



## GROUP 00

VEHICLE CHARACTERISTICS AND  
MAINTENANCE

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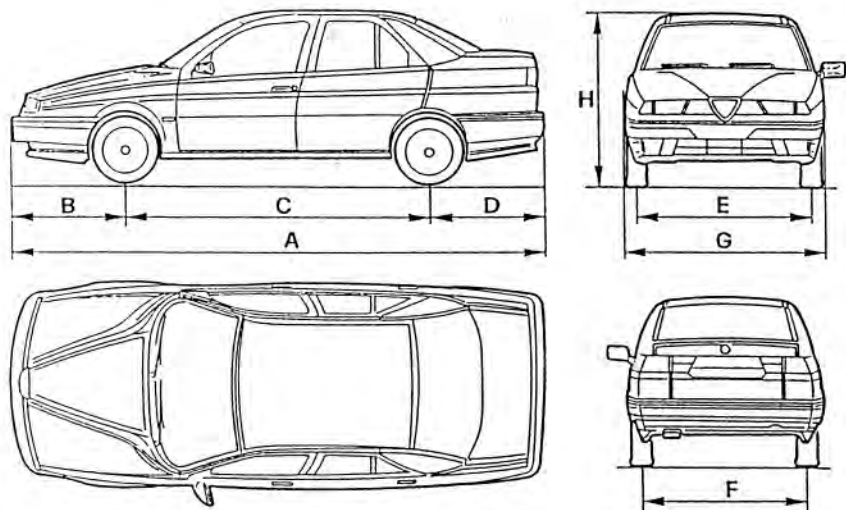
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## DIMENSIONS



Models		167 A4B 1749 c.c. (1)	155 T. SPARK 1.8	155 T. SPARK 2.0	155 V6
Dimensions					
A	Overall length	mm	4443	4443	4443
B	Front overhang	mm	960	960	960
C	Wheelbase	mm	2540	2540	2540
D	Rear overhang	mm	943	943	943
E	Front track	mm	1469	1469	1477
F	Rear track	mm	1402	1402	1402
G	Overall width	mm	1700	1700	1700
H	Overall height	mm	1440	1440	1440

(1) Commercial name not available at time of going to press.



## WEIGHTS AND LOADS

Models		167 A4B 1749 c.c. (1)	155 T. SPARK 1.8	155 T. SPARK 2.0	155 V6	
Weights and loads						
Kerb weight without driver		kg	1270	1270	1290	1370
Weight when fully loads		kg	1770	1770	1790	1850
Useful load		kg	500	500	500	480
Max. permissible weight per axle	front	kg	950	950	965	985
	rear	kg	950	950	965	965
Towable weight	with braked trailer	kg	1300	1300	1400	1400
	trailer without brakes	kg	450	450	450	450
Loading on tow hook		kg	90	90	95	95

(1): Commercial name not available at time of going to press.



## WHEELS AND TYRES

Models	167 A4B 1749 c.c. (1)	155 T. SPARK 1.8	155 T. SPARK 2.0	155 V6
Characteristics				
Rim dimensions	6J x 14"	6J x 14"	6J x 14" 6J x 15" (2)	6J x 15"
Tyre dimensions	standard	185/60 R14" 82H	185/60 R14" 82H	195/60 R14" 85V
	optional	195/60 R14" 85V	195/60 R14" 85V	195/55 R15" 84V (2)
Tyre pressures bars (kg/cm <sup>2</sup> )	medium load, normal speed	front 2.2 rear 2.0	front 2.2 rear 2.0	front 2.2 rear 2.0
	fully loaded, high speed	front 2.5 rear 2.5	front 2.5 rear 2.5	front 2.5 rear 2.5
Compact spare wheel	rim dimension	4J x 15"	4J x 15"	4J x 15"
	tyre dimension	115/70 R15"	115/70 R15"	115/70 R15"
	tyre pressure bars (kg/cm <sup>2</sup> )	4.2	4.2	4.2

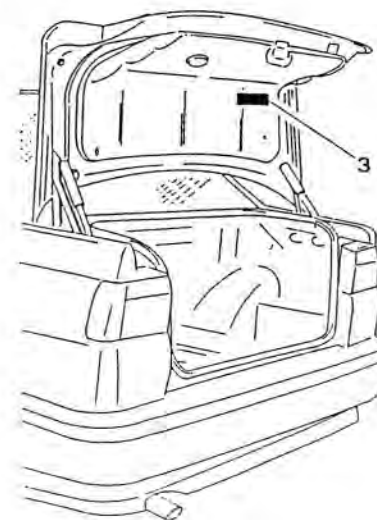
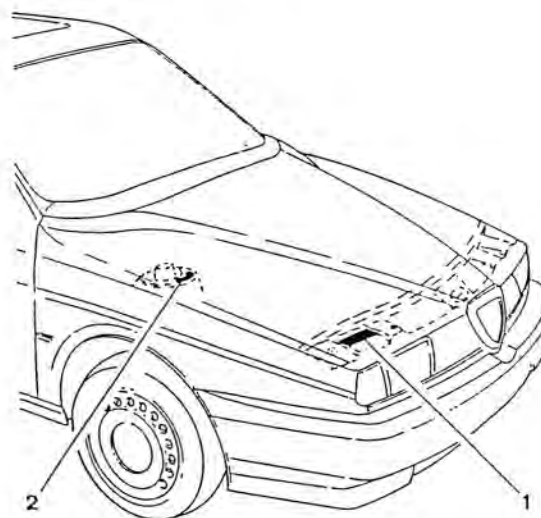
(1) Commercial name not available at time of going to press

(2) Optional for Germany

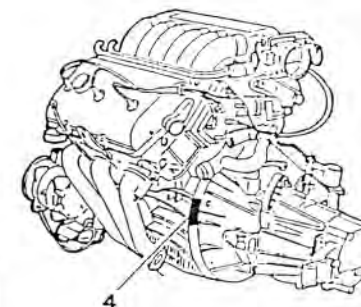


## MODEL IDENTIFICATION

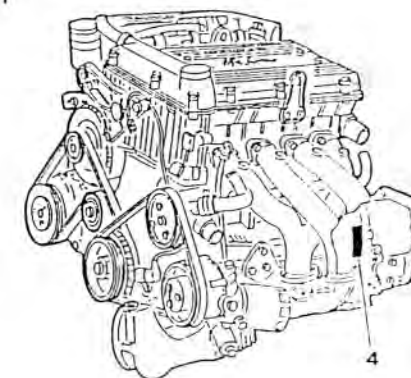
## IDENTIFICATION LABELS



## V6



## T. SPARK



1. Identification data
2. Body label
3. Paint identification label
4. Engine label



## MODEL IDENTIFICATION

Models		167 A4B 1749 c.c. (1)	155 T. SPARK 1.8	155 T. SPARK 2.0	155 V6
Type		4 door saloon			
Drive		LH + RH	LH + RH	LH + RH	LH + RH
Vehicle type No.	on identification label	167A4B	167A4C	167A2A	167A1
	in engine compartment to one side of the upper attachment of the right-hand shock absorber	167000	167000	167000	167000
Chassis serial number		0.000.000.1	0.000.000.1	0.000.000.1	0.000.0001
Engine type and serial No.		AR 67103 from 000.001	AR 67102 from 000.001	AR 67202 from 000.001	AR 67301 from 000.001

(1) Commercial name not available at time of going to press.



## IDENTIFICATION LABEL

This is located on the engine compartment crossmember.

It carries the identification data listed on the right:

The diagram shows a rectangular label with the Alfa Romeo logo on the left. The label contains the following fields:

- A: Manufacturer
- B: Homologation number
- C: Vehicle identification code
- D: Chassis serial number
- E: Maximum gross vehicle weight (Kg)
- F: Maximum gross weight on front axle (Kg)
- G: Maximum gross weight on rear axle (Kg)
- H: Engine code
- I: Chassis code
- L: Number for spare parts
- M: Smoke opacity index (for Diesel and Turbo Diesel engines)
- N: Supplier's code
- O: Foreign manufacturer

- A. Manufacturer
- B. Homologation number
- C. Vehicle identification code
- D. Chassis serial number
- E. Maximum gross vehicle weight
- F. Maximum gross vehicle weight including trailer.
- G. Maximum gross weight on front axle
- H. Maximum gross weight on rear axle
- I. Engine code
- L. Chassis code
- M. Number for spare parts
- N. Smoke opacity index (for Diesel and Turbo Diesel engines)
- O. Supplier's code
- P. Foreign manufacturer

## PAINT IDENTIFICATION LABEL

This is located on the inner part of the luggage compartment and carries the data given on the right:

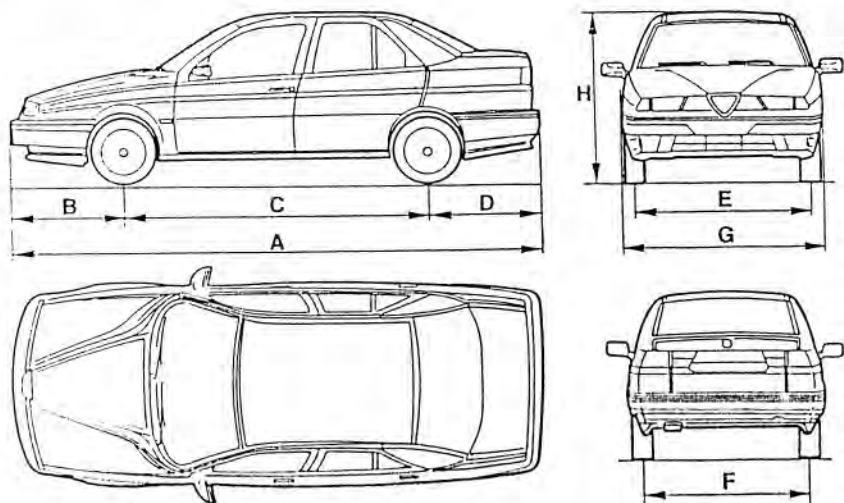
The diagram shows a rectangular label with the following fields:

- A: Paint manufacturer
- B: Colour name
- C: Colour code
- D: Respray and touch-up code

- A. Paint manufacturer
- B. Colour name
- C. Colour code
- D. Respray and touch-up code



## DIMENSIONS ('95 Versions)



Dimensions		Models	155 1.7 T. SPARK	155 1.8 T. SPARK	155 V6
		167A4H - 167A4G - 167A4L	167A4E - 167A4M	167A1E	167A1E
A	Maximum length	mm	4443		
B	Front overhang	mm	960		
C	Wheelbase	mm	2540		
D	Rear overhang	mm	943		
E	Front track	mm	1495	1496 (1)	(*)
F	Rear track	mm	1438	1438 (1)	(*)
G	Maximum width	mm	1730		
H	Maximum height	mm	1440	(*)	(*)

(\*) Not available at time of going to press.

(1) Versions with 14" rim.



## WEIGHTS AND LOADS ('95 Versions)

Weights and loads		Models	155 1.7 T. SPARK	155 1.8 T. SPARK	155 V6
		167A4H - 167A4G - 167A4L	167A4E - 167A4M	167A1E	167A1E
Kerb weight (without driver)	kg	1290			1370
Towable weight (with braked trailer)	kg	1300			1400

## TYRES AND WHEELS ('95 Versions)

Specifications		Models	155 1.7 T. SPARK	155 1.8 T. SPARK	155 V6
		167A4H - 167A4G - 167A4L	167A4E 167A4M	167A4E 167A4M	167A1E
Rim size	standard	6J x 14"	6J x 14"	6.5 x 15"	6.5J x 15"
	optional	-	-	7J x 16"	7J x 16"
Tyre size	standard	185/60 HR14	185/60 HR14	205/50 VR15	205/50 VR15
	optional (for versions/markets where applicable)	-	195/60 VR14	205/45 ZR16	205/45 ZR16
Tyre pressure bar (kg/cm <sup>2</sup> )	reduced load (2 persons)	front 2.2 rear 2.0	front 2.2 rear 2.0	front 2.5 rear 2.3	front 2.5 rear 2.3
	full load	front 2.5 rear 2.5	front 2.5 rear 2.5	front 2.8 rear 2.5	front 2.8 rear 2.5
Compact spare wheel	rim size	4J x 15" (1)	4J x 15" (1) 4B x 15" (2)	4B x 15" (1)	4B x 15" (2)
	tyre size	115/70 R15 90M			
	tyre pressure bar (kg/cm <sup>2</sup> )	4.2			

(1): In steel (2): In alloy

## WARNING:

In the event of continuous driving at top speed, the pressures should be increased by 0.3 bar.

NOTE: To improve mating between the wheels and the car body the rims have a specific camber for each rim size. Therefore in addition to the correct rim and tyre match it is also necessary to check and maintain the correct rim camber.

RIM SIZE	RIM CAMBER ANGLE
6J x 14"	31.5 mm
6.5J x 15"	37 mm
7J x 16"	41 mm



## MODEL IDENTIFICATION ('95 Versions)

## MODEL IDENTIFICATION

Models		155 1.7 T. SPARK			155 1.8 T. SPARK		155 V6
Trim level		4-door saloon					
Drive		LH + RH			LH + RH		LH + RH
Car model no.	on identification label	167A4H	167A4G <input type="checkbox"/>	167A4L <input type="checkbox"/>	167A4E	167A4M <input type="checkbox"/>	167A1E
	in the engine compartment, at the side of right-hand shock absorber upper connection	167000			167000		167000
Chassis serial no.		(*)	(*)	(*)	(*)	(*)	(*)
Engine type and serial no.		AR 67105 from (*)	AR 67103 from (*)	AR 67105 from (*)	AR 67102 from (*)	AR 67102 from (*)	AR 67303 from (*)

(\*) Engine/chassis no. not available at time of going to press.

() Only for certain markets.

## IDENTIFICATION LABEL

	(F)	
	(A)	
	(B)	
	(C)	
	(C)	
	1. (C)	
2. (C)		
MOTORE - ENGINE (D)		
VERSIONE - VERSION (D)		
N° PER RICAMBI (D)		
N° FOR SPARES (D)		

- A. National homologation
- B. Chassis serial number
- C. Maximum weights authorized by the different national regulations
- D. Model (for example 167A4H) and any supplementary information.
- E. Smoke opacity index
- F. Name of manufacturer



## SPECIFIC TOOLS

The specific tools play a very important role in the maintenance of the vehicle as they are able to guarantee an accurate, reliable and rapid service.

It must be noted that the length of the various operations has been calculated considering the use of the specific tools.

This manual lists and illustrates the special tools designed by the vehicle manufacturer to carry out overhaul and maintenance activities on the vehicle.

The tool number is formed by a new number of 10 digits and an old number of 1 letter and 5 digits.

e.g.: 1.821.124.000  
(A.3.0621)

The assistance network can supply particular specific tools through each Alfa Romeo dealer following procedures which already exist.

## LIFTING AND TOWING POINTS

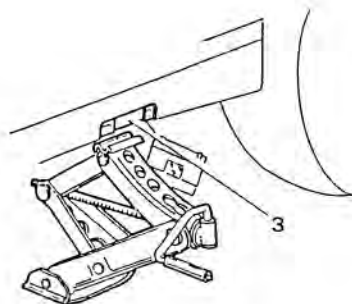
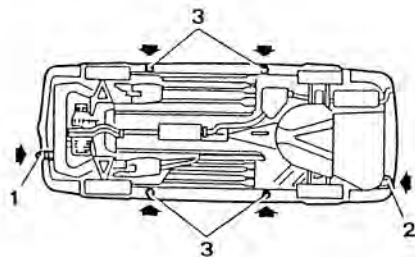
- If it is necessary to raise the vehicle, place jacks at the points indicated in the illustration.



### CAUTION

After the vehicle has been raised on the jacks, it must be supported by suitable safety stands.

Before lifting the rear (front) end of the vehicle lock the wheels by placing chocks in front of (behind) the front (rear) wheels.



1. Front tow hook
2. Rear tow hook
3. Jack socket



The vehicle is equipped with two tow hooks (front and rear) located on the right-hand side of the bumpers.

When towing the vehicle, drive with care and obey all the current laws.

Before towing, the ignition key of the vehicle to be towed should be turned to the MAR position and then turned to the STOP position without removing the key. In this way the steering wheel will not lock.

When being towed no vacuum will be created in the servo brake system and it will be necessary to exert more pressure on the pedal during braking.

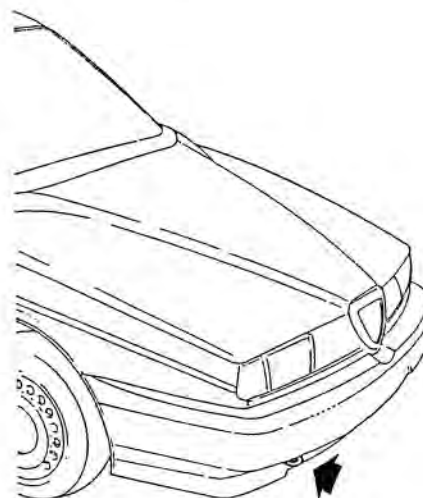
The power steering system will also be inoperative and it will therefore be necessary to exert a greater pressure on the steering wheel.



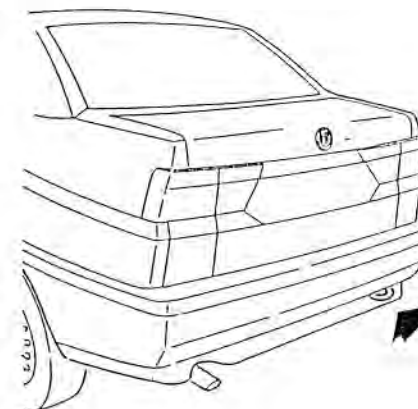
### CAUTION

Never remove the key from the ignition as this will cause the steering wheel to lock.

- Front tow hook



- Rear tow hook





## SERVICING OPERATIONS

The servicing operations comprise checking and restoring the efficiency of certain parts of the vehicle on which wear and phase displacement are foreseen after normal use.

The following table lists the servicing operations to be carried out at the specified mileage intervals.

### WARNINGS:

Precautions to be taken before servicing operations.  
The engine compartment contains many moving parts, high temperature components and high voltage cables that can be dangerous.

Carefully follow the precautions given below:

- Turn the engine off and allow it to cool down.
- Do not smoke or use naked flames. The presence of fuel can cause a fire hazard.
- Always keep a fire extinguisher handy.

Operations to have done at the mileage shown	km x 1.000									
	20	40	60	80	100	120	140	160	180	200
Changing the engine oil and filter (at all events once a year) and checking lubrication circuit for leaks	●	●	●	●	●	●	●	●	●	●
Checking the valve clearance (except engines with hydraulic tappets)		●		●		●		●		●
Changing the timing gear drive belt						●				
Checking the conditions of trapezoidal belts		●		●		●		●		●
Checking the conditions of Poly V belts				●				●		
Changing the air cleaner cartridge		●		●		●		●		●
Changing the fuel filter cartridge (petrol versions)				●				●		
Checking the operation of exhaust gas oxygen sensor (lambda probe)				●				●		
Changing the spark plugs		●		●		●		●		●
Changing the antifreeze mixture				●				●		
Checking the gearbox and differential oil level (only versions with manual gearbox)				●				●		
Changing the differential and gearbox oil (only versions with automatic gearbox)		●		●		●		●		●
Checking the conditions of protective bellows for axle shafts, power steering and steering knuckle caps		●		●		●		●		●
Checking the brake and fuel pipes for leaks		●		●		●		●		●
Checking the handbrake travel		●		●		●		●		●
Checking the power steering oil level		●		●		●		●		●







## SERVICING OPERATIONS (Continued)

To keep the car in good operating conditions, the following recommendations should be adhered to carefully:

Every 500 kms (or when refuelling) check:

- the engine oil level.
- the level of the fluid in the coolant circuit.
- the level of the brake/clutch fluid.
- the tyre pressures.
- the level of the fluid in the windscreen washer system.

### Engine oil and filter

To be changed at the specified intervals.  
At all events, they must be changed once a year.

### Air cleaner

If the car is habitually used on dusty roads, the air cleaner should be changed more often than specified.

### Brake pads

Wear of the brake pads is indicated by the turning on of a warning light on the instrument cluster.  
When changing the front pads, also check the rear ones. However, depending on the use of the car, the rear pads might not need to be changed immediately, in which case, you are recommended to check them at a later stage.

### Brake and clutch fluid

The brake fluid is hygroscopic, i.e. it absorbs moisture.  
To avoid faulty braking, change the brake fluid every two years, regardless of the mileage driven.

### Battery

During hot weather, check the electrolyte level frequently.

### Dust and/or pollen filter (if fitted)

Once a year, preferably at the beginning of summer, have the conditions of the dust and/or pollen filter (if fitted) checked by the Alfa Romeo Service Network.

If the car is mostly used for town/motorway driving or on dusty roads, it is wise to check more often than indicated.

**Warning:** Failure to change the filter can considerably reduce the performance of the air conditioner system.

### Anti-freeze

It is advisable to top up with **Alfa Romeo Climafuild Super Permanent -40°C** to conserve the protective properties of the mixture.

### Notes

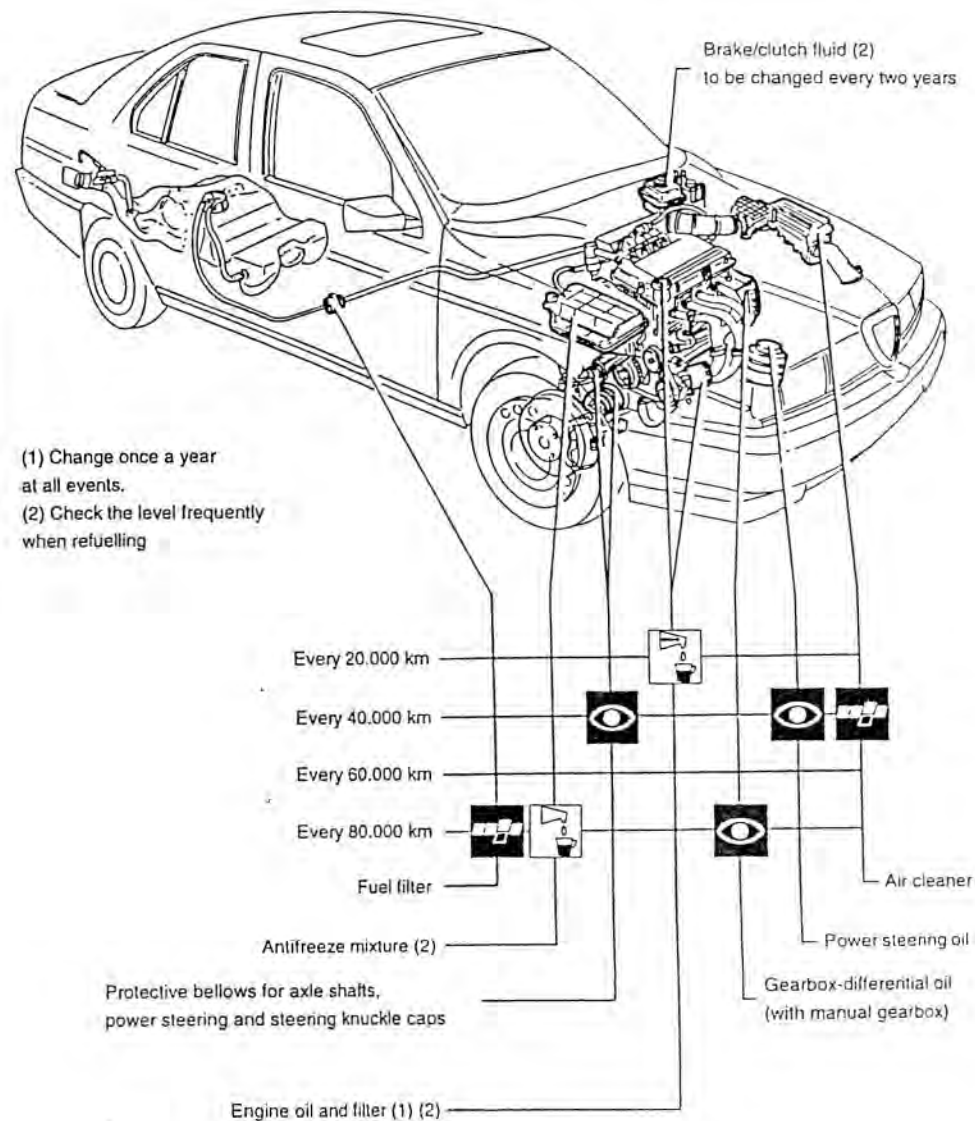
Under special driving conditions (e.g. on roads sprinkled with antifreeze salt and/or corrosive substances, rough road surfaces, etc.) often check the boots of the axle shafts and steering box, and clean and lubricate joints, hinges, door catches, bonnet catch, etc.)

When forced to use fuel, lubricants and/or fluids in general with characteristics other than those specified by the manufacturer (in emergencies), replace the fluids and corresponding filters at the earliest opportunity.



## SCHEDULED CHECKS AND MAINTENANCE

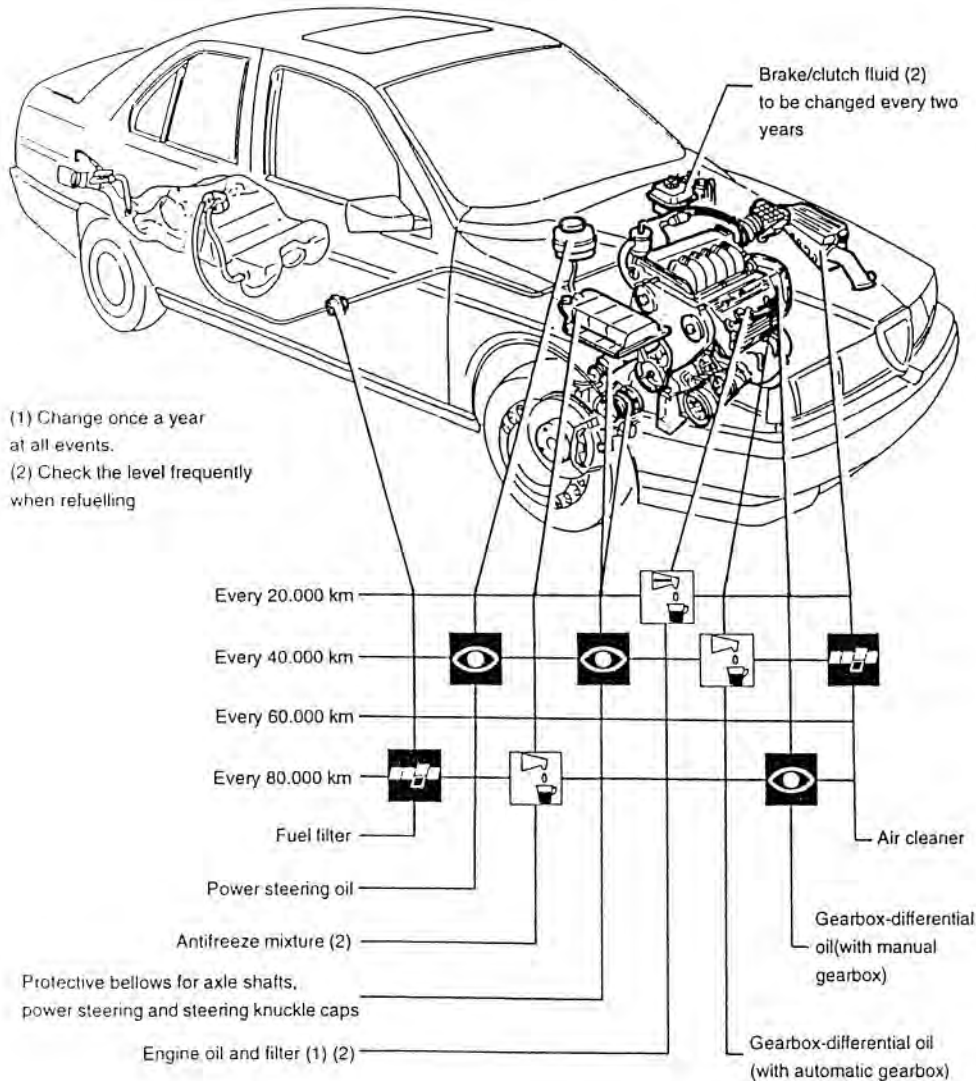
### Specific for T. SPARK models





## SCHEDULED CHECKS AND MAINTENANCE (Continued)

Specific for V6 model



(\*): This page replaces pages 00-16/17/18  
of publication PA4655A1000000 of 7 - 1991.  
Therefore pages 00-17/18 are annulled.

## FLUIDS AND LUBRICANTS

Type	Group ref.	Application	Classification	Name
OIL	01 - Engine (1)	Engine (Refilling)	API SG	SELENIA SPECIAL FORMULA ALFA ROMEO 10W/40
			CCMC G5	
	SAE 10W/40			
FLUID	13 - Gearbox and differential	Gearbox and differential (Refilling)	API GL-4	TUTELA ZC 80/S
	80 - Climate control	Compressor (Refilling)	-	SUNISO 5GS
				SANDEN SP 10 "PAG" (▲)
	07 - Engine cooling	Cooling circuit (Refilling)	-	ALFA ROMEO CLIMAFLUID SUPER PERMANENT -40°C
FLUID	12 - Clutch	Brake and clutch hydraulic circuit (Refilling)	DOT 4	ALFA ROMEO BRAKE FLUID SUPER DOT 4
	22 - Brakes		SAE J 1703 F	
	23 - Steering	Power steering system (Refilling)	G.M. DEXRON II	TUTELA GI/A
FLUID	80 - Climate control	Air conditioner circuit (Refilling)	-	RIVOIRA Freon 12
				- RIVOIRA: SUVA R134a (▲) - HOECHST - TAZZETTI: FRIGEN R134a (▲) - ICI - TAZZETTI: KLEA R134a (▲)
GREASE	SEE SPECIFIC FUNCTIONAL GROUPS			

(1): For decidedly sportive use of the car fully synthetic SELENIA Racing 10W/60 engine oil is recommended.  
(▲): From chassis no. 105779 - 1003349 (on two assembly lines).



## APPROXIMATE SERVICING CAPACITIES

Capacity		Models	T. SPARK	V6
Fuel tank			63 litres	63 litres
Fuel reserve			~ 5 litres	~ 5 litres
Engine oil	Total capacity: sump + filter + wells + radiator		4.9 kg	6.6 kg
	Sump + filter (for periodical replacement)		4.5 kg	6.15 kg
	Oil filter		0.5 kg	0.5 kg
	Camshaft wells		0.41 kg	0.45 kg
Gearbox - differential oil			2 litres	2 litres
Brake - clutch circuit fluid			0.6 litres	0.6 litres
Power steering oil			1.0 litres	1.0 litres
Antifreeze mixture			8.3 litres	9.2 litres
Air conditioner compressor oil			135 g 240 ± 15 cm <sup>3</sup> (▲)	135 g 240 ± 15 cm <sup>3</sup> (▲)
Air conditioner system fluid			950 g 700 g (▲)	950 g 700 g (▲)

(▲) From chassis no. 105779 - 1003349 (on two assembly lines).

## SPECIFIED FUEL

The octane number of a fuel defines its resistance to detonation: it is essential to use fuel with the correct number of octanes as this will prevent pinging which may prove dangerous for the engine.

The higher the octane number the greater the anti-detonation capacity.

The 155 model has been designed to run on unleaded petrol with an octane number of 95 RON (Research Octane Number).

These vehicles are all fitted with a catalytic converter. To enable this to function with the highest degree of efficiency, unleaded petrol must be used, as the lead deposits contained in other fuels build up on the surface of the catalytic converter and prevent it from working properly.

The size of the filler necks has been reduced in order to prevent the nozzles used on leaded petrol pumps from being inserted.



## ENGINE SERVICING OPERATIONS

Specific for T. SPARK engines  
(AR 67103 - AR 67102 - AR 67202)

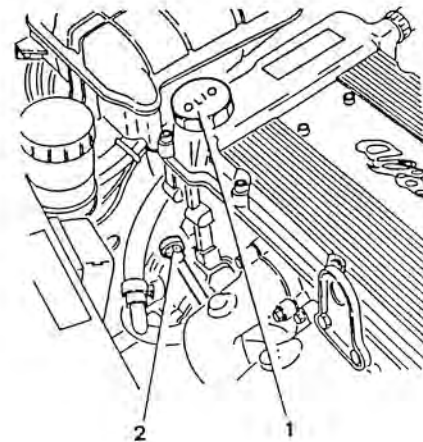
## CHANGING THE ENGINE OIL AND FILTER



## WARNING

Engine oil is harmful to the skin: avoid contact of the oil with the skin as far as possible; in the event of contact wash with soap and water.

- Set the car on a lift.
- 1. With the engine warm remove the filler cap.
- 2. Withdraw the oil level dipstick.



- Raise the car.
- 1. Slacken the drain plug and leave the oil to drain off completely for at least 15 minutes.
- 2. Using the special tool release the oil filter and remove it.



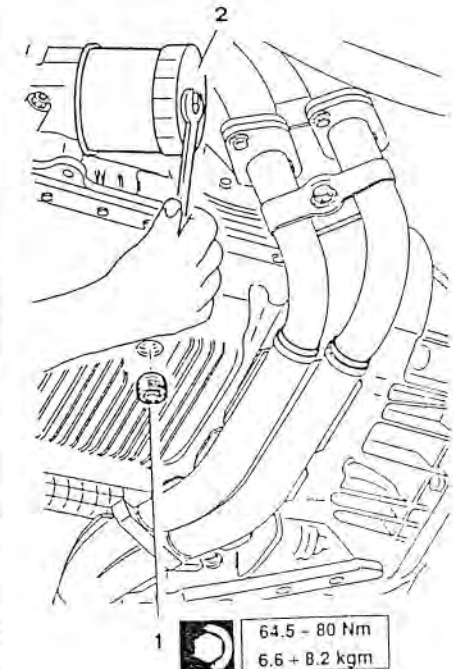
## WARNING

Do not discard the oil in the environment, as indiscriminate dumping of this product is a source of pollution; find out where the collection centre in your area is.



## WARNING

The presence of whiteish substances is caused by leaks of coolant in the oil. The low viscosity is due to dilution with the fuel.





- Clean the drainage plug and screw it back onto the sump along with the relative gasket.
- Lubricate the gasket on the new filter with oil and screw the filter on tightly.
- Lower the vehicle.
- Refill the system with the specified oil in the quantity indicated.
- Check that the level is correct with the dipstick.

**CAUTION**

The engine oil level should be checked when the vehicle is on level ground. If the oil level exceeds the MAX mark a loss of pressure will be caused by the excessive evaporation of the oil.

- Screw on the oil cap, and run the engine for about 2 minutes, then switch off the engine and wait for a couple of minutes.
- Check the level of the oil and check for leaks.

## TIGHTENING CYLINDER HEAD NUTS

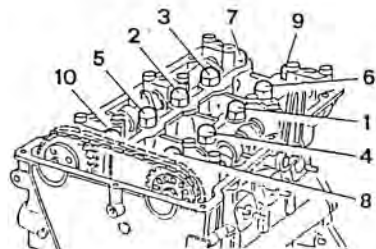
**CAUTION**

The cylinder head nuts should only be tightened when the engine is cold.

- Remove the timing cover (see CHECKING AND ADJUSTING VALVE CLEARANCE)
- Loosen the nuts by one turn following the sequence indicated in the illustration. Lubricate the surface between the washer and nut with engine oil and tighten to the following torque:



82.65 - 91.35 Nm  
8.43 - 9.3 kgm



- Refit the timing cover by reversing the procedure followed for removal.

**NOTE:** When removing or refitting the cylinder head, initially tighten to the following torque:



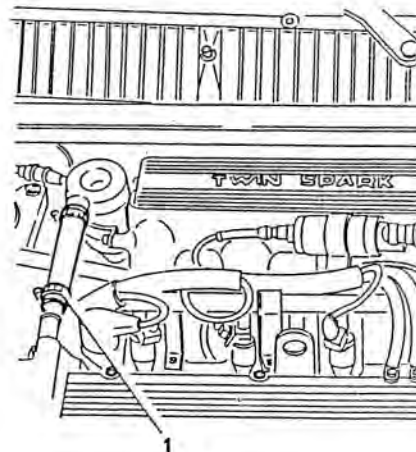
76 - 84 Nm  
7.75 - 8.56 kgm

After bench testing tighten again as before.

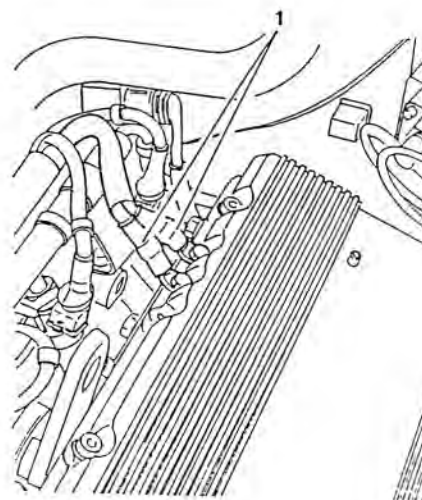


## CHECKING AND ADJUSTING VALVE CLEARANCE

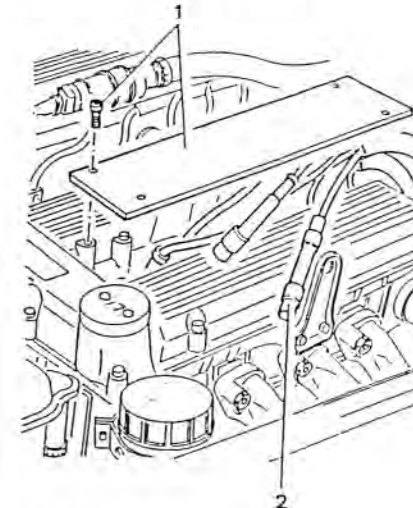
- Disconnect the negative cable from the battery.
- 1. Disconnect the oil vapour recovery hose from the timing cover.



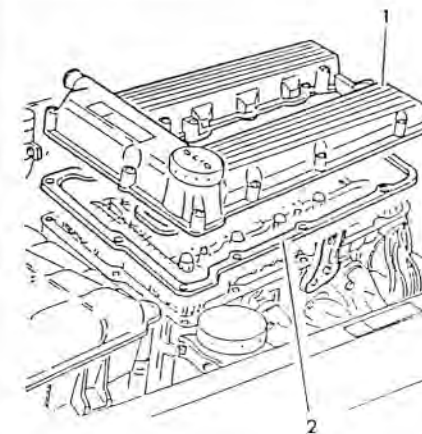
- 1. Disconnect the earth cables from the timing cover.



- 1. Remove the spark plug cover.
- 2. Disconnect the spark plug cables.



- 1. Remove the timing cover.
- 2. Remove the gasket.

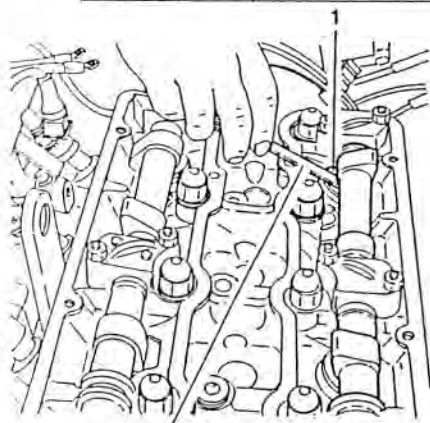




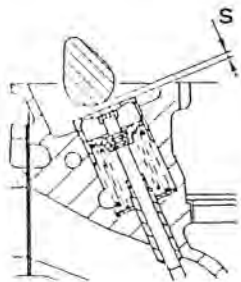
- Suck out the oil from the wells and put it back into the sump.
  - Clean the spark plug wells, remove the spark plugs and plug the holes to prevent foreign materials from entering.
- 1 When the engine is cold use feeler gauge N° 1.825.018.000 (C.6.0197) to check that the clearance "S" between the cam heel radius and the valve cup ceiling is within the specified limits.



Valve clearance Intake side	0.380 - 0.450 mm
Valve clearance Exhaust side	0.430 - 0.500 mm



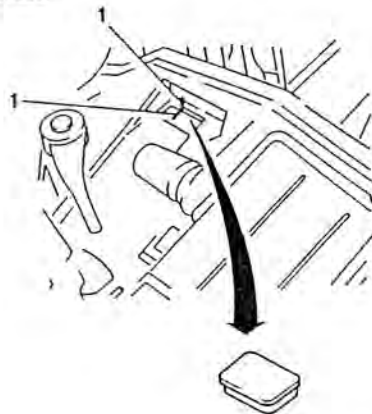
1.825.018.000  
(C.6.0197)



- If the valve clearance is not within the specified values register following the procedure described below.
1. Rotate the crankshaft until the reference notches on the camshafts are in line with those on the relative central caps.



1. Check that the reference notches stamped on the engine fly wheel and on the gearlever bell coincide when cylinder number 1 is at T.D.C. during the firing phase.

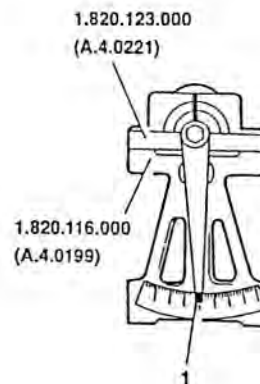


1. To check that the reference notches on the central caps are in the correct position, remove the caps and, using tool N° 1.820.116.000 (A.4.0199) and plate N° 1.820.123.000 (A.4.0221) check the relative angular value.

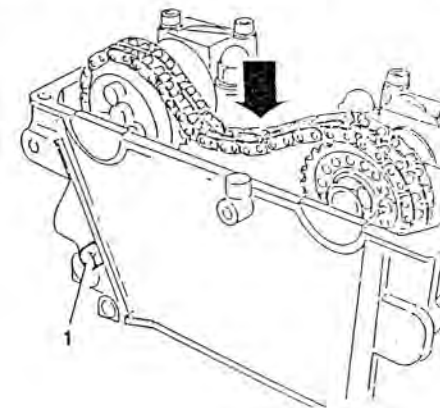


#### Angular value of the reference notches on the camshaft caps

Intake shaft cap	5° 30'
Exhaust shaft cap	13° 15'

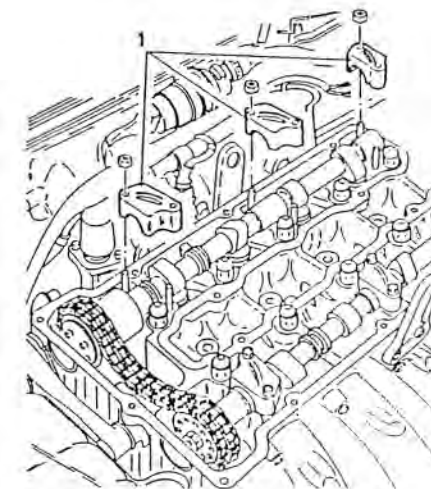


- If the reference notch is not positioned in accordance with the specified values make a correction by cutting a new notch on the cap.
  - Refit the caps and rotate the crankshaft until the reference notches on the shafts are aligned with the new notches on the relative caps.
1. Loosen the screw securing the chain tensioner and push the chain downwards. Lock the chain in this position by re-tightening the relative screw.



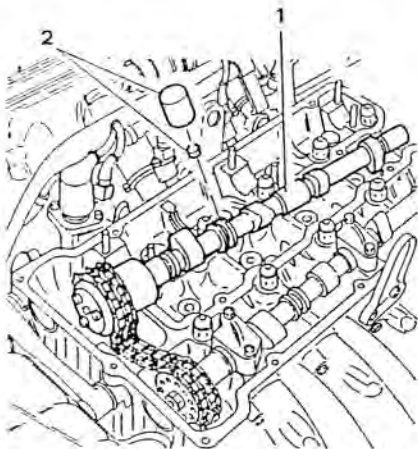
#### Adjusting valve clearance - Intake

1. Remove the three camshaft caps from the intake side.

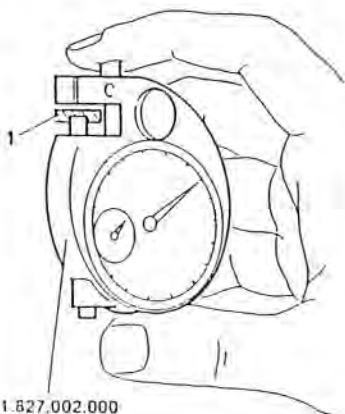




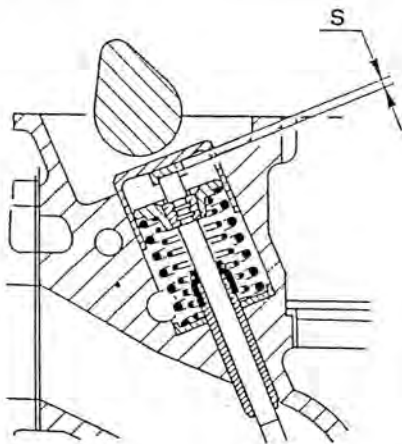
- 1 Remove the camshaft on the intake side with the chain and rest it in the middle of the head taking care not to move the chain in relation to the toothed wheel.
- 2 Withdraw a valve cup and its valve clearance regulation cap.



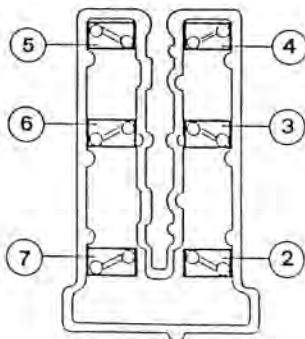
- 1 Measure the thickness "S" with the feeler gauge N° 1.827.002.000 (C.1.0108) and select a new cap of adequate thickness.



1.827.002.000  
(C.1.0108)

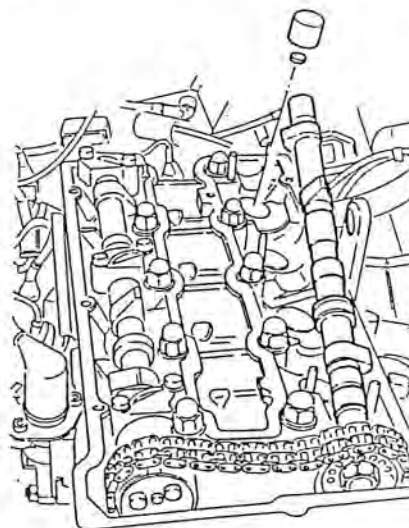


- Install the new cap and the valve cup after lubricating with engine oil.
- Repeat the procedure for the other cup-cap pairs.
- Re-position the camshaft taking care not to move the chain in relation to the toothed wheel.
- Remove the camshaft caps in the order shown below. Each cap has a number stamped on it.



### Adjusting valve clearance - exhaust

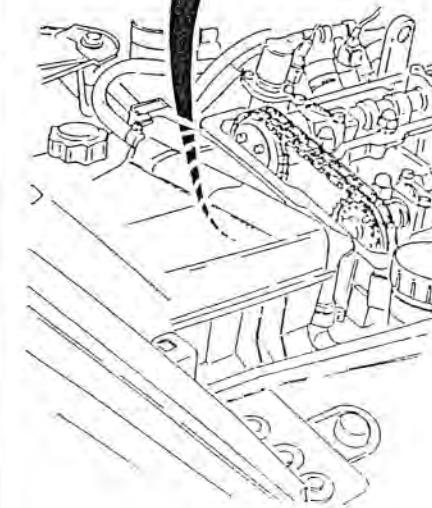
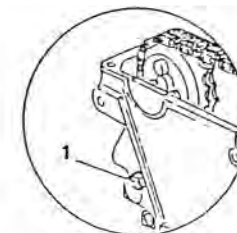
Proceed in the same way as for the intake valves taking care not to move the shaft when replacing the caps. The shaft should be lifted without moving the chain in relation to the toothed wheel.



- Tighten the timing chain (see specific paragraph).
- Check the valve clearance again and adjust the timing (see specific paragraph).
- Refit all the components by reversing the procedures followed for removal.

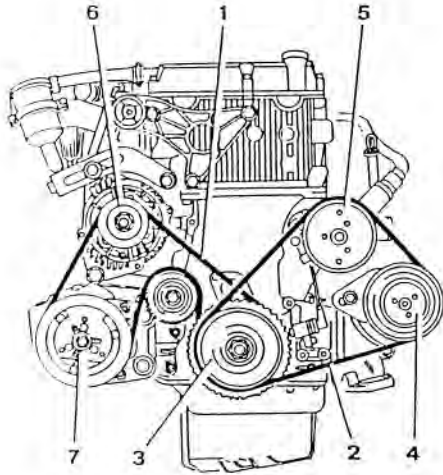
### CHECKING TIMING CHAIN TENSION

- Remove the timing cover (see CHECKING AND ADJUSTING VALVE CLEARANCE).
- 1. Loosen the screws securing the chain tensioner.
- Engage the highest gear, move the vehicle forward and keeping the vehicle in such a position that the chain stays taut, lock the screw securing the chain tensioner.





## AUXILIARY UNIT BELTS



- 1 Alternator - air conditioning compressor drive belt
- 2 Power steering pump - water pump drive belt
- 3 Engine pulley
- 4 Power steering pump
- 5 Water pump
- 6 Alternator
- 7 Air conditioning compressor

NOTE:: When checking the tensioning of the belt visually check its condition ensuring that it shows no sign of:

- cuts
  - cracks
  - superficial wearing of the material (which appears smooth and shiny)
  - dry or hardened parts (loss of adherence).
- If any of these conditions are found replace the belt.

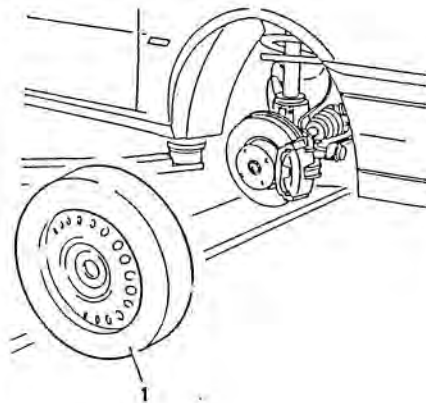
**CAUTION:**

If the belt comes into contact with oil or solvents the elasticity of the belt may be affected which will reduce its adherence.

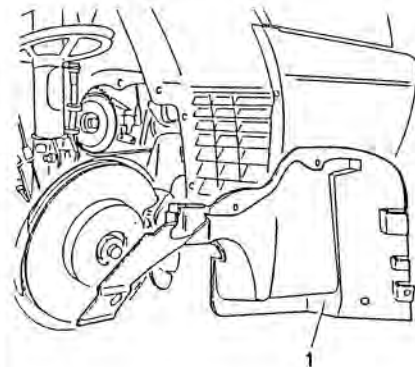
## WATER PUMP - POWER STEERING PUMP DRIVE BELT

## Checking and tensioning

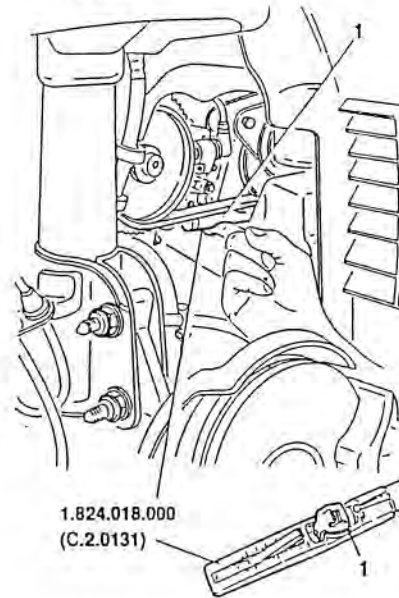
- Place the vehicle on a lift.
- 1. Remove the front right-hand wheel.



1. Remove the dustcover.



1. Working through the wheelhousing insert tool N° 1.824.018.000 (C.2.0131) as indicated in the illustration.



- Check that the tension values measured with a suitable tool, are within the specified limits.

## Water pump - alternator control "POLY - VK4" belt tension

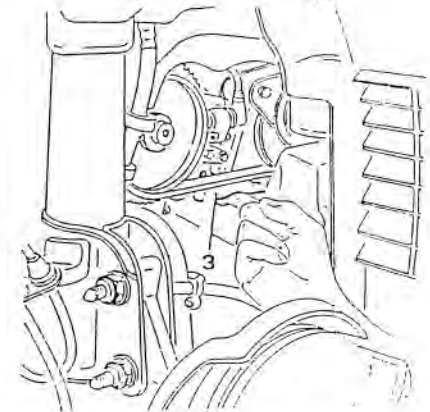
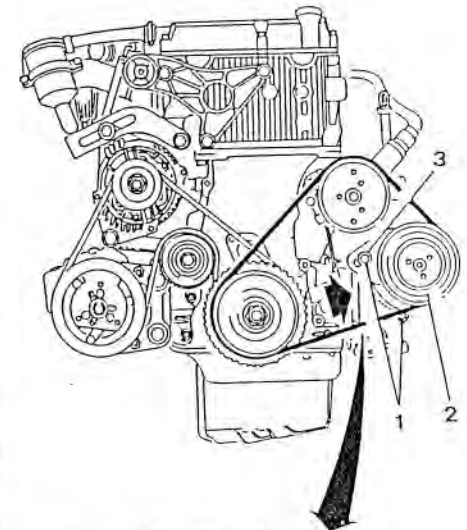
During installation	350 - 400 N
Minimum	250 N
Re-tensioning	250 - 300 N

NOTE: The belt can be re-tensioned after a brief testing period, operating as follows:

- run the engine until it reaches normal operating temperature;
- run the engine for about 10 minutes;
- switch off the engine and wait until it cools;
- re-tighten the belt to the specified value.

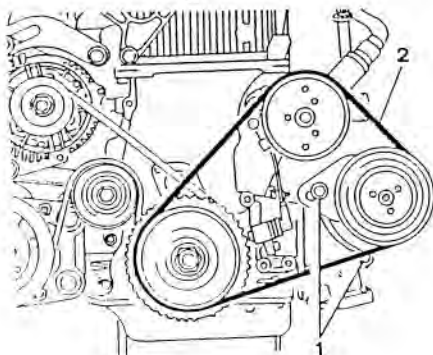
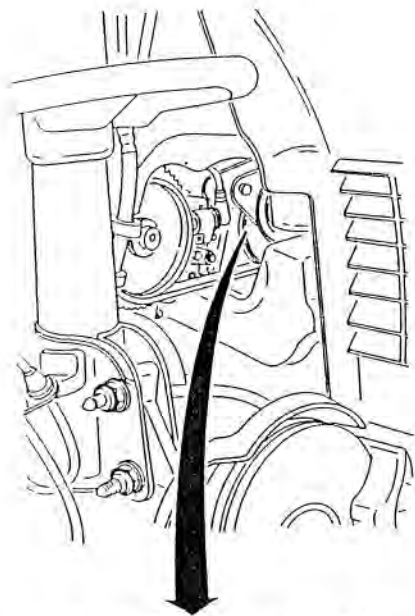
- If the belt is not correctly tightened proceed as follows:

1. Working through the wheelhousing loosen the two screws securing the power steering pump.
  2. Move the power steering pump to one side in order to increase the tension of the belt.
  3. Tighten the upper nut securing the power steering pump and check the tension on the belt.
- If the tension is correct tighten the other screws securing the power steering pump.

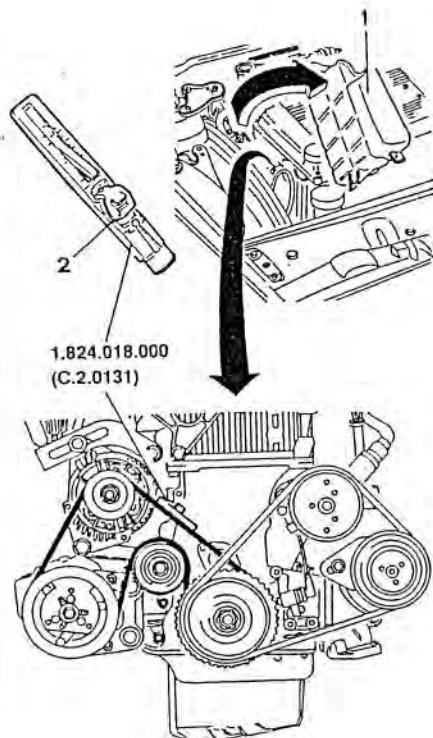


**Substitution**

- Place the vehicle on a lift.
- Remove the front right-hand wheel.
- Remove the dustcover.
- 1. Working through the wheelhousing loosen the two screws securing the power steering pump.
- 2. Remove the water pump - power steering pump drive belt.
- Install a new belt by reversing the procedure followed for removal.

**AIR CONDITIONING COMPRESSOR - ALTERNATOR DRIVE BELT****Checking and tensioning**

1. Loosen the screws securing the expansion tank and without disconnecting the hoses, move it to one side.
2. Working from the engine compartment measure the tension on the belt using tool N° 1.824.018.000 (C.2.0131), as indicated in the illustration.



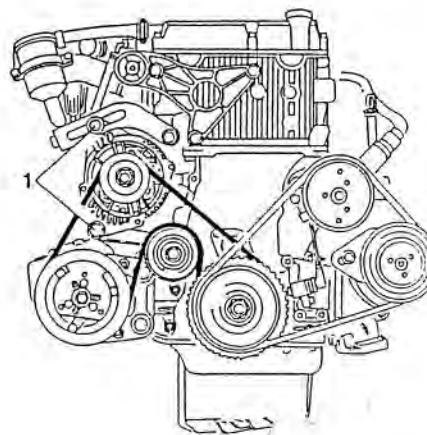
- Using the specific tool, check that the tension values are within the specified limits.

**Air conditioning compressor - alternator drive "POLY-VK5" belt tension**

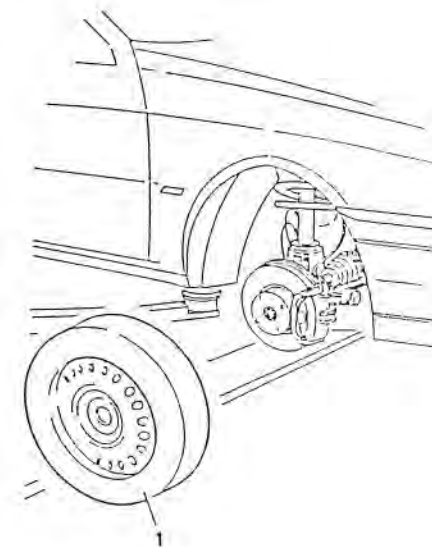
During installation	400 - 450 N
Minimum	300 N
Re-tensioning	300 - 350 N

- NOTE:** The belt can be re-tensioned after a brief testing period, operating as follows:
- run the engine until it reaches normal operating temperature;
  - run the engine for about 10 minutes;
  - switch off the engine and wait until it cools;
  - re-tighten the belt to the specified value.

- If the belt is not correctly tightened, proceed as follows:
  1. Unscrew the two screws securing the alternator.
  2. Adjust the micrometric tensioner screw until the specified belt tension is obtained.
- Tighten the two screws securing the alternator.

**Substitution**

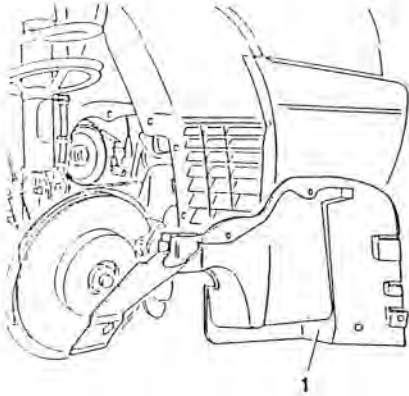
- Place the vehicle on a lift.
- 1. Remove the front right-hand wheel.



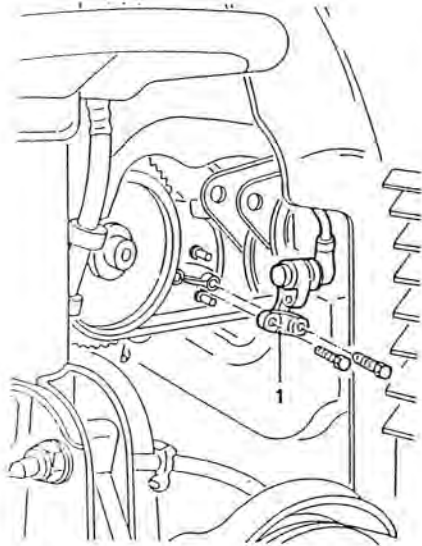





1. Remove the dustcover.



1. Remove the engine r.p.m. and timing sensor together with its support bracket, and move it to one side.

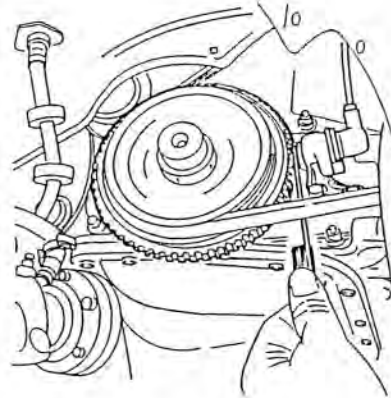


 During refitting check the air gap between the r.p.m. and timing sensor and the toothed pulley.



Air gap between r.p.m. and timing sensor and phonic wheel

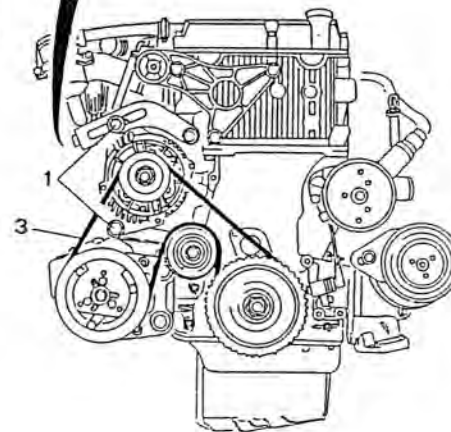
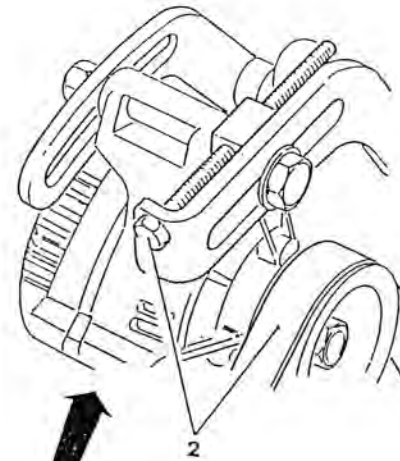
0.5 - 1.5 mm



- Remove water pump - power steering pump drive belt (see specific paragraph).
1. Loosen the screws securing the expansion tank and, without disconnecting the hoses, move it to one side.

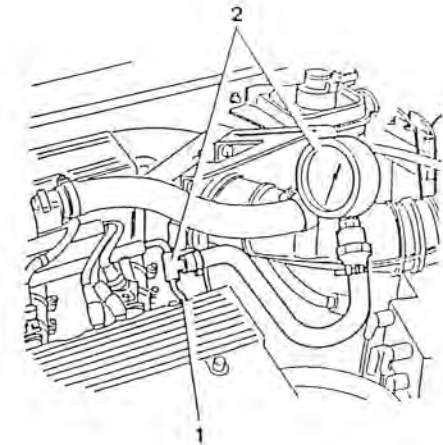


1. Unscrew the two screws securing the alternator.
2. Adjust the micrometric tensioner screw to reduce the tension on the belt.
3. Remove the air conditioner - alternator drive belt.
  - Fit a new belt by reversing the procedure followed for removal.

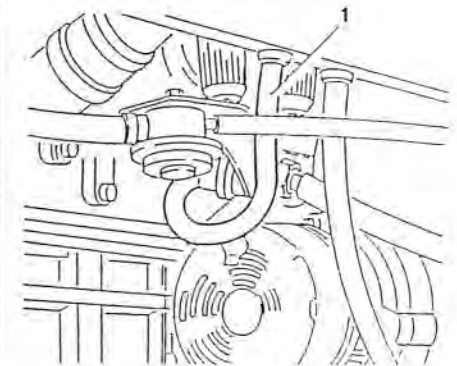


## CHECKING PRESSURE AND SEALING OF THE FUEL CIRCUIT

1. Disconnect the fuel delivery hose from the supply manifold.
2. Connect a pressure meter and a "T" union to the ends of the previously disconnected inlet hose.



1. Disconnect the pressure regulator vacuum intake hose from the air intake box in order to prevent variations in engine r.p.m. from influencing the readings.





- Start the engine and run at idle speed and check that the pressure of the fuel is within the specified limits.

**Fuel pressure at Idle speed**2.8 - 3.2 bar (2.9 - 3.3 kg/cm<sup>2</sup>)

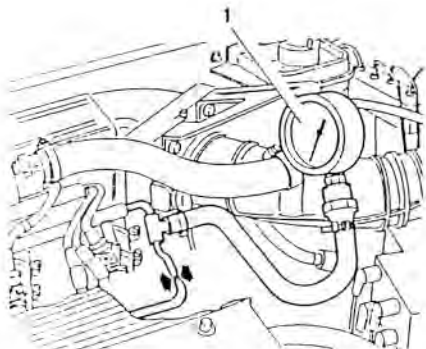
- Re-connect the vacuum intake hose to the air intake box. At idle speed the pressure must decrease by 0.5 bars and then increase when the throttle valve opens. If this does not happen, check for leaks in the vacuum intake hose of the fuel pressure regulator.

**NOTE:** When fuel is visibly leaking or there is a persistent smell of petrol, test the sealing of the fuel supply circuit.

**CAUTION:**

Keep a fire extinguisher to hand in case fuel is leaking.  
Do not smoke.

- With the pressure meter connected to the engine when running at idle speed, squeeze the hose just after the pressure regulator and check that the pressure increases to approximately 4 bars. Do not let the pressure exceed this value.



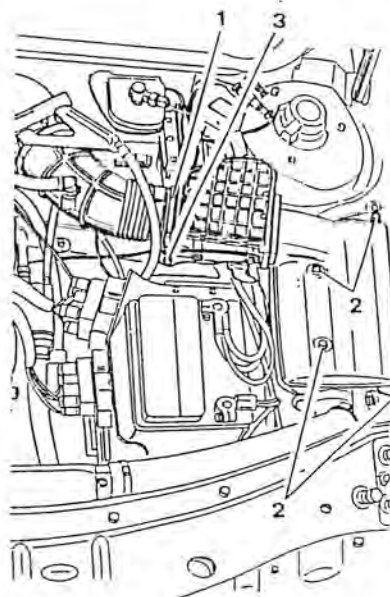
## CHECKING SEALING OF FUEL VAPOUR RECOVERY SYSTEM

### DUE FOR PUBLICATION

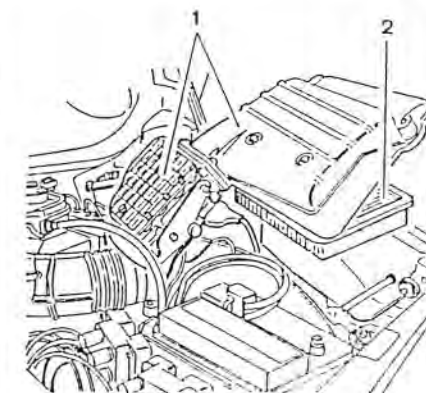


## REPLACING THE AIR CLEANER CARTRIDGE

- Loosen the clamp fastening the corrugated sleeve to the air-flow meter.
- Loosen the screws securing the air cleaner cover.
- Loosen the screw securing the air-flow meter support bracket.



- Lift the air cleaner cover - air-flow meter assembly without disconnecting the air-flow meter from its electrical connection.
- Remove the filter element.

**CAUTION:**

Any attempt to clean the air cleaner filter may result in damage to the filter and compromise the correct functioning of the engine supply system.

- Carefully clean the container holding the filter element.
- Position the new filter element.
- Refit the filter cover - air-flow meter assembly by reversing the procedure followed for removal.

**NOTE:** If the filter shows signs of oil contamination, check the entire air circuit for possible infiltrations.

## CHECKING SEALING OF THE AIR CIRCUIT

- Start the engine and run at idle speed.
- Using a brush, paint the junctions of the ducts downstream of the air-flow meter with soap solution.

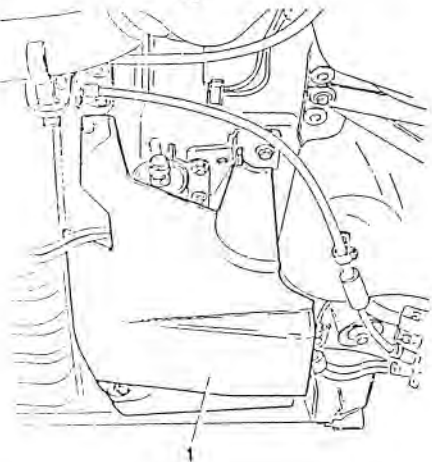
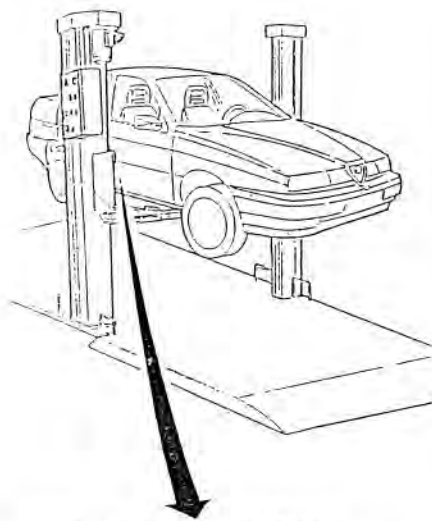


Check that the solution is not sucked into the ducts and that the r.p.m. remain constant.

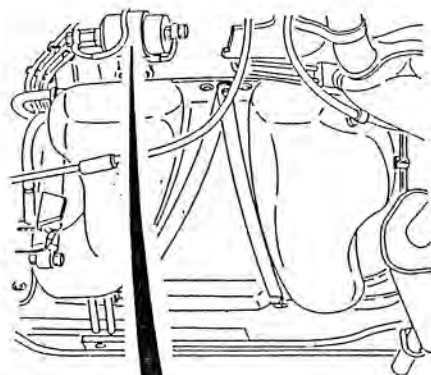


## REPLACING THE FUEL FILTER

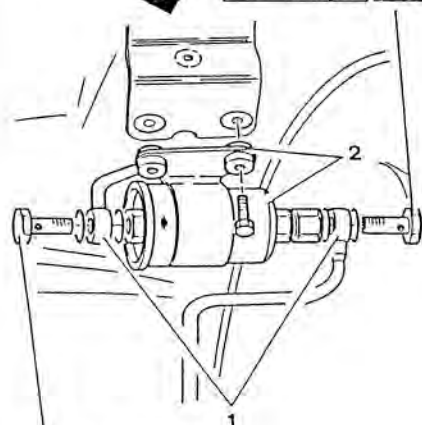
- Place the vehicle on a lift.
  - Start the engine; disconnect the relay from the fuel pump (see GROUP 40) and wait until the engine cuts out through lack of fuel.
1. Raise the vehicle and remove the fuel filter cover.



- Unscrew the inlet and outlet connections carrying fuel to and from the filter.
  - Collect the fuel in a suitable container and plug the ends of the connections without bending or twisting the pipes.
- Remove the fuel filter together with the supporting clamp.



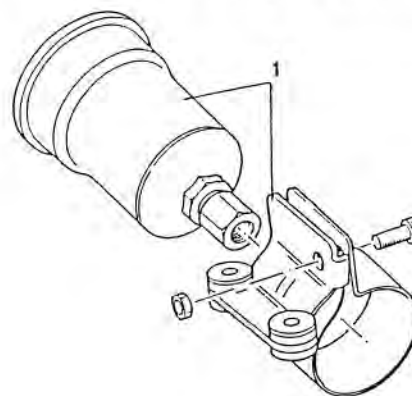
21 ± 26 Nm  
2.1 ± 2.7 kgm



30 ± 37 Nm  
3.1 ± 3.8 kgm



- Separate the fuel filter from the clamp on a bench.



- Fit a new filter by reversing the procedure followed for removal, following the indications given below:
  - replace the copper gaskets on the connections;
  - fit the filter so that the arrow stamped onto it points in the direction in which the fuel will flow.

## CHECKING EXHAUST EMISSIONS



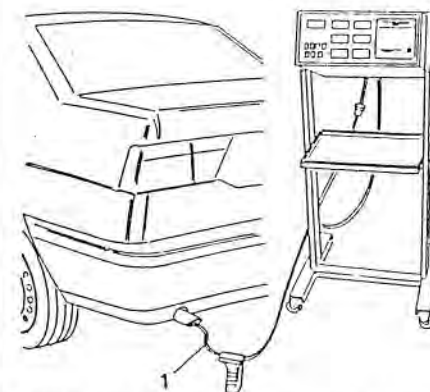
### CAUTION:

This operation should be carried out in the open or in a suitable location which fulfills the requirements of the current local regulations.

**NOTE:** The control must be carried out with the engine at idle speed and at operating temperature (after the electric fan has cut-in and then cut-off again).  
If the idle speed is not within the specified values check the operation of the constant idle speed actuator.

- Check that the engine oil level is correct and that the air cleaner filter cartridge is clean.
  - Start the engine and run it at idle speed.
- Introduce the probe of the analyzer into the end of the exhaust pipe and check that the CO and HC percentages are within the specified limits.

Idle speed	750 ± 50 r.p.m.
% of exhaust CO (volume)	≤ 0.5
Exhaust HC p.p.m.	≤ 50



If after checking the values are not found to be within the specified limits, consult the fault diagnosis located at the end of GROUP 04 - ENGINE MANUAL and refer to the diagnosis procedure employing the specific tool described in the "ELECTRICAL -ELECTRONIC DIAGNOSIS" MANUAL.

**NOTE:** THE CO PERCENTAGE CANNOT BE ADJUSTED!

If the values are not within the specified limits it is necessary to act on the faulty components.

## CHECKING THE LAMBDA PROBE

See "ELECTRICAL - ELECTRONIC DIAGNOSIS" MANUAL.

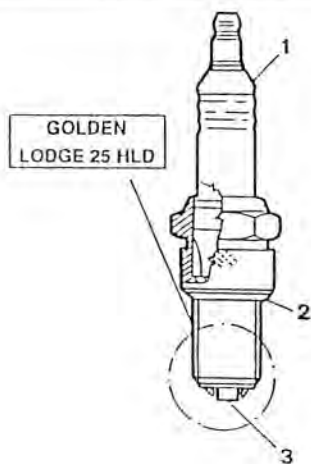


## CHECKING AND REPLACING THE SPARK PLUGS

The spark plugs are installed in series and may be of the surface discharge type with four peripheral points and one central electrode or of the type with one peripheral point and one central electrode.

The distance between electrodes on the first type does not need to be adjusted, but on the second a precise measurement must be maintained.

Firing order	1 - 3 - 4 - 2
--------------	---------------



CHAMPION  
65YCC

0.7 mm



- 1 Ceramic
- 2 Gasket
- 3 Electrode

## MAINTENANCE

Periodically check to see if the electrode is dirty. Also check to see if it is worn or the ceramic insulation broken.

Replace the spark plug if any of these faults are detected.

When refitting, lubricate the threads using ISECO MOLYKOTE A oil and tighten the spark plugs to a torque of:



28 - 34.6 Nm (2.85 - 3.5 kgm)



### CAUTION

Do not use spark plugs of a type or size different from those specified as this may cause damage to the engine and alter the level of toxic exhaust fumes.



### CAUTION

A dirty or burnt out spark plug is often symptomatic of a malfunction in the engine's supply system.

For example:

- Traces of carbon powder: incorrect mixture, air cleaner very dirty;
- Oil stains: infiltrations of oil from the piston rings;
- Ash formation: presence of aluminium material especially in oil;
- Melted electrodes: overheating due to unsuitable combustion, valve defects.
- Fast-wearing electrodes: damaging additives present in the fuel or oil, pinging, overheating;

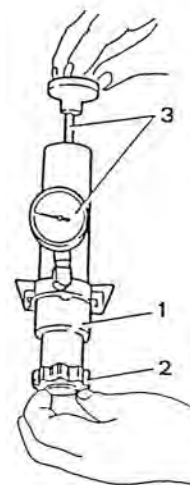
For greater detail regarding these problems refer to the fault diagnosis contained in GROUPS 01 and 04.



## TESTING THE SEAL ON ENGINE COOLING SYSTEM PRESSURIZED CAP

– Use a seal test instrument.

1. Screw the connection onto the lower end of the seal test instrument.
2. Fit the pressurized cap of the expansion tank onto the connection.
3. Pressurize the piston manually and check that the release valve opens at the correct pressure which can be read off the instrument.



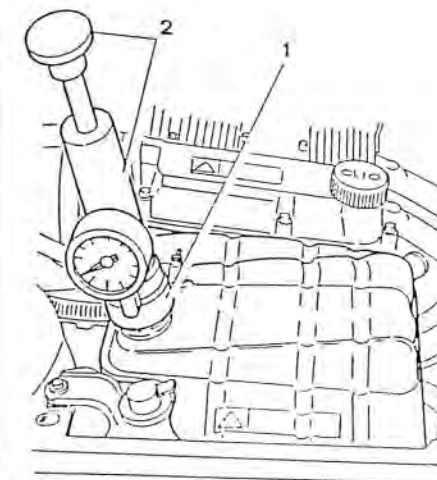
Pressure setting of the pressurized cap

0.98 ± 0.1 bar (1 ± 0.1 kg/cm<sup>2</sup>)

## CHECKING SEALING OF THE ENGINE COOLING SYSTEM

– Unscrew and remove the pressurized cap from the expansion tank.

1. Screw the connection of the test instrument onto the neck of the expansion tank.
2. Pressurize the system manually and check that the pressure is maintained at the prescribed level. If the pressure varies, check that there are no leaks in the sleeves or radiator.



Hydraulic system control pressure

1.08 bar (1.1 kg/cm<sup>2</sup>)



### CAUTION

For safety reasons the pressure during these checks with the test instrument should not exceed 1.38 bars (1.4 kg/cm<sup>2</sup>).

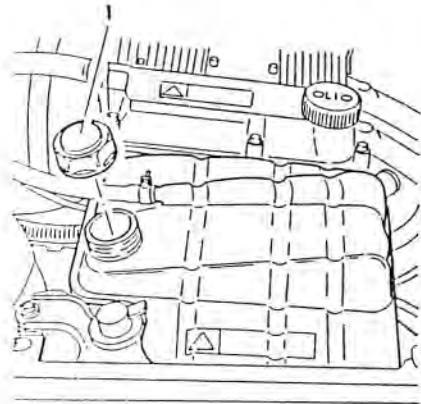


## REPLACING ENGINE COOLANT FLUID

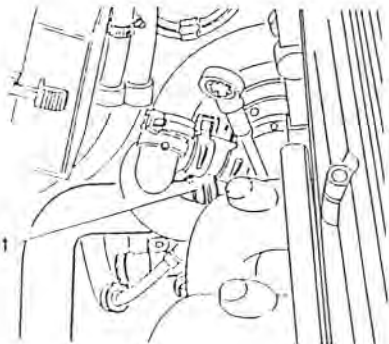
1. Unscrew and remove the cap from the expansion tank.

**CAUTION**

Never remove the cap from the expansion tank when the engine is warm!



1. Loosen the clamps securing the sleeve carrying the engine coolant to the pump from the radiator and disconnect the sleeve. Drain off the engine coolant into a suitable container placed under the vehicle.



- Re-connect the radiator - water pump sleeve and all the hoses which may have been previously disconnected. Check that the clamps are tight.
  - Refill the system up to the MAX level on the expansion tank.
- Indications regarding the quality and quantity of engine fluid to be used for refilling are given in the table below.

Minimum temperature		-40° C
Antifreeze concentrated	Alfa Romeo Antifreeze	4.6 litres (35%)
Distilled water		3.7 litres (45%)
Ready-for-use antifreeze	Alfa Romeo Climatfluid Permanent -40°C	8.3 litres

- Start the engine and run it at normal operating temperature until the opening of the thermostat frees the residual air from the circuit.
- When the engine is cold, top-up to the MAX mark on the expansion tank.
- Screw the pressurized cap back on to the expansion tank and tighten it.

**CAUTION**

It is inadvisable to mix different types of antifreeze.

Do not use rust-proofing additives as they may not be compatible with the antifreeze.



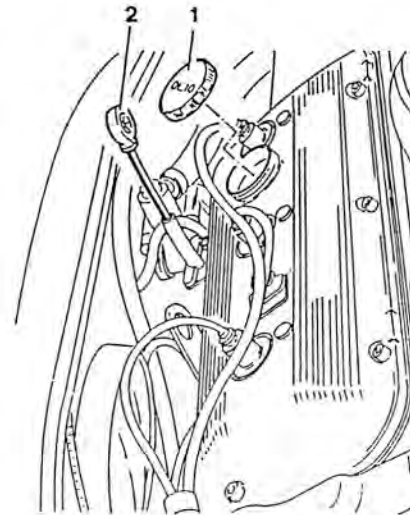
## ENGINE MAINTENANCE OPERATIONS For the V6 engine (AR 67301)

### REPLACING ENGINE OIL AND FILTER

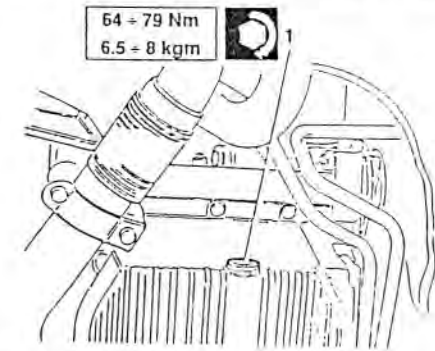
**CAUTION**

Engine oil is harmful to the skin. Keep all contact with the skin to a minimum. Wash off any oil with soap and water.

- Place the vehicle on a lift.
1. When the engine is warm, remove the oil cap.
  2. Remove the oil dipstick.



- Raise the vehicle.
1. Unscrew the drainage plug and let the oil drain off for at least 15 minutes.

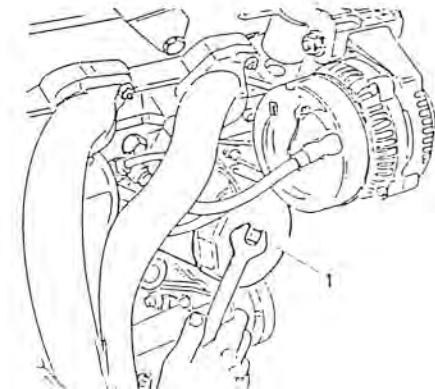
**CAUTION**

Indiscriminate dumping of oil causes environmental pollution. Take the oil to a collection point in your area.

**CAUTION**

The presence of a whitish substance is caused by engine coolant leaking into the oil circuit.  
Low viscosity is caused by dilution with fuel.

1. Working from underneath the vehicle unlock and remove the oil filter using the special tool.





- Clean the drainage plug and screw it back onto the sump along with the relative gasket.
- Lubricate the gasket on the new filter with oil and hand screw it back onto the sump along with the relative gasket.
- Lower the vehicle.
- Refill the system with the specified oil in the quantity indicated.
- Check that the level is correct.

**CAUTION**

The engine oil level should be checked when the vehicle is on level ground. If the oil level exceeds the MAX mark, a loss of pressure will be caused by the excessive evaporation of the oil.

- Screw on the oil cap and run the engine for about 2 minutes, then switch off the engine and wait for a couple of minutes.
- Check the level of the oil and check for leaks.

## TIGHTENING THE CYLINDER HEAD NUTS

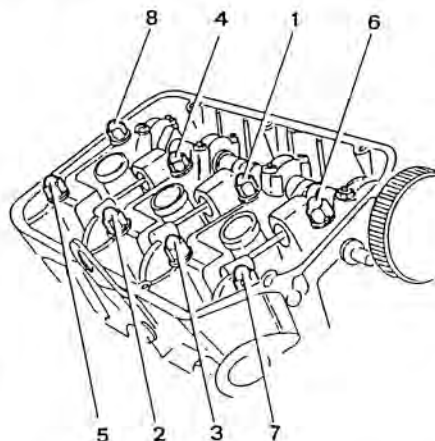
**CAUTION**

The cylinder head nuts should only be tightened when the engine is cold.

- Remove the timing covers (see "CHECKING AND ADJUSTING VALVE CLEARANCE").
- Loosen the nuts by one turn following the sequence indicated in the illustration. Lubricate the surface between the washer and the nut with engine oil and tighten to the following torque:



97.8 - 108.2 Nm  
10 - 11 kgm



**NOTE:** The diagram shows the right-hand head; the tightening order is symmetrical for the left-hand head.

- Refit all the components by reversing the procedure followed for removal.

**NOTE:** When removing or refitting the cylinder head, initially tighten to the following torque:



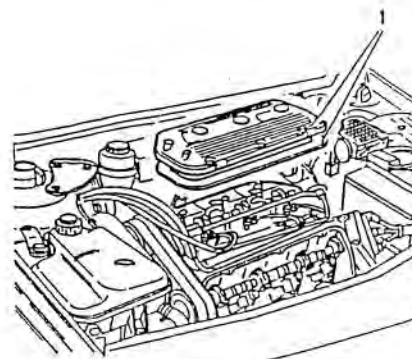
88.5 - 97.8 Nm  
9 - 10 kgm

After bench testing, tighten again as before.



## CHECKING AND ADJUSTING VALVE CLEARANCE

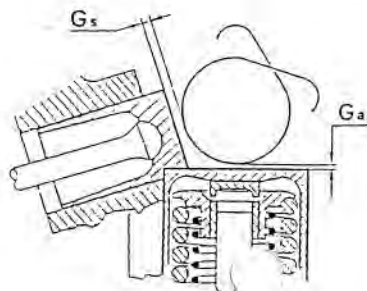
- Carry out the operations given in "REPLACING THE TIMING BELT" up to and including the removal of the timing belt front cover.
1. Remove the timing covers and relative gaskets.



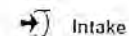
- Suck out the oil from the wells and put it back in the sump.
1. When the engine is cold, check that the clearance between the cam heel radius and the ceiling of the valve cups is within the prescribed values.



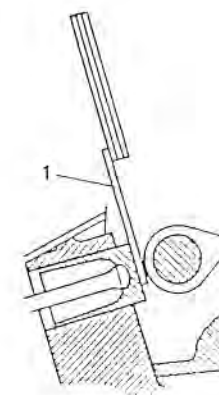
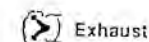
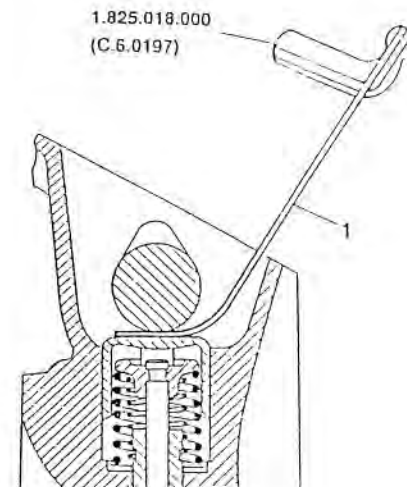
Valve clearance Intake side "G <sub>a</sub> "	0.475 - 0.500 mm
Valve clearance exhaust side "G <sub>s</sub> "	0.310 - 0.345 mm



**NOTE:** To measure the intake valve clearance use feeler gauge N° 1.825.018.000 (C.6.0197).



1.825.018.000  
(C.6.0197)

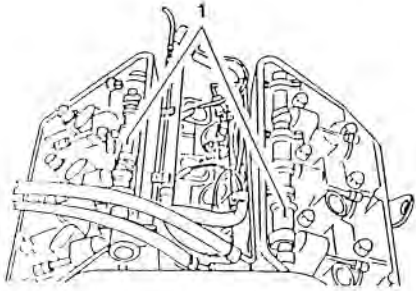




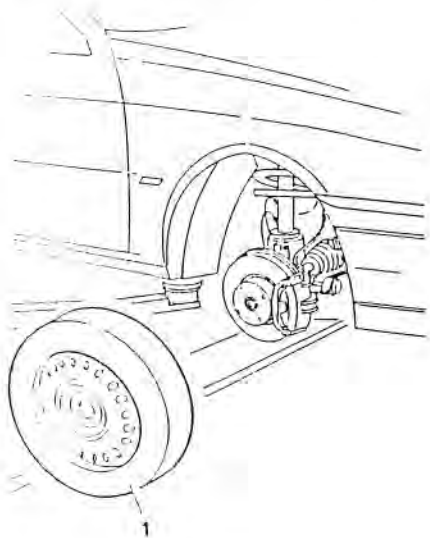
- If the valve clearance is not within the specified values, adjust as follows:

#### Adjusting valve clearance - intake

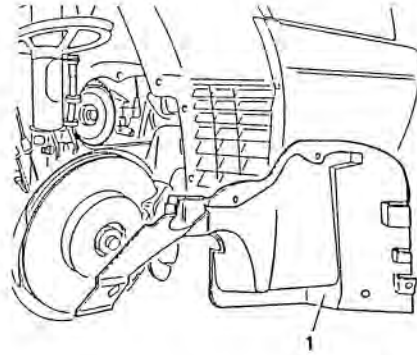
1. Rotate the crankshaft until the reference notches on the camshafts are in line with those on the relative caps.



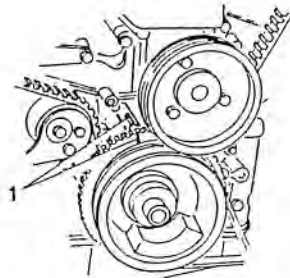
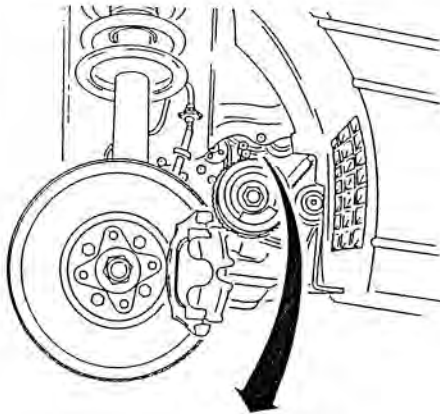
1. Remove the front right-hand wheel.



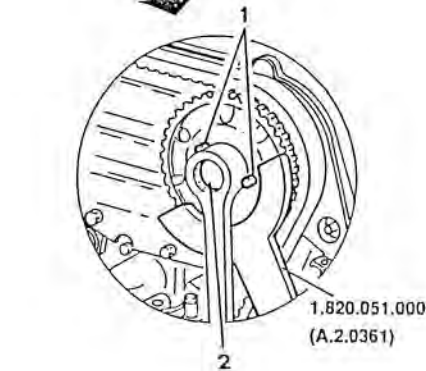
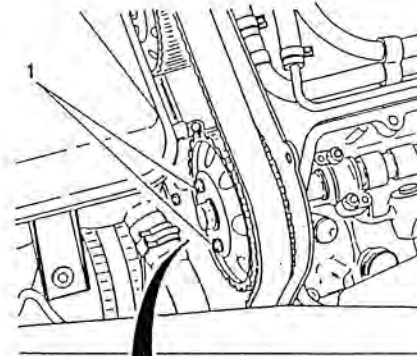
1. Remove the dustcover from the front right-hand wheelhousing.



1. Check that the reference notch on the phonic wheel is aligned with the pin on the front cover of the engine block.



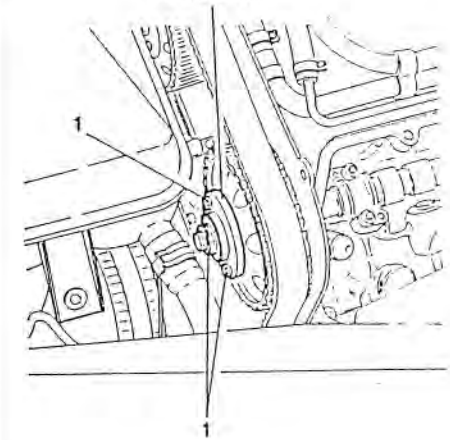
1. Loosen the screws securing the pulley to the supporting hub.
2. Using tool N° 1.820.051.000 (A.2.0361), unlock and remove the nut securing the hub.



- Remove the previously loosened screws securing the pulley to the hub.

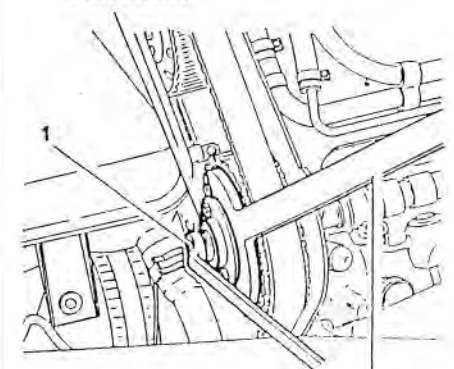
1. Install tool N° 1.820.232.000 on the timing pulley and tighten the three screws on the support hub.

1.820.232.000



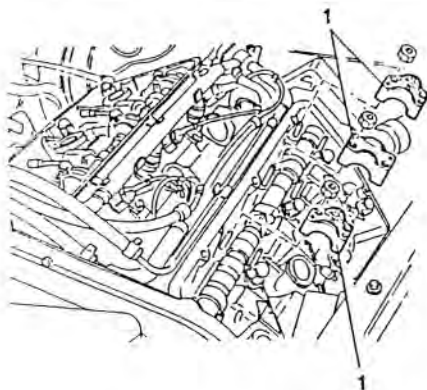
1. Tighten the nut of tool N° 1.820.232.000 and locking the pulley with tool N° 1.820.051.000 (A.2.0361), move the pulley and hub forward until they disengage from the camshaft.

1.820.232.000

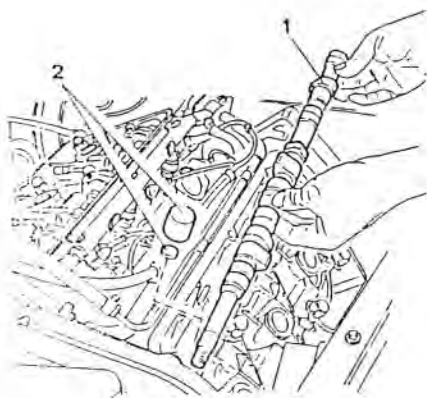
1.820.051.000  
(A.2.0361)



1. Remove the camshaft caps.

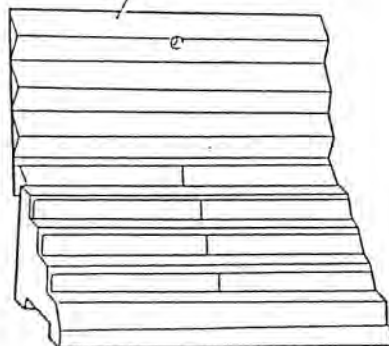


1. Remove the camshaft by lifting it from the rear end.
2. Withdraw a cup and relative valve clearance adjustment cap.

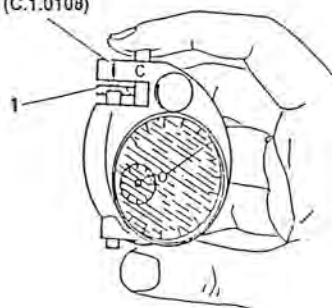


1. Measure the thickness of the caps with the specific dial gauge N° 1.827.002.000 (C.1.0108) and considering the difference in relation to the values measured previously, choose those suitable to re-establish the correct clearance of each valve from series N° 1.820.150.000 (R.9.0001).

1.820.150.000  
(R.9.0001)



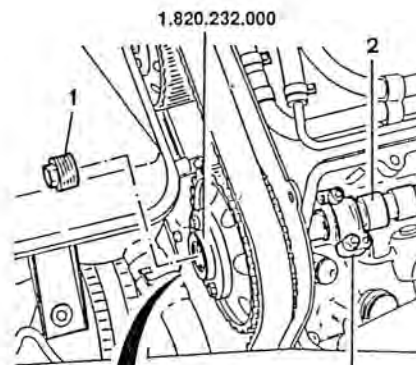
1.827.002.000  
(C.1.0108)



- Install the new cap and valve cup after lubricating with engine oil.
- Proceed in the same way for the remaining pairs of caps and cups.

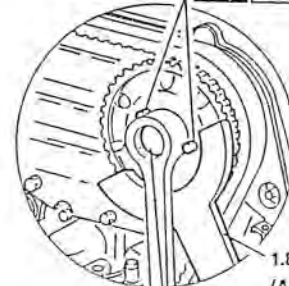


1. Remove the central part of tool N° 1.820.232.000.
2. Install the camshaft checking through the hole in the tool, that the key is correctly positioned.
  - Push the timing drive belt to the initial installation position and remove tool N° 1.820.232.000.
3. Tighten the three screws securing the pulley and the nut securing the hub, to the correct torque by applying a counter-torque with tool N° 1.820.051.000 (A.2.0361).
4. Install the camshaft caps and tighten the nuts to the specified torque.



16 + 18 Nm  
1.63 + 1.84 kgm

13 + 15.69 Nm  
1.32 + 1.6 kgm



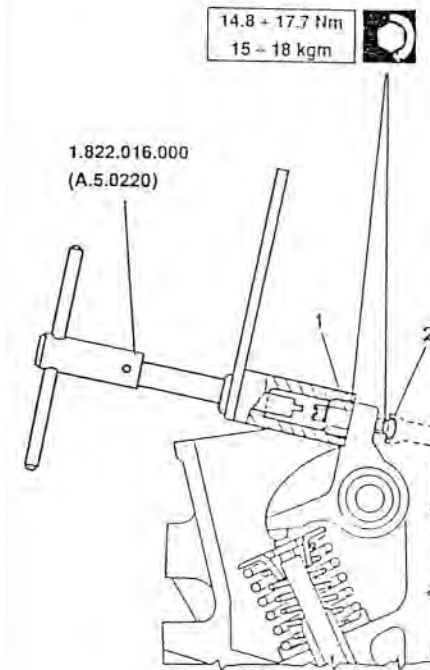
1.820.051.000  
(A.2.0361)

67 + 117.12 Nm  
= 12 kgm

#### Adjusting valve clearance - exhaust

1. Using tool N° 1.822.016.000 (A.5.0220) loosen the counternut locking the regulation screws by acting on the intermediate lever of the tool.
2. Using the same tool act on the regulation screw until the correct clearance is obtained.
  - Lock the counternut and check the valve clearance again.

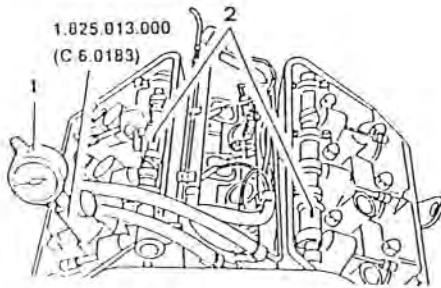
14.8 + 17.7 Nm  
15 - 18 kgm



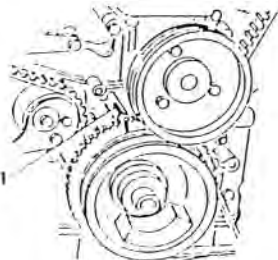
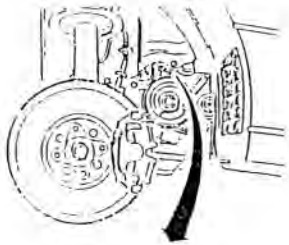




- Before refitting correctly position the camshafts as follows:
- 1. Install tool N° 1.825.013.000 (C.6.0183), fitted with a dial gauge in the spark plug seating of the first cylinder.
- Rotate the crankshaft until the piston of the first cylinder is at T.D.C. in the firing phase.
- 2. Check the alignment of the reference notches on the camshafts with those of the relative caps.



- 1. Check that the notch on the phonic wheel is aligned with the pin on the front cover of the engine block.

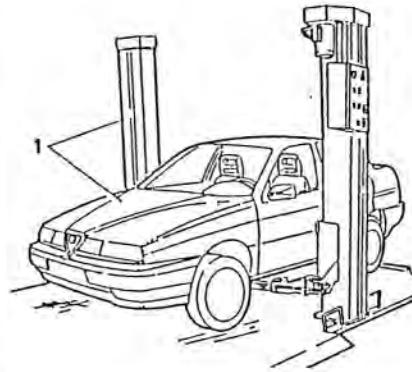


- Refit by reversing the procedure followed for removal.

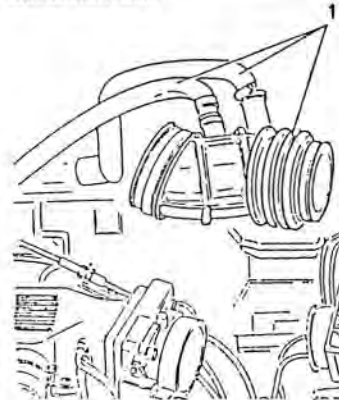
## REPLACING THE TIMING BELT

### Disassembly

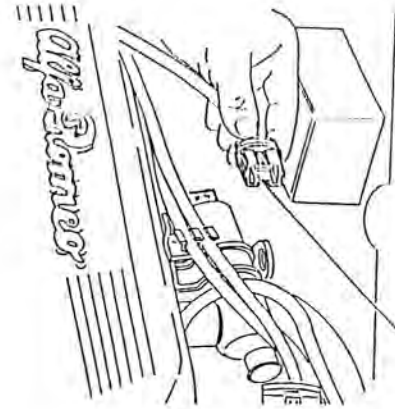
- 1. Place the vehicle on a lift.
- Disconnect the negative cable from the battery.



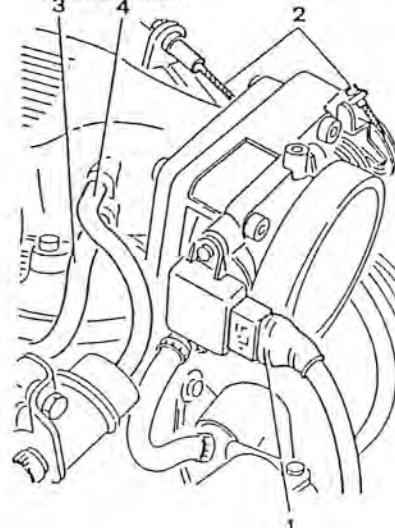
- 1. Remove the corrugated sleeve together with the constant idle speed actuator air intake and oil vapour recirculation hose.



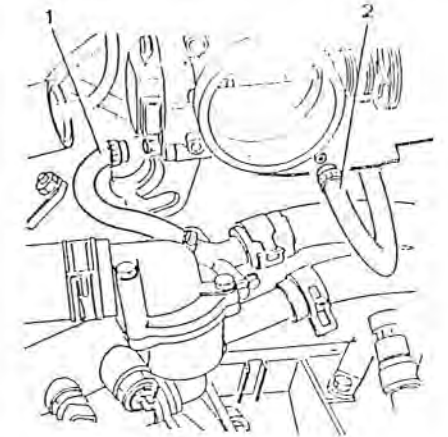
- Disconnect the spark plug cables.
- 1. Disconnect the electrical connection from the constant idle speed actuator.



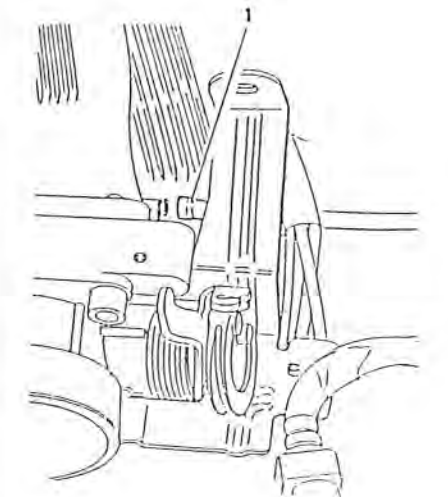
- 1. Disconnect the electrical connection from the throttle valve potentiometer.
- 2. Disconnect the accelerator cable from the throttle valve.
- 3. Disconnect the pressure regulator vacuum intake hose from the air intake box.
- 4. Disconnect the fuel vapour recirculation hose from the air intake box.



- 1. Disconnect the engine coolant delivery hose from the throttle body and plug the ends.
- 2. Disconnect the hose returning the engine coolant to the expansion tank from the throttle body and plug the ends.

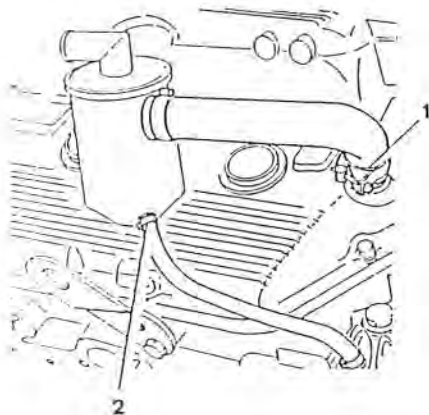


- 1. Disconnect the servo brake vacuum intake hose from the air intake box.

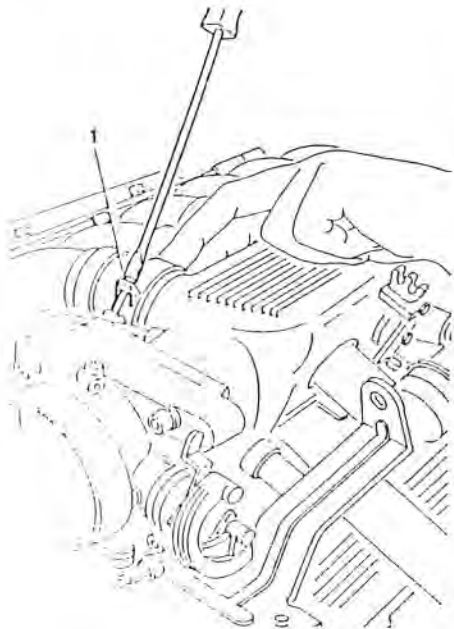




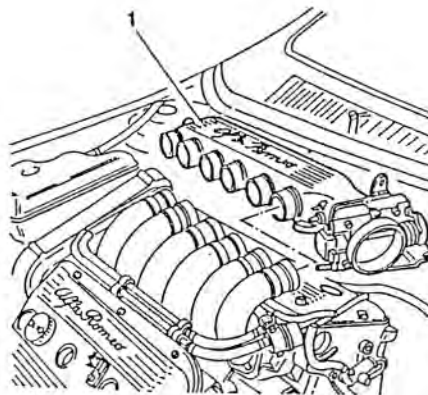
1. Disconnect the oil vapour recovery hose from the timing cover.
2. Disconnect the oil recovery hose from the separator.



1. Loosen the clamps securing the intake ducts to the air intake box.



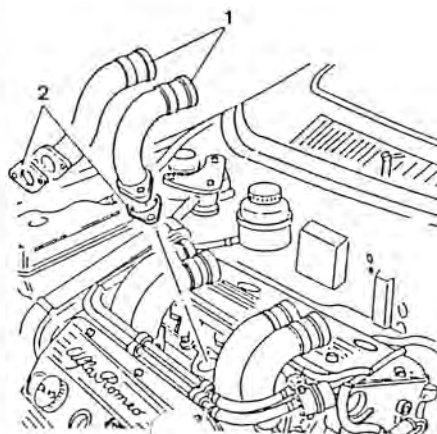
1. Loosen the screws and remove the air intake box after freeing the cables and hoses from the clamps fixed to it.



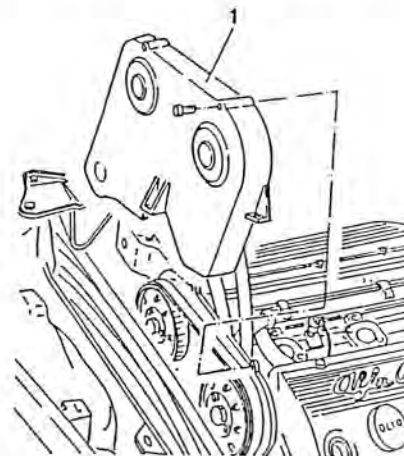
1. Loosen the screws and remove the air intake ducts.
2. Remove the gaskets.

**CAUTION**

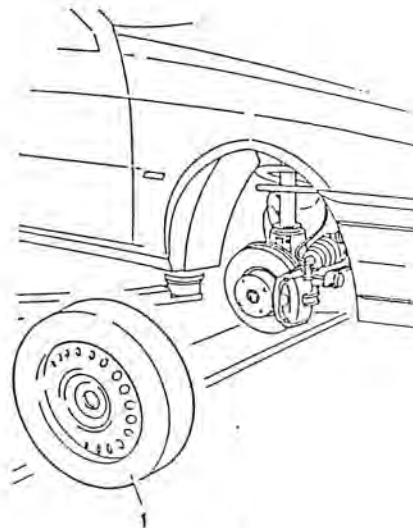
Plug the ends of the intake ducts to prevent foreign bodies from entering.



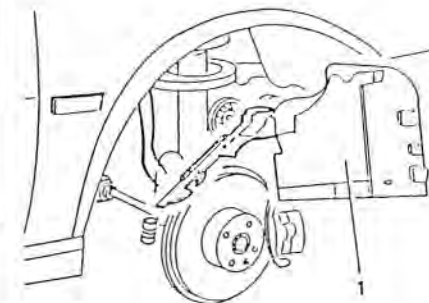
1. Remove the front cover from the timing belt.



1. Remove the front right-hand wheel.

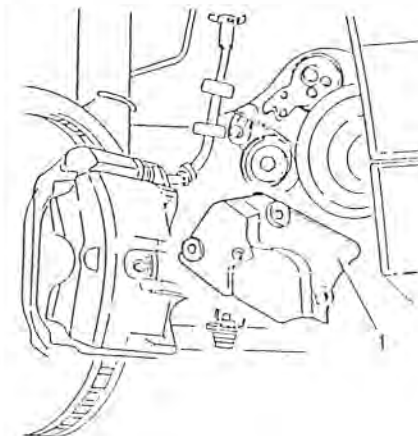


1. Remove the dustcover from the right-hand wheel-housing.



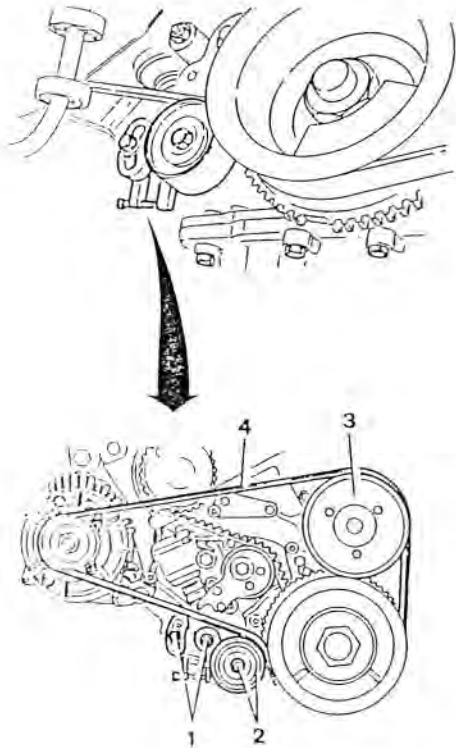
– Raise the vehicle.

1. Remove the cover from the hydraulic belt tensioner.

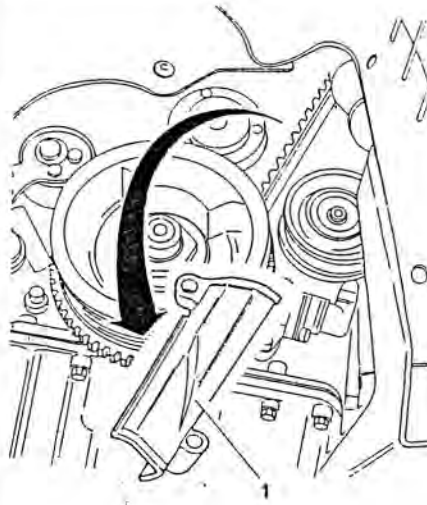




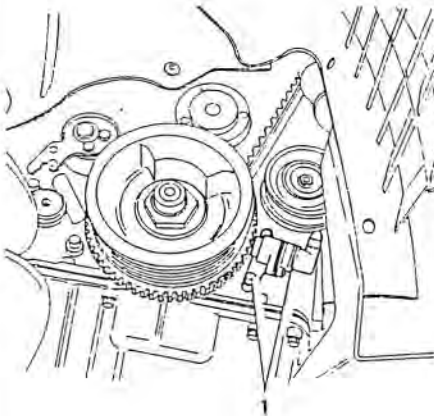
- Remove the air conditioning compressor drive belt. (see specific procedure).
- 1. Loosen the two screws securing the belt tensioner for the water pump - alternator drive belt.
- 2. Loosen the screw and remove the pulley from the tensioner
- 3. Remove the water pump pulley.
- 4. Remove the water pump - alternator drive belt.



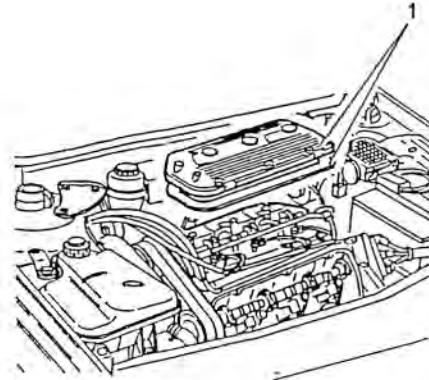
1. Remove the timing belt cover



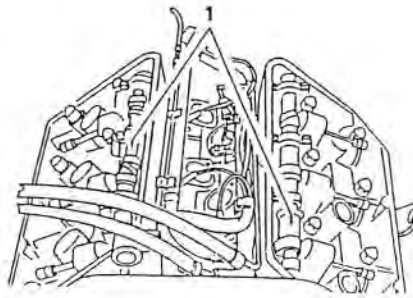
1. Remove the r.p.m. and timing sensor together with its support.



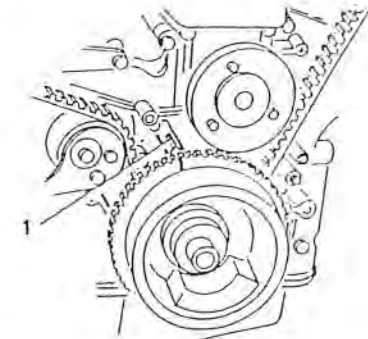
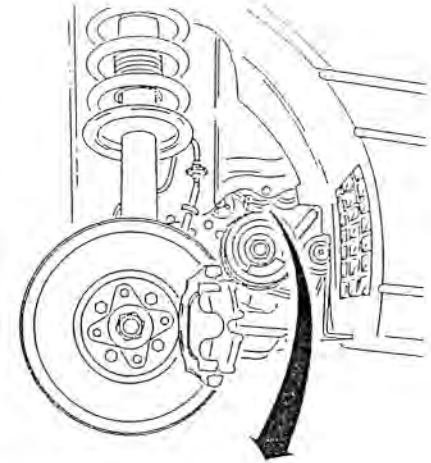
- Lower the vehicle.
- 1. Remove the timing covers and relative gaskets.



1. Rotate the crankshaft until the reference notches on the camshafts and those on the relative caps are in line.



1. Check that the reference notch on the phonic wheel is aligned with the pin on the front cover of the engine block.



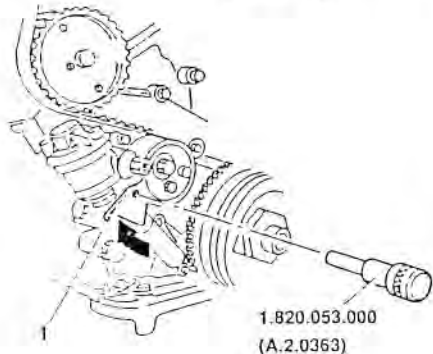
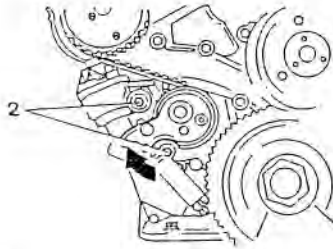
- Raise the vehicle.



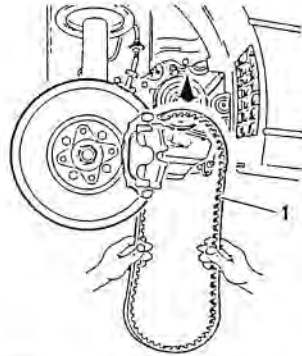
1. Raise the arm of the hydraulic belt tensioner and lock the belt tensioner with tool N° 1.820.053.000 (A.2.0363).

**NOTE:** To insert tool N° 1.820.053.000 (A.2.0363) it is necessary to align the housing hole with the hole on the body of the belt tensioner.

2. Loosen the two nuts securing the body of the belt tensioner to the engine block.
- Rotate the hydraulic belt tensioner upwards and lock it in this position by tightening the previously loosened nuts.



- Lower the vehicle and withdraw the timing belt from its pulleys.
1. Raise the vehicle and remove the timing belt



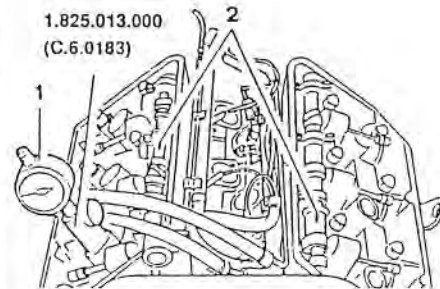
#### Refitting

1. Install tool N° 1.825.013.000 (C.6.0183) fitted with a dial gauge into the seat of the spark plug of the first cylinder.
2. Check that the reference notches on the camshafts are in line with those on the relative caps (cylinder N° 1 at T.D.C. during firing).
- Check that the reference notch on the phonic wheel is in line with the pin on the front cover of the engine block.

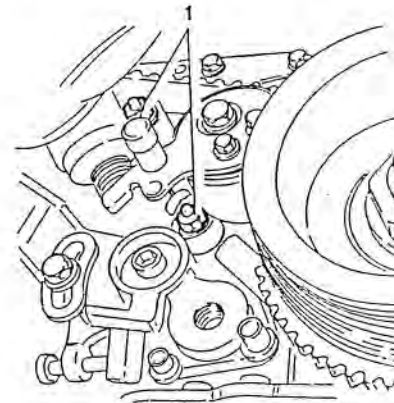


#### CAUTION

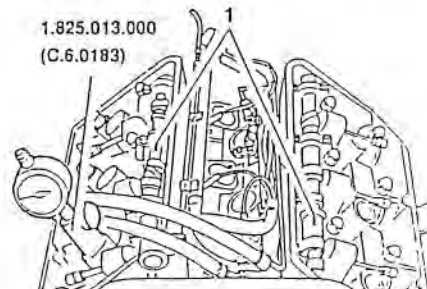
During refitting, check that the above conditions do not vary.



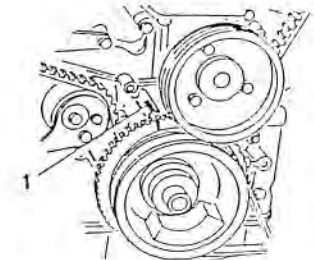
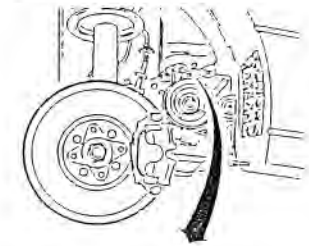
- Slide the timing belt on, keeping the arms taught and following the following order for installation:
  - toothed pulley of crank shaft
  - toothed pulley of left-hand head
  - toothed pulley of right-hand head
  - toothed pulley of oil pump control
  - belt tensioner pulley.
- 1. Loosen the two nuts securing the belt tensioner.
- Rotate the crankshaft in the normal direction of rotation and lock the two nuts securing the tensioner.



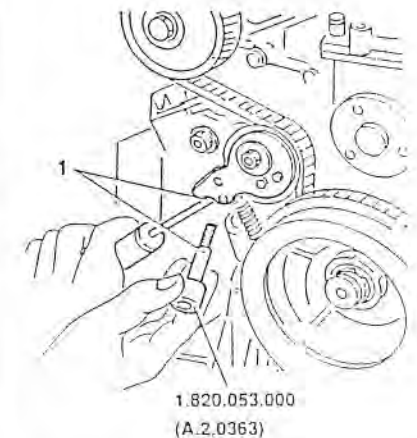
- Rotate the crankshaft in the usual direction of rotation until the piston of the first cylinder is at a T.D.C. during the firing phase.
- 1. Check that the reference notches on the camshafts are in line with those on the relative caps.



1. Check that the reference notch on the phonic wheel is aligned with the pin on the front cover of the engine block.



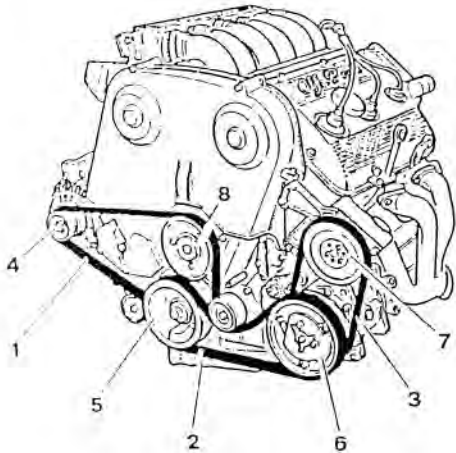
1. Slightly raise the arm of the belt tensioner and remove tool N° 1.820.053.000 (A.2.0363).



- Complete the refitting operations by reversing the procedures followed for removal



## AUXILIARY UNIT BELTS



1. Water pump-alternator drive belt
2. Air conditioning compressor drive belt
3. Power steering pump drive belt
4. Alternator
5. Engine pulley
6. Air conditioning compressor
7. Power steering pump
8. Water pump

**NOTE:** When checking the tensioning of the belt, visually check its condition ensuring that it shows no signs of:

- cuts
- cracks
- superficial wearing of the material (which appears smooth and shiny)
- dry or hardened parts (loss of adherence).

If any of these conditions is found, replace the belt.

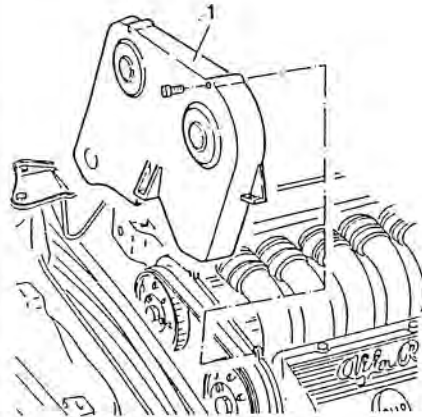


**CAUTION:**  
If the belt comes into contact with oil or solvent the elasticity of the belt may be affected which will reduce its adherence.

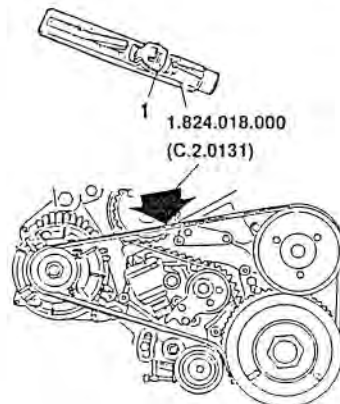
## WATER PUMP - ALTERNATOR DRIVE BELT

## Checking and tensioning

1. Remove the front cover from the timing belt.



1. Working in the engine compartment, measure the tension on the belt using tool N° 1.824.018.000 (C.2.0131), as shown in the illustration.



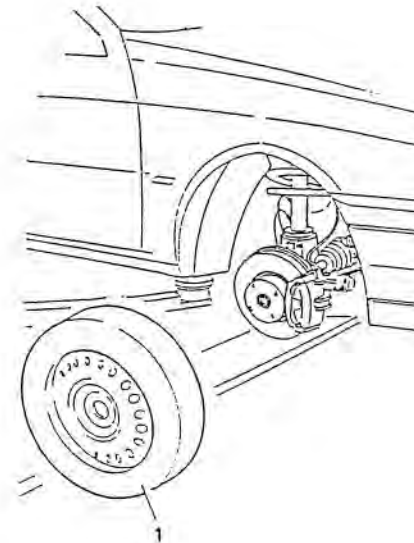
- Check that the tension values are within the specified limits.

## Water pump - alternator control "POLY-VK5" belt tension

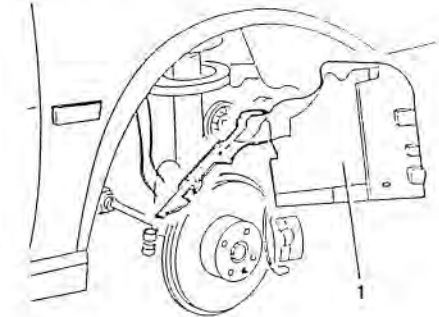
During installation	400 - 450 N
Minimum	300 N
Re-tensioning	300 - 350 N

- NOTE:** The belt can be re-tensioned after a brief testing period, operating as follows:
- run the engine until it reaches normal operating temperature
  - run the engine for about 10 minutes
  - switch off the engine and wait until it cools
  - re-tighten the belt to the correct value.

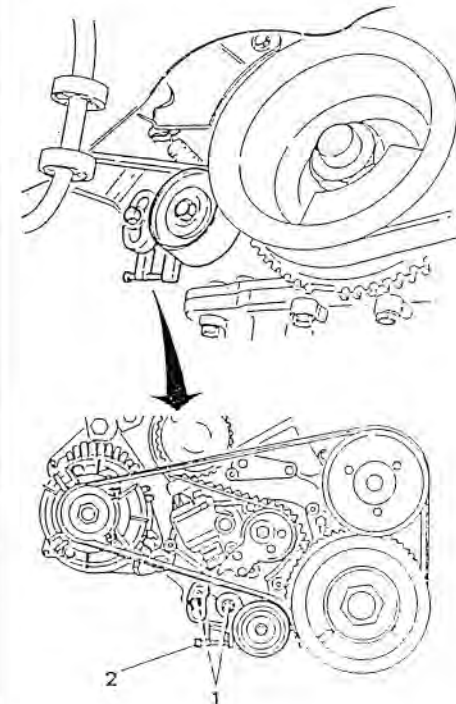
- If the belt is not correctly tightened, proceed as follows:
  - Place the vehicle on a lift.
1. Remove the front right-hand wheel.



1. Remove the the central engine protection moulding through the right-hand wheelhousing.

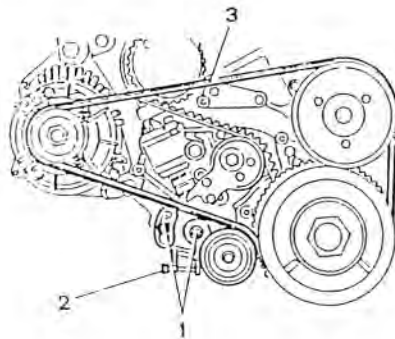


- Raise the vehicle.
1. Loosen the two screws securing the belt tensioner.
  2. Adjust the micrometric tensioning screw until the specified belt tension is obtained.
- Tighten the two screws securing the belt tensioner.

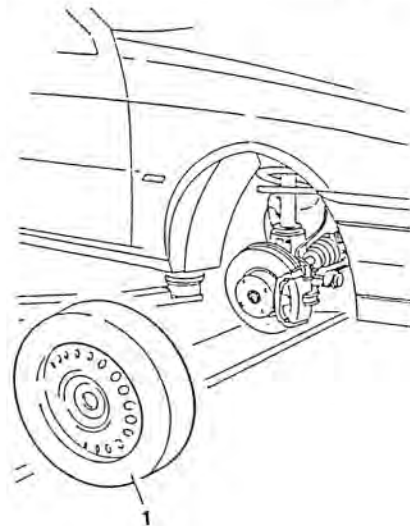


**Substitution**

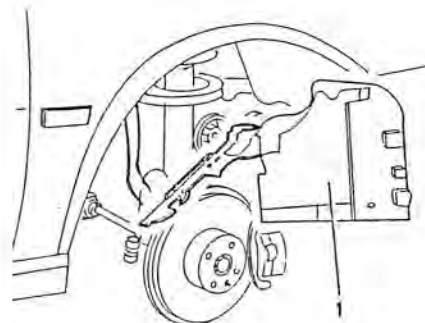
- Place the vehicle on a lift.
- Remove the air conditioning compressor drive belt (see specific procedure).
- 1. Loosen the two screws securing belt tensioner.
- 2. Adjust the micrometric tensioning screw in order to reduce belt tension.
- 3. Remove the water pump - alternator drive belt.
- Fit a new belt by reversing the procedure followed for removal.

**AIR CONDITIONING COMPRESSOR DRIVE BELT****Checking and tensioning**

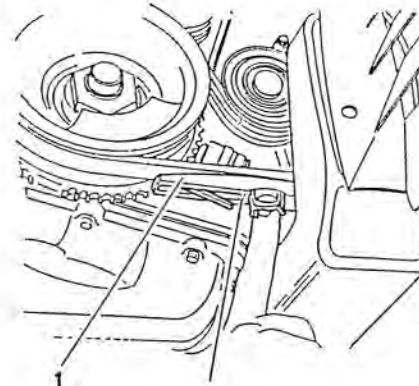
- Place the vehicle on a lift.
- 1. Remove the front right-hand wheel.



1. Remove the central engine protection moulding through the right-hand wheel housing.



- Raise the vehicle.
- 1. Working underneath the vehicle, insert tool N° 1.824.018.000 (C.2.0131), as shown in the illustration.

1.824.018.000  
(C.2.0131)

- Check that the tension values measured with the specific tool, are within the prescribed limits.

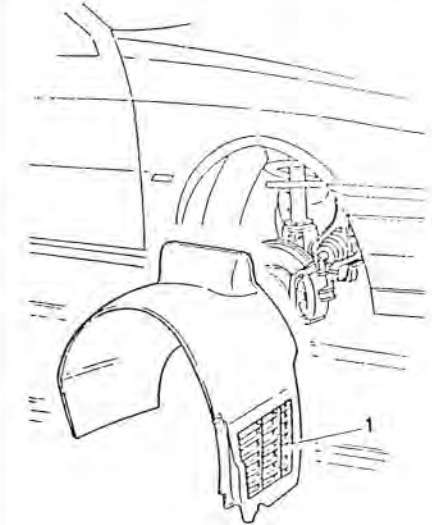
**Air conditioning compressor "POLY-VK6" drive belt tension**

During installation	550 - 600 N
Minimum	450 N
Re-tensioning	450 - 500 N

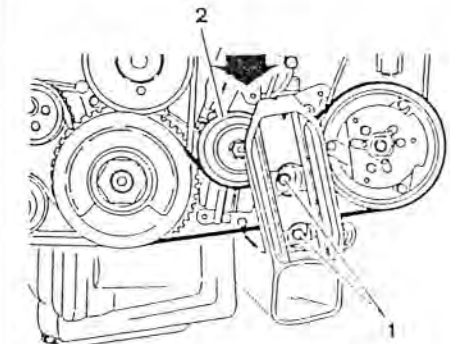
**NOTE:** The belt can be re-tensioned after a brief testing period, operating as follows:

- run the engine until it reaches normal operating temperature
- run the engine for about 10 minutes
- switch off the engine and wait until it cools
- re-tighten the belt to the correct value.

- If the belt is not correctly tightened, proceed as follows:
- 1. Remove the front right-hand wheelhousing.



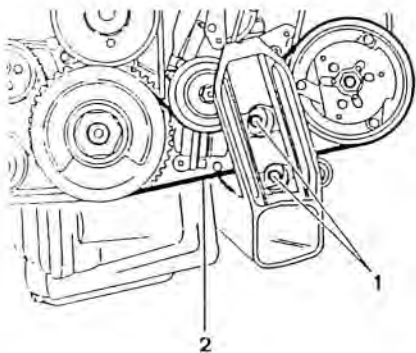
1. Loosen the two screws securing the belt tensioner.
  2. Move the belt tensioner downwards to increase the tension on the belt.
- Tighten one of the screws securing the tensioner and check the tension on the belt.
  - If the tension is correct, tighten the other screw securing the tensioner.





## Substitution

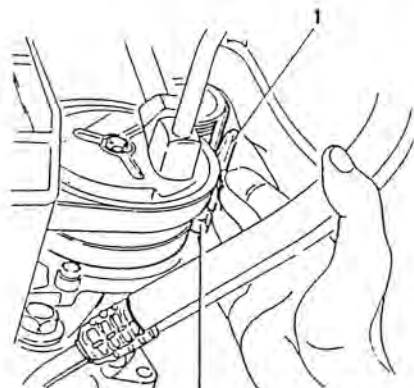
- Place the vehicle on a lift.
- Remove the front right-hand wheel.
- Remove the central engine protection moulding from the right-hand wheel housing.
- Raise the vehicle.
- 1 Loosen the two screws securing the belt tensioner.
- 2 Remove the air conditioning compressor drive belt.
- Fit a new belt by reversing the procedure followed for removal.



## POWER STEERING PUMP DRIVE BELT

## Checking and tensioning

- Place the vehicle on a lift and raise it.
- 1 Working from under the vehicle, insert tool N° 1.824.018.000 (C.2.0131), as shown in the illustration.



1.824.018.000  
(C.2.0131)

- Check that the tension values measured with the specific tool are within the specified limits.

## Power steering pump "POLY-VK4" drive belt tension

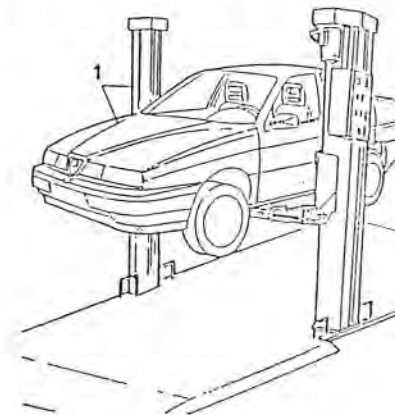
During installation	350 - 400 N
Minimum	250 N
Re-tensioning	250- 300 N

- NOTE:** The belt can be re-tensioned after a brief testing period, operating as follows:
- run the engine until it reaches normal operating temperature
  - run the engine for about 10 minutes
  - switch off the engine and wait until it cools
  - re-tighten the belt to the correct value.

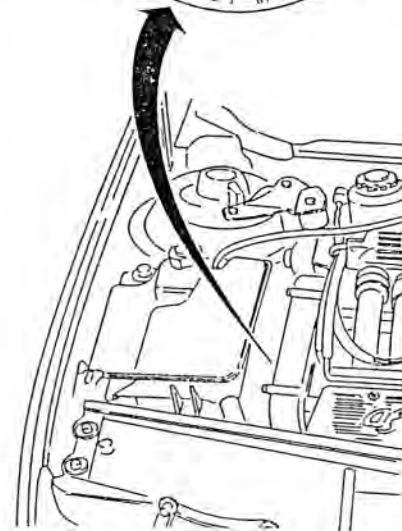


## Substitution

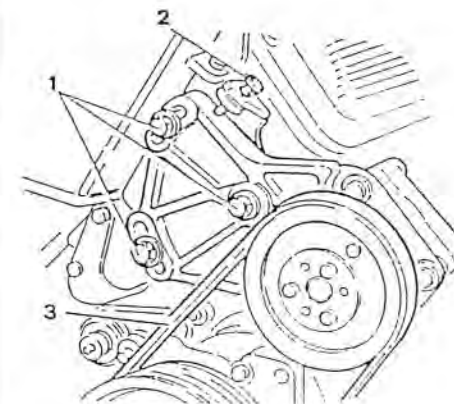
1. Place the vehicle on a lift.



- If the belt is not correctly tightened, proceed as follows:
- 1. Working in the engine compartment loosen the screws securing the power steering pump support bracket.
- 2. Adjust the micrometric tensioning screw until the correct belt tension is obtained.
- Tighten the screws securing the power steering support bracket.



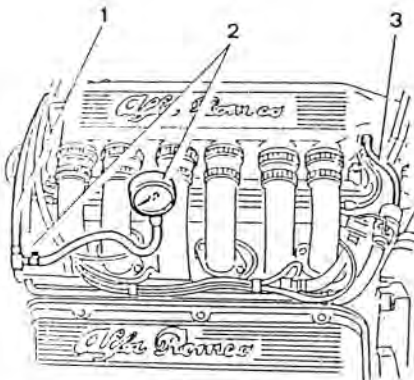
- Remove the air conditioning compressor drive belt (see specific procedure).
- Lower the vehicle.
- 1. Working in the engine compartment loosen the screws securing the power steering pump support bracket.
- 2. Adjust the micrometric tensioning screw to reduce the belt tension.
- 3. Remove the power steering pump drive belt.
- Fit a new belt by reversing the procedure followed for removal.





## CHECKING PRESSURE AND SEALING OF FUEL CIRCUIT

1. Disconnect the fuel delivery hose from the supply manifold.
2. Connect a pressure meter and a "T" union to the ends of the previously disconnected inlet hose.
3. Disconnect the pressure regulator vacuum intake hose from the air intake box in order to prevent variations in engine r.p.m. from influencing the readings.



- Start the engine and run at idle speed and check that the pressure of the fuel is within the specified limits.



Fuel pressure at idle speed

2.8 - 3.2 bars (2.9 - 3.3 kg/cm<sup>2</sup>)

- Re-connect the vacuum intake hose to the air intake box. At idle speed the pressure must decrease by 0.5 bars and then increase when the throttle valve opens. If this does not happen, check for leaks in the vacuum intake hose of the fuel pressure regulator.

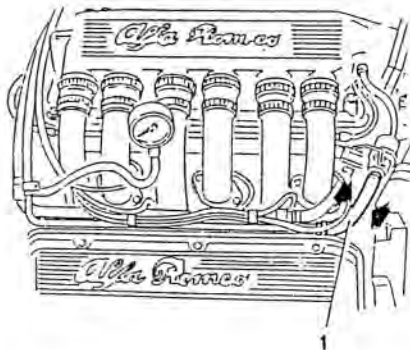
**NOTE:** When fuel is visibly leaking or there is a persistent smell of petrol, test the sealing of the fuel supply circuit.



### CAUTION:

Keep a fire extinguisher to hand in case fuel is leaking.  
Do not smoke.

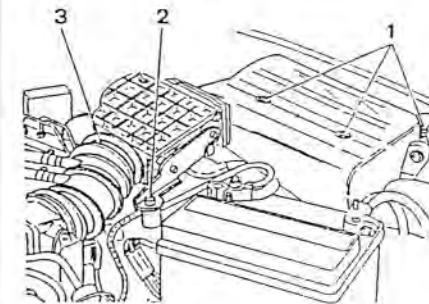
1. With the pressure meter connected to the engine when running at idle speed, squeeze the hose just after the pressure regulator and check that the pressure increases to approximately 4 bars. Do not let the pressure exceed this value.



## CHECKING SEALING OF FUEL VAPOUR RECOVERY SYSTEM

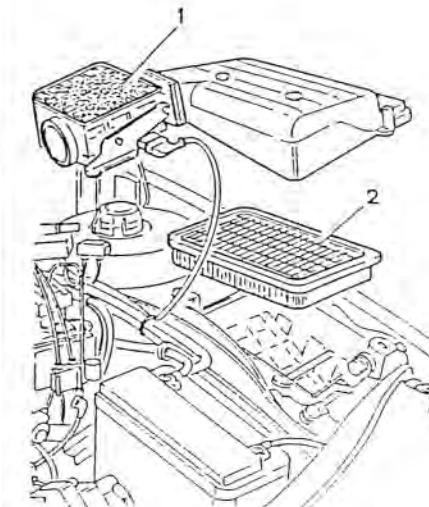
## REPLACING AIR CLEANER CARTRIDGE

1. Loosen the screws securing the air cleaner cover.
2. Loosen the screw securing the air-flow meter support bracket.
3. Disconnect the corrugated sleeve from the air-flow meter after loosening the relative clamp.



**DUE FOR PUBLICATION**

1. Lift the air-flow meter - filter cover assembly without disconnecting the air-flow meter from its electrical connection.
2. Remove the filter element.





**CAUTION:**

Any attempt to clean the air cleaner filter may result in damage to the filter and compromise the correct functioning of the engine supply system.

- Carefully clean the container holding the filter element.
- Position a new filter element.
- Refit the filter cover - air-flow meter assembly by reversing the procedure followed for removal.

**NOTE:** If the filter shows signs of oil contamination, check the entire circuit for possible infiltrations.

### CHECKING SEALING OF THE AIR CIRCUIT

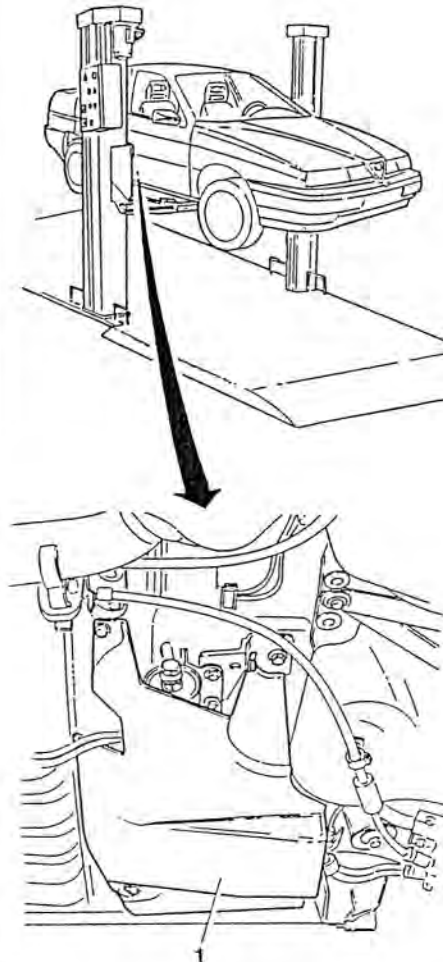
- Start the engine and run at idle speed.
- Using a brush, paint the junctions of the ducts downstream of the air-flow meter with soap solution.



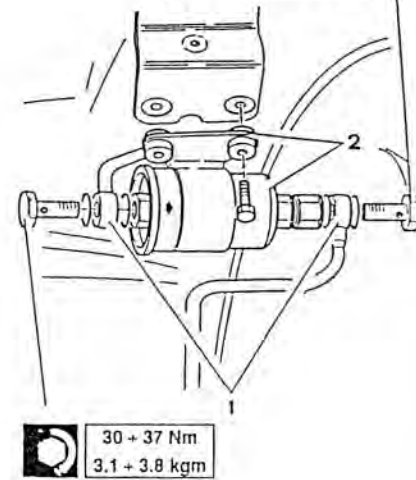
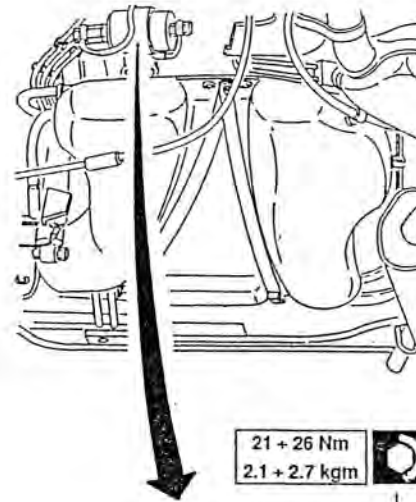
Check that the solution is not sucked into the ducts and that the r.p.m. remains the same.

### REPLACING THE FUEL FILTER

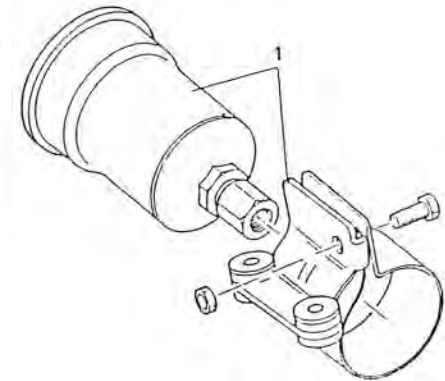
- Place the vehicle on a lift.
  - Start the engine and disconnect the relay from the fuel pump (see GROUP 40) and wait until the engine cuts out through lack of fuel.
1. Raise the vehicle, and remove the fuel filter cover.



1. Unscrew the inlet and outlet connections carrying fuel to and from the filter.
  - Collect the fuel in a suitable container and plug the ends of the connections without bending or twisting the pipes.
2. Remove the fuel filter together with the supporting clamp.



1. Separate the fuel filter from the clamp on a bench.



- Fit a new filter by reversing the procedure followed for removal and following the indications given below:
  - replace the copper gaskets on the connections;
  - fit the filter so that the arrow stamped onto it points in the direction in which the fuel will flow.

### CHECKING EXHAUST EMISSIONS

**CAUTION:**

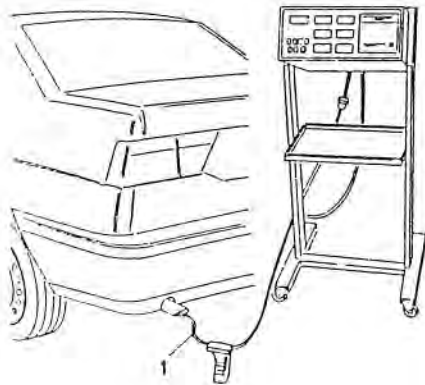
This operation should be carried out in the open or in a suitable location which fulfills the requirements of the current local regulations.

**NOTE:** The control must be carried out at with the engine idle speed and at operating temperature (after the electric fan has cut-in and then cut-off again).  
If the idle speed is not within the specified values, check the operation of the constant idle speed actuator.



- Check that the engine oil level is correct and that the air cleaner filter cartridge is clean.
- Start the engine and run it at idle speed.
- 1. Introduce the probe of the analyzer into the end of the exhaust pipe and check that the CO and HC percentages are within the specified limits.

Idle speed		750 ± 50 r.p.m.
% of exhaust CO (volume)		≤ 0.5
Exhaust HC	p.p.m.	≤ 50



If, after checking, the values are not found to be within the specified limits, consult the fault diagnosis located at the end of GROUP 04 - ENGINE MANUAL and refer to the diagnosis procedures employing the specific tool described in the "ELECTRICAL - ELECTRONIC DIAGNOSIS" MANUAL.

**NOTE: THE CO PERCENTAGE CANNOT BE ADJUSTED!**

If the values are not within the specified limits it is necessary to act on the faulty components.

## CHECKING THE LAMBDA PROBE

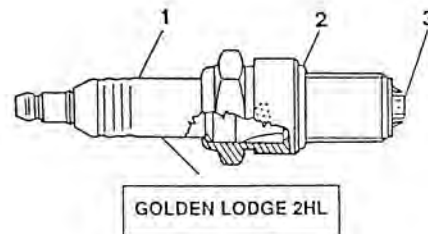
see "ELECTRICAL - ELECTRONIC DIAGNOSIS" MANUAL.

## CHECKING AND REPLACING THE SPARK PLUGS

The spark plugs are installed in series and are of the surface discharge type with four peripheral points and once central electrode.

The distance between electrodes on this type of spark plug does not need to be adjusted.

Firing order	1 - 4 - 2 - 5 - 3 - 6
--------------	-----------------------



1. Ceramic
2. Gasket
3. Electrode



### CAUTION:

Do not use spark plugs of a type or size different from those specified as this may cause damage to the engine and alter the level of toxic exhaust fumes.



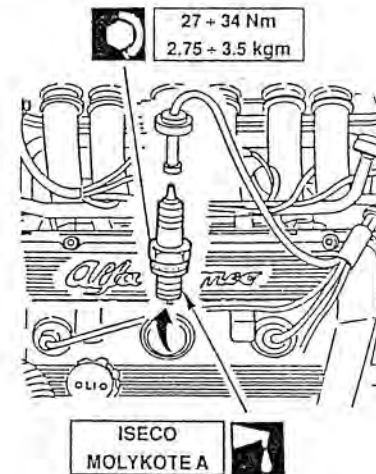
## MAINTENANCE

Periodically check to see if the electrode is dirty.

Also check to see if it is worn or the ceramic insulation broken.

Replace the spark plugs if any of these faults are detected.

When refitting, lubricate the threads using the prescribed oil and tighten to the specified torque.



### CAUTION:

A dirty or burnt out spark plug is often symptomatic of a malfunction in the engine's supply system.

For example:

- Traces of carbon powder: incorrect mixture, air cleaner very dirty;
- Oil stains: infiltrations of oil from the piston rings;
- Ash formation: presence of aluminium material especially in oil;
- Melted electrodes: overheating due to unsuitable combustion, valve defects;

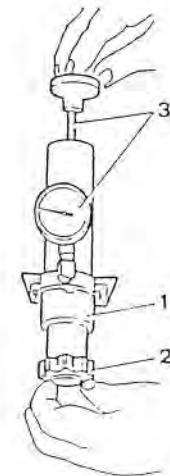
- Fast-wearing electrodes: damaging additives present in the fuel or oil, pinging, overheating.

For greater detail regarding these problems, refer to the fault diagnosis contained in GROUPS 01 and 04.

## TESTING THE SEAL ON THE ENGINE COOLING SYSTEM PRESSURIZED CAP

- Use a seal test instrument.

1. Screw the connection onto the lower end of the seal test instrument.
2. Fit the pressurized cap of the expansion tank onto the connection.
3. Pressurize the piston manually and check that the release valve opens at the correct pressure which can be read off the instrument.



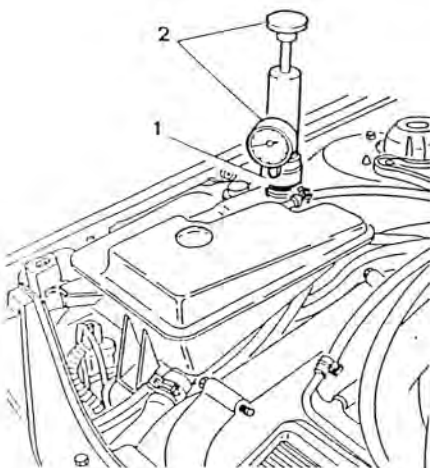
Pressure setting of the pressurized cap

0.98 ± 0.1 bars (1 ± 0.1 m<sup>2</sup>)



## CHECKING THE SEALING OF THE ENGINE COOLING SYSTEM

- Unscrew and remove the pressurized cap from the expansion tank.
- 1 Screw the connection of the test instrument onto the neck of the expansion tank.
- 2 Pressurize the system manually and check that the pressure is maintained at the prescribed level. If the pressure varies, check that there are no leaks in the sleeves or radiator.



Hydraulic system control pressure

1.08 bars (1.1 kg/cm<sup>2</sup>)



### CAUTION:

For safety reasons, the pressure during these checks with the test instrument should not exceed 1.38 bars (1.4 kg/cm<sup>2</sup>).

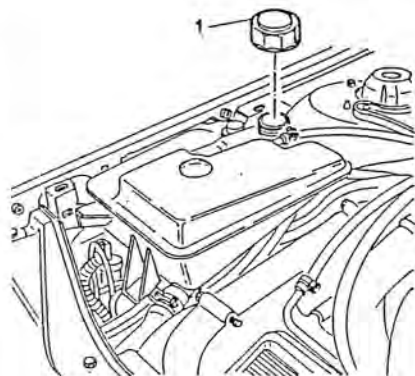
## REPLACING ENGINE COOLANT FLUID

1. Unscrew and remove the cap from the expansion tank.

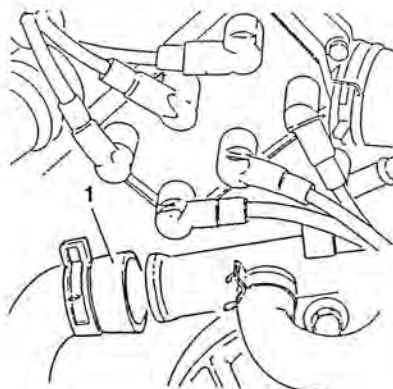


### CAUTION:

Never remove the cap from the expansion tank when the engine is warm!



1. Loosen the clamps securing the sleeve carrying the engine coolant to the pump (from the radiator) and disconnect the sleeve. Drain off the engine coolant into a suitable container placed under the vehicle.



Minimum temperature		-40°C
Antifreeze concentrated	Alfa Romeo Antifreeze	5.0 litres (55%)
Distilled water		4.2 litres (45%)
Ready-for-use antifreeze	Alfa Romeo Climaf fluid Permanent - 40°C	9.2 litres

- Start the engine and run at normal operating temperature until the opening of the thermostat frees the residual air from the circuit.
- When the engine is cold, top-up to the MAX mark on the expansion tank.
- Screw the pressurized cap back onto the expansion tank and tighten it.



### CAUTION:

It is inadvisable to mix different types of antifreeze.

Do not use rust-proofing additives as they may not be compatible with the antifreeze.

- Re-connect the radiator sleeve and any previously disconnected hoses and check that all the clamps are tight.
  - Refill the system up to the MAX mark on the expansion tank.
- Indications regarding the quality and quantity of the engine coolant fluid to be used for refilling, are given in the table below.

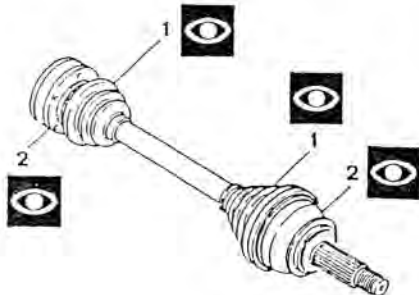


## MAINTENANCE OF MECHANICAL UNITS

### CHECKING FOR DAMAGE OF THE HALFSHAFT, POWER STEERING BELLOWS AND STEERING KNUCKLES

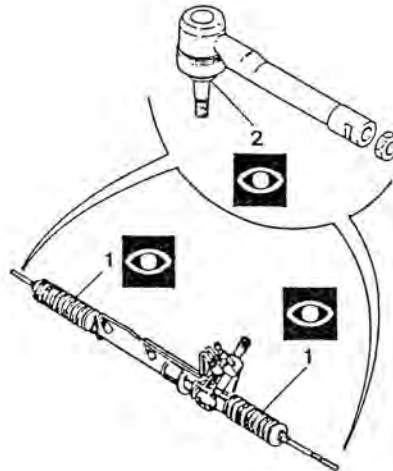
#### DRIVE SHAFTS

1. Check that the rubber boots are not damaged and that grease is not seeping from them. Overhaul the entire joint if any breakage is discovered as foreign matter may have penetrated which would result in serious malfunctions.
  2. Visually check the constant speed joints.
- If it becomes necessary to overhaul components, refer to REPAIR INSTRUCTIONS - MECHANICAL UNITS - GROUP 17.



#### STEERING RODS

1. Ensure that the protective boots are not damaged and if cracks or nicks are discovered, replace the boots.
  2. Check that the knuckle joints are not damaged or worn.
- If necessary replace the components, see: REPAIR INSTRUCTIONS - MECHANICAL UNITS - GROUP 23.



## BRAKING CIRCUIT SEALING TEST

1. Check pipes and hoses: they must not be damaged or show signs of swelling or corrosion. Also check that they are correctly installed.
2. Check the connections: there must be no leaks. If necessary tighten to the correct torque.
3. Check that the servo brake vacuum intake hose is correctly installed and not cracked or pinched.

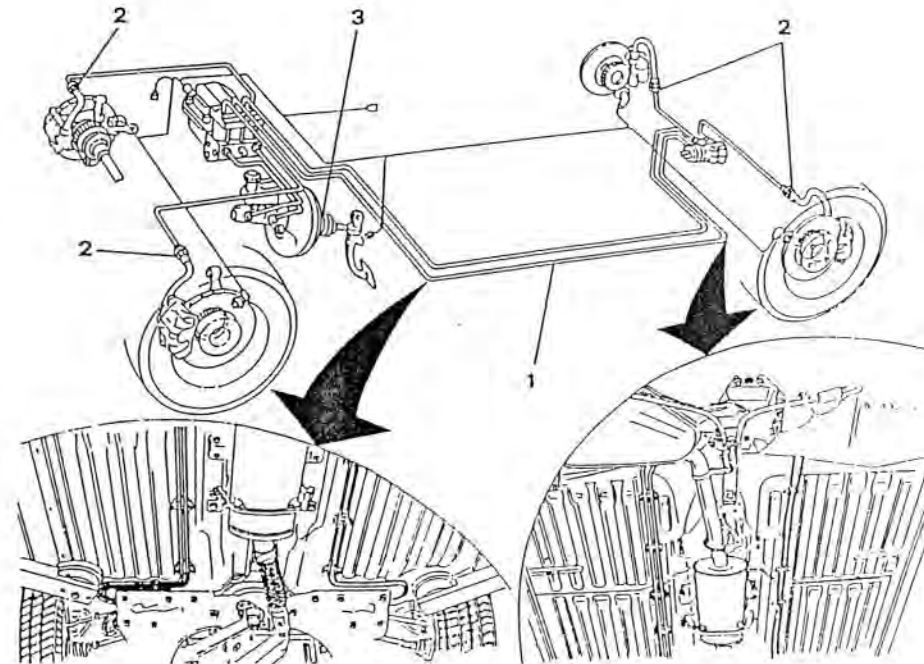
- Replace any damaged parts and bleed the system. (see: REPAIR INSTRUCTIONS - MECHANICAL UNITS - GROUP 22).



#### WARNING:

Clutch/brake fluid will damage paintwork and should be handled with care.

NOTE: The brake system must be bled if any part is disassembled or replaced (see GROUP 22).





## CHECKING THE LEVEL OF THE CLUTCH/BRAKE FLUID

**WARNING:**

Ensure that the fluid does not come into contact with the paintwork.

**NOTE:** When checking the level of the clutch/brake fluid the vehicle must be resting on a level surface.

- 1 Remove the cap from the brake clutch fluid reservoir
- 2 Ensure that the fluid reaches the MAX mark.
- 3 If necessary fill the reservoir with the prescribed fluid.  
If the level is very low, carefully check the system for leaks

**WARNING:**

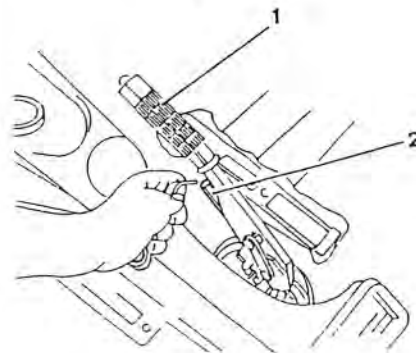
The clutch/brake fluid is hygroscopic and quickly absorbs water when in contact with humid environments.

Top-up with fluid contained in sealed cans which should not be opened until they are to be used.

**NOTE:** The brake system must be bled if any part is disassembled or replaced (see: REPAIR INSTRUCTIONS - MECHANICAL UNITS - GROUP 22).

## CHECKING HANDBRAKE TRAVEL

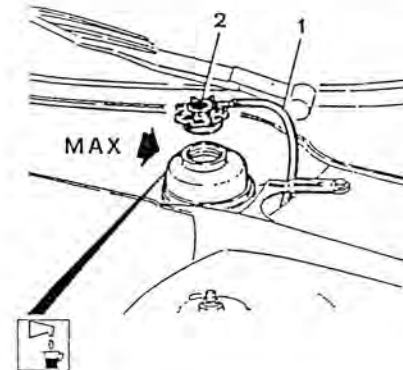
- 1 Pull on the handbrake to the third detent on the sector gear and check that the wheels are locked.
- 2 If they are not blocked tighten the regulation nut until they are.
  - Applying a force of approximately 40 Kg to the control lever, check that the number of detents does not exceed 7.
  - Ensure that when the handbrake is disengaged the wheels rotate freely.



## CHECKING POWER STEERING FLUID

**NOTE:** This check should be carried out when the vehicle is on level ground.

- 1 Remove the breather hose and cap.
- 2 Check that the level reaches the MAX mark.
  - If it does not, top-up with the specified oil.
  - Start the engine and wait until it is running smoothly and rotate the steering wheel a number of times as far as possible to the right and to the left.
  - Top-up the system to the MAX mark and close the cap.



## CHECKING AND REPLACING GEARBOX - DIFFERENTIAL OIL

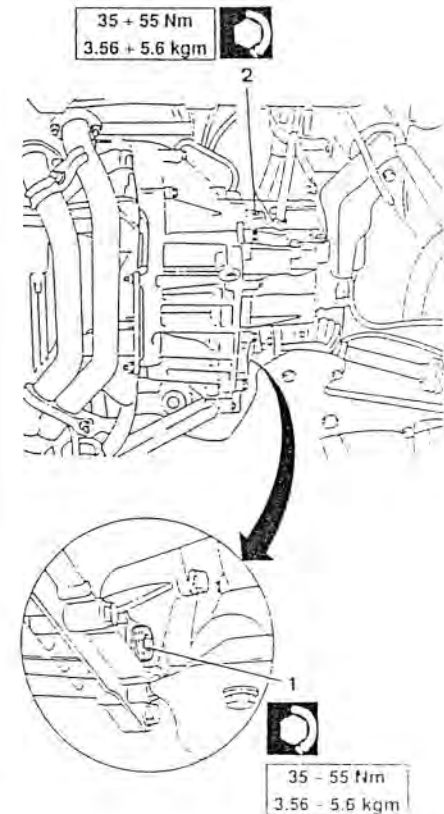
For T. SPARK engines

(AR 67103 - AR 67102 - AR 67202)

**NOTE:** The level should be checked when the vehicle is on level ground and on a vehicle lift.

- 1 Remove the drainage cap, filler cap and reversing light switch and leave the oil to drain off completely (wait for at least 15 minutes)

- Clean the drainage cap, screw it back on and refill the system through the filler neck with the prescribed oil up to the lower edge of the reversing light switch hole. Tighten the caps to the prescribed torque and connect the electrical connector of the reversing light switch.
- 2. If it is necessary to check the level of the oil, unscrew the reversing light switch and check that the oil reaches the lower edge of the relative hole.
- If necessary, top-up the system with the specified oil through the filler hole, clean the cap, tighten it to the specified torque and reconnect the electrical connector of the reversing light switch.





## CHECKING AND REPLACING GEARBOX - DIFFERENTIAL OIL

For V6 engines (AR 67301)

**NOTE:** The level should be checked with the vehicle on a level surface and on a vehicle lift.

- Operate when the engine is cold
- 1. Remove the dipstick and check that the oil level corresponds to the maximum mark on the dipstick itself

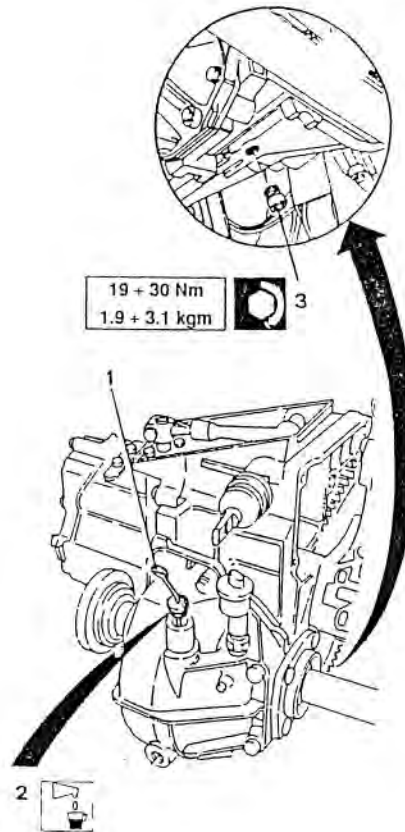


### WARNING:

Clean the dipstick with a lint-free cloth as fabric hair and threads could damage the gearbox.

- 2. If necessary top-up with the prescribed oil.
- 3. If necessary replace the oil, remove the magnetic cap on the gearbox and leave the oil to drain for at least 15 minutes
- Screw the caps back on and refill the system with the prescribed oil up to the maximum mark.

**NOTE:** Clean the caps before replacing them.



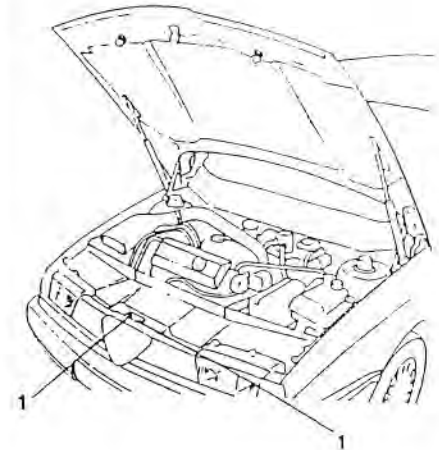
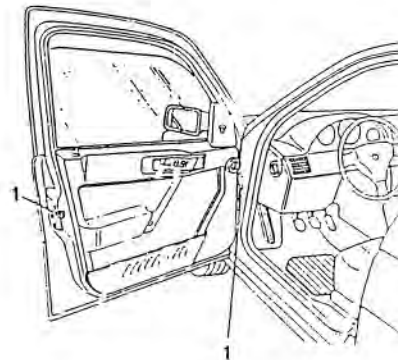
## LUBRICATING THE DOOR, BONNET AND BOOT HINGES; GREASING THE BONNET CATCHES

Apply a suitable amount of grease to the parts indicated below in order to prevent wear and corrosion:

- clean the parts affected
- grease
- remove excess grease.

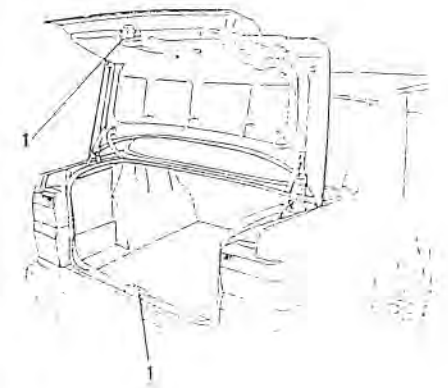
### DOORS

1. Lubricate the hinges, check strap and door locking device.



### BOOT

1. Lubricate the catch



### BONNET

1. Lubricate the catch and the bonnet release cable



## TECHNICAL CHARACTERISTICS AND SPECIFICATIONS

### BELT TENSION

For T. SPARK (AR 67103 - AR 67102 - AR 67202) engines

Belt	Power steering pump Water pump	Alternator Air conditioning compressor
Tension		
On installation	350 + 400 N	400 + 450 N
Minimum	250 N	300 N
Re-tensioning	250 + 300 N	300 + 350 N

For V6 (AR 67301) engine

Belt	Alternator Water pump	Air conditioning compressor	Power steering pump
Tension			
On installation	400 + 450 N	550 + 600 N	350 + 400 N
Minimum	300 N	450 N	250 N
Re-tensioning	300 + 350 N	450 + 500 N	250 + 300 N

### VALVE CLEARANCE

NOTE: only adjust valve clearance when the engine is cold

Engine	T. SPARK engines (AR 67103 - AR 67102 - AR 67202)	V6 engine (AR 67301)
Valve clearance		
Intake	0.380 + 0.450 mm	0.475 + 0.500 mm
Exhaust	0.430 + 0.500 mm	0.310 + 0.345 mm



### FUEL DELIVERY PRESSURE

Fuel pressure at idle speed	2.8 + 3.2 bars (2.9 + 3.3 kg/cm <sup>2</sup> )
Maximum pressure (with pressure regulator engaged)	4 bars (4.1 kg/cm <sup>2</sup> )

### IDLE SPEED AND EXHAUST EMISSIONS CHECK

Idle speed	750 ± 50 r.p.m.
% of CO in volume at exhaust, at idle speed	≤ 0.5
Exhaust HC at idle speed	p.p.m. ≤ 50

### SPARK PLUGS

	T. SPARK	V6
Type	GOLDEN LODGE 25HLD CHAMPION C6YCC	GOLDEN LODGE 2HL

### COOLING SYSTEM

Hydraulic system test pressure	1.08 bars (1.1 kg/cm <sup>2</sup> )
Pressurized cap pressure setting	0.98 ± 0.1 bars (1 ± 0.1 kg/cm <sup>2</sup> )

**PARKING BRAKE****CONTROL LEVER**

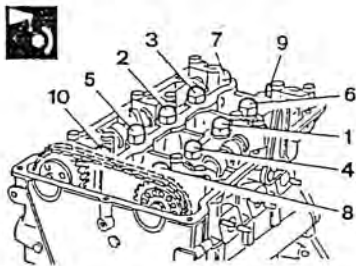
Number of clicks of the control lever before locking the rear wheels: 3

**FILLING FLUIDS AND LUBRICANTS**

See "FLUIDS AND LUBRICANTS" PAGE 00-16 and "APPROXIMATE SERVICING CAPACITIES" page 00-19.

**TIGHTENING TORQUES**

T. SPARK ENGINES (AR 67103 - AR 67102 - AR67202)

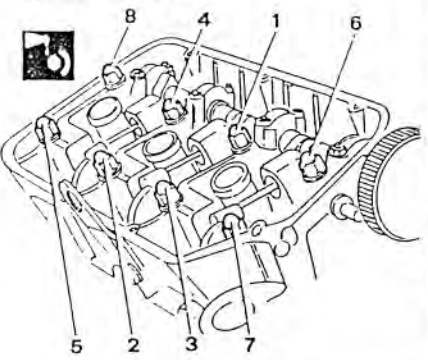
Part	N.m	kg.m
Oil sump drain plug	64.5 + 80	6.6 + 8.2
 Cylinder head nuts	<b>When refitting:</b> Tighten gradually in the sequence shown	76 - 84 7.75 - 8.56
	<b>After running in and testing on the bench:</b> With the engine cold, slacken the nuts one turn in the sequence shown, moisten with engine oil and tighten still following the sequence shown	82.65 - 91.35 8.43 + 9.3
Fuel outlet fitting from filter	21 + 26	2.1 + 2.7
Fuel inlet fitting in filter	30 + 37	3.1 + 3.8
Spark plugs	28 + 34.6	2.85 + 3.5





## TIGHTENING TORQUES (continued)

V6 (AR 67301) engine

Part	N.m	kg.m	
Oil sump drainage cap	64 + 79	6.5 + 8	
Cylinder head nuts 	<b>During installation:</b> gradually tighten following the sequence indicated	88.5 + 97.8	9 + 10
	<b>After bench testing:</b> When the engine is cold, loosen the nuts by one turn following the sequence indicated. Lubricate with oil and tighten following the sequence indicated	97.8 + 108.2	10 + 11
Nuts securing camshaft caps (oiled)	16 + 18	1.63 + 1.84	
Screws securing timing pulley to front hub	13 + 15.69	1.32 + 1.6	
Nut securing camshaft front hub	97 + 117.12	10 + 12	
Nut-screw for adjusting rocker-arm play	14.8 + 17.7	15 + 18	
Fuel filter outlet connection	21 + 26	2.1 + 2.7	
Fuel filter inlet connection	30 + 37	3.1 + 3.8	
Spark plugs	27 + 34	2.75 + 3.5	



## TIGHTENING TORQUES (continued)

GEARBOX AND DIFFERENTIAL

Part	N.m	kg.m
Threaded cap for introducing gearbox oil (only 1.8/2.0 T.S.)	35 + 55	3.56 + 5.6
Magnetic cap in gearbox for oil drainage (only 1.8/2.0 T.S.)	35 + 55	3.56 + 5.6
Magnetic cap in gearbox for oil drainage* (only 2.4 V6)	19 + 30	1.94 + 3.06

BRAKE SYSTEM

Part	N.m	kg.m
Connection for pipe on brake pump	15.3 + 18.9	1.55 + 1.93
Screw for bleeding on brake calipers	3.71 + 5.9	0.38 + 0.61
Connection for hoses on brake calipers	15.3 + 18.9	1.55 + 1.93
Connection for pipes on braking corrector	9.35 + 11.55	0.95 + 1.18



## SPECIFIC TOOLS

1.820.051.000 (A.2.0361)	Tool for rotating camshaft pulley and auxiliary unit control
1.820.053.000 (A.2.0363)	Hydraulic belt tensioner locking pin
1.820.116.000 (A.4.0199)	Tool for checking position of reference notches on camshaft central caps
1.820.123.000 (A.4.0221)	Plate for checking position of reference notches on camshaft central caps
1.820.150.000 (R.9.0001)	Container for caps for adjusting valve clearance
1.820.232.000	Tool for disengaging timing pulley from relative shaft for replacing intake valve clearance adjustment caps
1.822.016.000 (A.5.0220)	3 mm and 11 mm spanner for adjusting exhaust-side tappets
1.824.018.000 (C.2.0131)	Tool for checking belt tension
1.825.013.000 (C.6.0183)	Tool for checking T.D.C.
1.825.018.000 (C.6.0197)	Feeler gauge for checking valve clearance
1.827.002.000 (C.1.0108)	Dial guage for checking valve clearance