155

REPAIR MANUAL

VEHICLE CHARACTERISTICS AND MAINTENANCE

Alfa Romeo

7-1991

ALFA ROMEO 155

VOLUME 1
(CHARACTERISTICS)

[SMS PART No Z6016]

THIS MANUAL CONTAINS THE FOLLOWING UPDATES

DESCRIPTION	PRINT No
MAIN MANUAL	4655***00000
SUPPLEMENT	4655***00001
SUPPLEMENT	4655***00002
SUPPLEMENT	4655***00003
SUPPLEMENT	4655***00004
SUPPLEMENT	4655***00005
SUPPLEMENT	4655***00006

DIVISION OF
"REPAIR MANUAL"

Models 155

The documentation published by Alfa Romeo Assistance Service for the "155" vehicle is composed of the following publications:

155 REPAIR MANUAL
• VEHICLE CHARACTERISTICS AND MAINTENANCE

155 T.SPARK V6	- PA4655A1000000: GROUP 00
155 4x4	- PA4655A24x4000: GROUP 00
155 TD	- PA4655A3TD0000: GROUP 00
155 TD 2.5	- PA4655A4TD2500: GROUP 00
155 T. SPARK 16V	- PA4655A516V000: GROUP 00

155 REPAIR MANUAL
• ENGINES

- PA4655B1000000: T. SPARK ENGINE
- PA4655B2000000: V6 ENGINE

155 REPAIR MANUAL
• MECHANICAL UNITS
• BODY

- PA4655C1000000: MECHANICAL UNITS
- PA4655D1000000: Electrical components, Bodywork, Trim, Heating and Ventilation

155 REPAIR MANUAL
• ELETRICAL & ELECTRONIC DIAGNOSIS

- PA4655E1000000: Wiring diagrams and Troubleshooting

155 REPAIR MANUAL
SUPPLEMENT FOR 155 4x4
• ENGINES
• MECHANICAL UNITS
• BODY
• ELECTRICAL & ELECTRONIC DIAGNOSIS

- PA4736B14x4000: ENGINE
- PA4736C14x4000: MECHANICAL UNITS
- PA4736D14x4000: Electrical components, Bodywork, Trim, Heating and Ventilation
- PA4736E14x4000: Wiring diagrams and troubleshooting

155 REPAIR MANUAL
SUPPLEMENT FOR 155 TD
• ENGINES
• MECHANICAL UNITS
• BODY
• ELECTRICAL & ELECTRONIC DIAGNOSIS

- PA4805B1TD0000: ENGINE
- PA4805C1TD0000: MECHANICAL UNITS
- PA4805D1TD0000: Electrical components, Bodywork, Trim, Heating and Ventilation
- PA4805E1TD0000: Wiring diagrams and troubleshooting

155 REPAIR MANUAL
SUPPLEMENT FOR 155 TD 2.5
• ENGINES
• MECHANICAL UNITS
• BODY
• ELECTRICAL & ELECTRONIC DIAGNOSIS

- PA4830B1TD2500: ENGINE
- PA4830C1TD2500: MECHANICAL UNITS
- PA4830D1TD2500: Electrical components, Bodywork, Trim, Heating and Ventilation
- PA4830E1TD2500: Wiring diagrams and troubleshooting

155 REPAIR MANUAL
SUPPLEMENT FOR 155 T.SPARK 16V
• ENGINES
• MECHANICAL UNITS
• BODY
• ELECTRICAL & ELECTRONIC DIAGNOSIS

- PA4978B116V000: ENGINE
- PA4978C116V000: MECHANICAL UNITS
- PA4978D116V000: Electrical components, Bodywork, Trim, Heating and Ventilation
- PA4978E116V000: Wiring diagrams and troubleshooting

UPDATE CARD

UPDATE CARD			
[illegible]	SECTION	PAGE	
		SUBSTITUTED	ADDED
	Vehicle characteristics and maintenance ([illegible] with [illegible]155A1000001)		
1 (12/1994)		00-1	
1 (12/1994)		00-2	
1 (12/1994)			00-8/1
1 (12/1994)			00-8/2
1 (12/1994)			00-8/3
1 (12/1994)		00-11 to 00-16	
1 (12/1994)		00-19	
1 (12/1994)		00-20	
1 (12/1994)		00-77	

N.B. Each of the specific sections for models 155 Q4, 155 TD and 155 TD 2.5 contained herein has its own autonomous update card.

155

REPAIR MANUAL

- VEHICLE CHARACTERISTICS AND MAINTENANCE

INTRODUCTION

This publication provides the information necessary for the maintenance and repair operations regarding the 155 for the models listed in the "vehicle identification table. The aim of this publication is to provide the Alfa Romeo Service staff with a tool which can be used to rapidly identify any faults and help to render the intervention precise and efficient.

The manual shows the procedures relative to the removal and refitting operations, disassembly and checks regarding the various groups which form the vehicle. The procedures are illustrated in detail as is the use of any necessary tools. A system of symbols combined with the basic technical data given to one side of each drawing facilitate a rapid and complete consultation of the manual.

Particular attention has been given to the fault diagnosis procedures which can be found at the end of each group. These combine with the irreplaceable experience of the operator and help to correctly identify and rectify the fault starting from the malfunction which the operator himself has detected and carrying out a series of tests on the system affected by the fault.

For the information relative to the vehicle's electrical system the "155 - Repair Manual - Electrical-Electronics Diagnosis" manual should be consulted.

All the information contained in this manual is accurate to the date of publication.

Alfa Romeo reserves the right to carry out any modifications to its products considered necessary without warning, though the technical information and up-dates regarding this manual will be promptly published.

How to use this manual

This manual is divided into chapters [illegible] [illegible] to each of the assemblies which make up the vehicle.

To rapidly identify the group required refer to the [illegible] index.

Each group is accompanied by an analytic index and [illegible] illustrated index in order to facilitate the search for the required subject.

A brief description of the "removal-refitting", "disassembly/reassembly" and "checking and adjustment" procedures follows.

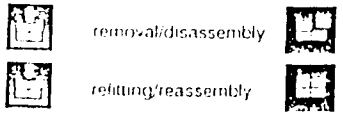
The procedures show the complete disassembly of the components and should be carried out alone only when strictly necessary. The reassembly and refitting procedures are normally a simple reversal of the "disassembly" and "removal" procedures and only the reassembly procedures which are significantly different are illustrated.

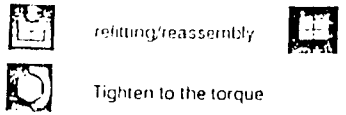
The technical data, specific tools and fault diagnosis procedures follow the procedures mentioned above.

Symbols

This manual employs a series of symbols in order for the maintenance information provided to be easily located.

The list of the symbols follows:


removal/disassembly


refitting/reassembly

Tighten to the torque


Rivet nut


adjustment/regulation

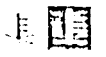

visual check


lubricate


weight difference


angular value


pressure


temperature


Bleed air from brake system


surface to be treated


interference


play


shape


exhaust


lubricate with engine oil


left-hand thread


tightening torque in oil


engine idle speed


ovalization


taper


eccentricity


flatness


diameter


linear dimension


parallelism


top-up with grease


heating temperature


seal


top-up with engine oil


grease


WARNING!


CAUTION!

Indications for the operators

All the operations must be carried out with the greatest care in order to avoid damaging vehicles and persons.

- For some procedures the use of the Alfa Romeo specific tools is indicated. The use of these tools is indispensable to the safety of the operation and to avoid damage to the parts involved in the procedure.
- To detach adhering parts, lightly tap with an aluminium or lead mallet; for parts in metal and a wooden or resin mallet for parts in light alloy.
- When disassembling check that the necessary parts have been marked.
- If necessary when refitting, lubricate the parts to prevent seizing or binding during the initial stages of operation.
- Using adhesive tape or clean rags, protect the parts which, after disassembly may allow dust or foreign particles to enter the engine.
- When refitting it is vital that the tightening torques and regulation settings are respected.
- During removal substitute the seal rings, oil seals, flexible washers, safety plates, self locking nuts and any other part showing signs of wear.
- Avoid marking the fittings inside the vehicle.

Assemblies or detached parts must only be replaced by original spare parts as only in this way can the suitability of the part and its perfect operation be guaranteed.

- CAUTION and WARNING indicate those procedures which must be carried out with particular care in order to prevent personal injury or damage to the vehicles.

WARNING:
is used when lack of care may cause pers
injury


CAUTION:
is used when lack of care may cause dan
to the vehicle or parts of it.

Obey the current safety regulations regarding
ation in the workshop. Where necessary sp
precautions have been given in the manual in
to prevent dangerous situations from arising.

NOTE:
It is possible that some subjects have not been
in time for publication.
In the indexes to the individual groups these subjects
indicated however and are accompanied by the
"Due for publication".
The Technical Assistance will provide documents
relative to these subjects in the form of up-date
or in "Technical Bulletins" which will promptly reach
the Alfa Romeo Assistance Network.

NOTE:
It should be pointed out that inside this manual the
vehicle may also be indicated with the "GT" vehicle

WEIGHTS AND LOADS

Version		155 T.SPARK 1.7 (167A4H)		155 T. SPARK 1.8 (167A4G)		155 T.SPARK 1.8 (167A4E)		155 T.SPARK 2.0 (167A4D)		155 V6 (167A1C)	
		(*)	(**)	(*)	(**)	(*)	(**)	(*)	(**)	(*)	(**)
Kerb weight kg		1205	1250	1205	1250	1205	1250	1215	1260	1290	1350
Towable weight	with trailer with brakes kg	1300	1300(•)	1300	1300	1300	1300	1400	1300	1400	1400
	with trailer without brakes kg	500	500	500	500	500	500	500	500	500	500
Maximum loading on tow hook kg		90	50	90	50	90	50	95	50	95	50

(*) Until September 1993
(**) From September 1993
(•) for 167A4L (french market) = 1200 kg

WEIGHTS AND LOADS

Version			155 TD2.5 (167A1A)	
			Until September 1993	From September 1993
Kerb weight (excluding driver)		kg	1340	1400
Towable weight	with trailer with brakes	kg	1500	1500
	with trailer without brakes	kg	500	500
Maximum loading on tow hook		kg	105	50

WEIGHTS AND LOADS

Version			155 TD (167A3)	
			Until September 1993	From September 1993
Kerb weight (excluding driver)		kg	1250	1300
Towable weight	with trailer with brakes	kg	1300	1400
	with trailer without brakes	kg	500	500
Maximum loading on tow hook		kg	90	50

VEHICLE CHARCTERISTICS AND MAINTENANCE 00

WEIGHTS AND LOADS

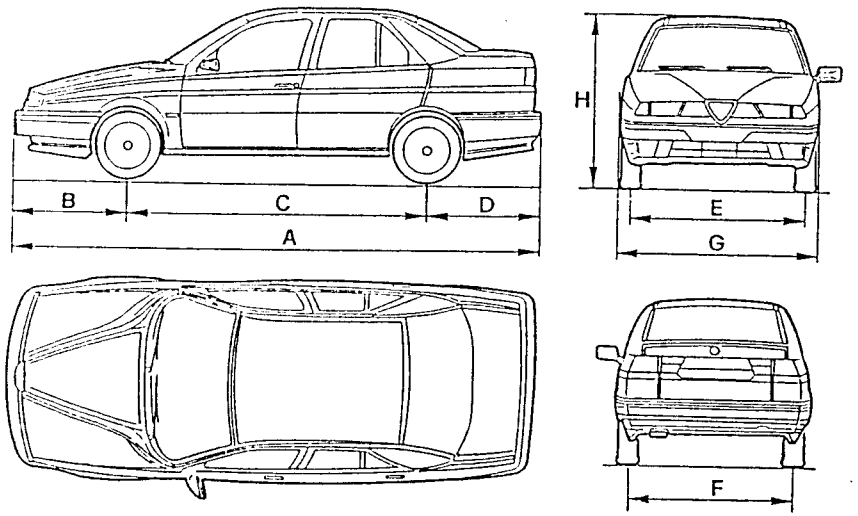
Version			155 (167A2C-167A2E)	
			Until September 1993	From September 1993
Kerb weight (excluding driver)		kg	1390	1465
Towable weight	with trailer with brakes	kg	1500	1500
	with trailer without brakes	kg	500	500
Maximum loading on tow hook		kg	105	50

GROUP 00

VEHICLE CHARACTERISTICS AND MAINTENANCE

INDEX

DIMENSIONS



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

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

WEIGHTS AND LOADS

Weights and loads			Models: 167 A4B 1749 c.c. (1)	155 T. SPARK 1.8	155 T. SPARK 2.0	155 V6
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

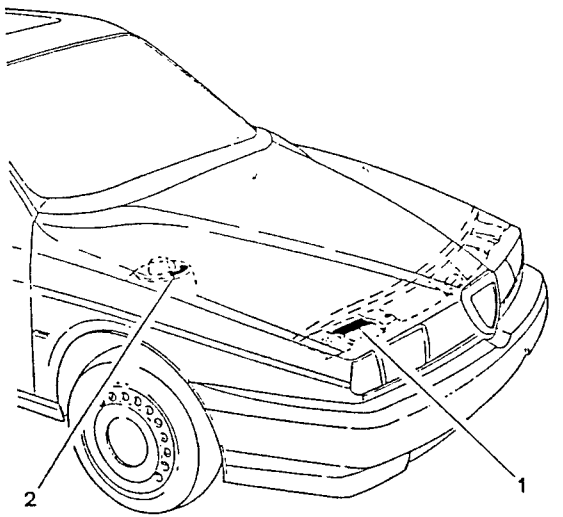
Characteristics \ Models		167 A4B 1749 c.c. (1)	155 T. SPARK 1.8	155 T. SPARK 2.0	155 V6
Rim dimensions		6J x 14"	6J x 14"	6J x 14" 6J x 15" (2)	6J x 15"
Tyre dimensions	standard	185/60 R14" 82H	185/60 R14" 82H	195/60 R14" 85V	195/55 R15" 84V
	optional	195/60 R14" 85V	195/60 R14" 85V	195/55 R15" 84V (2)	205/50 R15" 86V
Tyre pressures bars (kg/cm²)	medium load, normal speed	front 2.2 rear 2.0	front 2.2 rear 2.0	front 2.2 rear 2.0	front 2.5 rear 2.3
	fully loaded, high speed	front 2.5 rear 2.5	front 2.5 rear 2.5	front 2.5 rear 2.5	front 2.8 rear 2.5
Compact spare wheel	rim dimension	4J x 15"	4J x 15"	4J x 15"	4J x 15"
	tyre dimension	115/70 R15"	115/70 R15"	115/70 R15"	115/70 R15"
	tyre pressure bars (kg/cm²)	4.2	4.2	4.2	4.2

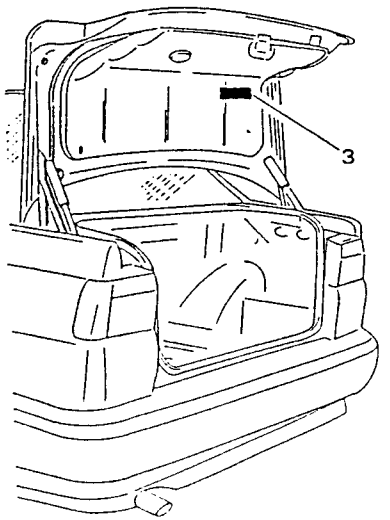
(1) Commercial name not available at time of going to press

(2) Optional for Germany

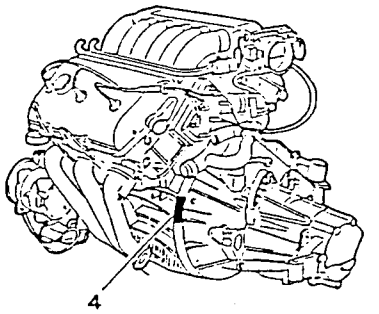
MODEL IDENTIFICATION

IDENTIFICATION LABELS

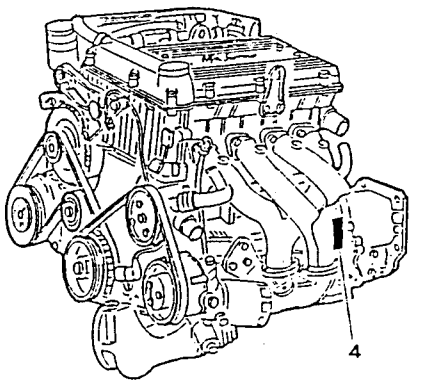




V6



T. SPARK



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

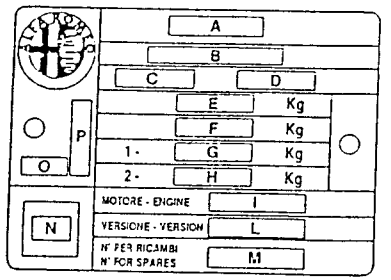
MODEL IDENTIFICATION

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

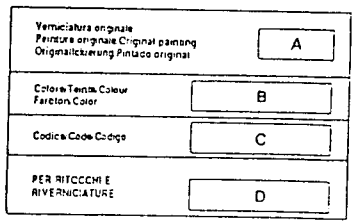
This is located on the engine compartment crossmember.
It carries the identification data listed on the right:



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

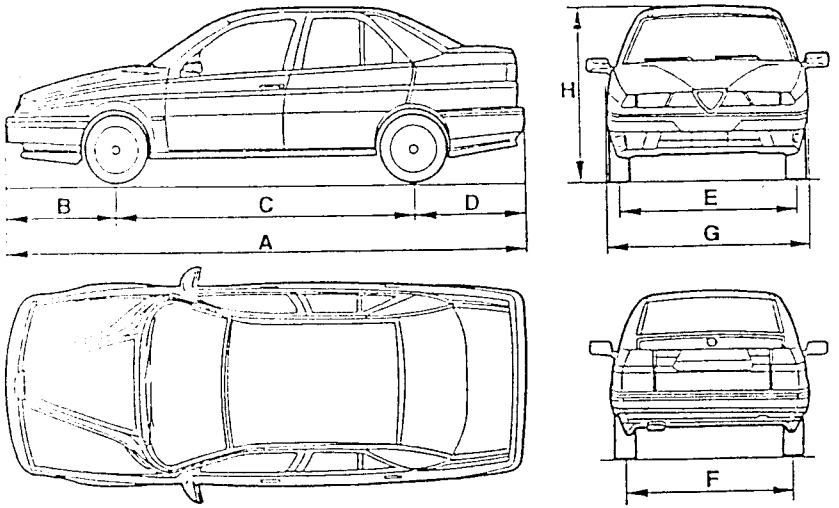
PAINT IDENTIFICATION LABEL

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



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 167A4H - 167A4G - 167A4L	155 1.8 T. SPARK 167A4E - 167A4M	155 V6 167A1E
A	Maximum length	mm	4443		
B	Front overhang	mm	960		
C	Wheelbase	mm	2540		
D	Rear overnang	mm	943		
E	Front track	mm	1496	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 167A4H - 167A4G - 167A4L	155 1.8 T. SPARK 167A4E - 167A4M	155 V6 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 167A4H - 167A4G - 167A4L	155 1.8 T. SPARK 167A4E 167A4M		155 V6 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
	opttional (for versions/markets where applicable)	–	195/60 VR14	205/45 ZR16	205/45 ZR16
Tyre pressure bar (kg/cm^2)	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^2)	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

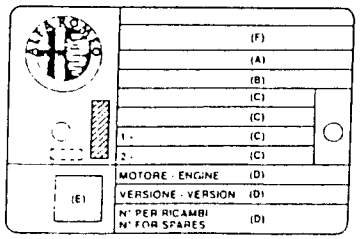
MODEL IDENTIFICATION ('95 Versions)

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 □	167A4L □	167A4E	167A4M □	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



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.

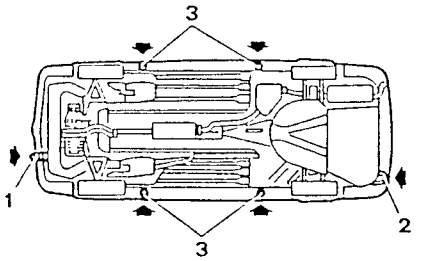
e.g.: 1.821.124.000
(A.3.0621)

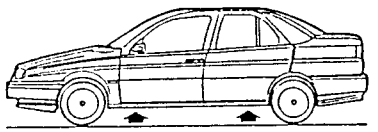
The assistance network can supply particular specific tools through each Alfa Romeo dealer following procedures which already exist.

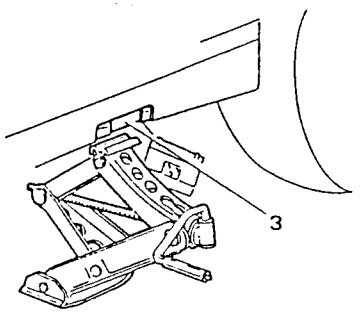
LIFTING AND TOWING POINTS

- 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.





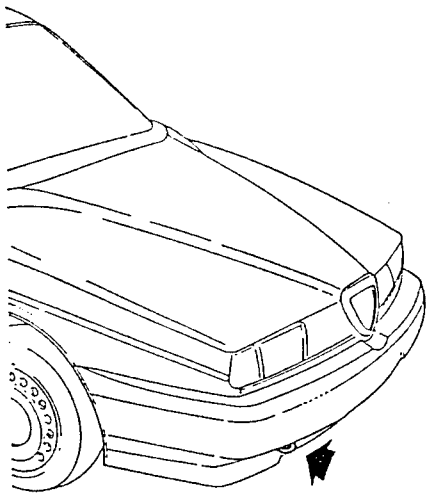


1. *Front tow hook*
2. *Rear tow hook*
3. *Jack socket*

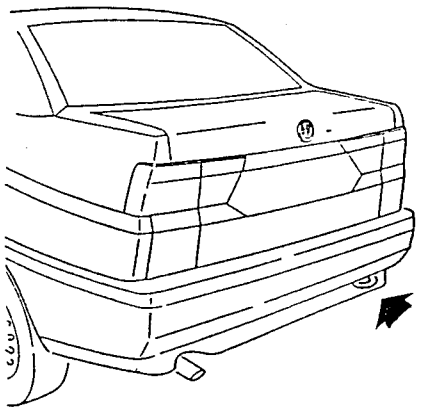
The vehicle is equipped with two tow hooks (front and rear) located on the right-hand side of the bumpers.
When towing the vehicle, drive with care and obey all the current laws.
Before towing, the ignition key of the vehicle to be towed should be turned to the MAR position and then turned to the STOP 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 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.

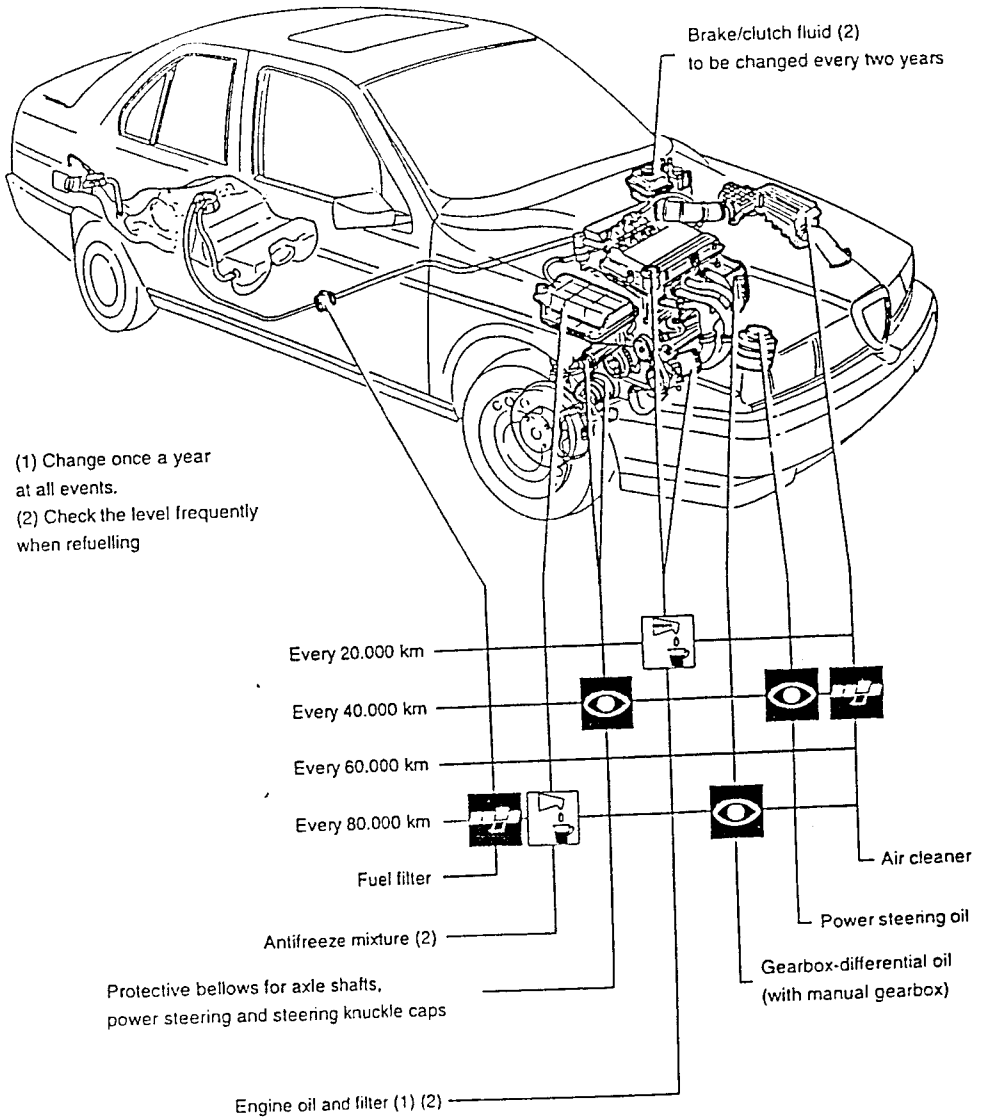
Dust and/or pollen filter (if fitted)
Once a year, preferably at the beginning of summer, have the conditions of the dust and/or pollen filter (if fitted) checked by the Alfa Romeo Service Network.
If the car is mostly used for town/motorway driving or on dusty roads, it is wise to check more often than 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 Climafluid 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.

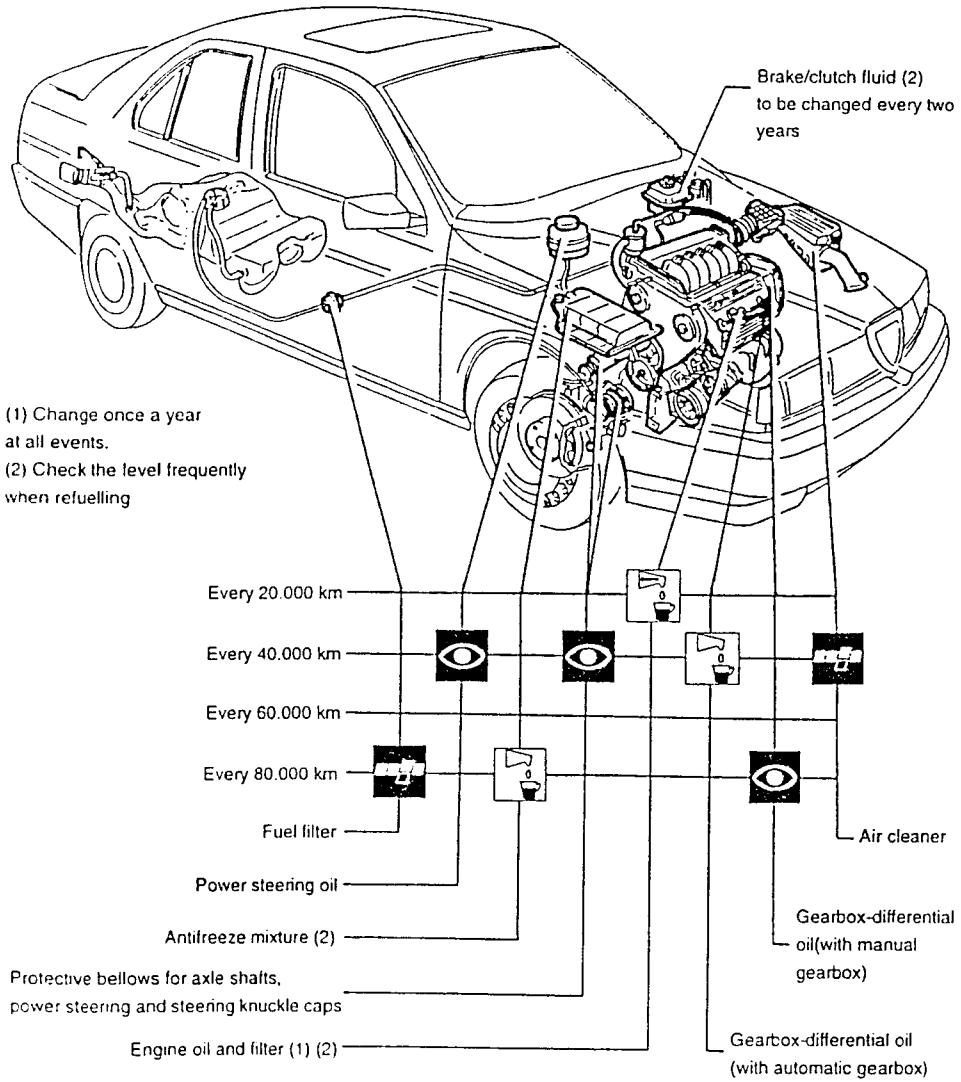
SCHEDULED CHECKS AND MAINTENANCE

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 CCMC G5 SAE 10W/40	SELENIA SPECIAL FORMULA ALFA ROMEO 10W/40
	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" (▲)
FLUID	07 - Engine cooling	Cooling circuit (Refilling)	–	ALFA ROMEO CLIMAFLUID SUPER PERMANENT -40°C
	12 - Clutch	Brake and clutch hydraulic circuit (Refilling)	DOT 4 SAE J 1703 F	ALFA ROMEO BRAKE FLUID SUPER DOT 4
	22 - Brakes			
	23 - Steering	Power steering system (Refilling)	G.M. DEXRON II	TUTELA GI/A
	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. [illegible]779 - 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^3 (▲)	135 g 240 ± 15 cm^3 (▲)
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.

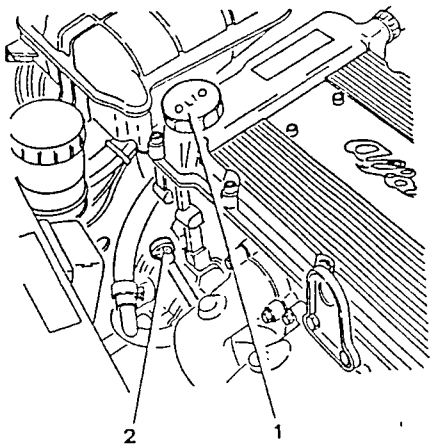
ENGINE SERVICING OPERATIONS

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.

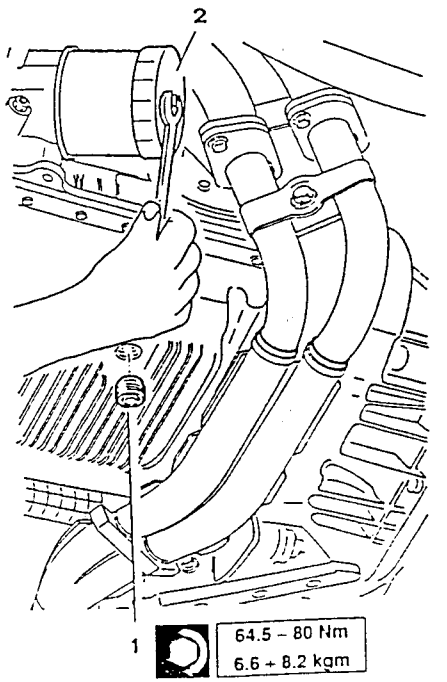
– Set the car on a lift.
1. With the engine warm remove the filler cap.
2. Withdraw the oil level dipstick.



– 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 off pressure will be caused by the excessive evaporation of the oil.

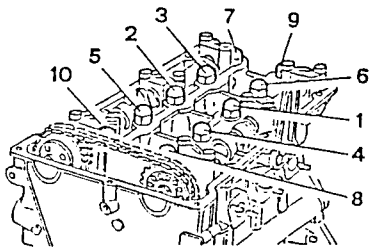
- Screw on the oil cap, and run the engine for about 2 minutes, then switch off the engine and wait for a couple of minutes.
- Check the level of the oil and check for leaks.

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.

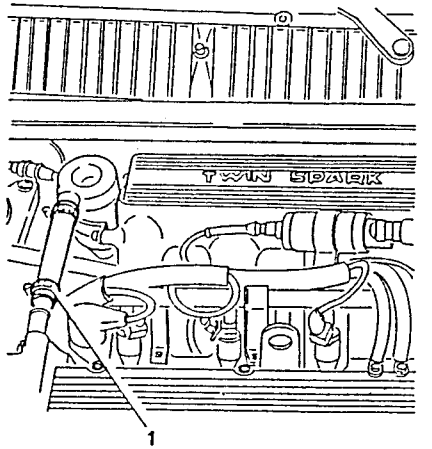
NOTE: **When removing or refitting the cylinder head, initially tighten to the following torque:**

76 - 84 Nm
7.75 - 8.56 kgm

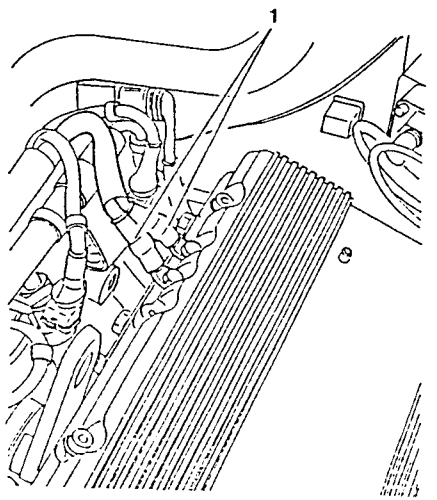
After bench testing tighten again as before.

CHECKING AND ADJUSTING VALVE CLEARANCE

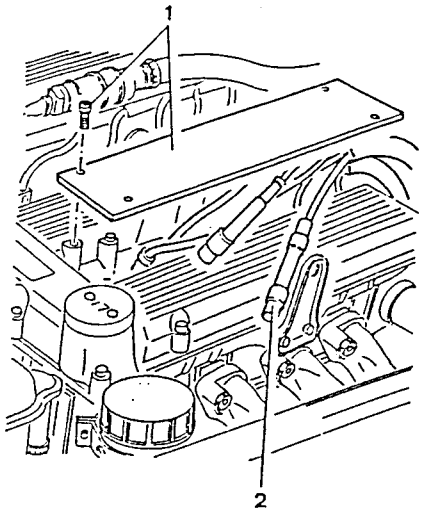
- Disconnect the negative cable from the battery.
1. Disconnect the oil vapour recovery hose from the timing cover.



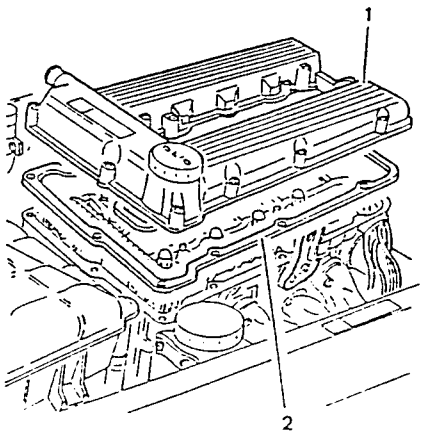
1. Disconnect the earth cables from the timing cover.



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



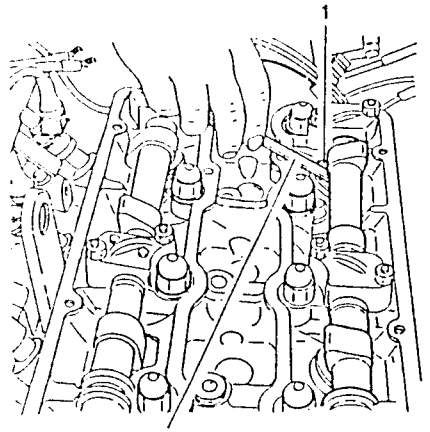
1. Remove the timing cover.
2. Remove the gasket.



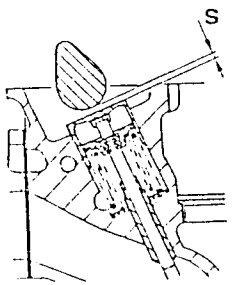
- Suck out the oil from the wells and put it back into the sump.
- Clean the spark plug wells, remove the spark plugs and plug the holes to prevent foreign materials from entering.

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

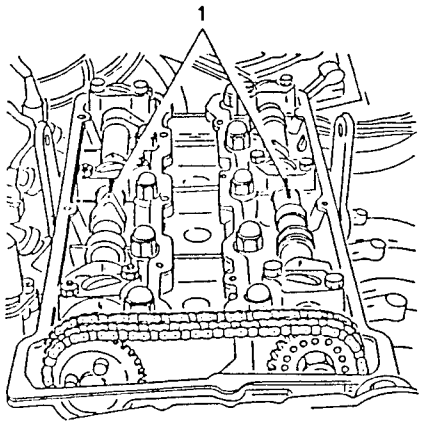


1.825.018.000
(C.6.0197)

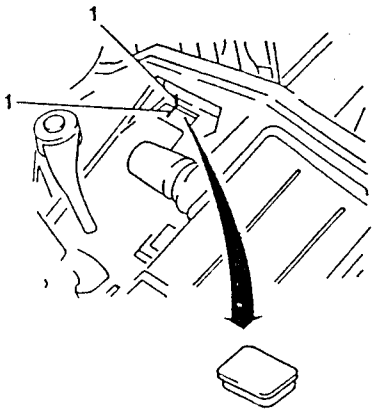


- If the valve clearance is not within the specified values register following the procedure described below.

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

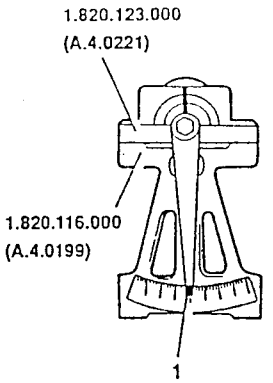


1. Check that the reference notches stamped on the engine fly wheel and on the gearlever bell coincide when cylinder number 1 is at T.D.C. during the firing phase.



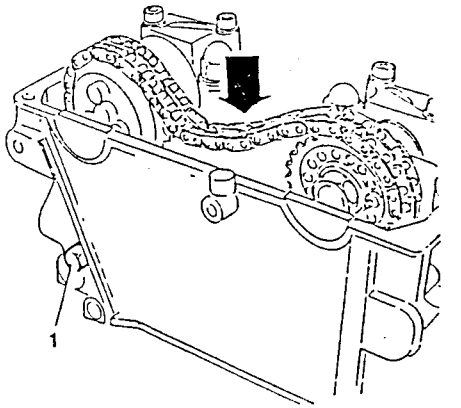
1. To check that the reference notches on the central caps are in the correct position, remove the caps and, using tool N° 1.820.116.000 (A.4.0199) and plate N° 1.820.123.000 (A.4.0221) check the relative angular value.

Angular value of the reference notches on the camshaft caps	
Intake shaft cap	5° 30'
Exhaust shaft cap	13° 15'



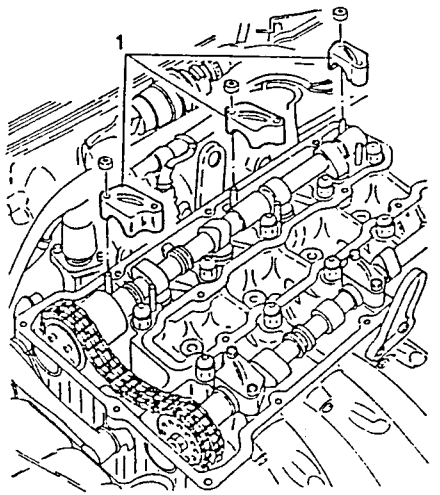
- If the reference notch is not positioned in accordance with the specified values make a correction by cutting a new notch on the cap.
- Refit the caps and rotate the crankshaft until the reference notches on the shafts are aligned with the new notches on the relative caps.

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.

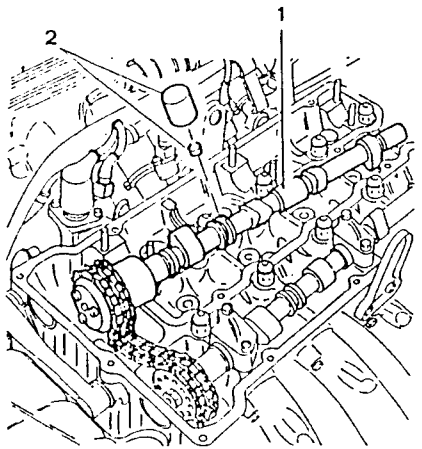


Adjusting valve clearance - intake

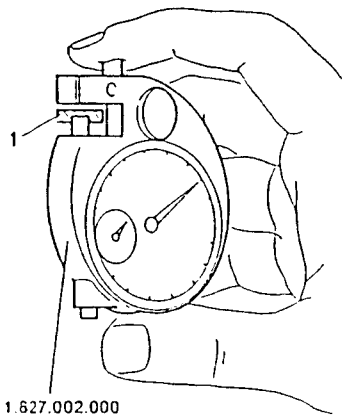
1. Remove the three camshaft caps from the intake side.



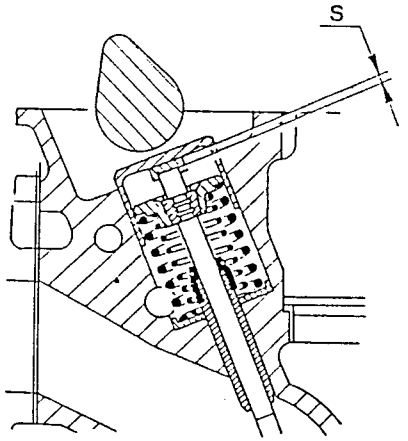
1. Remove the camshaft on the intake side with the chain and rest it in the middle of the head taking care not to move the chain in relation to the toothed wheel.
2. Withdraw a valve cup and its valve clearance regulation cap.



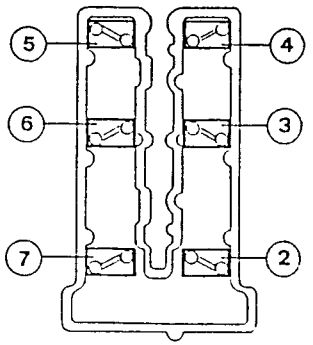
1. Measure the thickness "S" with the feeler gauge N° 1.827.002.000 (C.1.0108) and select a new cap of adequate thickness.



1.627.002.000
(C.1.0108)

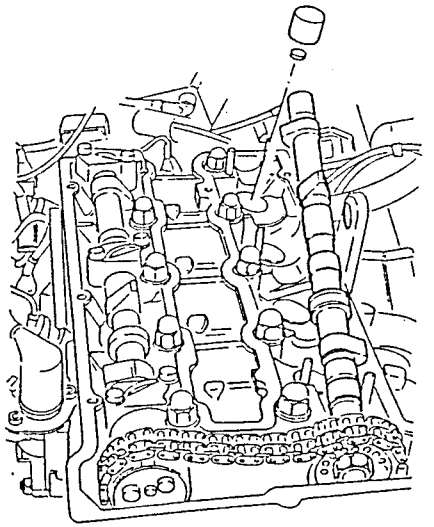


- Install the new cap and the valve cup after lubricating with engine oil.
- Repeat the procedure for the other cup-cap pairs.
- Re-position the camshaft taking care not to move the chain in relation to the toothed wheel.
- Remove the camshaft caps in the order shown below. Each cap has a number stamped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

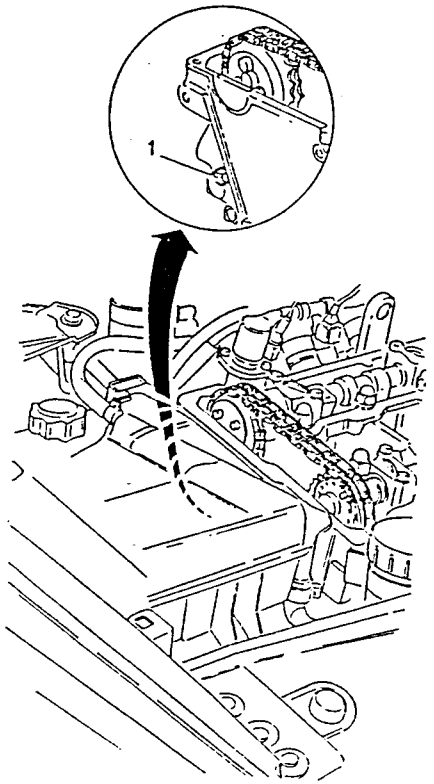


- Tighten the timing chain (see specific paragraph).
- Check the valve clearance again and adjust the timing (see specific paragraph).
- Refit all the components by reversing the procedures followed for removal.

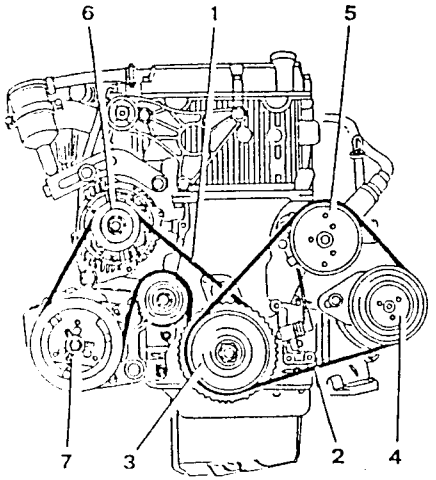
CHECKING TIMING CHAIN TENSION

- 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 is such a position that the chain stays taught, 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.

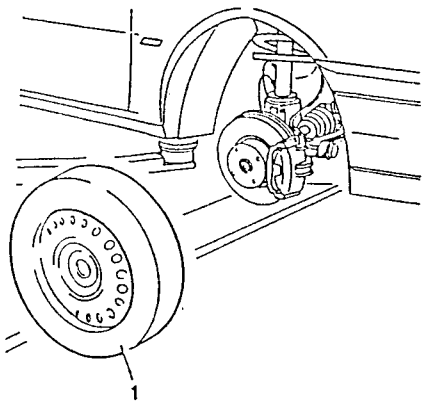
CAUTION:
If the belt comes into contact with oil or solvents the elasticity of the belt may be affected which will reduce its adherence.

WATER PUMP - POWER STEERING PUMP DRIVE BELT

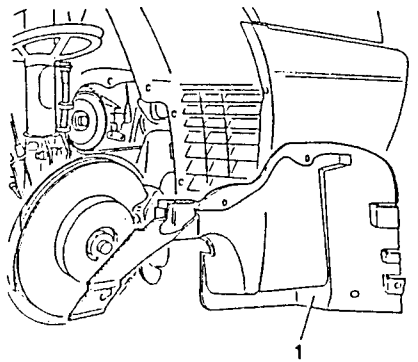
Checking and tensioning

– Place the vehicle on a lift.

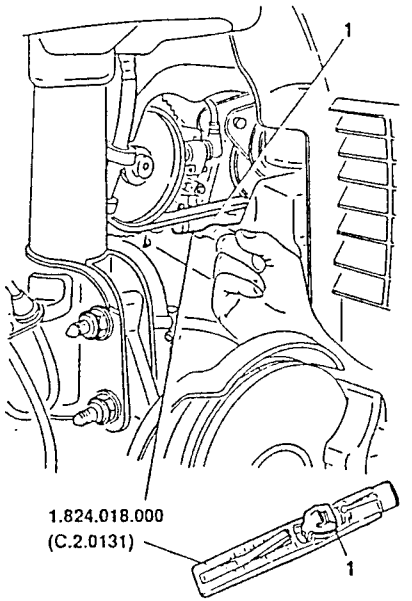
1. Remove the front right-hand wheel.



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.

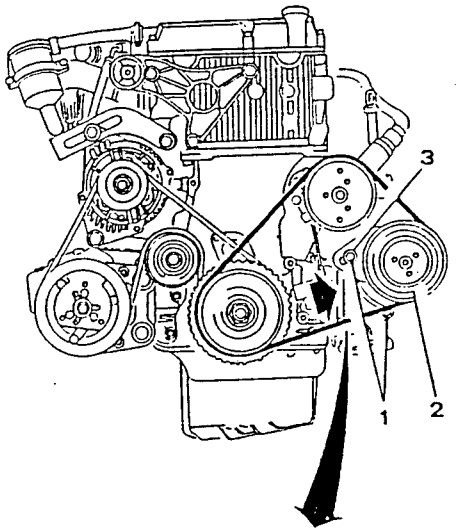
Water pump - alternator control "POLY - VK4" belt tension	
During installation	350 - 400 N
Minimum	250 N
Re-tensioning	250 - 300 N

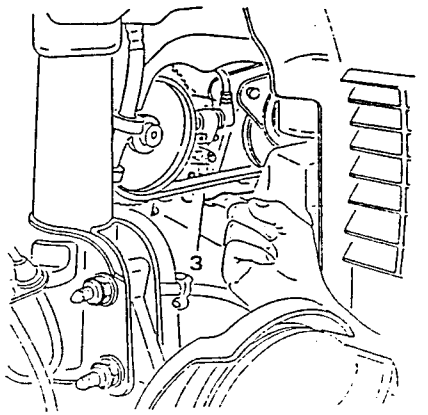
NOTE: The belt can be re-tensioned after a brief testing period, operating as follows:
- run the engine until it reaches normal operating temperature;
- run the engine for about 10 minutes;
- switch off the engine and wait until it cools;
- re-tighten the belt to the specified value.

– 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.



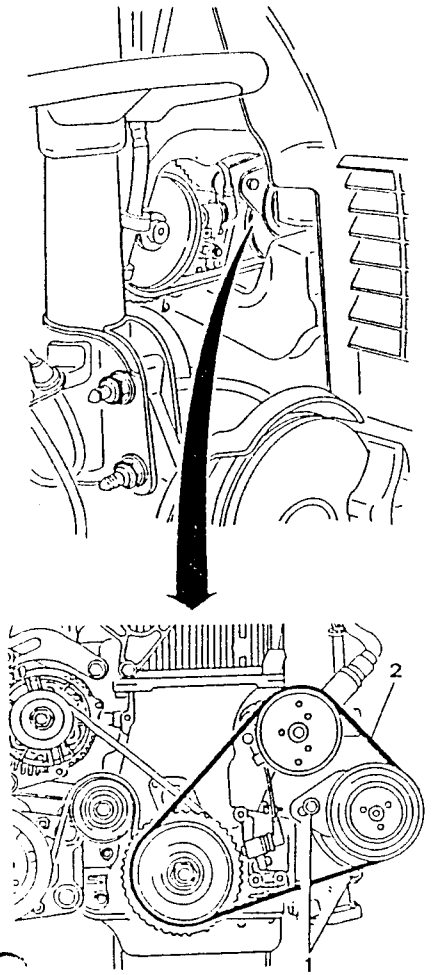


Substitution

- 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.

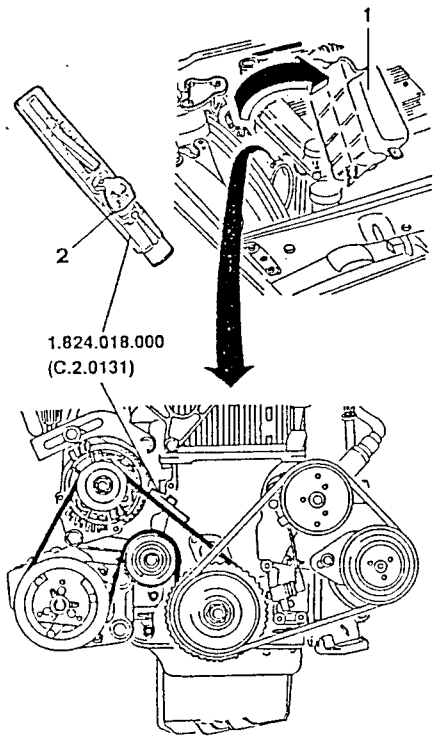
- Install a new belt by reversing the procedure followed for removal.



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.

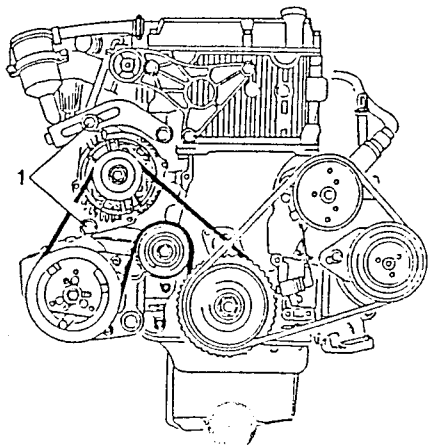
Air conditioning compressor - alternator drive "POLY-VK5" belt tension	
During installation	400 - 450 N
Minimum	300 N
Re-tensioning	300 - 350 N

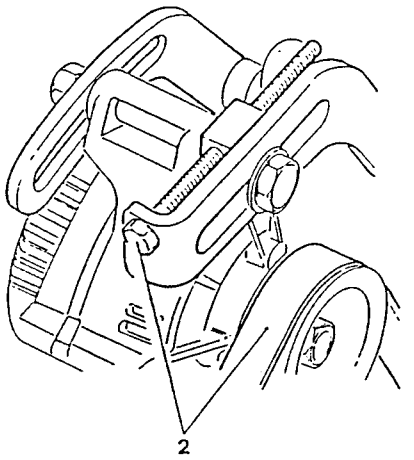
NOTE: The belt can be re-tensioned after a brief testing period, operating as follows:
- run the engine until it reaches normal operating temperature;
- run the engine for about 10 minutes;
- switch off the engine and wait until it cools;
- re-tighten the belt to the specified value.

- 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.

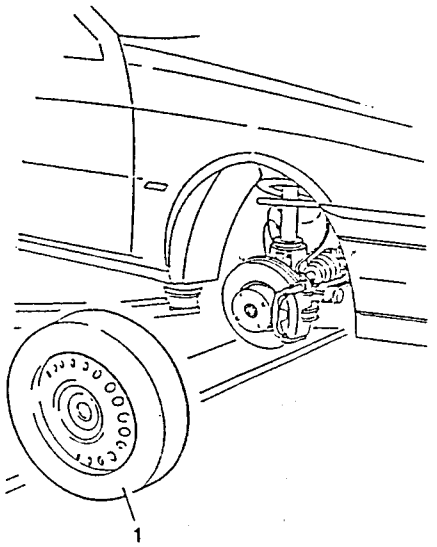




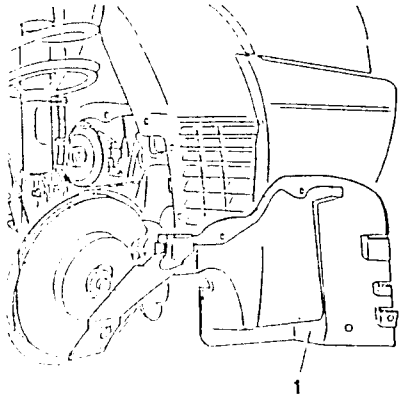
Substitution

- Place the vehicle on a lift.

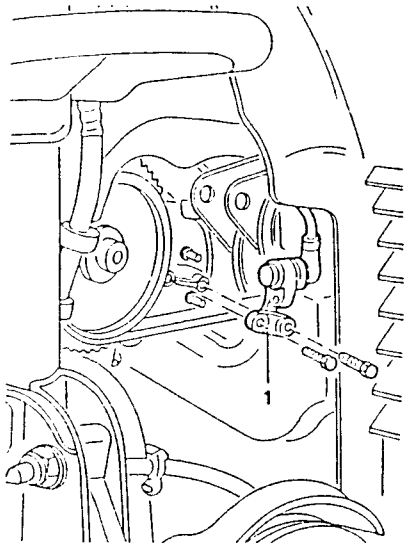
1. Remove the front right-hand wheel.



1 Remove the dustcover.

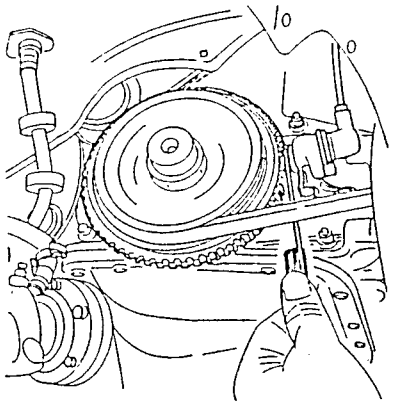


1. Remove the engine r.p.m. and timing sensor together with its support bracket, and move it to one side.

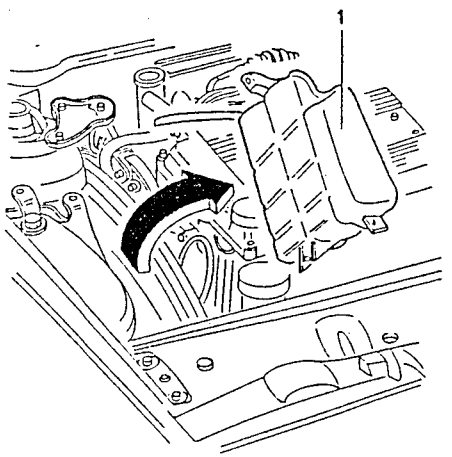


During refitting check the air gap between the r.p.m. and timing sensor and the toothed pulley.

Air gap between r.p.m. and timing sensor and phonic wheel
0.5 - 1.5 mm

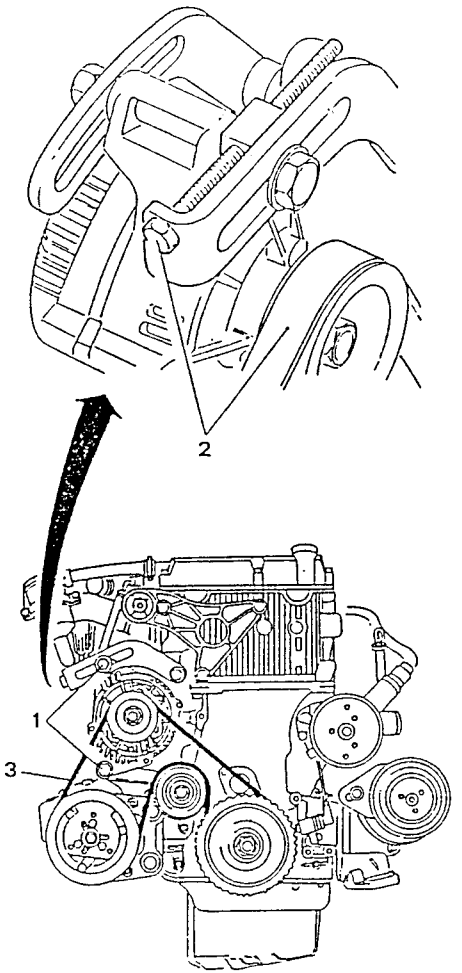


– Remove water pump - power steering pump drive belt (see specific paragraph).
1. Loosen the screws securing the expansion tank and, without disconnecting the hoses, move it to one side.



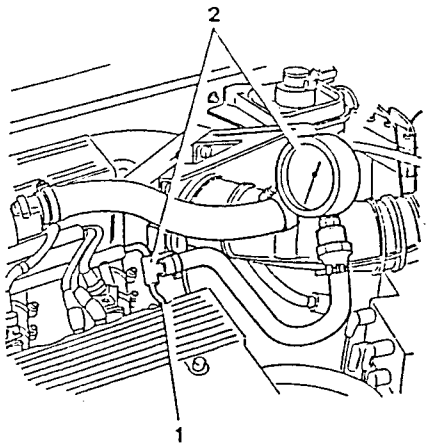
1. Unscrew the two screws securing the alternator.
2. Adjust the micrometric tensioner screw to reduce the tension on the belt.
3. Remove the air conditioner - alternator drive belt.

– Fit a new belt by reversing the procedure followed for removal.

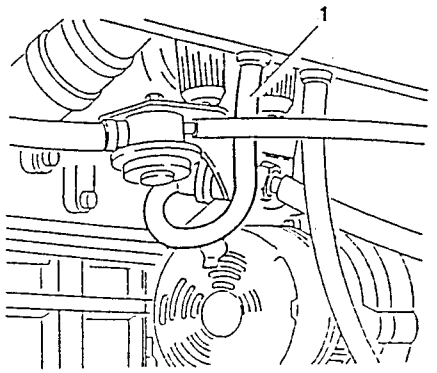


CHECKING PRESSURE AND SEALING OF THE FUEL CIRCUIT

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.

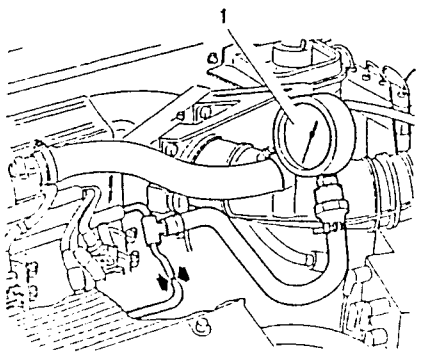
Fuel pressure at idle speed
2.8 - 3.2 bar (2.9 - 3.3 kg/cm^2)

- 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.

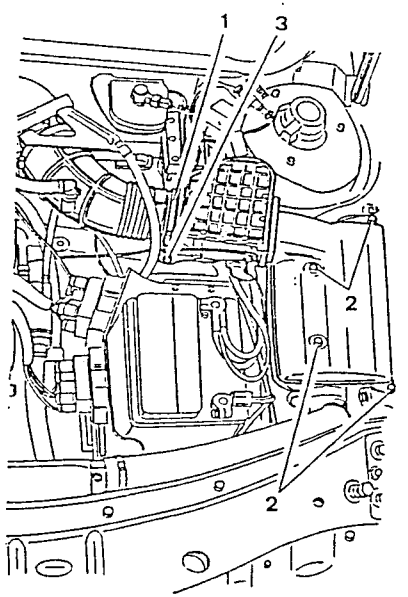


CHECKING SEALING OF FUEL VAPOUR RECOVERY SYSTEM

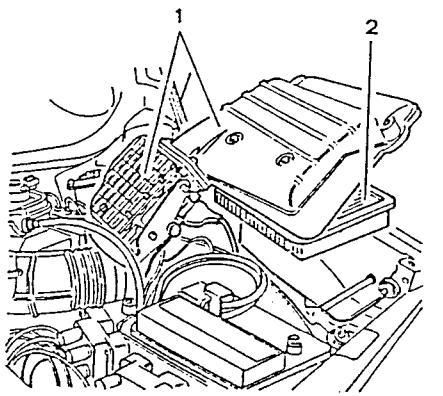
DUE FOR PUBLICATION

REPLACING THE AIR CLEANER CARTRIDGE

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



1. Lift the air cleaner cover - air-flow meter 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 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.**

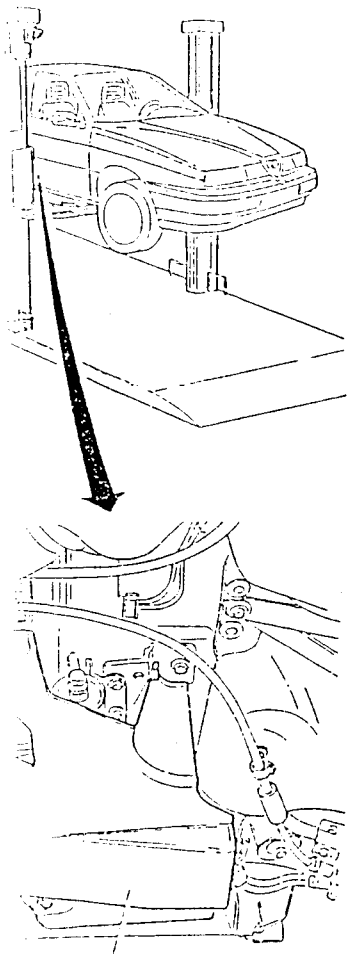
CHECKING SEALING OF THE AIR CIRCUIT

- 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.

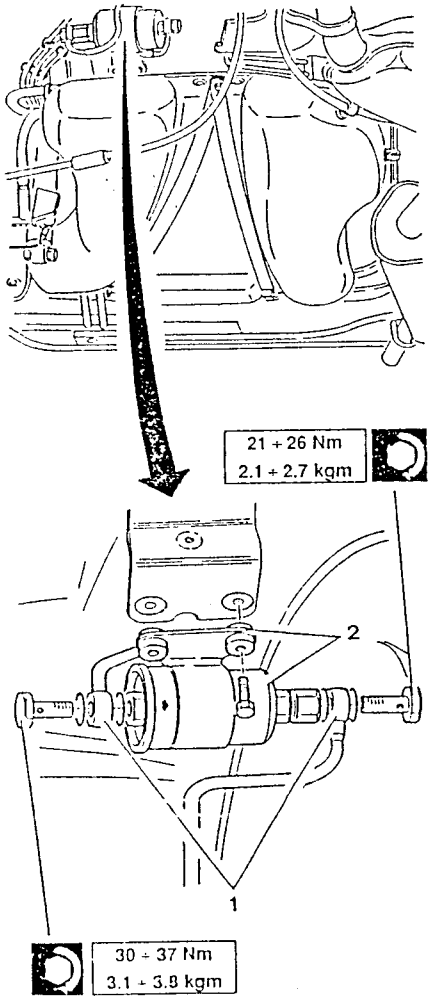
Check that the solution is not sucked into the ducts and that the r.p.m. re[illegible]s constant.

CING THE FUEL

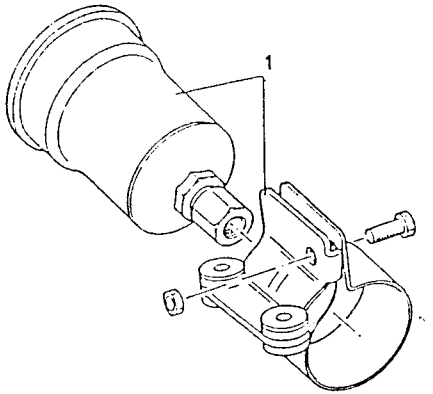
ne vehicle on a lift.
e engine; disconnect the relay from the fuel (see GROUP 40) and wait until the engine t through lack of fuel
ne vehicle and remove the fuel filter cover.



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, 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.

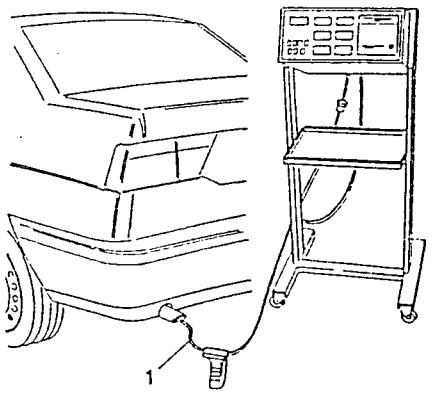
CHECKING EXHAUST EMISSIONS

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.
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 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.

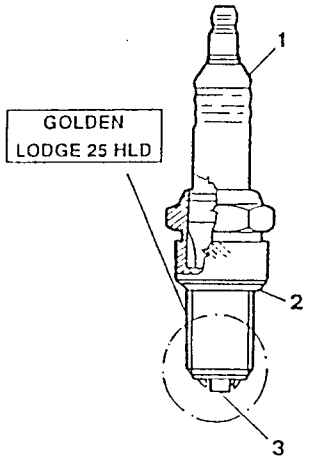
CHECKING THE LAMBDA PROBE

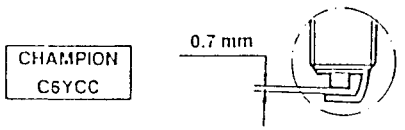
See "ELECTRICAL - ELECTRONIC DIAGNOSIS" MANUAL.

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





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.

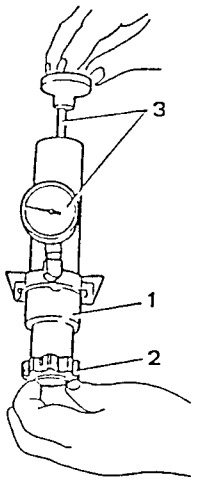
CAUTION
A dirty or burnt out spark plug is often symptomatic of a malfunction in the engine's supply system.
For example:
- **Traces of carbon powder: incorrect mixture, air cleaner very dirty;**
- **Oil stains: infiltrations of oil from the piston rings;**
- **Ash formation: presence of aluminium material 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.

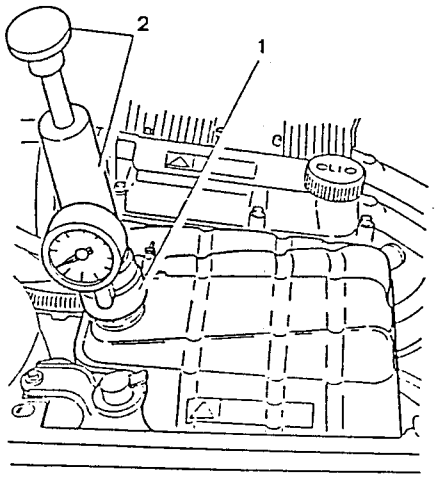


Pressure setting of the pressurized cap
0.98 ± 0.1 bar (1 ± 0.1 kg/cm^2)

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.



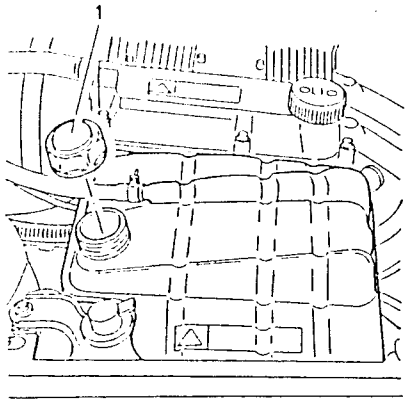
Hydraulic system control pressure
1.08 bar (1.1 kg/cm^2)

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

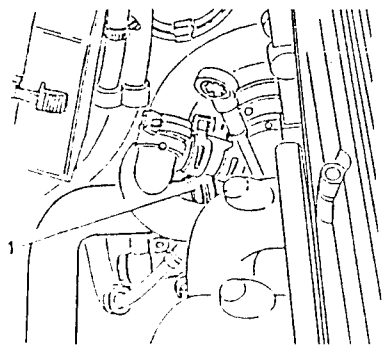
REPLACING ENGINE COOLANT FLUID

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 Climafluid 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.

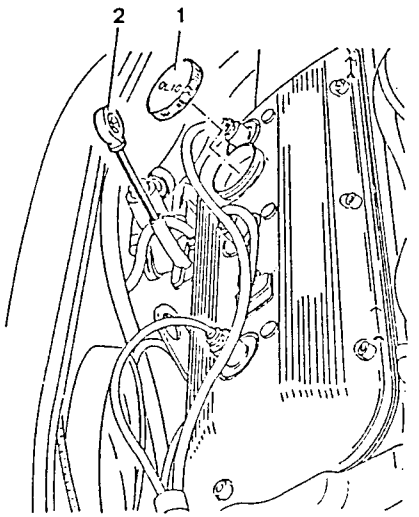
CAUTION
It is unadvisable to mix different types of antifreeze.
Do not use rust-proofing additives as they may not be compatible with the antifreeze.

ENGINE MAINTENANCE OPERATIONS
For the V6 engine
(AR 67301)

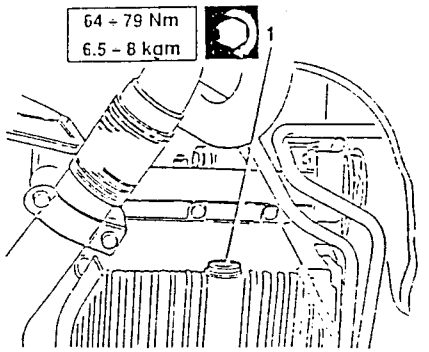
REPLACING ENGINE OIL AND FILTER

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.



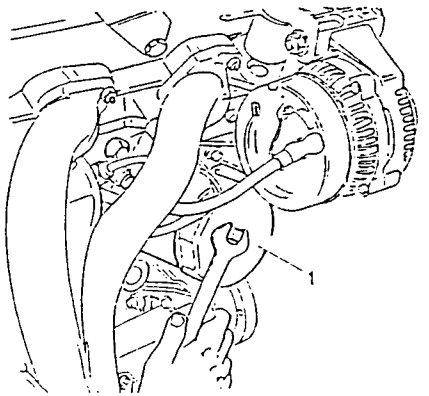
- Raise the vehicle.
1. Unscrew the drainage plug and let the oil drain off for at least 15 minutes.



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 cause 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.

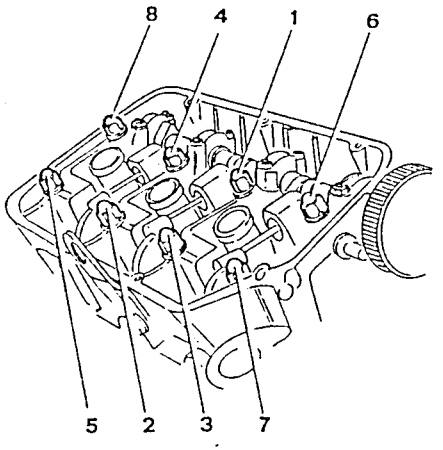
- Screw on the oil cap and run the engine for about 2 minutes, then switch off the engine and wait for a couple of minutes.
- Check the level of the oil and check for leaks.

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:**

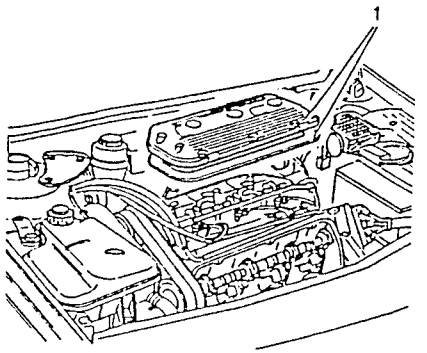
88.5 - 97.8 Nm 9 - 10 kgm

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.

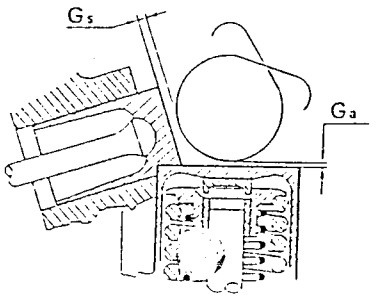
1. Remove the timing covers and relative gaskets.



- Suck out the oil from the wells and put it back in the sump.

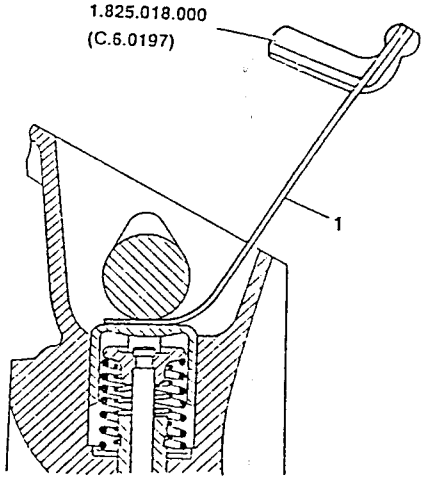
1. **When the engine is cold**, check that the clearance between the cam heel radius and the ceiling of the valve cups is within the prescribed values.

Valve clearance intake side "G_a"	0.475 - 0.500 mm
Valve clearance exhaust side "G_s"	0.310 - 0.345 mm

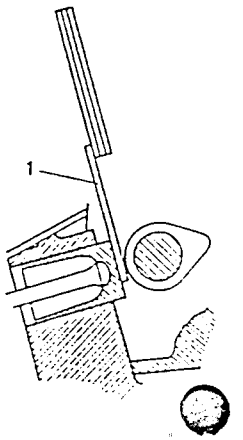


NOTE: **To measure the intake valve clearance use feeler gauge N° 1.825.018.000 (C.6.0197).**

Intake



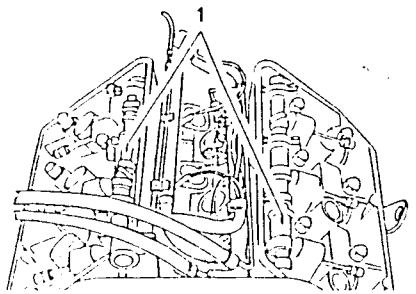
Exhaust



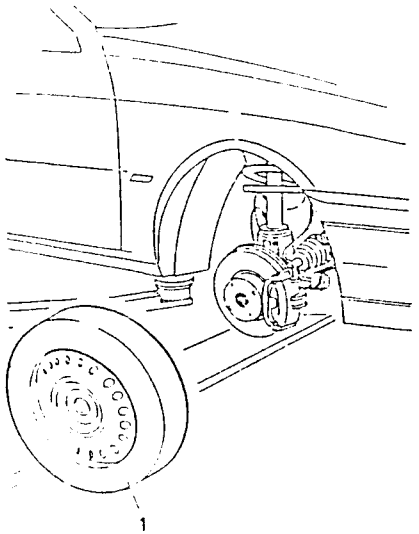
– If the valve clearance is not within the specified values, adjust as follows:

Adjusting valve clearance - intake

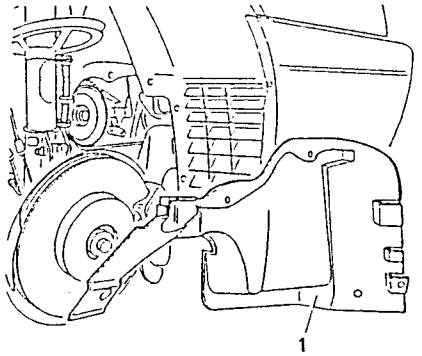
1. Rotate the crankshaft until the reference notches on the camshafts are in line with those on the relative caps



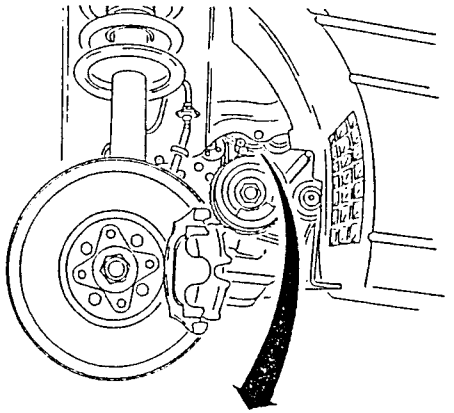
1. Remove the front right-hand wheel.

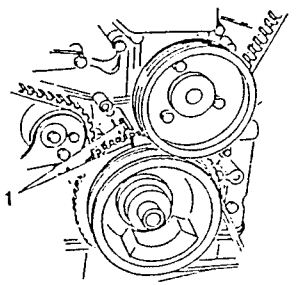


1. Remove the dustcover from the front right-hand wheelhousing.

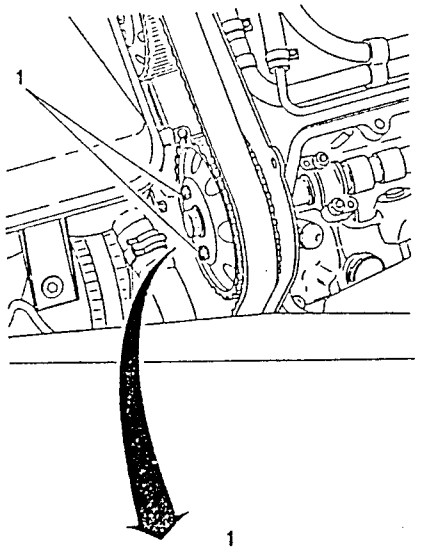


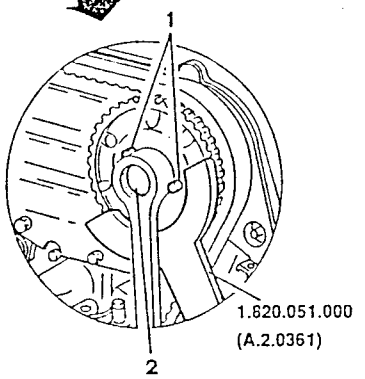
1. Check that the reference notch on the phonic wheel is aligned with the pin on the front cover of the engine block.





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.

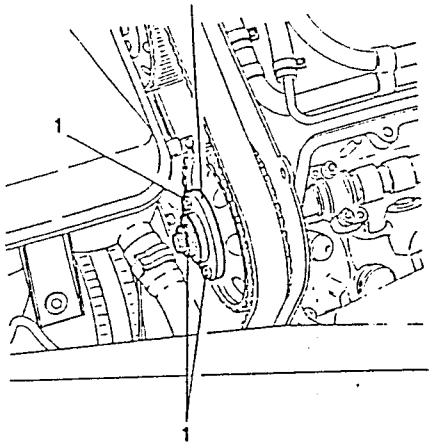




– Remove the previously loosened screws securing the pulley to the hub.

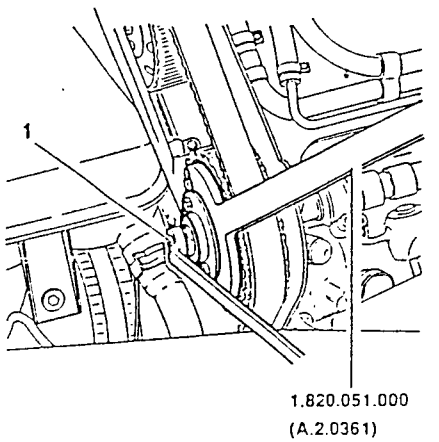
1. Install tool N° 1.820.232.000 on the timing pulley and tighten the three screws on the support hub.

1.820.232.000

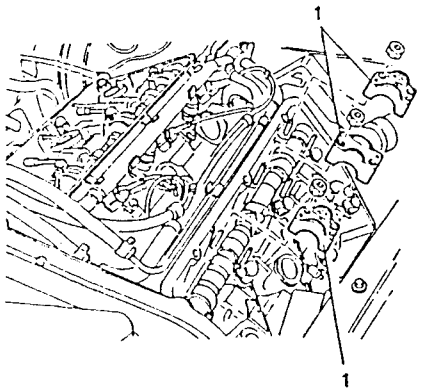


1. Tighten the nut of tool N° 1.820.232.000 and locking the pulley with tool N° 1.820.051.000 (A.2.0361), move the pulley and hub forward until they disengage from the camshaft.

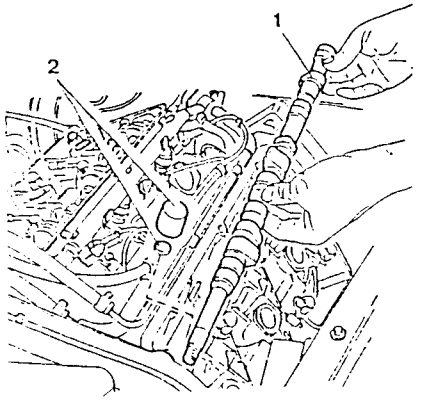
1.820.232.000



1. Remove the camshaft caps.

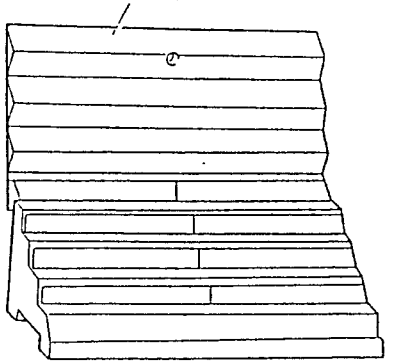


1. Remove the camshaft by lifting it from the rear end.
2. Withdraw a cup and relative valve clearance adjustment cap.

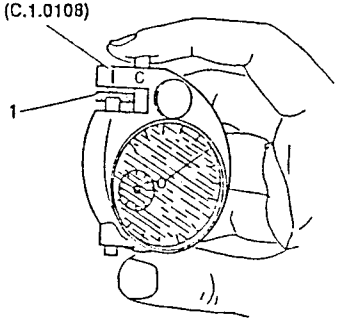


1. Measure the thickness of the caps with the specific dial gauge N° 1.827.002.000 (C.1.0108) and considering the difference in relation to the values measured previously, choose those suitable to re-establish the correct clearance of each valve from series N° 1.820.150.000 (R.9.0001).

1.820.150.000
(R.9.0001)



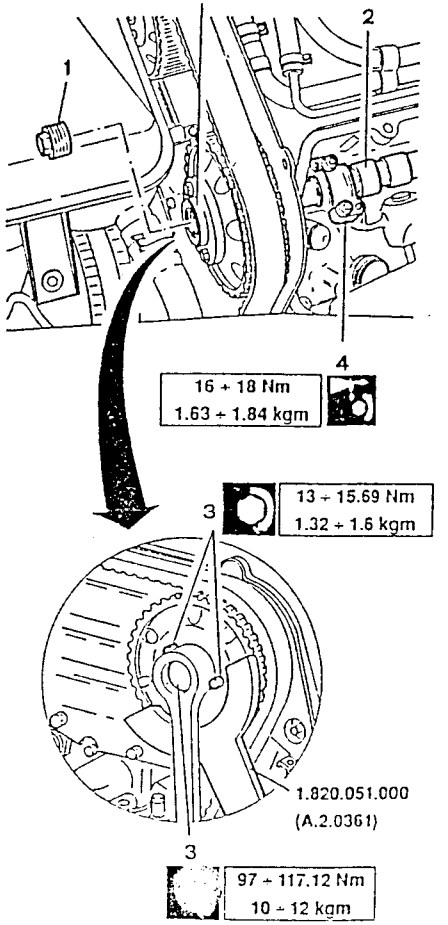
1.827.002.000
(C.1.0108)



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

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.

1.820.232.000



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.