DIENST

SERVICE

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SERVICO

VOLKSWAGEN

TRANSPORTER

VW-TRANSPORTER
english

INSTRUCTION MANUAL

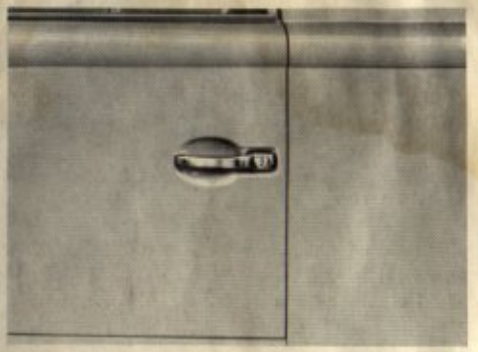
OCTOBER 1964 EDITION

Contents

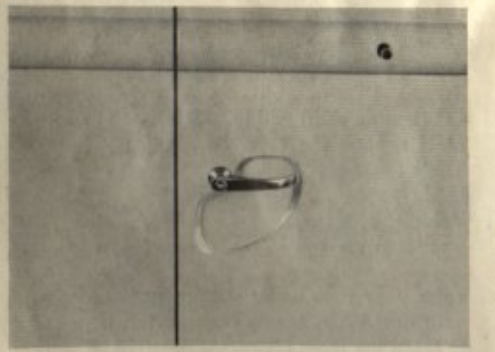
Take your time when getting acquainted with your new Volkswagen Transporter. If you wish to learn the most important detail quickly, read the first two sections of this manual:

VOLKSWAGENWERK AG · WOLFSBURG

With this key you can open all the door locks and the rear flap. The same key is also used for the ignition-starter switch. If your vehicle is fitted with an ignition-steering lock, you will receive a second key. It is advisable to note the key numbers and keep them with the vehicle documents so that, if you lose a key, you can get a replacement from your VW Dealer by just quoting the number.



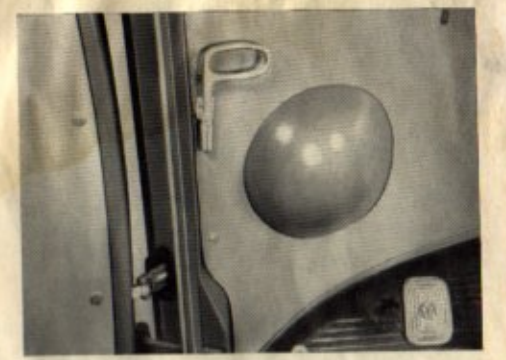
The door on the driver's side is locked and unlocked by turning the key slightly to left or right in the lock. The cab doors are opened from outside by pressing the button in the door handle.



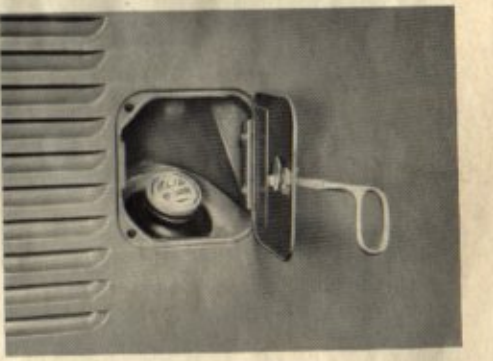
The wing door in the load or passenger compartment is unlocked by turning the key one half of a turn in the lock. The front part of the door is then opened by depressing the handle. The other part is opened from inside by moving the handle to the rear.

The rear door can only be opened or closed from outside. It is unlocked by turning the key one half of a turn in the lock. A spring lifts the door and holds it in the open position. To close the door, just press it down until the lock engages.

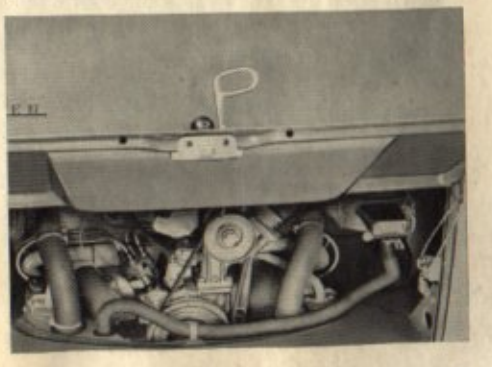
With this key you can open the cover over the tank filler cap and the engine compartment lid.



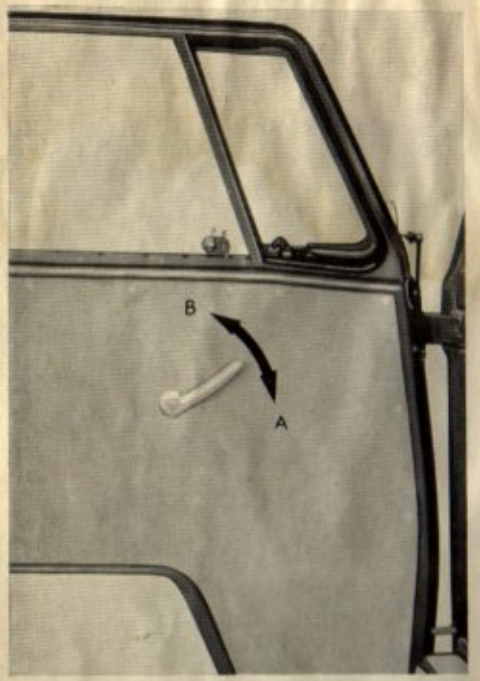
The square key is kept in a clip near the left headlamp housing in the cab.



The tank filler cap is located safely behind a lockable cover flap. The cover is opened by turning the key a quarter of a turn to the right.



A small turn to the right with the square key and the spring-loaded engine compartment lid opens automatically. To close the lid, just push it down until the lock engages.



Both cab doors can be locked from inside by pressing the handle forwards (A). To open the doors, move the handle to the rear (B).

When leaving the vehicle, lock the door on the passenger's side from inside before locking the driver's door from outside.

Sliding door. If your Transporter has a sliding door in the load or passenger compartment instead of the normal wing door, note the following instructions:

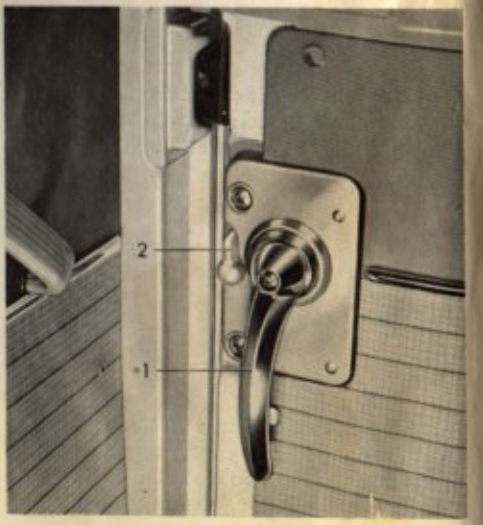
To open the door, press the handle down. The door slides back easily and is held open by a lever.

To close the door, press the handle down and slide the door forwards firmly until it engages. Then pull the handle up so that the rear edge of the door contacts the body properly.

The door can be locked to prevent pilfering.

Please remember that the sliding door must always be closed when the vehicle is in motion.

To open the door from the passenger compartment, pull the handle (1) to the rear. When the vehicle is in motion, press the latch (2) forward to prevent the door from being opened unintentionally.



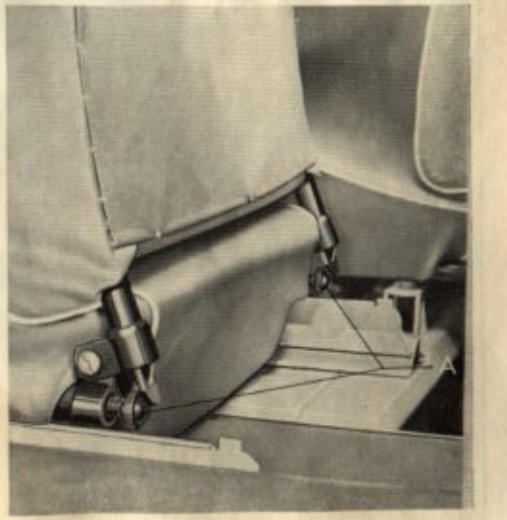
The cab seats are divided into an adjustable driver's seat and a seat bench. The driver's seat can be adjusted longitudinally, even when the vehicle is in motion, by lifting the adjusting lever and sliding the seat forward or backward until the best position is obtained. After adjusting, ensure that the lever engages properly so that the seat does not slide unintentionally while driving.

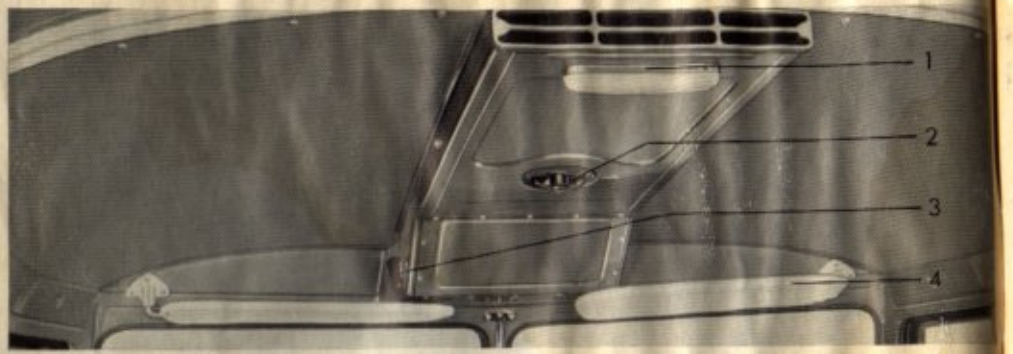
The angle of the back rest can be altered by turning the two adjusting screws.

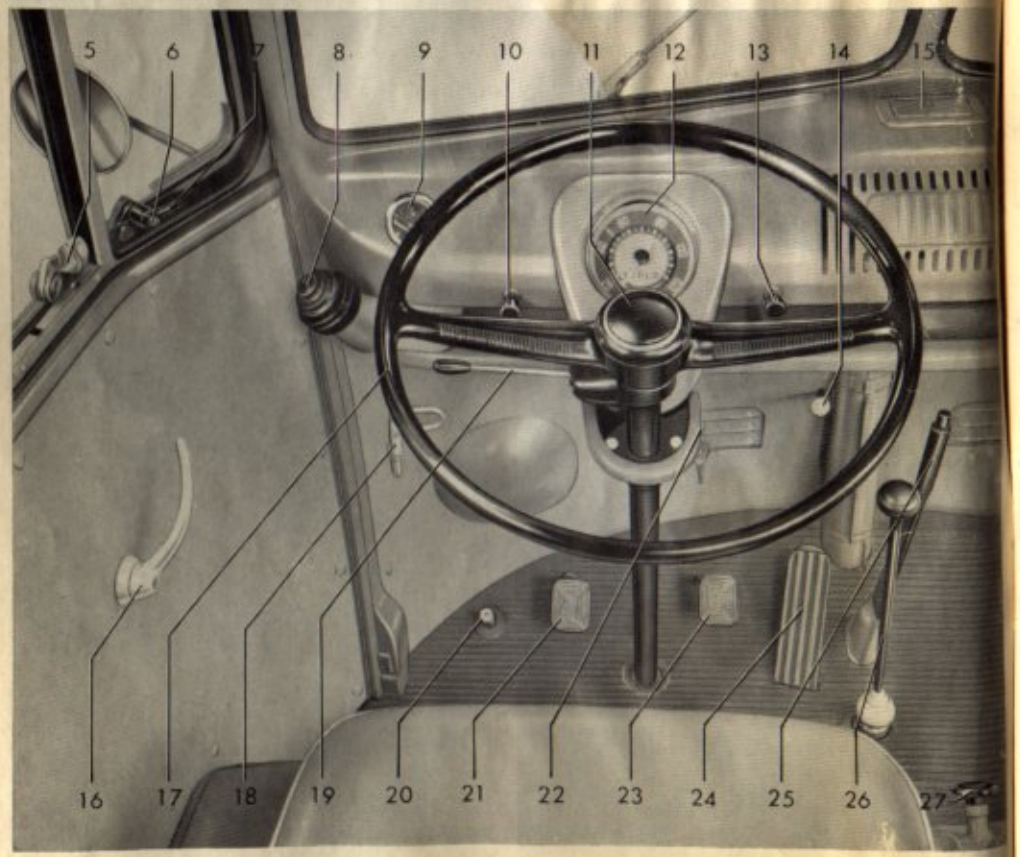
The seat bench can be tipped forward and taken out easily.

Sitting and driving for long periods places a certain amount of strain on the human body. It is, therefore, important to adjust the seat correctly to your individual requirements, and so avoid unnecessary fatigue.

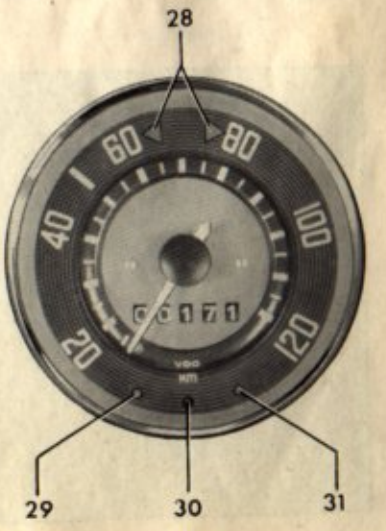
A — Adjusting screws







1 - Switch for cab lighting
2 - Fresh air distributor
3 - Fresh air regulator lever
4 - Sun vizors
5 - Door window fastener
6 - Vent wing lock button
7 - Vent wing fastener
8 - Rubber bellows for windshield washer
9 - Fuel gauge
10 - Windshield wiper switch
11 - Horn button
12 - Speedometer
13 - Instrument light switch
14 - Warm air control lever
15 - Ash tray
16 - Inside door handle
17 - Steering wheel
18 - Square key
19 - Turn indicator switch
20 - Dimmer switch
21 - Clutch pedal
22 - Ignition/starter switch
23 - Brake pedal
24 - Accelerator
25 - Hand brake
26 - Gear lever
27 - Heating control knob
28 - Warning light — green — for turn indicators
29 - Warning light — red — for generator and cooling
30 - Warning light — blue — for high beams
31 - Warning light — green — for the oil pressure



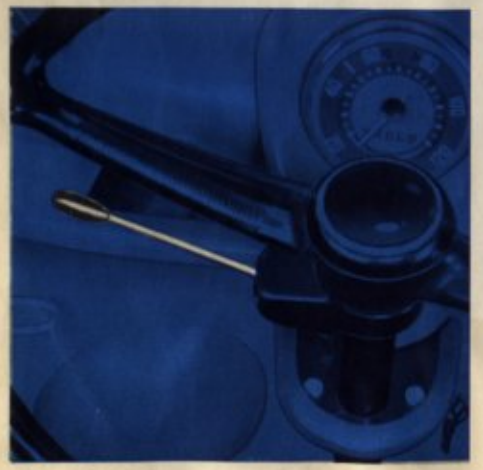
The rear view mirror can be adjusted from the driver's seat to suit individual requirements. Set it so that you can see the entire width of the road behind the vehicle for a great distance without turning the head or the upper part of the body. The position of the mirror should be checked every time the driving seat is moved.

The sun visors can be swivelled towards the door windows to give protection against dazzle from the side.

Turn indicator lever. You can operate the turn indicator lever with your fingers without taking your hands off the steering wheel.

Lever forward — right indicator
Lever to rear — left indicator

A green dual arrow warning light situated in the speedometer flashes whilst the indicators are in operation. The indicators are self-cancelling.



The windshield wipers operate when the knob (1) on the left of the speedometer is pulled out. The blades park automatically when switched off.

The wiper blades should be removed occasionally and cleaned thoroughly with a hard brush and methylated spirits or a strong detergent solution. Particularly during long dry periods they tend to become clogged with tar splashes and insects. The blades should be renewed once a year.

1 - Wiper switch
2 - Rubber bellows for washer
3 - Plastic ring

The windshield washer is operated by pressing down the rubber bellows (2). This pumping action can be repeated until the windshield is clean. Do not forget to fill the container from time to time. The opening is accessible after unscrewing the plastic ring (3) and lifting off the rubber bellows which forms the pump. The container holds about ¾ of a liter.

The stream of water from the jets should strike the upper part of the wiped area. The height of the stream can be corrected by turning the jet body slightly with a screwdriver.

The addition of 25% methylated spirits (3 parts water to 1 of meths) to the water in the container in winter will prevent it from freezing down to a temperature of —12° C (10° F). An anti-freeze solution can be used instead of meths. The mixing proportions are given by the manufacturers.

The lights are switched on with the switch on the right of the speedometer. The switch has three positions:

Fully in	— all lights off
Pulled out to first stop	— parking, tail and license plate lights
Pulled out fully	— high or dimmed headlight beams according to position of foot dimmer switch near clutch pedal

The instrument lighting can be varied in brightness by turning the lighting switch. It can also be switched off completely by turning the switch to the left.

The interior light in the cab is operated by a switch built into the lamp.

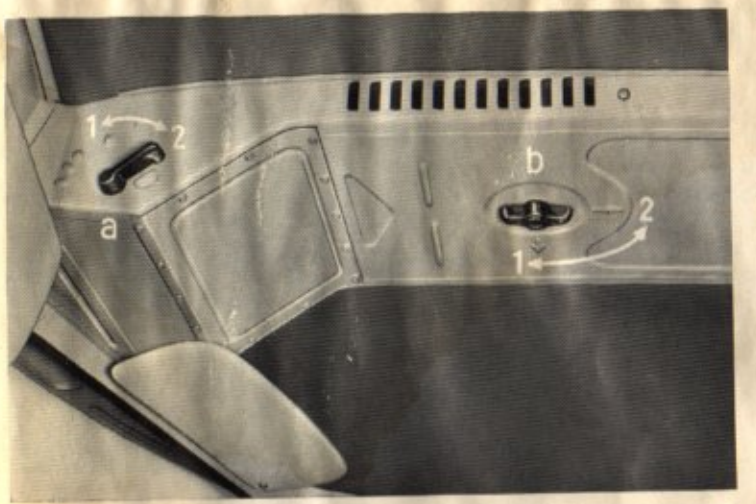
The light in the loading compartment or passenger compartment is operated by the tumbler switch situated on the left hand side of the instrument panel below the speedometer.

The sun roof is free to slide when the locking lever is turned to the left. It may be fixed in any desired position by merely twisting the lever to the right. It is good practice, however, to open the roof fully prior to sliding it to the desired position. This will not only make the opened roof look smarter, but is also better for the material.

To close the sliding roof, turn the handle to the left first, then pull the roof forwards until the locking hook engages and turn handle to the right.

The ash tray in the instrument panel can be easily removed by pushing it upward from below the panel.

The ash trays in the passenger compartment of the VW Micro Bus are pulled up for removal.



a - Control lever for fresh air ventilation

1 - open
2 - closed

b - Distribution lever

1 - cab
2 - load compartment

The ventilation of the cab and load compartment takes place through an air duct on the roof panel when the vehicle is in motion. The duct is opened and closed by a lever located on the left side. The amount of air entering can be controlled by placing the lever in one of three positions. When the lever is in the rear position the duct is closed.

A lever on the underside of the duct controls the distribution of the fresh air to the cab or load compartment. When the lever is across the duct, air flows to the cab only. When it is in line with the duct, air flows to the load or passenger compartment. Any position between these two, distributes air to both compartments.

Careful use of the fresh air ventilation and the vent wings gives a good flow of fresh air and extraction of stale air. Even when it is quite cold, at least one vent wing should be opened slightly. A continuous change of air in the vehicle keeps the windows clear and prevents the otherwise inevitable misting-up caused by the moisture in the occupants' breath and low outside temperatures.

Please check

the brakes, lighting and the amount of fuel before every trip. The oil level and tires of your car should also be checked at regular intervals.

The fuel tank has a capacity of 40 liters (10.6 U.S. gals., 8.8 Imp. gals.), which is sufficient for a distance of about 400 kilometers (250 miles).

The fuel gauge in the instrument panel shows the amount of fuel in the tank. When the needle is on "R" (Reserve) it is time to refuel at the next opportunity. The 5 liters remaining in the tank will last for about 50 km (30 miles).

The choice of fuel type and brand is left entirely to you. The VW engine is so designed that it will run satisfactorily on all normal reputable fuels. All good brands, including regular and premium mixtures, are distinguished by their consistent composition adequate anti-knock properties and freedom from harmful ingredients.

The brakes must be checked before starting out on a trip as the safety of your car depends mainly on them. When the car is in motion, depress the brake pedal a few times to make sure that the brakes are working efficiently.

The stop and turn indicator lights are an essential part of the lighting system. The ignition has to be switched on if you wish to check them.

If a turn indicator bulb is defective, the other turn indicator light and the warning light in the speedometer dial will flash considerably quicker. The stop lights only work when the foot brake is operated.

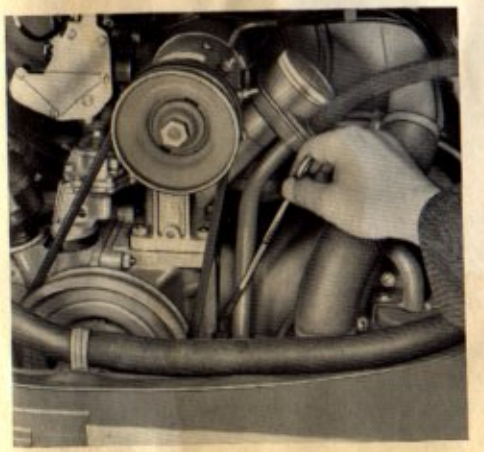
The oil level can only be checked when the engine is not running. It should always be between the two marks on the dipstick and **must never fall below the lower mark.** Wipe the dipstick with a clean rag before checking the oil level to avoid false readings.

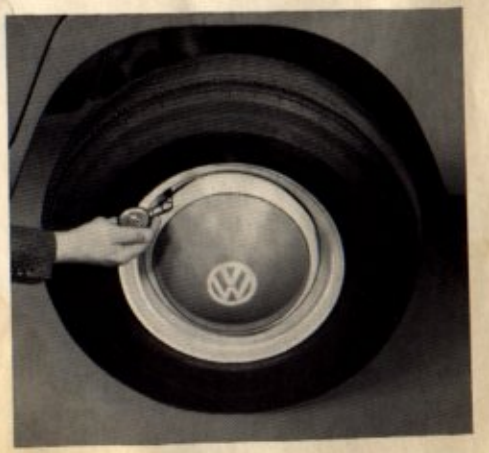
Use the same brand of HD oil for topping up whenever possible. Different oils do not always mix very well.

The tires require particular attention as the roadholding and suspension depend on them to a large extent. The pressures must be correct to get the best performance from the vehicle and long service life from the tires. It is advisable, therefore to check the pressures at least once a week. They are as follows:

Front	2.0 kg/cm² (28 psi)
Rear:	
up to ¾ payload	2.3 kg/cm² (33 psi)
with full load	2.8 kg/cm² (40 psi)
Spare wheel	2.8 kg/cm² (40 psi)
Ambulance front and rear	1.8 kg/cm² (26 psi)

Do not forget to replace the valve dust caps.





Starting the engine

The ignition and starter are switched on, one after the other, by means of the combined starter-ignition switch. As starter operation stresses the battery heavily, other big current users, such as the headlights, windshield wiper and radio, should not be switched on when starting. Make sure, also, that the gear shift lever is in neutral.

First switch on the ignition by turning the key to the right until the red and green warning lights in the speedometer come on. Then operate the starter without delay by turning the key further to the right.

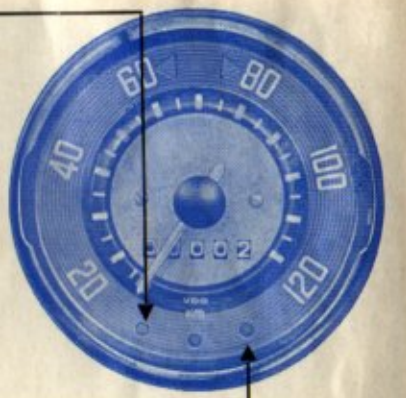
At temperatures above freezing point or when the engine is still warm, depress the accelerator pedal slightly while operating the starter. Only when the engine is very warm should the accelerator be fully depressed.

At temperatures below freezing point and when the engine is cold, depress the accelerator pedal fully and then release it before switching on the ignition. This enables the automatic choke device to close the choke valve. As the engine and transmission oils tend to become thick when cold, you should also declutch when starting so that the starter motor only has to turn the engine.

As soon as the engine starts, release the ignition key so that the starter is switched off. You can then drive off straight away as the choke valve opens automatically as the engine warms up and regulates the idling speed to suit the engine temperature. Do not race the engine when it is completely cold.

If the engine does not start within the first 10 seconds, pause for about the same length of time to rest the battery before repeating the starter operation. The ignition will have to be switched off first and then on again as a non-repeat lock in the switch prevents the starter from being operated repeatedly when the ignition is on and thus being damaged by the engine when it is running. The starting procedure should not be interrupted if the engine is heard to fire a few times.

The red warning light for the generator and cooling goes out as the engine speed increases. If this light comes on when you are driving, stop at once and check the belt which drives the generator. When the belt breaks, the cooling of the engine is interrupted. The proper way to replace the belt is described on page 43.



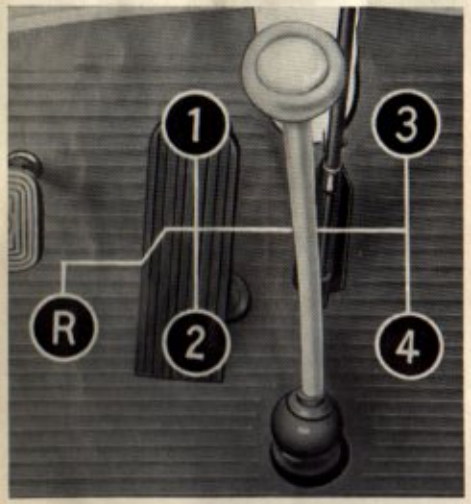
If the generator ceases to charge for any other reason, you can drive on, but only to the next workshop if possible as otherwise the battery will soon be run down.

The green warning light for the oil pressure goes out when the engine is started. If this warning light comes on whilst driving you must stop at once as this may mean that the oil circulation has been interrupted. Check the oil level at once. If the oil level is correct, get in contact with the nearest VW workshop.

If the light flickers occasionally when the engine is warm and running slowly it does not indicate trouble.

Be careful when starting the engine in the garage. Provide ample ventilation so that the exhaust fumes, which contain carbon-monoxide gas, can escape.

Practical Driving



Breaking-in instructions are not necessary for your Volkswagen Transporter. The most modern production and inspection methods have made it possible to dispense with the initial speed restrictions which are normally required. You can drive the vehicle at full speed from the first day.
The engine is fitted with a speed limiter to prevent you from driving with excessively high revs.
It is advisable, however, to observe certain general driving rules.

Gear shifting

Glance occasionally at the speedometer especially during the initial period.

Shift the gears within the permissible speed ranges only:

1st GEAR
0—12 mph
0—20 kph

You can drive very economically between:

Engage the reverse gear only when the car is stationary. A locking device prevents unintentional shifting. Depress the gear lever slightly and then move it to the left and to the rear to engage reverse.

Shifting to a lower gear

Shift down to a lower gear in good time when on inclines and also when accelerating from low speeds. The transmission of your car is

2nd GEAR
6—25 mph
10—40 kph

6 and 20 mph
10 and 30 kph

3rd GEAR
12—43 mph
20—70 kph

12 and 31 mph
20 and 50 kph

4th GEAR
20—65 mph
30—105 kph

20 and 46 mph
30 and 75 kph

fully synchronized so please do not hesitate to shift the gears.

Certain speed ranges have to be adhered to when shifting to a lower gear. Shifting down to a lower gear at excessive speeds puts an unnecessary strain on the transmission. On the other hand very low speeds in the individual gears are harmful to the engine. Shift down from 4th to 3rd gear approximately between 70 and 35 kph)43 and 22 mph) and from 3rd to 2nd gear between 40 and 25 kph (25 and 15 mph). The 1st gear is only used for moving off, driving at walking pace or on very steep inclines.

When shifting gears, it is absolutely essential to depress the clutch pedal fully. Incomplete declutching makes gear shifting difficult and leads to rapid wear of the synchronizer stop rings.

Do not race or labor the engine in the individual gears. This practice can have a detrimental influence on the life of the engine.

A few instructions on clutch operation:

Shift to first gear shortly before moving off only.

When stopping temporarily, do not wait with the clutch pedal depressed and a gear engaged.

Do not use the clutch pedal as a footrest when driving.

Economical operation is one of the outstanding features of your car. However, getting a few extra miles from each gallon depends on your driving habits.

Make good use of the lower speed ranges in the individual gears. The fuel consumption increases when you, to take one example, drive at 40 kph. (25 mph.) in 3rd gear in town traffic instead of using 4th gear. The same thing happens when you drive at unnecessarily high speeds in 1st or 2nd gear. Under normal circumstances you can shift into 2nd gear at 10 kph. (6 mph.), into 3rd at 20—30 kph. (12—20 mph.) and into top at 30—40 kph. (20—25 mph.).

Depress the pedal gradually when accelerating. Only use the full acceleration and particularly the excellent brakes of your vehicle when a critical traffic situation makes it absolutely essential.

Do not pump the accelerator pedal unnecessarily. Even the small quantity of fuel additionally discharged each time the accelerator pedal is depressed results in a marked increase in the overall consumption.

Do not continue to depress the accelerator pedal when your speed begins to drop on an incline, shift down in good time so that you keep the engine running at the best speed.

Reduce your speed in good time before corners and when stopping. Do not coast downhill.

High speeds always result in higher fuel consumption figures because the consumption does not increase uniformly but goes up rapidly. However, you can drive quickly and economically if you accelerate to the desired speed and then ease the pedal back slowly to the point where the vehicle just remains at this speed.

This method can prove very economically, particularly on long motorway trips.

The most advantageous engine operating conditions result from brisk driving and correct gear shifting.

Brakes

The brakes respond to even the slightest foot pressure. Apply the brakes carefully and avoid locking the wheels. Locked wheels will not shorten the braking distance but may cause you to loose control over the vehicle and will affect the tires.

When driving downhill, make use of the braking effect of the engine and shift to that gear which your would use in driving uphill. The ignition must never be switched off when going downhill.

Violent braking can only be justified in an emergency. Nevertheless, it is advisable to check the full braking effect at certain intervals so that you will be familiar with the behaviour of the car and the actual braking distance.

Parking

Parking in limited spaces can be made quite simple:

Stop your car level with the car in front of the space. Turn the steering wheel sharp to the right and reverse slowly into the gap:

When the front bumper of your Transporter is level with the rear bumper of the car ahead of you, turn the steering wheel fully to the left and back up further towards the curb:

Now turn the steering wheel to the right again and pull up a little bit, until both ends of the car are as close to the curb as possible:

When parking on a steep slope, set the handbrake to stop the car rolling. As a precautionary measure, it is advisable to engage first or reverse gear in addition to the handbrake. And do not forget to take the key out of the ignition switch before you leave your car.

If a steering-ignition lock is fitted, remove the key at the "Halt" position. This locks the steering and protects the vehicle against theft.

Always ensure, however, that the vehicle is at a complete standstill before the key is turned to the "Halt" position. It must not be withdrawn before as the steering is locked immediately.

Cold Weather Hints

In winter you will learn to appreciate the air cooling and the heating of your vehicle. You may leave your car out in the bitter cold without fear. The air-cooled engine will always start readily and will heat up the interior of the car quickly and uniformly.

The warm air heating can be regulated by a rotary knob situated at the right-hand side under the seat:

Anti-clockwise — (1) — heating on

Clockwise — (2) — heating off

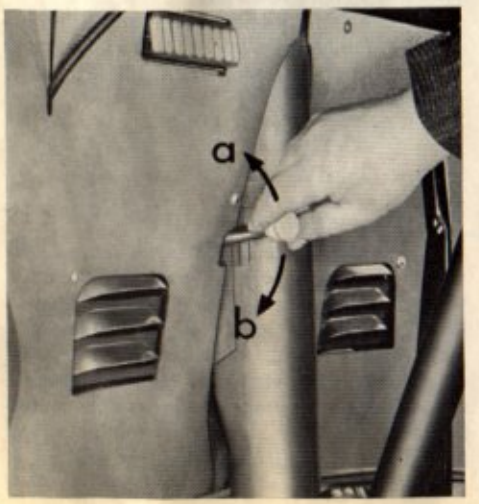
The distributor in front of the hand brake lever controls the flow of warm air to the foot well or to the defroster vents.

Lever up — a —
warm air to foot well

Lever down — b —
warm air to defroster vents

When the lever is in any position between these points, the air flow is distributed to foot well and defroster vents.

If you open a vent wing slightly at the same time, the heat output will increase noticeably because the fan can then force the warm air into the vehicle interior more easily.



The engine oil specified for the Volkswagen Transporter at temperatures above freezing point has a viscosity grading of SAE 30. At temperatures below freezing point, however, this oil will become so thick that it makes the engine hard to start. As soon as temperatures below freezing point are anticipated, the thinner SAE 10 W oil or a multigrade SAE W-30 should be used when changing the oil.

Only if your Transporter is mainly operated over short distances during the winter is it advisable to have the oil changed at more frequent intervals, say every 2,500 km. (1,500 miles), using the right HD oil. In the warmer seasons, additional oil changes are unnecessary and uneconomical.

In territories where exceptionally low temperatures prevail (below —25° C/—13° F), the use of SAE 5 W engine oil is recommended in place of SAE 10 W. The oil should be changed every 1250 km. (750 miles) and the oil strainer cleaned at the same time.

Transmission oil. SAE 90 oil can generally be used all the year round. Only in countries with arctic climates is it necessary to replace it with the thinner SAE 80 transmission oil.

The chassis is naturally exposed to very severe conditions in the winter. The steadily increasing use of chemicals to de-ice the roads produces solutions which attack even the most durable paintwork after a time. The underside of your Transporter is sprayed with a wax-based compound to protect it from these influences. It is advisable to examine the protective film at the beginning of the winter and have it repaired by respraying so that the full protective effect is retained.

The brakes are exposed to splash water and condensation which in winter is apt to freeze in the brake drums. Therefore, when parking your car, do not set the handbrake, but engage first or reverse gear.

The battery requires special care in winter because of the increased consumption of current when starting the engine and using the lights at night. Furthermore, its efficiency decreases at lower temperatures. If the car is mostly used over short distances or in city traffic, it is advisable to have the battery recharged occasionally. The connections between battery and starting motor must be kept perfectly clean.

The spark plugs should not have an excessively large gap especially in winter. The normal spark plug gap is 0.7 mm. (.028"). In extremely cold weather the gap can be reduced to between 0.4 and 0.5 mm. (.016" and .020") to facilitate starting.

The door locks can freeze up in winter, especially if water gets into the lock cylinder when washing the car. Do not aim the water jet directly at the lock, but instead, cover up the key hole when washing.

A frozen lock can be opened by warming the key before insertion and then squirting antifreeze into the lock cylinder straight away.

Tires with badly worn treads are very dangerous particularly in the winter so ensure that they are replaced in good time.

M+S tires with special heavy treads give good road holding in snow and slush. They can be fitted on the rear wheels only or to all four wheels. M+S tires should however, only be fitted on the front wheels when badly snowed-up roads are expected for long periods.

Better still are the M+S ice tires (spiked) which increase the safety margin even on hard snow and ice. Even with these tires, which should always be fitted to all four wheels, you should not allow yourself to be misled into driving faster than you would under the same conditions with normal M+S tires.

In general, special winter tires only have real advantages when conditions on the roads are really wintry. For safety reasons, it is not advisable to drive a vehicle fitted with any type of winter tire at top speed. You cannot expect a winter tire to have the same degree of adhesion on dry snow free roads as a normal tire. Furthermore, under these conditions M+S tires wear rapidly, particularly at high speeds.

Snow chains, in conjunction with normal and winter tires, can only be used on the rear wheels. Only passenger car type chains which do not stand clear of the inside of the walls more than 15 mm., including tensioner, are suitable. When driving over long stretches of road which are free of snow the chains should be removed. They serve no useful purpose here and merely damage the tires and wear out quickly.

Care of the Tires

Apart from the tire pressures, your driving habits also affect the service life of the tires considerably. Rapid acceleration, violent braking and cornering result in more excessive wear as compared to careful driving.

Avoid overloading the car and protect the tires from intense sunlight, fuel or oil.

The tires should be checked occasionally for foreign matter and external damage. The tires should always be replaced when the tread has worn down to a depth of 1 mm. (.04") which is the absolute minimum required for safe usage. If the tires show signs of uneven wear after a considerable mileage consult your local VW dealer.

For smooth running at high speeds and to ensure long tire life, it is important to have the wheels balanced statically and dynamically. As the wheels can get out of balance owing to natural tire wear, they should be balanced every 10,000 km. (6,000 miles).

The spare wheel is stowed in the cab behind the bench seat and is secured with a retaining bracket and wing nut. To take the wheel out, just tip the seat forwards.

The jack and other tools are also stowed underneath the seat.

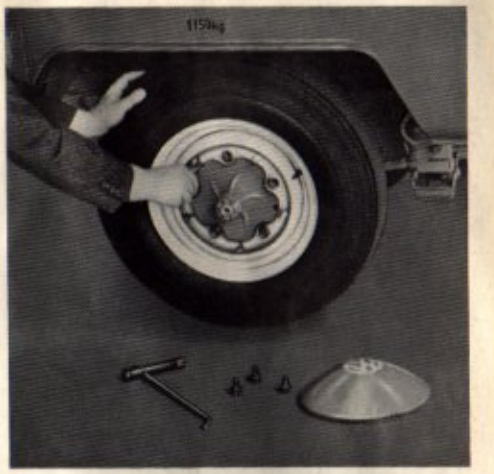
On the Pick-up the spare wheel is located in the load compartment under the platform.

Changing wheels on the road, usually in the rain, is certainly not pleasant. However, it will be easier after you have read these few lines which tell you how to do it properly.

Set the handbrake and block the wheel opposite the one to be removed to prevent the vehicle from rolling off the jack.

Insert jack into the square tube below the body and turn the hexagon head until the base touches the ground.

Remove wheel cap with cap removal tool.



Loosen wheel bolts with the socket wrench while the wheel is on the ground.

Raise vehicle until tire clears ground.

Remove wheel bolts and take off wheel.

When reinstalling the wheel, operate the jack until the five holes in the wheel are roughly lined up with the holes in the brake drum.

First, insert one wheel bolt only. Tighten it enough to allow the wheel to be swung around this point by hand, until the remaining holes in the wheel and brake drum coincide.

Insert and tighten the remaining bolts until the countersunk heads of the five bolts are centered in the recesses in the wheel.

Tighten all bolts diametrically opposite in turn.

Lower the vehicle, remove jack and make sure that all bolts are tight.

Install wheel cap firmly and make sure that it is tightly seated.

Care of the Car

Clean and smart appearance. To keep your Transporter looking smart and new should be a matter of pride to the driver or owner. It is our object to provide you with paintwork which not only looks good and has a sparkling lustre but is most durable. A chemical treatment protects the body against rust and anchors the synthetic resin enamel to the metal.

Even the best paint work requires regular care. You will realise the importance of this if you consider that the paints is exposed to sunshine, rain, dust and dirt.

Wash your new vehicle frequently during the first weeks as this is good for the finish. When washing you require a soft sponge for the body, a soft brush for the wheels, a sturdy, long-handled brush for the chassis, and plenty of water.

The chassis and underneath part of the body should first be flushed with water to soak off the dirt, and afterwards a brush should be used.

Spray the exterior finish of body and wheels evenly with water until dirt is soaked off. Do not allow a powerful jet of water to hit the painted surface. Using plenty of clear water, remove dirt with a sponge. Clean the sponge at short intervals to avoid scratching the paint work.

There are many proved auto soaps and detergents available which greatly facilitate this job. Do not buy just any product, let your VW dealer advise you. It is of utmost importance to rinse the body thoroughly with water to ensure that no traces of the detergent remain on the body. After washing, dry off with a clean chamois to prevent water spots from forming.

Preservation (Waxing) should be carried out for the first time after approximately 8 to 10 weeks and afterwards, if possible, at regular intervals of between 6 and 8 weeks. Waxing means to restore to the finish certain substances it has lost by exposure to the weather. At the same time a protective water-repellent coat of wax is applied to the body.

The "Genuine VW Preservative" (L 190) was specially produced for the Volkswagen Transporter and is obtainable from every VW dealer. After washing and drying the car thoroughly, apply the preservative with a soft cloth. Let it dry for approximately 20 minutes and then rub it down with polishing cotton or a soft polishing cloth until iridescent colours can no longer be seen when looking across the polished surface at an angle.

Do not forget to wax the car after each detergent washing as the intensive cleansing properties of the chemical detergent will partially disolve the protective film of wax.

Polishing. You should polish your car only if its appearance has been affected as a result of insufficient care, or if the application of the preservative no longer restores the original lustre. Avoid the use of abrasives or chemically harmful products.

A special polish for the synthetic-resin enamel finish is also available from your Volkswagen dealer under the designation "Genuine VW Polishing Fluid" (L 170). Prior to applying the polish, the car must be washed and dried carefully. The polish should be applied with a soft clean cloth or polishing cotton — use a straight horizontal or vertical motion rather than a circular motion. After rubbing for some time you will notice a slight resistance, which indicates that the ingredients of the polish have settled in the finish and that the solvent has evaporated. Now take clean polishing cotton and rub the body down until the high polish is restored.

To prevent the polishing fluid from drying off prematurely, do not apply it on too large an area of the body at a time. A subsequent application of preservative and your efforts will be rewarded with a long-lasting shine.

Never wash, wax or polish the car in sunlight.

How to remove spots. Water alone will not always remove splashes of tar, oil traces, "baked on" insects, etc. On principle, such foreign matter should be removed as soon as possible, for if you neglect this, permanent damage to the finish may be the result.

Tar spots have a tendency to corrode the finish within a short time and should be removed immediately after discovery. On the road, you usually will have nothing at your disposal but fuel, which may be applied with a soft cloth. Kerosene or turpentine oil may also be used. After this, the treated spots should be washed with a mild, lukewarm detergent solution and rinsed, in order to remove traces of the cleansing agent. It is, however, better to use our preservative already mentioned, which renders the treatment with soap solution unnecessary.

Insects are caught especially during the night, in hot weather, by the front end of the vehicle. Once baked on they are very difficult to remove with water and sponge, but should be treated with lukewarm detergent solution.

Parking under Trees. Vehicles which are parked under trees for long periods in summer ar often found to be covered with spots. These spots can be removed fairly easily with lukewarm detergent solution if the treatment is not delayed too long. It is advisable to apply a coat of preservative afterwards.

Chromium-plated parts should be treated with "Genuine VW Chrome Cleaner Chromlin" when dry. Apply Chromlin thinly and allow to dry for 10 minutes before polishing with a dry cloth.

Cleaning sun roof. The plastic cover of the sliding roof does not require any special attention. It is, however, essential to clean the top regularly and in good time. When very dirty it should be cleaned with a detergent solution or a normal plastic cleaner. A hard brush can be used to clean the grained surface of the top but take care that the brush does not scratch the paint at the edges of the sliding roof. After cleaning, the top should be rinsed thoroughly with clear water.

Spots can be removed by wiping with a benzine moistened cloth and then washing with a lukewarm detergent solution. The spots should not be removed with paint thinner, chlorine based spot removers or similar solutions as these will attack the plastic material.

If you have a Pick-up, note the following: When the tarpaulin is wet from rain or washing, always let it dry on the vehicle to avoid shrinkage.

Care of the upholstery. Leatherette upholstery should be cleaned with soft cloth or soft brush, particularly in the seams. Good results can be obtained using a soft brush and a lukewarm detergent solution. Use the water sparingly, as the upholstery otherwise requires a long time to dry if water trickles through the seams.

Grease and paint spots should be wiped off before they dry on. Soaked-in spots can be removed carefully using a rag moistened with fuel or alcohol. Spots caused by shoe polish can be removed with turpentine. Use these agents carefully and sparingly as they tend to dissolve the dust repellent finish of the leatherette.

Solvents such as trichlorethylene or paint thinner must not be used for cleaning.

After cleaning, the leatherette should be dried thoroughly with a soft cloth. So-called preservatives are not suitable for leatherette because they do not soak into the material and will merely collect dust and make clothing dirty.

The windows can be cleaned best with a clean sponge and warm water. A glass cleaning solution should only be added to the water in exceptional cases as these solutions tend to affect the paint preservative. Always use a special clean leather to dry the windows. This leather must not be used for the paintwork in any circumstances as most paint cleaners and polishes contain ingredients which will cause unpleasant streaks to appear on the windshield when it rains, even if only the smallest trace is present.

These streaks can only be removed with a good windshield cleaner and a lot of care, not forgetting the windshield wiper blades.

Door and window weatherstrips. It is important to keep the rubber parts undamaged and supple to ensure perfect sealing. To retain the original flexibility of the rubber, these parts should be coated occasionally with talcum powder.

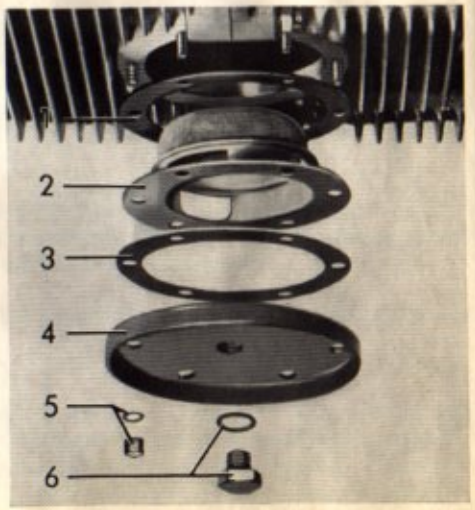
Lubrication Service

To lubricate correctly means to lubricate carefully and at the prescribed intervals. Therefore, do not omit to have the lubrication service carried out at regular intervals. A lubrication chart can be found on page 75 indicating the correct mileages at which to lubricate.

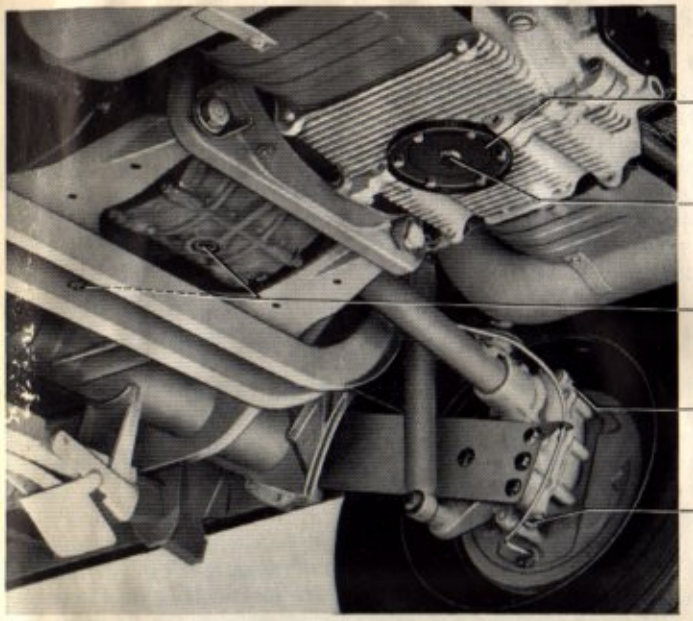
The Service Booklet makes it possible for you to have your car lubricated at our authorized workshops by skilled personnel, at the lowest cost and in a minimum of time. You really cannot afford to miss this opportunity.

Engine

Regular oil changes are necessary even if the very best branded oils are used. Dirty oil in your engine simply means increased wear and a shorter service life.



1 - Gasket
2 - Oil strainer
3 - Gasket
4 - Oil strainer cover
5 - Cap nut with washer
6 - Oil drain plug with washer



Oil strainer
with cover

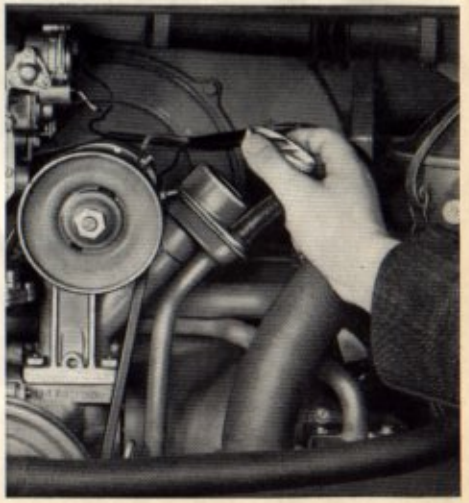
Oil drain plug
for crankcase

Magnetic oil drain plugs
for transmission

Oil filler plug

Oil drain plug
for reduction gears at rear wheels

The oil is drained, when warm, by removing the plug in the oil strainer cover plate. Flushing of the engine is unnecessary. However, the oil strainer must be removed and cleaned at every oil change. The two gaskets for the oil strainer and the washers for the cap nuts must be renewed each time. The engine is refilled with 2.5 liters of HD oil (5.3 US pints / 4.4 Imp. pints).



It is superfluous and uneconomical under normal operating conditions to change the oil at shorter intervals than every 5,000 km. (3,000 miles). We recommend oil changes at more frequent periods, i. e. at intervals of 2,500 km. (1,500 miles) only if you do not drive much in winter and in doing so mostly cover short distances in city traffic.

Types of lubricant

HD oils are prescribed for the engine lubrication. HD oil is an oil with proved oxidation stability, bearing corrosion preventive properties and detergent-dispersant characteristics which tend to hold in suspension foreign contaminants which would normally deposit on engine parts. These foreign contaminants will drain out with the oil at the periodical oil changes. The detergent properties of HD oil will make the fresh oil darker after a short time of operation. This is quite natural and there is no reason whatsoever to change the oil earlier than called for in the Lubrication Chart.

Some more information on oils

The quality of branded oils is such that the choice is left to your discretion. In cases of doubt your authorized VW dealer will be glad to assist you. We recommend that you select "your" oil after the first 500 km. (300 miles) and stick to it at all future oil changes.

Viscosity of the lubricant is an indication of its resistance to flow at a given temperature. The SAE numbers, such as SAE 20 W/20, SAE 10 W etc. classify lubricants in terms of viscosity. The outside temperature is decisive when selecting the viscosity.

SAE 30 is suitable for use at all temperatures above 0° C (32° F).

SAE 10 W should always be used in the cold season if the temperature is expected to fall below 0° C (32° F) by the next oil change.

SAE 5 W is only for use in countries with arctic climates and temperatures below — 25° C (—13° F) in place of SAE 10.

SAE 10 W-30 is a multigrade oil and can be used in summer and winter.

Temporary deviations in the temperatures for the various viscosity grades are of no importance. It is permissible to mix oils of different viscosity grades when it is necessary to add oil between the oil changes, and the outside temperature no longer corresponds to the viscosity grade of the oil in the engine. It is, however, essential that the same brand of oil be used.

In some countries the API classification is applied (API = American Petroleum Institute). According to this classification, the HD oils suitable for the VW engine are referred to as "For Service MS".

No additives of any kind should be mixed with HD oils.

Checking air cleaner

The oil bath air cleaner should be checked every 5,000 km. (3,000 miles).

All the dust present in the air drawn in by the engine is retained by the filter insert in the upper part of the air cleaner and washed out when the vehicle is in motion by the oil in the lower part of the cleaner. In time, this causes a layer of sludge to form at the bottom of the lower part. If the cleaner check reveals that there is only 4—5 mm. (.16—.2") of oil above the sludge layer, the lower part should be carefully cleaned and filled with fresh oil. The top part does not need cleaning. However, if the filter insert has become so dirty due to overdue cleaning or oil shortage that the air inlet holes on the underside are partly blocked, the encrusted dirt should be removed, preferably with a small piece of wood.

A dirty filter insert not only reduces the engine output, it can also cause premature wear in the engine. If the local conditions are such that the vehicle is frequently driven over very dusty roads it is advisable to clean the air cleaner more often.

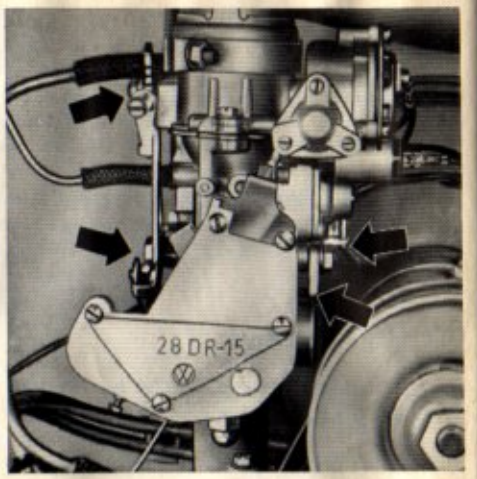
The warm air control flap should be checked each time for freedom of movement. This flap regulates the flow of pre-heated air to the carburetor in conjunction with the speed of the engine.

Servicing air cleaner

Pull crankcase breather hose off air cleaner. Pull warm air hose off air cleaner intake elbow. Take air cleaner off intake elbow and take upper part off. Never lay the upper part down with the filter element upwards.

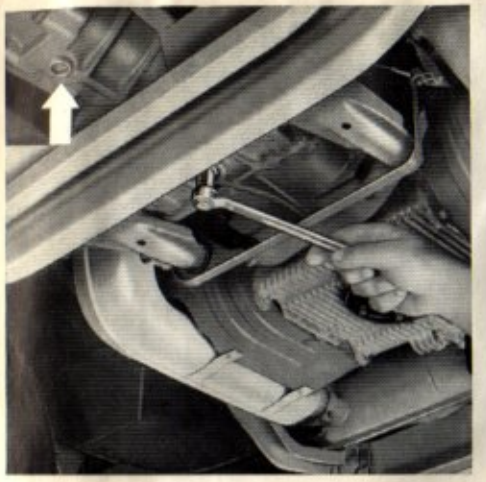
Clean the lower part thoroughly and fill to the mark with fresh SAE 20 engine oil.

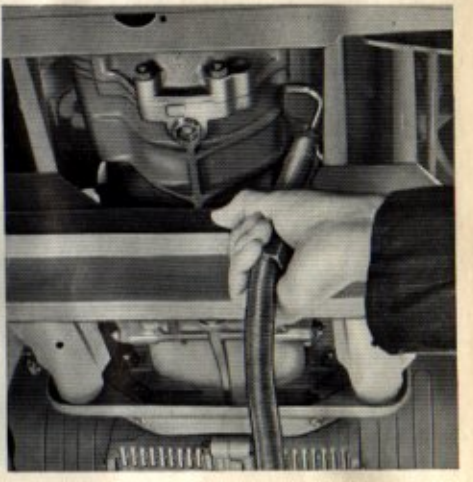
When installing, ensure that the cleaner fits properly on the intake elbow.



Carburetor

The joints in the carburetor linkage should be oiled every 5,000 km. (3,000 miles) so that the linkage works easily. A few drops of oil should be applied to the following points: choke valve shaft with fast idle cam, throttle valve shaft, accelerator cable retaining pin, operating rod and lever for accelerator pump.





Transmission and differential

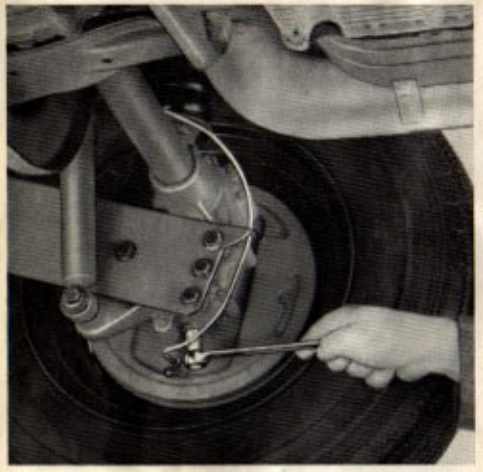
The transmission and differential gears are combined in the transmission case and both lubricated with the same hypoid oil. The old oil is drained by removing both the magnetic drain plugs while the oil is at operating temperature.

Then refill with 2.5 liters of hypoid oil (5.3 U.S. pints, 4.4 Imp. pints).

The magnetic drain plugs should be thoroughly cleaned at 500, 5,000 kilometers (300, 3,000 miles) and then at every transmission oil change at 50,000 km (30,000 miles). As the plugs can only retain a limited amount of deposits, the specified cleaning is particularly important when the gears are being run-in.

The oil level must be checked regularly between oil changes and topped up as necessary. The oil should be up to the edge of the filter hole.

Additives should not be used with hypoid oil.

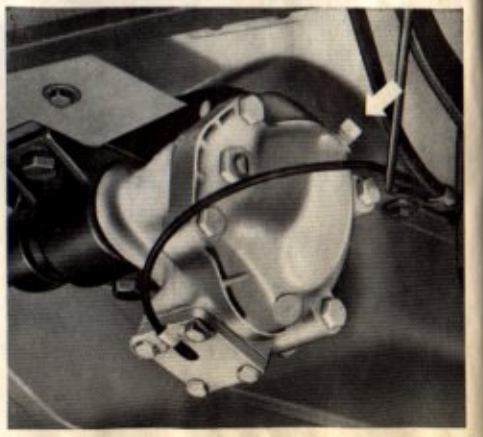


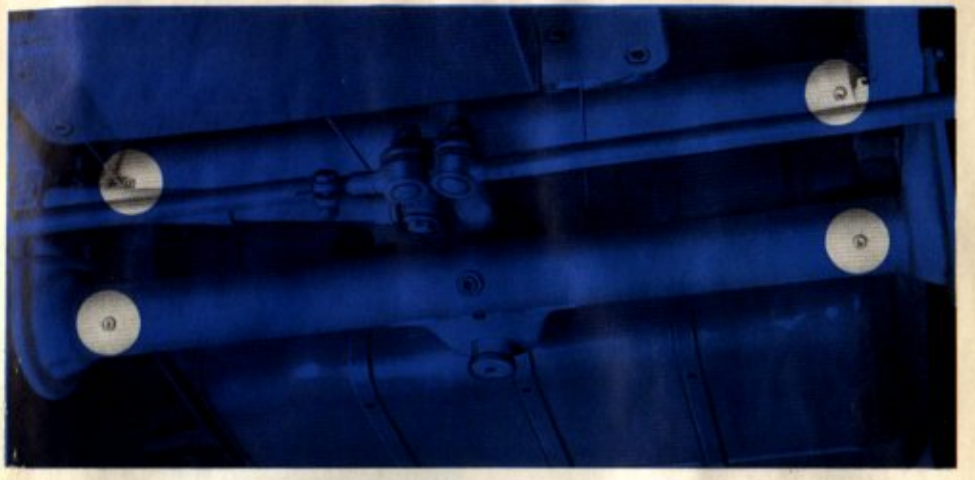
Reduction gears

Each reduction gear case should be refilled with **0.25 liters of hypoid oil (0.53 U.S. pint, 0.44 Imp. pint)** at the same intervals as the transmission case.

Steering gear

The steering assembly should be lubricated exclusively with SAE 90 hypoid oil, and under no circumstances with grease or any other oil. The level of the oil in the steering case should be kept at the lower edge of the filler plug hole.

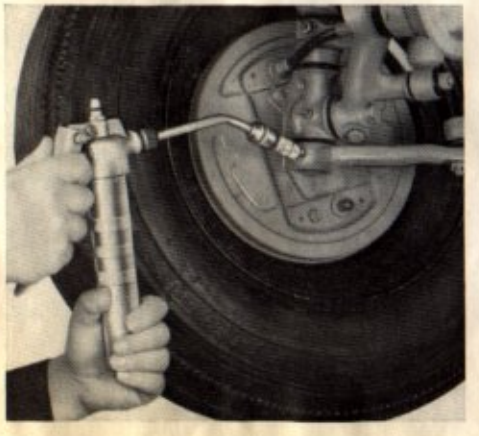


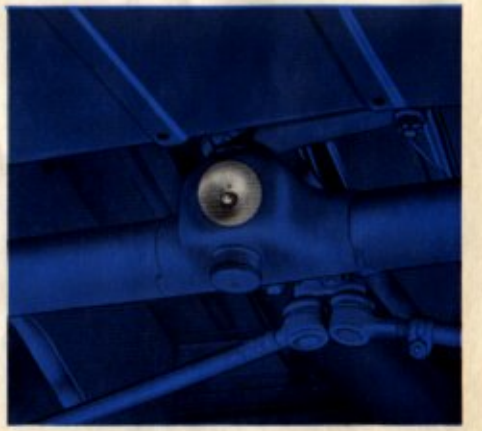


Chassis

The front axle bearing points can only be lubricated properly when the axle in free of load, that is, with the vehicle lifted.

The points on the front axle tubes, on the king pins of each wheel and on the swing lever shaft should be greased every 2,500 km (1,500 miles).





If the vehicle is frequently driven on bad roads it is advisable to grease the king pins again approximately every 1,250 km (750 miles).

Before greasing, the nipples should be wiped clean with a rag to prevent dirt from getting into the bearings. Grease must not be allowed to get on to tires and brake hoses. Even small quantities should be wiped off immediately.

Please check the dust seals on the maintenance-free tie rod ends for damage and security at every lubrication service. Damaged dust seals should be replaced as soon as possible.

Every year, preferably at the beginning of the cold season, the clutch, accelerator and heating control cables and the clutch cable adjusting nut should be checked and cleaned and greased if necessary.

The front wheel bearings

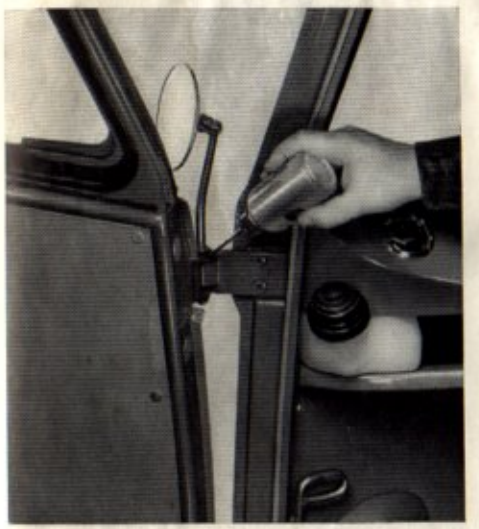
are packed with grease at the factory. The caps on the front wheels hubs must be free from grease.

Every 50,000 km. (30,000 miles) the bearings should be carefully cleaned and packed with the grease prescribed under "Lubricants".

The brake drums must be removed for this purpose. Finally the front wheel bearings must be adjusted. In order to avoid damage to the bearings, this operation should, if possible, be carried out in a VW workshop only.

Driver's seat

The upper and lower surfaces of the runners for the driver's seat should be greased lightly to ensure the desired freedom of movement. The runners should be cleaned with a rag before the grease is applied.



Doors and locks

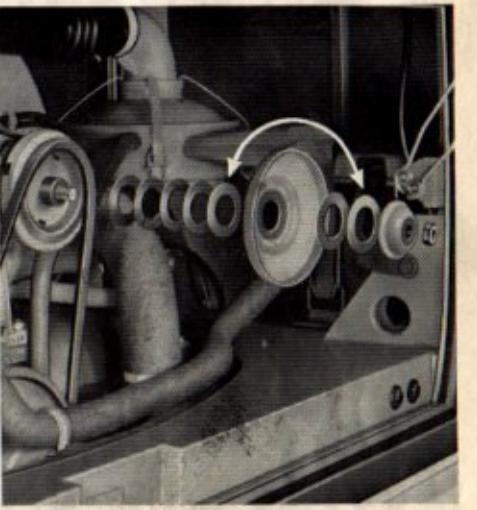
The door hinges should be oiled at every lubrication service or, better still, once a week after dust and dirt has been removed. The lid hinges should also be lubricated with oil.

Door cylinder locks should be treated with graphite. Dip the key into the graphite, insert key and move it back and forth several times.

Maintenance Service

The Volkswagen Service Organization has made available for you an extensive network of authorized VW workshops staffed with well trained and experienced personnel, and equipped with all the special tools required to service your car. If ever you should need service when touring and away from home, look for the well-known VW Service Sign. Here you will receive prompt and expert assistance.

In case you cannot get to an authorized VW workshop quickly and have to carry out small repairs yourself, we have listed here the most important tasks which are normally dealt with at the maintenance checks. However, it is important that repair jobs which are beyond your capacity should be performed by the nearest VW workshop. Your car is then in capable hands. This will save you time, inconvenience, and money.



Checking the V-belt

The belt which drives the generator and the fan should be checked at regular intervals for tension and wear. When pressed with the thumb it should yield approximately 1.5 cm. (.6") and should not show signs of excessive wear.

To adjust the belt, remove the rear half of the pulley on the generator. When loosening and tightening the nut, insert a screwdriver in the slot in the front half of the pulley and support it against the upper housing screw in the generator. To replace the belt, the cover plate for the crankshaft pulley must also be taken off after removing the securing screws.

The belt is tensioned by increasing or decreasing the number of washers between the pulley halves. Taking washers out increases the tension and putting them in decreases it.

New belts stretch slightly at first and must be checked after 500 kms. (300 miles) and the tension corrected. The tension does not change any more after this so it is not necessary to readjust the belt again. To have the belt too tight is just as bad as having it too loose.

Even though the belt normally has a long service life, it is advisable to always carry a spare.

Cleaning the fuel filter

The fuel pump filter prevents foreign matter and dirt from entering the carburetor.

The filter should be cleaned at the prescribed intervals.

Install clip on fuel hose between tank and engine compartment.

Remove cover screw and take cover off.

Take filter gauze out and clean in benzine.

When installing filter, do not forget cover gasket.

Ignition timing

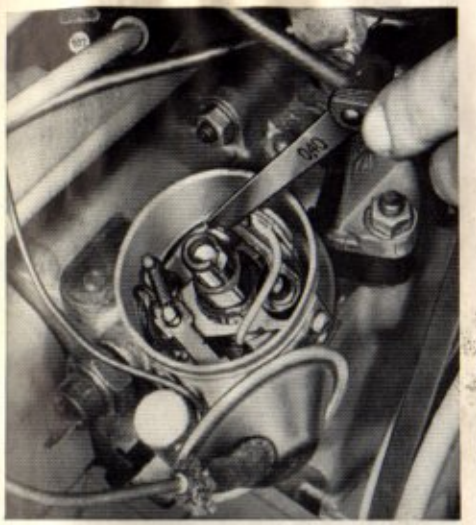
Particular attention must be paid to correct ignition timing. In many cases, poor performance, high fuel consumption and even damage to the engine can be the result of incorrect ignition setting. The ignition must not be advanced arbitrarily even when using super fuels. Alteration of the ignition is not only pointless, it can — as already stated cause damage to the engine.

Before setting the ignition timing the breaker contact point gap must be checked. With the breaker arm fully lifted the clearance should be 0.4 mm. (.016″). The initial spark advance must be set to 10° before top dead centre.

The ignition timing must only be set with the engine cold or when it is slightly warm.

Cleaning contact points

The contact points must be smooth and make even contact with each other. Dirty contacts should be cleaned and, if pitted, smoothed with a contact file. Whilst doing this, the contact points are pressed lightly together. Afterwards the ignition distributor should be blown out carefully with air. If the points are badly burnt they must be replaced.



Adjusting contact points

Remove distributor cap and rotor.

Turn the engine by means of the generator until the contact arm rests on the highest point of the cam lobe.

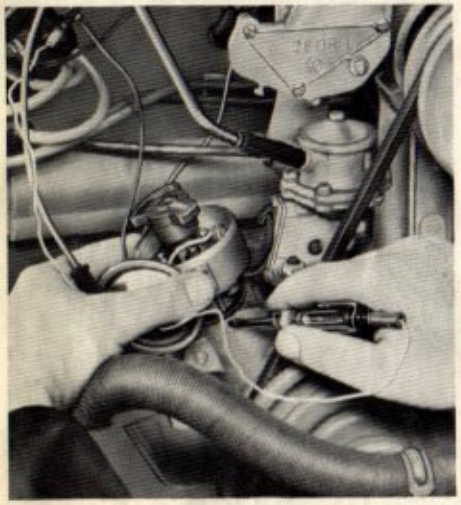
Loosen the breaker point locking screw.

Insert a screwdriver between the two lugs on the contact plate and the slot in the point carrier and adjust the gap to 0.4 mm. (.016″).

Tighten locking screw and install rotor.

After the contact points have been adjusted, the ignition timing must be reset.

Setting ignition timing



Turn the engine clockwise until the right-hand mark on the crankshaft pulley lines up with the crankcase joint and the distributor rotor arm is in line with the number 1 cylinder mark on rim of distributor.

Loosen clamp screw on distributor retainer.

Connect a 6 Volt test lamp to terminal 1 of the ignition coil and to ground.

Switch on ignition.

Rotate the distributor clockwise until the contact points are closed and then slowly anti-clockwise until the contact points just start to open and the test lamp comes on.

Tighten the clamping screw of distributor retainer.

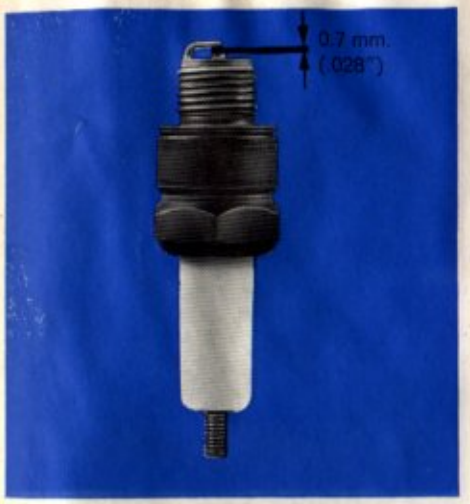
Install distributor cap.

The ignition is correctly set if, on cranking the engine slowly clockwise, the test lamp comes on when the right-hand mark on the crankshaft pulley is in line with the crankcase joint. Beforehand, the engine should be turned back anti-clockwise approximately a quarter of a revolution to take up the play in the distributor drive.

Lubricating ignition distributor

The breaker arm fiber block in the ignition distributor should always be lightly greased with lithium grease. Every 5,000 km. (3,000 miles) check whether this location must be cleaned and provided with new grease. Only a very small amount of grease should be used and none of it must come in contact with the breaker points as otherwise the ignition will be affected.

Checking the spark plugs



The appearance of the electrodes and insulation gives valuable information on the adjustment and condition of the engine:

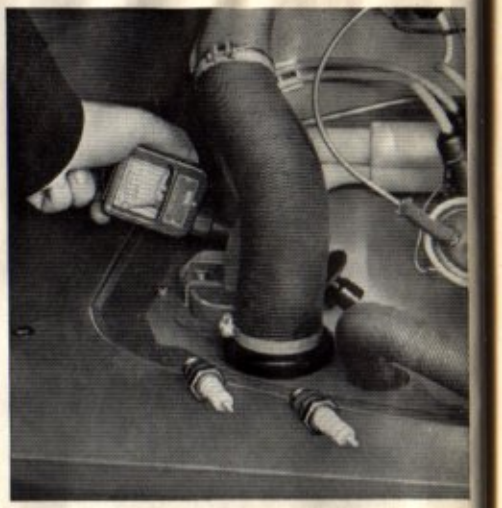
medium grey	— correct carburetor adjustment and proper performance of spark plug
black	— mixture too rich
light grey	— mixture too lean
oiled up	— failure of spark plug or piston ring blow-by

The spark plugs have an average service life of approximately 15,000 km. (10,000 miles) and should, therefore, be replaced in good time.

To prevent any breakdowns in the ignition system, the spark plugs should be removed every 5,000 km. (3,000 miles) and checked. Deposits can easily be removed with a brush and a chip of wood. Moreover, the insulator should be clean and dry on the outside in order to avoid short circuit and tracking. If necessary, adjust the spark plug gap which should be 0.7 mm. (.028").

Do not omit the gasket when screwing in the spark plug. Do not overtighten the spark plugs.

Checking the compression



The compression pressure is checked by inserting a suitable gauge into the spark plug hole when the engine is warm. All the spark plugs should be removed. The accelerator pedal is then depressed fully and the engine turned over with the starter until the gauge reading shows no further change.

The pressure should be at least 7 kg./cm.² (100 psi.). It is important that only a good accurate instrument is used and a good seal obtained between instrument and spark plug seat.

Adjusting the valves

The valves must only be adjusted when the engine is cold or slightly warm. The valve clearance 0.10 mm. (.004") for inlet and exhaust valves.

When adjusting, both valves must be closed i. e. the piston of the corresponding cylinder must be at T.D.C. on the compression stroke. The arrangement of the cylinders can be seen by the numbers 1 to 4 on the engine cover plates. Valve adjustment is carried out in the following sequence: cylinders 1, 2, 3, 4.

Remove distributor cap.

Turn the engine from the generator until the rotor arm points to the No. 1 cylinder mark on the rim of the distributor.

Remove cylinder head cover.

Loosen the adjusting screw lock nuts for the valves of No. 1 cylinder.

Adjust valve clearance with a feeler gauge.

Hold the adjusting screws and tighten the lock nuts.

To adjust the valves for cylinders No. 2, 3 and 4, turn the engine further **anti-clockwise** until the rotor arm is 90° offset each time.

Adjusting the carburetor

Each carburetor is checked at the factory and adjusted to the engine. Special knowledge and experience is required for checking and adjusting the carburetor with automatic choke and for carrying out repairs on the acceleration pump. For this reason, these operations should only be carried out by a VW workshop. Do not alter the adjustment by replacing the jets by other than the prescribed sizes. This would be detrimental under normal operating conditions and is not permissible.

Only the idling speed may require adjustment from time to time. The adjustment must be carried out when the engine is at operating temperature. Check that the idling adjusting screw is no longer resting on the fast idle cam of the automatic choke.

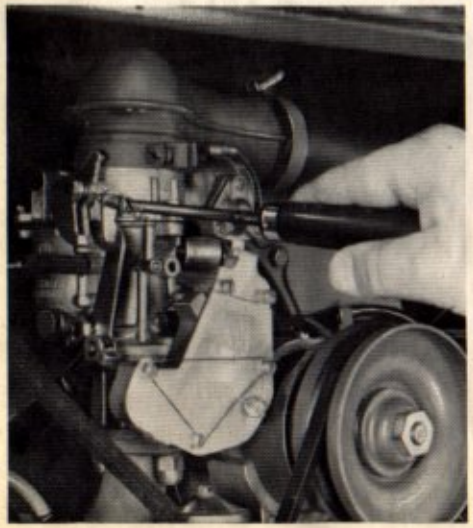
Turn the idling adjusting screw (1) until a normal idling speed (about 550 rpm.) is been attained. Turn the volume control screw (2) clockwise until the engine speed begins to drop. Then give it a ¼ to ⅓ of a turn in anti-clockwise direction.

Re-adjust the idling adjusting screw (1).

The adjustment is correct if the engine does not stall when the throttle is either suddenly opened or shut with the clutch pedal depressed.

Poor idling may also be the result of damaged gaskets, loose intake manifold flanges, faulty ignition or leaky valves.

1



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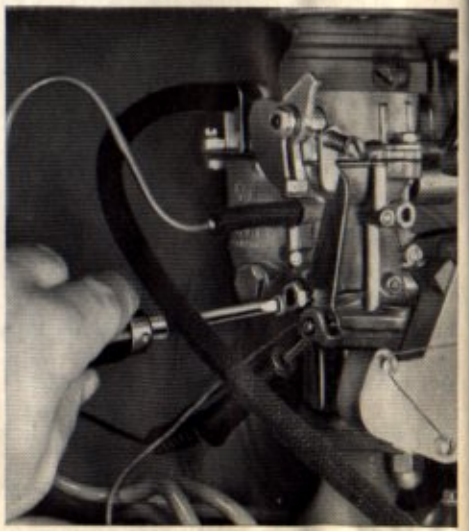


Checking clutch pedal free-play

Easy gear shifting and complete transmission of engine performance to gears and wheels can only be guaranteed if the clutch is adjusted as specified.

Measured at the clutch pedal, this free-play should be between 10 and 20 mm./.4 and .8 in. (a). The clearance is adjusted by an adjusting nut on the cable end.

Release lock nut on the threaded cable end. Adjust free-play by turning the nut.

Depress clutch pedal several times and recheck pedal free-play.

Hold adjusting nut and tighten lock nut.

Lubricate bearing point between operating lever and adjusting nut with universal grease.

Adjusting front wheel bearings

The adjustment of the front wheel bearings should, if possible, be carried out in a VW workshop only as incorrect adjustment of the bearings can cause severe damage in a short time.

If a front brake drum has to be removed for some reason, the bearings should be adjusted as follows:

Raise front of car.

Bend up lock plates and loosen nuts. The nuts of the left front wheel have left-hand threads. Remove outer nut and insert a new lock plate.

Rotate wheel and tighten inner nut until the thrust washer between bearing and nut can be moved easily with a screwdriver without turning or levering movements when the lock nut is fully tightened.

It should be just possible to rock the wheel when the adjustment is correct.

Bend up the lock plate alternately.

Checking and adjusting torsion arm link pins

The torsion arm link pins in the front suspension have hardly any detectable play when adjusted properly. In the course of time, the play increases due to natural wear and it must, therefore, be checked at the specified intervals of 5,000 km. (3,000 miles).

To check the play, the vehicle is lifted and the wheels moved to and fro at right angles to the direction of motion. When axial play is noticeable between the torsion arm link and the torsion arms, the link pins must be adjusted.

Adjusting

First grease torsion arm link pins thoroughly.

Loosen pinch bolts at torsion arm eyes.

Fully tighten link pins first, then back off about 1/8 of a turn.

Tighten the link pins until the resistance of the shoulder making contact can be felt.

Tighten pinch bolts.

If the range of adjustment is insufficient, the shims are worn and should be replaced in a VW workshop.

The toe-in should be checked and corrected if necessary each time the torsion arm link pins have been adjusted.

Toe-in adjustment

When the car is unladen the toe-in should be 0 ± 1 mm. ($0 \pm .040''$) and at maximum permissible weight is should be 2—5 mm. (.08—.2"). This measurement can only be checked properly with a track gauge, or in other words, in a workshop. Deviations from these values will have a detrimental effect on roadholding and tire wear.

Checking the steering

The steering should not have an excessive amount of play in the straight ahead position. Moreover, the wheels must self-center after cornering.

Adjustments to the steering require special experience as well as special tools, and these operations should be carried out in a VW workshop only.

Checking and adjusting brakes

As a result of natural wear, the clearance between brake shoes and drum will increase during the course of time. If the foot brake pedal travel becomes excessive, the brakes must be relined or re-adjusted.

The brake lining wear must be checked through the inspection hole in the brake drums every 5,000 km. (3,000 miles). The brake lining thickness must not be less than 2.5 mm. (.1"). Moreover, check the brake system for damage, leaks and corrosion. Damaged brake lines must be replaced immediately.

Spongy brake pedal travel indicates the presence of air in the system. Before bleeding the brakes, check the brake fluid level in the reservoir behind the spare wheel. The reservoir should be at least three quarters full. Only use Genuine VW Brake Fluid or Lockheed Brake Fluid when topping up.

Handle the brake fluid carefully as it will damage the paint work severely.

Adjusting the foot brake

The brake shoes are adjusted individually on all four wheels. Before and after adjustment, completely depress the brake pedal several times to centralize the brake shoes in the drums. When adjusting the rear brakes, the hand brake must be released.

Remove wheel cap.

Jack up a wheel and turn it until the hole in the brake drum is in line with one of the two adjusting nuts.

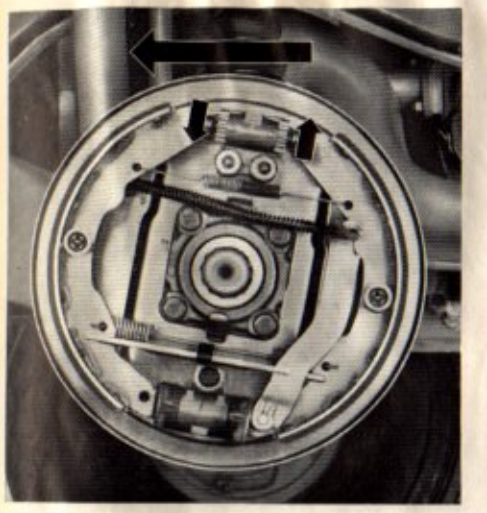
Turn the adjusting nut with a screwdriver in the direction indicated by the arrow until a slight drag is noted when wheel is turned by hand.

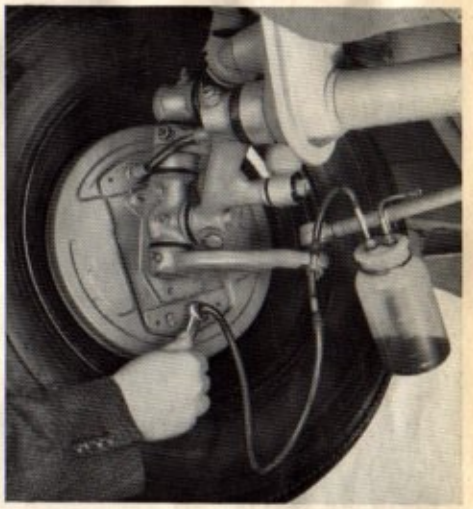
Repeat procedure on the other adjusting nut. Note that the two nuts turn in opposite direction.

Back off the adjusting nuts 3 to 4 teeth until the wheel rotates freely.

Install wheel cap and make sure that it is correctly seated.

Repeat the above operations on the other wheels.





Bleeding the brakes

When bleeding the brakes, always begin with the wheel which is farthest away from the master brake cylinder. The sequence is as follows: Right and left rear wheels, then the right front and finally the left front wheel.

Remove rubber cap from the bleeder valve and attach bleeder hose.

Submerge the free end of the hose in a glass container partially filled with brake fluid. The end of the drain hose should, if possible, be above the level of the bleeder valve.

Slacken the bleeder valve between ½ and 1 turn using a 7 mm. wrench.

Pump the brake pedal several times until the air bubbles cease to appear.

Keep the brake pedal in the fully depressed position on the last stroke until the bleeder valve is closed.

Remove the bleeder hose and replace rubber cap.

Repeat the above operations on the other wheels. Make sure that the brake fluid level in the reservoir is sufficient to ensure that air is not drawn in. After bleeding the complete system, check the brake fluid level and top up if necessary.

Adjusting hand brake

The hand brake is adjusted at the hand brake lever.

Raise both rear wheels.

Lift hand brake boot.

Back off lock nuts and tighten the adjusting nuts until the rear wheels are just free to turn when the hand brake is released.

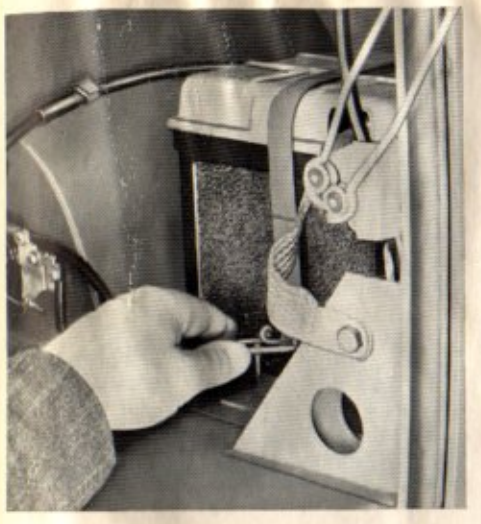
Pull up the hand brake lever by two notches and make sure both the rear wheels have the same braking effect. At the fourth notch it should be impossible to turn the wheels by hand.

Lock the adjusting nuts again carefully.

Checking the battery

Ready starting of the engine depends upon the condition of the battery. It should, therefore, be checked and maintained regularly. The battery cover can be removed by raising the rear seat and opening the battery snap fastener.

The acid level must always be slightly above the plates. The acid level has to be adjusted in accordance with the acid level mark. Depending on the type of battery, either the lower edge of the insert or the bar above the plates must just be covered. Losses by evaporation can be replenished by adding distilled water. Do not add acid unless some of the electrolyte has been spilled. The acid can boil over and cause damage. For this reason exercise care when topping up.



The battery should be checked with a cell tester. This is a voltmeter in parallel with a heavy resistance. The voltage of each cell should not fall below 1.6 Volts while the reading is being taken (10—15 seconds). Otherwise the cell is discharged or defective. The normal voltage is 2 Volts.

The battery poles should be cleaned with a clean cloth, or, if badly corroded, with a pole cleaning agent. The battery poles and cable terminals should be coated with grease. Make sure that the battery is correctly grounded.

The state of charge of the battery can be checked with a hydrometer. The specific gravity of the acid will increase with the charging of the battery. The gravity can be read from a scale.

Battery fully charged	1.285 = 32° Bé
Battery semi-charged	1.230 = 27° Bé
Battery discharged	1.142 = 18° Bé

When laying your vehicle up for a prolonged period, it is advisable to take the battery to a workshop for storage. A battery which is not in constant use will discharge itself in time and this can result in permanent damage to the plates if the battery is not checked about every 4 weeks and charged as necessary.

Headlight adjustment

If a headlight aiming device is not available, proceded as follows:

Stand the empty vehicle on level ground 5 m. (16.4 ft.) in front of a wall. The tire pressures must be correct.

Draw two crosses with setting lines on the wall to the measurements given in the sketch below. The longitudinal center line of the vehicle must be aligned exactly with the center between the two crosses and at right angles to the wall.

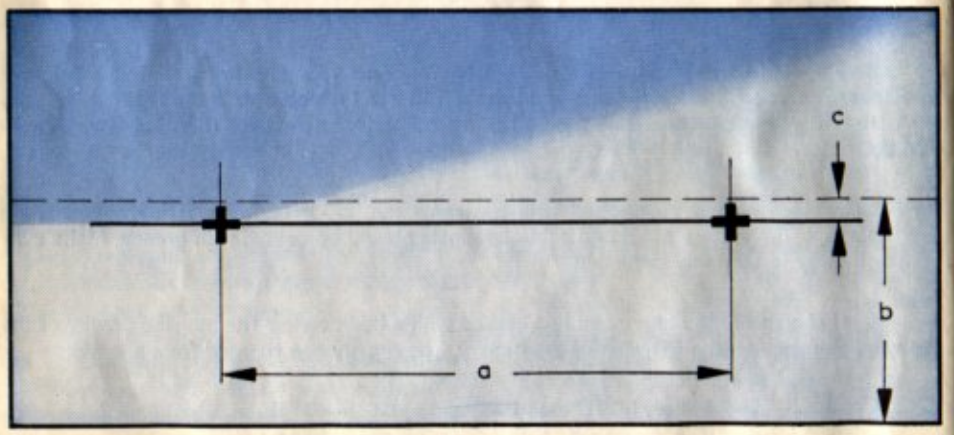
Aim the lights individually by turning the two slotted screws in the headlamp rim with the beams dimmed. Cover up the second headlamp.

Vertical adjustment (upper screw)

The headlamps should be aimed vertically so that the light-dark border line coincides with the adjusting line to the left of the cross and slopes upward to the right of the cross.

Horizontal adjustment (lower screw)

The headlamps should be aimed horizontally so that the angle on the light-dark border line is exactly on the center of the cross.



a = 1012 mm./39.8"
b = height of the headlamp center from the floor
c = 50 mm./2" (at a distance of 5 m./16.4. ft. from the screen)

Headlight bulb replacement

Loosen the slotted screw at the headlamp rim. Take out headlamp. Turn the cap to the left and take the holder out of the reflector. Pull the connector off the bulb base, take off the ground and parking light cables and replace the bulb.

When installing, make sure that the lug in the lamp holder engages in the notch provided in the reflector and that the contact strip is located on the base of the parking light bulb. When fitting the new bulb, hold it with a clean cloth or a paper serviette and not with the bare hand.

When replacing a broken lens, do not touch or wipe the surface of the reflector.

The following adjustments are for Transporters with "Sealed-Beam" headlights.

Adjustment	Headlamp: right	left
Vertical	**upper screw:** clockwise — lowers anti-clockwise — raises	**lower screw:** clockwise — raises anti-clockwise — lowers
Horizontal	**lower screw:** clockwise — to right anti-clockwise — to left	**upper screw:** clockwise — to left anti-clockwise — to right

Replacing front turn indicator bulbs

Remove left or right cab front panel lining.

Disconnect cable from indicator lamp and remove hexagon nut.

Remove two screws in rim, take rim with lens and gasket off and change bulb.

When installing, the lugs on the inside of the bulb holder must engage in the slots in the housing welded to the body and the rubber gasket must seat properly on the front panel.

Do not overtighten hexagon nut.

Replacing the rear indicator or stop and tail light bulbs

Remove two Phillips screws, take out glass insert and replace damaged bulb:

Top - Indicator bulb

Bottom - Stop and tail light bulb

When replacing the stop and tail light bulb, the retaining pin nearest to the bulb glass must point downwards. The Phillips screws in the glass insert should be tightened evenly but not excessively.

Replacing license plate lamp bulb

Open engine compartment lid, take bulb holder out and change bulb. Ensure that the contact springs are clean and correctly tensioned so that the bulb fits tightly and makes good contact.

Warning light bulb replacement

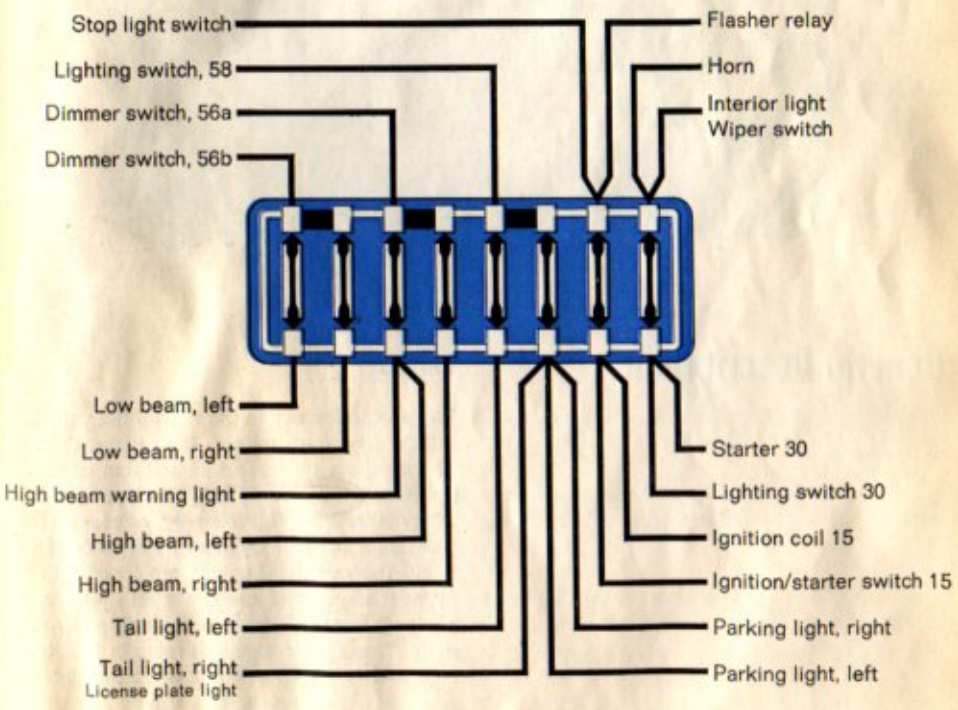
The warning lights for oil pressure, generator charging, flashing indicators, headlight main beam as well as the speedometer and fuel gauge lights are accessible from under the instrument panel. The bulb sockets can be easily removed.

Replacing fuses

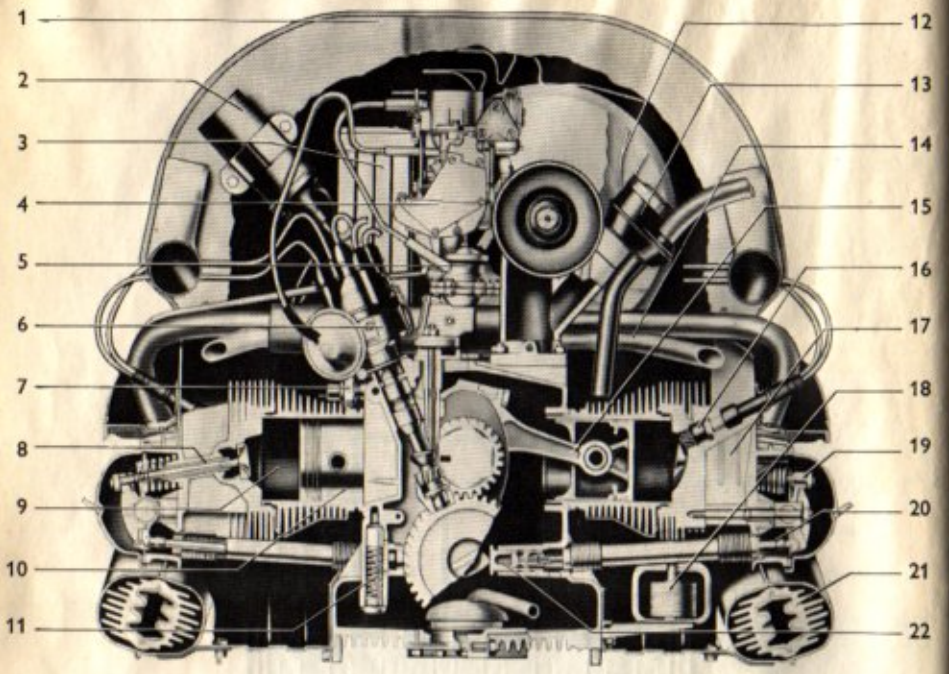
The fuse box, with transparent cover is located under the pared shelf.

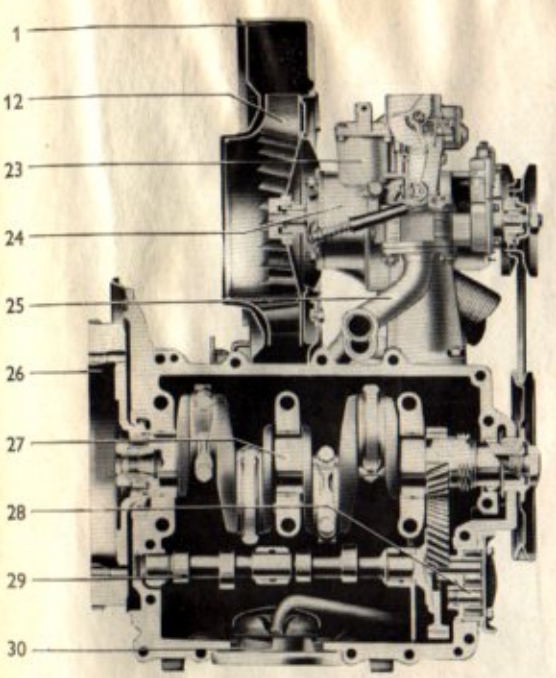
When a fuse has blown it is not sufficient merely to replace it with a new one. Inspect the electrical system for evidence of short circuits or other faults which may have caused the fuse to blow.

Under no circumstances use fuses which have been patched up with tin foil or wire as they would be liable to cause severe damage. We suggest that you always carry a few spare 8 amp. fuses.



Fuse box under parcel shelf





1 - Fan housing
2 - Ignition coil
3 - Oil cooler
4 - Speed limiter
5 - Fuel pump
6 - Distributor
7 - Oil pressure switch
8 - Valve
9 - Cylinder
10 - Piston
11 - Oil pressure relief valve
12 - Fan
13 - Oil filler and breather
14 - Pre-heating pipe
15 - Connecting rod
16 - Spark plug
17 - Cylinder head
18 - Thermostat
19 - Rocker arm
20 - Push rod
21 - Heat exchanger
22 - Cam follower
23 - Carburetor
24 - Generator
25 - Intake manifold
26 - Flywheel
27 - Crankshaft
28 - Oil pump
29 - Camshaft
30 - Oil strainer

General Description

Engine

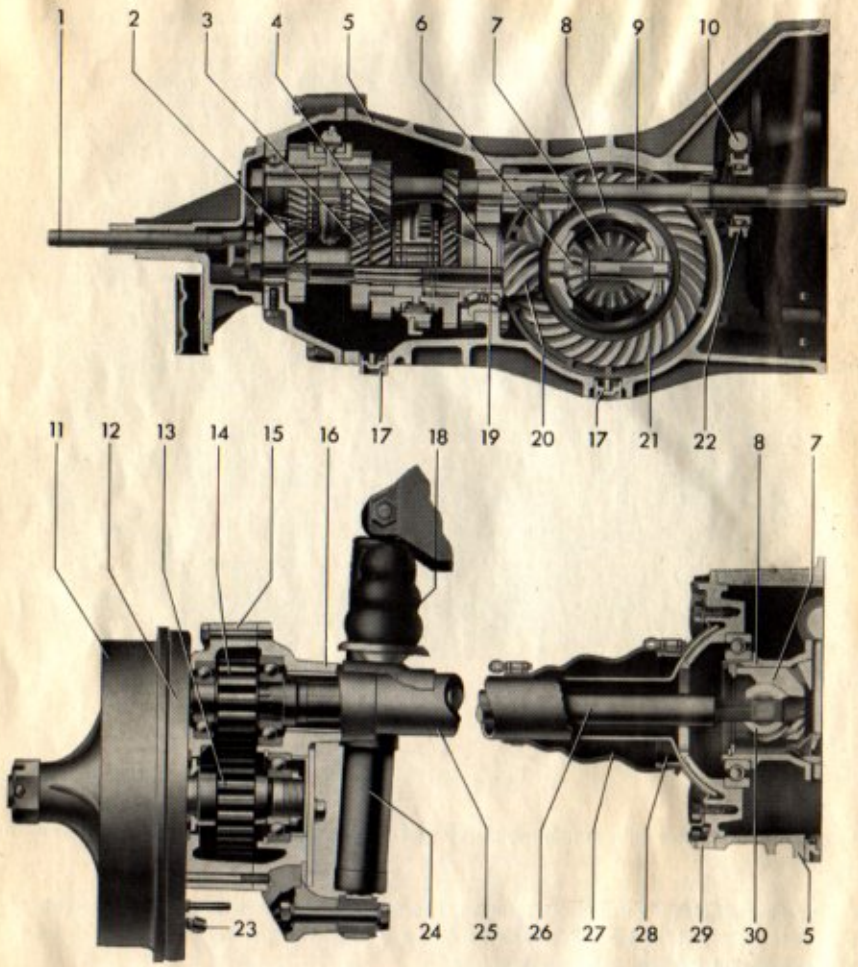
The engine located in the rear of the vehicle is attached by four bolts to the recessed flange of the rubber mounted transmission case. The crankcase is made of a light alloy. Two pairs of cylinders are horizontally opposed. Each pair has a common cylinder head made of light alloy. The overhead valves are located in the cylinder heads and are operated by the camshaft via cam followers push rods and rocker arms. The short crankshaft rests in four bearings and is induction hardened at its bearing surfaces. The camshaft is driven from it by means of helical gears. The connecting rods are provided with lead-bronze-bearings. The pistons are of light alloy with steel inserts.

A down-draft carburetor with automatic choke and accelerator pump supplies the fuel-air mixture to the cylinders.

The engine is equipped with battery ignition. The spark advance is controlled automatically by a vacuum mechanism. The generator is driven by a V belt. The generator pulley can be adjusted to alter the V belt tension.

The oil pump of the pressure lubrication system is driven by the camshaft. The oil is drawn from the crankcase via a strainer and forced via an oil cooler to the lubrication points. When the oil is thick an oil pressure relief valve enables the oil to flow direct to the lubrication points by by-passing the oil cooler.

The engine is cooled by a fan mounted at the generator. The fan sucks in air through an opening in the fan housing and forces it through the fins of the cylinders. The flow of cooling air is regulated by a thermostat and this ensures a constant operating temperature.



1 - Selector shaft, inner
2 - 4th gear
3 - 3rd gear
4 - 2nd gear
5 - Transmission case
6 - Differential pinion
7 - Side gear
8 - Differential housing
9 - Main drive shaft
10 - Clutch operating shaft
11 - Brake drum
12 - Brake back plate
13 - Reduction driven gear and shaft
14 - Reduction drive gear
15 - Reduction gear case cover
16 - Reduction gear case
17 - Magnetic oil drain plugs
18 - Rubber buffer
19 - 1st gear
20 - Drive pinion
21 - Ring gear
22 - Clutch release bearing
23 - Bleeder valve
24 - Telescopic shock absorber
25 - Rear axle tube
26 - Rear axle shaft
27 - Dust sleeve
28 - Rear axle tube retainer
29 - Final drive cover
30 - Fulcrum plate

Transmission and final drive

Power from the engine is transmitted to the gears via a single-plate dry clutch. In the transmission case the gearbox with four forward gears and one reverse is combined with the differential. All the forward gears are baulk synchronized so that they can be shifted without clashing. The gears are helically cut to provide silent operation. The drive pinion and the ring gear of the rear axle are cut spirally. The two rear axle shafts pivot in the differential side gears. Spur wheel reduction gears are fitted on the outer ends of the rear axle tubes.

Axles and steering

The front axle consists of two rigidly joined tubes containing the torsion springs and the suspension arms. The front wheels are sprung independently. The suspension arms form parallelograms assuring proper steering and suspension geometry under all driving conditions. Stops with rubber buffers are provided to prevent excessive rebound.

The steering gear, which is of a worm and peg type, actuates the steering arms of the independent suspension by a draglink and a divided tie rod. A hydraulic steering damper ensures steady steering.

The rear axle is of the swing half-axle type. The rear wheels are also independently sprung by means of adjustable round steel torsion bars. Double acting hydraulic shock absorbers of the telescope type in front and rear prevent rebound.

The foot brake, which operates on all four wheels, is of the hydraulic type. The hand brake operates on the rear wheels through cables.

Body

The body is of a self-supporting, all-steel design, provided with a strengthening frame to support the axles. The position of the load space within the wheelbase ensures an even distribution of the load on all four wheels, no matter how the load is placed. The load compartment is accessible through a double-wing door from the side and through a hinged rear panel. The tarpaulin of the Pick-Up as well as the bows which are fastened to the platform by means of a few screws can easily be removed and replaced. The driver's compartment, for 3 persons, offers exceptional driving visibility. Adequate ventilation is ensured by vent wings and sliding windows in addition to a fresh air regulator above the windshield.

Heating

The air drawn in by the fan is heated heat exchangers. The warm air then passes along a pipe in the center of the vehicle into the cab through a controllable outlet at foot level and two defroster vents at the windshield.

On the Micro Buses the passenger compartment is also heated by outlets under the rear seat.

The heating is regulated by a knob which is operated from the driver's seat.

Technical Data

Engine

Design	4 Cylinder, 4 stroke, carburetor-type, in rear of vehicle
Arrangement of cylinders	Horizontally opposed
Bore	83 mm. (3.267")
Stroke	69 mm. (2.716")
Capacity	1493 cc (91.10 cu. in.)
Compression ratio	7.8:1
Valves	Overhead
Valve clearance	Intake .....0.10 mm. (.004") Exhaust .....0.10 mm. (.004") to be adjusted when engine is cold
Brake horsepower (SAE)	51 hp at 3900 rpm
Lubrication	Pressure feed Gear pump with oil cooler
Oil capacity	Metric — 2.5 liters U. S. — 5.3 pints Imp. — 4.4 pints
Fuel pump	Mechanical type
Carburetor	Downdraft type Solex 28 PICT-1
Cooling system	Air cooling by fan, thermostat controlled
Battery	6 Volt, 77 Ampere Hours
Starter	Electric, 6 Volt, .6 hp
Generator	6 Volt, 200 Watts at 2600 rpm with voltage regulator
Ignition distributor	With vacuum spark advance
Firing order	1 — 4 — 3 — 2

Ignition setting	10° before TDC
Breaker point gap	0.4 mm. (.016")
Spark plugs	14 mm. thread Bosch W 175 T 1 Beru 175/14 Champion L 85 and plugs of similar values from other manufacturers
Spark plug gap	0.7 mm. (.028")

Clutch

Design	Single disc, dry
Pedal free-play	10 to 20 mm. (.4 to .8")

Transmission

4 Forward speeds, 1 reverse, gears synchronized and silent.

Gear ratios	First: 3.80 : 1 Second: 2.06 : 1 Third: 1.22 : 1 Top: 0.82 : 1 Reverse: 3.88 : 1

Rear axle

Power is transmitted through a helically-cut drive pinion and ring gear, via two swinging axles and spur wheel reduction gears to the rear wheels.

Ratio	4.375 : 1
Oil capacity of transmission and rear axle	Metric — 3 liters U. S. — 6.3 pints Imp. — 5.3 pints

Rear wheel reduction gears

Ratio	1.26 : 1
Oil capacity of reduction gear cases	Metric — 0.25 liter each U. S. — 0.53 pint Imp. — 0.44 pint

Chassis

Suspension, front	Two torsion bars
Suspension, rear	Two torsion bars
Shock absorbers	Double acting telescopic type at front and rear
Steering	Ross steering gear with hydraulic steering damper
Turns of steering wheel, lock to lock	2.8
Turning circle	about 12 m. (39 feet)
Foot brake	Hydraulic, operating on all 4 wheels
Hand brake	Mechanical, operating on rear wheels
Wheels	5 JK × 14, drop-center type
Tires	7.00—14 tubeless
Inflation pressure	Front: 2.0 kg./cm.² (28 psi)
Rear:	
Up to ¾ payload	2.3 kg./cm.² (33 psi)
With full load	2.8 kg./cm.² (40 psi)
Spare wheel	2.8 kg./cm.² (40 psi)
Ambulance	Front and rear: 1.8 kg./cm.² (26 psi)
Wheel base	2400 mm. (94.5″)
Track	Front: 1375 mm. (54.1″) Rear: 1360 mm. (53.5″)
Toe-in (Vehicle unladen)	0 ± 1 mm. (.04″)
(Vehicle fully loaded)	2—5 mm. (.08—.20″)

Dimensions and weights

	Delivery Van Micro Bus Kombi	Micro Bus De Luxe	Pick-Up and Double Cab without tarpaulin	Pick-Up and Double Cab with tarpaulin	with enlarged platform	with enlarged wooden platform	Ambulance	Fire Truck
Length	4280 (168.5″)	4300 (169.3″)	4290 (168.9″)	4290 (168.9″)	4290 (168.9″)	4300 (169.3″)	4280 (168.5″)	4820 (168.5″)
Width	1750 (68.9″)	1800 (70.9″)	1750 (68.9″)	1750 (68.9″)	2020 (79.5″)	1980 (78.0″)	1750 (68.9″)	1750 (68.9″)
Height	1925 (75.8″)	1925 (75.8″)	1910 (75.2″)	2200 (86.6″)	1910 (75.2″)	1910 (75.2″)	1915 (75.4″)	1925 (75.8″)
Ground clearance	200 (7.8″)	200 (7.8″)	200 (7.8″)	200 (7.8″)	200 (7.8″)	200 (7.8″)	190 (7.4″)	200 (7.8″)

Load Space in Delivery Van and Kombi

Mean length	2700 mm. (106.3″)	approx. 4.8 cu. m. (170 cu. ft.)
Mean width	1500 mm. (59.1″)	
Mean height	1350 mm. (53.1″)	

Luggage Compartment in Micro Bus

Mean length	700 mm. (27.6″)	approx. .8 cu. m. (28 cu. ft.)
Mean width	1450 mm. (31.5″)	
Mean height	800 mm. (31.5″)	

Pick-Up

Loading area		
Length	2600 mm. (102.4″)	approx. 4.2 sp. m. (45 sq. ft.)
Width	1570 mm. (61.8″)	
Height of drop sides	375 mm. (14.8″)	
Height of tarpaulin above loading area	1200 mm. (47.2″)	
Height of platform (unladen) above ground	970 mm. (38.1″)	
Locker		
Length	1200 mm. (47.2″)	approx. 1.9 sq. m. (20 sq. ft.)
Width	1600 mm. (63.0″)	
Height	340 mm. (13.4″)	
Loading space	.65 cu. m. (23 cu. ft.)	

Weight in kg (lbs.)	Kerb weight	Payload	Permissible total weight	No. of seats
Delivery Van	1070* (2350)	1000 (2204)	2070 (4563)	3
High Roofed Delivery Van	1110* (2447)	960 (2116)	2070 (4563)	3
Pick-Up without cover	1085* (2392)	985 (2271)	2070 (4563)	3
Pick-Up with cover	1120* (2469)	950 (2094)	2070 (4563)	3
Double Cap without cover	1130* (2491)	940 (2072)	2070 (4563)	6
Double Cab with cover	1150* (2535)	920 (2028)	2070 (4563)	6
Pick-Up with enlarged platform	1130* (2491)	940 (2072)	2070 (4563)	3
Pick-Up with enlarged wooden platform	1160* (2557)	910 (2006)	2070 (4563)	3
Kombi	1140** (2514)	930 (2050)	2070 (4563)	9
Micro Bus	1150 (2535)	920 (2028)	2070 (4563)	9
Ambulance	1250 (2756)	650 (1433)	1900 (4189)	7
Fire Truck	1200 (2645)	950 (2094)	2150 (4739)	3

* with driver
** with seats and driver

	front	rear
Permissible axle loads in kg. (lbs.)	950 (2094)	1150 (2535)
Ambulance	950 (2094)	1000 (2204)
Fire Truck	1000 (2204)	1200 (2645)

Fuel consumption

Tested according to DIN 70030	9.9 liters per 100 kms 28.5 mpg Imp. 26.75 mpg US.
Pick-Up with cover, High Roofed Delivery Van	10.3 liters per 100 kms 27.4 mpg Imp. 22.8 mpg US.

This ist the measured consumption plus 10 %, vehicle with half payload, driven at ¾ of maximum speed on a level road).

Fuel rating	86 Octane (Res. F 1)
Oil consumption approx.	0.5 to 1.4 liters per 1000 km. 1.7 — 4.8 US. pints per 1000 miles 1.4 — 4.0 Imp. pints per 1000 miles

Capacities

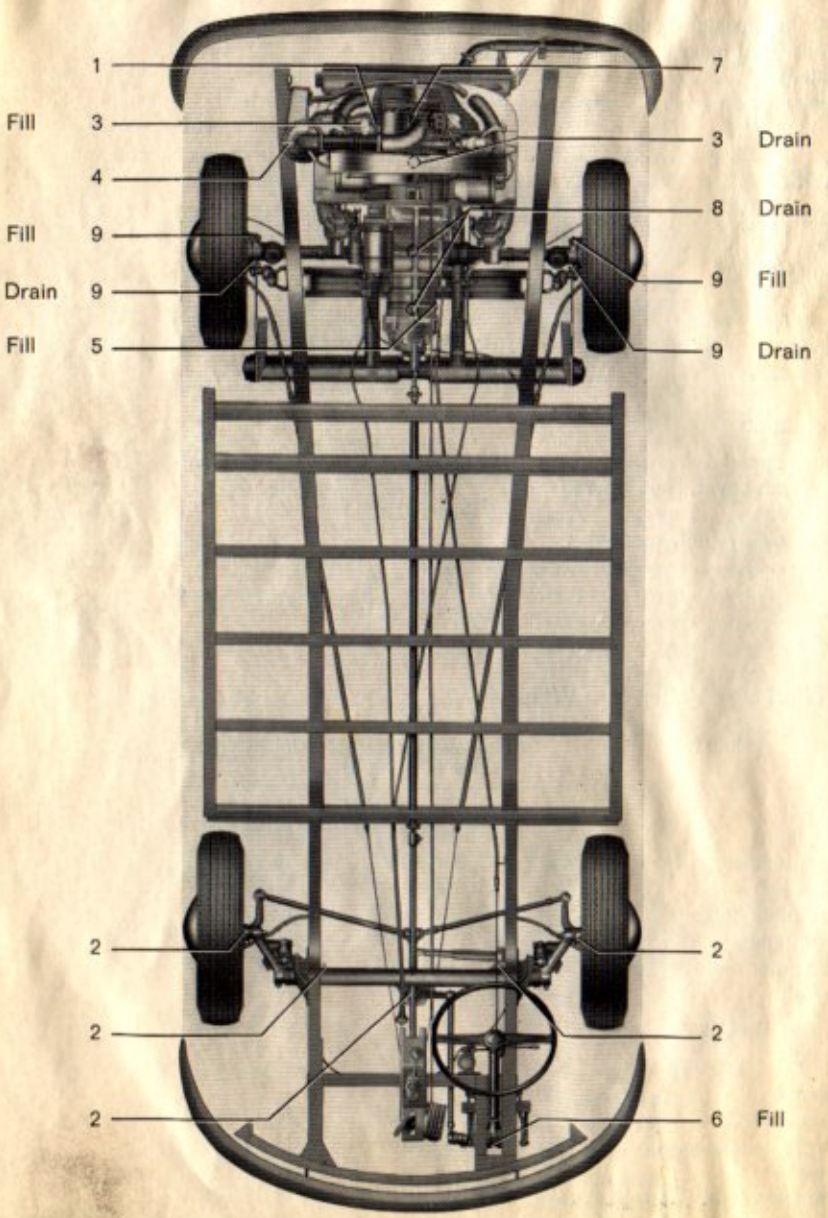
Fuel tank	40 liters	(US.-10.6 gallons, Imp.-8.8 gallons)
Engine	2.5 liters	(5.3 US. pints, 4.4 Imp. pints)
Transmission and rear axle	2.5 liters	(5.3 US. pints, 4.4 Imp. pints)
Reduction gear cases	0.25 liter	each (0.53 US. pints, 0.44 Imp. pints)
Steering gear	0.25 liter	(0.53 US. pints, 0.44 Imp. pints)
Brake system	0.3 liter	(0.63 US. pints, 0.53 Imp. pints)

Performance

Maximum speed	105 kph (65 mph)
Pick-Up with cover, High Roofed Delivery Van	95 kph (60 mph)
Climbing ability (fully loaded)	
1st gear	26 %
2nd gear	13.5 %
3rd gear	7.0 %
Top gear	4.0 %

Bulb chart V = Volts, W = Watts

Bulb for	Designation (according to German standard DIN 72601)	Part Number
Headlights	A 6 V 45/40 W	N 17 705 1
Parking lights	HL 6 V 4 W	N 17 717 1
Flashing indicators, front and rear	R 6 V 18 W	N 17 731 1
Tail/stop lights	S 6 V 18 W	N 17 737 1
License plate light	G 6 V 10 W	N 17 719 1
Warning lights	J 6 V 1.2 W	N 17 722 1
Speedometer and fuel gauge	J 6 V 1.2 W	N 17 722 1
Dome light	L 6 V 5 W	N 17 725 1
Micro Bus De Luxe		
Clock light	J 6 V 1.2 W	N 17 722 1
Ambulance		
Back-up light	E 6 V 25 W	N 17 710 1
Spot light	E 6 V 25 W	N 17 710 1
Ambulance Identification light (German type)	R 6 V 18 W	N 17 731 1



Lubrication chart

500 km. 300 miles	2,500 km. 1,500 miles	5,000 km. 3,000 miles	No.	Lubrication points	Every
			1	Engine: Check oil level	2,500 km. 1,500 miles
			2	Front axle: Lubricate	
				Door hinges	
			3	Engine: Change oil, clean oil strainer	5,000 km. 3,000 miles
			4	Check air cleaner: Clean lower part if necessary	
			5	Transmission: Check oil level	
			6	Steering gear: Check oil level	
			7	Carburetor: Lubricate linkage	
				Door and hood locks	
			8/5	Transmission: Change oil, clean magnetic oil drain plugs	50,000 km. 30,000 miles
			9	Reduction gear cases: change oil	

Lubricants

Lubricant	Lubrication points	Specifications		
		Temperature C°	F°	Viscosity
Engine oil (Branded HD oil for spark ignition engines)	Engine, oil bath air cleaner door hinges, carburetor	above 0	32	SAE 30
		below 0	32	SAE 10 W
		below —25	—13	SAE 5 W
Hypoid oil	Transmission case, reduction gear cases	SAE 90 all the year*		
	Steering gear case	SAE 90 all the year		
Lithium grease	Torsion arms, king pins with torsion arm link pins, swing lever shaft Door and lid locks, front wheel bearings Breaker arm fiber block	Multi-purpose-grease		

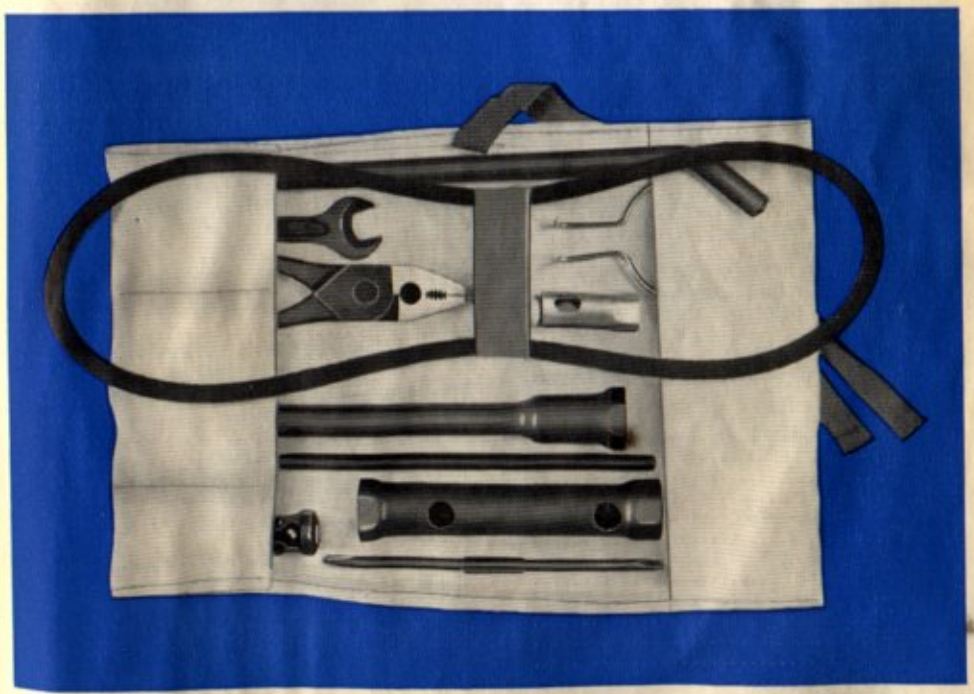
* SAE 80 all the year in countries with arctic climates

Maintenance chart

500 km. 300 miles	5,000 km. 3,000 miles	Operation	Every
		Check nuts and bolts on chassis, body, engine, rear axle, front axle and steering for tightness	
		Check engine for leaks	
		Check rear axle for leaks	
		Check tire pressures and security of wheel mounting bolts	
		Check fan belt	
		Clean fuel pump filter	
		Check breaker points, grease distributor Check contact breaker gap and timing	
		Check valve clearance	
		Check spark plugs and compression	
		Check exhaust system for damage Check rubber valve in crankcase ventilation system	
		Check clutch pedal free-play	**5,000 km.**
		Check torsion arm link pins, front wheel bearing play, tie rod end dust seals, tie rod ends, steering damper mounting and toe-in	**3,000 miles**
		Check steering adjustment	
		Check tire wear, damage and pressure	
		Check hydraulic brake system lines and connections for leakage and damage. Check brake fluid level and adjustment of hand and foot brakes	
		Check thickness of brake linings	
		Check battery, operation of complete electrical system and headlight alignment	
		Road test vehicle, check foot and hand brake efficiency. Check idling adjustment and heating	
		Clean, grease and adjust front wheel bearings	**50,000 km. 30,000 miles**

Tools and Accessories

1 Spare fan belt
1 Tool roll
1 Spare tire and wheel complete
1 Jack
1 Wheel cap removal tool
1 Square key
1 Combination pliers
1 Screwdriver with reversible blade
1 Open end wrench 8/13 mm.
1 Socket wrench 14 mm.
1 Socket for plugs, with bar
1 Socket wrench for wheel bolts, fan pulley nut and jack
1 Bar for socket wrench
1 VW Service booklet



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The model designation and the Chassis and Engine numbers are entered in the vehicle documents. The police or Traffic Department attach much importance to these details.

The Identification Plate is found in the cab on the right-hand side of the air duct.

The Chassis Number is found in the engine compartment on the right-hand engine cover plate.

The Engine Number is on the crankcase flange for the generator support.

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