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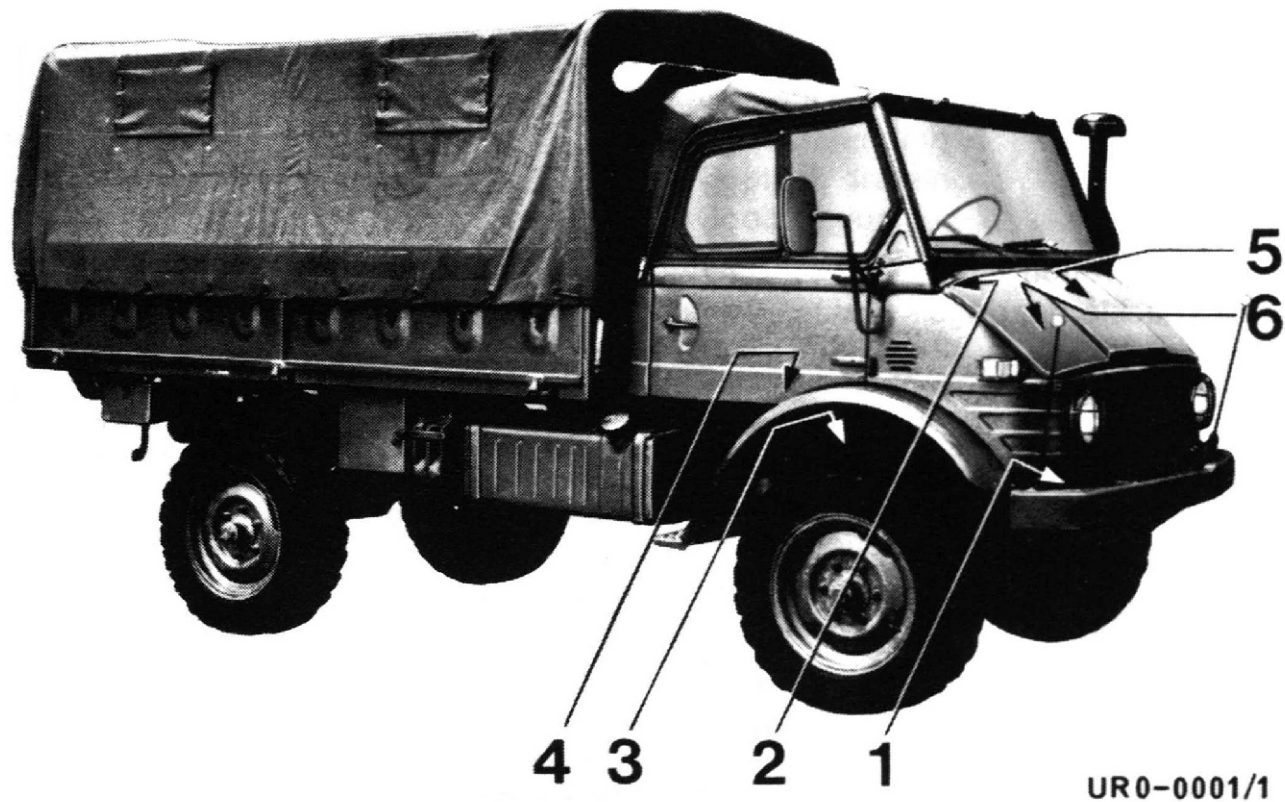
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- 1 Chassis number**  
on frame
- 2 Type plate**  
under engine hood
- 3 Axle number**  
on top of axle center housing
- 4 Transmission number**  
at top left of transmission housing
- 5 Cab number**  
on left door pillar
- 6 Engine number**  
on left side of engine block

UR0-0001/1

Figure 1 Location of type plates and numbers, type 404.0

- 1 Chassis number**  
on frame
- 2 Type plate and cab number**  
under engine hood
- 3 Axle number**  
on top of axle center housing
- 4 Transmission number**  
at top left of transmission housing
- 5 Engine number**  
on left side of engine block

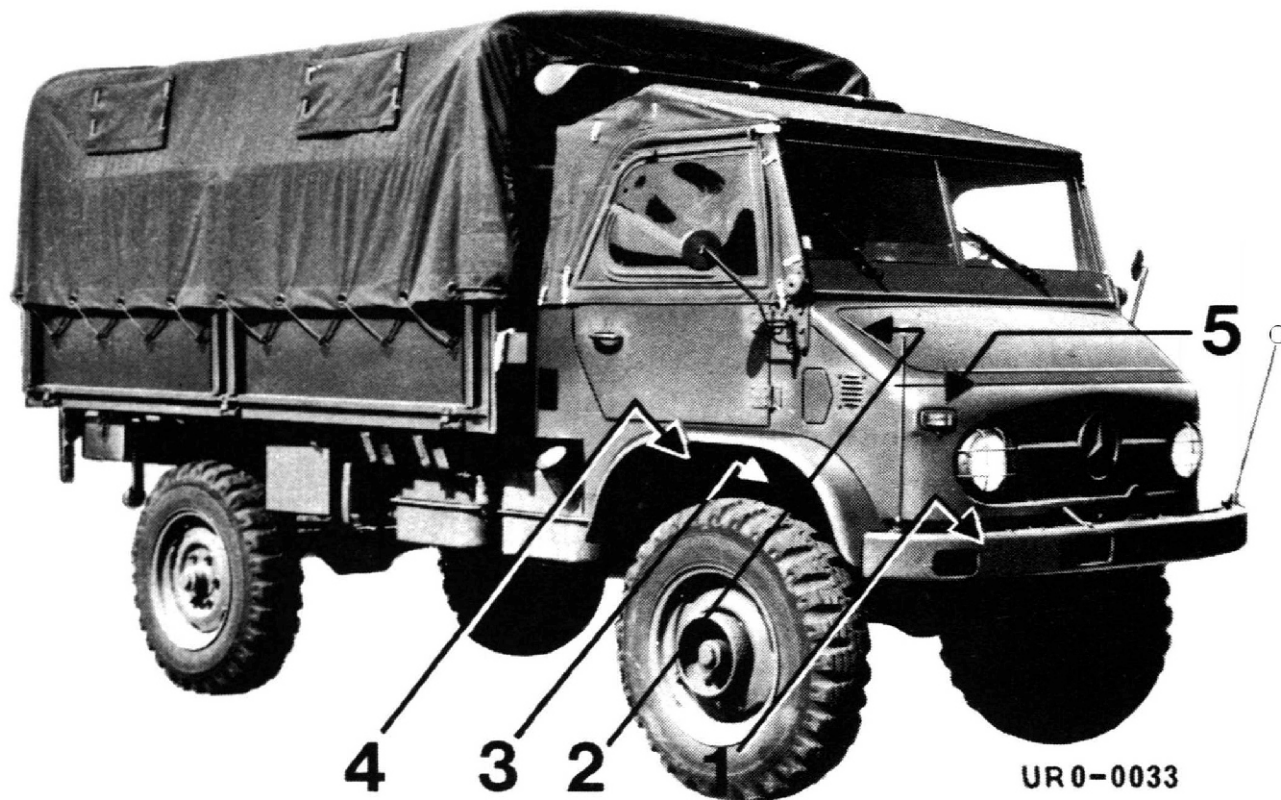


Figure 2 Location of type plates and numbers, type 404.1

# 1 General Information

## 1.1 Explanation of Contents

All 404 vehicle types are included in this instruction manual. The basic components of all models are identical. Major differences and design variations of type 404, 113/114 are dealt with under abbreviated type code **404.1** immediately following the description of the respective item.

Section **1 General Information** contains explanations as well as important information regarding warranty, numbers, keys and special equipment of the vehicle.

A careful study of the section **2 Operating Instructions**, particularly prior to the initial operation, is one of the prerequisites to troublefree operation of the vehicle.

In addition, relevant job instructions given in section **3 Maintenance Instructions** are intended to insure that the UNIMOG remains efficient and is constantly operational.

Use only Daimler-Benz recommended grades of fuels, coolants, lubricants, etc. described in section **4 Fuels, Coolants, Lubricants** in the quantities specified.

In the following section **5 Troubleshooting** we are providing information as to what causes may be applicable in case of possible trouble as well as recommendations for their elimination.

For immediate information, all significant data concerning the vehicle are summarized in section **6 Technical Data**.

## 1.2 Warranty

Warranty claims will only be successful if the warranty terms – contained in the general terms of sale – are observed.

## 1.3 Type Plate and Numbers

**In all inquiries concerning the UNIMOG, and when ordering spare parts and special equipment, be sure to list the type and model designation, the chassis and engine number, or other unit numbers.** Figure 1 and 2.

The designations “right-hand” and “left-hand” apply as seen in driving direction. The statements 1st, 2nd cylinder, etc. are always as seen from the direction of the radiator.

## 1.4 Doors and Engine Hood

### 1.4.1 Locks

The door key will only lock the left door.

However, both doors can be latched from inside.

The door locks of the folding top cab must be latched from the inside while driving.

In order to lock the door from outside place the inside handle in the "latched" position.

The **square hood key** is located in the left-hand door box.

**To open** the outside engine hood unlatch at the bottom and prop up.

**To remove** the hood unlatch at the upper bore with the same key.

Unlatching at the upper bore is eased after the hood is raised somewhat from below.

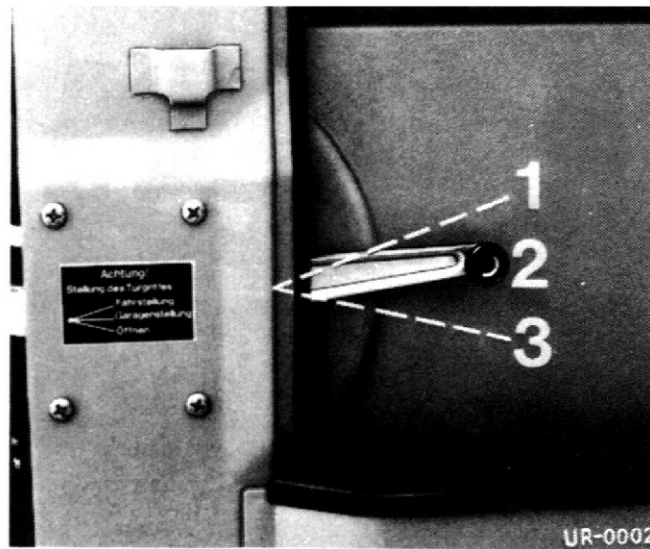


Figure 3 Door locks, RH side

- 1 Driving position (latched)
- 2 Neutral
- 3 Open



Figure 4 Door locks, RH side (all-steel cab)

- 1 Open
- 2 Neutral
- 3 Latched

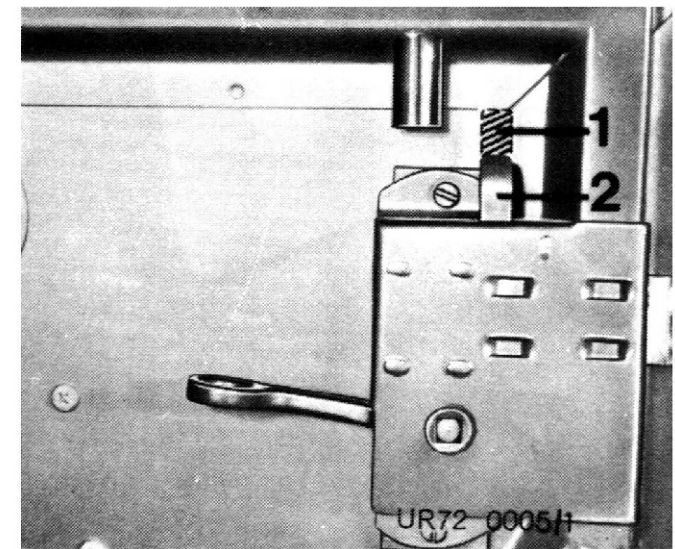


Figure 5 Door locks Folding top cab, 404.1

- 1 Open
- 2 Latched

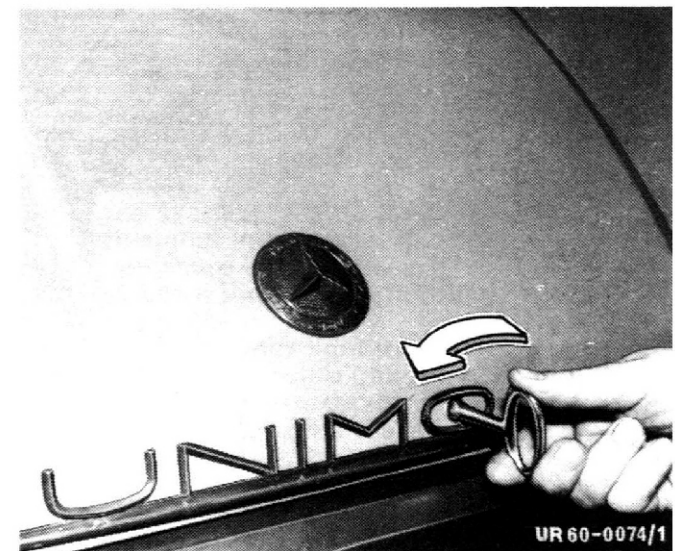


Figure 6 Opening engine hood

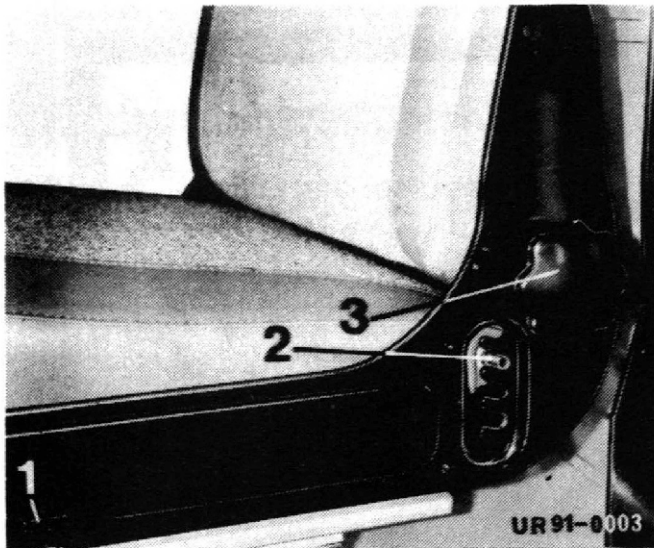


Figure 7 Seat adjustment

- 1 Longitudinal adjustment
- 2 Tilt of seat cushion
- 3 Tilt of backrest

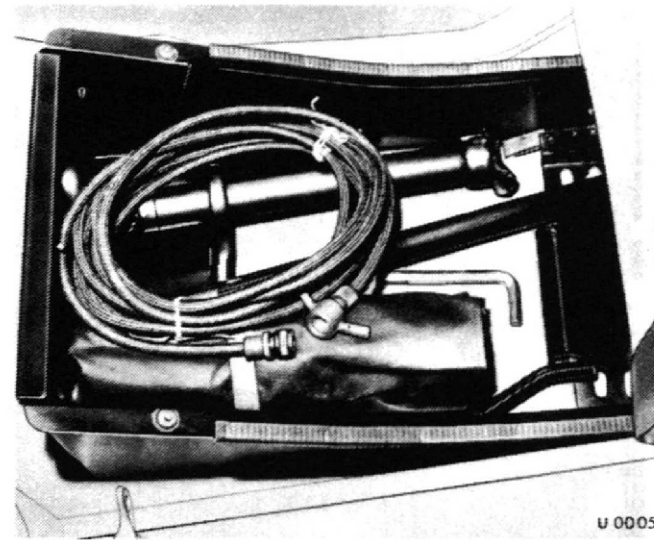


Figure 9 Vehicle tool box under asst. driver's seat

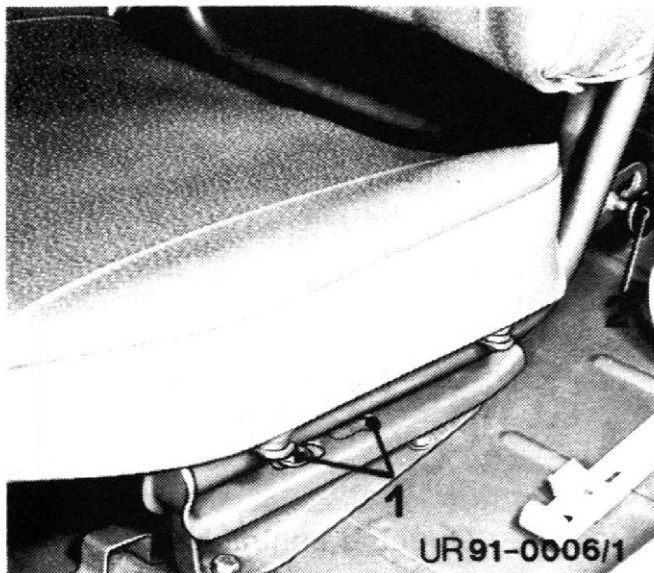


Figure 8 Seat adjustment, 404.1

- 1 Longitudinal adjustment
- 2 Tilt of backrest

## 1.5 Seats, Vehicle Tools

The driver's seat has three modes of adjustment, figure 7.

### 404.1

For longitudinal adjustment press seat forward and lift out in upward direction.

To adjust backrest press button (2), figure 8.

The **chock**, located in vicinity of fuel tank, is fastened with a spring hook.

The **vehicle tools** are located below the asst. driver's seat. Disengage rubber tensioning band and remove seat cushion.

## 1.6 Special Equipment

These operating instructions apply to the standard vehicle and to some special equipment. Please refer to the instructions concerning operation, maintenance and technical data applicable to your vehicle.

## 2 Operating Instructions

### 2.1 Instruments and Controls

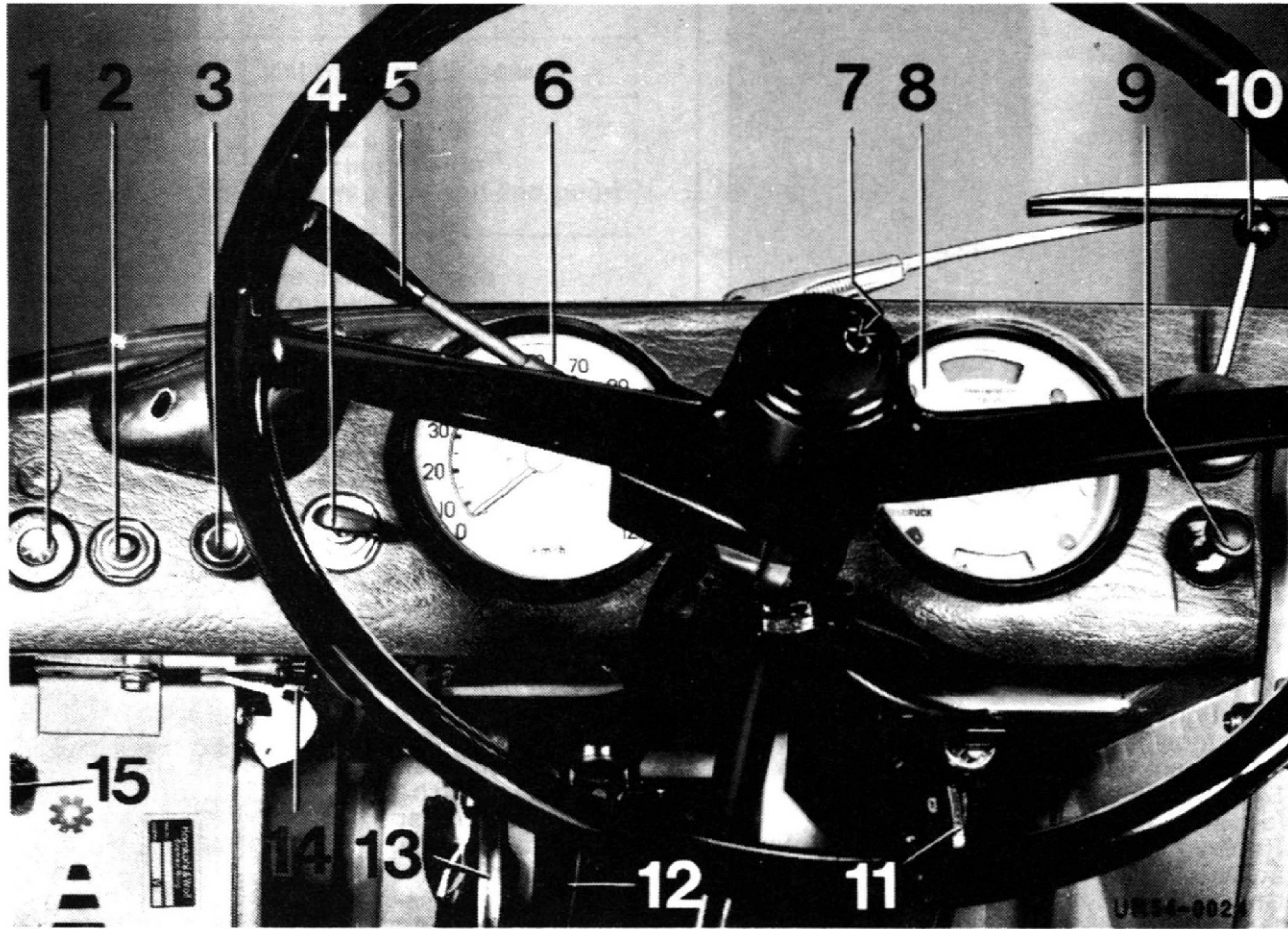


Figure 10 Location of instruments and control levers, 404.0

- |  |   |
|--|---|
| 1 Switch for hazard warning flasher system       | 9 Choke control cable                           |
| 2 Starter switch                                 | 10 Hand throttle                                |
| 3 Pull switch for windshield wiper/washer system | 11 Brake pedal                                  |
| 4 Switch box                                     | 12 Clutch pedal                                 |
| 5 Turn signal/horn/dimmer switch                 | 13 Parking brake lever                          |
| 6 Speedometer or tachograph                      | 14 Socket (1-pin)                               |
| 7 Turn signal indicator light for the trailer    | 15 Switch for heating and ventilation equipment |
| 8 Instrument cluster                             |   |

#### 2.1.1 Instruments

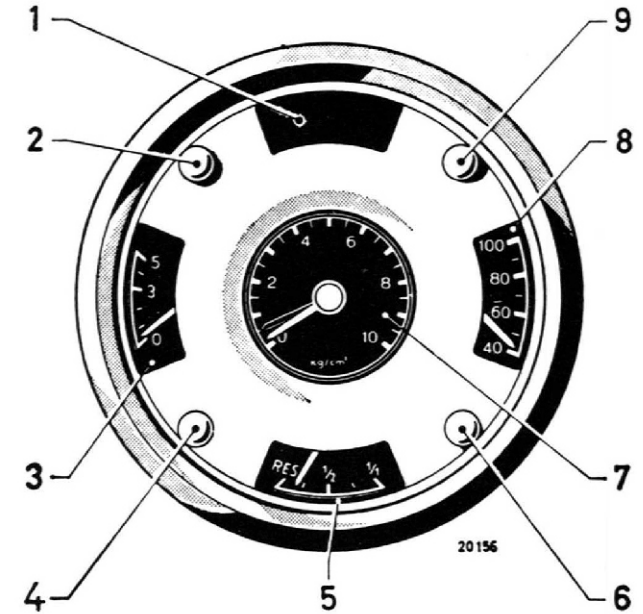


Figure 11 Instrument cluster

- 1 Brake system warning light (red)
- 2 Turn signal indicator light (green)
- 3 Oil pressure indicator
- 4 High beam indicator light (blue)
- 5 Fuel gauge
- 6 Charge indicator light (red)
- 7 Dual brake pressure gauge  
White needle = reservoir pressure  
Red needle = brake pressure
- 8 Coolant temperature gauge
- 9 Turn signal indicator light for 2nd trailer (green)

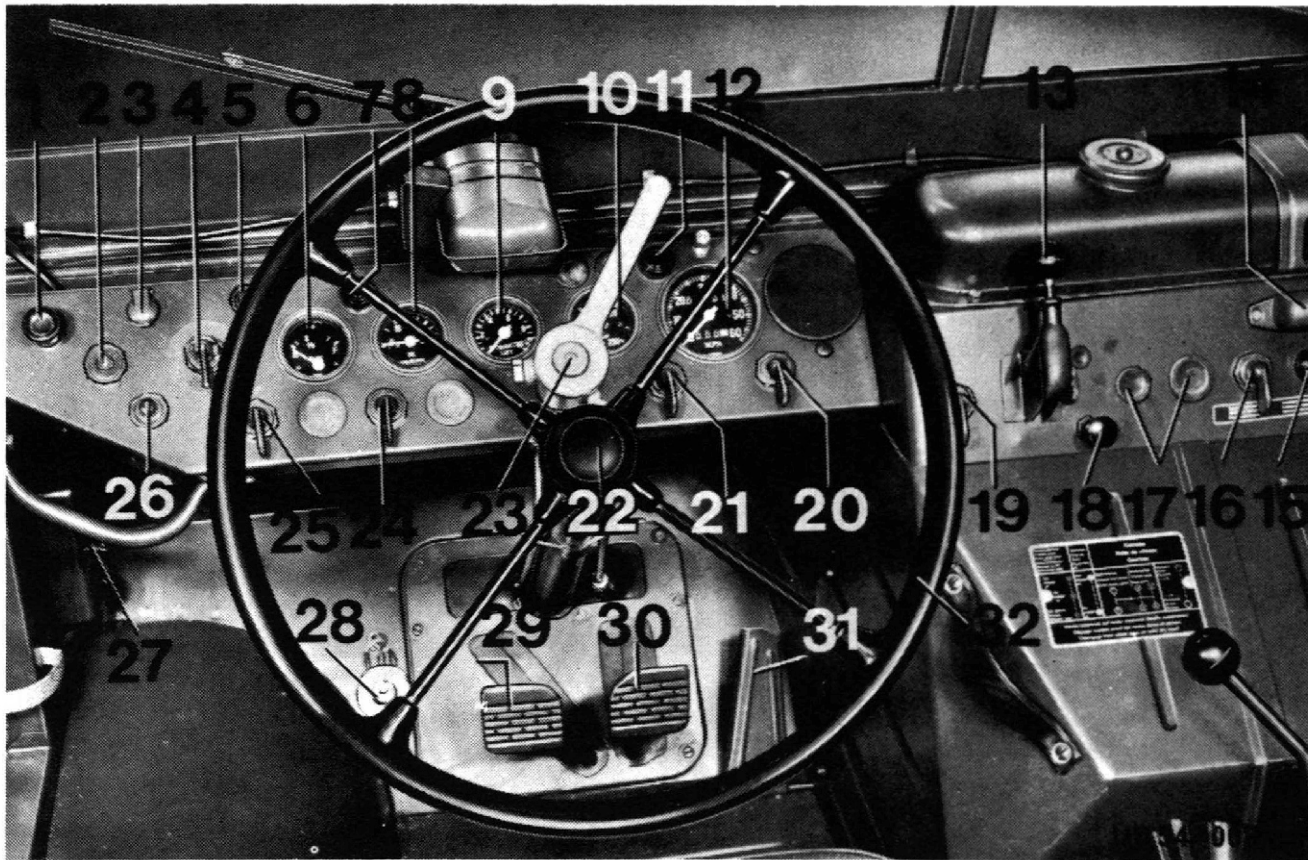


Figure 12 Location of instruments and control levers, 404.1

- |    |                                     |    |   |    |                              |
|----|-------------------------------------|----|---|----|------------------------------|
| 1  | Access to hood latch                | 13 | Hand throttle   | 22 | Horn button                  |
| 2  | Starter switch                      | 14 | Map light   | 23 | Hand brake valve             |
| 3  | Socket                              | 15 | Indicator light for supplementary equipment (supplementary fuel pump) | 24 | Socket switch                |
| 4  | Master light switch                 | 16 | Switch for supplementary equipment (supplementary fuel pump)          | 25 | Switch for instrument lights |
| 5  | Charge indicator light              | 17 | Reserved for switches for supplementary equipment                     | 26 | Starter switch               |
| 6  | Fuel gauge (rear fuel tank)         | 18 | Choke control cable   | 27 | Ventilation flap             |
| 7  | High beam indicator light           | 19 | Turn signal switch  | 28 | Dimmer switch                |
| 8  | Oil pressure gauge                  | 20 | Switch for windshield wiper, right                                    | 29 | Clutch pedal                 |
| 9  | Dual brake pressure gauge           | 21 | Switch for windshield wiper, left                                     | 30 | Brake pedal                  |
| 10 | Coolant temperature gauge           |    |   | 31 | Accelerator pedal            |
| 11 | Turn signal indicator light         |    |   | 32 | Steering wheel               |
| 12 | Speedometer with reset for odometer |    |   |    |                              |

## 2.1.2 Shifting Levers

### Transmission

Shift lever	Shifting positions	
1	1st—6th	1st through 6th gear
2	V O R	Forward Neutral position Reverse (1st and 2nd gear)
3	O VA VA+AS	Rear-wheel drive Four-wheel drive Four-wheel drive and differential locks
4	O E	Pto disengaged Pto engaged

Explanation of figure 13 and 16

### Supplementary crawler gear set

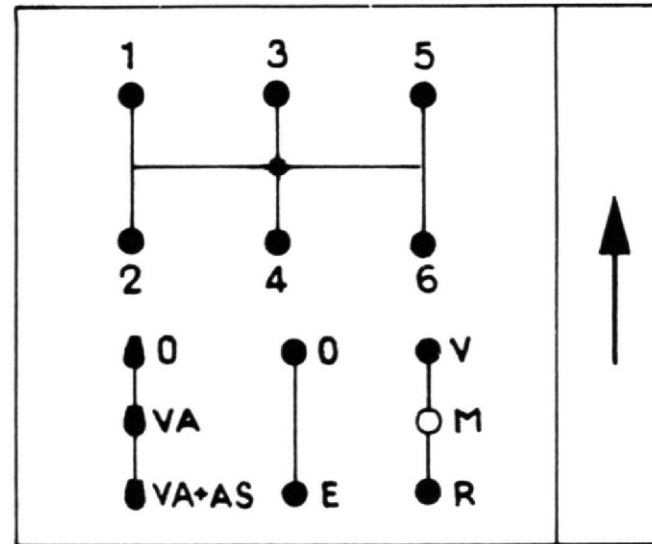
#### I Crawler gear shifting lever

- E Engaged
- A Disengaged

#### II Forward/reverse shifting lever

- V Forward
- M Neutral position
- R Reverse

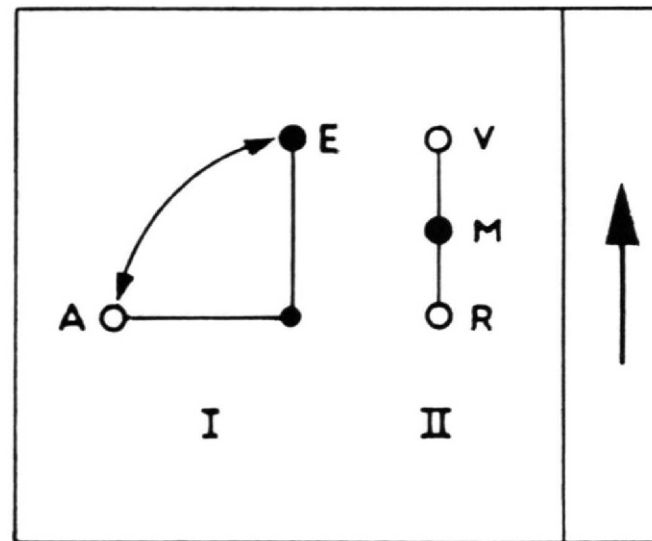
### Transmission



UZ 26 - 0114

Figure 13 Shifting positions

### Supplementary crawler gear set



UZ 26 - 0115

Figure 14 Shifting positions

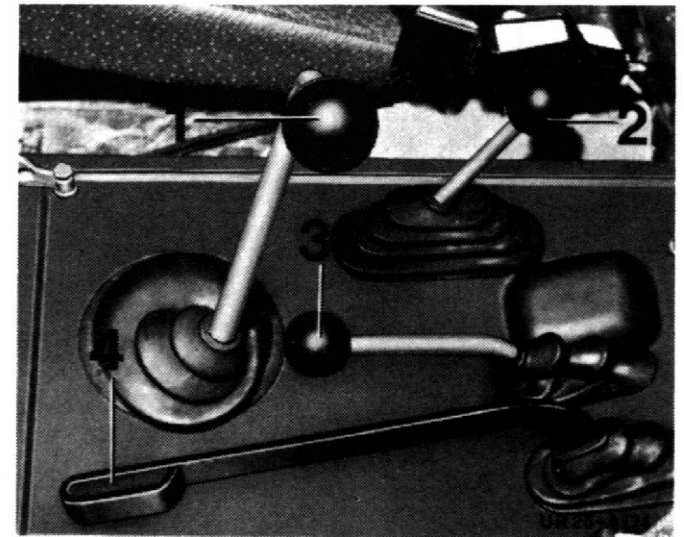


Figure 15 Shifting levers

- 1 Main shifting lever
- 2 Forward/reverse shifting lever
- 3 Pto shifting lever
- 4 Four-wheel drive/differential lock shifting lever

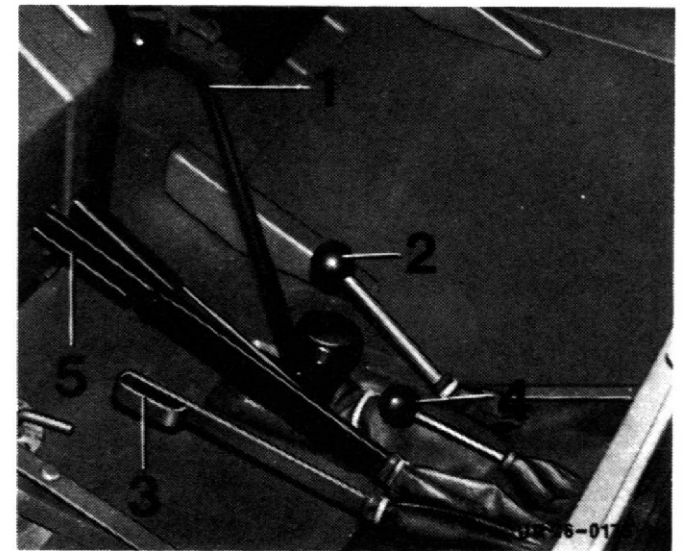


Figure 16 Shifting levers, 404.1

- 1 Main shifting lever
- 2 Forward/reverse shifting lever
- 3 Four-wheel drive/differential lock shifting lever
- 4 Pto shifting lever
- 5 Parking brake lever

## 2.1.3 Switches

### 1 Switch box, starter switch and battery master switch.



Figure 17 Switch box, 404.0

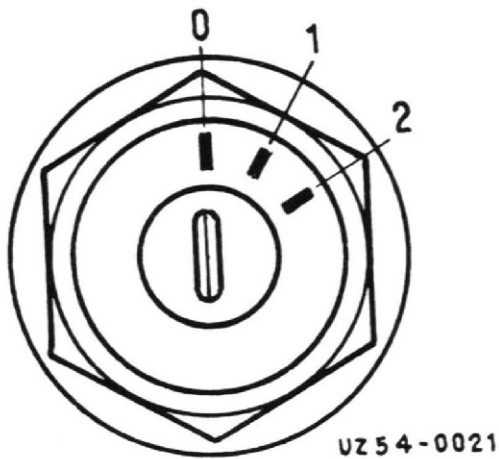


Figure 18 Switch box, 404.1

- 0 Off
- 1 Charge indicator light
- 2 Starting and driving position

### Switch box – explanation of figure 17

Switch position	Current consuming units
0 *	<b>Off</b> Socket, interior light Hazard warning flasher system
P	<b>Parking position</b> Parking light, clearance lights Instrument lighting Hazard warning flasher system Interior light Socket in cab
1	<b>Driving position</b> Charge indicator light Starter switch Horn, socket, interior light Turn signal and stop lights Windshield wipers Heating and ventilation system Instrument activation Hazard warning flasher system Back-up lights
2	<b>As position 1 plus:</b> Parking light, clearance lights (also with supplementary headlights) Instrument lighting Working light, rear
3 *	<b>As position 1 and 2 plus:</b> Low and high beam High beam indicator light

\* Depress switch box key when switching from position "0" to "P" and from "3" to "2"

The switch box key can only be inserted and removed when in position "0" and "P" – figure 17.

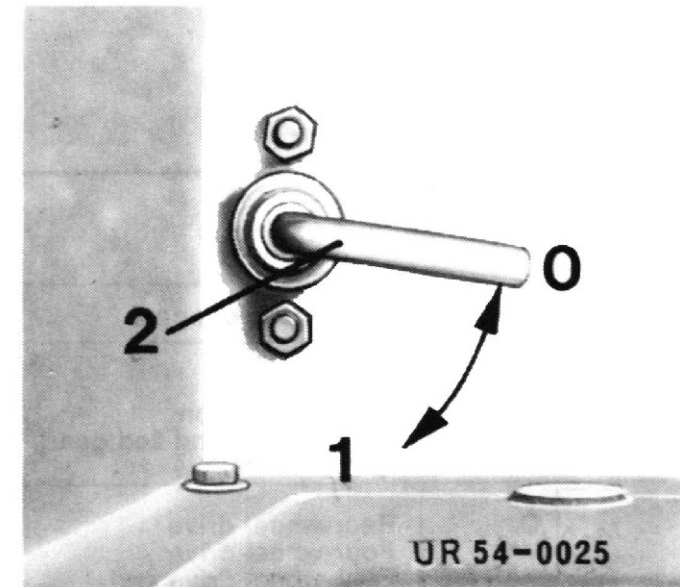


Figure 19 Battery master switch under driver's seat 404.1

- 0 Off
- 1 On
- 2 Switch key

### 404.1

The switch box key can only be inserted and removed when in position "0".

With a **battery master switch** (cutout switch) installed the negative cable from battery to frame can be disconnected and the entire vehicle network can thus be switched off.

The switch box key can be removed when in "Off" position.

**2 The main light switch** permits various switch positions for lighting the vehicle.

To switch from the main light circuit to the black-out light circuit, the arresting pin (1) is depressed with the switch-box key point and the locking bolt (2) is pushed to the left.

When switching back from the black-out circuit to the main light circuit (from 0 to day) press switch lever downwards.

**Switch positions**

Explanation of figure 20

**Main light circuit**

- Position "Day" = switched off
- Position "1" = parking light, clearance lights and instrument lighting.
- Position "2" = high/low beam in addition

**Black-out circuit**

- Position 0 = turned off
- Position 1 S = convoy light and black-out brake light, rear
- Position 2 S = black-out light, front only
- Position 3 S = black-out light, front and rear

**Note:**

The brake lights of the main and black-out light circuits only light up with the ignition turned on.

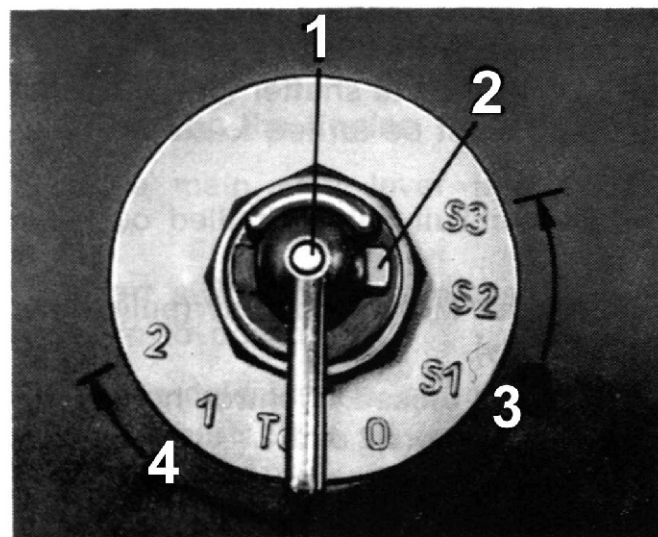


Figure 20 Main light switch

- 1 Arresting pin
- 2 Locking bolt
- 3 Black-out circuit
- 4 Main light circuit

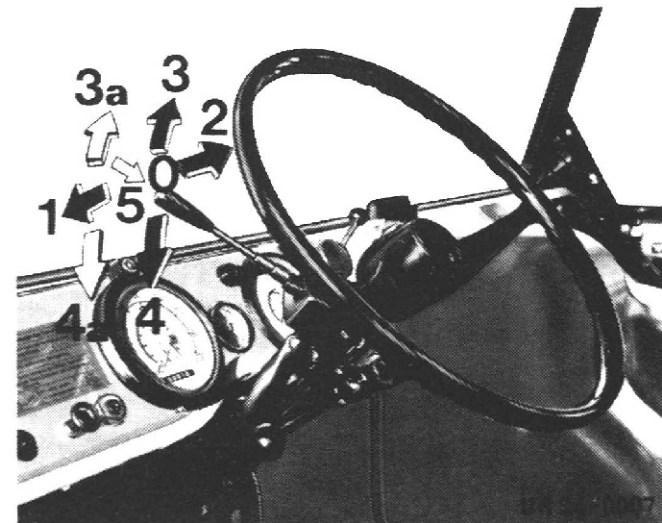


Figure 21 Turn signal, horn and dimmer switch

- 0 Low beam
- 1 High beam
- 2 Headlight flasher (optional)
- 3 or 3a Turn signal right
- 4 or 4a Turn signal left
- 5 Horn

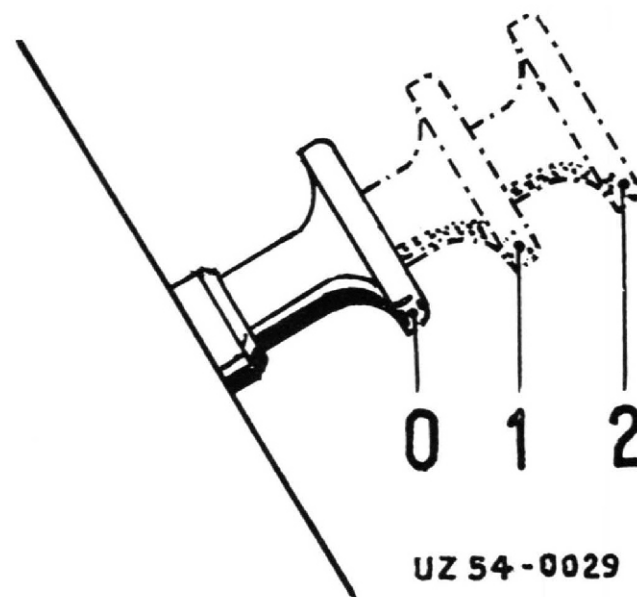


Figure 22 Switch for windshield wiper and washing system

- 0 Off
- 1 Windshield wiper
- 2 Windshield wiper and washing system

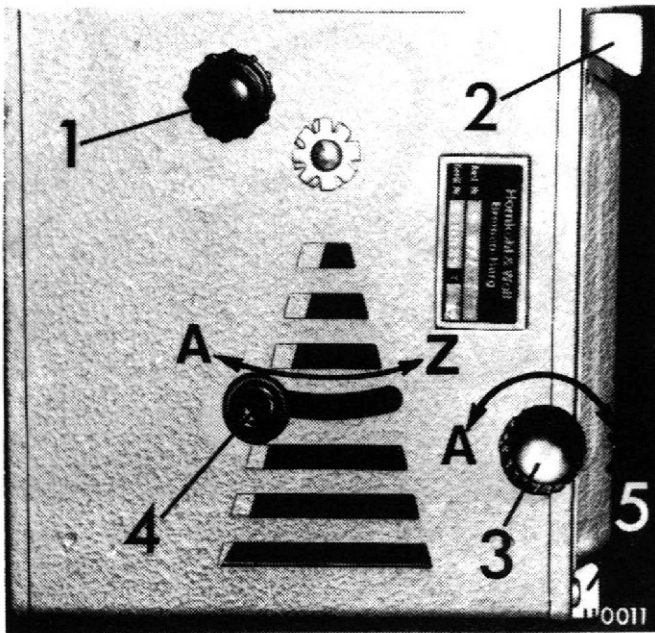


Figure 23 Heater (front view)

#### Explanation of figure 23 und 24

- 1 Blower pull switch (2 stages)
  - 2 Lateral shutter for heated air control in the driver's foot well
  - 3 Knob for cooling control
  - 4 Rear shutter for heated air control in cab
  - 5 Lateral shutter for direct fresh air inlet into driver's foot well
- A Open  
Z Closed

### 2.1.4 Heating and Ventilation System

#### Heating

The heated coolant is controlled with knob 3. The heated air is controlled with the 2-stage blower pull switch 1.

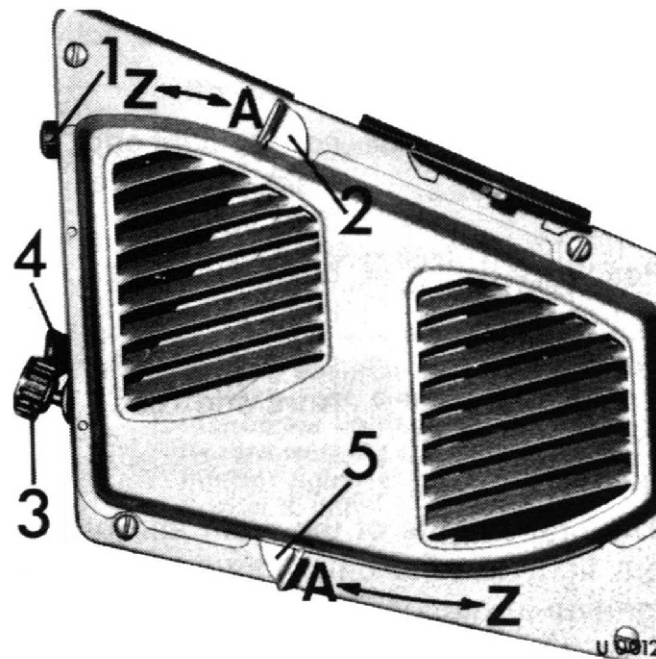


Figure 24 Heater (side view)

#### Ventilation

In the summer months the fresh air flow is controlled with the 2-stage blower pull switch (1) and the shutter (5). To do this knob (3) must be turned to closed position.

**1st Stage:** Full output (pulled out half-way).

**2nd Stage:** Medium output (pulled out completely).

Shutter (5) closed. Control heated air flow with shutters 2 and 4.

For faster windshield defrosting close shutters 2 and 4 until adequate visibility is obtained.

In addition the foot well on the assistant driver's side can be heated or ventilated with the control knob.

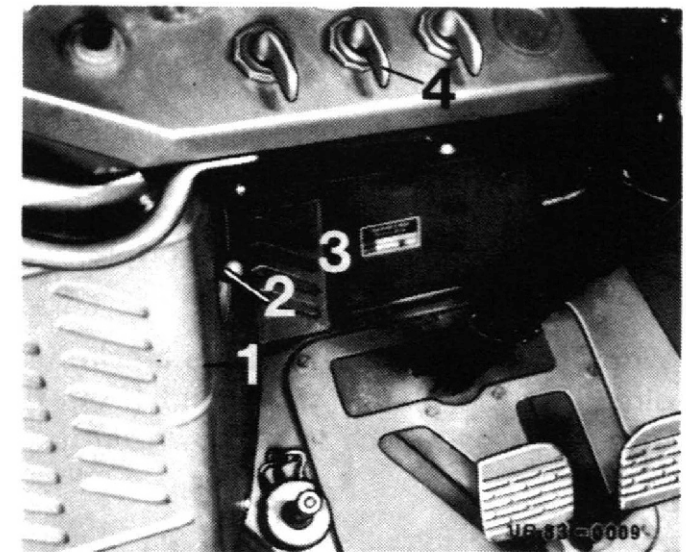


Figure 25 Heating and ventilation system 404.1

- 1 Blower
- 2 Lever for fresh air flap
- 3 Heat exchanger
- 4 Switch for blower

#### 404.1

#### Heating

Open both shut-off cocks in the engine compartment. Blower can be turned on in addition.

#### Ventilation

During the summer close both shut-off cocks.

Open fresh air flap.

Turn on blower.

## 2.2 Putting the Vehicle into Operation

### 2.2.1 Preparations Before Starting

1 Check coolant level in compensation tank. Prior to opening compensation tank cap, press button of safety valve in order to release any excess pressure.

#### 404.1

Not applicable to this vehicle.

The coolant in a cold engine should reach up to 30 mm below the upper edge of the compensation tank filler opening. **When replenishing the tank with water** be sure to add 10 cm<sup>3</sup>/lit. of anti-corrosion agent.

During winter operation make sure that a sufficient quantity of antifreeze is in the coolant.

Open knob of heating system all the way when providing tank **with a new fill**. Refer to 2.1 to 2.1.4.

Run engine at increased idling speed until the thermostat opens at approximately 78° to 80° C and the coolant level remains constant in the compensation tank thereafter. For filling capacity refer to 4.2.

Check **engine oil level** only when vehicle is positioned on level ground. If possible the oil level should be at the maximum mark. This is necessary particularly

during extended operation at extreme tilt as well as when operating implements.

**Do not fill beyond the maximum mark!**

Check **tire pressure**.

Check **lighting system**.

Check **brake system**.

#### **Important!**

Put vehicle into operation only after red warning light in the instrument cluster has gone out or an air pressure of 5.2 bar (kp/cm<sup>2</sup>) is registered on the dual pressure gauge.

**For trailer operation** adhere to instructions listed under 2.2.13.

**For winter operation** refer to instructions listed under 2.3.

### 2.2.2 Starting the Engine

1 Move main shift lever into center position.

2 Insert switchbox key into switchbox and turn to position 1:

3 With a cold engine, pull out throttle control cable all the way.

**Note:** With the engine at operating temperature **do not** pull out starter control cable. This is particularly the case while driving.

With high ambient temperatures, high tractive load and implements mounted

in front, switch on supplementary fuel pump if available, in order to counteract any possible fuel evaporation.

#### 404.1

During operation with supplementary fuel pump turn fuel switch-over cock to reserve (front tank) since the pump will only supply fuel from this tank.

4 Declutch and **do not** immediately operate accelerator pedal.

5 Operate starter switch. Engine starts. Release starter switch immediately after engine has started since the starter can otherwise be damaged.

If the engine does not start, repeat starting procedure after engine and starter have come to a stop. During repeated starting attempts, allow for recovery intervals to protect the battery.

#### **Note:**

#### 404.1

Pay attention to fuel cock and switch to reserve if necessary. Figure 26.

6 After the engine has started completely depress accelerator pedal and at the same time watch the oil pressure gauge.

If no oil pressure can be noted with the engine running, turn off the engine immediately and determine the cause.

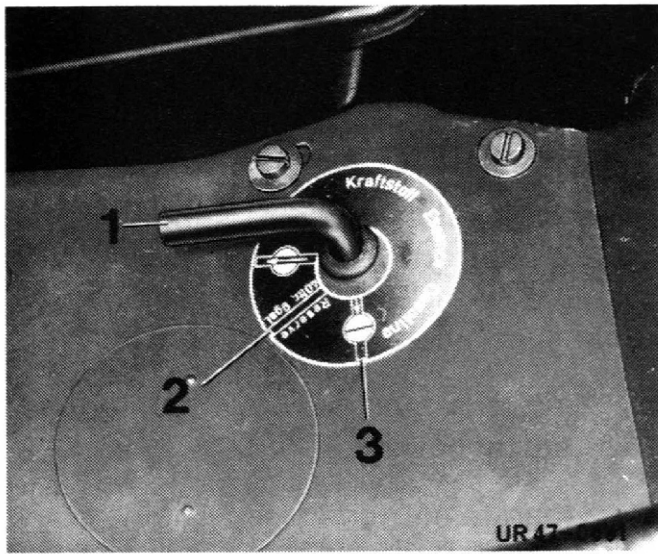


Figure 26 Fuel cock 404.1

- 1 Open
- 2 Reserve (front tank)
- 3 Closed

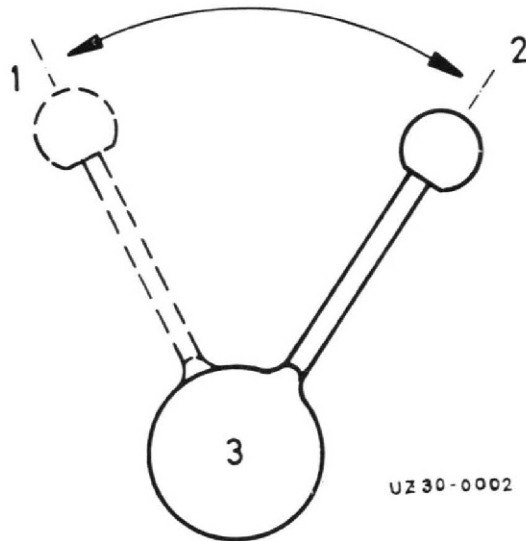


Figure 27 Hand throttle

- 1 Full load position
- 2 Idle position
- 3 Locking disc

#### 404.1

Pull hand throttle lever to the rear. Slowly push the starter control cable back as far as the engine will permit while still running true.

Push the starter control cable back all the way as soon as possible. At the latest when the engine is running true and smooth. When the coolant temperature of approximately 60° C has been reached the starter control cable should be pushed all the way in.

#### 2.2.3 Running-in

It is decisively important for the service life and operational safety that the engine and drive train of a new vehicle, an exchange engine or reconditioned engine **are not run at full load during the first 1500 km.**

Complete the specified service work according to schedule E once during the run-in period after 300 to 1000 km.

#### 2.2.4 Stationary Operation

For operation with the PTO as well as for operation at low speed, the desired engine speed can be set with the hand throttle. To do so tighten locking disc.

**When operating the stationary vehicle with PTO engaged be sure that the main shift lever is positioned between the 5th and 6th gear in order to ensure the oil supply to all rotating members of the transmission.**

#### 2.2.5 Stopping the Engine

Place switchbox key in 0 position. Do not stop the engine immediately if the coolant temperature is above 90° C but keep it running for another one or two minutes at an increased idling speed so that the coolant remains in circulation and is not ejected by the reheating effect of the engine.

## 2.2.6 Transmission shifting

The synchromesh transmission has 6 forward and 2 reverse speeds. For **road operation** the speeds 3, 4, 5 and 6 are sufficient, i. e. the vehicle can be started in 3rd gear. 1st and 2nd gear are intended for **higher tractive efforts** and low speeds. These ratios are obtained by a prestage in the transmission. The prestage is engaged by moving the main shift lever transversely from the idling speed position between the 3rd/4th gear to the idling speed position between 1st/2nd gear. Moving the lever transversely is a shifting operation similar to shifting a gear step and is permitted only while the clutch is disengaged with the engine running.

For **reverse driving** with the main shift lever in position 1 or 2 shift the short forward/reverse shift lever into reverse **with the vehicle stopped** after having previously declutched.

During repeated forward and reverse driving leave the main shift lever in position 1 or 2 and only shift into forward and reverse with the short forward/reverse lever.

In gear position 3 through 6 forward/reverse shift lever cannot be shifted into reverse.

Visaversa the position 3 through 6 cannot be shifted while in reverse position.

The **gear shift block in the 3rd gear** prevents an accidental shifting from 1st to 2nd gear into 5th and 6th gear.

Only after shifting into 3rd gear can the following gears 4 to 6 be shifted.

## 2.2.7 Supplementary Crawler Gear Shifting

Crawler gears can only be operated in 1st and 2nd forward speed. The shifting operation should only be carried out with the engine at idle speed and while declutching. To do so place the forward/reverse shift lever in center position. Figure 14.

## 2.2.8 Shifting of PTO, PTO Operation

Shifting the PTO may be accomplished with the vehicle stopped and while the clutch is disengaged. The PTO may be engaged and disengaged with the PTO shift lever.

Due to the type of drive in connection with the single-plate clutch the PTO drive becomes known as the **transmission driven PTO**.

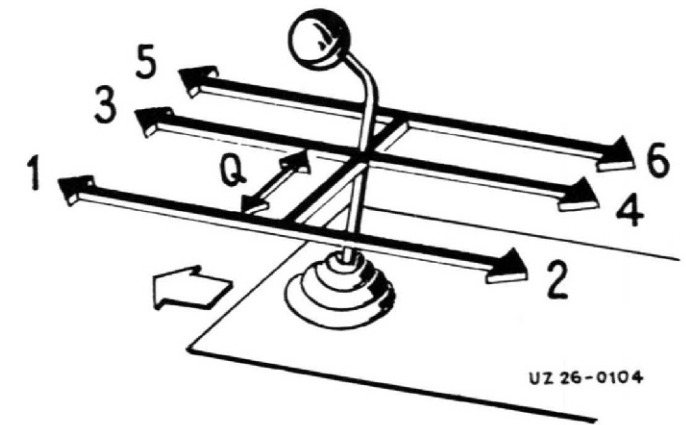


Figure 28 Gear shift pattern

Q Transverse shifting

## 2.2.9 Four-Wheel Drive, Differential Locks

If, under difficult ground conditions or with a high total towed weight, the ground adhesion of the rear wheels is no longer sufficient, engage the four-wheel drive or the four-wheel drive **with** differential locks. This will provide high tractive power for the vehicle in spite of its low vehicle weight. Placing an additional load on the platform will further improve the ground adhesion.

**The four-wheel drive and the differential locks can be engaged while driving without declutching** but only as long as the wheels are not spinning, i. e. as long as the wheels are rotating with traction.

The four-wheel drive/differential lock lever has two positions. The first position = four-wheel drive, second position = differential locks.

The operation is mechanically controlled.

If a wheel spins when the four-wheel drive or the differential locks are engaged, declutching is required, so that all wheels turn at a uniform speed or the vehicle comes to a stop.

**The differential locks and the four-wheel drive can also be disengaged while driving without declutching.** Briefly release accelerator pedal when disengaging the four-wheel drive.

Try not to engage the differential locks when cornering on roads so as to avoid any additional loads.

With the differential locks engaged the turning circle increases as a result of the forced wheel slippage.

For special information concerning cross-country operation refer to 3.7.4.

## 2.2.10 Instruments, Indicator Lights

Check instruments and indicator lights occasionally while driving. The most favorable coolant operating temperature is approximately 80° C and can be monitored on the coolant temperature gauge. At this temperature the engine wear and the fuel consumption are lowest. If at all possible the operating temperature should not exceed 90° C.

## 2.2.11 Brake System

Set off with the vehicle only after the red warning light in the instrument cluster has gone out or at least 5.2 bar (kp/cm<sup>2</sup>) are indicated on the dual pressure gauge. Warning light and compressed air pressure gauge are omitted on a vehicle **without** compressed-air system.

The service brake system is a single or dual-circuit system and acts hydraulically on all four wheels.

### 404.1

Fitted only with a single circuit brake system.

With a **compressed-air brake assistance system** installed the pedal pressure during a braking operation is assisted in a given ratio with the aid of the compressed-air brake booster.

On vehicles with a single-circuit brake a **vacuum brake** may also be installed which will take over a portion of the available brake force during a braking operation only with the engine running.

The **parking brake system** serves as an auxiliary brake. It acts mechanically on the rear wheels. With a trailer coupled, which has a compressed-air trailer brake system installed, a graduated braking action is initiated when operating the parking brake system.

### 404.1

With the parking brake valve on the steering column graduated compressed air braking action can be applied to the trailer independent of the tractor unit. This is necessary particularly when driving downhill and with heavy trailer loads.

2.2.12 Not Applicable to this Vehicle.

### 2.2.13 Trailer Operation

Coupling trailer.

For trailer loads refer to 6.10.2.

In order to prevent damage to the trailer coupling which might impair safety, only trailers with towing eyelets corresponding to DIN 74051 or the military towing eyelet may be used. Refer to 6.10.

**Be careful when coupling a trailer, particularly when inexperienced people are assisting!**

**1** Prior to coupling, brake trailer by means of its parking brake and if necessary secure with wheel chocks. If on trailers with overrunning brake, the tow-bar is raised without securing the trailer by means of wheel chocks the trailer may start to move immediately and cause serious accidents.

**2** Adjust tow-bar of trailer to height of coupling!

**3** Be careful when backing up the UNIMOG. **The assistant driver must never stand between UNIMOG and trailer when coupling.** While standing beside the vehicle he should give the driver agreed signals as to how and in which direction to drive.

**4** Check for proper engagement of coupling pin each time trailer is coupled.

**5** Connect **trailer supply hose** to palm coupling. This will automatically open a valve which switches the brake booster to trailer operation with the aid of the 3/2-way valve. This will reduce the brake assistance of the vehicle and the obtainable decelerations of the UNIMOG and the trailer are matched.

**6** Connect **trailer brake hose.**

**7** Plug **electric line plug** into appropriate trailer socket and secure with hinged cover.

**Note:** With two sockets (12 V and 24 V) only the standard plug according to DIN 72577 = 12 V or DIN 72579 = 24 V can be inserted into the appropriate socket.

**8** Adjust **brake power control valve** of trailer according to load carried.

**9** Loosen trailer **parking brake** and remove wheel chocks.

**10** Watch **dual brake pressure gauge** and do not set off until the red warning light goes out.

#### 404.1

To Item 5.

Connect supply hose to palm coupling (red), then connect brake hose to palm coupling (yellow). Open both shut off cocks.

The automatic palm couplings as well as the switch-over device of the compressed air brake booster are not applicable to this vehicle.

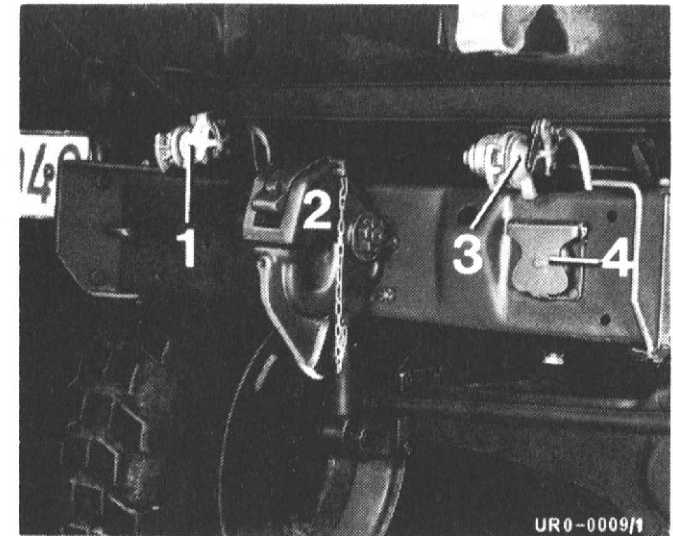


Figure 29 Trailer connections

- 1 Palm coupling (brake line)
- 2 Trailer coupling
- 3 Palm coupling (supply line)
- 4 Socket (24 V)

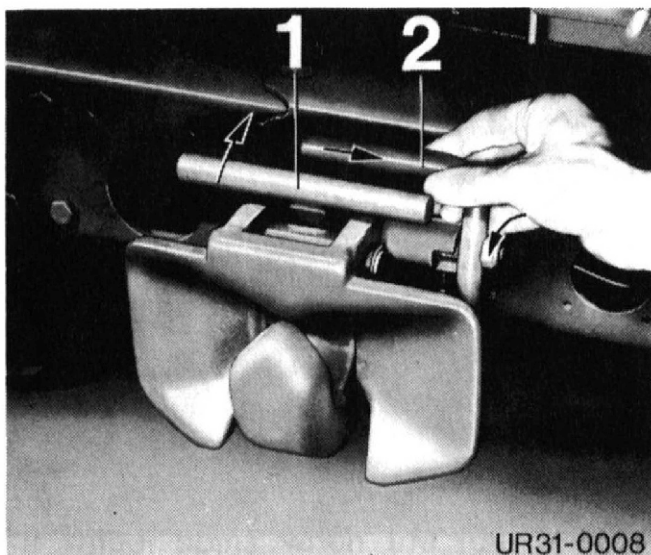


Figure 30 Opening trailer coupling

- 1 Hand lever
- 2 Securing bolt

### Trailer operation

**For safe trailer operation while driving it is important that the ratchet rod of the parking brake is released all the way up to the stop.**

When stopping and parking on a gradient while carrying a heavy trailer load, engage four-wheel drive and first gear to support the parking brake system, which acts only on the rear wheels of the UNIMOG.

With compressed-air control for the trailer brake system installed, the parking brake system will also act upon the trailer brake system.

### 404.1

During prolonged downhill driving with trailer, operate the hand brake valve at the steering column. Graduated braking independent of the tractor vehicle prevents a possible "pushing" of the trailer.

**When carrying trailer loads, also always load the auxiliary platform up to its permissible payload in order to improve the operational safety in general.**

### Uncoupling trailer

- 1 Engage trailer parking brake.
- 2 Secure trailer by means of wheel chocks.
- 3 Pull electric line plug out of trailer's socket.
- 4 Uncouple **trailer supply hose** from palm coupling (red) and then uncouple **trailer brake hose** from palm coupling (yellow) or from single-line palm coupling (black).
- 5 Pull safety button and open trailer coupling by means of hand lever.

**Note:** Seal off palm couplings immediately after uncoupling in order to prevent dirt from reaching the gaskets.

## 2.3 Winter Operation

The constant operational readiness of the vehicle is also assured when the following items are adhered to.

### 2.3.1 Engine Oil

During constant ambient temperatures below  $-0^{\circ}\text{C}$  change oil in the engine from heavy summer oil to light winter oil SAE 10 W at the **proper time**. The light winter oil facilitates starting and ensures adequate lubrication even at low ambient temperatures. Refer to 4.5.

### 2.3.2 Coolant

The cooling system has been filled with antifreeze to  $-25^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$ ) by the plant.

The antifreeze concentration must be checked several times during the cold season.

When adding coolant observe the mixing ratios set forth under 4.5!

#### Vehicles without antifreeze

If no antifreeze is available, the coolant must be drained at an ambient temperature of  $0^{\circ}\text{C}$ . To do so open **drain valve** or **drain plug of engine and radiator**. Refer to 3.4.



Figure 31 Antifreeze filling to  $-25^{\circ}\text{C}$  or  $-13^{\circ}\text{F}$

#### 404.1

With engine and battery preheating, additionally open drain plug at heat exchanger (water bushing) below the radiator.

With heating and ventilation system open shut off valves and drain cock of heating circuit in the engine compartment.

To drain coolant, unscrew cap of the coolant expansion tank. Also refer to 3.4.

**2.3.3** Not Applicable to this Vehicle.

### 2.3.4 Batteries

Keep batteries fully charged by careful servicing and low current consumption. The efficiency of batteries exposed to the cold is reduced. Recharge battery after prolonged storage. For freezing points of battery electrolyte refer to table under 3.10.6.

#### 404.1

On vehicles with engine and battery preheating:

Open battery box.

The battery preheater must only be switched on at temperatures below  $0^{\circ}\text{C}$ .

#### Important information:

However, it is imperative to pay attention that the system is switched off again at an ambient temperature above  $0^{\circ}\text{C}$ , since otherwise the battery electrolyte is heated excessively and increased evaporation of same occurs.

### 2.3.5 Starting at Low Temperatures

Starting in cold weather requires a full battery capacity. Therefore, switch off any unnecessary power consumers. De-clutch, completely depress accelerator pedal and start. Also refer to 2.3.8.

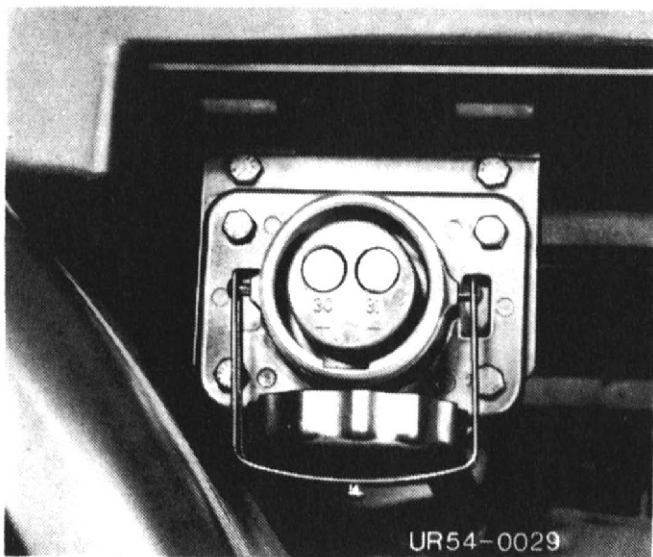


Figure 32 Auxiliary power receptacle  
404.1

2.3.6 Not Applicable to this Vehicle

### 2.3.7 Engine and Battery Preheating System

At extremely low ambient temperatures, the battery and the coolant in the engine circuit can be preheated by installing a preheating system.

The heater is electrically ignited and is operated with the fuel in the vehicle fuel tank.

Be sure to follow heater operating instructions.

404.1

### 2.3.8 Auxiliary Power Receptacle

Via the auxiliary power receptacle, the vehicle can be connected to an auxiliary power source.

It is thus possible to start the vehicle via an auxiliary power source, or to charge the battery if there is a battery failure or if it is insufficiently charged. Vice versa, starting aid can be given another vehicle with a 24 V system.

When starting pay attention to the same starting aids as described under 2.3.5.

### 2.3.9 Tire Chains

If required place tire chains on all four wheels if at all possible.

By engaging the four-wheel drive, the driving safety is increased on roads and off roads as well as on ice and snow.

After installation check turning angle of the wheels.

### 2.3.10 Compressed-Air System, Antifreeze Unit

To protect the entire compressed-air system against freezing fill up antifreeze unit with **ethyl alcohol** (fuel alcohol) antifreeze.

With ambient temperatures from  $+5^{\circ}\text{C}$  to  $-3^{\circ}\text{C}$  the danger of ice formation in pipes and brake valves is greatest.

#### Vehicle without antifreeze unit

- 1 Drain condensate.
- 2 Loosen screw connection behind pressure regulator, fill about  $\frac{1}{4}$  liter anti-freeze into pipe and reconnect again. **Be sure** to check that screwed connection is tightened leak proof.
- 3 Start engine and after obtaining the operating pressure, depress and release brake pedal several times so that the injected antifreeze is distributed onto the frost sensitive areas and the excess antifreeze can collect in the compressed-air tank.
- 4 After two weeks – in the meantime do not drain liquid from the compressed-air tank – add another  $\frac{1}{4}$  liter of anti-freeze as described above.
- 5 Add antifreeze every two weeks.

## Vehicle with antifreeze unit

When operating the antifreeze unit during the winter a wick is pulled into the top position with the adjusting lever, and thus into the air stream. The air flowing past is thus enriched with ethyl alcohol, which then reaches the entire compressed-air system.

To operate the antifreeze unit, set adjusting lever to winter position. To do so, turn adjusting lever until it is automatically pushed upwards. Also refer to 3.9.8.

### 404.1

#### Antifreeze unit pump

Operate antifreeze unit pump several times with the engine running. Prior to this, lower tank pressure to approximately 3 bar (kp/cm<sup>2</sup>) by operating the brake pedal. The injected antifreeze agent is then immediately distributed evenly by the air stream.

During damp cold operate three or four times daily.

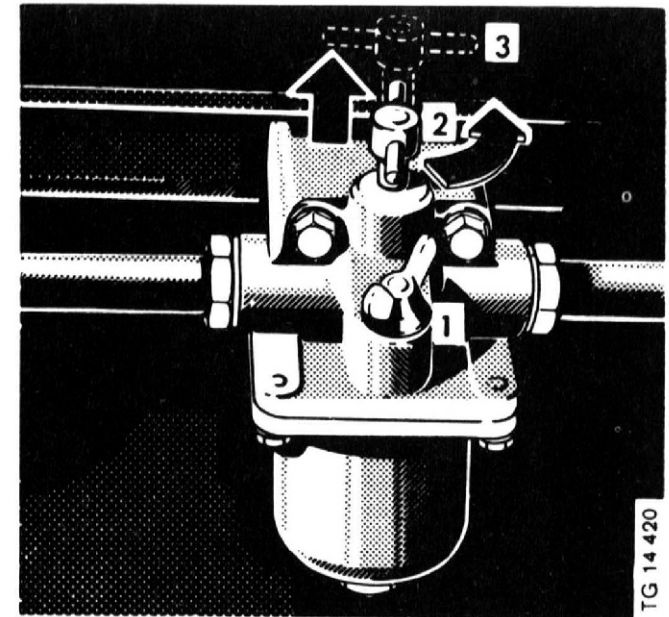


Figure 33 Antifreeze unit

- 1 Filler neck and dipstick
- 2 Adjusting lever (summer position)
- 3 Adjusting lever (winter position)

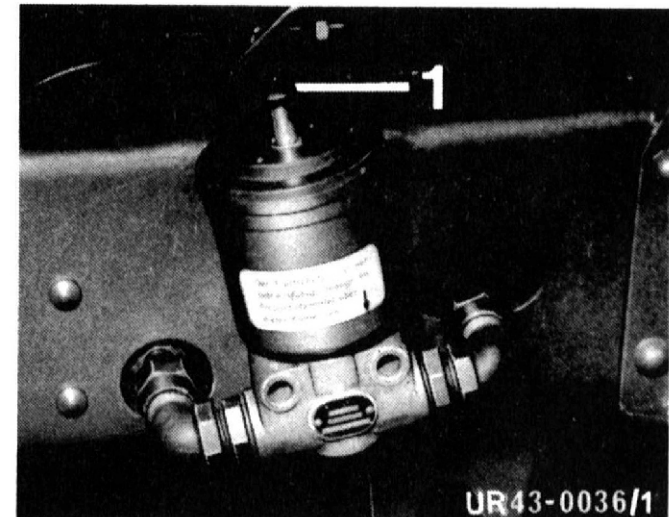


Figure 34 Antifreeze unit pump 404.1

- 1 Operating button



## 3 Maintenance Instructions

### 3.1 Maintenance Summary

#### 3.1.1 General

The maintenance work specified for the vehicle is set down in the Service Booklet.

The maintenance intervals are based on Kilometers (km).

The maintenance work is to be completely carried out after the specified maintenance intervals.

**Thoroughly clean grease nipples, oil filler and oil drain plugs prior to lubricating.**

#### 3.1.2 Maintenance Schedule

	Maintenance interval		Work schedule	Work to be carried out
		km		
<b>Normal operating conditions</b>		<b>300 to 1 000</b>	E	refer to 3.1.4
		<b>4 000</b>	A	
		<b>8 000</b>	B	
		<b>12 000</b>	A	
		<b>16 000</b>	B	
		<b>20 000</b>	A	
		<b>24 000</b>	B	
		<b>28 000</b>	A	
		<b>etc.</b>	etc.	
<b>Aggravated operating conditions</b>		<b>2 000</b>	—	<b>engine oil change</b>
<b>Vehicles on stand-by only</b>		<b>twice * yearly</b>	—	<b>engine oil change</b>
		<b>every two years</b>	—	<b>transmission and axle oil change</b>

\* Spring and fall inspection

### 3.1.3 Extent of Maintenance Work

#### 1 Minimum maintenance required

This category includes maintenance

work specified in the maintenance work survey (refer to 3.1.4) and such work

which must be performed at shorter or longer intervals:

Maintenance intervals	Maintenance work	Instructions under
<b>After one hour of operation</b> after changing a V-belt	Check V-belt and retighten if required	3.4, 3.6, 3.9
		3.10
<b>50 km</b> after a wheel or tire change	Retighten wheel nuts	3.7.1
<b>Every three months</b>	Clean filter element of pressure regulator	3.9.3
<b>Twice yearly</b> (Spring and fall inspection)	Change engine oil	3.2.2
	Check chassis for paint damage, touch up paint if required. Treat chassis with protective wax.	3.12.3, 4.13
<b>Spring inspection</b>	Change engine oil viscosity class during an oil change (not required with multi-grade oil)	3.2.2
	Change brake fluid	3.8.2
	Check brake hoses and lines	3.4.8, 3.8.9
<b>Fall inspection</b>	Change engine oil viscosity class during an oil change (not required with multi-grade oil)	3.2.2
	Replace summer coolant by winter coolant or check proportional antifreeze content, replenish	3.4.1
		4.5
	Change antifreeze in antifreeze unit or in the antifreeze pump	2.3.10
<b>Once a year</b>	Clean oil bath air cleaner housing	3.2.10
	Change oil in power steering system	3.6.2
	Replace wiper blades	3.12.1
<b>Every two years</b>	Replace coolant hoses	3.4.6
	Change oil in transmission and axles	3.5
	Change antifreeze	4.5

## 2 Maintenance work as required

Maintenance interval	Maintenance work	Instructions under
<b>Depending upon the operating conditions</b> of the vehicle between maintenance intervals specified in the maintenance schedule	Check oil level in engine oil pan and in oil bath air cleaner, readjust if required Check coolant level, readjust if required Check coolant hoses Check clutch adjustment, readjust if required Check brake hoses and lines Drain condensate from compressed-air tank Check tire pressures, readjust if required Interchange wheels diagonally Retighten control arm screws, power plant mounting and connecting screws	3.2.2, 3.2.10 3.4.1 3.4.6 3.5.1 3.8.9 3.9.4 3.7.5 3.7.1 3.11.1, 6.13
<b>Depending upon the amount of soiling</b> between the maintenance intervals specified in the maintenance schedule	Oil change in oil bath air cleaner and clean oil bath air cleaner housing and cyclone Clean fuel prefilter and strainer of fuel pump Clean and check spark plugs Clean fuel idle jets Clean wheel brakes, check thickness of brake linings	3.2.10 3.6.2, 3.13.1 3.8.4

### 3.1.4 Maintenance Work Survey

Lube work (The numbers in paranthesis indicate the number of lube points)	Refer to	Fig. 35 Item	Work schedule			Inspection and cleaning work	Refer to	Fig. no.	Work schedule		
			E	A	B				E	A	B
Change engine oil, service oil filter	3.2.2	1	■	■	■	Retighten cylinder head bolts	3.2.5	40	x		
Replace oil filter element 00 184 43 25	3.2.3	1, 3	f	f		Check valve clearance, adjust	3.2.7	41, 42	x	x	x
Check oil level in air compressor, correct 404.1	3.9.2		■	■		Service fuel prefilter	3.3.3	55	x	x	x
Change oil in oil bath air cleaner	3.2.10	14	■	■		Service strainer of fuel pump	3.3.5	56	x		x
Check oil level in coolant pump, correct	3.4.2	1			⊘	Retighten intake and exhaust line connections as well as oil pan bolts			x		x
Check oil level in visco fan system, correct (2)	3.4.9	15			⊘	Clean distributor, check contact breaker points	3.2.12	44			x
Distributor, grease felt wick and oil nipple	3.2.12	1, 2			■	Check spark plugs <sup>2)</sup>	3.2.11			x	x
Distributor, check grease wedge on rubbing block, grease		1, 2			▲	Clean carburetor	3.2.14				x
Distributor, insert cable ends with silicon paste					g	Check V-belts, retighten	<sup>3)</sup>		x		x
Oil choke cable	3.2.18				■	Check clutch adjustment, readjust	3.5.1	65, 66	x	x	x
Grease governor and linkage joints	3.14.10				■	Check functioning of differential locks	3.5.8	72, 73	x	x	x
Check oil level in transmission, correct	3.5.2	5		⊘		Retighten control arm and power plant mounting screws	3.11.1		x	x	x
Check oil level in differential (2) and hub reduction (4) of front and rear axles, correct	3.5.4 3.5.5	9, 12		⊘		Retighten connecting screws between hub reduction gear and steering knuckle, between axle housing and intermediate housing as well as spring mountings (front and rear)	3.11.1		x		x
Change transmission oil	3.5.2	5	●		●	Check shock absorbers for leaks, retighten mounting screws	3.11.2				x
Change oil in differential (2) and hub reduction (4) of front and rear axle	3.5.2 3.5.5	9, 12	●		●	Check pitman arm and steering mounting as well as steering for free travel, correct	3.6.1		x		x
Check oil level in steering gear, correct	3.6.2	10			⊘	Check tow-in	3.7.2			x	x
Check oil in power steering system, correct <sup>1)</sup>	3.6.2	11	▣	▣	▣	Interchange wheels diagonally	3.7.1				x
Check brake fluid level, correct	3.8.2	16	ⓘ	ⓘ	ⓘ	Retighten wheel nuts	3.7.1		x		x
Grease thrust ball (2)	3.5.3	7	▲	▲	▲	Check brake system	3.8.4	81—85	x	x	x
Grease steering knuckle bearings (4)	3.5.6	8	▲	▲	▲	Clean brake shoes, adjust brakes	3.8.4				x
Grease steering knuckle pins of front axle		12	▲	▲	▲	Check compressed-air system for functioning and leaks	3.9.5	93			x
Grease clutch release shaft	3.5.1	4	▲	▲	▲	Drain condensate from compressed-air tank	3.9.4				x
Grease steering linkage (6) 404.1	3.6.1	13	▲	▲	▲	Check fluid level in antifreeze unit, fill up	3.9.8	33, 34		x	x
Grease PTO shaft joints	3.14.8	15	▲	▲	▲	Check functioning of all current consumers, check fuses and line connections	3.10.1				x
Grease joints and nipples of parking brake and pedal linkage	3.8.8	6	▲	▲	▲	Check level and specific gravity of battery electrolyte, correct; clean and grease battery terminal clamps	3.10.6			x	x
Grease trailer coupling			▲	▲	▲	Check headlight alignment, correct	3.10.8				x
Grease body joints and hinges	3.11.2		▲	▲	▲	Check windshield washing system, add detergent	3.10.12		x	x	x
Grease stabiliser	3.11	18	▲	▲	▲	Check screws of cab and mountings for tight seating, retighten	3.11.1	102, 103			x
			▲	▲	▲	Check all lines for chafed spots					x

<sup>1)</sup> Change oil and replace paper oil filter element 000 466 04 04 after the first 84,000 km and every 56,000 thereafter.

<sup>2)</sup> Replace spark plugs at least every 16,000 km

<sup>3)</sup> Refer to information under 3.4.7, 3.4.8, 3.6.4, 3.9.2, and 3.10.11

### 3.1.5 Lubrication Points Survey

The numbers correspond to item references under lube work of the maintenance work survey.

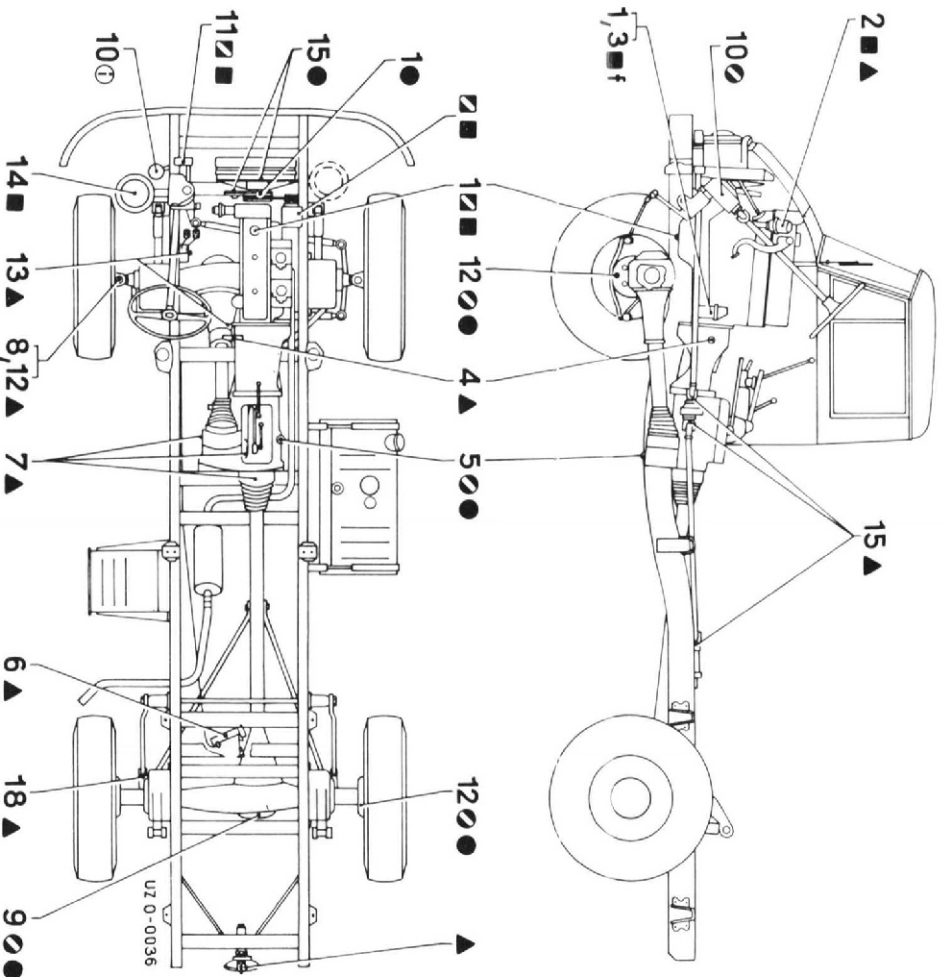
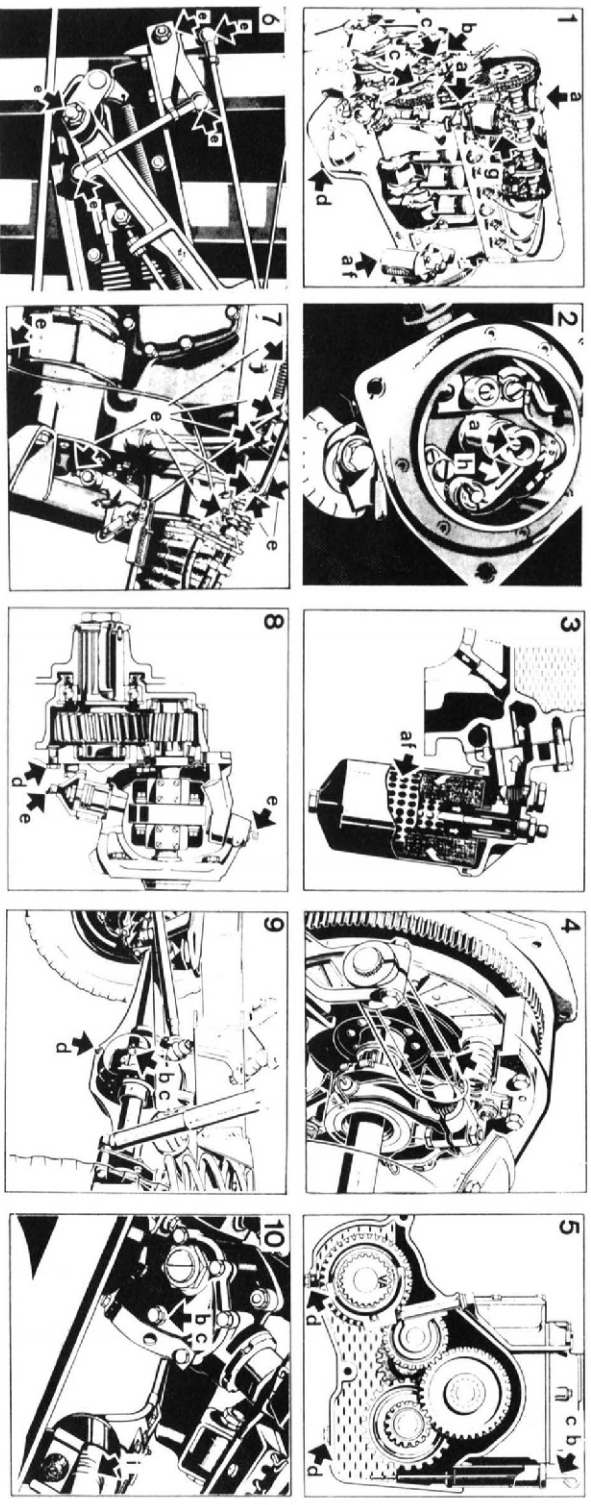
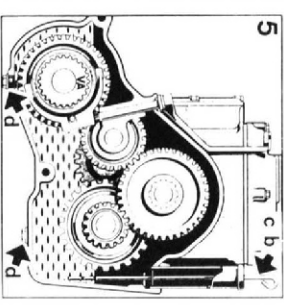
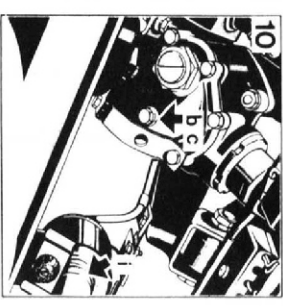
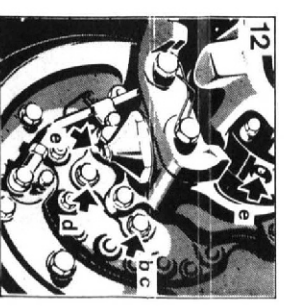
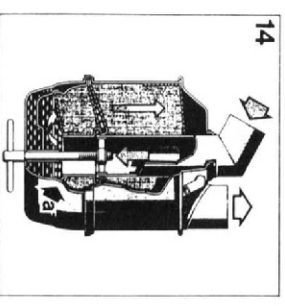
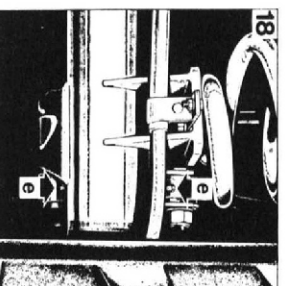


Figure 35 Lubrication points survey

- a Fill with engine oil
- b Fill with transmission oil
- c Check oil level
- d Drain oil
- e Lubricate with grease
- f Replace oil filter element
- g Silicon paste
- h High pressure lubricating grease
- ① Check brake fluid

- ▣ Check engine oil level
- Engine oil
- Transmission oil
- ◐ Check transmission oil level
- ▲ Grease



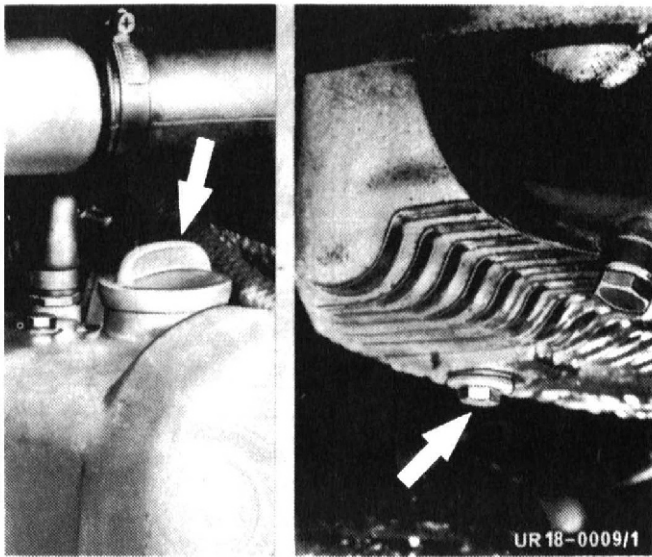


Figure 36 Oil filler neck and oil drain plug

## 3.2 Engine Group

### 3.2.1 Filling Engine with Oil

The oil filler neck is located in the front section of the cylinder head cover and can be reached after removal of the external engine hood.

For reasons of operational safety and economy, only use DB recommended engine oils.

Engines in new vehicles, exchange engines and fully reconditioned engines are filled with an initial operation oil for the first 300 to 1000 km. Refer to 4.6.1.

**Afterwards only use heavy duty (HD) engine oil grades of the specified viscosity class.**

Change the HD engine oil brand only during the next oil change.

### 3.2.2 Oil level and Oil Change

Check oil level regularly depending upon the operating conditions of the vehicle and adjust if required.

Check oil level in oil pan with the vehicle on level ground and with the oil dipstick wiped off.

The oil level should be between the minimum and maximum mark.

Complete oil change according to the maintenance schedule but at least twice a year. If aggravated operating conditions prevail, e.g. extreme short distance driving with the engine not at all or only rarely attaining the required operating temperature, we recommend changing oil at shorter intervals.

**Replace oil filter element during every second oil change.**

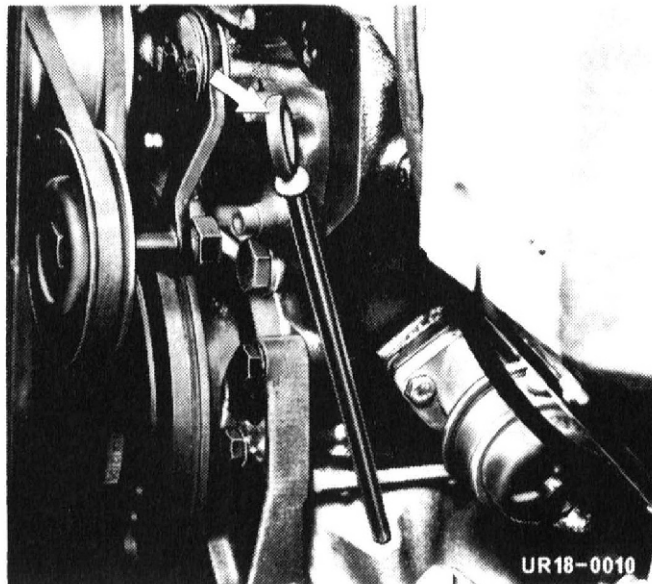


Figure 37 Engine oil dipstick

### 3.2.3 Oil Filter

Replace oil filter element according to maintenance schedule.

Have a collecting vessel ready!

Unscrew mounting screw (5) and drain oil from filter bowl. Remove filter bowl. Replace filter element. Prior to assembly clean filter bowl and inspect gaskets. The sealing ring (3) is located in the top ring groove of the filter bowl.

The tightening torque of the mounting screw is 40 Nm (4.0 kpm).

Fill up with engine oil.

Crank engine at starter speed (without ignition) until oil pressure is indicated.

For engine oil refer to 4.6.

For filling capacity refer to 4.2.

### 3.2.4 Oil Pressure

Under normal operating conditions and when using engine oil of the viscosity class SAE 30 the oil pressure is at least **2.5 bar (kp/cm<sup>2</sup>)** at rated speed. It may drop to **0.6 bar (kp/cm<sup>2</sup>)**, at idling speed without in any way endangering the operational safety of the engine.

### 3.2.5 Retightening Cylinder Head Bolts

This maintenance work is performed only once according to work schedule E.

Remove cylinder head cover.

**Loosen each bolt slightly prior to re-tightening.** Uniformly retighten cylinder head bolts on the **warm engine** according to the tightening pattern with the torque wrench to the specified torque. Check valve clearance, adjust if necessary. Refer to 3.2.7.

#### Tightening torques:

Engine with one carburetor (M 180)  
90 Nm (9.0 kpm).

Engine with two carburetors (M 130)  
110 Nm (11.0 kpm).

Tighten the four hex. socket screws (15) (two inside and two outside) of the cylinder head by hand.

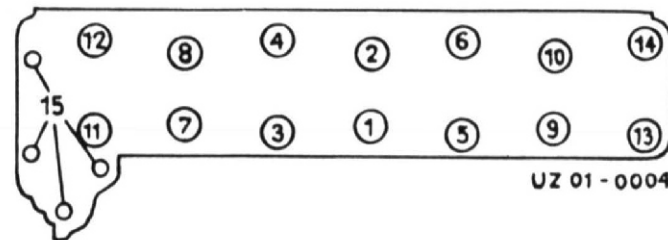


Figure 39 Tightening pattern of the cylinder head bolts

1 to 14 Cylinder head bolt SW 10  
15 Hex. socket screws SW 6

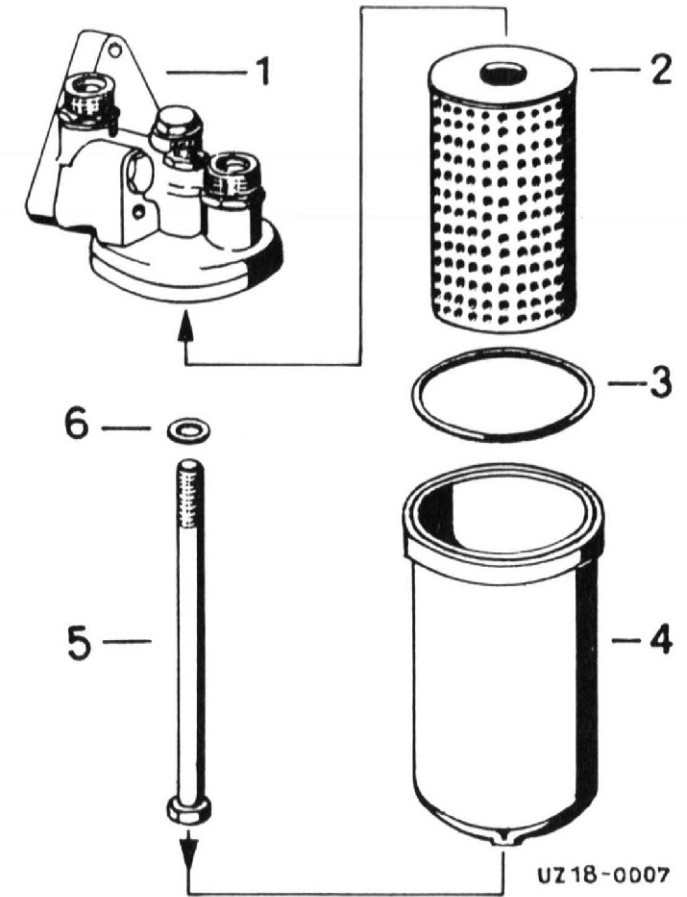


Figure 38 Oil filter

- 1 Oil filter bracket
- 2 Oil filter element
- 3 Sealing ring
- 4 Filter bowl
- 5 Mounting screw
- 6 Gasket

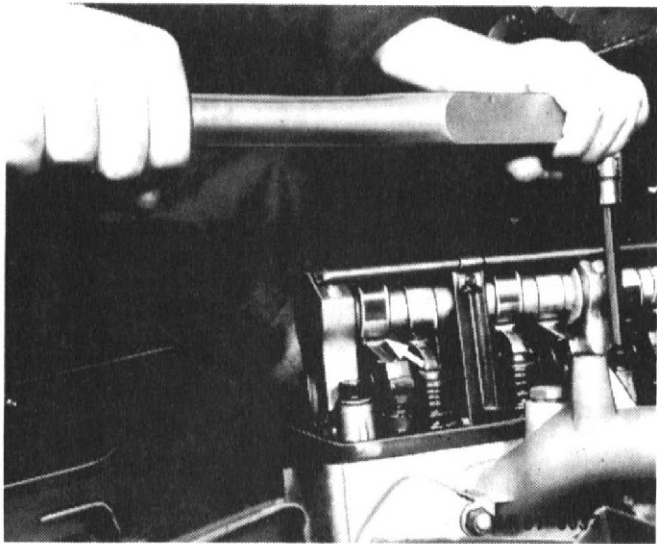


Figure 40 Retightening cylinder head bolts

### 3.2.7 Adjusting Valve Clearance

Check and adjust valve clearance according to maintenance schedule.

Let engine cool to below 50° C. Crank the engine with starter until the respective cam is at the top.

Measure gap between the cam base circle and the rocker arm with the feeler gauge.

For valve clearance refer to 6.2.

When the valve clearance is properly adjusted the Feeler gauge can be pulled through smoothly.

### 3.2.6 Not Applicable to this Vehicle.

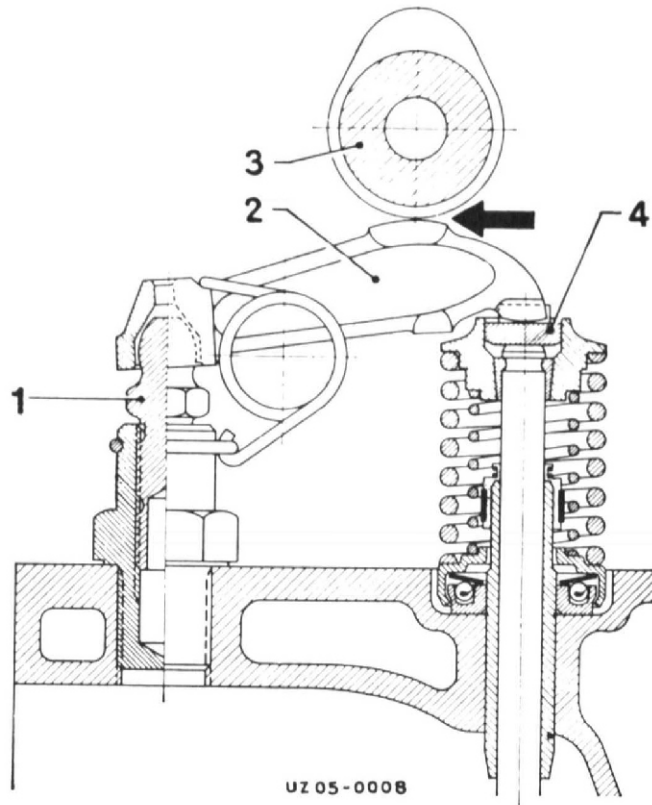


Figure 41 Valve adjustment

- 1 Adjustment screw
- 2 Rocker arm
- 3 Cam shaft
- 4 Valve with thrust block

For adjustment use the specified adjustment wrench and torque wrench.

The adjustment screw has a self-locking thread which must be counteracted by a displacement torque of at least 20 Nm (2.0 kpm), if necessary, replace adjustment screw and threaded bushing.

### 404.1

On engines without self-locking adjustment, the valve clearance is measured between valve and adjustment screw of the rocker arm.

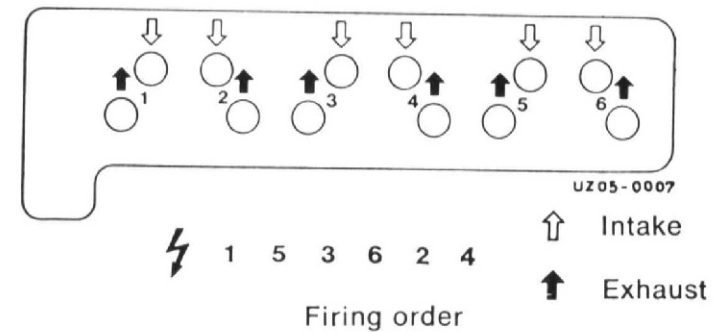


Figure 42 Valve locations

### 3.2.8 Checking Compression Pressure

When the engine output drops, measure compression pressure in each cylinder with a compression pressure gauge. Carry out measurement at starter speed and with the engine at operating temperature. Crank engine with starter for at least 8 rotations.

If the minimum value is not attained (refer to 6.2) check valve clearance. If required, remove cylinder head and check valves for leaks, condition of cylinder head gasket, cylinder wear and piston ring contact pattern in the cylinders.

If required remachine valve seats. Have engine reconditioned in case of cylinder or piston ring damage.

### 3.2.9 Not Applicable to this Vehicle

### 3.2.10 Air Cleaner

Change oil according to operating conditions and maintenance schedule.

The careful cleaning of the air cleaner is absolutely necessary in order to protect the piston and cylinder running surfaces and to prevent damage.

Disengage quick release lock to remove cleaner bowl at front folding part of

fender. Unscrew clamping screw of cleaner bowl and remove cleaner bowl with cleaner element.

The oil level must be at the level mark.

Remove oil, wash the cleaner element and cleaner bowl with cleaning gasoline and refill with fresh engine oil.

Dust deposits at the clean air end and in the intake manifold are a sure sign that the oil bath air cleaner must be serviced more often than specified in the maintenance schedule.

Service cleaner housing depending upon degree of soiling of cleaner element, however, at least once a year.

### 3.2.11 Intake Duct with Cyclone Filter

Under extremely dusty operating conditions, the intake air is precleaned with an additional intake duct with cyclone filter.

The air entry is located higher, causing a cleaner more dust free air intake and additionally achieves an optimum dirt and water separation via the cyclone filter with prefilter.

The cyclone prefilter normally requires no maintenance. Depending upon the type of dust accumulated (such as lime) remove cyclone prefilter and rinse.

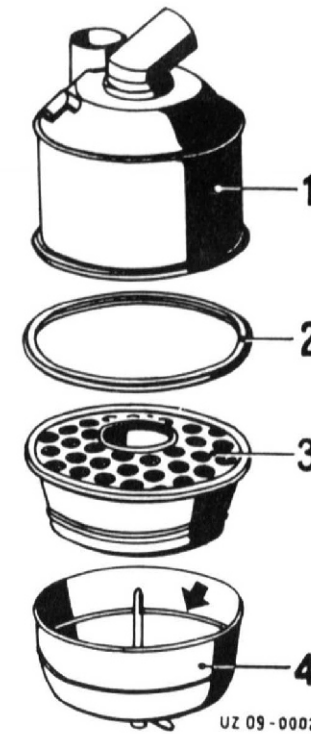


Figure 43 Oil bath air cleaner

- 1 Cleaner housing
- 2 Sealing ring
- 3 Cleaner element
- 4 Cleaner bowl with oil level mark (arrow)

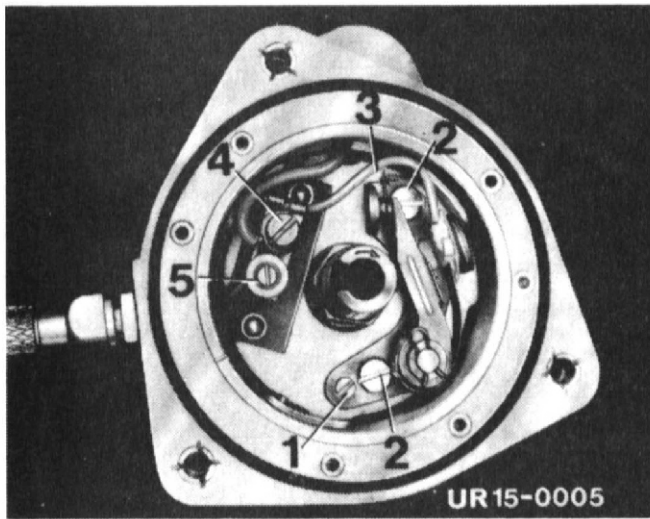


Figure 44 Contact Breaker

- 1 Eccentric adjustment screw
- 2 Locking screw
- 3 Contact gap
- 4 Terminal (condensor)
- 5 Terminal 1

### 3.2.12 Spark Plugs

Check spark plugs in accordance with maintenance schedule. However, renew at least every 16,000 km.

Only use spark plugs with prescribed heat value. Note length of spark plug thread.

To a great extent the faultless running of the engine is dependent upon the condition of the spark plugs.

**Note:** The higher the heat value of a spark plug is, the higher its resistance against incandescent ignition is and the lower its resistance is against fouling.

The lower the heat value of a spark plug is, the lower its resistance against incandescent ignition is and the higher its resistance is against fouling.

If possible, test and clean spark plugs with a testing set.

Be sure to adhere to the specified electrode gap of  $0.5^{+0.1}$  mm.

When installing the spark plugs do not interchange the ignition cables! Apply silicon paste to cable connections.

For heat value refer to table 6.2.2 and 6.13.

### 3.2.13 Ignition Distributor and Contact Breaker Points

Check point gap and condition of contact breaker and rotor according to maintenance schedule.

Check condition of distributor cap after removing (contact point fouling), clean or replace if necessary.

To remove contact breaker, remove locking clamp and screw (4) and pull out breaker arm.

Unscrew mounting screw (2), remove part while paying attention that eccentric set screw (1) is not dropped!

After installation apply some Bosch grease between cams and fiber blocks. Set point gap to 0.4 mm.

Carry out exact setting with the dwell angle tester.

Dwell angle at starter speed  $38^{\circ} \begin{smallmatrix} +3 \\ -1 \end{smallmatrix}$

### 3.2.14 Checking and Adjusting Ignition Timing

Check and adjust ignition timing according to maintenance schedule.

If possible, use optical measuring instruments (stroboscope) to check the correct firing point timing.

For measurement values refer to 6.2.1.

#### Manual setting of firing point timing.

Mark the firing point  $2^{\circ}$  bTDC (1st cylinder) (basic setting) on the graduated scale on the bottom of the counterweight with chalk. Approximately between 0 and first graduation line.

#### Observe sense of rotation!

**Note:**  $2^{\circ}$  bTDC is **not** marked.

The numbers 10, 20, 30, etc. are the respective degrees ( $^{\circ}$ ) for measurements with the stroboscope.

#### 404.1

The numbers 0, 1, 2, 3, 4 and 5 represent  $0^{\circ}$ ,  $10^{\circ}$ ,  $20^{\circ}$ ,  $30^{\circ}$ ,  $40^{\circ}$  and  $50^{\circ}$  respectively.

Pull off rotor and connect testing lamp (24 V) to terminal (4) and ground.

Turn the crankshaft via one rear wheel.

Secure vehicle against rolling (chocks). Release parking brake, differential lock disengaged.

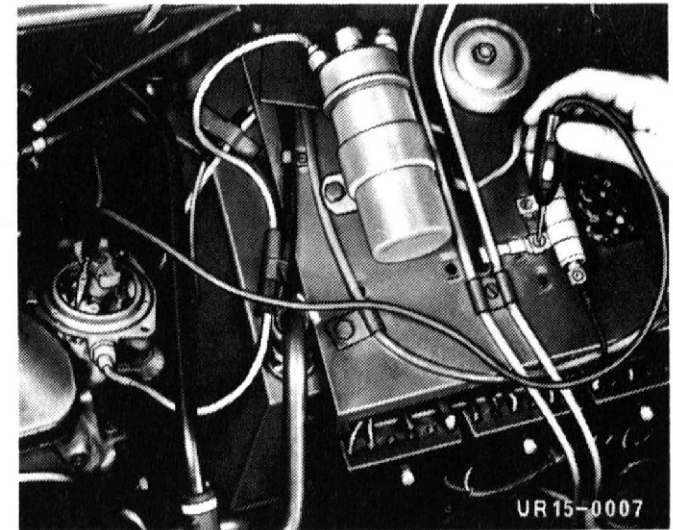


Figure 46 Check firing point with test lamp 404.1

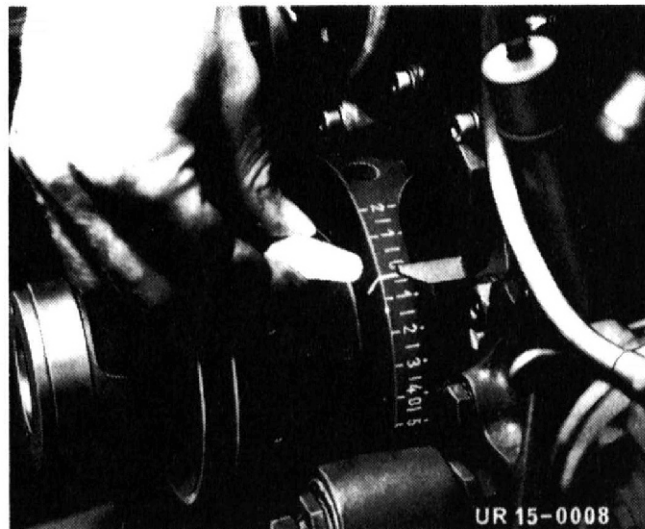


Figure 45 Mark firing point  $2^{\circ}$  bTDC at basic setting 404.1

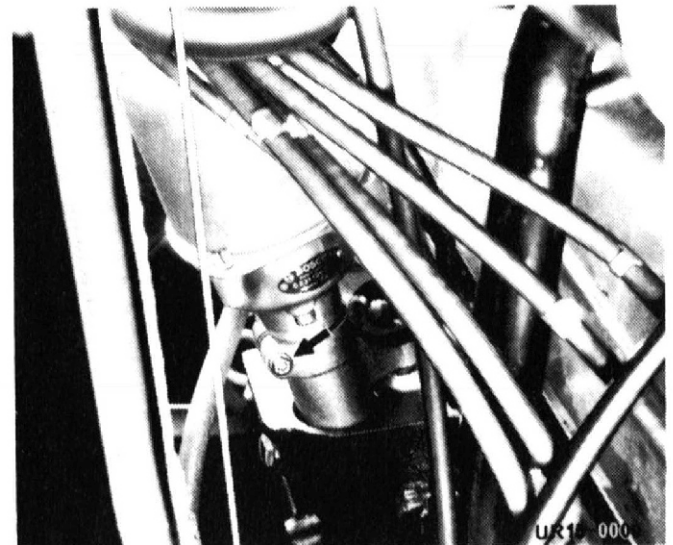


Figure 47 Clamping screw of ignition distributor

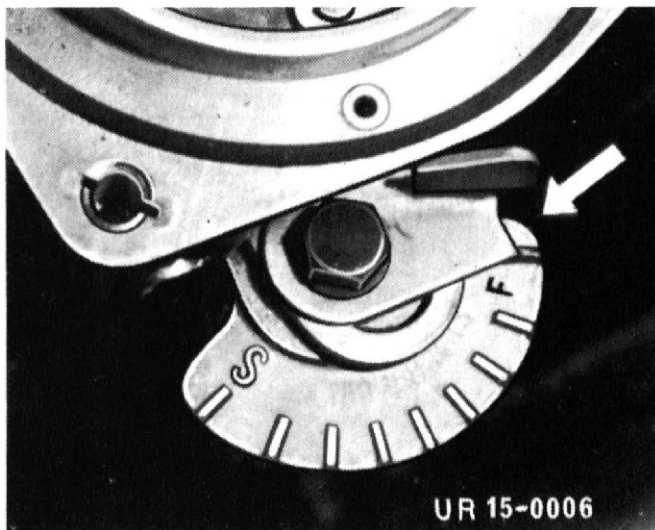


Figure 48 Advance/retard scale of ignition distributor 404.1

F Advance  
S Retard

Lift one side of rear axle. Switch ignition on. Engage 6th gear and turn wheel by hand in driving direction until  $2^{\circ}$  bTDC of 1st cylinder is reached.

**Check:** Rotor in direction of groove on distributor housing.

With proper adjustment the test lamp must light up exactly at the marking point ( $2^{\circ}$  bTDC).

In case of not noticing or passing the mark, repeat procedure again by turning further (2 rotations) or turning back (approx.  $\frac{1}{4}$  rotation).

The correct timing is set by turning the distributor to the exact setting.

Prior to turning loosen the clamping screw on the side. Figure 47.

Rotate distributor:  
**clockwise** = **retard**  
**counter clockwise** = **advance**

Check test by rotating crankshaft backward approximately  $90^{\circ}$  and forward again until the breaker point lifts off or test lamp lights up, then check position of graduated scale in relation to pointer.

#### 404.1

On vehicles with an advance/retard scale the pointer position "F" (advance) must be maintained. Figure 48.

**The distributor adjustment is also only accomplished via the clamping screw.** Figure 47.

The adjustment pointer permits a limited adjustment toward retard (octane number adaptation for fuels of lower quality) only when required.

### 3.2.15 Cleaning Carburetor

Clean carburetor according to maintenance schedule.

Cleaning of the carburetor is generally limited to blowing out the main and idle speed jets as well as cleaning the float housing.

#### Cleaning float housing

Unscrew fuel line (1) and carburetor housing. Disengage pump rod at the bottom. Remove carburetor cover.

Pull out double float at joint bearing. Thereafter open cover (2) of nozzle chamber. The fuel may now run off via the nozzle housing. Clean float and nozzle housing with a small brush.

Screw out **main and idle speed nozzles**, check for free passage and blow out.

During assembly check float for leaks. There must be no fuel in the float, replace if necessary. Check gaskets, fully tighten screws.

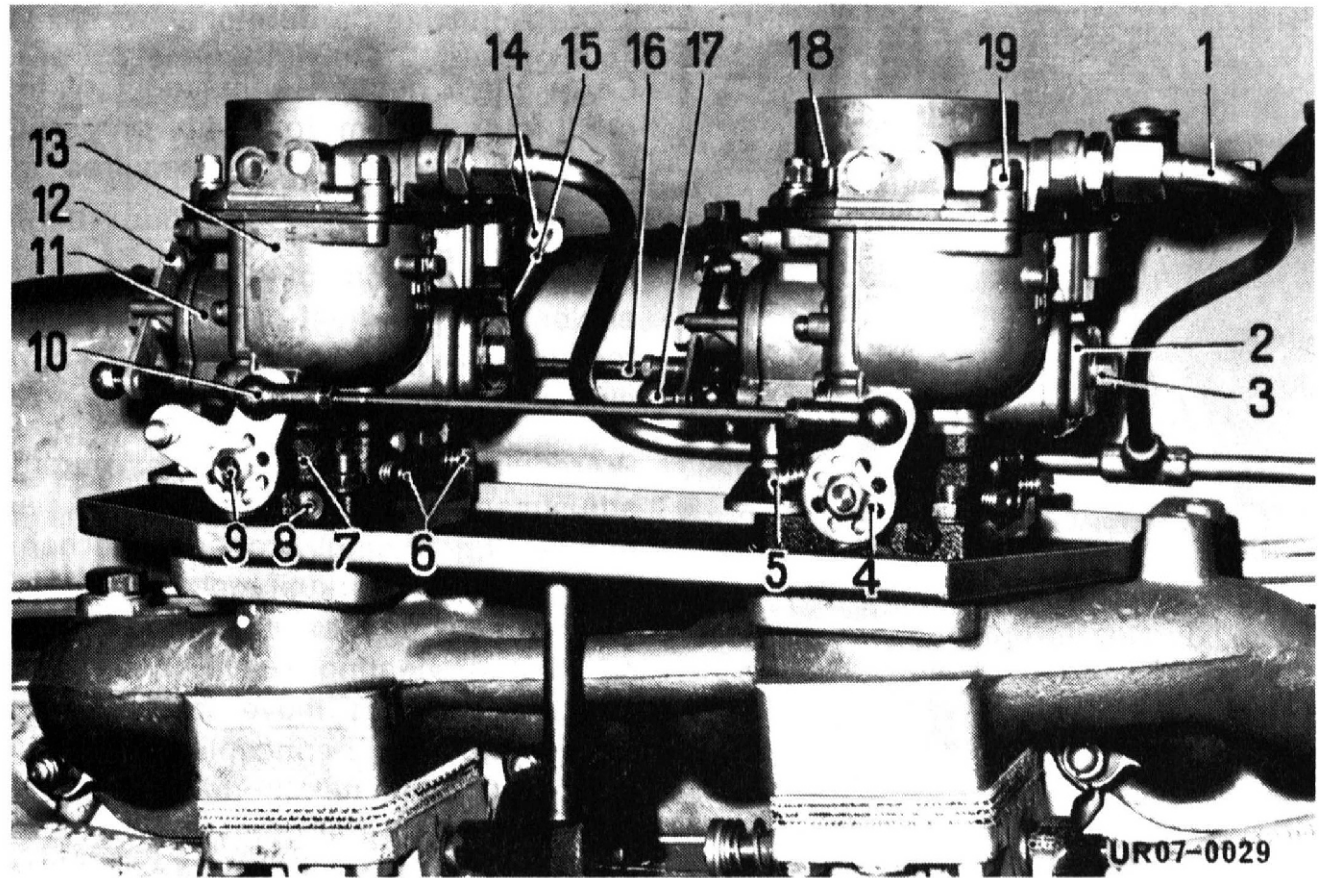


Figure 49 Carburetor system of M 130 engine

- |  |                                     |
|--|-------------------------------------|
| 1 Fuel line connection                   | 11 Choke                            |
| 2 Cover for main and idle speed nozzles  | 12 Choke lever                      |
| 3 Cover screw                            | 13 Float housing                    |
| 4 Throttle valve                         | 14 Pump lever, top                  |
| 5 Idle speed adjusting screw             | 15 Pump rod (to pump lever, bottom) |
| 6 Idle mixture adjusting screws          | 16 Connecting rod (choke)           |
| 7 Throttle valve assembly                | 17 Gate lever                       |
| 8 Vacuum connection                      | 18 Carburetor cover                 |
| 9 Throttle valve shaft                   | 19 Cover screw                      |
| 10 Connecting rod (throttle valve shaft) |                                     |

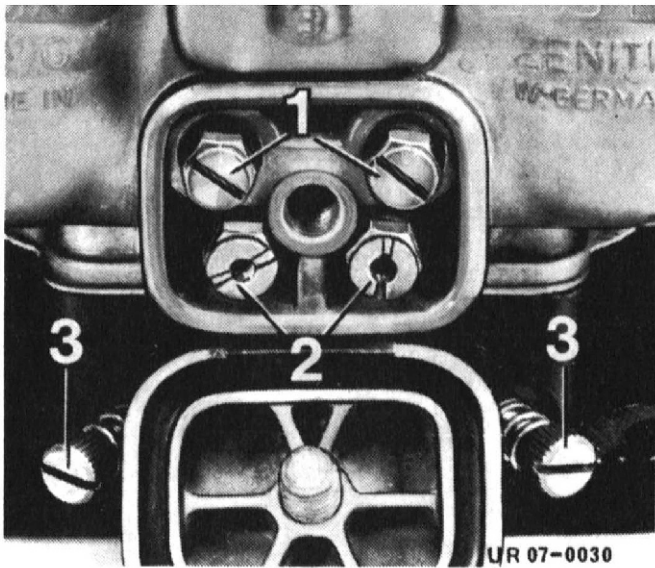


Figure 50 Nozzle housing

- 1 Idle nozzle
- 2 Main nozzle
- 3 Idle mixture control screw

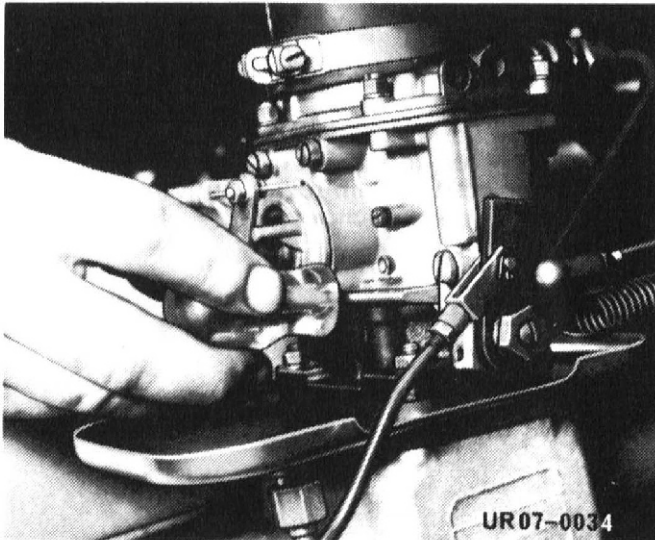


Figure 51 Adjusting idle speed adjustment screw

### 3.2.16 Adjusting Carburetor

Carry out a general adjustment of the carburetor system forthwith only with the usual test equipment required for this purpose.

Thus the provisions of § 47, Sec. 1 and 2 enclosure XI and XII of the road traffic registration regulation (StVZO) have also been complied with.

Prerequisites for an effective carburetor adjustment are an exact timing, an engine functioning properly mechanically (valves, spark plugs) and a leak proof intake and exhaust system. The mixture preheating valve below the intake pipe must move freely. Check functioning of thermospiral. Replace damaged or lame thermospiral. The engine should be at operating temperature.

#### Basic setting, mechanical

1 Remove intake manifold. Disengage accelerator pedal control linkage. In case of two carburetors, disengage connection linkage (10) figure 49.

2 Connect speed counter to engine.

3 Turn back idle adjustment screw until both throttle valves are closed. Then turn the screw back in again until the throttle valves start to open.

4 Unscrew and check idle mixture control screws (3) figure 50. Both must not show either annular grooves or other signs of wear.

5 Screw in control screws – **but only tighten lightly** – and turn back three half turns.

6 Start engine, set an idle speed of 800 to 850/min on the idle adjusting screw.

7 Very carefully turn in or out idle mixture control screw, until the speed begins to drop. Aim for smooth running.

## Synchronising carburetor

In order to achieve an even transition in all engine speed ranges with **two carburetors**, they must be synchronised with each other.

Complete items 1 through 3.

8 Start engine.

9 Place synchronisation tester on carburetor. Place glass tube in vertical position. Adjust control screw of unit in such a manner that the test insert in the glass tube will remain approximately in the center at idle speed.

10 Now screw the idle speed adjustment screw of **both** carburetors in and out in turn until an equally high reading in the vacuum tester is achieved. Both carburetors must show the **same** value, recorrect if necessary.

11 Adjust length of connecting rod (10), figure 49 and reengage again.

Complete item 4 and 5.

12 **Screwing in idle mixture control screw = leaning mixture. Screwing out idle speed control screw = enriching mixture.** In both cases a slight drop in speed will become noticeable. Aim for smooth running.

While doing so an even vacuum on both carburetors must also be achieved with the aid of the synchronisation tester.

13 Now only reregulate the constant idle speed via the adjusting screw of the throttle valve shaft.

The exhaust emission valve can only be measured with a tester.

For exhaust emission values refer to 6.2.1.

### 3.2.17 Choke Control Cable

Regularly lubricate choke control cable with a few drops of oil. Pay attention that with the choke not in operation there is a distance of approximately 2 mm between control cable button and retaining bracket. While pushing cable in this distance serves as a check that the choke is not engaged.

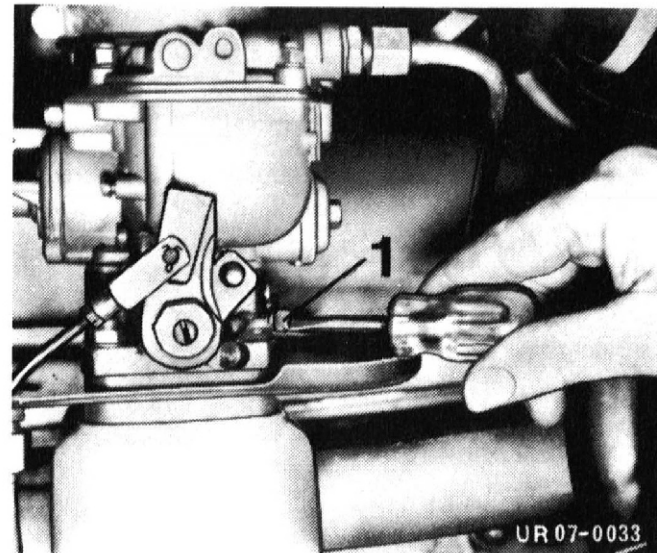


Figure 52 Adjusting idle mixture

1 Idle mixture control screw (2 each)

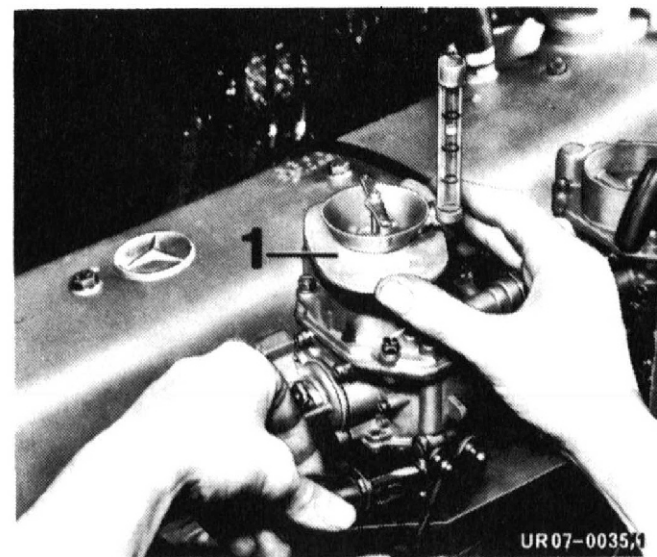


Figure 53 Synchronising carburetor

1 Vacuum tester (synchronisation tester)

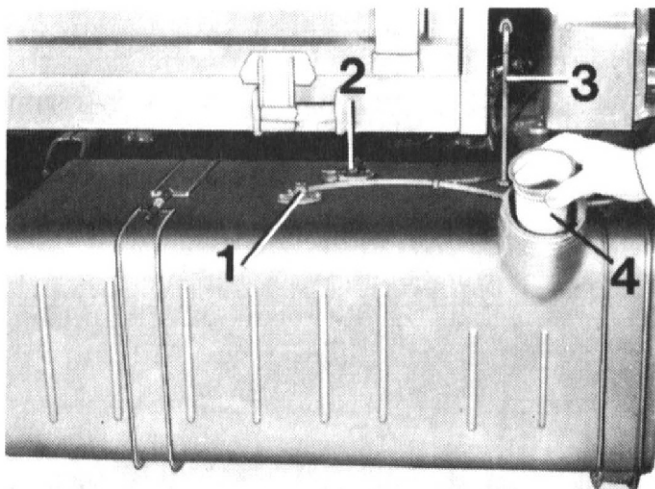


Figure 54 Fuel tank

- 1 Suction tube
- 2 Fuel gauge sending unit
- 3 Venting pipe
- 4 Fuel strainer

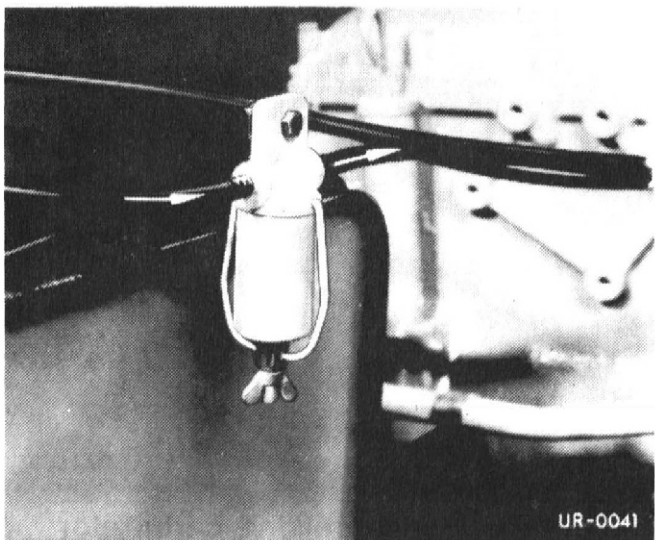


Figure 55 Fuel prefilter

### 3.3 Fuel System

#### 3.3.1 Filling Up with Fuel

When filling fuel into the fuel tank take care that impurities and water cannot enter the tank.

When refueling with a suction pump from containers always use a strainer.

To prevent possible condensate or dirt from entering the tank maintain an appropriate distance between pipe end of suction pump and bottom of container.

#### 3.3.2 Cleaning Fuel Tank

Clean fuel strainers and fuel tanks regularly.

If installed, remove filler strainer after unscrewing the cap and wash out in fuel with a brush.

Always be sure to remove and clean suction pipe with intake strainer in order to clean the fuel tank.

#### 404.1

The fuel tank **in front with** filler pipe is the reserve tank.

The fuel tank **in the rear without** filler pipe is the main tank. This one is filled via the overflow pipe but only after the front tank has been filled.

#### 3.3.3 Cleaning Fuel Prefilter

Clean prefilter according to maintenance schedule. Loosen wing nut, push clip aside and remove bowl. Unscrew strainer body. Carefully wash bowl and strainer in clean gasoline or diesel fuel, and blow out with compressed air.

Inspect gaskets during reinstallation, and replace if necessary since air can otherwise enter the fuel system after which the engine will no longer start.

**Note:** During assembly be sure to pay attention to proper seating of filter bowl.

#### 404.1

The fuel prefilter is located on the engine immediately in front of the fuel pump.

#### 3.3.4 Not Applicable to this Vehicle.

### 3.3.5 Fuel Pump and Supplementary Fuel Pump

#### 1 Cleaning filter in fuel pump:

Unscrew locking screw of pump cover and remove cover. Remove strainer and wash in fuel. Spray out separation chamber with fuel, or wipe out with a rag soaked in fuel.

During assembly be sure to watch for proper sealing. Completely tighten locking screw in order that pump will not suck in secondary air.

#### 2 Supplementary fuel pump:

When switching on the supplementary fuel pump, fuel in an increased quantity and flow speed is pumped into the carburetor via the suction line and feed pump. The solenoid valve connected parallel to the pump opens a return line to the fuel tank.

With this arrangement a rinsing action in the fuel system is maintained particularly during high ambient and/or engine temperatures.

#### Version I

Supplementary fuel pump **in** fuel tank

#### Version II

Supplementary fuel pump **laterally** on the fuel tank

During pump malfunctions (Version I) check suction pipe and strainer. Replace gasket between fuel tank and supplementary pump.

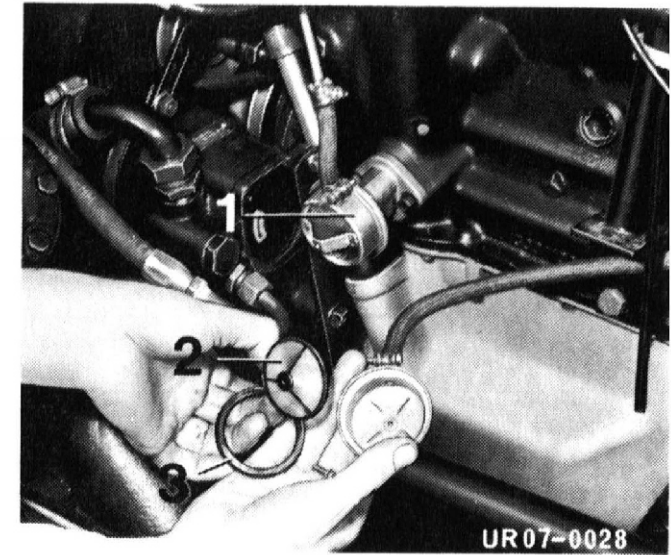


Figure 56 Fuel pump

- 1 Fuel pump
- 2 Strainer
- 3 Gasket

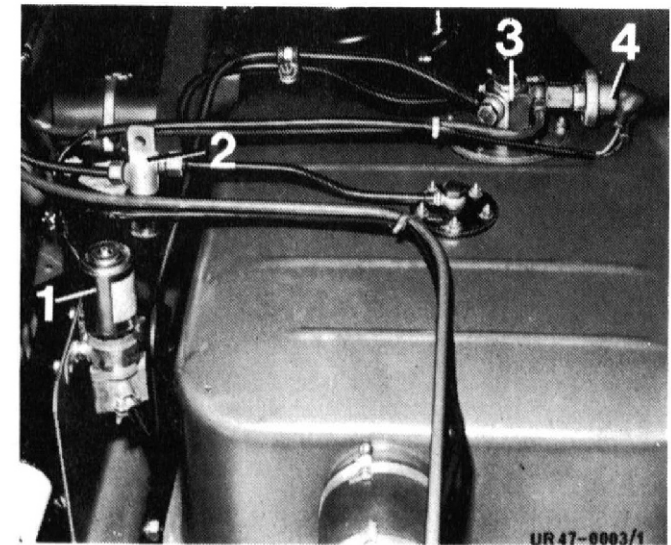


Figure 57 Supplementary fuel pump

- 1 Supplementary fuel pump
- 2 Fuel filter
- 3 Suction pipe
- 4 Pressure switch

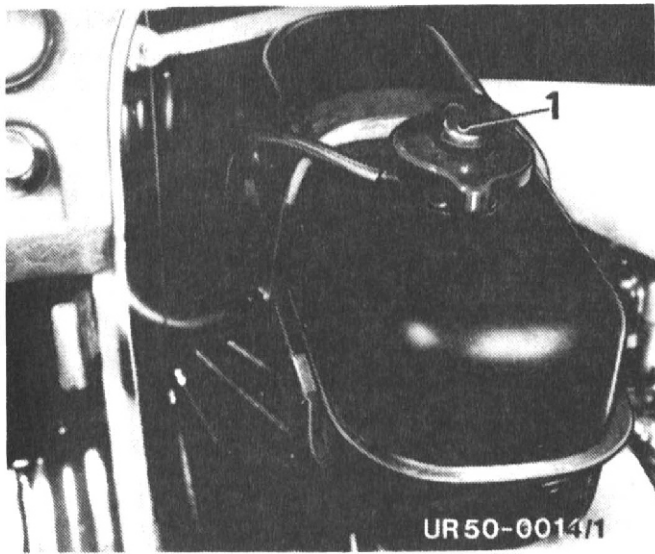


Figure 58 Coolant expansion tank

- 1 Filler cap with push button for pressure valve

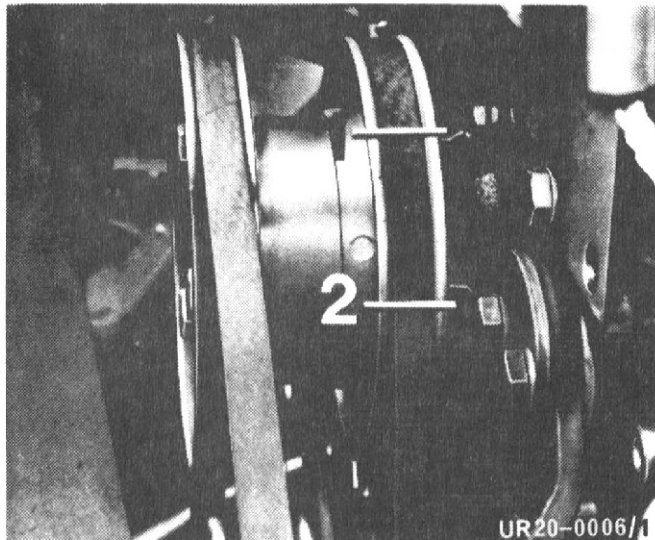


Figure 59 Coolant pump

- 1 Oil filler plug
- 2 Inspection plug

## 3.4 Cooling System

### 3.4.1 Filling Up with Coolant

Regularly check coolant level in expansion tank. Prior to opening turn filler cap to the first notch or press safety valve in order to relieve any possible excess pressure.

Coolant level of the cold engine should not be more than 30 mm below the upper edge of the filler opening of the expansion tank. Add coolant if necessary. Refer to 4.5.

When adding or changing coolant **be sure** to add 10 cc of corrosion inhibitor per liter of coolant for summer and winter operation, as well as antifreeze for winter operation (for mixing ratio refer to 4.5).

Turn knob of heater open all the way when changing coolant. Refer to 2.1.4.

### 404.1

Open heater valves in engine compartment in order that coolant can reach the heat exchanger of the heating and ventilating unit.

Let engine run several minutes at an increased idle speed. If necessary, fill up with coolant with engine running.

### 3.4.2 Coolant Pump

Check oil filling according to maintenance schedule.

Open oil filler plug (1) as well as inspection plug (2) on the side. Fill in transmission oil SAE 80 until it runs out at the bore (2).

### 3.4.3 Thermostat

The thermostat operates without any maintenance. During normal operation, it will open the coolant circuit via the radiator at approximately 80° C. Have damaged thermostat replaced immediately since the engine can otherwise overheat.

### 3.4.4 Draining Coolant

Prior to draining coolant, open filler cap of expansion tank. Open drain plug of radiator at drain fitting.

In order to completely empty the entire cooling system, open drain plug at the side of engine (for instance, during removal of engine).

#### 404.1

With engine and battery prewarming additionally open drain plug of heat exchanger (water container) below the radiator.

With heating and ventilation system, open shut off valves and drain cock of heating circuit in engine compartment.

In order to drain coolant unscrew filler cap of coolant expansion tank.

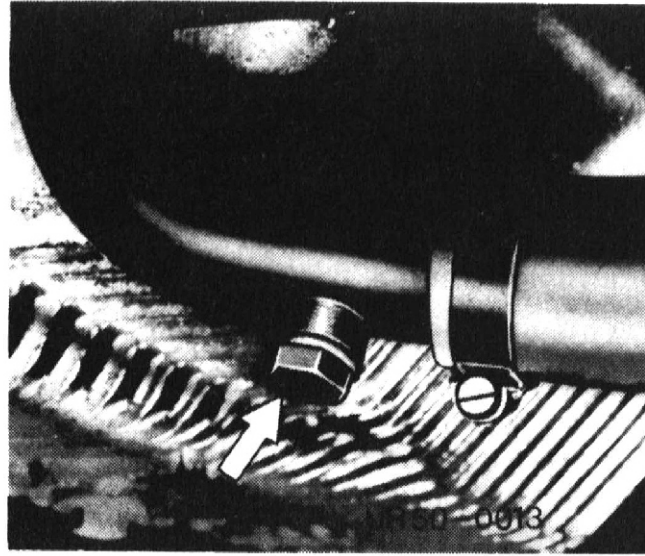


Figure 60 Drain plug of radiator

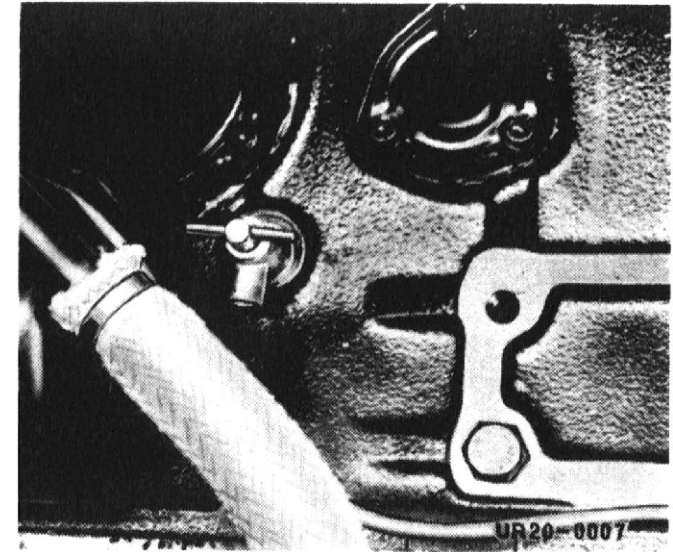


Figure 61 Drain plug on engine

### 3.4.5 Cleaning Cooling System

If the coolant temperature increases gradually above the specified value, this indicates a fault in the cooling system. For example, not enough coolant, dirty radiator, incorrectly tensioned V-belts or improperly operating thermostat.

Clean cooling system if it is dirty.

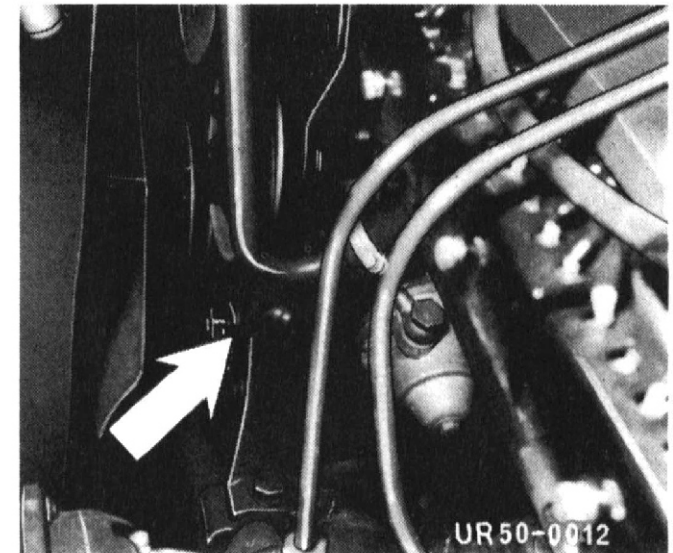


Figure 62 Drain cock on feed line of heating system 404.1

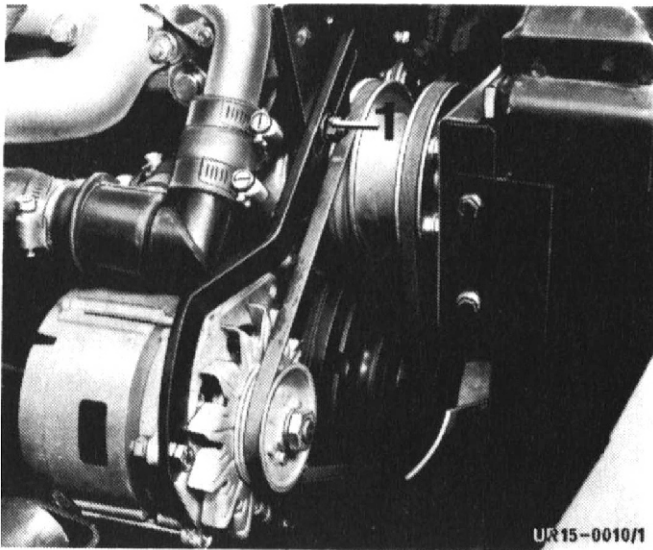


Figure 63 Tensioning V-belts

1 Tensioning screw on generator

### External cleaning

Blow out radiator from engine side with compressed air or spray out with water so that all foreign matter is removed from the radiator fins.

### Internal cleaning

Unscrew filler cap of expansion tank. Fill in two handfuls of soda or special agent. Drive for one day with this additive and then drain all of the coolant. Flush cooling system thoroughly with fresh running water.

### 3.4.7 Coolant Pump and Generator V-belt

Check V-belts according to maintenance schedule.

The V-belt should be tensioned in such a manner that it will deflect only approximately 10 mm from the straight line under thumb pressure.

To retension, adjust via tensioning screw of generator.

A V-belt which is too tight or too loose becomes worn prematurely and causes faulty power supply and engine cooling.

### 3.4.6 Coolant Hoses

Regularly check hoses of cooling and heating system for leaks, cracks and breakage. Replace damaged hoses immediately, otherwise approximately every two years.

### 3.4.8 Fan V-belt

Adjust V-belt tension via idler pulley bearing. To do so, loosen the two hex. head screws and press support upwards.

V-belt tension approximately 5 to 10 mm.

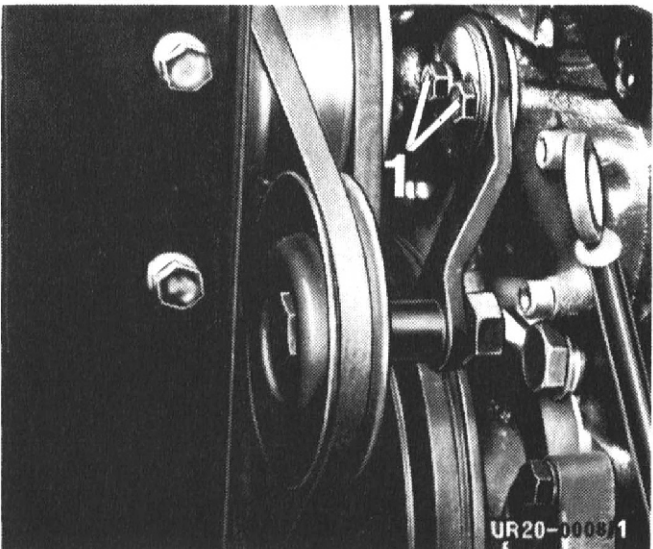


Figure 64 Tensioning V-belts

1 Idler pulley support

### 3.4.9 Fan Bearing

Lubricate fan bearing according to maintenance schedule. Turn fan in such a manner that the filler plug can be loosened. Fill in transmission oil via oil can. Only moderately tighten plug with gasket.

### 3.4.10 Idler Pulley Bearing 404.1

Lubricate pulley bearing according to maintenance schedule.

Open plug and fill in transmission oil until it runs out at the same bore.

## 3.5 Clutch, Transmissions, Axles

### 3.5.1 Clutch

Grease clutch release shaft according to maintenance schedule. Check adjustment of the hydraulically operated clutch according to maintenance schedule and readjust if necessary. However, the maintenance intervals mainly depend on the operating conditions of the vehicle.

The free travel of the clutch pedal – measured at upper edge of pedal plate – must be at least 25 mm before de-clutching begins.

Adjust clutch pedal free travel on the slave cylinder. Adjust by rotating adjustment screws.

The free travel between adjusting screw and clutch lever is  $3^{+0.5}$  mm.

### 404.1

The free travel of the clutch pedal is 30 to 35 mm.

To adjust free travel remove splined bolt at rear end of clutch rod and twist at forked head.

### Note:

Shortening length of pull rod – clutch pedal free travel is reduced.

Increasing length of pull rod – clutch pedal free travel is increased.

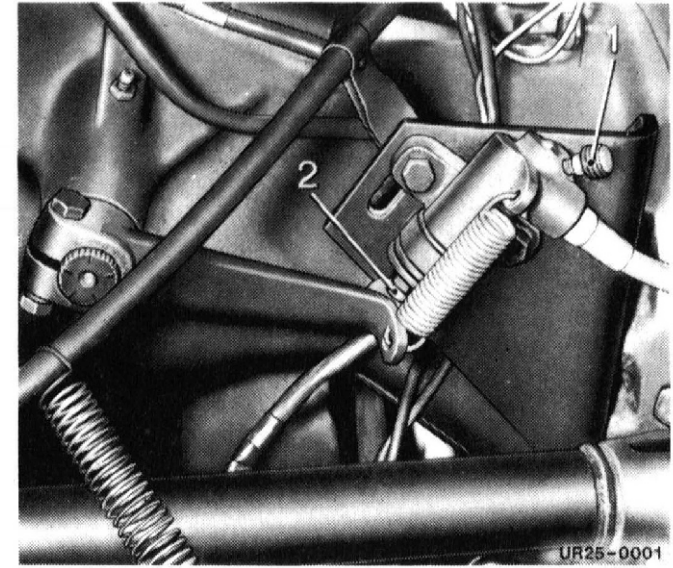


Figure 65 Operation of clutch

- 1 Bleed screw
- 2 Adjusting screw

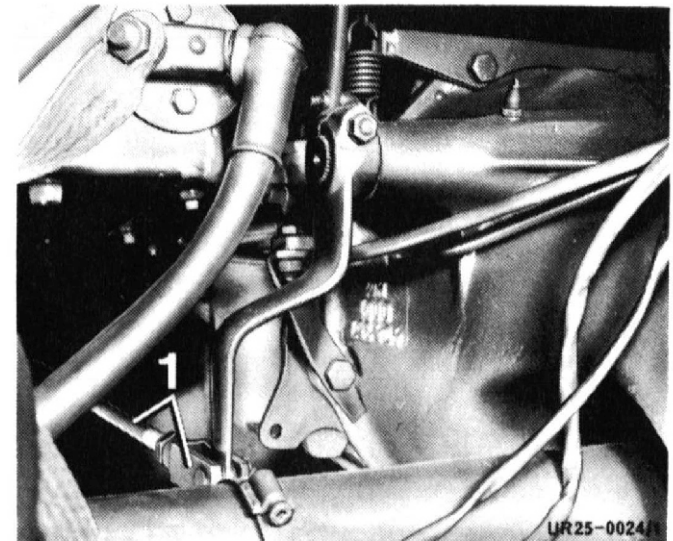


Figure 66 Operation of clutch 404.1

- 1 Clutch rod with forked head

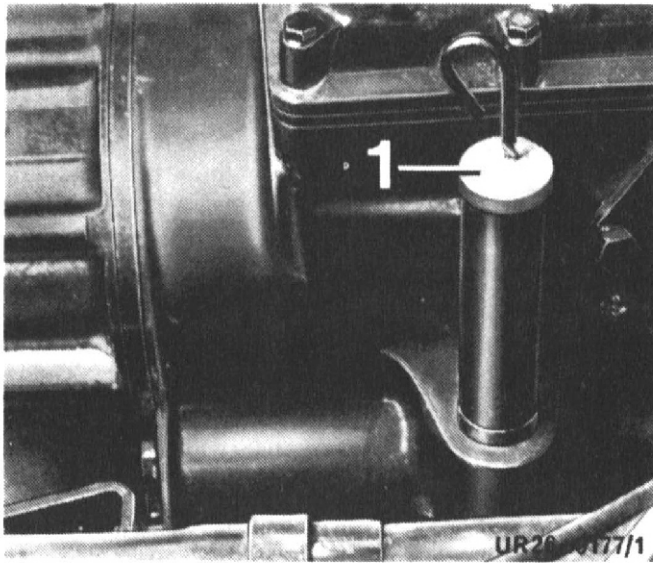


Figure 67 Transmission oil dipstick

1 Oil dipstick in filler neck

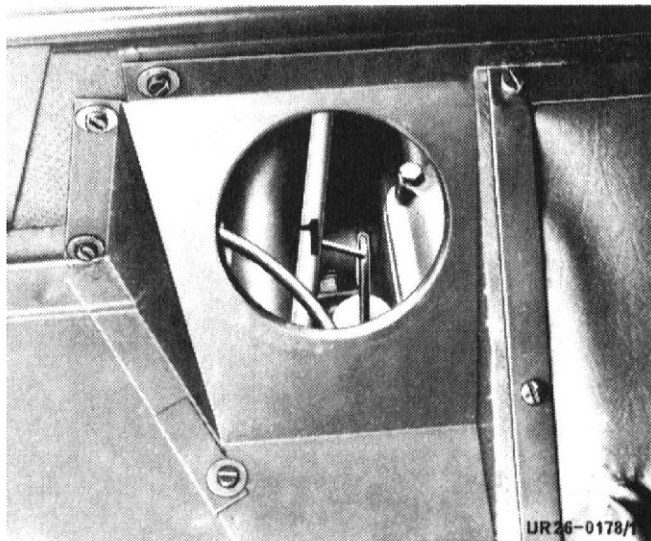


Figure 68 Transmission oil dipstick  
404.1

1 Oil dipstick

### Bleeding the hydraulic clutch system

The hydraulic clutch system is bled by means of the **bleeder screw of the slave cylinder**.

1 Fill brake fluid reservoir to upper mark.

**Note:** Always continuously refill brake fluid reservoir during bleeding process.

**Never pump reservoir empty.**

2 Fit bleeding hose over bleed screw and insert other end of hose in a transparent vessel, which is filled half way with brake fluid.

3 Unscrew bleed screw 1 to 2 turns, figure 65. Depress clutch pedal smoothly in one motion, tighten bleed screw and slowly release clutch pedal. Any trapped air will escape through the bleeding hose.

4 Repeat bleeding process until no further bubbles escape.

5 When depressing the clutch pedal for the last time, retain it in its lowest position until the bleed screw has been screwed down tight.

6 Remove bleeding hose and replace dust cap.

### 3.5.2 Transmission

Check oil level according to maintenance schedule. An exact oil level measurement can only be taken with the vehicle standing on level ground.

If the oil level is to be checked immediately after operating the vehicle, wait several minutes until the oil level has stabilised itself.

#### 404.1

The oil dipstick in the filler neck is accessible through the opening next to the transmission cover.

During an oil change be sure to open both drain plugs.

With a supplementary crawler gear set, open drain plug on the side.

If possible drain transmission oil as long as it is **hot and thin**. The opening of the oil dipstick tube (filler neck) also serves for pouring in the transmission oil.

Do not fill above the maximum mark!

For filling capacity and transmission oil viscosity refer to 4.2 and 4.8.

3.5.3 Not Applicable to this Vehicle.

### 3.5.4 Differential

Check oil level and change oil according to maintenance schedule.

Prior to removing oil filler (oil level control) plug clean the differential housing in this area.

The oil level must reach the bottom edge of the filler hole with the vehicle standing on level ground.

For filling capacity and transmission oil viscosity refer to 4.2 and 4.8.

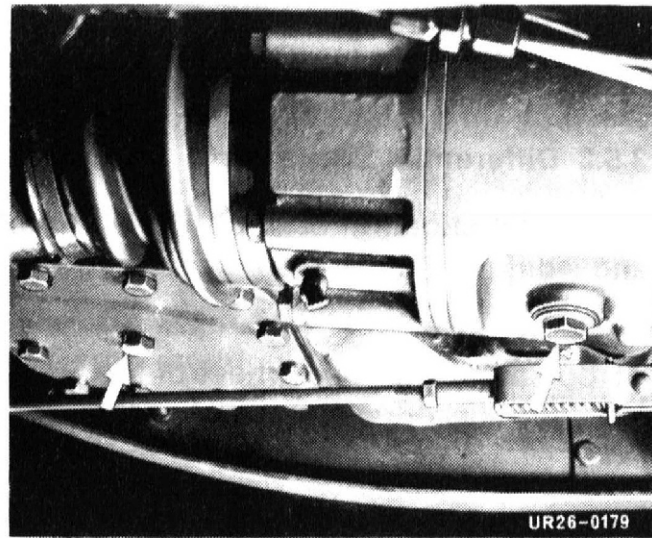


Figure 69 Transmission oil drain plugs

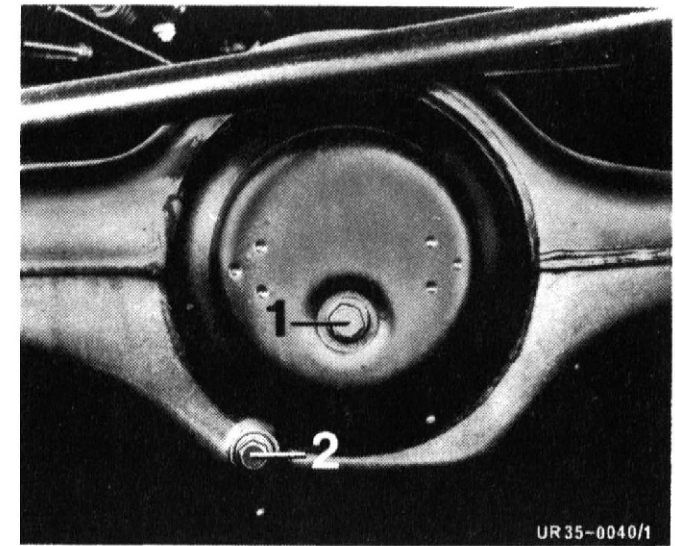


Figure 70 Differential

- 1 Oil filler plug
- 2 Oil drain plug

### 3.5.5 Hub Reduction Gears

Check oil level and change oil according to maintenance schedule.

Prior to removing the plugs, clean the housing in the areas around the plugs.

Unscrew oil filler plug (2) and oil level control plug (1) and pour in transmission oil. With the vehicle standing on level ground, the oil level must reach the bottom edge of the oil level inspection hole.

For filling capacity and transmission oil viscosity refer to 4.2 and 4.8.

### 3.5.6 Steering Knuckle Bearings

Lubricate steering knuckle bearings according to maintenance schedule.

Jack up axle.

Pay attention that grease emerges slightly between the king-pin and steering knuckle bearing during lubrication. If necessary, clean or replace grease nipple.

#### Note:

Lubricate top of steering knuckle bearings only with hand operated grease gun.

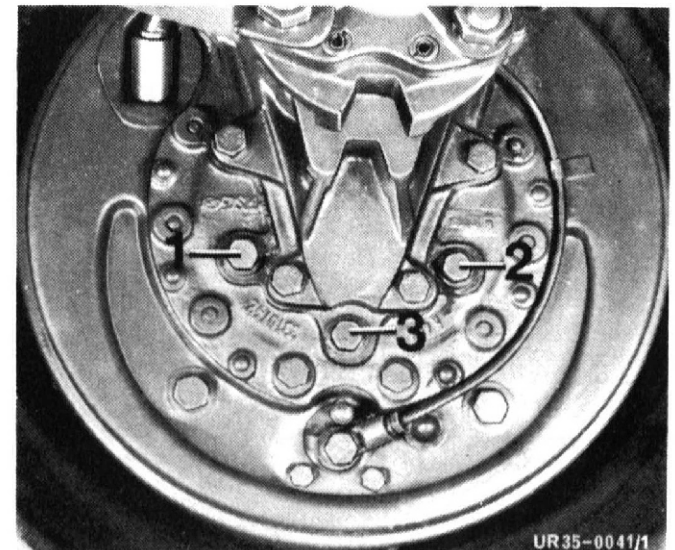


Figure 71 Hub reduction gear

- 1 Oil level control plug
- 2 Oil filler plug
- 3 Oil drain plug

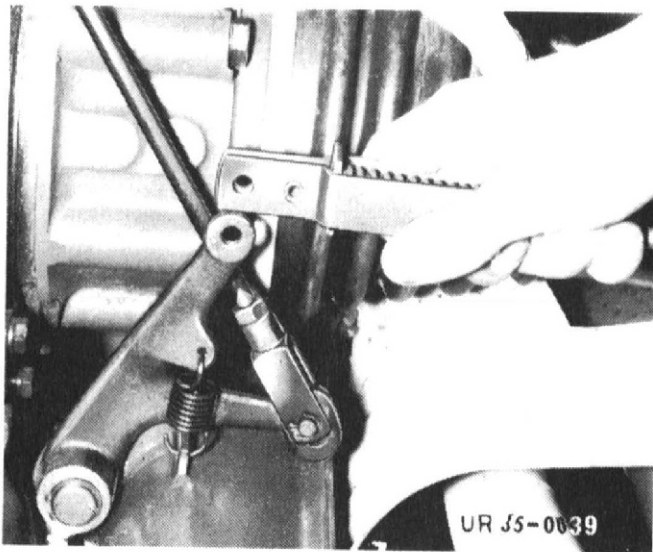


Figure 72 Checking rear axle differential lock

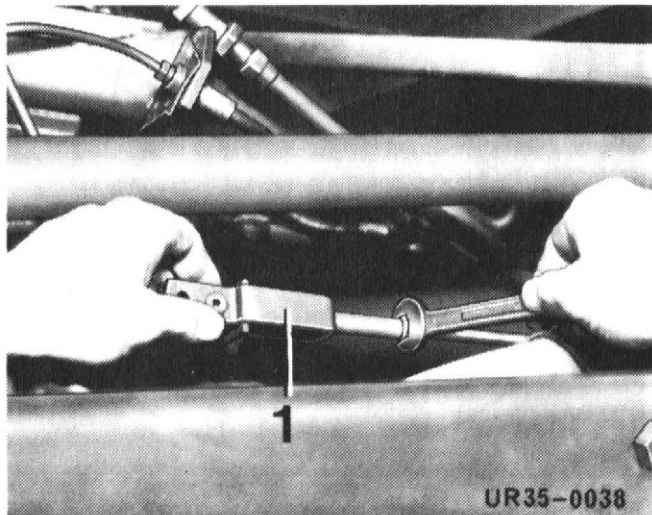


Figure 73 Adjusting differential lock

1 Spring element

3.5.7 Not Applicable to this Vehicle.

### 3.5.8 Differential Locks

Check **functioning** of four-wheel drive and differential locks according to maintenance schedule.

To do so, jack up one wheel of the front axle and the opposite wheel of the rear axle.

#### Four-wheel drive

Shift four-wheel drive / differential lock shifting lever into the **first position**. Turn one wheel, while doing so the wheel of the opposite axle must **turn as well**.

#### Differential lock

Shift the four-wheel drive / differential lock shifting lever into the **second position**.

Due to the locking of the differential both wheels must no longer turn.

#### Adjusting differential lock

Block up axle (do not suspend vehicle from crane!).

Remove splined bolt and disengage pull rod.

Check lock engagement by pulling the pull rod and simultaneously turning a wheel (second person). In pulled and/or engaged position, it must be possible to insert the splined bolt into the bore free of tension.

Compensate for deviations by screwing spring package of spring element in or out.

Thereafter screw the spring element onto the pull rod by an additional 3 turns = 3.8 mm to provide a preload in the event of vehicle distortion.

### 3.5.9 Propeller Shafts

Lubricate propeller shafts according to maintenance schedule.

## 3.6 Steering System

### 3.6.1 Checking Steering

Check pitman arm for tight seating and steering for proper functioning according to maintenance schedule.

#### Mechanical steering:

Check oil level in steering gear housing according to maintenance schedule and fill up if required.

The oil level must reach the lower edge of the filler neck.

For filler capacity and transmission oil viscosity refer to 4.2 and 4.8.

### 3.6.2 Oil Level, Oil Change, Oil Filter

Check oil level in steering oil reservoir according to maintenance schedule. The oil reservoir is located in front and on the left hand side in the engine compartment.

With the engine running, the oil level **must** be at the upper mark of the red ring on the inspection glass and **may** be somewhat higher with the engine turned off.

For an oil change according to maintenance schedule, detach return line at steering gear housing and drain oil. In doing so crank engine briefly with the starter and turn the steering wheel from stop to stop.

Unscrew oil reservoir cap and replace paper oil filter element.

Clean oil reservoir and fill up with HD engine oil. Refer to 4.9.

Clean bleeder slot of plug washer.

### 3.6.3 Bleeding Power Steering

Unscrew steering gear housing bleeding screws by 1 to 2 turns. Fill oil reservoir with HD engine oil SAE 10 W. In the meantime slowly turn steering wheel from stop to stop with no load on front axle or with steering rod disengaged, until the oil level reaches the upper edge of the red ring on the inspection glass. If necessary refill with oil. Then let the engine run at idle speed until the oil level has stabilized itself.

### 3.6.4 Power Steering Pump V-belt

Check V-belt according to maintenance schedule. Tension V-belt with tensioning screw in such a manner that it will deflect only approximately 10 mm from the straight line under thumb pressure.

Check a new V-belt several times during the first hour of operation for proper tension.

#### Important information

**In case of a sudden hydraulic booster failure, e. g. when the pump drive fails, the vehicle continues to be steerable.**

**However, a considerably greater force must be exerted for steering.**

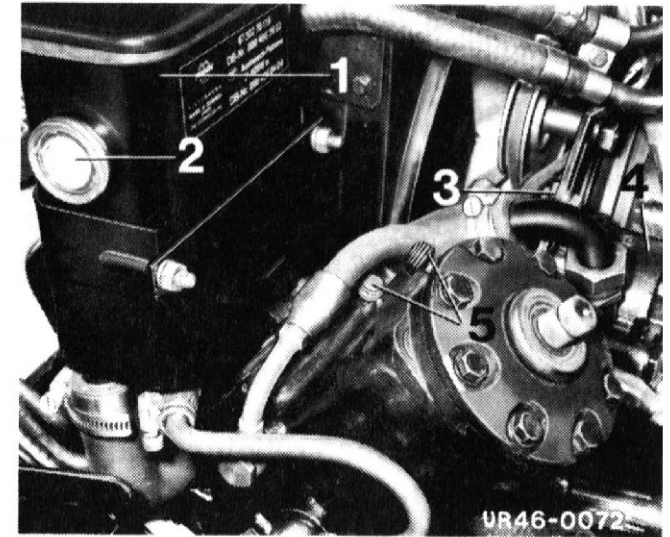


Figure 74 Power steering system

- 1 Oil reservoir
- 2 Oil level inspection glass
- 3 Steering pump tensioning screw
- 4 Steering pump
- 5 Power steering bleed screw

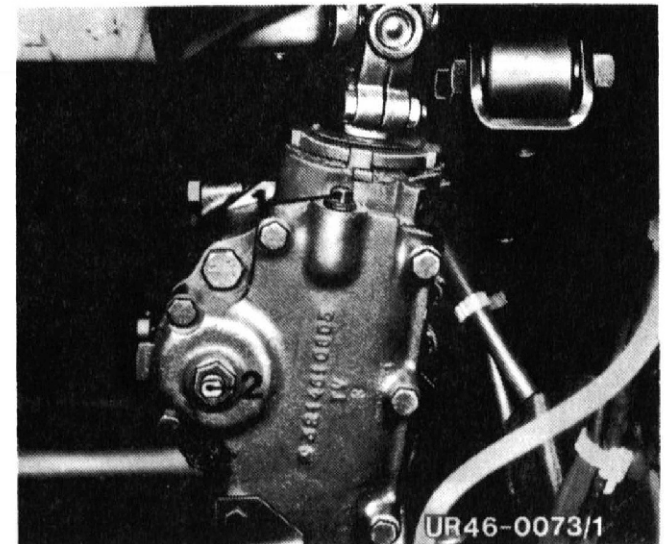


Figure 75 Mechanical steering

- 1 Oil filler plug
- 2 Adjusting screw

## 3.7 Wheels and Tires

### 3.7.1 Wheels

**Interchange wheels including spare wheel according to maintenance schedule in order that tire wear is as even as possible.** Rotate only between right front and left rear and/or left front and right rear.

After a wheel change retighten the wheel nuts again after driving approximately 50 km.

For tightening torque refer to 6.13.

### 3.7.2 Checking Tow-in

Measure tow-in of the front wheels at front of rim flange at wheel center level according to maintenance schedule. Repeat measurement after the respective front wheel has been rotated by 180°. Adjust tie-rod correspondingly, if necessary. For tow-in data refer to 6.3.3.

3.7.3 Not Applicable to this Vehicle.

### 3.7.4 Tire Treads

The corresponding tire treads for the various vehicle usages are given in the table in section 6.5.1.

If the vehicle is mainly **driven on the road** mount the tires in such a manner that the arrow tread on the ground points **forward** on the front wheels and to the **rear** on the rear wheels as viewed in driving direction. This causes the vehicle to run smoother at high speeds and reduces tire wear.

For **heavy traction** in terrain mount tires in such a manner that on the front and rear wheels the arrow tread on the ground points to the **rear** as viewed in driving direction. This is absolutely necessary in order to provide good grip and good self-cleaning action!

If necessary, interchange both front wheels.

### 3.7.5 Checking Tire Pressure

Prior to starting on a long drive, check tire pressure with a tire pressure gauge. Do not forget the spare wheel! For tire pressures refer to 6.5.2.

For a long service life of the tires be sure to always maintain the permissible loading capacity and the specified tire pressure.

On soft ground and on sand, the traction and performance can be increased considerably by reducing the tire pressure. A lower tire pressure also improves the self-cleaning action on a sticky, wet soil.

Be sure to inflate the tires to the normal tire pressure after the above operations have been completed.

## 3.8 Brake System

### 3.8.1 General

The **service brake system** is a hydraulic, two-circuit drum-type brake system with automatic wheel brake readjustment.

The **parking brake system** acts mechanically upon the rear wheel brake.

A compressed-air brake booster is installed in front of the master brake cylinder and serves as a **brake assistance** to take over part of the necessary pedal force during braking and thus relieving the driver.

For **compressed-air system** refer to 3.9.

The brake system corresponds to the **EC specifications** (EC = European Community).

### 404.1

The **service brake system** is a hydraulic, single-circuit drum-type brake system.

A two-circuit brake system can be installed as an optional extra (front axle and rear axle separate).

The **parking brake system** acts mechanically upon the rear axle.

A vacuum brake unit can be installed as a **brake assistance** in order to offer effective brake assistance with the aid of the engine vacuum.

For **compressed-air system** refer to 3.9.

### 3.8.2 Checking Brake Fluid Level

Check hydraulic brake system for leaks and contents of brake fluid reservoirs according to maintenance schedule.

Prior to opening, disconnect line connectors of warning device.

Fluid must be at upper level mark with the vehicle standing on level ground.

When the fluid level drops below the minimum mark the indicator light in the instrument cluster must light up with the ignition turned on.

This indication is activated via the float contacts in both reservoirs.

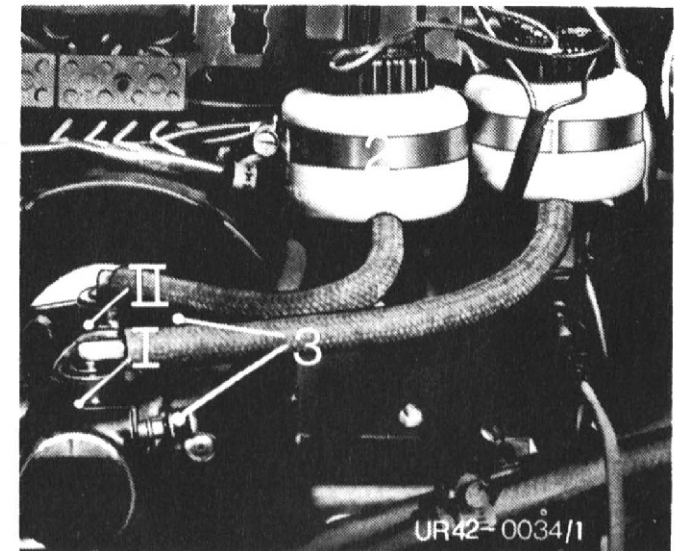


Figure 78 Brake fluid reservoirs

- 1 For hydraulic brake circuit I and hydraulic clutch
- 2 For hydraulic brake circuit II
- 3 Bleed screw

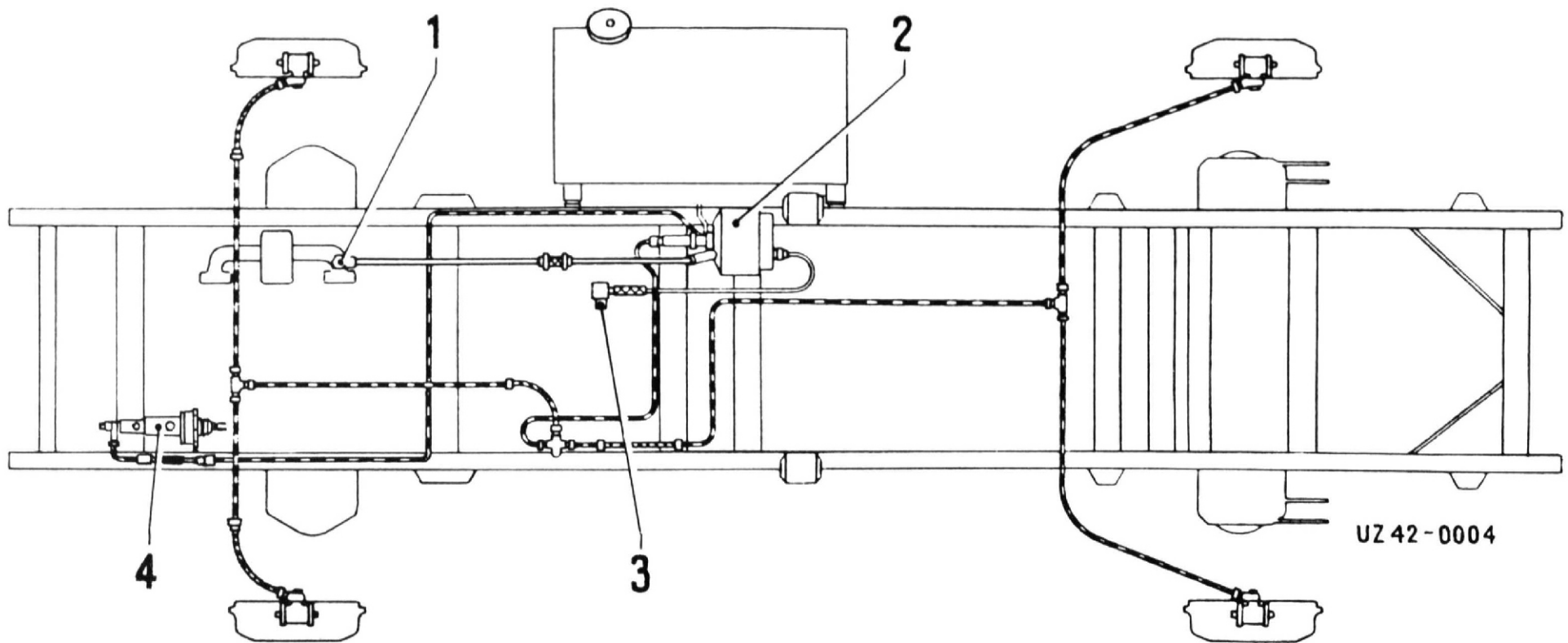


Figure 77 Schematic diagram of hydraulic brake system with vacuum brake assistance

- 1 Vacuum connection
- 2 Vacuum brake unit

- 3 Bleeding filter
- 4 Master brake cylinder

UZ 42-0004

**Do not permit brake fluid to touch paint-work**

If brake fluid needs to be added frequently the hydraulic brake or clutch systems are leaking.

Change brake fluid at least once a year (spring inspection).

Only use yellow brake fluid as of this date!

#### 404.1

Only one brake fluid reservoir without warning device.

Observe max. and min. mark!

### 3.8.3 Bleeding Hydraulic Brake System

If no firm resistance is felt, when fully depressing the brake pedal, the hydraulic brake system is either leaking or there is air in the hydraulic system, which must be removed immediately.

Use bleeding equipment to bleed the entire brake system! Carry out this work with particular care.

When bleeding with bleeding equipment, the pressure of such equipment must not exceed 1.0 bar (kp/cm<sup>2</sup>). Pressure which is too high can cause heavy foaming of the brake fluid so that proper bleeding is not guaranteed.

### Hydraulic brake circuit I

For complete bleeding proceed in the following sequence:

Bleed tandem master brake cylinder, hydropneumatic control valve and wheel brake cylinder, starting with right rear, left rear, right front (upper cylinder) and left front (upper cylinder).

### Hydraulic brake circuit II

Circuit II of the hydraulic brake system only acts upon the front wheel brake. Connect **bottom** bleed screw of the large wheel brake cylinder (2) and bleed separately together with the expansion reservoir II. Figure 76.

#### 404.1

On vehicles with single or two-circuit brake system carry out bleeding as follows:

Bleed master brake cylinder and wheel brake cylinder starting with right rear, left rear, right front and left front. With a brake assistance system installed also bleed the brake booster together with the master brake cylinder.

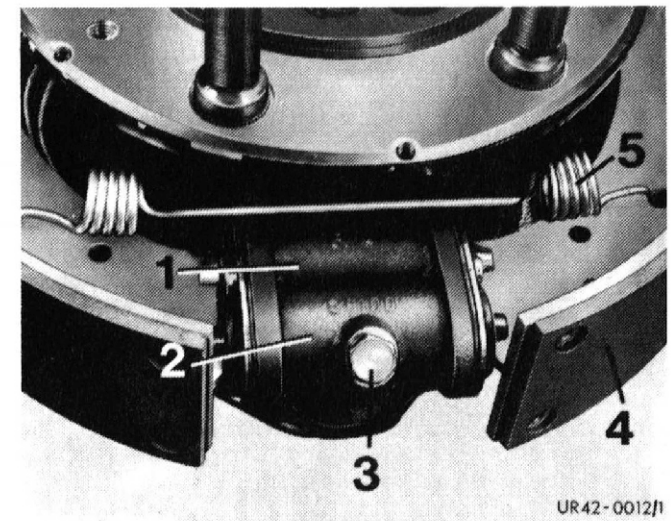


Figure 78 Front wheel brake with twin-wheel brake cylinder

- 1 Wheel brake cylinder circuit I
- 2 Wheel brake cylinder circuit II
- 3 Guide screw
- 4 Brake shoe
- 5 Return spring

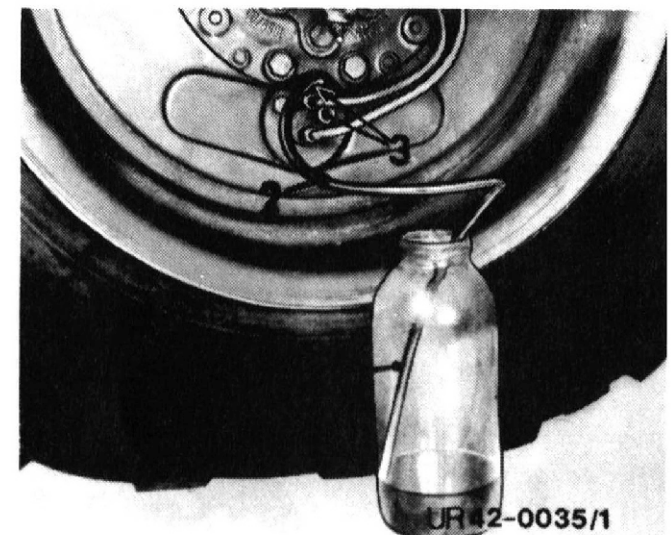


Figure 79 Bleeding hydraulic brake system

- 1 Transparent vessel
- 2 Bleeding hose
- 3 Bleed screw

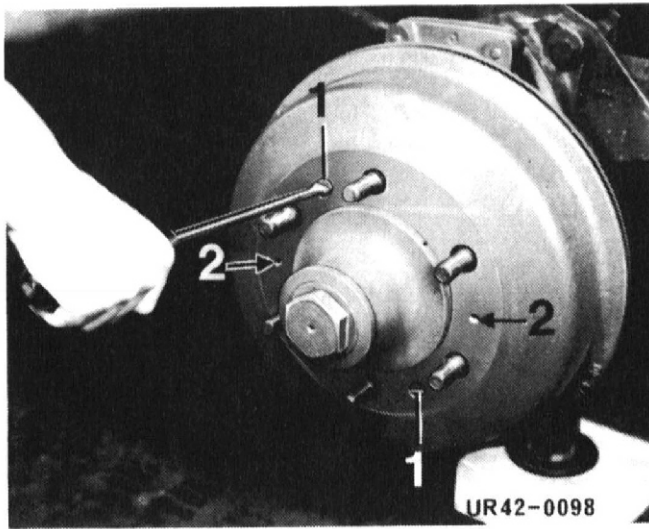


Figure 80 Brake drum

- 1 Mounting bolt
- 2 Bore for back-off bolt

During partial bleeding (e. g. after replacing a wheel brake cylinder) carry out the following work:

Remove respective dust cap. Connect bleeding hose and insert end of hose into transparent plastic vessel partly filled with brake fluid. Unscrew bleeding screw 1 to 2 turns. Depress brake pedal in one motion all the way. Tighten bleeding screw and **slowly** release brake pedal. Repeat this pumping action until no further air bubbles appear when the pedal is depressed. When depressing the brake pedal for the last time, retain it in its lowest position until the bleed screw has been screwed down. Remove bleeding hose and replace dust cap.

### 3.8.4 Checking and Cleaning Brakes

Clean wheel brake and check thickness of brake linings according to maintenance schedule. When using the vehicle jack make sure that it is applied as far to the outer end of the axle tubes as possible and never under the differential housing.

After removing the wheels unscrew the two countersunk head screws which become visible and press off the drum with two hex. head screws.

Due to uneven braking action as well as overheating due to dirt and mud which has penetrated the wheel brake it is absolutely necessary to clean them after a prolonged cross-country drive.

Check thickness and general condition of brake linings. Check wheel brake cylinder for leaks.

### 3.8.5 Brake Shoes

Check and clean brake shoes and linings according to maintenance schedule.

Shoe-to-lining clearance on both sides  $1.8_{+0.1}^{-0.3}$  mm (automatic resetting after braking action).

With increasing wear of the brake linings an **automatic readjustment of the front and rear brake cylinders** takes place.

#### 404.1

#### Readjusting brake shoes, service brake

With increasing wear of the brake linings, the operating travel of the brake pedal increases. This is a sign that the brake shoes have to be readjusted.

Raise axle.

Turn adjustable eccentric toward the outside until brake shoes rest against the brake drum and **only** then turn back so far that the wheel can still be turned freely.

After each adjustment the specified braking action delay must be achieved. If necessary replace brake linings and/or regrind brake drums.

### 3.8.6 Adjusting Brake Pedal

The free travel between piston rod and master brake cylinder or to the control piston of the brake booster must be approximately 1 mm in the resting position of the brake pedal. This corresponds to a free travel of approximately 6 to 7 mm at the pedal plate of the brake pedal. Adjust at the upper adjusting screw (eccentric) of the brake pedal and piston rod as required.

#### 404.1

The plunger is adjusted at the forked head of the master brake cylinder below the cab. Figure 83.

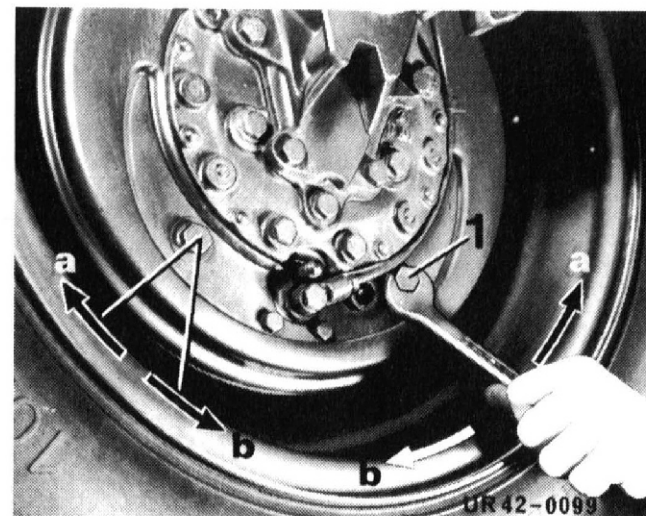


Figure 81 Adjusting brake shoes 404.1

- 1 Adjustable eccentric
- a engage
- b disengage

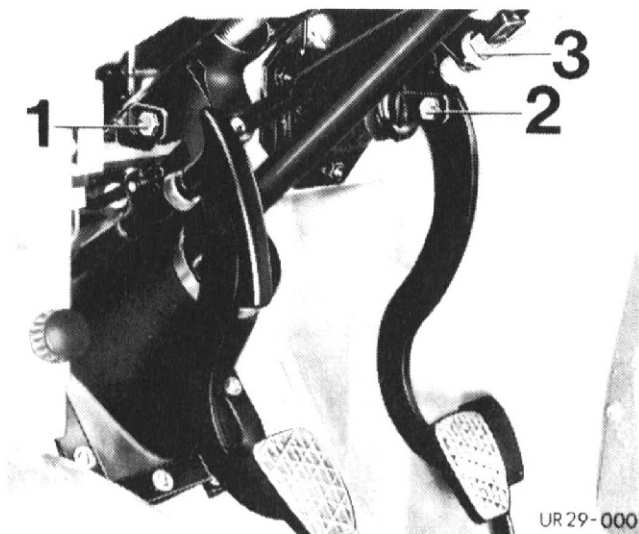


Figure 82 Adjusting pedals

- 1 Adjusting screw, clutch pedal
- 2 Adjusting screw, brake pedal
- 3 Stop light switch

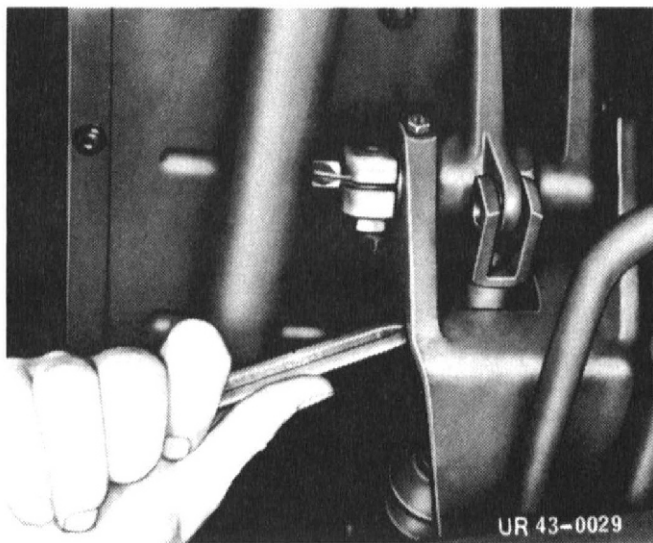


Figure 83 Adjusting plunger of master brake cylinder 404.1

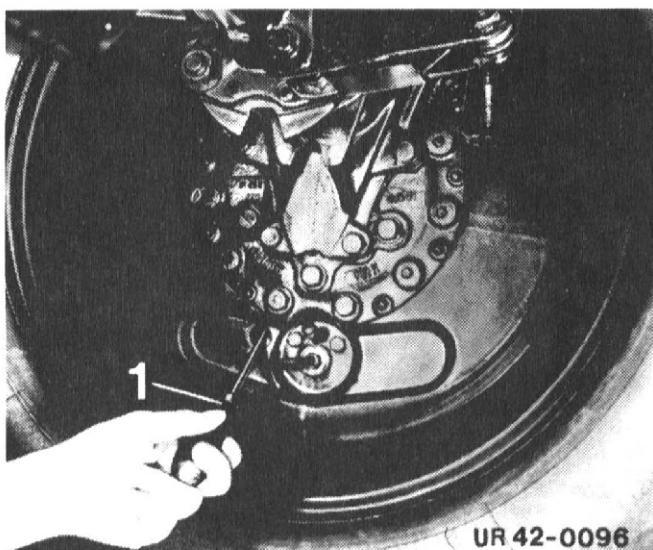


Figure 84 Adjusting parking brake

1 Screwdriver

### 3.8.7 Readjusting Parking Brake System

The ratchet rod must rest against the stop of the released position with the brake disengaged, i. e. the parking brake should only start engaging after reaching the second tooth.

If the free travel of the ratchet rod becomes too great, readjust parking brake system.

**On the 404.1** First readjust service brake system and then disengage the pull rod to the hand brake lever on top at the cable support.

Unscrew the plunger via the notched wheel with a screwdriver until the brake shoes snugly fit against the brake drum. Then turn back until the wheel still can be turned freely. The plunger has a right-hand thread.

Tighten the ratchet rod up to the second tooth. In this position the hand brake valve must react. After tightening up to the third tooth, it must no longer be possible to turn the rear wheel by hand even with increased force. However, after the ratchet rod has been disengaged they must again turn freely.

The length of the brake cable is adjusted at the forked head or at the nut (4). To do so loosen counter nut and shorten or lengthen with the other hex. nut. Should differing braking action still be noted, the respective brake cable can be readjusted via the adjusting nuts (2).

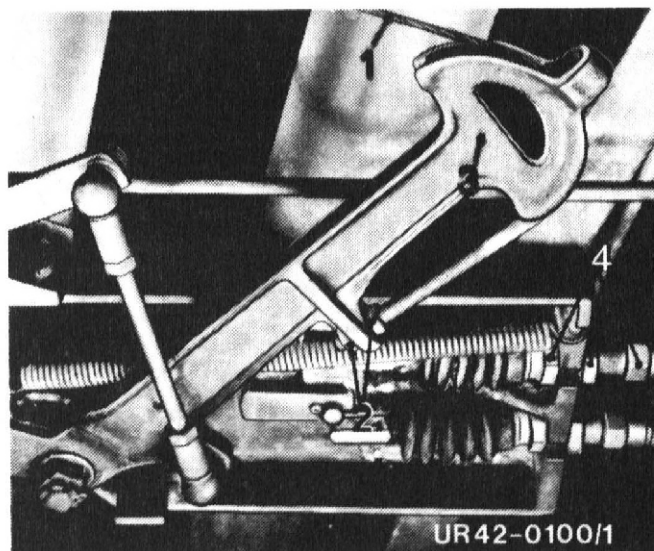


Figure 85 Parking brake readjustment

- 1 Brake cable
- 2 Brake cable with adjusting nuts
- 3 Linkage lever
- 4 Nut for brake cable adjustment

#### 404.1

After adjusting the parking brake re-engage the pull rod of the parking brake lever again.

Then check if both wheels are evenly braked after the parking brake lever has been pulled to the first or second notch, and adjust **again** at the respective notched wheel if necessary.

Adjust or readjust the brake cables via the cable support only in case of new or old brake cables as means of length compensation. However, with every adjustment of the parking brake a correction of the brake cables may become necessary. While doing so, the balancing arm must always be horizontal.

### 3.8.8 Parking Brake and Pedal Linkage

Lubricate all joints of the parking brake and pedal linkage with an oil can according to maintenance schedule. Refer to 3.1.5.

#### 404.1

Lubricate pedal linkage at frame and linkage lever at carrier tube.

### 3.8.9 Brake Hoses, Brake Lines

Replace leaking or externally damaged brake lines immediately. External damage comprises corrosion, chafing, pinching, etc.

Brake hoses must not be twisted when installed and must not bind or chafe when the wheels are turned. In addition, brake hoses must not **be painted or preserved with undercoating, etc. since rubber will become brittle and lose its elasticity.**

Brake hoses must only be cleaned with water.

3.8.10 Not Applicable to this Vehicle.

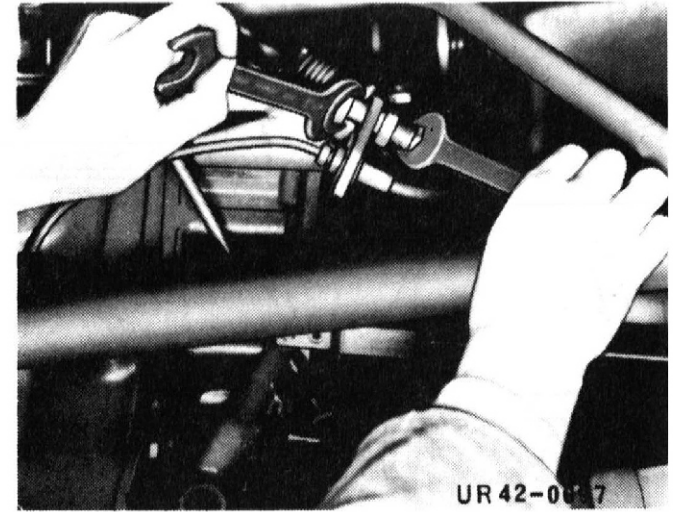
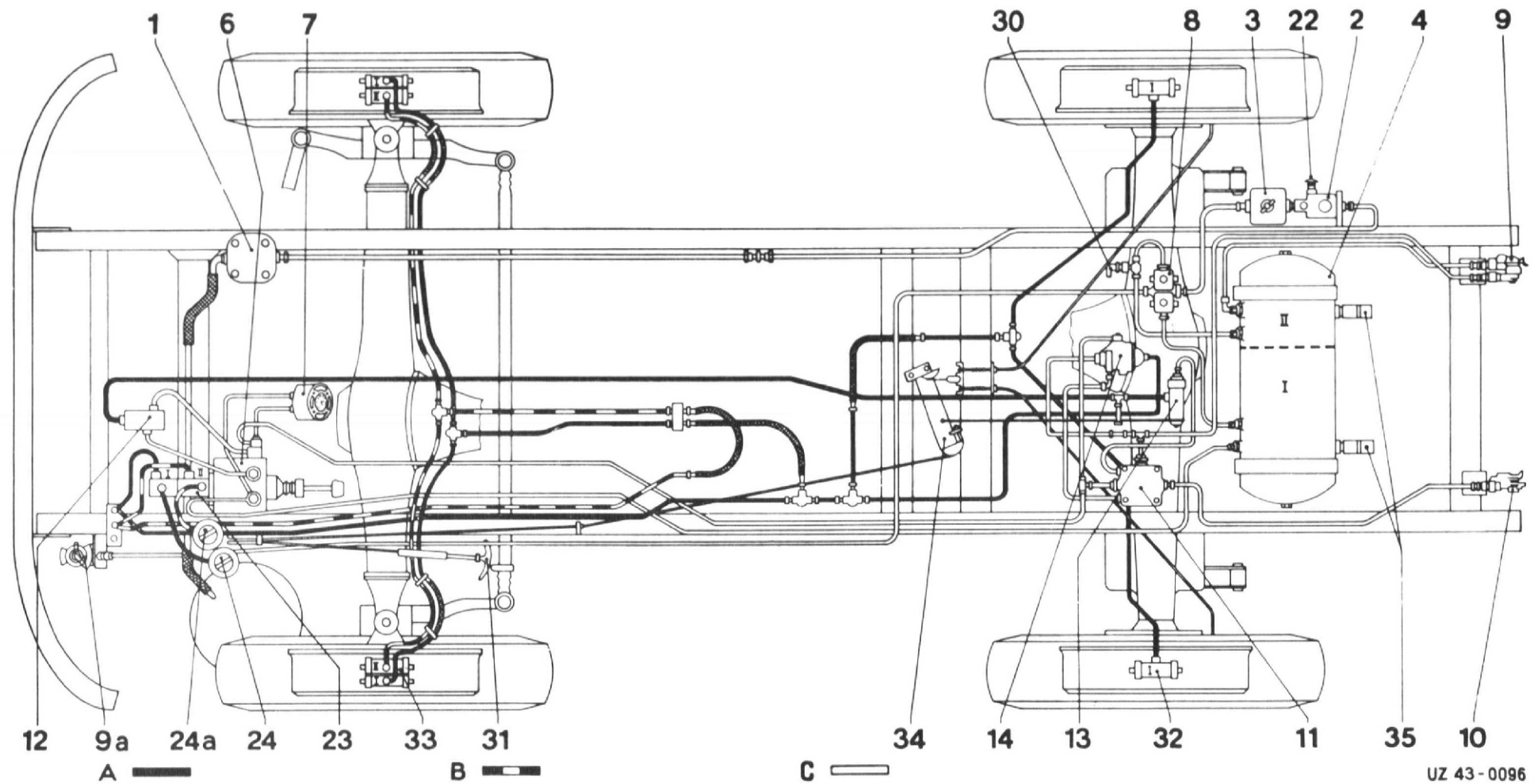


Figure 86 Readjusting brake cables  
404.1

### 3.8.11 Vacuum Brake Booster

An irregularly working vacuum brake booster becomes noticeable because of partial or complete failure of the brake system. In case of trouble, check all vacuum connections (intake manifold, vacuum hose, ring fittings, etc.) for tight seating. If all above listed work brings no remedy replace check valve and air cleaner packing.

### 3.9 Compressed-Air System



UZ 43-0096

Figure 87 Diagram of compressed-air brake assistance system with compressed-air control for the two-line trailer brake system and hydraulic two-circuit brake system 404.0

- | A Hydraulic brake line circuit I         | B Hydraulic brake line circuit II        | C Compressed-air brake line          |
|--|--|--------------------------------------|
| 1 Air compressor                         | 9a Palm coupling for supply line (front) | 24 Brake fluid reservoir circuit I   |
| 2 Pressure regulator                     | 10 Palm coupling for brake line          | 24a Brake fluid reservoir circuit II |
| 3 Antifreeze unit                        | 11 Trailer control valve                 | 30 Warning pressure switch           |
| 4 Compressed-air reservoir (two-chamber) | 12 3/2-way valve                         | 31 Parking brake ratchet rod         |
| 6 Compressed-air brake booster           | 13 Hand brake valve                      | 32 Wheel brake cylinder              |
| 7 Brake dual pressure gauge              | 14 Hydropneumatic control valve          | 33 Twin-wheel brake cylinder         |
| 8 Three-circuit protective valve         | 22 Tire inflator connection              | 34 Parking brake linkage lever       |
| 9 Palm coupling for supply line          | 23 Tandem master brake cylinder          | 35 Pressure relief valve             |

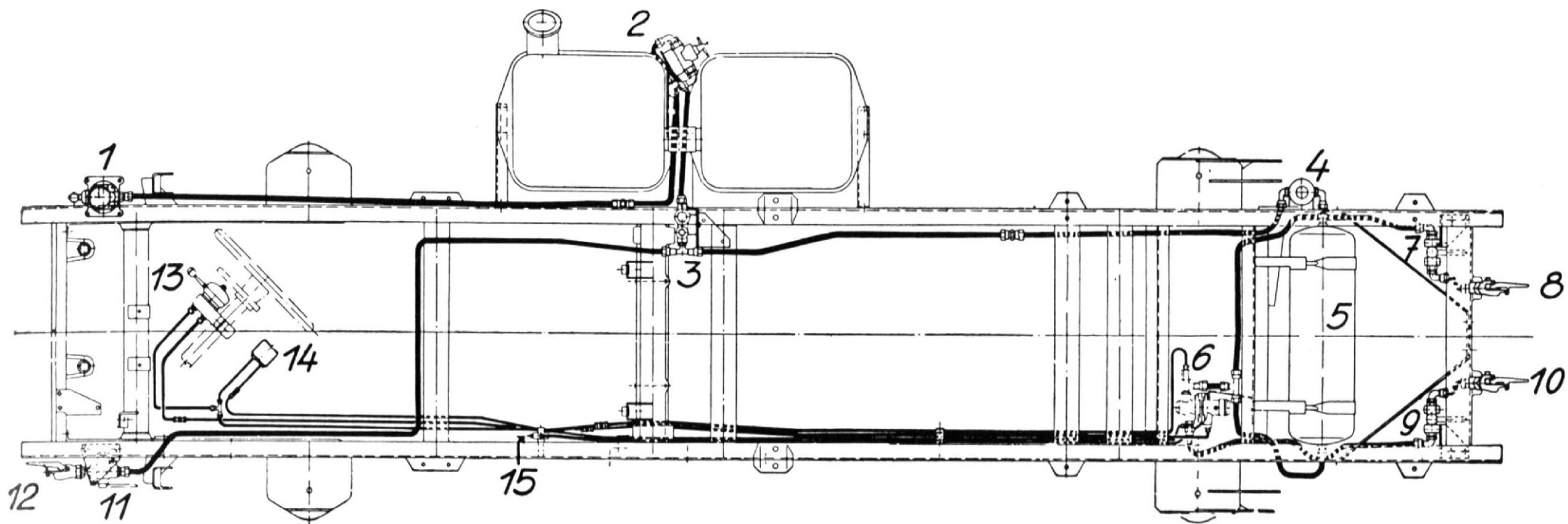


Figure 88 Diagram of the compressed-air control for the two-line trailer brake system 404.1

- |  |                                 |  |
|--|---------------------------------|--|
| 1 Air compressor                       | 7 Shut-off cock                 | 12 Palm coupling for supply line (front)                     |
| 2 Filter with tire inflator connection | 8 Palm coupling for supply line | 13 Hand brake valve for trailer operation                    |
| 3 Pressure regulator                   | 9 Shut-off cock                 | 14 Dual pressure gauge                                       |
| 4 Antifreeze pump                      | 10 Palm coupling for brake line | 15 Distributor, master brake cylinder to front and rear axle |
| 5 Compressed-air reservoir             | 11 Shut-off cock                |  |
| 6 Trailer control valve                |                                 |  |

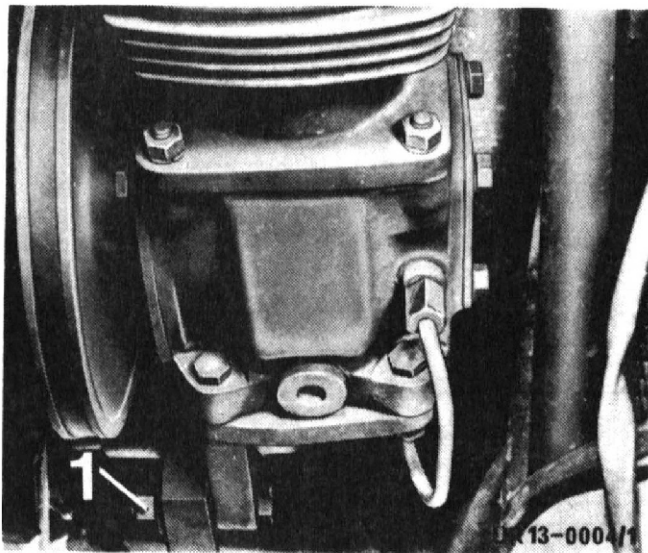


Figure 89 Tensioning V-belt

1 Tensioning screw

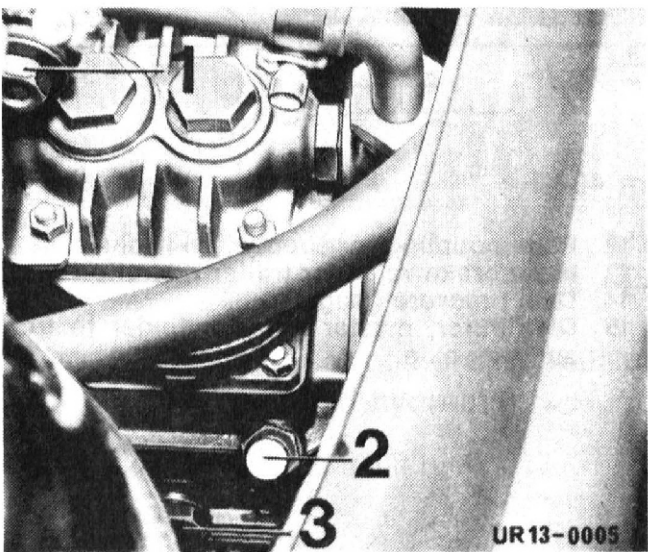


Figure 90 Air compressor 404.1

1 Tensioning nut  
 2 Oil dipstick  
 3 Oil drain plug

### 3.9.1 General

The compressed-air brake system consists of the compressed-air brake assistance system and the compressed-air control for the trailer brake system.

As an optional extra the compressed-air connection can be installed in front.

The system corresponds to the EC specifications (EC = European Community).

#### 404.1

On this model a compressed-air control can be installed for a single or two-line trailer brake system with or without a compressed-air connection in front. An additional hand brake valve serves to brake the trailer during down-hill driving.

### 3.9.2 Air Compressor

Compressed air is produced by the air compressor.

The lubrication of the air compressor is connected to the engine oil circuit.

Thus the air compressor requires no maintenance.

#### 404.1

**Air compressor:** Check oil level according to maintenance schedule.

Check V-belt according to maintenance schedule. Tension V-belt with tensioning screw in such a manner that it will give only approximately 10 mm from the straight line under thumb pressure. A V-belt which is too tight or too loose will be destroyed prematurely.

Check a new V-belt several times during the first hour of operation for proper tension and retension it if necessary, since it will stretch somewhat while running in.

### 3.9.3 Pressure Regulator Warning Device

The pressure regulator is set to a cut-off pressure of 7.35 bar (kp/cm<sup>2</sup>). With a pressure drop to below 5.2 bar (kp/cm<sup>2</sup>) a red warning light will light up in the instrument cluster.

Both brake fluid reservoirs are connected to the same warning light. If the brake fluid level drops below the minimum mark, the light will also light up in the instrument cluster.

#### 404.1

The optical warning indicator for the compressed-air system and brake fluid reservoir are omitted on this type.

Remove filter element of pressure regulator approximately every three months and clean in nitro thinner or replace it if necessary. Install filter element in dry condition only.

If the pressure regulator cuts off at a pressure which is too low or too high readjust with the adjusting screw.

### Pressure regulator with tire inflator connection

#### Inflating tires

In order to be able to **inflate tires** the compressed-air system may only have a pressure of at most 6.2 bar. Lower the pressure from 7.35 bar by operating the brake pedal several times. Thus the pressure regulator is switched over to air supply.

Loosen screw plug with the clamping handle on the pressure regulator. Screw tire inflator hose onto hose connection. To inflate tires let engine run.

For tire pressures refer to 6.5.2.

#### 404.1

#### Filter with tire inflator connection

Drain filter weekly and daily during the winter as well as prior to every **tire inflation**. To do so press button. Dirt and condensate are then blown out via a safety valve on the bleed connection.

Prior to **filling tires** unscrew wing nut with push button and connect tire inflator hose. Clean filter element every three months.

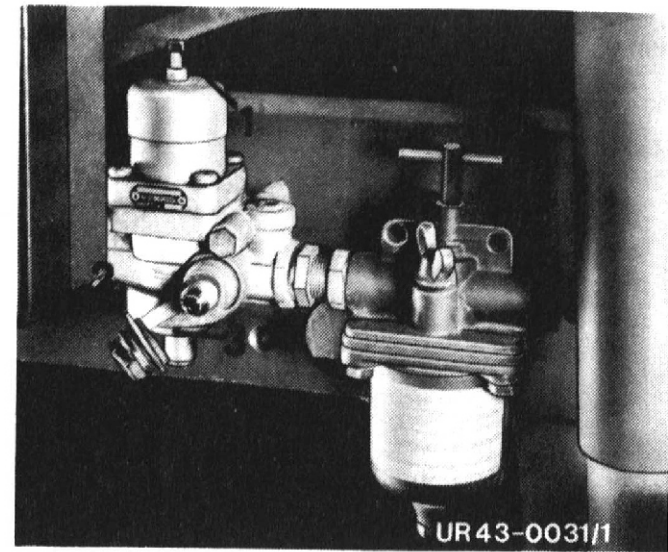


Figure 91 Pressure regulator and anti-freeze unit

- 1 Adjusting screw
- 2 Tire inflator connection
- 3 Filter housing

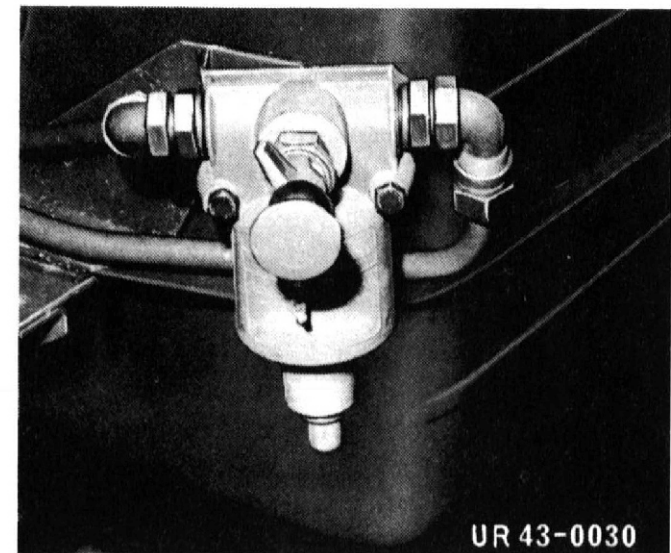


Figure 92 Filter with tire inflator connection 404.1

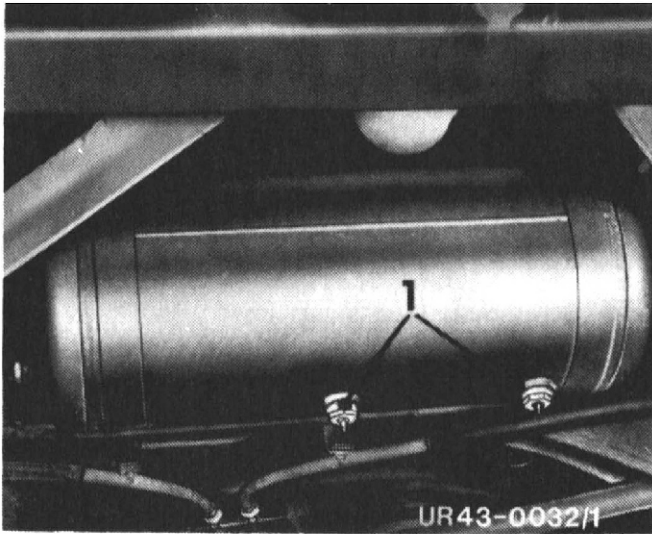


Figure 93 Compressed-air reservoir

1 Drain valve

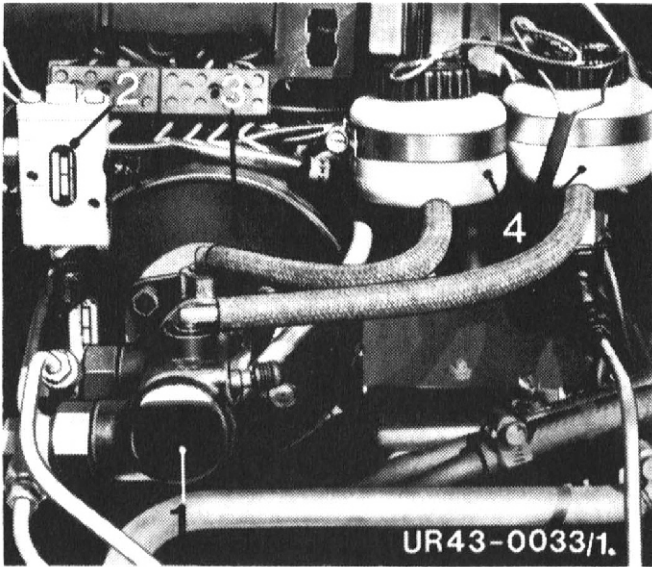


Figure 94 Tandem master brake cylinder with compressed-air brake booster

1 Tandem master brake cylinder  
 2 3/2-way valve  
 3 Compressed-air brake booster  
 4 Brake fluid reservoir

### 3.9.4 Compressed-Air Tank

**Regularly drain condensate** from compressed-air tank. Operate drain valves if installed.

If the drain valves are plugged due to ice formation operate service brake pedal several times in order to release the pressure in the compressed-air system.

Unscrew and clean the drain valves.

#### 404.1

Loosen plug on compressed-air tank two or three turns. Condensate is emitted via the venting bore of the plug.

### 3.9.5 Compressed-Air System

When operating the brake pedal the applied foot pressure is increased in a given ratio with the aid of the compressed-air brake assistance unit.

During a braking action depending upon the foot pressure and according to the respective vehicle operation an effective braking behaviour is thus achieved.

The unit requires no special maintenance.

### 3.9.6 Compressed-Air Control of Trailer Brake System

For increased safety the system is subdivided into two compressed-air circuits.

The compressed air produced by the air compressor is adjusted to the specified operating pressure of 7.35 bar (kp/cm<sup>2</sup>) by the pressure regulator and is stored in a two chamber compressed-air tank. A 3-circuit protective valve secures the pressure in both tank sections against each other.

A larger part of the compressed-air tank (20 lit. and 10 lit.) stores the compressed air during trouble free functioning with trailer operation (compressed-air circuit I).

In case of a failure of this compressed-air circuit the 3-circuit protective valve which maintains a safety pressure of 5.5 bar switches to the compressed-air tank portion (circuit II) which is still intact and ensures the continued functioning of the trailer brake with this compressed-air supply.

A valve in the palm coupling is automatically opened when the trailer is coupled to the supply palm coupling (red) and the supply air for the trailer control valve (2-line), hand brake valve and hydro-pneumatic control valve is released. Simultaneously the 3/2-way valve automatically switches the brake booster to trailer operation.

The trailer control valve (2-line) works in such a manner that the trailer is braked first in order to prevent it pushing up against the tractor. The braking action is initiated with the brake pedal or parking brake lever via the hand brake valve using control air.

The hydropneumatic control valve permits the 2-fold trailer control.

Pneumatic control if brake is intact and hydraulic control if the large compressed-air tank fails.

3.9.7 Not Applicable to this Vehicle.

### 3.9.8 Antifreeze Unit

Check fuel level of antifreeze unit according to maintenance schedule.

The fluid reservoir must remain filled up with antifreeze agent all year round.

Add antifreeze agent only in the summer position. To do so, unscrew filler screw with dipstick and pour in **ethyl alcohol** (fuel alcohol) with a small funnel. Maximum filling capacity 200 cc.

Minimum and maximum fluid levels are marked on the dipstick.

#### 404.1

Remove cap in order to fill up. Pay attention that antifreeze is filled in all year round.

The antifreeze pump is only operational as long as the antifreeze is not filled above the marked edge.

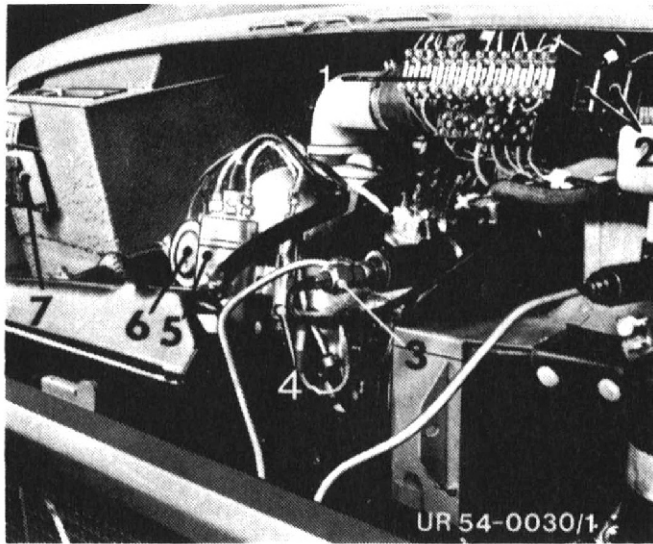


Figure 95 Electrical system

- 1 Fuse box
- 2 Plug connections
- 3 Stop light switch
- 4 Antiinterference condenser
- 5 Ignition coil
- 6 Series resistor
- 7 Turn signal transmitter

## 3.10 Electrical System

### 3.10.1 General

Check functioning of all consuming units according to maintenance schedule. Check fuses, line and ground connections.

Loose or oxidized cable connections cause contact resistance which can be damaging to the functioning of the regulator and the consuming units.

Also refer to engine ignition system.

### 3.10.2 Generator

**The 3-phase alternator** supplies the power for the vehicle and any supplementary equipment.

3-phase alternators supply power already when the engine is running at idle speed. This is recognizable because the charge indicator light is extinguished immediately.

**In case of 3-phase alternators observe the following important instructions:**

- 1 Replace defective charge indicator light immediately.
- 2 As long as the engine is running, do not remove the line terminals of the battery, the alternator connections or the regulator plug since otherwise there is a danger of inductive voltage peaks destroying the diodes in the alternator.
- 3 For the same reason it is not permitted to tow-start the vehicle engine as long as the batteries are not connected.
- 4 Do not in any case confuse the plus or minus lines on the starter or on the battery.
- 5 **Be careful with rapid chargers!**

Remove the battery terminals when recharging the battery with a rapid charger in the vehicle.

On rapid chargers with a separate main switch first reduce the charging current and only then switch it off.

Poor contact between battery connector and battery terminal as well as wrong connection of a rapid charger or another power source may also result in damage in case a starting aid is used.

Refer to 2.3.8.

#### **404.1**

This vehicle is equipped with a DC generator which has 300 or 600 W real power.

#### **3.10.3 Regulator, Charge Indicator Light**

Preexcitation is assured if the charge indicator light (red) lights up after the switch key has been switched to position (1) as long as the engine is not running. Also refer to 2.1.3.

Replace damaged indicator lights immediately!

It is recommended that the regulator be replaced in case of defect.

#### **404.1**

The regulator is pressurized water proof. Under no circumstances must the regulator adjustment be altered.

3.10.4 Not Applicable to this Vehicle.

### 3.10.5 Wiring Diagram 404.0

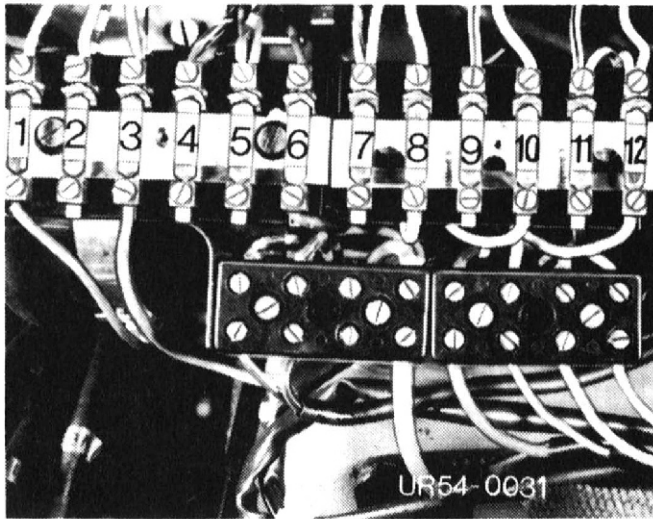


Figure 96 Fuse boxes

#### Key to wiring diagram 404.0

- 1 Socket, 1-pin
- 2 Horn
- 3a Turn signal/clearance light, left
- 3b Turn signal/clearance light, right
- 4a Main headlight, left
- 4b Main headlight, right
- 5 Windshield wiper
- 6a Fog light, left
- 6b Fog light, right
- 7 Indicator light for supplementary fuel pump
- 8 Switch for supplementary fuel pump
- 9 Interior light
- 10 Plug connection

- 11 Windshield wiper switch
- 12 Switch for fog lights
- 13 Blower for heater and ventilation
- 14 Indicator light for back-up light
- 15 Fuse boxes
- 16 Switch for back-up light
- 17 Line connector
- 18 Hazard warning flasher switch
- 19 Hazard warning flasher sending unit
- 19 Ignition distributor
- 21 Engine
- 21a Oil pressure sending unit
- 21b Coolant temperature sending unit
- 22 Switch box
- 23 Speedometer
- 24 Instrument cluster
- 25 Suppressor
- 26 Ignition coil
- 27 Regulator
- 28 3-phase alternator
- 29 Series resistor
- 30 Push button starter switch
- 31 Switch for back-up light indicator light
- 32 Stop light switch
- 33 Plug connections
- 34 Turn signal/horn/dimmer switch

- 35 Solenoid valve
- 36 Fuel gauge sending unit
- 37 Supplementary fuel pump
- 38 Starter
- 39 Battery
- 40a Turn signal/tail light/stop light, left
- 40b Turn signal/tail light/ stop light, right
- 41 Back-up light
- 42 Trailer socket

—— Series

-----Optional equipment

⊥ Ground

Color code of lines:

- bl = blue
- br = brown
- ge = yellow
- gn = green
- gr = grey
- li = lilac
- rt = red
- sw = black
- ws = white



## Key to Supplementary Wiring Diagram for Signaling System 404.0

(Fire fighting and police vehicles)

- 1 High volume horn "low"
- 2 High volume horn "high"
- 3 Horn (standard version)
- 4 Switch for flashing blue light
- 5 Alarm switch
- 6 Multi-tone switch
- 7 Switch for continuous operation
- 8 Indicator light
- 9 Cable connector
- 10 Fuse box
- 11 Plug (8-pin)
- 12 Switch box
- 13 Rotating beacon
- 14 To fuse 1 (Terminal 30)

UZ 54-0017

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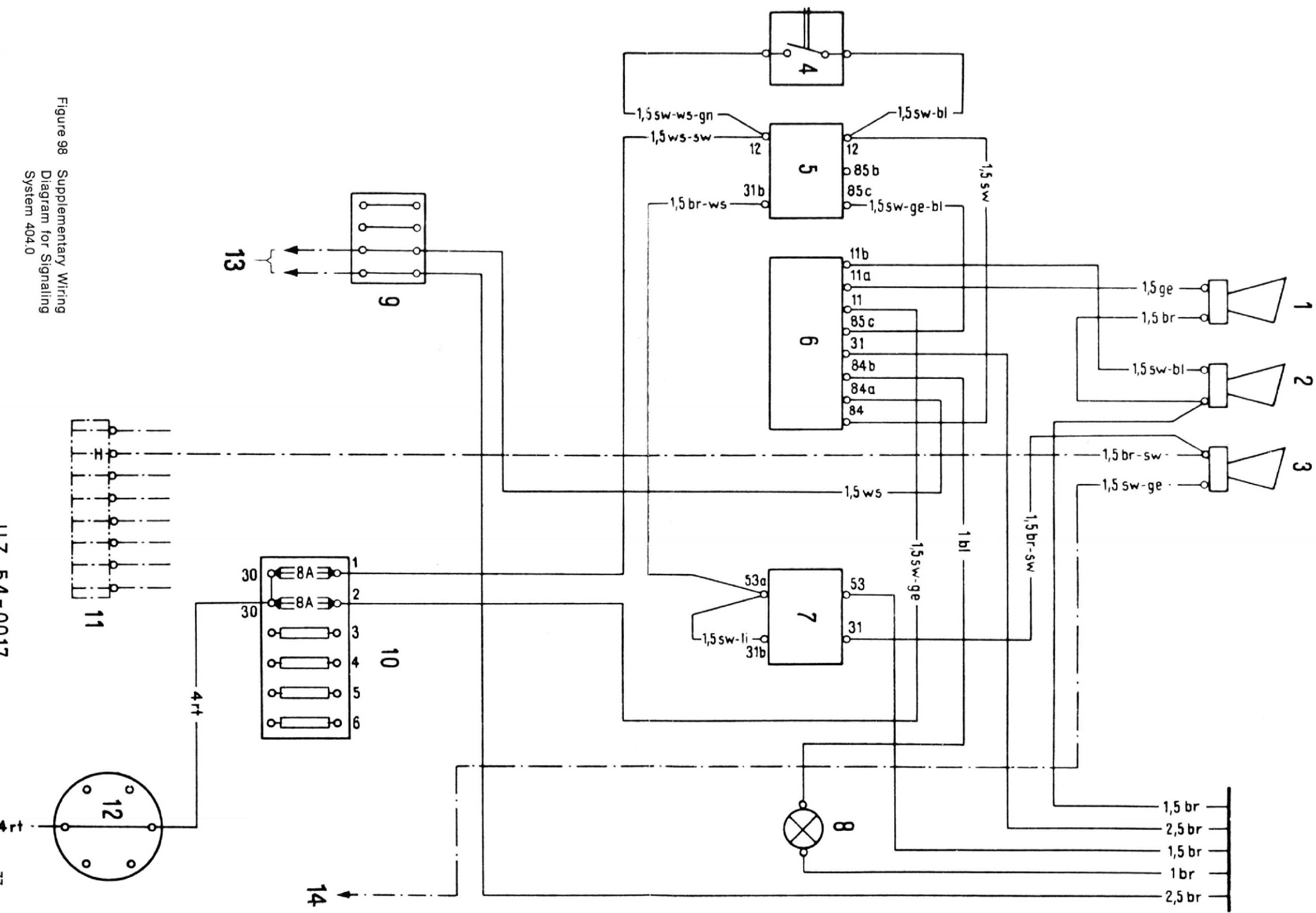
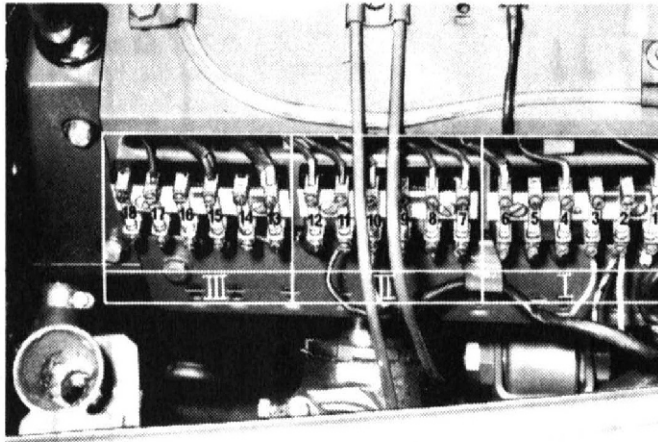


Figure 98 Supplementary Wiring Diagram for Signaling System 404.0

## Wiring Diagram 404.1



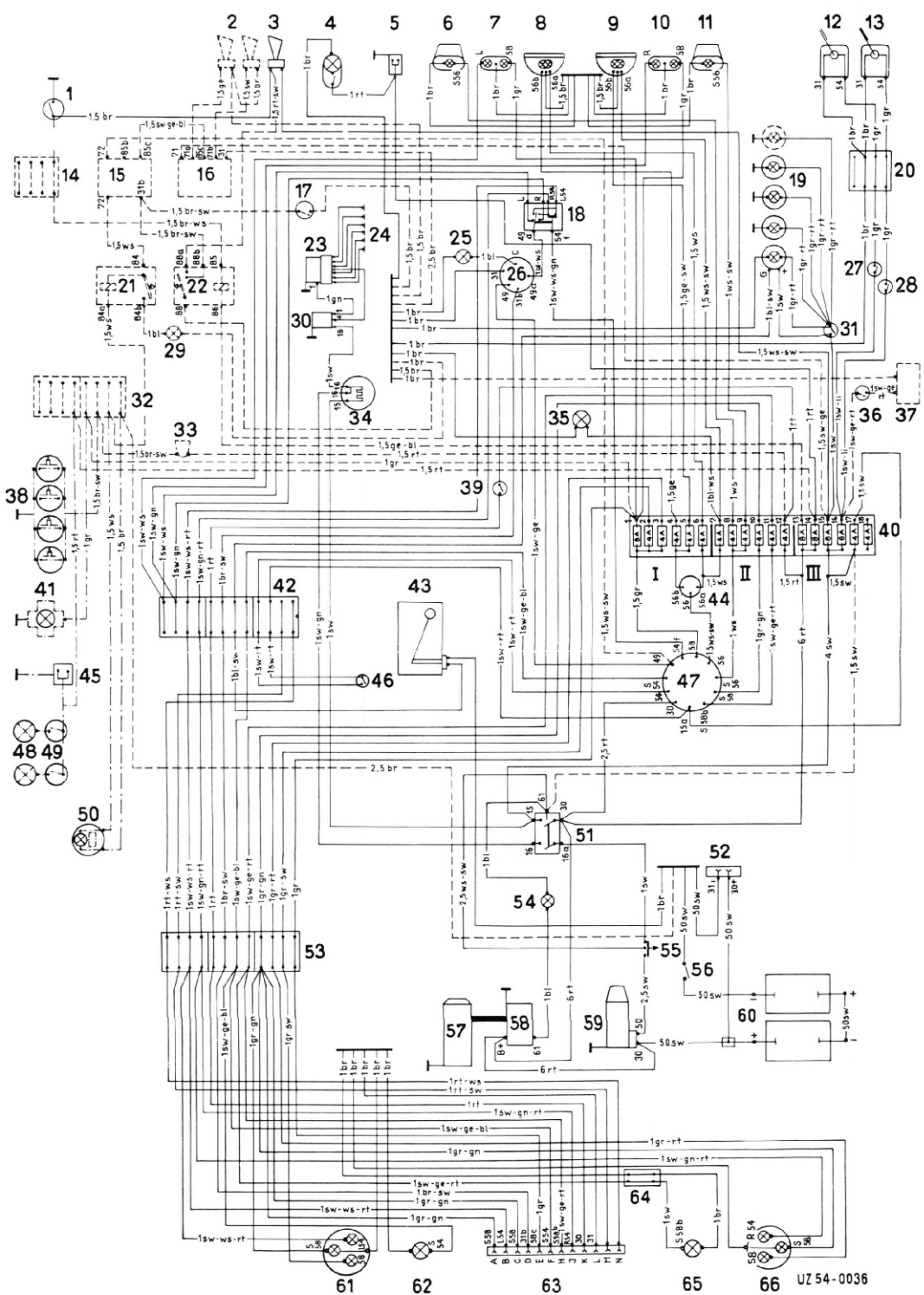
UR 54-0026

Figure 99 Location of fuse boxes

### Key to Wiring Diagram 404.1

- 1 Horn button
- 2 High volume horn signaling system
- 3 Signaling horn
- 4 Map light
- 5 Socket/hand light
- 6 Blackout light, left
- 7 Turn signal/clearance light, left
- 8 Headlights, left
- 9 Headlights, right
- 10 Turn signal/clearance lights, right
- 11 Blackout light, right
- 12 Windshield wiper, left
- 13 Windshield wiper, right
- 14 Cable connector

- 15 Alarm switching unit
- 16 Multi-tone switching unit
- 17 Switch for alarm switching unit
- 18 Turn signal switch
- 19 Instrument illumination
- 20 Cable connector
- 21 Relay for multi-tone switching unit
- 22 Relay for multi-tone switching unit
- 23 Ignition distributor
- 24 Spark plugs
- 25 Turn signal indicator light
- 26 Turn signal sending unit
- 27 Switch for windshield wiper, left
- 28 Switch for windshield wiper, right
- 29 Alarm indicator light
- 30 Ignition coil
- 31 Switch for instrument illumination
- 32 Cable connector
- 33 Buzzer (with special body)
- 34 Series resistor
- 35 High beam indicator light
- 36 Switch for heater
- 37 Heater
- 38 Switch for buzzer
- 39 Switch for buzzer (trailer)
- 40 Fuse boxes
- 41 Red cross light
- 41 Cable connector
- 43 Fuel gauge sending unit
- 44 Dimmer switch
- 45 Socket
- 46 Stop light switch
- 47 Light switch
- 48 Interior light
- 49 Lever switch for interior light
- 50 Rotating beacon
- 51 Ignition switch
- 52 External power socket
- 53 Cable connector
- 54 Charge indicator light
- 55 Starter button
- 56 Battery master switch
- 57 Generator
- 58 Regulator
- 59 Starter
- 60 Battery
- 61 Turn signal/stop light/tail light, left
- 62 Blackout stop light
- 63 Trailer plug, 12-pin
- 64 Cable connector
- 65 Convoy light
- 66 Turn signal/stop light/ tail light, right



## FUSE & LAMP CODE KEYS

404.1

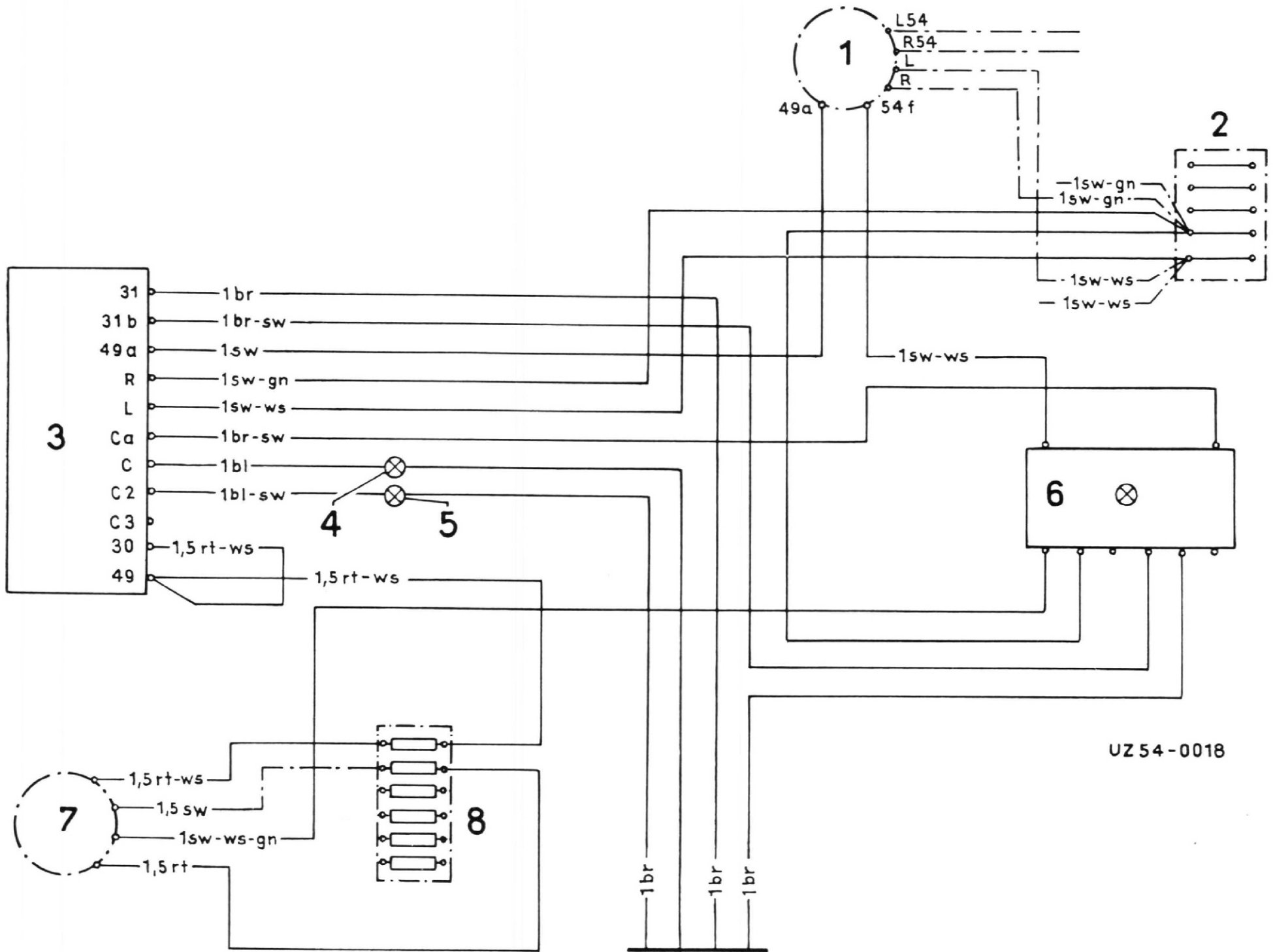
Fuse box	Fuse No.	Power consuming units	Amperage
I	1	Turn signal/clearance light, right Turn signal/clearance light, left Trailer socket E (cable connector in special body)	8
	2	License plate light	4
	3	Tail light, right	4
	4	Dimmer light, left	4
	5	Dimmer light, right	4
	6	High beam, left	4
II	7	High beam, right High beam indicator light	4
	8	Blackout light, left	4
	9	Blackout light, right	4
	10	Blackout tail light, right and left Trailer socket A and C	4
	11	Convoy light, trailer socket	4
	12	Trailer socket K (buzzer)	4
III	13	Connection, relay for high volume horn	8
	14	Socket/hand light	8
	15	Signal horn, instrument illumination	8
	16	Windshield wiper, left and right Heater and ventilation Light switch	8
	17	—	4
	18	—	4

Wiring Diagram Item No.	Power consuming units/lamps	Output W	Lamp Type
4	Map light	2	H
6, 11	Blackout light	20	R
7, 10	Turn signal light	20	R
7, 10	Clearance light	4	HL
8, 9	Headlight, high and low beam	45/40	B
19	Instrument illumination	2	H
25	Turn signal indicator light	2	H
29	Alarm indicator light	2	H
35	High beam indicator light	2	H
41	Red cross light	7	G
48	Interior light (body)	7	G
50	Rotating beacon	45	U
54	Charge indicator light	2	H
61, 66	Turn signal light, rear	20	R
61, 66	Stop light	20	R
61, 66	Tail light	5	G
61, 66	Blackout tail light	2	H
62	Blackout stop light	2	H
65	Convoy light	2	H

Lamps according to DIN 72601

Fuses according to DIN 72581

Figure 100 Wiring Diagram 404.1



80 Figure 101 Supplementary Wiring Diagram Hazard Warning Flasher System 404.1

## Key to Supplementary Wiring Diagram

### Hazard Warning Flasher System 404.1

- 1 Flasher switch
- 2 Cable connector
- 3 Hazard warning flasher sending unit
- 4 Turn signal indicator light
- 5 Turn signal indicator light, trailer
- 6 Hazard warning flasher switch
- 7 Light switch
- 8 Fuse box III

#### Note:

Hazard warning flasher sending unit (3) in place of (standard) sending unit.

— . — . — available lines and equipment

### 3.10.6 Battery

Keep battery clean and dry. Check electrolyte level and specific gravity as well as cells according to maintenance schedule. Clean battery only with screw plugs screwed on so that no dirt can enter the battery.

The electrolyte level in each cell must be approximately 10 to 12 mm above the top edge of the plates. **Add distilled water only.**

We would like to caution you against using special electrolytes. They may reduce battery service life.

Battery state of charge can be measured either with a hydrometer or a cell tester.

### 3.10.7 Connecting Battery

Clean battery terminals prior to connecting the battery.

Connect the (+) terminal first and then the (–) terminal. The plus terminal has a larger diameter. Thoroughly tighten battery terminals. Afterwards grease with acidproof grease in order to prevent oxidation.

**Avoid sparking when installing and removing batteries. Danger of oxyhydrogen gas explosion!**

During electric welding work on the vehicle, and prior to any work on the electrical system disconnect the negative battery lead (–). Do not place any conductive objects (tools) on the battery in order to avoid the danger of short circuit.

Density of battery electrolyte kg/lit.		Battery state of charge	Freezing points of battery electrolyte ° C	
Basic version	Tropical		Basic version	Tropical
1.285	1.23	Charged	– 68	– 40
1.20	1.16	Half charged	– 27	– 17
1.12	1.08	Discharged	– 11	– 6

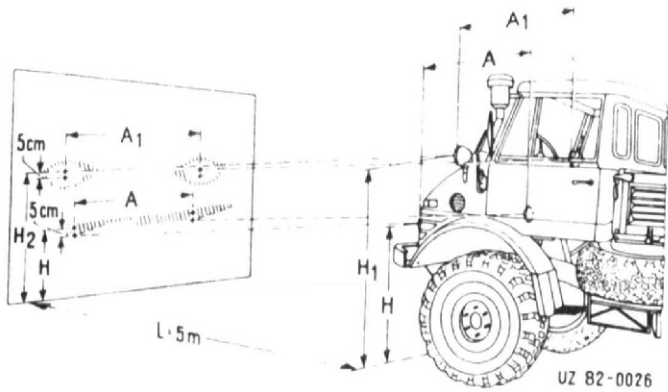


Figure 102 Aiming headlights

(Low beam of main headlights indicated. High beam of supplementary headlights indicated.)

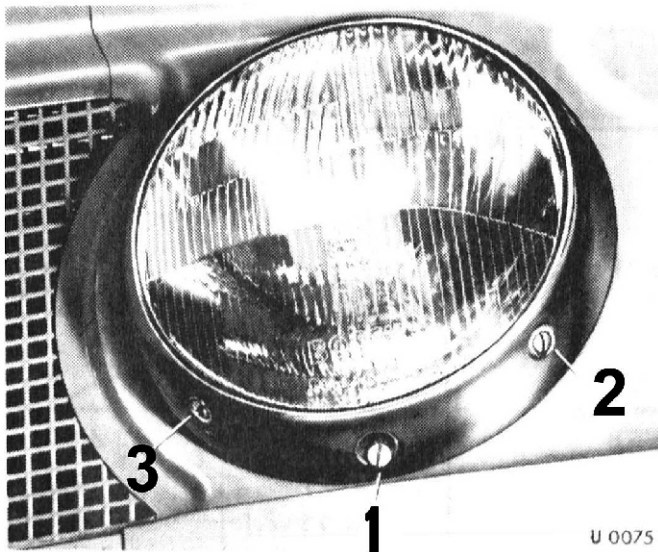


Figure 103 Main headlights

- 1 Mounting screw
- 2 Lateral aiming
- 3 Vertical aiming

### 3.10.8 Headlight Aiming

Check headlight aiming according to maintenance schedule, correct if necessary.

The following check or aiming according to figure 102 is a temporary expedient. Carry out exact aiming with optical equipment.

For a check of the aiming, place the unloaded vehicle on level ground approximately 5 m away from a wall which is vertical in relation to the longitudinal axis of the vehicle.

Make or affix marks as shown in Figure 102 to designate the center of the light beams.

All distances (A and H as well as A<sub>1</sub> and H<sub>1</sub>) refer to center of headlight.

**Switch on low beam** and check whether the light/dark boundary is on the separating line 5 cm below the mark and the break (15°) on the vertical line of the mark. Reaim the headlight if necessary.

#### Switch on high beam

The center of the light beam, however, should cover the upper cross, distance H, on the test wall.

Check each headlight individually. While doing so, cover up the other headlight and the remaining lights. Reaim the headlight if necessary.

### 3.10.9 Supplementary Headlight, Blackout Light

Switch on the supplementary headlights. To do so, change over plug connections in engine compartment. Circuit remains unchanged.

Checking and aiming the supplementary headlights is carried out in a similar manner as on the main headlights. The light/dark boundary 15 m in front of the supplementary headlights should be only half as high as the headlight centers. At a distance of 5 m this corresponds to  $\frac{5}{6}$  of the height H<sub>1</sub> on the vehicle.

E. g.:

Height of supplementary headlights

$$H_1 = 170 \text{ cm}$$

Light/dark boundary at 5 m

$$H_2 = \text{approximately } 140 \text{ cm}$$

$$A_1 = 165 \text{ cm}$$

For aiming, loosen hex. nut at bottom of lamp housing.

**Note:** The supplementary headlights may only be switched on if the main headlights are concealed by front-mounted implements.

## 404.1

### Aiming Blackout Lights

Aiming is accomplished in a similar manner as with the other headlights. At a distance of 2.5 m in front of the wall the light/dark boundary must be approximately 70 mm lower than the installed height of the blackout lights.

### 3.10.10 Replacing Headlight Bulb

Unscrew the headlight screw. Lightly tilt headlight insert and detach. Press bayonet socket downwards, turn to the left and take bulb out of headlight reflector. Pull plug from bulb.

**When replacing a bulb do not work with dirty or oily fingers, since the oil will evaporate through the heat of the bulb and will settle on the headlight reflector, thus reducing the lighting power of the headlights considerably.**

### 3.10.11 Generator and Coolant Pump V-Belts

Check V-belts according to maintenance schedule. Slightly loosen tensioning screw and push generator outward. After tensioning, it should still be possible to depress the V-belt approximately 10 mm from the straight line.

A V-belt which is tensioned too much or too little is subject to increased wear and will be destroyed prematurely. Figure 63.

## 404.1

Loosen counter nut and screw of clamping piece, rotate tensioning nut correspondingly.

### 3.10.12 Windshield Washing System

Regularly check condition of wiper blades. Replace as required.

Fill reservoir of windshield washing system with water. Add specified amount of MB-windshield detergent.

Observe the varied concentration ratios for summer and winter operation.

Check passage and spraying direction of nozzles. Spraying direction can be corrected at the nozzle head with a needle if necessary.

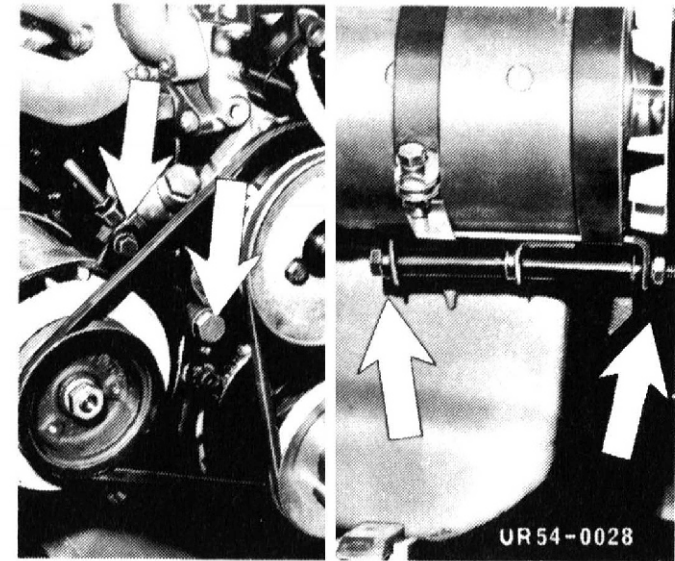


Figure 104 Generator 404.1

Tensioning V-belt,  
Checking mounting screws.

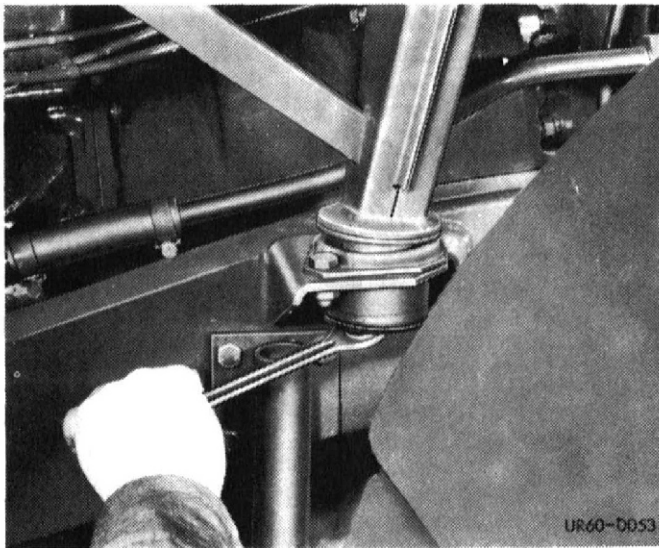


Figure 105 Loosening cab mounting in the rear

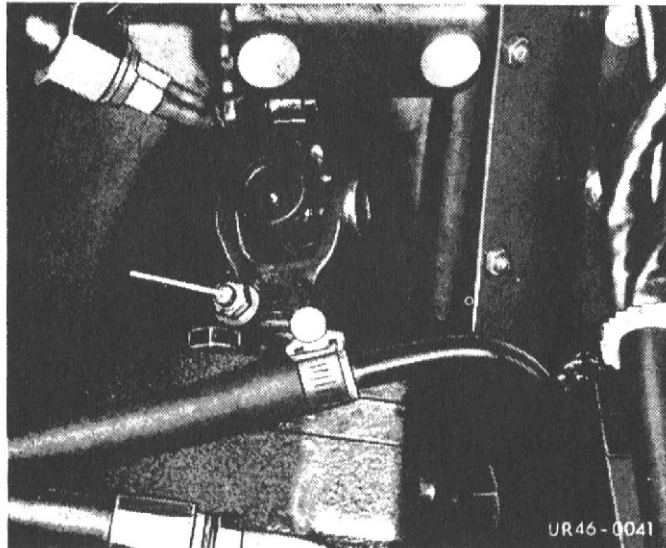


Figure 106 Loosening steering universal joint

## 3.11 Chassis, Body

### 3.11.1 Bolted Connections

Retighten control arm, engine mounting and connecting bolts according to maintenance schedule. Refer to 6.13.

### 3.11.2 Shock Absorber, Trailer Coupling, Stabilizer

Check **shock absorbers** according to maintenance schedule for leaks and retighten mounting bolts.

Replace any shock absorbers which no longer work properly or are damaged.

Grease **trailer coupling** according to maintenance schedule. Check for tight seating and locking. Refer to 6.13.

#### Stabilizer

For vehicles with a high center of gravity, the installation of a stabilizer on the rear axle is recommended. Due to the small spring travel of the rear axle with a stabilizer installed difficult cross country operations are not permitted.

Grease levers and pull rods of stabilizer according to maintenance schedule.

### 3.11.3 Tilting Cab

(Only possible on model 404.0)

Tilting the cab is a time-saving facility during maintenance and repair work. Tilting can be accomplished with the aid of a tilting device in the following order:

**Note:** With front mounted implements such as winch, these must be removed.

- 1 Remove outer engine hood.
- 2 Loosen and pull off rubber air intake manifold on carburetor.
- 3 With an air compressor installed, pull off intake hose.
- 4 Steering in center position, so that the front wheels are pointing straight ahead.
- 5 Remove fitted screws from the steering gear side of the universal joint. Pull off universal joint together with steering column and steering wheel in upward direction.
- 6 Open the four latches on the transmission cover in the cab and remove interior engine hood.
- 7 Loosen the two hex. nuts on the left and right of the front cab mounting only until the slotted retaining fork is released.
- 8 Unscrew the left and right rear cab mounting.

9 Unscrew left and right support at bottom of cab, fold over and screw to the frame. To do so, lift the cab in front with welded on strap of the 3-section support.

**Caution!** Do not damage radiator fins.

10 Remove loose parts from the cab and close the doors. Place door handles in "locked" position.

11 Attach hoisting equipment to the eyelet located in the rear wall of the cab. Lift cab. Four persons can tilt the cab by hand if required. Pull steel securing cable through the left cab support and engage both loops in the left step bracket.

12 Assemble the 3-section support, insert between the lower mounting point on the frame and the upper mounting point on the cab and fasten with the available screws. Remove hoisting equipment.

13 Lowering the cab takes place in reverse order.

14 Always use new self-locking nuts for the fitted screws on the steering universal joint.

**Note:**

After lowering the cab, press bottom of guide pulley housing for the hand brake cable upward until the leaf spring snaps into place.

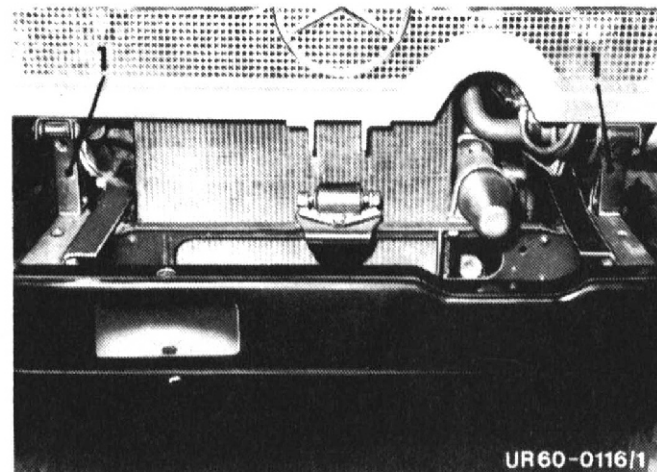


Figure 107 Cab supported in front

1 Support fastened to frame

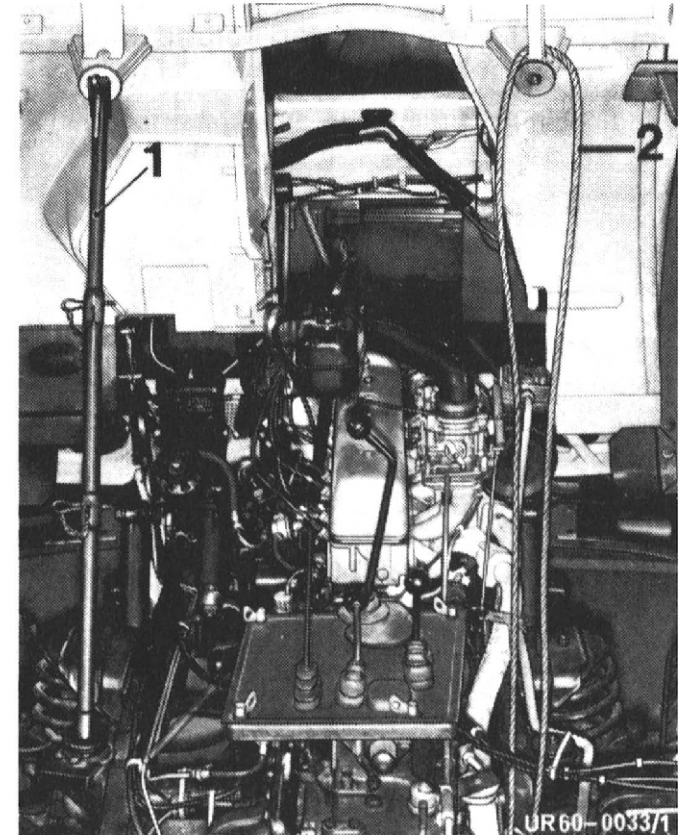


Figure 108 Cab tilted

1 3-Section cab support  
2 Steel securing cable

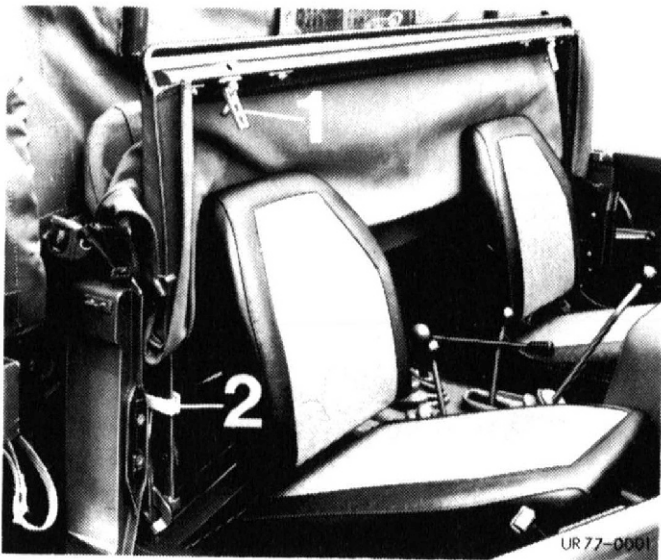


Figure 109 Folding top folded back

- 1 Snap lock
- 2 Fastening strap



Figure 110 Pull folding top scissors downward 404.1

### 3.11.4 Folding Top

The folding top is attached to the windshield frame with snap locks only and is not screwed down. It can be folded to the rear after opening the snap locks, or can be completely removed after removing the lateral fastening screws in the rear.

When folding the top back observe the following:

- 1 Open all strap buckles at the rear of top.
- 2 Open snap locks on the windshield and lift up top.



Figure 111 Fold top to the rear 404.1

- 3 Press left and right folding top joint outward out of notch.

Push top backward and at the same time fold it down behind the seats at the second joint.

- 4 Secure with the lateral fastening straps.

#### 404.1

Remove driver's and assistant driver's seats. Open belt straps on left and right side of cab. Loosen and remove all strap crimps. Open fastening straps on the inside of the folding top scissors.

Loosen left and right mounting screws of the folding top frame at the top of the windshield. Lift out folding top frame.

Pull folding top scissors downward and fold together.

Fold together lower folding top support. Carefully fold folding top.

### 3.11.5 Folding Down Windshield

The windshield can be folded forward or can be completely removed.

Prior to folding windshield down swing both wiper arms outward toward engine hood.

Unscrew left and right retaining screws with hex. socket wrench.

Fold windshield down toward the front and fasten to radiator grille with rubber fastener. Fold both support angles toward inside.

If the windshield is to be removed, unscrew left or right hinge and remove toward the side where hinge has been detached.

### 404.1

Fold back folding top or remove. Refer to 3.11.4.

After removing the detachable side windows loosen the tensioning screws of the windshield until the mounting plate releases the retaining bolt.

3.11.6 Not Applicable to this Vehicle.

### 3.11.7 Platform Tarpaulin

The platform tarpaulin consists of tarpaulin bows, mounting parts and spars. The parts are interchangeable so that they can be used as desired during installation.

If the vehicle is to be operated without tarpaulin the bows are inserted at the platform front wall behind the cab.

The spars are inserted into the support below the platform.

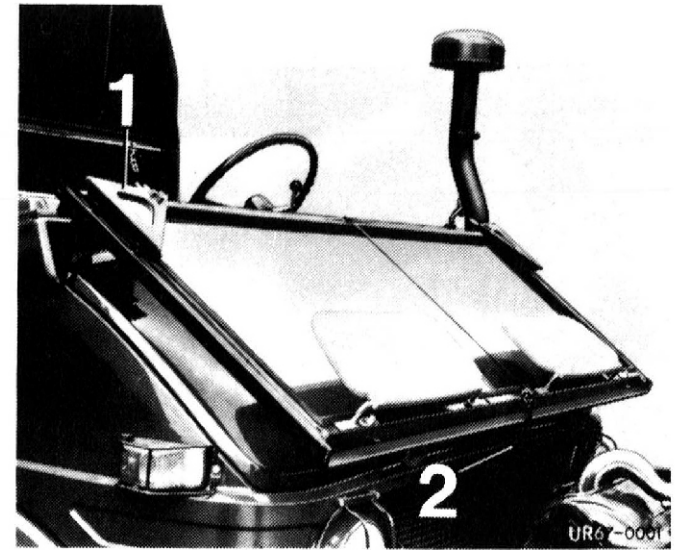
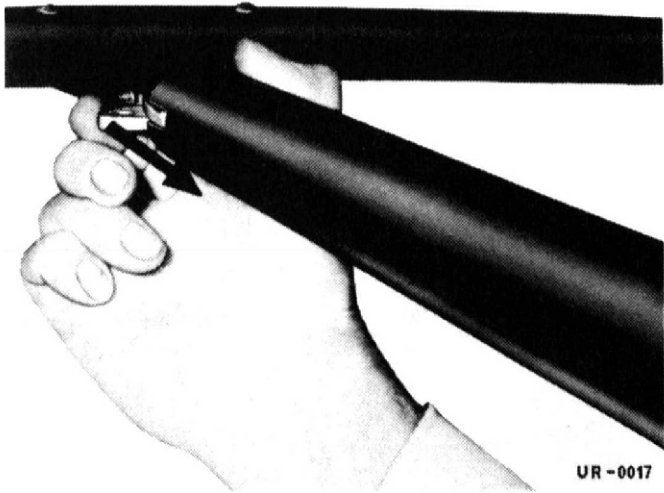


Figure 112 Windshield folded down

- 1 Support angles, folded down
- 2 Rubber fastener



Figure 113 Loosening tensioning screws 404.1



UR-0017

Figure 114 Opening spar lock

The retaining strap eases the installation and removal of the spars. Pay attention that the slot in the spar tube is always pointed downward during assembly.

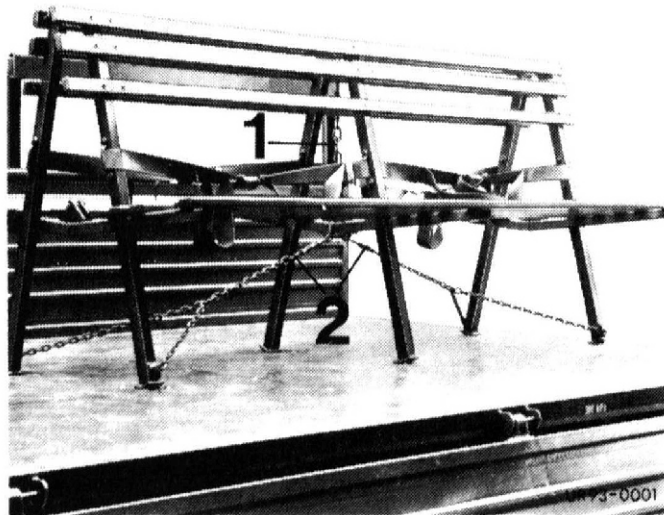
### 3.11.8 Center Bench

The tensioning chains of the center bench must be sufficiently tensioned with the bench mounted in order to ensure a firm position while driving.

Tighten turnbuckles if necessary.

**Persons to be transported must engage the available safety belts in accordance with the applicable regulations.** If the bench is fully occupied two persons can buckle up with one safety belt. The center bench offers seating space for eight persons.

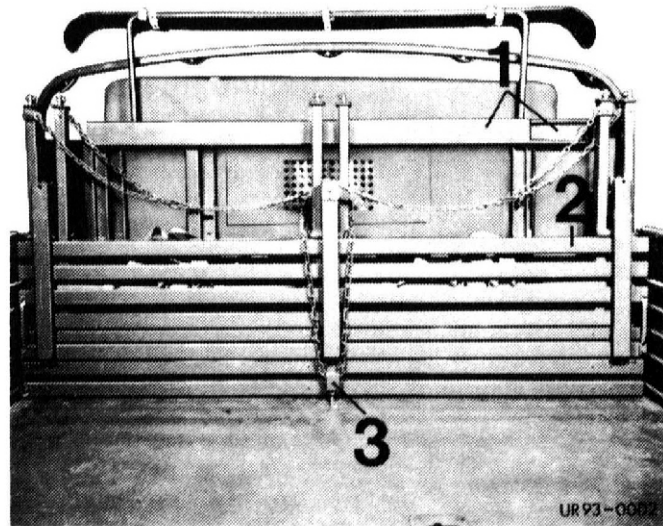
The center seat bench can be folded together when not in use and lashed down to the front wall of the platform together with the four mounting parts.



UR-0001

Figure 115 Center bench

- 1 Tensioning clamp
- 2 Turnbuckle



UR 93-0002

Figure 116 Bench and side components lashed down

- 1 Side components
- 2 Bench
- 3 Chain with floor hook

## 3.12 Vehicle Care

### 3.12.1 Cleaning Windshield

When cleaning the windshield from the outside observe the following items:

- 1 Fold down wiper arm on one side of the windshield.
- 2 Completely open door on same side.
- 3 Stand on lower cab frame above mudguard.
- 4 Take a hold at top of cab with one hand.
- 5 With the other hand clean the windshield with cleaning equipment.
- 6 Fold wiper arm upward again after cleaning.
- 7 Clean other side of the windshield in the same manner.

### 3.12.2 Cleaning Canvas

Remove coarse dirt with a brush or with lukewarm water only. **Never use acid-containing or strong grease-dissolving compounds**, since they will deactivate the impregnation agents for waterproofing and durability contained in the fabric.

### 3.12.3 Cleaning and Preservation of Vehicle

Only clean vehicle with the engine stopped in order to prevent possible water intake.

In order to preserve the chassis we also recommend treatment with protective wax at hard to reach places. While doing so, always ensure that the brake hoses are covered up.



Figure 117 Cleaning windshield

### 3.12.4 Laying-up Vehicle

Note the following instructions for laying-up the vehicle for an extended period (cancelling the registration, winter storage, sale, etc.).

Place the washed vehicle in an airy and dry garage and carry out the preservation.

#### 1 Laying-up for up to 3 Months:

Spray engine corrosion inhibiting oil into the engine intake pipe.

Drain coolant during the cold season or add antifreeze.

The coolant must contain a 1 % share of corrosion inhibitor.

Remove battery and store in a dry room. Check regularly and recharge if necessary.

Perform paintwork care.

Drain condensate from the compressed-air tank.

#### 2 Laying-up for 3 to 6 Months:

Carry out the work listed under item 1.

**Engine:** Carry out preservation run. Refer to **item 3**. Check oil level in all assemblies.

Lubricate **lubrication points** according to lubrication schedule.

### 3 Laying-up for more than 6 Months:

For the **preservation run** exchange engine oil for engine corrosion inhibiting oil (initial operation oil).

**Oil filter:** Replace filter element, clean housing and fill up with corrosion inhibiting oil.

**Oil bath air cleaner:** Clean and fill up with corrosion inhibiting oil.

**Oil change:** Carry out oil change in all remaining assemblies and fill up with corrosion inhibiting oil.

#### Attach notices!

**Fuel system:** Add 5 % of corrosion inhibiting oil to the fuel.

**Compressed-air system:** Fill antifreeze unit with antifreeze agent.

**Let engine run for 5 minutes with heater open.**

#### Electrical System

Cover generator with oil paper.

Thereafter, carry out the work listed under **item 1 and 2**.

**Front and rear axle:** rest on stands, release parking brake lever and deflate tires to a pressure of approximately **1 bar (kp/cm<sup>2</sup>)**.

Plug exhaust pipe.

### 3.12.5 Putting Vehicle into Operation after Laying-up Period

Check ignition and lighting system (fuses). Clean spark plugs. Check set of contacts in distributor housing.

Remove oil paper from generator. Unplug exhaust pipe.

Drain corrosion inhibiting oil from engine, oil bath air cleaner, transmission and axles and fill up again with oil of specified grades.

Inflate tires to specified pressure. Refer to 6.5.2.

Lower front and rear axle.

Install recharged or new battery.

Check V-belts for general condition and tension.

Operate starter. Crank engine until oil pressure is indicated.

Start as described under 2.2.2 and 2.3.5.

Check all hoses and lines for cracks and leaks.

Check brakes. Check compressed-air system for functioning and for overall leaks.

### 3.13 Not Applicable to this Vehicle

## 3.14 Vehicle Implements

### 3.14.1 General

**For installation and operation of the implements note the installation and operation instructions supplied by the implement manufacturer as well as the Mercedes-Benz UNIMOG implement approval information which is also supplied with the vehicle.**

The installation, mounting, attachment and operation of the implements also requires knowledge of the existing traffic regulations.

If implements are installed and operated for which neither a Mercedes-Benz UNIMOG approval certificate nor a written confirmation permitting their use with the vehicle have been issued the warranty entitlement may become forfeited in case of consequential damage.

### 3.14.2 Front-Mounted Implements

The implements are mounted to the front end of the frame or to the bumper by means of quick-hitch connections. Reposition bumper for installing implements if necessary. The winch is installed via the winch brackets which are mounted to the front end of the frame.

The winch is fitted on two guide bolts and thus also permits a fast removal.

The drive is via a front pto shaft with a  $1\frac{3}{8}$ " connection.

Information concerning the operation and maintenance of front-mounted implements may be obtained from the respective operating instructions provided by the manufacturers.

3.14.3

3.14.4 = Not Applicable to this Vehicle.

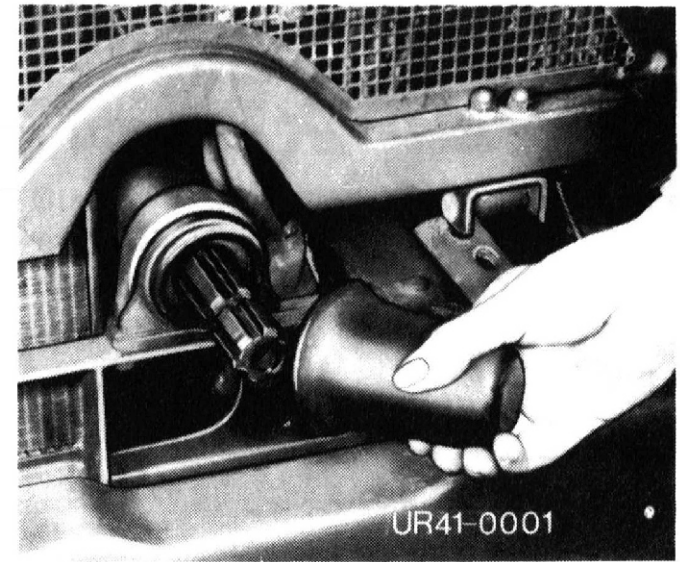


Figure 118 Front pto connection  $1\frac{3}{8}$ "

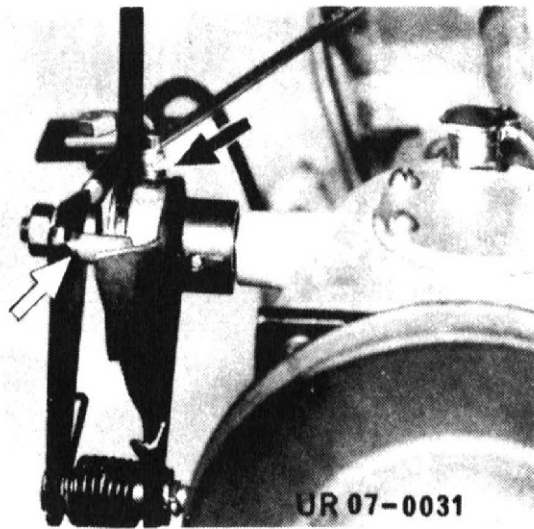


Figure 119 Governor with control linkage

### 3.14.5 Implements Mounted on Vehicle

On vehicles with a rear pto implements such as generator, compressor and fire pumps can be driven.

These implements can mainly be used for stationary operation in connection with an engine speed governor.

### 3.14.6 Drive of Implements

The implements are driven via the front and rear pto (transmission driven pto).

It is furthermore possible to install a center pto.

3.14.7 Not Applicable to this Vehicle.

### 3.14.8 Pto Shafts

#### Lubrication:

Lubricate the joints of the entire pto train according to maintenance schedule. The pto bearings are provided with a long term oil filling and require no maintenance.

For pto power output refer to 6.9.

### 3.14.9 Pto Shaft Protection

Clean and grease front and rear pto shafts after use and cover with the hood and pto shaft protection provided.

3.14.10 Not Applicable to this Vehicle.

### 3.14.11 Governor

Check oil level in governor according to maintenance schedule.

Fill governor via oiler with engine oil.

Unscrew drain plug and fill in oil until it runs out at the threaded bore.

Grease all connecting joints of the control and operating linkage according to the maintenance schedule. Refer to figure 119.

Use thin oil for this. It should be possible to depress the V-belt approximately 5 mm from the straight line.

#### Note:

In order to ensure perfect functioning of the governor it is mainly necessary to check the condition of the generator on the engine and the batteries. In case of batteries which are in poor condition or not charged the functioning of the generator on the engine is disturbed by increased power output which may also effect the governor as a result of an increased power requirement.

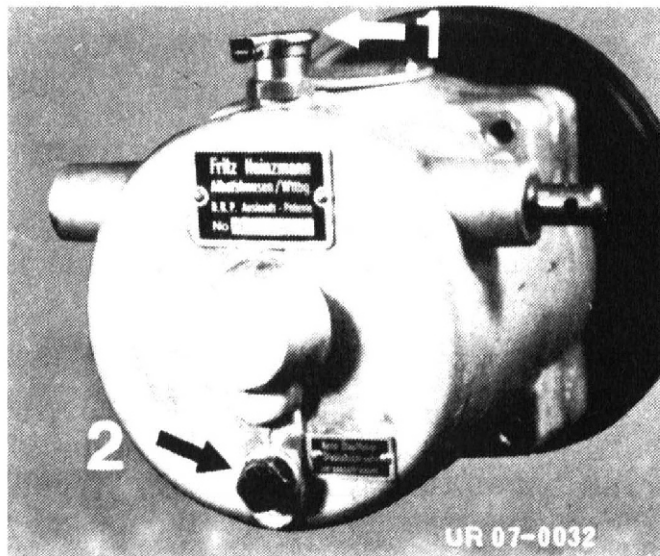


Figure 120 Governor

- 1 Oiler
- 2 Drain plug

## 4 Fuels, Coolants, Lubricants

### 4.1 General

In order to safeguard the interests of our customers we are constantly testing commercially available fuels, coolants, lubricants, etc. for their suitability for

use in our vehicles. Therefore, only use one of the products recommended by Daimler-Benz. Pertinent information is available from every UNIMOG Service

Station based upon the **Specifications for Fuels, Coolants, Lubricants** on hand there.

### 4.2 Filling Capacities

Assemblies	Fuels, Coolants Lubricants	SAE Grade	Season/ Ambient Temperature	Capacity (lit.)	
				404.0	404.1
Engine	HD engine oil <sup>1)</sup>	5	Winter	max. 6	max. 6
Engine oil filter		10		min. 4	min. 3.5
Oil bath air cleaner		20	Summer	0.5	0.5
	30	1.8		1	
Air compressor	HD engine oil	10	All year round	— <sup>4)</sup>	0.1
Governor	HD engine oil	10	All year round	as required	as required
Mechanical steering	Transmission oil	80	All year round	0.9	0.6
Power steering	HD engine oil Automatic transmission fluid (ATF) Type A	10	All year round Winter <sup>3)</sup>	2.5	—
Transmission with and without special pto	Transmission oil	90	All year round	6	6
Transmission with and without special pto with supplementary crawler gear	Transmission oil	80	All year round	7	7
Front and rear axle differential housing	Transmission oil	80	All year round	3 each	3 each
Front and rear axle each hub reduction gear	Transmission oil	80	All year round	0.3 each	0.3 each
Fan and idler pulley	Transmission oil	80	All year round <sup>2)</sup>	—	as required
Pto bearings	Transmission oil	80	All year round	0.1	0.1

Assemblies	Fuels, Coolants Lubricants	SAE Grade	Season	Capacity (lit.)		
				404.0	404.1	
Hydraulic brake system	Brake fluid	Refer to 4.7	All year round	approx. 1	approx. 0.8	
Hydraulic clutch control	Brake fluid	Refer to 4.7	All year round	approx. 0.2	—	
Cooling system Engine, radiator and heater	Coolant — water — corrosion inhibitor — antifreeze depending upon ambient temperature	Refer to 4.5	Summer All year round  Winter	16.5 approx. 1 %  as required	18 <sup>5)</sup> approx. 1 %  as required	
Windshield washer system	Water or Water, MB Winshield washer detergent	—	Summer All year round	2 as required	0.6 as required	
Fuel tank	Gasoline	Refer to 4.4		120	2 x 60	
Compressed-air system	Ethyl/denatured alcohol	—	All year round	0.2	0.3	
Coolant pump	Transmission oil	80	All year round	— <sup>2)</sup>	as required	
Grease nipples	Grease or multipurpose grease	—	All year round	as required	as required	
Battery terminal clamps	Acidproof grease	—	All year round	as required	as required	
Preservation (Laying-up)	Engine, transmission, axles	Initial operation oil Corrosion inhibiting oil	10	When laying-up	refer to 3.12.4	
	Fuel tank	Corrosion inhibiting oil		When laying-up	approx. 5 % of capacity	approx. 5 % of capacity
	Chassis, body	Protective wax	—	Spring and fall inspection	as required	as required

- 1) For multigrade oils refer to 4.6  
2) Permanent fill  
3) During extreme cold  
4) Engine lubrication  
5) with preheating system 20 lit.

## 4.3 Consumption Values

Standard fuel consumption  
(according to DIN 70030)

on level road

404.0

404.1

approx. 23.5/100 km

20.5/100 km

Engine oil consumption

depending upon operating conditions

approx. 1 % of actual fuel consumption

## 4.4 Fuel

### 4.4.1 Fuel for gasoline engines

First of all the fuel must meet the minimum demands required by the standards valid in the individual countries. In the Federal Republic of Germany the standard is DIN 51600. If no national standards exist, the internationally known specifications and testing instructions of ASTM (American Society for Testing Materials) or IP (Institute of Petroleum, Great Britain) can be applied as a guide.

Two types of fuel are available in almost every country. They mainly differ in the antiknocking property (octane number).

The octane number, according to the research method, more closely corresponds to the octane number required under road conditions. The RON is therefore given in most countries to designate the antiknocking properties of the fuel.

The required octane number first of all depends upon the compression ratio of the engine. When using fuel with an octane number which is too low the engine performance will drop considerably.

We therefore recommend the use of fuels, particularly in non-European countries, which come closest to the octane number range according to the RON corresponding to the engine compression ratio.

Type/model	404.0		404.1	
Engine model	M 180.958	M 130.925	M 180.927 928 953 958	M 180.952
Compression	7.0	7.8	7.0	8.7
Octane number range	RON 91–93			RON 97–99
Fuel	Regular gasoline			Premium gasoline

## 4.5 Coolant

### 4.5.1 Coolant for Summer and Winter Operation

The coolant is composed of water, corrosion inhibitor and antifreeze.

#### Only use clean tap water!

(No distilled water!)

The corrosion inhibitor prevents scale and corrosion. It must be water-soluble and compatible with antifreeze. Adequate protection against corrosion is achieved by adding 10 cc of corrosion inhibitor to each liter of coolant.

**The initial fill at the plant is sufficient for ambient temperatures down to  $-25^{\circ}\text{C}$  according to the table.** (Not for tropical countries)

The DB recommended antifreeze agents can be mixed with each other.

Do not add more than 60 % antifreeze to the coolant since a larger share will reduce the protection against freezing.

### Coolant mixing ratios

Ambient temperatures to		404.0	404.1	All types		404.0	404.1
		Cooling system capacity		Corrosion inhibitor		Antifreeze	
$^{\circ}\text{C}$	$^{\circ}\text{F}$	liter		cc/lit.	Vol. %	liter	
-10	+14					3.5	3.75
-20	- 4					5.5	6.0
<b>-25</b>	<b>-13</b>	16.5	18 <sup>1)</sup>	10	1	<b>6.5</b>	<b>7.0</b>
-30	-22					7.5	8.0
-40	-40					8.5	9.25

<sup>1)</sup> With engine and battery preheating 20 lit.

#### Important Note:

The all year round coolant/antifreeze mixture does not mean that the anti-freeze ratio need not be checked or corrected prior to onset of the winter season!

Replace antifreeze mixture every two years.

## 4.6 Engine Oil

### 4.6.1 Initial Operation Oil (Anticorrosion Oil)

New, exchanged or completely reconditioned engines are filled with initial operation oil (anticorrosion oil) for the first 15 to 50 hours or 300 to 1000 km of operation.

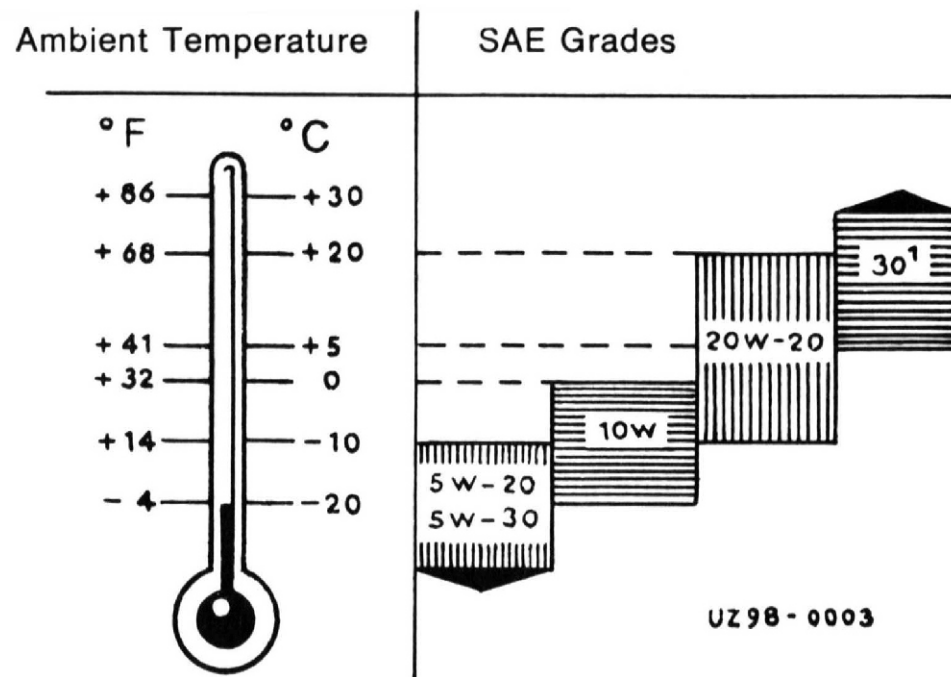
Initial operation oils have a favorable influence on the running-in process. They protect against corrosion and prevent undesirable wear, oil carbon deposits, the formation of sludge, etc. To meet all these demands, the initial operation oils also contain HD additives in addition to the anticorrosion additives. If oil needs to be added prior to the first service use initial operation oil or HD engine oil of the same viscosity grade.

Initial operation oils are subject to the same viscosity rules as are the HD engine oils. Refer to 4.6.2.

**Due to their good anticorrosion characteristics initial operation oils are also used for preserving the engines of vehicles which are to be laid up.**

## Viscosity grades of HD Engine Oils

### Single-grade oils



<sup>1)</sup> With ambient temperature continuously above 25° C (77° F) SAE 40 oil may be used.

**Multigrade oils** in the following viscosity ranges may also be used:

Ambient Temperatures		SAE Grade Viscosity Range
Celsius (° C)	Fahrenheit (° F)	
above -15	above +5	10 W - 40, 10 W - 50
above -5	above +25	20 W - 40, 20 W - 50
-15 to +20	+5 to +68	10 W - 30

The strict use of the SAE grades according to the ambient temperatures would result in a frequent engine oil change. The temperature limits for the SAE

grades are therefore to be considered as guides, which may be exceeded upward or downward for brief periods.

#### 4.6.2 Heavy Duty Oils

**Engine oil** is used in the engine, in the oil bath air cleaner and in the power steering.

**HD-Engine oils** in the engine will become darker in color faster than unblended engine oils, because the combustion residue entering the oil will not settle in the crankcase and moving parts, but will be kept suspended in the oil. For this reason do not change the HD engine oil prematurely because of its dark color.

The viscosity grades are determined according to the ambient temperature and have been established according to the specifications of the internationally recognised **Society of Automotive Engineers (SAE)**. Refer to table.

When strictly observing the specified SAE viscosity grades, an increased change of these SAE viscosity grades could result during Spring and Fall. We therefore recommend the use of

**SAE 20 W – 20** starting early April  
**SAE 30**

**SAE 10** starting early October

or appropriate multigrade oils for Temperate Zones, e. g. Central Europe.

#### 4.6.3 Multigrade Oils

Multigrade oils are engine oils which differ from single grade oils in their

lower temperature dependent viscosity change. Single grade oils correspond to one viscosity grade only, e. g. SAE 30. Multigrade oils such as SAE 10 W – 30 correspond to viscosity grade SAE 10 W at low ambient temperatures (cold start) and to viscosity grade SAE 30 at high ambient temperatures (operating temperature).

#### 4.7 Brake Fluid

**Only use yellow brake fluid** for the hydraulic brake and clutch system as of this date. Refer to Specifications for Fuels, Coolants, Lubricants for other recommended brake fluids. Refer to 4.1.

#### 4.8 Transmission Oil

The essential characteristics of transmission oil are reduction of friction, constancy of the viscosity, wear protection, ability to lubricate and compatibility with sealing materials. Only SAE 80 may be used.

**4.9 Not Applicable**  
to this vehicle

#### 4.10 Automatic Transmission Fluid

At very low ambient temperatures automatic transmission fluid (ATF) type A, suffix A can be used for the power steering system.

Ambient Temperatures		Viscosity Grade
Zone	Remarks	
Moderate Ambient Temperature	All year round	<b>SAE 10 W</b>
Low Ambient Temperature	Oil change for summer and winter operation absolutely necessary	SAE 5 W <sup>1)</sup>
High Ambient Temperature	Temperature in oil reservoir may not exceed 65° C	SAE 30

Viscosity grades of HD engine oils in the power steering system

<sup>1)</sup> Automatic transmission fluid (ATF) may also be used

## 4.11 Grease

Use lubricating grease or multipurpose grease for steering knuckle bearings, thrust ball, pto shaft joints, clutch release shaft, stabilizer as well as for the joints of the parking brake and pedal linkage. Hinges and joints on the chassis and body may also be lubricated with grease or with engine oil if necessary.

**Do not use antifriction bearing grease!**

### 4.11.1 Special Lubricants

Use acidproof grease (technical vaseline) for battery terminal clamps. **High pressure grease** (Bosch Ft 1 v 4) is suitable for ignition distributor contact breaker rubbing block.

For ignition cable connections to ignition distributor and spark plugs use **silicon paste** (Bosch VS 9350 Ft).

## 4.12 Antifreeze

The use of antifreeze for the **cooling system** is described in sections 2.3.2 and 4.5. Select the antifreeze mixing ratio in such a manner that absolute protection against freezing is assured for the respective ambient temperature range.

Use **ethyl alcohol** (fuel alcohol) for protecting the **compressed-air system** against freezing. Refer to 3.9.8.

## 4.13 Preservation Agents

For the **engine lubrication system:**

Initial operation oil (anticorrosion oil)

For the **fuel system:**

Anticorrosion oil as an additive (approximately 5 % of the filling capacity)

For the **chassis and body:**

Commercially available protective wax. Also refer to 3.12.

# 5 Troubleshooting

## 5.1 General

In the event of trouble, the following instructions are intended to assist you in restoring the vehicle to a condition which will enable you to visit a UNIMOG Service Station.

These instructions cannot be considered complete and are not meant to replace a thorough search for the cause of the

failure, as well as the expert repair at a UNIMOG Service Station.

## 5.2 Towing

**If towing the UNIMOG should be necessary observe the following in order to prevent transmission damage due to a lack of oil at the bearings:**

Shift **main shifting lever** into 2nd gear. Shift forward/reverse shift lever to neutral position. Maintain these shift lever positions during towing operation.

**Towing speed must not exceed 40 km/h.**

**Only use towing bar!**

Complaints	Possible causes	Remedies	Refer to
<b>5.3 Engine Group</b>			<b>3.3</b>
<b>5.3.1 Engine fails to start</b>	Fuel tank is almost or completely empty	Add fuel <b>404.1</b> Operate fuel changeover switch	
	Dirt in fuel lines, vent and intake strainer of fuel tank, fuel prefilter and in strainer of fuel pump	Clean	
	Ambient temperatures too low	Refer to instructions for winter operation	2.3
	Insufficient battery output	Check specific gravity of electrolyte, charge	3.10
	Ignition system damaged or improperly adjusted	Check ignition system	3.2
	Carburetor nozzle plugged	Clean nozzles	3.2

Complaints	Possible causes	Remedies	Refer to
<b>5.3.2 Engine Misfires</b>		Refer to 5.3.1	<b>3.3</b>
<b>5.3.3 Engine runs erratically</b>	Lack of fuel	Clean fuel prefilter Add fuel Leakproof fuel system if necessary	<b>3.3</b>
	Water in fuel	Drain water from fuel tank Filter fuel and fill into tank again	
	Engine sucks in leak air	Have intake system checked	
	Ignition system damaged or mal-adjusted	Have ignition system checked	3.2
	Spark plugs misfire (Oil dilution possible)	Check spark plugs	
	Carburetor dirty or maladjusted	Have carburetor cleaned and checked	
	Vapor bubbles in fuel (tropics, high altitudes, stationary operation)	Switch on supplementary fuel pump if installed	3.3
<b>5.3.4 Engine does not idle</b> (when at operating temperature)	Idle speed nozzle plugged	Clean nozzle	<b>3.3</b>
	Idle speed mixture adjustment screw maladjusted or damaged	Adjust idle speed. Replace idle speed mixture adjustment screw	

Complaints	Possible causes	Remedies	Refer to
<b>5.3.5 Engine emits smoke</b>	<p>Blue smoke: Oil level of engine too high Piston ring damaged</p> <p>White smoke: Cylinder head gasket damaged</p>	<p>Check oil level Measure compression pressure Overhaul engine or exchange</p> <p>Replace cylinder head gasket</p>	3.2
<b>5.3.6 Poor engine performance</b>			<b>3.3</b>
	Unsuitable fuel	Use specified fuel	4.4
	Fuel system dirty	Clean fuel system	3.3
	Carburetor dirty or maladjusted. Wrong main nozzle	Clean and check carburetor. Install specified nozzles	3.2
	Choke does not open all the way	Properly adjust linkage from accelerator pedal to carburetor	
	Oil bath air cleaner dirty	Clean oil bath air cleaner	
	Ignition system damaged or maladjusted	Check ignition system	
	Exhaust and intake valve leaks, piston wear	Adjust valve clearance, check compression pressure	
<b>5.3.7 Excessively high coolant temperature</b>	Coolant level too low	Check coolant level, add coolant if necessary	3.4
	Radiator dirty	Clean	

Complaints	Possible causes	Remedies	Refer to
	Cooling system leaks (loss of coolant)	Check radiator, hose connections, heater, expansion tank filler cap for leaks, seal if necessary, fill up with coolant	
	Insufficient tension on V-belt of coolant pump and fan	Check V-belt, retension	3.4
	Thermostate faulty	Replace	
	Coolant pump faulty	Replace	
	Cylinder head gasket leaks	Check cylinder head gasket, replace if necessary	3.2
	Unfavorable fan ratio (only on 404.1)	Alter fan ratio	6.14
<b>5.3.8 Oil pressure too low</b>	Dirty oil filter element	Carry out oil change together with filter service	3.2
	Almost no engine oil in oil pan	Correct oil level, remedy causes	
	Dirty oil pressure valve in filter carrier or in crankcase housing	Remove, check and clean	
	Oil pressure sending unit or oil pressure indicator damaged, electric line loose	Check, replace if necessary, connect line tightly	
	Engine damage indicated if above mentioned items are in order	Have this checked and engine overhauled or exchanged if necessary	
<b>5.3.9 Explosions at engine overrun</b>	Intake and exhaust system leaks	Seal, replace gaskets	
	Exhaust and intake valves leak, improper valve clearance	Measure compression pressure Adjust valve clearance	6.2

<b>Clutch</b>			<b>3.5</b>
<b>Clutch does not properly disengage</b>	Clutch free play excessive	Adjust free travel on clutch slave cylinder or clutch linkage on <b>404.1</b>	6.3
	Air in hydraulic clutch control	Bleed, add brake fluid	
<b>Clutch slips</b>	No or too little clutch free play	Adjust free travel on clutch slave cylinder or clutch linkage on <b>404.1</b>	
	Release shaft hard to move or stuck	Lubricate, make operable	
	Linings grease or oil covered	Replace clutch disc	
	Lining worn, clutch damaged	Repair clutch, replace	
<b>Throw-out bearing noisy</b>	Throw-out bearing running dry, defective	Lubricate, replace	

## 5.5 Steering System

<b>5.5.1 Intermittant steering wheel stiffness of power steering</b>	Insufficient oil delivery of power steering pump because V-belt of power steering pump slips	Retension V-belt	<b>3.6</b>
	Oil level too low, air in oil circuit	Check system for leaks, fill up with oil, bleed	
<b>5.5.2 Power steering stiff</b>	V-belt of power steering pump torn	Replace and properly tension V-belt	
	Power steering pump damaged	Have pump replaced	

Complaints	Possible causes	Remedies	Refer to
<b>5.5.3 Vehicle cannot be steered properly</b>	Steering has too much free play	Have steering adjusted, replace if necessary	<b>3.6</b>
	Tire pressure too low, uneven	Correct	6.5
	Tow-in maladjusted	Adjust, check tie rods for damage	6.3
	Ball ends of drag link and tie rod worn	Replace	3.7
	Control arm loose	Tighten mounting screws, replace rubber bushings if necessary	
	Steering knuckle stiff	Lubricate with axle raised	3.5
	Vehicle overloaded Axle loads unevenly distributed	Adhere to specified weight limits!	6.10
	Unfavorable tire treads	Only drive at maximum speeds with regular tread	6.5

Complaints	Possible causes	Remedies	Refer to
<b>5.6 Brake System</b>			<b>3.8</b>
<b>5.6.1 Drum-type Brake</b>			
Insufficient braking effect	Brakes wet or dirty	Drive until dry, apply brakes slightly or clean	
	Brake linings oily	Reline	
Uneven braking effect	Poor tires	Replace bald tires	
	Uneven tire pressure	Correct tire pressure	6.5
	Brakes maladjusted	Adjust brakes, adjust wheel brakes on 404.1	
	Brakes wet on one side or dirty after driving through water	Drive until dry, apply brakes slightly or clean	
	Brake lining oily or unevenly worn on one side	Replace wheel brake cylinder Seal wheel hubs or steering knuckle, replace brake linings	
<b>5.6.2 Hydraulic Brake System</b>			<b>3.8</b>
No or insufficient braking effect	Air in system	Bleed system, add brake fluid	
	System leaks	Seal system, replace gaskets	
	Failure of hydraulic brake circuit I or II (404.0)	Driving capability limited with reduced braking effect! Check brake lines and wheel brake cylinders immediately, replace	
Warning light in instrument cluster lights up	Brake fluid level of reservoirs too low or reservoirs empty	Check brake fluid level. Correct, bleed	

Complaints	Possible causes	Remedies	Refer to
<b>5.6.3 Compressed-air brake assistance system</b>			<b>3.9</b>
<b>No effect Braking requires increased foot pressure</b>	<p>Insufficient tank pressure in compressed-air tank caused by:</p> <ol style="list-style-type: none"> <li>1 Required tank pressure not yet reached</li> <li>2 Compressed-air system leaks</li> <li>3 With trailer brake system: Failure of or leak in compressed-air circuit I (left hand section of compressed-air tank)</li> </ol>	<p>Wait until red warning light goes out or until a pressure of 5.2 to 7.35 bar (kp/cm<sup>2</sup>) is reached</p> <p>Check compressed-air system for leaks, have sealed or repaired if necessary</p>	
5.6.4 Not applicable to this vehicle			
<b>5.6.5 Vacuum brake booster inoperative</b>	<p>No vacuum because engine is not running</p> <p>Vacuum lines leak</p> <p>Check valve defective</p> <p>Air cleaner clogged</p>	<p>Complete brake assistance is only achieved with engine running</p> <p>Check connections for leaks</p> <p>Replace</p> <p>Service cleaner element, replace</p>	<b>3.8</b>

Complaints	Possible causes	Remedies	Refer to
<b>5.7 Compressed-Air System</b>			<b>3.9</b>
<b>5.7.1 Warning light in instrument cluster lights up</b>	No or too little tank pressure. Also refer to 5.6.2	Watch dual brake pressure gauge until the tank pressure is reached, check compressed-air system for leaks if necessary, seal. Filling time should not exceed 3 minutes	
<b>5.7.2 Pressure build-up insufficient or too slow</b>	Air compressor does not deliver enough air Pressure regulator blows off constantly	Have air compressor checked, overhauled or replaced if necessary Clean pressure regulator or replace if necessary	
<b>5.7.3 Dual pressure gauge indicates incorrectly</b>	Unit defective	During full brake application with the vehicle stationary both needles must be in alignment, replace unit if necessary	
<b>5.7.4 Air compressor generates insufficient or no compressed air</b>	V-belt torn or slipping Suction or pressure valves leak, piston and cylinder worn	Check V-belt, retension or replace if necessary Have air compressor overhauled or replaced	
<b>5.7.5 Pressure regulator cuts out too early or too late</b>	Improperly adjusted	Adjust to cut out pressure of 7.35 bar (kp/cm <sup>2</sup> ). Replace gasket, replace pressure regulator if necessary	6.6
<b>5.7.6 Compressed-air control for trailer operation:</b> Poor braking action of trailer	Brake pressure control valve of trailer not properly adjusted Brake hose couplings plugged or leaking	Set according to load condition Clean, replace gaskets if necessary	2.2

Complaints	Possible causes	Remedies	Refer to
<b>5.8 Electrical System</b>			
<b>5.8.1 Charge indicator light</b> does not light up when ignition key in position 1	Charge indicator light defective Lines loose or defective Regulator defective Battery discharged	Replace charge indicator light Tighten or replace Replace Check, charge	<b>3.10</b>
<b>5.8.2 Charge indicator light</b> lights up while driving	Loose generator V-belt  Regulator defective Line between charge indicator light and generator has a short circuit, interrupted Generator defective	Check tension of V-belt, retension if necessary Have checked, replaced Look for chafed spot, replace line  Have generator checked, overhauled or replaced if necessary	
<b>5.8.3 Starter motor does not operate</b>	Battery discharged, insufficiently charged   Electric line of starter switch loose, interrupted Magnetic switch of starter is de- fective	As a check: Switch on high beam and operate starter switch – a if lights go out slowly the battery is insufficiently charged Charge battery, replace  b if the brightness of the lights remains unchanged there is a loose line or the starter is defective  Tighten line Check starter. Repair magnetic switch, replace	

Complaints	Possible causes	Remedies	Refer to
5.8.4 } 5.8.5 } Not applicable to this vehicle			
<b>5.8.6 Lighting system</b>			<b>3.10</b>
Lamp does not light up	Filament of lamp burnt through	Replace lamp Note voltage and wattage information!	
	Fuse blown	Replace	
	Poor supply line and ground cable contact	Clean cable connections and contact points	
	Electric line chafed bare	Connect, change line routing	
	Light fitting oxidized	Clean, bare metal	
	Respective switch defective	Replace switch	
	Wrong lamp	Replace with proper lamp (refer to table)	
Light of headlights insufficient	Headlight reflector dull	Replace, aim headlights	
	Lamps have a blue coating	Replace	
<b>5.8.7 Turn signal system</b>			
Turn signal indicator light not working	Indicator light defective	Replace	
Turn signal indicator light constantly lit	Wrong turn signal lamps in trailer	Check trailer turn signal system (21-W lamps)	
Turn signals not working	Turn signal sending unit defective	Replace	
	Turn signal switch defective	Check system, repair	
	Turn signal sending unit failure Fuse blown	Replace	
	Short circuit in the electrical system of trailer	Check electrical system of trailer, particularly plugs and sockets	

Complaints	Possible causes	Remedies	Refer to
<b>5.8.8 Ignition system</b>			<b>3.2</b>
Engine does not start	Ignition key not in position 2	On 404.1 switch to starting position 2	2.1
	Spark plugs wet, dirty	Clean spark plugs Adjust electrode gap	6.2
	Ignition cable interchanged, plugged in or installed wrong	Attach ignition cable according to firing order while paying attention to good contact of cable ends	
	Firing too early or too late	Check ignition, adjust	3.2
	Ignition distributor damp inside	Clean out distributor housing with a dry rag, check for hair-line cracks	
	Contact breaker points badly burnt	Replace, adjust dwell angle	
	Rotor defective	Replace	
	Ignition coil defective	Replace	

## 6 Technical Data

### 6.1 Types and Models

Chassis			Engine			Cab		Platform
Type	Sales designation	Model	Model	Continuous output DIN 70 020		Model		Model
				kW	HP	Folding top	Steel	
404.0	U 082/404	404.010	180.958	60	82	416.810	406.821	404.642
		404.011						
	U 110/404	404.012	130.925	81	110	416.810	406.821	404.642
		404.013						
404.1	U 082/404	404.113	180.928	60	82	404.510	404.520	404.632
		404.114						
		404.115	180.953			404.511	404.521	404.632
	U 91/404	404.113	180.952	67	91	404.510	404.520	404.641
		404.114						
		404.115				404.511	404.521	

none tilting

tiltable

not tiltable

## 6.2 Engine

Mercedes-Benz Type			M 130	M 180		
Model			130.925	180.958	180.928	180.953   180.952
Operating principle			4-stroke gasoline engine			
No of cylinders/cylinder arrangement			6/vertical in line			
Bore		mm dia.	86.5	80		
Stroke		mm	78.8	72.8		
Total piston displacement		cc	2748	2195		
Compression ratio			7.8	7.0		8.7
Compression pressure at normal		bar (kp/cm <sup>2</sup> )	8.6 to 9.6	8.5 to 9.5		10 to 11
Starting speed	at least	bar (kp/cm <sup>2</sup> )	7.2	5.5 to 6.0		8.0 to 8.5
Continuous output (effective output according to DIN) at rated speed		kW (HP) l/min.	81 (110) 4800	60 (82) 4800		67 (91) 4800
Maximum torque at speed		Nm (kpm) l/min.	186 (19) 3200	143 (14.6) 3200		164 (16.7) 3200
Max. speed		l/min.	5500	5500		5500
Idle speed		l/min.	800 to 850	800 to 850		800 to 850
Valve arrangement			overhead			
Valve clearance for intake	cold/hot <sup>1)</sup>	mm	0.10/0.15	0.10/0.15		
Valve clearance for exhaust	cold/hot <sup>1)</sup>	mm	0.20/0.25	0.20/0.25		
Coolant temperature		C°	75 to 95	75 to 95		
Oil pressure	normal	bar (kp/cm <sup>2</sup> )	2 to 5	2 to 5		
	idle speed at least	bar (kp/cm <sup>2</sup> )	0.6	0.6		
Weight		kg	210	182		
Firing order			1-5-3-6-2-4			
Ignition timing		° bTDC	2			
Ignition advance/retard			automatic through centrifical force			
Contact breaker point gap		mm	0.4	0,4		
Dwell angle at idle speed		°	38 <sup>+3</sup> <sub>-1</sub>	38 <sup>+3</sup> <sub>-1</sub>		

<sup>1)</sup> With engine hot = 60° C ± 15

## 6.2.1 Engine Adjustment Data

### Ignition

Ignition timing adjustment

**without** vacuum

Engine speed

Degrees bTDC

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At starting speed

**2**

idle speed

850 to 950/min

5 to 15 <sup>1)</sup>

high idle range

1500/min

20 to 27 <sup>1)</sup>

partial load range

3000/min

25 to 31 <sup>1)</sup>

full load range

4500/min

38 to 41 <sup>1)</sup>

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<sup>1)</sup> With ignition distributor ZV/IFUR 6 BR 27 and ZV/IFUR 6 BR 47 2° less respectively

### Carburetor

Exhaust emission values

**without** load

Engine speed

CO content in %

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At idle speed

850 to 950/min

4.3 to 5.5

high idle range

1500/min

3.0 to 4.2

partial load range

3000/min

2.6 to 3.6

full load range

4500/min

0.5 to 2.0

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## 6.2.2 Spark Plugs

Electrode gap 0.5 mm Spark plug thread length 19 mm <sup>2)</sup>					
Ignition system: Standard version					
Compression ratio	Bosch	Beru	Champion <sup>1)</sup>	Driving	
				normal distances	short distances
7.0	W 175 T 30 (W 175 T 2)	D 175/14/3 A (D 175/14/3)	N-9 Y	x	
	W 145 T 30	145/14/3	N-14 Y		x
7.8 8.7	W 215 T 30 (WG 215 T 30)	D 215/14/3 A (G 215/14/2)	N-7 Y	x	
	W 200 T 30	D 200/14/3 A (D 200/14/3)	N-8 Y		x
Ignition system: Special version; short-range radio shielded and splash water protected					
7.0	WC 175 ERT 27	ED 175/14/3 m 5 E 175/14/3 m 5	XMN	x	
	WC 145 ERT 2	—	XMN 12		x
7.8 8.7	—	E 225/14/3 m 5 (ED 225/14/3 m 5)	—	x	
	WC 175 ERT 27	ED 175/14/3 m 5 (E 175/14/3 m 5)	XMN 12		x

Only use the spark plug types in parenthesis ( ), if the ones listed first are not available.

<sup>1)</sup> Use only if Bosch or Beru spark plugs are not available

<sup>2)</sup> Maximum resistance 7 to 8 kΩ

### 6.2.3 Carburetor

Model	32 NDIX – DB 2
Carburetor Type	Pallas-Zenith dual downdraft carburetor (cross-country)

#### Carburetor Parts (valid to approx. 1,500 m above sea level)

Name	Jets/technical data	Type M 180 (one carburetor) Quantity	Type M 130 (two carburetors) Quantity
Venturi	32–36 (26 mm inside dia.)	2	4
Main metering jet	140 <sup>1)</sup>	2	4
Air correction jet	210	2	4
Main discharge jet well	4 N	2	4
Idle fuel jet	55	2	4
Idle air jet	140	2	4
Injection pump jet	55	2	4
Injection tube, long	3	2	4
Starter fuel jet	100	1	2
Starter air bore	5	–	–
Float needle valve	200	1	2
Pressure release valve, short	100	1	2
Idle mixture screws	3 half turns	2	4
Pump linkage	in outer bore		
Fuel level (measured at a test pressure of 1.8 m WC)	17.3 ± 1 mm <sup>2)</sup>		
Accelerating pump, quantity injected	1.5 ± 0.2 cc/stroke		

<sup>1)</sup> From 1,500 m to 3,000 m (above sea level) main metering jet 132  
From 3,000 m to 4,500 m (above sea level) main metering jet 125

<sup>2)</sup> On M 130 engine 12.3 ± 1 mm

## 6.3 Clutch, Transmission, Axles

### 6.3.1 Clutch

Manufacturer		Fichtel & Sachs
Model		Single-plate dry clutch
Type/designation	dia.	KS 225 Sph
Pressure applied	N(kp)	6100-6750 (610-675)
Clutch plate Facing		225 GSD "CERAM" Kerasinter
Clutch operation		
Type 404.0		mechanical/hydraulical
Type 404.1		mechanical
Clutch free play		
Type 404.0	mm	3 + 0.5 at slave cylinder
Vype 404.1	mm	30 to 35 at clutch pedal

### 6.3.2 Transmission

<b>Transmission</b>	Model		UG 1/11 – 2 + 4/14.93
	Design		6-speed synchromesh transmission with rear axle drive, front axle drive which can be engaged and disengaged while driving and transmission driven pto.
	Ratio	i	1st gear = 14.93 2nd gear = 8.23 3rd gear = 4.47 4th gear = 2.47 5th gear = 1.53 6th gear = 1.00
			1st reverse gear = 20.12 2nd reverse gear = 11.10
<b>Supplementary crawler gear</b>	Model		VOG 1/11 – 1/3.08
	Ratio	i	1st gear = 46.01 2nd gear = 25.34
<b>Special pto</b>	Speed (at 3000/min engine speed)	1/min	635
	Ratio	i	4.7
	Permissible power take off via pto	kW (HP)	37 (50)

## 6.4 Steering System

### 6.4.1 Mechanical Steering

Design	404.0	40.1
Manufacturer, Type	Recirculating ball-type steering	
Center position ratio	Daimler-Benz L 3.5 K	L 2
	34.2:1	29.7:1

### 6.4.2 Power Steering

Design	Ball-nut steering
Manufacturer, Type	ZF-Schwäb. Gmünd, ZF-8036
Center position ratio	18.85

### Steering pump

Design	ZF vane-type pump
Manufacturer, Type	ZF-Schwäb. Gmünd ZF-7672
Delivery	approx. 4.5 at 500/min } at 50° C 9.0 at 3060/min }
Pump pressure, max.	100, pressure limiting valve in the power steering

119

### 6.3.3 Front Axle

Model	Portal axle with thrust tube, differential lock and hub reduction gears
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Model	404.0	404.1
Ratio (refer to rear axle)	AU 1/3 ES – 2.5	AU 1/3 E – 2.5
Tow-in	mm	0 to 2
Camber	°min.	1° 45 min.
King pin inclination	°	10
Max. turning angle, inside wheel	°	40

### 6.3.4 Rear Axle

Design	Portal axle with thrust tube, differential lock and hub reduction gears
--------	---

Model	404.0	404.1
	HU 1/3 ES – 2.5	HU 1/3 E – 2.5
Axle drive ratio	i	39:11
Hub reduction ratio	i	32:15
Total axle ratio	i	7.56

## 6.5 Wheels and Tires

### 6.5.1 Tires

Application		Tread type	Tires			
			6 PR	10,5-20 8 PR	10 PR	10-20 Radial
Off road %	On road %		Rims 9 x 20"			
Tire tread						
60	40	Cleat tread		Metzeler U 1	Metzeler U 1	
40	60	Multipurpose tread	Dunlop 705	Conti E 4 Dunlop 705	Conti E 4 Semperit M 157	Michelin XL
20	80	Closed tread	Conti M Dunlop M Veith M Metzeler M Phönix M Fulda M Uniroyal M	Conti M Dunlop M Veith M	Conti M	
10	90				Conti Titan	

### 6.5.2 Tire Pressure in bar (kp/cm<sup>2</sup>)

	Wheels	Tires 10.5—20			10-20
		6 PR	8 PR	10 PR	Radial
Off road to 20 km/h	Tire pressure in bar (kp/cm <sup>2</sup> )				
	front	1.5	1.5	1.5	1.6
	rear	1.5	1.75	2.0	2.0
On road to max. speed	front	2.5	3.0	3.75	3.75
	rear	2.5	3.0	3.75	3.75

## 6.6 Brake System

### 6.6.1 Hydraulic Brake System

Design

On 404.0

Hydraulic 2-circuit brake system (EEC)

On 404.1

Hydraulic single-circuit brake system  
(standard version)

On 404.1

Hydraulic 2-circuit brake system  
(special version)

### 6.6.2 Parking Brake System

Design/mode of operation

Mechanical hand brake system acting on the rear wheels. With compressed-air control for trailer brake system, hand brake also acting on the trailer.

### 6.6.3 Brake Assistance System

Design

Manufacturer

Operating pressure

Mode of operation

bar (kp/cm<sup>2</sup>)

Compressed-air brake assistance

Westinghouse

7.35

2-stage, can be switched over via a 3/2-way valve during trailer operation.

Design

Manufacturer

Model

Brake assistance

Vacuum brake assistance

(as special version)

Teves, Frankfurt

T 50 / 26 / 3

1:40 at 0.8 bar vacuum

#### 6.6.4 Compressed-Air Control for Trailer Brake System

	Type/Model		404.0	404.1
	Design		2-line compressed-air system (according to EEC)	2-line compressed-air system
Trailer control valve	Operating pressure	bar (kp/cm <sup>2</sup> )	7.35	7.35
Pressure regulator	Cut-in pressure	bar (kp/cm <sup>2</sup> )	6.6	6.2
	Cut-out pressure	bar (kp/cm <sup>2</sup> )	7.3 ± 0.2	7.3
3-circuit protection valve	Safety pressure		6.0 – 0.3 (in case of pressure loss)	–
Pressure switch	Brake pressure	bar (kp/cm <sup>2</sup> )	0 to 5.5 warning light lights up	–
Hydropneumatic control valve, 2-circuit	Mode of operation	1st circuit	pneumatic	–
		2nd circuit	hydraulic (in case of pressure loss)	–
Compressed-air tank	Contents	lit.	20 and 10 (2-chamber)	20
Air compressor	Displacement	cc	106	150
	No. of cylinders		1	1
	Lubrication		Force-feed lubrication via engine	Splash lubrication TH

## 6.7 Electrical System

	Type/Model		404.0	404.1
Generator	Rated voltage	V	24	24
	Design		3-phase alternator	3-phase alternator
	Model (Bosch)		K 1 – 28 V 27 A 23	K → 28 V 19 A 14
	Output	W	750	300
	Generator voltage	V	28	28
	Ampere	A	27	19
	Generator, reinforced	Model (Bosch)		K 1 – 28 V 45 A 27
Output		W	1,250	600
Generator voltage		V	28	28
Ampere		A	45	38
Starter	Design		Screw-push drive	
	Model (Bosch)		GE 24 V 1 PS or	EGE 1/24 R 301
	Output	kW (HP)	0.7 (1)	0.7 (1)
Battery (2 each)	Rated voltage	V	2 x 12 (24)	2 x 12 (24)
	Capacity	Ah	55	45

6.8 Not applicable to this vehicle

## 6.9 Pto

Front and rear pto	Speed	1/min	540 at engine speed of 2,540/min.	
	Pto connection	inch	1 <sup>3</sup> / <sub>8</sub>	
	Permissible power take off	kW (HP)	37 (50) at pto shaft speed of 1,000/min.	

## 6.10 Weights and Trailer Loads

### 6.10.1 Weights

		Vehicle version	without brake assistance	with brake assistance	with brake assistance and reinforced springs
		Type/Model	404.1	404.0 404.1	404.0 404.1
		Tires/Ply Ratings	10.5-20 6 PR 8 PR	10.5-20 6 PR 8 PR	10.5-20 10.5-20 10-20 8 PR (10 PR <sup>1)</sup> Radial
Permissible gross vehicle weight	kg		4750 1900	5000 2150	5250 (5500 <sup>1)</sup> 2400
Permissible front axle load	kg		2500	2500	2500
Permissible rear axle load	kg		2700	2600	2950 (3300 <sup>1)</sup>
Permissible front axle load	kg	With heavy front-mounted implements and speed limitation to 25 km/h <sup>2)</sup>	2700	2700	2700
Permissible gross vehicle weight	kg	With heavy front-mounted rotating snow clearing implements and speed limitation to 25 km/h <sup>2)</sup>	—	5500	5500
Permissible front axle load	kg		—	3300	3300
Permissible rear axle load	kg		—	3300	3300
Curb weight	kg	Chassis with cab and platform	2850	2850	2850
		Chassis with cab without platform	2300	2300	2300
Chassis load capacity	kg		2450	2700	2950 (3200 <sup>1)</sup>

<sup>1)</sup> Only for fire department and disaster vehicles

<sup>2)</sup> May only be driven in 4-wheel drive

## 6.10.2 Permissible Trailer Loads

The trailer loads correspond to the German registration regulations in conjunction with the respective specified trailer couplings according to DIN 74051 as well as to trailers with a brake system

With permissible gross vehicle weight kg	4750 without brake assistance	5000 with brake assistance	5250 with brake assistance and reinforced springs	5500 <sup>1)</sup> with brake assistance and reinforced springs
	Trailer load kg			
With 60 kW (82 HP) engine	4750	5000	5000	4750
With 81 kW (110 HP) engine	4750	5000	5000	5550
With 60 kW (82 HP) engine	—	5000	5000	4750
With 81 kW (110 HP) engine	—	7000	7350	7700

<sup>1)</sup> Only for fire department and disaster vehicles

## 6.10.3 Trailer coupling

Manufacturer	With type 404.0 / 404.1	404.1
Designation / Size	Rockinger / Ringfeder * 227 G 110 D / L 227 G 110 J * UNIMOG D } optional	Ringfeder K 1 D
Tow bar load (DIN)	tons 6.5	4
Permissible support load	N (kp) 5000 (500)	4000 (400)

## 6.11 Dimensions

Wheel base	mm	2900
Track	mm	1630
Minimum track circle diameter	approx. m	11.9
Minimum turning circle diameter	approx. m	12.9
Maximum length	mm	5030
Maximum width	mm	2150
Maximum height of cab, unloaded	mm	2290
Maximum height of tarpaulin frame, unloaded	mm	2630
Ground clearance under axle housing, loaded	mm	400
Bulk clearance	approx. mm	585
Fording depth	approx. mm	800
Overhang, front	mm	930
Overhang, rear	mm	1200
Angle of approach	°	45
Angle of departure	°	46
Length of platform (inside dimension)	mm	3000
Width of platform (inside dimension)	mm	2000
Available loading platform space	m <sup>2</sup>	6
Height of platform sides	mm	500
Loading height above ground, unloaded	approx. mm	1190
Number of seats in cab		2

## 6.12 Maximum Speeds

With engine speed of 4800/min  
and overall axle ratio  $i = 7.56$

Speed	Forward speeds						Reverse speeds	
	1	2	3	4	5	6	1	2
Transmission km/h	7.21	13.08	24.07	43.66	70.59	107.66	5.35	9.70
Supplementary crawler gear km/h	2.34	4.25	—	—	—	—	—	—

## 6.13 Tightening Torques

Designation	Nm		(Kpm)		Designation	Nm	(Kpm)	Designation	Nm	(Kpm)
	M 180	M 130	M 180	M 130						
<b>Engine</b>					<b>Clutch — Transmission</b>			<b>Wheels</b>		
Cylinder head bolts engine cold	80	100	(8)	(10)	Transmission housing to carrier tube	200	(20)	Wheel nuts	290	(29)
engine hot	90	110	(9)	(11)	Special pto to transmission housing	50	(5)			
Cylinder head cover	10		(1)					<b>Chassis</b>		
Rocker arm bearing brackets	80		(8)		<b>Axles</b>			Shock absorber	120-140	(12-14)
Camshaft bearing bolts	25		(2.5)		Axle torque arm to support bearing	80	(8)	Trailer coupling		
Oil pressure valve	40		(4)		Steering knuckle or intermediate housing to housing	240	(24)	227 G 110 D	60	(6)
Oil filter bowl	40		(4)		Control arm	160-170	(16-17)	227 G 110 J	60	(6)
Spark plugs	30-40		(3-4)		Wheel locking bolt	750-1000	(75-100)	227 G 110 L	60	(6)
Intermediate flange to rear of engine	50		(5)					UNIMOG D	50	(5)
Oil pan	13		(1.3)		<b>Steering</b>			RU K 1 D	135	(13.5)
						mech.	hydr.	mech.	hydr.	
					Steering gear to steering gear bracket	95	—	(9.5)	—	
					Pitman arm	280	400	(28)	(40)	
					Clamping screw to steering bracket	70	—	(7)	—	
					Steering gear to frame	550-600		(55-60)		
					Torque rod	140		(14)		
					Fitted screw to universal joint	25		(2.5)		

## 6.14 V-Belts

Engine Model	Chassis Type / Model	Drive	Dimension mm	DIN
130.925 180.958	404.0	Crankshaft – Generator – Coolant Pump  Fan – Coolant pump – Idler pulley  Crankshaft – Air compressor  Crankshaft – Steering pump	9.5 x 850  9.5 x 850  9.5 x 1175  9.5 x 775	7753
180.928 .952 .953	404.1	Crankshaft – Generator – Coolant pump  Fan – Coolant pump – Idler pulley  Crankshaft – Air compressor  Generator – Governor	9.5 x 995 (9.5 x 900 <sup>1)</sup> )  9.5 x 875  9.5 x 1175  8 x 710	

In order to reduce the fan speed during **continued low ambient temperatures** interchange the front pulley of the coolant pump against the idler pulley.

In order to increase the coolant pump speed during **continued high ambient temperatures** interchange the rear pulley (149 mm dia.) of the coolant pump against a new pulley (115 mm dia.). To do so, use V-belt 9.5 x 900 mm <sup>1)</sup>.