Operating Instructions

Mercedes-Benz

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307 D  309 D
407 D  409 D

Operating Instructions
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These Operating Instructions are designed to provide clear answers to essential questions concerning operation, service and maintenance.

In some sections you will in addition find instructions for the economic operation of your vehicle. By complying with these instructions you can assist in effectively reducing the fuel consumption (energy consumption).

To ensure continuous operational reliability and roadworthiness, we strongly recommend that service and maintenance work listed in the Maintenance Booklet be carried out on time.

For this purpose, an extensive network of MERCEDES-BENZ service stations is at your disposal.

Before operating the vehicle for the first time, please refer to the sections entitled

"Components" and "Operation"

Several vehicle types whose principal components are identical are dealt with in these Operating Instructions.

Besides this important optional extras are included. Your vehicle may therefore differ from some of the descriptions and illustrations.

We wish you good motoring!
Daimler-Benz Aktiengesellschaft
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Tire pressure chart
1 Components

1.1 Door control front

**Hinged door**

Door control, outside

1. Locked
2. Unlocked
   - To open the door, press in door lock cylinder

Door and window control, inside

1. Door latch unlocked
2. Door latch locked
3. Opening lever, door
4. Window crank
1.2 Driver’s seat adjustment

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1. Lever moved to the right = locked
2. Lever moved to the left = released

1.3 Seat belt (example)

Fastening:
1. Pull belt with tongue (1) over shoulder and lap. The belt must not be twisted but must be tight.
2. Press tongue (1) into buckle (2) and allow to engage audibly.

Unfastening:
1. Depress red button in buckle (3).
2. Return tongue (1) to initial position.

Note:
The inertia reel of the seat belt stops the belt unwinding further in case of vehicle deceleration in any direction and if the belt is pulled out quickly.
1.4 Instruments – summary

1 Ventilation and defrosting nozzles for side windows (page 16)
2 Light switch (page 12)
3 Coolant temperature gauge
4 Indicator lights (page 10)
5 Speedometer or tachograph (page 13)
6 Selector lever position indicator – MB automatic transmission or fuel gauge (page 31)
7 Idle speed control (page 29)
8 Switches (page 10)
9 Heating and ventilation (page 16)
10 Plug socket
11 Radio (page 14)
12 Ashtray
13 Engine cover
14 Clock
15 Steering lock (page 13)
16 Horn
17 Fuel gauge or operating hours indicator
18 Combination switch (page 12)
19 Pull knob, engine compartment flap (page 23)
1.5 Indicator lights and switches

The following symbols have been chosen to facilitate identification of the individual switches and indicator lights.

**Indicator lights**

1. High beam
2. Preglows
3. Turn signal indicator light - tractor
4. Turn signal indicator light - trailer
5. Rotary flashing beacon
6. Charge indicator light (page 36)
7. Brake fluid and brake pad wear (page 34)
8. Oil pressure - engine
9. Heated rear window
10. Supplementary heater (page 16)

**Switches**

11. Blower, high speed - low speed (page 16)
12. Heated rear window
13. Rotary flashing beacon
14. Interior light - bus
15. Supplementary heater (page 16)
16. Hazard warning flasher switch with indicator light
17. Light switch (page 12)
1.6 Light switch

0 Off-position
1 Parking lights
2 Headlights
3 Standing lights, right
4 Standing lights, left
A As position 1 or 2 plus fog lights
B As position 1 or 2 plus rear fog light with indicator light

1.7 Combination switch

1 Low beam
2 High beam
3 Headlight flasher
4 Turn signal lights, right
5 Turn signal lights, left

Note:
Switching on turn signal lights:
Up to point of resistance = brief flashing
Beyond point of resistance (engagement) = continuous flashing

6 Windshield washer/headlight washer
Note: When the windshield washer system is actuated, the windshield wipers are also switched on.
The headlight washer (optional) is only operated when the vehicle lights are switched on.
Check wiper blades regularly for soiling and damage.

7 Windshield wiper
Position “O” = off
Position “I” = intermittent wiping
Position “II” = low speed
Position “III” = high speed
1.8 Steering lock

0 The key can be removed only in this position.
The steering is locked when the key is withdrawn.
1 Steering unlocked
2 Preglowing and driving position
3 Starting position

1.9 Tachograph (example)

1 Time group knob
2 Speedometer
3 Speed warning light
4 Clock function control light
5 Tachograph function control light

The control light comes on if no diagram chart is inserted or if the tachograph is defective.
Brief lighting up of the control light while the tachograph is opened or closed proves the control light to be in good working order.
1.10 Radio

Radio with push buttons for band selection and tuning of preset stations

Radio with push buttons for band selection and tuning of preset stations and with built-in cassette player
On-Off/Volume control

Turn knob (1) clockwise to switch on radio and to increase volume. The green control light will come on.

Tone

Turn lever (2) to alter the tone.

Station Tuning

Select desired wave band by pushing the respective button (3). The wave band selected is indicated by wave band indicator (9). The desired station is tuned in by turning the manual tuning knob (4). For good reception, accurate manual tuning is important.

To preset stations of various wave bands pull out preset button (3) to the stop, tune in station with manual tuning knob (4) and push preset button in again to the stop.

Tape Playback

Only use brand C 60 or C 90 cassettes. Push cassette into cassette slot as far as it will go with the full reel on the right side.

The radio will then switch over from radio reception to tape playback. The cassette will be released automatically as soon as the tape reaches its end.

To play the other side of the tape, turn cassette upside down and reinsert it into cassette slot.

To manually eject the cassette, push release bar (5). When the cassette is ejected, the unit will switch over to radio reception automatically.

Push button 6 or 7 for fast forward or rewind of the tape. Briefly touching the counteracting button will stop the winding process.

Service and Maintenance

Since deposits on the pick-up head are inevitable after extended operation, the cassette should be cleaned with a cleaning cassette if the quality of the sound reproduction declines. After approx. 500 operating hours the unit should be inspected by a specialist.
1.11 Heating and ventilation

Control levers are infinitely variable

1. Blower switch: press upper end = low speed  
   center position = off  
   press lower end = high speed

2. Ventilating or defrosting windshield  
   Lever position: left = closed  
   right = open

3. Control valve for heater  
   Lever position: left = cold  
   right = warm

4. Ventilating or heating footwell  
   Lever position: left = closed  
   right = open

5. Supplementary heater switch:  
   press upper end = on  
   press lower end = off

6. Ventilation and defrosting nozzles – windshield

7. Ventilation and heating nozzles – footwell

8. Ventilation and defrosting nozzles, adjustable  
   The nozzles can be opened and closed with the lever in the nozzles.

Supplementary heater

The supplementary heater can be operated with the engine on or off.  
Switching on supplementary heater:  
Actuate toggle switch. The indicator light on the instrument panel comes on. The heater will come on after approx. 2 minutes.

Adjusting examples:

When defrosting windows  
1 = press lower end  
2 = right  
3 = right  
4 = left  
8 = turn nozzles towards side window and open them

For full heating capacity  
1 = press lower end  
2 = right  
3 = right  
4 = right

For full ventilation  
1 = press lower end  
2 = right  
3 = left  
4 = right

Switching off supplementary heater:  
Actuate toggle switch. The indicator light goes out. The heater continues to operate for about 2 minutes and then switches off automatically.
1.12 Headlight beam control

0 Normal position
I Vehicle with maximum load (with evenly spread load)
II Vehicle with maximum load (with large part of load shifted to rear axle)

1.13 Interior light (example)

Position 1: On
Position 2: Off
Position 3: Light is switched on and off by the door contact.

1.14 Interior mirror

Operating lever
1 Normal position
2 Dimming position
Unlocking right
Operate lever, tilt seat forward or backward until lock engages.

Unlocking left
Operate lever, tilt seat forward or backward until lock engages.
1.16 Headrest (example)

Height and inclination of headrest can be adjusted.

1.17 Door control – cargo space

Rear door
Door control, outside (example)

1. Unlocked
   To open the door, press in door lock cylinder
2. Locked

Door control, inside

1. Door latch unlocked
2. Door latch locked
3. Opening lever of 1st door
4. Lock of 2nd door
   To open, swing handle up.
Opening angle 90°

1. Locking hook
   - Open door 90° and engage locking hook.
2. Clamp
   - Fasten locking hook before closing the door.

Opening angle 180°

1. Locking hook
2. Door strap
   - Disengage locking hook, swing door strap inward.
   - Open door 180° and engage locking hook.
   - Prior to closing the door, engage door strap. Attach locking hook.

Opening angle 270°

1. Door lock
   - Disengage locking hook, swing door strap inward.
   - Open door 270°. Engage lock.
   - To unlock, pull forward latch in the door lock.
   - Prior to closing the door, engage door strap. Fasten locking hook.
**Sliding door**

Door control, outside

1. Locked
2. Unlocked

To open the door, press in door lock cylinder, grab handle and push door rearward to the stop.

To close the door, grab handle and push door forward until the door lock engages.

Door control, inside

1. Door latch unlocked
2. Door latch locked
3. Opening lever, door

Opening the engine cover

1. Clamp

Note:
Prior to the detachment of the engine cover, remove driver's seat.
1.19 Engine compartment flap

Opening the engine compartment flap
1 Pull knob

Closing the engine compartment flap
1 Lift securing device
2 Operation

2.1 Preparations for driving

Check the following items daily

- Accessibility and completeness of the emergency equipment, e.g. first aid kit, hazard warning triangle, fire extinguisher

Prior to starting the engine

- Fuel reserve
- Vehicle lighting, turn signal and stop lights
- Oil level in engine

After having started the engine

- Engine oil pressure
- Steering free play
- Tachograph for proper function

Fuel reserve

Turn steering lock to driving position. Check fuel level, replenish if necessary. Prior to filling the fuel tank, shut off engine and supplementary heater. Always keep the fuel tank vent clean. Do not fill fuel tank to the brim because of heat expansion. For summer and winter operation vehicle diesel fuels, refer to “Fuels, coolants, lubricants, etc.”.
Vehicle lighting, turn signal and stop lights

The lighting system including the stop lights must be checked daily for good condition and clean lenses. If bulbs have to be replaced, observe the specified voltages. Refer to "Technical data".

Oil level in engine

Vehicle has to be on level ground when oil level in oil sump is checked. Oil level to be somewhere between the lower and the upper mark on the oil dipstick. Oil level should not exceed the upper mark.

Caution: Use only engine oils of specified SAE grades (viscosity ranges). Refer to "Fuels, coolants, lubricants, etc.".

Steering free play

Manual steering

Should there be any free play in the steering, have the steering system adjusted at a MERCEDES-BENZ service station immediately.

Power steering

The wheels must start moving when the steering wheel is turned approx. 30 mm (1.2 in). If they do not move, have steering gear and linkage inspected by a MERCEDES-BENZ service station.

Function test – tachograph

The indicator light must not come on. Brief lighting while opening or closing the tachograph indicates that the light is in good working order.
Check at regular intervals:
(for example once a week or whenever you refuel)

- Coolant level
- Power steering - oil level
- Hydraulic clutch control and hydraulic brake system - fluid level
- Soiling of air cleaner
- Batteries - fluid level
- Windshield washer system - fluid level
- Seat belts
- Inflation pressure and condition of tires
- Engine, transmission, live axle, steering system, cooling and heating system for leaks

Coolant level

The coolant expansion tank must be filled up to the marking in the filler neck.

If possible, replenish coolant only with the engine cold (coolant temperature less than 122°F/50°C) and the heater valves open. Do not open filler cap if the coolant temperature is above 194°F (90°C).

After having added coolant, seal coolant expansion tank with cap. Run engine briefly, check coolant level and add more coolant, if required.

Use clean and well filtered water (potable water quality) with the least possible content of lime. Coolant blended with antifreeze can be retained in the cooling system all year round. Refer to “Fuels, coolants, lubricants, etc.”.

Power steering - oil level

The oil reservoir is filled correctly if the oil level reaches the mark in the oil reservoir.
Hydraulic clutch control and hydraulic brake system – fluid level

The translucent reservoirs are located in the engine compartment, front, left. The fluid level can be determined without unscrewing the cap. The reservoir must always be filled sufficiently. If brake fluid needs to be replenished, have the hydraulic system inspected.

Soiling of air cleaner

If the complete red field is visible in the service indicator, actuate push button to disengage the colored field. Clean or renew filter element.

Batteries – fluid level

The batteries are located below the driver's and assistant driver's seats. The electrolyte level in each cell must be approx. 15 mm (0.6 in) above the upper edge of the plates. Only replenish with distilled water. During the hot season, check battery electrolyte level more frequently.
Windshield washer system – fluid level

The windshield washer reservoir is accessible after opening the engine compartment flap. Add MERCEDES-BENZ windshield washer detergent to the water.

Seat belts

The inertia reel must stop the seat belt unwinding further if the vehicle
- is braked or accelerated
- is cornering
- or when the belt is pulled out quickly.

Inspect belts visually for damage. Renew damaged seat belts.

Inflation pressure and condition of tires

Check inflation pressure on cold tires. The pressure differential of the tires on one axle must not exceed 0,1 bar (1,4 psi). High speed operation or hot weather may increase the tire inflation pressure as much as 1 bar (14 psi). Never bleed any air as the pressure will otherwise drop below specifications. For tire inflation pressure, refer to “Tire pressure chart”.

Engine compartment flap opened
1 Reservoir of windshield washer system
II Starting and shutting off the engine

Adhere to specific measures before starting an engine for the first time after it has been laid up for an extended period. Refer to “Preparing the vehicle for service after storage”.

Shift transmission to neutral (MB automatic transmission selector lever position “P” or “N”). Engage hand brake or service brake.

Insert steering lock key and turn to driving position. The charge indicator light and the "preglowing" indicator light will come on.

When the "preglowing" indicator light goes out, this is an indication that the engine can be started. Turn steering lock key all the way to the right to start the engine.

Before starting again, return key to the stop.

When the engine is at operating temperature the "preglowing" indicator light comes on only briefly and the engine can be started immediately.

When the engine is cold, depress accelerator halfway and turn idle speed adjusting knob to the left to the stop. Release accelerator. At low ambient temperatures (below +32°F/0°C), depress both accelerator and clutch pedal fully while starting the engine.

Release steering lock key after the engine has started, ease off the accelerator and adjust idle speed by means of the idle speed adjuster knob. Check oil pressure warning light immediately after starting. Should the oil pressure warning light fail to go out, shut off engine immediately and determine cause.

Shutting off the engine:

Turn steering lock to position “0”.

For shutting off the engine when the vacuum system is faulty, refer to section 5.7.

The engine should never be shut off at a coolant temperature above normal (in excess of 194°F = 90°C), e.g. after operation in mountainous areas, but should be allowed to idle for about another 1 – 2 minutes.
2.3 Hand brake operation

To release:
Pull lever slightly, depress button in hand brake lever and swing lever downward.

To engage:
Pull lever firmly to the last possible catch.

2.4 Starting the vehicle and shifting gears

Do not set off immediately after the first few engine revolutions!

1. Do not turn on heater until a coolant temperature of 122°F (50°C) is reached.
2. Let the engine idle at moderate speed for a short period of time.
3. Warm up the engine smoothly at medium engine speeds in the lower gear ranges.
4. Demand full engine output only after the operating temperature has been reached.

Engage reverse gear only at engine idle speed and with vehicle at a standstill.

Caution: Immediately after setting off, test brakes (service and parking brakes) on a dry road affording good grip.

The brake is in good working order if the brake action of the wheels is equal and if sufficient deceleration is obtained. Your sound judgement will tell you whether the vehicle is prepared for the road.

There must be no oil or water on the brake linings. If water has penetrated to the brake shoes, apply service brake with light pedal force until the required brake action is restored.

If even only one brake fails to work, stop immediately.
Manual transmission

Shift all gears consecutively in accordance with the shifting pattern.

MB automatic transmission

The automatic transmission facilitates and simplifies the handling of the vehicle.

Operating ranges are selected by means of the selector lever.

Within the selected ranges, the gears are shifted automatically conditional upon driving speed and accelerator position.

Shift to desired driving position only with the engine idling. Release brake only when driving off. If a driving range is selected the vehicle might start off (creeping) prematurely.

Accelerator positions

Partial throttle = immediate upshifting = moderate acceleration.

Full throttle = retarded upshifting = maximum acceleration.

Kickdown: Depress accelerator beyond full throttle pressure point = full throttle downshift = maximum acceleration. The transmission will shift down only if the driving speed is below the maximum speed of the next lower gear.

Selector lever positions

The selector lever permits adaptation of the automatic shifting process to specific operating conditions.

"P" Parking lock. The parking lock is an additional safeguard when parking the vehicle. Engage position "P" only with the vehicle stationary.

"N" Neutral. The engine can be started only with the transmission shifted to position "P" or "N".

No power is transmitted from the engine to the rear axle. With the brakes being released, the vehicle can coast freely. Engage "N" only when the vehicle is stationary or moving at low speed.
"Normal position. All 4 gears are shifted automatically and consecutively. Position "4" affords optimum driving characteristics under almost all operating conditions.

"3" Transmission shifts up to 3rd gear only. Preferably used on moderate uphill gradients to avoid alternate up and downshifting between 3rd and 4th gear and on moderate downhill gradients in order to take advantage of the engine braking effect up to the maximum permissible engine speed in third gear. Refer to marks on speedometer or tachograph.

"2" Transmission shifts up to 2nd gear only. Preferably used on moderate uphill gradients to avoid alternate up and downshifting between 2nd and 3rd gear and on moderate downhill gradients in order to take advantage of the engine braking effect up to the maximum permissible engine speed in second gear. Refer to marks on speedometer or tachograph.

"1" Only 1st gear is at your disposal. Advantageous for the operation on steep uphill gradients and as brake downshifts within the permissible speed range of the 1st gear on steep downhill gradients.

"R" Reverse gear. Engagement and disengagement of reverse gear only with vehicle at standstill and engine idling.

Important notes

When maneuvering the vehicle in limited space, control driving speed by gently releasing the service brake. Apply accelerator only slightly and do not pump the accelerator pedal.

For short stops, e.g. at a bus stop or traffic light, leave selector lever in the driving position and control vehicle with the brake. For extended stops with the engine running, shift to position "P" or "N". On long uphill gradients, particularly in case of heavy loads (operation with trailer), select lower gear range in time.
2.8 Breaking-in

With regard to service life, operational reliability and economical operation of the vehicle it is most important that the engine should not be run to the limit of its output during the break-in period.

Break-in instructions

Up to 2000 km (1200 miles).

Vehicles with manual transmission
Break-in carefully.

Use only ¼ of the admissible maximum speed of each gear (refer to marks on speedometer or tachograph).

Load: without trailer.

Vehicles with automatic transmission
Break-in carefully.

Avoid: high loads (full throttle driving), high engine speeds, no kickdown if possible.
Do not brake by selecting lower speeds.
Load: without trailer.

From 2000 km (1200 miles) on: Increase slowly to top speed.

Wheel mounting bolts or wheel securing nuts

It is imperative that wheel mounting bolts or wheel securing nuts on all new vehicles be re-tightened after 50 km (30 miles).

Disk wheels: Tighten wheel mounting bolts or wheel securing nuts crosswise.

Observe specified tightening torque.
2.6 Driving and braking

Oil and fuel consumption depend largely on driving habits and operational conditions. Increased fuel consumption is a result of trailer operation, driving in the city or over short distances, driving in mountainous areas, accelerating and decelerating the vehicle frequently, etc. For that reason, no accurate consumption figures can be given.

Depending upon the operational conditions, maximum oil consumption is 1% of the fuel consumption.

The drive wheels must always be in firm contact with the ground (especially in off-the-road operations). If the wheels on one side of the live axle are spinning, serious damage to the differential will result because the load on the differential gears will then be excessive.

When driving observe the gauges and control lights on the instrument panel from time to time. The governor on the injection pump limits the maximum engine speed. Travelling downhill, the vehicle determines the engine speed and the governor cannot limit it. In such a case the driver himself must make sure that the engine maximum revolutions are not exceeded in the individual gears. Observe marks on speedometer or tachograph. Negligence may cause damage to engine, injection pump or propeller shafts.

Indicator light – brake fluid and brake pad wear

The indicator light comes on:
1. When the engine is started.
2. When the fluid level in the reservoir is too low.
3. When the brake pads of the front wheel brake are worn.

The fluid level can be too low:
- if the hydraulic system is leaking
- if the brake linings are worn

Have brake system checked immediately!

Test function of indicator light:
- Turn steering lock to driving position
- Depress control pin on the reservoir
Tachograph

Continuously check and improve your driving habits by means of the tachograph diagram. Use only original diagram cards with correct scale. Check function daily.

The more steadily the vehicle is driven the lower is the fuel consumption. Brief bursts of speed will improve the average speed only negligibly.

Explanation of sample graphs:

Uneconomic driving – peaked graph lines.
The vehicle was accelerated, braked down abruptly and reaccelerated rapidly.

Economic driving – rounded graph lines.
The vehicle was accelerated to economic speed. The speed of the rolling vehicle was gradually reduced to zero.
Charge indicator light

If the charge indicator light comes on while the engine is running, stop vehicle, switch off engine and inspect V-belt.
Caution: Do not run engine without a V-belt.

Temperature gauge

Conditional upon the operating conditions and ambient temperature, coolant operating temperature in continuous operation ranges from 158–203°F (70–95°C).

Brief vehicle operation (10 minutes at the most) at a coolant temperature of 212°F (100°C) is permissible. This temperature, however, should not be exceeded.

Braking

When travelling down long downhill gradients, exploit the engine braking effect by shifting into lower gear.

Parking

Apply hand brake when stopping or parking a vehicle on level ground or on downhill gradients. Vehicles equipped with MB automatic transmission: In addition to this, shift selector lever to position “P”.

Safeguard a loaded vehicle or a vehicle parked for an extended period with at least one chock to prevent it from rolling away.

Caution! On uphill or downhill gradients of more than 15 %:
- Secure empty vehicle at front axle with a chock.
- Secure loaded vehicle at rear axle with a chock.

When parking a vehicle at night on public roads in built-up area, switch on parking or standing lights.

Reflector panels can also be used for this purpose if permitted by law.
2.7 Trailer

Vehicle with trailer coupling (ball head)

Secure the trailer so it cannot roll away. Back up vehicle until the drawbar can be engaged in the pintle hook. Engage drawbar and lock.

Vehicle with trailer coupling (coupling jaw)

Extreme care and caution must be used when coupling the trailer.

Prior to the coupling operation, the trailer must be braked and secured by chocks under the wheels and its drawbar must be set to coupling height.

Use caution when handling the drawbar – it may whip!

No one must stand between tractor and trailer when the tractor is backing up!

Following the coupling operation, check the pertinent locking device or indicator (feeler pin or safety button) for proper seating of the trailer coupling bolt. Check fastening bolts of trailer coupling regularly for tight seating and tighten, if necessary. According to manufacturer’s instructions, regularly clean and grease trailer coupling.

Connection of cable: The cable should be routed so that it will yield easily during cornering without kinking or chafing. Before connecting the cable, check the voltage of the consuming units on the trailer.

Caution:

Trailer coupling with detachable ball neck:

Comply with manufacturer’s instructions.
2.8 Winter operation

Corrosion inhibition

The increasing application of thawing salts for clearing snow-covered or icy roads may well be of benefit to roadworthiness, but salts do cause damage to the exposed under-sections of the vehicle and to the units exposed to splash water. Thawing salts are corrosive. Wash the vehicle more often during the cold season to remove adhering thawing salts or deposits of salty splash water from underbody and painted and chromium-plated parts. The vehicle should be regularly inspected for corrosion. Brake, air, and oil lines should be checked with particular care.

As preventive measure, spray vehicle underside with wax-based preservative. If the vehicle is used regularly, repeat treatment with preservative now and then.

Spraying agents formerly used such as petroleum, diesel oil, diluted used oil, etc. must not be used any more, since they might soften or dissolve the corrosion inhibitor previously applied.

Engine oils

Change the engine oil at the onset of the cold season. As replacement use an engine oil of the specified SAE grades (viscosity range). Refer to "Fuels, coolants, lubricants, etc.".

Lubrication

Chassis and brake system suffer particularly from the influence of snow and snow sludge. Timely and thorough cleaning and greasing, especially of the brake linkage joints and yokes, of the brake units and the trailer coupling will contribute to avoid premature wear and increase roadworthiness.
Coolants

Winter operation without antifreeze is dangerous and should be avoided at all costs.

Antifreeze can be retained in the cooling system all year round. Check its effectiveness with a hydrometer prior to and frequently during the cold season.

Refer to “Fuels, coolants, lubricants, etc.” for brands of antifreeze and mixture ratios.

Diesel fuel

Winter grade diesel fuel of a sufficient fluidity is to be used during prolonged cold periods.

As an exception, kerosene may be added to the diesel fuel if no winter diesel fuel is available or if the ambient temperature drops below +5° F (-15° C). Refer to “Fuels, coolants, lubricants, etc.”.

General driving instructions

Do not set off immediately after the first few engine revolutions! Idle the engine for a short period at moderate speed. Then warm up engine at a moderate speed and by driving smoothly in lower gears, avoiding high engine load, until the normal operating temperature of 158 to 203° F (70 to 95° C) is attained. Engine may be run at full speed only after this temperature has been reached.

In winter, use only tires whose treads afford good grip. If the drive wheels start spinning, try to get on firm ground immediately.

On slush and ice covered roads, put chains on the rear wheels. Refer to manufacturer’s mounting instructions.
3 Fuels, coolants, lubricants, etc.

3.1 Diesel fuels

Diesel fuels should meet the minimum requirements of DIN 51601 or such international specifications as the American ASTM D 975 No. 1-D and No. 2-D as well as VV-F-800 a DF-A, DF-1, DF-2 and the British B.S. 2869 A1, or even A2 in cases of emergency.

All branded diesel fuels commonly sold in Central Europe meet these requirements.

Change engine oil as under severe operating conditions if diesel fuels are used whose sulphur content exceeds 0.5 % by weight. Marine diesel fuel, heating oil or the like must not be used.

When fuel is filled from barrels, it should be passed through a filter, a piece of chamois leather or even a clean flannel cloth, inserted into the filler neck. The suction port of the pump must be protected by a fine-meshed strainer. Always allow a gap between the end of the suction tube and the bottom of the barrel to prevent deposits (dirt, sludge, water) from being sucked up.

If diesel fuel has been spilt, the affected spots can be cleaned by using a mixture of 25–50 % vinegar and 75–50 % water (depending on the degree of contamination). This will help to get rid of the offensive odor.

### Diesel fuels at extremely low temperatures

At very low temperatures the fluidity of diesel fuel may become insufficient due to paraffin separation. To avoid malfunctions, diesel fuels of a lowered cloud point are marketed during the cold season.

If winter diesel fuel is used, there will hardly be any malfunctions at ambient temperatures reaching as low as 5°F (−15°C).

Varying with the temperature add a certain quantity of kerosene\(^1\) if only summer diesel fuels or less cold resistant winter diesel fuels are available or if temperatures drop below 5°F (−15°C).

<table>
<thead>
<tr>
<th>Ambient temperature °F (°C)</th>
<th>Summer diesel fuel %</th>
<th>Supplementary fuel %</th>
<th>Winter diesel fuel %</th>
<th>Supplementary fuel %</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 to 14 ( 0 to −10)</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>−</td>
</tr>
<tr>
<td>14 to 5 (−10 to −15)</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>−</td>
</tr>
<tr>
<td>5 to 8 (−15 to −20)</td>
<td>−</td>
<td>−</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td>− 4 to −8 (−20 to −22)</td>
<td>−</td>
<td>−</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

Should gasoline have to be added in case of emergency, never exceed a proportion of 30 %. Premium fuels must not be used.

Caution: The lower flash point of the supplementary fuels increases the danger of explosions.

The engine output may drop according to the proportion of supplementary fuel. For this reason, keep percentage of fuel added to the minimum necessitated by the ambient temperature.

\(^1\) The use of kerosene in road vehicles is not permitted in some countries, e.g. UK. Therefore consult the authorities before such mixtures are used.
3.2 Engine oils

The suitability of the various engine oils is specially tested in our engines. For this reason, only use engine oils which have been recommended by our company.

MERCEDES-BENZ service stations have all the information on recommended brands.

Caution!
In order to ensure sufficient lubrication of the moving parts, select engine oil viscosity (SAE grades) according to ambient temperature.

Uncompounded engine oils must not be used!

The MERCEDES-BENZ factory or your service station fills a new or a reconditioned engine with an initial operation oil. This is a high quality oil which was specially developed for the operating conditions during the first 500 to 1500 km (300 to 900 miles).

If the oil level reaches the minimum mark on the dipstick before the inspection (500-1500 km [300-900 miles]), the engine may be topped up with recommended engine oil if no initial operation oil is available.

<table>
<thead>
<tr>
<th>Ambient temperature in °C</th>
<th>Viscosity range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>SAE 40 (0W-40)</td>
</tr>
<tr>
<td>20</td>
<td>SAE 10W-40 (10W-40)</td>
</tr>
<tr>
<td>30</td>
<td>SAE 15W-40 (15W-40)</td>
</tr>
<tr>
<td>40</td>
<td>SAE 20W-50 (20W-50)</td>
</tr>
<tr>
<td>50</td>
<td>SAE 30 (30)</td>
</tr>
</tbody>
</table>

SAE 40 oil may be used at ambient temperatures continuously above +86 °F (+30 °C).
3.3 Coolants

Cooling water

In the factory the cooling water is blended with antifreeze (protection down to \(-20\,^\circ\text{C} / -4\,^\circ\text{F}\)) throughout the year. Antifreeze reduces the formation of scale and corrosion.

If antifreeze is not required, 1\% (10 cm\(^3\)/liter) of recommended corrosion inhibitor must be used to treat the cooling water (potable water quality).

Information regarding recommended corrosion inhibitors and antifreezes may be obtained from any MERCEDES-BENZ service station.

Antifreeze

Winter operation without antifreeze is very dangerous and therefore prohibited. If the antifreeze has been in the cooling system all year, check for sufficient protection. The antifreeze solution must be drained from the system and renewed after a maximum period of two years.

The efficiency of the antifreeze solution decreases at a higher percentage.

Mixing ratio

<table>
<thead>
<tr>
<th>Protection to (\text{°F} / \text{°C})</th>
<th>Water</th>
<th>Antifreeze</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-4) / (-20)</td>
<td>66</td>
<td>34</td>
</tr>
<tr>
<td>(-22) / (-30)</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>(-40) / (-40)</td>
<td>49</td>
<td>51</td>
</tr>
</tbody>
</table>

The cooling system may need degreasing, descaling and flushing prior to the use of antifreeze.

Do not add any more than 60\% of antifreeze.
4 The vehicle, service and maintenance

Like any other technical equipment, the vehicle requires service and maintenance. Scope and frequency of the service work depend mainly on operating conditions which, in turn, may vary to a considerable degree.

More frequent maintenance and grease jobs are required under severe operating conditions.

Preventive maintenance work and jobs required for the retention of the operational reliability are itemized in the enclosed Maintenance Booklet.

Special skills are required for inspections and maintenance work. They cannot be taught within the scope of these instructions. It is recommended to have these jobs performed by the trained personnel which is at your disposal in the large number of MERCEDES-BENZ service stations.

Expert service is guaranteed by experience and regular technical instructions from the factory, by workshop equipment and service tools.

The MERCEDES-BENZ service station certifies the jobs carried out in the Maintenance Booklet.

A small sticker, attached to the door post of the driver’s door by the MERCEDES-BENZ service station, is a reminder of the coming service or maintenance work.

Should any service and maintenance jobs have to be carried out on a do-it-yourself basis for organizational reasons, drain oil, fuel or coolant into a trough or something similar and not into the drain or on the ground (environmental pollution). Operate stationary engine no longer than necessary. When working on the vehicle, adhere to safety regulations.

Floor jacks, lifting platforms or jack stands may be positioned only under the front axle, below the rear axle housing and/or rear axle support tubes underneath the springs.

Position two-pillar lifting platforms at the specified frame supporting points. Before lifting the vehicle, clamp it to the support arms of the lifting platform.

Vehicles which do not correspond to standard specifications with respect to wheelbase, length of overhang, permissible axle loads and special structures over front and rear end must not be lifted up with a dual post lifting platform. In addition to this special regulations must be complied with. Any MERCEDES-BENZ service station will advise you accordingly.

For lubrication use only high pressure
Grease guns not exceeding a maximum pressure of approx. 400 bar (5680 psi).

Grease guns without safety devices may damage bearings, ball joints, seals, etc.

Carefully clean lubrication nipples prior to the lubrication service and drain plugs before unscrewing them.

Depending on the operating conditions, grease more frequently propeller shafts and steering knuckle pins.

Lubricate special bodies and equipment in compliance with manufacturer's instructions.

MERCEDES-BENZ special tools required in addition to commercially available tool kits and torque wrenches to work on the vehicle can be obtained from the spare parts department of any MERCEDES-BENZ service station.

All MERCEDES-BENZ service stations store the MERCEDES-BENZ original spare parts required for maintenance and repair work. Besides this bases are provided all over the globe intended to ensure the rapid supply of MERCEDES-BENZ original spare parts.

More than 200,000 different spare parts, even for rather old vehicle models, are furthermore stocked in the central plant warehouses.

We guarantee maximum operational efficiency and reliability as well as optimum retention of the vehicle value when MERCEDES-BENZ original spare parts are installed, as they are subjected to most severe quality inspections. Each part has been specifically developed, manufactured or selected for and adapted to MERCEDES-BENZ vehicles.

For this reason, only MERCEDES-BENZ original spare parts should be installed.

The vehicle has been provided with a standard cavity wax protection in the works. In order to retain the vehicle value we strongly recommend that you repeat this preservation procedure in the course of the first year of operation. Any MERCEDES-BENZ service station will readily advise you accordingly.
4.1 Engine

4.1.1 Oil and filter change

The filter element must be renewed at every oil change.

Fill engine with oil. Start engine and idle for a short while. Observe oil pressure gauge indicator lamp. The indicator lamp must go out after a few seconds. Shut off engine.

Check oil filter and oil drain plug for leaks.

Check engine oil level and top up oil to the upper dipstick mark.

Note: An initial operation filter element is installed by the factory and must be replaced at the time of the first oil change after 500 to 1500 km (300 to 900 miles). Oil change should be performed after a long distance drive, while the oil is still hot and thin.

Prior to removing the oil filter, place oil catch pan under oil filter. Loosen, but do not unscrew oil filter cover securing nuts. Pull off cover from oil filter housing in order that the oil may drain. Unscrew securing nuts and remove cover. Replace filter element and all sealing rings. Position cover while paying attention to proper seating of the gasket and tighten nuts. Observe tightening torque.

Before in and tighten oil drain plug.
4.1.2 Inspecting and servicing air cleaner

Check filter element soiling at maintenance indicator regularly.
Normally weekly inspections will do; in case of heavy dust accumulation, check daily.

Inspection:
If the complete red field is visible in the service indicator, actuate push button to disengage the colored field. Clean or renew filter element.

Servicing
1. Loosen center bolt of the filter bowl and detach it with filter element.
2. Take out filter element and clean filter bowl.
3. Cover up the inner space of the filter element. Blow compressed air with a maximum pressure of 5 bar (71 psi) along the outside in direction of the folds. Then blow out the inner space carefully.

Should this cleaning process prove inadequate, the filter element can also be washed.
To do this adhere strictly to the following safety measures.
Use filter manufacturers' detergents.
Any MERCEDES-BENZ service station will offer you advice. If no such detergent is available, a non-foaming household detergent may be used.

Caution:
Filter manufacturers' detergents have a strong degreasing effect. Protect your hands with rubber gloves or skin protection cream. Never apply lyes or hot fluids.
4. Soak filter element for 10 minutes in a cleansing solution of approx. 40°C (104° F). Then swirl in solution for about 5 minutes and rinse in clean water until clear water drops off. Shake the filter firmly and allow to dry in a dust-free room (max. temperature 60°C / 140°F). Install element only if thoroughly dry.
5. Clean gaskets of filter element and sealing faces in filter housing.
Renew damaged element.
7. Mark number of times cleaned on face of filter element.
8. Replace filter bowl with filter element to the filter housing and retighten center bolt.
Renew filter element after 3 cleaning jobs or after 2 years at the latest.

Caution:
Dust deposits in the air intake ducts indicate a leak in the intake system which must be eliminated at once.
4.1.3 Removal and installation of cylinder head cover

Clean soiled cylinder head cover.

Pull off crankcase vent line. Disengage throttle linkage. Detach oil filter neck. Unscrew securing nuts and remove cylinder head cover. Check gasket for damage and replace if necessary.

Ensure correct seating of gasket when installing it.

Adhere to the tightening torque of the securing nuts.

4.1.4 Adjusting valve clearance

Using a feeler gauge, measure valve clearance between rocker arm sliding surfaces and the camshaft on the cold or hot engine. The cam lobe must then point upward. Crank engine at the crankshaft in direction of rotation (not at the camshaft).

Use special tools for valve adjustment.

Place counterholding wrench on the hexagon of the valve spring retainer to prevent the valve from rotating. Slacken hex nut on valve counterholding the cap nut. Adjust valve clearance by rotating the cap nut. Lock cap nut by tightening the hex. nut and verify valve clearance once more. For valve clearance, refer to "Technical data".

If there is no need to readjust the valve clearance, check tightness of the cap nuts and hex. nuts.

Caution: Check contact surfaces of the hex. nuts. Replace heavily worn hex. nuts together with cap. nuts.

Minimum height of hex. nut: 5 mm (0.2 in).
4.2 Fuel system

The injection pump is connected to the engine oil cycle and requires no maintenance.

It has been set at the factory for optimum efficiency and most economical fuel consumption. An inspection of the injection pump and the adjustment of the start of delivery must be performed at a MERCEDES-BENZ service station only.

Dirt accumulations in the fuel system will result in malfunctioning of injection nozzles and cause black exhaust smoke and erratic engine operation.

A defective nozzle must be replaced or cleaned. Special skills are required for this job and it should only be performed at a MERCEDES-BENZ service station.

New injection lines must be thoroughly cleaned prior to installation. Blow them out with cleaning solution (diesel fuel).

4.2.1 Fuel prefilter

Regularly check fuel prefilter for soiling (visual inspection). Replace, if required.

Caution: The arrow on the filter housing must point in driving direction.

4.2.2 Replacing the fuel filter

Unscrew securing screw of filter and remove filter. Replace sealing ring of securing screw and install a new filter. Finally bleed fuel system.
4.2.3 Bleeding the fuel system

A completely bled fuel system is imperative for the perfect operation of the engine. Under operating conditions, continuous bleeding is ensured through the overflow line. After any repairs to the fuel system or in the event of driving until the fuel tank is completely empty, the entire system must be bled manually.

Actuate the primer pump until the overflow valve on the injection pump opens (rattling noise). To operate the primer pump, release the handle first (by turning it counter-clockwise). Always screw in again after use.
4.3 Cooling system

**Caution:** Keep air intake free.
Do not attach any posters, badges or other trim in the region in front of the radiator.
The cooling temperature is controlled by one thermostat.
The gradual rise of the cooling temperature above the usual level indicates a failure in the cooling system.
The cause may be lack of cooling water, a clogged radiator, slack V-belts or a faulty thermostat.
Check cooling and heating system for leaks at regular intervals and renew hoses, if required.
Radiator hoses and heater hoses should be replaced by new ones when they have been in use for an extended period of time (approx. four years).
Use only tested and recommended hose material and hose clamps.

4.3.1 Draining coolant and filling system with coolant

**Draining:**
1. Remove cap of cooling water expansion tank.
2. Open heater control valve.
3. Remove drain plugs.
They are located:
- at the bottom section of radiator;
- on the right hand side of engine.
After having drained the coolant, check whether the drain ports are restricted by residual matter. Seal drain ports.

**Filling with coolant:**
If possible, replenish coolant only if the coolant temperature in the system is less than 122° F (50° C).
Replace cap of coolant expansion tank.
Operate engine until operating temperature is reached (thermostat has opened).
Shut off engine and replenish coolant.
4.3.2 Cleaning the cooling and heating systems

Cleaning the radiator

Blow out the radiator core from the engine side with compressed air or a jet of water until the radiator fins are freed from foreign particles (dust, insects, etc.).

4.3.3 V-belts

Testing V-belt tension

Use "Krikit" tester

1. Lower feeler arm in tester.
2. Position tester in the middle between two pulleys. The stop must contact the side of the V-belt.
3. Continuously press the push button at right angles to the V-belt until the crack spring can be felt or heard to disengage. Discontinue pressure as otherwise measuring data are incorrect.
4. Carefully lift off tester without altering the feeler arm position.

5. Read off the V-belt tension at the intersection of the "KG" scale and the feeler arm.
   Specified value for used V-belts
   V-belt section width:
   12,5 mm = 40–45 on "KG" scale

6. Correct V-belt tension, if required.

Tensioning V-belts

Alternator V-belt:

1. Slacken securing screws.
2. Turn tensioning screw until the specified value is achieved.
3. Retighten securing screws.
Power steering pump V-belt:

1. Slacken securing screws and counter nut.
2. Turn tensioning screw until the specified value is achieved.
3. Retighten securing screws and counter nut.

Renewal of V-belts

Only use tested and recommended V-belts.

1. Check V-groove faces of pulley, remove rust and dirt.
2. Release tensioning screw until the V-belt can be slipped on.

3. Turn tensioning screw until the specified value is achieved.

Specified value for new V-belts
V-belt section width
12,5 mm = 50 on “KG” scale

4. Check V-belt tension once more after running engine for 10-15 minutes.

Specified values for used V-belts must be attained.

If in exceptional circumstances no tester is available, tighten new V-belt temporarily.

The V-belt must not deflect by more than approx. 6 mm (0.24 in) from a straight line when subject to thumb pressure.

Correct V-belt tension to specified value for used V-belts as soon as possible.
4.4 Clutch

The clutch is adjusted automatically. Basic adjustment of the clutch control mechanism is for example necessary after the pedals have been worked on or after the renewal of the master cylinder.

This adjustment requires special skills and should only be performed at a MERCEDES-BENZ service station.

4.4.1 Hydraulic sections of clutch and brake systems – checking fluid level

The translucent brake fluid reservoir is located on the front LH side of the engine compartment.

Function of the indicator light can be tested.

- Turn steering lock to driving position.
- Depress control pin on reservoir.

If brake fluid needs to be replenished, check hydraulic system for leaks and check thickness of brake linings.

Always screw on cover of reservoir tightly.
4.5 Transmission

4.5.1 Manual transmission

4.5.1.1 Oil level check and oil change

Prior to unscrewing the screw plug, carefully clean its vicinity. Change oil immediately after an extended trip while it is still hot and thin.

Clean oil drain plug.

Oil level check: The oil level in the correctly filled transmission reaches the lower edge of the filler hole in the transmission housing. Add oil through the filler hole, if required. If the oil level is checked with the transmission at operating temperature, do not allow any emerging oil to drain.

Draining oil: Unscrew oil drain plug and oil filler plug.

Filling with oil: Pour oil through the filler hole in the transmission housing until the level reaches the lower edge of the filler hole.

4.5.1.2 Cleaning breather

Clean exterior of breather on transmission housing as otherwise oil loss may be caused by the pressure built up in the transmission housing.

4.5.2 MB automatic transmission

Engage parking brake and move selector lever to gearshift position "P" when working on a vehicle with automatic transmission whose engine is idling.
4.5.2.1 Oil level check

Vehicle has to be on level ground when oil level is checked.

Prior to the oil level check, allow engine to idle for approx. 1–2 minutes. Check oil level by means of dipstick while the engine is running.

Observe painstaking cleanliness. To wipe the dipstick, do not use woolen fabric (buff). Replenish oil only through a fine-mesh strainer. Even minor impurities may cause malfunction.

The oil level in the transmission fluctuates with the oil temperature. With the transmission at operating temperature (194°F = 90°C) the oil level must be somewhere between the lower and the upper dipstick marking. Do not fill above upper marking. If the transmission is cold (68–86°F = 20–30°C) the maximum oil level is approximately 35 mm (1.3 in) below the dipstick minimum marking.

4.5.2.2 Oil and filter change

Change oil immediately after an extended trip while it is still hot and thin.

To drain the oil from the transmission:
- Unscrew securing screw of oil filler neck and drain oil.
- Drain oil from torque converter:
  - Turn crankshaft until the drain plug of the torque converter appears in the opening of the torque converter housing. Back off drain plug. Drain oil. Renew seal rings.
- Screw in and tighten drain plug. Observe tightening torques.

Filter change: Remove and clean transmission oil pan. Renew filter.

Check oil pan gasket for damage and renew if required. Attach oil pan.

Screw on oil filler neck with securing screw and new seal rings.

Observe tightening torques.

Filling with oil: First pour in 4 liters of oil through the oil filler pipe. Secure vehicle to prevent it from rolling away.
Start engine and run it at idle. Selector lever in position “P”.

Pour in the rest of the oil while the engine is running. Shift all gears and return selector lever to neutral position (“P”).

Inspect oil level while the engine is operating. Add oil, if necessary. Check transmission and lines for leaks.
4.6 Rear axle

4.6.1 Oil level check and oil change

Prior to unscrewing the screw plug, carefully clean its vicinity. Change oil immediately after an extended trip while it is still hot and thin.

Oil level check: The rear axle is filled correctly if the oil level reaches the lower edge of the filler hole in the differential.

Add oil through the filler hole, if required.

Should the oil level be checked with the rear axle warmed up, do not allow any emerging oil to drain.

Draining oil: Unscrew oil drain plug and oil filler plug.

Filling with oil: Pour oil through the filler hole in the differential until the oil level reaches the lower edge of the filler hole.

1 Filler hole – oil level
2 Oil drain plug
4.7 Steering

For safety reasons, perform maintenance jobs at regular intervals.

This adjustment requires special skills and should only be performed at a MERCEDES-BENZ service station.

4.7.1 Checking the steering linkage

Drag link ends and tie rod ends must be periodically checked for excessive play or looseness. Lift front axle. The balls must rest in their sockets without play. Socket caps and seals must be tight and undamaged.

Check all bolts and nuts for tight seating.

4.7.2 Checking steering free play

Manual steering

Should there be any free play in the steering, have the steering system adjusted at a MERCEDES-BENZ service station immediately.

Power steering

Play in the steering should only be checked when the engine is running.

When the engine is not running (hydraulic system of the steering assembly is inoperative), the play verified would be inaccurate (excessive).

The wheels must start moving when the steering wheel is turned approx. 30 mm (1.2 in). If they do not move, have steering gear and linkage inspected by a MERCEDES-BENZ service station.
4.7.3 Checking oil level

Manual steering

LHD vehicles
Turn steering wheel all the way to the left.

RHD vehicles
Turn steering wheel all the way to the right.

Clean area around screw plug before unscrewing the plug! When the steering gear is correctly filled, the oil level is

35–45 mm (1.4–1.6 in) from the upper edge of the filler hole.
No oil change is required.

Power steering

Regularly check the oil level in the power steering reservoir. The correct oil level reaches the reservoir marking.
No oil change is required.

4.7.4 Checking the toe-in

For all measurements on the front axle, position vehicle on a perfectly level surface. The tires must be inflated to equal pressure. Looseness in wheel bearings, tie rod ends and drag link ends must not be tolerated. The toe-in may be checked on an empty or loaded vehicle.

To measure toe-in (steering in straight-ahead position), mark measuring points on the rim flange in front of the axle at wheel center height, using chalk or colored pencil.

Measure the distance between these two points.

Move the vehicle backwards or forwards to wheel rotation and measure the distance between the two points which are located behind the front axle.

The difference in measurement between the distance of the two points before and after the wheel rotation is the amount of toe-in.

Vehicles with straight tie rod:
After having loosened the clamping sleeves, the tie rod can be adjusted infinitely.

Vehicles with offset tie rod:
Toe-in is adjusted by pushing one end of the tie rod out of the steering arm by means of a pusher (special tool).

Observe specified torque to which the nuts have to be retightened.
4.8 Wheels and tires

4.8.1 Spare wheel location

Spare wheel below cargo body:
Unscrew the securing screws. Remove spare wheel from the side and unscrew spare wheel from carrier.

Spare wheel below chassis frame end:
3. Lower spare wheel carrier. Unscrew securing screw and remove spare wheel.
4.8.2 Wheel change

Caution: When wheels are changed, specified tire load capacities and tire pressures must be observed (refer to "Tire pressure chart").

Make sure the vehicle cannot roll off.

Positioning the jack at front end:
Under the pertinent spring, directly in front of the front axle.

Positioning the jack at rear end:
At rear axle support tube, under no circumstances under the differential housing.

Do not damage the threads on the bolts when removing or installing the disc wheels.

Before disk wheels are positioned, remove rust and dirt from contact surfaces of brake drums, rims and wheel mounting bolts or securing nuts.

Apply some graphite paste to bolts in order to avoid "jamming" of the wheel mounting bolts or wheel securing nuts.

Prior to positioning the inner wheel (twin wheels), make sure all spherical rings are properly seated. After having positioned the outer wheel, screw in and tighten two to three wheel stud nuts together with spherical spring washers. Make sure wheel is correctly centered (wheel bolts exactly in the center of the disk wheel holes).

Position and tighten remaining spherical spring washers and wheel stud nuts.

For the tightening of the wheel mounting bolts or securing nuts, refer to section 2.5.

The wheel mounting bolts or securing nuts of a changed wheel must be checked after 50 km (30 miles) and retightened, if necessary. Thereafter periodic inspections will do.

Wheel mounting bolts or securing nuts are to be tightened crosswise.
4.9 Brake system

4.9.1 Checking the brake lines

Inspect brake lines for leaks and good condition periodically. Brake lines must be replaced if signs of corrosion (pitting), chafing, crushing etc. are visible. Brake lines showing even minor damage must be replaced.

Commercial vehicles designed to haul chemicals and acids are particularly jeopardized by brake line corrosion. Besides vehicles intended for the transportation of cement, lime, animals and hides this category includes brewery vehicles and similar.

4.9.2 Checking brake lining thickness

Front wheel brakes (disk brakes)

Minimum lining thickness: 2.0 mm (0.8 in). When minimum lining thickness is reached, replace brake pads immediately.

For a closer inspection of the brake linings, detach front wheels and remove brake pads.

Check lining thickness through one of the openings in the disk wheels (use a light for visual inspection). Rotate disk wheels if required.

This adjustment requires special skills and should only be performed at a MERCEDES-BENZ service station.
**Rear wheel brake** (drum brake)

Thickness of rear wheel brake linings must be regularly checked through the inspection holes (inner side of wheel - brake anchor plate).

The brake linings must be replaced as soon as they are worn to minimum thickness.

Minimum thickness: 3 mm (0.12 in)

For a careful check of the brake shoes and linings, remove the brake drums.
Simultaneously make sure that the brake shoes pivot freely around their anchor pins.
This adjustment requires special skills and should only be performed at a MERCEDES-BENZ service station.
4.9.3 Hydraulic sections of clutch and brake systems – checking fluid level

The translucent brake fluid reservoir is located on the front LH side of the engine compartment.

The fluid level can be checked without screwing off the cap. The reservoir must always be sufficiently filled.

Do not fill above upper marking (maximum marking).

The indicator light on the instrument panel comes on if the fluid level in the reservoir is too low.

Function of the indicator light can be tested.

Turn steering lock to driving position.

Depress control pin on reservoir.

If brake fluid needs to be replenished, check hydraulic system for leaks and check thickness of brake linings.

Always screw on cover of reservoir tightly.

Use only tested and recommended brake fluid brands for replenishment or renewal.

Observe boiling point (DOT 4).

Replace brake fluid once a year, most suitably in spring.

A small sticker, attached to the door pillar of the driver's door by the MERCEDES-BENZ service station, is intended to serve as a reminder when next to replace the brake fluid.
4.0.4 Bleeding the brake system

The presence of air in the system is indicated by a springy, spongy feeling of the brake pedal. The brake (hydraulic system) will then have to be bled immediately.

Add brake fluid during the bleeding operation so as to ensure that the reservoir is always filled to three quarters of its capacity. Bleed brake system with a bleeding device or by hand in the following order:

- Remove dust cap from the respective bleed screw.
- Connect bleeder hose.
- Place hose end in a jar half filled with brake fluid.
- Depress brake pedal until resistance can be felt. Retain pedal in this position.
- Back off bleed screw by approx. 1/4 revolution.
- Continue depressing the pedal to the stop.
- Retain pedal in this position and allow brake fluid to flow out.
- Turn in bleed screw and release brake pedal.

Repeat this sequence until the brake fluid emitted from the hose is free of bubbles.
- Remove bleeder hose, install dust cap.
- Correct brake fluid level.

Bleeding the hydraulic brake system deserves your special attention because it is of paramount importance to the road-worthiness of the vehicle.
4.10 Electrical system

4.10.1 Three-phase alternator

Due to major differences in the operating characteristics of the three-phase alternator and the DC generator, the following points have to be observed:

1. The three-phase alternator must never be disconnected from the batteries while the vehicle is in operation. As long as the engine is running, neither an alternator cable, nor a battery terminal may be loosened, removed or wrongly connected.

2. Tow-start the vehicle only with the batteries connected.

3. Only after positive and negative cable terminals have been removed from the terminal posts may the batteries be charged by means of a rapid charger.

4. For welding jobs with the electric welder, directly connect the ground terminal to the part to be welded. Detach positive and negative battery terminal clamps.

5. Repairs and inspections on the alternator are to be performed by the skilled staff members of a MERCEDES-BENZ service station only.

4.10.2 Fuses

All points of connection must be in positive contact with each other. For return of the current, make sure all power consuming units are well grounded.

Damaged cables must be insulated by means of insulating tape. Faulty fuses must be replaced instead of repaired. An additional set of fuses and bulbs should always be carried in the vehicle for emergencies.

Be sure to remove the cause of a burnt out fuse prior to replacing the fuse.

Prior to performing work on the electrical system, the negative (−) battery terminals must be disconnected from the battery posts. Objects liable to conduct electricity (tools) must not be put on top of the batteries because they might cause shorts.
Fuse box I

<table>
<thead>
<tr>
<th>No.</th>
<th>Consuming unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High beam, left, high beam indicator light</td>
</tr>
<tr>
<td>2</td>
<td>High beam, right</td>
</tr>
<tr>
<td>3</td>
<td>Low beam, left</td>
</tr>
<tr>
<td>4</td>
<td>Low beam, right</td>
</tr>
<tr>
<td>5</td>
<td>Parking light, left, tail light, left, instrument panel lighting</td>
</tr>
<tr>
<td>6</td>
<td>Parking light, right, tail light, right</td>
</tr>
<tr>
<td>7</td>
<td>Hazard warning flasher switch, interior light, clock</td>
</tr>
<tr>
<td>8</td>
<td>Horn, stop light switch</td>
</tr>
<tr>
<td>9</td>
<td>Turn signals, windshield wiper, oil pressure warning light, brake fluid indicator light</td>
</tr>
<tr>
<td>10</td>
<td>Blower, temperature gauge, fuel gauge</td>
</tr>
</tbody>
</table>

Fuse box on RH side below the instrument panel

1. Locking handle
   Turn to open

1-10 Fuses
4.10.3 Checking the headlight alignment

Correct headlight aiming is of paramount importance to roadworthiness. Periodic checks with a headlight aimer should therefore be made.

Each headlight must be checked individually. The other headlight and the other exterior lights must be covered up for this process.

Loaded vehicle:

The bright/dark borderline of the low beam is determined by subtracting 10 cm (4 in) from the headlight horizontal centerline (distance between headlight center and ground) with a vehicle positioned in such a way that the headlights are 10 m (32.8 ft) from the aiming screen.

Unloaded vehicle:

(Loaded with 1 driver or 75 kg = 165 lbs).

On vehicles equipped with headlight beam control, turn beam control knob to initial position.

The bright/dark borderline of the low beam is determined by subtracting 30 cm (12 in) from the headlight horizontal centerline (distance between headlight center and ground) with a vehicle positioned in such a way that the headlights are 10 m (32.8 ft) from the aiming screen.

4.10.4 Headlight bulb replacement

Turn left and detach cap of headlight cowling. Disconnect electrical connector, unlock bulb holder from its bayonet lock by depressing and turning it counterclockwise. Remove two-filament bulb with socket. Do not touch the new bulb with moist or oily fingers but use tissue paper. Install the lamp in such a way as to ensure the insertion of the two bulb socket guide lugs into the notches on the reflector neck. Put on lamp holder and depress and turn it clockwise for engagement. Connect the electrical connector, position cap and fasten by turning to the right.

Then check headlight adjustment.

For bulb specifications refer to "Technical data".
4.10.5 Battery care

Clean batteries only with the plugs screwed in. No gasoline, benzol, kerosene or similar should be used for cleaning. Lightly coat terminals with acid-proof grease, particularly clamp underside. Vent holes in the plugs and/or cell ventilation hoses must not be plugged. No metal objects should be placed on the batteries (danger of short circuit). Battery visual inspections must never be performed with naked lights because the formation of oxy-hydrogen gas might create the danger of an explosion. Only use electric lights.

The electrolyte level in each cell should be approx. 15 mm (0.6 ft) above the plate upper edge. Replenish only with distilled water. Water evaporates while the battery is charged during vehicle operation. No metal funnels must be used for replenishment. The electrolyte specific gravity gives a rough indication of the battery state of charge. Replace drained electrolyte by chemically pure battery acid of the like specific gravity. The charging current should not exceed 1/10 of the battery capacity. The battery can be considered charged as soon as all cells produce gas uniformly and vigorously.

Caution: Be sure to check the electrolyte level at least once every week in summer and in hot areas.
4.11 Vehicle cleaning and care

Use an ample supply of water to wash the vehicle. Do not wash it in strong sunlight. Use dry cleaning gasoline (not automotive fuel) to remove grease stains. Do not apply crude oil or grease to the synthetic resin finish since such agents will quickly destroy the protective film on the finish.

Do not clean lenses of turn signal and tail lights with nitro thinner but use cleaning gasoline.

For cleaning steering wheel, gearshift lever, soiled upholstery and floor covering in the cab, use only warm water with dish washing detergent or washing powder for delicate fabrics. Do not use scouring agents. Use dry cleaning gasoline to remove grease stains in the upholstery.

Clean seat belt webbing with lukewarm water and soap. Do not apply any chemical cleaning agents. Do not dry the webbing at temperatures above 176° F (80° C) or in direct sunlight. Never bleach or re-dye the webbing.

Apply some talcum to window weatherstrips and door rubber seals.

Have the chassis thoroughly cleaned and inspected prior to the performance of major maintenance work.

After cleaning the vehicle, especially if steam cleaners or grease solvents were used, lubricate chassis according to the Maintenance Booklet.

All vehicle components are exposed to mechanical action (flying stones, gravel) and chemical reactions (melting snow, thawing salts). Have damage repaired and corroded spots eliminated as soon as possible. Repair paintwork and apply underseal.

Perform necessary welding prior to the application of corrosion inhibitor.

The use of aerosols, such as kerosene diesel oil and the like, should be discontinued. Information on tested and recommended anti-corrosion compounds can be obtained from any MERCEDES-BENZ service station.

Brake hoses must never be painted or cleaned with gasoline, benzol, kerosene or mineral oils. Clean hoses only with water. Be sure not to apply any sprays or grease to the brake hoses when spraying or lubricating the vehicle.
4.12 Preparing the vehicle for storage

- Thoroughly clean the interior and exterior of the vehicle and park it in a dry and airy garage.
- Grease all lubricating points in accordance with specifications in the Maintenance Booklet.
- Increase tire pressure by approx. 2 bar above the specified level to prevent flat spots on the tires.
- Cover up tires to protect against sun rays.
- Fill up fuel tank completely.
- Check coolant for antifreeze content. If the vehicle is operated without antifreeze in the coolant (e. g. in tropical zones), it will do to add 1% anticorrosion oil.
- Check paintwork for damage and repair.
- Spray chassis with underseal and repeat body cavity protection with wax-based compound provided this has not been done yet.
- Should the vehicle be laid up for an extended period, spray paintwork and chromium-plated parts with wax intended for outer skin protection.
- Position wheel checks to prevent the vehicle from rolling away.
- Release hand brake.

Regularly service batteries which are not in use. Coat terminal posts with acidproof grease. Recharge batteries once a month or charge continuously with 0.06 A. Discharge and recharge every 3 months. Check electrolyte level. Battery service life, however, is limited, no matter how well batteries are serviced.

Drive vehicle every 3 months for approx. 1 hour. If this cannot be done, run engine at moderate speed for approx. 1 hour. Operate supplementary heater and air conditioning system for approx. 10 minutes.

Engine, fuel system etc. can also be preserved for extended periods. Every MERCEDES-BENZ service station will readily advise you.

Change engine oil and filter according to Maintenance Booklet specifications. Should the 500-1500 km/300-900 miles inspection have not been carried out yet use initial operation oil.
4.13 Preparing the vehicle for service after storage

The following points must be observed when a laid-up vehicle is put back into service:

- Inflate tires to specified pressure.
- Renew brake fluid if it has not been replaced for one year or if the storage period of the vehicle is unknown.

Should the engine have been preserved, perform special depreservation measures. Every MERCEDES-BENZ service station will you accordingly.

- Check oil levels in engine, steering gear, transmission and live axles.
- Check coolant level and antifreeze effect.
- Function-test electrical system.
- Start engine and check oil pressure. Inspect hoses and lines for cracks and leaks. Check brake efficiency.
# 5 Troubleshooting

The following suggestions will help you to cope with roadside failures. It is their purpose to enable you to drive your vehicle to a MERCEDES-BENZ service station where possible malfunctions will be eliminated. The following suggestions are to facilitate troubleshooting. They are not to substitute the work of the expert who will eventually eliminate the cause of the malfunction. These recommendations cannot be considered exhaustive.

## 5.1 Engine and fuel system

<table>
<thead>
<tr>
<th>Cause</th>
<th>Corrective action</th>
<th>For details refer to section</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Engine will not start</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel tank almost or completely empty</td>
<td>Fill up and bleed the system</td>
<td>2.1</td>
</tr>
<tr>
<td>Fuel line, fuel tank strainer or precleaner clogged</td>
<td>Clean and bleed the system</td>
<td>4.2.3</td>
</tr>
<tr>
<td>Fuel filter clogged</td>
<td>Renew filter element, bleed the system</td>
<td>4.2.2</td>
</tr>
<tr>
<td>Fuel system leaking</td>
<td>Seal the fuel lines, bleed the system</td>
<td>4.2.3</td>
</tr>
<tr>
<td>Ambient temperature below +32° F (0° C)</td>
<td>Observe winter operation instructions</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hard starting or engine stalling</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel filter clogged</td>
<td>Renew filter element, bleed the system</td>
<td>4.2.2</td>
</tr>
<tr>
<td>Vent in fuel tank clogged</td>
<td>Clean the vent</td>
<td>4.2.3</td>
</tr>
<tr>
<td>Overflow valve in the injection pump does not hold the developed pressure</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Cause</td>
<td>Corrective action</td>
<td>For details refer to section</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>--------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Lack of power</td>
<td>Drain and replace by branded fuel</td>
<td>3.1</td>
</tr>
<tr>
<td>Unsuitable fuel</td>
<td>Observe winter operation instructions</td>
<td>2.8</td>
</tr>
<tr>
<td>Lack of fuel</td>
<td>Inspect fuel filter</td>
<td>4.2.1</td>
</tr>
<tr>
<td>Full-load stop is not reached</td>
<td>Adjust full-load stop, consult workshop</td>
<td>-</td>
</tr>
<tr>
<td>Insufficient air supplied at high engine speeds</td>
<td>Service the air cleaner or renew</td>
<td>4.1.2</td>
</tr>
<tr>
<td>Black exhaust smoke</td>
<td>Clean or renew</td>
<td>4.1.2</td>
</tr>
<tr>
<td>Air cleaner dirty</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Faulty injection nozzles</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Start of delivery maladjusted</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Excessive quantity of fuel injected</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Engine overheats</td>
<td>Add coolant, check system for leaks</td>
<td>2.1</td>
</tr>
<tr>
<td>Not enough coolant</td>
<td>Replace thermostat</td>
<td>-</td>
</tr>
<tr>
<td>Faulty thermostat</td>
<td>Retighten or renew V-belts</td>
<td>4.3.3</td>
</tr>
<tr>
<td>V-belts loose or broken</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Cooling system clogged</td>
<td>Clean exterior of radiator</td>
<td>4.3.2</td>
</tr>
<tr>
<td>Exterior of radiator soiled</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>5.2 Clutch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clutch slips</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Clutch facings worn or covered with grease or oil</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Clutch dragging</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Air in the hydraulic system</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Insufficient release travel of slave cylinder</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Fluid level in hydraulic system too low</td>
<td>Check system for leaks, replenish</td>
<td>4.4.1</td>
</tr>
<tr>
<td>5.3 Steering</td>
<td>Cause</td>
<td>Corrective action</td>
</tr>
<tr>
<td>--------------</td>
<td>-------</td>
<td>------------------</td>
</tr>
<tr>
<td><strong>Hard steering</strong></td>
<td>Steering knuckles not lubricated  No oil in steering gear</td>
<td>Lubricate  Check system for leaks, add fluid</td>
</tr>
<tr>
<td><strong>Hard steering</strong></td>
<td>Low fluid level in system  V-belts loose or broken  Air in hydraulic system</td>
<td>Check system for leaks, add fluid  Retighten or renew V-belts  Check system for leaks, add fluid</td>
</tr>
<tr>
<td><strong>Power steering rattles when being turned</strong></td>
<td>Air in the hydraulic system  Low fluid level in system</td>
<td>Check system for leaks, add fluid  Check system for leaks, add fluid</td>
</tr>
<tr>
<td><strong>Poor centering</strong></td>
<td>Steering knuckles not lubricated  Excessive free play  Tires underinflated  Incorrect toe-in  Maladjusted front wheel bearings  Low fluid level in system  Air in the hydraulic system</td>
<td>Lubricate  Workshop responsibility  Inflate to correct pressure  Correct  Workshop responsibility  Check system for leaks, add fluid  Check system for leaks, add fluid</td>
</tr>
</tbody>
</table>
## 5.4 Brake system

<table>
<thead>
<tr>
<th>Cause</th>
<th>Corrective action</th>
<th>For details refer to section</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Uneven braking action</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worn tires</td>
<td>Exchange</td>
<td>4.9.1</td>
</tr>
<tr>
<td>Tires underinflated</td>
<td>Inflated to correct pressure</td>
<td></td>
</tr>
<tr>
<td>Oil on brake linings</td>
<td>Reline brakes, clean brake drum (workshop responsibilities)</td>
<td></td>
</tr>
<tr>
<td>Uneven brake lining wear</td>
<td>Reline brakes (workshop responsibility)</td>
<td></td>
</tr>
<tr>
<td>Faulty hydraulic system</td>
<td>Workshop responsibility</td>
<td></td>
</tr>
<tr>
<td><strong>No or insufficient braking effect</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum brake booster defective</td>
<td>Workshop responsibility</td>
<td></td>
</tr>
<tr>
<td>No brake fluid in hydraulic system</td>
<td>Check hydraulic system for leaks, add brake fluid, bleed system</td>
<td></td>
</tr>
<tr>
<td>Air in hydraulic system</td>
<td>Add brake fluid, bleed system</td>
<td></td>
</tr>
<tr>
<td>Worn lining, grease on lining</td>
<td>Reline, workshop responsibility</td>
<td></td>
</tr>
<tr>
<td><strong>The braking effect cannot be controlled</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty wheel brake cylinder</td>
<td>Workshop responsibility</td>
<td></td>
</tr>
<tr>
<td><strong>Hand brake not releasing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hand brake cable stuck</td>
<td>Workshop responsibility</td>
<td></td>
</tr>
</tbody>
</table>
### 5.5 Electrical system

<table>
<thead>
<tr>
<th>Cause</th>
<th>Corrective action</th>
<th>For details refer to section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery flat</td>
<td>Charge</td>
<td>4.10.5</td>
</tr>
<tr>
<td>Battery faulty</td>
<td>Replace</td>
<td>4.10.5</td>
</tr>
<tr>
<td>Battery terminals loose, corroded</td>
<td>Clean terminals, coat with acid-proof grease, tighten firmly</td>
<td>4.10.5</td>
</tr>
<tr>
<td>Cables loose or faulty</td>
<td>Tighten or replace</td>
<td>-</td>
</tr>
<tr>
<td>Starter defective</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Burnt-out bulb</td>
<td>Replace</td>
<td>-</td>
</tr>
<tr>
<td>Open circuits in wiring</td>
<td>Tighten or replace connections</td>
<td>-</td>
</tr>
<tr>
<td>Regulator or alternator defective</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>V-belts loose or broken</td>
<td>Relighten or renew V-belts</td>
<td>4.3.3</td>
</tr>
<tr>
<td>Burnt-out bulb</td>
<td>Replace</td>
<td>-</td>
</tr>
<tr>
<td>Interrupted preglow circuit</td>
<td>Workshop responsibility</td>
<td>-</td>
</tr>
<tr>
<td>Glow plug(s) faulty</td>
<td>Replace glow plug(s)</td>
<td>-</td>
</tr>
<tr>
<td>Battery low</td>
<td>Recharge battery</td>
<td>4.10.5</td>
</tr>
</tbody>
</table>
## 5.6 Supplementary heater

<table>
<thead>
<tr>
<th>Cause</th>
<th>Corrective action</th>
<th>For details refer to section</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heater will not ignite,</strong></td>
<td><strong>Glow plug burnt out</strong></td>
<td>Workshop responsibility</td>
</tr>
<tr>
<td>control unit shuts off</td>
<td><strong>Glow plug is grounded or</strong></td>
<td>Workshop responsibility</td>
</tr>
<tr>
<td><strong>automatically</strong></td>
<td><strong>carbon-fouled</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Ambient temperature below</strong></td>
<td>Workshop responsibility</td>
</tr>
<tr>
<td></td>
<td><strong>32° F (0° C)</strong></td>
<td>Comply with measures required</td>
</tr>
<tr>
<td></td>
<td><strong>Fuel pump will not feed</strong></td>
<td>for winter operation</td>
</tr>
<tr>
<td></td>
<td><strong>Heater motor will not start</strong></td>
<td>Workshop responsibility</td>
</tr>
<tr>
<td></td>
<td><strong>Battery flat</strong></td>
<td>Charge</td>
</tr>
<tr>
<td></td>
<td><strong>Fuse defective</strong></td>
<td>Renew fuse</td>
</tr>
<tr>
<td></td>
<td><strong>Commutator or carbon brushes worn</strong></td>
<td>Workshop responsibility</td>
</tr>
<tr>
<td></td>
<td><strong>System overheats</strong></td>
<td>Clean</td>
</tr>
<tr>
<td></td>
<td><strong>Outlet openings in passenger</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>compartment have been blocked</strong></td>
<td></td>
</tr>
</tbody>
</table>
5.7 Shutting off the engine when the vacuum system is faulty

Open engine cover and push down stop lever on injection pump until the engine stops.
5.8 Tow-starting and towing the vehicle

Towing
For towing, leave engine running, if possible, to allow the power steering to become effective and to supply vacuum to the brake system.

In case of engine damage
Vehicles with manual transmission:
Towing distance up to 100 km (60 miles).
There are no restrictions for towing the vehicle.
Towing distance more than 100 km (60 miles)
Remove propeller shaft of the live axle.

Vehicles with automatic MB transmission:
Towing distance up to 50 km (30 miles).
1. Move transmission selector lever to position “N”.
2. Do not exceed a towing speed of 40 km/h (25 mph).
For a towing distance of more than 50 km (30 miles), remove propeller shaft of the live axle.

In case of transmission damage
Remove propeller shaft of the live axle.

In case of rear axle damage
Lift rear axle.

In case of front axle damage
Lift front axle.

A bogged down vehicle whose driving wheels have dug into soft or muddy ground, should be towed out with utmost care, especially when the vehicle is loaded.
The vehicle must not be pulled out jerkily or at an angle – especially sideways – because the chassis of the vehicle might be damaged. Never pull out a vehicle together with the trailer.
A useful piece of advice: using the rear coupling jaw, pull the vehicle out backward along its original track, if possible.
Tow-starting

Manual transmission:
Turn steering lock to driving position. The preglowing indicator light must have gone out.
Declutch, engage 2nd or 3rd gear, tow-start vehicle, engage clutch slowly and actuate accelerator until the engine starts firing.

Automatic MB transmission:
Turn steering lock to the driving position. The preglowing indicator light must have gone out.
Move selector lever to neutral (position "N"). Tow-start vehicle. For approx. 2 minutes, maintain a towing speed of approx. 25 km/h (15 mph) with a cold transmission and 40 km/h (25 mph) with a warm transmission to ensure sufficient fluid pressure in the transmission.
Move selector lever to position "2".
Actuate accelerator only when the engine is driven by the transmission.
If the engine starts firing, return selector lever to the neutral position immediately (position "N").
Caution: Should the engine fail to fire within a few seconds, shift to neutral again and repeat tow-starting action.
6 Technical data

6.1 Data cards/identification plates

Data cards bearing all major vehicle data are supplied with the vehicle.

Card No. 1
For safety reasons this card must not be kept in the vehicle. It lists the key number for the ordering of replacement keys.

Card No. 2
This card (without key number) is kept in the Maintenance Booklet.

Please quote the complete chassis number and engine number when ordering spare parts or inquiring for technical details.
1 Chassis number  
2 Identification plate  
   in right entrance

1 Engine No. on L-H engine side

1 Body number on right side front cab post
### 6.2 Weights kg (lb)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissible front axle load</td>
<td>1350</td>
<td>1500</td>
<td>1500</td>
<td>1350</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1700</td>
<td>1700</td>
<td>(2980)</td>
<td>(3310)</td>
<td>(3310)</td>
<td>(3750)</td>
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<tr>
<td></td>
<td>(2980)</td>
<td>(3310)</td>
<td>(3310)</td>
<td>(2980)</td>
<td>(3310)</td>
<td>(3310)</td>
<td>(3310)</td>
<td>(3750)</td>
<td>(3750)</td>
<td>(3750)</td>
<td>(3750)</td>
<td>(3750)</td>
<td>(3750)</td>
</tr>
<tr>
<td>Permissible rear axle load</td>
<td>1400</td>
<td>1400</td>
<td>1680</td>
<td>2030</td>
<td>2030</td>
<td>2210</td>
<td>2210</td>
<td>3200</td>
<td>3200</td>
<td>(3090)</td>
<td>(3090)</td>
<td>(3700)</td>
<td>(7050)</td>
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<tr>
<td></td>
<td>(3090)</td>
<td>(3090)</td>
<td>(3700)</td>
<td>(4480)</td>
<td>(4480)</td>
<td>(4870)</td>
<td>(4870)</td>
<td>(7050)</td>
<td>(7050)</td>
<td>(3090)</td>
<td>(3090)</td>
<td>(3700)</td>
<td>(7050)</td>
</tr>
<tr>
<td>Gross vehicle weight</td>
<td>2550</td>
<td>2650</td>
<td>2800</td>
<td>3200</td>
<td>3200</td>
<td>3500</td>
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<td>4600</td>
<td>4600</td>
<td>(5620)</td>
<td>(5840)</td>
<td>(6170)</td>
<td>(7050)</td>
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<tr>
<td></td>
<td>(5620)</td>
<td>(5840)</td>
<td>(6170)</td>
<td>(7060)</td>
<td>(7060)</td>
<td>(7720)</td>
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<td>(10140)</td>
<td>(10140)</td>
<td>(10140)</td>
<td>(10140)</td>
<td>(10140)</td>
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</table>

1 Only van

### 6.3 Main dimensions mm (in)

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<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheelbase</td>
<td>3050</td>
<td>3350</td>
<td>3700</td>
<td>3350</td>
<td>3700</td>
<td>3350</td>
<td>3700</td>
<td>3350</td>
<td>3700</td>
<td>(120.1)</td>
<td>(131.9)</td>
<td>(145.7)</td>
<td>(131.9)</td>
<td>(145.7)</td>
<td>(145.7)</td>
<td>(145.7)</td>
<td>(145.7)</td>
</tr>
<tr>
<td>Min. turning circle</td>
<td>10.9 m</td>
<td>11.8 m</td>
<td>12.7 m</td>
<td>11.8 m</td>
<td>12.7 m</td>
<td>11.8 m</td>
<td>12.7 m</td>
<td>11.8 m</td>
<td>12.7 m</td>
<td>(35.7 ft)</td>
<td>(38.7 ft)</td>
<td>(41.7 ft)</td>
<td>(38.7 ft)</td>
<td>(41.7 ft)</td>
<td>(41.7 ft)</td>
<td>(41.7 ft)</td>
<td>(41.7 ft)</td>
</tr>
<tr>
<td>Track, front approx.</td>
<td>1600</td>
<td>1600</td>
<td>1600</td>
<td>1600</td>
<td>1600</td>
<td>1600</td>
<td>1600</td>
<td>1600</td>
<td>1600</td>
<td>(63.0)</td>
<td>(63.0)</td>
<td>(63.0)</td>
<td>(63.0)</td>
<td>(63.0)</td>
<td>(63.0)</td>
<td>(63.0)</td>
<td>(63.0)</td>
</tr>
<tr>
<td>Track, rear approx.</td>
<td>1610</td>
<td>1610</td>
<td>1610</td>
<td>1610</td>
<td>1610</td>
<td>1610</td>
<td>1580</td>
<td>1580</td>
<td>1580</td>
<td>(63.4)</td>
<td>(63.4)</td>
<td>(63.4)</td>
<td>(62.2)</td>
<td>(62.2)</td>
<td>(62.2)</td>
<td>(62.2)</td>
<td>(62.2)</td>
</tr>
</tbody>
</table>
### 6.4 Engine

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>207 D</th>
<th>209 D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>307 D</td>
<td>309 D</td>
</tr>
<tr>
<td></td>
<td>407 D</td>
<td>409 D</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engine</th>
<th>616</th>
<th>617</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>616.9</td>
<td>617.9</td>
</tr>
</tbody>
</table>

- **Method of operation**: Diesel four stroke
- **Cylinder arrangement**: 4 cylinders, 5 cylinders vertical in line
- **Bore**: 90.9 mm (3.58 in), 92.4 mm (3.6 in)
- **Stroke**: 2399 cm³ (146.4 cu. in), 2998 cm³ (183.0 cu. in)
- **Compression ratio, approx**: 21
- **Min. compression pressure**
  - Developed horsepower according to DIN
  - **Max. torque in Nm (lb.-ft.)**: 53 kW (72 HP) 65 kW (88 HP) 137 (99) 172 (124) at 2400/min
- **Idle speed**: 750/min 700/min
- **Injection order**: 1–3–4–2 1–2–4–5–3
- **Ejection pressure of injection nozzles**
  - New nozzles: 115-123 bar (1 664-1 778 psi)
  - Used nozzles: at least 100 bar (1 450 psi)
- **Start of delivery (basic setting)**: 24° before TDC
- **Valve arrangement**: Overhead, per cylinder 1 intake and 1 exhaust valve

---

*The specified output measured according to DIN 70 020 is actually available at the clutch for the propulsion of the vehicle since all power requirements for the auxiliary units are deducted.*
6.5 Cooling system

Valve clearance
with engine cold
Valve clearance
with engine warm
(140° ± 59° F)
(60° ± 15° C)

Lubrication system
Oil pump
Oil filter
Oil pressure
Idle speed

including

<table>
<thead>
<tr>
<th>Component</th>
<th>Intake</th>
<th>Exhaust</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake valve clearance</td>
<td>0.10 mm (0.004 in)</td>
<td>0.30 mm (0.012 in)</td>
<td></td>
</tr>
<tr>
<td>Exhaust valve clearance</td>
<td>0.15 mm (0.006 in)</td>
<td>0.35 mm (0.014 in)</td>
<td></td>
</tr>
</tbody>
</table>

Force-feed lubrication
Gear type pump
Paper full-flow filter

at least 0.5 bar (7.1 psi)

Water circulation cooling
Thermostat
158–203° F (70–95° C)

6.6 Clutch

Clutch control

Single-plate dry clutch
Hydraulic

6.7 Transmission

Design

Synchromesh transmission
G 1/18-5/6.15
711.1

Model

5 forward, 1 reverse

Number of gears,

i = 6.157/3.148/1.743/1.278/1.0;

Gear ratios

reverse = 5.347

Optional:

MB automatic transmission W 4 A 018
720.1

4 forward, 1 reverse

i = 4.007/2.392/1.463/1.1;

reverse = 5.495

\[1\] At ambient temperatures continuously below -4.0°F 
(-20° C) add 0.05 mm (0.0012 in) to valve clearance.
6.8 Steering system

<table>
<thead>
<tr>
<th>Design</th>
<th>Model</th>
<th>Manual steering L 1.5 Z 760.2 Optional: Power steering LS 2 A 765.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power steering pump drive</td>
<td>V-belt, narrow type 12.5 x 900</td>
<td></td>
</tr>
</tbody>
</table>

6.9 Front axle

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Design</th>
<th>Model</th>
<th>207 D/209 D Rigid knuckle yoke axle VL 0/1 C-1.3 730.4 Optional: Rigid knuckle yoke axle VL 0/2 C-1.5 730.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>207 D/209 D</td>
<td>Rigid knuckle yoke axle VL 0/2 C-1.5 730.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>307 D/309 D</td>
<td>Rigid knuckle yoke axle VL 0/3 C-1.7 730.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Design</th>
<th>Model</th>
<th>Toe-in (measured on the wheel flange)</th>
</tr>
</thead>
<tbody>
<tr>
<td>407 D/409 D</td>
<td>Rigid knuckle yoke axle VL 0/3 C-1.7 730.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Camber</th>
<th>Kingpin inclination</th>
<th>Caster</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ± 0.5 mm (0 ± 0.012 in)</td>
<td>offset tie rod 0 ± 2 mm (0 ± 0.08 in)</td>
<td></td>
</tr>
<tr>
<td>1°</td>
<td>5°</td>
<td></td>
</tr>
<tr>
<td>2° 30'</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When camber, caster and kingpin inclination data are quoted in degrees of angle, a tolerance of ± 20' must not be exceeded

1 Van standard version
### 6.10 Rear axle

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Design</th>
<th>Model</th>
<th>Rear axle ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>207 D/209 D</td>
</tr>
<tr>
<td></td>
<td>Hypoid gear axle HL 0/1-1.7</td>
<td>741.408</td>
<td>l = 4.4</td>
</tr>
<tr>
<td></td>
<td>Optional:</td>
<td></td>
<td>Hypoid gear axle HL 0/2-2.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>741.404</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>l = 4.9</td>
</tr>
<tr>
<td>Vehicle cargo truck</td>
<td></td>
<td></td>
<td>307 D/309 D</td>
</tr>
<tr>
<td></td>
<td>Hypoid gear axle HL 0/2-2.2</td>
<td>741.404</td>
<td>l = 4.9</td>
</tr>
<tr>
<td>Vehicle Van</td>
<td></td>
<td></td>
<td>407 D</td>
</tr>
<tr>
<td></td>
<td>Hypoid gear axle HL 0/3-3.3</td>
<td>741.52</td>
<td>l = 5.333</td>
</tr>
<tr>
<td></td>
<td>Optional:</td>
<td></td>
<td>l = 4.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>407 D</td>
</tr>
<tr>
<td></td>
<td>Hypoid gear axle HL 0/3-3.3</td>
<td>741.52</td>
<td>l = 4.9</td>
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<tr>
<td></td>
<td>Optional:</td>
<td></td>
<td>l = 5.333</td>
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</table>
6.11 Brake system

Cargo trucks and vans:
1st circuit = front wheel brake (disk brake)
2nd circuit = rear wheel brake (drum brake)

Cargo bus for personnel transportation:
1st circuit = front wheel brake (disk brakes, lower pistons of brake calipers) and rear wheel brake (drum brake)
2nd circuit = front wheel brake (disk brake, upper pistons of brake calipers)
### 6.12 Electrical system

<table>
<thead>
<tr>
<th>Component</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alternator</strong></td>
<td>Three-phase</td>
</tr>
<tr>
<td>Design</td>
<td>14 V/56 A</td>
</tr>
<tr>
<td>Output</td>
<td>V-belt 12.5 x 1015</td>
</tr>
<tr>
<td><strong>Alternator drive</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Starter motor</strong></td>
<td>Inertia gear-drive starter</td>
</tr>
<tr>
<td>Design</td>
<td>12 V/2.3 kW</td>
</tr>
<tr>
<td>Output</td>
<td></td>
</tr>
<tr>
<td><strong>Batteries, Engine 616</strong></td>
<td>12 V 66 Ah</td>
</tr>
<tr>
<td></td>
<td>Optional:</td>
</tr>
<tr>
<td></td>
<td>12 V 88 Ah or</td>
</tr>
<tr>
<td></td>
<td>2 x 12 V 66 Ah or 2 x 12 V 88 Ah</td>
</tr>
<tr>
<td><strong>Engine 617</strong></td>
<td>12 V 88 Ah</td>
</tr>
<tr>
<td></td>
<td>Optional:</td>
</tr>
<tr>
<td></td>
<td>2 x 12 V 88 Ah</td>
</tr>
</tbody>
</table>
## Lamps (DIN 72 601)

<table>
<thead>
<tr>
<th>Light Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headlights</td>
<td>A 12 V 45/40 W</td>
</tr>
<tr>
<td></td>
<td>Optional:</td>
</tr>
<tr>
<td></td>
<td>H 4/12 V 60/55 W</td>
</tr>
<tr>
<td>Parking lights</td>
<td>HL 12 V 4 W</td>
</tr>
<tr>
<td>Turn signals</td>
<td>P 25-1/12 V 21 W</td>
</tr>
<tr>
<td>Stop lights</td>
<td>G 12 V 10 W</td>
</tr>
<tr>
<td>Rear fog light</td>
<td>G 12 V 5 W</td>
</tr>
<tr>
<td>Tail lights</td>
<td></td>
</tr>
<tr>
<td>Cargo truck</td>
<td>L 12 V 5 W (Festoon bulbs)</td>
</tr>
<tr>
<td>Van</td>
<td></td>
</tr>
<tr>
<td>License plate lights</td>
<td></td>
</tr>
<tr>
<td>Interior light</td>
<td>K 12 V 10 W (Festoon bulbs)</td>
</tr>
<tr>
<td>Instrument lighting</td>
<td>H 12 V 2 W</td>
</tr>
<tr>
<td>Maximum speed warning light</td>
<td></td>
</tr>
<tr>
<td>Indicator lights</td>
<td>W 5-12 V 1.2 W Glass-base lamp</td>
</tr>
<tr>
<td>Hazard warning flasher indicator light</td>
<td></td>
</tr>
<tr>
<td>Illumination of heater controls</td>
<td></td>
</tr>
<tr>
<td>Indicator light of rear fog light</td>
<td></td>
</tr>
<tr>
<td>Fuses</td>
<td>8 A, 16 A, 25 A DIN 72 581</td>
</tr>
</tbody>
</table>
**Key to wiring diagram (Position 1 to 7)**

**Wire color code**
- bl = blue
- br = brown
- el = ivory
- ge = yellow
- gn = green
- gr = grey
- li = violet
- rs = pink
- rt = red
- sw = black
- ws = white

Example:
- Wire designation 1.5 gr/rt
- Cross section of wire 1.5 = 1.5 mm²
- Basic color gr = grey
- Identification color rt = red

1. **Starter control, power supply**
   - A1 Steering lock
   - G1 Battery 12 V
   - G2 Alternator
   - H1 Preglowing indicator light
   - H2 Charge indicator light
   - K1 Relay
   - M1 Starter
   - R1 Glow plugs
   - S1 Battery master switch

2. **Light switch, rear fog light, license plate light, tail light, right, parking light, right**
   - E1 Rear fog light
   - E2 License plate light
   - E3 License plate light
   - E4 Tail light, right
   - E5 Parking light, right
   - F6 Fuse
   - Q1 Light switch
   - X1 Trailer plug socket

3. **Parking light, left, tail light, left, trailer plug socket**
   - E6 Parking light, left
   - E7 Tail light, left
   - F5 Fuse
   - X1 Trailer plug socket

4. **Headlights**
   - E8 Headlight, left
   - E9 Headlight, right
   - F1-F4 Fuses
   - H3 High beam indicator light
   - S2 Combination switch

5. **Fog lights**
   - E10 Fog light, left
   - E11 Fog light, right

6. **Turn signal lights, hazard warning flasher system**
   - F9 Fuse
   - H4 Turn signal indicator light, trailer
   - K2 Hazard warning flasher sending unit
   - S2 Combination switch
   - S3 Hazard warning flasher switch

7. **Operation monitoring components**
   - H5 Turn signal indicator light, tractor
   - H6 Turn signal, front, right, on side
   - H7 Turn signal, front, right
   - H8 Turn signal, rear, right
   - H9 Turn signal, rear, left
   - H10 Turn signal, front, left
   - H11 Turn signal, front, left, on side
   - X1 Trailer plug socket
### Key to wiring diagram (Position 8 to 18)

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8</strong></td>
<td>Windshield wiper, windshield washer</td>
</tr>
<tr>
<td>M2</td>
<td>Windshield wiper motor</td>
</tr>
<tr>
<td>M3</td>
<td>Windshield washer motor</td>
</tr>
<tr>
<td>K3</td>
<td>Switch, windshield wiper, intermittent wiping</td>
</tr>
<tr>
<td>S2</td>
<td>Combination switch</td>
</tr>
<tr>
<td><strong>9</strong></td>
<td>Stop light</td>
</tr>
<tr>
<td>B1</td>
<td>Stop light switch</td>
</tr>
<tr>
<td>F8</td>
<td>Fuse</td>
</tr>
<tr>
<td>H12</td>
<td>Stop light, left</td>
</tr>
<tr>
<td>H13</td>
<td>Stop light, right</td>
</tr>
<tr>
<td>H14</td>
<td>Horn</td>
</tr>
<tr>
<td>S4</td>
<td>Switch, horn</td>
</tr>
<tr>
<td>X1</td>
<td>Trailer plug socket</td>
</tr>
<tr>
<td><strong>10</strong></td>
<td>Heater blower</td>
</tr>
<tr>
<td>M4</td>
<td>Heater blower motor</td>
</tr>
<tr>
<td>S5</td>
<td>Heater blower switch</td>
</tr>
<tr>
<td><strong>11</strong></td>
<td>Fuel, coolant</td>
</tr>
<tr>
<td>B2</td>
<td>Sending unit for fuel gauge</td>
</tr>
<tr>
<td>B3</td>
<td>Sending unit for coolant temperature gauge</td>
</tr>
<tr>
<td>P1</td>
<td>Fuel gauge</td>
</tr>
<tr>
<td>P2</td>
<td>Coolant temperature gauge</td>
</tr>
<tr>
<td><strong>12</strong></td>
<td>Backup light</td>
</tr>
<tr>
<td>E12</td>
<td>Backup light, left</td>
</tr>
<tr>
<td>E13</td>
<td>Backup light, right</td>
</tr>
<tr>
<td>F10</td>
<td>Fuse</td>
</tr>
<tr>
<td>S6</td>
<td>Backup light switch</td>
</tr>
<tr>
<td><strong>13</strong></td>
<td>Speedometer, tachograph, clock</td>
</tr>
<tr>
<td>E14</td>
<td>Lighting for heater control</td>
</tr>
<tr>
<td>P3</td>
<td>Speedometer</td>
</tr>
<tr>
<td>P4</td>
<td>Tachograph</td>
</tr>
<tr>
<td>P5</td>
<td>Clock</td>
</tr>
<tr>
<td><strong>14</strong></td>
<td>Door contact switch, interior lights, plug socket</td>
</tr>
<tr>
<td>E15</td>
<td>Interior light</td>
</tr>
<tr>
<td>F7</td>
<td>Fuse</td>
</tr>
<tr>
<td>H15</td>
<td>Interior light</td>
</tr>
<tr>
<td>S7</td>
<td>Switch, interior light</td>
</tr>
<tr>
<td>S8</td>
<td>Door contact switch</td>
</tr>
<tr>
<td>S9</td>
<td>Switch, interior light</td>
</tr>
<tr>
<td>X2</td>
<td>Plug socket</td>
</tr>
<tr>
<td><strong>15</strong></td>
<td>Heated rear window</td>
</tr>
<tr>
<td>B4</td>
<td>Switch for heated rear window</td>
</tr>
<tr>
<td>H16</td>
<td>Indicator light for heated rear window</td>
</tr>
<tr>
<td><strong>16</strong></td>
<td>Brake fluid, oil pressure</td>
</tr>
<tr>
<td>H17</td>
<td>Indicator light, brake fluid</td>
</tr>
<tr>
<td>H18</td>
<td>Indicator light, oil pressure</td>
</tr>
<tr>
<td>K5</td>
<td>Relay</td>
</tr>
<tr>
<td>S10</td>
<td>Switch, brake fluid</td>
</tr>
<tr>
<td>S11</td>
<td>Switch, oil pressure</td>
</tr>
<tr>
<td><strong>17</strong></td>
<td>Clearance lights</td>
</tr>
<tr>
<td>E16</td>
<td>Clearance light, front, left</td>
</tr>
<tr>
<td>E17</td>
<td>Clearance light, front, right</td>
</tr>
<tr>
<td>E18</td>
<td>Clearance light, rear, left</td>
</tr>
<tr>
<td>E19</td>
<td>Clearance light, rear, right</td>
</tr>
<tr>
<td><strong>18</strong></td>
<td>Brake pad wear</td>
</tr>
<tr>
<td>S12</td>
<td>Switch, brake pad wear, left</td>
</tr>
<tr>
<td>S13</td>
<td>Switch, brake pad wear, right</td>
</tr>
<tr>
<td>X1</td>
<td>Trailer plug socket</td>
</tr>
</tbody>
</table>
Key to wiring diagram of automatic transmission

1. Speedometer lighting
2. Relay
3. Fuse box (standard equipment)
4. Starter
5. Selector lever position indicator
6. Transmission
   a. Starter lock-out switch
   b. Switch backup light
   c. Solenoid valve (kickdown)
   d. Solenoid valve (1st gear)
7. Cable connection
8. Backup light
9. Kickdown switch
10. Sending unit, selector lever position indicator
7 Tightening torques in Nm (lb-ft)

**Engine**
- Cylinder head cover: 15 (10.8)
- Oil pan to crankcase
  - M 6: 11 (7.96)
  - M 8: 30 (21.7)
- Oil drain plug – oil pan: 35–45 (25.3–32.5)
- Oil filter cap: 20 (14.4)
- Hose clamp: 6 (4.3)

**Transmission**
**Manual transmission**
- Oil drain plug: 70 ± 15 (50.6 ± 10.8)

**Automatic transmission**
- Oil pan: 7 (5)
- Oil filter: 4 (2.8)
- Oil drain plug – torque converter: 14 + 2 (10.1 + 1.4)
- Securing screw – oil filler pipe: 35 + 7 (25.3 + 5.1)

**Front axle**
- Front spring U-bolt: 80 (57.8)

**Rear axle**
- Rear axle cover: 40–50 (28.9–36.1)
- Rear spring U-bolt: 80 (57.8)

**Wheels**
- Wheel mounting bolts or securing nuts of disk wheels: 160–180 (115.7–130.2)

**Steering**
- Pitman arm to steering gear L 1.5Z: 360 (260.4)
  - LS 2A: 360 (260.4)
- Clamping sleeve to tie rod: 45–55 (32.5–39.8)
- Conical joints – tie rod: 90–100 (65.1–72.3)
Components and lubricants must match. Therefore, only tested and recommended brands must be used. MERCEDES-BENZ service stations will readily give you all the required information.

<table>
<thead>
<tr>
<th>Component Type</th>
<th>Model</th>
<th>Capacities ca.</th>
<th>Fuel, coolant, lubricant or brake fluid</th>
<th>Viscosity ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine with oil filter</td>
<td>616</td>
<td>max. 6.5 l&lt;br&gt;(13.8/11.5 US/Imp. pts.)&lt;br&gt;min. 5.0 l&lt;br&gt;(10.6/8.8 US/Imp. pts.)</td>
<td>Engine oil&lt;br&gt;&lt;br&gt;Refer to “Section 3.2”&lt;br&gt;&lt;br&gt;max. 2.3 l&lt;br&gt;(4.9/4.1 US/Imp. pts.)&lt;br&gt;&lt;br&gt;Automatic transmission fluid (ATF) type A Suffix A</td>
<td>-</td>
</tr>
<tr>
<td>Manual transmission G 1/18–5</td>
<td>711.1</td>
<td>2.3 l&lt;br&gt;(4.9/4.1 US/Imp. pts.)&lt;br&gt;&lt;br&gt;Automatic transmission fluid (ATF) type A Suffix A</td>
<td>-&lt;br&gt;&lt;br&gt;7 l&lt;br&gt;(14.8/12.3 US/Imp. pts.)&lt;br&gt;&lt;br&gt;Automatic transmission fluid (ATF) Dexron B</td>
<td>-</td>
</tr>
<tr>
<td>MB automatic transmission</td>
<td>720.1</td>
<td>7 l&lt;br&gt;(14.8/12.3 US/Imp. pts.)&lt;br&gt;&lt;br&gt;Automatic transmission fluid (ATF) Dexron B</td>
<td>-&lt;br&gt;&lt;br&gt;1.5 l&lt;br&gt;(US/Imp. pts.)&lt;br&gt;&lt;br&gt;Hypoid gear oil&lt;br&gt;&lt;br&gt;SAE 90, 85 W/90</td>
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<tr>
<td>Rear axle</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>HL 0/1 – 1.7</td>
<td>741.406</td>
<td>1.5 l&lt;br&gt;(US/Imp. pts.)&lt;br&gt;&lt;br&gt;Hypoid gear oil&lt;br&gt;&lt;br&gt;SAE 90, 85 W/90</td>
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<td></td>
</tr>
<tr>
<td>HL 0/2 – 2.2</td>
<td>741.404</td>
<td>1.8 l&lt;br&gt;(3.8/3.2 US/Imp. pts.)&lt;br&gt;&lt;br&gt;Hypoid gear oil&lt;br&gt;&lt;br&gt;SAE 90, 85 W/90</td>
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<td></td>
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<tr>
<td>HL 0/3 – 3.3</td>
<td>741.52</td>
<td>1.8 l&lt;br&gt;(3.8/3.2 US/Imp. pts.)&lt;br&gt;&lt;br&gt;Hypoid gear oil&lt;br&gt;&lt;br&gt;SAE 90, 85 W/90</td>
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<td></td>
</tr>
<tr>
<td>Model</td>
<td>Capacities ca.</td>
<td>Fuel, coolant, lubricant or brake fluid</td>
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<td></td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clutch and brake systems - hydraulic sections</td>
<td>0.7 l (1.4/1.2 US/imp. pts.)</td>
<td>Brake fluid</td>
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<td></td>
</tr>
<tr>
<td>Grease nipples on chassis and body</td>
<td></td>
<td>Multipurpose grease</td>
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<tr>
<td>Battery terminals</td>
<td></td>
<td></td>
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<tr>
<td>Fuel tank</td>
<td>70 l (18.5/15.4 US/imp. gals)</td>
<td>Bosch Ft 40 v 1</td>
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<tr>
<td>Engine 616</td>
<td>10.5 l 22.2/18.5 US/imp. pts.</td>
<td>Diesel fuel</td>
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</tr>
<tr>
<td>Engine 617</td>
<td>10 l 21.1/17.6 US/imp. pts.</td>
<td>Coolant</td>
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<tr>
<td>Cooling system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windshield washer system and headlight washer system</td>
<td>7 l (14.8/12.3 US/imp. pts.)</td>
<td>Water with MB windshield washing agent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9 Service and maintenance jobs — summary

(For details refer to Maintenance Booklet)

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Under severe operating conditions</th>
<th>Under normal operating conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>after 500 - 1 500 km (300 - 900 miles)</td>
<td>after 500 - 1 500 km (300 - 900 miles)</td>
</tr>
<tr>
<td></td>
<td>Operating hours (h)</td>
<td>Fuel throughput liters</td>
</tr>
<tr>
<td>Service</td>
<td>70</td>
<td>800</td>
</tr>
<tr>
<td>Service</td>
<td>140</td>
<td>1 600</td>
</tr>
<tr>
<td>Maintenance</td>
<td>200</td>
<td>2 400</td>
</tr>
<tr>
<td>Service</td>
<td>270</td>
<td>3 200</td>
</tr>
<tr>
<td>Service</td>
<td>340</td>
<td>3 000</td>
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<td>4 800</td>
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<td>Service</td>
<td>470</td>
<td>5 600</td>
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<tr>
<td>Service</td>
<td>540</td>
<td>6 400</td>
</tr>
<tr>
<td>Maintenance</td>
<td>600</td>
<td>7 200</td>
</tr>
<tr>
<td>Service</td>
<td>670</td>
<td>8 000</td>
</tr>
<tr>
<td>Service</td>
<td>740</td>
<td>8 800</td>
</tr>
<tr>
<td>Maintenance</td>
<td>800</td>
<td>9 600</td>
</tr>
</tbody>
</table>

etc.

- Change oil and filter at least twice a year.
Tire pressure chart

Tire pressure in bar (psi)

<table>
<thead>
<tr>
<th>Tires</th>
<th>PR</th>
<th>Front axle Axle loads kg (lbs)</th>
<th>Rear axle Axle loads kg (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1350</td>
<td>1500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2980)</td>
<td>(3310)</td>
</tr>
<tr>
<td>175 R 14 C/N</td>
<td>6</td>
<td>3.75</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(53.4)</td>
<td></td>
</tr>
<tr>
<td>185 R 14 C/N</td>
<td>8</td>
<td>3.25</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(46.2)</td>
<td></td>
</tr>
<tr>
<td>205 R 14 C/N</td>
<td>8</td>
<td>-</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(42.7)</td>
</tr>
<tr>
<td>215 R 14 C/N</td>
<td>8</td>
<td>2.75</td>
<td>2.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(39.1)</td>
<td>(39.1)</td>
</tr>
</tbody>
</table>

Summer tires, top speed 140 km/h (87 mph)
Winter tires, top speed 120 km/h (74 mph)

Your MERCEDES-BENZ service station will give you more information on winter tires.

Caution:
The tire inflation pressure changes by approx. 0.1 bar whenever the ambient air changes by 10 °C. This must be kept in mind when checking the inflation pressure in a room of different ambient temperature, particularly during the cold season.

Example:
Room temperature = approx. +20 °C
Outside temperature = approx. 0 °C
Inflation pressure to be set = specified tire pressure +0.2 bar.