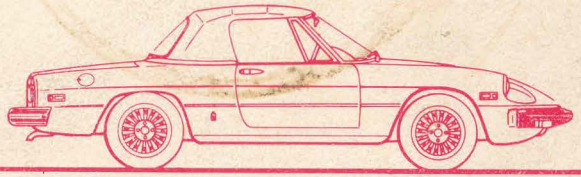
Alfa Romeo 2000 Spider Veloce®

1979 MODEL YEAR.



OWNER'S MANUAL

CONTENTS

The operation and maintenance instructions contained in this manual, particularly as far as the efficiency of the fuel injection system is concerned,

MUST BE CAREFULLY OBSERVED

by every owner who desires to get the best from his vehicle and to ensure a long life for every component.

Owners are recommended, in their own interest, to entrust maintenance and repair work to Dealers equipped with the proper tools and staffed by specially trained mechanics.

ALFA ROMEO *CUSTOMER SERVICE*

The technica! data are approximate only. Alfa Romeo reserves the right fo change without notice any features and data given in this book. Some of the cquipmcnl are optional cxtras. Rcfcr to price list for a comprchcnsivc list of options.

FUEL REQUIREMENTS

To prevent serious damages to the catalytic converter **only unleaded gasoline** of at least **91 R.O.N.** and **83 M.O.N.** must be used.
Always refuel from pumps displaying the syrnbol shown above. Where pumps show the average between Research and Motor Octane Numbers use only unleaded gasoline with a rating of at least 87, i.e.: $\frac{R \quad M}{} = 87$.

The fi.J.ler neck of the tank prevents accidental filling with other th:rn **unleaded gasoline.**

WARNING

The Clean Air Act, as amended, provides in sect. 203 that tampering with emission related components or specifications is prohibited.
« Tampering » can be defined as any operation performed that causes any change in the specifications contained with in this owner's manua-1 and in the maintenance manual.
All Alfa Romeo vehicles are certified and are controlled to insure that they meet these specifications when they leave the factory. Vehicles being out of specification due to maladjustment or modification will usually exceed established emission standards for that vehicle, as weU as consume excessive fuel.
The specifications contained in this manual have been furnished to Federal and State Environmental Control Agencies, and are those which are used in surveillance programs to determine the vehicles conformity to its certified configuration.

ATTENTION:

Vehicles driven at high altitude - 1219 metres (4000 Ft) or more - must have the idle CO reset. Ask your Alfa Romeo dealer to perform this adjustment.

ALFA ROMEO NEW CAR LIMITED WARRANTY

Except for the Emission Control System Warranty, this is the only express warranty given by Alfa Romeo, Inc. Alfa Romeo, S.p.A., the manufacturer of Alfa Romeo cars, gives no express warranty. Alfa Romeo, Inc. and Alfa Romeo, S.p.A. do not authorize any other person, including an authorized Alfa Romeo dealer, to change this warranty or create for them any other obligation in connection with Alfa Romeo cars.

Alfa Romeo, Inc. will not do anything other than what is stated in this warranty if a defect is found to exist in an Alfa Romeo car. All other remedies are excluded, including any obligation or liability on the part of Alfa Romeo, Inc. or Alfa Romeo, S.p.A. for consequential or incidental damages (such as loss of use of the car, loss of time or inconvenience) arising out of a defect.

ALL IMPLIED WARRANTIES ON THE PART OF ALFA ROMEO, INC., AND ALFA ROMEO, S.p.A. APPLICABLE TO ALFA ROMEO CARS, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE DURATION OF THIS WARRANTY.

Some states do not allow the exclusion or limitation of incidental or consequential damages, and some states do not allow limitations on how long an implied warranty lasts so the above exclusion or limitation may not apply to you.

WHAT IS COVERED BY THE WARRANTY

Alfa Romeo, Inc., 250 Sylvan Avenue, Englewood Cliffs, New Jersey warrants to the consumer owner of each Alfa Romeo automobile, that it will repair or replace, at its option, free of charge, any part (except tires) which is defective in workmanship or material. **This warranty is effective for 12 months from the date the car is delivered to the first consumer purchaser, or for 12,000 miles, whichever occurs first.**

WHAT IS NOT COVERED BY THE WARRANTY

- Charges for parts and labor made in connection with normal or suggested maintenance service.
- Defects or damages resulting from misuse, negligence, alterations or accident.
- Defects or damages resulting from failure to operate, maintain and service the car as suggested in the Owner's Manual and Routine Maintenance Program book, including improper maintenance or service performed by someone other than an authorized Alfa Romeo dealer or installation of improper parts supplied by someone other than an authorized Alfa Romeo dealer. Although it is recommended that suggested maintenance and service be performed by an authorized Alfa Romeo dealer, it will not effect your rights under this warranty if the suggested maintenance and service is properly performed elsewhere.
- Any car registered or predominantly operated outside the United States.
- Any car on which the odometer readings have been altered.
- Tires.

WHAT TO DO IF YOU REQUIRE WARRANTY SERVICE

- Present your car to any authorized Alfa Romeo dealer during normal business hours. You must also show your Routine Maintenance Program book to verify warranty coverage. In some cases it may be necessary for you to show routine maintenance has been performed. It is your responsibility to keep and provide records (such as the Routine Maintenance Program book or repair orders) of maintenance on your car.
- Authorized Alfa Romeo dealers are listed in the Yellow Pages of their local telephone directories.
- This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

EMISSION CONTROL SYSTEM WARRANTY

Alfa Romeo warrants to the ultimate purchaser and each subsequent purchaser that the vehicle is designed, built, and equipped so as to conform at the time of sale with all U.S. emission standards applicable at the time of manufacture and that it is free from defects in materials and workmanship which would cause it not to meet these standards within the period of 5 years or 50,000 miles, whichever occurs first. Failures, other than those resulting from defects in material or workmanship which arise solely as a result of owner abuse and/or lack of proper maintenance, are not covered by the warranty. Federal Law prohibits manufacturers and dealers from knowingly removing or rendering an emission control system inoperative or ineffective.

TIRE INFORMATION

Tires are covered by the tire manufacturer's warranty which is issued only to the tire manufacturer. Any authorized Alfa Romeo dealer will assist you in requesting an adjustment if this becomes necessary.

SERVICE NETWORK

Alfa Romeo Dealers are shown in the list supplied with every vehicle. In any event rely on your Alfa Romeo Dealer displaying the shield with the Alfa Romeo emblem and name.

ANY QUESTIONS ABOUT YOUR LIMITED WARRANTY

Your dealer is the most important link between you and Alfa Romeo. You are his customer and he is vitally interested in you. Even so, it is possible that a misunderstanding may arise regarding service. If it happens that you have a problem with your dealer you should:

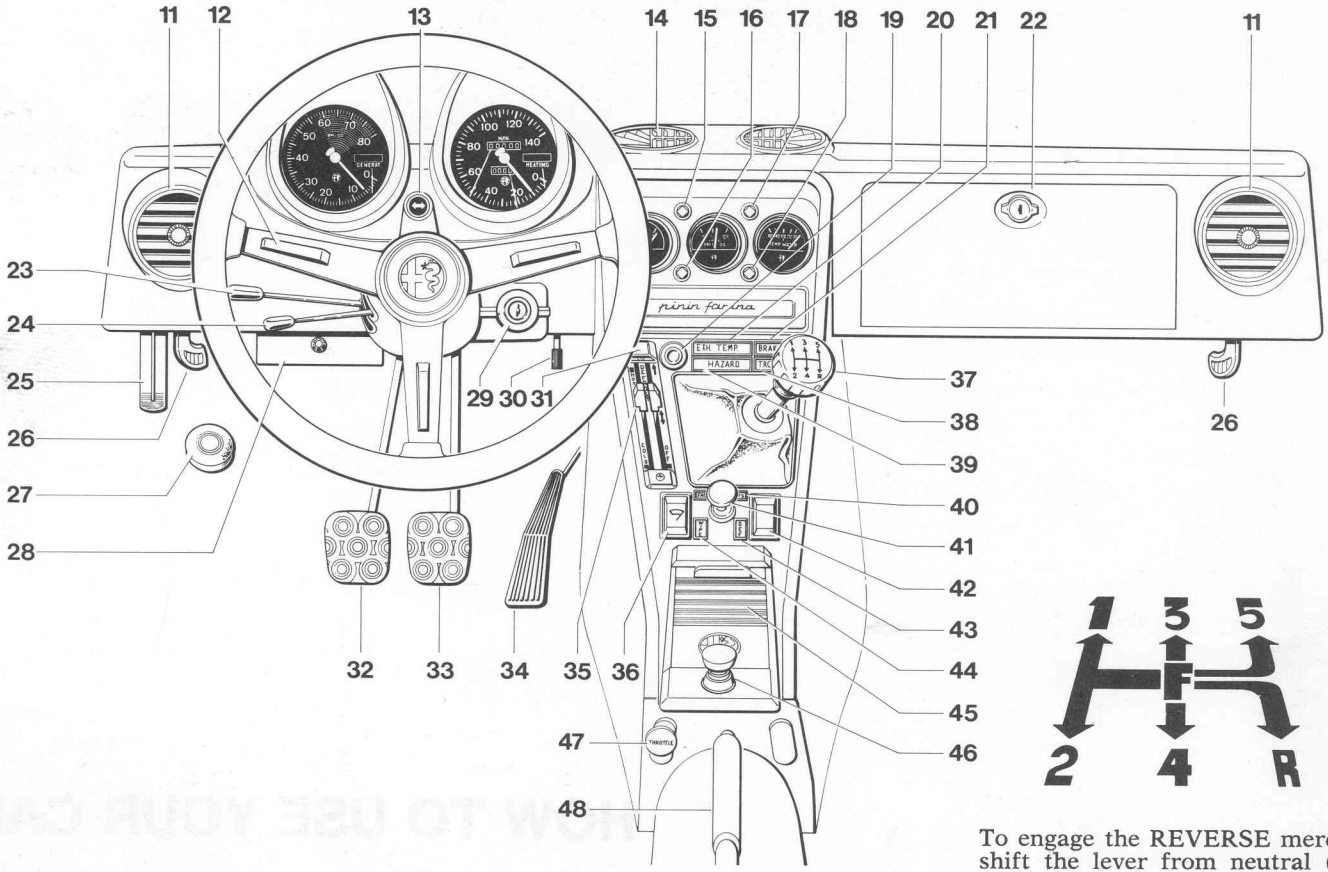
- **First:** Talk it over with the general manager or owner of the dealership. Chances are the problem will be resolved right away.
- **Second:** if your dealer can't solve the problem phone the Alfa Romeo divisional office nearest you and ask for the Service Representative calling on your dealer. He'll work with you and the dealer together... in person, if necessary.
- **Third:** If for some reason there still has been no solution, contact Owner Relations at either Alfa Romeo divisional office.

EASTERN DIVISION
Alfa Romeo, Inc.
250 Sylvan Avenue
Englewood Cliffs
New Jersey 07632
(201) 871-1234

WESTERN DIVISION
Alfa Romeo, Inc.
215 Douglas Street South
El Segundo
California 90245
(213) 772-4414

HOW TO USE YOUR CAR

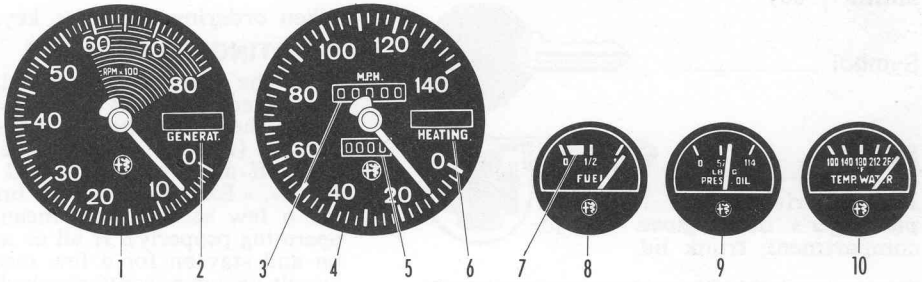
CONTROLS AND INSTRUMENTS



To engage the REVERSE merely shift the lever from neutral (F) as shown.

CONTROLS

11 Ventilating air outlet
12 Horn
13 Direction indicator warning light
14 Windshield demisting outlet
15 Low fuel pressure warning light
16 Parking light warning
17 Low oil pressure warning light
18 Headlamp high beam warning light
19 Hazard flasher push button switch with built in warning light
20 Catalyst overtemperature warning light « Exh. Temp. »
21 Warning light for minimum brake fluid level and parking brake
22 Glove compartment (with interior lighting that comes on when lid is opened)
23 Headlamp, dimmer & flashing switch
24 Direction indicator switch
25 Hood release
26 Side outlet lever
27 Windshield washer: when the control is pressed the windshield wiper also comes into action
28 Fusebox (at its left there is an additional fuse holder with a fuse for the fuel pump and a spare fuse)
29 Ignition switch antitheft & buzzer
30 Tripmeter reset knob (push knob up and turn clockwise to reset)
31 Heater control panel light (operates when parking lights are on)
32 Clutch
33 Brake
34 Accelerator



35 Heating, ventilating and demisting (control panel lit when parking lights are on)
36 Windshield wiper switch (two-speed)
37 Gearshift lever
38 Throttle warning light
39 « Hazard » light (operates when parking lights are on)
40 « Fasten seat belts » light
41 Dimmer for HAZARD - WIPE - DEF lights and heater control panel light
42 Blower switch (two-speed)
43 « Def » light (operates when parking lights are on)
44 « Wipe » light (operates when parking lights are on)
45 Ash tray (removable)
46 Cigarette lighter
47 Hand throttle
48 Hand brake (for emergency and parking)

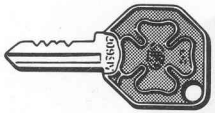
INSTRUMENTS

1 Tachometer
2 Alternator warning light
3 Odometer
4 Speedometer
5 Tripmeter
6 Heater blower warning light (glows brighter when blower operates on high speed)
7 Fuel reserve warning light
8 Fuel level indicator
9 Oil pressure gage
10 Coolant temperature indicator

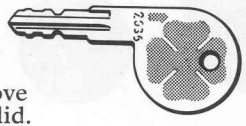
KEYS

Ignition and antitheft key

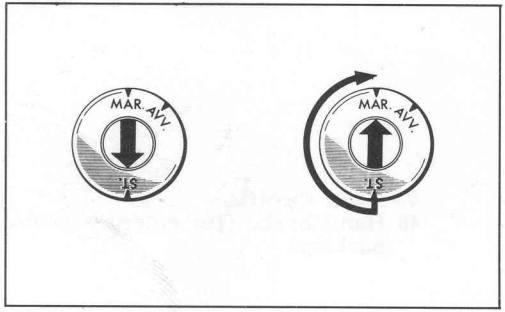
Symbol _____

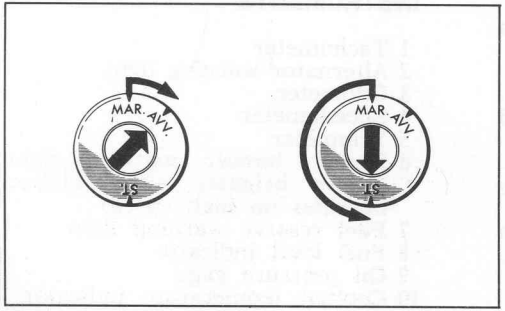


Symbol _____



Key to driver's and passenger's door, glove compartment, trunk lid.





Keep a record of the symbol stamped on the key handle. Write it here, and also on the back of your owner service card.

When ordering duplicate keys, **please quote the symbol.**

STARTING THE ENGINE

Place the gearlever in neutral. Fasten the seat belts. Failure to fasten the driver's seat belt will activate the reminder buzzer.

Insert the key in the ignition switch and turn it clockwise to the MAR. position (ignition « on ») make sure the low fuel pressure warning light goes off after having flashed on. Also make sure that « Fasten Seat Belts », « Exh. Temp. » and brake warning lights come on and stay lit for a few second (this means that the above indicating devices are operating properly). If all or any of the warning lights should not come on and stay on for a few seconds have the lights and or the relevant circuit or components checked immediately.

Wait a few moments and then turn the ignition key further clockwise to AVV. to operate the starter. As soon as the engine fires release the key. If the engine fails to start, the key must be returned to STOP and the operation repeated.

WARNING

On turning the ignition key to « MAR. » position, should the « Exh. Temp. » catalyst overtemperature warning light either fail to come on for a few seconds or stay lit permanently, have the circuit of « Exh. Temp. » warning light checked at once.

If the fuel pressure warning light does not flash on, this is an indication of failure of the indicating device or fuel feed system or coming into operation of the inertia switch (refer to page 11).

STOPPING THE ENGINE

Return the key counterclockwise to STOP. In such a position the ignition is « off ». The key can be withdrawn only in STOP position.

When the key is withdrawn it is no longer possible to rotate the steering wheel.

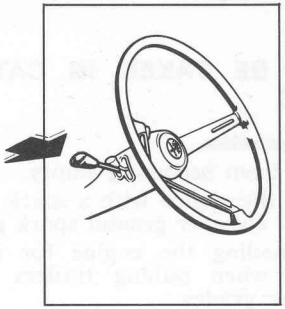
Never withdraw the key before the car has come to a complete stop as the « steering lock » condition may occur.

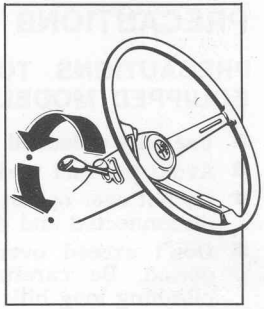
ANTITHEFT - STEERING LOCK

By withdrawing the key (when in STOP position and steering wheel spokes balanced for straight ahead direction), the steering is locked; to release the lock easier slightly rotate the wheel in both directions, after having inserted the key.

LIGHTING

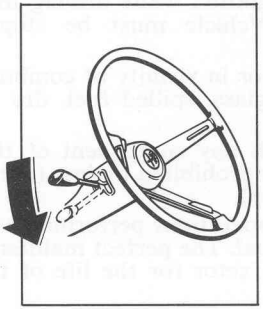
Flashing
Press in the knob irrespective of the position of the switch.
Parking lights and license plate light
Irrespective of the position of the lever, turn the knob to the first notch. The instrument lights, the green warning light on the instrument panel, the HAZARD, WIPE, DEF lights and the heater control panel light (light brilliance is controlled by dimmer on console) will come on. Flashing is still possible by pressing the knob.

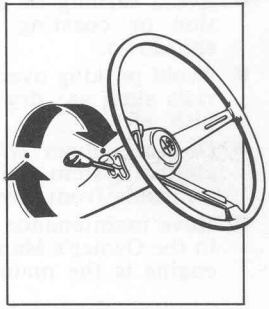




HEADLAMP HIGH/LOW BEAMS

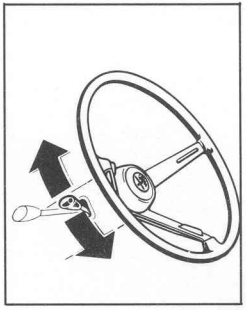
Turn the knob forward to the second notch.
If the lever is up, the low beams come on (no flashing).
If on the other hand, it is down, the high beams and the blue warning light come on (flashing possible).
The movement of the lever up and down allows the light to be dimmed or returned to high beam.
The lights are extinguished by turning the knob back over the notches.





DIRECTION INDICATORS

Direction indicators are controlled by the lever shown.
Move the lever:
— up, to signal a right turn;
— down, to signal a left turn.
The warning light between speedometer and tachometer will flash on-and-off.



PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN CATALYTIC EQUIPPED MODELS

- **Use only unleaded gasoline.**
- Avoid the fuel tank from becoming empty.
- Do not ever operate the engine with a spark plug lead disconnected and do not ever ground spark plugs.
- Don't exceed overloading the engine for prolonged period. Be careful when pulling trailers or when climbing long hills or grades.
- Avoid turning off ignition while driving in any condition or coasting. Vehicle must be stopped before shutdown.
- Avoid parking over or in vicinity of combustible materials such as: dry glass, spilled fuel, dry leaves, rubbish, etc.
- Do not tamper with any component of the emission control system. It is prohibited by law (see WARNING on inside front cover).
- Have maintenance operations performed as prescribed in the Owner's Manual. The perfect maintenance of the engine is the main factor for the life of the catalyst.

BREAKING IN

To allow the various parts of the car, **particularly the engine, transmission** and **differential,** to settle in gradually, a breaking in period is necessary, during which maximum performance must not be demanded of the car.

RECOMMENDATIONS FOR THE FIRST 1000 MILES

Maximum engine speed during breaking in period	
Mileage reading	r.p.m.
Up to **300**	**3500**
from **301** to **1000**	**4500**

Cold starting:
- before using the vehicle, run the engine for a few minutes at low revs.

While driving:
- do not drive at max. recommended speeds for long periods;
- never fully depress the accelerator pedal;
- now and then release the accelerator pedal;
- avoid full and extended braking during the first 600 miles.

Note: The same recommendations apply also in the case of engine reconditioning involving replacement of cylinder barrels, pistons, piston rings and bearings.

1,000 MILE FREE SERVICE COUPON

Have the lubrication and maintenance operations of 1000 mile free service coupon in the routine maintenance book carried out by an Alfa Romeo Dealer.

STARTING ENGINE FROM COLD

When starting from cold in winter, it is necessary to press the clutch pedal down fully.

Automatic devices, besides doing away with the conventional choke, facilitate the initial running of engine after a cold start, allow a faster warming up of the engine and improve driveability.

As an aid in starting from cold, depress the accelerator pedal partially (about ½ inch.). After a cold start, and especially when the outside temperature is below freezing, let the engine run for 2 to 3 minutes at fast idle of between 2000 & 2500 rpm. Use the hand throttle if required. This helps warm the engine and permits the oil to reach critical points.

STARTING ENGINE WHEN HOT

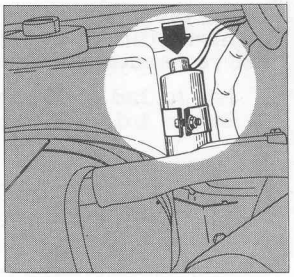
When the engine is already hot or with very high ambient temperatures (above 77 °F) slowly depress the accelerator pedal to facilitate starting.

ENGINE DOES NOT START

If the engine fails to start, look for the cause as follows:

- the battery charge may be too weak to rotate the starter sufficiently fast to start the engine;
- the ignition equipment may be defective (dirty plugs, oxidized contact-breaker points, wet or cracked distributor cap, damaged distributor or coil);
- the solenoid-actuated cold start device may fail to operate;
- electric circuits may be broken or fuses blown.

PRIOR TO GET AWAY



Check the fuel pressure warning light (15). If the light remains on this may be attributable to the inertia switch that, in the event the car comes into collision, cuts off feed to electric fuel pump. The warning light should therefore be tested by pushing the inertia switch reset button. If warning light still remains lit, contact an Alfa Romeo Dealer.

Check brake warning light 21 for proper operation.

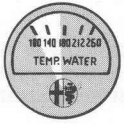
With engine running and ignition on this light should:

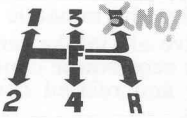
- Stay on for a few seconds after starting.
- Stay lit until handbrake is engaged.
- Go off when brake is disengaged. If the warning light still remains on after having released the handbrake stop the car and have the level of fluid in brake fluid reservoir checked by an Alfa Romeo Dealer.

USE OF THE GEARBOX

Driving away when cold:

When driving away after having started from cold, it is recommended to shift from 1st to 2nd gear at 20 mph. This will improve driveability. Avoid the use of 5th gear when engine temperature is below 80 deg C (175 deg F).





Normal use:
The most efficient use of the engine will result by using these recommended shift points;

1st to 2nd at 15 mph	3rd to 4th at 40 mph
2nd to 3rd at 25 mph	4th to 5th at 50 mph

DRIVING PRECAUTIONS

Temperature of the catalyst

Excessive temperature in the catalyst bed during driving can cause damage to the pelletized catalyst thereby lowering their conversion efficiency as well as cause damage to the container and to the vehicle or possibly cause fire hazard.

Then when the « Exh. Temp. » warning lamp is flashing indicating abnormal catalyst temperature the driver **must reduce the engine load** by easing up the accelerator pedal. If after a certain period the lamp does not stop flashing or if it stays lit permanently, indicating a further increase of the temperature, there is evidence of need for possible engine maintenance. We recommend that the car be driven slowly to the nearest ALFA ROMEO Dealer for diagnosis of the cause of the overtemperature.
Engine malfunctions that can cause catalyst overtemperature are:

- Wrong spark timing or defective timing switching devices.
- Spark plug fouling of one or more cylinders.
- Defective fuel injection pump or injectors.
- Air filter elements very dirty.
- Defective thermostatic actuator.
- Defective air intake temperature control system.
- Engine accelerator control linkage out of setting.
- Engine and related devices not set to factory specifications.

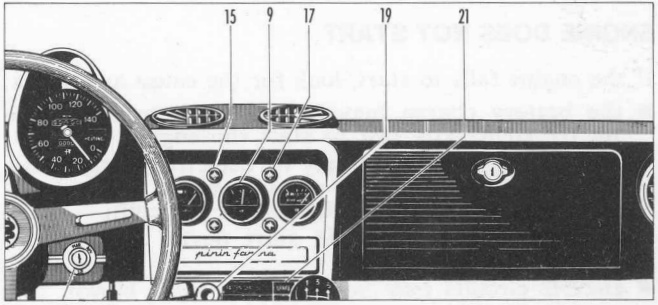
Driving methods that can cause catalyst overtemperature are:

- Use of wrong gears.
- Too low level in the fuel tank.
- Engine overloading for prolonged time e.g. when racing the engine, pulling trailers or climbing long hills or grades.
- Driving or coasting with the ignition turned off.

These raccomendations should also be followed:

- Take care **not to run the engine beyond the maximum** RPM range shown as a red area on tachometer dial.
- When shifting gears, take care to depress the clutch pedal fully; this will ensure smooth operation and save synchronizers from excessive wear.
  Do not rest your foot on clutch pedal when not actually using it.
- Do not drive at high speed until the oil in the engine, transmission and differential has warmed up properly.
- Check the oil pressure gage 9 from time to time and **stop the engine** if the pressure with a hot engine and at maximum revolutions should fall below limits shown.

Oil pressures with hot engine-psi	
Engine idling	minimum 7
Engine running fast	minimum 50 maximum 65-70



- **Check the low oil pressure warning light 17: if on it is an indication of a trouble in the lubricating system: in this case, stop the car and have the lubricating system checked by an authorized Dealer.**

However, it is possible for the warning light to come on when the car is cornering: this may be caused by a low level of oil in the pan which can be easily remedied by topping up.

No trouble exists if the warning light comes on while the engine is idling, specially when hot.

- Check that the low fuel pressure warning light 15 is off; when on, it means that either the inertia switch has cut off feed to the fuel pump or the feed system is developing troubles; therefore, have it checked by your Dealer.

Do not coast downhill with the engine stopped; there will be no suction in the brake boosters and a greater pressure will be needed with the brake pedal to obtain comparable braking effect.

WHILE PARKING

NEVER REMOVE THE RADIATOR CAP UNLESS ABSOLUTELY NECESSARY; IN ANY CASE, TO AVOID SEVERE INJURIES, WAIT THAT THE LIQUID IS COOLED DOWN TO OUTSIDE TEMPERATURE.

Never leave the key in the **MAR.** position (ignition « on ») to prevent battery discharge and coil damage. Apply the hand brake and, when parking the car uphill or downhill, shift into a low gear and steer the front wheels in such a direction as to cause the car, should the parking brake disengage accidentally, to move toward the curb.

When opening driver's door, a suitable buzzer will alert you, if the key has been left in the ignition switch.

Caution: the antipollution system of your Alfa Romeo causes high exhaust system temperatures.

Driving or parking the car over flammable materials such as dry leaves or grass may cause them to burn.

WARNING

Switch on the road hazard lights when required.
To operate the hazard flashers, push the switch (19, page 12) mounted on the console near the heater control panel.

IMPORTANT

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.

TIRE CHAINS

The tire chains are to be fitted to the drive wheels.

FOR VERY LOW AMBIENT TEMPERATURES

The **Alfa Romeo Antifreeze** gives full protection against freezing down to — 20 °C (— 4 °F).

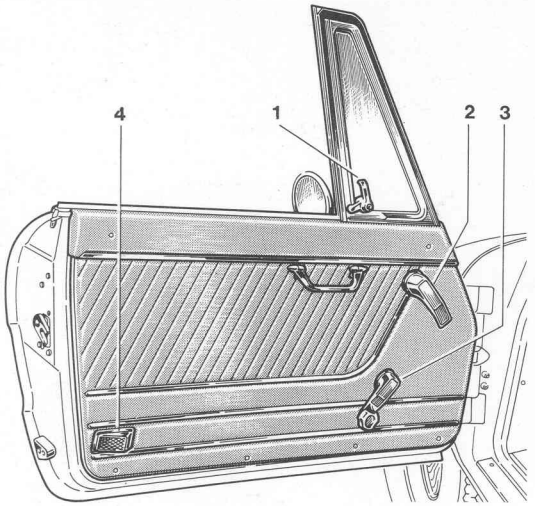
In places where the temperature falls below — 20 °C, the antifreeze mixture can be made stronger by varying its concentration.

To this end, a certain amount of mixture should be drained off the circuit and replaced with the same quantity of Alfa Romeo concentrated Antifreeze drawn from suitable containers available by Alfa Romeo Dealers.

It is recommended that this operation should be entrusted to an authorized Dealer.

For protection to		Drain off and replace		
°F	°C	Radiator	Reservoir	Total
−16	−26	800 cc.	200 cc.	1,000 cc.
−30	−35	1,600 cc.	400 cc.	2,000 cc.
−48	−44	2,400 cc.	600 cc.	3,000 cc.

INTERIOR



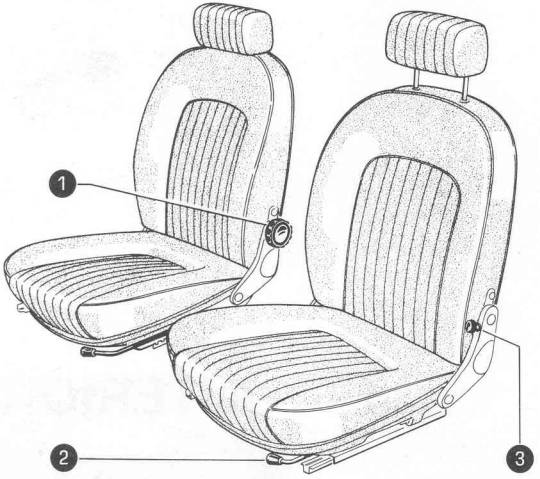
DOORS

1 Vent window control (with a safety catch).

2 Lever to open and lock the doors (pull the lever backward to open) Both doors can be locked from the outside with the key.
When doors are shut, pushing the lever forward will lock the doors. When so locked the doors cannot be opened from the outside unless the key is used.

3 Window regulator handle.

4 Reflector for signalling opening of the door.
On the passenger's door there is a hand grip.

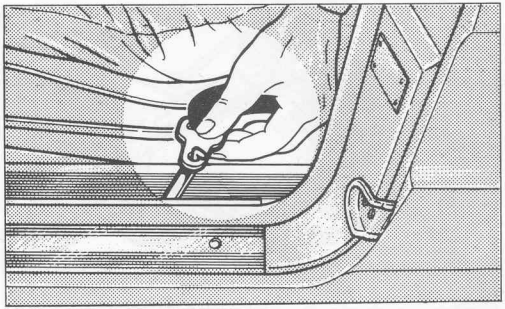


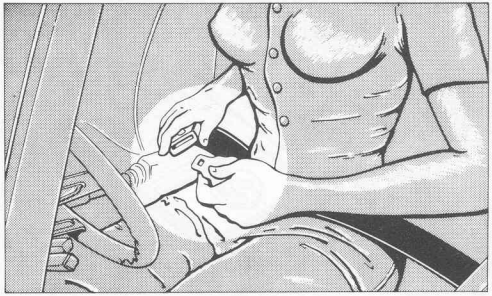
SEATS

- The handwheels **1** at the inboard sides of the seats control the angle of the backrests. Pushing down the levers **3** at the outboard sides of the seats will unlock the backrests for tipping forward.
- The positioning of the seats is controlled by the lever **2** on the front edge of each seat: by freeing the lever the seat may be moved to the position desired.
- The bucket seats are provided with vertically-adjustable head restraints.

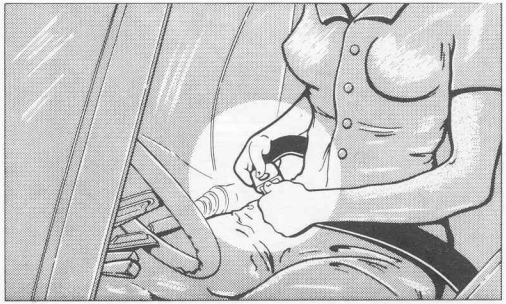
SAFETY BELTS

The car is fitted with safety belts of lap type. The belts are provided with automatic retractors.
Fasten seat belts before getting away.
Note. When belt is retracted in its storage position the belt tongue is at its storage hook on the outboard side of seat. Pull out the belt until it is extended sufficiently to connect the belt tongue to the buckle on tunnel. If the retractor locks while the belt is being pulled out return the belt fully and then repeat the operation.

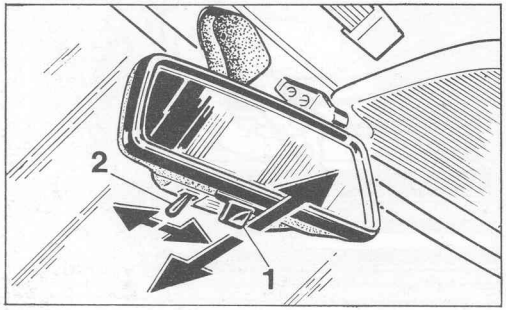


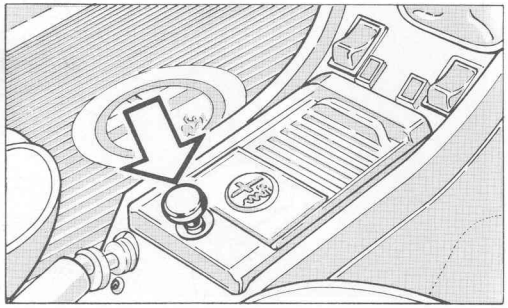


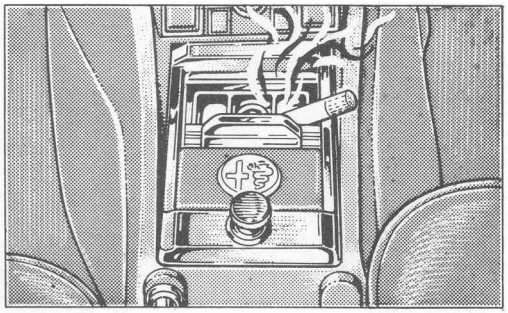
Warning: if the driver fails to wear his seat belt, as the ignition key is turned to « MAR » position the «Fasten Seat Belts » warning light and a buzzer will be activated for a few moments.
Furthermore, even if the driver has properly fastened the seat belt, the « Fasten Seat Belts » light will remain lit for a few seconds.



To unfasten the belts push the button on buckle taking care not to let the belt twist while being rewound on its reel. Attach the belt tongue to its storage hook.







REARVIEW MIRROR / INTERIOR LIGHTING

- The rearview mirror, which disengages automatically in the event of a crash, has a day/night antiglare device operated by the lever 1 shown at the illustration.
- Internal lighting is provided by a lamp in the rearview mirror; the switch 2 has two positions: light always on and courtesy light automatically operated when opening doors.

CIGARETTE LIGHTER

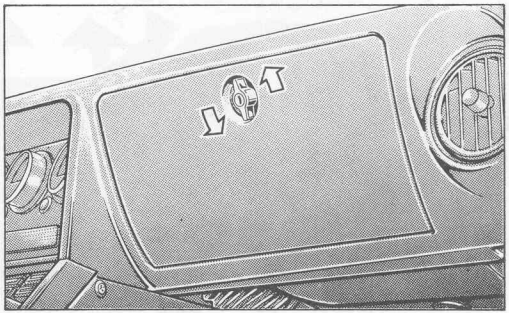
To operate press the black plastic knob fully in; when ready for use the lighter will automatically eject itself partially. A lamp at the lighter will glow when parking lights are on.

ASH TRAY

It is at the center of console.
Slide the cover backward. For emptying withdraw the inner tray. When parking lights are lit, a light comes on as an aid in locating the tray.

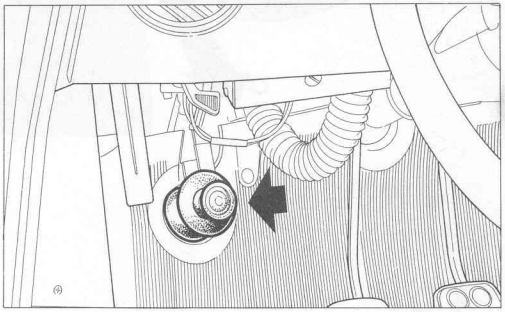
GLOVE BOX

To open the glove box door rotate the lock handwheel counterclockwise; the lock uses the same key as the door.
Lighting is provided by a bulb which is automatically switched off when closing the glove box door.



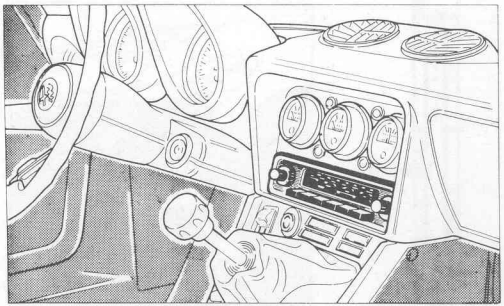
WINDSHIELD WASHER PUMP

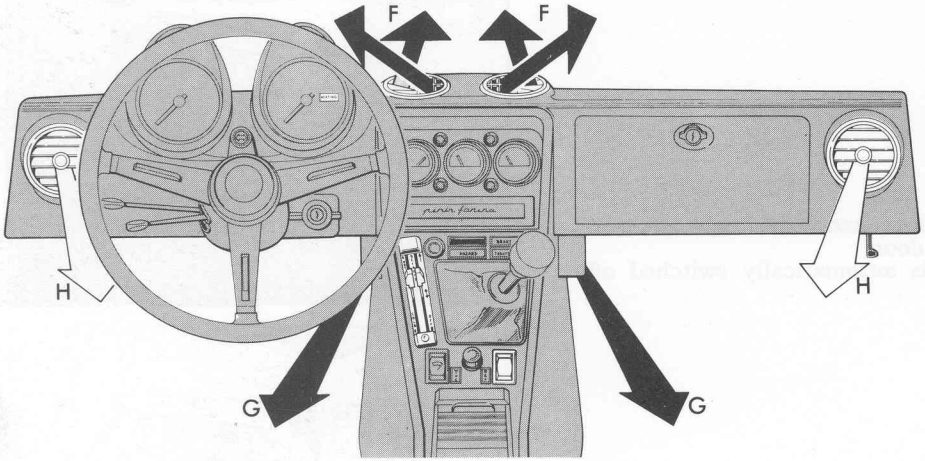
To operate the washer pump depress the pedal actuated device shown at the illustration; by depressing and at once releasing the pedal, the wiper blades will operate automatically thru a complete cycle wiping the windshield clean with the liquid sprayed. If pedal is kept depressed the wipers operate continuously.



RADIO

Refer to page 81 for instructions on the proper use of the AM/FM stereo radio & cassette player, if so equipped.
The installation procedure is however outlined herewith for fitting the radio to unequipped cars.
Provision is made in the instrument panel for the installation of the radio. To install it, remove the ornament from the instrument panel.





VENTILATION-DEMISTING AND HEATING

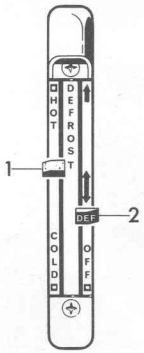
Air enters through:

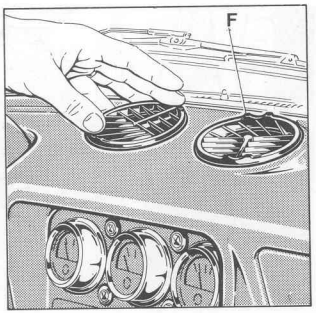
- **F** for windshield demisting (warm and fresh air)
- **G** for ventilation and heating
- **H** for ventilation

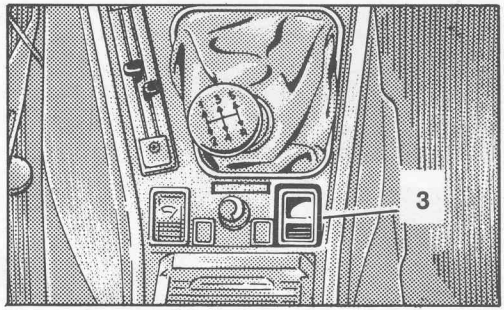
CONTROLS

- The air admitted to the car can be gradually heated by the movement of the lever **1** (operate this lever only when engine is warmed up).
- The movement of the lever **2** gradually regulates the flow of air through the openings **F** and **G.** Specifically:

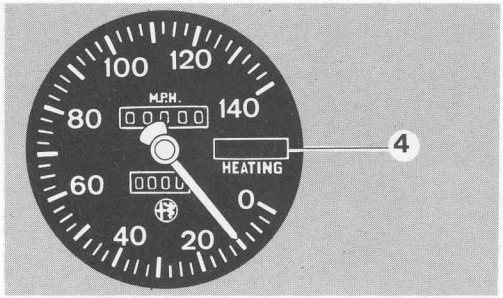
With the lever all the way down (OFF) the flow to vents **F** and **G** is cut off; moving the lever upward part of the air will be directed to vent **F** and part to vent **G**; with the lever all the way up all the air will flow out of vent **F** for maximum demisting of windshield (or both windshield and side windows according to the direction of grilles of vents **F**).



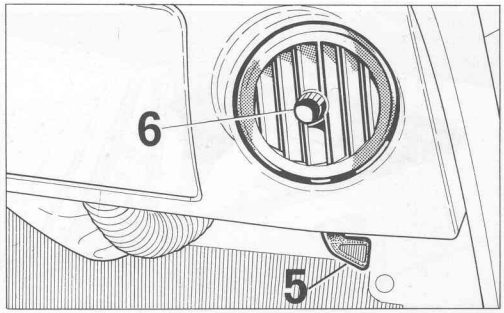




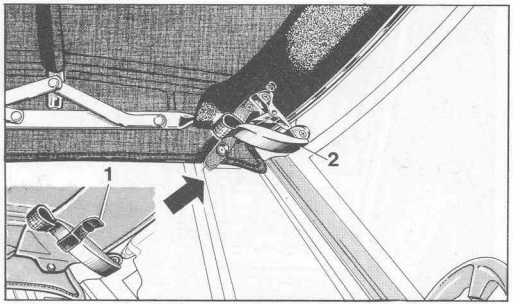
■ In order to produce a satisfactory flow of air into the car at low speeds, switch on the electric blower by means of switch **3.** Warning light **4** indicates that this has been done.



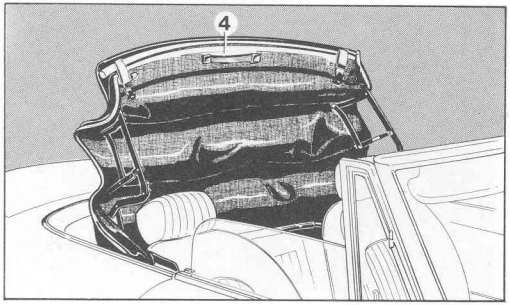
■ To open the outlets **H** push the lever **5** toward the inside of car. The flow of air can then be directed as desired by rotating the knob **6.**



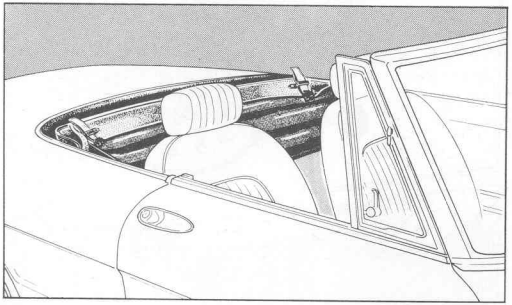
FOLDING THE TOP



Lower the side windows and sun visors. Slacken the straps **1** and release the toggle clamps **2** securing the top to the windshield bow.

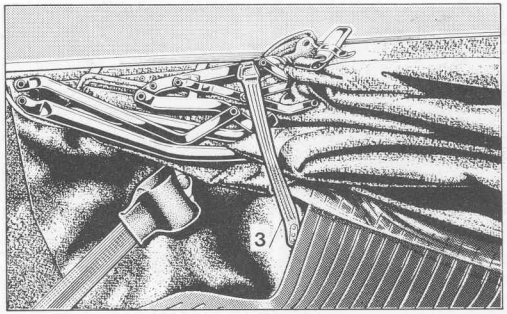


Slacken the two rubber belts **3** and, with handle **4**, push the top frame backward. As the top is lowered make sure that the window folds evenly by guiding it with your hand.

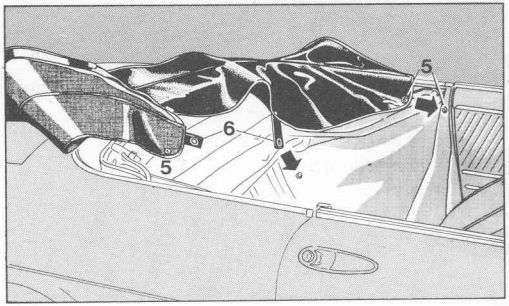


In order to prevent chafing of the top while in the down position the corners of the last fold should be tucked in.
Lock the toggle clamps in place with the straps **1.**

Attach the hooks of the rubber straps **3** to the frame of the top as shown to prevent excessive movement.

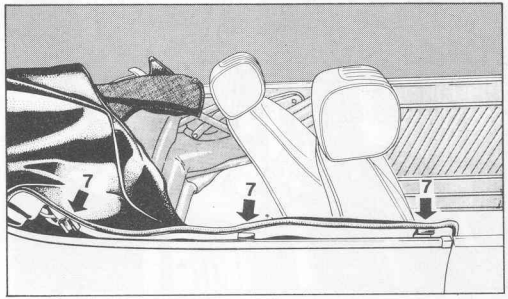


Spread the top cover on to the top and secure the cover with the fasteners **5** and the belts **6.**



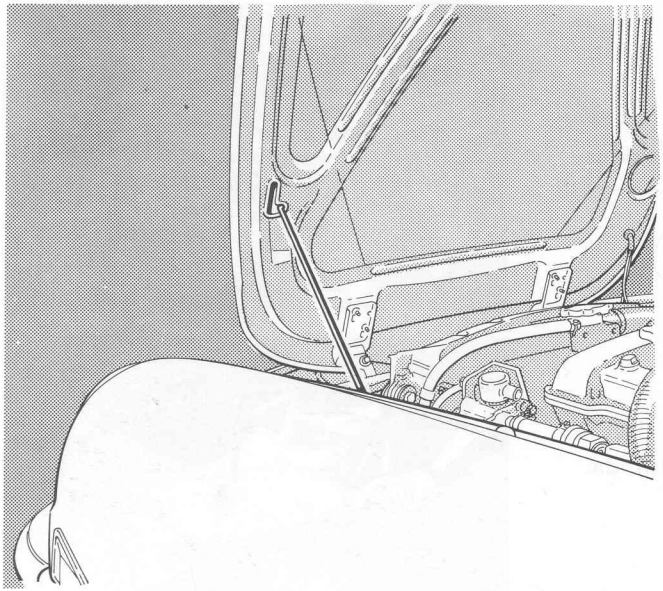
Finally, insert the plastic clips **7** into the chrome moulding.

Note: to raise the top reverse the folding procedure.



HARD TOP

Provision is already made for the installation of a hard top. It is a Dealer installed option.

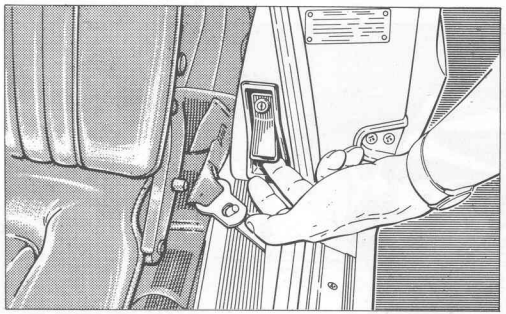


ENGINE HOOD

The hood opens opposite travel direction; to release the catch, pull the lever under the instrument panel.

The hood is held in open position by the rod.
Illumination of the engine compartment is by a light under the hood. It operates automatically when the hood is raised and the parking lights are on.

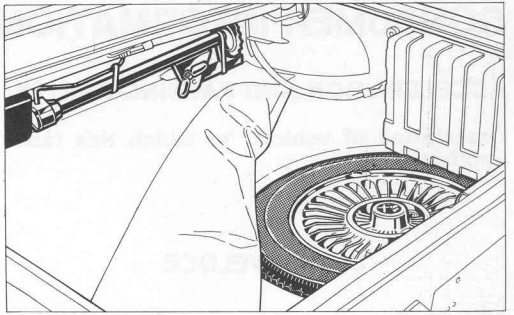
Prior to close the hood withdraw the support rod from lug and secure it to the plastic retainer on wheelhouse.

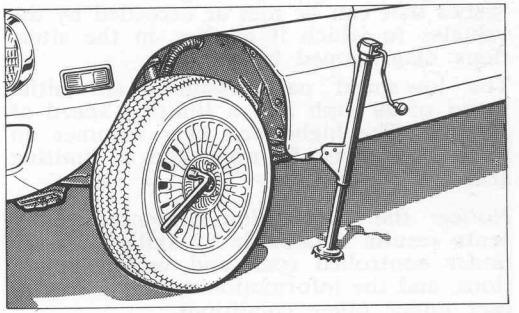


TRUNK LID

To open, lift the lever situated on the door jamb on the driver's side. The lock uses the same key as the doors.
Lighting of the trunk is provided by a suitable lamp. It operates automatically when the lid is raised and the parking lights are on.
Caution - When closing the trunk lid, to avoid deforming the lid panel, apply pressure with both hands to the rear lid edge only, never to the center of lid panel.

In the trunk there are the jack secured with a wingnut, the battery at the right behind the protection shield and the spare tire and the tool kit under the carpeting.





WHEEL CHANGE CAUTION

before operating the jack apply the parking brake and chock the wheels.

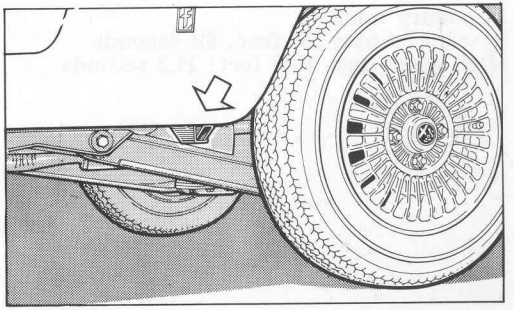
If necessary, switch on the road hazard lights.

Wheel removal

- Slacken wheel nuts by one turn with the wheel wrench.
- Turn the nuts counterclockwise to unscrew.
- Remove jack from trunk.
- Raise the car by inserting the jack arm in the special socket in the body rocker panel.
- Fully unscrew the nuts and remove the wheel.

Reinstallation

- Tighten the nuts carefully in diagonal order.
- Check again tightness of nuts after lowering the jack. Turn the nuts clockwise to tighten.
- Release the parking brake.
- As soon as possible, check that the inflation pressure is as specified (refer to inside backcover).



CONSUMER INFORMATION

ACCELERATION AND PASSING ABILITY

Description of vehicle to which this table applies:

SPIDER VELOCE

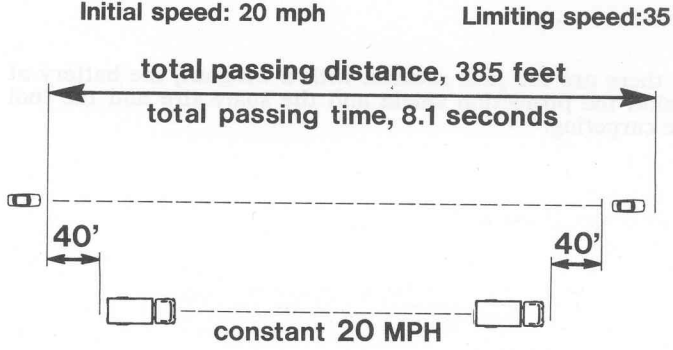
This figure indicates passing times and distances that can be met or exceeded by the vehicles to which it applies, in the situations diagrammed below.

The low-speed pass assumes an initial speed of **20** mph and a limiting speed of **35** mph. The high-speed pass assumes an initial speed of **50** mph and a limiting speed of **80** mph.

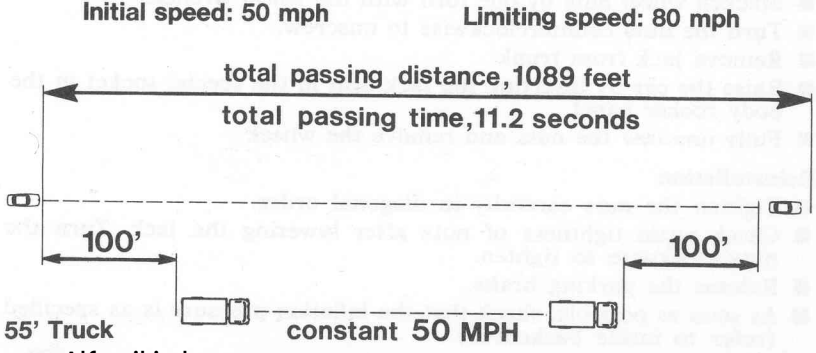
Notice: the information presented represents results obtainable by skilled drivers under controlled road and vehicle conditions, and the information may not be correct under other conditions.

Summary table:
Low speed pass **385** feet; **8,1** seconds
High-speed pass **1089** feet; **11,2** seconds

LOW SPEED



HIGH SPEED



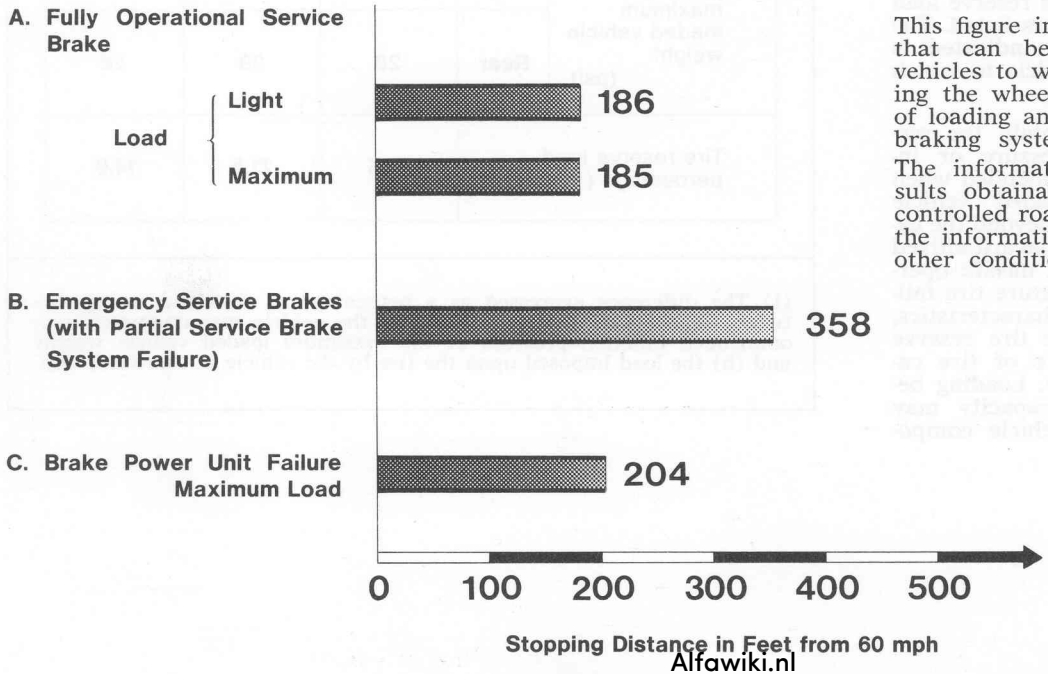
VEHICLE STOPPING DISTANCE

Description of vehicle to which this table applies:

SPIDER VELOCE

This figure indicates braking performance that can be met or exceeded by the vehicles to which it applies, without locking the wheels, under different conditions of loading and with partial failures of the braking system.

The information presented represents results obtainable by skilled drivers under controlled road and vehicle conditions, and the information may not be correct under other conditions.



TIRE RESERVE LOAD

Description of vehicle to which this table applies:

SPIDER VELOCE

This tables lists the Tire Size Designations recommended by the manufacturer for use on the vehicles to which it applies, with the recommended inflation pressure for maximum loading and the tire reserve load percentage for each of the tires listed. The tire reserve load percentage indicated is met or exceeded by each vehicle to which the table applies.

WARNING - Failure to maintain the recommended tire inflation pressure or increase tire pressure as recommended when operating at maximum loaded vehicle weight, or loading the vehicle beyond the capacities specified on the tire placard affixed to the vehicle, may result in unsafe operating conditions due to premature tire failure, unfavorable handling characteristics, and excessive tire wear. The tire reserve load percentage is a measure of tire capacity not of vehicle capacity. Loading beyond the specified vehicle capacity may result in failure of other vehicle components.

		165 HR 14		
Recommended tire size designations		Ceat Continental Firestone Good-year Pirelli	Kleber	Michelin
Recommended cold inflation pressure for maximum loaded vehicle weight (psi)	**Front**	24	24	21
	Rear	26	29	26
Tire reserve load percentage (1)		21,5	21,5	14,8

(1) The difference expressed as a percentage of tire load rating, between (a) the load rating of a tire at the vehicle manufacturer's recommended inflation pressure at the maximum loaded vehicle weight and (b) the load imposed upon the tire by the vehicle at that condition.

LUBRICATION AND MAINTENANCE

ROUTINE SERVICING

DURING EACH REFUELLING: check engine oil level

AT THE FIRST 1,000 MILES: have the free servicing of 1,000 miles free coupon carried out by an Alfa Romeo Dealer.

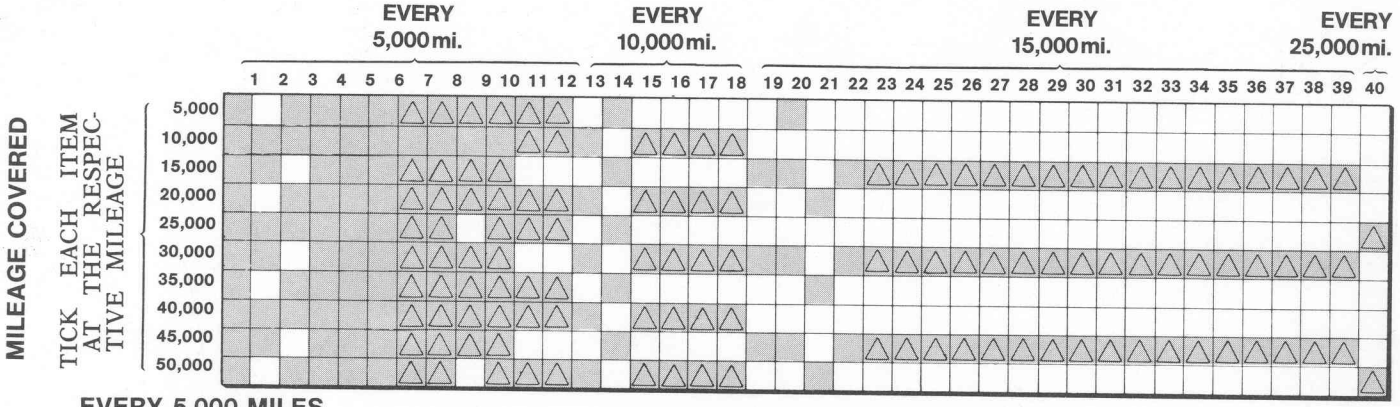
AFTER 5,000 MILES: HAVE THE SCHEDULED SERVICING CARRIED OUT; FURTHERMORE:

— check engine bolts for tightness

— check doors for proper closure and adjust, if necessary.

EMCON MAINTENANCE

ITEMS NOT RELATED TO EMCON MAINTENANCE



EVERY 5,000 MILES

1 Check level of clutch fluid and top up, if necessary
2 Check level of gearbox and differential oil and top up if necessary
3 Check level of brake fluid and top up, if necessary
4 Check tire pressures
5 Check battery electrolyte level and top up with distilled water, if necessary (more frequently in summer months); clean terminals and grease, if necessary
6 Check brake pads and hydraulic system components; change as necessary
7 Change engine oil filter (or every six months whichever occurs first)
8 Change engine oil (or every 6 months whichever comes first)
9 Check engine coolant level and top up, if necessary
10 Adjust timing chain tension
11 Clean air pump filter
12 Clean air cleaner elements

EVERY 10,000 MILES

13 Grease drive shaft slip yoke
14 Check level of steering box oil and top up, if necessary

15 Change tank fuel filter and main fuel filter element
16 Check hoses, connections, seals, thermostat of engine cooling system and heater;
17 Check brake booster vacuum hose and check-valve;
18 Change injection pump oil filter

EVERY 15,000 MILES

19 Clean, check and lubricate accelerator cable
20 Change brake fluid (or every 12 months whichever occurs first)
21 Change gearbox and differential oil
22 Test vehicle

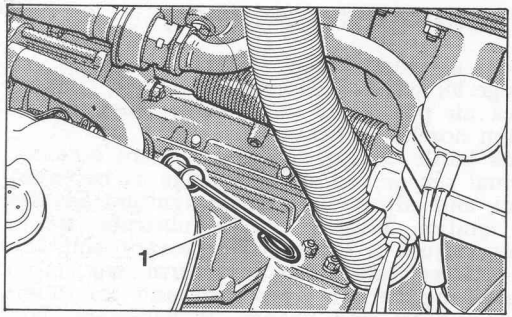
23 Check alternator drive belt tension and adjust as necessary-change belt, if necessary
24 Check cylinder head nuts for tightness
25 Check valve clearance and adjust, if necessary
26 Change spark plugs
27 Clean and check crankcase ventilation system components; change as necessary
28 Clean and check fuel evaporative system components; change as necessary
29 Check fuel tank, filler cap and gasket, lines and connections; change as necessary
30 Clean throttle throats and adjust control linkage

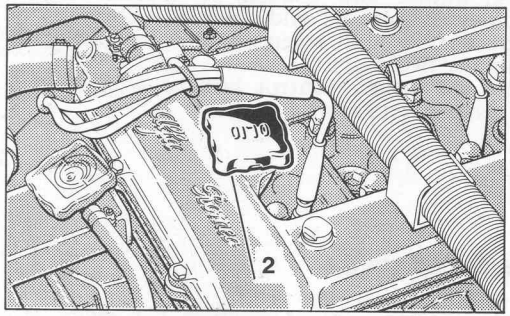
EVERY 15,000 MILES (CONTINUED)

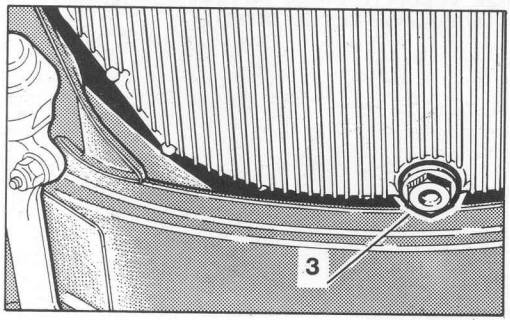
31 Change air pump filter
32 Change air cleaner elements
33 Check air pump and check-valve; clean air injection nozzles, if necessary
34 Check baffle control linkage, vacuum actuator, thermal sensor; adjust or change as necessary
35 Check and adjust dwell angle, ignition advance and ignition advance curve; lubricate cam
36 Check, adjust or change, if necessary, coil, contact-breaker, condenser, rotor arm, cap, spark plug wiring, rubber protections and connectors
37 Check, adjust and change, if necessary, cold start device solenoid and thermostatic actuator
38 Check fuel cut-off solenoid and microswitch; change as necessary
39 Check and adjust control linkage stop screws, idle exhaust emissions

EVERY 25,000 MILES

40 Change engine coolant mixture (or every two years whichever occurs first)







CHECK ENGINE OIL LEVEL

When checking (with car on a level surface and the engine stopped) push the dipstick 1 all the way down. Never allow the oil to fall below the minimum or, while topping up, to exceed the maximum level.

IMPORTANT NOTE

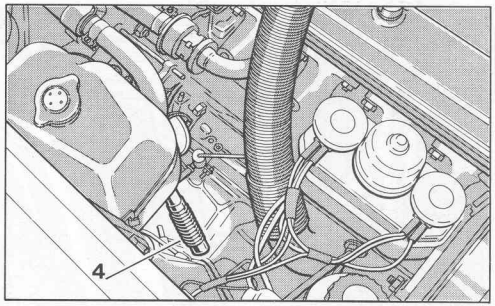
The lubricants used for the first filling, shown by the plate in the engine compartment (see page 79) and the table « Lubricants » on inside back cover, are factory tested for meeting completely the operation requirements.
These lubricants can be used both for topping up and changing. **When topping up,** it is recommended to use exclusively the same type of oil as already filled in the engine or the main unit.

CHANGE ENGINE OIL

With the engine warmed up and stopped remove drain plug 3 from oil pan and drain off old oil; refit drain plug and tighten it to the specified torque.
Replace the oil filter (4, page 33) whenever engine oil is changed.
Replenish with new oil, of quantity and type as specified, thru the filler port 2.

CHANGE ENGINE OIL FILTER

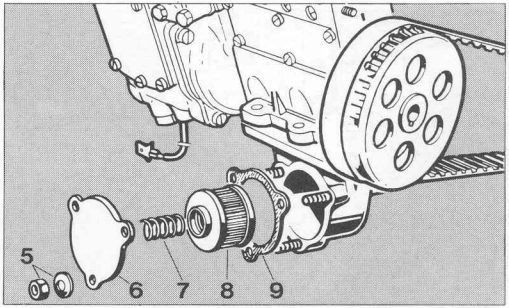
To remove the filter slacken it with the suitable wrench 4 then unscrew the filter by hand. To facilitate this, remove the hot air snorkel tube.
On refitting, smear the gasket with oil then screw in the oil filter and lock hand tight or to the specified torque with a wrench.
After having replenished the engine pan with oil, start the engine, run it at idle to fill the filter housing and check for no oil leaks. Refit the hot air snorkel tube.



CHANGE INJECTION PUMP OIL FILTER

At the prescribed intervals (or in the event the engine oil has to be renewed due to contamination by water or other foreign substances) change the oil filter, located in the injection pump support, by proceeding as follows:

- clean very carefully the filter housing cover 6 and the surrounding areas with gasoline;
- unscrew the three nuts 5 and remove the cover 6, the spring 7 and the filter 8;
- clean thoroughly the filter housing and insert the new filter and the spring in such a way that the spring faces the cover, renew the cover gasket 9 if necessary.
  Slightly tighten the two upper cover retaining nuts and lock securely the nut at the bottom. Run engine at idle for a few minutes until the oil just oozes out; then lock the upper nuts fully.

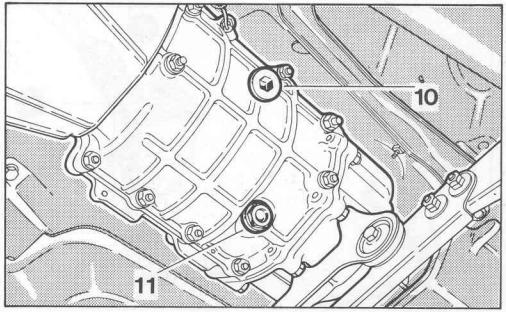


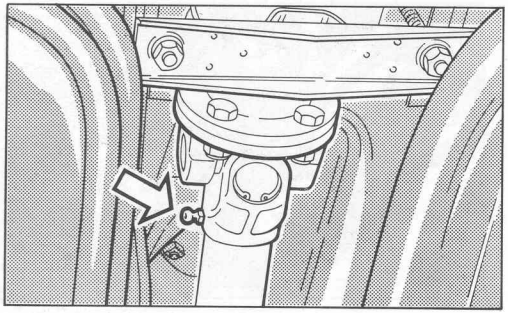
CHECK LEVEL OF GEARBOX OIL

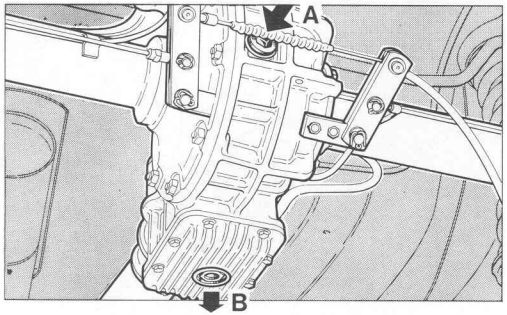
Remove filler plug 10; oil level should be at the edge of filler orifice. Replenish as necessary with oil of the specified type. Clean and refit filler plug 10.

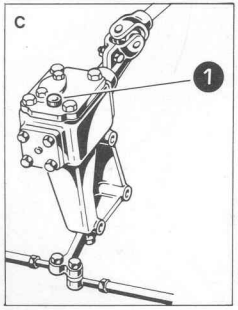
CHANGE GEARBOX OIL

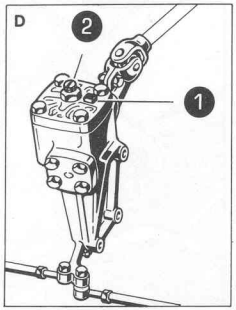
Drain off old oil by removing filler plug 10 first, then drain plug 11. Clean and refit drain plug 11.
Replenish with new oil, of quantity and type as specified, thru the filler port. Check that oil level is at the edge of filler orifice; clean and fit filler plug 10.











GREASE DRIVE SHAFT SLIP YOKE

The drive shaft is in two sections and has an intermediate flexible support attached to the body.
The front section is provided with a rubber coupling at the trasmission end; a universal joint is provided at each end of the rear section.
Grease the slip yoke at the scheduled intervals.

CHECKING AND CHANGING DIFFERENTIAL OIL

To check differential oil level at the prescribed intervals, remove filler plug A; oil level should be at the edge of filler orifice.
To change oil proceed as follows (with hot engine):
— Drain off old oil by removing drain plug B and filler plug A;
— Clean drain plug B and refit it;
— Replenish with oil of the prescribed type (refer to inside backcover) through filler plug A. Check that oil level is at the edge of filler orifice; clean filler plug and fit it.
Check that **limited-slip differential** is full of oil to the edge of the filler hole.

STEERING GEAR AND LINKAGE

This model is produced alternatively with steering of the worm and roller or recirculating ball type.

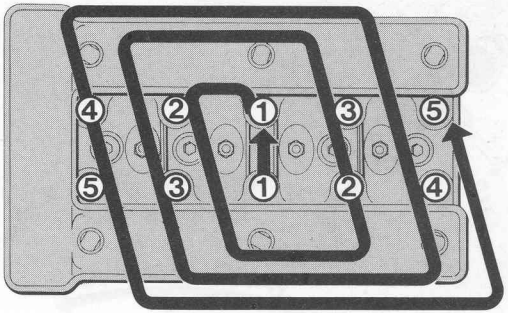
C - Recirculating ball steering.
At the prescribed intervals check:
- the oil level in the steering box (by removing the plus 1 shown in the figure);
- the steering linkage joints for play.

The steering of the recirculating ball type does not require any regular adjustment.

D - Worm-and-roller steering.
At the prescribed intervals check:
- the oil level in the steering box (by removing the plug 1 shown in the figure);
- the steering linkage joints for play;
- the worm and roller for play (adjust with screw 2, if necessary).

The ball and socket joints of the rods **do not require any lubrication.**

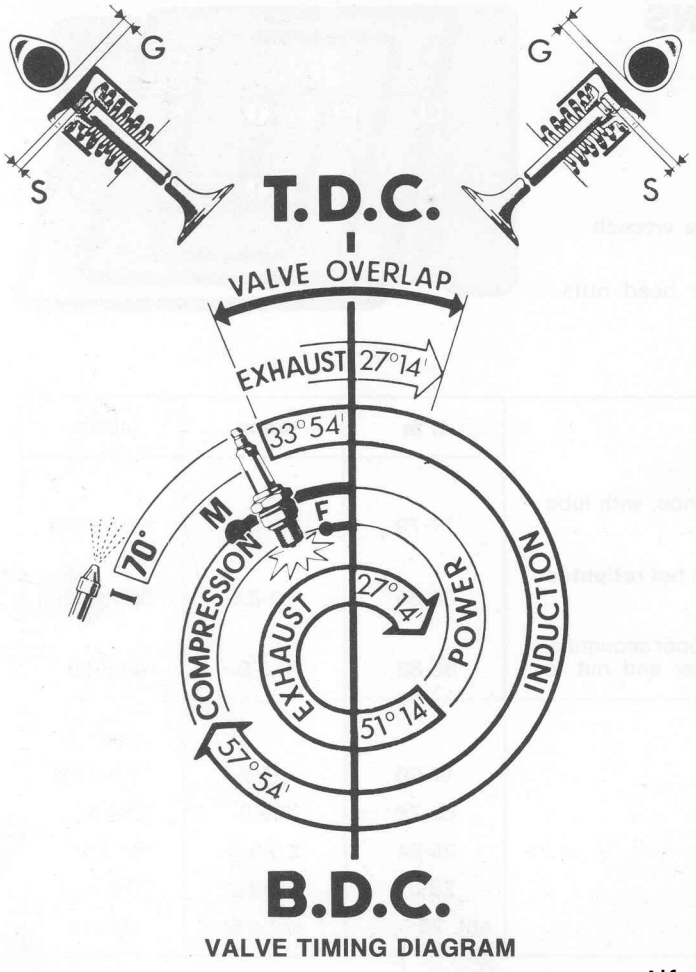
TIGHTENING TORQUE SPECIFICATIONS



To avoid stressing the metal, tighten as follows **with a torque wrench set to the prescribed torque.**

The illustration shows the tightening sequence of cylinder head nuts.

	N m	kg_Fm	lb-ft
CYLINDER HEAD NUTS			
After reconditioning tighten, when cold and in proper sequence, with lube between washer and nut to	77-79	7.9-8.1	57.1-58.6
Then warm up the engine by actually driving the car and when hot **retighten without unscrewing to**	82-83	8.4-8.5	60.7-61.5
After having covered abt. 600 miles, slacken, **when cold** and in proper sequence, the nuts **by one turn and torque,** with lube between washer and nut to	86-88	8.8-9	63.8-65
MISCELLANEOUS ITEMS			
Engine oil filter	17-20	1.7-2	12.3-14.5
Oil pan drain plug	69-78	7.0-8	50.6-57.8
Spark plugs (with graphite grease)	25-34	2.5-3.5	18.1-25.3
Injectors	28-31	2.8-3.2	20.2-23.1
Injection pipe fittings (and check for leaks)	abt. 25	abt.2.5	abt. 18



VALVE TIMING DIAGRAM

CHECK AND ADJUST VALVE CLEARANCE

When the engine is cold, carefully measure the clearance G with a feeler gage.

G = Intake: 0,475 — 0,500 mm (.0187 – .0197in.)
Exhaust: 0,525 — 0,550 mm (.0206 – .0216in.)

If the clearance is not as specified, remove camshafts and valve cups; measure the thickness S of the adjusting pad on each valve stem and replace it with another of proper thickness so that the clearance is the correct one shown in the diagram.
To facilitate this adjustment the pads are made available in a series of thicknesses ranging from 1,3 - 3,5 mm. (0.051 to 0.138 in.) in increments of 0,025 mm. (0.001 in.).

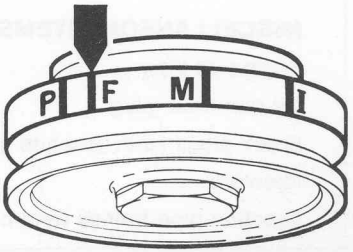
REFERENCE MARKS ON CRANKSHAFT PULLEY

M IGNITION TIMING AT 5000 RPM

F IGNITION TIMING AT IDLE

I TIMING OF INJECTION START

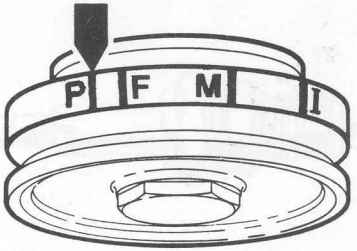
P T.D.C. OF FIRST CYLINDER PISTON



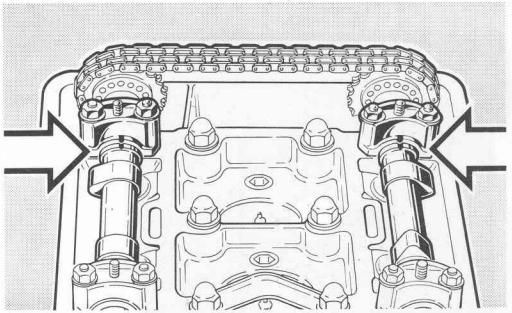
CHECK VALVE TIMING

The valve timing is correct when:

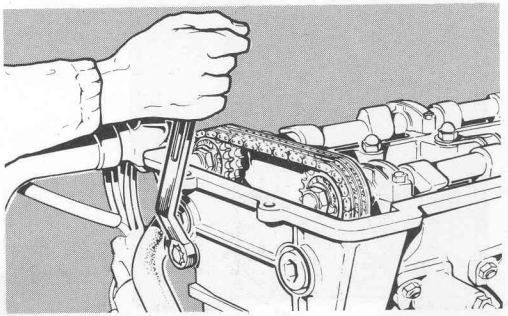
- with valve clearance as specified
  — no. 1 piston on compression stroke, the timing mark cut in the crankshaft pulley and marked P, is in line with the reference plate and...



  — ...when the timing marks cut on the camshaft front journals are in line with those on the journals bearings.



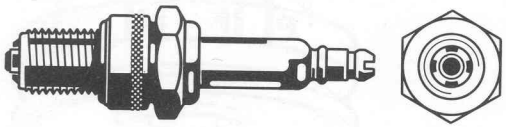
- No 1 cylinder cams must be positioned as shown in the illustration, i.e. **POINTING OUTWARD.**



ADJUST CHAIN TENSION

Proceed as follows:

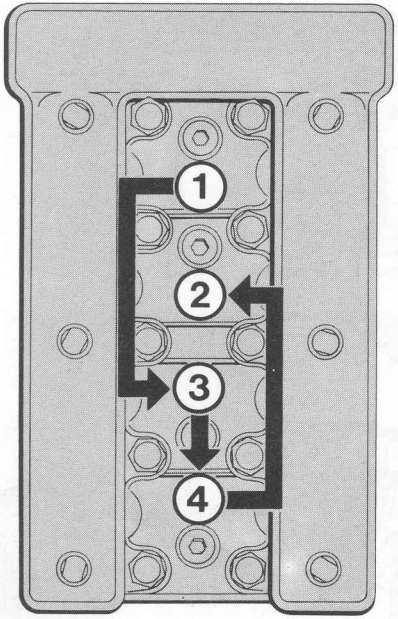
- run engine at idling speed; while performing the following adjustment any revving up of the engine must be absolutely avoided;
- slacken off the setscrew securing the chain tensioner; wait a few minutes to allow the tensioner to tighten the chain, then lock the chain tensioner setscrew firmly.



SPARK PLUGS

The standard plugs fitted to the engine are **LODGE HL.** A decal, giving the specifications for these plugs, in attached under the hood. Below, the text of the decal is repeated.

In order to comply with the Federal rule regarding the control of air pollution the engine is fitted with **LODGE-HL** spark plugs. These plugs are completely adequate when the automobile is driven at speeds not exceeding the limits specified by speed regulations. If the automobile is driven at sustained speeds higher than the said speed limits, **LODGE-2HL** spark plugs must be used.



The spark plugs are of the surface gap type with four points and a central electrode. The only maintenance required is occasional cleaning with a brush of the central electrode and points. No routine adjustment is necessary of the gap between the electrode and points. If the ceramic insulator is cracked or the electrodes are excessively worn away, the spark plugs must be replaced.

Use of other plugs can promote serious engine damage, as well as alter emission levels.

Note: when renewing the spark plugs reconnect wires according to the firing order and make sure no one of plug wires is disconnected since this will seriously damage the catalytic converter.

FIRING ORDER 1 - 3 - 4 - 2

The ignition system is of the battery and coil type with a centrifugal advance governor.
The ignition distributor is protected by two half-jackets fastened together with a retainer.

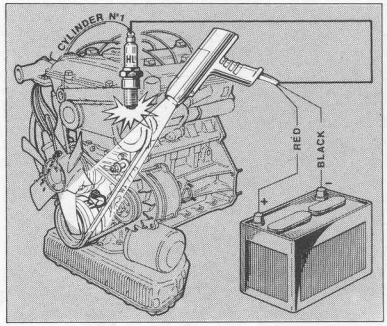
CHECK THE IGNITION TIMING

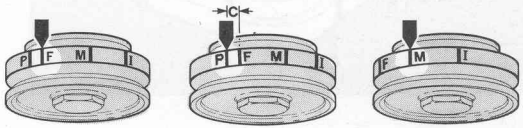
Ignition timing must be checked with the vacuum switch connected, the engine stabilized at normal operating temperature (coolant temperature higher than 80°C (180°F) and idling; use a timing light to illuminate the pulley on the crankshaft.

WARNING
Timing light should not be connected to vehicle's battery system.
A separate power source should be used.
Timing at idle speed must be adjusted with special care as it affects more greatly the emission levels.

- Ignition must be at 5° ± 1° (notch F in line with fixed pointer - see fig. A).
- While pinching the vacuum hose 1 on the check valve, after a few seconds the ignition will change to retard (pointer will be approx 6.5 mm (0.260") to the left of the F mark - refer to fig. B, dimension C). By freeing the hose again, the ignition must advance to the preceding value (F).

With engine at 5000 RPM/no load, check that ignition is at 33° ± 3° BTDC (notch M must be in line with the fixed pointer or at a maximum distance of 3 mm - Refer to fig. D).

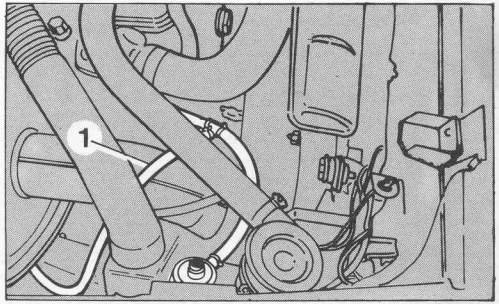


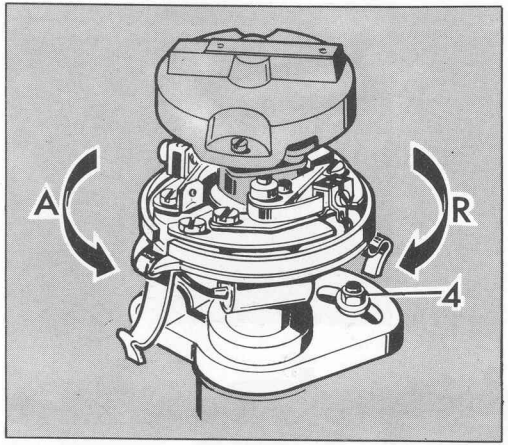


A
Ignition timing at idle 5° ± 1° BTDC

B
Pointer indication with vacuum hose pinched

D
Ignition timing at high speed 33° ± 3° BTDC at 5000 rpm





IGNITION ADVANCE AND RETARD

If the timing requires adjustment, proceed as follows:

- unscrew the distributor securing nut 4 on the stud so as to allow the distributor to be rotated together with its supporting clamp;
- rotate the distributor body counter-clockwise or clockwise according to whether it is necessary to respectively advance (A) or retard (R) the ignition setting;
- retighten the nut, taking care not to move the distributor body;
- recheck timing.

	Primary breaker	Secondary breaker (retarded)
Points opening	mm 0.45 ± 0.03 (0.017 – 0.019")	mm 0.45 ± 0.09 (0.014 – 0.022")
Dwell	60° ± 3°	60° ± 5°

IGNITION DISTRIBUTOR

At the prescribed intervals:

Check with a feeler gage the contact-breaker point gaps.
Check that the secondary contact-breaker (see figure on page 41) is set at 3° ± 30' retarded from the primary set.
Adjust the opening S2 of the secondary breaker (within the limits permitted) if necessary:

- increase the opening (reduce dwell angle) to reduce the retardation
- decrease the opening (increase dwell angle) to increase the retardation.

ADJUST CONTACT-BREAKER POINT GAP

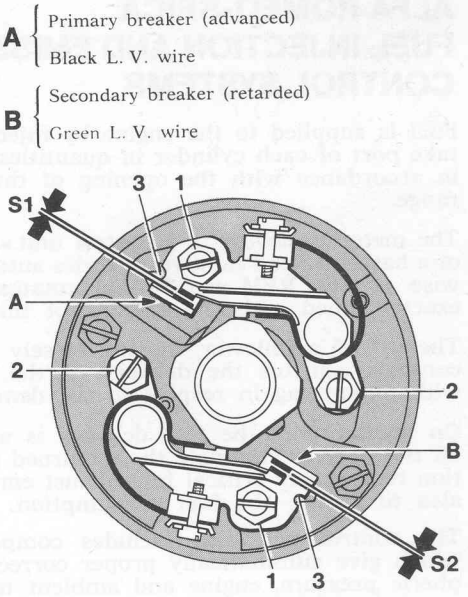
To adjust the contact-breaker point gap, loosen the screws **1** and **2**, insert a screwdriver in the adjustment slot **3** and pry the stationary-point plate back or forth as required.

Smear the distributor cam with grease. Check the inside of distributor cap for any sign of moisture, carbon deposits or cracks and the central power electrode for free movement in its seat and effective spring action. Finally, check cap terminals.

Make sure that during cranking, i.e. while starter motor is operating, the relay contact (connected in series to the secondary breaker) is open.

Condenser capacity test

Should an excessive wear of breaker points be experienced, check that the condenser capacity is not lower than 0.20 micro farad i.e. over 20% less than its rated capacity (0.25 micro farad) marked on the condenser body.



CHANGE THE DISTRIBUTOR

When reinstalling or replacing the distributor, perform the following procedure:

- rotate the crankshaft to bring no. 1 cylinder piston to the compression stroke (both valves closed);
- by slightly rotating the crankshaft bring the advance mark F on pulley into line with the reference pointer;
- fit the supporting clamp into the distributor body and tighten the clamp;
- remove distributor cap and rotate the drive shaft by hand to bring the rotor arm in line with the contact for no. 1 cylinder;
- as a trial, install the distributor and move the supporting clamp so that the stud is centered in the clamp slot **when rotating the distributor body the contact-breaker points of primary breaker are about to open for no. 1 cylinder.**

  Note: if a test lamp for checking opening of primary breaker points is used, the electrical connections of vacuum switch must be disconnected.

- then, remove the distributor with its supporting clamp, taking care not to disturb the distributor body/clamp setting and lock the clamp in place.
  Reinstall the distributor and adjust timing as directed on page 40.

ALFA ROMEO-SPICA FUEL INJECTION AND EMISSION CONTROL SYSTEMS

Fuel is supplied to the engine by injection into the intake port of each cylinder in quantities exactly metered in accordance with the opening of throttles and RPM range.

The metering device, or « control unit », consists mainly of a barrel shaped cam which slides automatically lengthwise as the RPM varies and rotates about its axis exactly timed with the opening of throttles.

The lift of a follower, moving closely against the cam contour, controls the delivery of the injection pump, without any lag in respect to the demand of power.

On deceleration, the fuel delivery is automatically cut off not only to eliminate the unburned gases in a condition remarkably critical for exhaust emission levels, but also to reduce the fuel consumption.

The control unit also includes compensating devices which give automatically proper corrections for atmospheric pressure, engine and ambient temperature, cold starting and initial running ensuring the optimum under all operating conditions.

WARNING

Never tamper with the control unit, it is prohibited by law.

AIR INTAKE TEMPERATURE CONTROL SYSTEM

The system is designed to maintain the temperature of intake air entering the engine at approximately 40 °C (104 °F).

The sensor element (8, page 47) is a bimetallic bleed unit, modulating the vacuum from the engine, and controlling the position of the valve 1 in the intake air mixer tube. The position of the valve controls the amount of hot air entering the inlet manifold, maintaining the correct air temperature under all engine temperature and driving conditions.

AIR INDUCTION SYSTEM

The filtered air enters the engine thru four intake ports each with a throttle 30.
Idle air is fed thru a separate circuit which, starting from the air cleaner connects to the intake ports downstream of the throttle valves and includes the idle air equalizer 9.

The accelerator pedal is mechanically linked thru the rods and the relay crank to the throttle valve lever and the control unit lever. Therefore, any position of the accelerator pedal corresponds to an exact position of throttle valve and control unit levers.

FUEL FEED SYSTEM

Inserting the key in the ignition switch and rotating clockwise to the first click will operate the electric pump 24. The gasoline flows from the tank thru tank filter 23 and filter 7 and feeds the injection pump 13.

In the case the car comes into collision an inertia switch cuts off the feed of current to the electrical pump thus blocking the supply of fuel.

The excess fuel, acting also as a coolant for the injection pump, before returning to the tank, passes thru a calibrated orifice which regulates the fuel pressure within the injection pump. A pressure switch 6 inserted in the delivery pipe will switch on the warning light on dashboard if a pressure drop occurs in fuel lines.

A pressure relief valve limits the fuel pump outlet pressure bypassing fuel to the recovery pipe.

FUEL VAPOR RECOVERY SYSTEM AND TANK VENTILATION

Vapors, emanating from fuel tank both during engine operation and hot soak period after engine shutdown, are collected in the expansion tank 26 which acts also as a vapor liquid separator returning the condensate to the fuel tank via the pipe located at the bottom of expansion tank.
The pipe serves to make a proper connection between the fuel tank, when fully replenished, and the expansion tank. To prevent fuel vapors from escaping to the open air, a sealed filler cap 27 is provided.
Fuel vapors coming from the expansion tank flow out of the separator from the top and, passing thru the pipes, enter the cam cover and then flow into the crankcase: during the hot soak period, the crankcase is used for storage while during engine operation the crankcase is purged of vapors by the action of the ventilation system. Should the pressure in the expansion tank decrease as a result of decreasing temperature, fuel vapors will flow back to it from the engine to maintain both it and the fuel tank at atmospheric pressure. A valve 25 permits a constant supply of fuel to the engine if an obstruction should occur in the pipe between the expansion tank and the engine.

IGNITION SYSTEM

The ignition system is equipped with a distributor having two sets of contact points which are controlled by a vacuum switch connected to the inlet manifold and by a relay which operates only during engine cranking action.

The main contact pair (advanced) works for low and medium loads of the motor, where for high loads, in order to avoid accidental knocking, the vacuum switch changes the ignition to the secondary contacts (retard), eliminating the risk of knocking. These advance characteristics have been done to reduce idle emission and obtain better fuel economy.

A relay, connected in series to vacuum switch and to secondary breaker, cuts off the latter during cranking, thus changing the ignition to advance in order to facilitate starting.

CRANKCASE VENTILATION SYSTEM

The exhaust gases and the oil vapors developed during engine operation collect in the camshaft cover; from here they are sucked in the combustion chambers and burned as well as the fuel tank vapors.

The crankcase ventilation system controls gases both at high engine RPMs and at idling speed when the throttles are closed. When the throttles are fully opened the vapors flow thru the hoses to the oil separator 3 and to the manifold chamber communicating with the intake ports.

When the throttles are partially closed, the secondary circuit comes into operation; such a circuit starts from the oil separator 3 and conveys unburned gases and vapors directly into the intake ports downstream of the throttles by means of the idle air system provided with calibrated orifices. The oil collected in the separator returns to the pan via a suitable hose.

At the prescribed periods have the hoses of crankcase ventilation system checked for sound conditions and leaks and the connections for tightness; clean and change as necessary.

AIR INJECTION SYSTEM

The system injects air into exhaust manifold to cause combustion of the exhaust gas and to supply air to the catalytic converter for a proper operation. The air is supplied by a vane type pump 12 through a check valve 19 to an air manifold that distributes the air to four injection nozzles located near the exhaust ports. The check valve is provided in the system to stop gas flowing back into the air pump when air pressure drops for any reason, such as drive belt failure.

CATALYTIC CONVERTER

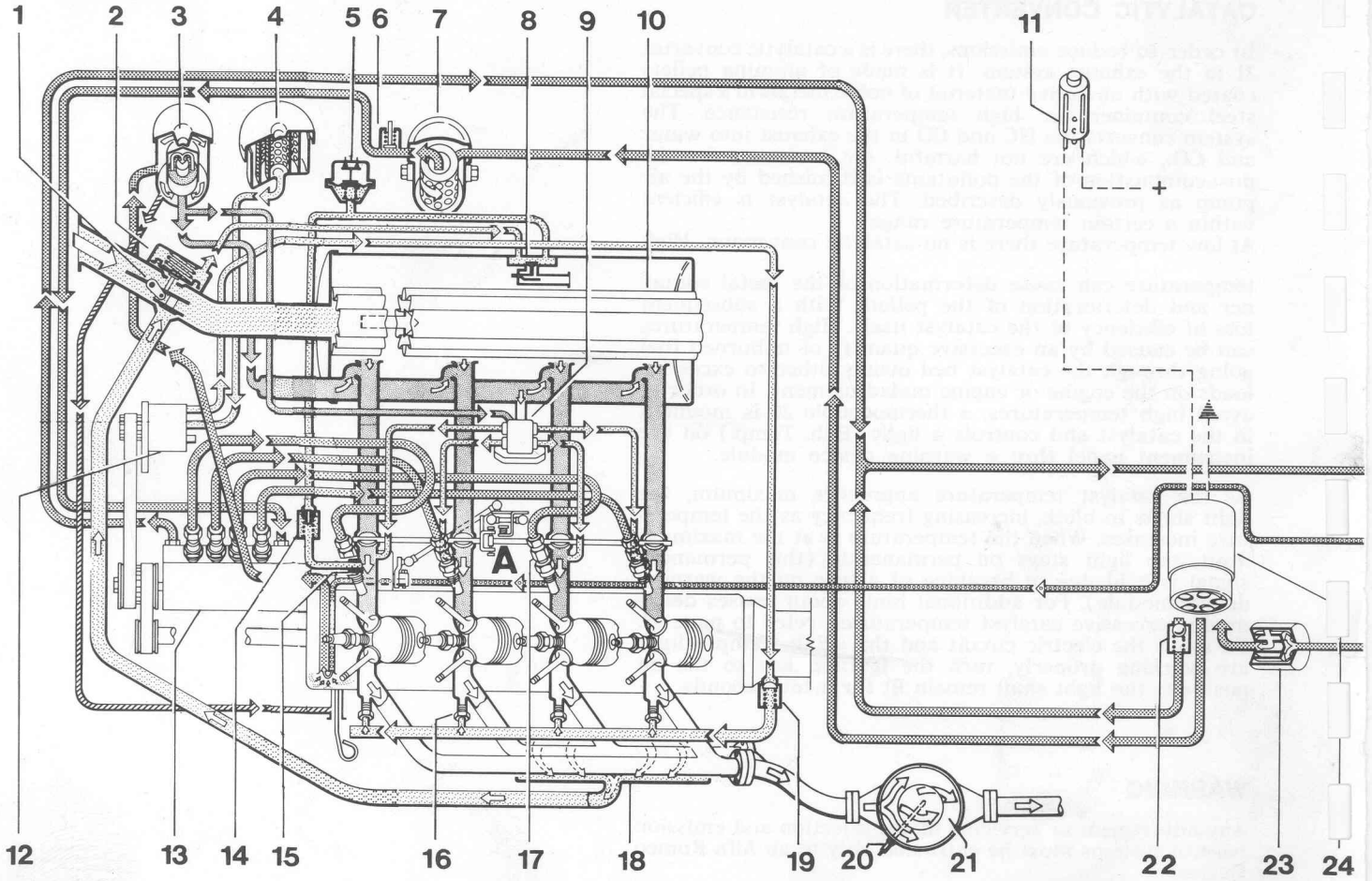
In order to reduce emissions, there is a catalytic converter 21 in the exhaust system. It is made of alumina pellets coated with an active material of noble metals in a special steel container for high temperature resistance. The system converts the HC and CO in the exhaust into water and CO_2, which are not harmful. Air necessary for the post-combustion of the pollutants is furnished by the air pump as previously described. The catalyst is efficient within a certain temperature range.
At low temperature there is no catalytic conversion. High

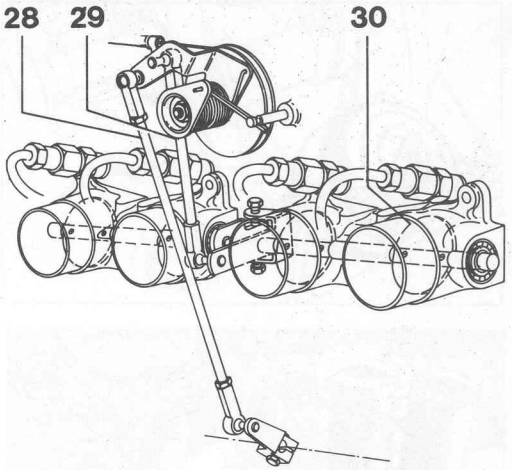
temperature can cause deformation of the metal container and deterioration of the pellets, with a subsequent loss of efficiency of the catalyst itself. High temperatures can be caused by an excessive quantity of unburned fuel going through the catalyst bed owing either to excessive loads on the engine or engine maladjustment. In order to avoid high temperatures, a thermocouple 20 is mounted in the catalyst and controls a light (Exh. Temp.) on the instrument panel thru a warning device module.

As the catalyst temperature approches maximum, the light starts to blink, increasing frequency as the temperature increases. When the temperature is at the maximum limit, the light stays on permanently (this permanent signal is held due to breaking of a fuse on the warning device module). For additional hints about causes determining excessive catalyst temperatures, refer to page 12. To see if the electric circuit and the « Exh. Temp. » light are working properly, turn the ignition key to the on position: the light shall remain lit for a few seconds.

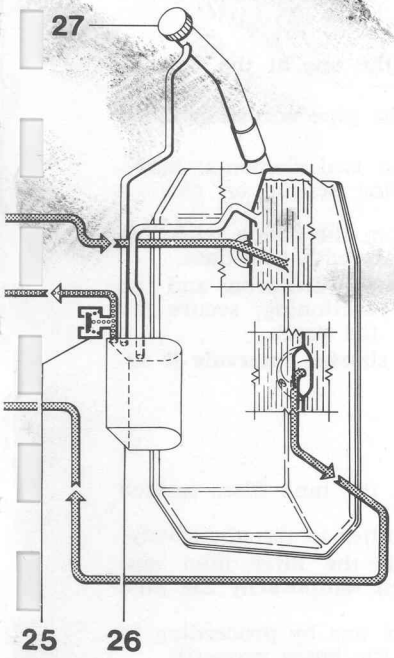
WARNING

Any adjustment or servicing of the injection and emission control systems must be entrusted only to an Alfa Romeo Dealer.



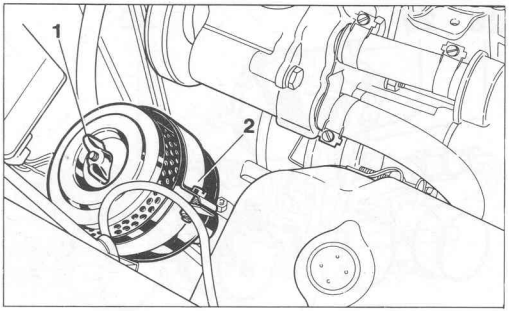


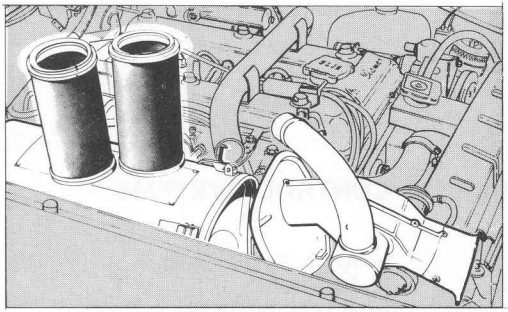
DETAIL VIEW A

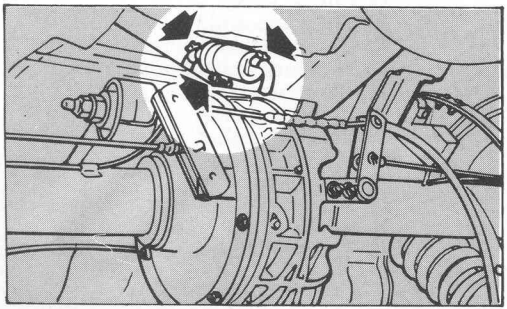


FUEL INJECTION AND EMISSION CONTROL SYSTEMS OPERATING DIAGRAM

1 Air control valve
2 Diaphragm motor
3 Oil separator
4 Air pump filter
5 Vacuum switch
6 Pressure switch
7 Main fuel filter with moisture separator
8 Sensor
9 Idle air system
10 Air cleaner
11 Inertia switch
12 Air pump
13 Injection pump
14 Check valve
15 Control valve vacuum connection
16 Air injection nozzle
17 Injectors
18 Intake air mixer tube
19 Check valve
20 Thermocouple
21 Catalytic converter
22 Pressure relief valve
23 Tank filter
24 Electric pump
25 Vacuum relief valve
26 Liquid vapor separator
27 Sealed filler cap
28 Relay crank-to-control unit rod
29 Relay crank-to-throttle rod
30 Throttle throats







CLEAN/CHANGE AIR PUMP FILTER ELEMENT

Unscrew the wingnut 1 securing cover to filter housing. Remove the element and clean the inside of filter housing. Clean the filter element and fit it again into its housing. Cleaning should be performed every 5000 miles. Every 15000 miles replace the element with a new one. To prevent dust particles from entering the hose while cleaning the inside of filter housing it is advisable to loosen the fastening clamp 2 and remove the filter assembly.

CLEAN/CHANGE AIR CLEANER ELEMENTS

The air cleaner is equipped with two pleated elements offering the maximum filtering surface.

To remove the elements proceed as follows:

- Loosen the two fasteners at the top and the one at the bottom securing the front cover of cleaner;
- Disconnect the hot air snorkel tube and the pipe across cylinder head and separator;
- Remove the front cover assembly and the two elements. Make sure not to disconnect the hose connecting sensor on cleaner body to cleaner cover.

Clean the elements blowing them through from the inside with low pressure compressed air or replace the elements with new ones.

On refitment, check the outer element for proper centering and the seal stuck to the cleaner body for proper positioning; secure the cover with its three fasteners and reconnect the pipes.

Air filtering elements should be replaced at shorter intervals if vehicle is used in dusty areas.

REPLACE THE TANK FUEL FILTER

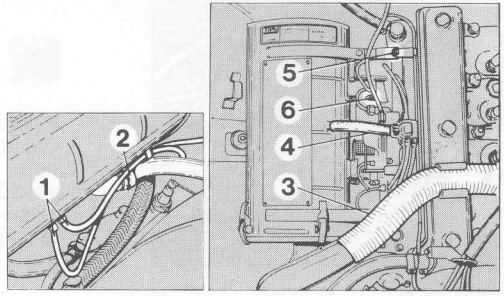
At the prescribed periods, replace as follows the tank filter located at the rear underbody of the car;

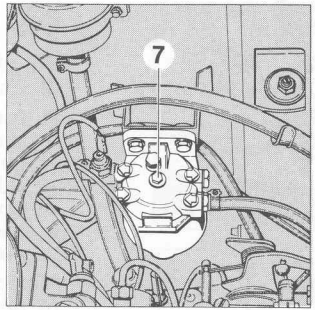
- slacken the nut on the clamp securing the filter to the underbody;
- loosen the clamps securing the hoses to the filter inlet and outlet adapters; it is advisable to blank out temporarily the pipe from fuel tank;
- remove the filter and replace it with a new one by proceeding in reverse order of removal; take care to fit the hoses properly.

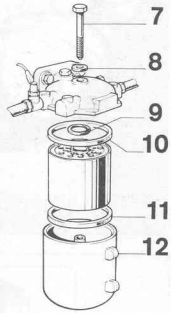
CHANGE THE MAIN FUEL FILTER ELEMENT

At the prescribed periods replace the main fuel filter element.
To provide room for this operation, the air cleaner must be removed.

- disconnect the control damper sensor hoses 1;
- loosen clamp and disconnect duct 2 from oil separator;
- disconnect hot air snorkel tube 3;
- disconnect idle air system hose 4;
- detach two upper anchoring straps 5 at manifold side;
- loosen at the engine side the four clamps 6 on the intake hoses.
- **disconnect the battery negative terminal and the positive starter cable;**
- clean carefully the outside of filter body and nearby lines to make sure no foreign matter could enter the filter on reassembly (for an easier refitting, loosen the two screws securing filter bracket to car's body);
- Slacken and withdraw the screw 7 (with its copper washer 8) securing filter housing to bracket and remove the filter housing 12 by pushing it downward;
- Withdraw the filter element;
- Get rid of foreign matter that may have collected in the housing; replace the following items, if damaged:
  - □ Bottom gasket 11 (between element and housing bottom);
  - □ Top gasket 10 and sealing ring 9 between bracket and element
  - □ Copper washer 8 (lubricate washer prior to tighten screw 7).





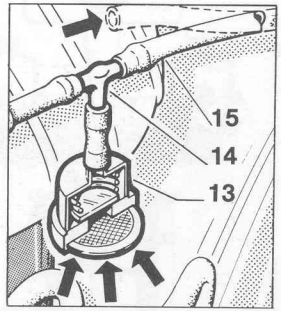


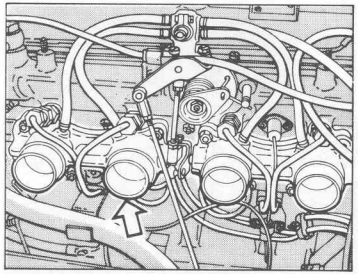
VACUUM RELIEF VALVE

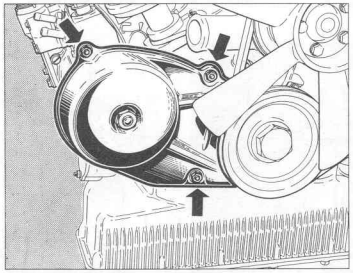
If, with freezing weather, performance and driveability are impaired or the low fuel pressure warning light comes on, the cause may be vacuum taking place in the fuel tank owing to a stuck closed relief valve 13 and/or an obstruction of the pipe 15 both occurring at the same time.
To remedy this trouble, remove the relief valve from the T-adapter 14 and blow the valve through to clear it from foreign matter (if the valve is instead defective, replace it with a new one). The vent pipe 15 must also be disconnected from the T-adapter and blown through to clear it from any obstruction which may have formed.
Refit all parts.

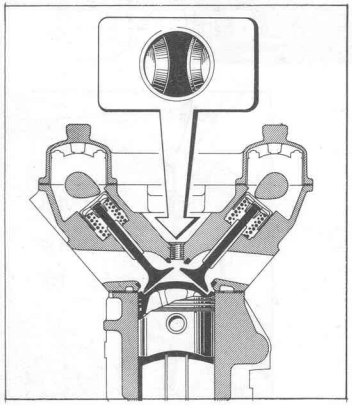
At the prescribed intervals perform the following:

- Clean and inspect the lines, connections and vacuum relief valve of fuel evaporative system; replace as necessary;
- Inspect fuel tank, filler cap and gasket pipes and connections for sound conditions; **change filler cap gasket, if necessary.**









CLEAN THE THROTTLE THROATS

Remove the air cleaner (see page 49).
Clean the throttle throats at the areas of contact of throttle edges with throat bore by holding the throttles in full open position and using a brush soaked in gasoline; the cleaning can be completed by rubbing repeatedly the affected areas with a lint-free cloth. Then, clean in a similar way the throttle edges taking care not to strain the spindles.
Refit the air cleaner (see page 49).

TIMING THE INJECTION PUMP

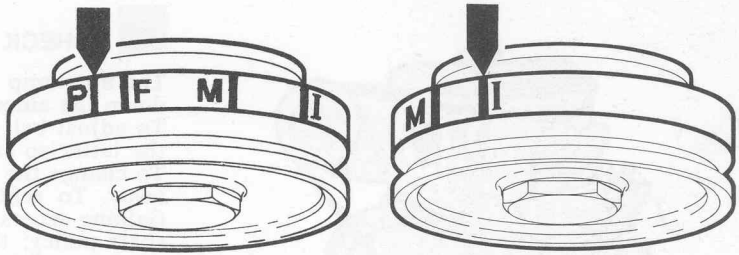
To check the injection pump timing, proceed as follows:
- unscrew the attaching nuts and remove the pump drive belt cover
- turn the crankshaft over (by shifting into fourth and pushing the car either forward or backward) so as to **bring the reference mark I in line with the pointer;** remove the spark plug from cylinder no. 1 and **check that the exhaust valve is still open** (if closed, turn the crankshaft over by one more revolution).
- **check that the reference mark on the splined pulley and the pointer on the pump body are aligned.**

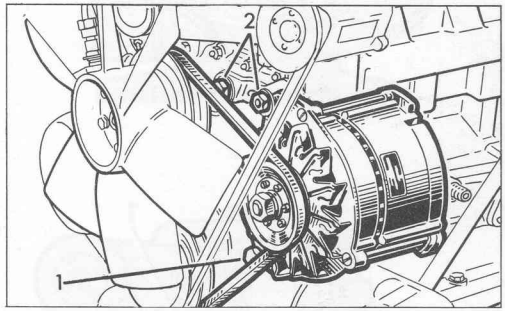
Note: reference mark and pointer can be out of alignment within a tolerance of about ± 5 mm. (0.2") corresponding to half pitch of the pulley splines.
If the pump is out of timing, time it according to the same procedure as for drive belt replacement.

REPLACE THE INJECTION PUMP DRIVE BELT

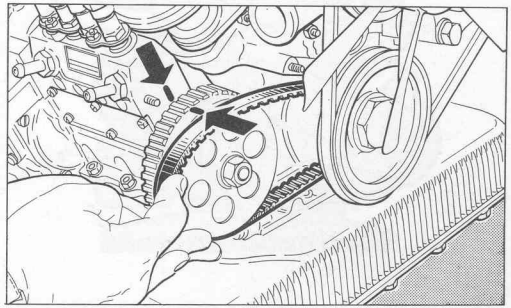
Should the injection pump drive belt need replacement, proceed as follows:
- Remove the air pump drive belt (see page 52).
- Unscrew the three attaching nuts and remove the pump drive belt cover.
- Turn the crankshaft over (by shifting into fourth and pushing the car either forward or backward) so as to bring the no. **1** piston to the **T.D.C.**; remove the spark plug from cylinder no. **1** to check that both valves, intake and exhaust, are in the open position (overlap stage).
(If the valves are closed, turn the crankshaft over by one more revolution).

- In this condition, the mark **P** on the crankshaft pulley shall line up with the pointer.
- Push the car slowly backward so as to rotate the crankshaft counterclockwise by **70** degrees, i.e. in such a way that mark **I** on crankshaft pulley and pointer line up.





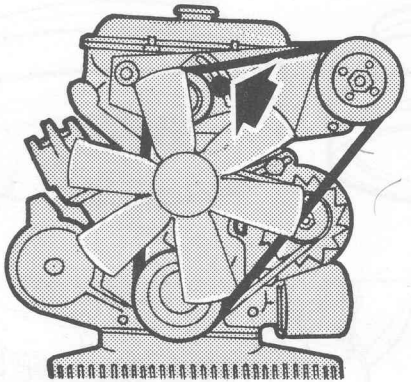
- Loosen the bolt **1** and the nuts **2**, move alternator toward the crankcase and take the alternator drive belt off.
- Replace the injection pump drive belt with a new one; to install the new drive belt first mount it onto the crankshaft splined pulley.



- Then, rotate the injection pump splined pulley by hand to align the reference mark on the pulley with the pointer on pump body and mount the toothed belt onto the pump pulley; slightly turn the pulley in either direction to engage the nearest spline.

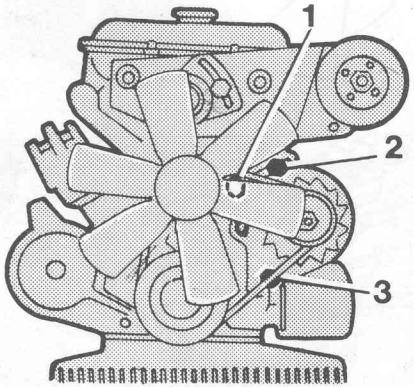
N.B. Reference mark and pointer can be out of alignment within a tolerance of about ± 5 mm (0,2") corresponding to half pitch of splines.

Refit:
- The spark plug.
- The alternator drive belt (and adjust tension refer to page 52).
- The pump drive belt cover.
- The air pump drive belt (see page 52).



CHECK AND/OR CHANGE THE AIR PUMP DRIVE BELT

The air pump drive belt tension is correct when on pressing the belt down the amount of play is approximately ½ in.
To adjust belt tension, loosen the nut on the tensioner and adjust the latter so as to obtain the proper belt tension.
To change the belt, loosen nut move the tensioner and take the belt away. To refit, pass the new belt between fan blades and shroud. Gaining access from the bottom, fit the belt to the **front race** of crankshaft pulley; then, from the top, fit the belt to air pump pulley and tensioner. Prior to tighten the tensioner nut, make sure belt tension is as specified.



CHECK AND/OR CHANGE COOLANT PUMP AND ALTERNATOR DRIVING BELT

If the tension is insufficient, the belt will slip and wear prematurely: furthermore:
- the cooling action will be affected because of the reduced speed of the fan and pump;
- the battery charging current will be reduced owing to the slower alternator speed.

If the tension is excessive, the alternator and pump bearings will be overloaded with the consequent risk of damage.
The tension is correct when on pressing the belt down the amount of play is approximately 10-15 mm.
To adjust belt tension:
- loosen the nuts 1 and 2 on the link; also loosen the bolt 3;
- then, move the alternator so as to obtain the proper belt tension.
- After adjusting, tighten the nut 2 and check for proper tension;
- tighten nut 1 and bolt 3;
- check again tension.

Change the belt at the prescribed periods. Prior to do so, it is necessary to remove the air pump drive belt as outlined in the preceding paragraph. To remove the old belt take it away from pulleys and pass it between fan blades and shroud. To refit, pass the new belt, from top, between fan blades and shroud. Gaining access from the bottom, fit the belt to the **rear race** of crankshaf pulley; then. from top, fit the belt to the pulleys of fan and alternator.
Adjust belt tension as above outlined. Refit the air pump drive belt (refer to the preceding paragraph).

IDLE ADJUSTMENT

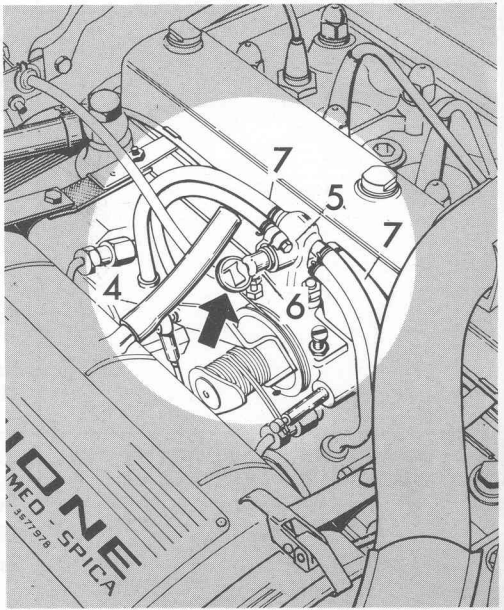
Usually, idle speed is adjusted only when regular maintenance operations as set out on the coupons of Routine Maintenance Book are performed. However, if a pressing need for idle adjustment should arise, warm up the engine, inspect the ignition system for proper operation, then proceed as follows:

- **Idle too slow but even**
  (engine runs smoothly)
  This is due to too rich a mixture fed to the engine.
  To correct this trouble, remove the hose 4 connecting the idle equalizer to the air cleaner, loosen the bolt 5 and **gradually unscrew** the adjuster 6 with a coin until the engine is idling at as fast a speed as possible yet with no roughness. Back up the adjuster by one third of the amount it was previously unscrewed, then retighten the bolt 5 and refit the hose 4.
- **Idle too slow and rough**
  (engine runs unevenly)
  One of the hoses 7 connecting idle equalizer to throttle throats is obstructed (by buckling) cracked or disconnected from a fitting. Reconnect or replace the hose, if necessary.
- **Idle too fast and rough**
  (engine runs unevenly; hunting also takes place)
  This is caused by too lean a mixture fed to the engine due to air leaking through one of the hoses 7 connecting idle equalizer to throttle throats. Check the four hoses 7 for sound conditions and leaks.
  If this does not correct the trouble, remove the hose connecting idle equalizer to air cleaner, loosen the bolt 5 and **gradually screw** in the adjuster 6 **with a coin** until the engine is idling smoothly and sufficiently high. Then, back up the adjuster by one third of the amount it was previously screwed in; retighten the bolt 5 and refit the hose 4. **Performing the above adjustments will also keep exhaust emission at the normal levels.**
  Should difficulties arise in adjusting the idle, entrust the adjustment to an Alfa Romeo Dealer.

RECOMMENDED IDLE SETTING

Idle speed must be . . . . . **750 ± 100 rpm** with transmission in neutral and accessories (conditioner, etc.), if any disengaged.
IDLE EXHAUST EMISSIONS:
carbon monoxide: . . . . . **max. 1.2%**
unburned hydrocarbons: . . . **below 300 ppm**

Important note: the reading of values of carbon monoxide and unburned hydrocarbons must be taken exclusively with properly calibrated NDIR instrumentation from the tap upstream of catalytic converter..



ENGINE TROUBLE DIAGNOSTIC CHART

SYMPTOM	POSSIBLE CAUSE	CORRECTION
Low fuel pressure warning light does not flash on when ignition key is turned.	Fuse no. 6 blown. Warning light bulb burnt out. Pressure switch faulty (jammed open).	Replace fuse. Replace bulb. Have switch checked and replaced if necessary. *DEALER OPERATION*
Low fuel pressure warning light stays on (fuel pump operates: a light buzzing can be heard).	Fuel tank empty. Pressure switch faulty (jammed closed). Fuel pump outlet pressure too low (warning light comes on while running at high speed): – tank to pump lines clogged or air seeping thru them – tank fuel filter clogged – main fuel filter clogged – pump pressure relief valve defective or stuck open. Fuel pump delivery too low. Relief valve of liquid/vapor separator stuck closed (in winter).	Refuel it. Have switch checked and replaced if necessary. *DEALER OPERATION* Have fuel lines inspected. *DEALER OPERATION* Replace filter Clean filter and replace element Have pump valve checked and replaced, if necessary. *DEALER OPERATION* Have fuel pump checked or replaced. *DEALER OPERATION* Remove valve and check it for proper operation; replace, if necessary. (See page 49).
Low fuel pressure warning light stays on (fuel pump fails to operate).	Inertia switch open Fuse no. 1 on additional box blown. Electric wires to pump disconnected. Fuel pump faulty.	Reset switch Replace fuse. Check and reconnect. Have the pump checked or replaced. *DEALER OPERATION*

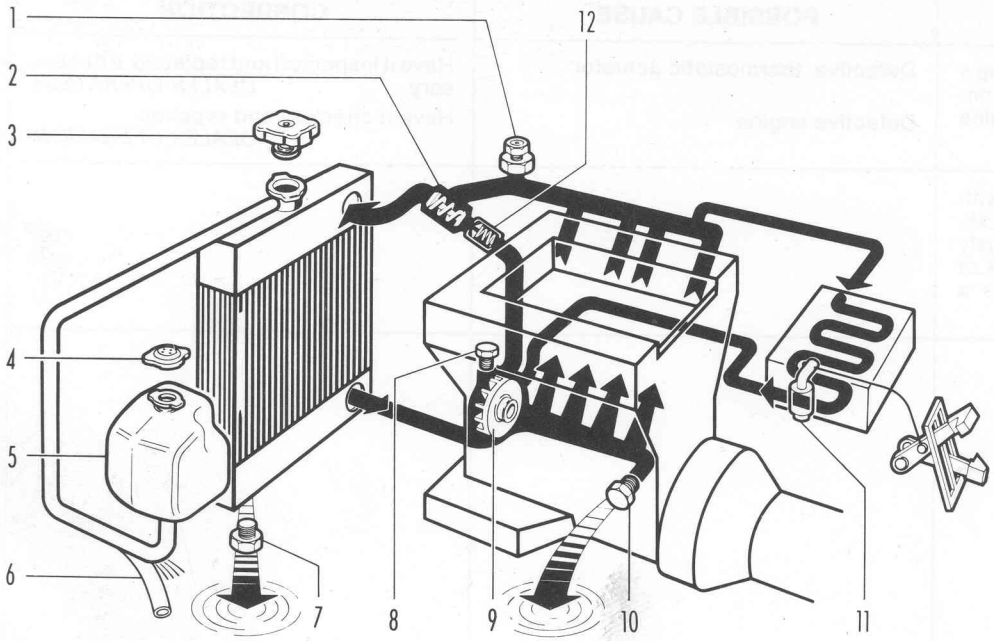
SYMPTOM	POSSIBLE CAUSE	CORRECTION
Engine will not start	Battery charge too weak to rotate the starter sufficiently fast	Have the battery charged
	Ignition system defective (dirty plugs, oxidized contact-breaker points, wet or cracked distributor cap, damaged distributor or coil, defective electrical connections).	Have the system checked and repaired, if necessary. *DEALER OPERATION*
Engine will not start from cold.	Solenoid-actuated cold start device fails to operate.	Check electric connections. Have the device checked or replaced. *DEALER OPERATION*
	Ignition advance relay fails to operate	Have it checked *DEALER OPERATION*
Smoky exhaust after starting.	Cold start solenoid plunger stuck.	Have the plunger checked. *DEALER OPERATION*
Engine misfires; rough idle.	One injector defective.	Have the injector replaced, if necessary. *DEALER OPERATION*
	Injection pipe fittings leaking.	Have fittings tightened *DEALER OPERATION*
	Injection pipes cracked.	Have the pipes checked and replaced, if necessary. *DEALER OPERATION*
	Ignition system faulty	Have it inspected *DEALER OPERATION*
Idle too slow but even.	Idle air equalizer out of adjustment (adjuster too much screwed in).	Unscrew the adjuster (with a coin) until a faster but again even idle is obtained. (See page 53).
Idle too slow and rough (engine runs unevenly).	Idle air hose(s) disconnected from equalizer or throttle throat fittings or even obstructed or damaged.	Connect, clear or replace hose(s) respectively. (See page 53).
Idle too fast and rough (engine runs unevenly. hunting also takes place).	Idle air equalizer out of adjustment (adjuster too much screwed out).	Screw in the adjuster (with a coin) until an even idle is obtained. (See page 53).
	Air seeping into an idle air hose.	Check idle air hose for sound condition and replace if necessary. (See page 53).

SYMPTOM	POSSIBLE CAUSE	CORRECTION
Idle too fast; engine does not slow down to idle on deceleration	Accelerator linkage fails to return fully.	Have the accelerator linkage checked. *DEALER OPERATION*
Idle CO and HC too high.	Idle speed incorrect; ignition system faulty.	Have them inspected. *DEALER OPERATION*
	Air injection system defective	Have it inspected *DEALER OPERATION*
Too fast an idle and smoky exhaust.	Faulty thermostatic actuator.	Have it inspected. *DEALER OPERATION*
Engine keeps running at idle but stops on accelerating.	Altitude compensator faulty.	Have the altitude compensator replaced. *DEALER OPERATION*
	Excessive vibrations of injection pump and control unit.	Have the injection pump and control unit brackets checked. *DEALER OPERATION*
Unsatisfactory driveability, hesitations; unsatisfactory road performance.	Control linkage out of adjustment.	Have the throttle/control unit linkage checked. *DEALER OPERATION*
	Fuel pump outlet pressure too low (warning light comes on while running at high speed).	Check and replace, if necessary, tank fuel filter and/or main filter element.
	Injector defective.	Refer to corrections as under «Engine misfires; rough idle». *DEALER OPERATION*
	Faulty ignition retardation	Have it checked and adjusted *DEALER OPERATION*
	Injection pump or control unit defective.	Have them checked and replaced, if necessary. *DEALER OPERATION*
	Ignition system faulty	Have it inspected *DEALER OPERATION*
	Air induction clogged.	Check and replace air cleaner elements, if necessary.
	Air intake temperature control system defective	Have it inspected *DEALER OPERATION*

SYMPTOM	POSSIBLE CAUSE	CORRECTION
Unsatisfactory driveability, hesitations; unsatisfactory road performance.	Relief valve of liquid/vapor separator stuck closed (in winter).	Remove valve and check it for proper operation; replace, if necessary, (See page 49).
Excessive fuel consumption.	Fuel feed circuit leaks.	Check pipes, fittings, seals and replace defective parts.
	Thermostatic actuator defective; also refer to causes as under «Too fast an idle».	Have the thermostatic actuator checked and replaced, if necessary. *DEALER OPERATION*
	Defective carburation.	Have the injection pump adjusted. *DEALER OPERATION*
Engine stalls flat.	Injection pump driving belt broken.	Have belt replaced. *DEALER OPERATION*
Detonations in the exhaust pipe on deceleration.	Fuse no. 6 blown.	Replace fuse.
	Feed wire disconnected at fuel cut off solenoid.	Re-connect wire.
	Loose junction of fuel cut off device feed wire disconnected.	Re-connect junction.
	Defective fuel cut off solenoid.	Have the fuel cut off solenoid checked and replaced, if necessary. *DEALER OPERATION*
	Defective fuel cut off device microswitch.	Have the fuel cut off device checked. *DEALER OPERATION*
Engine stops: – wholly or occasionally on deceleration in neutral – occasionally or wholly when reaccelerating after a deceleration. Engine fires again suddenly and with delay when reaccelerating after a deceleration.	Fuel cut off solenoid stuck in cut off position or sluggish in backing up.	Have the fuel cut off solenoid checked and replaced, if necessary. *DEALER OPERATION*
Noisy electric fuel pump.	Line between pump and main filter distorted or forced in the rubber mounting or against the recovery pipe.	Have the line reset. *DEALER OPERATION*

SYMPTOM	POSSIBLE CAUSE	CORRECTION
Noisy electric fuel pump.	Tank filter and hoses improperly fitted.	Have the filter and hoses checked. *DEALER OPERATION*
Knocking at full throttle	Defective vacuum or electrical connections to vacuum switch	Check noses, clamps, connections, etc.
	Defective vacuum switch	Have it checked and replaced, if necessary *DEALER OPERATION*
	Defective distributor	Have it checked and repaired *DEALER OPERATION*
Catalyst overtemperature «Exh. Temp.» warning light does not come on (only for a few moments) when the ignition key is turned on.	Fuse no. 6 blown	Replace fuse
	Light bulb is burned out	Replace it
	Light bulb circuit is disconnected	Have it checked and repaired *DEALER OPERATION*
	Warning device fuse is burned out	Have it replaced *DEALER OPERATION*
	Electric circuit of the warning device is disconnected	Have it checked and replaced if necessary *DEALER OPERATION*
	Defective warning device	Have it checked and repaired if necessary *DEALER OPERATION*
Catalist overtemperature «Exh. Temp.» warning light stays on when ignition key is turned on and catalyst is cold	Thermocouple disconnected and/or burned out	Have it checked and replaced, if necessary *DEALER OPERATION*
	Defective warning device	Have it checked and replaced, if necessary *DEALER OPERATION*
Catalyst overtemperature «Exh. Temp.» warning light flashes or stays on continuously (*) even with minimum engine load	Defective ignition system	Have it checked and repaired *DEALER OPERATION*
	Defective injection system	Have it checked and repaired *DEALER OPERATION*
(*) See footnote on next page	Defective air intake temperature control system	Have it checked and repaired *DEALER OPERATION*

SYMPTOM	POSSIBLE CAUSE	CORRECTION
Catalyst overtemperature «Exh. Temp.» warning light flashes or stays on continuously (*) even with minimum engine load	Defective thermostatic actuator Defective engine	Have it inspected and replaced, if necessary *DEALER OPERATION* Have it checked and repaired *DEALER OPERATION*
(*) In the case the engine was run with the catalyst overtemperature «Exh. Temp.» warning light continuously on, follow through with the check of the catalytic converter which is a dealer operation.		



1 Air bleed valve on manifold
2 Thermostat
3 Radiator cap, 10 p.s.i.
4 Reservoir filler cap
5 Reservoir
6 Supply line from reservoir to radiator
7 Radiator drain plug
8 Air bleed screw on pump
9 Water pump
10 Drain plug on crankcase
11 Heater valve
12 By-pass control valve

The cooling system is provided with a compensating reservoir containing a special **Alfa Romeo Antifreeze** which gives full protection against freezing down to **— 20 °C (— 4 °F)**.

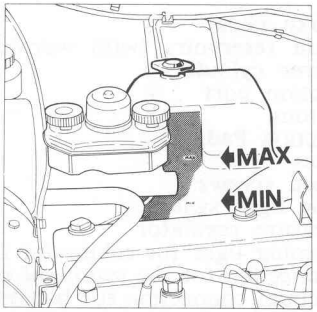
At the prescribed periods have the hoses, connections and filler cap of cooling system and the heater hoses checked for sound conditions and leaks.

CHECK LEVEL OF COOLANT MIXTURE

To ensure the efficient operation of the cooling system, the following procedure should be observed.

WARNING

Never remove the radiator cap unless absolutely necessary; in any case, to avoid severe injuries, wait that the liquid is cooled down to outside temperature.



Every 5000 miles check level of coolant in the reservoir: this should be done **exclusively with a cold engine** as with a hot engine the level may increase remarkably, even after stopping the engine.
The level of mixture in the reservoir should never fall below the « Min » nor exceed the « Max » marks.
To top up use a coolant suitable for aluminum alloy engines.
In the event this would not be feasible, distilled water may be used provided the concentration is not altered to prevent impairing the efficiency of the coolant.
Topping up with fresh water actually alters the characteristics of the Antifreeze and should be avoided.
If as a provisional measure, fresh water has been added, the whole circuit must be thoroughly drained as soon as possible and replenished with a mixture of antifreeze and distilled water.

IMPORTANT NOTE

The mixture in the cooling circuit gives full protection against freezing down to **— 20 °C (— 4 °F)**.
In places where the temperature falls below **—20 °C** the mixture can be strengthened as directed.

Should an excessive consumption of coolant mixture be experienced check for no sign of leaks. Inspect the radiator filler cap to make sure that valves, springs and seals are in sound conditions and properly operating; if doubt exists, it is advisable to replace them with new ones.

CHANGE COOLANT MIXTURE

Every 25,000 miles (or every two years whichever occurs first) have the coolant mixture renewed after the circuit has been flushed with a suitable descaling compound.

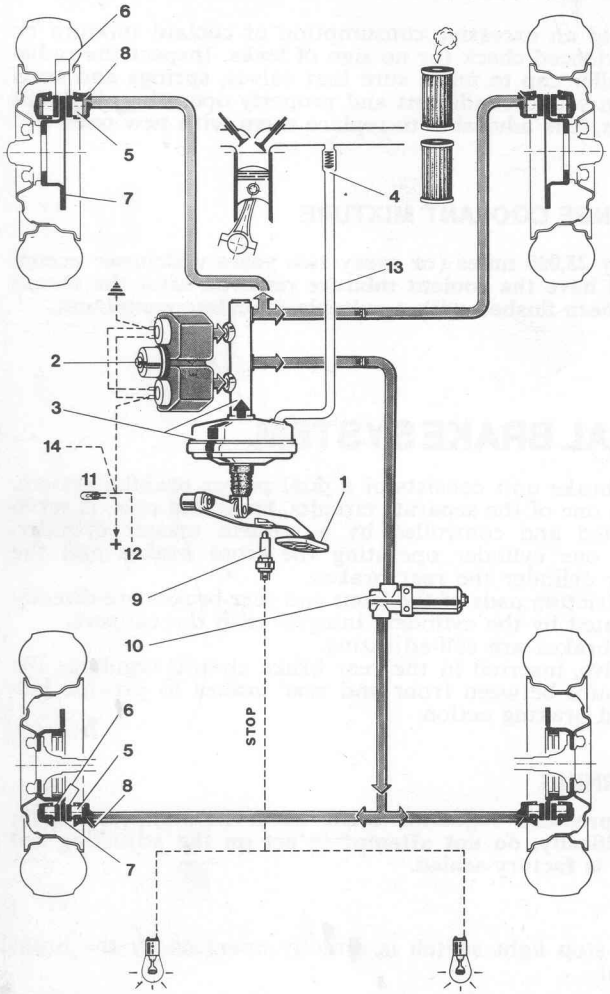
DUAL BRAKE SYSTEM

The brake unit consists of a dual power braking system. Each one of the separate circuits, front and rear, is servo assisted and controlled by a tandem master cylinder, with one cylinder operating the front brakes and the other cylinder the rear brakes.
The friction pads of the front and rear brakes are directly actuated by the cylinders integral with the calipers.
The brakes are self-adjusting.
A valve, inserted in the rear brake circuit, regulates the pressure between front and rear brakes to provide balanced braking action.

WARNING

the pressure regulator must never be tampered with; specifically, do not attempt to act on the adjusting nut as it is factory sealed.

The stop light switch is directly operated by the brake pedal.



DUAL BRAKE SYSTEM

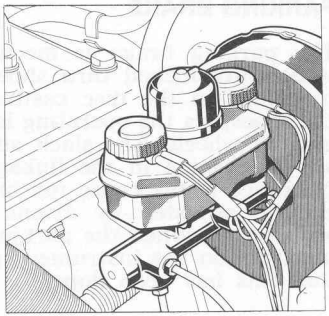
1 Brake pedal
2 Fluid reservoirs (with warning light switches)
3 Power cylinder
4 Suction port
5 Pistons
6 Friction Pads
7 Discs
8 Bleed screws
9 Stop light switch
10 Pressure regulator
11 Warning light for minimum fluid level and parking brake
12 Connection for the switch of parking brake
13 Vacuum connection for booster
14 Connection for brake warning system control unit.

CHECK BRAKE FLUID LEVEL

The two brake reservoirs have suitable markings for maximum and minimum levels; the reservoirs are provided with a baffle, which prevents fluid from interflowing between each other; however, the reservoirs are replenished thru a single filler port common to both.

Two microswitches, located at the top of reservoirs, light up a red warning light on instrument panel when the minimum level of fluid in the reservoirs is reached.

This warning light serves also as a warning for the parking brake when applied.



Therefore, should the warning light come on, first make certain the parking brake is fully released; if warning light still remains on, stop the car and check the fluid level in the service brake reservoirs; if the level is at the minimum have the circuit checked for possible failure by an **Alfa Romeo Dealer.**

To maintain the brakes in good operating condition, follow the servicing instructions given below:

- For renewal or topping up, it is absolutely essential to use only fluids meeting requirements of U.S. FMVSS 116 with the container marked « **D.O.T. Grade 3** » with minimum wet boiling point of at least 140 °C (284 °F). Always buy fresh fluid by checking container date.

Container must be sealed.
When adding fluid, clean filler cap before removing and leave the strainer in place so as to filter the fluid.

For effective and reliable operation of the brake system, the pipes must always be full of fluid and free of air bubbles.

Excessive and spongy brake pedal action is an indication of the presence of air bubbles in the system. Compressed air must not be used for replenishing the system.

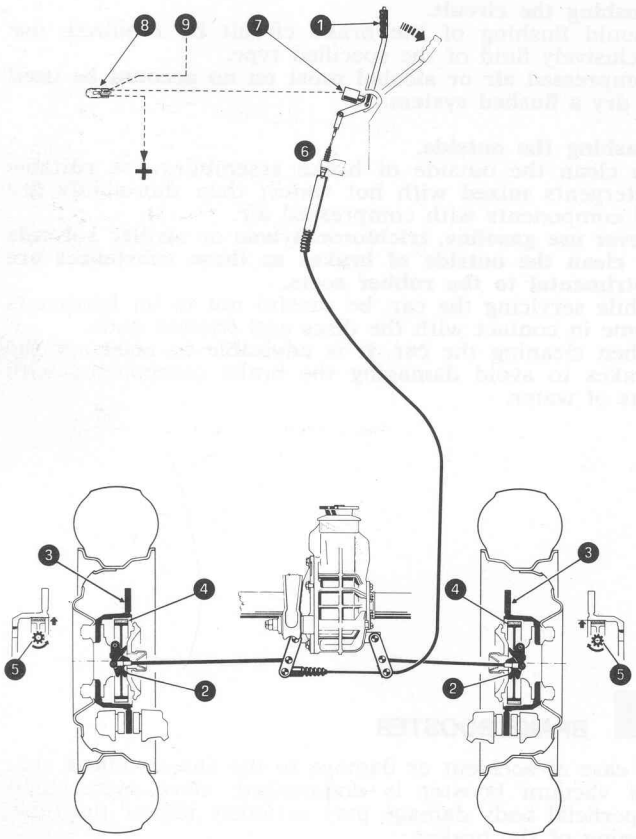
CLEANING OF BRAKES

Flushing the circuit.
Should flushing of the brake circuit be required, use exclusively fluid of the specified type.
Compressed air or alcohol must on no account be used to dry a flushed system.

Washing the outside.
To clean the outside of brake assemblies use suitable detergents mixed with hot water; then thoroughly dry all components with compressed air.
Never use gasoline, trichloroethylene or similar solvents to clean the outside of brakes as these substances are detrimental to the rubber seats.
While servicing the car, be careful not to let lubricants come in contact with the discs and friction pads.
When cleaning the car, it is advisable to mask off the brakes to avoid damaging the brake components with jets of water.

BRAKE BOOSTER

In case of accident or damage to the chassis check that the vacuum booster is undamaged, since even slight superficial body damage may seriously impair the functioning of the brakes.
At the prescribed periods have the brake booster vacuum hose, check-valve and connections checked for sound conditions and leaks.

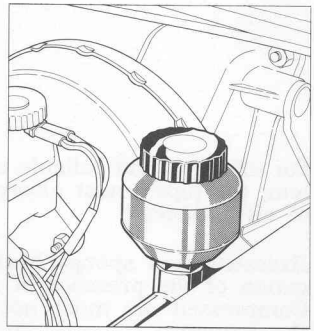


PARKING BRAKE

The parking brake is mechanically-operated; the rear wheels are locked thru shoes **4** acting against a drum machined in the disc casting. Pulling the lever causes the shoes, via the operating levers **2,** to expand thus looking the wheels. The slack adjuster **6** allows to take up any slackening in the linkage. If an excessive running clearance is the cause for linkage slackening, the shoes can be adjusted by means of the running clearance adjusters **5**. When the parking brake is applied, a warning light on the instrument panel comes on to indicate that this has been done.

1 Hand lever
2 Operating levers
3 Discs
4 Shoes
5 Running clearance adjuster
6 Slack adjuster
7 Parking brake warning light switch
8 Warning light for fluid level, service brake pressure and parking brake
9 Electrical connection to brake pressure switch unit and fluid level switches

CLUTCH

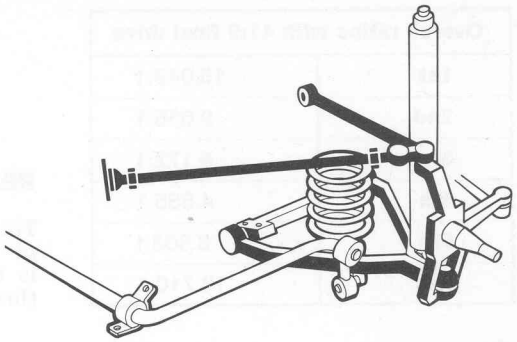


The clutch is of the self-adjusting, hydraulically-operated, single-plate dry type. At the prescribed periods check that level of fluid in clutch reservoir is between MIN. and MAX. marks. Top up if necessary.
When topping up, use the same type of fluid as specified for brake system (see page 63).

SUSPENSIONS

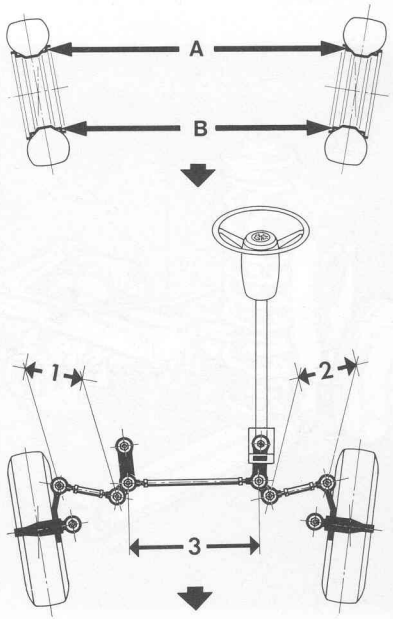
FRONT SUSPENSION

The front wheels are independently suspended and connected to the body by A-arms.
Coil springs and double-acting hydraulic telescopic shock absorbers are located between the lower arms and the body.
The suspension system is completed by a trasverse stabilizer rod which improves the stability of the vehicle when cornering
Upward movement of the arm is restricted by bumper pads situated near the springs. Downward movement is restricted by pads attached to the cross member.
Suspension components require no regular lubrication.
Whenever the damping action of the shock absorbers is uneven, have them checked by an Alfa Romeo Dealer.



FRONT WHEEL TOE-IN

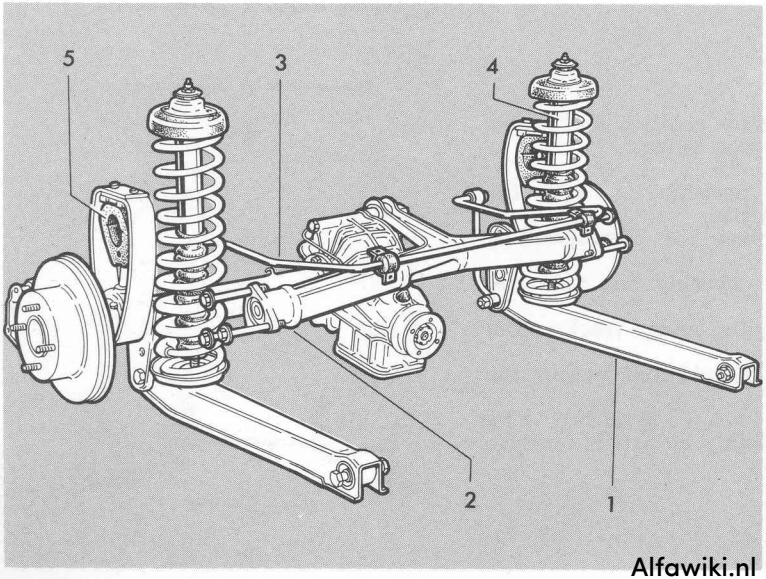
To avoid uneven and premature tire wear, and to ensure positive and stable steering, front wheel toe-in must be set to the prescribed values.
Toe-in A=B+.12"
To adjust toe-in lock steering wheel in the central position, i.e. with the spokes symmetrically disposed in relation to the vertical;
starting with the rod **2** on the steering box side, place the corresponding wheel so that the toe-in is **.06 in.;**
measure the length thus obtained of the rod on the steering box side and shorten by **.2 in.** the rod 1 on the other side;
bring the right-hand wheel to **.66 in.** toe-in by adjusting the center track rod **3;**
Length of track rods
As measured between ball joint centers, the length should fall within the following limits:
❶ ❷ **10.71** ± **.3 in.** ❸ **21.26** ± **.4 in.**
If these values cannot be restored, the cause will probably be attributable to distortion of the body resulting from a collision.



Overall ratios with 41:9 final drive	
1st	15.049:1
2nd	9.055:1
3rd	6.172:1
4th	4.555:1
5th	3.603:1
Rev.	13.710:1

REAR AXLE

The live axle is attached longitudinally to the supporting structure by means of two trailing arms with rubber bushes at the ends; transverse attachment is effected by means of a T-arm hinged to the body and to the rear axle thru rubber bushes. The final drive is of the hypoid type.



REAR SUSPENSION

The rear suspension consists of coil springs and large diameter telescopic shock absorbers coaxial with the springs.
The suspension system is completed by a transverse stabilizer rod linked to the trailing arms and the body.
1 Trailing arm
2 T-arm
3 Stabilizer rod
4 Shock absorber
5 Rubber buffer and rebound strap.
The rebound of rear axle is limited upward by rubber pads and downward by fabric and rubber straps.
The suspension units do not require any regular lubrication. Whenever the damping action of the shock absorbers is uneven, have them checked by a service station as soon as possible.

TIRES

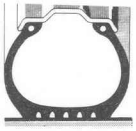
TIRE MAINTENANCE

Note

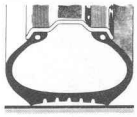
New tires, including the spare, should be broken in for at least 50 miles at speeds not to exceed 60 miles per hour.

- Check pressure regularly.
- Slow down when rounding corners or sharp curves.
- Avoid fast acceleration and prolonged periods of high speed driving.
- Avoid extreme and unnecessary braking.
- Avoid sharp objects and chuck holes in pavement.
- Maintain wheels in balance and front suspension in alignment.

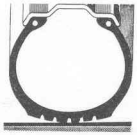
HOW INFLATION PRESSURE AFFECTS TIRE PERFORMANCE



Correct. The tire gives optimum performance, the tread works over its entire width, thus ensuring uniform tire wear and long life.



Too low. The tire will overheat: the sides of the tread will wear quickly and the tire plies will tend to separate.



Too high. Riding comfort will be reduced, and the tire will suffer from excessive wear in the center of the tread and vulnerability to knocks.

WHEEL BALANCING

Whenever a tire is changed or repaired the wheel must be rebalanced.

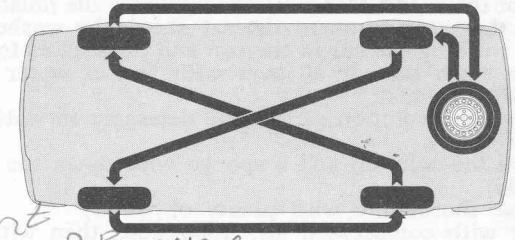
It should be remembered that unbalanced wheels cause unstable steering, abnormal steering gear wear and uneven tire wear.

To balance the rear wheels both tires must be raised from ground.

TIRE ROTATION

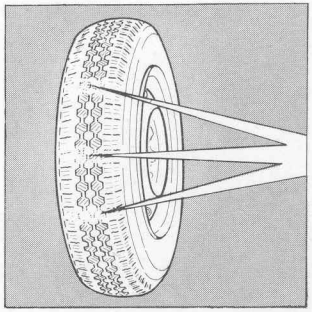
To ensure even and uniform tire wear and long tire life, front and rear wheels and the spare should be changed over regularly.

On completion of rotation inflate tires as specified.



TREAD WEAR INDICATORS

Tread wear indicators are built into the original equipment tires on your car to assist you in determining when your tires have been worn to the point of needing replacement. These indicators are molded into the bottom of the tread grooves and will appear as ½ inch wide bands when tire tread depth becomes $^{1}/_{16}$ of an inch. When the indicators appear in two or more adjacent grooves, tire replacement is recommended (see illustration).



BODY

WASHING THE CAR

The body should be washed frequently, depending on the use of the car, the environmental conditions and the state of the roads. Moreover the lighter is the finish paint shade the more frequent the car should be washed.
Avoid washing the car in the sun and proceed as follows:

- first flush the car all over with jets of water to remove the dust;
- prepare a solution of suitable detergent in water (2% in weight);
- with the solution and a sponge wipe down the whole body;
- rinse thoroughly with plenty of water;
- dry with compressed air, if possible, then with chamois leather.

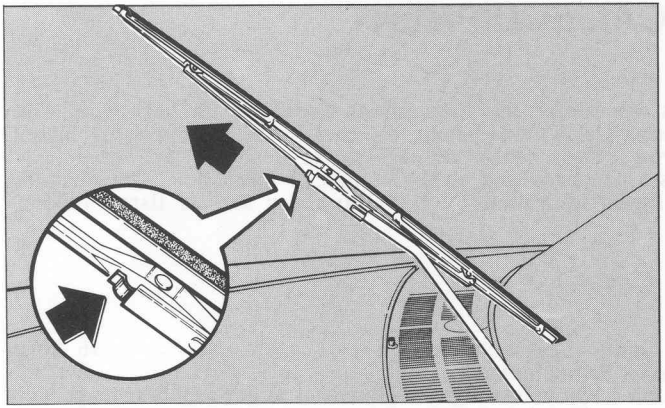
POLISHING

Note: for cleaning the outside of brakes refer to page 59.

To put fresh gloss on the paintwork, polish once or twice a year with a polish suitable for synthetic or nitrocellulose paint, according to the type of paintwork on the car.
On the chromework use gasoline to remove grease and a suitable compound to take out any scratches.
Use only woollen cloth for polishing.
Do not use gasoline or solvents on rubber mouldings and weatherstrips. When refuelling or lubricating, be careful not to splash gasoline or hydraulic fluid on the paintwork.

UPHOLSTERY

Periodically dust the inside upholstery using a vacuum cleaner if possible.
To remove oil and grease stains, use diluted ammonia on the cloth parts and vaseline on the leather.
Use trichloroethylene or neutral soap to remove stains from the carpets. The steering wheel and control knobs may be cleaned with gasoline.



CHANGING WINDSHIELD WIPER BLADES

Never attempt to force by hand the wiper arms in their normal directions of operation to avoid straining them and the drive mechanisms.
To remove the blade:

- turn wiper arm over forward
- Press the tip of locking spring 1 toward the blade; withdraw the blade from arm by keeping the spring depressed.

Caution: take care not to let the locking pin get out of its seat; make sure it is properly seated.
To refit the blade position it on the wiper arm and push in until locking pin engages.

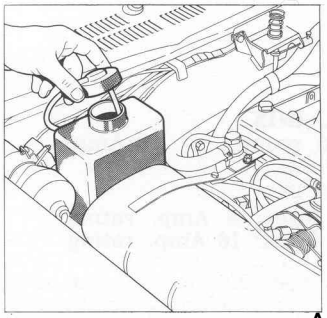
STORING THE CAR

If the car will be left unused for any length of time the following protective steps should be taken:

- add engine oil to the fuel in the tank in such quantity as to get a 2-3 per cent mixture, then run the engine at idle for about 5 minutes to protect the fuel feed system.
- empty the fuel tank; clean the oil filter and the main fuel filter;
- inject a little engine oil into the cylinders thru the spark plug holes and rotate the crankshaft by hand several times in order to spread a film of oil over the cylinder walls;
- remove the battery, store it away from frost, and recharge it once a month; never allow it to become fully discharged or plate sulfation will result;
- jack up the car, clean the tires and slightly deflate them;
  if tires are removed, dust them internally (and their tubes) with talcum powder; store them in a dark and airy but dry place;
- dust the seats and upholstery with moth preventive;
- cover the car with a dust sheet. To avoid serious damage to the paintwork, do not use polyvinyl-type tarpaulins.

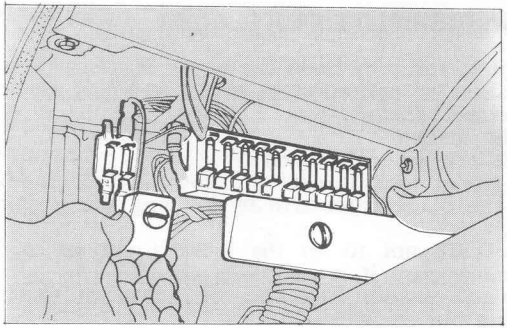
WINDSHIELD WASHER LIQUID

According to environmental conditions replenish the windshield washer container with suitable liquid (better if an antifreeze mixture).
In winter, never add water.
If run out of liquid, do not persist in operating the windshield washer or the electric pump will be damaged.

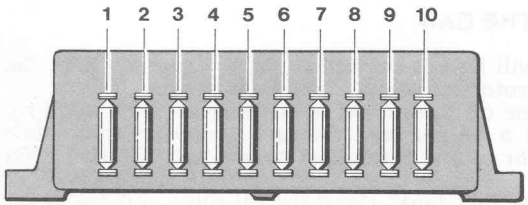


ELECTRICAL EQUIPMENT

FUSEBOXES

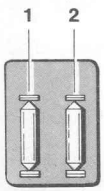


The fuseboxes are under the instrument panel, at the left side. The additional fusebox is provided near the main one. To open the boxes loosen the screw at the center of each cover.
Two spare fuses are provided at the center of main box. The circuits protected by fuses, identified by item numbers are as listed below:



MAIN BOX:

1 -	Courtesy light - Seat belt device	16 Amp.
2 -	Stop lights - Windshield wiper	8 »
3 -	Flasher unit - Glovebox light - Blower - Cigar lighter	8 »
4 -		8 »
5 -	Instrument light - Engine compartment light - Parking light and telltale - Warning lights	8 »
6 -	Backup lights - Pump solenoid - Catalyst overtemperature warning device	8 »
7 -	L.H. high Beam - H.B. Warning light	8 »
8 -	R.H. high beam	8 »
9 -	L.H. low beam	8 »
10 -	R.H. low beam	8 »



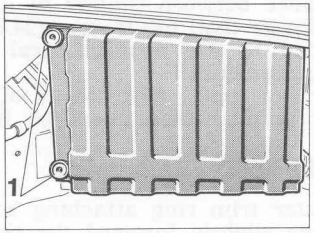
ADDITIONAL BOX

ADDITIONAL BOX

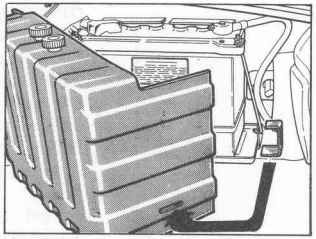
1 -	Fuel feed pump	8 Amp.
2 -		» »

N.B. - Black fuses: 8 Amp. rating
Green fuses: 16 Amp. rating

BATTERY



It is at the right side of trunk. To take the protection shield away fully unscrew the knobs 1 and remove the shield from the two threaded pins and the retainer at the rear.
The battery water level should be 4-5 mm. (3/16") above the plates. When filling up the battery, use only distilled water; **never add acid.**
Make sure that terminals are tight-and are sufficiently coated with pure vaseline. Furthermore, the following should be born in mind:



- In summer, check frequently the electrolyte level.
- When recharging the battery, completely disconnect it from the system.
- Never reverse the battery polarity or the alternator diodes will be damaged.
- When electric weldings are carried out on car, disconnect battery making sure the positive terminals is properly insulated. **The engine must be stopped.**
- Do not connect timing lights to the battery-alternator system.

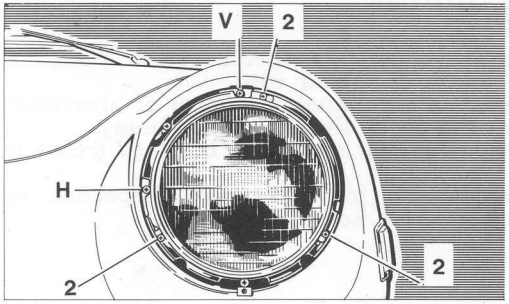
ALTERNATOR

The alternator requires some special cares.

- **It should not be tampered with.**
- Never disconnect the battery terminal of alternator-to- battery cable while the engine is running.
- Avoid overloading the alternator bearings (refer to page 52).
- It is recommended to entrust any inspection or repair work to Alfa Romeo Dealers.

STARTER

Regularly:
Inspect commutator and brushes.
The brushes must be clean and must slide freely in their holders: brush working face must be cleaned with a cloth soaked with gasoline; the brush spring must apply effective pressure.
When one brush has to be replaced, it is a good rule to replace the other at the same time. Always fit new original brushes of the prescribed type.
After replacing the brushes, run the starter with no load and for such time as is necessary to bed the brush working face to the commutator.
If the commutator is burned or elongated, it most be reworked on a lathe taking care to decrease the diameter of the minimum required only: after machining, undercut the mica between the segments.

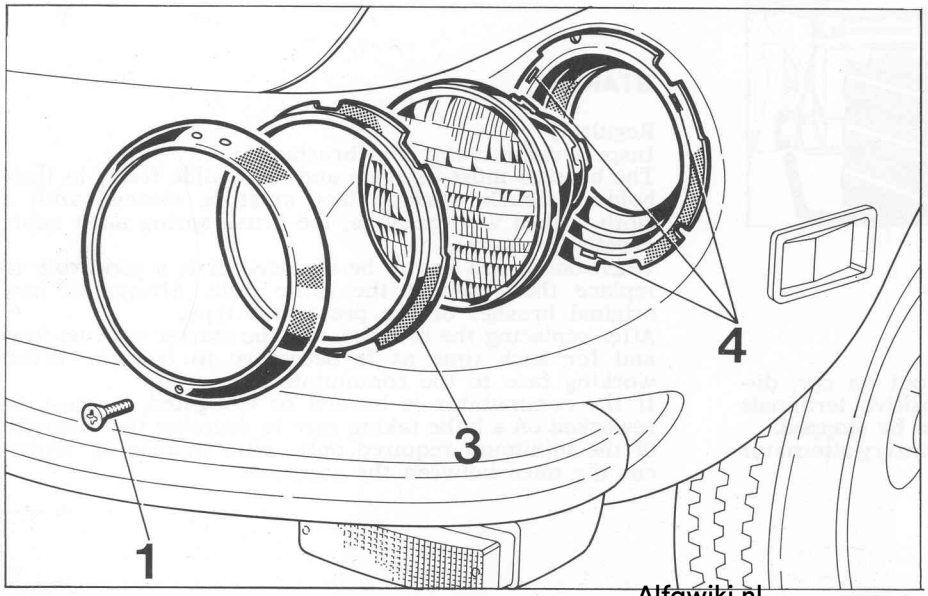


HEADLAMP BEAM SETTING

Warning: distance between centers of light beams and level ground **must not** be lower than 619.76 mm (24.4"). For setting the beams it is recommended to use a mechanical aiming device meeting the SAE J 602 requirements.
H - screw for horizontal adjustment of headlamp beams
V - screw for vertical adjustment of headlamp beams

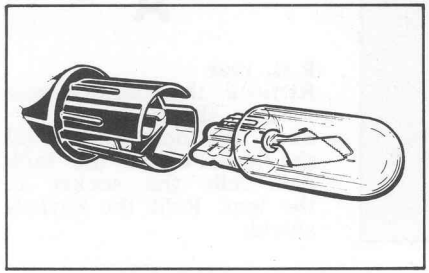
REPLACING SEALED BEAM UNITS

Loosen the outer trim ring attaching screw 1 and remove the trim ring by bending slightly forward the ring bottom. Loosen the three screws 2 securing the ring 3 (take care not to disturb the setting of adjusting screws V and H); rotate ring 3 counterclockwise and remove it. Hold the sealed beam unit firmly to prevent it from dropping out.



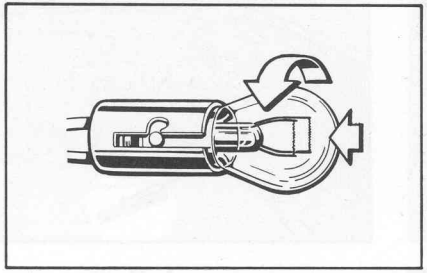
Disconnect the feed wire connector from sealed beam unit. Fit the connector to the new sealed beam unit. Mount the unit in such a way that the glass « bosses » seat properly into the notches 4 in the unit support.
Note: the sealed beam unit can be fitted only if correctly positioned. Therefore, if difficulties arise, rotate the unit by 120 degrees clockwise or counterclockwise until it is properly fitted to its support.
Place the ring 3 in position onto the support and rotate the ring clockwise; then, tighten screws 2.
Fit the two retainers at the trim ring top to their seats and retighten the attaching screw 1.

REPLACING BULBS



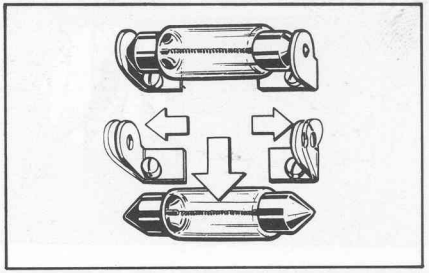
A

All glass type:
to remove, grasp the bulb socket with the fingers and withdraw the bulb.



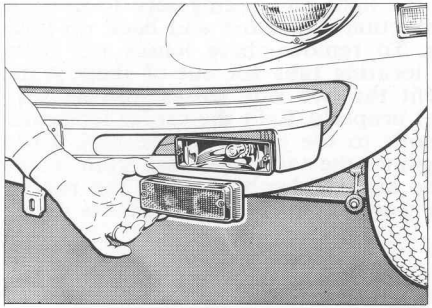
B

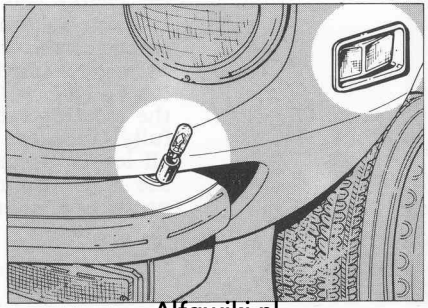
Bayonet type mount:
push the bulb in rotate it counter-clockwise and withdraw the bulb.



C

Cylindrical type:
snap the bulb off putting the terminal springs apart.





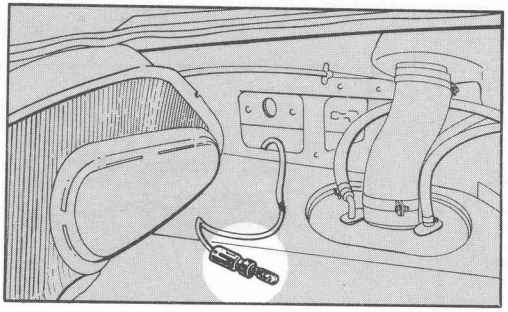
B

Front direction indicators and parking lights
Slacken the lens attaching screws and remove the lens. Renew the bulb and refit lens.

A

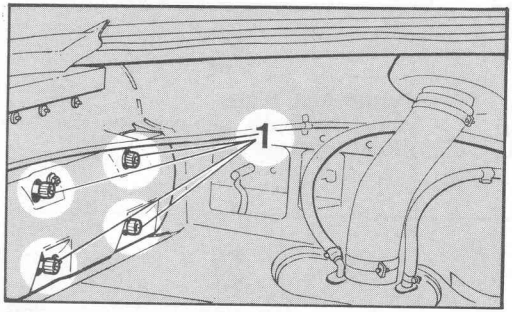
SIDEMARKER LIGHTS

Front
From inside. the wheelhouse, snap the bulb socket off the lens; renew the bulb and refit the socket to the lens.



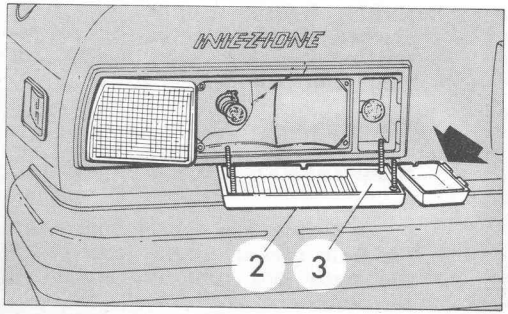
A

R.H. rear
Remove the battery protection shield.
Snap the bulb socket off the lens; renew the bulb and refit the socket to the lens. Refit the battery shield.



L. H. rear
Remove the bulb socket and renew the bulb. Refit the socket to the lens.

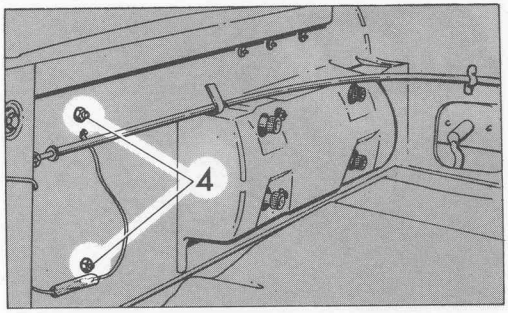
B

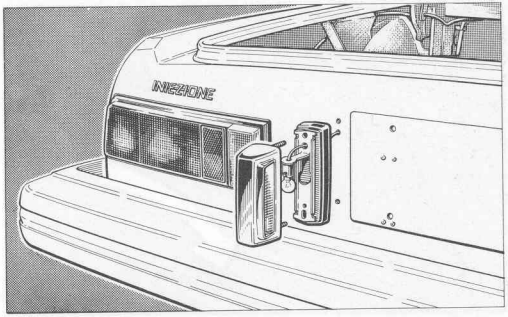


Tail direction indicators, parking and stop lights - Back up lights.
Raise the trunk back panel rubber protection. Unscrew the four knurled knobs **1** and, from the outside, remove the center lens **2** of the light unit taking care to prevent the side sections (direction indicators and back up light lenses) from falling. To remove these lenses tilt them backward until the locating tabs get out of their seats. Renew the bulb. Refit the two side lenses making sure the locating tabs seat properly. Refit the center lens carefully (reflector **3** nearer to the center of the car). Keep all lenses pressed against the tail panel and from inside the trunk tighten the knurled knobs **1.** Refit the rubber protection in such a way that its bottom edge fits under the carpet.

LICENSE PLATE LIGHTS

Raise the trunk back panel rubber protection.
Loosen nuts **4** securing housing to car's body. From the outside remove the housing and renew the bulb. Refit the housing making sure the lens is pointing toward the license plate and the seating gasket fits properly against body panel.
Retighten the two nuts 4 and lower the rubber protection in such a way that its bottom edge fits under the carpet.

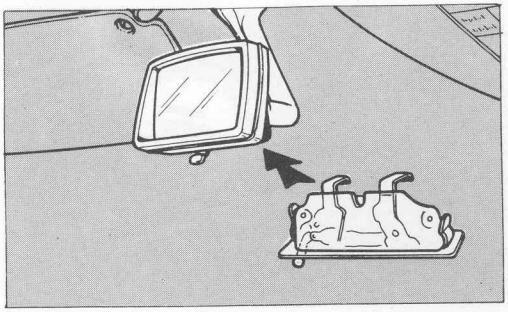


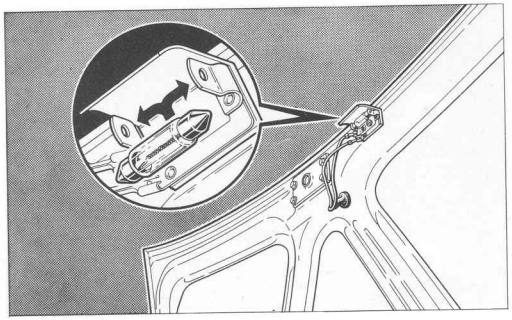


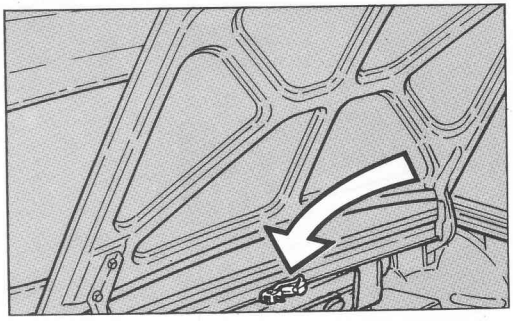
C

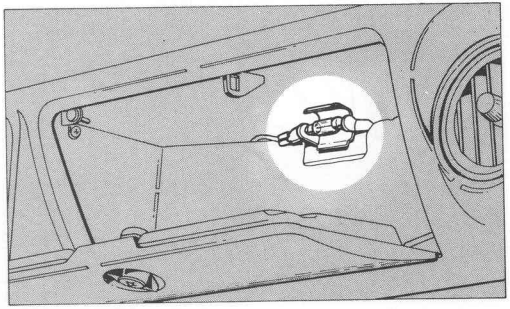
COURTESY LIGHTS

Snap off the light unit. Renew the bulb and refit the unit, making sure it is properly positioned (the bent ends of terminal springs should be pointing toward the front of the car).





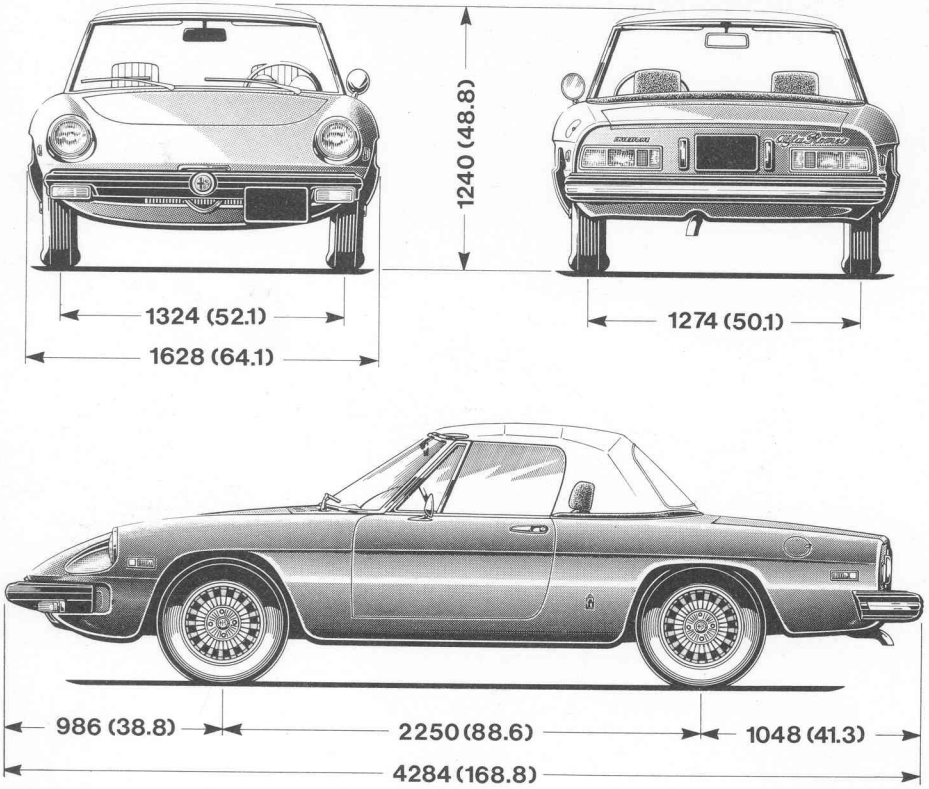




C

Engine glove and baggage compartment lights
Remove bulb and change it.

GENERAL DATA



Dimensions in millimeters (and inches). Height under static load.

SPECIFICATION

ENGINE

Number and layout of cylinders	4 in line
Bore and stroke	84×88.5 mm
Total displacement	1962 cc

CHASSIS

Turning circle	(10,400 mm) 34.5 ft
Designated seating capacity	2
Tires	165 HR 14
Curb weight	kg 1114 (2455 lbs)
Trunk capacity	dm^3 300 (cu. ft. 10)
Towing gross weight	kg 800 (1764 lbs)

IDENTIFICATION

Identification and/or specification labels and stampings are located as follows:

Vehicle identification number
1 Firewall
2 Windshield plate
3 D.O.T. certification label

Production date
3 D.O.T. certification label

Gross vehicle weight
3 D.O.T. certification label

Engine number
4 Left rear side of engine block

Exhaust emission data - Compliance with air pollution regulations
5 Emission data label

Useful load - Seating capacity - Tire pressure
6 Label on inner side of glove compartment lid

Break in data
7 Label on passenger's sun visor

Lubrication data
8 Lubrication data label

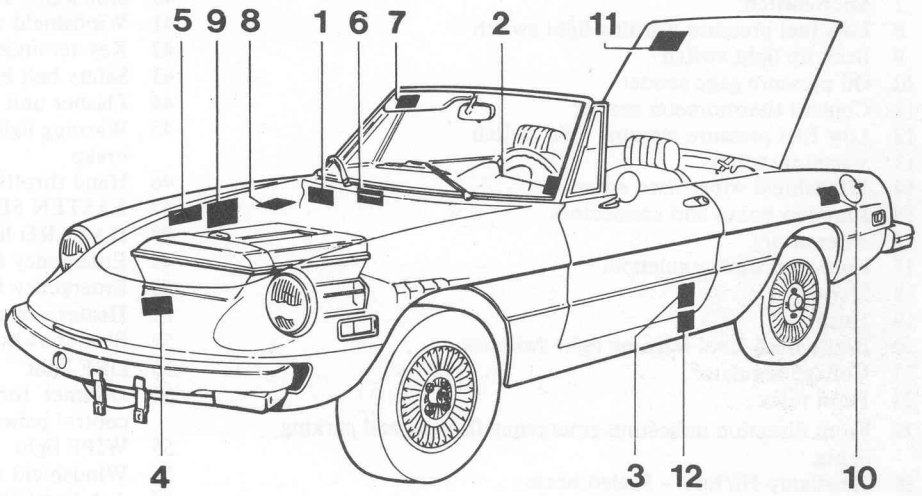
Spark plug data
9 Spark plug data label

Fuel requirements
10 Label near fuel tank filler port cover

Paint
11 Paint label

Compliance with air pollution regulations
12 Label on jamb

When contacting a Member of our Service Organization please state: car model no., Vehicle identification number, registration date, distance covered and car's purchase data.



ELECTRICAL EQUIPMENT ITEMS

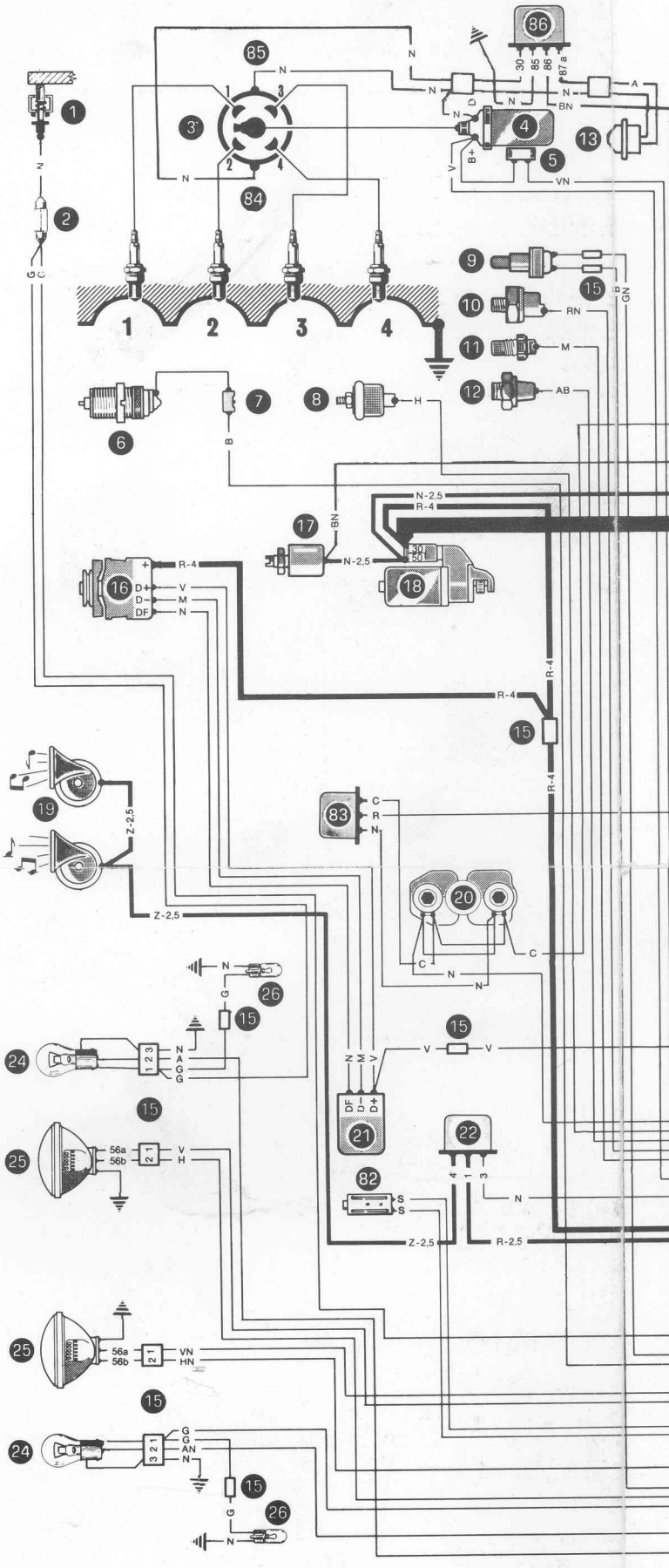
1 Engine compartment light switch
2 Engine compartment light - 5 W
3 Ignition distributor
4 Coil
5 Resistance (off during starting)
6 Fuel cut-off solenoid
7 Microswitch
8 Low fuel pressure warning light switch
9 Back up light switch
10 Oil pressure gage sender
11 Coolant thermometer sender
12 Low fuel pressure warning light switch
13 Vacuum switch
14 Windshield wiper (two speed)
15 Junction boxes and connectors
16 Alternator
17 Cold start device solenoid
18 Starter
19 Horn
20 Brake fluid level warning light switches
21 Voltage regulator
22 Horn relay
24 Front direction indicators-emergency flashers and parking lights
25 Headlamp Hi/Low - Sealed beam
26 Side marker lights, front - 3 W
27 Safety belt device
28 Glove compartment light
29 Glove compartment light switch
30 Blower motor (two speed)
31 Low oil pressure warning light
32 High beam warning light
33 Low fuel pressure warning light
34 Parking light warning
35 Instrument lights
36 Fuel reserve warning light
37 Blower warning light (two brightness levels)
38 Alternator warning light
39 Direction indicators warning light
40 Stop lights switch
41 Windshield washer switch foot operated
42 Key-remindez buzzer
43 Safety belt buzzer
44 Flasher unit
45 Warning light for minimum brake fluid level and parking brake
46 Hand throttle warning light
47 FASTEN SEAT BELTS light
48 HAZARD light
49 Emergency flashers switch
50 Emergency flasher pushbutton warning light
51 Heater control panel light
52 Blower switch
53 DEF light
54 Dimmer for HAZARD, DEF, WIPE lights and heater control panel light
55 WIPE light
56 Windshield wiper switch
57 Ash tray light - 5 W
58 Ash tray light switch
59 Cigarette lighter
60 Hand throttle warning light switch
61 Parking brake warning light switch
62 Courtesy light - 5 W
63 Courtesy light switch (in mirror)
64 Ignition and starting switch

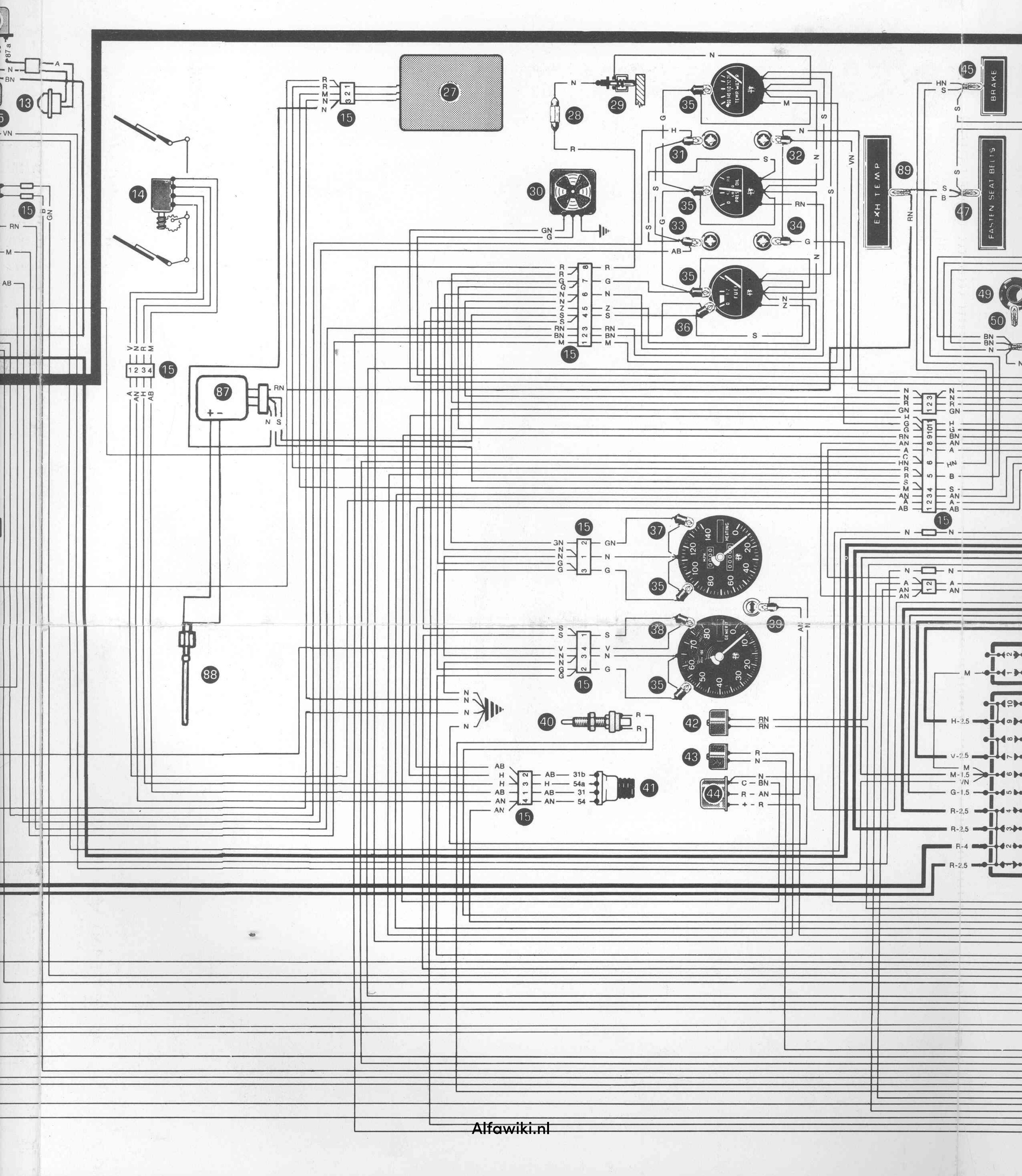
65 Horn control
66 Fuseboxes
67 Parking lights, headlamps and flashing switch
68 Direction indicators switch
69 Key-reminder buzzer switch
70 Courtesy light switch on door jambs
71 Battery - 12 V / 60 Ah
72 Belt switch (driver's side)
73 Trunk light switch
74 Trunk light
75 Electric fuel pump
76 Fuel level sender
77 Side marker lights, rear - 3 W
78 Rear direction indicators - 21 W
79 Parking and stop lights-emergency flashers - 5/21 W
80 Back-up lights - 21 W
81 License plate lights - 5 W
82 Inertia switch
83 Brake warning light relay
84 Auxiliary breaker
85 Primary breaker
86 Relay for ignition advance (on starting)
87 Catalyst overtemperature (Exh. Temp.) warning light feed unit
88 Thermocouple for catalyst overtemperature warning light
89 Catalyst overtemperature (Exh. Temp.) warning light 1.2 W

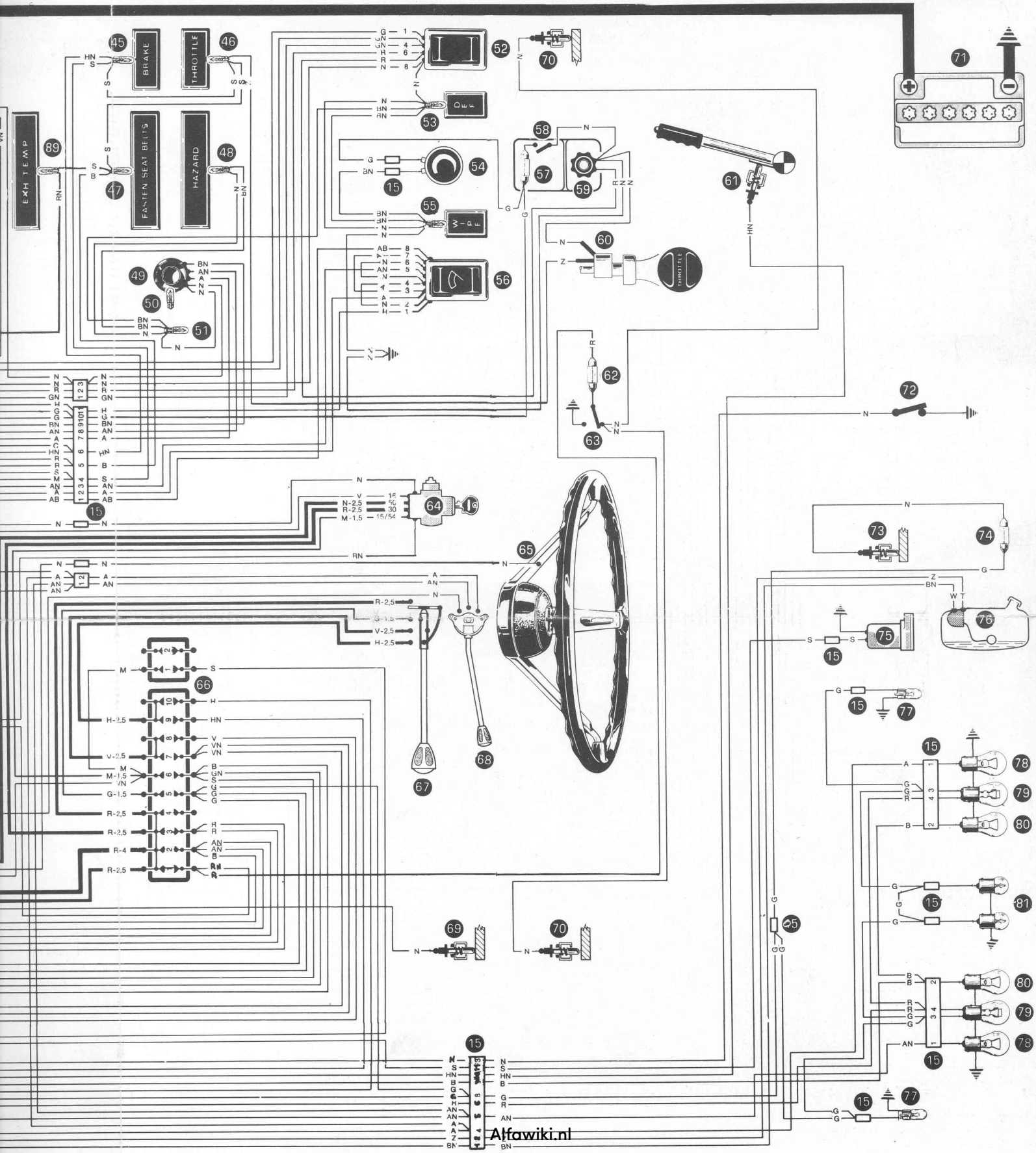
CABLE COLOR CODE

A	blue	**AB**	blue/white
B	white	**AN**	blue/black
C	orange	**BN**	white/black
G	yellow	**GN**	yellow/black
H	grey	**HN**	grey/black
M	brown	**RN**	red/black
N	black	**SN**	pink/black
R	red	**VN**	green/black
S	pink	**ZN**	violet/black
V	green	**N-R**	red-striped black
Z	violet	**N-V**	green-striped black

The figure following the color code on the diagram shows the wire gauge in mm^2.
Where not shown the wire gauge is 1 mm^2.




BRAKE
FASTEN SEAT BELTS
EXH TEMP
TEMP WATER
PRESS OIL
FUEL
HEATING
GENERAL
13
14
15
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
47
49
50
87
88
89
31b
54a
31
54
H-2,5
V-2,5
M-1,5
G-1,5
R-2,5
R-4


BRAKE
THROTTLE
EXH TEMP
FASTEN SEAT BELTS
HAZARD
OIL
WIPE
THROTTLE
Alfawiki.nl

CASSETTE STEREO TAPE PLAYER WITH AM/FM STEREO RADIO

OPERATING INSTRUCTIONS

ANTENNA

For best reception on the AM band leave the antenna fully extended; for best reception on the FM band adjust the height of the mast to approximately 32" (81 cm).

TO TURN TAPE PLAYER OR RADIO ON

The ON-OFF switch is combined with the VOLUME control, both of which are operated with the left front knob. Turn this knob clockwise until a « click » is heard, which indicates that the set is now « ON ». Further clockwise rotation will increase the volume.

TONE CONTROL

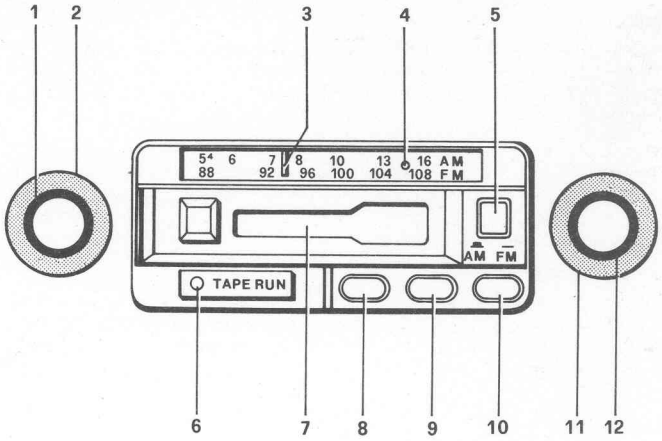
Adjust the tone for the most pleasing sound by turning the left knob behind the volume control. Turn the knob clockwise to increase the treble or counterclockwise to increase the bass.

BALANCE CONTROL (LEFT-RIGHT)

Adjust the balance control, the knob behind the manual tuning knob, to the point where the volume is equal between the left and right speakers.

CASSETTE STEREO PLAYER OPERATION:

Insert the tape cassette into the tape slot until it locks into position. The unit is automatically switched to tape player operation and the green Tape Run indicator light will be on. When the end of the tape is reached the indicator light will go off and the motor will be shut off. To play the other side of the tape program, depress the eject button and pull the tape cassette out. Turn the cassette over and reinsert into the tape slot.



1 ON-OFF volume control
2 Tone control
3 Red dial pointer
4 Red stereo indicator light
5 AM/FM selector button out AM, in FM
6 Green tape run indicator
7 Cassette tape door
8 Fast forward button
9 Rewind button
10 Tape eject button
11 Right-left balance control
12 Manual tuning control

Note:
Do not leave a tape cassette engaged in the tape player when it is turned off. This can result in the tape player tearing the tape when it is again turned on.

Rewind
Keep the rewind button (REW) pushed in to rewind the tape in order to repeat other sections of the tape program. When the button is released, the unit will play at normal speed.

Eject
To eject the tape cassette push in firmly on the eject button (EJ) and the cassette will be partially ejected from the tape slot. The unit is automatically switched to radio operation.

Fast forward
Keep the fast forward button (FF) pushed in to increase the tape speed in order to locate other sections of the tape program. When the button is released, the unit will play at normal speed.

AM/FM STEREO RADIO OPERATION:

Remove the tape cassette from the slot.

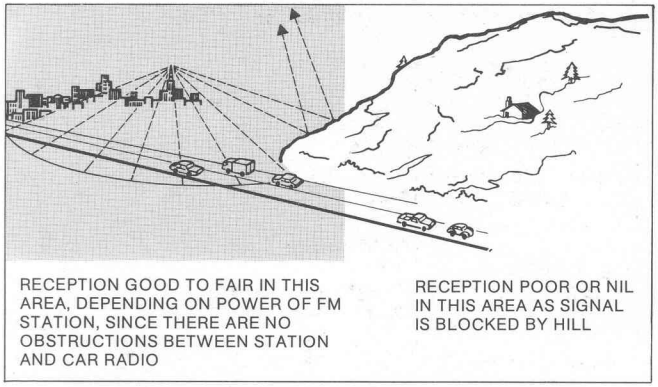
AM-FM selection
The desired broadcast band is selected with the AM-FM selector button, located at the right side of the tape slot. Leave the button in the Out position for AM reception, and push the button in the In position for FM reception.

Manual station tuning
Turn the right front knob in either direction until the desired station is received. The upper set of numbers on the dial scale is for AM and the lower set of numbers is for FM. Tune the set carefully until you are exactly on the station, tuning to either side of the station will result in poor tone quality and noisy reception.

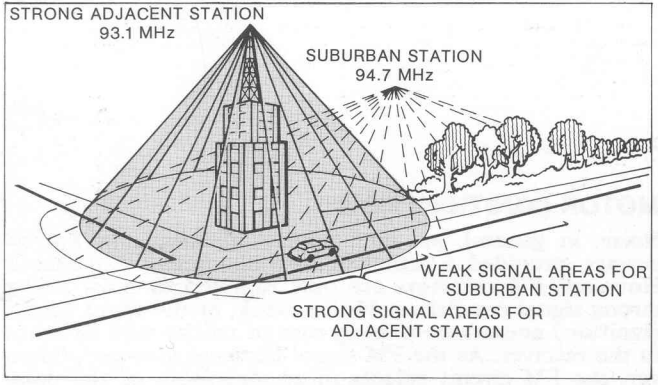
Stereo indicator light
This radio has a red stereo indicator light located behind the right side of the dial scale. This light will be on whenever the radio is tuned to an FM station broadcasting in stereo.

MOTOR (IGNITION) NOISE

Noise, in general, presents no real problems in FM receveirs ,provided a signal of sufficient level is available. However, FM receivers are only immune to noise under strong signal conditions. With a weak, or no signal, motor (ignition) noise from passing cars or trucks may be heard in the receiver. As the FM signal becomes stronger, however, the FM circuit rejects more and more of the noise until it will no longer be heard.



GOOD AND BAD FM RECEPTION AREAS



CAPTURE EFFECT

FM RECEPTION

There are many advantages to FM radio, such as high fidelity reception relatively free from noise, a fine choice of programs, and fine tonal quality. The effective range of FM stations, however, is not as great as of AM stations. This is primarily due to the fact that radio signals in the frequency range utilized by FM, travel through space in straight lines, often referred to as « line of sight », and are easily absorbed or blocked by mountains, hills, etc. Due to this characteristic the usual range of an FM station, although there are exceptions, may be limited to 25 miles, or less.

As you drive away from the FM station the signal will become weaker, performance will decrease and interference will become increasingly noticeable. This is brought about by the fact that an FM radio requires a certain minimum level of signal strength to provide noise-free reception. When the received signal drops below that minimum level, it is normal for the radio to pick up electrical interference such as ignition noise from surrounding cars, electric signs, etc., which may interfere with or completely drown out the FM station to which you were listening.

Also in weak signal of « fringe » areas, the station may fade out completely, or flutter in and out when objects come between the station and the receiver. The rate at which the flutter occurs in this case is dependent upon the car's speed in passing the objects. This type condition is more noticeable when driving in areas of hills and valleys.

CAPTURE EFFECT

Capture effect is noticed primarily when driving in the downtown areas of large cities. If a station with fairly low signal level is being received and a higher level signal from an adjacent frequency becomes available at the antenna, the radio may possibly pull-in or « capture » the stronger signal momentarily. Generally, each time you drive by a tall building or other object which can cause the station to which you are tuned to lose signal strength, it is possible for the radio to pull-in a much stronger adjacent channel signal. The tuner determines which of the two signals is the strongest and automatically shifts to it.

RECOMMENDED LUBRICANTS

PART	Classification	Commercial equivalents		
		Agip	Shell	IP
Engine	10 W/50 API SE ASTM SE SAE SE	AGIP SINT 2000 SAE 10 W/50	SHELL Super X Motor Oil 10 W/50	IP Super X Motor Oil 10 W/50
Transmission Gearbox Steering box and differential	SAE 85 W/90 API GL 5	AGIP F. 1 Rotra MP SAE 85 W/90	SHELL Spirax 90 HD	IP Pontiax HD SAE 85 W/90
Spline on propeller shaft slip yoke	SAE NLGI 1	AGIP F.1 Grease 15	SHELL Retinax A	IP Auto Grease MP
Front wheel bearings	SAE NLGI 2/3	AGIP F.1 Grease 33 FD	SHELL Retinax AX	IP Auto Grease FD

API – American Petroleum Institute
ASTM – American Society for Testing Materials
SAE – Society of Automotive Engineers
NLGI – National Lubricating Grease Institute

RECOMMENDED TIRE PRESSURE (COLD)

165 HR 14 (with 6 J x 14 rims - alloy wheels) (with 5 1/2 J x 14" rims - pressed steel wheels)	FRONT		REAR	
	PSI	kg/cm²	PSI	kg/cm²
Ceat D 2 **Continental** Conti TT 714 **Firestone** Cavallino Sport 200 **Good Year** G 800 Grand Prix **Pirelli** Cinturato HR	24	1,7	26	1,8
Kleber Colombes V 10 GT	21	1,5	26	1,8
Michelin XAS	21	1,5	26	1,8

CAPACITIES

	U.S.A.	METRIC
Cooling system . . . . . abt.	2.5 gals	9,7 l
Fuel*		
Tank capacity . . . . . abt.	12.2 gals	46 l
Reserve . . . . . abt.	1.3-2.1 gals	5 – 8 l

* Fuel requirements (refer to page 1)

Oil Engine	U.S.A.	METRIC
when full* . . . . . abt.	7.1 qts	6,6 l
danger level . . . . . abt.	4.75 qts	4,4 l
Transmission . . . . . abt.	3.8 pts	1,85 l
Differential . . . . . abt.	3.0 pts	1,4 l
Steering box . . . . . abt.	.8 pt	0,4 l
* This quantity is that needed for regular changing. The total amount of oil in the circuit (pan, filter and passages) is . . . . . abt.	7.8 qts	7,16 l

ALFA ROMEO – DIREZIONE ASSISTENZA TECNICA – CENTRO DIREZIONALE – 20020 ARESE (MILANO)
Public. N. 2681 – 10/78 – 2400 – Printed in Italy by Tipolito Maggioni

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