Complete Car

Page
Return
Index
Page 2
Page 3
Page 4
Page 5
Page 6
Page 7
Page 8
Page 9
Page 10
Page 11
Page 12
Page 13
Page 14
Page 15
Page 16
Page 17
Page 18
Page 19
Page 20
Page 21
Page 22
Page 23
Page 24
Page 25
Page 26
Page 27
Page 28
Page 29
Page 30
Page 31
Page 32
Page 33
Page 34
Page 35
Page 36
Page 37
Page 38
Page 39
Page 40
Page 41
Page 42
Page 43
Page 44
Page 45
Page 46
Page 47
Page 48
Page 49
Page 50

GROUP 00

COMPLETE CAR

TABLE OF CONTENTS

GROUP 00

COMPLETE CAR

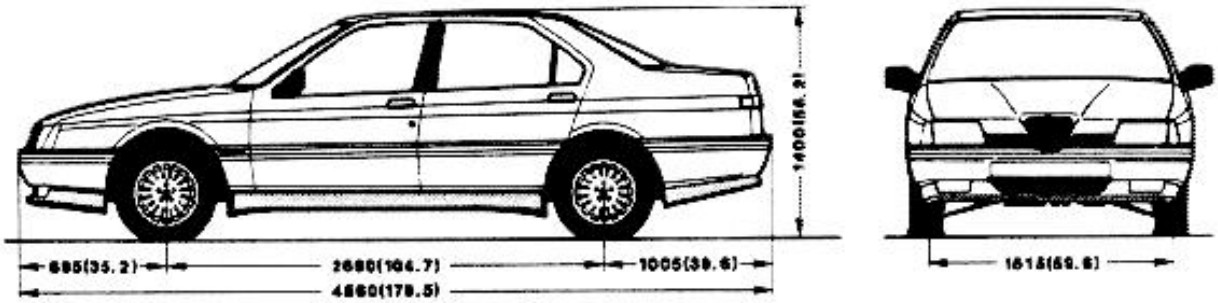
TABLE OF CONTENTS

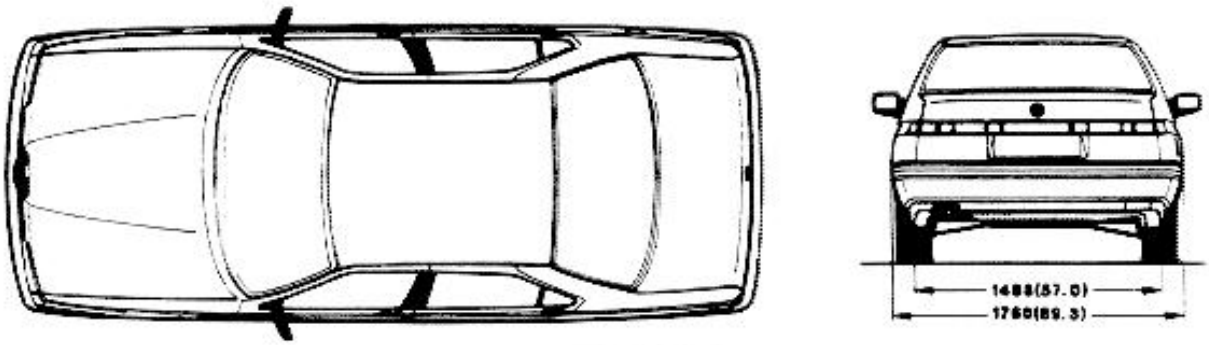
COMPLETE CAR

ALFA ROMEO 164

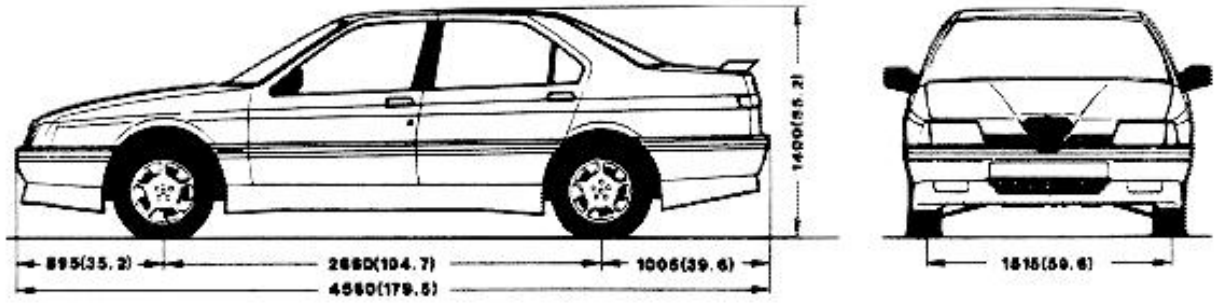
DIMENSIONS
mm (in)

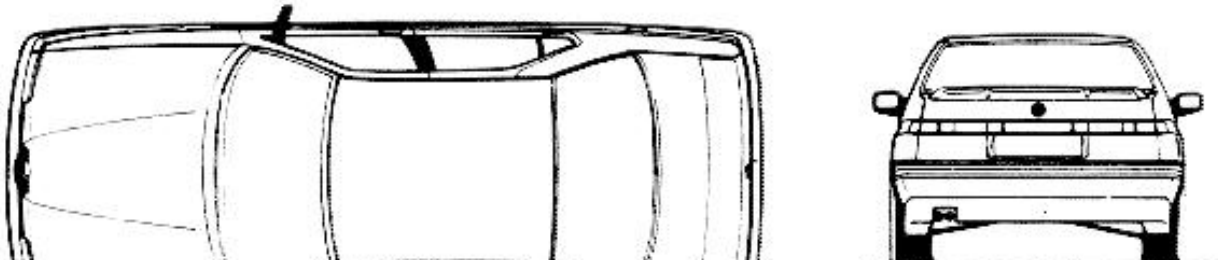
164 - 164 L





164 S





WEIGHTS AND LOADS

			164 - 164 L (M.T.)	164 - 164 L (A.T.)	164 S
Curb weight		lbs kg	3300 1510	3395 1540	3395 1540
Useful load		lbs kg	937 425	937 425	937 425
Max allowable weight per axle:	- front	lbs kg	2320 1052	2320 1052	2320 1052
	- rear	lbs kg	2100 953	2100 953	2100 953
Max roof load		lbs kg	177 80	177 80	177 80
Trunk capacity		cu.ft dm³	17.8 504	17.8 504	17.8 504
Minimum turning diameter		ft m	35.4 10.8	41.0 (right) 38.0 (left) 12.5 (right) 11.6 (left)	35.4 10.8

WHEELS AND TIRES

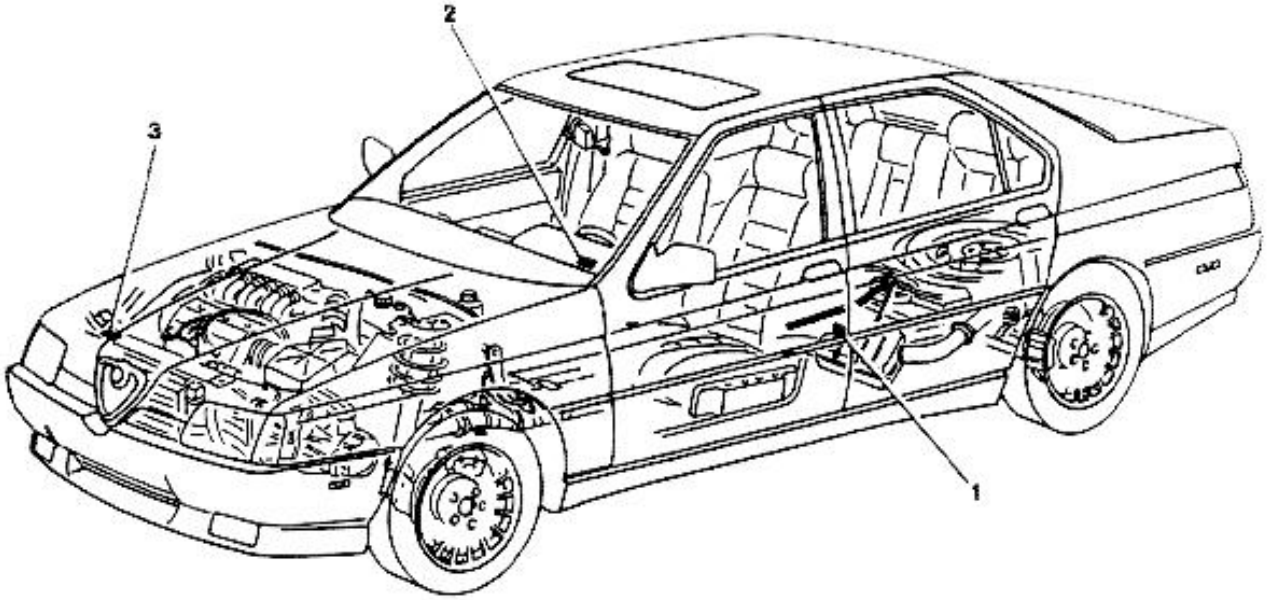
			164 - 164 L	164 S
Rims			6J x 15"	6J x 15 "
Tires			195/65 VR 15"	195/65 VR 15"
Make			PIRELLI P4000 GOOD YEAR EAGLE NCT	PIRELLI P4000 GOOD YEAR EAGLE NCT
Inflation pressure (cold tire) :				
- Reduced load, normal speed:				
	front	psi	31	31
		kPa	216	216
	rear	psi	28	28
		kPa	196	196
- Full load, high speed:				
	front	psi	35	35
		kPa	245	245
	rear	psi	35	35
		kPa	245	245
COMPACT SPARE WHEEL (1)				
Rim			4J x15"	4J x 15"
Tire			T 115/70 R 15"	T 115/70 R 15"
Inflation pressure (cold tire)		psi	60	60
		kPa	420	420

(1) Temporary use only. Max speed 50 mph - 80 km/h

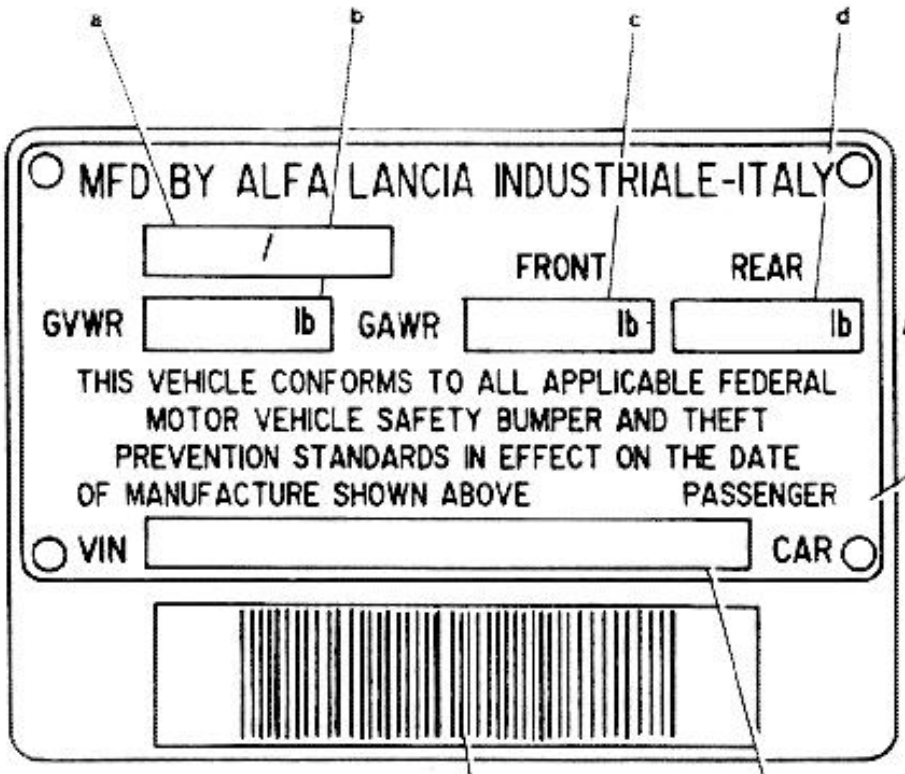
MODELS IDENTIFICATION

	164 Automatic Transmission	164 Manual Transmission	164 S
ENGINE FAMILY	LAR 3.0V5F6T5		MAR 3.0V5F6S5
CARLINE	1030		1030
ENGINE CODE	6412T1		6412T2
TRANS. CODE	6412 (M5)	6422 (A4)	6412 (M5)
EVAP. FAMILY	6412E1		6412E1
EVAP. CODE	6412E1.0		6412E1.0

VEHICLE IDENTIFICATION PLACARDS



1 - D.O.T. certification and vehicle identification (V.I.N.) placard
2 - Vehicle identification number (V.I.N.) placard
3 - Engine tune-up label (see next page)



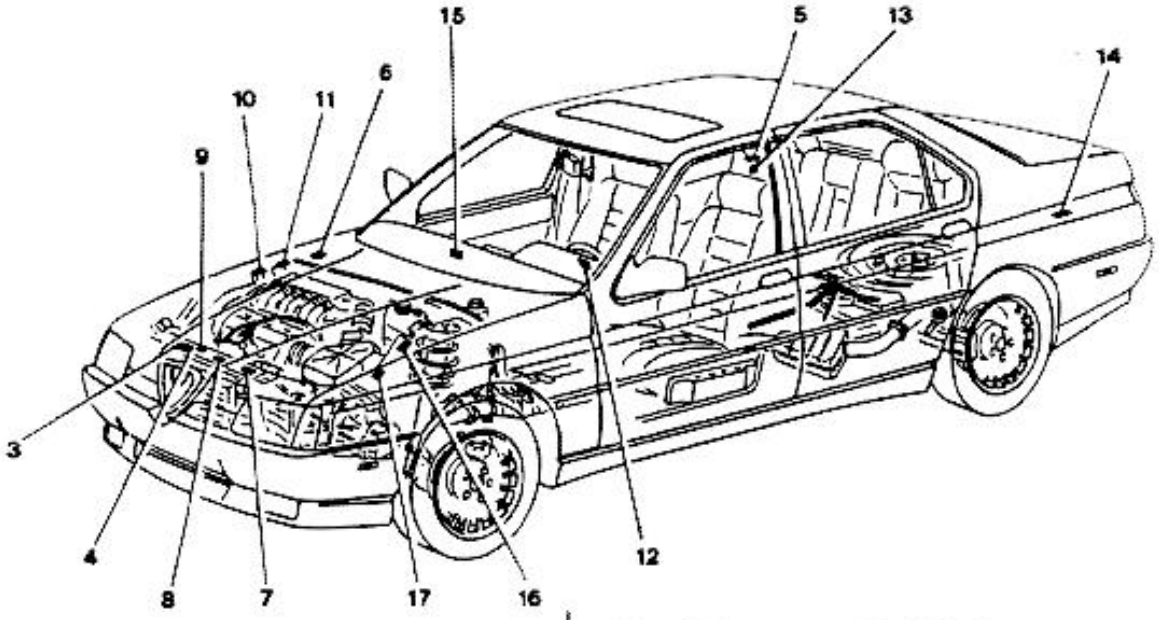
V.I.N. Placard

a - Month/year of manufacture
b - Maximum allowable load
c - Front axle maximum load
d - Rear axle maximum load
e - Number of passengers
f - Vehicle identification number (V.I.N.)

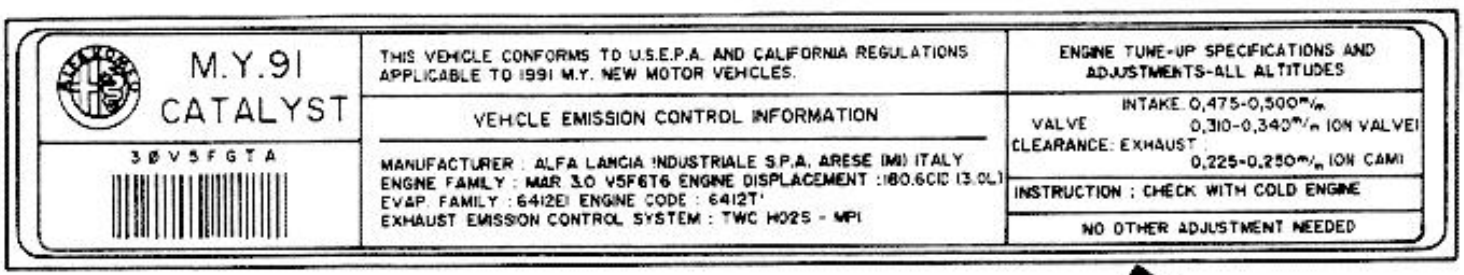
g f

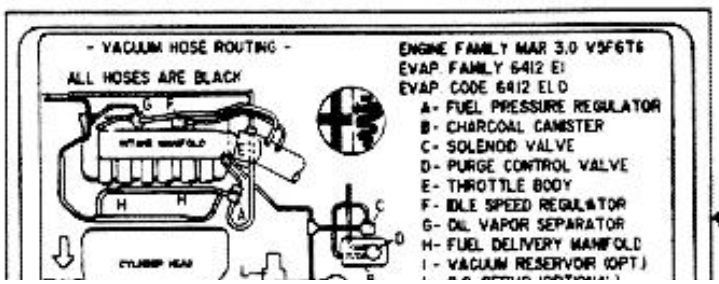
f - Vehicle identification number (V.I.N.)
g - V.I.N. bar code

MAINTENANCE AND WARNING LABELS



3 - Engine tune-up label
4 - Vacuum hose routing label
5 - Fuel requirement label
6 - Lubricants label
7 - Ignition system warning label
8 - Pressurized cap warning label
9 - Rotating units warning label
10 - Air conditioning fluid warning label
11 - Air bag warning label
12 - Air bag precaution label
13 - Tank cap opening label
14 - Battery label
15 - Tire pressure label
16 - Paintwork label
17 - Hood closing precaution label
— Anti-theft labels: set of 14 labels located on fenders (4), bumpers (2), doors (4), engine hood and trunk lid (2), engine (1) and gearbox (1)





Engine tune-up label

Vacuum hose routing label

SPECIAL TOOLS

The special tools play a very important role in the maintenance of the vehicle since they are essential to guarantee accurate, reliable and fast service.
It must be noted that the duration time of the various operations has been determined considering the use of the special tools.
This manual contains a list and the illustrations of the special tools designed by the vehicle manufacturer to carry-out overhaul, maintenance and repair activities of the car.
The tool identification code, which is the Part Number, consists of ten digits as specified below:

1.820.093.000 Tool, valves clearance check.

1.821.123.000 Puller, camshaft pulley

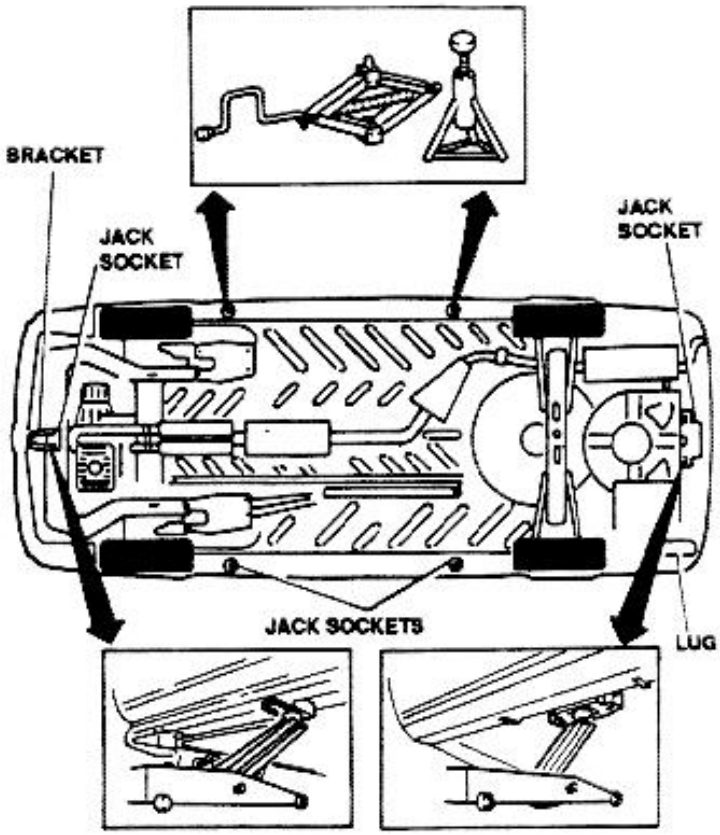
The tools in this manual are identified with the above shown Part Number, and are listed in a table located at the end of each Group.
Provisioning of the special tools can be performed by the assistance network following the procedures already existing by each Alfa Romeo Dealer.

JACKING AND TOWING POINTS

WARNING:

a. After the vehicle has been lifted on jacks, support it using suitable safety stands.

b. Before lifting the rear (front) side of the vehicle, block the wheels placing suitable chocks before (after) the front (rear) wheels.



TOWING INSTRUCTIONS

Since the towing sling is the most commonly used piece of lifting and towing equipment, all the following instructions must be observed.
If the vehicle is to be towed on its drive wheels, the transmission and differential must be operational.
Place the transmission to NEUTRAL; move the vehicle only within the manufacturer's recommended speeds and distances.
If any doubt exists about the condition of the transmission or differential, tow with the drive wheels off the ground, or use a wheel dolly.
Even on a drive-wheels-raised tow, the transmission must be in NEUTRAL, and the parking brake released.
During any tow, the raised wheels might contact the road or other ground surfaces so they need to rotate freely.
Before towing a vehicle from the rear (with the rear wheels lifted), unlock the steering wheel with the ignition key.

Safely position the jacks and safety stands in the locations shown in the illustration.

Then secure the steering wheel with a steering wheel clamping device, designed for towing service.

The anti-theft steering column lock is not strong enough to withstand shocks transmitted from the wheels while towing.

When locked vehicles must be moved and keys are not available, the front of the car should be lifted to prevent damage to the steering column anti-theft lock.

Locked rear-wheel drive cars should be moved with a wheel dolly under the drive wheels.

As an alternative to the wheel dolly the drive shaft can be disconnected, with parking brake released.

Do not tow over 50 mph for any reason. Safe operating speeds depend on weather, road, traffic, and visibility conditions, as well as the conditions of the towed vehicle. This applies in all cases of towing with a conventional tow truck, with or without the use of a towing dolly.

A tow truck is an emergency vehicle to be used to move disabled vehicles to a suitable place of repair and should not be used for long distances.

Sharp rises, such as curbs, should be crossed at 45° angle to minimize the possibility of scraping the underbody of the towed vehicle. Insure adequate ground clearance when towing over rough terrain or when crossing sharp rises such as curbs.

Ground clearance can be increased by removing the wheels from the lifted end of the disabled vehicle.

"Panic" or "fast" stops during towing should be avoided because many vehicles tend to ride up the sling. When this happens the vehicles may come in contact with rigid portions of the wrecker or sling, considerably damaging the towed vehicle and the wrecker.

To minimize the chances for ride-up, make sure the towbar end sling spacer bars is lower than the wrecker end of the spacer bars.

Towed vehicles should be raised until wheels are a minimum of six inches from the ground and there is adequate clearance at the opposite end of the lifted vehicles. Increased ground clearance may be obtained by using a dolly.

Lift the end of the disabled vehicle just as if towing. Never attempt to rock or pivot the vehicle on jack stands to allow positioning of the dolly.

important to use a safety chain system completely independent of the primary lifting and towing attachments. During installation of safety chains, be careful not to damage lights, bumpers, or painted surfaces.

Do not lift or tow any vehicle by attaching towing chains or hooks to rear springs, shock absorbers, stabilizer bars, front strut rods or the down eyes.

Position J-hooks and chains cautiously to prevent damage to brake lines located on the dedion axle tube.

When towing using the grab hook ends of the chains (commonly called "short-chaining"), pass the hook over then back under the chassis member before attaching the hook in the chain.

The hook will remain engaged in the event the chain becomes slack.

Regular use of silicone lubricant (aerosol spray or grease forms) will keep sling belts from weathering and deteriorating.

Such lubrication also helps prevent damage to rubber bumper strips and rubber-faced bumper guards. Inspect points of attachment to the disabled vehicle.

If they appear to be damaged select other attachment points at a substantial structural member of the frame. Do not allow the fuel tank to support any of the vehicle's weight during towing.

In addition, bumper-to-towbar restraint straps may be required to prevent fuel tank damage from sudden stops.

Before moving the vehicle, remove any loose or protruding parts of damaged vehicles.

The operator should be familiar with the specific towing equipment being used and follow the manufacturer's recommendations.

State and local laws regarding such items as warning signals, night illumination, speed, etc., must be followed.

Do not go under the vehicle while it is lifted by the towing equipment. Never allow passengers in a towed vehicle.

The safety of the operator and others in the vicinity of the wrecker or the towed vehicle must be considered at all

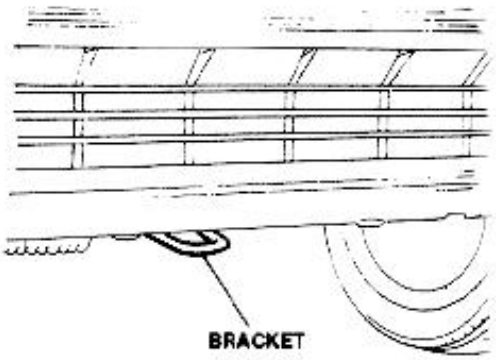
Serious operator injury or vehicle damage may result. It is | times.

TOWING THE VEHICLE

Not recommended with conventional sling-type equipment. Sling-type equipment may damage the front airdam. If the vehicle must be towed from the front, wheel lift or flat bed equipment is recommended.

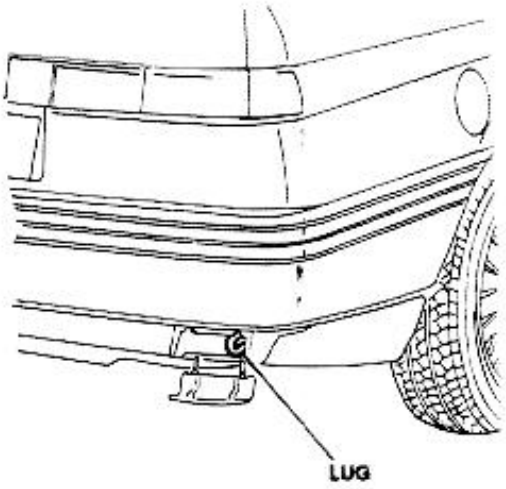
NOTE: When towing, local laws and regulations in effect locally should be strictly adhered to. When being towed, secure the rope to brackets. Turn the steering lock/ignition switch key to the position 0 (stop).

NOTE: Never withdraw the key from the steering lock/ignition switch because it is possible for the steering lock to engage accidentally.



While the car is being towed, no power assistance is available to the brake system; a substantially greater foot pedal effort will therefore be needed to obtain comparable braking effect.

NOTE: Under no circumstances must towing be attempted by attaching chain or cables to the bumpers. The bumpers are mounted on energy absorbing units that can easily be damaged by towing and render ineffective their low speed protective characteristics. When towing another vehicle, secure the rope to the hole in



VARIANTS FOR VEHICLES EQUIPPED WITH AUTOMATIC TRANSMISSION

a) "Flat Bed" towing is recommended over the conventional (tow trunk) method if possible.

b) If "Flat Bed" transportation is not available, it is recommended to tow the car with the front wheels off the ground to avoid excessive drive train wear/damage.

If recommendations a) and b) above are not available, the car may be towed for less than (30 miles) with the selector lever in N at speeds of 50 Km/h (30 mph) or less.

NOTE: For longer towing distances 1 Kg (2 lbs) of prescribed oil should be added to the automatic transmission.
Towing speed must never be higher than 50 Km/h (30 mph). This additional quantity of fluid must however be drained off when towing is over.

When towing do not start the engine. If the above towing instructions are not strictly observed, severe damage to

the lug at the underside of trunk.

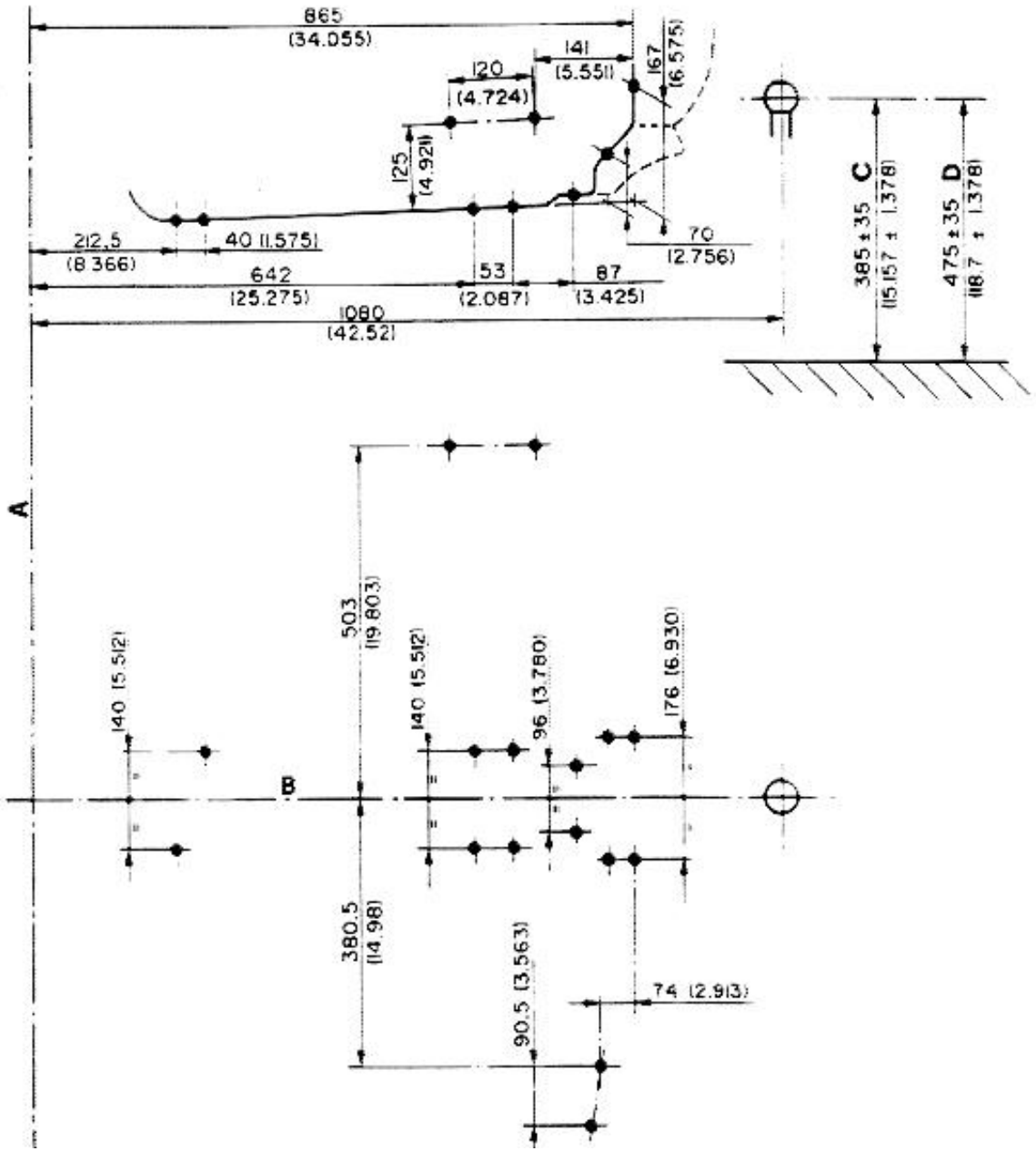
automatic transmission will result.

TOW HOOK

The vehicle is enabled to tow a trailer by applying a suitable tow hook.
Alfa Romeo supplies a tow hook complying with the local safety rules.
The following scheme shows the attachment points to the car body, which do not vary according to the tow hook shape and dimension.
The electrical junction for the trailer electrical connection must be applied to the hook supporting arm, in the most suitable position.

CAUTION:
After performing drilling operations, protect the involved steel sheet area by using a suitable product which will avoid direct contact with atmospheric agents, and consequent oxidation.

mm (in)



A - Rear wheel centre line
B - Vehicle centre line
C - Static load
D - Unladen

PRE-DELIVERY CHECKS

INTRODUCTION

This paragraph lists all checks to be carried-out on the Alfa Romeo 164 model prior to delivery. The pre-delivery checks consist of a series of inspections to be carried-out on new vehicles before delivery to a customer with the aim of identifying any possible malfunction. At the receipt of vehicles, the dedicated personnel must anyway visually inspect it to determine:

- The vehicle is in running conditions, in particular for what the lubricants, fluids, etc. are concerned.
- The vehicle is free of dents, scratches or any other defect of the body and of the upholstery.
- The presence of all the applicable equipment.

PRE-DELIVERY CHECKS

TOPPING UP (Levels)

1 Engine Coolant
2 Engine oil
3 Gearbox/differential oil
4 Brake and clutch fluid
5 Power steering fluid
6 Windshield washer fluid

CHECKS

7 Tyre pressures
8 Wheel nut tightening
9 Tool kit and spare wheel

OPERATION

10 Battery
11 Engine starting
12 Engine controls
13 Engine cooling fan
14 Clutch and brake pedals, gear shift lever
15 Instrument panel
16 Leaks from all systems
17 Heating and air conditioning
18 Headlights, warning lights and electrical accessories
19 Windshield wiper and washer
20 Locks and hinges, power window lift.
21 Seat adjustment, seatbelts, steering wheel adjustment and outside mirrors
22 Inspect body for water seepage
23 Road test

BODY

24 External and internal cleanliness
25 Paintwork
26 Interior and exterior trimming

SAFETY DEVICES

ACTIVE SAFETY

The active safety is a new design philosophy that provides effective means to prevent accidents in addition to already known passive safety devices that intervene after a collision.
The most significant results of this new philosophy are:

- Brake system with A.B.S.
- High stiffness of vehicle body, and in particular of the passenger compartment.
- Optimized suspensions for a high road holding.
- High visibility from driver's place.
- Travel comfort (soundproofing, air conditioning).
- Weight distribution and vehicle's attitude.

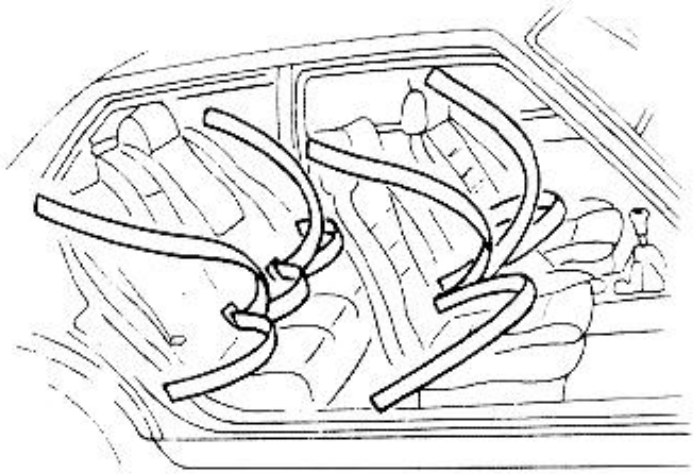
PASSIVE SAFETY

To provide occupants with highest grade of passive safety, an integrated restraint system has been designed, as follows:

- Seat belts.
- High energy absorption knees protections properly located below the dashboard.
- Air Bag (Supplementary Restraint System - S.R.S.).

SEAT BELTS

The front seats are provided with three-point type automatic reeling belts (inertial reel belts); the belt upper attachment point can be adjusted to fit occupant height.
The belts conform to the most restrictive regulations.
The two lateral rear seats are provided with three-point type automatic reeling belts (inertia reel belts), whilst the central seat is provided with a lap belt.



TECHNICAL DATA

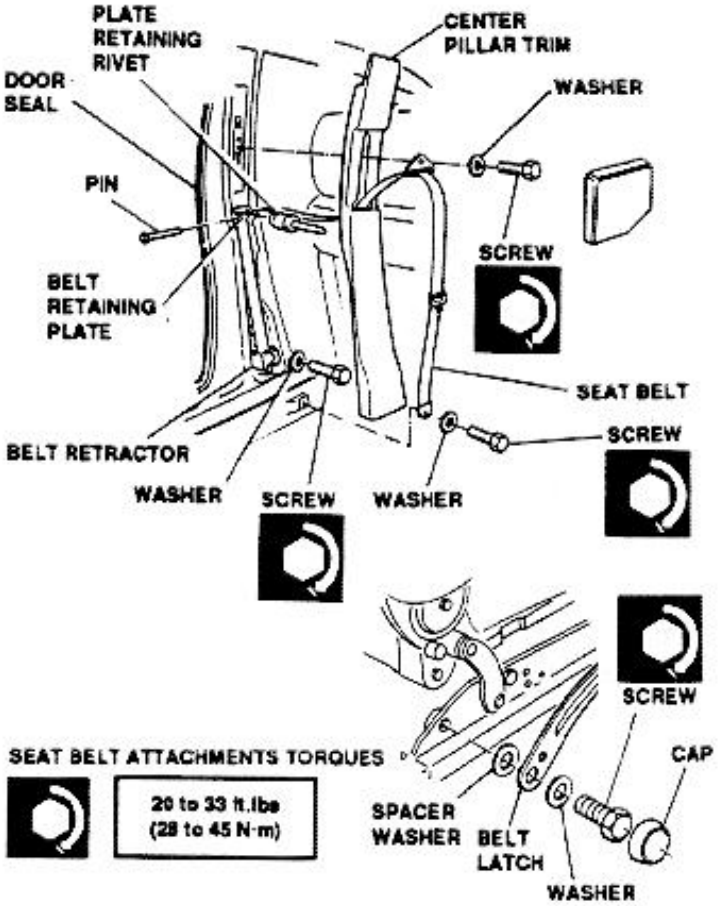
Minimum strength offered by seat belts (according to current regulations: FMUSS N. 209).

- Stretching at 9.8 kN (2200 lbs) = 6 to 8%
- Breaking load ≥ 28 kN (6300 lbs)

REMOVAL/INSTALLATION

(Refer to **Group 66 - SEAT BELTS**).

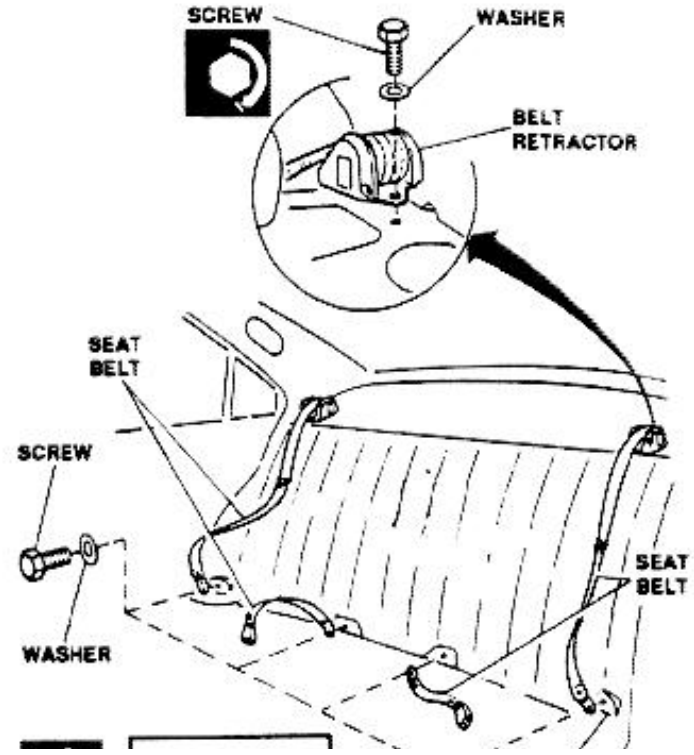
FRONT SEAT BELTS



SEAT BELT ATTACHMENTS TORQUES

20 to 33 ft.lbs (28 to 45 N·m)

REAR SEAT BELTS

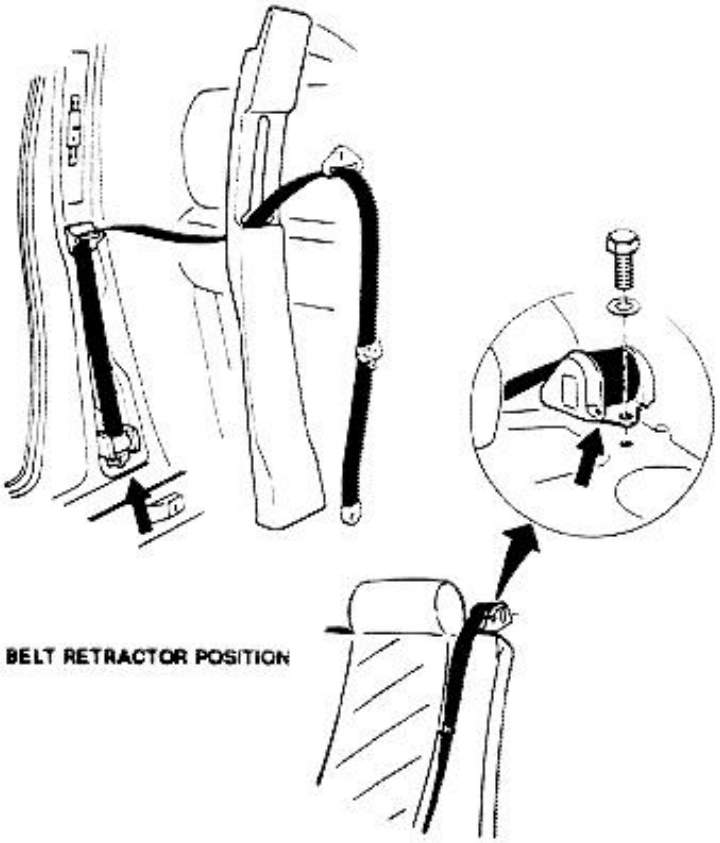


CHECKS AND INSPECTIONS

Carefully check the belts for absence of damages, wear or fraying. Replace belts if any of these damages is found. Check proper operation of the automatic belt reeling device:

- The belt retracts regularly when reeled out smoothly.
- The belt locks when reeled out quickly and with force.

Check proper positioning of retractor in case of abnormal operation: proper operation could be prevented even by a small displacement from design and installation angle: restore correct position of retractor , or replace if necessary.



BELT RETRACTOR POSITION

NOTE: in case of accidents or violent collision, it is recommended to replace the seat belts, the attachments, retractors and securing screws.
Even if the belts shown no evident damage, their original strength could have been

20 to 32 ft.lbs
(28 to 44 N m)

SEAT BELT ATTACHMENTS TORQUES

LOWER
ATTACHMENTS

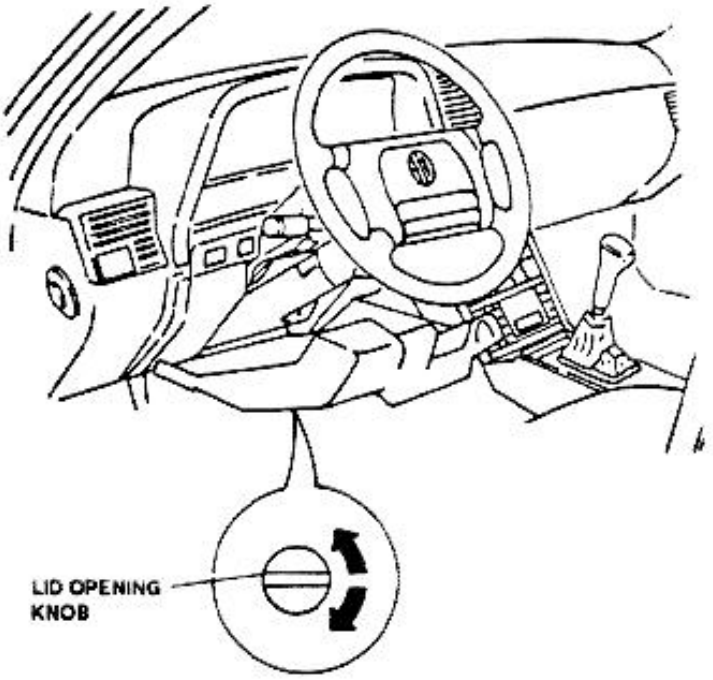
weakened.

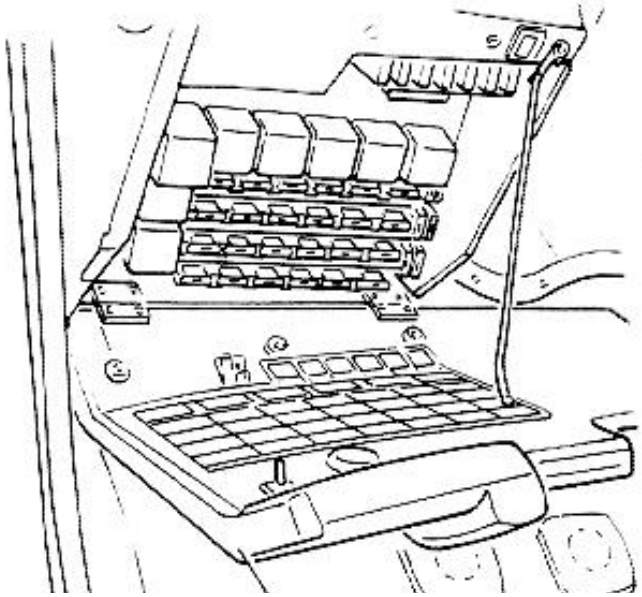
KNEES PROTECTIONS

REMOVAL/INSTALLATION

Driver's knees protection

1. Open fusebox lid integrated with the knees protection acting on relevant knob.
2. Remove knees protection acting on attachment screws.





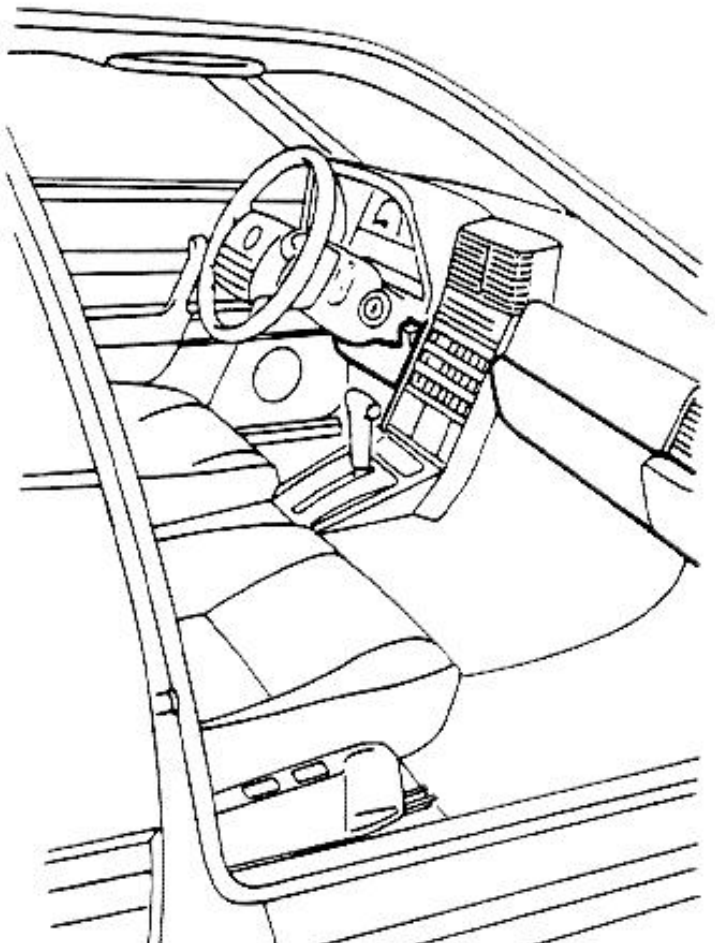
CHECKS AND INSPECTIONS

Carefully check the knees protections for absence of distortion or breakage, even of minor entity. Replace knees protections if damaged.
Furtherly, check attachments for absence of damages.

NOTE: In case of accidents or violent collision, always remove and carefully inspect the knees protections.

Passenger's knees protection

The front passenger's knees protection is integrated in the dashboard.
Refer to **Group 66 "DASHBOARD, REMOVAL AND INSTALLATION".**




KNEES PROTECTION

AIR BAG (Supplementary Restraint System - S.R.S.)

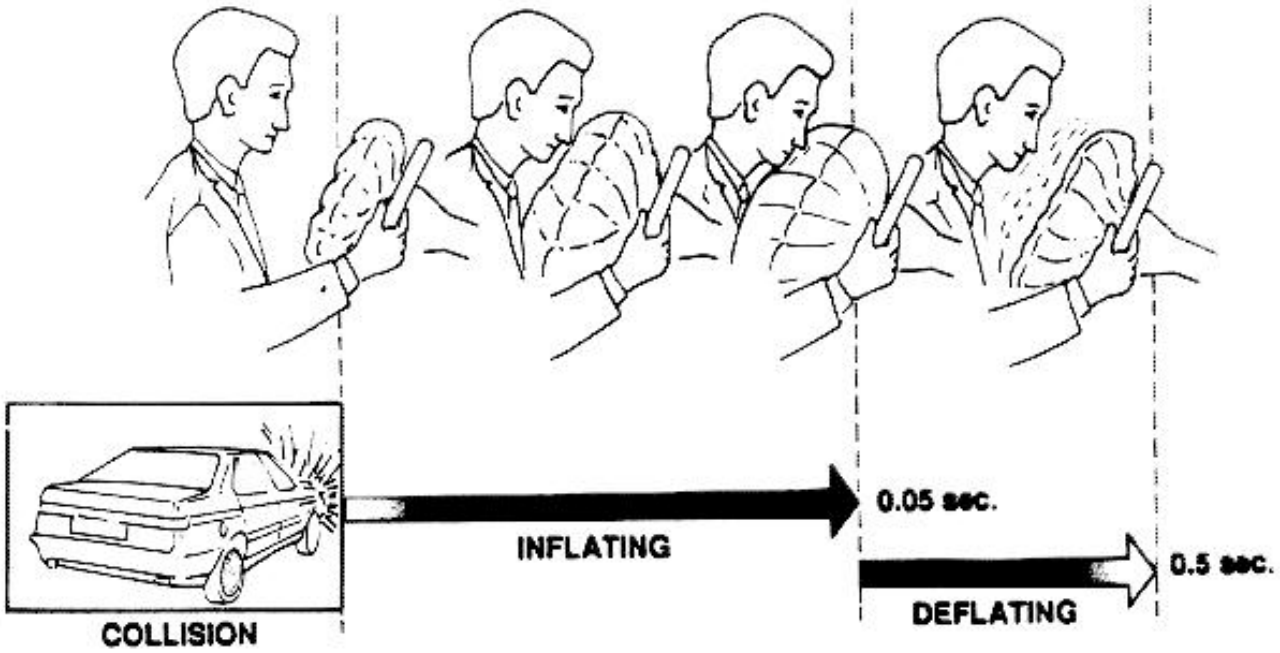
The driver's safety has been furtherly implemented with the installation of the Air Bag, which prevents the driver from hitting the steering wheel in the event of a violent collision.

OPERATION

The air bag consists of an electronically controlled device that actuates a bag stowed inside the steering wheel, that "blasts" in case of violent collision and inflates between the driver and the steering wheel.

Inflation of the air bag is almost instantaneous, as weel as its deflation to allow the driver to recover control of the vehicle.

Furthermore, the geometry and size of the steering wheel are such as to direct the bag towards th driver's chest, thus preventing a dangerous "punch" on his chin or face that could dangerously stun him.

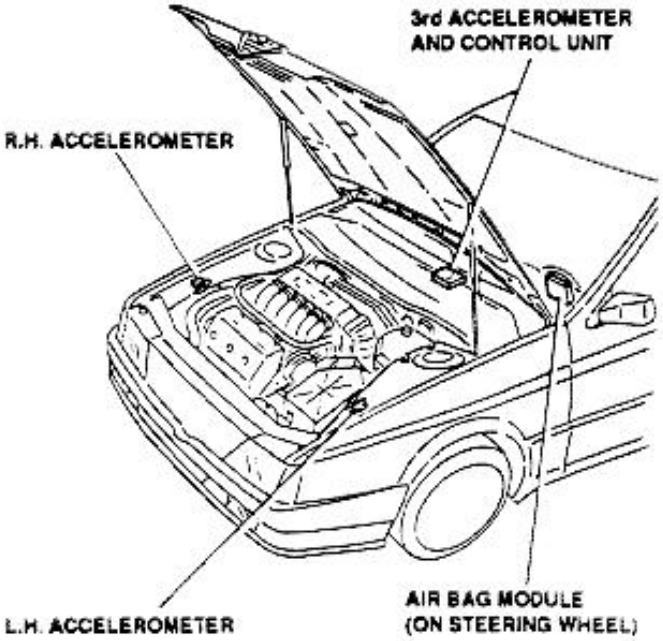


DESCRIPTION

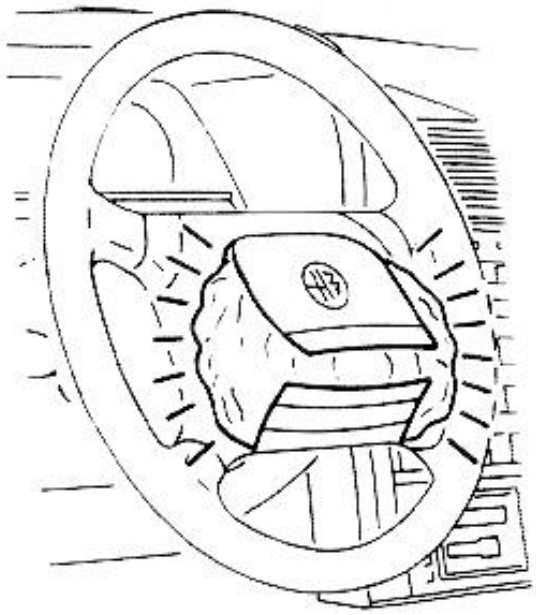
The air bag system consists of:

- **Three accelerometers**: two are located on right and left sides of engine compartment and one is located on the control unit.
  Setting of the accelerometers is such that a signal is supplied to the control unit is case of a very high deceleration.
  The accelerometer on the control unit has a function of control and monitoring to prevent the actuation of the air bag in case of lateral collisions, sudden bounces or other accidental reasons.
- The **control unit** receives the collision signals from the accelerometers and, after the signal has been verified, it delivers in real time a current signal to the air bag module.
  The control unit monitors the proper operation of the system through a safety circuit, and alerts of any malfunction to the system switching on the relevant warning lamp on the instrument panel.
  Furthermore, this safety circuit will send the current signal to the air bag module even if the control unit is malfunctioning or in failure.

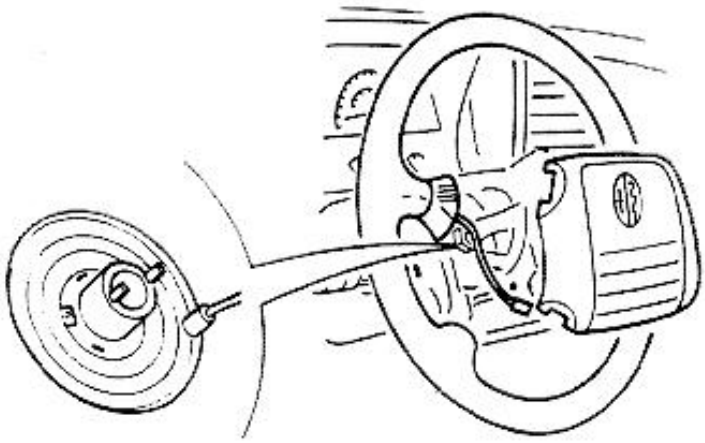
- The **air bag module**, located in the steering wheel, contains a blasting charge (squib). In case of a collision, the current signal delivered by the control unit actuates the squib which will produce the gas necessary to inflate the bag; the bag remains inflated for a few instants, then deflates discharging the gas through calibrated holes.



The cover of the air bag module has been designed with particular sections (of lower thickness) that facilitate breaking in pre-determined positions, thus preventing the cover to be jettisoned towards the driver.



The electric contact between the steering wheel and the horn is realized by means of a circular spiral spring that provides a proper transmission of the electric signals under any condition.



TECHNICAL DATA

Actuation times
- Bag inflation < 0.05 sec.
- Bag deflation < 0.5 sec.
- Squib actuating current = 650 to 1750 mA
- Total bag volume = 18 Gals (67 l.)

MAINTENANCE AND REPAIR

NOTE: The electronic system is provided with a built-in self-diagnosis circuit that alerts of any malfunction to the system by means of a warning lamp on the instrument panel. In addition, the **"WIRING DIAGRAMS AND ELECTRICAL DIAGNOSIS" Book** contains a detailed troubleshooting procedure that enable the operators to isolate any possible malfunction.

WARNING:
Before carrying-out any operation on the air bag system, it is essential to prevent accidental actuation of the bag performing the following operations:
- **Disconnect (+) and (-) leads from the battery.**
- **Insulate (-) lead.**

steering column that transmits the signals for the air bag

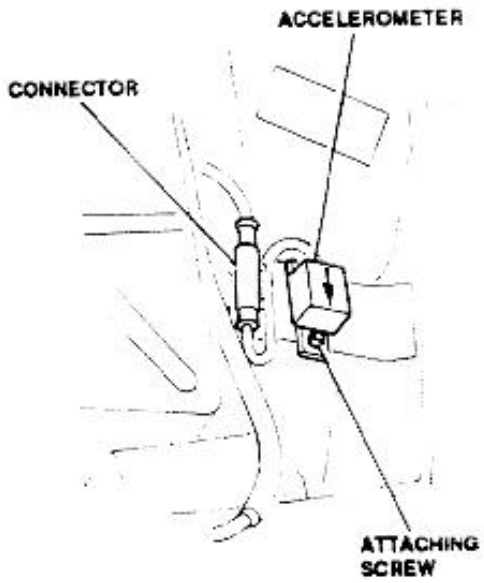
ACCELEROMETERS

ACCELEROMETERS IN ENGINE COMPARTMENT

REMOVAL/INSTALLATION

1. Operate inside the engine compartment and disconnect accelerometer connector.
2. Remove accelerator acting on two attaching screws.
3. Install accelerometer acting in reverse order, and verify that the cable is free of any damage or improperly connected wires before reconnecting the accelerometer cables.

NOTE: The accelerometers have a definite mounting direction shown by the arrow and "FORWARD" label.



CHECKS AND INSPECTIONS

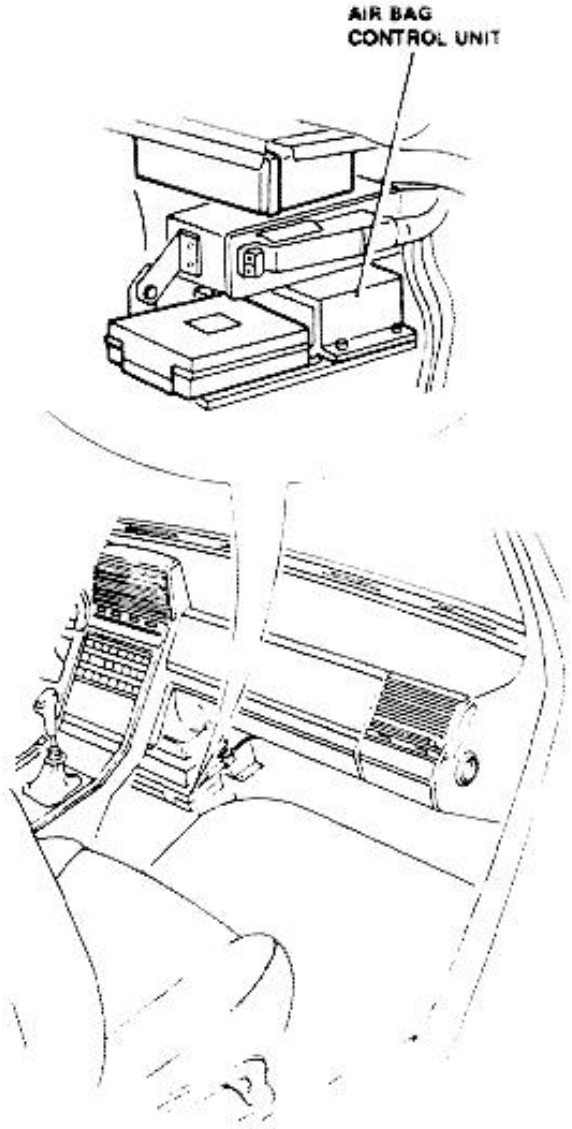
Check proper operation and adjustment of accelerometers (refer to **"WIRING DIAGRAMS AND ELECTRICAL DIAGNOSIS" Book**).

ACCELEROMETER ON CONTROL UNIT

Proceed in analogy to instructions given for the two

ELECTRONIC CONTROL UNIT

For a detailed description and maintenance of the control unit (operating logics, removal and installation, checks and inspections) refer to the **"WIRING DIAGRAMS AND ELECTRICAL DIAGNOSIS" Book**).



Proceed in analogy to instructions given for the two accelerometers in engine compartment.

AIR BAG MODULE

CAUTION:
Before carrying-out removal or installation of the steering wheel or the air bag, ensure the wheels are perfectly straight.

REMOVAL/INSTALLATION

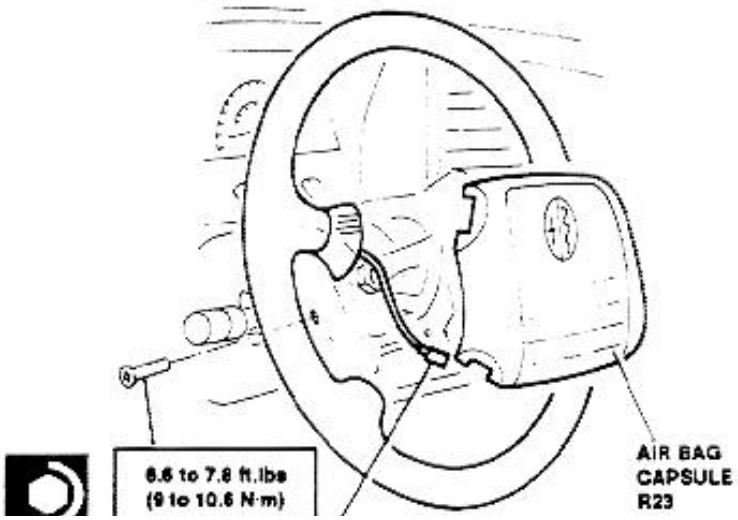
WARNING:
Operate with precaution! The air bag module contains a blasting charge that produces gas.

1. Remove two screws securing the module to the steering wheel using a suitable wrench (Torsen No.30).

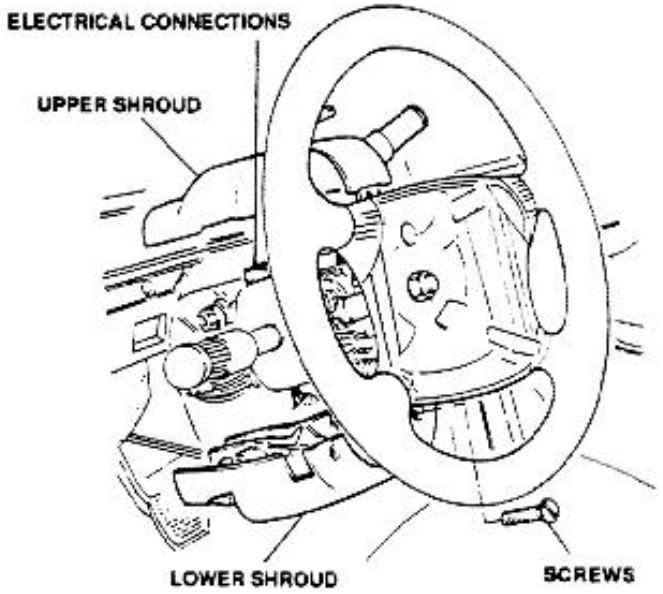
Replace screws at any removal.

2. Partially extract air bag from steering wheel and disconnect electrical connector.
3. Remove air bag capsule.

NOTE: **Stow the air bag module in the relevant safety container just after removal.**

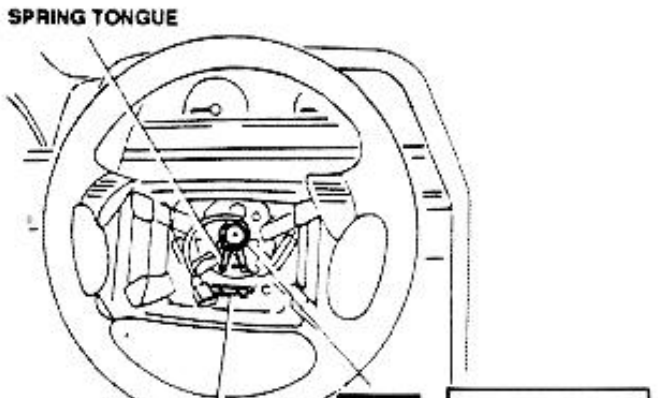


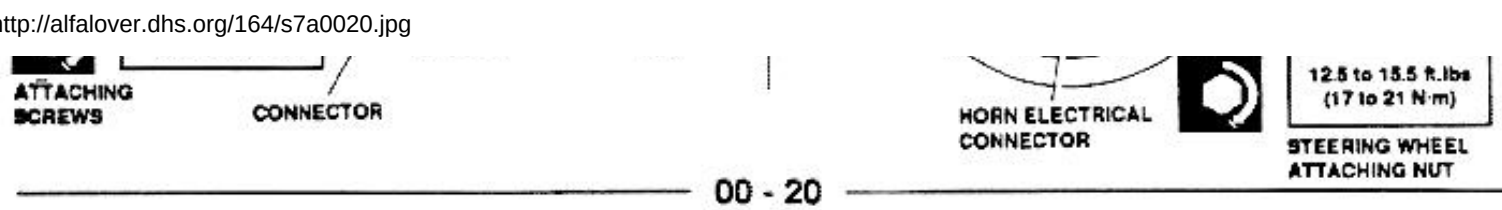
4. Rotate the steering wheel by 90° leftwards, and remove the left-side shrouds fixing screws, then rotate it by 180° rightwards and remove the right-side fixing screw.
5. Disconnect electrical connections and remove shrouds.

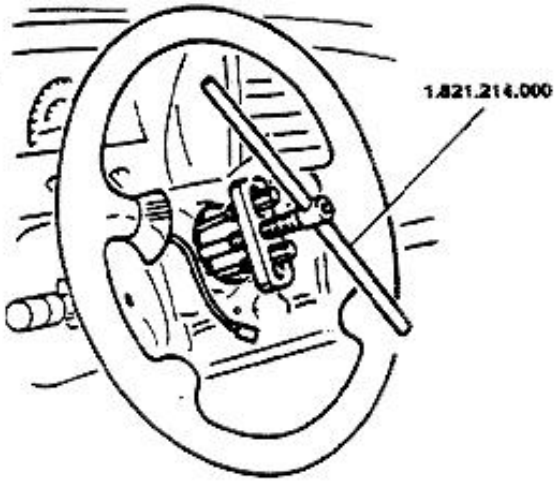


6. Disconnect horn electrical connector.
7. Loosen central nut securing steering wheel to steering column.
8. Remove spring tongue.
9. Remove steering wheel using tool **1.821.214.000**.

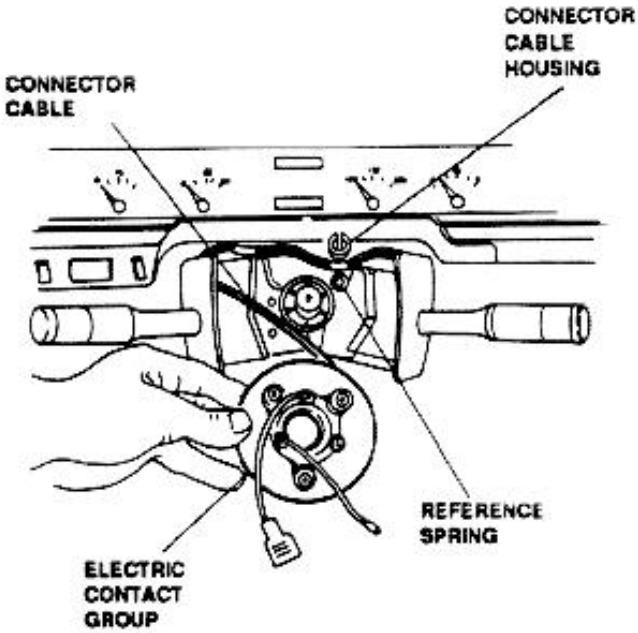
CAUTION:
Do not rotate steering wheel whilst performing this operation to prevent breakage of steering wheel electric contact spiral spring.







10. Extract the electric contact group, paying attention not to damage the reference spring.
11. Disconnect the connector cable.



On reassembly, ensure the electric contact group reference spring is properly positioned, and the cable of electric connector is seated in its housing.

NOTE: Ensure the wheels are perfectly straight before carrying-out the following operations.

NOTE: After installation of air bag module, the warning lamp will indicate a malfunction; reset the warning lamp as indicated in the "WIRING DIAGRAMS AND ELECTRICAL DIAGNOSIS" Book.

CHECKS AND INSPECTIONS

The air bag module cannot be repaired: replace in case of malfunction (refer to troubleshooting procedure in the **"WIRING DIAGRAMS AND ELECTRICAL DIAGNOSIS" Book**).

WARNING:
Ensure the gas producer is removed by specialized and authorized operators!

If for any reason the air bag module has been disassembled into its components, do not reinstall it, but fit a new one on the vehicle.

NOTE: In case of accidents or violent collision which caused the air bag blasting, replace the air bag module and check with maximum care all air bag system components. Furthermore check for proper operation the steering system (refer to Group 23).

WARNING:
A check of the car component ground connection has to be carried out every 2 years. Only an efficient grounding ensures a correct operation of the Air bag system. Therefore, pay the utmost attention to prevent corrosion of grounding points and to correctly tighten the fixing nuts.

MAINTENANCE OPERATIONS

The maintenance operations consist of checking and restoring the efficiency of those parts of the vehicle subject to wear and misadjustment during normal operation of the vehicle. The table below lists all the operations to be performed at various mileages; the same table is contained in the Maintenance Program Book supplied with the vehicle. The coupons must be signed and stamped by the dealer to assure that the prescribed maintenance activities have been carried-out.
As for the pre-delivery, where the checks indicate the need of topping or change of fluids already described in the text, the operation shall be considered as integral part of the maintenance activity. In case of activities (malfunctions) which differ from those stated, it shall be necessary to proceed to the eventual adjustment or repair in accordance with the current applicable rules concerning both the technical and administrative aspects.

CAUTION:
- **Improper maintenance can lead to operational problems of the vehicle.**
- **Improper maintenance during the warranty period will void all rights stated in the warranty statement.**

WARNING:
Precautions to be observed prior to maintenance operations. The engine compartment locates many rotating parts, high temperature parts and high voltage cables that could be dangerous.
Carefully adopt the following precautions:
- **Shut-down engine and wait until cool.**
- **Do not smoke or use free flames. The presence of fuel could start a fire.**
- **Ensure a fire extinguisher is always available.**
- **Do not lift the vehicle using the vehicle jack.**

SCHEDULED MAINTENANCE

The scheduled maintenance operations listed and described in the following refer to normal use of the vehicle in normal operating conditions.
For proper operation of the vehicle is also necessary to observe the following recommendations:

- **Engine oil and filter.**
  Change at the prescribed mileage. Change once a year in case of limited mileage.

- **Air filter.**
  Check filter at intervals shorter than those stated in case of operation in dusty areas.

- **Brake pads.**
  In case of definite sporting driving, or frequent use on particular roads or mountains, check pads more frequently than stated.
  Being the brake pads subject to different grades of use and wear, it is recommended to check them between a maintenance activity and the subsequent one.

- **Brake/clutch fluid.**
  The brake/clutch fluid is highly hygroscopic (it absorbs humidity).
  Change fluid once a year to prevent abnormal braking regardless of mileage.

- **Anti-freezing mixture.**
  Change every two years.
  It is suggested to top-up level with anti-freezing mixture to maintain the protective characteristics of mixture.

NOTE: **In particular operating conditions (such as driving on roads spread with anti-frost salt and/or corrosive materials, uneven surfaces, etc.) frequently check the drive shafts and steering box boots, and cleanliness of articulation points, hinges, door, hood and trunk lid locks,**

etc.

FLUIDS AND LUBRICANTS

If in case of an emergency are used fuels, lubricants and/or fluids having characteristics different from those required by Alfa Romeo, it is suggested to replace the affected fluid and filters as soon as possible.

ENGINE PERFORMANCE

To provide best vehicle performance and lowest vehicle emission, it is of most importance that the tune-up be done accurately, using the specifications listed on the Vehicle Emission Control Information label in the engine compartment.

EMISSION CONTROL SYSTEM

The American legislation in matter of atmospheric pollution (Clean Air Act), amended Sect. 203, prohibits tampering of components of the anti-pollution system, or to alter the system's characteristics.

"Tampering" could be defined as any intervention that alters or modifies the characteristics specified in this manual. All ALFA ROMEO produced vehicles are certified and, before leaving the factory, are subject to a final check aiming to ensure they conform to such characteristics. The vehicles non conforming to such specifications because misadjusted or non properly tuned-up, or modified with respect to the certified type, will possibly be non conforming to the law requirements on vehicles emission, and also have a higher fuel consumption.
The characteristics and data contained in this manual have been registered at the competent American Authority.
These characteristics and data are referred to during the conformity to certified type cheks.

FIRST COUPON SERVICE

The First Coupon service (F.C.) is carned-out under warranty coverage by an authorized Alfa Romeo Dealer at 1500 miles.

VEHICLE MAINTENANCE SCHEDULE (*)

N°	Description of the operations	MILEAGE COVERED MILES x 1000 (Tick each item at the respective mileage) F.C.= First Coupon						
		F.C.	10	20	30	40	50	60
1	Change engine oil (or once a year whichever occurs first)	•	•	•	•	•	•	•
2	Change engine oil filter	•	•	•	•	•	•	•
3	Change air cleaner element				Δ			Δ
4	Change spark plugs				Δ			Δ
5	Change engine coolant mixture (or every two years whichever occurs first)				•		•	
6	Replace exhaust gas sensor (oxigen sensor)							Δ
7	Replace timing belt						•	
8	Replace fuel filter						•	
9	Change alternator, coolant pump, power steering pump and air conditioner compressor belts				Δ			
10	Check alternator, coolant pump, power steering pump and a/c compressor drive belts for soundness and tension							Δ
11	Check valves clearance	Δ			Δ			Δ
12	Check cylinder head nuts for proper torque	Δ						
13	Check protective boots half-shafts, steering box and steering knuckle pivots for soundness	•	•	•	•	•	•	•
14	Inspect brake system for leaks	•	•	•	•	•	•	•
15	Check brake pads		•	•		•	•	•
16	Change brake pads				•			
17	Check brake, clutch fluid level (change every 12 months)	•	•	•	•	•	•	•
18	Check handbrake travel	•	•	•	•	•	•	•
19	Check fluid level in power steering	•	•	•	•	•	•	•
20	Check level of gearbox and differential oil				•		•	
21	Change gearbox and differential oil					•		•
22	Check electrical connections in engine compartment (conditions and positioning of connectors and caps)					•		•
23	Lubricate door & lid hinges; grease lid latches				•		•	•
24	Test vehicle	•	•	•	•	•	•	•

• = RECOMMENDED MAINTENANCE

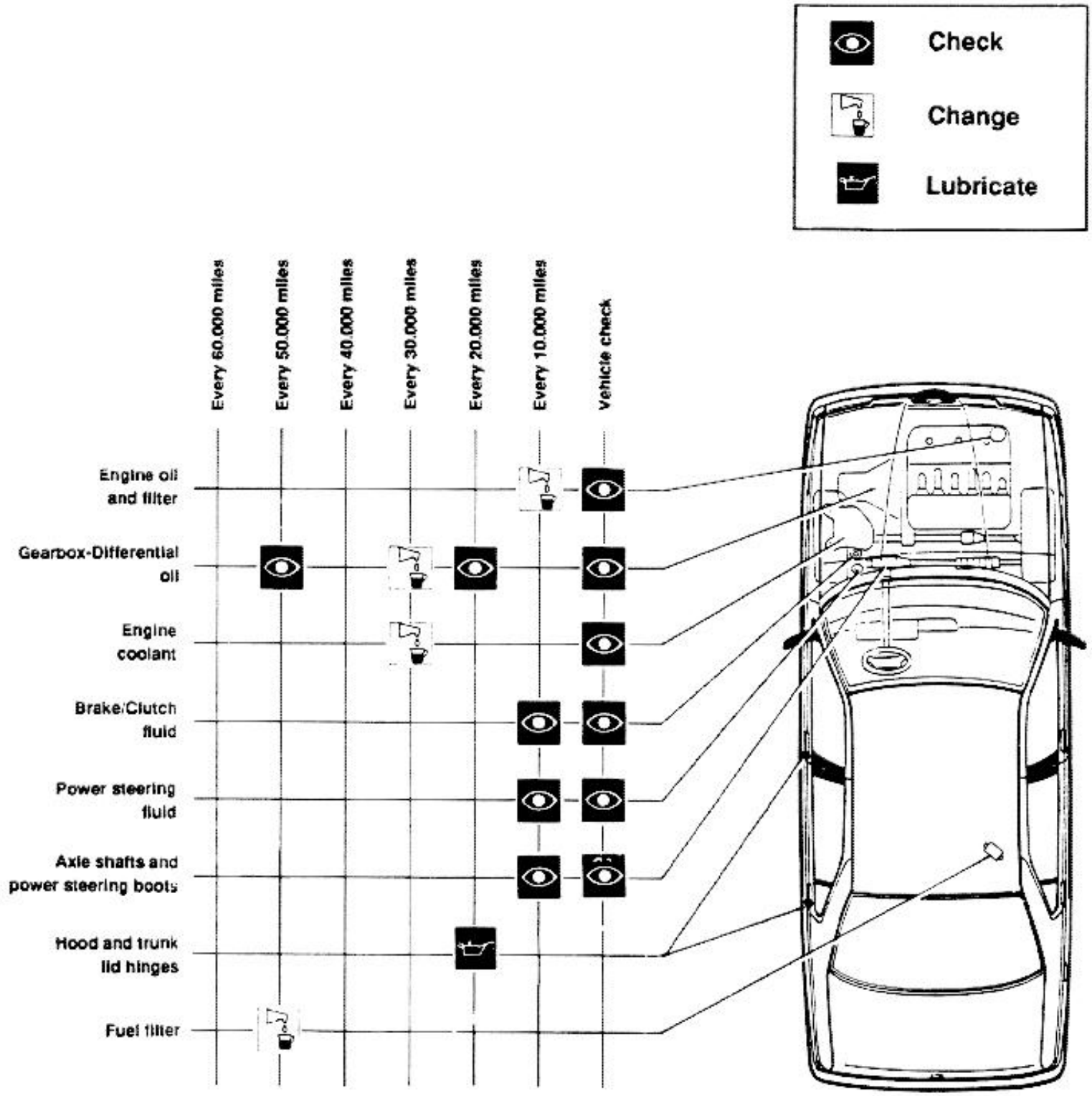
- = RECOMMENDED MAINTENANCE

Δ = MAINTENANCE REQUIRED FOR PROPER OPERATION OF EMISSION CONTROL SYSTEM PERFORMANCE

(*) Operation here listed will be illustrated in the next paragraphs following the reference number

FLUIDS AND LUBRICANTS

SCHEDULED CHECKS AND SERVICING



SUMMARY TABLE

Type	Application	Classification	Name
OIL	Engine - 01	SAE: 10W/40 API SG CCMC G5	AGIP NUOVO SINT 2000 10W/40 SHELL Fire & Ice Motor Oil 10W/40
			ISECO Molykote A
	Gearbox - 13 Automatic Transmission -16 Steering - 23	DEXRON II	AGIP DEXTRON II SHELL ATF DEXRON II
	Air Conditioning - 80		SUN OIL COMPANY Suniso 46
GREASE	Engine - 01		ISECO Molykote BR2
	Ignition - 05		ISECO Molykote BR2
	Cooling System - 07		R. GORI: Never Seez
	Clutch - 12		AGIP Grease 33 FD
			SHELL Retinax G

(Cont.d)

SUMMARY TABLE

Type	Application	Classification	Name
GREASE	Gearbox - 13		AGIP Grease 33 FD
			ISECO Molykote Longterm N. 2
	Drive Shafts - 17		Optimol - Olistamoly 2LN 584 Molykote VN 2461/C
	Suspension - 21		AGIP Grease 30 SHELL Alvania Grease 3
	Brakes - 22		ATE - Bremszylinder Paste DBA Paste
			SHELL Retinax G
	Steering - 23		SPCA Spagraph ISECO Ergon Rubber Grease 3 REINACH Sferul B2 AR
			ISECO Molykote Paste G
FLUID	Engine - 01		MILLOIL: Lubricant for elastomer seals UNION CARBIDE CHEM. Co. UCON Lubricant 50 HB-5100

(Cont.d)

SUMMARY TABLE

Type	Application	Classification	Name
FLUID	Cooling System - 07		Alfa Romeo ANTIFREEZE SUPER Alfa Romeo CLIMA FLUID PERMANENT
	Brakes - 22 Clutch - 12		Alfa Romeo BRAKE FLUID SUPER AGIP BRAKE FLUID DOT 4
	Wheels and Tires - 28		MILLOIL SC 40/K Lubricant for elastomer seals MASCO 203 SVA
	Windshield - 75		e.g. "WINDSHIELD WASHER SOLVENT", Union Carbide Corp., 1209-34 Protection up to -40°C/-40°CF
	Air Conditioning - 80		MILLOIL SC 40/K Lubricant for elastomer seals MASCO 203 SVA
		FREON	RIVOIRA Freon 12

FUEL

OCTANE NUMBER

The octane number of a fuel defines it resistance to detonation. Use of fuel with the proper octane number is essential to prevent the detonation phenomenon that could be dangerous for the engine of the vehicle. The higher the octane number, the greater the anti-detonation capacity. Normal fuels have an octane number that ranges from 91 to 95 RON (Research Octane Number), or from 86 to 90 PON (Pump Octane Number).
The Pump Octane Number PON is shown at U.S.A. filling stations. This number is determined as follows:

$$\frac{RON + MON^{*}}{2} = PON$$

* Motor Octane Number

NOTE: The Pump Octane Number PON is normally 5 points lower than Research Octane Number RON:
91 RON = 86 PON
95 RON = 90 PON

PRESCRIBED FUEL

The Alfa Romeo 164 model has been designed to operate on Premium unleaded gasoline having a minimum Pump Octane Number (PON) of 90 (Equivalent to 95 RON).
The 164 model can be modified by the manufacturer on request to operate on unleaded gasoline having a minimum Pump Octane Number (PON) of 86 (Equivalent to 91 RON).

FUELING

All Alfa Romeo vehicles sold in the U.S. are equipped with catalytic converters.
The use of unleaded fuel is required in order for the converter to work at maximum efficiency.
Lead deposits coat the surface of the catalyst and hamper efficient operation thus defeating the catalyst's purpose of controlling harmful exhaust emissions. Reminder label is located near the fuel filler.
Smaller than normal fuel filler necks are installed which prevent the use of a regular (leaded) fuel nozzle.

USE OF GASOLINE/ALCOHOL BLEND

Blends of unleaded gasoline and ethanol (grain alcohol) not containing over 10% ethanol may be used without affecting your Alfa Romeo Limited Warranty.
Should gasohol cause driveability problems, a return to unleaded gasoline is suggested.
Blends containing methanol (wood alcohol) are not recommended unless they also contain cosolvents and corrosion inhibitors.
DO NOT USE GASOHOL EXCLUSIVELY. TESTS HAVE SHOWN THAT CORROSION TO FUEL SYSTEMS CAN RESULT FROM EXCLUSIVE USE OF GASOHOL.
Some problems are currently associated with the use of gasoline/alcohol blends.
Fuel economy may be reduced, and driveability may suffer.
Greater potential exists for cold weather hesitation, staffing and vapor lock.

APPROXIMATE SERVICING CAPACITIES

Fuel tank			l. (Gals)	65 (17.5)
Fuel reserve			l. (Gals)	8 (2.2)
Engine oil	Total capacity		l. (Gals)	7.5 (2)
	Partial capacity (Filter + oil sump) for scheduled change		l. (Gals)	7 (1.9)
	Sump capacity only (refer to MAX/MIN marks on dipstick)	MAX	l. (Gals)	6.5 (1.7)
		MIN	l. (Gals)	4.5 (1.2)
	Camshaft support sumps		l. (Gals)	0.5 (0.14)
Gearbox differential oil			l. (Gals)	1.8 (0.5)
Automatic gearbox oil			l. (Gals)	9 (2.4)
Power steering system fluid			kg (lbs)	0.9 (2)
Brake and clutch system fluid			kg (lbs)	0.5 (1.1) 0.7* (1.6)*
Cooling system			l. (Gals)	9.5 (2.55)

(*) With A.B.S.

MAINTENANCE OPERATION

**THE FOLLOWING PAGES CONTAIN ALL THE SCHEDULED MAINTENANCE OPERATIONS.
THE SEQUENCE NUMBER SHOWN IS THE SAME STATED IN THE "VEHICLE MAINTENANCE SCHEDULE".**

1-2 - ENGINE OIL AND FILTER CHANGE

WARNING:
The engine oil is harmful for your skin: reduce to minimum contact of used oil with your skin; wash out with water and soap.

OIL LEVEL CHECK

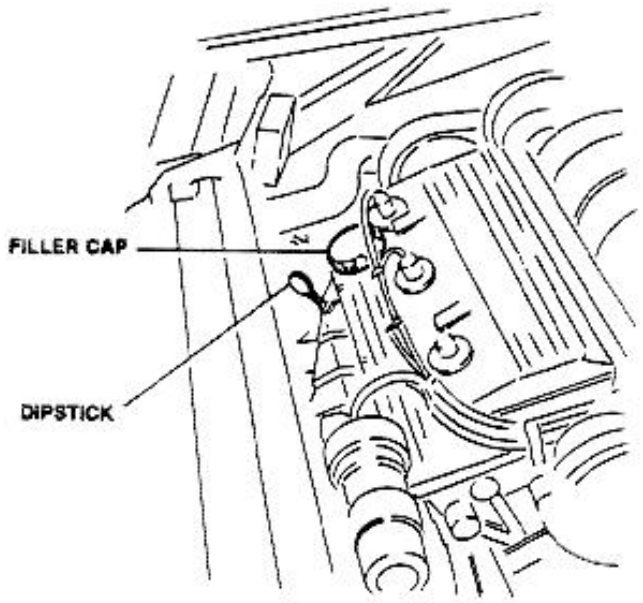
1. Check oil level using dipstick: the level shall be between the MIN and MAX marks on the dipstick.

- Carry-out check of oil level with vehicle on a level surface.
- Due to detergent additives, the oil will show dark even after a short period of use: in any case, this does not mean that it must be changed before the scheduled interval.
- Presence of whitish matter indicates leaks of coolant.
- Low viscosity is due to dilution with fuel.

OIL AND FILTER CHANGE

- Operate on warm engine.

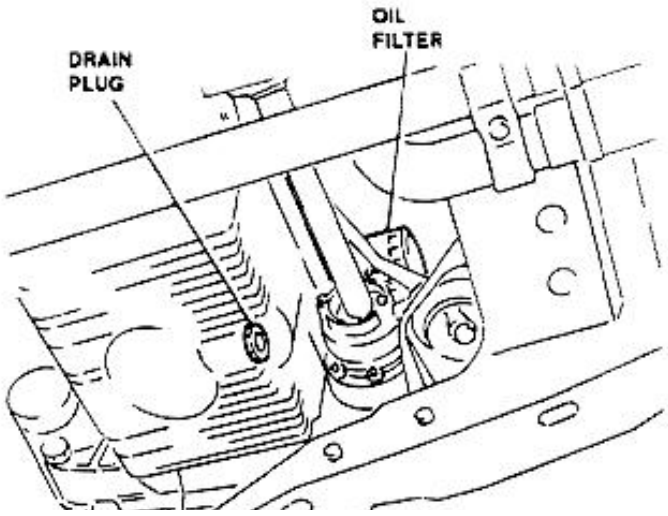
1. Remove filler cap.
2. Remove oil dipstick.



3. Remove drain plug and leave oil to drain completely for at least 15 minutes.

WARNING:
Do not disperse used oil in the ambient, since indiscriminate dispersion of oil will cause damage to the ambient; investigate where used oil is safely collected in your area.

4. Remove oil filter using suitable wrench.



5. Thoroughly clean the drain plug and screw it on the sump together with relevant seal.
6. Wipe seal of a new filter with engine oil, then hand screw new filter on engine; finally, tighten filter using a suitable wrench.

NOTE: **Use filter from those approved by Alfa Romeo.**

7. Service with prescribed quantity of approved oil.

Engine oil	**AGIP NUOVO SINT 2000 10W/40 SHELL Fire & Ice Motor Oil 10W/40**
Quantity	**7 l. (1.9 Gals)**

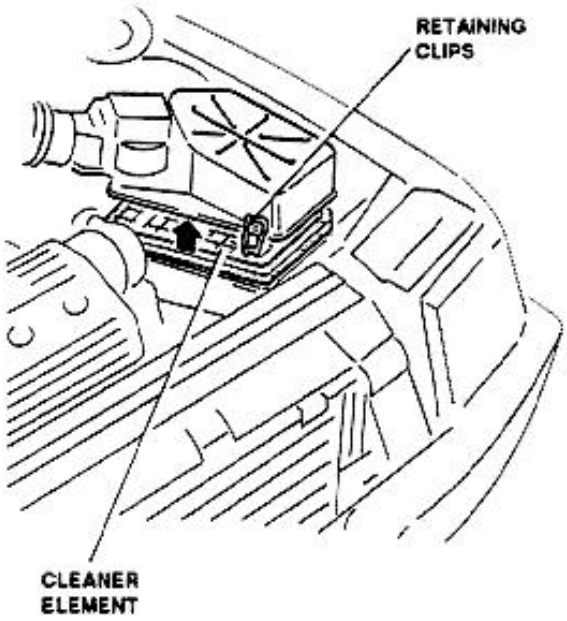
8. Check oil level using the dipstick.

CAUTION:
Oil level above MAX mark could cause excessive oil evaporation and loss of pressure.

9. Install filler cap and operate engine at idle speed for about 2 minutes; shut-down the engine, wait a few moments then re-check oil level. Check for absence of leaks.

3 - AIR CLEANER ELEMENT CHANGE

1. Release retaining clips.



3. Thoroughly clean air cleaner box.
4. Position new air cleaner element with screen faced upwards.
5. Install cover ensuring it is correctly positioned, then engage securing clips.

CAUTION:
Any cleaning operation could damage the air cleaner element, thus jeopardizing proper operation of engine supply system.

NOTE: **If filter shows traces of oil, check for possible seepage in the whole air intake system.**

4 - SPARK PLUGS CHANGE

The spark plugs installed at factory (**GOLDEN LODGE 2HL for 164-164L, NGK PGR6A for 164S**) are of the surface discharge type, with four peripheral points and central electrode: **this type of spark plugs does not**

2. Remove air cleaner element.

require adjustment of gap between electrodes.

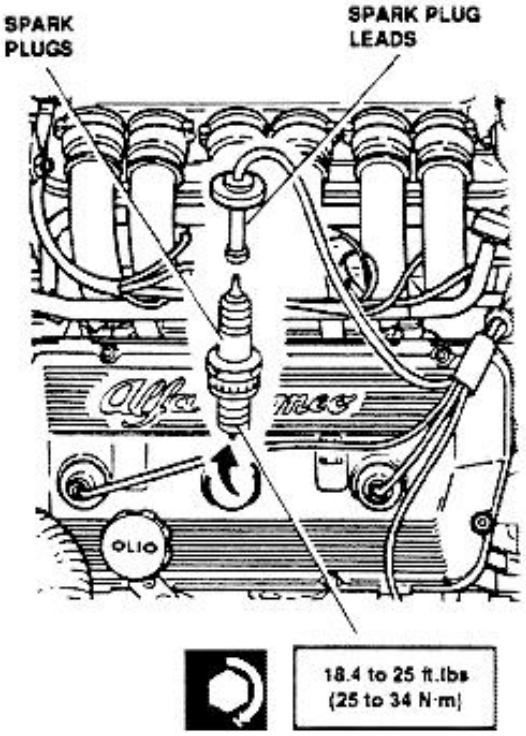
NGK PGR6A-1645

GAP 0.024"-0.028" (.6-.7mm)

CHANGE

- Operate with cold engine.

1. Disconnect spark plug leads.
2. Blow air in spark plug seatings to remove any foreign matter and dirt.
3. Remove spark plugs.



- Always change spark plugs if the ceramic insulator is broken or if the electrodes are worn.

4. Lubricate spark plug threads with **ISECO Molykote A** oil and torque to prescribed value.

CAUTION:
Use of spark plugs having different characteristics or size could seriously damage the engine and alter the emission level of harmful exhaust gases.

5. Ensure of a good mechanical and electrical connection between the spark plugs and relevant fittings.

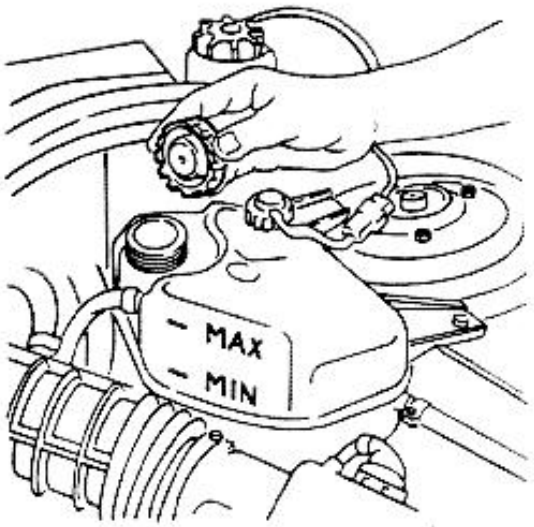
NOTE: Spark plug leds must be connected following the firing order: 1-4-2-5-3-6

5 - ENGINE COOLANT CHANGE

Coolant level and circuit check

- Check coolant level when engine is cold.

1. Check that level of coolant in header tank is between MIN and MAX marks.



2. Check circuit for integrity and absence of leaks.
3. Check efficiency of pressurized cap springs, seal and valves.
4. Carry-out tighteness check of pressurized cap (refer to **Group 07**).
5. Carry-out tighteness check of hydraulic circuit (refer to **Group 07**).

Change

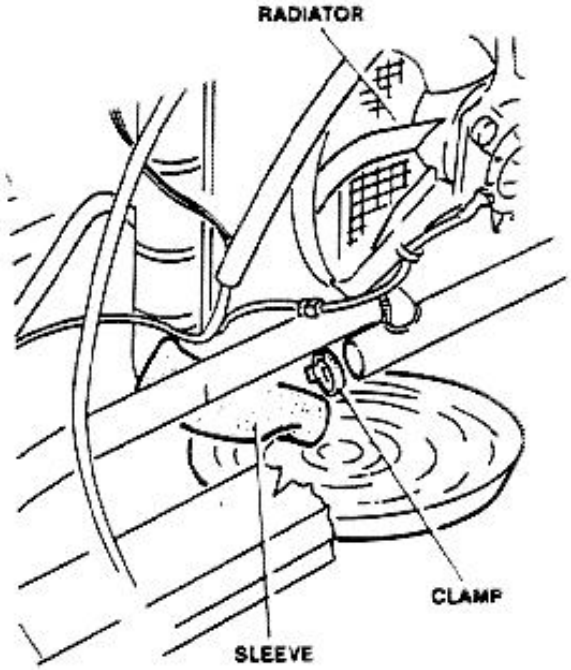
CAUTION:
The anti-freezing mixture used as engine coolant is harmful for the paintwork: prevent any contact with painted surfaces.

6. Connect spark plug leads.

11. Unscrew and remove cap from header tank.

WARNING:
NEVER REMOVE CAP when engine is warm!

2. Loosen clamp and disconnect radiator outlet sleeve.
3. Drain coolant in a suitable container placed below the vehicle.



4. Re-connect radiator outlet sleeve.
5. Service circuit through header tank using approved fluid in the quantities shown in the table below, and in any case to MAX level mark.

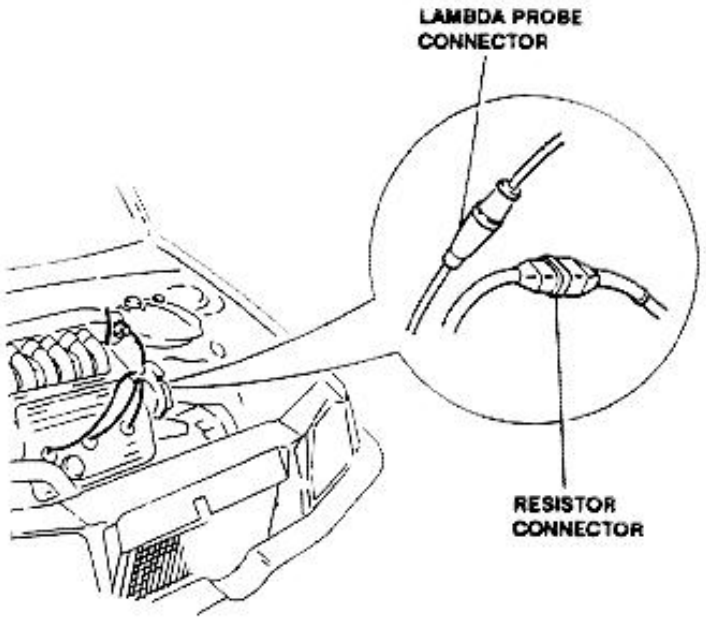
Minimum Outside temperature	**°F °C**	**-4 -20**	**-40 -40**
Concentrated anti-freeze	**l. Gals**	**4.3 1.15**	**7.1 1.9**
Dilution Distilled water	**l. Gals**	**8.7 2.35**	**5.9 1.6**
Anti-freeze mixture - Ready for use	**l. Gals**	**13 3.5**	**— —**

NOTE: The quantities shown in the above table refer to the total capacity of the cooling circuit. It must be noted that servicing capacity of circuit is 9.5 l. (2.55 Gals).

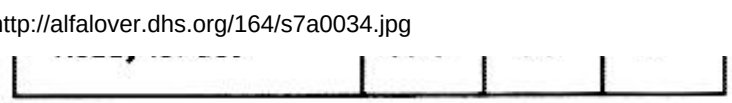
6. Start engine and bring to normal operating temperature until opening of thermostat reliefs residual air trapped in the circuit.
7. With cold engine, top-up coolant level to MAX mark.
8. Install header tank cap.

6 - EXHAUST GAS SENSOR REPLACEMENT (LAMBDA PROBE - OXIGEN SENSOR)

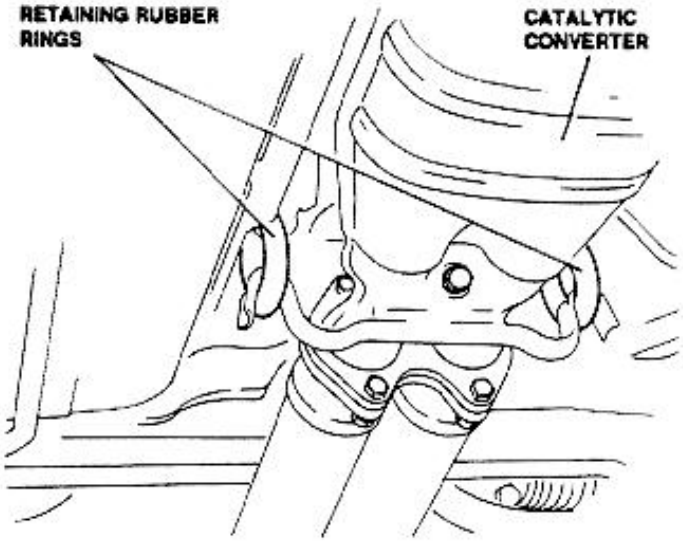
1. Place vehicle on auto-lift.
2. Disconnect battery (-) lead.
3. Remove air cleaner cover-air flow meter assembly (refer to **Group 04**).
4. Disconnect lambda probe and heating resistor electrical connector.



5. Lift the vehicle.
6. Disengage rubber rings securing catalytic con-

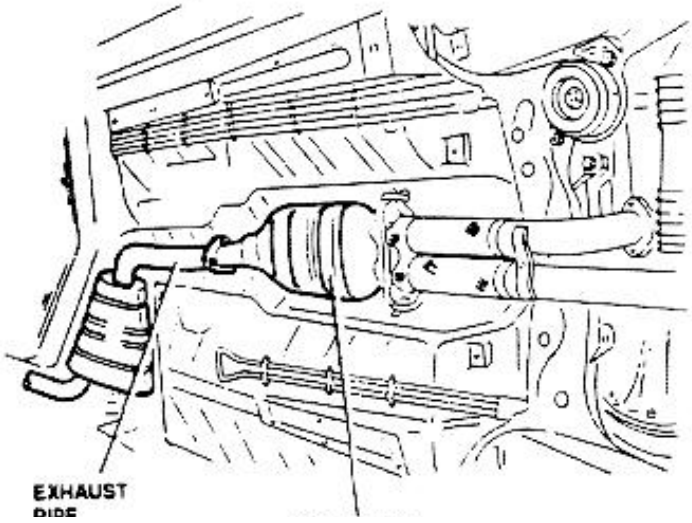


verter.

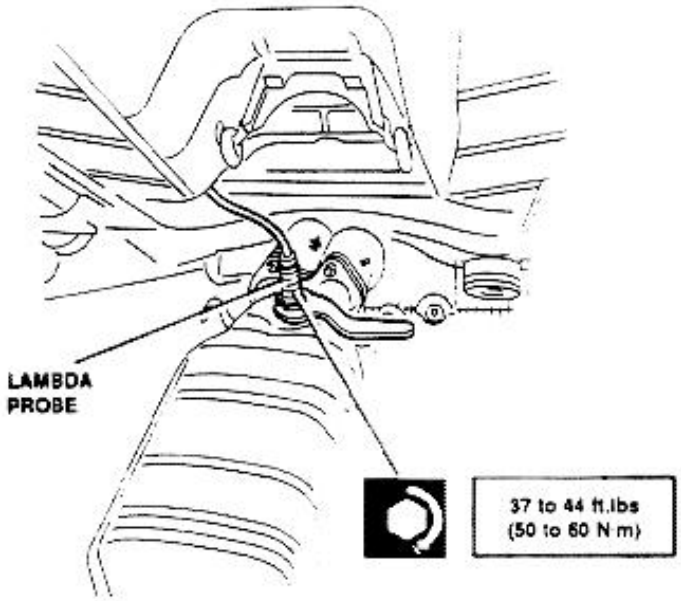


WARNING:
The catalytic converter reaches a high temperature during operation. Therefore, allow sufficient time to cool off after engine has been shut down before attempting any operation on the catalytic converter.
NEVER touch the catalytic converter unless adequate protective equipment has been previously worn (gloves, etc.)
DO NOT APPROACH any easily flammable material to the catalytic converter!

7. Disconnect catalytic converter from center section of exhaust pipe.



8. Remove lambda probe using suitable wrench-tool.



9. Wipe thread of new lambda probe with anti-seizing compound **(R. GORI never seez)**, then install probe.
10. Torque lambda probe to prescribed torque.
11. Connect two electrical connectors and install air cleaner.

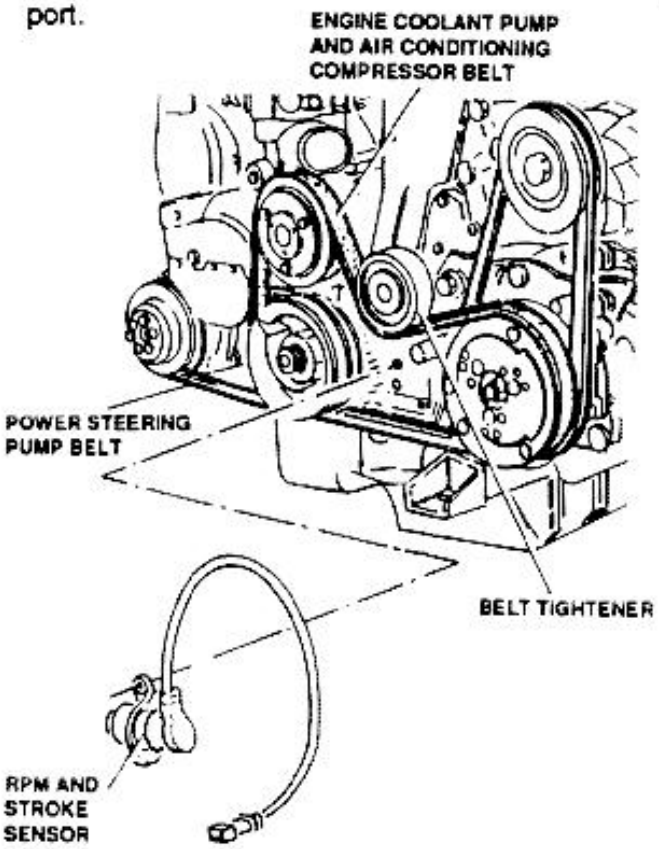
NOTE: The catalytic converter and exhaust pipe of "S" versions have a different shape, but the maintenance procedures are identical to those stated above.

7 - TIMING BELT REPLACEMENT

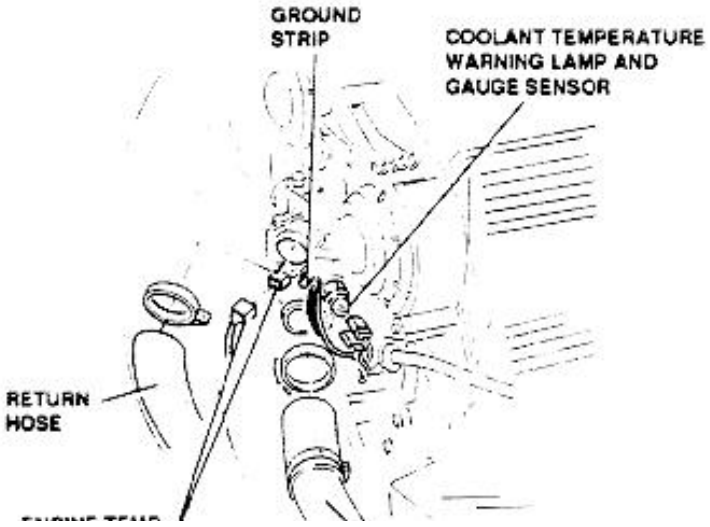
Disassembly

1. Disconnect battery (-) lead.
2. Remove right front wheel and two fenders (front and rear).
3. Remove coolant pump and air conditioning compressor drive belt, together with hydraulic belt tightener and steering pump drive belt (refer to subsequent **No. 9** operation).

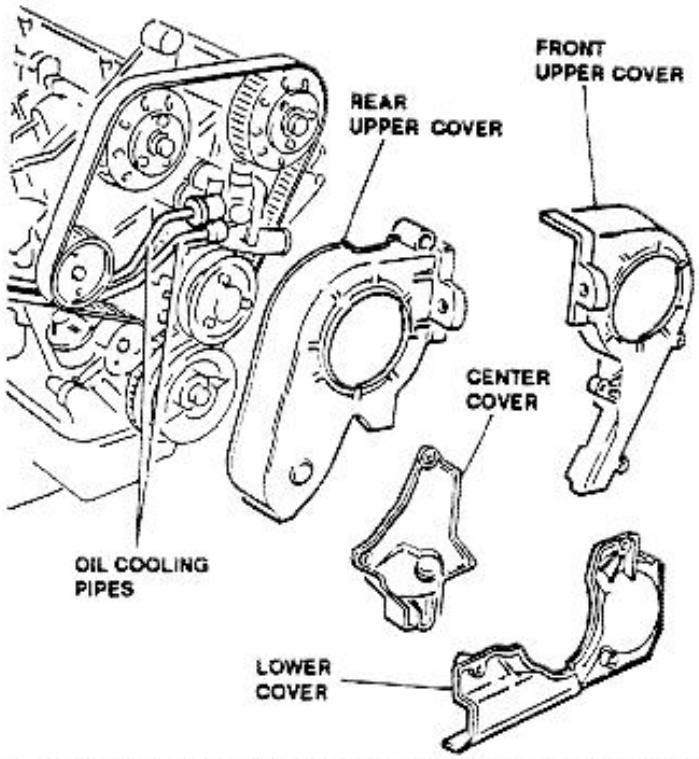
4. Remove RPM and stroke sensor and relevant support.



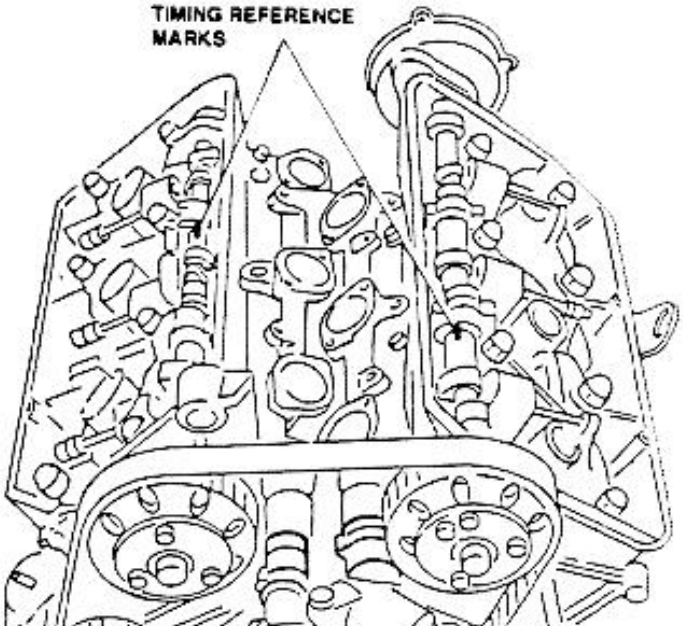
5. Remove both timing system covers (refer to subsequent **No. 10** operation).
6. Partially drain hydraulic circuit (refer to previous **No. 4** operation).
7. Disconnect coolant delivery hose from thermostat unit.
8. Disconnect sensors electrical connectors and ground strip.
9. Disconnect return hose from coolant pump.



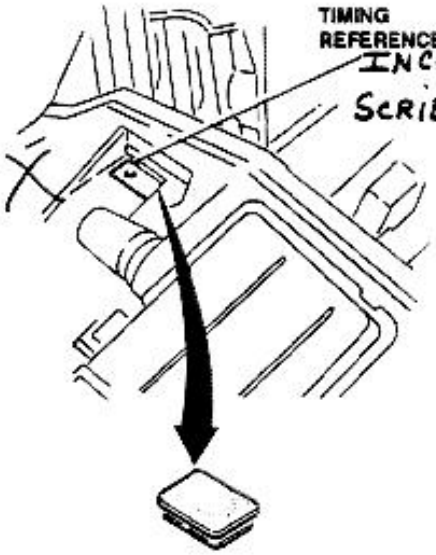
10. **(Only for vehicles equipped with water-oil heat exchanger)**. Disconnect oil cooling pipes.
11. Remove four covers protecting the timing belt.



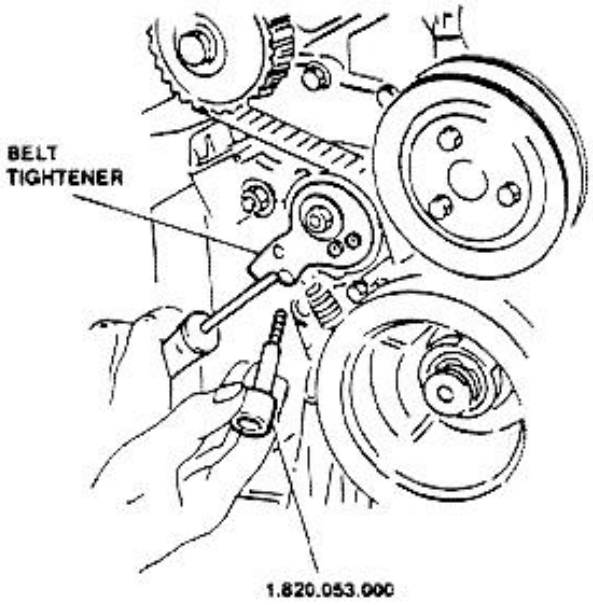
12. Clean spark plug seatings, remove spark plugs and plug holes to prevent entry of foreign matter.
13. Engage highest gear speed (D, with automatic transmission) and move vehicle forwards to rotate the crankshaft until notches engraved on camshafts align to notches engraved on relevant caps.



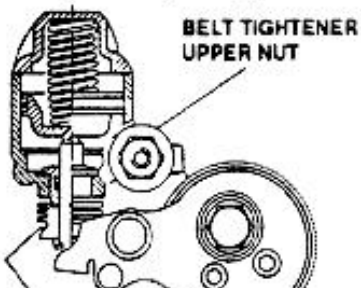
14. In this position (No.1 cylinder at T.D.C. in firing phase), the SCRIBED LINE on the flywheel must match the notch engraved on the gearbox cone.



15. Lift belt tightener arm and insert tool 1.820.053.000 into arm hole.

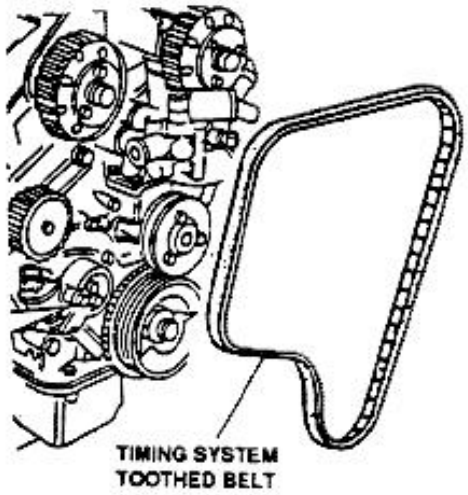


16. Loosen nuts and push belt tightener downwards to bottom of travel; torque upper nut.



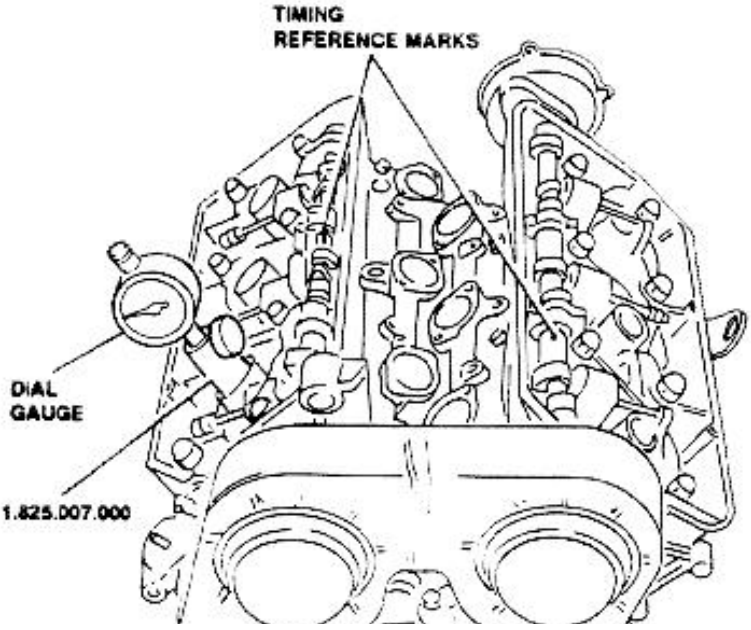
17. Remove toothed belt.

WARNING:
Contact of oil or solvents with the toothed belt could affect elasticity of belts rubber, and cause slipping of teeth.



Reassembly

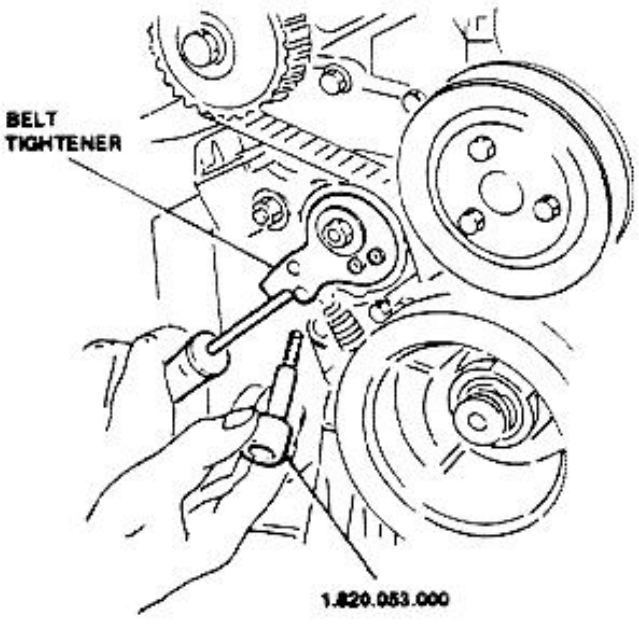
1. Install tool 1.825.007.000 and dial gauge into seating of No. 1 cylinder spark plug.
2. Verify alignment of notches engraved camshafts and relevant caps.



3. Ensure the hole on flywheel is aligned to notch engraved on gearbox cone.

- **During the whole belt reassembly procedure, check that conditions stated at steps 2 and 3 are continuously met.**

4. Install toothed belt maintaining under tension the stretched arms, and observing the following reassembly order:
   - Crankshaft toothed pulley.
   - Left cylinder head toothed pulley.
   - Right cylinder head toothed pulley.
   - Oil pump toothed pulley.
   - Belt tightener pulley.
5. Loosen nuts securing belt tighteners.
6. Engage highest gear speed (D, with automatic gear) and move vehicle forwards to rotate crankshaft of two revolutions; stop movement when piston of No. 1 cylinder is at T.D.C. position in firing phase (timing notches aligned, as previously indicated).
7. Keep belt under tension, press tightener pulley against belt and tighten two nuts securing the belt tightener.
8. Slightly lift tightener arm and remove pin **1.820.053.000**; release tightener arm.



9. Reinstall all remaining components by reversing the order of disassembly procedure.

Engine timing check and adjustment: refer to **Group 01**.

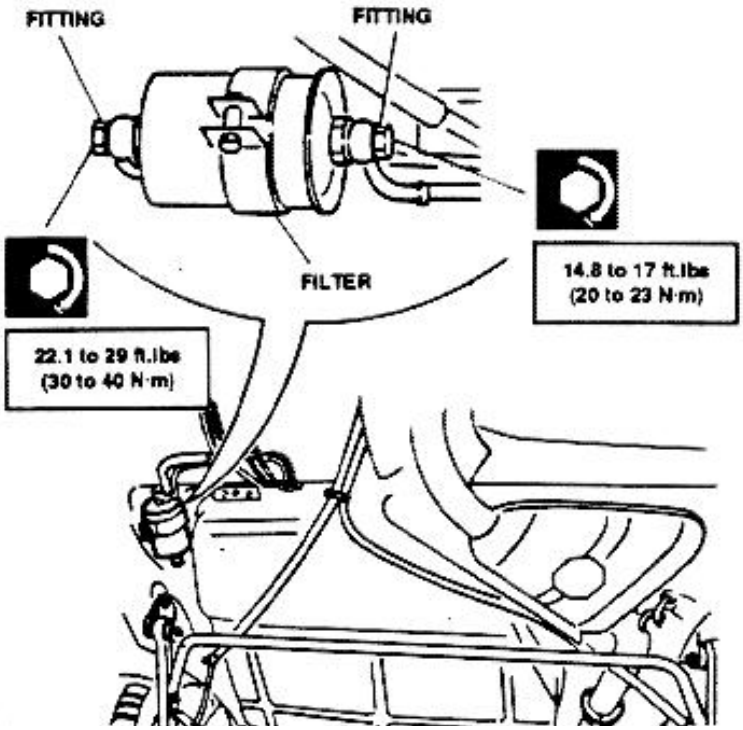
Timing belt tension check and adjustment: refer to

8 - FUEL FILTER REPLACEMENT

WARNING:
Carefully follow the instructions below when acting on fuel system components:
- **Ensure the workshop is provided with prescribed safety equipment (fire extinguishers, etc.)**
- **Disconnect battery (-) lead.**
- **Store fuel drained from the system into a suitable container with safety cap.**
- **The fuel system could be pressurized: operate with precaution.**
- **Do not smoke.**

1. Start engine.
2. Disconnect fuel pump main relay (refer to **Group 40**) and wait until engine stops for loss of supply.
3. Unscrew two fittings of filter.
4. Collect drained fuel into a suitable container, then plug fitting without bending or twisting rigid pipes.
5. Remove fuel filter.
6. Install new fuel filter and new copper seals on fittings.

NOTE: Direct arrows engraved on filter cup towards sense of fuel delivery.



9 - DRIVE BELTS TENSION CHECK

NOTE: When checking belts for proper tension, **always check visually for integrity of belt**, and in particular for absence of:

- cuts.
- cracks.
- superficial wear of fabric (appearing smooth and bright).
- Dry or hardened parts (loss of adhesion).

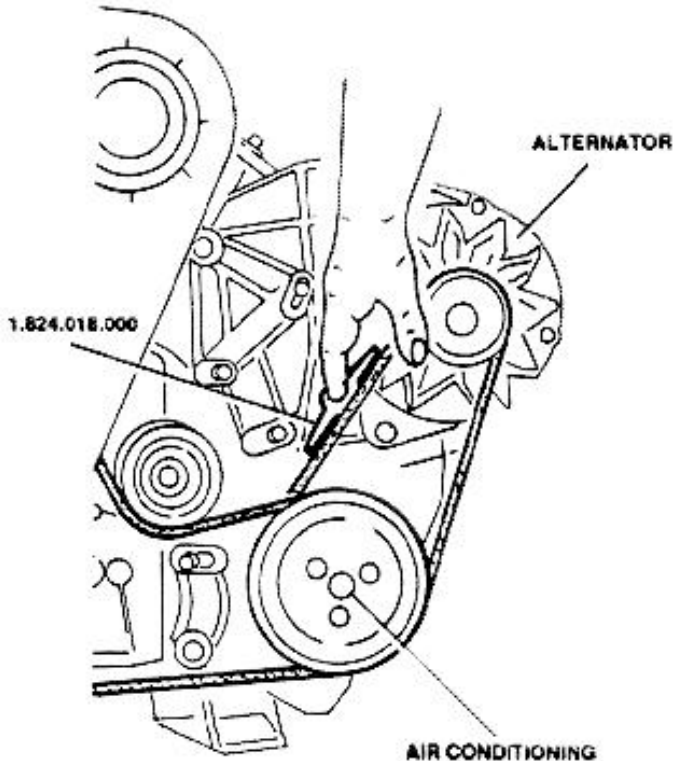
In all the above-mentioned cases, replace the belt.

CAUTION:
Contact of oil or solvents with the belts could affect elasticity of belt rubber, and reduce belt adhesion.

a) Alternator belt.

- **Check:**

1. Acting in the engine compartment, insert tool **1.824.018.000** as depicted in the illustration.

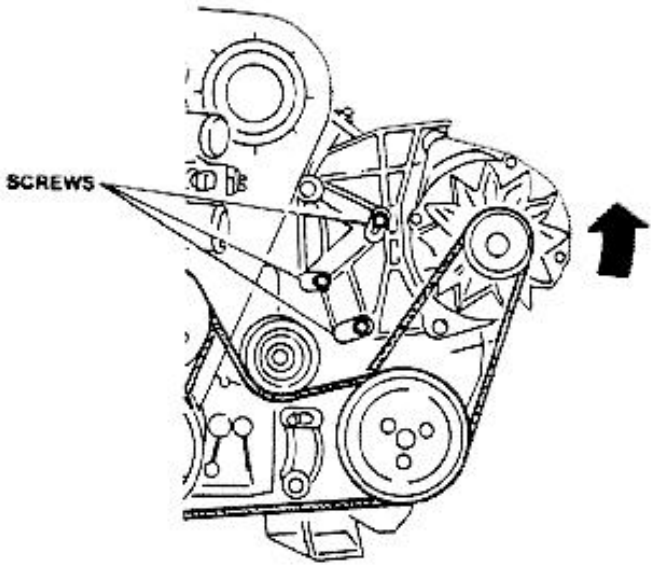


2. Check that the minimum (cold) belt tension is the prescribed one

Alternator belt	
Minimum tension (cold)	300 N 67.5 lbs

- **Retensioning:**

1. Remove complete right headlamp unit.
2. Loosen securing screws and move alternator upwards to increase belt tension.



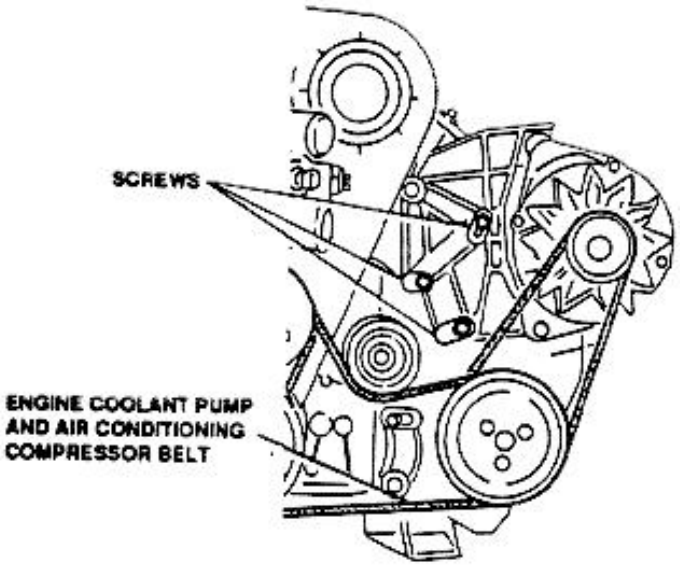
3. Torque one screw and check belt tension.
4. Torque remaining screws when belt tension is correct.

Alternator belt	
Retensioning	300 to 350 N 67.5 to 78.7 lbs

- **Replacement:**

1. Remove coolant pump and air conditioning compressor belt (refer to following step b.).
2. Loosen screws securing alternator.

COMPRESSOR



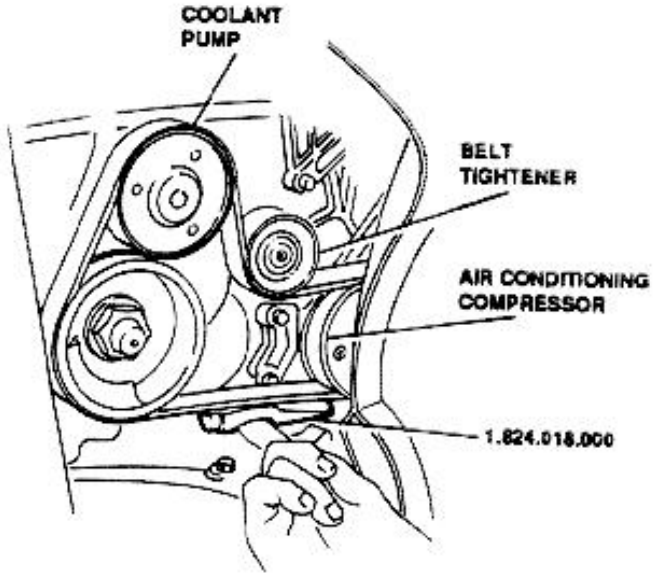
3. Remove worn belt.
4. Install new belt.
5. Install coolant pump and air conditioning compressor belt (refer to following step b.).
6. Stretch the alternator driving belt to the assembly value.
7. Perform a short run-in according to the following procedure:
   - Let the engine reach its operating temperature (water at 80°C)
   - Let the engine idle for 10 minutes
   - Let the engine cool down.
8. Adjust the belt tension to the prescribed value.

Alternator drive belt	
Tension (Assembly)	400 to 450N 90 to 101.2 lbs
Retensioning (after run-in)	300 to350N 67.5 to78.7 lbs

b) Coolant pump and air conditioning compressor belt.

- **Check:**

1. Remove right front wheel and relevant front fender.

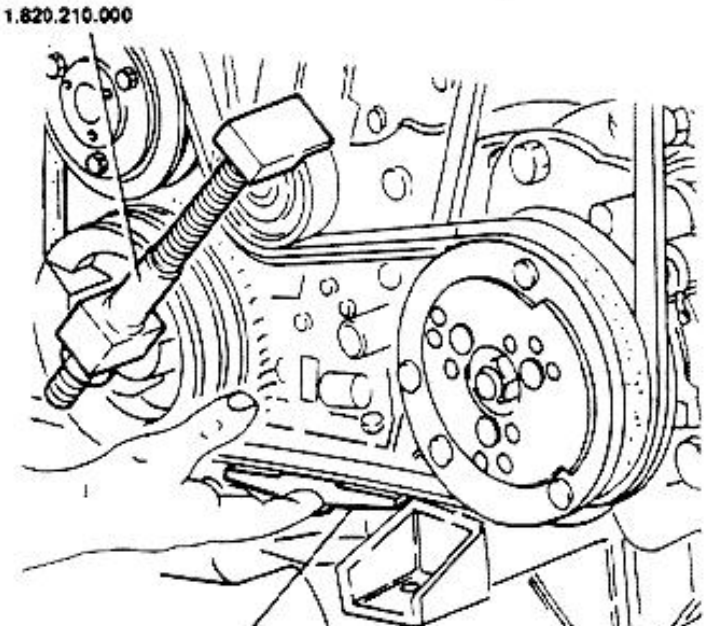


- **Check that minimum (cold) tension is the prescribed one.**

Conditioner compressor and water pump drive belt	
Minimum tension (cold)	550 N 124 lbs

- **Retensioning:**

1. Loosen screws securing belt tightener.
2. Install tool **1.820.210.000** and act on tightener by pulling the tool until correct tension is obtained (measured with tool **1.824.018.000**).



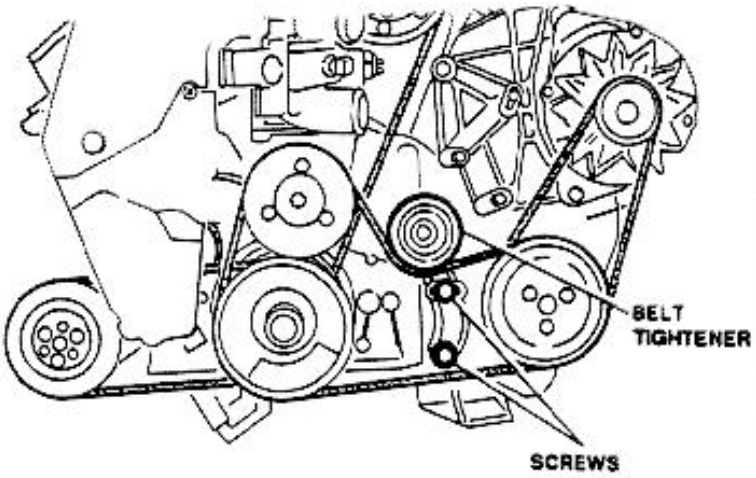
2. Insert tool **1.824.018.000.**

Conditioner compressor and water pump drive belt	
Retensioning	550 to 600 N 124 to 135 lbs

3. Tighten screws securing belt tightener.

- **Replacement:**

1. Loosen tightener and remove worn belt.
2. Install new belt (in case of difficulties, remove upper screw securing tightener).



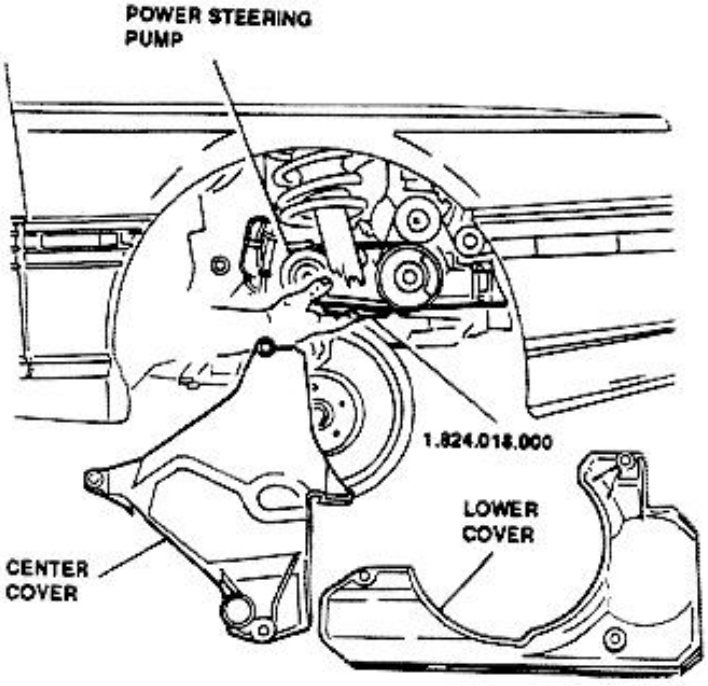
3. Stretch the conditioner compressor and water pump driving belt to the assembly value.
4. Perform a short run-in according to the following procedure:
   - Let the engine reach its operating temperature (water at 80°C)
   - Let the engine idle for 10 minutes
   - Let the engine cool down.
5. Adjust the belt tension to the prescribed value.

Conditioner compressor and water pump drive belt	
Tension (Assembly)	650 to 700 N 146 to 157 lbs
Retensioning (after run-in)	550 to 600 N 124 to 135 lbs

c) Power steering pump belt.

- **Check:**

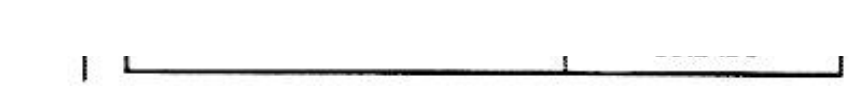
1. Remove right front wheel and relevant front fender.
2. Lift rear fender and remove central cover.
3. Loosen coolant pump and air conditioning compressor belt tightener, and remove lower cover.
4. Insert tool **1.824.018.000**.



- **Check that minimum (cold) tension is the prescribed one.**

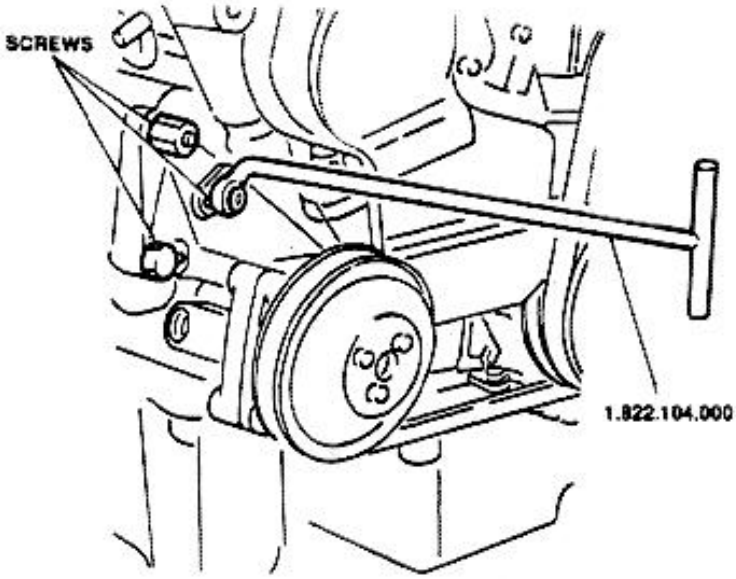
Power steering pump drive belt	
Minimum tension (cold)	250 N 56.2 lbs

5. Adjust the belt tension to the prescribed value.



- **Retensioning:**

1. Loosen attaching screws using tool **1.822.104.000**.

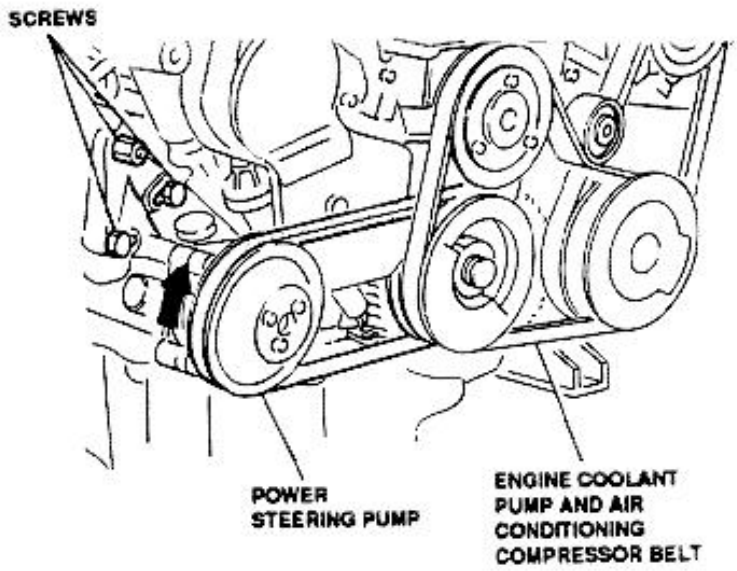


2. Move power steering pump outwards to increase belt tension.
3. Tighten one attaching screw and check belt tension.
4. Tighten remaining attaching screw after correct belt tension is obtained.

Power steering pump drive belt	
Retensioning	300 to 350 N 67.5 to 78.7 lbs

- **Replacement:**

1. Remove coolant pump and air conditioning compressor belt (refer to preceding step b.).



3. Remove worn belt.
4. Fit new belt.
5. Install coolant pump and air conditioning compressor belt, and adjust belt tension (refer to preceding step b.)
6. Adjust power steering pump belt tension as indicated above to the assembly value.

Power steering pump drive belt	
Tension (Assembly)	400 to 450 N 90 to 101.2 lbs

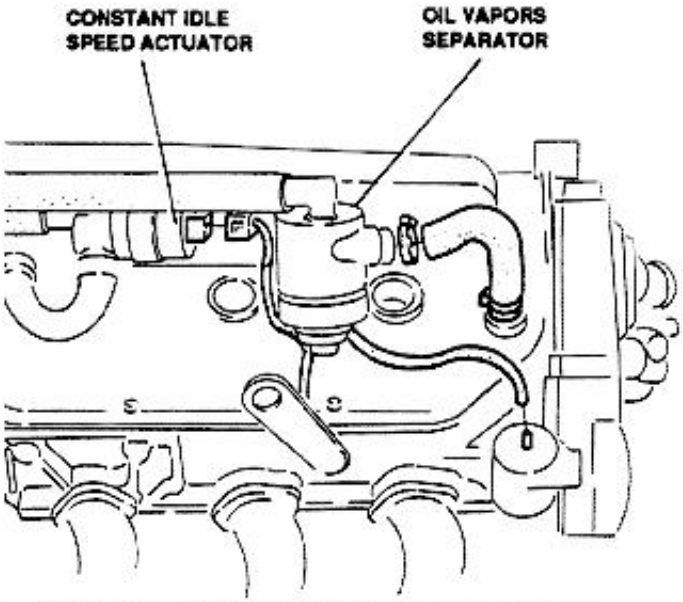
10 - VALVE CLEARANCE CHECK AND ADJUSTMENT

WARNING:
All the operations described below must be performed with COLD ENGINE.

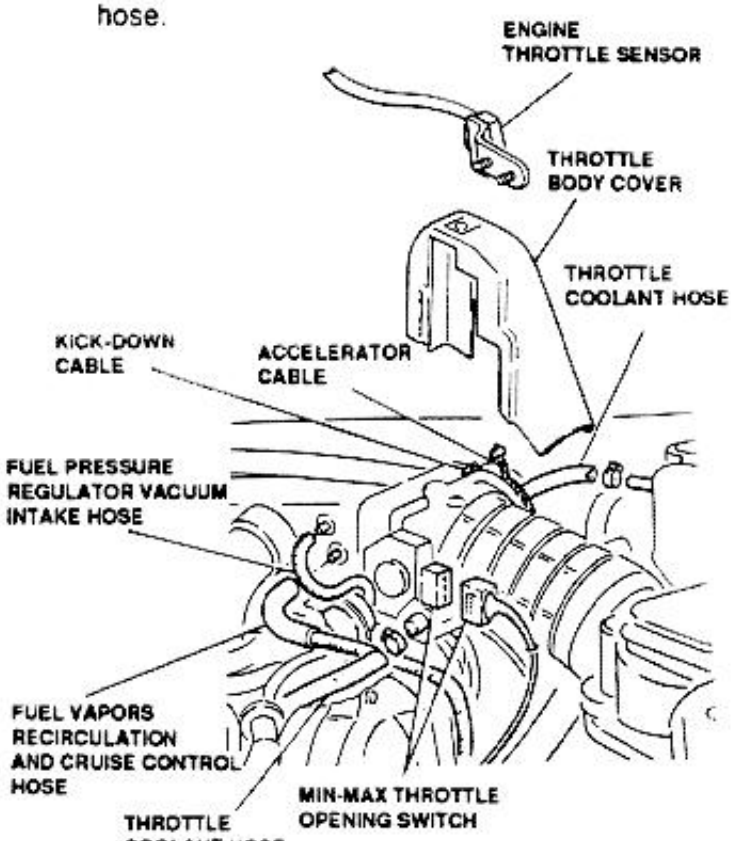
Right timing system cover removal.

1. Disconnect battery (-) lead.
2. Disconnect constant idle speed actuator connector.

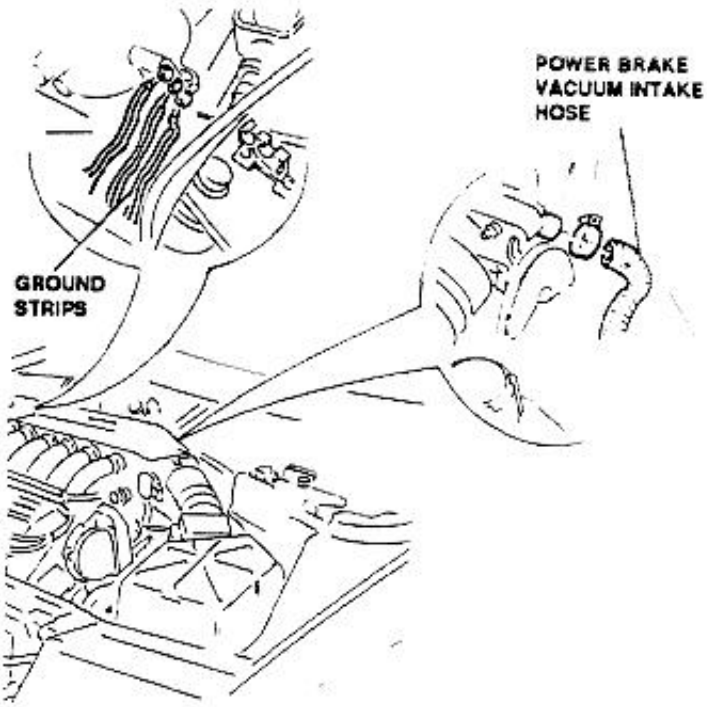
2. Loosen screws securing power steering pump.
3. Disconnect oil vapor recirculation pipes.



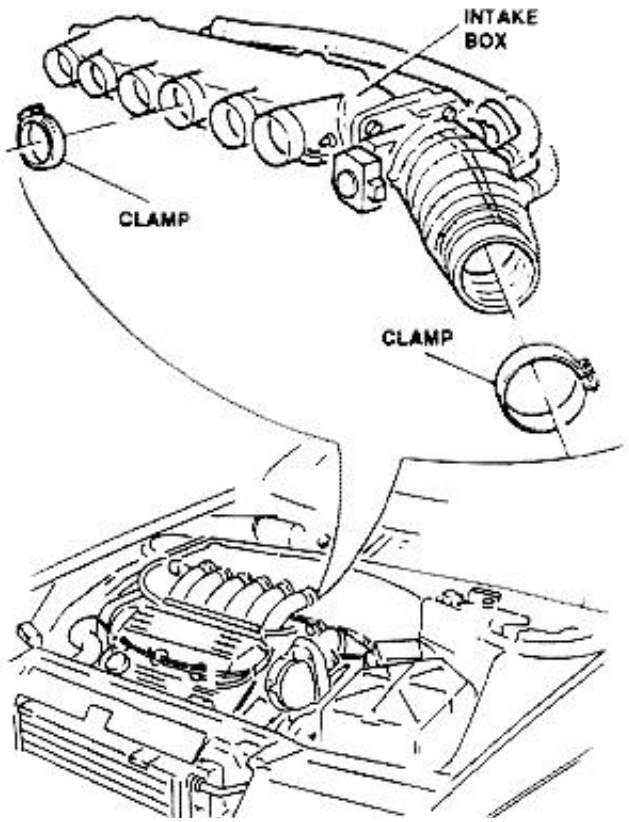
4. Disconnect Min-Max throttle opening switch.
5. Remove throttle body cover.
6. Disconnect accelerator cable.
7. (**Vehicles with automatic transmission only**). Disconnect kick-down cable.
8. (**"S" version only**). Remove engine throttle sensor.
9. Disconnect throttle coolant hoses.
10. Disconnect fuel vapor recycling and cruise control hose.
11. Disconnect fuel pressure regulator vacuum intake hose.



12. Disconnect power brake vacuum intake hose.
13. Disconnect ground strips.

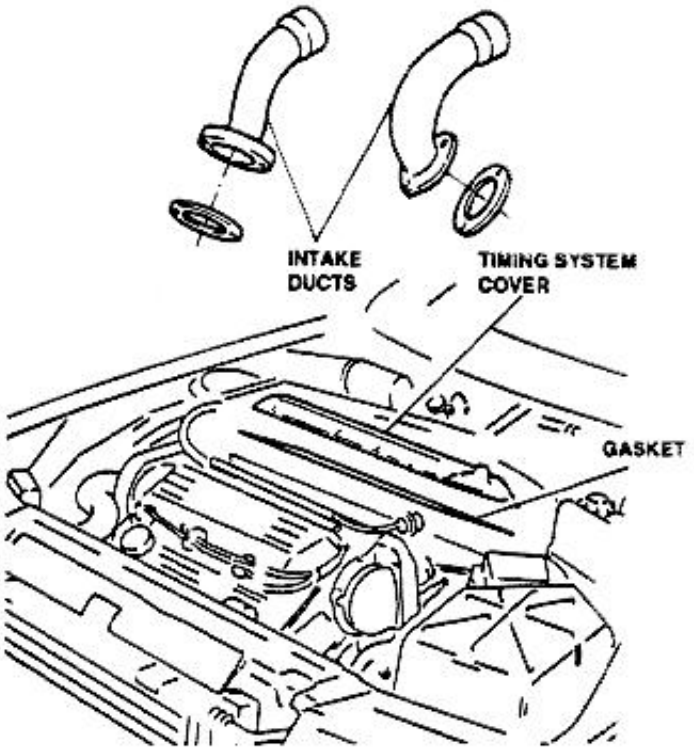


14. Remove air intake box acting on three attaching screws and intake duct clamps.



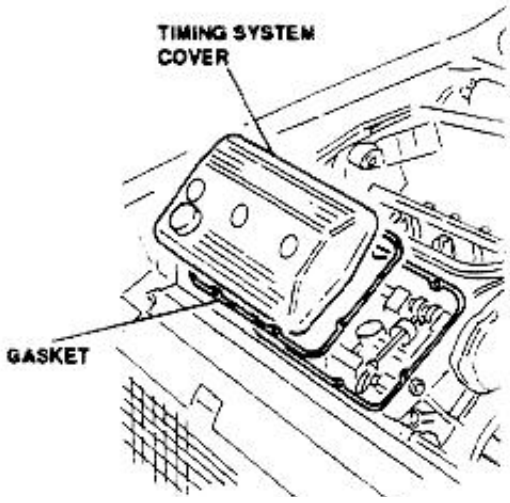
COOLANT HOSE

15. Disconnect spark plug leads of cylinders No. 1,2 and 3.
16. Remove intake ducts and relevant gaskets.
17. Remove right timing system cover and relevant gasket.



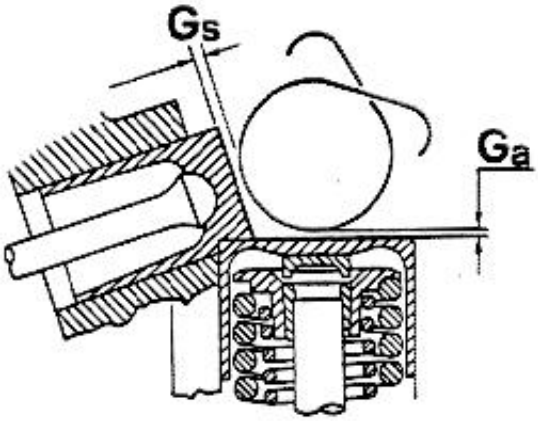
Left timing system cover removal.

1. Disconnect spark plug leads of cylinders No. 4, 5 and 6.
2. Remove left timing system cover and relevant gasket.



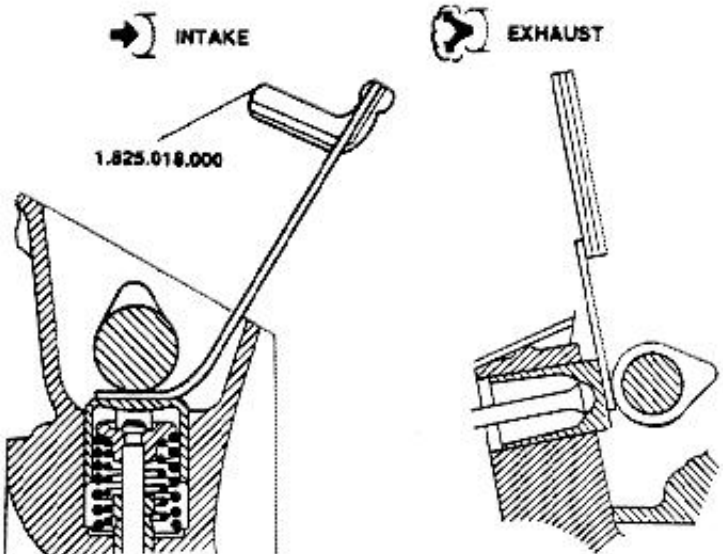
Valve clearance check.

1. Suck oil from cylinder head sumps and re-introduce it into engine sump.
2. Clean spark plug seatings, remove spark plugs and cap holes to prevent entry of foreign matter.
3. **WITH COLD ENGINE**, check clearance between cams rest angle and top of valve caps is within prescribed limits.



Valve clearance (engine cold)
G_a = 0.475 to 0.500 mm 0.0187 to 0.0197 in
G_s = 0.225 to 0.250 mm 0.0088 to 0.0098 in

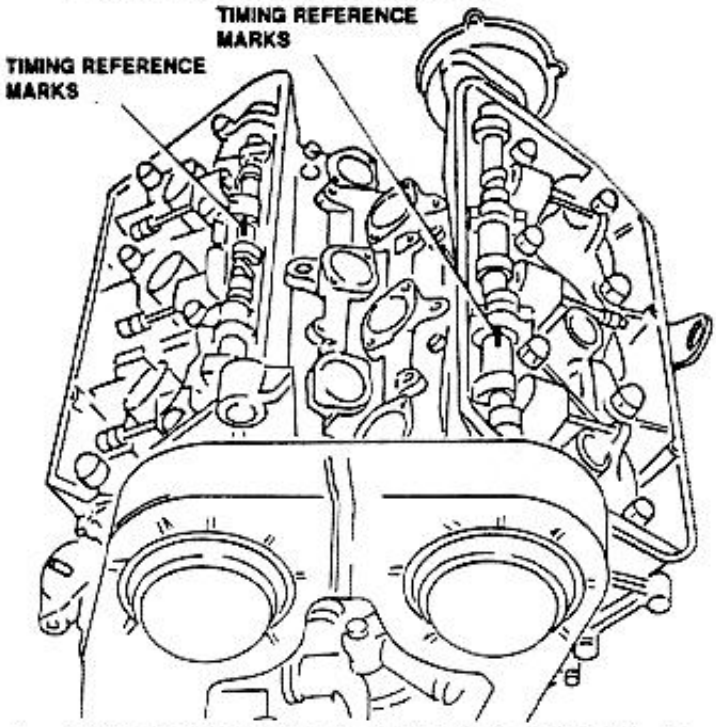
NOTE: **Check intake valve clearance using feeler gauge 1.825.018.000.**



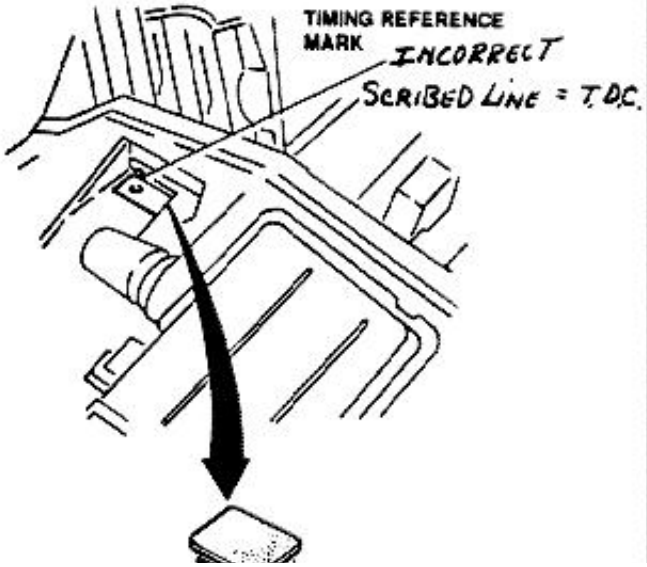
- If valve clearance is not within prescribed limits, adjust clearance as indicated below.

Valve clearance adjustment - Intake side.

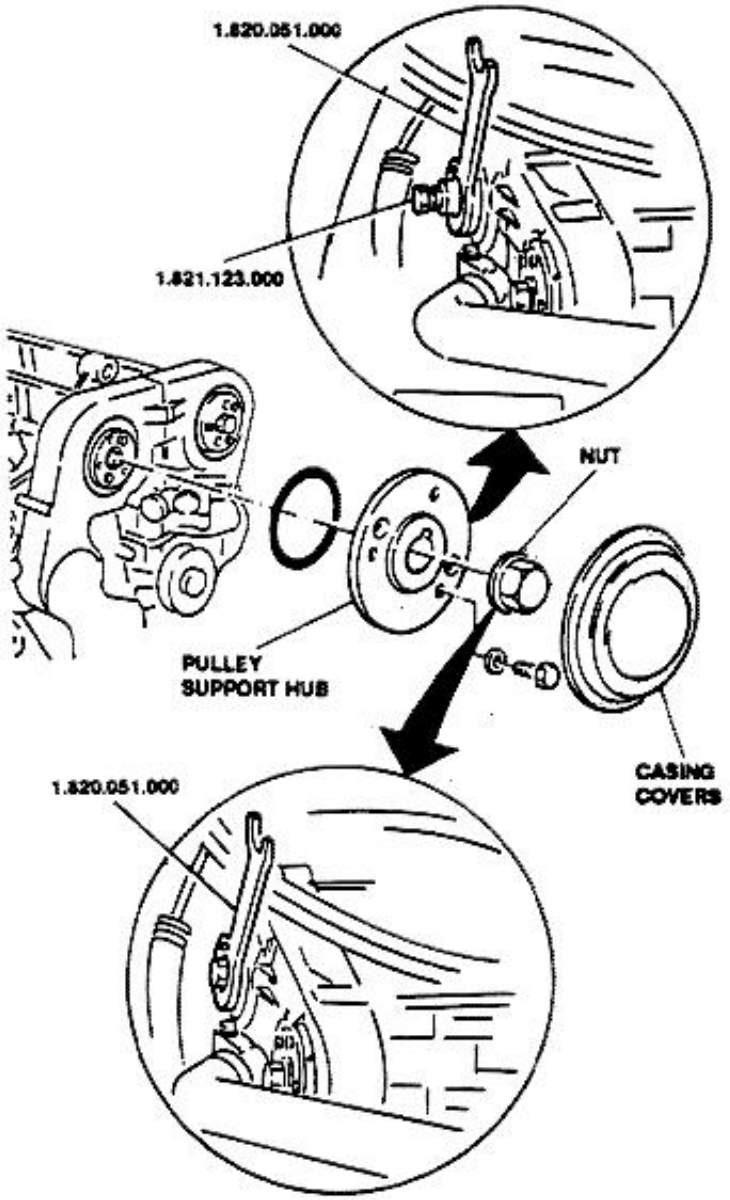
1. Engage highest gear speed (D, with automatic gear) and move vehicle forwards to rotate crankshaft until timing notches engraved on camshafts are aligned to those engraved on relevant caps.



2. When in this position (cylinder No. 1 at T.D.C. in firing phase), the SCRIBED LINE on the flywheel should match the notch engraved on gearbox cone.

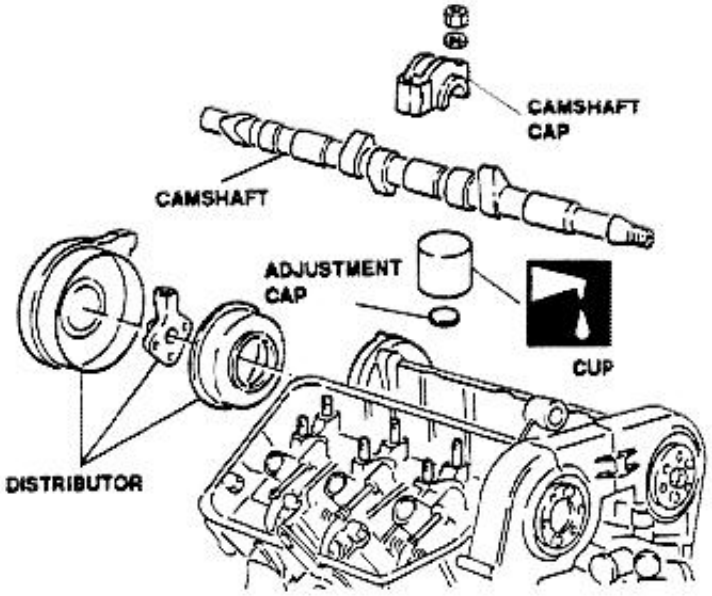


3. Remove covers from timing belt casing.
4. Remove securing nut using torque reactor **1.820.051.000**.
5. Remove three screws securing toothed pulley support hub.
6. Extract support hub and relevant seal using puller **1.821.123.000** and torque reactor **1.820.051.000**.

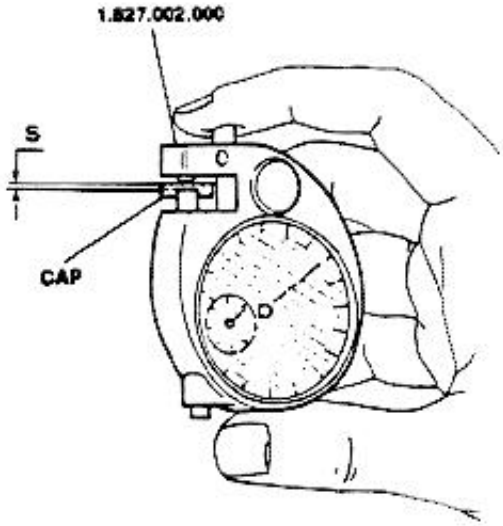


7. Remove camshaft caps.
8. (Left cylinder head only). Remove distributor cap, rotor arm and body.
9. Withdraw camshaft lifting from rear end.

10. Withdraw a valve cup and relevant adjustment cap.

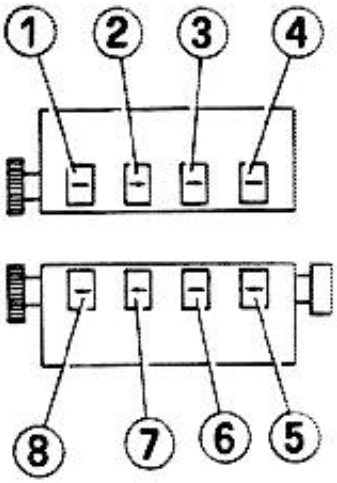


11. Measure thickness **S** using feeler gauge **1.827.002.000**; select new cap of proper thickness.
12. Lubricate new cap with engine oil and install together with valve cup.
    Operate in analogy on the remaining cap-cup pairs.



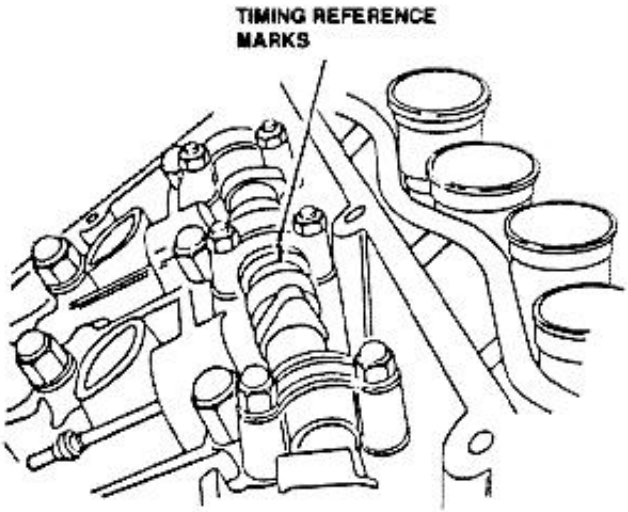
13. Position camshaft and install relevant caps.

NOTE: Observe the numbering and arrow engraved on caps.

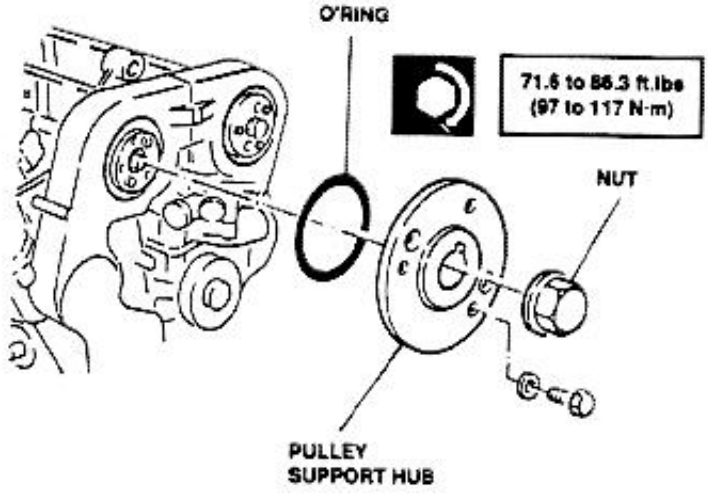


11.8 to 13.2 ft.lbs (16 to 18 N·m)

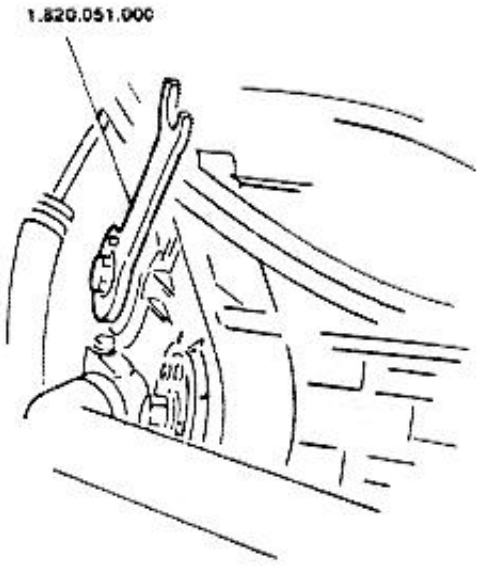
14. Tighten nuts securing cap to prescribed torque.
15. Rotate camshaft to align notches on camshaft to those engraved on relevant cap, and check alignment of flywheel hole with notch engraved on gearbox cone.



16. Install toothed pulley support hub complete of a new seal and screw without tightening the attaching screws.
17. Install nut securing toothed pulley to camshaft.

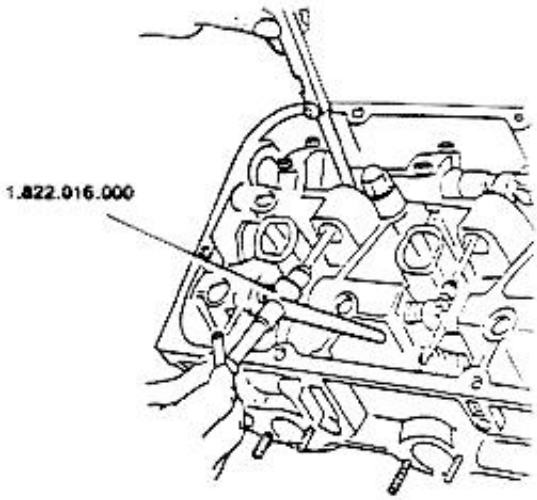


18. Prevent rotation of pulley using tool 1.820.051.000 and lock nut to prescribed torque.
19. Torque completely screws securing hub.
20. (Left cylinder head only). Re-install distributor assembly.

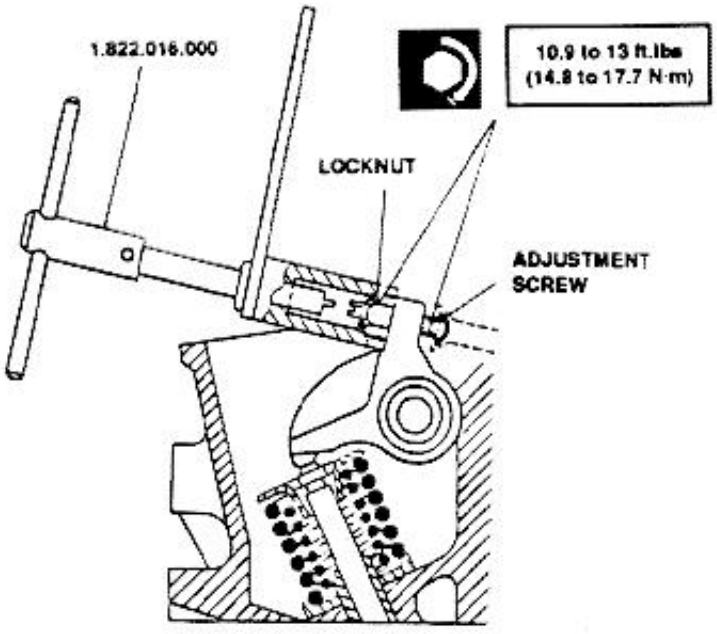


Valve clearance adjustment-exhaust side.

1. Loosen locknut using tool 1.822.016.000 and acting on intermediate lever of tool.

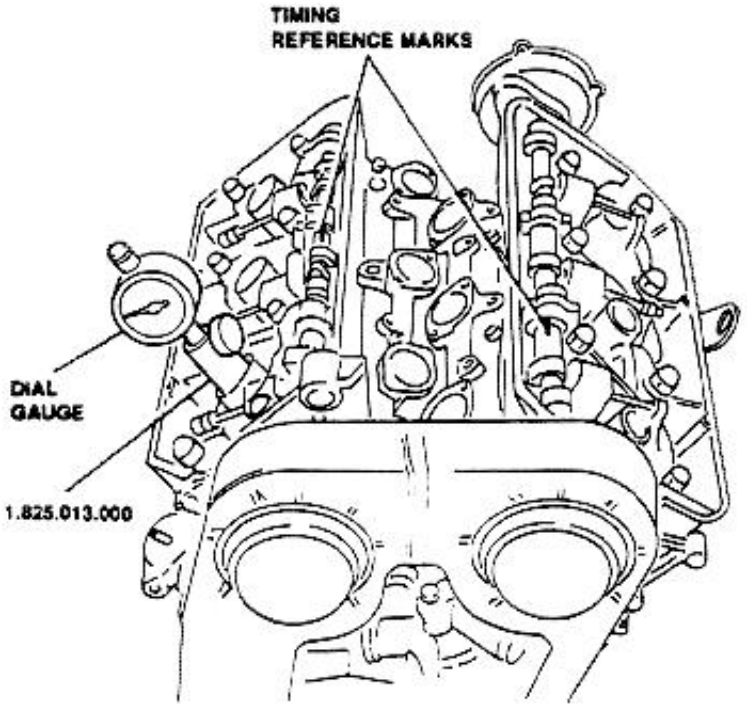


2. Using the same tool, act on adjustment screw until the prescribed clearance is obtained.
3. Tighten locknut and check again valve clearance.



- Prior to proceed to reassembly, position camshafts properly as follows:

4. Install feeler pin **1.825.013.000** and dial gauge into seating of cylinder No.1 spark plug.
5. Engage the highest gear speed (D, with automatic transmission), and rotate the crankshaft to align timing notches on camshaft to notches on relevant caps.
6. When in this position (No. 1 cylinder at T.D.C. in firing phase), the hole on flywheel must be aligned to notch engraved on gearbox cone.



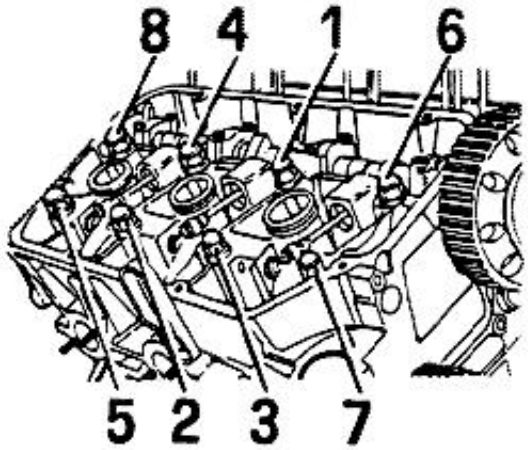
Reassembly

- Perform reassembly by reversing order of disassembly procedure. Ensure of correct positioning of gaskets.

11 - CYLINDER HEAD NUTS TIGHTENING

- Perform operation with cold engine.
1. Remove timing system covers. (Refer to proceeding step 10).
2. Loosen nuts of one turn in the sequence shown in illustration; wipe with engine oil the surface between washer and nut, then torque to following value:

72.2 to 79.8 ft.lbs (97.8 to 108.2 N·m)



NOTE: The sequence shown refers to the R.H. cylinder head. Operate in analogy for the L.H. cylinder head.

3. Perform reassembly in reverse order.

NOTE: In case of **disassembly and reassembly of cylinder heads**, perform a first torquing to following value:

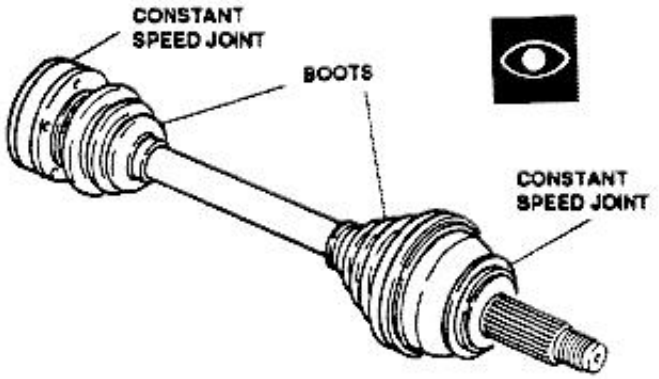
65.3 to 72.2 ft.lbs (88.5 to 97.8 N·m)

Repeat operation stated at steps 1. and 2. above after about 650 miles covered.

12 - INTEGRITY CHECK OF AXLE SHAFTS, STEERING BOX AND STEERING KNUCKLE JOINTS PROTECTIVE BOOTS

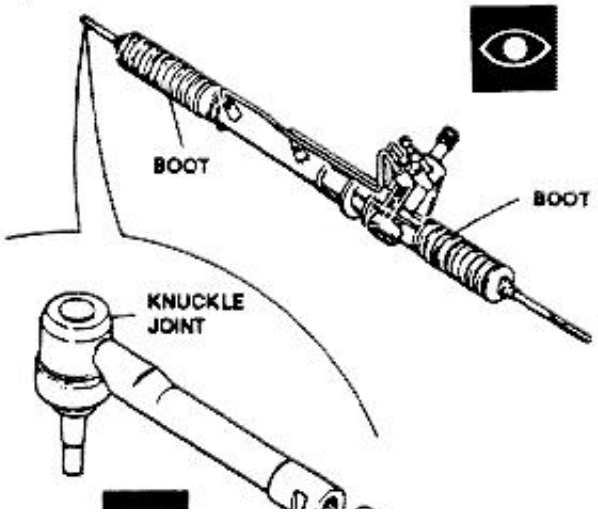
AXLE DRIVE SHAFTS

1. Check rubber protective boots for absence of damages and traces of grease seepage from the boot. Overhaul the complete joint if any breakage is found, since foreign matter could have been trapped and cause severe failure.
2. Visually check constant speed joints for condition.
3. Refer to **Group 17** if some components require overhaul.



STEERING RODS

1. Check rubber protective boots for integrity; replace boots if cracks or nicks are found.
2. Check knuckle joints for absence of damage or wear.
3. Refer to **Group 23** to replace components, when required.



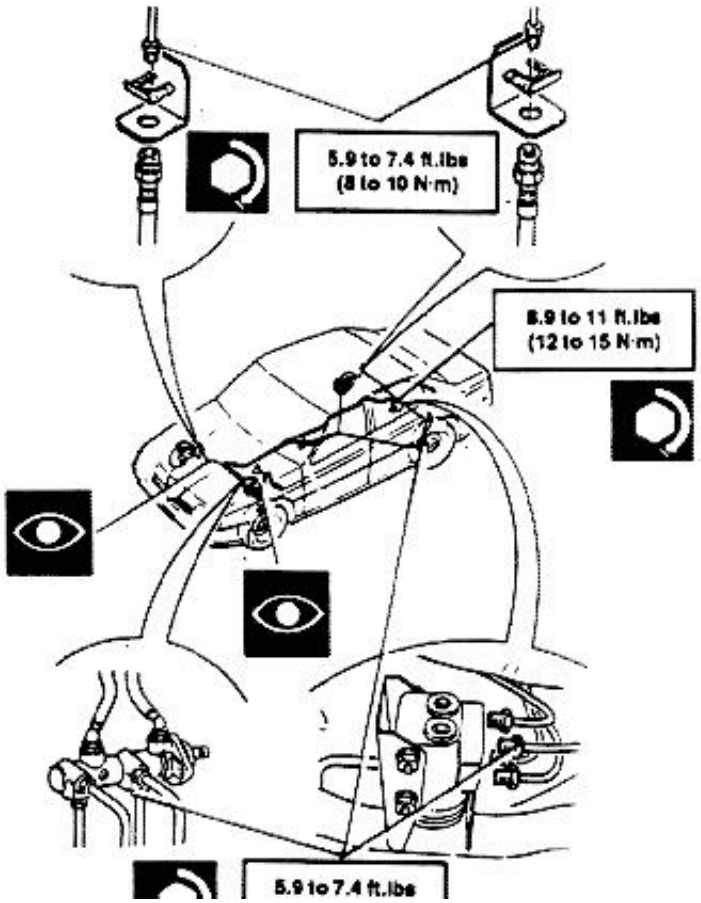
13 - BRAKE CIRCUIT PIPING TIGHTNESS CHECK

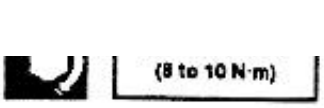
1. Check tubes and hoses: no damages, swelling and oxidation are allowed. Check tubes and hoses for proper and safe installation.
2. Check fittings: no leaks are allowed; torque to prescribed value, if necessary.
3. Check power brake vacuum hose for absence of flaws or chokes, and for proper connection.

- Replace defective items. In this event, bleed brake system. (Refer to **Group 22**).

CAUTION:
The brake/clutch fluid is harmful for the vehicle's body. Operate with precaution.

NOTE: Bleed the brake system (refer to **Group 22**) any time a part of the system is removed or replaced.

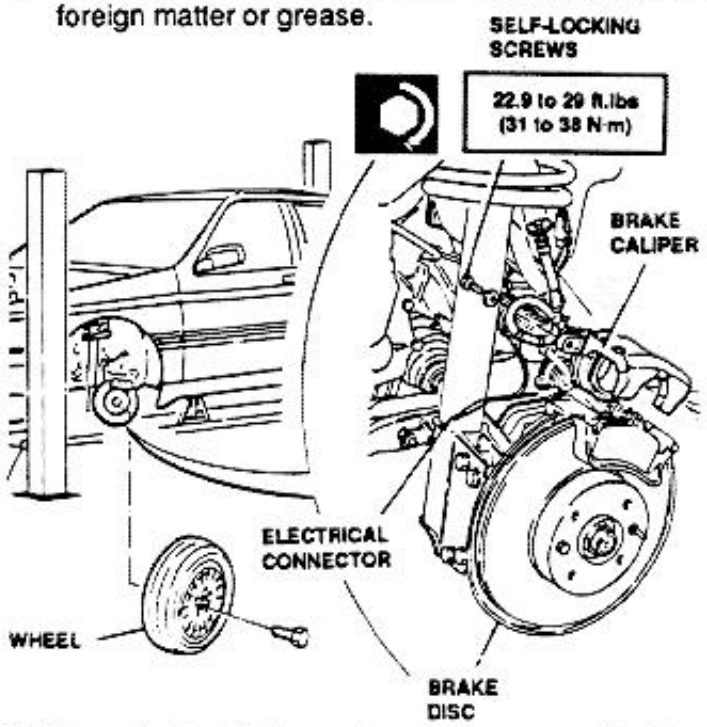




14 - BRAKE PADS WEAR CHECK

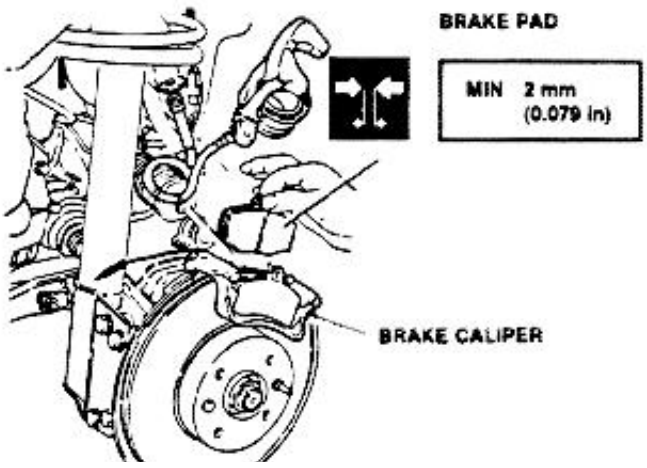
FRONT BRAKES

1. Remove front wheel.
2. Disconnect brake pad electrical connector.
3. Remove brake caliper acting on attachment screws.
4. Thoroughly clean disc surface from any trace of foreign matter or grease.



NOTE: On installation, always use new self-locking screws securing brake caliper body; torque screws to prescribed value.

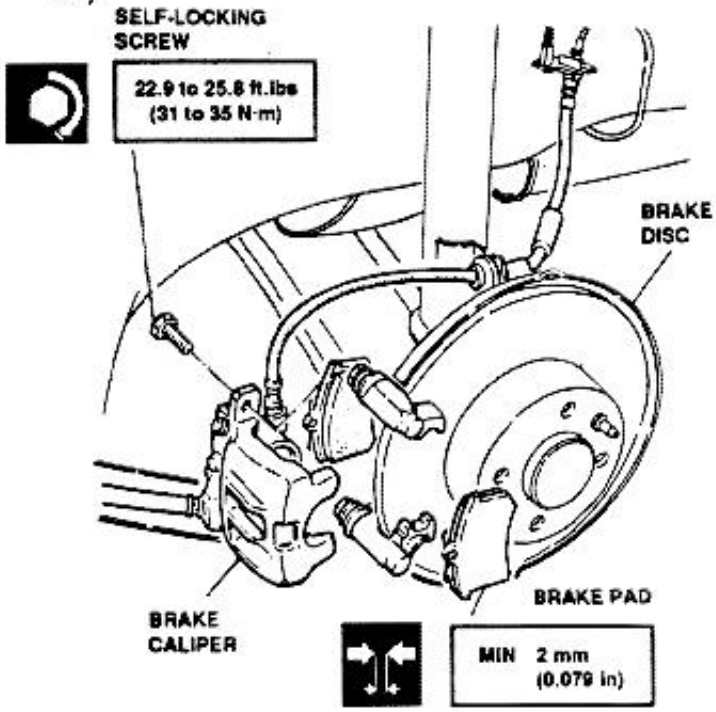
5. Check brake pads: replace if gasket thickness is lower than **0.079 In (2 mm)**.
- Check brake disc wear, if required (refer to **Group 22**).



6. On installation, inner brake pad must be positioned with relief groove faced towards rear end of vehicle. Install brake pad with wear sensor on inner side of disc.

REAR BRAKES

1. Remove rear wheel.
2. Remove brake caliper acting on attaching screws.
3. Thoroughly clean disc surface from any trace of foreign matter or grease.
4. Check brake pads: replace if gasket thickness is lower than **0.079 In (2 mm)**.
- Check brake disc wear, if required (refer to **Group 22**).



NOTE: On installation, always use new self-locking screws securing brake caliper body; torque screws to prescribed value.

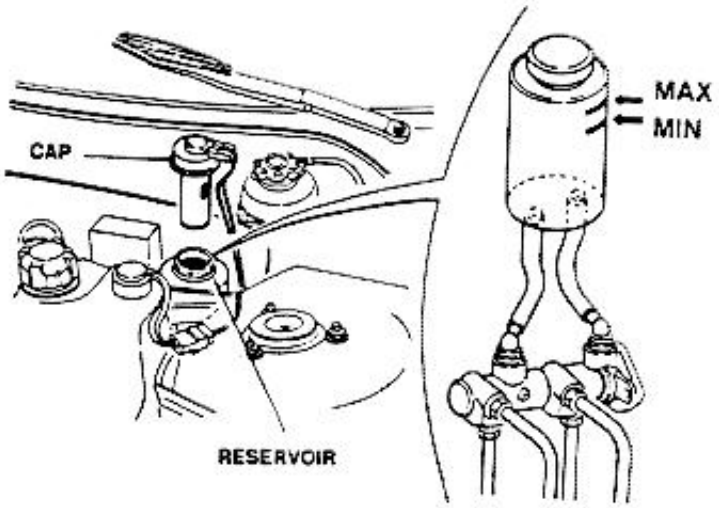
5. Retract cylinder into brake caliper by pressing manually before installation of brake caliper.
6. After reassembly, start engine and press brake pedal several times, to restore automatic parking brake slack take-up.
- Road test the vehicle by applying brakes several times to eliminate any trace of residual matter and to verify proper efficiency of brake system.

15 - BRAKE/CLUTCH FLUID LEVEL CHECK

CAUTION:
The brake/clutch fluid is harmful for the vehicle's body. Operate with precaution to prevent fluid from contacting painted surfaces, and subsequent damage.

NOTE: Check fluid level with vehicle on a level surface.

1. Remove reservoir cap, paying attention not to disconnect electrical connector.
2. Ensure the level is at **MAX** mark on reservoir.



3. Top-up with prescribed fluid, if necessary.

Alfa Romeo	BRAKE FLUID SUPER DOT 4
AGIP BRAKE FLUID DOT 4	

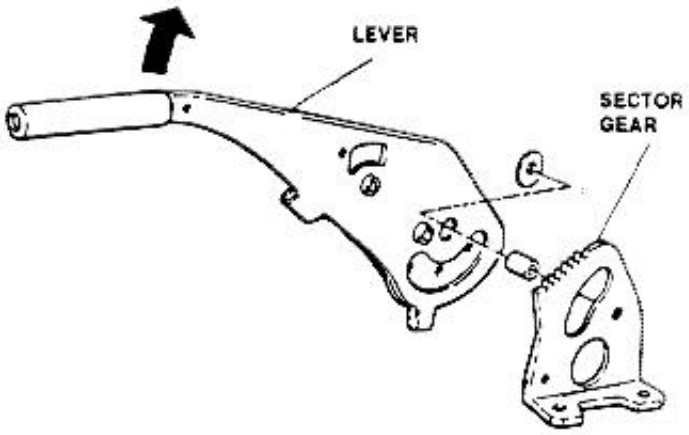
4. If level is too low, carefully check tightness of brake system (refer to preceding operation 13).

CAUTION:
The brake/clutch fluid is hygroscopic, in other words its easily absorbs water when in contact with humid environment.
Top-up using only fluid from sealed containers opened just before use.

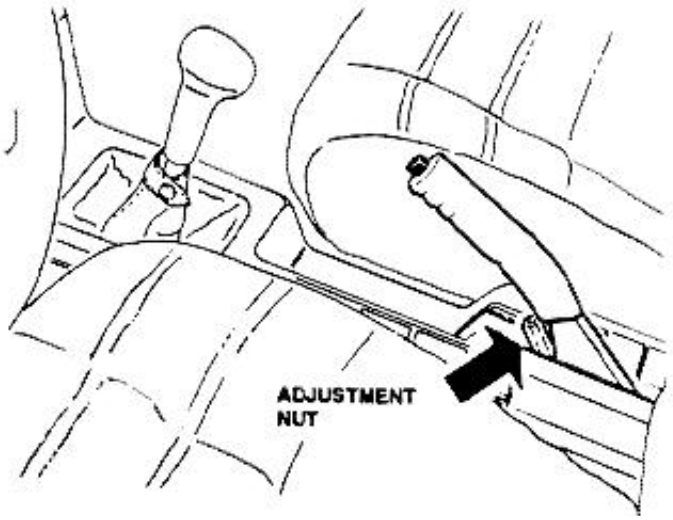
NOTE: Bleed the brake system (refer to **Group 22**) any time a component of system is removed or replaced.

16 - PARKING BRAKE TRAVEL CHECK

1. Set parking brake lever to third detent on sector gear.



2. Act on adjustment nut until wheels are blocked.



system (refer to preceding operation 15).

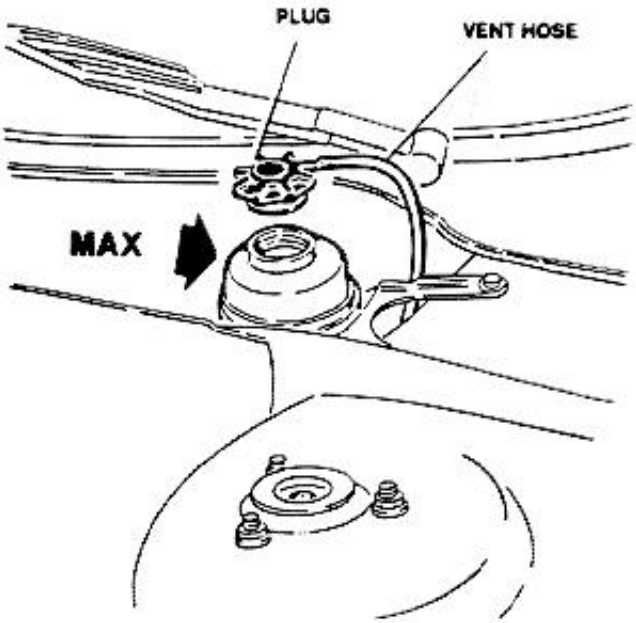
3. Act on the lever and verify that:

   - The lever performs a travel of about seven detents when a force of about **80 lbs (40 kg)** is applied.
   - The wheels are free when lever is in rest position.

17 - POWER STEERING FLUID LEVEL CHECK

NOTE: Check level with vehicle on a level surface.

1. Remove vent hose and plug.
2. Check fluid level is at **MAX** mark.



3. Top-up with prescribed fluid, if necessary.

AGIP DEXRON II D 21103
SHELL ATF DEXRON II D 20137

4. Start engine and wait until fluid level stabilizes rotating the steering wheel completely several times.

18 - GEARBOX AND DIFFERENTIAL OIL LEVEL CHECK

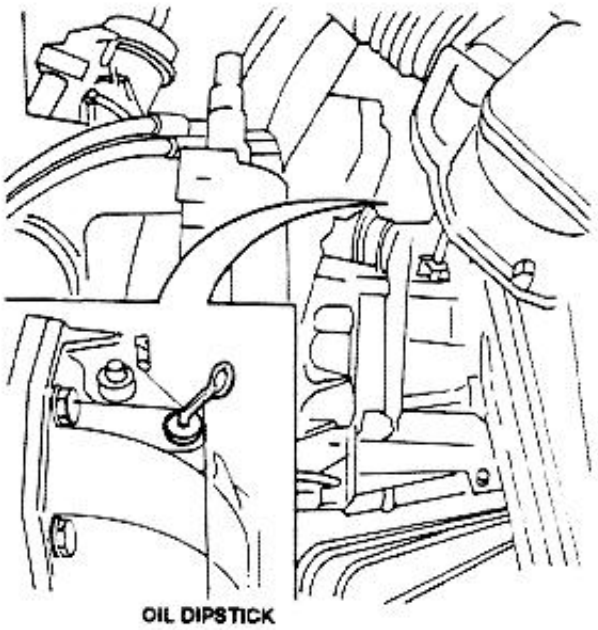
NOTE: Check level with vehicle on a level surface.

a) Manual transmission

- Operate with cold engine.

1. Pull-out dipstick and check that oil level is at max notch on dipstick.

CAUTION:
Clean dipstick using a lint-free cloth. Fabric hair or threads could damage the gearbox.



2. Top-up with prescribed oil, if required.

AGIP DEXRON II 21103
SHELL ATF DEXRON II 20137

b) Automatic transmission

WITH COLD ENGINE

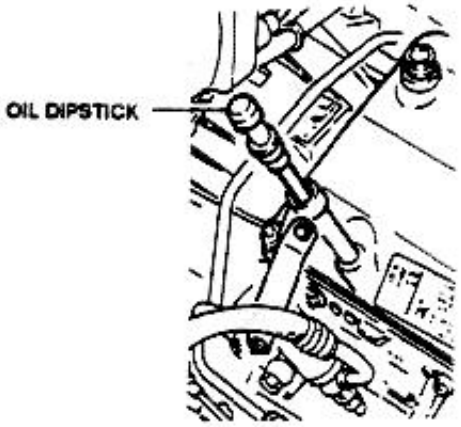
1. Engage parking brake.
2. Position gear selector lever to "P" (Parking).

5. Top-up fluid to **MAX** mark and plug reservoir.

2. Position gear selector lever to "P" (Parking)

3. Start engine.
4. Apply brake pedal and, with engine at idle, select all remaining gear speeds, proceeding from "P" to "1" and viceversa; hold about two seconds in each position.
5. Position lever again to "P" and check level of gearbox oil is at **MIN** mark for temperature of **40°C (104°F)**.

CAUTION:
Clean dipstick using a lint-free cloth. Fabric hair or threads could damage the gearbox.



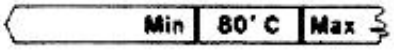
Dipstick-Right side

6. Top-up with prescribed oil, if required.

AGIP DEXRON II D 21103
SHELL ATF DEXRON II D 20137

WITH WARM ENGINE

1. With engine at normal operating temperature, idle speed and selector lever to position "P" (Parking), check level of oil in gearbox is between **MIN** and **MAX** marks for temperature of **80°C (176°F)**.



Dipstick - Left side

2. Top-up with prescribed fluid, if required.

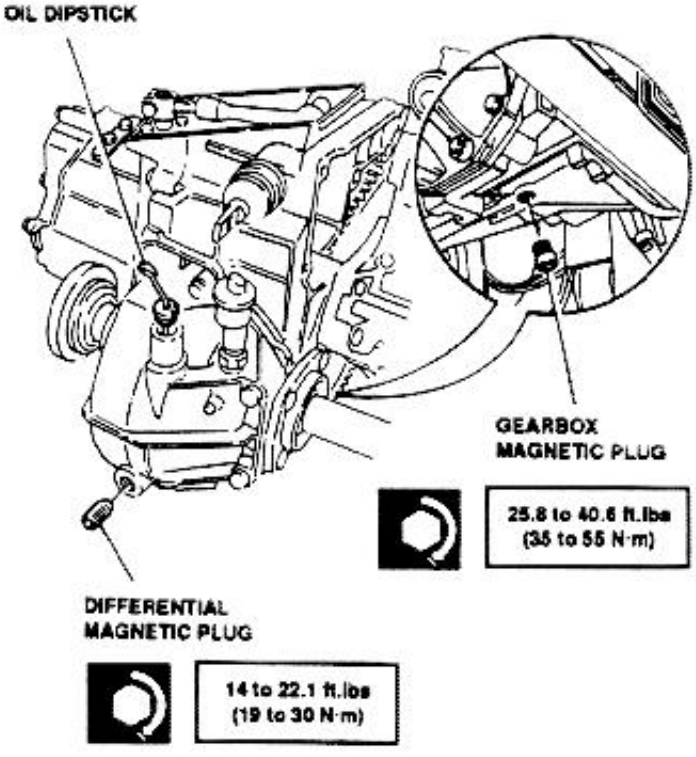
AGIP DEXRON II D 21103
SHELL ATF DEXRON II D 20137

NOTE: In both cases, top-up oil level with selector lever to "P" (parking) and engine at idle.

19 - GEARBOX AND DIFFERENTIAL OIL CHANGE

a) Manual transmission

1. Place vehicle on autolift.
2. Remove magnetic plug from gearbox and plug from differential.
3. Leave oil to drain for at least 15 minutes.
4. Re-install plugs and service with prescribed oil to maximum level.



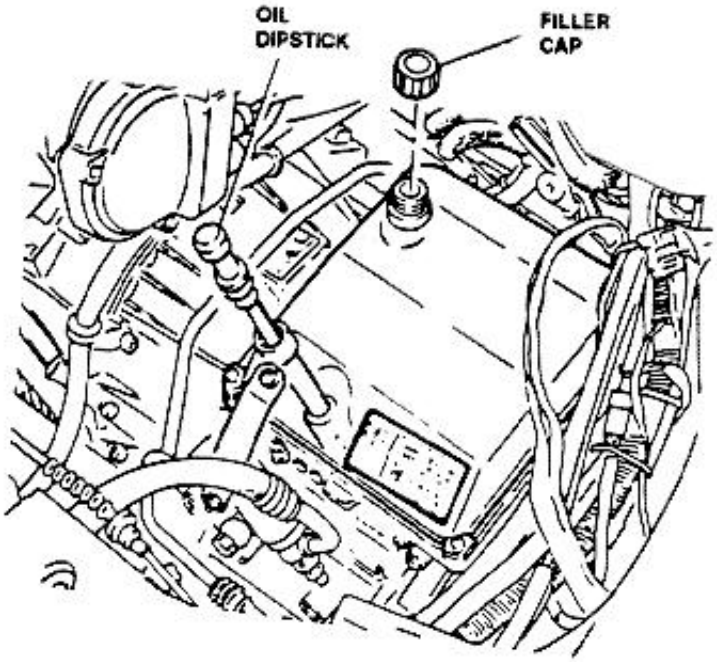
NOTE: Clean plugs before re-installing

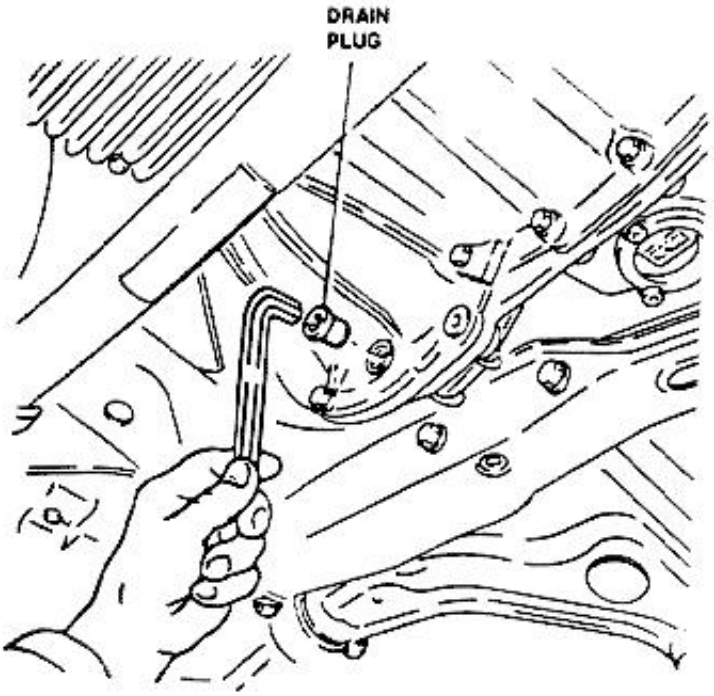
Dipstick - Left side

NOTE: Clean plugs before installation.

b) Automatic transmission

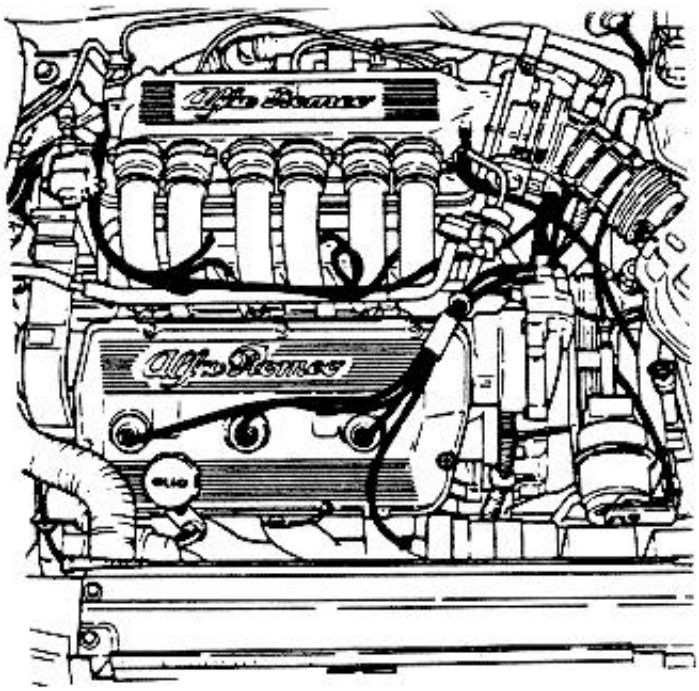
1. Place vehicle on auto lift.
2. Remove magnetic plug
3. **Operate with warm gearbox group**, and leave oil to drain for at least 15 minutes.
4. Reinstall plug and service with prescribed oil.





20 - ENGINE COMPARTMENT ELECTRIC CONNECTIONS CHECK

1. Check condition and positioning of connectors and covers.
2. Check connectors are properly connected.
3. Check cables and wires are not peeled, cut or worn, and properly secured to attaching clamps.



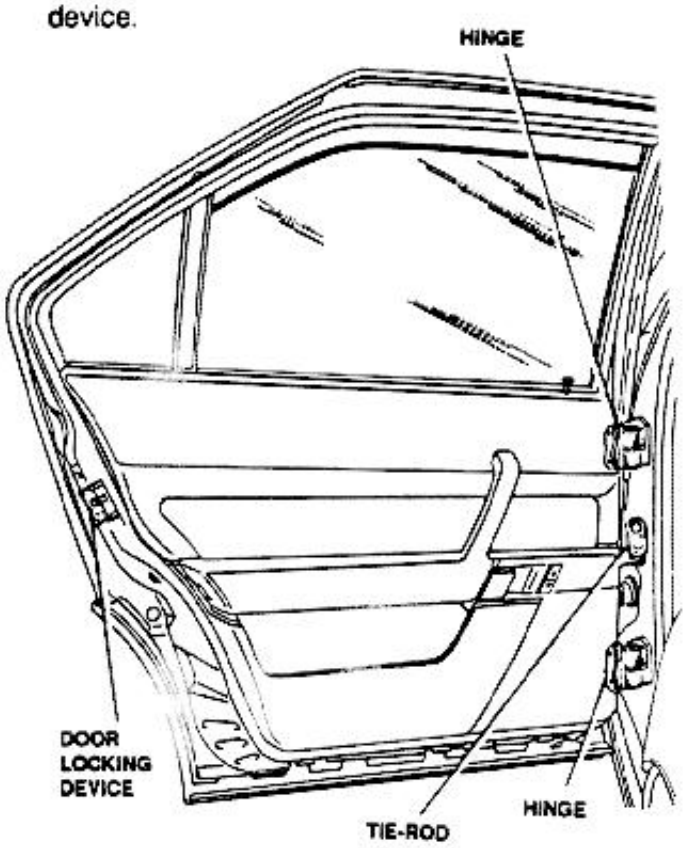
21- DOOR, HOOD AND TRUNK LID HINGES LUBRICATION; HOOD AND TRUNK LID LATCHES GREASING

Apply a sufficient quantity of grease on parts listed below to avoid wear and oxidation:

- Clean affected items.
- Apply grease.
- Remove excess grease.

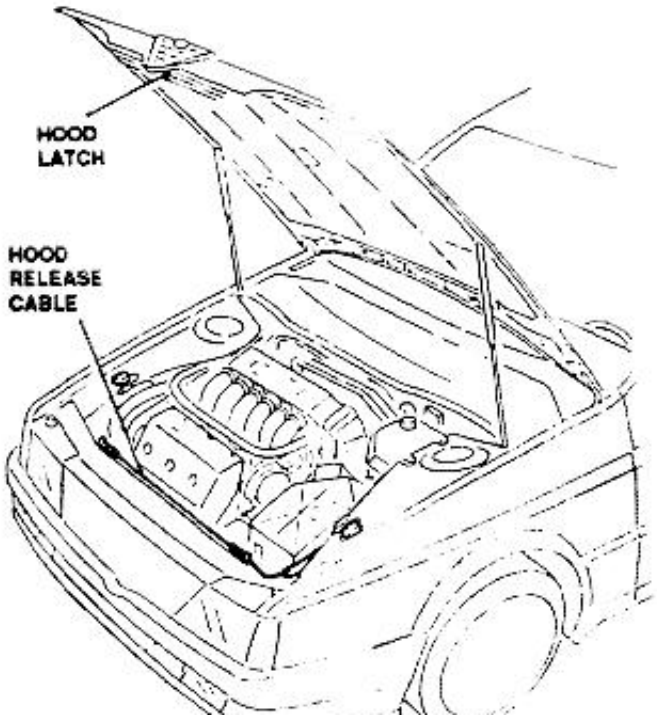
DOORS

- Lubricate hinges, tie-rod and door locking device.



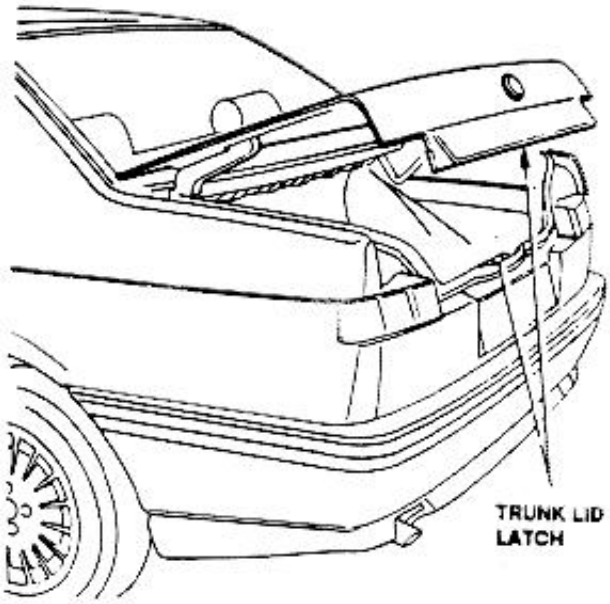
ENGINE HOOD

- Lubricate hood latch mechanism and release cable.



TRUNK-LID

- Lubricate lid latch mechanism.



22 - VEHICLE TESTING

Road test the vehicle. Ascertain proper operation of all systems and component which have been subject to maintenance and/or repair activities.

TECHNICAL CHARACTERISTICS AND SPECIFICATIONS

(Data required to carry-out maintenance activities)

BELT TENSIONING

NOTE: Carry-out belts tensioning using tool 1.824.018.000

ALTERNATOR BELT

On installation	400 to 450 N	90 to 101.2 lbs
Minimum (Cold engine)	300 N	67.5 lbs
Retensioning (Cold engine)	300 to 350 N	67.5 to 78.7 lbs
Retensioning (after run-in)	300 to 350 N	67,5 to 78,7 lbs

POWER STEERING PUMP BELT

On installation	400 to 450 N	90 to 101.2 lbs
Minimum (Cold engine)	250 N	56.2 lbs
Retensioning (Cold engine)	300 to 350 N	67.5 to 78.7 lbs
Retensioning (after run-in)	300 to 350 N	67,5 to 78,7 lbs

COOLANT PUMP AND AIR CONDITIONING COMPRESSOR BELT

On installation	650 to 700 N	146 to 157 lbs
Minimum (Cold engine, after Run-in)	550 N	124 lbs
Retensioning (Cold engine)	550 to 600 N	124 to 135 lbs

VALVES CLEARANCE

NOTE: Check/Adjust valves clearance only with cold engine

INTAKE	0.475 to 0.500 mm	0.0187 to 0.0197 in
EXHAUST	0.225 to 0.250 mm	0.0088 to 0.0098 in

BRAKE SYSTEM

Minimum brake pads thickness	2 mm	0.079 in

PARKING BRAKE

Number of free teeth on sector gear before wheels are locked	N. 3

wheels are locked

FLUIDS AND LUBRICANTS

Type	Application	Name	Quantity
OIL	Engine oil servicing	AGIP NUOVO SINT 2000 10W/40 SHELL FIRE & ICE MOTOR OIL 10W/40	7.5 l 2 gals
OIL	Manual gearbox oil servicing	AGIP DEXRON II SHELL ATF DEXRON II	1.8 l 0.5 gals
OIL	Automatic gearbox oil servicing	AGIP DEXRON II SHELL ATF DEXRON II	9 l 2.4 gals
OIL	Power steering oil servicing	AGIP DEXRON II SHELL ATF DEXRON II	0.9 kg 2 lbs
FLUID	Brake/clutch system servicing (*) With ABS	Alfa Romeo BRAKE FLUID SUPER DOT 4 AGIP BRAKE FLUID DOT 4	0.5 kg 1.1 lbs 0.7* kg 1.6* lbs
FLUID	Engine cooling system servicing	Antifreezing ALFA ROMEO Climafluid Permanent - Ready for use	13 l 3.5 gals
OIL	Spark plugs tightening	ISECO Molykote A	–
ANTISEIZING COMPOUND	Lambda probe tightening	R.GORI Never Seez	–

TIGHTENING TORQUES

ENGINE

Cylinder head nuts:		
- on cylinder heads assembly (lubricated)	65.3 to 72.2 ft.lbs	88.5 to 97.8 Nm
- after about 650 miles (cold engine, lubricated)	72.2 to 79.8 ft.lbs	97.8 to 108.2 Nm
Camshaft cap nuts (lubricated)	11.8 to 13.2 ft.lbs	16 to 18 Nm
Spark plugs (lubricated with ISECO Molykote A oil)	18.4 to 25 ft.lbs	25 to 34 Nm
Camshaft front hub nut	71.6 to 86.3 ft.lbs	97 to 117 Nm
Lambda probe	37 to 44 ft.lbs	50 to 60 Nm
Rocker arm adjustment nut-screw	10.9 to 13 ft.lbs	14.8 to 17.7 Nm
Fuel filter fitting	21.1 to 29 ft.lbs	30 to 40 Nm
Fuel filter fitting	14.8 to 17 ft.lbs	20 to 23 Nm

GEARBOX (M.T.)

Differential oil drain plug	14 to 22.1 ft.lbs	19 to 30 Nm
Gearbox magnetic plug	25.8 to 40.6 ft.lbs	35 to 55 Nm

BRAKE SYSTEM

Rigid pipe fitting on brake pump	5.9 to 7.4 ft.lbs	8 to 10 Nm
Hose fitting on brake caliper	5.9 to 7.4 ft.lbs	8 to 10 Nm
Front brake calipers attaching screws	22.9 to 28 ft.lbs	31 to 38 Nm
Rear brake calipers attaching screws	22.9 to 25.8 ft.lbs	31 to 35 Nm
Rigid pipe fitting on load proportioning valve	8.9 to 11 ft.lbs	12 to 15 Nm

SPECIAL TOOLS

Tool number	Description
1.820.051.000	Tool, camshaft pulley turning
1.820.053.000	Pin, hydraulic belt tightener lock
1.820.210.000	Tool, coolant pump and air conditioning compressor belt tightener lock
1.821.123.000	Puller, camshaft pulley
1.822.016.000	Wrench, exhaust side timing system adjustment
1.822.104.000	Wrench, power steering pump secure
1.827.001.000	Dial gauge, valve caps check.
1.824.018.000	Tool, belt tensioning check
1.825.013.000	Tool, T.D.C. check
1.825.018.000	Feeler gauge, valves clearance check