



MERCEDES-BENZ TYPE 190 b

OWNER'S MANUAL

Edition A

DAIMLER-BENZ AKTIENGESELLSCHAFT
STUTTGART-UNTERTÜRKHEIM

Attention

When starting cars which have not been in use for a longer period of time!

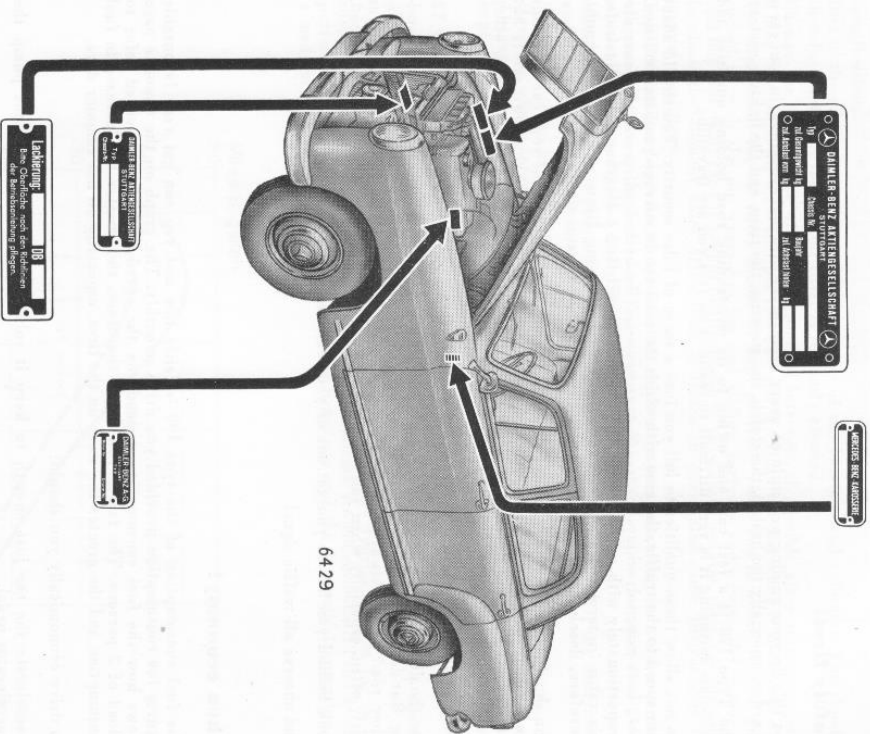
To insure engine lubrication, watch oil pressure when starting the car.

The engine should never be rewed up or subjected to load before the oil pressure gauge starts functioning.

Table of Contents

	page
A few general hints	4—5
Operating instructions	6—22
Instruments and control levers	6—11
Fuels, coolants, lubricants	12—14
Starting and stopping	15—16
The "first 900 miles"	16—17
Gearshifting	17
Driving hints	18—19
Winter driving	19—21
Hints for long trips abroad	22
Maintenance	23—49
Lubrication and maintenance schedule	23—28
Cleaning the car and taking care of the bodywork	29—31
Instructions for the sliding top	31
Points to be especially considered with regard to:	
Engine	32—36
Carburetor	36—37
Clutch	38
Brakes	38—39
Wheels	40—41
Lubrication of wheel bearings	40
Wheel changing	41
Wheel interchanging	41
Tires	41—43
Tire changing	41
Tire pressure	42
Tire wear	43
Tire care	43
Electrical system	44—48
Lights and lamps	47—48
Cooling system	48
Keeping in a garage and laying up the car	49
Hints for emergency repairs	50—54
Towing the car	50
Starter motor fails to turn over	50
Engine does not start	50—51
Engine stalls	52
Engine is "pinking"	52
Red generator indicator lamp lights up when driving	52
Oil pressure suddenly drops	52
Cooling water becomes too hot	53
Clutch is slipping	53
Braking effectiveness decreases	53—54
Defects in the electrical system	54
Technical Data	55
Alphabetical subject index	56
Not responsible for errors. Subject to modifications!	

Position of model designation, engine and chassis number plates



Make a careful note of the chassis and engine numbers of your car, including the complete model designation which is stamped in above them.

Any orders for spare parts can only be dealt with promptly and correctly — and this also applies to an ignition or car key (the latter also fits the luggage compartment lock) — if the chassis and engine numbers as well as the complete model designation are mentioned on your order.

A few general hints

which must be read before starting on the first trip.

Safety first!

Let this be your guiding principle on every drive. Make sure that everything in your car is in order, especially the brakes, the clutch, the steering, the tires, and the lighting system.

The Type 190 is a fast car, and owing to its outstanding road holding qualities and first-class springing it is very difficult to realize how fast you are travelling.

Do not allow these qualities to lull you into a sense of false security. You should adapt your speed to the traffic, the ease with which the road can be surveyed and its condition. Wet, snow-covered or icy roads are treacherous. The braking distance increases disproportionately with every increase of speed. You will find a diagram which illustrates this ratio in terms of figures in the section on «Driving Hints», p. 18. You should, therefore, decelerate and brake earlier than you would instinctively do otherwise.

You should, therefore, only make full use of the high performance of your car when this can be done without any danger. You are responsible not only for your own safety but also for that of your fellow passengers and for all the damage you may cause to other road users.

Keep to the traffic rules in force in your country.

Use the direction signals each time you alter the direction in which you have been travelling. But do not rely entirely on this just as you should not count on the discipline of the other road users. Always keep a sharp look-out, and glance at the rear-view mirror fairly often, especially when you leave a main road and drive into a lane or private road.

Look behind you before you get out of your car, especially in city traffic.

And observe all traffic signs!

Then economy!

The fuel consumption of the type 190 is fairly low and you can get very favourable figures for consumption provided you drive smoothly. The graph on the opposite page shows how the fuel consumption depends on the speed. The data specified refer to a load of 2 persons. The faster you drive, therefore, the greater the increase in fuel consumption and the greater the wear on the tires, especially on hot summer days.

To drive economically you should:

1. accelerate the car just enough to keep it rolling along evenly; do not pump the accelerator pedal.
2. drive «gently» and evenly and adapt your speed to the terrain; above all, do not corner too sharply. Any reckless driving round a sharp corner will wear out tires much more than miles of normal driving on a main road;
3. avoid any sudden changes of speed through sharp braking or hard acceleration, for both accelerating and braking increase the fuel consumption and the tire wear.

Very fast «sporty» driving, however, costs more money. You should, therefore, consider which is more important to you at the moment: saving travelling time or saving money.

Don't forget the maintenance of your car

The best lubricants are just good enough for your car. Be sure to use always those brands which correspond to the actual seasonal requirements and meet our viscosity specifications.

Dirt in the oil damages the working surfaces of the bearings and cylinders. You should, therefore, see to it that the oil filter is regularly cleaned.

Change the engine lube oil at the specified intervals, if possible after returning from a long trip, while the oil is still hot and thin and can flush the dirt while it is drained out.

The element of the air filter should be kept perfectly clean and in order, for the dust sucked in with the air wears bearing and sliding surfaces and causes the valves to seal improperly. If the car is continually driven in very dusty country, then it is advisable to clean the element more often than indicated in our maintenance instructions for normal conditions.

Type 190 is not equipped with a central lubrication system; however, there are a number of grease nipples at the front and rear axle, as well as at the universal joint shafts, into which grease should be regularly filled at the specified intervals.

Have the fuel filters cleaned at the specified intervals and see to it that the distributor and spark plugs are checked.

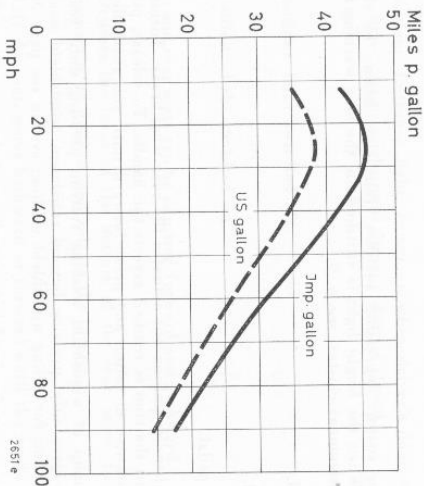
Do not forget to have the battery serviced. A new battery is expensive.

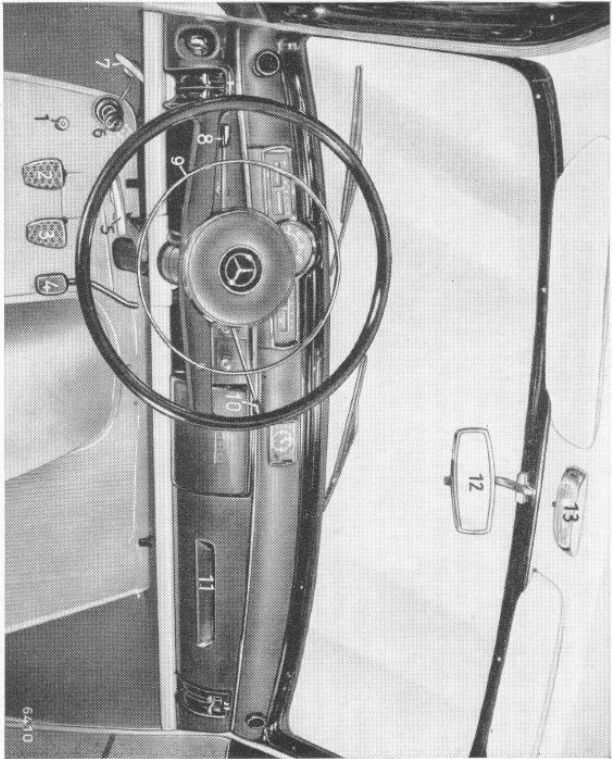
Have the wheels interchanged and balanced in accordance with our instructions. Always adhere to the specified tire pressure, which ensures that the wear on the tires is kept down to a minimum and that the steering gear and spring-suspension remain good.

If you follow these hints

your 190 will never let you down, and you will find it a practical touring car equally suitable for town, country and long-distance driving.

Type 190 combines the advantages of the large and heavy touring cars as far as the suspension and the passenger and luggage compartments are concerned with the driving performance of a sports car, the safety of a heavy car and the economical operation of a medium class car.





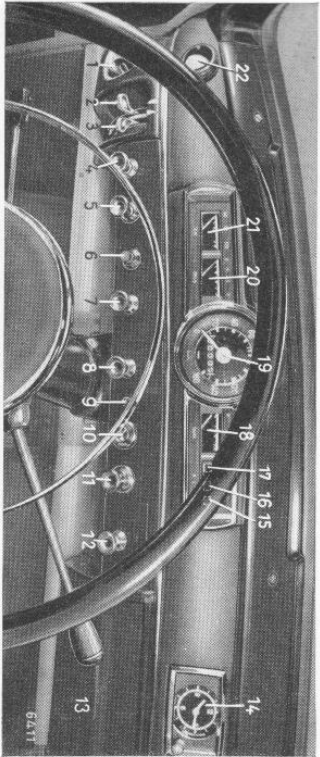
Driver's seat

1. Foot dimmer switch: depressing switches from «low beams» to «high beams» or vice-versa. When the bright light is switched on, the blue warning light «F» lights up in the instrument cluster, see p. 9.
2. Clutch pedal.
3. Brake pedal.
4. Accelerator pedal.
5. Hand brake handle: pulling out actuates the rear wheel brake. Turning in clockwise direction until the stop is reached arrests the handle. To release, pull handle, turn it in anti-clockwise direction and press forward until you reach the stop.
6. Pedal for pump of windshield washing system: pressing until resistance is felt, windshield wipers only; pressing beyond resistance, windshield washing system in addition. Solution for filling windshield washing system see page 30.
7. Clamp handle for engine hood lock. Opening and closing see page 32.

6

8. Lever for direction signal lights and passing signal light.
Turning clockwise: direction signal light, right;
Turning anti-clockwise: direction signal light, left
(returns automatically when steering wheel is in straight-ahead position);
Lifting: passing signal light — only European design —
9. Contact ring for horn. Pressing down actuates horn.
10. Lever for transmission. Shifting see page 17.
11. Glove compartment. Serves as shelf when folded down.
12. Rear view mirror. Adjustable in all directions. Prevention of injuries by the mirror because it is fastened with a spring-loaded ball pin to the mounting plate and is released upon impact.
If a following vehicle is blinding, the mirror can be dipped to anti-dazzle position by pressing the small lever.
13. Interior light. Also entrance light.
The switch underneath the light can be moved to three positions:
Left position: Entrance light; comes on when driver's door is opened and re-
(as seen in driver's main a light until driver's door is closed.
ing direction)
Center position: light switched off.
Right position: light switched on.
Both the front and rear seats can be adjusted forward and backward.
Front seats: Depress the lever at the bottom of the seat, move the seat forward or
backward, as desired, and release the lever.
Back seats: Lift the seat, move backward or forward until the guide pins engage again
(2 positions).

7



Instrument panel

1. Light switch. Turn and pull switch.

Lever vertical: 0 position

Turning clockwise 1. stop = parking light, tail light, licence plate light, instrument light.

Turning clockwise 2. stop = in addition high beam or low beam (actuation by foot dimmer switch).

Pulled out with 1. or 2.

stop = in addition fog light¹.
The rules of the individual countries must be adhered to with regard to the fog lights.

Turning anti-clockwise from 0 1. stop = clearance lights, right } In Germany only permitted independently from the light switch, the other consumers function if the ignition is switched on.
2. stop = clearance lights, left }

2. Temperature control lever, one each right and left (see page 10).

3. Air supply control lever, one each right and left (see page 11).

4. Pull switch for window wiper (without windshield washing system) see also item 6 page 6.

5. Pull switch for blower, for defrosting when car is stationary (see page 11).

6. Push button switch for starter.

7. Pull button «choke»: pulling out sets the choke of the carburetor into operation; the white control lamp «S» (16) in the instrument cluster remains lighted as long as this choke button is pulled out.

Push back in two stages (see page 15).

8. Pull button switch for instrument panel lighting; this is switched on when the light turn switch is set to position 1 or 2. This light is dim when this pull button is pushed in and bright when it is pulled out.

9. Red generator indicator light. If the electric system is functioning properly, it lights up after the ignition key has been inserted and goes out when the engine has exceeded idling speed (normal driving).

¹ Fog light only delivered upon special order.

10. Steering lock, which combines the ignition switch and a locking device for the steering column.

Three positions of the steering lock:

Key on «Stop and removed»: Ignition turned off; steering locked;

Key on «Garage and removed»: Ignition turned off, steering free; (Position must be felt).

Key on «Drive»: Ignition on, steering free.

11. Electric cigarette lighter: press the button for a few seconds until the heating coil glows red.

12. Ashtray: to empty, pull the ashtray out; apply a slight pressure to the sheet metal cover, after which it can be removed.

13. Ornamental cover: a radio can be installed here upon special request and at extra cost.

14. Clock, electric. Setting is effected by the button on the clock.

15. Red control light for the direction signals remains lighted as long as the signals are switched on.

16. White choke control light; remains lighted as long as the choke is pulled out.

17. Blue control light for high beam; remains lighted as long as high beam is switched on.

18. Fuel gauge; this only indicates when the ignition is switched on. If the hand points to the left mark «R», then a red warning lamp lights up and indicates that there is only a fuel reserve amounting to about 8³/₄—9²/₅ Imp. pints or 10¹/₂—11³/₅ U.S. pints (5—5.5 ltrs.) available, which suffices for about 25—30 miles (40—50 km). After this red warning lamp has lighted up, it is, therefore, imperative to refuel as soon as possible.

19. Speedometer; the red marks indicate the max. permissible speeds in the 1st—3rd gears; the odometer is in the middle of the dial.

20. Oil pressure gauge; only indicates when the engine is running.

21. Cooling water thermometer; the temperature of the cooling water should not rise above the red limit mark.

22. Air outlet to the front side windows, one each right and left (see page 11). The escaping airstream can be decreased or cut off altogether by the adjustable flap.

Important note concerning the care of the instrument panel:

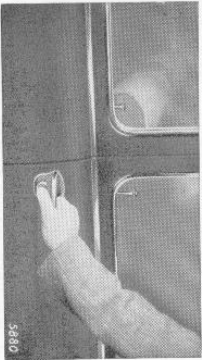
The panelling on the right and left side of the instrument panel, the plate for the control knobs, the covers for the ashtray, the glove box and the centre of the switchboard, the window mouldings of the driver's doors and of the rear doors and the one at the top and sides of the windshield are made out of a special material. Normally, the surface of these parts should be cleaned with a dry wool cloth only; should it become dull in the course of time, then we advise you to call at one of our service stations, where it will be reconditioned.

Operating the door locks:

Both front doors can be locked from outside by means of a key.

Unlock: Turn key by 90° away from handle and back again. Remove key.

Lock: Turn key by 90° towards the handle and back again. Remove key.



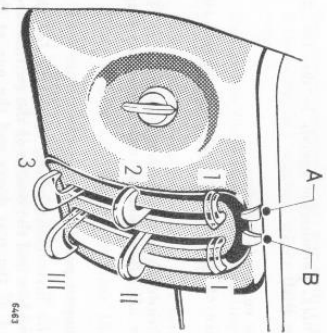
The outer handles are rigidly mounted to the doors.

When opening the door from outside, hold the handle with your fingers and press the push button with your thumb as shown on the opposite photograph. Now the door will open easily.

All doors can be secured from inside. This is effected by means of a lock pin with pushpull knob, which protrudes behind each crank-operated window from the window moulding. If the push-pull knob remains entirely at its bottom position, the respective door lock is secured and bolted. Only if the lock pin is pulled up the push button on the outer door handle can be pressed and the door opened.

If you intend to secure the door after getting out of the car, the pull knob must be pressed down before closing the door, except the driver's door, whose pull knob can only be pushed down when the door is closed.

Luggage compartment lock: The lock is opened by half a turn of the key. The key can only be removed if the lock has been turned to its initial position. In this position it snaps in automatically when closing the lid of the luggage compartment. Therefore never leave your key in the luggage compartment.



A = heating
I = open
II = medium
III = cut off

B = ventilation
I = shut
II = medium
III = open

Ventilation and heating

The control of the fresh air supply and the operation of the heating is effected separately for each car side by 2 control levers each mounted at the outer right and left side of the instrument panel.

The inner one — blue marked, pointing upward — serves to control the fresh air supply,

The outer one — red marked, pointing downward — serves to control the temperature.

Control of the fresh air supply

Lever moved to the top: air supply switched off.

While the lever is being moved from the top to the bottom, the amount of air that enters is steadily increasing. At the same time, the air is gradually directed to the foot space, the windshields, and the side panes. This is done in such a way as to ensure that during the first quarter of the travel of the lever the air is directed downwards to the foot space only whereas, when it is opened further, the air also escapes at the deflector jets in an increasing amount.

Lever moved to the bottom: air supply switched completely on.

In addition, there are the following devices for controlling the air supply:

1. Adjustable flaps on the outlet nozzles for the side pane ventilation in the instrument panel.
2. Adjustable flaps on the outlet openings to the foot space. If these are adjusted horizontally, the air will be evenly distributed, particularly at the front part of the foot space. If they are adjusted vertically, the air escapes as a compact jet. Normally, these flaps will have to be opened only if the foot space in front of the back seats is to be heated also.
3. Deflector panes in the front doors. When closing the deflector panes close the latches hard. If they are closed only loosely, there will be noises caused by the wind.
4. A fan in the air duct on the near side and, upon special request, an additional fan in the other duct. Both of them can be switched on jointly by turning the pull switch (5, page 8) on the instrument panel.

Heating control

Lever pushed down, heating switched off.

The lever can be adjusted to any intermediate position, but the fresh air supply must not be cut off by the air control levers.

As a principle, in winter, the ventilation and heating should not be opened before the cooling water has reached a temperature of approx. 122° F (50° C).

For heating the car inside, open ventilation lever and heating lever for a short time to its full effect, then after 5-10 seconds set levers to position 1/3 or 1/2 without waiting for the full heating effect. The complete heating capacity, with the heating lever pushed to the very top, will only have to be resorted to when the outdoor temperature is very low. The temperature within the car will then be very agreeable. The full amount of air is required only when driving at low speeds. Normally, therefore, you can leave the air control levers in position 1/3 once the desired inside car temperature has been reached.

For defrosting of windshield and side panes, completely open the air and ventilation levers as well as the flaps on the instrument panel and turn on the fan until the windows are defrosted. Then turn the levers back to the desired inside car temperature and almost completely close the flaps on the instrument panel. The small gap that is left open will suffice to keep the windows free of any mist.

Due to the possibility of separated control of the air supply to the foot space or to the windshield and side panes, the regulation can be adjusted to personal requirements.

Do not fail to observe the following: Shut the ventilation flaps when driving immediately behind a vehicle which leaves a trail of dust or exhaust fumes, so that no exhaust fumes may enter the interior of the car.

Fuels, coolants, lubricants

In the interest of our customers, we are constantly testing the fuels on the market for their suitability for our vehicles. Therefore, you should only use one of those products which are approved by us.

In this issue we can refrain from listing the individual brands because our plants and also our agencies at home and abroad are in a position to give expert information with regard to questions about fuels, coolants and lubricants, especially about all products which have been tested and approved by us. If you are ever in doubt with regard to a product in a country outside of Germany and if an inquiry at a service station is not possible, you should always choose the product of a well-known firm which has an extensive international network of filling stations.

Fuels

Capacity of fuel tank: approx. 12.3/14.8 Imp./US gals. (56 ltrs.), out of which 1.1/1.3 to 1.2/1.4 Imp./US gals. (5—5.5 liters) are for reserve. If you drive at moderate speed, this reserve quantity will be sufficient for another 25—30 miles (40—50 km). When only this reserve quantity is left in the fuel tank, a red warning lamp lights up in the fuel gauge.

For proper functioning (no pinking), the engine of your 190 needs commercial premium fuels. The engine has been set by the factory using a fuel of 96—99 octane rating according to the Research Method (R.O.Z.).

When driving in countries in which only fuels with a lower Research Method octane rating are available, see page 22 under «Hints for long trips abroad».

Fuel substitutes, e. g., gasoline with too high a boiling point should not be used, neither alone nor in a mixture. By no means try to make your own gasoline benzene mixtures. Always keep drainage openings in fender filler neck clean.

Coolants

Capacity of the entire cooling system including DB heating is approx. 2.0/2.4 Imp./US gals. (9.3 liters).

Caution! Overpressure cooling system!

Open radiator cover only if cooling water temperature is below 90° C (195° F). First turn to mark I and blow off overpressure; then turn somewhat farther and remove cap. When closing turn to mark II.

For radiator covers use only covers bearing the number 100.

Boiling point of cooling water is only at 239° F (115° C) — see red mark at cooling water thermometer. When driving in the mountains, or in regions where the outside temperature is high, the cooling water temperature may rise up to 239° F (115° C).

Use clean water with the lowest possible calcium content or well filtered river water.

The cooling water has already been treated in the factory, i. e., a corrosion prevention agent has been added. If you drive with untreated cooling water, scale, rust and other corrosion products will form in the cooling system. Because these substances are poor heat conductors the efficiency of the cooling system will be decreased.

For the treatment of cooling water we only approve of those products which are compatible with the anti-freeze agents, because even with an anti-freeze agent, treated cooling water should be used e. g. Fuchs Anticorit MKR; Esso Kurwell 40; Shell Donax C; Valvoline-Korrosionsschutzöl S 2; Veedel Anornust 50; Phosphatol; Rheinpreussen-Korrosionsschutzöl.

The concentration is 2.5—5 cm³/lit. cooling water (0.15—0.3 cu. in. p. lit.). Higher concentrations should be avoided. If a cooling water loss occurs because of leakage in the cooling system, the loss should be compensated by water and a corrosion prevention agent. General replenishing (loss because of evaporation) can be done with water only.

If engine is hot, only fill in cold water while the engine is running. However, hot water can be filled into a cold engine at any time.

Refill cold water into a hot engine only when it is running; however, hot water can be filled into a cold engine at any time.

Caution! When replenishing the cooling water, proceed as follows:

1. Set the two heating levers to «opens».
2. Slowly fill in cooling water up to filler cap rim.
3. Run engine with increased idling speed and with opened radiator filler cap for about 1 minute.
4. Reduce to idling speed and slowly top up cooling system
 - a) with cold cooling water up to metal mark (about 2 ins. [50 mm] below the filler cap) in the radiator filler,
 - b) with warm cooling water up to the rim of the filler cap.



If the cooling water temperature slowly exceeds the normal temperature, then the cooling system is dirty. It should be cleaned of grease and scale (see page 48); this is best done at a service station.

In frosty weather the measures for winter driving (see p. 19) should be observed.

Lubricants

Constructional parts and lubricants must be compatible in order to ensure smooth functioning.

Any service station will advise you as to which lubricants have been tested and approved by us. We also refer you again to the introduction of this chapter.

Lubrication point	Lubricant	Filling quantity in Imp./US pints (lit.)	Viscosity	
			Outside temperature ° F (C)*	SAE groups
Engine and crankcase	HD engine oil	min. 4.4/5.3 (2.5) max. 7/8.5 (4)	above +86 (+30)	30
			from +50 to +86 (+10 to +30)	20 W/20
Oil filter	HD engine oil	0.9/1 (0.5)		10 W-20
Distributor: oiler to cam bearings; Felt in cam bore;	HD engine oil		from -13 to +50 (-25 to +10)	10 W
			below -13 (-25)	5 W or 5 W/20
Brake point rubbing block;	Bosch grease Ft 1 v 4			
Transmission	Automatic transmission fluid	2.5/2.9 (1.4)	all year round	—
Drive axle	Hypoid transmission oil	3.9/4.7 (2.25)	all year round	SAE 90
Steering gear	Hypoid transmission oil	0.5/0.6 (0.3)	all year round	SAE 90
Water pump	Hypoid transmission oil	—	all year round	SAE 90
Front wheel hubs	Bearing grease	2.30 oz. ca. (65 g)	all year round	—
Lubricators	Chassis grease	—	all year round	—
Battery terminals	Bosch grease Ft 40 v 1	—	all year round	—

* The change-over to another SAE group because of the reason can be found in the table. In the case of sudden frost the oil should be changed at the next opportunity. The change should be made out of schedule.

Starting and Stopping

Check at regular intervals and before setting out on a longer trip:

1. Fuel level; the fuel gauge only indicates when the ignition is switched on;
2. Water level in the radiator; with cold cooling water it should come up to the mark on the radiator filler;
3. Oil level in the crankcase; clean oil dipstick before using. The oil level should be at the upper mark on the dipstick; do not check when the car is on an incline;
4. Tire pressure; for exact details on tire pressure see page 42;
5. Braking effectiveness; when actuating the brake pedal you should feel a distinct resistance so that it cannot be pushed down completely. If this is not the case, see «emergency repairs», page 53.
6. High beam and low beam headlight.

Starting

Be careful when starting and running the engine in the garage; always keep garage door open and see to it that the exhaust gases escape quickly. The exhaust gases contain the odourless and invisible carbon monoxide which is very poisonous.

If a radio is installed, it should never be turned on while starting the car.

The gear lever must be in neutral position (central position).

Turn ignition key in the security lock to «Drive» (see page 9). The further procedure depends upon the engine temperature and upon the outside temperature; therefore the starting procedure for warm and cold engines will be described separately.

- a) Starting a cold engine (up to an outside temperature of about 5° F [-15° C]).

Starting with temperature below approx. 5° F [-15° C] see winter operation, page 20. The cold engine as well starts very easily with temperatures exceeding 50° F (+10° C). During the warm season the engine can mostly be started without actuating the choke.

Pull out choke completely (starting position) only when it is rather cold outside — the white control light «S» in the instrument cluster will light up.

Press starter button and release it only when the engine is firing regularly and not immediately after it has fired just once; on the other hand, you should not activate it for longer than 20 seconds at a time, since the battery will be subjected to too great a strain otherwise.

When starting, the accelerator pedal should normally not be depressed, however, in higher altitudes (starting at approx. 3000 ft., ca. 1,500 m), it is advisable to slightly accelerate the engine after it has fired until it is running smoothly.



A = Starting position; B = Warm-up position;
C = Driving position

As soon as the engine has started and has been idling for a few seconds push back choke only as far as to resting position (warming-up position). For some time — even while driving — the choke can be left in this position, without there being the danger that the engine will get too rich a mixture.

If the engine does not start after the starter has been operated twice, you should look for the source of trouble (see page 50).

b) Starting a warm engine (even in cold weather).

Press on starter push button and at the same time press accelerator pedal slowly to floorboard, without varying the pressure on the accelerator pedal. Do not pull out the choke. After the engine has started, release the starter button and the accelerator pedal, so that the engine does not rev up too much.

Warning up the Engine

It is not favourable to let the engine idle until the normal operating temperature is reached, because it will take a long time as little heat is produced by the idling engine. It is therefore recommended to drive off at a moderate speed immediately after starting at outside temperatures down to 32° F (0° C). Only at lower temperatures the engine should be idling for one minute at most before driving off, to make sure that the lubrication of the engine is functioning even with very cold oil. But do not rev up the engine when idling.

Driving off

Press down clutch pedal.

Shift gear lever to 1st gear.

Release hand brake.

Slowly release clutch pedal and at the same time slowly press down accelerator pedal with your right foot — the car will drive off — accelerate gradually, not jerkily, and change up into 2nd, 3rd, and 4th speed.

As soon as the normal operating temperature has been reached, the choke should be pushed back completely (driving position) — the white control light goes out.

Parking or Stopping

Turn ignition key in steering lock to position «Parking» or «Stop» and remove key. With «Stop» position turn steering wheel a little until the catch snaps into place.

The «first 900 miles» (1,500 km)

The engine is not sealed. It is a well-known fact that the length of life and the economical running of the car depends decisively upon the way it is handled for the first 900 miles (1,500 km). The more you spare the engine in the beginning the more satisfied you will be with its performance later on.

For this reason drive the first 900 miles with varying speed and revolutions and shift gears more frequently. Above all, avoid «torturing» your engine during this period by driving in lower speeds, and do shift gears back in time.

It is recommended not to exceed the following speeds during the first 900 miles:

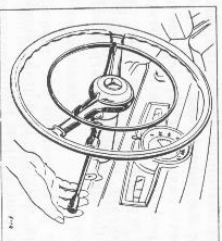
Odometer reading	Speed in m. p. h. (km/h)			
	1st gear	2nd gear	3rd gear	4th gear
up to 300 miles	15 (25)	25 (40)	37 (60)	50 (80)
300 to 900 miles	17 (28)	28 (45)	43 (70)	62 (100)
900 to 1,250 miles	May be gradually increased to maximum speed			

It is of special importance for the longevity and the quiet running engine of the vehicle as well as driving safety that the noncurrent «First Lubrication and Maintenance Work» mentioned on pages 23 to 25 are carried out. The first pages of your Service Book are especially provided for this purpose. Don't fail to take your car to the Service Station in time.

Gearshifting

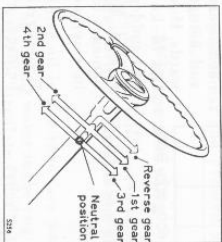
The gearbox is fitted with constant forced synchromesh for all speeds, i. e. a special device in the gearbox causes the relevant gear wheels to engage smoothly by a series of couplings. Consequently the annoying process of double clutching with an intermediary acceleration becomes unnecessary. Changing up and down is effected as follows: Release accelerator pedal, press clutch pedal fully down. Shift gear lever fluently from one gear position to the next, re-engage clutch gently and at the same time press on the accelerator pedal.

The gear lever itself is placed in a readily accessible position on the steering column beneath the steering wheel. It can be brought out of its central position (idling) into three «gear levels» one above the other and can be pushed round towards the desired gear at these different levels:

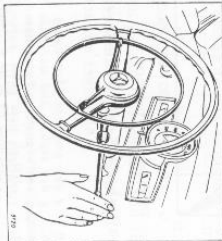


1st and 2nd gear

When engaging these gears pull up gently and push forward for 1st gear or backward for 2nd gear. Reverse gear. Press up hard as far as it will go and push the gear lever forward.



Gear changing guide



3rd and 4th gear

When engaging these gears press the gear lever gently down and then push forward for 3rd or backward for 4th gear.

When you reach the middle and top «gear level» a slight resistance is clearly perceptible. Neutral is in the center position between the gears and the gear levels and the gear lever is automatically pulled down by a spring from the center to the lower gear level. When changing from 1st to 2nd gear you must guide the gear lever exactly along the stop, and when you come to the half-way position you must resist the downward pull of the spring — otherwise you might get into 4th gear — and you must not press up too strongly either — otherwise you will push right up into reverse gear. Gearshifting can be effected without using force.

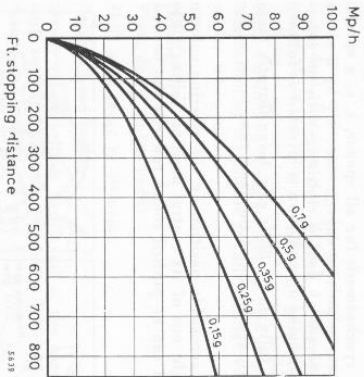
The only things to observe are therefore:

1. Before any gear change: release the accelerator and let out clutch completely.
2. Always move the gear lever in straight lines exactly at right angles to one another, shift gear lever fluently and without slowing down in between.
3. Always engage the next gear and never omit a gear.
4. Only engage the reverse gear when the car is at a standstill.

Driving hints

The Type 190 is a speedy car. Due to its splendid road holding qualities and excellent suspension you will be hardly aware how fast you are actually driving. It is therefore of special importance to decelerate and actuate brakes earlier than you would instinctively do otherwise.

Any increase in speed inevitably results in a still longer braking distance.



The opposite diagram shows the relation between braking distance including 1 second of reaction time and the increase in speed under different road conditions. This indicates that with the best brakes and friction values between road and tires a speed of 90 m. p. h. including 1 second of reaction time entails a braking distance of about 500 ft.

At high speeds the air resistance itself has a considerable braking effect. In normal cases therefore decelerate early and actuate the foot brake only afterwards. However, avoid jerkily depressing the brake pedal; do it gently. Abrupt and sudden braking could cause the car to skid. Moreover, it causes considerable damages to the tires. Brake sharply only in emergency.

While driving, only the foot brake should be used, even on a steep hill.

0.7 g dry concrete (Autobahn)
0.5 g dry asphalt and macadam
0.35 g wet asphalt and macadam
official max. perm. value for vehicles exceeding 62 m. p. h. / 100 km/h
0.25 g official max. value acc. to present regulations (not exceeding 62 m. p. h. / 100 km/h)
0.15 g ice, max. perm. value for hand brake

If you use the hand brake alone when the car is driving fast, this in itself will harm neither the brake nor any other part of the car. The rear wheels, however, may lock and especially on a slippery road, this may cause the car to skid. The hand brake should normally be used only to keep the car stationary.

Always keep an eye on the speed at which you are driving. The speedometer is placed in such a favourable position that you can easily read it without taking your eyes from the road.

The set-up of the gears is arranged very favourably so that it will be possible to fully utilize the good qualities of the wheels, springs, etc., as well as the qualities of the engine at all times. You should, therefore, always take advantage of the constant forced synchromesh transmission and shift gears in time, particularly with regard to city-driving, when going uphill, or when passing a speedy truck.

There are red marks on the speedometer which specify the maximum permissible speeds for the 1st, 2nd, and 3rd gear. Change gears at the latest when reaching these marks. You save gasoline when changing sooner.

When driving downhill, especially on long and steep inclines, it is best to change down to a low gear. Let the engine act as brake when driving downhill by releasing the accelerator pedal, but do not declutch; on no account switch off ignition, as otherwise the gasoline drawn in by the engine and not yet burnt, will wash the oil film off the cylinder walls.

If you have to leave your car parked on a slope, it is advisable for safety's sake to engage 1st gear or reverse gear. Furthermore, turn your steering wheel in such a way that in case of unintentional release of the hand brake the car rolls towards the mountainous side and not into the abyss. In winter the car should be secured by putting a wedge before or behind each wheel.

If the oil pressure suddenly drops when the engine speed remains constant, or if from one day to the next it does not attain the usual level, you should stop and proceed in accordance with the section «Hints for emergency repairs» on page 52.

If the engine is very cold, the oil pressure reading will rise only some time after starting the engine, as the increase in pressure takes effect only slowly in the narrow connecting pipe leading to the pressure gauge.

The cooling water temperature is normally between 158 to 203 ° F (70 to 95 ° C). When starting, this temperature will be reached after driving for 4 to 5 minutes at moderate speed. At especially high outside temperatures and if the car is heavily loaded and is climbing a long grade, the temperature can rise to the red spot on cooling water thermometer without any danger. In this case the temperature of the cooling water can, if necessary, be reduced by changing down into a low gear. If you have to stop after a long and continuous drive uphill, you should let the engine idle for a short time as the cooling water may boil over if you stop the engine at once.

If the cooling water temperature rises above the red mark this indicates a defect in the cooling system; immediately stop your car and proceed according to the section «Hints for emergency repairs» on page 53.

Winter Driving

In cold weather it is necessary to take certain precautions to protect the engine and the radiator as well as to ensure safe starting. Special care should also be taken when driving.

Precautions

Replace the summer oil by winter oil in due time (see page 14).

The built-in thermostat keeps the cooling water in the engine automatically at the correct temperature by allowing the water to circulate from the engine into the radiator only when the temperature of the water has reached about 158° F (70° C) and by cutting the radiator out of the cooling water circuit at lower temperatures. Consequently, in winter the water in the radiator core may be frozen even though the car is being driven.

During frost an anti-freeze should, therefore, be added.

As a protection against freezing, only one of the commercial brands of anti-freeze should be used, and the amount to be added, which is dependent on the outside temperature, is laid down in the instructions of the particular manufacturer. The following table gives the quantities of water and Glysantin or Gemanin required for the correct mixture for different degrees of cold.

The capacity of the radiator and engine together, filled up to the mark on the radiator filler, is about 2.0/2.5 Imp./US gals. (9.3 lit.) if a DB heating system is installed.

Freezing point	Gemanin/Glysantin in pts.		Water in pts.	
	Imp.	US	lit.	Imp. US
approx. 14° F (—10° C)	3 1/2	4 1/4	2.0	12 3/4 15 1/2
approx. 5° F (—15° C)	4 3/4	5 3/4	2 1/4	11 1/2 13 3/4
approx. —4° F (—20° C)	5 1/2	6 3/4	3 1/4	10 1/2 12 1/4
approx. —13° F (—25° C)	6 1/2	8.0	3 3/4	9 3/4 11 3/4
approx. —22° F (—30° C)	7 1/2	9.0	4 1/4	8 3/4 10 1/2
approx. —40° F (—40° C)	8 1/4	10	4 3/4	8.0 9 1/2
				7.3 6.55 6.05 5.55 5.05 4.55

Before filling in an anti-freeze, the cooling system should be flushed, especially if the cooling water has been treated with an additive.

Caution! An acid-type anti-corrosion agent or a radiator cleansing agent should not be used together with the anti-freeze. An anti-corrosion oil may, however, be used.

You should not fill in the cooling water above the mark to be found on the radiator filler when the engine is cold, otherwise nearly 1 quart of the cooling water will be expelled through the relief pressure valve and be lost when the coolant expands due to warming up.

After having used an anti-freeze, flush engine and radiator.

If for some reason or other an anti-freeze is not obtainable, the radiator should be covered, even if the car is driven, without blocking the air intake for the heating and ventilation system.

If in this case the car is not kept in a warm garage, the cooling water must be drained off while the engine is still warm, if possible at a sheltered spot. For this purpose open the drain cocks at the bottom of the radiator and at the left side of the engine and loosen the heating hose at the bottom of each heating element, in order to obtain proper draining of the heater element. Moreover, the radiator cap should be removed. **Caution!** Overpressure cooling system: for opening see page 12. Watch the draining of the cooling water during the whole process and if the drain cock should become frozen up or blocked, poke it clear with a piece of wire.

Then run the engine for a short time, so that the cooling water is completely drained off. Keep the drain cock open until the radiator is filled up again and attach to the radiator a warning "water drained off".

Do not forget to tighten the lower cap nut each heating element and to close the drain cock before filling up again.

Measures to be taken to ensure starting in cold weather

By all means use winter engine lube oil meeting the specifications on page 14. In addition, charge your battery well.

Should temperatures fall below 5° F (—15° C), the following additional measures should be adopted when starting unless you have a heated garage:

1. If possible, the ignition should be adjusted to a fully advanced position. (see ps. 22 and 35).
2. Before starting, completely depress accelerator pedal slowly 3 to 6 times depending on the outside temperature, then start immediately. This should be done only, however, if the engine has cooled down completely.

If it looks as though the outside temperature would fall below —13° F (—25° C), and if the car is left in the open for a longer period of time, the following preservative measures may be taken:

1. Remove the battery and store it in a warmed up room or bring it to indoor temperature, as a deeply cooled battery produces only a fraction of the starting capacity of a battery at normal temperatures.
2. After stopping the engine drain the cooling water, warm it up to approx. 203° F (95° C) before starting and refill into cooling system. There is no risk for the cooled down engine, even if it is filled up with boiling cooling water.

If you go to this trouble your starter motor, engine, and battery will last longer.

Winter Driving

Wet, snow-covered and icy roads are treacherous. For this reason, adjust your speed to the road conditions and always let the necessary caution prevail! It sometimes happens on clear winter days that ice is formed on the roads just between sunny and shadowy spots, e. g., where the road passes under a bridge or at the edge of a village or woods. Moreover, especially if frost has set in, a bridge may be iced, although the road itself is still free of ice due to the warmth of the ground. Drive carefully over such stretches.

A prompt and effective defrosting of the windshield and of the two front side windows is obtained, if a DB-heating system is installed, by moving the two ventilation levers to the bottom and the two heating levers to the top (see page 11).

For filling solutions for the windshield washing system see page 30.

If the luggage compartment lid is frozen, beat along the edge of the lid with your fist to loosen the ice between the edge and the rubber moulding. Proceed at first in the same manner with a frozen compartment door.

In snow storms or with snow raised by cars driving ahead of you the insect screens in the ventilation ducts may become clogged and impair the heating system of the vehicle. The only remedy in this case is to thoroughly clean the insect screens or to completely remove them in winter. The gap should then be sealed by means of an insulating tape or steel strip. Do not misty the screens and do not forget to re-install them later on.

When foggy or snowing, the following regulations according to P. 33 of the Traffic Regulations apply for Germany:

No. 4: During heavy fog or snow fall low beam lights should be turned on during the day.

No. 5: Fog lights may be used during fog or snow fall only in connection with low beam lights.

All regulations governing light illumination installations are possible on our vehicles for abroad. We urgently recommend, however, that the applicable regulations are observed for each country.

If the car is parked in the open in frosty weather, the hand brake should not be applied, nor should the car be left in gear, in order to prevent freezing up. In this case the car should be kept stationary by means of blocks under the wheels.

You can prevent the windshield from icing up when the car is parked by placing a piece of canvas or newspaper of the same size as the windshield under the windshield wipers.

Usually it is not necessary to use snow chains on tires the tread of which is still in good condition. They cause an increase in fuel consumption. In districts with much snow it is advisable to use tires with a special snow tread. Our Service Stations will inform you where such tires can be obtained. Only under especially unfavourable conditions, when the snow is deep and there are hills to climb is it advisable to put on snow chains. It is, however, important to see that the chains have small links and hold the track sufficiently at the side (square tread chains). Ladder type chains are unsuitable.

On ice-covered roads you should drive without chains. Remove the chains immediately when the roads are clear of snow as chains wear out rapidly.

The manufacturers issue special instructions for fitting and servicing the chains. Please observe these instructions closely.

Hints for long trips abroad

Also in foreign countries you will find a chain of Mercedes-Benz Service Stations. For details concerning this subject please consult the «List of Authorized Mercedes-Benz Agencies in Export Countries». The place to ask for this list is our Export Service Department, Stuttgart-Untertürkheim, Germany. With the aid of this list, you will always know whom to turn to when abroad.

In very remote regions, however, it still may happen that you are forced to see a non-Mercedes workshop for help. To meet such emergencies, we compiled an «emergency assortment of the most important spare parts (like gaskets etc.)». Before going abroad please make sure to get these parts.

Moreover, we advise you to take along a spare tire, and tube valves. In addition, you should be forced to use a fuel with a lower octane rating in an exceptional case for the battery. A first-aid kit should also form part of your travelling equipment.

According to international regulations it is necessary to affix the national initials of your country to the rear of your car when going abroad.

If your vehicle is equipped with an asymmetric low beam light (see page 47) and as a tourist you must drive on the lane opposite to that in your own country, then after you cross the border you should cover the prism section of the lens with opaque adhesive tape. This will make the low beam symmetric and prevent blinding of the oncoming driver.

When refilling fuels, coolants, and lubricants, always see to it that there will be no contamination.

Only use fuels with the required minimum octane rating (see page 12).

Should you be forced to use a fuel with a lower octane rating in an exceptional case and should you then note a «pinging» of the engine, the ignition may be timed within certain limits at the ignition distributor and thus adapted to the octane rating of the fuel used (for details see p. 35). However, a fuel with the required octane rating should be used as soon as possible afterwards and, if an adjustment has been made at the ignition distributor, the ignition must be timed as before.

The engine oil also should meet the requirements outlined on page 14. At any rate, you should use an HD oil of a viscosity group appropriate for the prevailing season. Should the HD oil brand you are used to not be available abroad, please change over to an internationally recognized HD oil brand (see appendix).

Our standard cars are equipped for operation in Central Europe on normal roads. It is obvious that trips in extreme climatic conditions (as e. g. in the tropics) or on extremely bad roads will be hard on the car. In order to meet similar situations, we advise you to have certain special items fixed to your car before starting out on such trips. In this way, the engine and the aggregates will be protected against sand or dust, rocks or under damage and will also serve to meet the outside temperature.

Should you have any questions with regard to the installation of these special items or with regard to any measures to be taken, please contact our general agencies or our Export Service Dept. in Stuttgart-Untertürkheim, Germany. Take advantage of this possibility before starting out on a trip to countries with extreme climatic and road conditions.

Maintenance

It is urgently recommended to leave all maintenance work and servicing to the skilled mechanics of our service shops. In particular, it is in your own interest to see that the service work as listed in the Service Book is carried out in due time and without any omissions. If you do this you will not only ensure that your car is kept in excellent condition, but also that small defects will be set right before they develop into major faults. We wish to point out in this connection that guarantee claims will not be met if not all of the maintenance jobs specified have been carried out in due time at a service station authorized by us.

In case you wish to service your car yourself or should be obliged to take it to some other garage, the following hints should be taken into consideration:

Lubrication of the grease nipples at the front and rear axle, at the pedal linkage and at the drive shaft, checking oil level and oil change in the gearbox and the rear axle housing as well as draining off the motor oil should be carried out from below on a pit or ramp and after the distances covered according to the specification of the lubrication chart (pages 24—28). In addition, a cover at the center of the drive shaft has to be removed from the frame floor. Now all grease nipples are easily accessible so that you can get at them in the usual manner.

If a high-pressure grease gun is used, the grease pressure must not exceed 400 kg/cm² (5,690 psi); if necessary, it must be limited to this value by a safety device at the press. Please give the necessary direction to your workshop.

Change oil immediately after a trip while the oil is still hot, so that all existing impurities will be flushed away.

For regular care and protective treatment of the paintwork and the chromium-plated parts see pages 29 to 31.

Nonrecurrent „first“ lubrication and maintenance work

After the first 30 to 60 miles (50 to 100 km):

Check all wheel nuts for tight seat, if necessary tighten.

After the first 300 miles (500 km):

Lubrication

Engine: Change oil while still hot;

Renew paper element in oil filter (see page 32).

Transmission: Change oil while still hot

Grease nipples with grease gun: at front axle

a) at the lower right and lower left wishbones, 2 nipples each

b) at the upper right and left wishbone 1 nipple each front, and 1 nipple each, rear

c) at the right and left steering knuckle, 3 nipples each.

at the bearing of the intermediary steering lever, 1 nipple

at pedal linkage (2 nipples)

at the drive shaft

- a) front: the grease nipple at flange
- b) center: grease nipple in bearing
- c) rear: grease nipple in keyway

at the rear axle suspension (2 nipples)

Lubricate with a few drops of engine oil: hand brake lever; hand brake equalizer lever; steering column gear shift; rod end of clutch control; accelerator linkage; leverage, wire cables and carburetor linkage; hinges of luggage compartment cover; hinges of engine hood; engine hood safety catch; bolts of door straps.

Moisten with Carambah: bowden cables of the heating aggregates. Distributor: fill up with oil.

Carburetor: fill shock absorber with Engine oil SAE 10 W.

Checking and maintenance

Engine:

Check tightening torque of cylinder head with torque wrench. Adjust valves.

Check for tight seat at the engine: the flange nuts of the exhaust pipe; the fastening bolts of the suction pipe, of the exhaust manifold, of the chain tightener, and of the insulating flange; the fastening nuts of the fuel feed pump and of the intermediary flange; the fastening bolts of the engine supports at the cylinder block; the vacuum connection at the distributor.

Check for tight seat at the carburetor system: the nuts at the carburetor flange, the screws on the carburetor cover, the screws of the venturi-tube fastening, the screws of the shock damper fastening, main nozzle support, idling fuel jet, pump jet, air correction jet at the mixing tube support, starter jet, ball-type valve on bottom of accelerator pump, vacuum connection, choke cable clamping screw.

Check chain tightener for ease of movement.

Check tension of V-belt.

Clutch: adjust free travel.

Brake system: Check brake master cylinder, brake fluid container, brake lines and brake hoses for tightness; check brake hoses for worn spots and laying; bleed foot brake and, if installed, Ate T 50 booster brake; fill up brake fluid; adjust parking brake.

Engine, engine oil lines, steering, gear box and rear axle: check for tightness.

Pipes and connection hoses for cooling water, fuel, vacuum: check for leaks, worn spots, and impressions.

Radiator: fill up cooling agent.

Battery: add distilled water.

Electrical equipment: check all current consumers for proper functioning.

Door arresters: adjust and grease.

Hood and trunk lid: slightly grease catch.

Wheels: tighten wheel nuts; check tire pressure.

Front axle: check toe-in and camber.

Rear axle: check camber.

On test drive: check foot and parking brake, booster brake¹ and clutch for functioning and effectiveness.

¹ If installed.

After the first 1,900 miles (3,000 km):

Lubrication

Engine: Oil change while oil is hot.

Grease nipples with grease gun: See «after first 300 miles» (500 km).

Checking and maintenance

Fuel pre-filter: clean filter housing, bottom part and gasket, clean filter element only if wire strainer and no paper element is installed.

Check for tight seat on engine: See «after first 300 miles».

Check for tight seat at the carburetor system: See «after first 300 miles» (500 km).

Check chain tightener for ease of movement.

Check V-belt tension.

Distributor: Adjust with scintillation stroboscope and cam angle meter.

Check breaker point gap.

Clutch: adjust free travel.

Brake system: Check brake master cylinder, brake fluid container, brake lines and brake hoses for tightness; check brake hoses for worn spots and laying; fill up brake fluid; adjust parking brake.

Check the following bolts and nuts for tight seat:

Steering housing at front axle beam.

Lower fastening nuts of shock absorbers.

Lower wishbone mounting (58—72 ft. lbs./8—10 mkg).

Fastening bolts of the flexible disc at the drive shaft, remove cotter pins of nuts first, replace cotter pins.

Thrust rod mounting (58—80 ft. lbs./8—11 mkg), remove cotter pins of nuts first, replace cotter pins.

Bolts at left supporting tube cover and at the front housing cover of the rear axle.

Visual inspection of nuts and cotter pins of the rods, steering arm and pitman arm.

Fastening of hood catch.

Look plate of trunk lid catch.

Engine, engine oil lines, steering, gear box and rear axle: check for tightness.

Pipes and connection hoses for cooling water, fuel, vacuum: check for leaks, worn spots, and impressions.

Radiator: fill up cooling agent.

Battery: check acid level and specific gravity, add distilled water, check terminals for proper seat, grease.

Electrical equipment: check all current consumers for proper functioning.

Headlights: adjust.

Door hinges and locks, striker plates:

Check bolts for tight seat, double wedge locks clean with dry cloth only.

Sliding roof: Check guide rails for tight seat, retighten; check for dirt and resin formation; rub with thin and resin-free oil; clean Covertex-cover, rub with stearin.

Wheels: Retighten wheel nuts; correct tire pressure.

On test drive: check foot and parking brake, booster brake¹ and clutch for functioning and effectiveness.

¹ If installed.

Regular lubrication and maintenance work

Specified Mileage	Page	Part of car	Nature of work
1,900 (3,000 km)	27	Engine Front axle, steering linkages, drive shaft, rear axle suspension	Check oil level, add oil ¹ Grease nipples with grease gun ² (see earlier first 300 miles)
—	27	Brake fluid container	Add brake fluid. If heavy loss of fluid is noticed check brake system for tightness.
—	27	Battery	Add distilled water
—	27	Radiator	Add cooling agent
—	—	Wheels	Tighten wheel nuts
—	42	Tires	Check tire pressure
—	27	Lubrication Engine	Oil ¹ change ² when oil is hot Replace paper filter element ¹ Check oil level, add oil
—	27	Transmission	Check oil level, add oil
—	27	Rear axle housing	Check oil level, add oil
—	—	Parking brake equalizer lever; steering column gear shift; rod end of clutch actuation; accelerator linkage shaft; levers, cables and linkage at carburetor; hinges of trunk lid; hinges of hood; battery covers of hood; body panels of hood; retainer strips	Grease with a few drops of engine oil
3,800 (6,000 km)	—	Bowden cables on the levers Heater flap shaft	Moisten with Caranba
—	—	Checking and Maintenance	Spray with crude oil or Caranba Check for ease of movement
—	—	Front air scoops	Clean insect screens
—	32	V-belt	Check tension
—	33	Air filter	Clean paper element
—	35	Spark plugs	Clean, adjust electrode gap
—	34	Distributor	Adjust ignition with stroboscopic light and cam angle meter; check breaker point gap
—	38	Clutch	Adjust free travel
—	—	Brake master cylinder Brake fluid container Brake lines Brake hoses	Check for tightness

¹ Pay attention to quality and viscosity prescriptions!
² In case of muddy roads, snow sledge and on very poor roads every 900 miles (1,500 km).
³ In case of city driving only or when driving in dusty regions every 1,500 miles (3,000 km).
⁴ After the first 7,000 miles only every 7,000 miles (12,000 km).

Specified Mileage	Page	Part of car	Nature of work
—	39	Brake hoses Parking brake	Check for worn spots and laying Adjust
—	—	Engine, engine oil lines, steering, gear box, rear axle	Check for tightness
—	—	Connection hoses for cooling water, fuel, vacuum	Check for leaks, worn spots and impressions
3,800 (6,000 km)	—	Electric system	Check all consumers for proper functioning
—	—	Door edge	Clean, rub seals with talcum powder
—	—	Door locks	Double wedge locks: clean with a dry rag only
—	—	Door arresters	Adjust and grease
—	—	Wheels, tires	Check for exterior damages (visual inspection)
—	—	Wheels	Balancing and swivling according to pattern on page 41
—	—	Foot and parking brake, booster brake ¹ and clutch	Check for function and effectiveness on test drive
—	27	Lubrication Transmission	Oil change when oil is hot
—	27	Rear axle housing	Oil change when oil is hot
—	48	Water pump	Check oil level, add oil
—	27	Steering gear housing	Check oil level, add oil
—	27	Door hinges	Lubricate nipples with grease gun
—	27	Parking brake cables	Lubricate nipples with grease gun
—	27	Hood and trunk lid	Lightly oil cardes
—	27	Front wheel bearings	Renew grease in wheel caps
—	27	Checking and maintenance	Check compression pressure, adjust valve clearance
11,400 (18,000 km)	36	Engine On engine: Flange nuts of the exhaust pipe; fastening bolts of the suction pipe; of the exhaust manifold, of the clamp tightener; of the insulating flange; fastening bolts of fuel feed pump and of the intermediary flange; fastening bolts of the engine supports on cylinder block; the vacuum connection at distributor Carburetor system: nuts of carburetor flange, screws on carburetor cover, screws of venturi-tube fastening, screws of shock absorber fastening, main nozzle support, idling fuel jet, pump jet, air correction jet on mixing tube support, starter jet, ball-type valve on bottom of accelerator pump, vacuum connection, vacuum cable clamping screw.	Check for tight seat
—	—	Check for tightness	Check for tight seat

¹ If installed.



Distributor



Cooling water filler nipple



Engine oil filler nipple



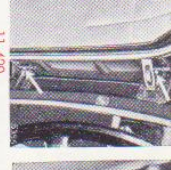
Engine - oil dipstick water drain cock



Brake fluid container



Battery



Hinges at the front doors



Hinges at the rear doors



Transmission - oil filler screw; oil drain screw



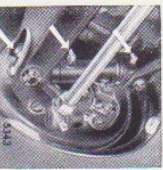
Propeller shaft, rear



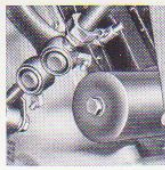
Steering gear housing, oil filler screw



Cooling water drain cock



Lubrication at steering knuckle, (right and left wheels)



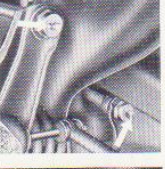
Engine oil filter



Mounting of the right wishbone, front



Engine oil drain screw



Mounting of the left wishbone, front



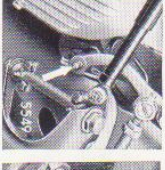
Front wheel bearing (left and right wheel)



Mounting of the left wishbone, rear



Pedal linkage



Bearing of intermediate steering lever



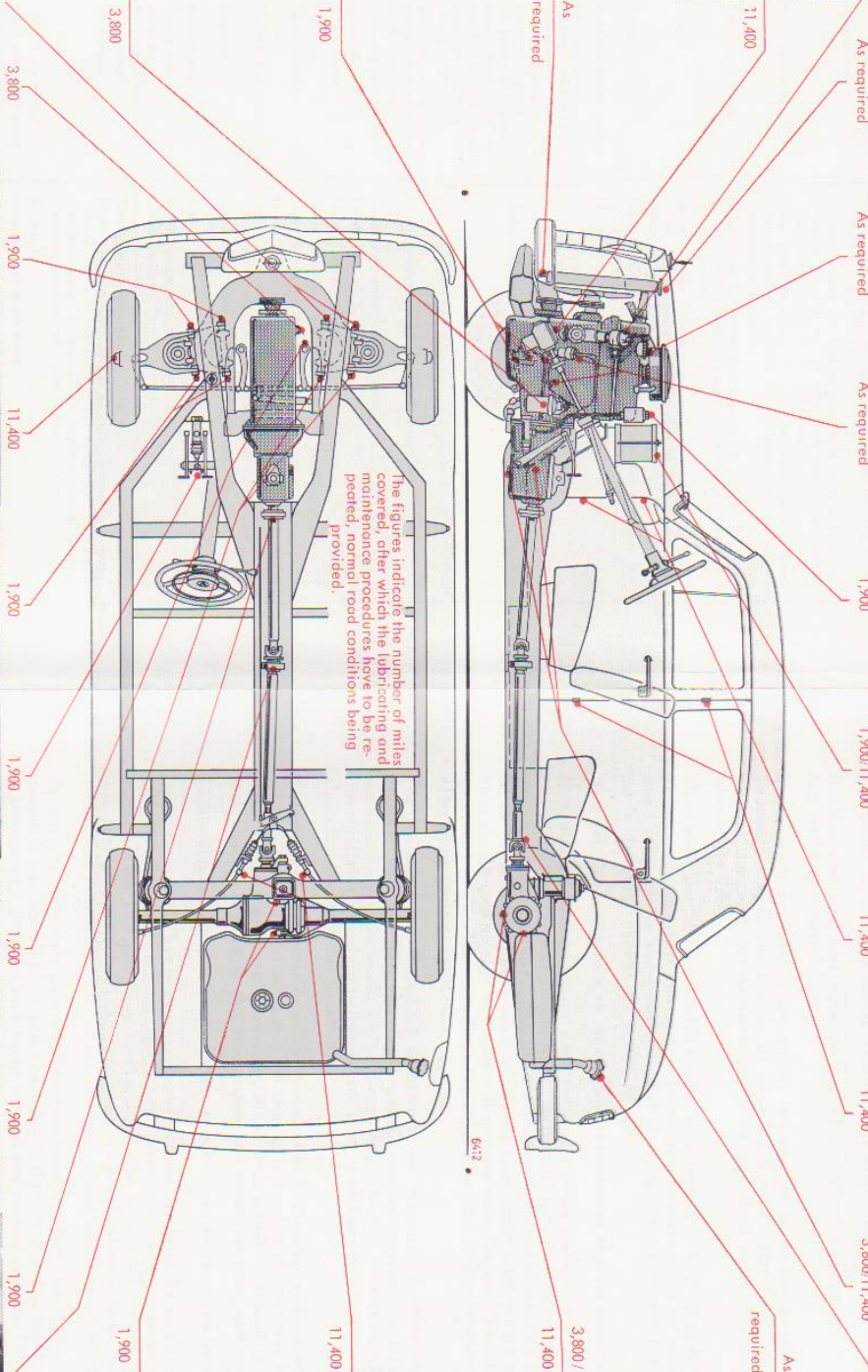
Mounting of the right wishbone, rear



Propeller shaft, front



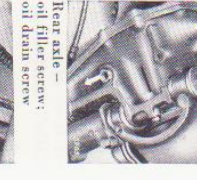
Propeller shaft, center 1 X bearing



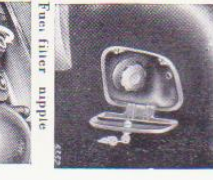
Grease nipples at rear axle



Grease nipples of brake knuckles (right and left)



Rear axle - oil filler screw; oil drain screw



Fuel filter nipple

Specified Mileage	Page	Part of car	Nature of work
	37	Carburetor-shock absorber	Add engine oil SAE 10 W Check for ease of movement Replace
	35	Chain tightener Spark plugs	
	34	Distributor	Replace breaker points. Slightly grease distributor cam, replace grease reserve in point rubbing block (Dostel grease Pt 1 V 9) Slightly grease the felt in cam bore with 2 drops of engine oil. Fill up oil cup with engine oil. Check vacuum connection for tight seal.
	33	Fuel pre-filter	Clean filter housing, bottom part and gasket, clean filter element only. If wire strainer and no paper element is installed. Loosen cover screw by approx. 2 turns, draining water screw.
	33	Fuel feed pump	Smooth brake linings with emery cloth. Remove brake dust, check drums and dust caps of brake cylinders, check wheel brake cylinders for leaks Replace filter packing, deck system for function and tightness Check
	38	Brakes Booster brake ²	Smooth brake linings with emery cloth. Remove brake dust, check drums and dust caps of brake cylinders, check wheel brake cylinders for leaks Replace filter packing, deck system for function and tightness Check
11,400 (18,000 km)	—	Parking brake cables Steering gear housing on the front axle beam, lower wishbone fastening, car fastening of engine hood, engine fastening of front seat grille rails, front seat arresters	Visual inspection of nuts and cotter pins Check ball ends for tightness Check for oil leaks Check flexible disc Check flexible disc, check play in steering mechanism Clean hoses on bottom of jacket Check grille rails for tight seal, re tighten; check for dirt and resin formation, rub with thin and resin-free oil; clean Coverscover, rub with steam. Check acid level and specific gravity, check terminals for proper seal, grease
	46	Battery	Adjust Check top-in and camber Check camber
	47	Headlights Front axle Rear axle	Adjust Check top-in and camber Check camber
approx. 32,000 (50,000 km)	33	Air filter ¹ Generator Fuel feed pump Fuel pre-filter with paper element Door hinges	Clean paper element Exchange generator. If not possible, remove generator, check commutator for perfect condition, re-machine if necessary. Clean carbon brush support, replace carbon brushes with new ones. Exchange Replace paper element Check fastening bolts for tight seal
approx. 63,000 (100,000 km)	—	Thrust rod mounting for the rear axle	Replace rubber mountings, check thrust bearings and plates on frame floor, replace if necessary.

¹ Sooner in very dusty regions.

² If installed.

Cleaning the car and care of the bodywork

Resin-base paintwork¹

Never clean your car with anything that might leave scratches or marks on the paintwork, i. e. never use dusters, brushes, rough rags or cotton, nor any agents that are not suited for the purpose. Our service stations will gladly give you detailed information on the agents to be used and on any other questions relating to paintwork. Should the paintwork need repair, our service stations will do the job according to our directives.

Regular and frequent washing is most important with regard to the paintwork, for dirt will prove harmful to it.

Never wash or polish your car in the sun, or while the engine hood is still warm. Thoroughly wash the vehicle by spraying it with water from a hose (diffused spray) so that the hard dirt particles will soak and flush away. For removing tar stains or insects see below.

Then wash the paintwork with a soft, clean sponge from the top downward. When doing so, take care to rinse the sponge thoroughly several times in clean water in order to avoid scratches on the paintwork. For cleaning the chassis and the wheels by all means use a different sponge or a soft brush.

Now rub the car down with clean damois leather so that no water stains will form.

If you want to «shampoo» your car, our service stations will be glad to inform you about the solutions to be used, all tested and approved by us. On principle, only mild products should be used, and the concentrations recommended by us must be observed. In any event, the vehicle must be rinsed thoroughly with plenty of water after it has been shampooed so that the soap will not dry onto the car. We advise you to treat the paintwork with «Mercedes-Benz-Kunstharz-Polish» (Mercedes-Benz Resin-Base Polish) after shampooing.

For polishing the resin-base paintwork we recommend «Mercedes-Benz-Kunstharz-Polish». This specially developed polish ensures careful and efficient treatment and involves very little work. By no means apply brands containing abrasive particles like nitro-polishes, standard polishes, etc. They would mean less trouble, it is true, but they also would scratch the paintwork.

The purpose of the resin-polish treatment is to remove, without scratches, the dirt and oil particles that did not come off the surface when the car was being washed, and to preserve the paintwork. Therefore, if the resin-polish treatment is repeated fairly regularly once in 8 to 10 weeks, the lacquer will retain its gloss and resistance much longer.

Light-coloured cars with metal gloss require a more frequent treatment.

After the vehicle has been washed and completely dried by means of a piece of leather, and after any existing tar stains have been removed, put some polish on soft clean cotton. With this polishing cotton, treat the paintwork evenly, and go over the car one part at a time until it reaches the desired brilliance. Now remove any polish left with clean cotton until there are no more stains on the surface of the paintwork.

In case the resin-base paintwork has not been regularly maintained, or if for some other reason it has lost its gloss, resin-base polish does, in general, no longer suffice to achieve a satisfactory gloss. In such cases, consult our service stations for other, more effective polishes.

Stains on the paintwork, such as tar or oil stains, bugs or similar things, mostly do not come off just by washing. They should be removed, however, as soon as possible as otherwise they may cause lasting damage to the paintwork.

¹ The exact type of paintwork is specified on a plate below the engine hood. If the car is done in nitro paintwork (upon special request) the maintenance instructions are different.

Tar stains should only be treated with «Mercedes-Benz Tar Remover» as some of the commercial tar removers available on the market will be harmful to the paintwork.

It is very difficult to get insect stains off the paintwork. If possible, try to get them off on the same day they got on, using lukewarm water. If this is not possible, use a mild, 1-2% nonalkali soap solution (do not use higher concentrations). After this, thoroughly rinse with much water.

Car windows and windshield

It is possible to fold back the windshield wipers so that the windshield can be cleaned more easily.

It is best to remove the dirt from the panes by means of «Mercedes-Benz-Fensterreinigungsmittel» (Mercedes-Benz window cleaning agent). Apply a thin coat on the pane, after drying remove it with a soft rag.

For the filling of the windshield washing system you add 1 package of Mercedes-Benz window washing agent to 1 liter of fluid in summer and 2 packages in winter to prevent freezing as low as 15.8° F (-9° C).

When washing the window panes also clean the windshield wiper blades from the dirt and sand that has accumulated along the rubber by means of a clean rag, or, if necessary, with soap water or alcohol. Wipe blades in vertical direction.

Moreover, we advise you to replace the windshield wiper blades by new ones once or twice a year. When removing the blades, move the small lever that protrudes from the support of the blade below the mounting point in the direction of the arrow that is stamped into the support. Now the blades can easily be removed from the wiper arms. Thoroughly clean the mounting point. After having pushed the small lever back into the direction of the arrow again (see above), the new wiper can be fastened to the wiper arm.

Chromium-plated and light metal parts. All chromium-plated and light metal parts must be rubbed dry after they have been cleaned with water and a sponge. Tar stains should be removed with the a/m «Mercedes-Benz Teerentferner» (Mercedes-Benz Tar Remover). By no means use any sharp-edged tools — knives or the like. Then a thin layer of the chromium preservative «Mercedes-Benz-Brillant» is to be applied to the parts with a soft cotton rag. Allow the compound to dry shortly, and then polish the parts with a clean part of the rag. Particularly in winter this treatment should be repeated thoroughly every time the car has been washed. There is only very little expense involved, and the results you achieve will be excellent.

Under severe conditions, particularly during the winter months, when there is snow and the streets are strewn with gravel and salt, we advise you to treat the chromium-plated parts with a chrome preservative paste which offers still more protection on account of its higher wax content. This paste is to be applied with polishing cotton, and distributed evenly. Before doing this, clean the chrome parts from snow and salt water by washing them with warm water. After the paste has been allowed to dry for a short while, polish to high gloss by means of clean cotton.

Upholstery and tops

For the cleaning of upholstery and tops a brush which is not too hard should be used. Do not try to remove oil or grease stains with just any kind of cleaning agent because otherwise the material that is underneath the covers may produce ugly marks; it is best to use «Mercedes-Benz-Fleckenwasser» (Mercedes-Benz stain-remover).

There is no universal solvent which you might resort to when trying to remove stains. It has to be decided in the particular instances which agent is most suitable. In most cases, it will suffice to rub the upholstery, after it has been brushed, with diluted liquid ammonia (use 1 part of commercial liquid ammonia for 3-4 parts of water). When

rubbing, use a piece of gauze, soft muslin or something similar, which should be damp, but not wet. Then let the upholstery get dry. Sugar and ink stains come off by using warm water. Oil colours and resinous substances can be removed with a little turpentine. Rust stains come off by treating them several times with a diluted solution of citric acid. Finally always rub a little diluted liquid ammonia into the material.

On principle, it is recommended to contact one of our service stations for removing stains.

Leather covers can be easily cleaned by rubbing them with a soft brush or a cloth moistened in a soft soap solution. See to it that no water remains on the leather upholstery which might penetrate into the upholstery through the seam stitches and renders drying more difficult. Rough soap and hard brushes are not suitable. Rinse off the soap solution with clean water and rub it dry with a rag. Afterwards treat the leather with «Mercedes-Benz-Karneol» according to the instructions, see to it that no visible residues remain in the pores and grains of the leather.

Electro-static darning is simple. Use Mercedes-Benz Antielectro-stationum as instructed. Leatherette, welts, and Covertex sliding top should be brushed thoroughly with water to which a washing agent (soap, REL, Fewa etc.) has been added or should be cleaned with Tuba dry cleaning agent. Organic solvents (like tar remover, stain remover, diluting agents etc.) are not to be used for cleaning imitation leather and sliding tops.

Steering wheel, lamps, and rubber parts

If possible, do not touch white steering wheels with gloves that are not colourfast. Moreover, do not use coloured steering wheel covers made of synthetic material for white steering wheels. Steering wheels, no matter what colour they are, as well as plastic fittings on lamps, also rubber parts and welts, are to be cleaned with normal soap solution only. By no means use organic solvents (like gasoline, spot removers, or diluting agents).

For care of the instrument panel see instructions on page 9.

Instructions for the sliding top

In the garage, the top should always be kept closed.

Opening the top

Turn the locking lever by 180° in counterclockwise direction and slide the top backwards with a slight push.

By turning the locking lever by 180° in clockwise direction into locking position, the top can be arrested in any desired position.

Opening the top partly

If you want to open the top only a little or half to ventilate the car, slide the top right back first and then pull the bow forward to the desired position. Thus the folds lie in the rear and do not act as wind resistance.

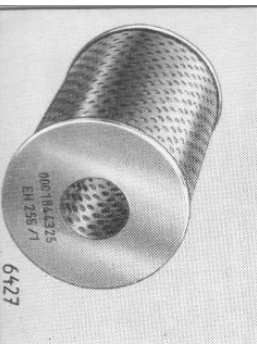
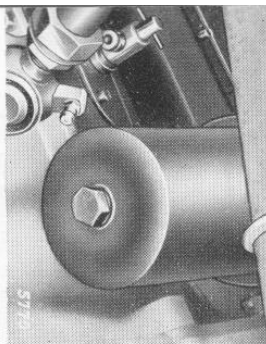
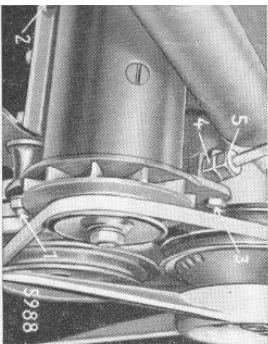
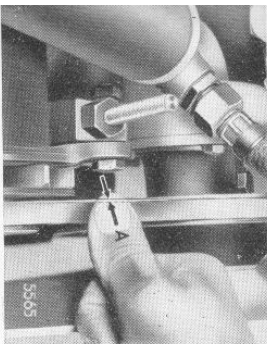
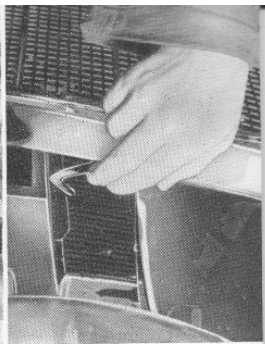
Closing the top

Turn the locking lever by 180° in counterclockwise direction, pull the top right towards front until the locking hook engages with the provided opening, then turn locking lever by 180° in clockwise direction.

Care of the top

Clean the cover with water only.

If it is not possible to move the top easily, the sliding rails should be cleaned and the leather guides running in the rails should be slightly greased with a non-resinifying oil, e. g. sewing machine oil or home oil. At the latest after 11,000 miles (18,000 km), the Covertex area should be cleaned and rubbed down with Stearn.



To open the engine hood: Pull out the hood lock control knob beneath the instrument panel. The radiator grille which is tightly connected with the engine hood will then open as far as the stop of a safety hook which is on the lower left behind the radiator cover (seen in driving direction). Reach right and left through the air intake openings behind the radiator grille at the level of the first opening; pull the safety hook forward on the left, and lift the radiator grille.

To close the engine hood: Press radiator grille down and slam engine hood by hand.

Points for particular attention:

Engine

To check the fan belt: If it shows signs of wear, replace it by a new one. For mounting see below. Caution! You should not try to press the belt on by means of a screw driver or the like.

The belt should neither be too tight nor too loose. You should therefore check the tension of the belt regularly: The distance A which is the amount the belt can be pushed out of straight when moderate thumb pressure is applied (on generator side), should be at least 0.2 in. (5 mm), but should not exceed 0.4 in. (10 mm).

To readjust: Loosen the front (1) and the rear (2) securing bolts at the generator support underneath the generator and the securing bolt (3). Beside the readjusting nut on top; the readjusting nuts (4 and 5) should be loosened by means of a wrench until the correct belt tension is obtained. Tighten bolts (1) to (3).

When fitting a new belt, proceed in the same manner, but tighten the readjusting nuts (4 and 5) almost completely.

Oil filter

Unscrew fastening screw on filter housing from underneath and remove the filter housing vertically. Caution! Housing is filled with oil. Do not lose gaskets underneath the fastening screw. The filter housing lid remains on the engine. Empty filter housing and take out element. This paper element can not be cleaned it must be replaced by a new one (DB No. 000 184 13 25 international measurement) according to the number of miles given in the maintenance chart (see pages 23 to 26). **To drive without the paper element is dangerous for the engine because then the oil will then not be filtered.**

When remounting the housing, the gasket in the lower part of the housing should lie perfectly flat on the groove base. The gasket underneath the fastening screw should not be tightened too much or too forcibly.

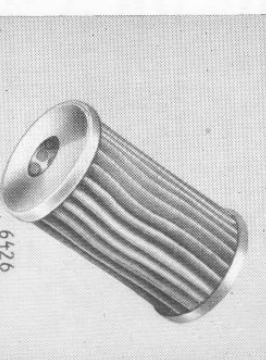
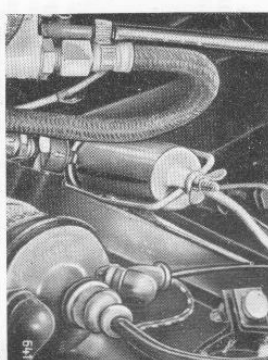
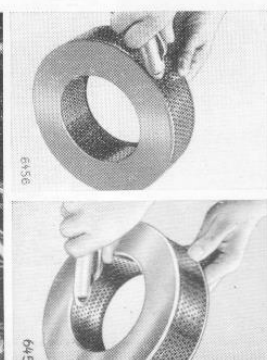
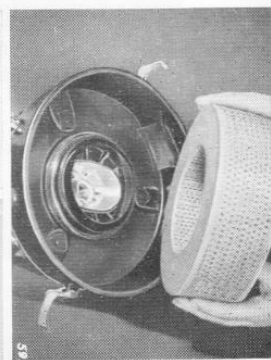
Air filter

Its paper element (Pico or Micronic cartridge) should not be oiled or made wet. Under normal dust conditions (paved roads) the element should be cleaned every 3,800 miles (6,000 km); to do this, loosen tightening clamp remove lid, take out cartridge and blow compressed air (5 kg/cm² at the most) through the cartridge from the outside then also blow through the cartridge from the inside. While blowing through the cartridge knock it gently several times on a firm base. If no compressed air is available, the cleaning can also be effected — however only to a limited extent — by slightly knocking the cartridge on a firm base. Housing and lid should be wiped with a rag which has been soaked in fuel. Be careful when doing this to keep dirt out of the outlet opening. Check gaskets in lid and lower part of housing for tight seat insert cartridge. Clamp lid exactly in center and tighten opposite tightening clamp at the same time. After appr. 32,000 miles (50,000 km), the cartridge should be exchanged for a new one. In excessively dusty areas the cleaning of the element should be carried out accordingly sooner.

The fuel pre-filter is in the engine housing, left front, behind the steering housing. Its paper element can not be cleaned, however, it should be replaced at the latest after every 32,000 miles (50,000 km). To do this: loosen thumb screw, fold down clamp and remove the upper part; then the paper element can be exchanged. Also clean and check for good condition the gasket in the lower part and the lower part itself. When reassembling, the clamp must be mounted vertically and the thumb screw tightened securely.

The cover retaining screw (1) at the fuel pump should be loosened by two turns and the water drained off. Firmly tighten the screw again.

Every time the carburetor or fuel pipes have been emptied, or when the tank has become empty when driving, press down the hand lever on the fuel pump about 10 or 12 times. When doing



this a slight resistance must be perceptible and the sound of fuel sucked in and sprayed into the carburetor must be clearly heard; the spraying noise will stop as soon as the carburetor is full. If no resistance is felt and if no sucking or spraying noise can be heard, which is possible at a certain position of the crankshaft, actuate the starter for a moment, so that the position of the crankshaft is altered and then the hand pump will function.

Distributor

The distributor is lubricated with engine oil at the oiler which is fitted with a turnable cover. The oil level should be checked after the «first» 300 miles (500 km) and every 11,400 miles (18,000 km) the oiler should be replenished with the engine oil in use.

Felt, saturated with oil, is placed in the cavity of the cam where the distributor rotor is; this felt is to be lubricated every 11,400 miles (18,000 km) with two drops of engine oil only; do not overgrease.

Moreover, you should check every 11,400 miles (18,000 km) whether there is still a grease reserve at the breaker point rubbing block; if necessary, refill with Bosch grease Ft 1 v 4 by means of a spatula 0.2 in. (5 mm) wide. The distributor cams should be slightly greased at the same time. Be careful not to get any grease or oil on the breaker contacts.

The gap between the breaker contacts should be 0.016—0.020 in. (0.4—0.5 mm) to ensure a faultless running of the engine. The gap between the breaker contacts can be measured as follows:

- a) with a feeler gauge
- b) with a cam angle meter.

Measuring with a feeler gauge:

1. Remove distributor cap and rotor.
2. Turn crankshaft — the best way would be to turn a jacked-up rear wheel with 4th gear engaged — until one cam of the distributor shaft lifts the contact breaker arm. At this point the point gap is at its maximum and should be 0.016—0.020 in. (0.4—0.5 mm).

Correct measuring with the feeler gauge is only possible on new or smooth flat points and then only if the drive shaft of the distributor does not have too great a radial play. Moreover, when measuring with the feeler gauge pressing the distributor shaft against the breaker points must be avoided.

Measuring with the cam angle meter is far more exact and, therefore, to be preferred if possible.

The cam angle should be 46° to 52° at idling speed, measured at the distributor. The difference between this ratio at idling speed and that at higher speeds must not exceed 3°. If greater deviations occur they suggest too great a radial play of the drive shaft, a loose base plate or other faults of the distributor.

If the cam angle is too small it means that the point gap is too great and, vice versa, if the cam angle is too great it means that the point gap is too small.

The cam angle can be adjusted by altering the point gap.

Adjusting the contact gap:

Loosen the setscrew (1) below the breaker points and turn adjusting screw (2) at the other end of the angular piece until the correct distance is obtained. The gap becomes wider by turning to the left and narrower by turning to the right. Tighten setscrew (1).

After the cam angle has been adjusted by altering the point gap, the gap must be checked again with the feeler gauge. Cam angle and breaker point gap must be within the specified limits.

If the gap is smaller than 0.016 in. (0.4 mm) after adjustment of the cam angle, the breaker points will have to be replaced by new ones. In any case, we would advise you to renew the breaker points after every 11,400 miles (18,000 km).

If the point gap is still too small at the proper cam angle and in spite of new contacts the distributor must be replaced by a new one. On no account must the cam angle be altered to make up for a point gap which is too small.

Attention is drawn to the fact that every modification of the contact gap results in either advancing or retarding the ignition timing. Therefore check the ignition timing (factory setting page 55) every time the contact gap has been readjusted.

Ignition timing

By the factory, the engine is set to the most advantageous performance using a premium fuel of 96—99 octane rating according to the Research Method (R.O.Z.). The factory adjustment is set on advanced ignition. The ignition timing can be adjusted within certain limits after loosening the setscrew (3). Illustration 6229) with the small lever (4). Illustration 6229) at the foot of the distributor. Adjusting the lever clockwise: «retarded ignition»; adjusting in counter-clockwise direction, «advanced ignition». Setting the engine to retarded ignition will only be necessary if the fuel available does not correspond to the required minimum octane rating (see page 12), or if a «pinkings» of the engine can be noticed. As soon as possible set the engine back to completely advanced ignition. Retighten setscrew (3) after each adjustment.

Spark plugs

These should only be unscrewed with a special wrench. Clean dirty spark plugs with brush and a cloth which has been saturated with gasoline, blow out.

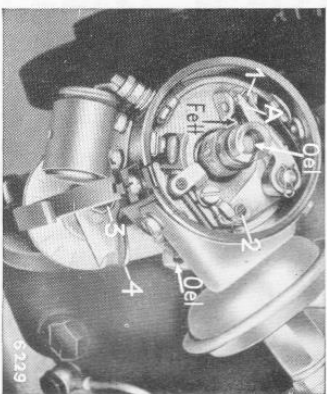
Check gap of electrodes with spark plug gauge: 0.027—0.031 in. (0.7—0.8 mm) with normal plugs and 0.035—0.039 in. (0.9—1.0 mm) with plugs interference suppressed for radio operation.

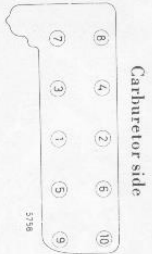
If necessary, bend only the ground electrode, never the central electrode.

The spark plugs should be replaced by new ones every 11,400 miles (18,000 km).

Exhaust and intake pipes: Check to see that all nuts, especially the flange nuts of the exhaust manifold, are tight. Defective gaskets can be recognized:

- a) in the exhaust pipe by blow-off;
- b) in the intake pipe by unsatisfactory idling.



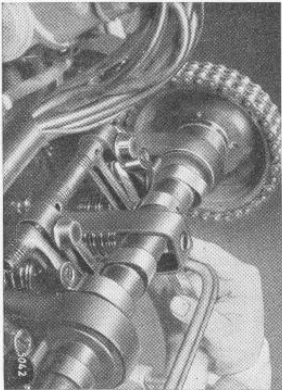


Carburetor side

After the first 300 miles (500 km), the cylinder head bolts should be checked for tightness by means of a torque wrench and should be retightened, if necessary (sequence acc. to opposite graph). Permissible tightening: 58 ft.lbs. (8 mkg) with cold engine and 65 ft.lbs. (9 mkg) with warm engine should not be exceeded.

Due to constructional features, special measures should be observed when assembling cylinder head and cylinder head gasket. Therefore, have these jobs carried out in one of our service workshops which are familiar with these methods.

Checking the valve clearance: The clearance between the valve stem and the adjusting



screw should be 0.004 in. (0.10 mm) for the inlet valve and 0.008 in. (0.20 mm) for the exhaust valve when the engine is cold. To obtain access to the adjuster screws unscrew the three knurled screws on the cylinder head cover, which should then be removed.

The clearance of each valve can only be measured when the cam belonging to it is no longer pressing on the rocker arm, so that the valve is completely shut. If necessary, this position of the cam can be obtained by jacking up a rear wheel and turning it with 4th gear engaged.

Gauges of the requisite thickness (see above) should be used for measuring the clearance. If the gauge will just slip between the valve stem and the adjuster screw, the clearance is correct.

When refitting the cylinder head cover make sure that the gasket is in good condition. You are recommended to have the valve clearance adjusted at a service station only.

The present carburetor has been designed as «compound» or two-stage carburetor, i.e. it has two separate intake ports each of which is fitted with a throttle of its own—so-called «barrels». The throttles are connected to each other and to the accelerator pedal by means of a linkage. As soon as the accelerator pedal is actuated, the throttle of the primary barrel opens, and when it is somewhat more than half opened, the throttle of the secondary barrel begins to open. In the secondary barrel, there is still an additional throttle somewhat below the main one—the eccentrically mounted vacuum throttle. A counterweight which is fitted to it ensures that it only opens when a correspondingly high engine speed has been reached as a result of the accelerator pedal being completely depressed. Only then the formation of the fuel-air mixture in the secondary barrel can start. The vacuum throttle makes it possible to use the largest possible Venturi tubes in the secondary barrel for top speeds without impairing the driving performance in the lower engine speeds.

Position of the jets in the carburetor

Since there are two intake ports, there are also two main jets and two air compensating jets in the carburetor. On the other hand, you will find the idling jet, the pump jet, and the starter jet in the primary barrel only. The opposite photos indicate the position of the individual jets. Access to the air compensating jets can be obtained by removing the air filter and the carburetor cover.

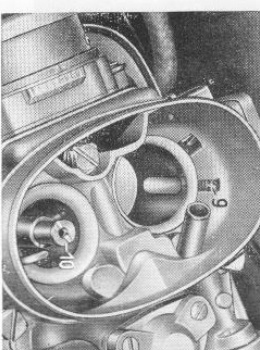
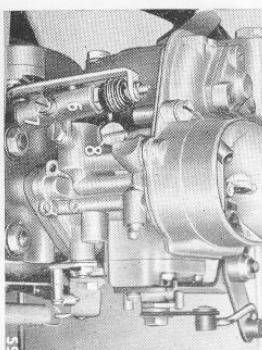
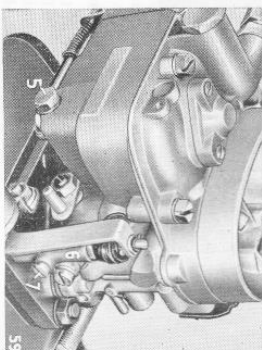
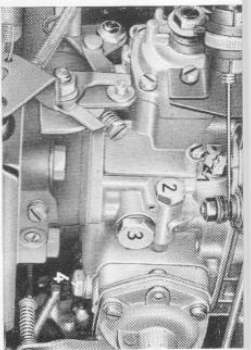
Absolutely pure fuel and complete tightness as well as the timing specified by the Factory constitute the basic conditions for satisfactory functioning of the carburetor. Any trouble which may occur will probably be due to the jets clogging as a result of dirt in the fuel, to water in the float chamber or to leaks at the connections or fiber sealing rings.

Therefore, if there is any trouble, the jets, in particular the idling fuel jet and the starter jet should be cleaned first of all. This should only be done by blowing through—a metal object, needle, or something similar should never be used. After the pump deck valve (4) has been unscrewed, dirt and water can be drained out of the float chamber. Tighten connections and check seal rings.

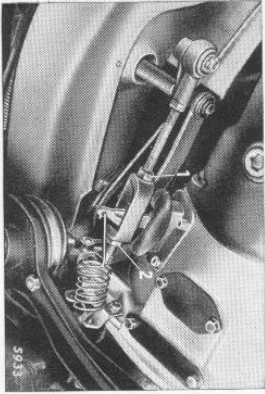
At the carburetor, there is a shock absorber (6) the oil level of which should be checked for the first time after 300 miles (500 km), and then every 11,400 miles (18,000 km). If necessary, oil should be refilled on the occasion of such checks. When refilling, proceed as follows:

1. Unscrew slotted screw (7) and gasket;
2. Inject, by means of a suitable injection-type can, engine oil SAE 10 W into the filler bore until the oil overflows;
3. Put back screw (7) or close bore by placing a finger on it;
4. Move plunger rod of shock absorber up and down until, when making the upward move, a resistance is clearly perceptible. This means that the space below the plunger is filled.
5. Open filler bore again, and again inject oil until it overflows. The total filling capacity is about 0.07 cu. in. (1.2 cm).
6. Screw back on again screw No. (7) and the gasket. Now the absorbing effect should be perceptible almost to the end of the lift.

Any other remedies with regard to the carburetor, in particular adjustments at the linkage, or removal, should be effected only in one of our service workshops.



1. Idling fuel jet
2. Pump jet, primary barrel
3. Main jet, secondary barrel
4. Pump deck valve
5. Starter jet
6. Shock absorber
7. Shock absorber filler screw
8. Main jet, secondary barrel
9. Air compensating jet, primary barrel
10. Air compensating jet, secondary barrel



Clutch

To check the free movement of the clutch pedal: This should be 0.98 ins. (25 mm) measured from the top edge of the foot plate before any pressure is exerted. If less than this, adjust the clutch. To do this, unscrew the lock nut (1) from underneath, give the adjusting nut (2) a few turns until the clutch rod is lengthened enough to give a free movement of 0.98 ins. (25 mm). If the clutch cannot be adjusted any more, apply to your service station.

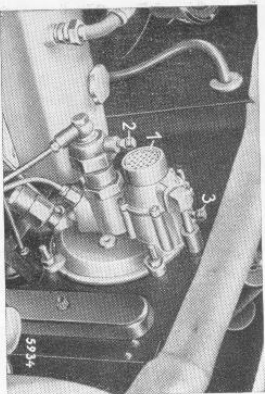
Brakes

We urgently advise you to have all brake jobs done only in one of our service stations. The brake fluid container of the master brake cylinder should be always at least $\frac{3}{4}$ full. If a severe loss of brake fluid is noticed, then there is a leak in the braking system. Check all lines and connections for tightness. For refilling use only ATE Blue Original Brake Fluid or Lookheed Brake Fluid (only Wagner Lookheed 21 B or British Lookheed Heavy Duty Type or Lookheed H.D. 1). Caution, brake fluid has a corroding effect, damages paintwork and must not be allowed to get into contact with the brake linings.

Never clean the rubber parts of the brake system with gasoline

When checking the brakes before starting to drive, resistance must make itself felt at the foot brake lever after the pedal has been normally depressed. Should this not be the case, then proceed as described on page 53.

The hydraulically operated foot brake which simultaneously acts on all four wheels will be additionally equipped with the Ate T 50 booster brake upon special request.



This relieves the driver by providing part of the braking force. The T 50 booster brake is a hydraulic braking device that takes advantage of the difference in pressure between the vacuum created in the intake manifold of the engine and the atmospheric pressure. This difference provides a source of energy for the booster brake. The latter intensifies the braking pressure created in the master brake cylinder by the driver's foot pressure and transmits this boosted pressure to the wheel brake cylinders. If the vacuum fails, it is nevertheless possible to brake the car although a considerably stronger foot pressure is then required.

The filter element of the booster brake should be replaced every 11,400 miles (18,000 km) by a new one. After removing the outer snap ring (1), the strainer disc and the filter element can be removed. After every 11,400 miles (18,000 km), the booster brake should be checked for leaks with regard to all pipe and screw connection points. This is best done in a service shop. Moreover, please check to see whether the vacuum line at the air intake manifold and at the check valve is leaking. The vacuum line should never be contracted or clogged. When bleeding the braking system, also bleed the T 50 booster brake at the two bleeder screws (2) and (3).

Bleeding the braking system:

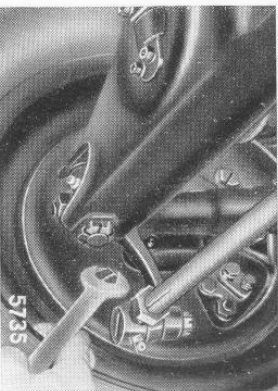
Special tools required: 1 bleeder hose, 1 glass container

1. The brake fluid container should be constantly refilled while the brakes are being bled (see point 6).
2. At a front wheel: pull off rubber cap at the bleeding screw of the wheel brake cylinder and connect bleeding hose to the nipple which is now exposed.
3. Push the wrench over the bleeding hose and apply to the bleeder screw.
4. Insert the other end of the hose in the glass container which should be filled with brake fluid until the hose nozzle lies under the fluid surface.
5. Loosen the bleeder screw by a few turns, but do not unscrew completely.
6. Repeatedly depress the brake pedal energetically, allowing it to return slowly to its original position until no air bubbles appear in the glass container any more. Caution! The level of the fluid in the container should not sink completely; otherwise air will be pumped back into the line.
7. When pushing the brake pedal down for the last time, hold it or clamp it in the depressed position until the bleeder screw has been completely retightened. Only then should you allow the brake pedal to return to its original position.
8. Take the bleeding hose out of the nipple, replace rubber cap.
9. Repeat this procedure at the other wheels and at the Ate-T-50 booster brake.
10. Top up main container and close it.

Adjusting the brakes

Foot brake:

1. Jack up the wheel.
2. Turn both adjusting bolts in downward direction until slight friction is felt at brake drums.
3. Turn back the bolt a little to the extent where the wheels run freely, when you turn the wheels.



Hand brake: Turn the adjusting nut at the hand brake lever to the right. Only adjust so far that it is still possible to easily rotate the rear wheels when the hand brake is released. The hand brake shall start being effective when the hand brake lever is pulled out up to the 3rd or 4th notch.

Final check-up: When the brakes are released and the car is coasting, it should come to a standstill without any jolts. The brake drums should not be found to have warmed up noticeably if they are checked after you have driven for several miles without using the brakes.

If the linings are worn very much and it does no longer suffice to readjust at the readjustment nut, you can also readjust by moving the pulley at the compensation lever further to the front. This is done by adjusting the retaining bolt. After having renewed the brake shoes, however, the displaced pulley must be put back to its original position. If possible, this should be done in a service workshop.

At the flexible casings of the hand brake cables one grease nipple each is provided. These nipples should have a small quantity of grease only after every 11,400 miles (18,000 km). Be careful not to overgrease because otherwise you will get grease on the brake shoes.



Wheels

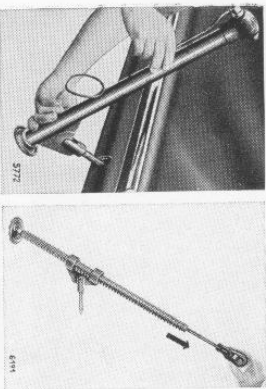
Lubrication of the front wheel bearings: Remove the ornamental cap with the offset end of the wheel brace and pull off the hub cap (special tool). Fill the hub cap with grease and press in, thereby forcing the grease into the ball bearings. Reinstall the ornamental cap and the hub cap.

Lubrication of the rear wheel bearings is effected by a grease reserve which only needs to be topped up as repairs are made on the rear axle.

To change wheels

The spare wheel, lifting jack and the brace which is used as a wheel nut wrench and for removing the ornamental cap, are in the trunk compartment. Pull the hand brake before changing wheels. If there is a choice at all, wheels should not be changed in a spot where the car is inclined toward one side.

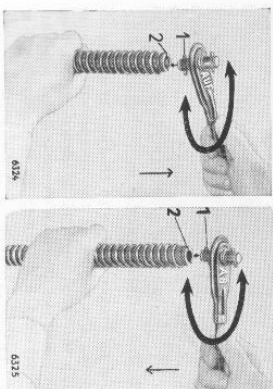
On a gradient the car should be protected against rolling downhill by putting wedges under the wheels. Remove the ornamental cap, loosen the wheel nuts, but do not unscrew them completely.



One of two types of jacks is delivered with the car depending upon preference — either one operated by a crank (Illustration 5772) which is mounted on the jack and is always ready for immediate use, or, the second type which is operated by a

slip — on ratcheted (Illustrations 6191, 6324, 6325). For the second type the ratchet has to be pulled out of the jack by its handle. Then the ratchet is inserted into the top of the jack. To raise the car the stamped in word «Auf» (up) should be on top. For lowering the car the word «Ab» (down) should be on top.

The pins on the ratchet for either operation must mesh with the guide grooves of the jack.



Horizontal to-and-fro movements of the ratchet lever will move the car up or down depending upon how the ratchet is inserted.

Either type of jack has to be inserted into the jack support adjacent to every wheel in such a way that the spring loaded bolt touches the bottom part of the jack. The jack must slant away from the car. By no means should it be set vertically because if so it might dent the body of the car as it is jacked up. Jack the car up until the wheel turns freely. Remove wheel nuts and wheel.

Screw on all wheel nuts but do not tighten yet. Lower the lifting jack, tighten the wheel nuts, always jumping one, until all of them are tight. Adjust tire pressure (see page 42). Have damaged tires repaired as soon as possible.

To balance the wheels

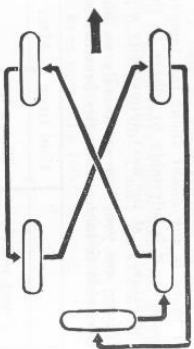
An uneven distribution of material and weight in a rotating body — wheel and tire — is known as lack of balance. Excess lack of balance in the wheels may at speeds over 50 m.p.h. (80 km) lead to steering difficulties and cause the bodywork to vibrate and the wheels to jump even over smooth roads. As a further consequence there is greatly increased wear and tear on the tires.

Therefore, wheels and tires should be re-balanced statically and dynamically after every 3,800 miles (6,000 km) and after every tire repair.

We recommend having the wheels balanced at one of our customers' service stations only.

Interchanging the wheels

In order to ensure that the tires are evenly worn, and to raise their longevity as much as possible, we urgently advise you to see to it that the road wheels are interchanged in accordance with the opposite scheme every 3,800 miles (6,000 km).



Tires

Changing the tires: Only a tire lever — on no account a sharp-edged tool — should be used to pull off the tire from the rim, and you should not apply any force. When renewing the tube, always see to it that the size of the new tube corresponds to that of the tire.

Insert the tube, which should be slightly inflated first, into the outer cover in such a way that the tire valve and the red point on the outer cover — which marks the lightest point — lie next to each other. Before finally inflating, check the seat of the beads. Inflate as specified (see page 42). After the tube has been changed, it is necessary to balance the wheel (see above).

Tire pressure

Always adhere to the specified pressure

This is of utmost importance for your driving safety and comfort and for the life of the tires.

When driving, the temperature of the tires and, therefore, the tire pressure rises. This increase in pressure depends on the speed and load, and it is necessary for the durability of the tires.

If you therefore, check the tire pressure in the course of a longer trip, while the tires are warm, and you find that a higher pressure has been reached, by no means deflate to the figure specified for cold tires. On the contrary, if you have to inflate the tires in the course of a longer trip, that is to say when the tires are warm, a higher degree of pressure will be required than for cold tires. Please consult the table below on this point:

	Cold tires	After prolonged city driving or moderate highway driving	After fast highway driving
Front wheels	24 p. s. i. (1.7 kg/cm ²)	27.5 p. s. i. (1.8 kg/cm ²)	27 p. s. i. (1.9 kg/cm ²)
Rear wheels	25.5 p. s. i. (1.8 kg/cm ²)	28.5 p. s. i. (2.0 kg/cm ²)	30 p. s. i. (2.1 kg/cm ²)

Spare tire: 27 p. s. i. (1.9 kg/cm²)

When the car is being driven with full load, i. e. with 6 persons and luggage, the tire pressure of the rear wheels has to be raised to 27 p. s. i. (1.9 kg/cm²) with cold tires. When driving a short distance at moderate speed, e. g. from the garage to the filling station, the temperature of the tires hardly rises at all. In that case, the pressure should correspond to the figures indicated for cold tires.

If there is any doubt about the temperature of the tires after driving a fairly long distance, it is advisable to adhere to the maximum pressure specified and to correct the pressure at the next opportunity when the tires are cold.

If you use your car exclusively on highways for long distances at high speed it is advisable to increase the tire pressure to the following figures:

	Cold tires	After driving fast on highways	Only for continuous driving on highways
Front wheels	27 p. s. i. (1.9 kg/cm ²)	30 p. s. i. (2.1 kg/cm ²)	
Rear wheels	28.5 p. s. i. (2.0 kg/cm ²)	33 p. s. i. (2.3 kg/cm ²)	

Spare tire: 28.5 p. s. i. (2.0 kg/cm²)

Before starting for a long trip, and at least once a week, you should check the tire pressure.

As the pocket tire pressure gauges normally available are not always very reliable, we recommend to have your tire pressure taken with a precision tire pressure gauge. From time to time this instrument should be tested at one of our service stations.

If the tire pressure drops by more than 3 lbs./sq. in. (0.2 kg/cm²) within a week, there is a defect in the valve or inner tube, and this should be put right as soon as possible. It has been found by experience that a nail stuck in the tire does not immediately cause a complete loss of pressure but only a gradual decrease in pressure. After the car has been driven over some distance the damage caused to the inner tube by the foreign body sticking in is increased by the movement of the tire until finally the air escapes suddenly. If the tire pressure is too low, the deformation of the tire along the ground is larger than if the pressure is correct. Even an inexperienced driver will soon notice the difference if he looks at the tires carefully. It would be good to briefly glance at the tires before every trip.

Tire wear

Every driver can influence the service life of his tires considerably, for the amount of the tire wear largely depends on the way the car is driven.

Hard cornering, sudden braking, fast getaways all result in greatly increased tire wear. On the other hand, tire wear does not rise unduly, for instance, if you drive straight ahead only at very high speeds on a highway. In this connection, please refer to the hints for economic driving on page 4.

In summer, tire wear is inevitably higher than in winter as the rubber is less abrasion-proof in a warm than in a cold condition. Rough road surfaces result in greater tire wear than smooth ones.

It is not possible to combine maximum resistance to skidding on slippery roads and the highest possible durability in one tire. When choosing tires, one should therefore keep in mind that very good anti-skid tire treads wear off somewhat quicker.

Premature and uneven wear on the tire may be due to the following causes:

1. The tire pressure is too low. This can be seen from the fact that the tread is worn more at the sides than in the middle.
2. Unsuitable tires. Our service stations will at all times give you expert advice and tell you which make of tire is best suited in the prevailing conditions.
3. Faulty toe-in on the front axle. This is the case when the tires become worn prematurely yet evenly along the circumference. In extreme cases saw-like patches may appear across the tire.
The toe-in is correct if the distance between the two front wheels measured at the edge of the rim in the middle of the wheel is 0-0.078 in. (0-2 mm) less at the front than at the rear. This applies to an unloaded car. To compensate for any possible bend in the rim the mean number of two measurements should be taken, the second measurement being made when the wheel has been turned by 180°.
4. Lack of balance.
To balance the wheels see page 41.
5. Damaged shock absorbers.
6. Brakes which grip unevenly.
7. Faulty camber of the front wheels, or bent rim or axle caused by having run into something.
Defects 3 to 7 can only be tested exactly and remedied at a service station.

Tire maintenance

Examine the tires as often as possible and remove any foreign bodies that have penetrated into the cover. The best time to carry out this inspection is when the wheels are being interchanged. All cuts and damage to the rubber should be put right by an expert. If the thickness of profile (original, re-tread, or re-profiled) in the center of the tread is appr. 1 mm, the limit of traffic and skidding safety has been reached.

If the car has been driven fast all the time, it is inadvisable to have worn tires re-treaded, as the foundation will have been impaired by the fast driving. If, on the other hand, the car has only been driven at moderate speed the tires may be re-treaded by a reliable firm. With re-treaded tires fitted you should, however, not exceed a driving speed of 80 m. p. h. (130 km/h).

For painting, the tires do not use a nitro-cellulose paint, but only one of the special commercial tire paints.

Check the rims. Dented, bent or rusty rims cause damage to the beaded edge.

Have the rust removed from the rims once a year.

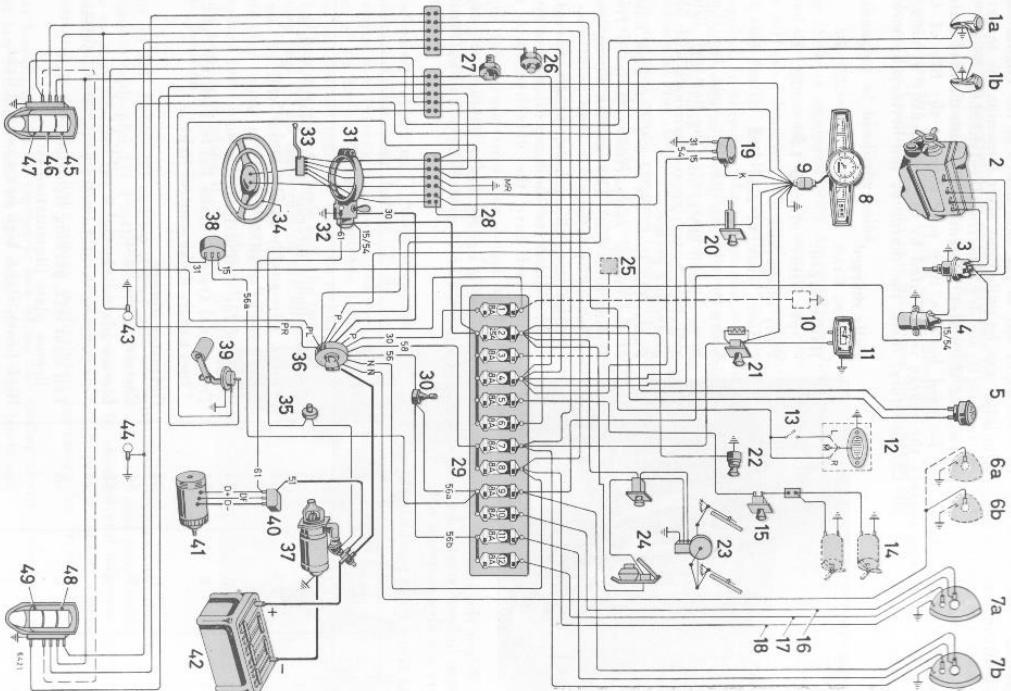
Electrical equipment

Key to wiring system (see diagram page 45)

- | | |
|---|--|
| 1a Clearance and turn signal light, left | 25 Reserved for optional equipment |
| 1b Clearance and turn signal light, right | 26 Back-up light switch |
| 2 Engine | 27 Brake light switch |
| 3 Distributor | 28 Cable connector |
| 4 Ignition coil | 29 Fuses |
| 5 City horn | 30 Foot dimmer switch |
| 6a Fog light ¹ , left | 31 Ignition switch and steering lock |
| 6b Fog light ¹ , right | 32 Generator indicator |
| 7a Headlight, left | 33 Direction signal switch |
| 7b Headlight, right | 34 Signal ring |
| 8 Instrument cluster | 35 Starter push button |
| 9 Wire coupling | 36 Rotary light switch (with positions for parking light and push-pull switch for fog light) |
| 10 Socket ¹ | 37 Starter motor 12 V |
| 11 Clock | 38 High beam blinker relay ² |
| 12 Interior light and switch | 39 Transmitter, fuel gauge |
| 13 Door contact | 40 Regulator |
| 14 Heater fan motors | 41 Generator 12 V |
| 15 Switch for heater fan motor | 42 Battery 12 V, 56 Ah |
| 16 Cable for high beam headlight | 43 License plate and trunk light, left |
| 17 Cable for low beam headlight | 44 License plate and trunk light, right |
| 18 Cable for parking light | 45 Tail light, stop light, and clearance light left |
| 19 Direction signal transmitter | 46 Back-up light left |
| 20 Clوحة | 47 Turn signal left |
| 21 Instrument panel switch | 48 Tail light, stop light, and clearance light, right |
| 22 Cigarette lighter | 49 Turn signal right |
| 23 Windshield wiper with switch | |
| 24 Pedal pump for windshield washing system with switch for windshield wipers | |

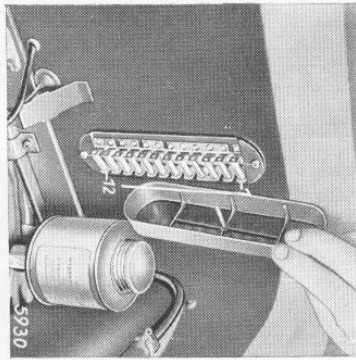
¹ Only delivered upon special order

² Not applicable on USA-design



Wiring diagram for electrical fittings

Battery: 12 volts, 56 Ah; on the front right side of the back board of the engine compartment, covered by a panel. The latter can be pulled out after loosening the securing bolts. Keep the exterior of the battery clean and dry. The fluid level should be $\frac{39}{64}$ — $\frac{19}{32}$ in. (10—15 mm) above the upper edge of the plates. Replenish only with distilled water. Special electrolytes should not be used because they may shorten the life of the battery. In a well kept battery the charge is indicated by the acid density at an acid temperature of 68° F (+20° C), therefore, check the charge of the battery by means of an acidimeter.



Fully charged:
Spec. Grav. of acid 1.285 = 32° Be
Half charged:
Spec. Grav. of acid 1.20 ≈ 20° Be
Fully discharged:
Spec. Grav. of acid 1.12 ≈ 16° Be

Clean terminals with hot soda lye (Caution! No lye may enter the battery). Rinse with cold water; erase terminals with acid protecting grease.

Fuses: The fuses are in a box at back board of the engine compartment (as seen from driving direction). The ignition wirings not protected by fuses.

If fuses burn through repeatedly, have the lines checked for short circuit at a service station and have the defective lines replaced.

Note: When the ignition is turned off the horn, turn signals, brake lights, fuel gauge, cigarette lighter, starter button, windshield wipers, starter control light, and defrosting blowers are also switched off.

List of fuses from top to bottom:

No.	Fuse DIN 72381	Lead	Consumer points
1	8	30	Clearance lights, interior lights (socket) ¹ , clock
2	25	54	Wipers, 1st signal horn (2nd and 3rd and horn relay) ¹ , cigarette lighter
3	8	54	Reserved for optional equipment
4	8	54	Turn signal system, brake lights, back up light, fuel gauge, choke control light
5	8	54	Defroster blower
6	8	54	Passing signal light ²
7	8	58	License plate light right, tail light right, parking light right, instrument panel lighting
8	8	58	Tail light left, parking light left, fog light ¹ , license plate illumination left
9	8	56a	High beam, right, high beam control light
10	8	56a	High beam, left
11	8	56b	Low beam, right
12	8	56b	Low beam, left

¹ Supplied only upon special request. ² Not applicable on USA-design.

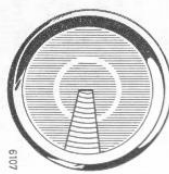
Headlights

The following description is only applicable for European countries, since in the United States sealed-beam headlights must be installed.

Do not clean the interior reflectors of the headlights. Finger prints impair the reflector surface. The headlight should only be opened to exchange the bulb.

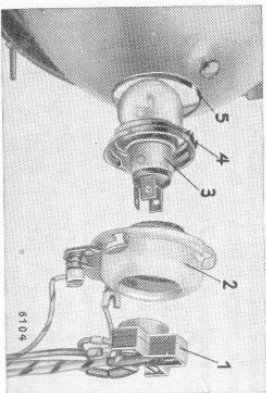
Exchanging of headlight bulbs

The 190b is equipped with asymmetrical low beam head lights, this can be recognized by the wedge-shaped section on the left side (seen in driving direction) of the diffusing lens (see illustration opposite). In countries with left side traffic, headlights with left-asymmetric low beam are provided. In this case the wedge shaped section is at the right hand side (seen in driving direction). To do this, unscrew the oval head countersunk screw at the bottom of the headlight, remove ornamental ring. Unscrew fastening screw of headlight, then the reflector unit can be removed from the protective housing which is located in the fender. Moreover, the following should be kept in mind: when inserting the bulb touch it only with tissue paper or something similar. Do not touch it with moist or oily fingers. Otherwise, the moisture will vaporize later and impair the lighting power. Do not clean dirty bulbs with gasoline but with alcohol.



With the asymmetrical low beam head-light the bulb and the socket form an integral unit which can only be replaced together.

Disconnect cable plug (1), then disengage and remove the lamp holder (2) by depressing and turning it counterclockwise out of its bayonet joint, then the bulb can be removed together with the socket (3). When inserting the new bulb the two fixing legs (4) on the socket of the bulb must fit into the cut-out (5) in the reflector neck of the headlight. The bayonet joint of the bulb holder (2), can only snap into place if the bulb is in this position.



Put on bulb holder (2) and let it snap into place by depressing and turning it clockwise. Connect cable plug (1). Finally, insert and mount reflector unit into fender. As soon as possible the headlight aiming should be checked and adjusted after having inserted a new bulb. This should be done in a workshop by means of a headlight aiming device. A precise headlight aiming is absolutely necessary for asymmetric low beam.

For headlights with asymmetric low beam, the aiming should only be carried out with the low beam switched on and not with the high beam.

In this case, the bright-dark borderline must be horizontal from left to center and should rise by an angle of about 15 degrees beginning from the center toward right top. (In case of left asymmetric low beam, horizontal at the right side of the center, then rising towards left top under an angle of 15°.)

Combined tail, brake, clearance, turn signal and back-up light

Left and right at the rear of the car the following lights are installed in one common housing on each side:

Sequence from top to bottom:

In the top section behind the red glass:

top: the bifilar bulb (5/15-Watt) for tail light and brake light.

bottom: the 1.5-Watt bulb for the rear clearance light.

In the center section, behind the white glass:

the 1.5-Watt bulb for the back-up light (in Germany to be found in the left housing only).

In the bottom section, behind the orange-colored glass:

the 1.5-Watt bulb for the direction indicator

Replacing a bulb:

Unscrew the upper and lower securing bolt of the housing cover — in emergency cases use a coin — and remove housing cover. Ball-type bulb (brake light, clearance light, tail light, turn signal light): Press in bulb, turn counterclockwise and pull out.

Installing a ball-type bulb: Press the bulb with the guide pins in the sections of the reflector, then turn clockwise by pressing slightly, until a stop can be felt.

Licence plate and trunk compartment lighting:

In each of the rear bumper guards a 10-watt bulb is installed. For replacing same loosen the 2 screws on the bumper guard, remove cover and washer, press bulb upward, turn and remove it.

Cooling system. Cleaning the cooling system:

If the temperature of the cooling water gradually rises above the normal level, this indicates dirt in the cooling system. The cooling system must then be cleaned of grease and scale, and well flushed. **Caution!** Overpressure cooling system; for opening see page 12.

a) **Degreasing:** Put approx. 2.2 lbs. (1 kg) of soda or 1.1 lbs. (0.5 kg) of P 3 into the cooling system through the radiator filler. With this added to the water run the car for a day. Drain off the solution at the drain cocks at the left side under the radiator and the engine. With the engine running and with fresh water running into the radiator at the same time thoroughly rinse the cooling system.

b) **Descaling:** You are particularly recommended to have scale deposits removed only at a service station. Various commercial products can be used, however, no harmful ones such as hydrochloric acid. The most effective method is with hydrothronium, for which the directions should be followed closely. By no means use hydrothronium in connection with an anti-freeze.

Depending upon the degree of scale formation in the cooling system, add 0.9/1—1.3/2.1 Imp./US pt. (0.5—1 lit.) while the engine is running. Do not fill in more than 0.9/1 Imp./US pt. (0.5 lit.) at a time. Briefly dip a testing strip through the filling opening into the cooling water after a long drive, or, at the latest, after a day. Refer to the color scale which is supplied with the testing instructions and the testing strip by the manufacturer to find out which pH-value corresponds to the shade on the testing strip which has been used. If this amounts to more than 6, the cooling water should be drained off, the cooling system thoroughly rinsed out again and the procedure repeated. The cleaning process is completed when the pH-value remains below 6 after a long drive. Then drain off the cooling water again, thoroughly rinse the cooling system and treat the cooling water which is then filled in according to the instructions (see page 13).

c) **Cleaning:** Blow through radiator from the engine with compressed air or spray with water to clean the radiator ribs thoroughly from all foreign matter. Check rubber hose connections between radiator and pipe for leaks and replace if defective.

Remove and thoroughly clean thermostat

Check water pump oil level every 11,400 miles (18,000 km) at the oil level check screw of the water pump (on the side of the bearing housing approx. 0.19 in. [4.5 mm] below shaft center). The oil level should also be checked if the water pump has been dismantled or if a replacement pump is installed. If the oil level does not come up to the check screw, the same oil as for the rear axle should be filled in at the filler screw (upper). Make sure the ventilation hole in the filler screw is not clogged.

Garaging and storing the car

Use only an airy and dry place which is regularly and adequately ventilated for storing your car. **Caution:** Never leave the engine running in a closed garage, exhaust gases are poisonous.

If your car is going to be laid up for a considerable time, it must be thoroughly cleaned inside and out and well greased. The painted parts of the body should be checked for damaged spots and repaired. The chromium-plated parts should be preserved by means of chromium protective agent. Check also the floor unit for damaged paintwork and repaint with chassis paint. All parts which are not painted including springs and spring suspension should be greased with anti-corrosion vaseline or grease. At the engine, the crankcase, the combustion chambers, the carburetor system, the cooling water jackets and all those parts of the exterior which are not painted, like the side parts of the V-belt pulley, the carburetor etc., should be preserved. To do this properly, drain the engine oil and in its place fill in the normal amount of Engine Anti-corrosion Oil SAE 10⁺; empty the fuel tank and refill a mixture of approx. 1.1/1.3 Imp./US gals. (5 liters) of fuel and 15.25 cu. in. (250 cc) (5%) of the above Engine Anti-corrosion Oil SAE 10⁺. Add about 3.05 cu. in. (50 cc) (1/2%) of water-soluble anti-corrosion oil to the cooling water. See page 13. Now run the engine warm so that the cooling water temperature is at least 140° F (60° C); then put the car in the place where it is to be garaged.

In order to preserve the combustion chambers, unscrew the spark plugs and spray approximately 0.6 cu. in. (10 cc) of Engine Anti-corrosion Oil SAE 10⁺ through each spark plug bore. Screw plugs in again and crank the engine by means of the starter just for one second. Before doing this, pull the thick high-tension lead out of the ignition coil.

In conclusion, spray those parts of the engine on which there is no coat of paint with Engine Anti-corrosion Oil SAE 10⁺; when doing so, cover or remove the V-belt.

Drain the cooling water only if you expect the weather to turn cold and if you have not added anti-freeze to it. For measures concerning draining see page 20.

If somehow possible, the battery should be removed and stored at a place where there is no danger of frost. We urgently advise you to check the charge once every 4—6 weeks, and to re-charge the battery carefully if necessary.

Jack up the car to relieve the tires and place blocks only underneath the four jack supports. Keep tires which are being relieved in this way at a pressure of about 7—14 p.s.i. (0.5—1.0 kg/cm²).

When taking the car out of the garage again, check the cooling water level and refill, if necessary. Crank the engine — without ignition — (the thick high-tension lead must be pulled out of the ignition coil) by means of the starter motor for about 10 seconds. Then unscrew the spark plugs, clean with gasoline, and put them back in place.

For a short while, you may go on using Engine Anti-corrosion Oil⁺ in the engine; you should drain it, however, as soon as you get a chance and replace it by normal HD oil appropriate for the prevailing season.

If the car is to be laid up for more than 6 months we advise you to consult our service stations for additional preservative measures.

⁺ For suitable Engine Anti-corrosion Oil, SAE 10⁺ consult our service stations.

Hints for emergency repairs

If you service your car yourself in accordance with the maintenance instructions or, better still, have it serviced and inspected regularly at a service station, there is little risk that your engine will not start or, apart from possible tire trouble, that you will have to do any emergency repair work on the road.

If, however, your car refuses to function properly in spite of this, the following hints will be helpful in diagnosing from the symptoms any cause of trouble and in remedying the fault. To open the hood see page 32.

The spare wheel is fitted on the right side in the trunk compartment. After the wing screw has been loosened, the claw can be lifted and the spare wheel taken out. Tools, lifting jack and wheel nut wrench, which are supplied with the car as standard equipment, are placed beside the spare wheel.

Should it prove necessary to tow the car please only fasten the towing rope to the bracket mounted to the front part of the subframe. While being towed make sure that the rope is always stretched. When starting out, therefore, the towing vehicle must stretch the «trains» first by releasing the clutch very slowly whereas the driver of the second car, by braking equally carefully, and braking in time, also when going downhill, must keep the rope stretched always.

The starter motor fails to turn over. Possible causes:

The key in the steering lock is not in «driving» position.

Should this not be the case, then switch on the high beam headlight first and then press the starter push button. If then

1. the lights suddenly go out, it means that there is a bad contact on one of the two battery terminals or at one of the two starter terminals. Clean the terminals thoroughly until the metal shines;
2. the lights go out slowly, the battery is insufficiently charged. Have the battery recharged by an outside source of current. To start off you can, if necessary, engage third gear, declutch, have the car pushed or towed forward, and then release the clutch;
3. the lights remain as bright as usual, there is a defect in the starter itself, and this can only be put right at a service station.

The engine does not start although the starter turns. Possible causes:

1. Faulty servicing:
 - A. There is no fuel in the tank. The fuel gauge will only function when the ignition is switched on. The last gallon (5 ltrs.) in the tank will not be indicated.
 - B. The choke has not been pulled out when the engine is cold or when starting in high altitudes the instructions on page 15 have not been observed.
 - C. The accelerator has not been actuated when the engine is warm.

II. Trouble with the car:

A. A fault in the ignition.

It is best to carry out the following tests with a leather glove on or with a dry cloth, and never use a metal tool but a dry wooden stick when testing; as otherwise there may be a short circuit. The cable should not be removed from the battery before the damage has been located and is to be remedied.

The procedure for testing is as follows: Remove the lead from a spark plug; screw it off the cable. Caution! Touch the high-tension lead only as far as 1.2-1.6 ins. (30-40 mm) off its outer end. Get someone else to press on the starter button with the ignition switched on and the gears in neutral. The end of the lead should be kept 0.25-0.32 ins. (7.8 mm) away from the grounding cylinder block. The spark must clearly jump this gap between the end of the cable and the cylinder block. If it does not, there is bound to be a fault. In this case, check

1. whether a) the cable leading to the ignition coil (terminal 15),
 - b) the H. T. cable (thick) and the L. T. cable (thin) between the ignition coil and the distributor,
 - c) the cable leading to the spark plugsare not broken and see that the ends are making good contact. Take the opportunity also to test the spark plugs (see page 35) for cleanliness and electrode gap.

2. whether the current is reaching the ignition coil. To do this remove at terminal 15 the cable leading to the ignition coil. Press the end of the cable against the brass sleeve of the plug for the inspection lamp and hold the middle contact of the latter against the cylinder head. If the lamp lights up, then the supply of current is in order. If the lamp does not light up, there is either a break in one of the cables or the ignition lock is damaged.

Emergency remedy: Attach an additional emergency cable from terminal 51 (thick cable) of the generator regulator to terminal 15 of the ignition coil.

By this remedy, however, current is being constantly taken from the battery when the engine is not running. It is, therefore, absolutely necessary to remove the emergency cable when the engine is stopped. As soon as possible you should take the car to a service station and have the defect put right by a specialist.

3. whether the ignition coil itself is in order. To do this, remove from the distributor the thin cable which leads from the ignition coil to the condenser terminal 1 on the distributor, press the free end of the cable against the brass sleeve of the plug of the inspection lamp, and hold the middle contact of the latter against the cylinder head. If the lamp does not light up and if the supply of current was found by test 2 to be in order, then there is a fault in the ignition coil (fracture or short circuit). This can only be put right at a service station.

If the lamp lights up, connect the removed cable again to distributor and check:

4. whether the distributor is in order; see page 34.

If the final test shows that the distributor is in good order and if you still have not discovered the cause of trouble, check once again to see:

5. whether a spark jumps over to the grounding cylinder block from an ignition cable — with the connection of the spark plug unscrewed — when the engine is being cranked by the starter motor. Should this not be the case, then the high-tension winding of the ignition coil is damaged and must be replaced.

B. Trouble with the fuel supply. Test as follows:

Switch off the ignition, loosen a little the securing screw of the fuel supply pipe at the carburetor, actuate the hand primer on the fuel pump, and see whether any fuel comes out at the screw. When actuating the hand primer, you should feel a slight resistance and hear a sucking noise. If this is not the case, which may occur when the crankshaft is in a certain position, press on the self-starter for a moment so that the hand pump diaphragm can function.

If then still no resistance can be felt and no sucking noise heard, screw off the pump and see if the actuating plunger can easily be moved. If necessary, remove it and get it to move freely. Screw on the pump again.

If, after actuating the primer 15—20 times still no fuel comes out at the screw on the carburetor, the following may be the cause:

1. Dirty fuel filter: To clean see page 33.
2. The fuel pump is not functioning properly, because:
 - a) The securing screw on the cover is loose. Tighten.
 - b) The gasket on the cover does not fit tightly. Replace gasket.
 - c) The packing washer under the securing bolt of the cover is leaking. Replace.
 - d) The filter part is blocked. Take out and clean.
 - e) The diaphragm or valves of the pump are leaking. This may be determined as follows:

Remove the flexible tube from the pump and place the finger over the intake opening of the pump. Actuate the primer and hold the lever in the bottom position and remove the finger from the opening. If the pump is in good order a sucking noise should be heard. If this is not the case, a replacement pump must be fitted.

3. The fuel line is blocked:

In order to be able to check, remove the flexible hose at the fuel pump, lift it, and pour in fuel. After about 0.05/0.06 Imp./US gals. (1/4 liter) of it have been poured in, fuel should flow out by the lines at the back of the tank. If it turns out that the line is clogged, disconnect it at the fuel pre-filter and poke a steel wire about 0.08 in. (2 mm) thick into it.

The engine stalls. The cause of the trouble may be:

1. Lack of fuel:

- The tank is getting empty; the red warning light in the fuel gauge has not been observed. Refuel as soon as possible.
- If the engine does not stall completely, but continues to operate with inefficient output, one or more carburetor jets are clogged. For seat of jets see page 37.

2. Trouble with the fuel supply:

If the output gradually falls and the engine stalls in hot weather in dense city traffic or when driving at moderate speed over long mountain passes, then this can be due to the formation of steam bubbles in the fuel pump, if poor qualities of fuel are used. To remedy this, wrap a wet rag around the fuel pump, wait for a short while, and then start the engine again.

If trouble occurs in the fuel supply at normal temperatures and under normal driving conditions, check as described under "The engine does not fire".

3. Ignition trouble. See under "The engine does not fire".

Engine is "pinkish". The causes may be:

- Unsuitable fuel; to remedy this, see under "Hints for trips abroad" (page 22).
- Fuel deposits in the combustion chambers. See a service station.
- Incorrect ignition timing. Please, visit a service station.

The red generator indicator lamp lights up when you are driving

If the generator indicator lamp lights up while you are driving, i. e. at medium and high engine speeds, this means that the electrical system is not in order. Stop the car and look for the fault. The cause of the trouble may be:

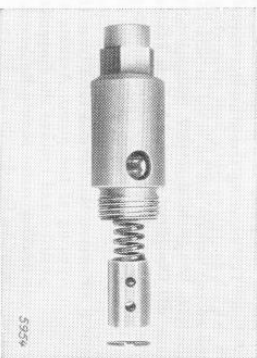
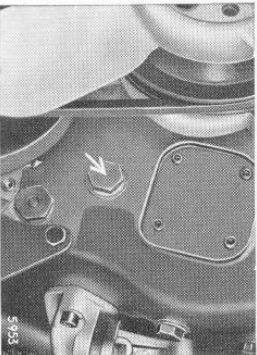
- A damaged generator, which should be remedied as quickly as possible at the nearest service station, since the battery can no longer be charged if the generator is not functioning.
- Loose or damaged V-belt. To tighten, see page 32.
- The cable leading from the generator indicator lamp to the generator or from the generator indicator lamp to the battery is earthing.

The oil pressure suddenly drops. The cause of the trouble may be:

1. Too little oil in the crankcase.

The lack of oil may be noticeable by a drop in the oil pressure when cornering, while the gauge indicates normal pressure when driving straight ahead. The oil level in the crankcase should at least come up to the 1st mark on the dipstick.

- The oil relief pressure valve on the engine is dirty or leaky.
- Remove the relief pressure valve, dismantle it and clean.



3. The pipe between the engine housing and the oil filter is leaking. Tighten the pipe connections. If points 1-3 are in order:

4. Check the oil pressure gauge itself:

Loosen the connecting line at the filter. If oil comes out at the connection when the engine is running, it is only necessary to replace the oil pressure gauge itself or perhaps the pipe leading to the oil pressure gauge. Otherwise there is a fault in the engine itself, and this can only be put right at a service station.

Cooling water becomes too hot. The cause of the trouble may be:

- Too little water in the radiator. Caution! Superpressure cooling system. The permissible cooling water temperature is 239° F (115° C). Open only, when cooling water temperature is below 194° F (90° C). First turn to stop I and let superpressure blow out, then go on turning and remove cap. When closing it again, turn to stop II. Top up only when the engine is running and do so slowly. The hose connections at the top and bottom between the radiator and engine and on the right and left between the engine and the heater element should be checked to see that they fit tightly. If necessary, tighten.
 - The radiator may be covered up too much.
 - The V-belt for the fan, or the one for the water pump may have insufficient tension (see page 32) or may be torn.
 - The radiator cover may leak so that no superpressure can form. The cooling water then boils as early as at 212° F (100° C).
 - The radiator thermostat may be damaged; replace.
 - The cooling pipes are blocked.
 - The water pump is damaged.
 - Retarded ignition: in this case the output is weak at the same time.
 - A damaged cylinder head gasket.
- Faults 5-9 are best remedied at a service station.

The clutch is slipping

If it is found that the r. p. m. increase when you open the throttle without any increase in the travelling speed, then the clutch is slipping. You can, if necessary, just drive on to the nearest service station at slow speed using the accelerator sparingly, so that you do not cause the clutch to slip. This is usually possible if you engage a low gear.

- The cause of the trouble may be:
- The clutch pedal has insufficient free movement. To adjust see page 38.
 - The clutch is smeared with oil.
 - A damage in the clutch lining or clutch mechanism. This is best put right at a service station.

Brakes

If the brakes are in good order, the brake pedal should have a distinct resistance when you carry out your routine check before driving off.

If this is not so, you may find the following:

- The brake pedal can be pushed right down quickly or slowly.

The cause of the trouble may be:

 - A wheel brake cylinder or a brake pipe is leaking. Before driving off, repair the leak by tightening up the connections or go to a service station.
 - The master brake cylinder is damaged. This cannot be noticed by an outward sign of leakage. The master brake cylinder can only be remedied at a service station.
- The brake pedal can be pushed right down against an elastic perceptible resistance. In this case there is air in the braking system. Bleed the brakes see page 39, and if necessary top up the reservoir with brake fluid.

When driving

- If you find that the brake pedal can be pushed right down when driving down a long hill, release the pedal for an instant and actuate it twice in quick succession, and you should then again feel the resistance.

If, however, the brakes still do not work, stop the car by means of the hand brake and, if necessary, by changing down to a lower gear.

Check to see whether there is a damage as in 1a) or 1b). Have the braking system checked as soon as possible at a service station.

2. Inadequate braking effectiveness. Possible causes:

- a) Damaged brake linings: have them checked in a service workshop.
- b) No vacuum in the T-50 booster brake¹, on account of a leak in the lines, in the booster brake itself, or in the intake pipe along the engine side, or in the throttle. Check all pipe connections, and replace, if necessary. You may also have the booster brake checked in a service station.

3. Retarded reaction of the brake. Possible causes:

Slow rise of the vacuum in the booster brake cylinder¹; check the hose which leads from the brake fluid container to the booster brake, and if it has been dented, replace it.

4. Slow releasing of the brake. Possible causes:

- a) the pedal linkage sticks,
- b) the piston of the T-50 booster brake¹ does not easily move; in that case, have the booster brake checked in a service station.

5. Difficulties in responding to pedal pressure. Possible causes:

- a) The linkage and brake-pedal do not move freely; get the linkage to function smoothly, grease.
- b) The piston of the booster brake¹ sticks; have booster brake checked at a service station.

6. Rattling brake. Possible causes:

- a) Out of round brake drums (motion can be felt in the pedal): have the brake drums reconditioned.
- b) Burnt brake linings (the brakes tend to grip): replace linings, refinish the drums.

7. Skewing or vibrating of the pedal when the brake is being actuated or released.

Possible cause:
The piston in the booster brake¹ does not move freely: have the booster brake checked, released. Remedy:

- a) Remove the drums, check the shoes to see if they function smoothly, and check the clearance.
- b) Check whether the relief port in the master brake cylinder is unobstructed when the brake pedal is in initial position. To do so, remove the filler screw of the brake fluid container and depress the brake pedal: if the port is unobstructed, brake fluid gushes out when the brake pedal is actuated; should this not be the case, have the adjustment of the brake pedal checked in a service workshop.

Trouble with the electrical system

All the fuses are to be found in a little box on the left front side of the dashboard (see page 46). The cause of failure in one of the electrical fittings may be:

1. The fuse is making a bad contact: Turn the fuse round, clean up the contacts, if necessary bend the contact spring.
 2. The fuse is damaged. It is either burnt out or else the fuse wire in the cartridge is not making contact. This cannot be definitely ascertained from the outside. For a substitute, use only soldered, welded or such fuses, the metal parts of which are made of one piece.
 3. A faulty contact at one of the connections: tighten up the terminals.
 4. One of the leads is earthing: Examine the cable harness for any frayed wires.
 5. The fitting itself is damaged: Faults 3-5 are best remedied at a service station.
- ¹ The Air-T-50 booster brake is installed only upon special request.

Technical Specifications

Engine	MB Type M 121 B-1b	Firing order, cylinder 1 at radiator 1-3-4-2
Method of operation	4 stroke	Point of ignition (factory setting) appr. 4° before TDC
Engine output according to SAE standards	4 stroke	Ignition timing automatically by centrififugal force and vacuum (see page 35)
Engine speed at 62 m.p.h. (100 km/h) : 3,530 r.p.m.		Starter motor Bosch EED 0.8/12 R 30
Maximum engine speed 6,000 r.p.m.		Generator Bosch LJ/CEC 160/12-2500 R 8
Bore/stroke 3.31/3.29 ins. (85/83.6 mm)		Generator output (W) 160/210 max.
Number of cylinders 4		Distributor Bosch VJUR 418 27 mK
Total effective piston displacement		Ignition coil Bosch TK 12 A 3
Compression ratio 13.75 ex. ins. (1.897 cm)		Carburetor Solex compound down-draft carburetor 32 PAJTA
Oil capacity of crankcase 85.1		Carburetor adjustment
max. 98/1.05 Imp./US gals (4 1/2)		1st barrel 2nd barrel
min. 0.55/0.66 Imp./US gals (2.5 lit)		
Capacity of cooling system with Daimler-Benz heating 2.0/2.5 Imp./US gals (0.3 lit)		Venturi tube 23
Valve clearance (when engine is cold)		Air compensating jet 180
inlet valves 0.004 in. (0.10 mm)		Air idling jet 1.0
exhaust valves 0.008 in. (0.20 mm)		Fuel idling jet 650
Spark plugs (electrode gap see page 35)		Fuel pump jet 80
Standard plugs		Main jet 0125
non-suppressed		Starter fuel jet 110
Bosch W 175/14/3		Starter air jet 3
Bosch W 175 T 27		Mixing tube 44
interference suppressed L radio operation		Floated needle valve 2.0
Bosch W 175 RT 27		

Road speeds in m.p.h. (km/h) approx.	1st gear	2nd gear	3rd gear	4th gear
Climbing ability in %	25 (40)	43 (69)	68 (110)	90 (145)
	58	29	17	9.5

Transmission DB 4-speed transmission, constant forced synchromesh gears, column gearshift
Steering gear DB recirculating ball-type steering with automatic readjustment and steering shock absorber

Camber of the front wheels + 20' to 40' unloaded
Toe-in of the front wheels 0—0.078 in. (0—2mm)
Caster of the front wheels approx. 2° 50' to 4°
Wheels (disc wheels, steel sheet) Size of tires 6.40—13
Type of rims well base rims Tire pressure, rear } see page 42
Size of rims 4 1/2 K x 13—B Tire pressure, front }

Overall length 117.1 ins. (4,500 mm)
Overall width 68.5 ins. (1,740 mm)
Overall height, unloaded approx. 61.4 ins. (1,560 mm)
Wheelbase 104.53 ins. (2,650 mm)
Track, front 56.3 ins. (1,430 mm)
Track, rear 58.06 ins. (1,475 mm)
Turning circle dia. approx. 34 ft. (10.7 m)
Max. speed, timed approx. 90 miles/h (145 km/h)
Fuel tank capacity approx. 12.3/14.8 Imp./US gals. (56 liters)

Dry weight of vehicle approx. 2,450 lbs. (1,110 kg)
Curb weight (net weight as per DIN 70 020) front approx. 1,700 lbs. (770 kg)
approx. 2,650 lbs. (1,200 kg) Permissible axle load.
Permissible total weight approx. 3,610 lbs. (1,650 kg) rear approx. 1,910 lbs. (880 kg)
Payload approx. 990 lbs. (450 kg) Battery capacity approx. 12 V 56 Ah

Subject to modification!

Alphabetical Index

	Page		Page
Air filter, cleaning	33	Engine disturbances	50, 51
Air intake pipes	35	Engine hood catch	32
Anti-freeze agents	12	Engine oil dipstick	27
Ashtroy	9	Filter for engine oil	32
Axle load	55	Filter in fuel pump	33
Balancing	41	Firing order	33
Battery	46	Foot brake	38
Bleeding brakes	38	Foot dimmer	6
Body care	29	Front seats, adjusting	7
Brakes	38	Fuel	12
Brakes, adjusting	39	Fuel, coolants and lubricants	12-14
Breaking-in	16	Fuel filler points	28
Car cleaning	29	Fuel filter	33
Carburetor	36	Fuel gauge	9
Carburetor, cleaning	37	Fuel reserve	9
Carburetor jets	37, 55	Fuel system	48
Choke	8	Fuses, electric	46
Chromium parts	30	Gas pedal	6
Cleaning air filter	33	Generator indicator light	6
Cleaning car	29	Gear shift lever	17
Cleaning cooling water system	48	Ground clearance	55
Climbing ability	55	HD oil	11
Clutch adjusting	38	Heating	14
Clutch pedal	6	Headlight bulbs	47
Cold weather measures	19-21	Headlight control light	6
Cooling agent	12	High beam control light	6
Cooling system, disturbances	53	Ignition distributor	34
Cooling water drain cock	27	Ignition distributor	50
Cooling water quantity	12	Ignition switch	8
Cooling water temperature	19	Ignition timing	55
Compression ratio	55	Imbalance	41
Corrosion protection agents	12	Jack, how to use	40
Customer service	22	Jacking up car	40
Cylinder head bolts	36	Length of car	5
Dimming switch	6	Light switch	6
Drain cock	20	Lubrication plan	23-28
Driving	15	Lubricants	13
Driving speeds	55	Main dimensions	55
Driver's seat	45	Maintenance	23-31
Electrical diagram	35	Oil	14
Electrode gap	32	Oil filler point	27
Engine	32	Oil filter	32
		Oil pressure	19
		Oil pressure gauge	9
		Oil pressure relief valve	52
		Paint	29
		Parking brake	6, 39
		Polishing	29
		Pulling off hub cap	40
		Rear view mirror	9
		Rear wheel bearings	40
		Reverse gear	17
		Shifting	17
		Shifting speeds	17
		Shifting roof	31
		Snow chains	21
		Spare tire	42
		Spark plugs	35, 55
		Specifications	55
		Speedometer	9
		Standard fuel consumption	55
		Starter	55
		Starting	15
		Starter motor, disturbances	50
		Starter switch	8
		Steering lock	8
		Storing	49
		Storing car	49
		Tips for emergency service	50-54
		Tire changing	41
		Tire pressure	41
		Tires	41
		Tire size	55
		Tire size of wheels	43
		Towing	50
		Transmission	17
		Treads	55
		Treating cooling water	12
		Trips abroad	22
		Trip preparation	22
		Two-filament bulbs	47
		Valve clearance	36
		V-belt	32
		Ventilation	10
		Water filler point	27
		Washers	55
		Wheelbase	55
		Wheels, changing	40
		Width of car	55
		Windshield wiper	7
		Winter driving	19-21

Extract from our list of engine and transmission oils, greases and protective agents intended for internal use

The following extract from the great number of products tested and released by us should not be regarded as a quality classification, but rather as a selection of products of firms maintaining an extensive sales network in Germany and in several European and non-European countries. If any doubts should arise and it will be impossible for you to consult one of our service stations, this extract will serve as a guide.

Engine: HD engine oils

- BV-Aral
- Caltex
- BV-Oel HD, BV-Oel Spezial (HD), Aral-Motor-Oel Spezial (HD), Caltex RPM Delo Spezial (HD), Caltex Motor Oil HD bzw. Havoline the Premium Motor Oil HD, Caltex Motor Oil Spezial (HD) bzw. Havoline Motor Oil Spezial (HD), Castrolite (HD), Castrol XL (HD), Castrol CR HD Oil, Castrolite (HD), Energol Motor Oil HD, Energol Visco-Static (HD), Esso, Esso Extra Motor Oil (HD), Delvac Oil 900 (HD), Mobiloil (HD), Mobiloil Spezial (HD), Motanol HD, Motanol Super (HD), Motanol Record (HD), Shell Rotella HD, Shell X-100 Motorenoel (HD), Valvoline Super HPO (HD), Valvoline „All-Climate“ HPO (HD), Veedol Motor Oil HD 900, Veedol 10-30 Motor Oil HD.

Drive axles, steering, water pump:

Hypoid transmission oils

- BV-Aral
- Caltex
- Castrol
- BP
- Esso
- Gasolin-Nitag
- Mobil Oil
- Shell
- Valvoline
- Veedol
- BV-Getriebeöl Hyp.
- Caltex Universal Thuban
- Castrol Hypoid
- Energol Getriebeöl EP (Hypoid)
- Esso XP
- Gasolin Getriebeöl Hypoid
- Mobilube GX
- Mobil Oil
- Shell Getriebeöl Hypoid
- Valvoline Hypoid X 18
- Veedol-Hypoid-Getriebeöl

Transmission: Automatic Transmission Fluid (ATF)

- BV-Aral
- Caltex
- BP
- Esso
- Gasolin-Nitag
- Mobil Oil
- Shell
- Valvoline
- Veedol
- BV-Oel SGP
- Caltex Texamatic Fluid
- Castrol TQ
- Energol Automatic Transmission Fluid
- Esso Getriebeöl ATF 55 Type A
- Gasolin Spezialgetriebeöl Fluid
- Mobilfluid 200 bzw. 200-Y
- Shell Donax T 6
- Valvoline
- Valvolamic Type A
- Veedol-Transmission Fluid Type A

Front wheel hubs: Roller bearing greases

BV-Aral: BV-Wälzlagerfett
Caltex: Caltex Marfak Nr. 2 HD
BP: Energrease N 2
Esso: Esso Wälzlagerfett
Gasolin-Nitag: Gasolin Wälzlagerfett
Mobil Oil: Mobilgrease MG 5
Shell: Shell-Wälzlagerfett

Lubricating nipples: Lubricating greases

BV-Aral: BV-Abschmierfett
Caltex: Caltex Marfak
BP: Energrease C 1
Esso: Esso-Abschmierfett
Gasolin-Nitag: Gasolin Hochdruckfett rot
Mobil Oil: Mobilgrease Nr. 4
Shell: Shell Retimax C

Corrosion prevention oils water soluble for cooling water circuit

Esso: Kintwell 40
Shell: Shell Donax C
Valvoline: Valvoline Korrosionsschutzöl S 2
Veedol: Veedol Anorust 50

Anti-freezes

BP: BP Anti-Frost
Farbwerke Hoechst: Genantin
Chem. Fabr. Hohen: Glysantin
National Carbon: Prestone, Anti-Freeze
Shell: Shell-Antifrost

Brake fluids

Teves: ATE blaue Originalbremsflüssigkeit
Lockheed: Wagner Lockheed 21 B (USA)
British Lockheed Heavy Duty Typ (UK)
Lockheed H.D. 1 (Frankreich)