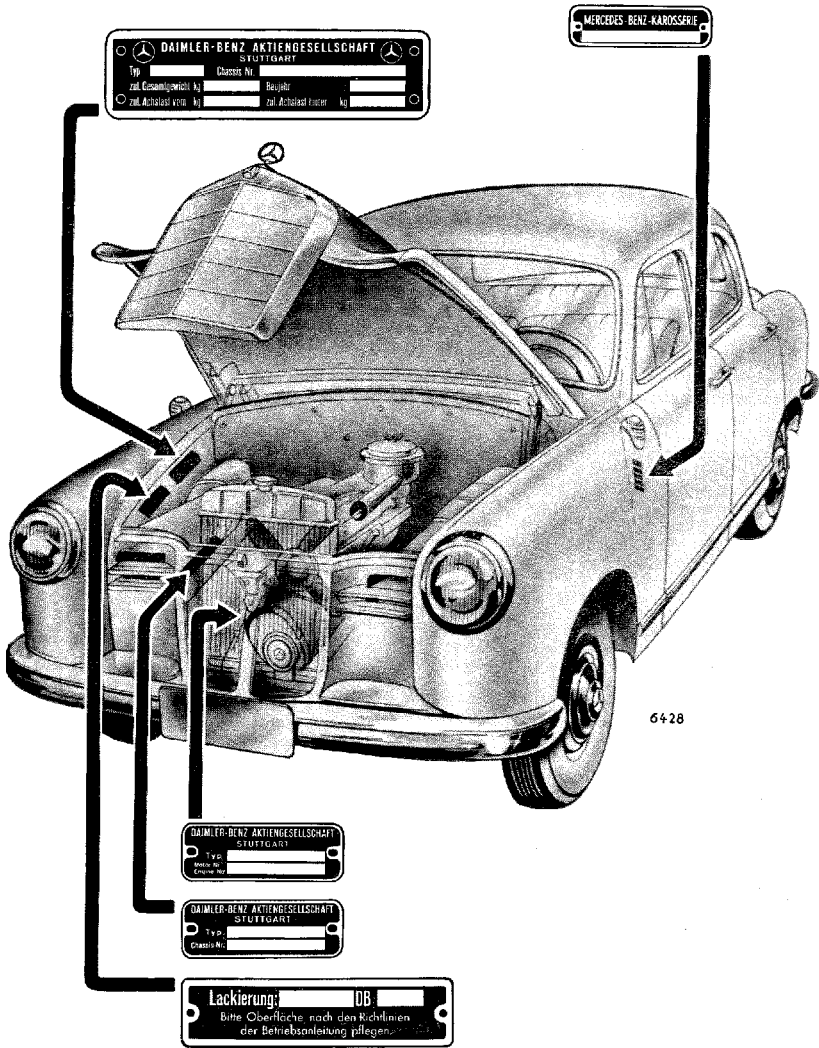


## Position of name plate, engine and chassis numbers



Be certain to make a note of the chassis and engine numbers of your car and also include the corresponding type designation, as indicated above these numbers.

The correct and quick delivery of spare parts, and also of an ignition key or door key (also fitting the trunk compartment), will be possible only if the chassis number, as well as the engine number along with the complete type designation, is stated when placing the order.

## **A few general hints**

that ought to be read before taking your first drive!

### **Safety first!**

Let this be your firm principle for each drive. Make sure that your car is at all times in excellent condition, particularly the brakes, the clutch, the steering mechanism, the tires and the overall lighting system.

Adapt your speed to the speed of the traffic, the visibility, and the condition of the road. Wet, snow covered, and particularly, icy roads are dangerous. Bear in mind that any increase in speed involves an increase in the stopping distance; that is, the stopping distance will increase proportionately at a much greater rate than your speed. Under "Drivings Hints", page 19, you will find a diagram presenting the respective rates.

Do not fully utilize the high efficiency of your car unless this can be accomplished without hazard! You are not only responsible for your own person but also for your passengers and for any damages you may inflict on other users of the road. Keep to the traffic rules in force in your country.

Actuate the turn 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.

First take a look behind before getting out of your car on the left side, especially in city traffic.

Observe the traffic signs.

### **And now economy!**

The fuel consumption of the type 180 D is low, and smooth, steady driving will yield very favorable consumption rates. The diagram on the opposite page clearly shows how much the fuel consumption is dependent upon the cruising speed. The figures given apply for a load of 2 people. Remember, the faster you drive, the more fuel you will burn, and this applies to an even greater extent to tire wear and tear, particularly on hot summer days.

Prerequisites for economic driving are:

1. Accelerate only to the extent where the car keeps going at a constant speed, and do not pump gas pedal.
2. Drive smoothly at uniform speeds by adapting yourself to the terrain and, above all, do not take curves too sharply. Wild driving through a narrow curve will cause more tire wear than miles of normal highway driving.
3. Avoid sudden changing of your speed by abrupt braking or excessive acceleration, since both, acceleration and braking, increase fuel consumption and tire wear.

Very speedy "sporty" driving will cost more money. Decide which you prefer: speed or economy.

## And of no less importance is car maintenance!

Only top quality lubricants are good enough for your car. Be sure to use only the oil that corresponds to the viscosity grades we recommend for the different seasons of the year.

Dirt particles contained in the oil will damage bearings and the working surfaces of the cylinders. The oil filter should therefore be cleaned regularly. Have the engine oil changed within the prescribed intervals and, if possible, immediately after returning from a long drive when the oil is hot and thin and will thus readily flush out the impurities when drained off.

Always keep the air filter perfectly clean and in good order. Any dust sucked in along with the air has an abrasive effect on the bearings and sliding surfaces and will cause the valves to become worn. When driving long distances on particularly dusty roads, it is advisable to clean the air filter more often than recommended in the operating instructions for normal conditions.

The Mercedes 180 D is **not** fitted with a central lubrication system. A number of grease nipples are located on the front and rear axles, and on the drive shaft, which must be greased regularly within the prescribed intervals. Have injection pump as well as glow plugs checked and the fuel filter cleaned within the prescribed intervals.

And do not forget to service your battery. A new battery will be expensive.

Have the wheels rotated and balanced according to our instructions. Be sure you always have the correct tire pressure.

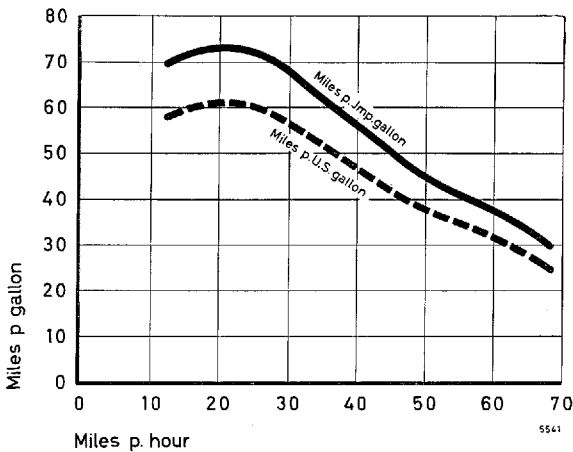
This will make for minimum tire wear, and insure that the steering gear and springs will always be in good condition.

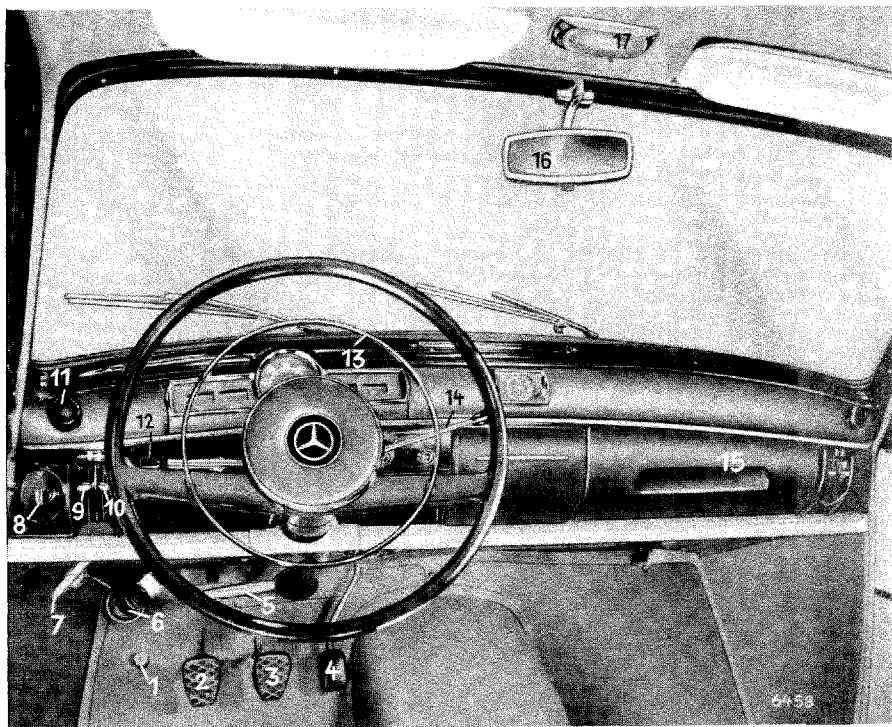
## If you follow these instructions

the 180 D will never let you down and you will appreciate it as a very practical car performing equally well in the city, commuting, or on long trips.

In fact, if you have to cover long distances regularly, you will no doubt recognize the outstanding features of the 180 D, namely:

**Outstanding driving performance, safety and comfort in conjunction with unexcelled economy in operation.**





## Driver's seat

1. Foot dimmer switch: pressing down switches from low beam to high beam headlights or vice versa. When bright lights are on, the blue warning lamp "F" fitted in the instrument cluster will light up.
2. Clutch pedal.
3. Brake pedal.
4. Accelerator pedal.
5. Hand brake handle: pulling outward will brake rear wheels. Turning clockwise locks the handle in position. To release, pull outwards, turn counter-clockwise pushing it all the way forward.
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 32.
7. Clamp handle for engine hood lock. Opening and closing s. page 34.

8. Light switch. Turn and pull switch.

- Lever vertical: = 0 position
- Turning clockwise from 0 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 light<sup>1</sup>  
The rules of the individual countries must be adhered to with regard to the fog lights.

- Turning anticlockwise from 0
    - 1. stop = clearance lights, right
    - 2. stop = clearance lights, left
- } In Germany only permitted for use in residential areas

Independently from the light switch, the other consumers function if the ignition is switched on.

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

10. Air supply control lever, one each right and left (see page 10).

11. Air outlet openings to the front side windows, 1 each right and left (see page 11).  
The escaping air flow can be reduced or completely shut off by means of the adjustable flap.

12. 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.

13. Contact ring for horn. Pressing down actuates horn.

14. Lever for transmission. Shifting see page 17.

15. Glove compartment. Serves as shelf when folded down.

16. 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.

17. 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 (as seen in driving direction) remains alight until driver's door is closed.

Center position: light switched off.

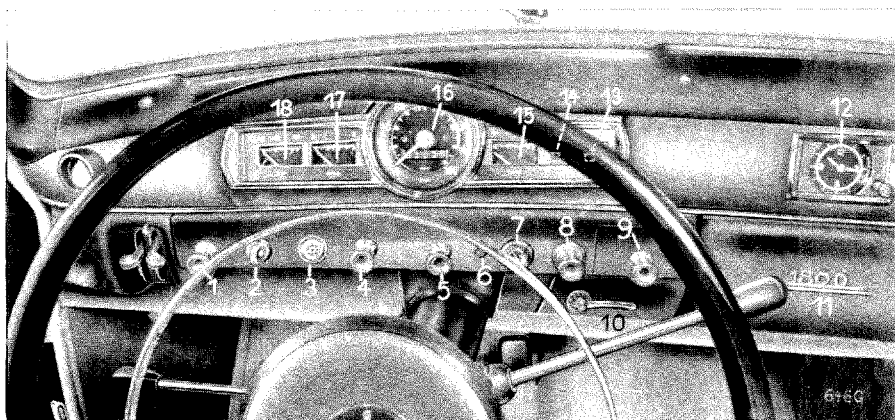
Right position: light switched on.

The front and rear seats can be adjusted in longitudinal direction.

Front seats: Press down lever at bottom of seat, shift seat forward or backward, then release lever.

Rear seats: Lift seat, shift forward or backward until the guide pins engage (2 positions).

<sup>1</sup> Fog light only delivered upon special order.



## Instrument panel

1. Pull switch for window wiper (without windshield washing system) see also item 6 page 6.
2. Turnswitch for engine idling adjustment. Turning to the left will open throttle, thus increasing the idling speed of the engine (see starting, page 15).  
When shutting the engine off, turn idling switch back to the right prior to setting the ignition switch (10) to "stop". Idling switch should be kept in this position while driving.
3. Glow control lamp. Red light indicates that the glow plugs are in operation (see starting, page 15).
4. Pull-button for instrument cluster light. It will light up only when the lighting system switch is in position 1 or 2. To dim instrument lights, press button in, and pull button out to brighten lights.
5. Pull-switch for defroster blower when car is stationary (see page 11). The blowers are optional accessories.
6. Red generator indicator. Provided the electrical system is intact, it will light up after the key is inserted into the steering lock and will go out as soon as the engine exceeds idling speeds (normal operation).
7. Steering lock; combines glow and starting main switch as well as locking device for the steering column. The key can be withdrawn **only** with the engine shut off, that is, when the starter switch (10) is turned to position „stop”.

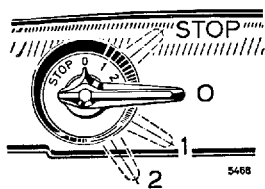
Three positions of the steering lock:

- Key withdrawn, "Halt" (stop) = current supply to the preglowing system switched off, steering locked
- Key vertical and withdrawn, "garage" (parking) (position must be sensed by feel) = current to the preglowing system switched off, steering released
- Key oblique left, "Fahrt" (drive) = current supply to the preglowing system switched on, steering released.

8. Electric cigarette lighter. Press button for a few seconds until heating coil glows red.

9. Ash tray: For emptying, pull outward, press slightly on cover and withdraw completely.

10. Starter switch: four positions:



0: Driving position; normal position when engine is running.

1: Pre-glow position. Heating of glow plugs before starting (see page 15).

2: Starting position. Contact for starter motor (see page 15).

Stop: stop position, shuts the engine off (see page 16).

11. Ornamental cover. A radio set can be installed here upon special request and at extra cost.

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

13. Red control light for directional signals; it lights up when turn signals are switched on.

14. Blue high beam control light; it lights up as long as high beam is switched on.

15. Fuel gauge: it operates only when key in steering lock is set to position "Fahrt" (drive). When pointer has reached the mark "R" on left, the red warning lamp will light up, indicating that only a fuel reserve of 5 liters (about 1.1 gallons) are left in the tank, which will suffice for another 34 to 37 miles approximately (55 to 60 km). When this red warning light comes on have car refuelled at earliest convenience.

16. Speedometer: red marks indicate permissible speeds of first to third gear. In center of dial, the odometer is located.

17. Oil pressure gauge: operates only when engine is running.

18. Cooling water thermometer: the cooling water temperature should not exceed the red mark.

**For care of dashboard note the following:**

The panelling at the dashboard right and left, the plate for the control knobs, the covers for the ash tray, the glove box and the one on the center of the switchboard, the window mouldings of the driver's door and the rear doors as well as the mouldings on top and at the side of the windshield are made of a special material. The surfaces of these parts should normally **only** be treated with a dry woolen rag. Should the surfaces become dull in the course of time, contact one of our service stations.

## Door and luggage compartment lock

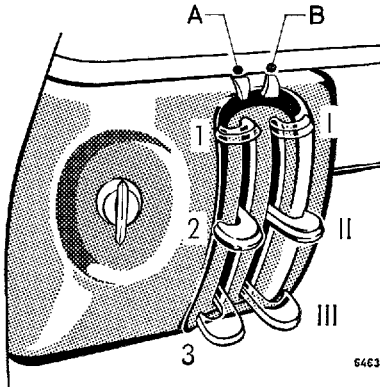
Both front doors can be locked with a key from the outside. Moreover, every door can be locked from the inside by pressing down a securing button on the inside window ledge so that the door can not be opened from the outside.

The securing button in the driver's door can not be pressed unless the door is closed to prevent the driver from locking himself out accidentally.

The luggage compartment lock can also be opened with the door key by a half turn. The key cannot be removed unless it is turned back to its initial position. In this position compartment will automatically lock when closed. Never leave the key inside the luggage compartment.

The engine hood is opened from inside the car. The T-handle on the left underneath the instrument panel must be pulled out to lift the radiator grille with the engine hood up to the safety hook (left in driving direction in the upper part). This hook will, if pulled out to the front, make the entire engine room accessible. Press the grille down hard to lock the hood lock again.

The tank filler opening can also be locked with the key.



- |             |                 |
|-------------|-----------------|
| A = heating | B = ventilation |
| 1 = open    | I = shut        |
| 2 = medium  | II = medium     |
| 3 = cut-off | III = open      |

For these three above-mentioned locks you only need **one** key; however, one spare key will be supplied.

## Ventilation and heating

Control of fresh air supply and the operation of the heater are done separately for each side of the car with the aid of four control levers, two of them mounted on the extreme left and two on the extreme right side of the dashboard.

The **inner** lever - marked blue and pointing upward - serves to control the fresh air supply.

The **outer** lever, - marked red and pointing downward - serves to control the temperature.

## Control of the fresh air supply

**Lever in upward position: air supply switched off.**

Lowering the lever will increase the air supply proportionately. The fresh air supply is distributed appropriately to the openings in the leg space, the windshield and the side windows; this is done in such a manner, that during the first quarter of lever travel, the incoming air is directed to the leg space only, and when opened further, the air is also emitted through the defrosting system in ever increasing quantities.



**Lever in downward position: air supply completely open.**

In addition to the above, the amount of air supply can be varied by the following means:

1. Adjustable flaps on top of the air outlets on dashboard for side window ventilation.
2. Adjustable flaps at the air outlets for the leg space. If they are set at an oblique angle, the air will be diffused mainly at the front section of the leg space. If the flaps are adjusted vertically, the air will escape as a compact jet. Normally, these flaps will have to be vertically opened only if the leg space in front of the back seats is to be heated as well.
3. Deflector panes at 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. With a view to providing sufficient amounts of air for defrosting and heating purposes while parking or driving slowly, for instance in city traffic, a blower can be fitted in each air duct upon special request. The two blowers would be actuated by pulling out knob 5 (page 8) located on the dashboard.

## **Heating control**

**Lever in complete downward position: heating switched off,**

**lever in complete upward position: heating fully opened.**

The heater will be proportionately effective in all intermediate positions, provided the fresh air supply is not cut off by the air control levers.

In winter, the heater should as a rule not be turned on before the cooling water has reached a temperature of about 122° F (50° C). For heating the interior of the car, fully open the ventilation and heating levers for a short time, and after 5 to 10 seconds, set levers  $\frac{1}{3}$  or  $\frac{1}{2}$  of their capacity without waiting for the full heating effect. Full heating capacity – with heating lever pushed to the very top – will only have to be used in extremely cold weather to ensure comfortable warmth in the car. The full amount of air intake will be required only when driving at low speed. Consequently, you can normally leave the air control levers  $\frac{1}{3}$  open, once the desired temperature is reached.

For defrosting of icy windshield and side windows, fully open ventilation and heater levers as well as the flaps on the dashboard; also turn on the blower (optional), until the windows are cleared. Then reverse the levers to the desired car temperature and shut off the dashboard flaps save for a narrow gap, which will suffice to keep the windows cleared.

Owing to the variety of possibilities for regulation, both ventilation and heating can be readily adjusted to individual requirements.

**When driving behind a vehicle that leaves a trail of dust or exhaust fumes, the fresh air supply will at times have to be shut off to prevent exhaust fumes from getting into your car.**

## **Fuels, coolants and 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**

Maximum capacity of fuel tank: approx. 12.3/14.8 Imp./US gals. (56 lit.), out of which 1.1/1.2 Imp./US gal. (5 lit.) are for reserve. If you drive at moderate speed, this reserve quantity will be sufficient for 34-37 miles (55-60 km) to go yet. When only this reserve quantity is left in the fuel tank, a red warning lamp lights up in the fuel gauge.

In case fuel tank has been completely emptied, entire fuel system will have to be bled before it can be used again (see page 37).

**Therefore, refuel in time, before tank is completely emptied.**

**The Diesel fuels used should not fall below the standards of DIN 51601.**

Tractor fuel and petroleum can be used to a limited extent only if they meet the requirements according to DIN 51602 or DIN 51636. Pure shale oil distillates can also be used.

You are cautioned against using non-standardized fuel mixtures, since these frequently contain greater amounts of resin-forming residues and corrosive acids. Qualities, such as "Diesel-Fuel", fuel oil etc. should not be used, since these among others might contain traceable amounts of vanadium which would cause corrosion.

When filling in fuel do not spill any fuel and make sure that the gasket of the tank cover is not damaged and fits tightly.

Caution! Do not spill Diesel fuel on floor covering or upholstery of your car. The smell of Diesel fuel dissipates very slowly.

**The drain holes for the tank filler plug in the wheel arch should always be kept scrupulously clean.**

## Coolants

Capacity of the entire cooling system including DB heating approx. 1.9/2.2 Imp./US gals. (8.6 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 40.

When driving in the mountains, or in regions where the outside temperature is high, the cooling water temperature may rise up to red mark at cooling water thermometer.

Use clean water with the smallest possible lime 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.**

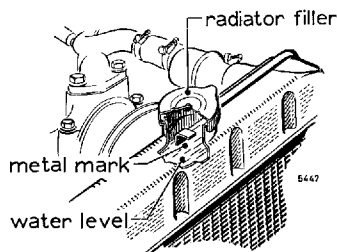
For the treatment of cooling water we only approve of those products which are compatible with the anti-freeze agents, because even with an anti-freeze agent, treated cooling water should be used e. g. Fuchs Anticorit MKR; Esso Kutwell 40; Shell Donax C; Valvoline-Korrosionsschutzöl S 2; Veedol Anorust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

The concentration is 2.5–5 ccm/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.

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

1. Set the two heating levers to “open”.
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 appr. 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 49); this is best done at a service station.

In frosty weather the measures for winter driving (see p. 20) 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	Capacity ltr. (Imp./US pt.)	Viscosity	
Engine	Engine and crankcase	HD engine oil	min. 2.5 (4.4/5.3) max. 4 (7.0/8.4)	Outside temperature ° F (C)*	SAE groups
				above + 86 (+ 30)	30
	Oil filter	HD engine oil	0.5 (0.9/1.0)	from + 14 to + 86 (- 10 to + 30)	20 W/20 or 10W-20
				from - 13 to + 14 (- 25 to - 10)	20 W/20 or 10W-20 or 10W
	Injection pump	HD engine oil		below - 13 (- 25)	10 W
				*) the change-over to another SAE group because of the season can usually be effected with the next oil change due. Only in the case of sudden frost should the change be made out of schedule.	
Transmission	Automatic transmission fluid		1.4 (2.5/2.9)	the whole year round	—
Drive axle	Hypoid gear oil		2.25 (3.9/4.7)	the whole year round	SAE 90
Steering gear housing	Hypoid gear oil		0.3 (0.5/0.6)	the whole year round	SAE 90
Water pump	Hypoid gear oil		—	the whole year round	SAE 90
Front wheel hubs	Anti-friction bearing grease		65 g ea. (2.3 oz.)	the whole year round	—
Lubricators	Grease		—	the whole year round	—
Battery terminals	Bosch grease Ft 40 v 1		—	the whole year round	—

## Starting and stopping

The following should be checked at regular intervals and prior to long drives:

1. Fuel level; the fuel gauge will register only if the key in steering lock is set to "Drive";
2. Water level in the radiator; with cold water, the level should not exceed the mark inside the radiator filler;
3. Oil level in the sump; do not check when the car is standing on a grade; wipe off dipstick before measuring; the oil level should reach upper mark on stick.
4. Tire pressure (for detailed instructions on tire pressure, see page 42);
5. Braking; in depressing the brake pedal, a marked resistance must be felt, that is, the pedal cannot be completely depressed; if no resistance is felt, follow instructions under "emergency repairs", page 54;
6. High and low beam, parking light, turn signals, tail and stop light;
7. Charge of battery. It is very important that the battery be at all times fully charged, particularly in winter.

When storing the car for a prolonged period of time, or when fuel tank is completely empty, it is necessary to bleed fuel filter and injection pump prior to operation by use of the hand primer located on the fuel pump (see items I and II, page 37).

In cold weather, follow the instructions given under "Winter Driving", page 20 and 21

### Starting

If a radio is installed, this should not be switched on during the starting procedures, therefore, the radio must be switched off before starting the car.

1. Gear shift must be in neutral (central) position.
2. Set steering lock key to "Fahrt" (drive); red control lamp on dashboard lights up.
3. Turn and keep starter switch in starting position "1" (pre-glowing). Fading of the control lamp and subsequent lighting up of the glow control indicates that plugs are glowing. The time required for pre-glowing depends on the engine and outside temperatures.

### Average pre-glow time with cold engine:

outside temperature + 68° F (20° C)	about 20 seconds
outside temperature + 32° F (0° C)	about 40 seconds
outside temperature + 23° F (-5° C)	about 1 minute

for lower temperatures, no longer than a maximum of 2 minutes (see page 22).

The glow control should glow light red only; if glowing white, this indicates that one of the plugs has been grounded, which has to be remedied without delay (see hints for emergency repairs, page 51).

4. Turn and keep - for 20 sec. max. - starter switch in position 2 (starting) until engine starts up. After engine has started, release starter switch immediately allowing it to return to position "0".

If there is no ignition after three successive attempts, try to locate the cause (see hints for emergency repairs, page 51).

After the engine has started check oil pressure at oil pressure gauge. If the engine is very cold, the oil pressure gauge will indicate a slow increase of oil pressure only some time after starting, since the pressure increase makes itself felt only slowly in

the narrow connecting line to the pressure gauge. However, if the gauge does not indicate any pressure at all, shut off the engine and locate the cause (see hints for emergency repairs page 52).

5. If the engine is cold, turn the „idling button“ (item 2, page 8) to the left until engine will run smoothly with a somewhat increased idling speed.

**Warming up of engine**

There is no need to have the engine run at idling speed until the normal operating temperature has been reached. This would take too long a time considering the low heat development of an idling engine.

With outside temperatures down to 32° F (0° C), it is permissible to start driving off at low speed immediately after starting. Only in the case of lower temperatures should the engine idle for one minute max., in order to ensure lubrication if the engine is cold. Do not rev up the engine when car is stationary.

**Starting out:**

1. Depress clutch pedal
2. Shift to first gear
3. Release hand brake
4. Slowly release clutch pedal, at same time gently pressing on accelerator with your right foot, putting car in motion.
5. After car is moving, press down accelerator pedal evenly, never suddenly, shifting to 2nd, 3rd and 4th gears.
6. As soon as a cooling water temperature of appr. 122° F (50° C) is reached turn back idling button to its normal position.

**Turning the engine off**

1. Turn starter switch to position “stop”, which blocks fuel supply to engine causing it to stop. Idling button must be turned back to normal position.
2. Turn ignition key to position “Garage” or “Halt” and withdraw.  
Note: this can **only** be done if starter switch was previously turned to “stop”.

**The first 900 miles (1.500 km)**

**Engine is not sealed,**

but with a view to the life, operational safety and economy of the entire car, it is of extreme importance that the engine not be utilized to its full capacity for the first 900 miles (1.500 km) of operation. For these first 900 miles (1.500 km), the following speeds should not be exceeded and, in covering long distances, drive with varying speeds and varying engine rotations.

Mileage:	Speed in m. p. h. (km-hr.)			
	1st gear	2nd gear	3rd gear	4th gear
up to 300 miles . . . . . 500 km . . . . .	10 miles (15 km)	20 (30)	30 (50)	45 (70)
300 miles to 900 miles . 500 km to 1500 km . .	15 miles (20 km)	20 (35)	35 (60)	50 (80)
900 miles to 1200 miles . 1500 km to 2000 km . .	can be increased slowly to full speeds			

the narrow connecting line to the pressure gauge. However, if the gauge does not indicate any pressure at all, shut off the engine and locate the cause (see hints for emergency repairs page 52).

5. If the engine is cold, turn the „idling button“ (item 2, page 8) to the left until engine will run smoothly with a somewhat increased idling speed.

**Warming up of engine**

There is no need to have the engine run at idling speed until the normal operating temperature has been reached. This would take too long a time considering the low heat development of an idling engine.

With outside temperatures down to 32° F (0° C), it is permissible to start driving off at low speed immediately after starting. Only in the case of lower temperatures should the engine idle for one minute max., in order to ensure lubrication if the engine is cold. Do not rev up the engine when car is stationary.

**Starting out:**

1. Depress clutch pedal
2. Shift to first gear
3. Release hand brake
4. Slowly release clutch pedal, at same time gently pressing on accelerator with your right foot, putting car in motion.
5. After car is moving, press down accelerator pedal evenly, never suddenly, shifting to 2nd, 3rd and 4th gears.
6. As soon as a cooling water temperature of appr. 122° F (50° C) is reached turn back idling button to its normal position.

**Turning the engine off**

1. Turn starter switch to position “stop”, which blocks fuel supply to engine causing it to stop. Idling button must be turned back to normal position.
2. Turn ignition key to position “Garage” or “Halt” and withdraw.  
Note: this can **only** be done if starter switch was previously turned to “stop”.

**The first 900 miles (1.500 km)**

**Engine is not sealed,**

but with a view to the life, operational safety and economy of the entire car, it is of extreme importance that the engine not be utilized to its full capacity for the first 900 miles (1.500 km) of operation. For these first 900 miles (1.500 km), the following speeds should not be exceeded and, in covering long distances, drive with varying speeds and varying engine rotations.

Mileage:	Speed in m. p. h. (km-hr.)			
	1st gear	2nd gear	3rd gear	4th gear
up to 300 miles . . . . . 500 km . . . . .	10 miles (15 km)	20 (30)	30 (50)	45 (70)
300 miles to 900 miles . 500 km to 1500 km . .	15 miles (20 km)	20 (35)	35 (60)	50 (80)
900 miles to 1200 miles . 1500 km to 2000 km . .	can be increased slowly to full speeds			

Do not rev up the engine when car is stationary, since this will always be harmful. Also avoid "torturing" the engine with slow revolutions and shift in due time.

Of specific importance for the life and the smooth running of the engine, as well as for the operational safety of your car are the preliminary lubrication and maintenance procedures, as described on pages 25-27.

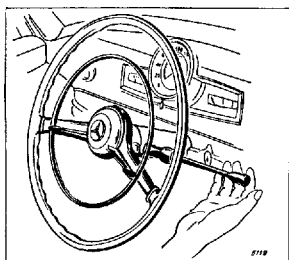
The first sheets of your Customer Service Book are especially provided for this servicing. You are therefore advised to call on your service station in due time.

## Changing of gears

All gears are fitted with blocked synchronisation which consists of a special device in the transmission automatically giving a smooth mesh of the respective gear wheels by the action of a special synchrone-clutching arrangement. The annoying double-clutching is thus eliminated. Consequently, in shifting up and down, you can proceed as follows:

Let up gas, depress clutch pedal completely, steadily move gear shift from one position to the next, engage the clutch smoothly, accelerating at the same time.

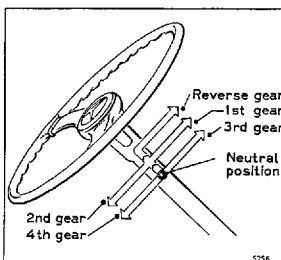
The shifting lever is located within easy reach on the steering column beneath the steering wheel. From neutral (center position) it can be brought to three "shifting planes" placed in adjoining positions.



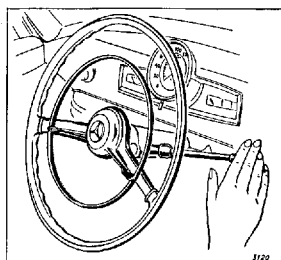
1st and 2nd gear

For shifting these gears, pull towards you gently and push upwards for 1st and downwards for 2nd gear.

For shifting into reverse gear, pull lever all the way towards you and then bring lever upwards.



Gear changing diagram



3rd and 4th gear

For engaging these gears, gently press lever away from you and then push upwards for 3rd, and down for 4th gear.

In reaching the central and upper "shifting planes", a slight resistance will be felt distinctly. When the gear shift is not in any of the gears but in neutral (center) position, a spring will automatically pull the gear shift from the central to the forward notch of the three-step "shifting plane". Therefore, when changing from 1st to 2nd gear, move the shift lever gently alongside the first notch, not yielding to the forward pull of the spring in traversing the neutral position - else you will end up in 4th gear, nor pull towards you too hard so as not to end up at the base (end notch) for the reverse gear. Shifting of all gears is done without using force.



Do not rev up the engine when car is stationary, since this will always be harmful. Also avoid "torturing" the engine with slow revolutions and shift in due time.

Of specific importance for the life and the smooth running of the engine, as well as for the operational safety of your car are the preliminary lubrication and maintenance procedures, as described on pages 25-27.

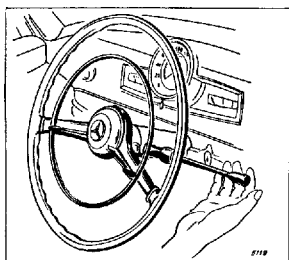
The first sheets of your Customer Service Book are especially provided for this servicing. You are therefore advised to call on your service station in due time.

## Changing of gears

All gears are fitted with blocked synchronisation which consists of a special device in the transmission automatically giving a smooth mesh of the respective gear wheels by the action of a special synchro-clutching arrangement. The annoying double-clutching is thus eliminated. Consequently, in shifting up and down, you can proceed as follows:

Let up gas, depress clutch pedal completely, steadily move gear shift from one position to the next, engage the clutch smoothly, accelerating at the same time.

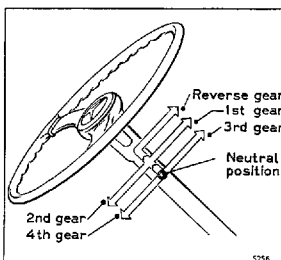
The shifting lever is located within easy reach on the steering column beneath the steering wheel. From neutral (center position) it can be brought to three "shifting planes" placed in adjoining positions.



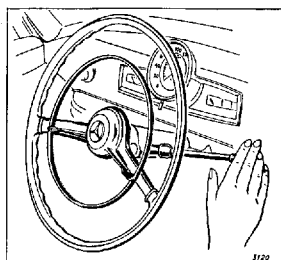
1st and 2nd gear

For shifting these gears, pull towards you gently and push upwards for 1st and downwards for 2nd gear.

For shifting into reverse gear, pull lever all the way towards you and then bring lever upwards.



Gear changing diagram



3rd and 4th gear

For engaging these gears, gently press lever away from you and then push upwards for 3rd, and down for 4th gear.

In reaching the central and upper "shifting planes", a slight resistance will be felt distinctly. When the gear shift is not in any of the gears but in neutral (center) position, a spring will automatically pull the gear shift from the central to the forward notch of the three-step "shifting plane". Therefore, when changing from 1st to 2nd gear, move the shift lever gently alongside the first notch, not yielding to the forward pull of the spring in traversing the neutral position - else you will end up in 4th gear, nor pull towards you too hard so as not to end up at the base (end notch) for the reverse gear. Shifting of all gears is done without using force.

The only things to observe are therefore:

1. Before any gear change: release the accelerator and throw out clutch completely.  
As soon as you are familiar with your car, you will find out that you need not decelerate when making a **fast downshift**; thereby the engine is kept at high revolutions, necessary for the higher gear ratio.
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

At the beginning, it should be mentioned that quite naturally the Diesel is somewhat noisier than the gasoline engine.

It is advisable to keep the Diesel engine "revved up", meaning the engine speed should not drop too much in the individual gears. **The red marks on the speedometer** indicate the maximum permissible speeds in 1st, 2nd and 3rd gears. When needle reaches these marks change gears. Timely shifting helps to save fuel.

Therefore, do not hesitate to make full use of the advantages afforded by baulked synchronization of the transmission by shifting in time, especially in town traffic and on grades. Also in driving downhill, especially steep and long grades, you should shift to a lower gear.

Have your engine act as a brake in driving downhill by releasing the gas pedal, but without pressing the clutch, and never shut off the engine.

With new engines, the **oil pressure** amounts to approx. 43 p. s. i. ( $3 \text{ kg/cm}^2$ ) under normal operating conditions; even after a long, fast drive, it will not drop below this value at medium and higher engine speeds. When idling and with the oil hot, pressure will decrease to about 14 p. s. i. ( $1 \text{ kg/cm}^2$ ). After the engine is properly broken in and all bearing parts have become smooth, a lower oil pressure is sufficient to press the same quantity of oil through the bearings. The oil pressure can then decrease to 31 p. s. i. ( $2.2 \text{ kg/cm}^2$ ) at full engine speed and to 4 p. s. i. ( $\frac{1}{4} \text{ kg/cm}^2$ ), when idling, without any damage being done to the engine.

When the engine is extremely cold, the oil pressure gauge will not signal until some time after starting and will slowly indicate rising oil pressure, because the narrow duct of the pressure gauge will only gradually convey the pressure increase.

In case the **oil pressure** drops suddenly while engine is running at a constant speed, or if it fails to reach the usual pressure from one day to the next, then you should stop immediately and proceed according to "hints for emergency repairs", page 52.

**The cooling water temperature** will normally amount to 158–200° F (70–95° C). This temperature is attained in driving at moderate speed for about 4 to 5 minutes after starting. With extremely hot outdoor temperatures and when the car is heavily loaded, negotiating long grades may cause the cooling water temperature to rise up to 212° F (100° C) without any damage being done.

In this case the temperature can be decreased by shifting to a lower gear, if deemed necessary. When stopping immediately after a prolonged steep upgrade, let the engine idle for a short period, since immediately shutting it off is likely to cause the water to splash out.

The only things to observe are therefore:

1. Before any gear change: release the accelerator and throw out clutch completely.  
As soon as you are familiar with your car, you will find out that you need not decelerate when making a **fast downshift**; thereby the engine is kept at high revolutions, necessary for the higher gear ratio.
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

At the beginning, it should be mentioned that quite naturally the Diesel is somewhat noisier than the gasoline engine.

It is advisable to keep the Diesel engine "revved up", meaning the engine speed should not drop too much in the individual gears. **The red marks on the speedometer** indicate the maximum permissible speeds in 1st, 2nd and 3rd gears. When needle reaches these marks change gears. Timely shifting helps to save fuel.

Therefore, do not hesitate to make full use of the advantages afforded by baulked synchronization of the transmission by shifting in time, especially in town traffic and on grades. Also in driving downhill, especially steep and long grades, you should shift to a lower gear.

Have your engine act as a brake in driving downhill by releasing the gas pedal, but without pressing the clutch, and never shut off the engine.

With new engines, the **oil pressure** amounts to approx. 43 p. s. i. ( $3 \text{ kg/cm}^2$ ) under normal operating conditions; even after a long, fast drive, it will not drop below this value at medium and higher engine speeds. When idling and with the oil hot, pressure will decrease to about 14 p. s. i. ( $1 \text{ kg/cm}^2$ ). After the engine is properly broken in and all bearing parts have become smooth, a lower oil pressure is sufficient to press the same quantity of oil through the bearings. The oil pressure can then decrease to 31 p. s. i. ( $2.2 \text{ kg/cm}^2$ ) at full engine speed and to 4 p. s. i. ( $\frac{1}{4} \text{ kg/cm}^2$ ), when idling, without any damage being done to the engine.

When the engine is extremely cold, the oil pressure gauge will not signal until some time after starting and will slowly indicate rising oil pressure, because the narrow duct of the pressure gauge will only gradually convey the pressure increase.

In case the **oil pressure** drops suddenly while engine is running at a constant speed, or if it fails to reach the usual pressure from one day to the next, then you should stop immediately and proceed according to "hints for emergency repairs", page 52.

**The cooling water temperature** will normally amount to 158–200° F (70–95° C). This temperature is attained in driving at moderate speed for about 4 to 5 minutes after starting. With extremely hot outdoor temperatures and when the car is heavily loaded, negotiating long grades may cause the cooling water temperature to rise up to 212° F (100° C) without any damage being done.

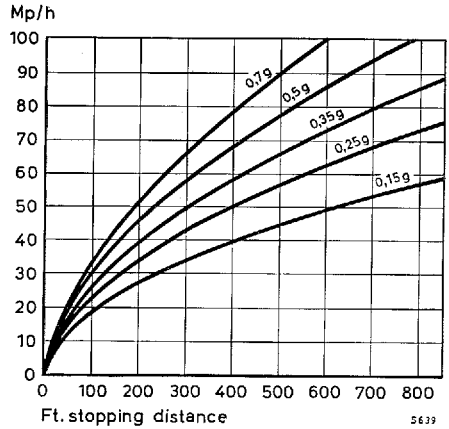
In this case the temperature can be decreased by shifting to a lower gear, if deemed necessary. When stopping immediately after a prolonged steep upgrade, let the engine idle for a short period, since immediately shutting it off is likely to cause the water to splash out.

Rising of the cooling water temperature above 212° F (100° C) (red mark on temperature gauge) indicates a defect in the cooling system. If this should happen, stop immediately and proceed according to „hints for emergency repairs”, page 53.

**With low outside temperatures and slow driving**, the cooling water temperature may drop to about 122° F (50° C) without any danger to the engine. Also the heating will still function sufficiently well to ensure that the interior of the car will be fairly warm and the windshield stays clear.

**While driving, only the foot brake should be used**, even when descending steep grades. Refrain from pressing down the brake pedal abruptly, but do it gently. Abrupt and jerky braking should be avoided as much as possible, because it may cause the car to skid on slippery roads and the car behind you may hit you from the rear; in addition, it causes excessive strain to the tires. Abrupt braking is justified only in the face of immediate danger.

The excellent road holding properties of the 180 D will tempt you to exceed the conventional speeds. Any speed increase, however, will entail an increase in the stopping distance. The diagram on right side of this page presents the stopping distances for different road conditions in relation to speed increase, with one second added to compensate for time due to driver's reaction. Be aware of this interrelation when you increase your speed!



Braking distance with one second added for driver's reaction

- 0.7 g dry concrete (superhighway)
- 0.5 g dry asphalt and macadam
- 0.35 g wet asphalt and macadam (at the same time, this represents the official max. perm. braking distance for vehicles exceeding 62 m. p. h. (100 km/h))
- 0.25 g official max. perm. braking distance acc. to present regulations (not exceeding 62 mph/100 km/h).
- 0.15 g iced conditions, at same time max. perm. value for hand brake.

When braking car at high speeds with the hand brake alone, no damage will be done to the brake or any other part of your car. However, the use of the hand brake especially on a slippery road may easily cause the rear wheels to lock and the car is liable to skid. Therefore, the hand brake should only be employed in holding the car while it is not in motion.

If you have to leave your car standing on a steep grade, take the precaution of shifting into first or reverse gear. In addition, turn the wheels in such a manner that car will roll toward a rising grade and not down a precipice if the brake should come loose. In winter, secure car by placing blocks under the wheels.

## Winter driving

has lost its terror but it still presents many small handicaps. These difficulties which you have to expect in winter can be overcome by some attention and a little care. Against ice, snow and slush, however, you are best protected by appropriate tires. But caution is always a cardinal principle.

### Precautions

The viscosity groups as prescribed on page 14 should be adhered to.

In severely cold weather use an oil of the group SAE 10 W if the car is parked in the open for a long period.

The built-in thermostat will automatically keep the cooling water of the engine at the correct temperature by preventing the water from circulating from radiator to engine before the temperature has reached about 158° F (70° C), and shutting the radiator off below this temperature. Consequently, in winter the water contained in the body may freeze even though the car is being driven.

### At below freezing temperatures an anti-freeze should be added

to safeguard against freezing. Use only one of the standard commercial brands of anti-freeze, with the amount to be added to the cooling water, depending on the outside temperature, prescribed and guaranteed by the manufacturer.

The table below gives the quantities of water and Glysantin or Genantin required for a correct mixture suited to varying degrees of frost.

The capacity of the radiator including engine, filled to the mark inside radiator filler, is about 2.3 US gallons (8.6 l) if a DB type heating system is installed.

Freezing point	Genantin / Glysantin in gals.			water in gals.		
	Imp.	US	ltrs.	Imp.	US	ltrs.
approx. 14° F (—10° C)	0.44	0.52	(2.0)	1.45	1.74	(6.6)
approx. 5° F (—15° C)	0.55	0.66	(2.5)	1.34	1.61	(6.1)
approx. — 4° F (—20° C)	0.65	0.79	(3.0)	1.23	1.47	(5.6)
approx. —13° F (—25° C)	0.76	0.92	(3.5)	1.12	1.34	(5.1)
approx. —22° F (—30° C)	0.87	1.05	(4.0)	1.01	1.21	(4.6)
approx. —40° F (—40° C)	0.99	1.19	(4.5)	0.90	1.08	(4.1)

Before adding anti-freeze, thoroughly flush the cooling system, especially if water refining additives have been used.

Caution! No acid-type anti-corrosion agents or radiator cleansers – save an anti-corrosion oil – can be used together with anti-freeze.

After having used anti-freeze, thoroughly flush the radiator system.

If for some reason no anti-freeze can be obtained, the radiator must be covered up, even if the car is being driven, but be careful not to block the air intake for heater and ventilation system. For best results, use the radiator shutter designed by us which is fitted upon special request and at extra cost.

In the latter case, if the car is not parked in a warmed garage, the cooling water will have to be drained off while the engine is still warm and, if possible, in a sheltered spot. For this purpose, open the drain cock located at lower right side of radiator and loosen the heater hose at bottom of each heating element in order to obtain proper drainage of the heater as well. Also remove the radiator cap. Caution: First turn to the first stop and allow the excess pressure to escape, then turn to second stop and lift cap off. Watch the draining of the cooling water during the entire process and should the drain become plugged, clear it with a piece of wire.

Next, run the engine for a few seconds, so that the cooling water will be completely drained from the entire radiator system. Leave the drain cock open until radiator is filled up again and attach a reminder on car reading "water drained off".

Before refilling, be sure to tighten the lower screw cap at each heater element and close the drain cock.

### Mixture of Diesel fuel «gas oil» in extremely cold weather

At low outside temperatures the cold flow properties of the diesel fuel might become insufficient due to the separation of paraffin. This might lead to difficulties in the supply caused by clogging of filter or lines. During the cold season winter diesel fuels are available on the market to prevent such troubles.

However, if winter diesel fuels with adequate cold flow properties are not available in time, starting difficulties may occur after the car has been parked in the open for a long period at temperatures below 14° F (-10° C). Therefore, to ensure satisfactory engine performance in very cold weather, it might become necessary to mix the diesel fuel with a filling station gasoline or, preferably, petroleum or tractor fuel; the amount to be added depends upon the outside temperature. At any rate, this is also applicable for winter diesel fuel at outside temperatures below 5° F (-15° C).

If petroleum or tractor fuel is available besides filling station gasoline, the first should be preferred, because the use of gasoline might cause troublesome vapor locks and the engine will work harder. Do not use benzine-benzene mixtures or super fuels, since they will considerably reduce the ignition properties of the diesel fuel.

At lower temperatures such a mixture ensures better flow properties compared to the unmixed diesel fuel.

The table below gives the mixing ratio of the various additional fuels that can be added to summer or winter diesel fuel depending on the outside temperatures.

### Mixture ratio

Outdoor temperature ° F (° C)	Summer diesel fuel %	Additive %	Winter diesel fuel %	Additive %
32 to 14 (± 0 to -10)	80	20	100	—
14 to 5 (-10 to -15)	70	30	100	—
5 to -4 (-15 to -20)	50	50	80	20
-4 to -13 (-20 to -25)	—	—	70	30
below -13 (below -25)	—	—	50	50

It is important that the fuel to be added to the normal diesel fuel is put into the tank soon enough so that all lines will be filled with the mixture before the critical outside temperature is reached. Prior to filling in the diesel fuel add the additional fuel which has a lower

specific weight and then thoroughly mix the two fuels by means of a clean stick. It is advisable to carry with you adequate quantities of additional fuel in cans so as to have it ready when needed.

With this frost mixture the engine output will be lower than with pure diesel fuel, i. e. the lower, the more has been added. Therefore – after the respective outside temperature has been considered – only the smallest possible amount should be added to the diesel fuel.

#### **Steps to ensure safe starting in cold weather:**

At low temperatures be sure to pre-glow sufficiently and see that the diesel engine reaches a sufficiently high number of revolutions.

The essential prerequisite for this is the use of winter oil (for extremely cold temperatures oil of group SAE 10 W) as well as excellent condition of the battery (see page 46) and glow plug system. Note here that pre-glowing only slightly depletes the battery, whereas starting requires a good deal of the energy stored.

#### **a) Starting at moderately cold temperatures:**

1. Keep starter switch in position “1” (pre-glowing) for 1 to 2 minutes.
2. Press down accelerator pedal completely.
3. Turn starter switch to position “2” (starting) and keep it there for 10 seconds maximum. Engine will then start.
4. Turn idling adjustment button (item 2, page 8) left until engine runs smoothly with slightly increased idling speed.

If engine has failed to start, turn starter switch to position (1) (pre-glowing) and again pre-glow for one to two minutes, then try to start once more. Proceed in the same manner when the speed of the starting motor decreases.

#### **b) Steps to be taken in extremely cold weather:**

1. Any time when pre-glowing keep starter switch in pre-glowing position for two minutes.
2. Throw out the clutch and completely press down accelerator pedal.

Then proceed according to points 3 and 4 for starting at moderately cold temperatures (see above).

If the engine is stone cold at outside temperatures below 5° F (-15° C), starting is generally impossible without further assisting measures. In these temperatures, the following precautions should be taken, preferably immediately upon shutting off the engine:

- a) take out battery and store it in a heated room.
- b) drain off coolant after shutting off the engine – see page 21 – and before using car again warm coolant up and pour it back into the radiator. Pouring of boiling coolant into a cold radiator and engine involves no danger.

This procedure, even though being rather troublesome, goes a long way to spare the engine, starter motor and the battery.

#### **Winter driving**

As already mentioned on page 4, wet, snow-covered and icy roads mean danger. Therefore adapt your driving to these road conditions and at all times use the necessary care.

On clear winter days, ice is liable to form in transition spots of sun and shade, for instance at road underpasses, along the edges of residential areas and forests. It may also occur that ice has already formed on bridges while the other road sections are still clear due to the inherent warmth of the soil. Therefore, use special care in crossing these sections.

The windshield and the two lateral front windows are **quickly and safely defrosted** if a DB-heater is installed and if both ventilation levers are completely down and the heater levers are pointing upwards (see page 11).

For the cleaning agent to be filled into the windshield washing system see page 32.

Should the trunk compartment lid be stuck due to freezing, loosen by beating all around the lid margin with your fist; in this way, the ice between rim of lid and rubber seal is cracked and lid will come loose. Use the same method in case of a frozen door.

**During heavy snowfall** or when cars driving in front of you whirl up snow, the insect screens at the ventilation ducts may become clogged to such an extent, that the heating capacity might be impaired. This is remedied by thoroughly cleaning the insect screens, or by removing them altogether during winter driving. In latter case, do not neglect to seal the now open gap in the air ducts by means of an insulating tape or steel strip. Do not lose the screens and be sure to re-fit them later.

According to § 33 of the German Highway Code the following regulations must be followed in Germany in foggy weather or when it is snowing:

Section 4: Low-beam headlights must be switched on in the daytime if there is dense fog or snow is falling.

Section 5: Fog headlights may only be switched on in conjunction with the low-beam headlights in foggy weather or when snow is falling.

Abroad, it is possible to use different methods of lighting the way. However, we urgently advise you to adhere to the traffic regulations of the country in which you are driving.

**When parking car in the open in freezing weather**, be sure not to engage the hand brake, nor any of the gears, because they might get frozen. Instead place blocks under the wheels,

Ice forming on the windshield may be avoided by placing a piece of canvas or news-papers under windshield wipers, covering entire windshield.

The use of **snow-chains** is not generally necessary with tires of good tread. Chains will cause higher fuel consumption. For snowy territories we recommend the use of snow tires, our service shops will give you the names of the dealers for such tires. Thus, snow chains are to be used only under particularly difficult conditions, for instance in case of deep snow on upgrades. The chains should have small-sized links with sufficient side-grip (so-called square-track chains). Ladder-type chains are not suitable.

Icy roads are better negotiated without chains; also when driving over roads that are free from snow, chains should be removed without delay, since they will then be subject to extreme wear.

Dealers issue special instructions for fitting and treating chains which should be adhered to.



## Hints for long trips abroad

Also in foreign countries, an extensive network of Mercedes-Benz Service Station is at your disposal. For details on this subject, consult our **List of Authorized Mercedes-Benz Agencies in Export Countries**. For this list, write to our Export Department, Stuttgart-Untertuerkheim, Germany. This list will show where to turn when travelling abroad.

In very remote regions, however, you might at times have to resort to service shops other than those authorized by us. For such emergencies, we have compiled an "emergency assortment of the most necessary spare parts (such as gaskets, etc.)". Be on the safe side by carrying these parts with you when going abroad.

You are also advised to carry with you a spare tire and tube valves. In some cases, there might also be need for refining agents for the cooling water and distilled water for your battery. A First Aid Kit should also be part of your 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 car is equipped with **asymmetric low beam** (see page 47) and if you enter a country in which traffic runs on the other side than in your home country, you should cover the wedge-shaped sectors of the diffusing lenses by means of an adhesive tape so that no light may penetrate. Now your low beam becomes symmetric and you will not dazzle oncoming vehicles.

Be especially watchful of impurities when refilling **fuels, coolants and lubricants**.

The engine oil should come up to the requirements set forth on page 14. At any rate, use **HD type oil** with a viscosity range adapted to the prevailing season. Should your domestic HD brand not be available, switch to one of the **internationally recognized HD oil brands** (see appendix).

Our production line cars are equipped for operation in climatic conditions as prevailing in Central Europe, and for normal roads. It goes without saying that driving in extreme climatic conditions, (e. g. in tropical regions) or on extremely poor roads, will put additional demands on the car. In order to successfully cope with such conditions, we advise you to have certain special equipment fitted in your car before setting out on such trips. This equipment is aimed at protecting engine and related units from sand and dust penetration, guarding against falling rocks and roads with a high crown, and will compensate for high outside temperatures.

For more detailed information on this subject of special equipment, and preventive measures, please get in touch with one of our export agencies or with our Central Export Department, Stuttgart-Untertuerkheim, Germany. **Make full use of these possibilities before you depart to regions where extreme climatic and road conditions will be encountered.**

## Maintenance

It is urgently recommended to have all repair and maintenance carried out by the well trained personnel of our Service Stations. In your own interest, see to it that all servicing and maintenance work as listed in the Service Coupon Book is carried out completely and in due time. This will not only guarantee the properly maintained condition of your car, but at the same time minor troubles which might later develop into major defects, are readily eliminated. In this connection, it is pointed out that the guarantee is forfeited unless all of the prescribed servicing up to expiring date of the guarantee is carried out at the proper time and by one of our authorized work shops.

The following hints are aimed at guiding you for the most important work in case you desire to take care of servicing your car yourself, or if you are compelled to use the service of workshops other than those authorized by us.

**Lubrication of grease nipples** at front and rear axle, at floor pedal joints and drive shaft, checking of oil level and oil change in the transmission and rear axle housing as well as draining off engine oil must be carried out **from below on a grease pit or car lift**, in accordance with the lubrication diagram (see page 25-30) and after the prescribed mileage. In addition, a cover at the center of the drive shaft has to be removed from the frame floor. All grease nipples will then be accessible and are to be fed by a conventional grease gun in the usual manner.

If a high-pressure grease gun is being used the lubrication pressure must not exceed 5,700 psi (400 kg/cm<sup>2</sup>), if necessary, the pressure should be limited to this value by means of safety device at the grease gun.

Please give the necessary direction to your workshop.

**The oil change should always be done immediately after a long drive while the oil is hot, so that it can readily flush out all impurities while being drained off.**

For regular care and protection of paint and chrome plated parts see page 31-33.

## Non-recurrent "first" lubrication and maintenance jobs

**After the "first" 30-60 miles (50-100 km):**

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

**After the "first" 300 miles (500 km):**

### Lubrication

Engine: change oil while it is hot  
clean wire coil in oil filter

Transmission: change oil while it is hot.

Lubricate grease nipple with grease gun:

at front axle

- a) at lower right and at lower left wishbone 2 nipples each
- b) at upper right and at upper left wishbone 1 nipple front and  
1 nipple rear each
- c) at right and left steering knuckle 3 nipples each

at bearing of intermediary steering lever 1 nipple

at pedal linkage (2 nipples)

at the drive shaft

a) front: lubricating nipple at flange

b) center: the lubricating nipple in the bearing

c) rear: the lubricating nipple at the keyway

at the rear axle suspension (2 nipples)

Lubricate with some drops of engine oil: hand brake lever; hand brake equalizing lever; steering column gearshift; rod end of clutch pedal linkage; control shaft; joints of levers and linkage for throttle housing and injection pump; hinges of trunk lid; hinges of engine hood; safety hook of engine hood; bolts of door holding straps.

Apply Caramba to: Bowden cables at the heating elements

Injection pump: check oil level, refill; fill in approx.  $\frac{1}{20}$  cu. in. (1 c. c.) of engine oil at oiler of governor; actuate hand pump of fuel feed pump repeatedly.

### **Check-up and maintenance**

#### **Engine:**

Check torque of cylinder head bolts by means of torque wrench (see page 36)

Check valve clearance (see page 36), adjust, if necessary

Check for tight seat: the flange nuts at exhaust pipe, the fastening screws of the suction pipe, the exhaust manifold

Check tension of V-belts

Clutch: adjust free travel of clutch pedal (see page 38)

#### **Brake system:**

Check master brake cylinder, brake fluid container, brake lines and brake hoses for tightness; check brake hoses for worn spots and correct installation; bleed foot brake; refill brake fluid; adjust hand brake and foot brake

Engine, engine oil pipes, steering, transmission and rear axle: check for leaks

Pipes and connecting hoses for cooling water, fuel:  
check for leaks, worn spots and dents

Radiator: add cooling water

Battery: add distilled water

Electric system: check all electric consumers for proper function

Door arrester: adjust and grease

Engine hood and trunk lid: slightly grease lock

Wheels: retighten wheel nuts; correct tire pressure

Front axle: check toe-in and camber

Rear axle: check camber

During test drive: check functioning and effectiveness of foot and hand brake and clutch.

## **After the “first 1,900 miles” (3,000 km):**

### **Lubrication**

Engine: change oil while it is hot

Lubricate grease nipples with grease gun: see “after the first 300 miles” on page 25

### **Check-up and maintenance**

Fuel pre-filter: clean filter housing, wire strainer, lower part and sealing ring

At engine check for tightness: see “after the first 300 miles” (500 km)

Check tension of V-belts

Clutch: adjust free travel of clutch<sup>pedal</sup> (see page 38)

Brake system: check master brake cylinder, brake fluid container, brake lines and brake hoses for tightness; check brake hoses for worn spots and correct installation; refill brake fluid; adjust hand and foot brake

Check the following screws and nuts for tight seat:

steering gear housing at front axle support

lower fastening nuts of shock absorbers

lower wishbone mounting (8–10 mkg)

fastening screws at the drive shaft joint disc; to do this, remove cotter pins from nuts and insert new cotter pins,

thrust rod mounting (8–11 mkg); to do this, remove cotter pins from nuts and insert new cotter pins,

screws at cover of left rear axle casing and at front housing cover of rear axle,

visual inspection of nuts and locking devices at tie rods, drag links, pitman arm and steering shock absorber

mounting of engine hood lock

locking plate of trunk lid lock.

Engine, engine oil pipes, steering, transmission and rear axle: check for leaks

Pipes and hose connections for cooling water, fuel: check for leaks, worn spots and dents

Radiator: add cooling water

Battery: check acid level and density, add distilled water, check terminals for tight seat grease

Electric system: check all electric consumers for proper functioning

Headlights: adjustment

Door hinges and locks, striker plates:

check fastening screws for tight seat,

double wedge locks: clean with a dry rag only

Sliding roof: check tight seat of guide rails, retighten; check for dirt deposits or resinification, apply resin-free, thin oil; clean Covertex top, treat it with stearine.

Wheels: retighten wheel nuts; correct tire pressure

During test drive: check functioning and effectiveness of foot and hand brake, and clutch.

## Regular lubrication and maintenance service

After every miles	Page	Part of car	Nature of work
1,900 (3000 km)	29	Engine	Change <sup>1</sup> oil while it is hot, Lubricate <sup>2</sup> grease nipples with grease gun (see "after the first 300 miles" [500 km] page 25)
	29	Front axle, steering linkage, pedal linkage, drive shaft, rear axle suspension	
	29	Brake fluid container	Add brake fluid. Check brake system for leaks in case of excessive loss of brake fluid
	29	Battery	Refill distilled water
	29	Radiator	Add cooling water
	—	Wheels	Retighten wheel nuts
42	Tires	Correct tire pressure	
3,800 (6000 km)	<b>Lubrication</b>		
	35	Engine, oil filter	Clean wire coil
	29	Transmission	Check oil level, refill oil
	29	Rear axle housing	Check oil level, refill oil
	—	Hand brake lever; hand brake equalizing lever; steering column gear-shift; rod end of clutch pedal linkage; control shaft; joints of levers and linkage for throttle housing and for injection pump; hinges of trunk lid; engine hood hinges; safety hook of engine hood; bolts of door holding straps	Lubricate with some drops of engine oil
	—	Bowden cables at heating elements	
	38	Injection pump	Check oil level, refill oil. Add appr. 1 ccm of oil at flap oiler of governor
	<b>Check-up and maintenance</b>		
	34	V-belts	Check tension
	34	Air cleaner	Clean element and sprinkle with oil
	38	Clutch	Adjust free travel of clutch pedal
	—	Master brake cylinder, brake fluid container, brake lines and hoses	Check for leaks
—	Brake hoses		
39	Hand brake and foot brake	Check for worn spots and correct installation Readjust	

<sup>1</sup>When driving only in cities or on very dusty roads correspondingly sooner  
Observe quality and viscosity specifications!

<sup>2</sup> With extremely muddy and slushy roads and very unfavourable road conditions every 900 miles (1,500 km).

After every miles	Page	Part of car	Nature of work
3,800 (6000 km)	—	Engine, engine oil pipes, steering, transmission, rear axle	Check for leaks
	—	Pipes and connecting hoses for cooling water, fuel	Check for leaks, worn spots and dents
	—	Electric system	Check all electric consumers for proper functioning
	—	Front ventilation ducts	Clean insect screens
	—	Door fold	Clean, and apply talcum powder to all draft excluders
	—	Door locks	Double wedge locks: clean with a dry rag only
	—	Door arrester	Adjust and grease
	41	Wheels, tires	Check for exterior damages (visual inspection) Balance and interchange acc. to plan page 41
11,400 (18000 km)	29	<b>Lubrication</b>	
	29	Transmission	Change oil while it is hot
	29	Rear axle housing	Change oil while it is hot
	35	Water pump	Check oil level, refill oil
	29	Steering gear housing	Check oil level, refill oil
	29	Door hinges	Lubricate grease nipples with grease gun
	29	Hand brake cables	Lubricate grease nipples with grease gun
	—	Engine hood lock and trunk lid lock	Slightly grease striker plates
	29	Front wheel bearing	Renew grease in wheel caps
	—	<b>Check-up and maintenance</b>	
	36	Engine	Check valve clearance, adjust if necessary
	—	At engine: the flange nuts at exhaust pipe, the fastening screws of suction pipe, of exhaust manifold	Check for tight seat
36	Fuel pre-filter	Clean filter housing, wire strainer, lower part and sealing ring	
36	Fuel main filter	Check fuel flow, or clean element	

continued on p. 30

The figures indicate the number of miles covered, after which the lubricating and maintenance procedures have to be repeated assuming normal road conditions.

Oil filler plug for steering case 11,400

Radiator filler As required

Oil dipstick As required

Oil filler As required

Brake fluid container 1,900

Battery 1,900/11,400

Hinges of front doors 11,400

Hinges of rear doors 11,400

Transmission-Oil filler screw; Oil drain plug 3,800/11,400

Drive shaft, rear 1 keyway 1,900

Cooling water drain cock 1,900

Oil drain plug for engine 1,900

Lubrication at steering knuckle (right and left wheel) 1,900

Mounting for right wishbone arms, front 1,900

Mounting of intermediate steering lever 1,900

Injection pump 3,800

Mounting for left wishbone arms, front 1,900

Front wheel bearing (right and left wheel) 11,400

Mounting for left wishbone arms, rear 1,900

Pedal linkage 1,900

Mounting for right wishbone arms, rear 1,900

Oil filter 3,800

Drive shaft, front 1,900

Drive shaft, center 1 bearing 1,900

Fuel tank filler As required

Rear axle oil filler and oil drain plug 3,800/11,400

Grease nipple of hand brake cables (right and left) 11,400

Grease nipple at the rear axle 1,900

After every miles	Page	Part of car	Nature of work
11,400 (18000 km)	—	Brakes	{ Smoothen linings with emery cloth, remove dust deposits, check drums and dust caps of brake cylinders, check wheel brake cylinders for leaks
	—	Hand brake cables	Check
	—	Steering gear housing at front axle support, lower wishbone mounting, mounting of engine hood lock, plate of trunk lid lock, seat guide rails, arrester of front seats	{ Check screws and nuts for tight seat
	—	Tie rods, drag links, pitman arm, steering shock absorbers	{ Visual inspection of nuts and locking devices
	—	Steering linkage	Check sealing of ball heads
	—	Shock absorbers	Check oil tightness
	—	Drive shaft	Check universal joint
	—	Steering	Check universal joint, check play of steering
	—	Main silencer	Clean bores in lower part of casing
	—	Sliding roof	{ Check guide rails for tight seat, retighten, check for dirt deposits and resinification, treat with resinfree, thin oil. Clean Covertex top, apply stearine
	47	Battery	Check acid level and density, check terminals for tight seat and grease
	—	Headlights	Aim headlights
	—	Front axle	Check toe-in and camber
—	Rear axle	Check camber	
approx. 32,000 (50000 km)	—	Generator	{ Exchange generator. If this is impossible: dismount, check commutator for perfect condition, and smoothen if necessary, clean carbon brush holder, replace carbon brushes by new ones
	—	Door hinges	Check fastening screws for tight seat
approx. 63,000 (100000 km)	—	Strut mounting for rear axle	Renew rubber pads, check step bearing at frame floor and plate, if necessary, renew

## Cleaning the car and taking care of the body

### Resin-base paintwork<sup>1</sup>

When cleaning your car, avoid anything that might leave scratches or marks on the paint, that is, never go over the car with dusters, brushes, rough rags or cotton, nor use cleaning agents which are not suited for this purpose. Our service stations will give you detailed information regarding the agents to be used for all occasions. Patching up of paintwork, if required, will be done by our service stations according to our specific directions.

**Regular and frequent washing** constitutes a major part of paintwork care, for road dust is liable to mar the paint.

**Do not wash or polish your car in the direct rays of the sun or with the engine hood still warm.**

Start off by thoroughly rinsing the car with a weak spray, soaking the hard dirt particles. For removal of tar spots or dead insects, see below.

Subsequently, wash paintwork with a soft, clean sponge from top downward. For this, repeatedly rinse sponge thoroughly in clean water to avoid scratching the paint. For cleaning chassis and wheels, be sure to use a different sponge or a soft brush.

Now go over the car with a clean chamois to prevent the formation of water stains.

If you want to "shampoo" the car, our service stations will gladly recommend suitable agents which have been tested and approved by us. As a rule, only mild products should be used and the concentrations prescribed must be adhered to. In any event, rinse car thoroughly using a large amount of clean water so that the shampoo will not dry onto the car. For best results, treat your car with "Mercedes-Benz-Kunsthartz Polish" (Mercedes-Benz resin-base polish) after shampooing.

**For polishing resin-type paintwork**, we recommend "Mercedes-Benz-Kunsthartz Polish". This specially developed polish makes for careful and thorough treatment with little work involved. On no account use brands containing abrasive particles such as nitro-polishes, multi-purpose polishes, etc. Their use would mean less work, it is true, but they scratch the paint.

The resin polish is designed to remove, without scratching, the dirt and oil particles still sticking to the surfaces after washing, and to preserve the paint. **Therefore, if you treat your car with resin polish regularly at 8 to 10 weeks intervals, the lacquer will retain its gloss and resistance much longer. Cars with light-colored metal gloss paint will require more frequent polishing.**

After the car is washed and wiped dry with the chamois, and after the removal of tar stains, if any, some polish is poured on a wad of clean cotton which must be free from knots. Now treat car evenly, go over the surfaces in sections until the desired degree of brightness is attained. Depending on state of contamination, exert more or less pressure. Later, remove visible polish residues with clean cotton, until surfaces are free from any veil.

In case the resin-base paint has not been maintained regularly, or if it has for some reason lost its lustre, the application of resinbase polish will usually no longer suffice in bringing about satisfactory gloss. In this event, see one of our service stations for other, more effective polishes.

**Stains on the paintwork**, such as tar or oil stains, dead insects and the like will generally fail to come off by washing. They should be removed, however, as soon as possible, since they may cause lasting damage to the paint.

**Tar stains should be removed only with "Mercedes-Benz Tar Remover"**, because some of the tar removers available on the market have been found to be harmful to the paintwork.

<sup>1</sup> The exact type of paintwork is specified on plate below engine hood. If car has a nitro-paint finish (upon special request) maintenance is different.



Dead insects will stick forcefully to the paint, therefore you should try to remove them with lukewarm water on the same day. If this fails, try a mild 1-2% alkali-free soap solution (do not use a higher concentration). Subsequently, rinse thoroughly with plenty of water.

### **Car windows and windshield**

For easy accessibility, windshield wipers can be tilted forward.

For best results in cleaning panes, use "Mercedes-Benz Fensterreinigungsmittel" (Mercedes-Benz Window Cleaner). Apply a thin coat to panes, and after the white film has dried on, remove with a soft cloth.

For the filling of the windshield washing system you add 1 package of Mercedes-Benz 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).

Along with washing of panes, also clean the windshield wiper blades from dirt and sand accumulated alongside rubber, with a clean rag or, if required, with soapy water or alcohol. Wipe blades in vertical direction.

Replace windshield wiper blades by new ones once or twice a year. For removing, push the small lever protruding from blade support below mounting point in the direction of the arrow stamped into the support, and the blades will come off easily. Clean mounting point carefully. New wiper blades are placed in the wiper arm by again pushing small lever in arrow direction (see above).

### **Chrome-plated and light metal parts**

Wash with water and sponge, then wipe dry. Tar stains, if any, are removed with "Mercedes-Benz Tar Remover"; never use sharp-edged tools, knives and the like. Subsequently, use chrome polish "Mercedes-Benz-Brillant", applying a thin layer with soft cotton (molton), allow compound to dry, then polish the parts with a clean part of the rag. This should be done carefully each time car is washed, especially in winter; this treatment will yield excellent results with little trouble involved.

Under adverse conditions, particularly in winter, after snowfalls and when roads are strewn with gravel and salt, we advise you to go over the chrome parts with a chrome preservative paste which affords even greater protection due to higher wax content. Apply paste with cotton wad, distribute evenly. First, wash off snow and salt water with warm water. Allow paste to dry on briefly, then polish to high gloss with clean cotton.

### **Upholstery and top**

Cloth-type upholstery and textile tops are cleaned dry with a fairly soft brush. Oil and grease stains are best removed with "Mercedes-Benz Fleckenwasser" (Mercedes-Benz Cleaning Fluid), not with any handy type of cleaner because these may leave ugly marks.

There is no such thing as a universally applicable solvent, and the type of suitable agent will have to be determined for each type of stain. In most cases it will suffice to rub upholstery after brushing with a solution of diluted liquid ammonia (1 part of commercial liquid ammonia for 3-4 parts of water), use some gauze, soft muslin cloth or some similar material which should be damp, not wet; then allow to dry. Sugar stains and ink spots can be

removed with warm water. Oil paint and resin stains are dissolved with a little turpentine. Rust stains will come off with a diluted solution of citric acid. Afterwards, always rub in a small amount of diluted liquid ammonia.

**On principle, we recommend contacting one of our service stations for removal of stains.**

**Leather upholstery** is cleaned with a soft brush or rag moistened with a soft soap solution. Be sure to avoid the formation of water pools on the leather upholstery; these might seep through seam stitches and render drying difficult. Coarse sand-soap and stiff brushes are unsuitable. The soap solution is washed off with clear water and wiped dry with a rag. Afterwards, treat leather with "Mercedes-Benz Karneol" according to instruction for use, but be sure no visible residues will remain in the pores or grain of the leather after treatment is completed.

Electro-static charging is simple. Use **Mercedes-Benz Antielectro-staticum** as instructed.

**Imitation leather covers, rubber strippings and Covertex-type sliding tops** should be thoroughly brushed with washing agents added (soap or foam cleanser), or treat with a dry foaming agent.

Do not use organic solvents such as liquid cleaners, tar removers, nitro thinner, etc.

### **Steering wheel, lamps and rubber parts**

Avoid touching white finish of steering wheels with gloves that are not colorfast. Further, do not use colored steering wheel covers made of synthetic materials on a white wheel. Steering wheels, irrespective of color, or plastic fittings on lamps and also rubber parts and welts are cleaned with soap solution only. Never use organic solvents (like gasoline, spot removers, thinners, to name but a few).

For maintenance of instrument panel, see instructions on page 9.

## **Instructions for use of sliding roof (folding top)**

Always keep roof closed when car is inside garage.

### **Opening of roof:**

Turn locking lever left by 180 degrees, slide roof backward by pushing gently. By turning roof lever right by 180 degrees to locking position, the roof can be held in any desired opening position.

### **Partial opening of roof:**

If you want to open roof halfway or only a short distance for ventilation purposes, first push roof back completely and then pull locking bow forward to desired position; the folds are thus always toward the rear and the air pressure will not force the latch.

### **Closing of roof:**

Again turn locking lever left by 180 degrees, pull roof completely forward until locking hook engages with the provided opening, then turn locking lever right by 180 degrees.

### **Maintenance of roof:**

Clean roof fabric with water only.

If you have to exert pressure in sliding the top, clean sliding rails and slightly oil the leather guides running in the rails with oil that is free from resin, for instance sewing machine or bone oil. Clean covertex cover and rub in stearine after 11,400 miles (18,000 km) maximum.

removed with warm water. Oil paint and resin stains are dissolved with a little turpentine. Rust stains will come off with a diluted solution of citric acid. Afterwards, always rub in a small amount of diluted liquid ammonia.

**On principle, we recommend contacting one of our service stations for removal of stains.**

**Leather upholstery** is cleaned with a soft brush or rag moistened with a soft soap solution. Be sure to avoid the formation of water pools on the leather upholstery; these might seep through seam stitches and render drying difficult. Coarse sand-soap and stiff brushes are unsuitable. The soap solution is washed off with clear water and wiped dry with a rag. Afterwards, treat leather with "Mercedes-Benz Karneol" according to instruction for use, but be sure no visible residues will remain in the pores or grain of the leather after treatment is completed.

Electro-static charging is simple. Use **Mercedes-Benz Antielectro-staticum** as instructed.

**Imitation leather covers, rubber strippings and Covertex-type sliding tops** should be thoroughly brushed with washing agents added (soap or foam cleanser), or treat with a dry foaming agent.

Do not use organic solvents such as liquid cleaners, tar removers, nitro thinner, etc.

### **Steering wheel, lamps and rubber parts**

Avoid touching white finish of steering wheels with gloves that are not colorfast. Further, do not use colored steering wheel covers made of synthetic materials on a white wheel. Steering wheels, irrespective of color, or plastic fittings on lamps and also rubber parts and welts are cleaned with soap solution only. Never use organic solvents (like gasoline, spot removers, thinners, to name but a few).

For maintenance of instrument panel, see instructions on page 9.

## **Instructions for use of sliding roof (folding top)**

Always keep roof closed when car is inside garage.

### **Opening of roof:**

Turn locking lever left by 180 degrees, slide roof backward by pushing gently. By turning roof lever right by 180 degrees to locking position, the roof can be held in any desired opening position.

### **Partial opening of roof:**

If you want to open roof halfway or only a short distance for ventilation purposes, first push roof back completely and then pull locking bow forward to desired position; the folds are thus always toward the rear and the air pressure will not force the latch.

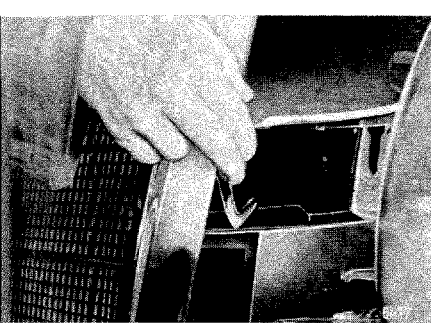
### **Closing of roof:**

Again turn locking lever left by 180 degrees, pull roof completely forward until locking hook engages with the provided opening, then turn locking lever right by 180 degrees.

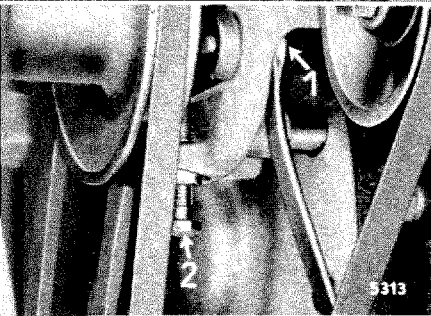
### **Maintenance of roof:**

Clean roof fabric with water only.

If you have to exert pressure in sliding the top, clean sliding rails and slightly oil the leather guides running in the rails with oil that is free from resin, for instance sewing machine or bone oil. Clean covertex cover and rub in stearine after 11,400 miles (18,000 km) maximum.



**Opening of engine hood:** Pull out hood locking control under the dashboard. The radiator cover which is rigidly connected with the hood will then open by a small gap to the limit stop of a safety hook fitted behind the radiator cover on the left (from driving direction). Place one hand on each side of the radiator screen, in line with the first slot of the air intake openings, pull the securing hook - on the left - forward and lift radiator screen.

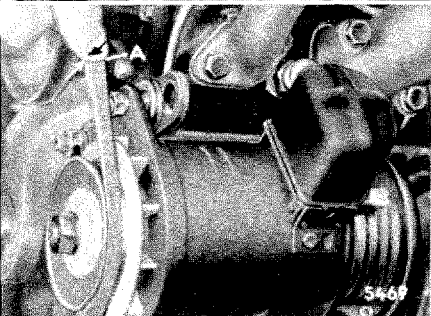


**Closing of engine hood:** Press radiator screen down and close engine hood by hand.

### Points requiring special attention

#### Engine:

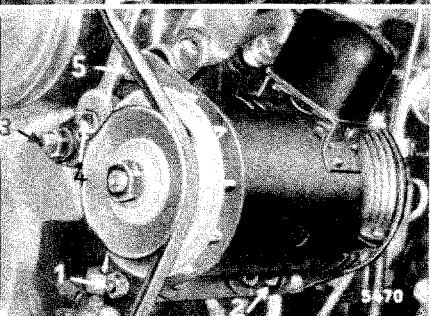
The engine is fitted with two V-belts; the short one drives the fan and the longer one the generator and water pump. If belts show sign of wear, replace by new ones. For putting on new belt see below, but proceed with care. Do not try to force belt onto the pulley with a screw driver or the like. Belt tension should be neither too tight nor too loose.



**Fan belt:** With moderate pressure applied by your finger, deflection must be at least 0.4 in. (10 mm) and must not exceed 0.6 in. (15 mm).

**Re-adjustment:** Slacken the 2 screws (1) at support, belt tension can now be regulated exactly by the adjusting screw (2).

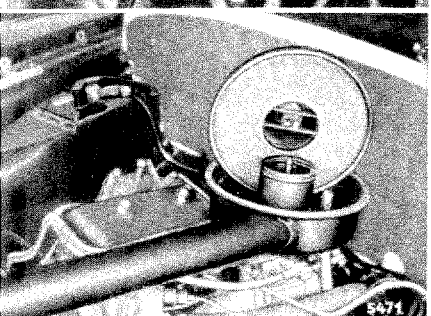
Then tighten the screws (1). Proceed likewise when fitting new belt.



**Cooling water and generator belt:** With moderate thumb pressure applied to belt between generator and water pump, the distance A, by which this belt can be deflected, must be at least 0.2 in. (5 mm) and should not exceed 0.4 in. (10 mm).

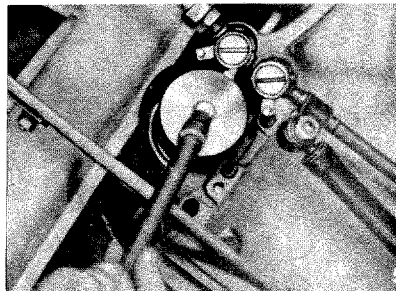
**Re-adjustment:** Slightly slacken front (1) and rear screw (2) at generator support underneath generator and the 3 screws (3, 4, 5) at the support rail. Pivot generator until correct belt tension is obtained. If necessary, swivelling range of generator can be enlarged by moving top screw (5) outside by one hole. Carefully tighten screws (1-5).

Use same procedure when fitting on a new belt. If necessary, move screw (5) back into lowest hole of support rail.

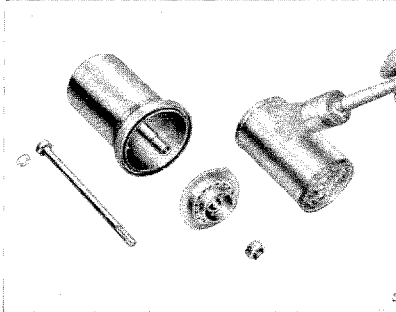


**Cleaning of air filter:** Loosen wing nut, remove lid and dip both lid and filter element into fuel. Allow to dry for a short time, then moisten the filter element evenly with 4 tablespoons of engine oil (about 50 g : 2 ozs.). Replace lid and tighten nut.

**Cleaning of oil filter:** Unscrew securing bolt at bottom of filter housing, at the same time hold filter housing in vertical position with one hand and take it out. Caution! the housing is filled with oil, do not lose sealing ring under hexagonal head of securing bolt.

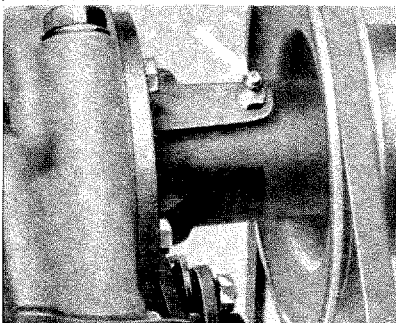


The filter housing lid remains at the engine. Tip over and empty filter housing. Filter can now be disassembled: unscrew the hexagonal nut, remove clamping cover and wire coil housing. Wash filter coil on in- and outside in gasoline with a soft brush, never with a wire brush.

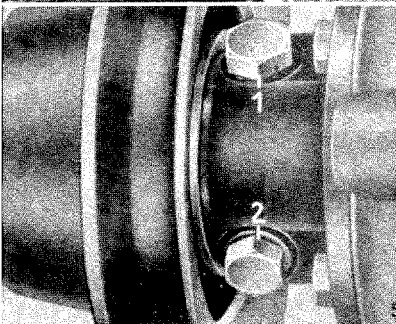


**Reassembling:** Replace coil and clamping cover with sealing ring downward in the housing. Tighten hexagonal nut on clamp cover. Attach filter housing on engine from below. Caution! Do not forget to fit the sealing ring under the hexagonal securing screw and do not tighten excessively.

**Cooling water pump:** One of two types is installed: one with and one without a pressure lubricator. Every 1,900 miles (3,000 km), no more than  $\frac{1}{20}$  cu. in. (1 c. c.) (see page 14) of grease is to be fed to the pressure lubricator ( $\frac{1}{20}$  cu. in. corresponds to two shots with the "Hydraulic Tecaletit" grease gun No. 1304). Caution overgreasing may clog water drain bore.

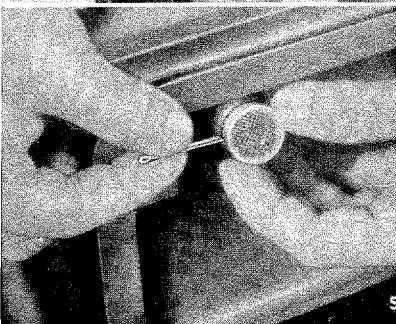


With the other type of pump, check oil level control plug (2) (at side of bearing case, about 0.177 in. [4.5 mm] below center of shaft) every 11,400 miles (18,000 km). Check oil level also in case water pump has been dismantled in the past or if pump has been replaced by a similar one. In case oil level falls below control plug (2), replenish at filler plug (1), using same type of oil as for rear axle (see page 14). Make sure vent bore in filler plug (1) is not clogged!

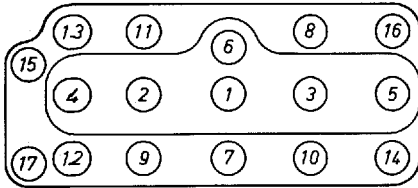


At rear end of tappet chamber cover, a screen is located, which should be cleaned every 11,400 miles (18,000 km). Remove cotter pin above screen and pull out screen. Re-insert by proceeding in reverse order.

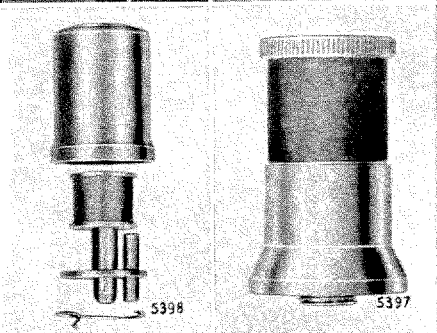
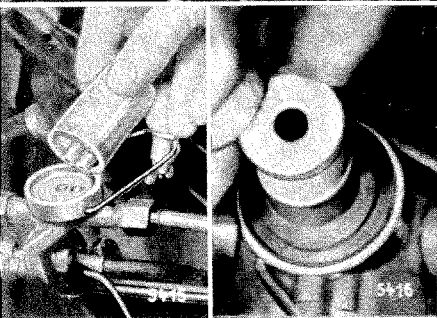
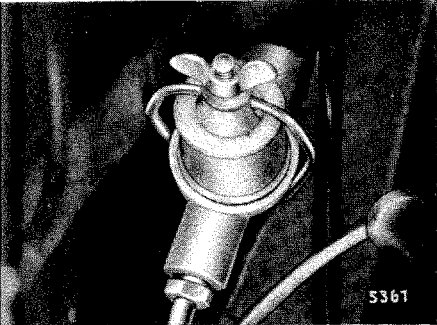
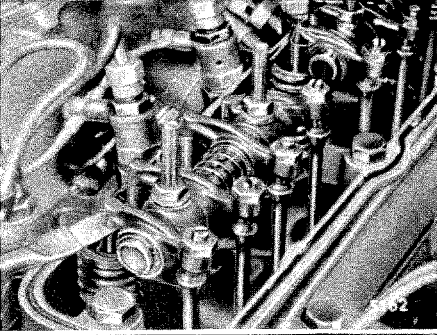
Starting with engine No. 45 0 6526, this screen will be omitted, while an additional air filter is installed in the cover of the engine filler cap, through which the air required for crankcase ventilation can enter.



## Side of injection pump



5172



**Tightening of cylinder head screws:** First remove cylinder head cover, rocker arm, brackets and cooling water outlet flange on engine, also turn lube oil pipe at exhaust side upwards after having removed the rear fastening nut and loosened the front nut. Always use a torque wrench for retightening and adhere to the sequence given on illustration, left. Basic rule for permissible torque: not to exceed 58 ft. lbs. (8 mkg) with cold and warm engine.

**Checking of valve clearance:** With cold engine, gap between the pressure point of the rocker arm and the valve stem should be 0.008 in. (0.2 mm) for inlet valves and 0.006 in. (0.15 mm) for the exhaust valves.

Rocker arms become accessible after cylinder head cover has been removed. Clearance is measured by using corresponding metal strips as feeler gauges.

**Caution:** Take the measurement at the rocker arm only when the respective valve is completely closed and its push rod can be turned freely. By shifting into 4th gear and pushing car forward, the necessary position of the push rod can be obtained. You are advised to have the valve clearance adjustment carried out at a service workshop.

**Glow plugs and glow plug ports** should be cleaned by a service workshop only.

## Fuel system

**Cleaning of fuel pre-filter:** Filter is located on left side behind steering gear housing. For cleaning, loosen wing nut, let down clamp laterally, remove upper part.

Further steps depend upon the design of filter installed. With one model, strainer is located in the upper part (fig. 5415); in this case, exert gentle pressure on the retainer spring at bottom of upper part and remove it. Take off sieve and clean thoroughly with a brush, never with a wire brush, in clean gasoline and also wash the protecting cap in gasoline.

If filter element is screwed into bottom part (fig. 5416), unscrew and clean along with filter cap as described above.

For both models: clean bottom part and gasket and inspect for proper condition. Assemble in reverse order, take care it is adjusted vertically and that wing nut is properly tightened.

## Fuel filter at engine

Unscrew bleeder screw and tightening nut at housing cover, remove cover, pull out and clean filter element

with compressed air from the inside. The fuel soaked up in the felt will then foam out and carry the dirt with it. Rinse outside of filter element with gasoline, using a brush, but hold the inner passage holes closed to prevent dirt from entering.

Every 11,400 miles (18,000 km), check the degree of dirt contamination by means of a passage test: loosen vent screw (1) at housing cover, pump a few times with hand primer (2) when a strong jet of fuel should spurt out at vent screw. If fuel will come out in a weak jet only, the filter element is dirty and must be cleaned. Loosen vent screw and bleed injection pump (see II).

### Bleeding of fuel system

For the proper functioning of the Diesel engine, it is imperative that the entire fuel system be at all times completely free from air bubbles. During operation the fuel system is vented by an overflow line at the fuel filter. However, air may enter after the fuel tank has been completely emptied during driving. If this happens, and also after each major repair, or after engine was first taken in operation, the entire fuel system should be bled (I-III).

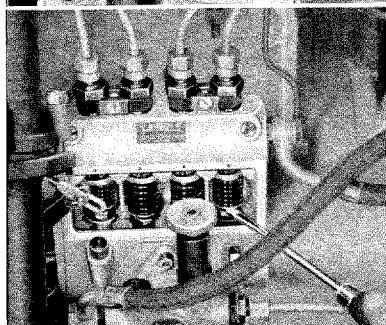
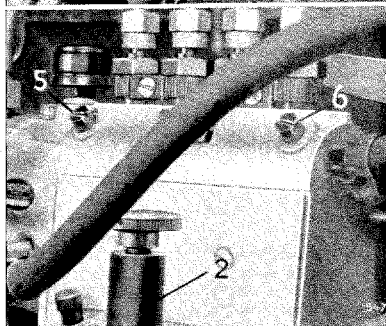
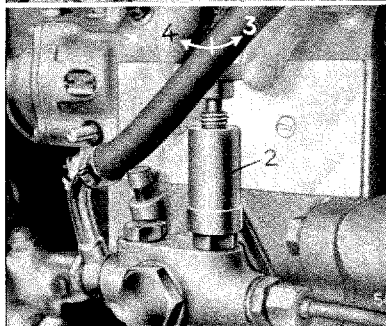
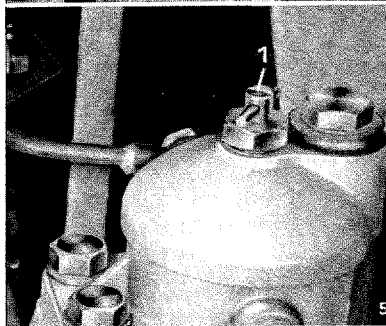
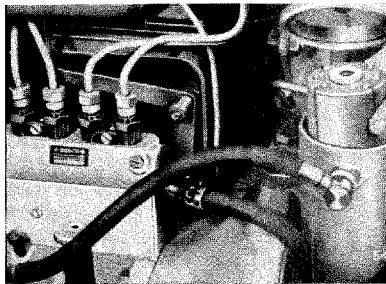
**I. Venting of fuel filter:** Turn vent screw (1) at fuel filter by one or two turns, loosen hand primer (2) by turning towards (3), and then primer until fuel flows without bubbles at the vent screw. Retighten vent screw. Fuel pump is tightened by turning towards (4)

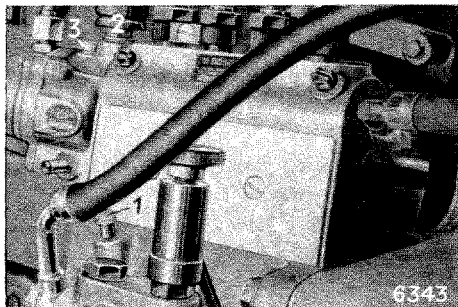
**II. Venting of injection pump:** Turn both vent screws (5, 6) partially loose, pump with hand primer (2) until fuel flows without bubbles at vent screws. Retighten vent screws.

**III. Venting of injection lines:** Injection lines and nozzles do not have to be separately vented after tank has been emptied in driving, since they hardly ever contain air.

However, if lines have been emptied owing to dismantling, they should be bled as follows for the sake of the battery.

For this, remove lateral injection pump cover, pump each pumping element on lower side with a screw driver until the spatter of the respective nozzle can be heard. Fit on lateral cover again. In case of the pumping elements failing to work regularly, have injection pump replaced at a service station.

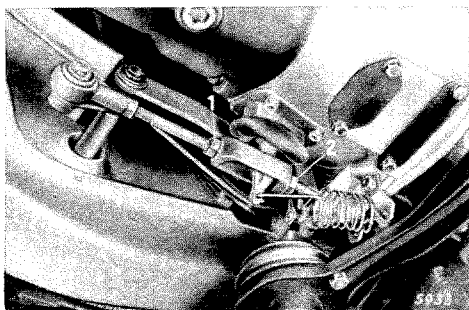




**Injection pump:** Check regularly with dipstick (1) to make sure oil reaches up to the upper mark on stick. If required, fill with engine oil. Wipe dipstick before measuring. Every 3,800 miles (6 000 km) add approx.  $\frac{1}{16}$  cu. in. (1 c. c.) of engine oil at lubricator of governor. In normal conditions, the small filter for ventilation of the governor housing (2) requires no servicing, only after long drives in dusty or sandy territories it is necessary to clean it occasionally.

Checking the timing of injection and possible replacement of a defective injection pump should be done **only** at a service station. This applies also for checking of **the injectors**. The spray pressure of the injection nozzles should not vary with the individual nozzles and with new engines should normally amount to 1,635 p.s.i. (115 kg/cm<sup>2</sup>) and at least 1,420 p.s.i. (100 kg/cm<sup>2</sup>) with broken-in engines.

Checking the timing of injection and possible replacement of a defective injection pump should be done **only** at a



## Clutch

**Checking 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 carried out by one of our service workshops only.

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 **Lockheed Brake fluid** (only Wagner Lockheed 21 B or British Lockheed Heavy Duty Type or Lockheed HD 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.**

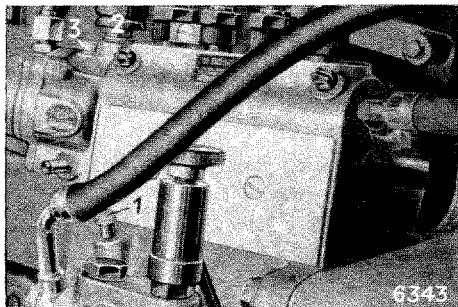
When checking the brakes before starting to drive, resistance must make itself felt at the foot brake lever after the pedal has been normally depressed. Should this not be the case, then proceed as described on page 54.

### 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).

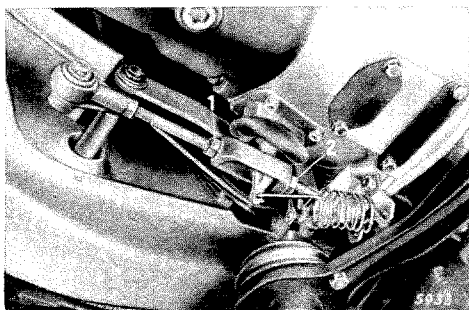




**Injection pump:** Check regularly with dipstick (1) to make sure oil reaches up to the upper mark on stick. If required, fill with engine oil. Wipe dipstick before measuring. Every 3,800 miles (6 000 km) add approx.  $\frac{1}{16}$  cu. in. (1 c. c.) of engine oil at lubricator of governor. In normal conditions, the small filter for ventilation of the governor housing (2) requires no servicing, only after long drives in dusty or sandy territories it is necessary to clean it occasionally.

Checking the timing of injection and possible replacement of a defective injection pump should be done **only** at a service station. This applies also for checking of **the injectors**. The spray pressure of the injection nozzles should not vary with the individual nozzles and with new engines should normally amount to 1,635 p.s.i. (115 kg/cm<sup>2</sup>) and at least 1,420 p.s.i. (100 kg/cm<sup>2</sup>) with broken-in engines.

Checking the timing of injection and possible replacement of a defective injection pump should be done **only** at a



## Clutch

**Checking 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 carried out by one of our service workshops only.

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 **Lockheed Brake fluid** (only Wagner Lockheed 21 B or British Lockheed Heavy Duty Type or Lockheed HD 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 54.

### 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).

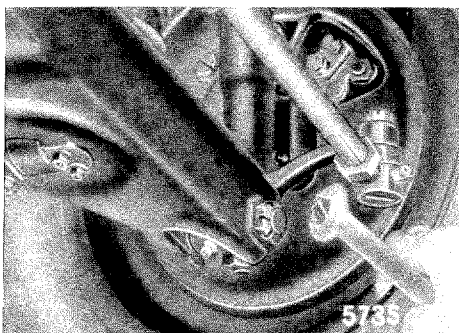
2. At a front wheel: pull off rubber cap at the wheel brake cylinder and connect bleeding hose to the nipple which is now exposed.
3. Push the wrench over the bleeding hose and apply to the bleeder screw.
4. Insert the other end of the hose in the glass container which should be filled with brake fluid until the hose nozzle lies under the fluid surface.
5. Loosen the bleeder 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 depress 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.
10. Top up main container and close it.

### Adjusting of brakes

**Foot brake:** By turning both adjustment bolts:

1. Jack up the wheel.
2. Turn both adjusting screws 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 adjusting nut on the hand brake lever at front left side of engine space to the right. Adjustment is made only to the extent where rear wheels are still rotating freely with the hand brake released.

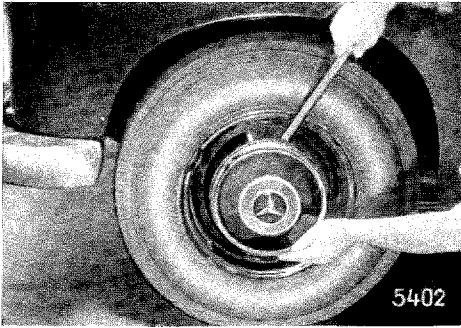


Braking effect of hand brake should start when hand brake lever is pulled up to 3rd or 4th notch.

**Final check:** When brakes are released and car is coasting, it should come to a smooth standstill without any jolting. The brake drums should not warm up noticeably if you touch them after driving several miles without using the brakes.

If linings are badly worn and adjustment of the appropriate nut is no longer sufficient, adjustment can still be made by shifting the cable guide pulley at the compensating lever by refitting its fastening bolt. However, after replacing the brake shoes by new ones, the shifted cable guide pulley should be replaced to its former position. If possible, this should be done in a service station.

A grease nipple is fitted to each cable casing of the hand brake cables. After every 11,400 miles (18,000 km), a small quantity of grease should be pressed into them. Caution! Do not overgrease to prevent grease from getting into contact with the brake shoes.



## Wheels

### Lubrication of the front wheel bearings:

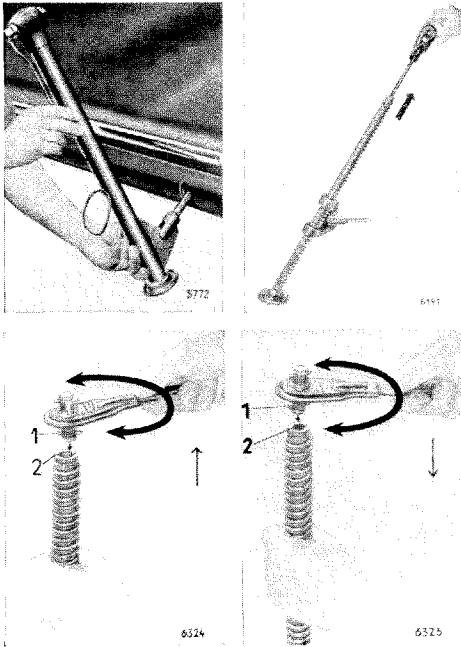
Remove the ornamental cap with the flattened end of the lug wrench and pull off the hub cap (special tool). Fill the hub cap with grease and press in, thereby forcing the grease into the ball bearings. Reinstall the ornamental cap and the hub cap.

### Lubrication of the rear wheel bearings:

is effected by a grease reserve which has to be topped up when carrying out rear axle repairs.

## Changing wheels

The spare wheel, the jack and the wheel nut wrench, which can also be used for removing the ornamental cap, are in the trunk compartment. Engage hand brake before changing wheels; if possible avoid to do this in a spot where car is inclined toward one side. On a grade, secure car against rolling downhill by putting wedges under the wheels. Remove hub cap, loosen wheel nuts, but do not screw them completely out.



There are two types of car jacks. One type which can easily be operated by means of a crank (fig. 5772) attached to the jack.

Or a second type which is operated by means of slip-on ratchet (illustrations 6191, 6324, 6325). To do this, the ratchet with its lever must first be pulled out of the car jack. Then it is inserted into the head of the jack. For jacking up the car, the cast-in marking "up" (Auf) should be on top; for lowering the car, the cast-in marking "down" (Ab) must be on top - in each case the set pins (1) at the ratchet should mesh with the guide grooves (2) of the jack head. The jack is operated by moving the ratchet lever horizontally to and fro, either up or down, depending on how the ratchet has been inserted.

Place the jack (both types) in the corresponding jack support next to the wheel in such a manner that the spring-supported bolt comes to rest under the lower nose part of the lifting jack; thus, the jack will be inclined outward. On no account place it in a vertical position. Lift car until wheel turns freely. Remove wheel nuts and wheel. Install spare wheel.

Screw on all wheel nuts, but do not tighten them yet. Lower car to ground, then tighten wheel nuts, always jumping one, until all of them have been tightened. Put on ornamental cap, correct tire pressure (see page 42). Have damaged tires repaired at earliest convenience.

### Balancing of the wheels

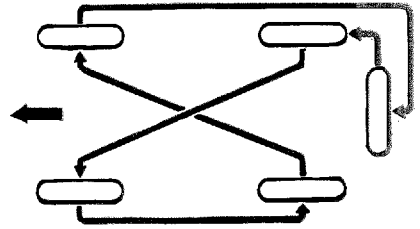
Uneven distribution of material and weight in a rotating body – wheel and tire – is known as unbalance. At speeds above 50 m. p. h. (80 km), unbalance in the wheels will result in steering difficulties, shaking of the body and jumping of the wheels, even on smooth roads. It will also lead to a very uneven wear of 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.

Therefore, have your wheels balanced at one of our service stations.

### 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.

Too low a tire pressure results in increased wear and tear, also makes for poor road holding in curves. Too high a tire pressure spoils the springs and on poor roads it causes excessive strain to the body.

Screw on all wheel nuts, but do not tighten them yet. Lower car to ground, then tighten wheel nuts, always jumping one, until all of them have been tightened. Put on ornamental cap, correct tire pressure (see page 42). Have damaged tires repaired at earliest convenience.

### Balancing of the wheels

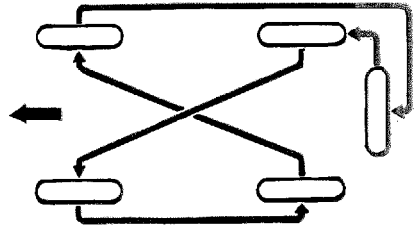
Uneven distribution of material and weight in a rotating body – wheel and tire – is known as unbalance. At speeds above 50 m. p. h. (80 km), unbalance in the wheels will result in steering difficulties, shaking of the body and jumping of the wheels, even on smooth roads. It will also lead to a very uneven wear of 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.

Therefore, have your wheels balanced at one of our service stations.

### 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.

Too low a tire pressure results in increased wear and tear, also makes for poor road holding in curves. Too high a tire pressure spoils the springs and on poor roads it causes excessive strain to the body.

In driving, the tire temperature and consequently also the tire pressure will increase depending on the speed and load.

Therefore, if you check the tire pressure on a long drive while tires are still warm and the pressure is higher than usual, by no means reduce the pressure to the specification meant for cold tires. On the contrary, if during a long drive, e. g. when the tires are warm, you find that the tires are insufficiently inflated, correct this to a higher pressure than is required for cold tires. See table below:

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

**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/cm<sup>2</sup>) 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.

**Prior to a long drive, and at least once a week, the tire pressure must be checked.**

Since 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 p. s. i. (0.2 kg/cm<sup>2</sup>) 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 drive.

### 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 being 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 threads 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 at 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 0–0.08 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 running 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 is reached.

We recommend having re-treading or re-capping done only by one of the vulcanizing shops recognized by our customer service department.

To brighten up tire paint, do not use nitro-cellulose lacquer, but one of the special tire paints available on the market!

**Check the rims! Dented, bent or rusty rims will damage the beaded edge of the tire.  
Have rust removed from the rims once a year.**

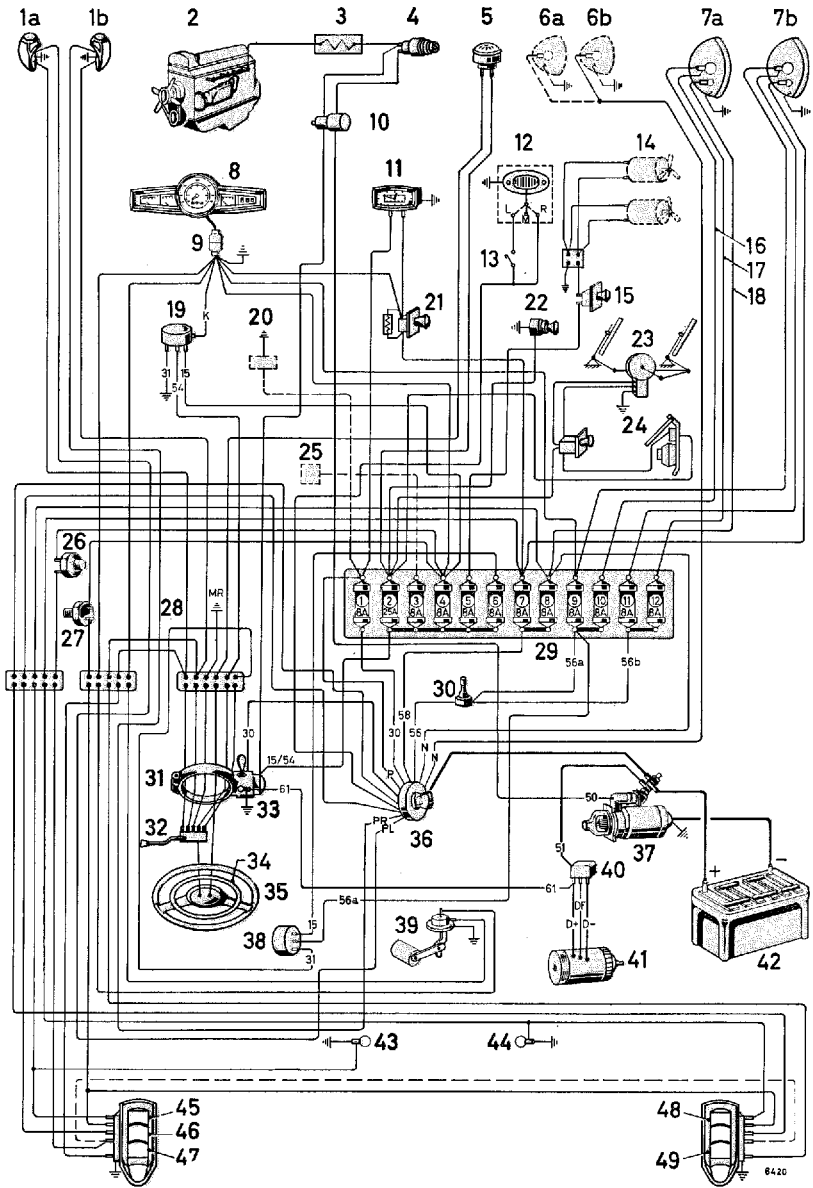
## Electrical fittings

### Key to electric wiring diagram (opposite)

- |  |  |
|--|--|
| 1a = Clearance and direction signal light, left  | 24 = Pedal pump for windshield washing system with windshield wiper switch                           |
| 1b = Clearance and direction signal light, right | 25 = Reserved for optional equipment   |
| 2 = Glow plugs (engine)                          | 26 = Back-up light switch  |
| 3 = Glow plug resistor                           | 27 = Stop light switch   |
| 4 = Glow control                                 | 28 = Cable connector   |
| 5 = Horn   | 29 = Fuses   |
| 6a = Fog light, left (upon special request)      | 30 = Foot dimmer switch  |
| 6b = Fog light, right (upon special request)     | 31 = Steering lock   |
| 7a = Headlight, left                             | 32 = Direction signal light switch   |
| 7b = Headlight, right                            | 33 = Generator indicator light   |
| 8 = Instrument cluster                           | 34 = Signal ring   |
| 9 = Wire coupling                                | 35 = Steering wheel  |
| 10 = Glow starting switch                        | 36 = Light turn switch with additional positions for clearance lights and pull switch for fog lights |
| 11 = Clock                                       | 37 = Starter motor 12 volts  |
| 12 = Interior light with switch                  | 38 = High beam blinker relay <sup>1</sup>  |
| 13 = Door contact                                | 39 = Transmitter for fuel gauge  |
| 14 = Heater blower motors (upon special request) | 40 = Regulator   |
| 15 = Switch for heater blower motors             | 41 = Generator   |
| 16 = Cable for high beam headlight               | 42 = Battery   |
| 17 = Cable for low beam headlight                | 43 = License plate and trunk light, left   |
| 18 = Cable for parking light                     | 44 = License plate and trunk light, right  |
| 19 = Direction signal transmitter                | 45 = Tail, stop and clearance light, left  |
| 20 = Socket (upon special request)               | 46 = Back-up light, left   |
| 21 = Switch for instrument panel lighting        | 47 = Direction signal light, left  |
| 22 = Cigarette lighter                           | 48 = Tail, stop and clearance light, right   |
| 23 = Windshield wiper with switch                | 49 = Direction signal light, right   |

<sup>1</sup> Not applicable on USA-design

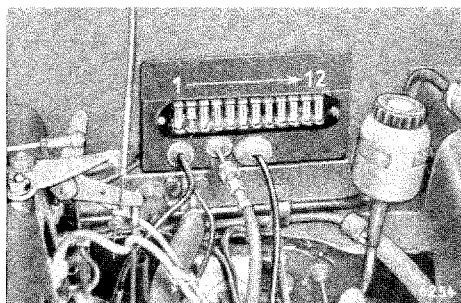




Wiring diagram of the electrical fittings

**Battery:** 12 volts, 84 Ah, located at right front of back board of engine compartment under a covering plate, which can be removed after loosening retaining screws. Keep outside of battery dry and clean. Acid level should be 0.39 to 0.59 in. (10–15 mm) above top of plates. Use only distilled water when refilling. Use caution against the use of special electrodes, since they may shorten life of battery. With a well maintained battery, the density of the acid indicates the state of charge; therefore, check state of charge with acidimeter. – Acid temperature 68° F (20° C) –

<b>Fully charged:</b>	Spec. grav. of acid 1.285 = 32° Bé	} If too low recharge with an outside source of current
<b>Half charged:</b>	Spec. grav. of acid 1.20 ≈ 24° Bé	
<b>Empty:</b>	Spec. grav. of acid 1.12 ≈ 16° Bé	



Wash terminals with hot soda lye (Caution! No lye must enter the battery!) Afterwards, rinse with cold water, grease terminals with anti-acid grease. **Fuses:** Located in a fuse box at left front side at back board of the engine compartment (viewed in driving direction). Line to glow plug system does not pass a fuse. If fuses blow out repeatedly, have cables checked for grounding and defective ones replaced at a service workshop.

**Note:** With steering lock in “stop” (Halt) or “parking” (Parken) position, horn, direction signal lights, stop lights,

fuel indicator, cigarette lighter, glow starting switch, windshield wipers and blowers<sup>1</sup> for defrosting of stationary car are switched off.

List of fuses in sequence from left to right, when facing fuse box:

No.	Fuse strip DIN 75581	Cable	Electrical unit
1	8	30	Dome light, clearance lights, electric clock (socket) <sup>1</sup>
2	25	54	Windshield wiper system, 1st signal horn, cigarette lighter
3	8	54	Reserved for optional equipment
4	8	54	Turn signals, stop light, back-up light, fuel gauge, electric fuel reserve
5	8	54	Defrosting of stationary car left and (right) <sup>1</sup>
6	8	54	Passing signal light <sup>2</sup>
7	8	58	Tail light right, parking light right, instrument panel lighting, license plate illumination right
8	8	58	Tail light left, parking light left, (fog lamp) <sup>1, 3</sup> , license plate illumination left
9	8	56a	High beam headlight right, high beam indicator
10	8	56a	High beam headlight left
11	8	56b	Low beam headlight right
12	8	56b	Low beam headlight left

<sup>1</sup> Only delivered upon special request    <sup>2</sup> Not applicable on USA-design.

<sup>3</sup> On USA-design through an additional fuse.

## Headlights

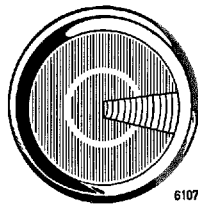
The following description is only applicable for European countries, since in the United States sealed-beam headlights must be installed.

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 180 Db is equipped with asymmetrical low beam headlights, 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). -

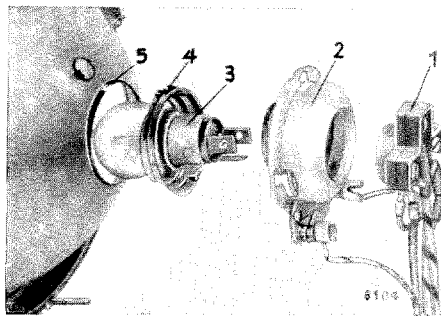
First remove the reflector unit from the fender. To do this, unscrew the oval-head countersunk screw at the bottom of the headlight, remove ornamental ring. Unscrew fastening screw of headlight, then the reflector unit can be removed from the protective housing which is located in the fender.



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 headlight 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 lugs (4) at the socket of the bulb must fit into the cut-out (5) at the reflector neck of the headlight - the bayonet joint of the lamp holder (2) can snap into place only if the bulb is in this position.



Put on lamp 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 horizontally from left to center and should rise by an angle of about 15 degrees beginning from the center towards right top. (In case of left-asymmetric low beam horizontally at the right side of the center, then rising towards left top under an angle of 15°.)

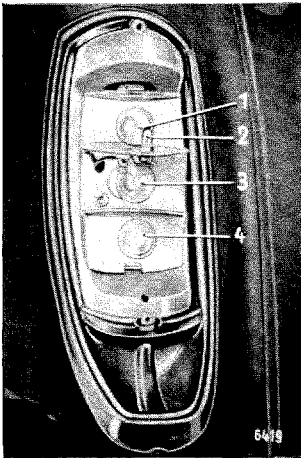
### Combined tail, stop, clearance, turn signal and back-up light

Left and right at the rear of the car these lights are installed in one common housing on each side. The lights are arranged from top to bottom as follows:

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.



- 1 = bifilar bulb for tail light and brake light
- 2 = clearance light
- 3 = back-up light
- 4 = turn signal light

In the **center** section behind the white glass:

the 15-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 15-watt bulb for the direction indicators.

### 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 (stop 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.

### Tail light tubular bulb:

Press contact spring outward and take tubular bulb out resp. install.

### 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 13.**

- 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 neck. 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. For this treatment various products may be used, however, no aggressive agents, such as products containing hydrochloric acid.

The scale deposits are best removed by a hydrochromium treatment. Strictly adhere to the manufacturer's recommendations. Never use hydrochromium in conjunction with anti-freeze. Depending on the degree of scale deposits in the cooling system pour 0.9/1-1.8/2.1 Imp./US pt. ( $\frac{1}{2}$  to 1 lit.) of the solution into the system while engine is running in quantities of 0.9/1 Imp./US pt. ( $\frac{1}{2}$  lit.) each. After driving some distance, in any case no later than the next day, shortly dip a testing strip into the cooling water through the filler neck. With the aid of the color scale provided by the manufacturer, his testing instructions and testing strip, the pH value for any color of the testing strip can be easily noted. If this exceeds 6, drain water off, flush system again thoroughly, and repeat this procedure. Treatment is complete, when pH value remains below 6 after driving some distance. If this is the case, drain off water again, flush thoroughly, refill with cooling water treated according to instructions on page 13.

- c) **Cleaning:** Blow compressed air through the radiator starting from the engine side or squirt water through, thus cleaning the radiator ribs of all foreign matter. Be sure rubber hose connection between radiator and pipe is water tight, replace if found to be torn or brittle.

Remove and thoroughly clean **thermostat**.

### Garaging and storing a 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.**

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 injection 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 injection pump etc., should be preserved. To do this properly, drain off the engine oil and in its place fill in the normal amount of engine anti-corrosion

oil SAE 10<sup>1</sup>; add 5-10 per cent of the same engine anti-corrosion oil SAE 10 to the fuel in the tank as well as to the oil in the cam space of the injection pump. Add about 2.44 cu. in. (40 c.c. = ½ per cent) of water-soluble anti-corrosion oil - see page 13 - to the cooling water. Now run the engine warm (cooling water temperature 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 glow plugs and spray approx. 0.6 cu. in. (10 c.c.) of "Engine Anti-corrosion Oil SAE 10" through each glow plug bore. Screw plugs in again and crank the engine by means of the starter for about 5 seconds. Before doing so, however, shut off fuel supply of injection pump. Due to the combination starting stopping switch, this is only possible while engine is being cranked, if the stop cable at the lever of the pump is loosened and the lever is set to stop position by hand.

Then spray the unpainted engine part with anti-corrosion oil for engines SAE 10; for this, cover up or take off the V-belt.

Drain off cooling water only when temperatures below freezing point are anticipated and when no anti-freeze has been added. For draining, see page 21.

If practicable, dismantle the battery and store it in a warm place. You are strongly advised to check the battery charge at 4 to 6 weeks' intervals and if necessary, to re-charge it carefully.

To spare the tires, jack car up and place supporting blocks **only** under the four jack supports. Reduce pressure of thus releaved tires to about 7-14 p. s. i. (0.5-1.0 kg/cm<sup>2</sup>).

When putting car back in operation, bleed the fuel system (see page 37) and add water, if required. For a short period, you may drive with the anti-corrosion type engine oil, but be sure to replace it with the normal HD-oil and the proper viscosity grade according to the season (see page 14), at your earliest convenience.

If the car is to be laid up for longer than 6 months, call on one of our service shops additional protective measures required.

## Hints for emergency repairs

If you service your car according to our maintenance instructions, or better, have it serviced and checked by one of our service repairshops, there will be little danger of the engine failing or having to cope with defects on the road, except for flat tires.

If it should occur, however, that the car will not function properly, the following recommendations might be helpful to you in spotting and eliminating failures. For opening of the hood, see page 34.

You will find the spare tire on the right side of the trunk compartment. It is retained by a wing nut. Loosen this nut, lift retaining claw and take the wheel out.

Tool kit, jack and lug wrench are next to the spare tire. For changing of wheels and tires, see pages 40-43.

If car has to be **towed**, be sure to fasten the tow rope **only** to the bracket mounted on the front part of the lower engine mount. Be sure the rope does not slacken while you are being towed. To do this, driver of towing vehicle should release the clutch very slowly, gently stretching the rope and, during the drive, the driver of disabled car should help keep the rope taut by gently applying the brakes when necessary and with discretion; this is particularly important when going downhill.

<sup>1</sup> For suitable "Engine Anti-corrosion Oils SAE 10" consult our service stations.

**Glow control lamp fails to light up** despite the starter switch being set to "position 1" or, **starting motor fails to rotate** despite starter switch being set to "position 2". The causes may be:

a) key in steering lock is not set to "Fahrt" (drive) position;

b) battery is not in order:

Check by momentarily turning starter switch to "position 2"; if starter motor will turn now, battery is o. k. and a defect in the glowing system is indicated. (see c, below).

If the starter motor still fails, the battery should be checked. For this, turn on the headlights to high beam and turn starter switch on "position 2". If:

1. headlights go out, one of the battery cables or cable connections to the starter is making poor contact: clean terminals and connections thoroughly so that metal will shine;
  2. headlights go out gradually, battery is insufficiently charged: have battery recharged;
  3. brightness of lights is unchanged: the starter motor itself is defective; it should only be repaired in a service workshop.
- e) If the above check (b) shows the battery to be in perfect condition, the glowing system itself is damaged.

Find out first, if each of the series connected glow plugs is receiving current: have somebody hold the starter switch in position "1" while you try to obtain a spark by touching a screw driver to the crankcase and briefly holding it close to the circuit conduct of each glow plug. If no sparks are produced by one of the plugs, the plug in question is at fault.

Use the same test if the **glow control lights up with a white glow** when starter switch is in position "1". This method helps in finding out which glow plug is grounded. Damaged glow plugs must be replaced.

d) Series resistors or glow control lamp proper are damaged. Have them replaced in a service workshop.

**The engine fails to start, although the starter turns and the glow control glows:**

In almost all cases, the cause is lack of fuel.

- a) No fuel in tank: refuel, and if tank was completely emptied, bleed the fuel system after tank is filled (see page 37).
- b) Engine still too cold: see steps to be taken at low temperatures, pages 20–22.
- c) Fuel system insufficiently bled: bleed again (see page 37). While bleeding, you can at the same time find out whether the fuel system is tight and whether the fuel filter is unduly dirty (see passage test, page 37). If necessary, also clean fuel pre-filter (see page 36) as well as the fuel filter element on the engine (see page 36). Tighten leaky pipe connections.
- d) In case there is no ignition in one or several cylinders, the corresponding glow plug or plugs may have "body contact", that is, the current passes through properly but it still fails to glow. This happens when plug remains wet and sooty. The plug must be replaced.

**The engine stalls** (Nearly always caused by lack of fuel):

- a) Lack of fuel: refill. Caution: If tank has been completely emptied, bleed the fuel system after tank is filled (see page 37).
- b) Fuel pre-filter is dirty. For cleaning, see page 36.
- c) Main fuel filter at engine is dirty. Clean filter element.
- d) Fuel pipes are leaky: tighten pipe connections.
- e) Fuel pump fails to feed. If fuel pump fails, use the hand primer at the fuel feed pump to pump fuel filter to overflowing and bleed the injection pump. This will allow you to drive on for another few miles, using the fuel filter as a reserve tank, be sure to keep vent screw on upper side of fuel filter open.
- f) Injection nozzles dirty or damaged: the major cause for this is the use of inadequate fuel. Have nozzles replaced or cleaned in a service workshop.

### **Engine suddenly starts to knock heavily**

The needle of an injection nozzle is sticking due to dirt deposits.

**Remedy:** First throw out the clutch, then press down accelerator several times. If the knocking occurs repeatedly, it is advisable to have entire fuel system cleaned in a service workshop at your earliest convenience.

### **Exhaust is thick and black**

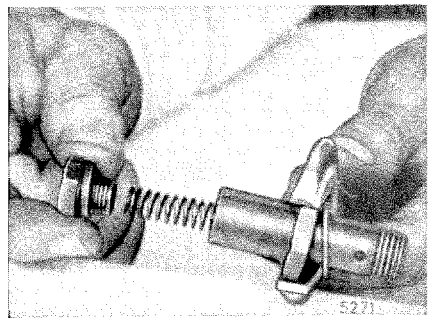
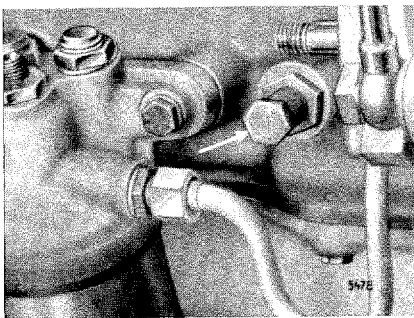
This may be caused by the following:

- a) air filter is choked: clean the filter (see page 34);
- b) one or several nozzles are coated with carbon or damaged, a nozzle needle is sticking: Check nozzle and fuel filters.
- c) Injection pump is not intact.
- d) Compression is too low.  
Defects "b" to "d" should be handled only by a service workshop.

### **Sudden drop of oil pressure**

The causes may be:

- a) Oil pressure in crankcase below a safe level. Lack of oil may be indicated by a drop in oil pressure on the gauge (see page 18) when driving around curves, going back to normal at this stage, when driving on straight sections. The engine oil level should reach at least to the lower mark on dipstick.
- b) The oil pressure release valve at the engine is dirty or leaky; remove the valve, disassemble and clean it.





- c) Pipe between engine housing and oil filter is leaking. Retighten connecting bolts.
- d) If the points a) to c) are in order, check oil pressure gauge proper: loosen connecting line at filter. If oil escapes at the connection while the engine is running, then the oil pressure gauge itself or the line to the oil pressure gauge is damaged and should be replaced. Otherwise, there is a defect in the engine, which can only be eliminated in a service workshop.

**Engine becomes too hot:**

The causes may be:

- a) Too small an amount of cooling water in the radiator. Be careful when opening the radiator cap, boiling water may spurt out, therefore, turn radiator cap first to the first notch allowing excess pressure to escape then turn to second notch and remove cap. Add water only while engine is running and do it slowly. The hose connections on upper and lower sides between radiator and engine, and also those right and left between radiator and the heater elements should be checked for their tight fit; tighten if necessary.
- b) The radiator may be covered up excessively.
- c) V-belt for fan or that for waterpump is too loose or torn (see page 34)
- d) Pipes of cooling system choked
- e) Water pump is damaged
- f) Cylinder head gasket is damaged  
Defects e) to f) are best handled by a service workshop

**Red generator indicator light comes on while driving**

Flashing on of generator indicator light while driving, i. e. with medium or high engine speed, indicates a fault in the electrical system. Stop car and check! Causes may be:

- a) A defect in the generator; have this attended to immediately at a service workshop since battery is no longer charged after generator breaks down.
- b) V-belt loose or damaged: for retightening, see page 34
- c) Cable from generator indicator lamp to generator, or cable from generator indicator lamp to battery, is grounded.

**Clutch is slipping**

The clutch slips when you find that car fails to accelerate as gas pedal is pressed and the engine revolutions are duly increasing. In emergencies, use the car for driving slowly to the nearest repair shop, accelerating only to the extent where clutch is still gripping. Generally, this is best done by driving in low gear. The causes may be:

- a) Clutch pedal does not have the prescribed free play. For readjustment, see page 38.
- b) Clutch is oily.
- c) Clutch lining or clutch itself is damaged and should be repaired in a service workshop.

## Brakes

Before driving, depress brake pedal for normal resistance. If there is inadequate resistance you may find that:

**a) Brake pedal can be depressed completely, either slowly or quickly.**

The causes may be:

1. A leaky wheel brake cylinder or brake pipe. Before driving, eliminate leakage by tightening the corresponding connections or consult service workshop.
2. Brake master cylinder is damaged. This is not indicated by any outside leakage. It can only be repaired in a service workshop.

**b) Brake pedal can be pressed to floor against an elastic, perceptible resistance.**

In this case, air has entered the brake pipes: bleed (see page 38 and 39) and refill brake fluid container, if required.

## While driving

**If brake pedal can be depressed to floor during a long downhill drive:** release shortly and press down twice in quick succession, after which the resistance should be felt again.

If brakes still fail to grip, stop car with the aid of the emergency brake and, if required, by shifting to low gear.

Check whether there is any damage according to points “a” and “b”, above. Have brakes checked at a service workshop as soon as possible.

## Trouble with the electrical system

All fuses are located in a box to the left of the back board of engine compartment, see page 46.

The reasons for the malfunction of an electric unit might be:

- a) Fuse makes poor contact; turn fuse around, clean contact points (shine) and, perhaps, bend contact spring.
- b) Fuse is damaged; it is either blown out or has no contact inside the fuse cartridge, and this can not be determined from the outside. For a substitute, use only soldered, welded or such fuses, the metal parts of which are made of one piece.
- c) Insufficient contact at a connection; tighten connection.
- d) A cable is grounded: check the wire for frayed insulation.
- e) The electric unit itself is at fault: for defects “c” to “e”, go to service workshop

## Technical data

### Engine

Model . . . . . M-B Type OM 636 VII  
 Type of engine . . . . . Diesel 4-stroke  
 Engine output according to SAE  
     46 gross HP/3500 rpm.  
 Engine revolutions at 62 mph . 3220 rpm.  
 Max. engine speed . . . . . 3600 rpm.  
 Number of cylinders . . . . . 4  
 Bore/stroke 2.95/3.94 ins. (75/100 mm)  
 Total capacity 107.83 cu. ins. (1.767 c. c.)  
 Compression ratio . . . . . 19:1  
 Valve clearance (with cold engine):  
     Intake valves: 0.008 in. (0.2 mm)  
     Exhaust valves: 0.006 in. (0.15 mm)  
 Firing order, cyl. 1 at radiator 1-3-4-2  
 For injection start, adjust to cyl. 1  
 Engine with injection timer 26° before UDC  
 Injection pump: Bosch Einspritzpumpe  
 Injection nozzles with holder DNO SD 211  
 Working pressure of injection nozzles  
     1,564-1,706 psi (110-120 kg/cm<sup>2</sup>)

With broken-in nozzles at least  
     1,420 psi (100 kg/cm<sup>2</sup>)  
 Glow plugs . . . . . Bosch KE/GA 1/8  
     Beru 214 GK  
 Fuel supply: feed pump at injection pump  
 Starting motor: Bosch EJD 1,8/12 R 70  
 Generator: Bosch LJJ/GEG 160/12-2500R10  
 Generator output (W) 160/240 max . . .  
 Cooling: Water circulation by pump and  
     thermostat with short-circuit line, fan  
 Operating temperature of water:  
     by thermostat 158-203° F (70-95° C)  
 Capacity of cooling system:  
 w/o. DB-heater: 1.6 Imp. gals. } (7.5 lts)  
                   1.9 US gals. }  
 with DB-heater: 1.9 Imp. gals. } (8.6 lts)  
                   2.2 US gals. }  
 Oil pan capacity:  
     max. 0.88 Imp. or 1 US gallon (4.0 lts)  
     min. 0,6 Imp. or 0.7 US gallon (2,5 lts)

### Chassis

Transmission . . . . .  
  
 Steering . . . . .  
 Camber of front wheels . . . . .  
 Toe-in of front wheels . . . . .  
 Caster of front wheels . . . . .

DB type, four speeds plus reverse, all forward speeds fitted with blocked synchronization; steering column gear shift  
 DB type recirculating balls  
 + 20' to 40' unloaded  
 0-0.08 in. (0-2 mm) unloaded  
 2° 50'-4° unloaded

	1st gear	2nd gear	3rd gear	4th gear
Travelling speed in mph (km/h) . . . . .	17 (28)	30 (48)	47 (75)	70 (110)
Climbing ability . . . . . %	1 in 2.85 (35%)	1 in 5.26 (19%)	1 in 9.09 (11%)	1 in 16.6 (6%)
Wheels . . . . . disc wheels	Size of tires . . . . . 6,40-13			
Type rims . . . . . drop base rims	Tire pressure rear } see page 42 Tire pressure front }			
Size rim . . . . . 4½ K × 13 - B				
Max. length . . . . 177.1 ins. (4.500 mm)	Fuel consumption during average highway driving: 41-30 miles/US-gall. } (5,7-7,8 ltr./100 km) 50-36 miles/Imp. gall. }			
Max. width . . . . 68.5 ins. (1.740 mm)				
Max. height, unloaded 61.4 ins. (1.560 mm)	Fuel consumption acc. to DIN 70030 measured at 51.2 mph (82,5 km/h): 34.6 miles/US-gall. } (6,8 ltr/100 km) 41.5 miles/Imp. gall. }			
Wheel base . . . . 104.3 ins. (2.650 mm)				
Track, front . . . . 56.3 ins. (1.430 mm)	Fuel tank capacity: approx. 14.7/12.3. US/Imp. gals (56 ltr)			
Track, rear . . . . 58.05 ins. (1.475 mm)				
Diameter of turning circle: 35 ft (10.7 m)	Payload: approx. 990 lbs. (450 kg) Permissible axle load front: approx. 1,720 lbs. (780 kg) rear: approx. 1,940 lbs. (880 kg) Battery capacity . . . . . 12 V. 84 a. h.			
Ground clearance (with two passengers) 7.6 ins. (195 mm)				
Max. clocked speed, appr. 70 mph (110 km/h)				
Engine oil consumption 196/235 m. p. US/Imp. pt. (0.15 lt/100 km)				

Dry weight: approx. 2,510 lbs. (1.140 kg)  
 Kerb weight: (net weight as per DIN 70020)  
     approx. 2,670 lbs. (1.210 kg)  
 Permissible total weight:  
     approx. 3,660 lbs. (1.660 kg)

Subject to modification!

## Alphabetical index

Accelerator pedal	6	Filter element in air filter	34	Oil pressure gauge	9
Adjustment of brakes	39	Firing order	55	Oil relief pressure valve	52
Adjustment of clutch	38	Foot brake	6, 39	Paint	31
Air filter, cleaning of	34	Foot dimmer switch	6	Payload	55
Air pressure of tires	41	Front seat adjustment	7	Polishing	31
Anti-corros. precautions	12	Fuel	11-14	Precautions against frost	20
Anti-freeze mixtures	20	Fuel pre-filter	36	Preparations for driving	15
Ash tray	9	Fuel consumption, standard	55	Rear view mirror	7
Axle load	55	Fuel filter	37	Rear wheels, greasing of	40
Balancing wheels	41	Fuel filter nipple	29	Relief pressure valve for oil	52
Battery	46	Fuel gauge	9	Reverse gear	17
Biflar bulb	47	Fuels and lubricants	11	Running-in instructions	16
Bleeding brakes	39	Fuses	46	Service stations	25
Brakes	38	Garaging	49	Shifting gears	17
Bulbs for headlight	47	Gear changing	17	Sliding top	33
Chrome-plated parts	32	Gear shift lever	7	Snow chains	23
Cleaning of air filter	34	Gears	17	Spare tire	40
Cleaning of car	31	General dimensions	55	Special treatment of cooling water	12
Cleaning of cooling system	49	Generator indicator light	8	Speedometer	9
Cleaning of oil filter	35	Glow plugs	55	Speeds	55
Climbing ability	55	Glow plug control lamp	8	Starter	51
Clutch, adjustment of	38	Ground clearance	55	Starter switch	9
Clutch pedal	6	Hand brake	6, 39	Starting	16
Coolant	13	Headlights	47	Steering lock	8
Cooling water, amount of	13	Heating of car	11	Storing of car	49
Cooling water, filler cap	29	Height of car	55	Stopping	16
Cooling water pump	35	High beam light control	9	Switching off	19
Cooling water quantity	12	Hints for emergencies	50	Tire pressure	42
Compression ratio	55	Hub caps, removal of	40	Tires	41
Cylinder head bolts	36	Injection nozzles	38, 55	Tires, changing of	41
Defects in the cooling system	53	Injection pump	38, 55	Tires, size of	55
Defects in the engine	51	Injection timing	55	Toe-in of front wheels	55
Defects in the glow plug system	51	Jacking up the car	40	Towing	50
Defects in the starter	51	Length of car	55	Track	55
Dimmer switch	6	Lifting jack, fitting of	40	Transmission	29
Dipstick	29	Lighting switch	6	Travelling speeds	55
Distance between axles	55	Lubricants	13-14	Unbalance	41
Drain cock	29	Lubricating system	25-30	Valve clearance	36
Driver's seat	6	Main dimensions	35	V-belts	34
Electrical wiring diagram	45	Maintenance	25-30	Ventilation	10
Emergency repairs	50-54	Maximum load	55	Venting of fuel system	37
Engine	34	Oil	14	Water filler cap	27
Engine oil consumption	55	Oil, changing of	25, 27, 28	Weights	55
Engine output	55	Oil consumption of engine	55	Wheel changing	40
Fan belt	34	Oil filler cap	29	Wheels	40
Feed begin	55	Oil filter	35	Width of car	55
Filter for engine oil	35			Windshield wipers	8
				Winter driving	20

## **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:	BV-Oel HD, BV-Oel Spezial (HD), Aral-Motor-Oel Spezial (HD).
Caltex:	Caltex RPM Delo Special (HD), Caltex Motor Oil HD bzw. Havoline the Premium Motor Oil HD, Caltex Motor Oil Special (HD) bzw. Havoline Motor Oil Special (HD).
Castrol:	Castrol CR HD Oil, Castrolite (HD), Castrol XL (HD).
BP:	Energol Diesel D (HD), Energol Motor Oel HD, Energol Visco-Static (HD).
Esso:	Essolub HD, Esso Extra Motor Oil (HD).
Mobil Oil:	Delyac Oil 900 (HD), Mobiloil (HD), Mobiloil Special (HD).
Gasolin-Nitag:	Motanol HD, Motanol Super (HD), Motanol Record (HD).
Shell:	Shell Rotella HD, Shell-X-100 Motorenoel (HD).
Valvoline:	Valvoline Super HPO (HD), Valvoline „All-Climate“ HPO (HD).
Veedol:	Veedol Motor Oil HD 900, Veedol 10-30 Motor Oil HD.

### **Drive axles, steering, water pump:**

#### **Hypoid transmission oils**

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

#### **Transmission: Automatic Transmission Fluid (ATF)**

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

## Corrosion prevention oils water-soluble for cooling water circuit

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

## Anti-freezes

BP:	BP Anti-Frost
Farbw. Hoechst:	Genantin
Chem.Fabr.Holten:	Glystantin
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)