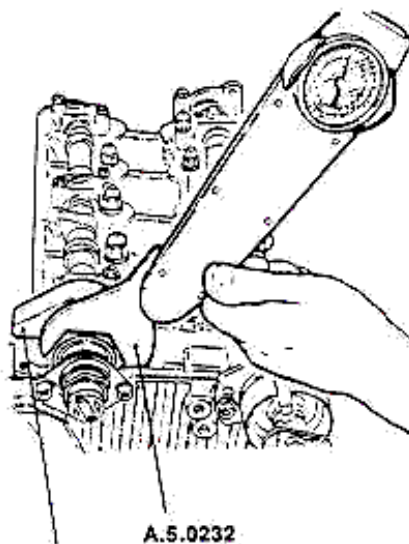
- i. Intake-side camshaft
1. Remove tool C.6.0122.

2. Insert highest speed and move vehicle in such a way as to be able to insert restraining tool A.2.0423 into the timing variator.



3. Using wrench A.5.0232, slacken timing-variator securing nut no further than 1/8 of a turn.

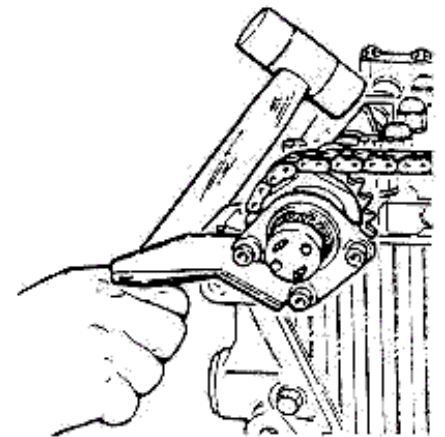
CAUTION:
Strictly stick to the above mentioned procedure to avoid disengaging the front dog clutch.



A.2.0423

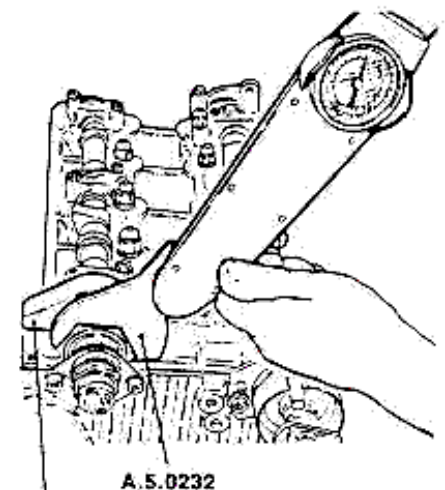
4. Free the camshaft, removing tool A.2.0423.
5. Return piston No. 1 to T.D.C. with valves closed (piston No. 1 cams pointing outwards).

6. Re-insert tool C.6.0122 into spark plug support hole in order to establish exact position of T.D.C.
7. Further unscrew the timing-variator securing nut previously slackened so that the gear is completely disengaged, from the front clutch.
8. Using a synthetic-resin mallet, rotate the camshaft in order to align the reference notches.



9. Tighten the nut to lock the gear on the front clutch.
10. Lock the timing variator using tool A.2.0423.
11. Tighten the nut using wrench A.5.0232 to the prescribed torque:
88 to 96 N·m
(8.8 to 9.6 kg·m)
64.9 to 70.6 ft·lb;

equal to:
(108 to 117 N·m)
(11 to 12 kg·m)
(79.6 to 86.3 ft·lb)
on nut axis.

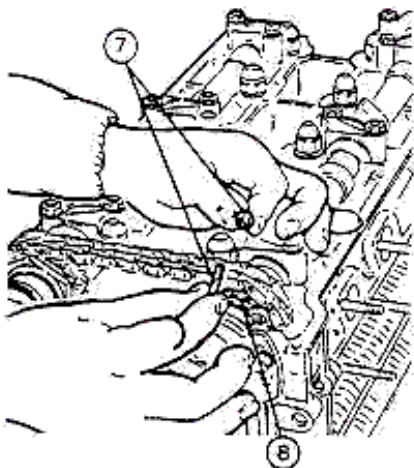


A.5.0232

12. Unlock timing variator, removing tool A.2.0423.

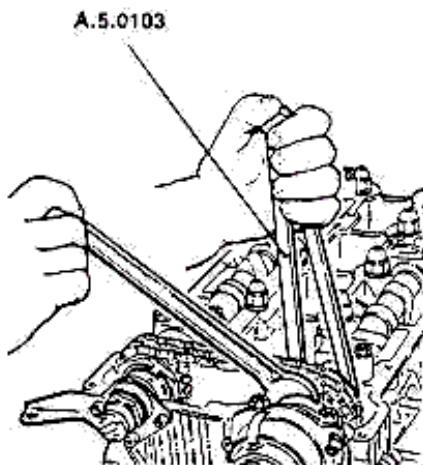
j. Exhaust-side camshaft

13. Remove bolt (7) securing gear (8) to camshaft sleeve.



7. Bolt
8. Camshaft gear

14. Raise the nut locking piece and using tool A.5.0103 as a locator, loosen the nut securing the gear to the camshaft.
15. Using tool A.5.0103, rotate camshaft without moving the chain, in order to align the reference notches.



16. Still using tool A.5.0103 as a locator, tighten the nut previously slackened.
17. Replace bolt (7) in the aligned holes of gear (8) and tighten it.
18. Fold down the nut lockin piece.
19. Ensure that the centre line of the di-

tributor revolving brush is positioned as per f. above; tighten the relative securing screws.

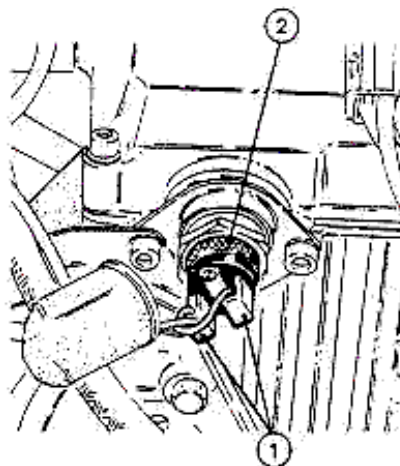
- k. Carefully position the retaining half rings and the gaskets between the head and the timing cover.

- l. Replace the timing cover, proceeding in reverse order as against removal. Tighten the nuts securing the timing cover to the prescribed torque:

T: Tightening torque for nuts securing timing cover
10 to 14 N·m
(1.0 to 1.4 kg·m
7.4 to 10.3 ft·lb)

CHECKING AND RESTORING THE TIMING VARIATOR FUNCTIONING

- a. Start the engine and run it at the idle r.p.m.
- b. Detach the solenoid (2) connectors (1) and connect the 12 V supply (battery) to pins of electromagnet itself; in these conditions, the engine should go off or, however, run unevenly.



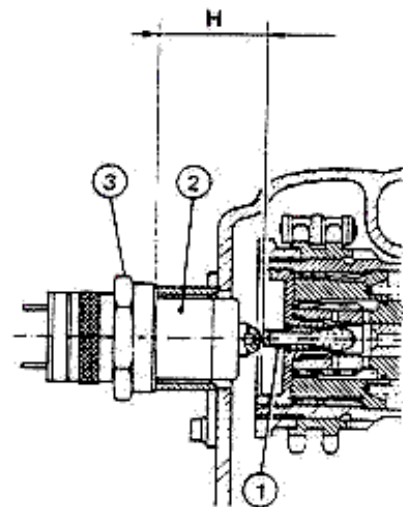
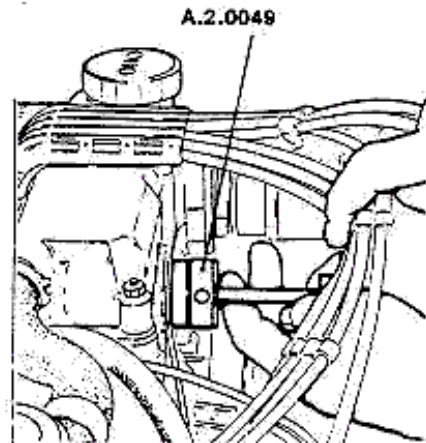
1. Connectors
2. Timing variator solenoid

- c. If so, the valve timing variator operation is to be considered as regular. If not so, proceed as follows.

d. **Adjustment of timing variator solenoid position**

1. Unscrew and remove the solenoid.
2. Using tool A.2.0049 measure distan-

ce «H» between timing variator control valve (1) and the outside edge of the solenoid support flange. Refer this value less 0.1 to 0.4 mm (0.004 to 0.016 in) to the solenoid in such a way that once installed, solenoid moving core (2) is at a distance of 0.4 mm (0.016 in) from the control valve of the timing variator.



1. Timing-variator control valve
2. Moving core
3. Solenoid securing nuts

3. Fit the solenoid, screwing it into the support flange (still keeping distance «H» unvaried) until securing nut (3) touches the support; tighten the nut.

T: Tightening torque
Nut securing solenoid
12.7 to 14.7 N·m
(1.2 to 1.4 kg·m
8.7 to 10.1 ft·lb)

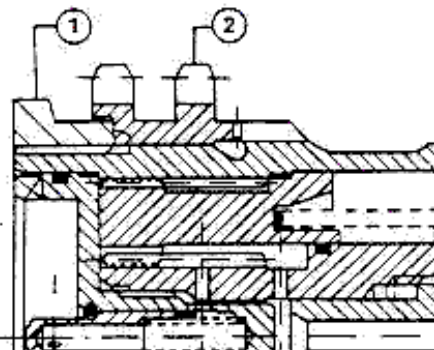
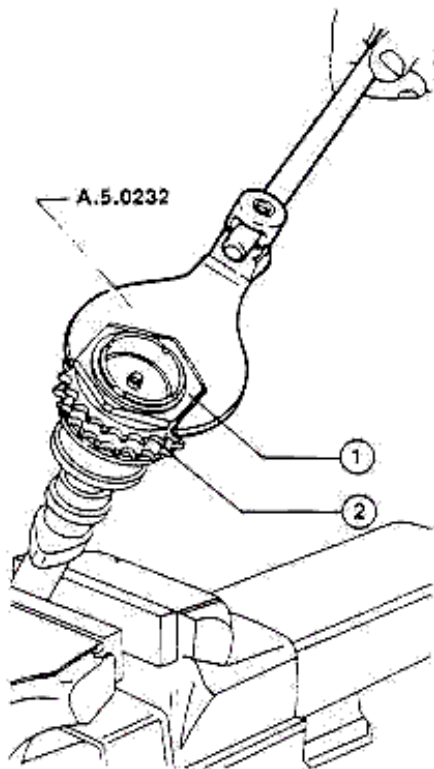
e. Remove the camshaft with timing variator, from cylinder head

1. Remove the timing system cover as described in «Check and Adjustment of Valve Clearance», step 1.

2. Disassemble the intake camshaft, operating as described in: «Check and Adjustment of Valve Clearance» step 3.

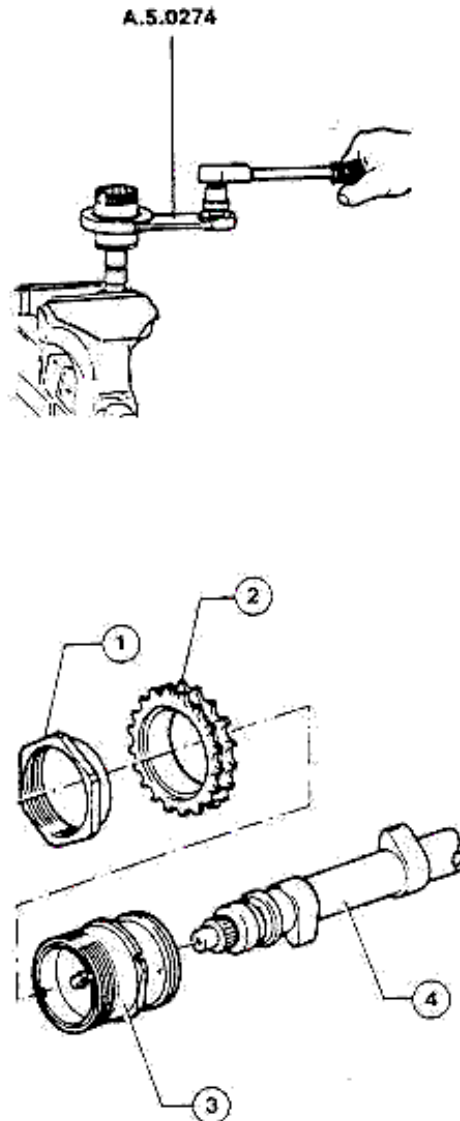
f. Remove the timing variator from camshaft

1. Block the camshaft on a vice fitted with protective jaws; use wrench A.5.0232, to unscrew nut (1); then remove gear (2)



- 1. Nut
- 2. Timing system chain gear

2. Always with camshaft clamped on a vice, and by means of wrench A.5.0274, unscrew the complete valve timing variator from camshaft.



- 1. Nut
- 2. Timing system chain gear
- 3. Timing variator
- 4. Camshaft

3. Move the control valve inwards, blow compressed air in the main duct and verify that timing variator rotates. If required, disassemble the valve timing variator.

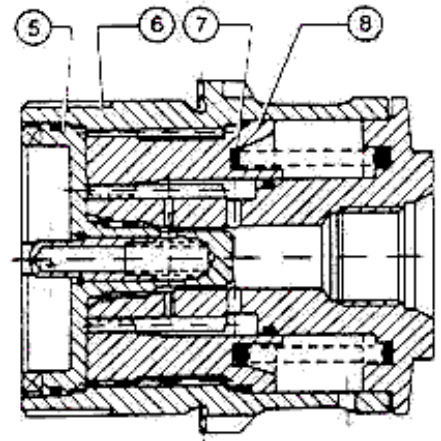
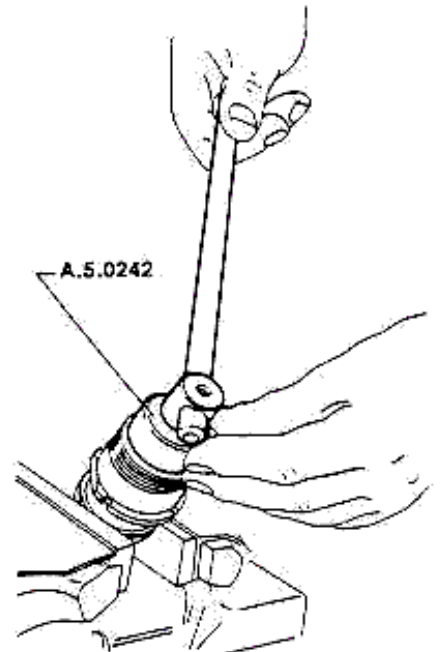
g. Disassemble the timing variator

1. Unscrew cover (5) by means of tool A.5.0242.

CAUTION:

The threading of the cover in object is «left-handed».

2. Withdraw sleeve (6), piston return spring (7), and piston (8).



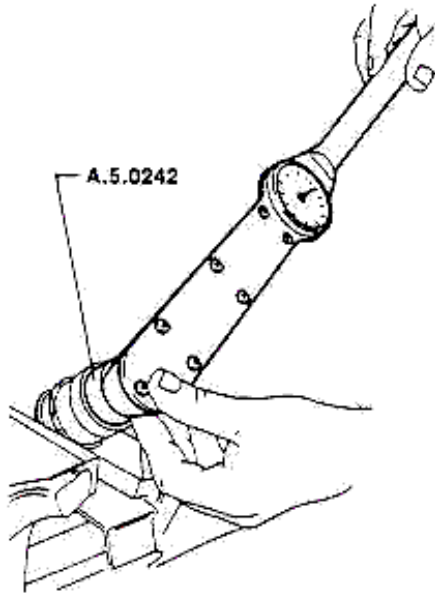
- 5. Cover
- 6. Sleeve
- 7. Spring
- 8. Piston

h. Check timing variator

- 1. Check that oil passage is not clogged.
- 2. Check efficiency of oil seal rings.

i. Reassemble the timing variator

1. Reassemble it installing piston and return spring.
2. Screw the left-handed threading cover and tighten it with the tool A.5.0242 to the prescribed torque 59 N·m (6 kg·m; 43 ft·lb).

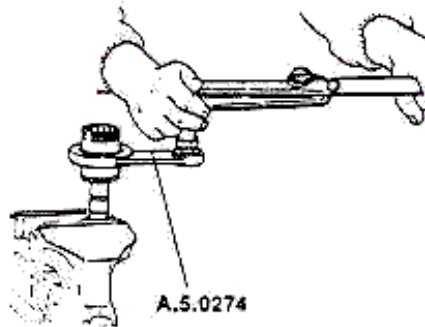


CAUTION:

Take care to prevent the sealing compound from obstructing the oil ducts.

2. By means of wrench A.5.0274, screw the valve timing variator on shaft and tighten to the prescribed torque 98 to 117 N·m (10 to 12 kg·m; 72 to 86 ft·lb).

Wait for about 6 hours before installing shaft on cylinder heads.

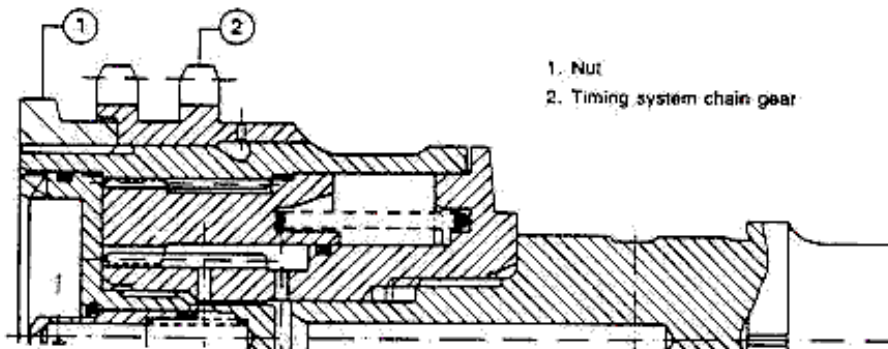


j. Install valve timing variator on camshaft

1. Lay a coat of Loctite sealing compound on camshaft threading.

CAUTION:

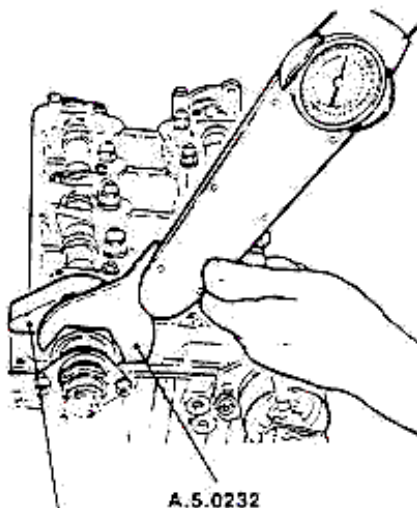
The nut is to be tightened so as to leave gear ② free.



k. Install camshaft, on head

1. Install the camshaft, complete with timing variator, on head, operating as described in: «Check and Adjustment of Valve Clearance».
2. Stretch the timing system control chain (refer to: «Check of Timing System and Control Chain Tensioning»); then tighten the gear until the coupling is tightly packed.
3. Lock timing variator by means of tool A.2.0423, tightening the nut to the prescribed torque 88 to 96 N·m (8.8 to 9.6 kg·m; 65 to 71 ft·lb) making use of wrench A.5.0232 corresponding to 108 to 117 N·m (11 to 12 kg·m; 79 to 88 ft·lb) on nut axis.

With the valve closed, the piston, under the oil pressure, performs the stroke [12.3 to 12.7 mm (0.48 to 0.50 in)] due to the helicoidal coupling, thus causing the camshaft to rotate clockwise by 14°45' to 15°15' approx.



A.2.0423

A.5.0232

l. Install the timing system cover

1. To carry out this operation, (refer to: «Check and Adjustment of Valve Clearance»).

CHECKING GOOD CONDITIONS, REPLACING AND ADJUSTING THE ALTERNATOR DRIVE BELT TENSIONING

1. Tensioning adjustment

The tensioning is correct when, applying 78 N (8 kg; 17.6 lb) load approx. in the

middle of belt, this deflects by 10 to 15 mm (0.40 to 0.60 in) approx.

To adjust the tensioning, unscrew nuts ① and ② on the adjusting arm, then loosen bolt ③.

Move the alternator away so as to increase the belt tensioning, and tighten nut ②, re-check the belt tensioning, then tighten bolt ③ and nut ①.

2. Belt replacement

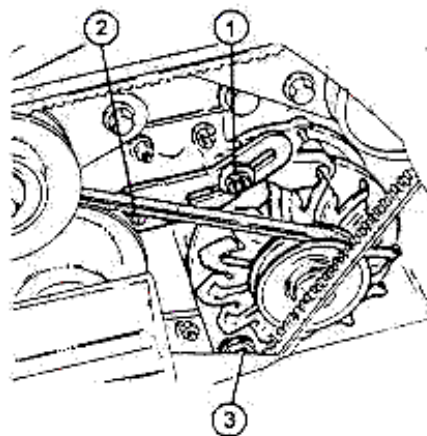
Remove the power steering pump drive belt and the conditioner compressor drive belt as described in the paragraphs below.

Loosen nuts ① and ② and bolt ③. Move the alternator inwards and remove the worn belt.

Fit the new belt over the three pulleys and adjust the alternator until the required tension value is obtained.

Tighten nut ② fully and check tension; tighten bolt ③ and nut ①.

Re-fit power steering pump drive belt and conditioner compressor drive belt as described in the paragraphs below.



1. Nut
2. Nut
3. Bolt

TENSION ADJUSTMENT AND REPLACEMENT OF POWER STEERING PUMP DRIVE BELT

1. Tension adjustment

The belt is properly stretched if it deflects by 13 mm (0.51 in) when a load of approx. 147 to 294 N (15 to 30 kg; 33 to 66 lb) is applied in the middle of the belt.

To adjust tension, slacken screws ① and ③ on front bracket ② of the tension pulley.

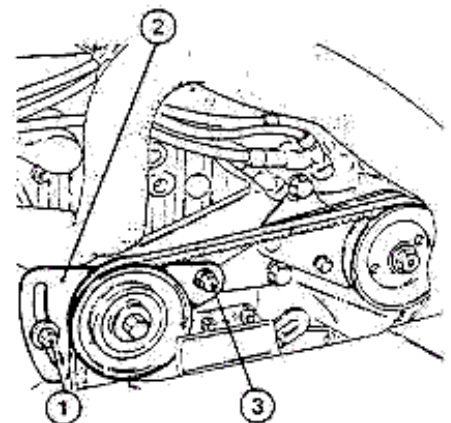
Move the bracket upwards in order to increase belt tension, then tighten screw ①. Re-check tension, then fully tighten screws ① and ③.

2. Belt replacement

Loosen screws ① and ③ and move tension pulley bracket ② downwards and remove the worn belt.

Fit the new belt over the three pulleys and adjust the tension pulley bracket in such a way as to obtain the required belt tension.

Fully tighten screw ①, re-check belt tension, then tighten screw ③.



1. Tension pulley bracket securing screw
2. Tension pulley bracket
3. Tension pulley bracket securing screw

TENSION ADJUSTMENT AND REPLACEMENT OF CONDITIONER COMPRESSOR DRIVE BELT

1. Tension adjustment

The belt is properly stretched if it deflects by 10 to 15 mm (0.40 to 0.60 in) when a load of approx. 78 N (8 kg; 17.6 lb) is applied in the middle of the belt.

To adjust tension, loosen bolts (2) in two slotted brackets (1), then remove bolt (4). Move the compressor outwards in order to increase belt tension and re-tighten bolts (2); re-check belt tension, then tighten bolt (4).

2. Belt replacement

Remove the power steering pump drive belt, as explained in the preceding paragraph.

Disconnect cooling-system liquid hose (3) and empty the system using a suitable container to collect the liquid.

Loosen bolts (2) in two brackets (1) and bolt (4), then move the compressor inwards and remove the worn belt.

Fit the new belt over the two pulleys and adjust the compressor in order to obtain the required tension value.

Fully tighten bolts (2); check belt tension and then tighten bolt (4).

Re-fit the power steering pump drive belt and adjust tension as described in the preceding paragraph.

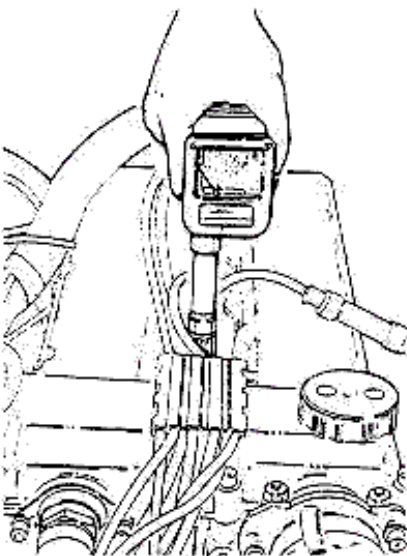
Reconnect cooling-system liquid hose (3) previously disconnected, and fill the system with liquid (quantity and type as per section «Engine Cooling», point 4.).

CHECK OF CYLINDER COMPRESSION

When checking poor engine performance because power is not up to normal, it is advisable to test cylinder compression using the related tester.

The check is to be carried out as follows:

- Start the engine and warm it up to the normal running temperature.
- Remove spark plugs.
- Disconnect the connectors from power modules and the connectors on the electro-injectors.
- Insert the compression test instrument in a spark plug seat.



- Crank the engine briefly, keeping the accelerator pedal fully pressed.

Check for leaks from pressure gauge union.

- Repeat the test to measure the compression value of the remaining cylinders taking care to reset the writing end of tester each time; then compare the values measured.

CAUTION:

If the difference between the pressure values measured in the cylinders is remarkable, identify the cause starting from the check of valve tightness and, if necessary, carrying out the check of compression rings.

FUEL SYSTEM

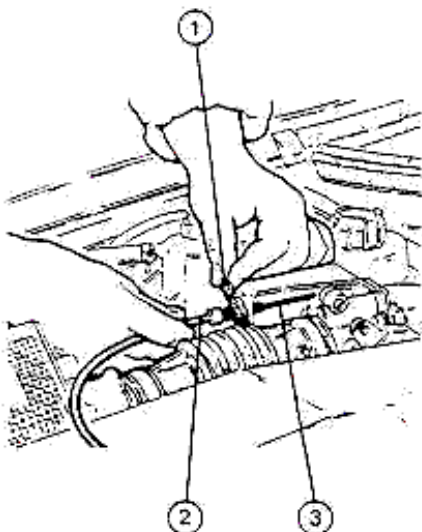
CHECK AND ADJUSTMENT OF ACCELERATOR CONTROL

1. Checking of cable sliding

Check that the control cable moves freely in its sheath.

2. Check of cable backlash

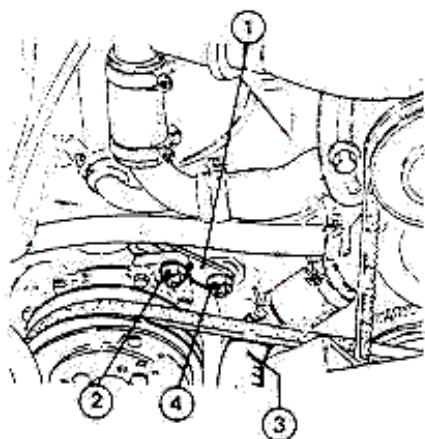
- With the accelerator pedal raised check that the accelerator cable end play on the control lever is 1 to 2 mm (0.04 to 0.08 in).
- If necessary, adjust the cable backlash by extracting the adjusting spring (1) and moving sheath (2) in order to produce the prescribed backlash on cable (3). Then re-insert the spring in the new position.



- Adjusting spring
- Accelerator cable sheath
- Accelerator cable

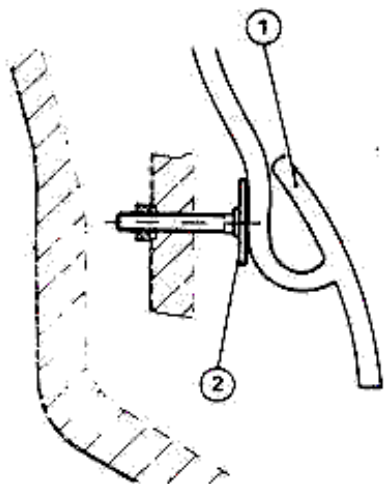
3. Check of throttle valve max opening

- With accelerator pedal fully depressed check that the accelerator control cam can still rotate 1 to 2 mm (0.04 to 0.08 in).



- Bracket
- Bracket securing bolt
- Cooling system hose
- Securing bolt for conditioner support cradle

b. If necessary proceed with the adjustment by means of end of travel screw (2) under accelerator pedal (1).



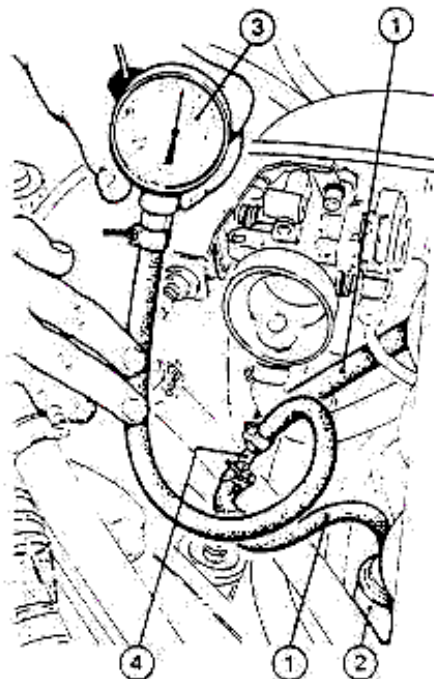
1. Accelerator pedal
2. End of travel screw

CHECK OF FUEL SYSTEM PRESSURE AND SYSTEM TIGHTNESS

1. Check of fuel system pressure

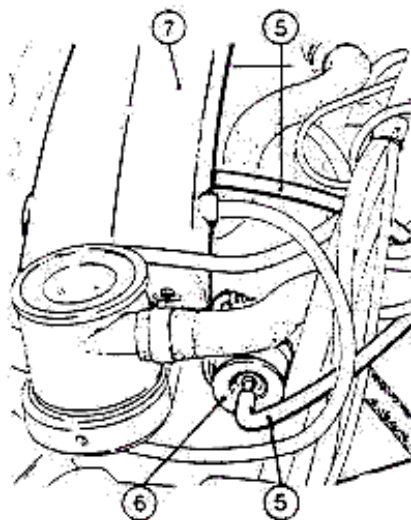
Check as follows:

a. Connect a pressure gauge (3) by means of a T adaptor (4) between fuel supply hose (1) and hammering damper (2).



1. Fuel delivery hose
2. Damper
3. Pressure gauge
4. «T» adaptor

b. Disconnect hose (5) which connects pressure regulator (6) to intake air box (7) in order to prevent any idle-speed irregularities from causing irregular readings.



5. Hose
6. Pressure regulator
7. Intake air box

c. Start the engine. With the engine idling check that the fuel pressure shown on

the gauge is as prescribed:

Fuel pressure
284.3 to 323.6 kPa
(2.8 to 3.2 bar; 2.9 to 3.3 kg/cm²;
41.2 to 46.9 psi)

d. Re-connect hose (5) to intake air box (7). At idle speed fuel pressure must fall by about 0.5 bar (7.3 psi) and then rise again when the throttle valve is opened. If this does not happen, look for possible leaks from hose (5).

2. Checking system tightness

a. With the pressure gauge still connected and with the engine idling choke hose immediately downstream of pressure regulator (6).

Measure the increase of the pressure up to 4 bar (58 psi) (ensure that the pressure does not exceed it).

b. At a pressure of 4 bar (58 psi) check that the fuel supply unions and hoses have no leaks.

c. If the pressure does not reach 4 bar (58 psi) and there are no leaks check the filter and/or the functioning of the fuel pump.

CHECK OF AIR-SYSTEM INTAKE DUCTS FOR TIGHTNESS

- Start the engine and keep it idling.
- Apply soap solution with a brush to the duct joins downstream of the air flow meter.
- Verify that the solution is not sucked into the ducts, with consequent variation of the engine revs.
- If this does not happen tighten the relative clamps and, if necessary, locate and replace the faulty part.

CHECK, CLEANING AND REPLACEMENT OF AIR FILTER CARTRIDGE

a. Release the clips (1) which secure filter cover (2) to container.

b. Lift cover enough to remove cartridge (3) without damaging the surrounding components.

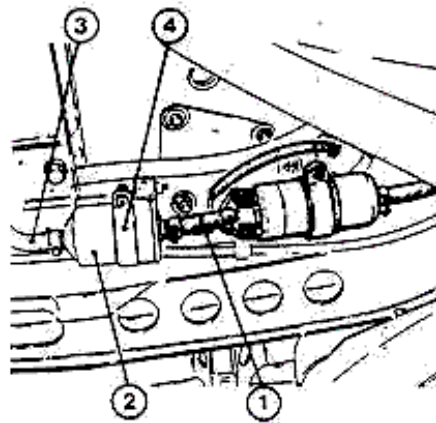
c. Clean filter container (4).

d. Clean the cartridge thoroughly blowing low pressure compressed air from cartridge lower side.

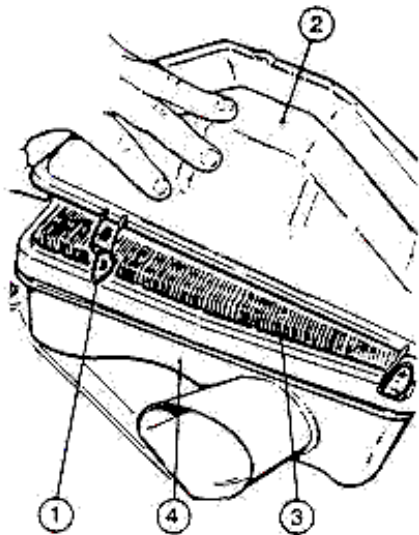
e. Insert the cartridge into container, positioning it with the «top» writing upwards.

f. Refit the filter cover (2) and tighten it with the related clips (1).

Replace the cartridge periodically (refer to: Vehicle Maintenance Schedule).



1. Fuel delivery hose
2. Fuel filter
3. Fuel outlet hose
4. Filter support clamp



1. Clips
2. Cover
3. Cartridge
4. Container

REPLACEMENT OF FUEL FILTER

a. Working from underneath the vehicle, clip hoses (1) and (3).

b. Loosen the clamps and disconnect hoses (1) and (3) from filter (2).

c. Loosen support clamp (4) and remove the filter.

d. Install the new filter, paying attention that the arrow marked on the body faces the fuel delivery direction.

e. After fitting, remove the clips from the fuel supply hoses.

CHECK AND ADJUSTMENT OF EXHAUST EMISSIONS

The check must be carried out with the engine at normal running temperature (after the electric fan has been turned on and off) and whilst running at idle speed.

NOTE:

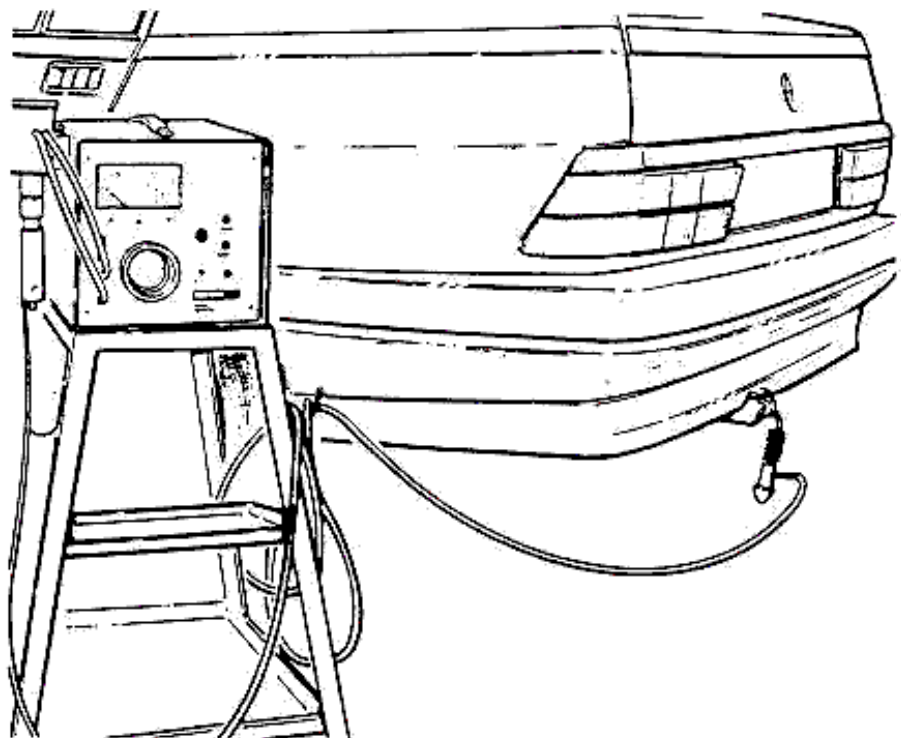
If idle speed is not 800 ± 50 r.p.m., before adjusting CO level check the idle-speed actuator.

Also the following preliminary checks are to be carried out:

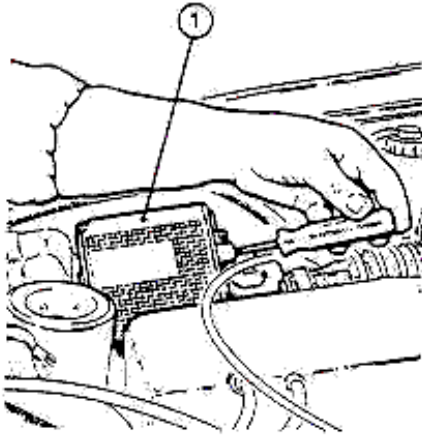
- Check of engine oil level
- Cleaning of air filter cartridge
- Check of ignition system efficiency
- Ignition timing

a. Insert tester probe into the fan pipe; the carbon monoxide percentage (CO%), read on tester, shall be within the prescribed values.

% CO = 0.4 to 1.0



- b. If the CO percentage is not within the specific range, operate on the air flow gauge (1) removing the sealing cap in order to reach adjusting screw.



1. Air flow gauge

- c. Operate on the adjusting screw, keeping the idle r.p.m. constant, according to the following indications:

- when tightening, the CO% increases;
- when loosening, the CO% decreases.

- d. Verify, on tester, that the HC value does not exceed the prescribed value

$$\text{HC} \leq 350 \text{ p.p.m.}$$

- e. Verify that idle r.p.m. not exceed the prescribed value of 800 ± 50 r.p.m..
f. After adjusting insert a new sealing cap.

ENGINE IGNITION

CHECK OF IGNITION TIMING

CAUTION:

Checking of idle r.p.m. timing, must be carried out with the utmost care; a correct timing in fact, is the most important factor as far as the emission levels are concerned.

- a. Connect the stroboscopic gun to the terminal relative to the spark plug of cylinder n. 1 on the respective distributor. Connect the positive and negative cables of the stroboscopic gun to the relative terminals of the battery.
- b. Connect an electronic rev counter to the engine.
- c. Run the engine to normal running temperature and, at the idle r.p.m. (800 ± 50 r.p.m.), check that notch marked on engine pulley is aligned with the fixed reference index on water pump.

Fixed advance

$$10^\circ \pm 1^\circ \text{ before T.D.C.};$$

Closely comply with the idle r.p.m. (800 ± 50 r.p.m.)

CAUTION:

The system does not require or allow any adjustment of spark advance. Do not rotate ignition distributor. If it is rotated, in fact, the firing order could be modified, thus causing very serious consequences.

Should the check of ignition distributor alignment be required, refer to the «WORKSHOP MANUAL - Engines - Group 05 - Installation of Ignition Distributor on vehicle».

CHECK, CLEANING AND/OR REPLACEMENT OF SPARK PLUGS; FIRING ORDER

1. Check

- The original spark plugs are of the surface discharge type, with four points and central electrode; no adjustment of the distance between electrodes is required by this type of spark plugs.

- Use of spark plugs having different features or dimensions, can cause serious engine damage and alter emission levels.
- Clean and replace the spark plugs periodically, according to the routine checks contained in the: «Vehicle Maintenance Schedule».
- If the ceramic insulator is cracked, or electrodes are too worn, replace the spark plugs.

2. Replacement

- a. On cold engine, roll up the rubber cap, remove cables, blow compressed air in the spark plug seats in order to remove any impurities; then remove the spark plugs.
- b. Lubricate the threading with grease ISECO Mollkote A, and tighten the spark plugs to:

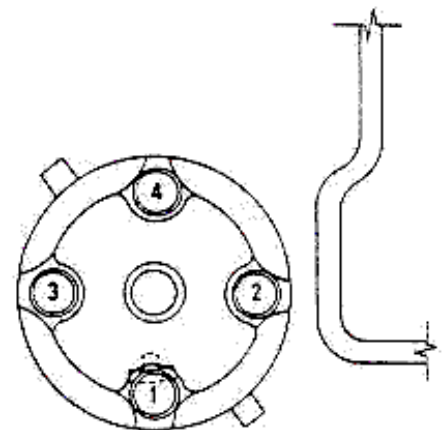
$$25 \text{ to } 34 \text{ N-m} \\ (2.5 \text{ to } 3.5 \text{ kg-m; } 18.4 \text{ to } 25 \text{ ft-lb})$$

- c. Check for good mechanical and electrical connection between spark plug cables and coupling.
- d. If in doubt, slide the rubber cap along cable, tighten the coupling fully, and refit rubber cap above coupling. Connect coupling to the spark plug.

CAUTION:

The spark plug cables are to be reconnected according to firing order.

Firing order: 1-3-4-2.



ENGINE COOLING

CHECK OF ANTIFREEZE MIXTURE LEVEL AND COOLING SYSTEM TIGHTNESS CHECK

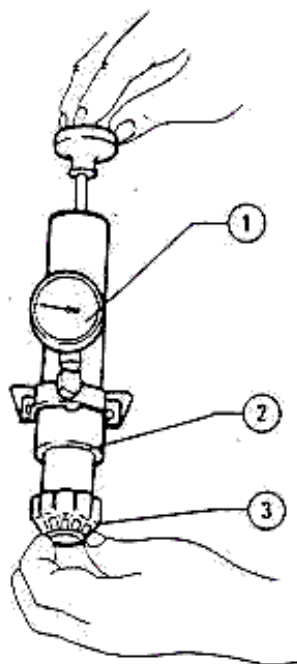
1. System check

- Verify that the coolant level in the filler tank is within the MAX and MIN reference marks.
- Check for good conditions and leaks in the sleeves and piping.
- Check the filler tank plug, verifying that springs, gasket and valves are in good conditions.
- Test the electric fan functioning.
 - Detach the two cables of thermal switch on radiator, and shortcircuit them.
 - Turn the ignition key and verify that electric fan starts.
- Check radiator referring to Group 07 - Radiator in the «WORKSHOP MANUAL - engines».
- Should considerable amounts of coolant be required, identify any possible leaks in the cooling system in order to eliminate them.

2. Tightness test of the pressurized cap

- Apply the suitable union (2) to tester and insert it on the pressurized plug.
- Pressurize the plug and verify, on tester that, when pressurizing to the setting pressure, the relief valve opens.

Plug setting pressure
68,6 kPa
 (0.69 bar; 0.7 kg/cm²; 99 psi)

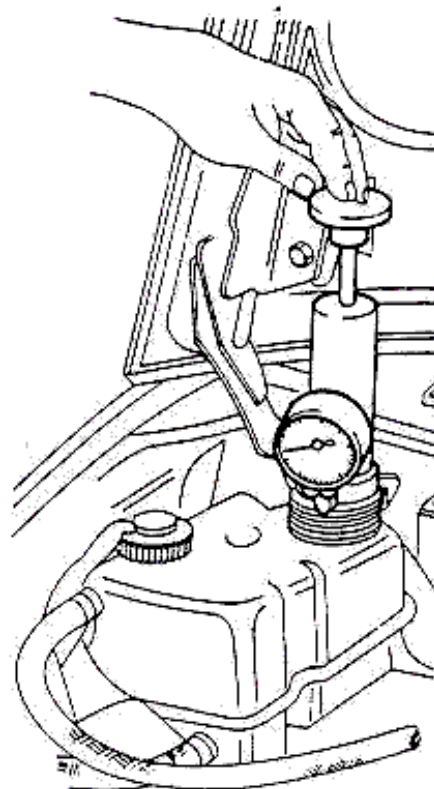


- Tester
- Union
- Plug

3. Tightness test of hydraulic system

- Unscrew the pressurized plug of header tank.
- Apply the hydraulic system tester to header tank union.
- Pressurize the system and verify, on tester, that pressure is within the prescribed value.

Hydraulic system
 test pressure
107,9 kPa
 (1.08 bar; 1.1 kg/cm²; 15.65 psi)



4. System refill

Drain the system, then refill it with the following quantity and quality of fluid:

Min. external temperature	°C (°F)	-30° (-22°)	-45° (-49°)
Concentrated antifreeze	l (Imp.gall)	1,2 (0.26)	2,65 (0.58)
Std. N. 3681-69956			
Delution distilled water	l (Imp.gall)	6,8 (1.5)	5,35 (1.18)
Antifreeze ready to use	l (Imp.gall)	6 (1.8)	— (—)
Std. N. 3681-69958			

To increase the antifreeze protection from -30° to -45°C (-22° to -49°F) without draining the whole system, replace 2 l (0.44 Imp.gall) mixture with as many liters of specific concentrated antifreeze product.

CAUTION:

Products harmful to paint.
 Avoid contact with painted surfaces.

Refilling is to be carried out through tank filler, complying with the following indications:

- a. Set the heater control knob to the «fully open» position.
- b. Fill the system until reaching the max index of header tank.
- c. Run the engine to the normal running temperature, so that the residuous air contained in the system flows through thermostat opening.
- d. On cold engine, top-up up to the level corresponding to the max index of header tank.
- e. Refit tank plug.

MAINTENANCE OF MECHANICAL COMPONENTS AND BODY

As per **Alfa 75** except:

CHECK OF VEHICLE HEIGHT

As per **Alfa 75** except:

FRONT HEIGHT

Front height value

$$B - A = 44 \pm 5 \text{ mm (1.73} \pm 0.2 \text{ in)}$$

The difference between the right suspension and the left suspension must not exceed 5 mm (0.2 in).

REAR HEIGHT

Rear height value

$$T = x - y = 83 \pm 5 \text{ mm (3.27} \pm 0.2 \text{ in)}$$

$$C = y - z = 13 \pm 5 \text{ mm (0.51} \pm 0.2 \text{ in)}$$

WHEEL ALIGNMENT

CHECK OF FRONT WHEELS ALIGNMENT

As per **Alfa 75** except:

1. Toe-out

Toe-out value

E - D mm (in)	Angle α	Rim diameter mm (in)
2 ± 1 (0.08 \pm 0.04)	9°	365 (14.37)

Also the following condition related to tie rod length equality is to be verified:

$$G = H$$

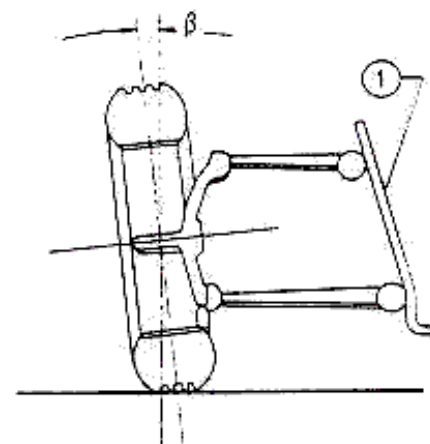
2. Camber angle

Checking is to be performed on both wheels.

$$\beta = -30' \pm 30'$$

The max difference between right and left wheel must be 40'.

The camber value varies by 15', when adding or removing one shim (1).



1. Shim

3. Caster angle

Checking is to be performed on both wheels.

$$\gamma = 4^{\circ}30' \pm 30'$$

The max difference between right and left wheel must be 20'.

FRONT AND REAR BRAKES

As per **Alfa 75** except:

FRONT BRAKES

Discs thickness wear limit

$$S = 20 \text{ mm (0.787 in)}$$



REAR BRAKES

Discs thickness wear limit

$$S = 8 \text{ mm (0.315 in)}$$



BODY

As per **Alfa 75** except:

SEAT BELTS

T: Tightening torque

Seat belt screws

28 to 48 N·m

(2.8 to 4.8 kg·m)


20.25 to 34.71 ft·lb)

SERVICE DATA AND SPECIFICATIONS


ENGINE MAINTENANCE

TECHNICAL DATA — CHECKS AND ADJUSTMENTS


Engine unit

		Model	
Inspection data			
Valve clearance (cold engine)	Intake	mm (in)	0.400 to 0.450 (0.0157 to 0.0177)
	Exhaust	mm (in)	0.450 to 0.500 (0.0177 to 0.0197)
Alternator - pump belt tensioning	Force applied to belt	N (kg; lb)	78 (8; 17.6)
	Arrow	mm (in)	10 to 15 (0.40 to 0.60)
Air conditioner compressor belt tensioning (if installed)	Force applied to belt	N (kg; lb)	78 (8; 17.6)
	Arrow	mm (in)	10 to 15 (0.40 to 0.60)
Power steering pump belt tension	Force applied to belt	N (kg; lb)	147 to 294 (15 to 30; 33 to 66)
	Arrow	mm (in)	13 (0.51)

Cooling system


		Model	
Test pressure			
Pressurized cap adjustment	kPa		68.6
	bar		0.69
	kg/cm ²		0.7
	p.s.i.		9.95
Hydraulic system	kPa		107.9
	bar		1.08
	kg/cm ²		1.1
	p.s.i.		15.6

Ignition

		Model	
Timing			
Static advance	r.p.m.		800 ± 50
	advance degrees		10° ± 1° (1)
Firing order			1 - 3 - 4 - 2

(1) Before T.D.C.

Fuel system

	Model	
Inspection data		
Engine idle r.p.m. (speed gear into neutral - clutch engaged)	r.p.m.	800 ± 50
Exhaust CO percentage with idle r.p.m.	% in vol.	0.4 to 1.0
Exhaust HC values idle r.p.m.	p.p.m.	≤ 350
Fuel delivery pressure (1)	kPa	284.3 to 323.6
	bar	2.8 to 3.2
	kg/cm ²	2.9 to 3.3
	p.s.i.	41.2 to 46.9
Fuel system tightness test pressure	kPa	402
	bar	4.0
	kg/cm ²	4.1
	p.s.i.	58

(1) Fuel delivery pressure at engine idle r.p.m. (800 ± 50 r.p.m.)

FLUIDS AND LUBRICANTS


Refer to: Fluids and Lubricants Layout - Recommended Fuel and Lubricants - Approximate Refill Capacities.

WHEELS AND TYRES

As regards tyre pressure, refer to paragraph "Tyres".

TIGHTENING TORQUES

Unit: N·m (kg·m; ft·lb)

	Model	
Item		
TIGHTENING OF CYLINDER HEAD NUTS (1)		
A) On reassembly		
1 - cold engine (1)		77 to 79 (7.9 to 8.1; 56.8 to 58.3)
2 - hot engine		62 to 63 (6.4 to 6.5; 60.5 to 61.2)
B) After 1,000 km (621 mil)		
- cold engine (1)		86 to 88 (8.8 to 9; 63.4 to 64.9)
Nuts securing camshaft caps (1)		20 to 25 (2.0 to 2.5; 14.7 to 18.4)
Spark plugs tightening (2)		25 to 34 (2.5 to 3.5; 18.4 to 25)
Screws securing cylinder head cover		10 to 14 (1.0 to 1.4; 7.4 to 10.3)
Nut securing timing vanator solenoid		12.7 to 14.7 (1.2 to 1.4; 6.7 to 10.1)
Water temperature sender on air-intake manifold		34 to 39 (3.5 to 4; 25.3 to 28.9)

(1) During first free maintenance operation, operate as per step B


(1) In oil

(2) In oil ISECO: Molykote A

MAINTENANCE OF MECHANICAL COMPONENTS AND BODY

TECHNICAL DATA – CHECKS AND ADJUSTMENTS


Axles and suspensions

Inspection data		Model	
Vehicle static load diagram (1)			$A + B = 490 + 245 = 735 \text{ N}$ ($50 + 25 = 75 \text{ kg}$; $110 + 55 = 165 \text{ lb}$)
Height	Front	mm (in)	$E = B - A = 44 \pm 5 (1.73 \pm 0.19)$
	Rear	mm (in)	$C = 13 \pm 5 (0.51 \pm 0.19)$ $T = 83 \pm 5 (3.27 \pm 0.19)$
Front toe-out (2)		mm (in)	$E - D = 2 \pm 1 (0.078 \pm 0.039)$ $\alpha = 8'$
Front toe-out angle			
Wheel rim diameter		mm (in)	$\emptyset = 365 (14.37)$
Rear toe-in angle			$\alpha = 0^\circ \pm 10'$
Tie-rod length			$G = H$
Front camber angle (2)			$\beta = -30' \pm 30'$
Rear camber angle (2)			$\beta = 0^\circ \pm 30'$
Front caster angle (2)			$\gamma = 4^\circ 30' \pm 30'$
Max steering lock (2)			$\delta = 30^\circ$

(1) After loading, move car up and down to settle suspensions. Suspension height is to be carried out with vehicle in running order

(2) Values referring to vehicle in nominal height, corresponding to static load

Braking system

Inspection data		Model	
Front disc brakes			
Disc min thickness		mm (in)	20 (0.79)
Rear disc brakes			
Disc min thickness		mm (in)	6 (0.31)
Parking brake			
Number of notches available on scroll gear before wheel locking			4 to 6

TIGHTENING TORQUES

As per  6V Iniezione model, given in basic manual which should be referred to whenever necessary.