

22



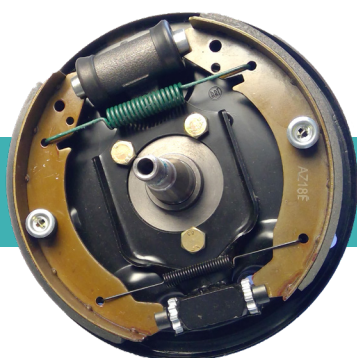
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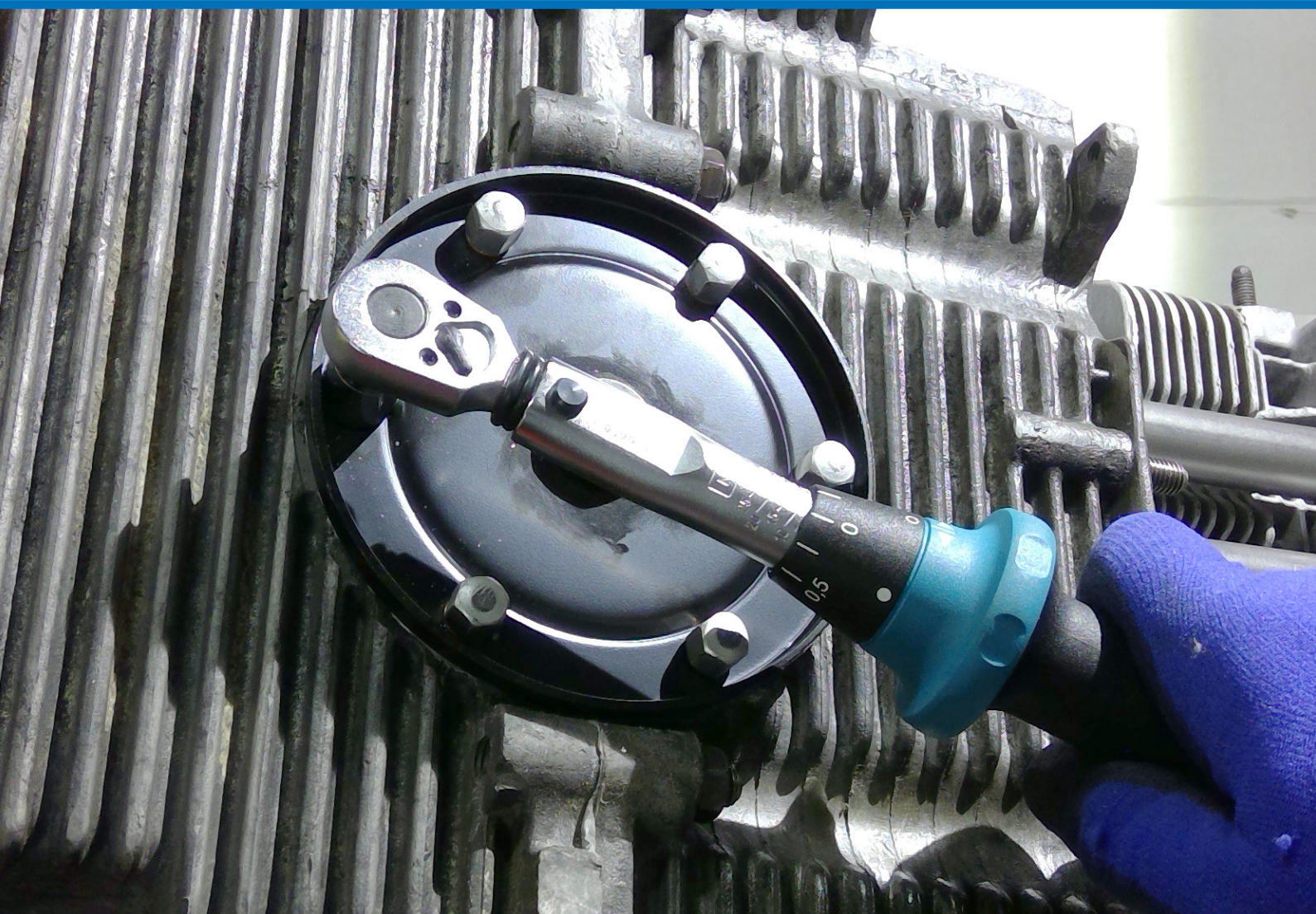
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Introduction

In the previous edition we determined the ideal stud length for the engine sump plate. You can read all about it in [edition 21 on page 38](#). The sump plate is fixed with nuts, the studs should not protrude too far, otherwise it turns with you when you tighten the nut.

If the studs are not tightened properly, it is practically impossible to tighten the sump plate to compress the paper gaskets. The infamous engine oil leak is the result, and no, **it is not normal for an air-cooled VW to leak!** A leaking engine will be rejected at the mandatory technical inspection.



replacing the sump plate studs

If you tighten the nuts too hard, there is a good chance that the nuts themselves will be damaged, the stud will not break so quickly.

In [edition 20](#) we mentioned that you should not tighten the nuts too hard. Ideally you use a torque wrench set at 7 Nm, or you use a tool with the smallest possible arm, as shown on the picture on the right. With a torque wrench you of course know exactly when to stop tightening, at 7 Nm the paper gaskets should be pressed enough not to let any engine oil through.

It can happen that the studs are damaged over the years of (mis) use. During the 50 years, and more, of maintenance at official Volkswagen dealers, unbranded garages and hobbyists, a lot can have gone wrong with your VW.

**small handle =
little chance of damage**



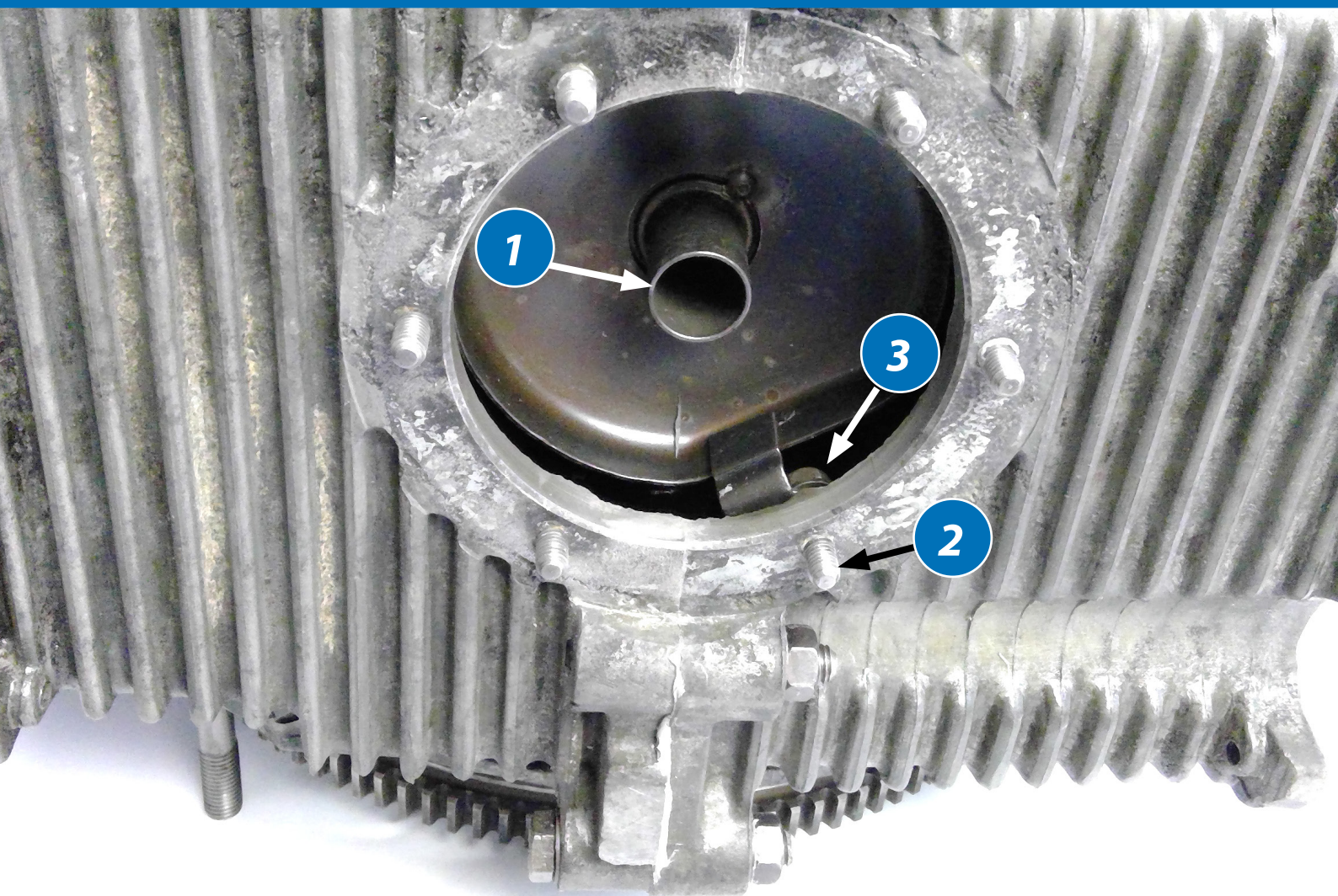
Damaged crankcase studs can be one of the problems you will have to deal with. Damaged studs will make it difficult or impossible to tighten the nuts with the correct tension, resulting in oil leaks.

Or maybe you just want to replace the old studs with ones with a built-in Allen key head to make adjustment easier. Well, whatever the reason, we explain in this article how to replace the studs.

6 studs

The type 1 engine has six studs to attach the sump plate. Originally these are five M6 studs with a length of 20.50 mm, and one M6 of 32.20 mm (AB 1300 engine). The longest studs serve to attach the oil suction pipe inside the crankcase. We have shown the construction earlier in [edition 20](#).

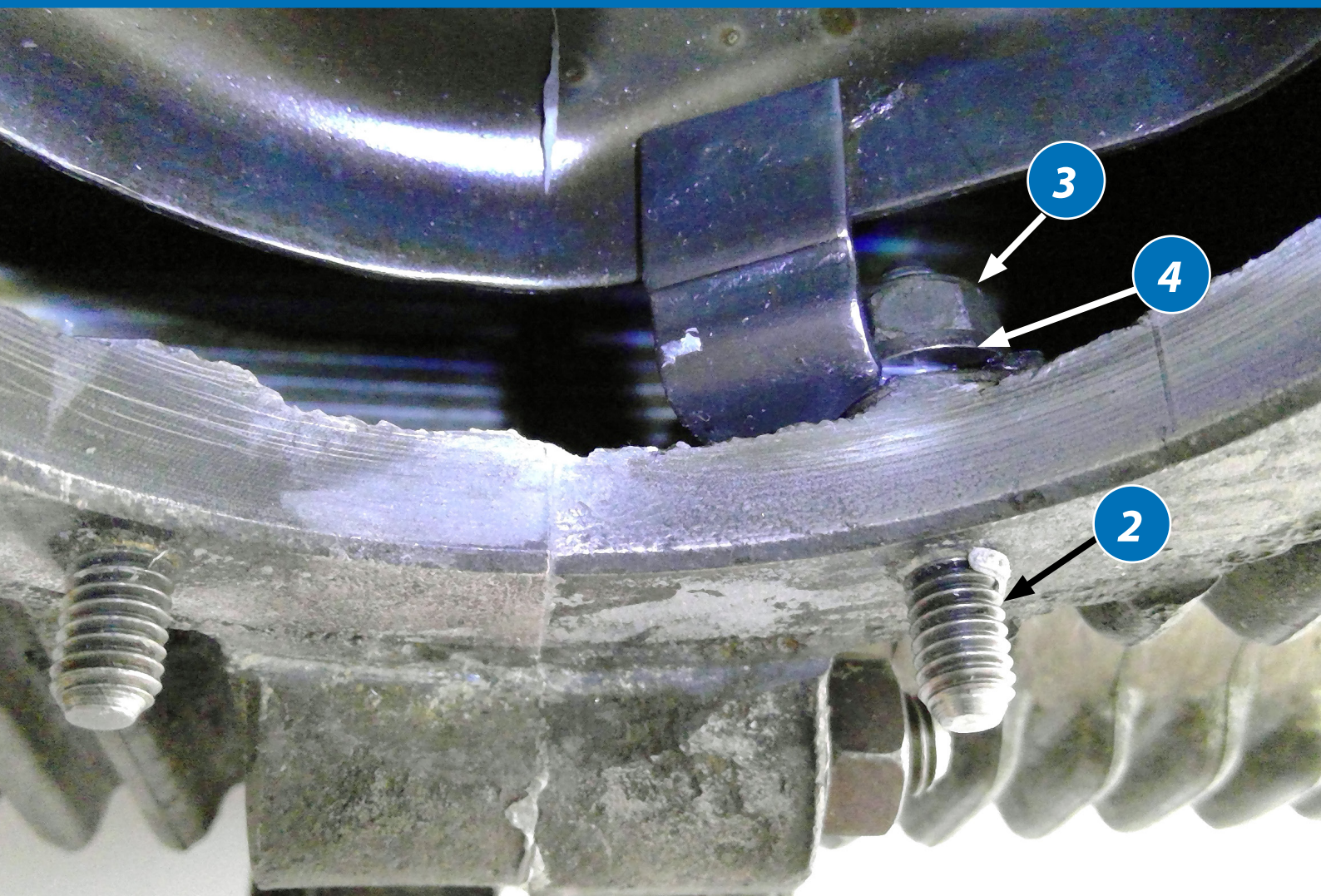
Below we show the metal plate (present from 01/08/1965) with the suction tube (1) and the longest sump plate stud to attach it to the crankcase. In the crankcase this long stud is fastened with a locknut (3) which a flat washer (4).



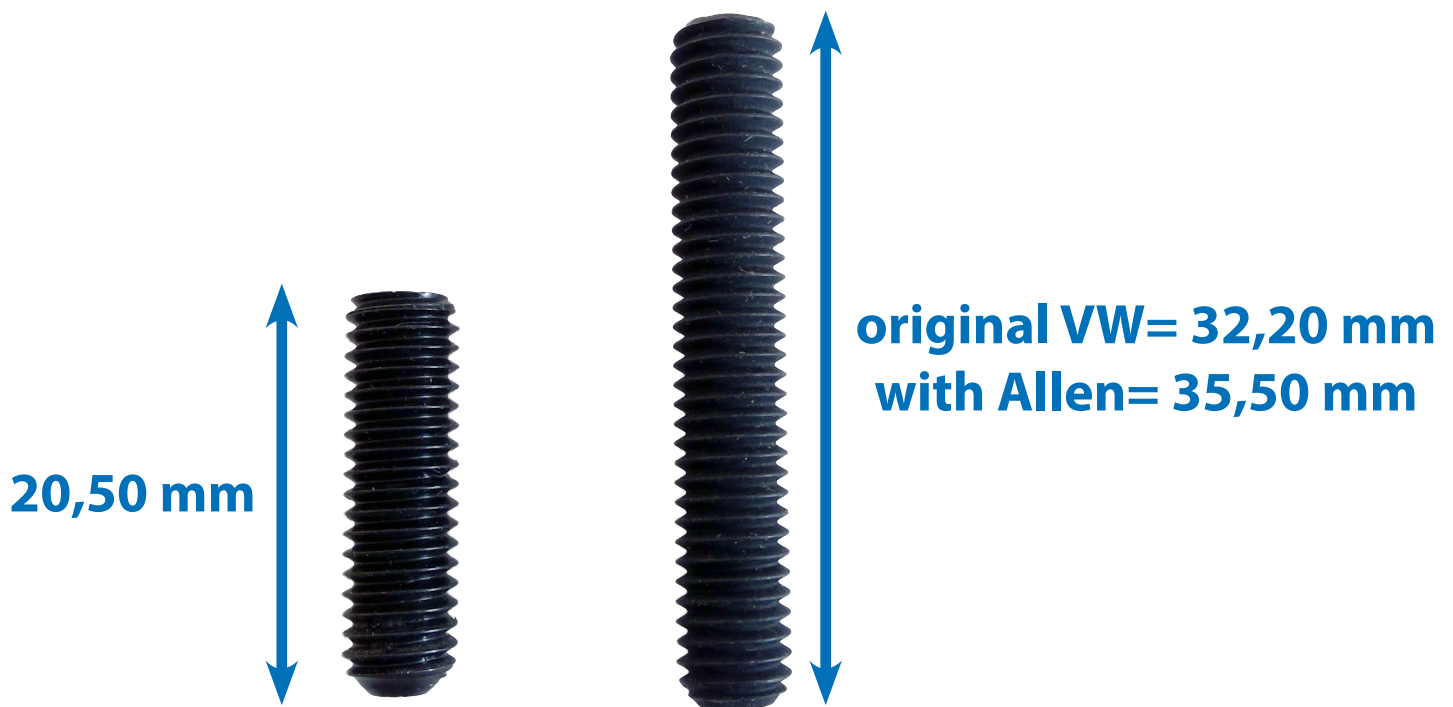
replacing the sump plate studs

Below is a close-up of the long stud. We will see that the small studs are easy to remove from the outside of the crankcase. The long stud requires a little more preparation and adjusting a wrench to remove the locknut.

After all studs have been removed, there is no danger that the suction tube or the metal plate will fall into the engine crankcase, as it is firmly stuck in the engine. It may be that it is a bit loose, but that is not the way it should be, even loose it will not fall out.



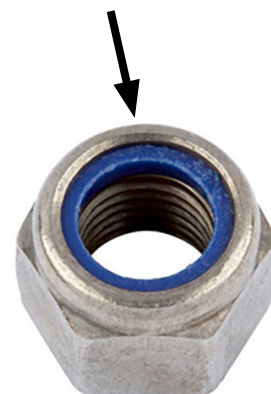
Replacement studs are now supplied as standard with an Allen key head to make adjusting the depth in the crankcase easier. We have explained this in [edition 21](#). If you are ready to replace your studs, we recommend this Allen key version. These are very hard, if you tighten the nuts too hard, the nuts will break sooner than the studs. The long stud is longer than the original stud, namely 35.00 mm instead of 32.20 mm.



replacing the sump plate studs

The longest stud serves to secure the suction pipe, and is fastened to the inside of the crankcase with a locknut. Originally this is an M6 nut with metal locking on the German Volkswagen crankcases and a high M6 nut with plastic locking on the Brazilian and Mexican Volkswagen crankcases.

Brazil & Mexico crankcase



German crankcase

The metal locking nut offers a better long-term locking. A plastic locking can be affected by the engine oil, in practice plastic locking devices should not be used in the vicinity of harmful fluids.

You can reuse the original German locknut (we do not recommend this), provided you use Loctite (see the following pages for more explanation). Metal locknuts as shown in the picture below are very easy to find in specialty stores, search for example for "*full metal locknut*".



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Threadlocker

To secure the studs, you will need Loctite, or a similar product. There are many different types of Loctite on the market. Before using Loctite, look for the most up-to-date Loctite application table on the manufacturer's website.

The difference between the different types lies in the application and the size of the nut-bolt connection. If you want to secure a stud that is already mounted in the crankcase and has come loose, you will need Loctite with a low viscosity, which flows easily into the thread.

If the stud still has to be mounted, then the classic Loctite with a higher viscosity will suffice.

Then you still have the choice between different bond strengths. Loctite uses color code **purple**, **blue**, **red** and **green**. **Purple** offers the lowest bond strength, this type of Loctite will be used if a part needs to be detached regularly. **Blue** is for medium bond strength. **Red** is for permanent locking and recommended for this application. **Green** is a low-viscosity penetrating locking agent.

The intention is that the sump plate studs will not come loose or be replaced in the future.

Different types of Loctite have a different "*cure time*" (drying time) say from 2 hours to 24 hours. Keep this in mind, for example to wait to tighten the crankcase cover nuts, or to fill the engine with fresh oil.



replacing the sump plate studs



Loctite also offers different options for plastic, metal, ... and for temperature range.

It's hard to know which one to use for your old Volkswagen. That's why we'd like to share our experiences.

We recommend blue **Loctite 243** for this application. Or possibly **Loctite 270**, but if you break the thread of a stud, it will

be very difficult to remove the stud from your crankcase, it is also resistant to oils and chemicals. **Loctite 290** on the other hand is not, and will only be used for example for securing instruments screws...

On the picture we also show **Loctite 2710**, for the sake of completeness, this type of locker compound is used for parts that are subject to large vibrations, like for example a drive shaft.

Replacing the studs

The five short studs are easy to replace, the longest stud is more difficult to remove when the two crankcase halves are not split. Splitting the crankcase is done during a total overhaul of the engine, measuring the length of the studs is part of the engine overhaul. If the studs are not mounted correctly, or are loose, now is the time to do this job when the crankcase halves are split.

On the picture we show a Volkswagen type 1 crankcase split for a total overhaul. On the picture you see the metal plate (1) with suction tube (5) which is attached to the crankcase with the long stud (2).

In most cases, you will want to replace the studs when the engine is ready for use, probably also with the engine built in. This is not impossible, but it takes patience and precision, and making a custom tool.

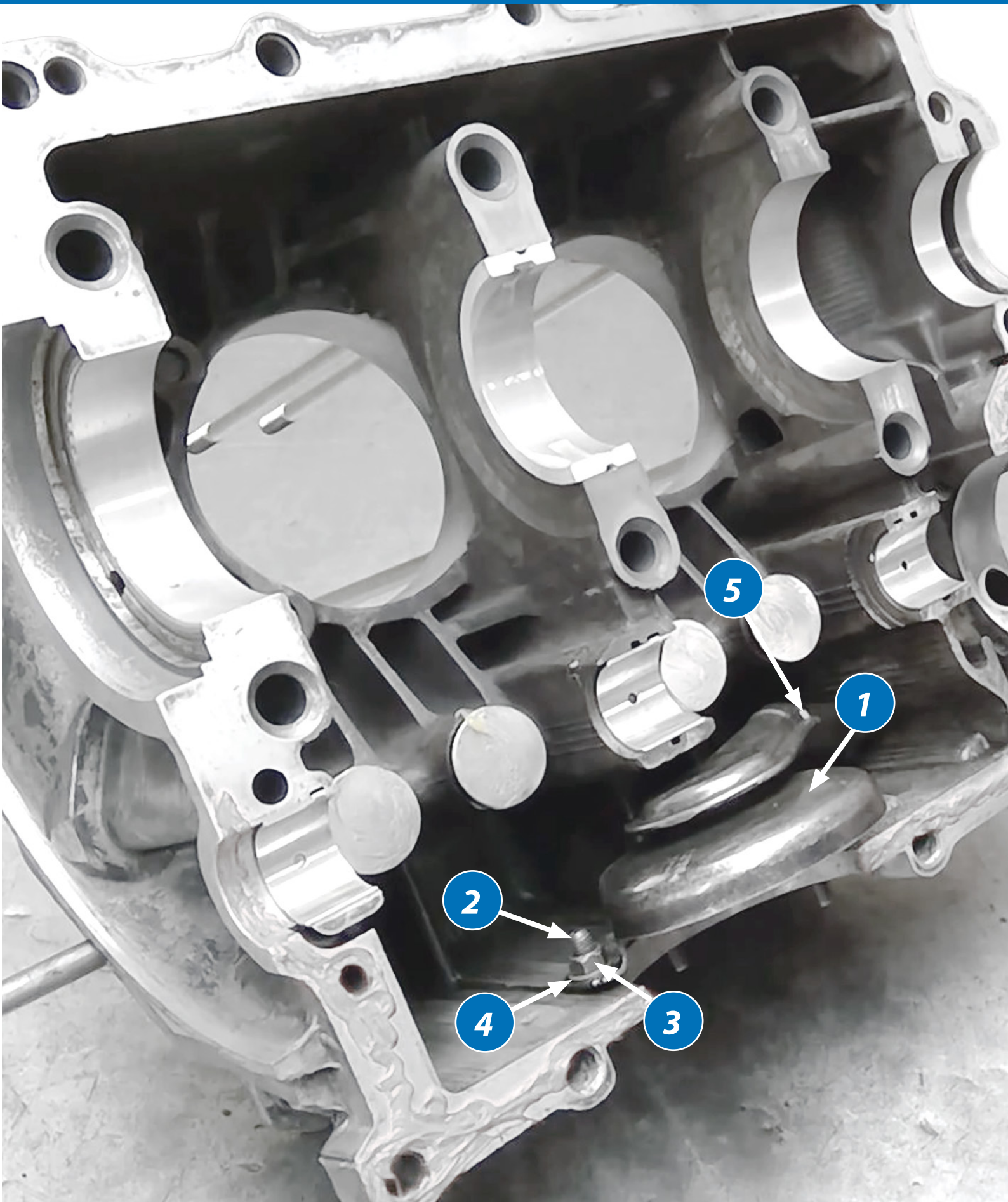
- 1 oil suction plate (from 01/08/1965)
- 2 long stud
- 3 locknut
- 4 flat washer
- 5 oil suction pipe

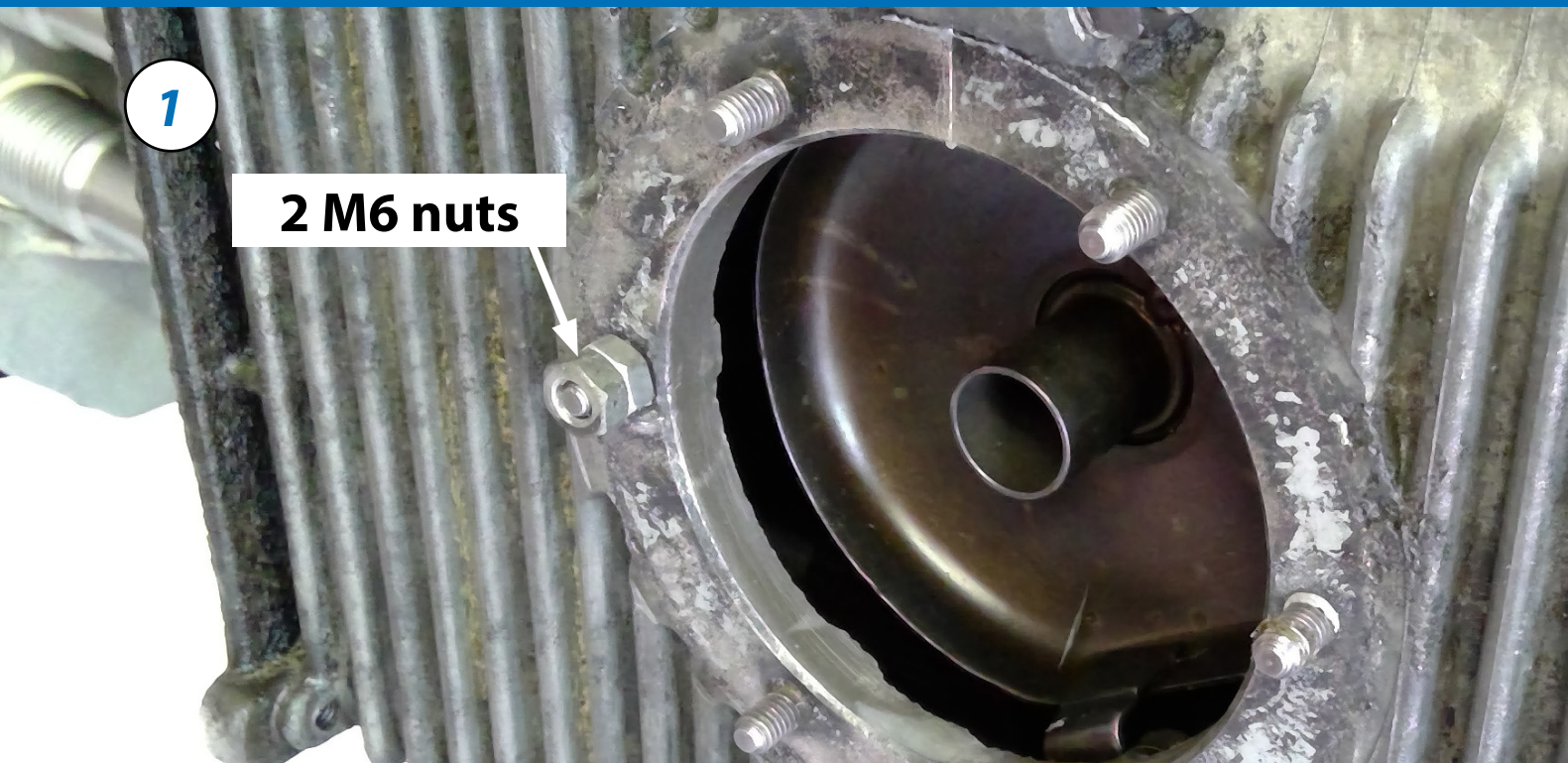
Locking installed studs

If the existing studs are not damaged but they turn with the nuts, you can still secure them with **Loctite 270** while they are mounted. This is low viscosity Loctite ([see page 9](#)). Take this opportunity to adjust the stud depth as explained in [edition 21](#).



replacing the sump plate studs





Removing the studs

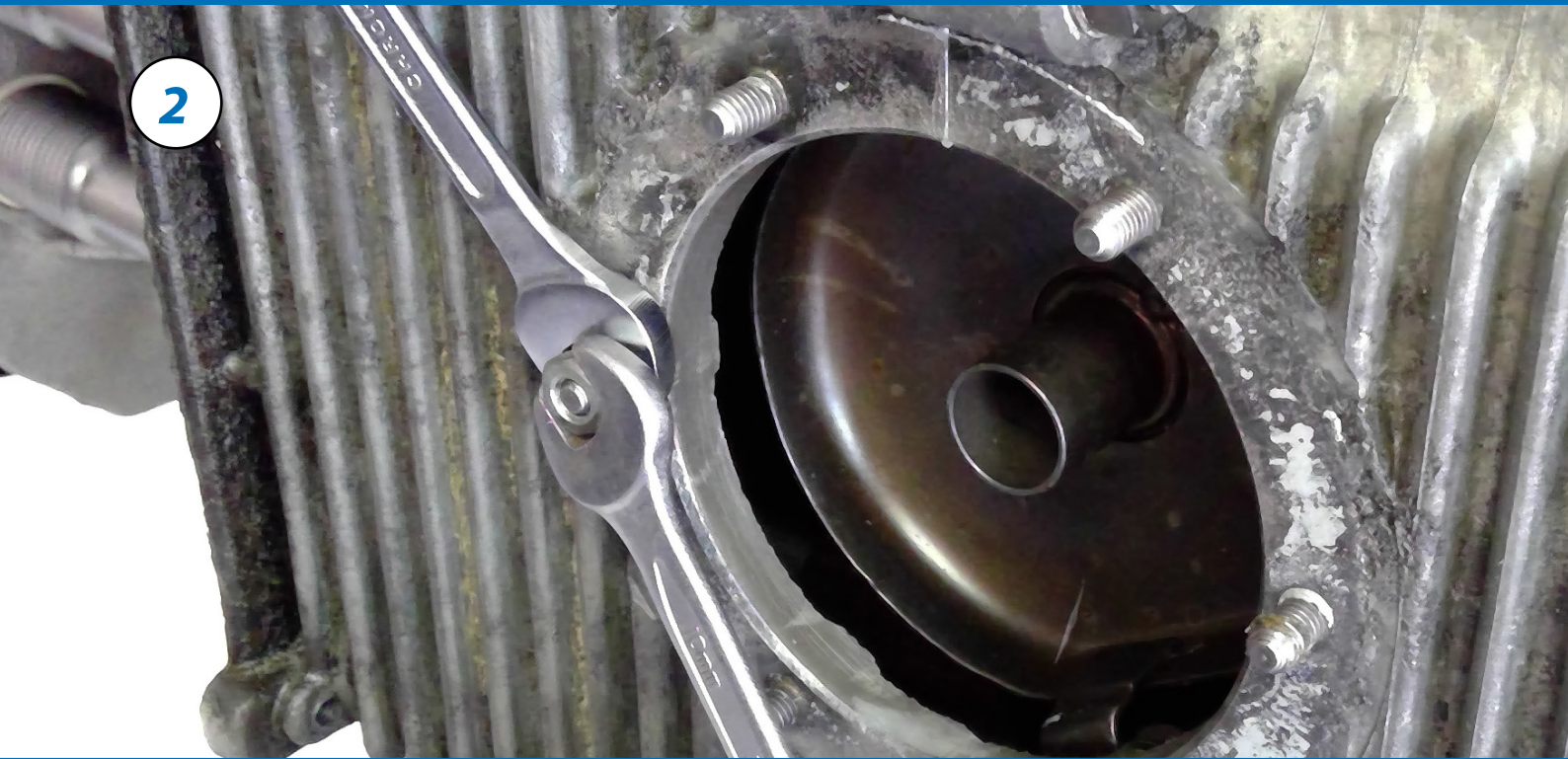
First you have to drain the engine oil out of the crankcase. You can do this by unscrewing the large bolt in the middle of the crankcase cover (if there is one) or by loosening the six crankcase sump plate nuts. Changing the engine oil is best done with a warm engine, then the oil is the thinnest and easily drains out of the crankcase.

The studs are now accessible. You can recognize the longest stud by looking inside the crankcase, this is the studs that hold the oil suction tube.

Start with the short studs. If the studs are loose and you can unscrew them by hand it is very handy. It also means it's time you did this job. If the studs are tight, you will have to unscrew them using the two nuts technique. We have discussed this technique in [edition 14](#).

Use two new M6 nuts (picture 1). Tighten both nuts one after the other on a stud, when they are both fully on the stud, tighten them firmly together, very firmly (picture 2).

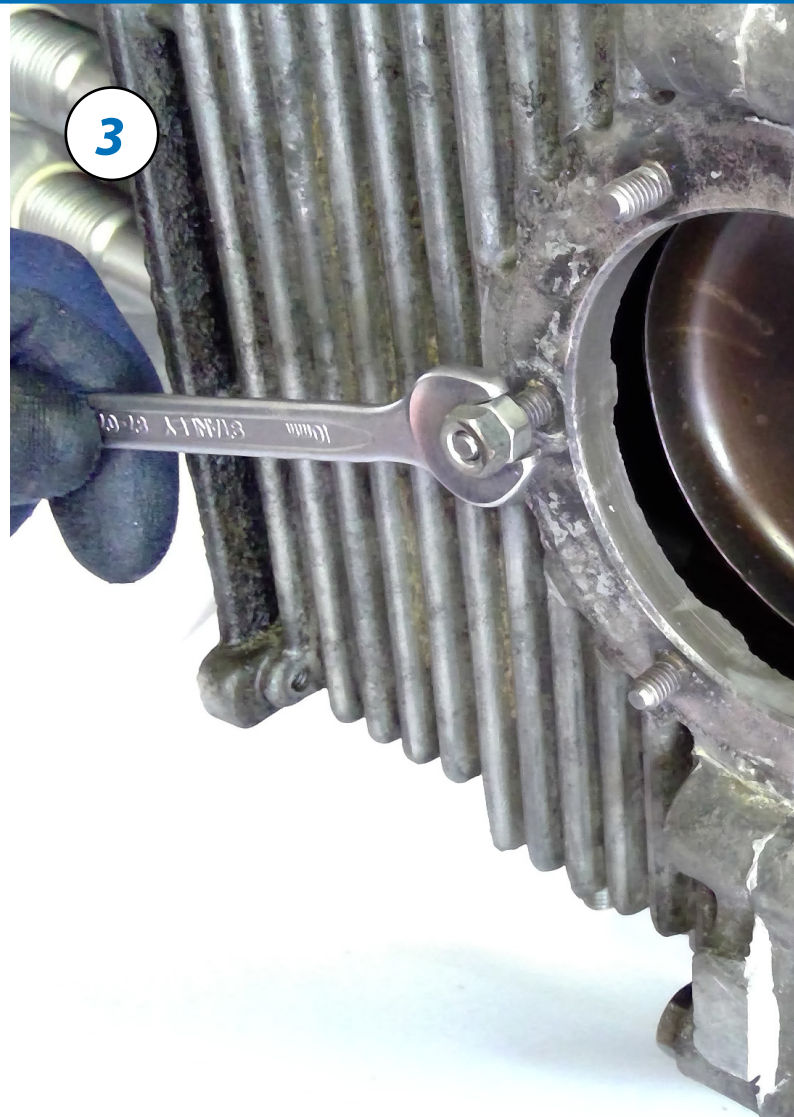
replacing the sump plate studs



The trick is to tighten both nuts very well, otherwise the technique won't work.

Then loosen the inner nut (picture 3), the stud should come loose. If it doesn't move, use an electric paint stripper to heat up the stud. Sometimes it is not clear if the stud is rotating, a small lick of paint on the stud can help to see if it is moving.

Repeat this technique for the other four short studs.



4



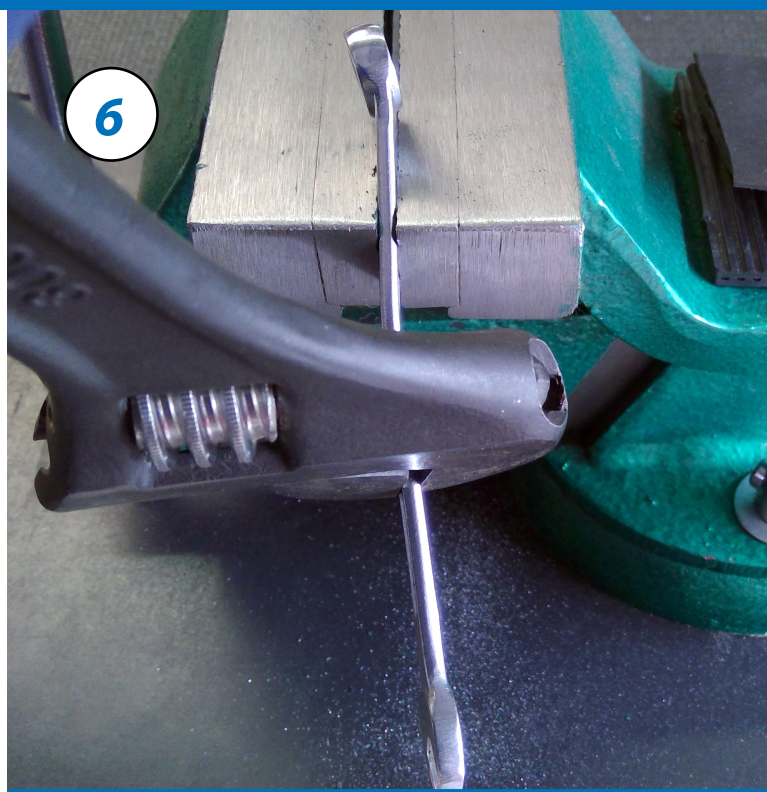
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replacing the sump plate studs

Now it's time to remove the long stud. This is, as mentioned before, fixed with a locknut on the inside of the crankcase. Unscrewing the locknut will be difficult because you can't get into the crankcase with an open-ended wrench. The long stud can also be loosened with the two-nut technique, but you have to stop the nut on the other side.

A standard spanner will just not work (picture 4), therefore it is recommended to bend an old 10 mm spanner with a sturdy pair of pliers as we show on picture 6 and below.



Picture 5 on the previous page shows how the open ended wrench fits perfectly. To prevent the nut from falling into the crankcase, you can seal the back of the wrench with Duct tape.

bent 10 mm spanner



original 10 mm spanner



6

Duct tape

It is not always clearly visible whether the stud is rotating, or whether the nuts are turning together, especially when working underneath the car with little lighting. A handy tip is to apply a clear paint mark on one side of the stud, as we show on the picture. When the stud rotates, it is very visible because the paint rotates with it.

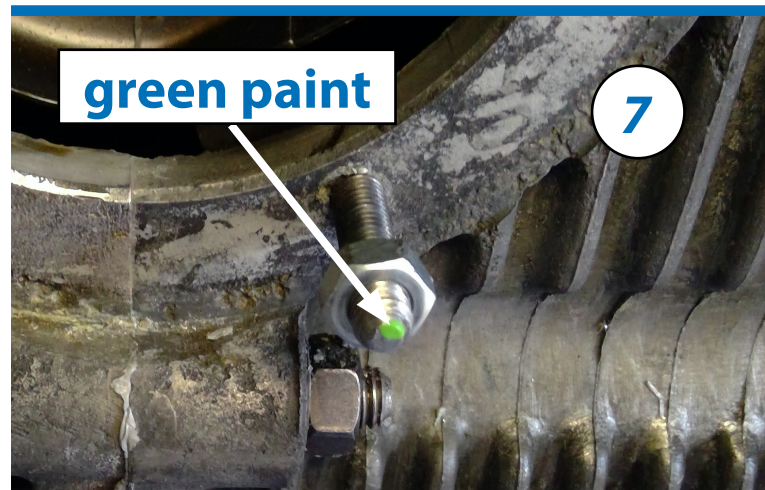
3

Now unscrew the long stud with the two-nut technique, while holding the nut (3) in place with the bent spanner (picture 5 on the previous page). Remove the nut when it comes loose from the stud, if you use Duct tape it will stick to the wrench.

Note, there is still a flat washer (photo 8) (see pictures page 5 and 11) between the nut and the crankcase. Use a magnet to prevent it from disappearing into the crankcase while unscrewing the long stud.

green paint

7



8

4



replacing the sump plate studs

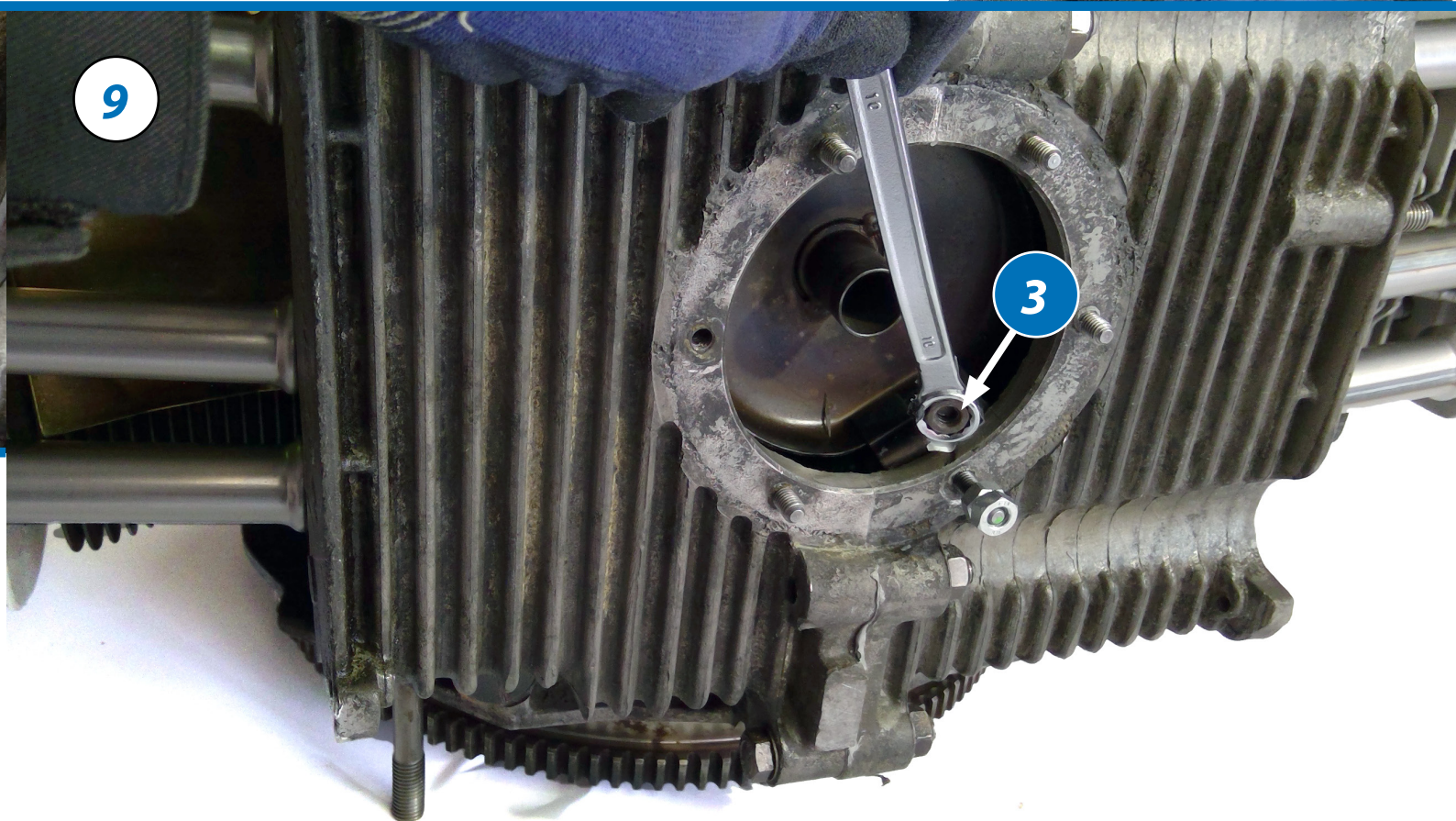
Securing the studs

Fix the five short studs using the two-nut technique, making sure that they are fixed at the correct depth (see [edition 21](#)).

Use Loctite as mentioned earlier to lock the studs, taking into account the drying time of the locking compound used.

The nut of the long stud (3) can be put in place with the curved wrench (picture 9), a piece of Duct tape will hold the nut in place. Don't forget to mount the flat washer between nut and

crankcase first. Set the depth of the long studs to the same length as the short studs.

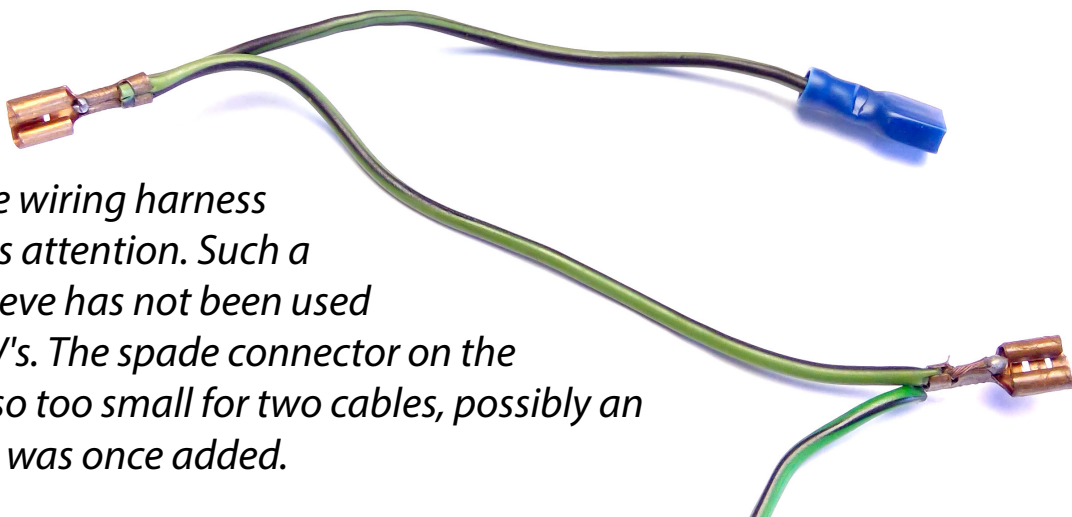


Introduction

In the previous edition we explained how to determine which spade connectors you need. In this edition we will show you how to attach an electric cable to such a spade connector. A sloppy electrical connection will soon lead to the failure of electrical accessories or in the worst case the engine. Bad connections can also result in short-circuits, causing the wiring harness to burn out. Enough reasons to master a good technique to make the electrical connections of your classic Volkswagen neat and tidy.

Broken, corroded or damaged spade connectors in a fifty year old Volkswagen is a common problem. Therefore you should not replace the entire wiring harness, this is too expensive and impossible work when the car is not completely dismantled. Selectively repairing spade connectors and parts of the wiring harness will take you a long way. But to do that, you will have to master a number of techniques, such as assembling spade connectors, and that is exactly what we describe in this article.

For this exercise, we use a wiring harness that needs to be repaired (picture below).

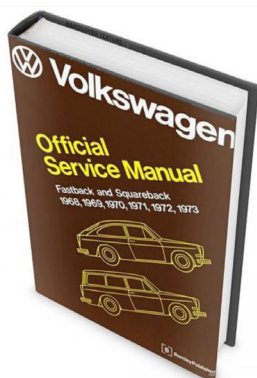
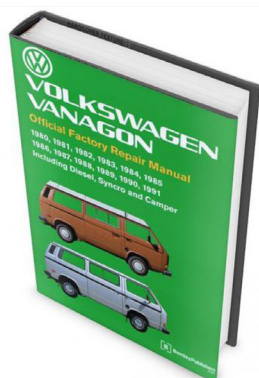


Part of the wiring harness that needs attention. Such a plastic sleeve has not been used on old VW's. The spade connector on the right is also too small for two cables, possibly an accessory was once added.

replacing spade connectors

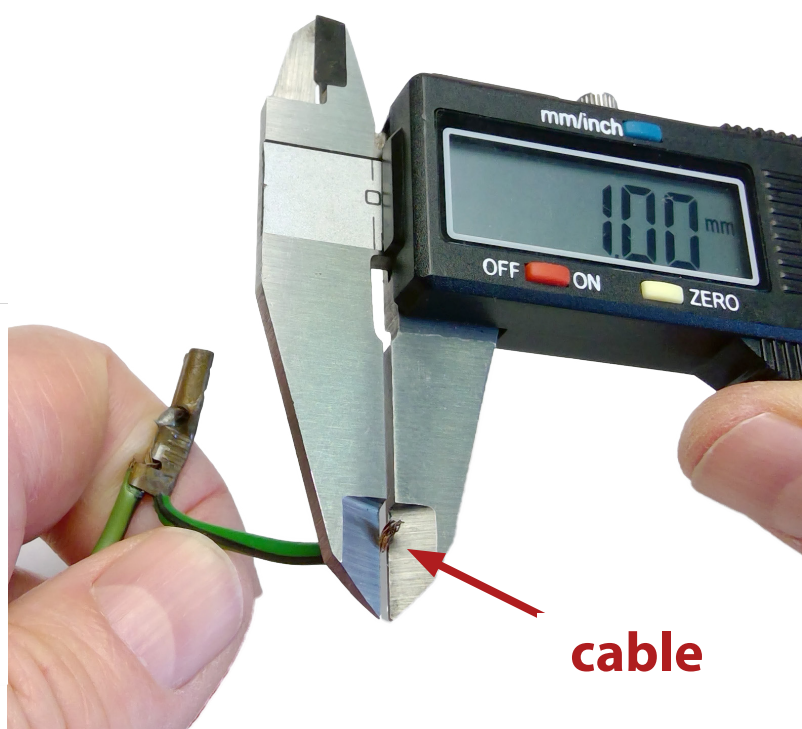
Cable diameter

The first thing you need to do is check if the cable diameter used corresponds to the electrical diagram for your type of Volkswagen. You should never assume that the previous owners did everything right according to the manufacturer specs. In many cases "quick" repairs were carried out and never corrected after that. It wouldn't be the first time an electrical cable was replaced by a cable that was too thin (thicker isn't so bad, thinner can have nasty consequences). You can find the electrical diagram for your Volkswagen in the [Bentley Publishing](#) book series, and compare if the diameter of the cables are correct.



The formula and the method to determine the diameter of a cable can be found in [edition 21](#). We are going to repair the green cable with black stripe, the diameter is 1.00 mm (picture below). First cut a piece of the cable, strip the insulation, then you are sure that the copper conductor has its full thickness. According to the formula below, 1.00 mm diameter corresponds to a diameter of 0.75 mm².

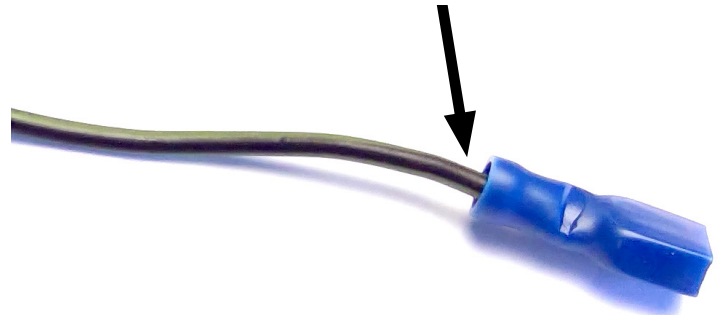
$$A = \pi \times r^2$$



Installation techniques

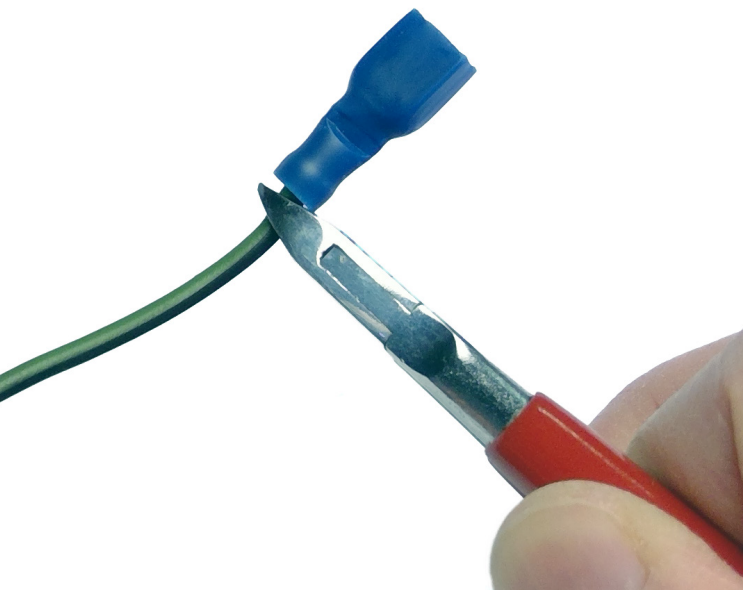
It is not possible to reuse the piece of copper wire that was clamped in the spade connector, it is usually too damaged. Cut the cable as close as possible to the connector, so you have a fresh piece of cable with intact insulation. If the insulation against the spade connector is damaged, you will have to cut further. It is possible that the cable has become too short, you will first have to extend it with a piece of cable of the same color or color combination.

cut here



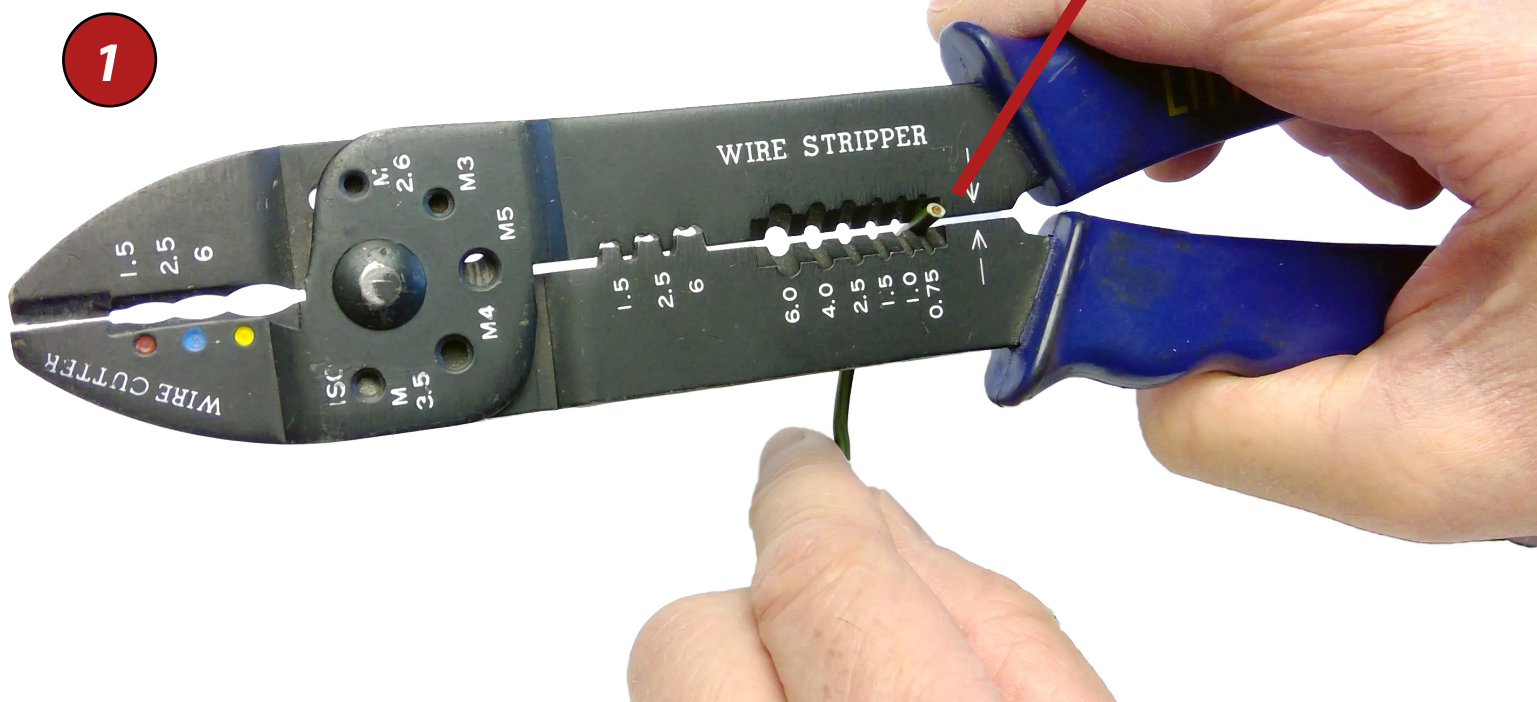
Wire stripping

Remove a piece of insulation, about 1 cm. You can do this by using a wire stripper, there are several versions of this. The most important thing when stripping the insulation is that the copper conductor is not damaged. The trick is not to cut the insulation off completely, to avoid touching the copper conductor. If the copper conductor is partially cut, its diameter will be smaller or, in the worst case, it will break off. So practice on an old piece of cable of the same diameter before working on the good cable.



replacing spade connectors

To secure the wire on the spade connector we use this handy tool (picture 1), it has several functions, including stripping the insulation of a conductor. This pliers only works for straight spade connectors, for angled spade connectors you need a special pair of pliers, this one is quite expensive for one time use compared to this one. Our cable is 0,75 mm², we slide the cable with insulation between the clamp at the place indicated with 0,75. Squeeze tight and pull firmly at the other end of the cable, and the insulation is stripped.



Extending the cable

If the cable or insulation is badly damaged and you have to cut away a large length, you will have to make an extension. It is important that the extension has the same color code as the cable to which it is attached. If you have to make a diagnosis later (or someone else), it is easy if the original color codes are kept.

Strip both cable ends as shown in the picture. One cable may be stripped of slightly more insulation. The latter can be twisted around the shortest (picture below) so that they stick together tightly. This gives a good basis to solder both cables together.

Use a standard soldering iron (2), a version with temperature control (3) is nice, but they are more expensive. They are used in electronics where semiconductors or integrated circuits need to be soldered with thermal control to prevent them from burning. To solder these types of cables together, a temperature control is a superfluous luxury.



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replacing spade connectors

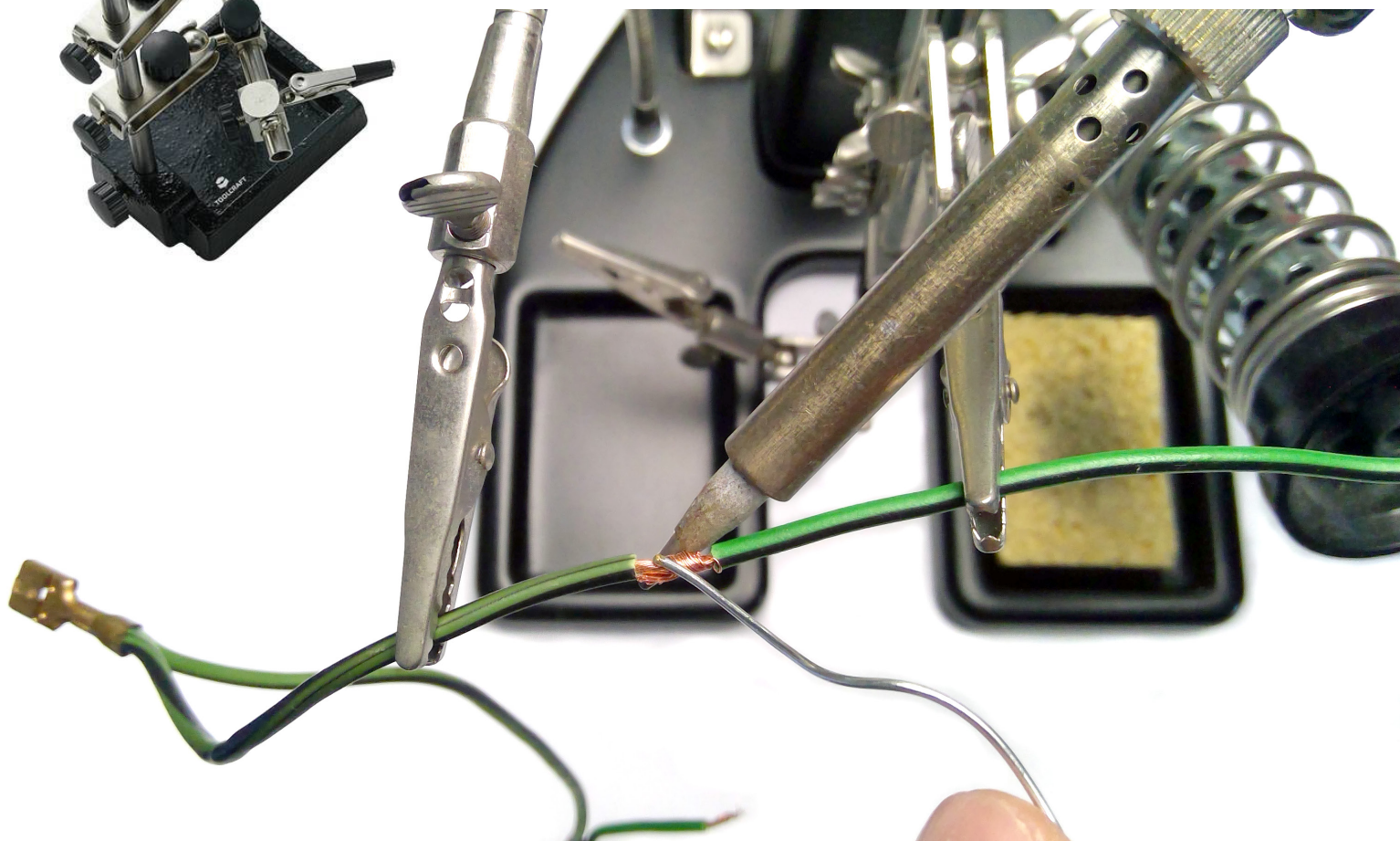
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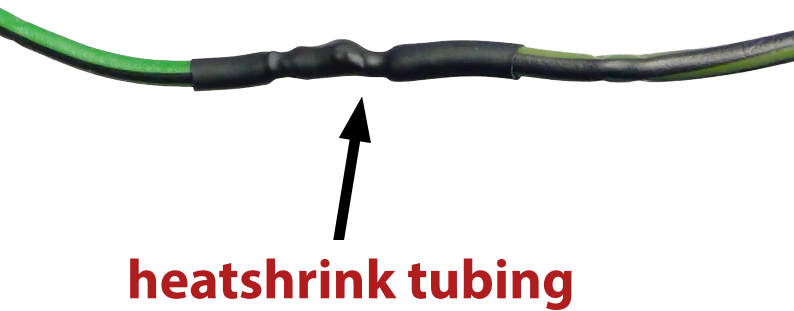


Make sure that both cables are securely attached, so that you have both hands free to solder. Useful is for example a so called "third hand" (picture 4 and picture below) to stabilize the cables.

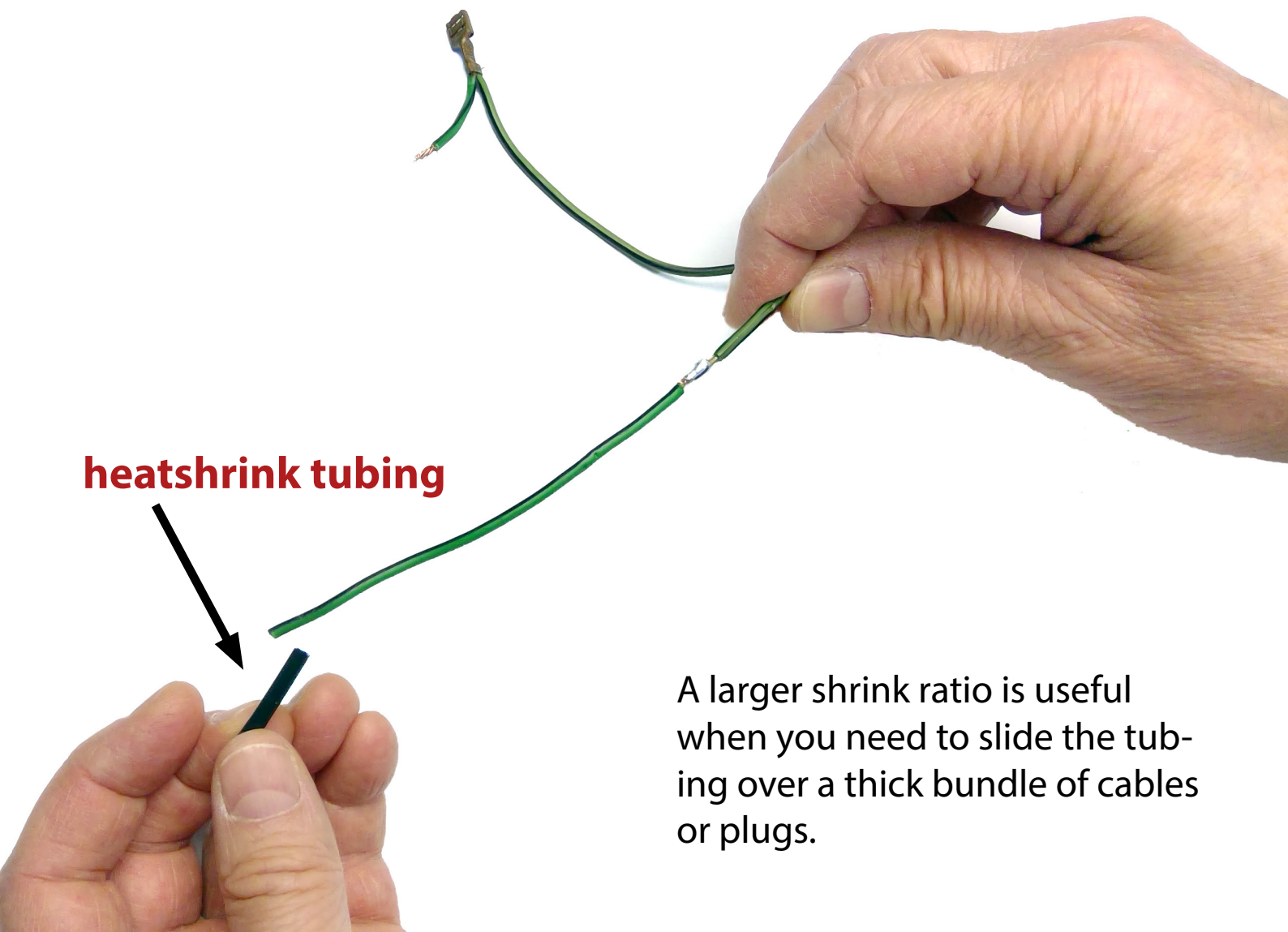
If you don't have this in your workshop, use two pieces of wood, for example, to fix the cables with tape, that works just as well. Place the soldering iron at the bottom of the cables, warm the cable, press the soldering tin against the top of the cable. If it doesn't work, the soldering iron is warm enough.

4





The soldered connection can be insulated with insulating tape. It is better to use shrink tubing. There are various types of heatshrink tubing with different diameters and different shrink ratios. A larger shrink ratio means that the heatshrink tube will shrink more than those with a lower shrink ratio.



A larger shrink ratio is useful when you need to slide the tubing over a thick bundle of cables or plugs.

replacing spade connectors

Choosing the spade connector

In [edition 21](#) we explained how to determine the size of the spade connector. Read that article in [edition 21](#) before continuing.

There are different sizes and versions, and spade connectors with and without barb. We use a 6.30 mm sliding plug, which can clamp a cable cross-section between 0.50 and 1.00 mm² (see [edition 21](#)). We prefer the brass version, because Volkswagen used it ex works in our oldtimers.

Again, you can't start from the principle that everything is correct in your Volkswagen. So first measure the male plug over which the sliding plug should fit. We have shown in [edition 21](#) how to measure that.

We measure a male connector of 6.30 mm, so we have to use a female brass one (Volkswagen has used the brass version with our type VW, and we are going to stick to that), without barb.



**brass
without barb**

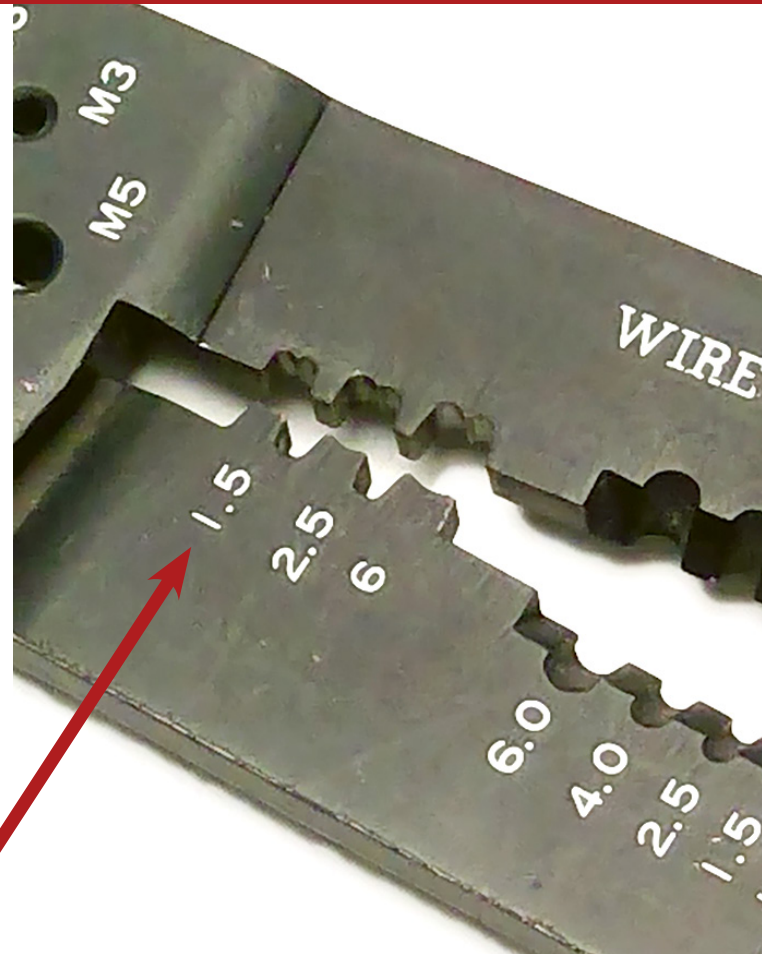


**tin-plated
with barb**

Securing the cable

A long-term correct electrical connection will only be achieved if you use the correct assembly technique together with the appropriate tools.

As tool we use a different function of our special pliers. You can also use a standard pliers, but the quality of the connection will leave much to be desired both functionally and aesthetically.



We use the smallest setting, namely 1.5 for our 0.5-1 mm² spade connector. We will first attach the cable to the spade connector

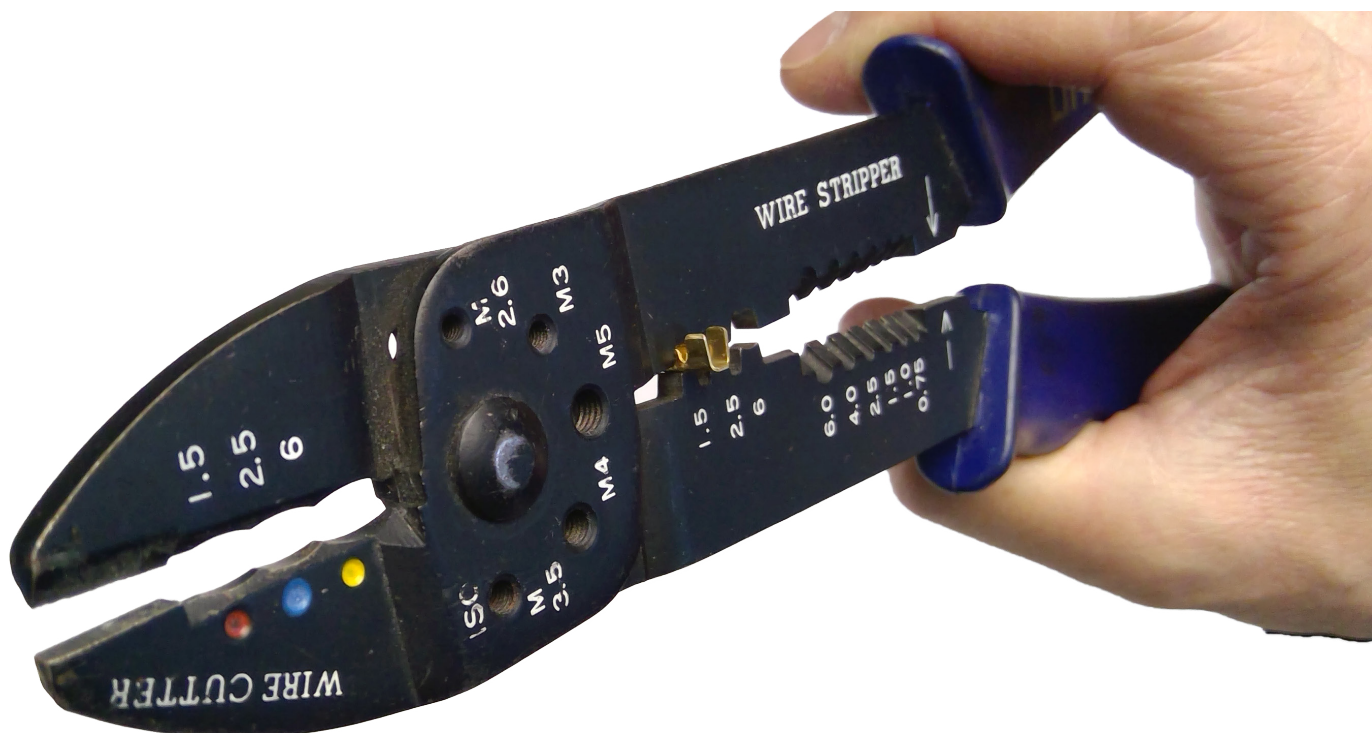


replacing spade connectors

Follow these steps to assemble the spade connector.

- 1** Strip a length of insulation just long enough to fit in the middle part of the sliding plug (see page 21).
- 2** Make sure that the copper conductor just fits into the spade connector as shown in the picture on the top right, so that the insulation can be clamped with the largest clamps.

- 3** I personally find it more convenient to first insert the spade connector into the pliers (picture below), then clamp it a bit, and then slide the conductor in. Use the corresponding diameter as indicated on the pliers. Squeeze the pliers tight, the metal clamps will bend neatly this way, and the copper conductor will clamp into the spade connector.

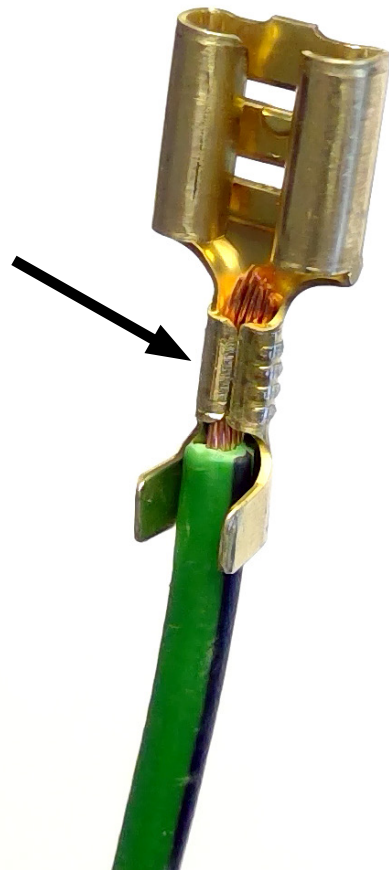


With the spade connector clamped into the pliers, it is easy to position the cable correctly, and then squeeze the pliers closed.

Make sure a piece of insulation is still in the clamping area of the two large clamps.

One hand to squeeze the pliers, and one hand to position the cable in the right place.

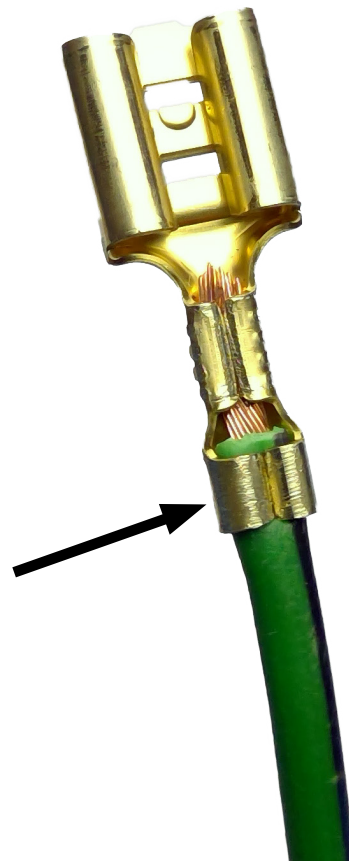
On the right we show how the copper conductor is clamped into the spade connector. This provides a good electrical connection, but not yet a good mechanical locking. The two large clamps need to be clamped firmly around the insulation.



replacing spade connectors

4 Now it's the insulator's turn. The insulator is clamped with the larger clamps of the spade connector. It is this securing that ensures the strength of the whole, if the insulator is properly clamped, it can handle large pulling forces.

5 The fifth step, soldering the joint, is optional, it provides extra good conductivity and strength of the joint. For the 6 volts version of our Volkswagen is recommended because it is precisely these that suffer more from bad electrical connections. It's a bit more work, but it gives an extra "*finishing touch*" to your restoration work. Volkswagen hasn't applied this.



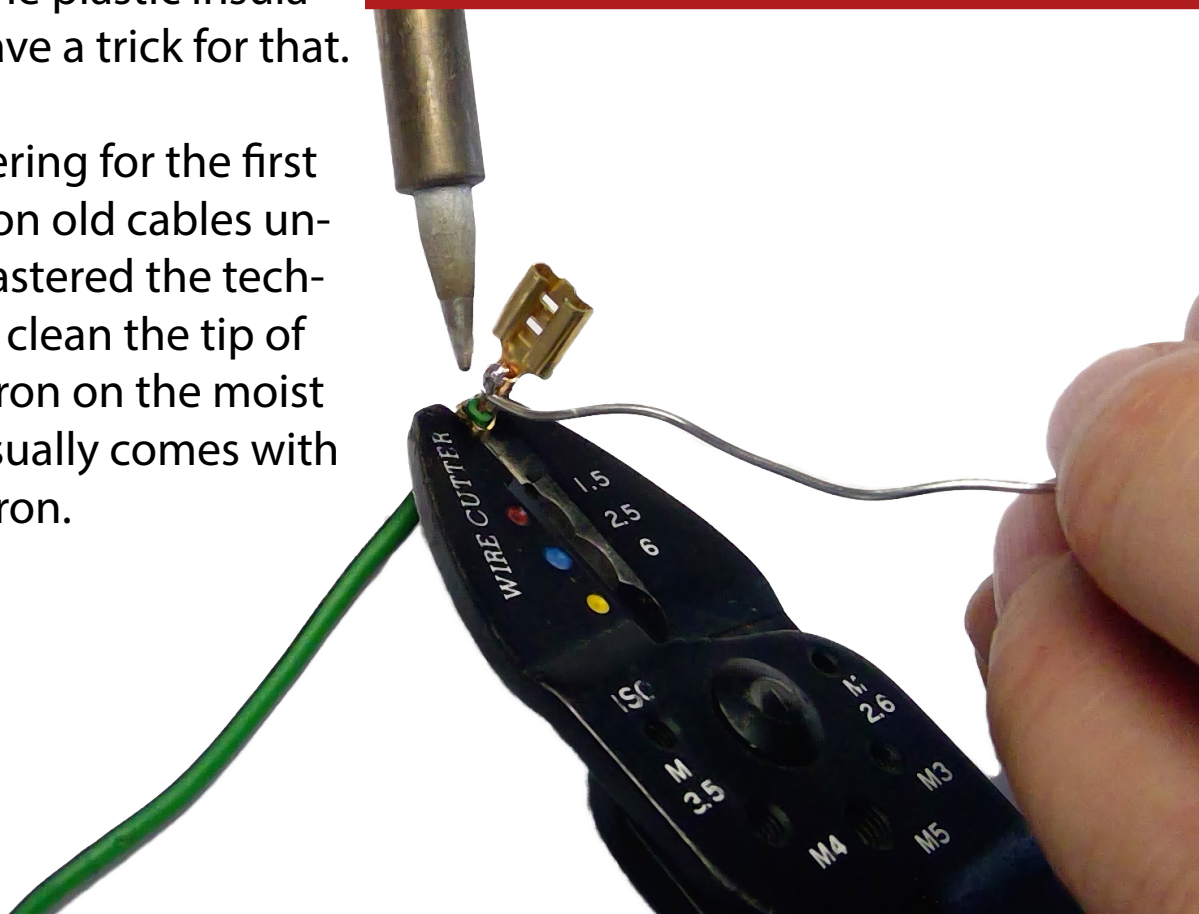
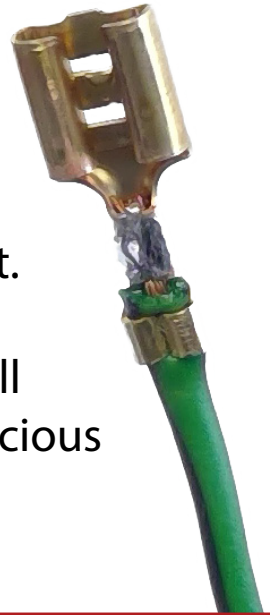


You can use a professional adjustable soldering iron (picture above), or a cheap soldering iron without regulation, it's all possible. The cheap soldering iron without temperature control can cause problems because the copper conductor can get too hot and melt the plastic insulation, but we have a trick for that.

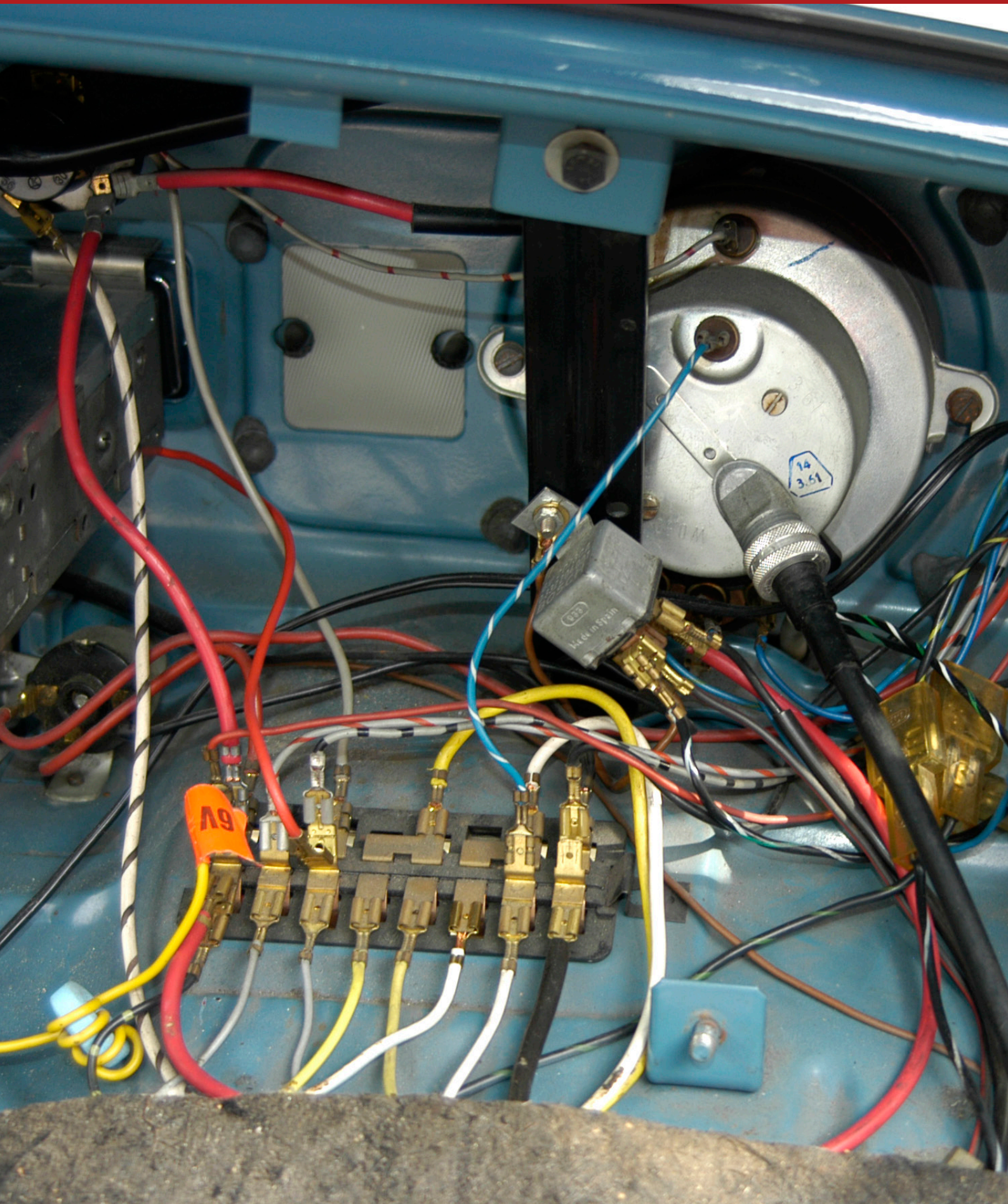
If you are soldering for the first time, practice on old cables until you have mastered the technique. You can clean the tip of the soldering iron on the moist sponge that usually comes with the soldering iron.

Use the pliers and clip them onto the metal spade connector on the insulation side (photo below). This will dissipate the heat from the soldering iron through the metal mass of the pliers. The pliers serves as a cooling plate. On the right we show the end result.

We hope this article will help you save your precious wiring harness.



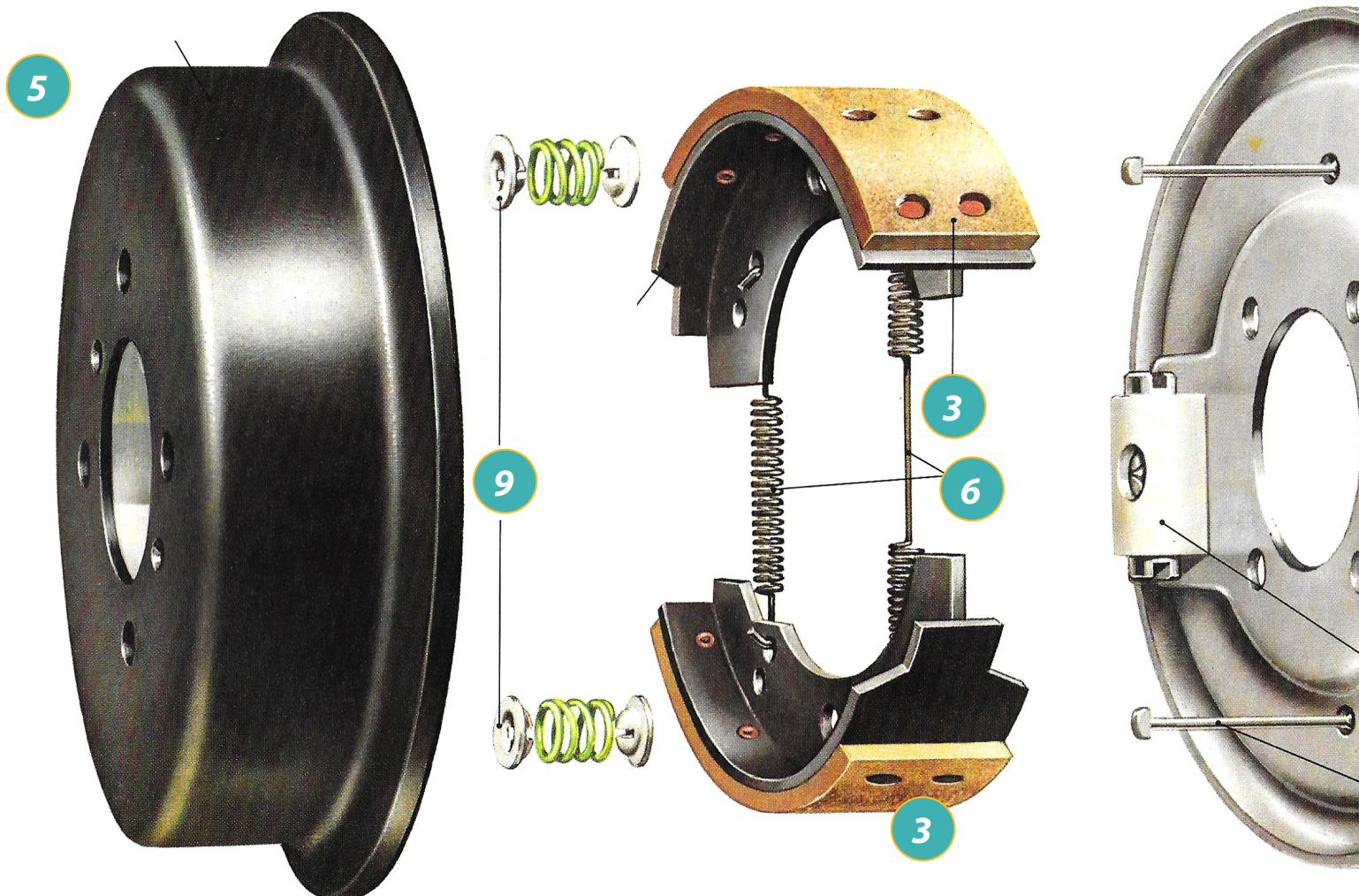
replacing spade connectors



Introduction

The brakes are a crucial part of your classic Volkswagen, actually of any car. We advise you not to save on them, and to install them carefully. If you don't have enough technical knowledge, or you don't feel confident enough, have the work on your brakes done by a professional mechanic.

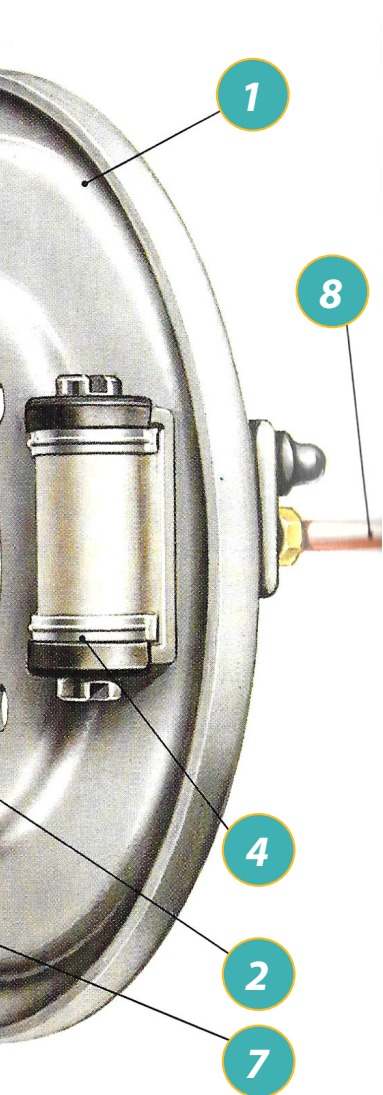
If, during the work, you come across parts that are corroded or show any kind of wear or damage, it is necessary to replace them with new parts. Rather leave the car for a few days to order the right parts. Mounting damaged or wrong brake parts can have disastrous consequences.



replacing front drum brakes

In [edition 12](#) we explained how drum brakes work. Read that article before you start working on your brakes. At the bottom we show again the drawing of a drum brake, this is not specific to a Volkswagen but could be of most brands from that time.

We have already shown the separate parts in [edition 12](#). Each part can be ordered in our webstore. In this article we will replace the front brake of a VW Beetle from 1970. The construction and assembly procedure for all VW's is quite similar. When you have read this article, you can replace the brakes of most VW models or other brands.



- 1 Backing plate or support plate**
- 2 Shoe adjusting bolt**
- 3 Brake shoes**
- 4 Wheel cylinder**
- 5 Brake drum**
- 6 Retracting springs**
- 7 Brake shoe hold down pins**
- 8 Brake line (hydraulic)**
- 9 Brake shoe hold down springs and retainers**

Brake parts

In [edition 12](#) we already showed the drum brake parts, here we put all the parts we will need on our workbench (picture 1). Not all brake parts need to be replaced with every brake shoe change. But mostly we have to deal with under-maintained oldtimers, cars that have been stationary for too long or classic cars with no service history. It is then advisable to replace all mechanical parts.

In our example we also replaced the brake backing plates, these were very corroded, crooked and the inspection holes were damaged so that no rubber inspection plug fitted.

On this model VW Beetle the left and right brake backing plates are identical, note that this is not the case with every type of Volkswagen.

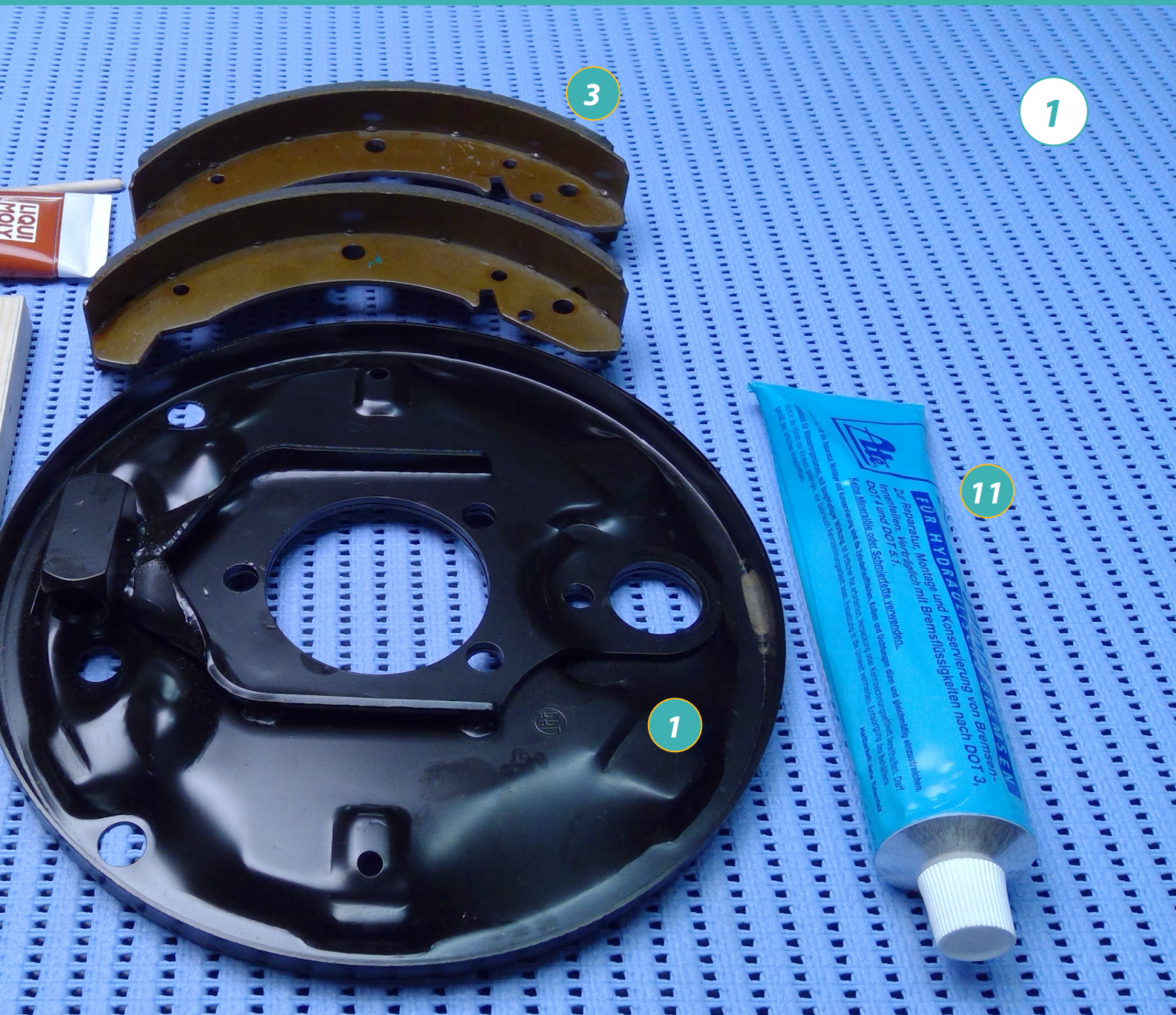
We also show here the copper paste needed to make metal parts squeak-free and to protect the assembly parts against jamming. The Até brake cylinder paste on the right plays a crucial, often underestimated role in the assembly of the brake cylinders.



- 1** Backing plate or support plate
- 2** Shoe adjusting bolt
- 3** Brake shoes
- 4** Wheel cylinder



replacing front drum brakes



- 6 Retracting springs
- 7 Brake shoe hold down pins
- 9 Brake shoe hold down springs and retainers
- 10 Copper paste
- 11 Até brake cylinder paste

Dismantling

The disassembly will not be dealt with in detail, because it usually goes quite easy. However, we will give some tips to avoid damaging reusable parts.

Hold down springs

The hold down springs are difficult to remove without the right technique and tools. On the right (pictures 2 and 3) we show an example of a tool that makes disassembling and reassembling the metal retainers of the locking springs very easy.

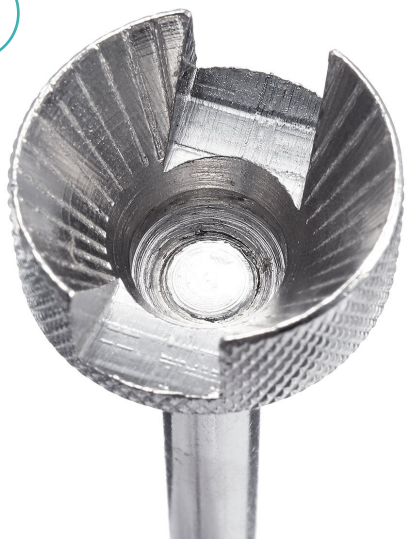
If you don't want to look for such a tool, or you don't want to wait, we show you how to do it without special tools.

Always replace left and right brake shoes together!

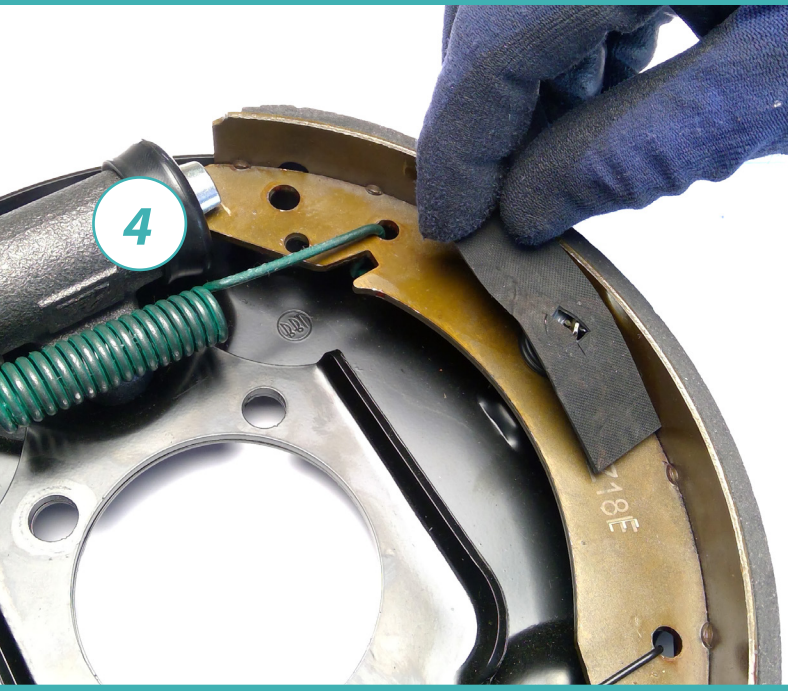
2



3



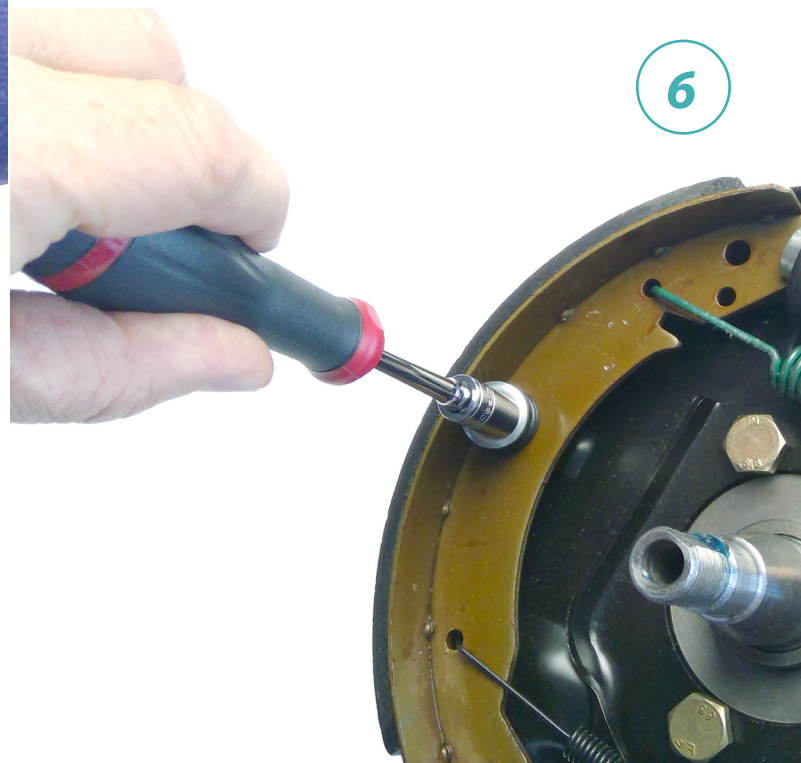
replacing front drum brakes



You can use a socket spanner with a piece of rubber underneath (picture 4) to have the necessary friction. In principle, you can do this without the rubber as we show on picture 6, but the socket spanner can slide over the metal retainer. The tool on pictures 2 and 3 has grooves to get the same effect (friction).



The use of a gripper or pliers is not recommended as you can damage the parts.



Retracting springs

The brake shoe retraction springs sometimes offer a lot of resistance. Once the lock springs with metal retainer have been removed, the brake shoes will almost automatically want to come loose. You only have to pull them from over the wheel brake cylinder, without loosening the retraction springs (picture 7).

8

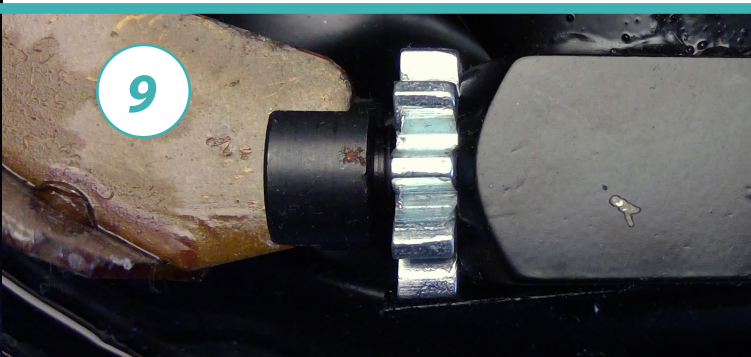


7



replacing front drum brakes

First make sure that the shoe adjusting bolts are fully screwed in (picture 9), this way there is the least resistance on the retraction springs. This can sometimes make the difference between a difficult job and a pleasant day of tinkering.



Trying to loosen the retraction springs even before they are removed is a hell of a job, usually resulting in damage. It is much easier to leave the pullback springs in place, and loosen the brake shoes themselves first.

When the tension of the retraction springs has disappeared, you can loosen the brake shoes without using force (picture 8).

Mounting paste

This part of the procedure is skipped too much. Because one does not know this, or wants to work too fast, or because one does not have the special brake cylinder mounting paste.

Wheel brake cylinders must never be mounted dry, every internal part must be lubricated with a thin layer of brake cylinder paste.

You would think that new brake parts are already factory fitted with special grease, but that is not always the case, so you should check this yourself before fitting the part.



Do not use any universal oils, greases or brake fluid but only brake cylinder paste, only then you are assured of a perfect long lasting lubrication and pro-

tection against corrosion, avoiding the risk of leakage due to dry running or corrosion.

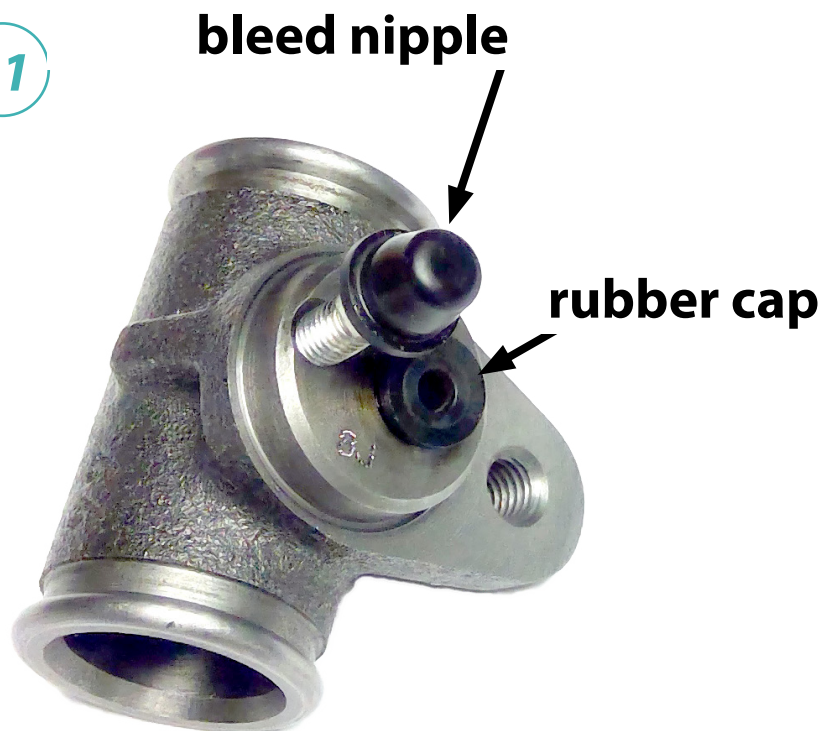
The Até paste for hydraulic brakes has been specially developed to protect the parts of the brake circuit against corrosion. This paste is resistant to the aggressive brake fluid and will not affect the hydraulic characteristics (built up pressure) of your brake circuit.

Remove the rubber sleeve from the wheel brake cylinder on one side (picture 10). Slide the piston with sleeve out of the housing (photo 12). If the pistons are stuck, remove the rubber cap or the brake bleeder at the back of the wheel brake cylinder to eliminate the pressure inside (photo 11). Push the rubber seal with spring outwards, be careful, the whole thing can fly out with force (photo 13).

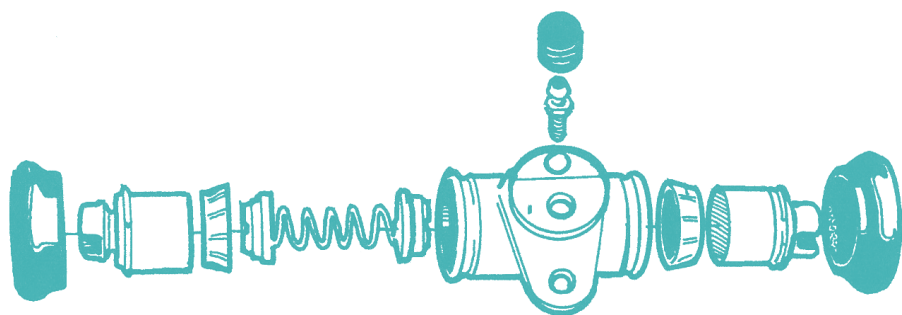
10



11



replacing front drum brakes



On the left we show the parts of a wheel brake cylinder. Make sure all seals are intact. Grease everything with At  paste.

Use a soft brush to apply a thin layer of brake cylinder paste to the inside of the housing (photo 15). Do the same with the piston, as we show on picture 15.

Repeat this operation for the other piston (the other side) of the wheel brake cylinder.

The special paste will ensure that the inside of the wheel brake cylinder is lubricated and will protect it from corrosion and jamming.

If the special brake cylinder paste is not used, the service life of the brake cylinder is significantly reduced.

15

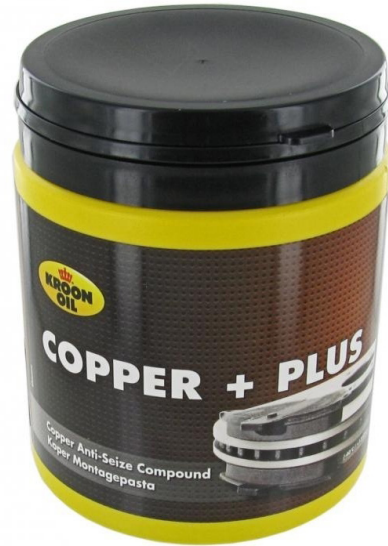


Installing the brake parts

You now have all the parts available on your workbench. The wheel brake cylinder is protected with brake cylinder paste. You have copper paste (photo on the right is the copper paste we offer in the web shop) to grease all moving parts to avoid squeaking, cracking and corrosion.

You can also use copper paste for the bolts to prevent them from getting stuck, because the brake parts can get very hot.

Mount the wheel brake cylinder on the backing plate (16), and secure it at the rear with the bolt (picture 17 on the next page).



16



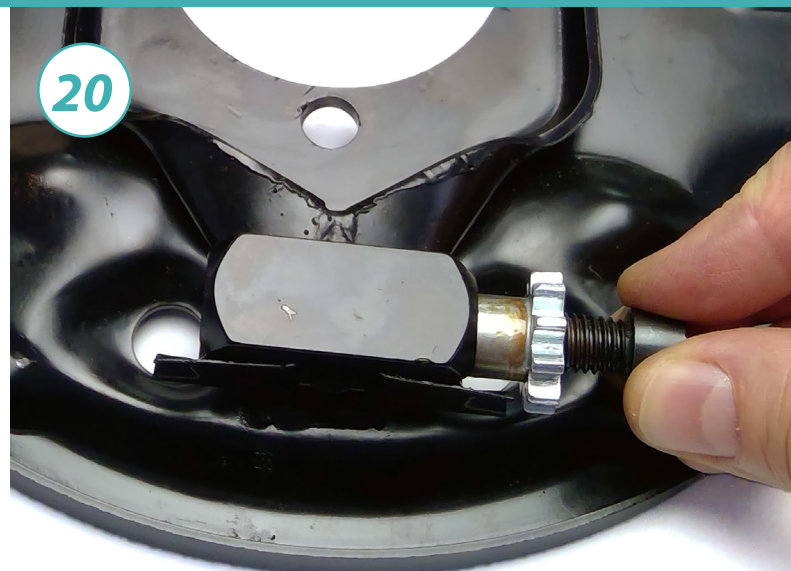
wheel brake cylinder



replacing front drum brakes



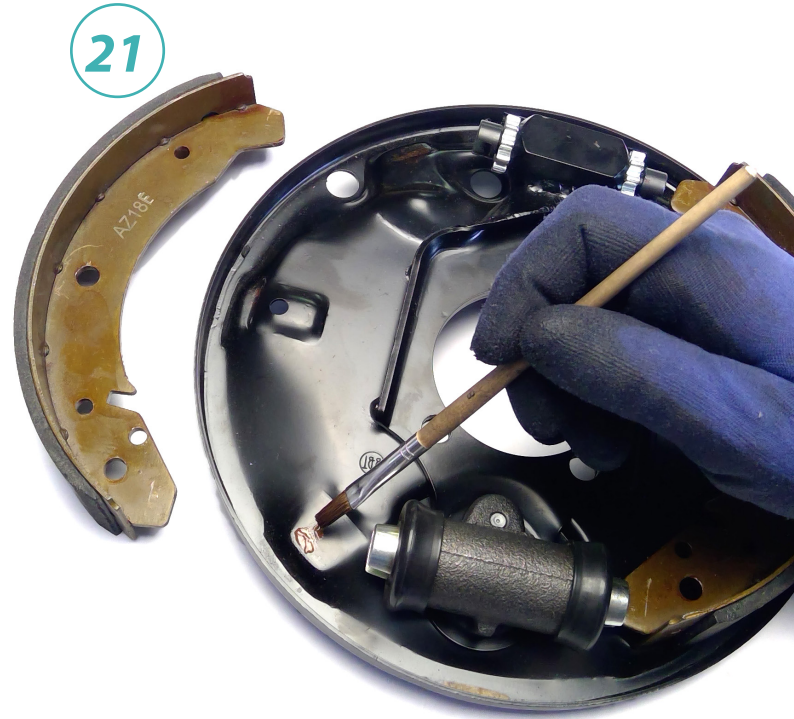
Apply a little copper paste to the threads of the two adjusting screws (photo 18). This will prevent them from jamming after a while, making adjustment impossible. Also apply copper paste to the shaft of the two gears (pictures 19 and 20).



Then turn the adjusting screws in the gears and slide them into the brake backing plate.

Make sure the adjustment bolt is fully screwed in, this will give less tension on the brake shoe retraction springs later on, and make mounting easier.

21



Apply a little copper paste to the brake backing plate where the brake shoes touch the backing plate (picture 21). This will avoid squeaking and creaking during braking. Use very little copper paste!

Apply copper paste with very small amounts, you don't want grease to get stuck on the brake shoes.

22

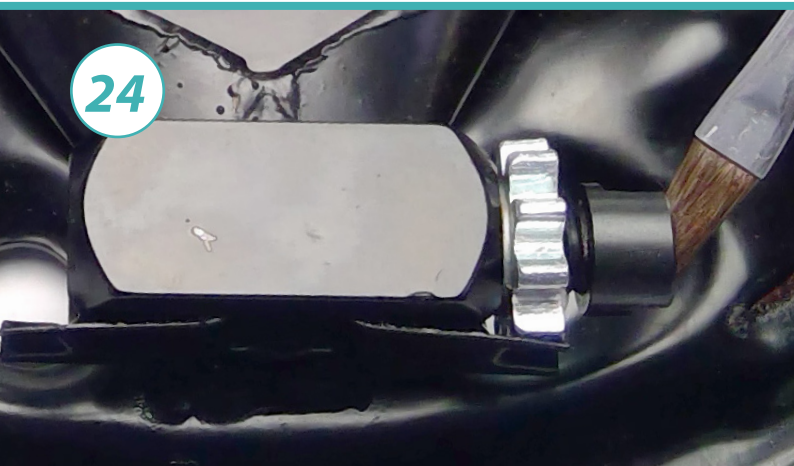


23



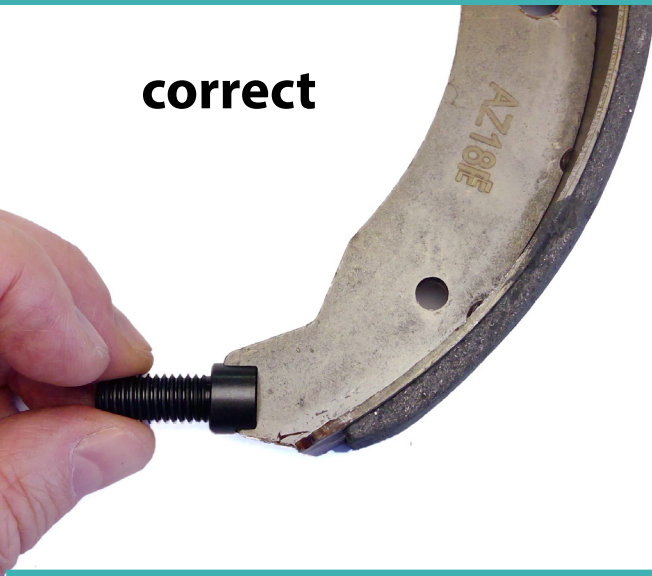
The slots in the adjustment bolt where the brake shoe fits, are not equally deep on each side, they are slanted, they are made in such a way that the brake shoes can be pushed away optimally. On the pictures on the left (pictures 22 and 23) you can clearly see that. So make sure that the adjustment bolts are correctly positioned before you mount the brake shoe. In the picture on page 45 we show how to position the adjustment bolt in relation to the brake shoe. Provide the contact surface with the brake shoe with copper grease (picture 24).

24



replacing front drum brakes

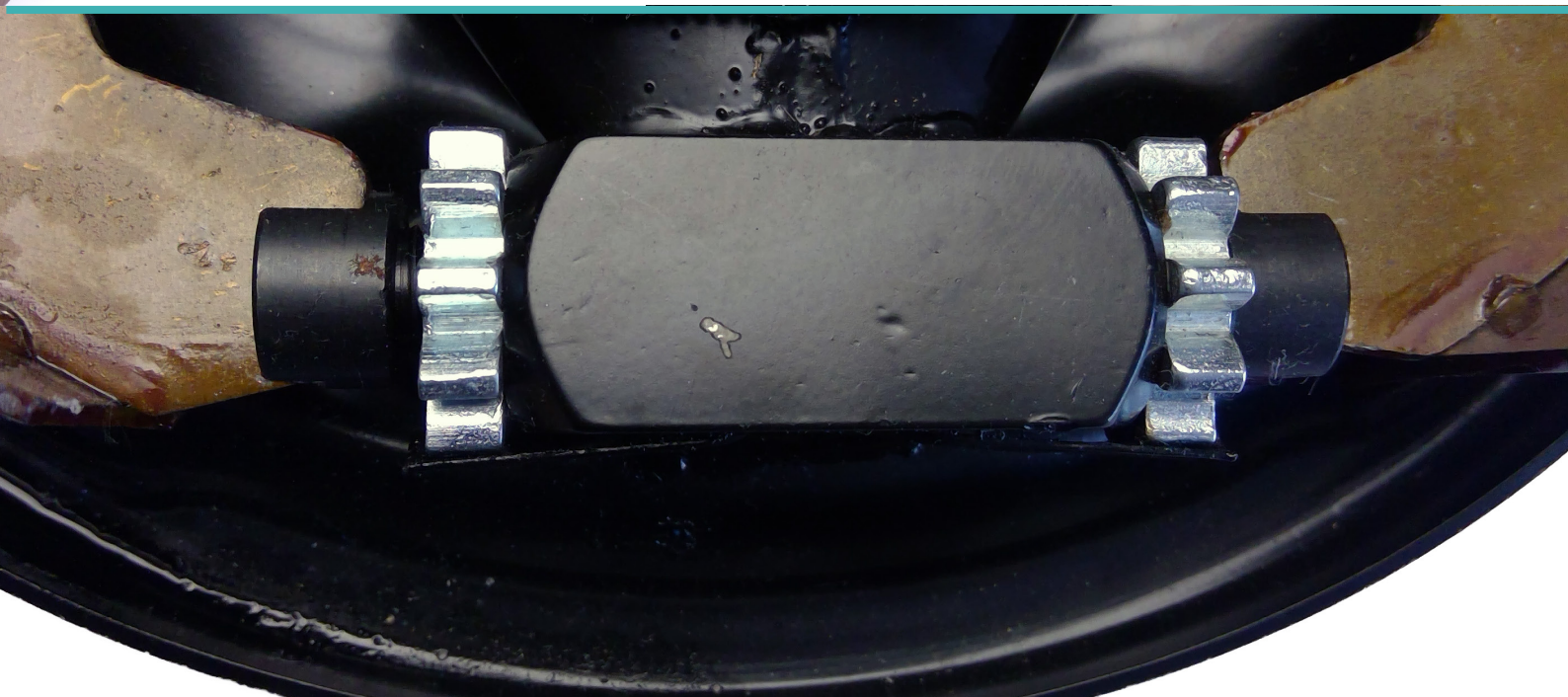
correct



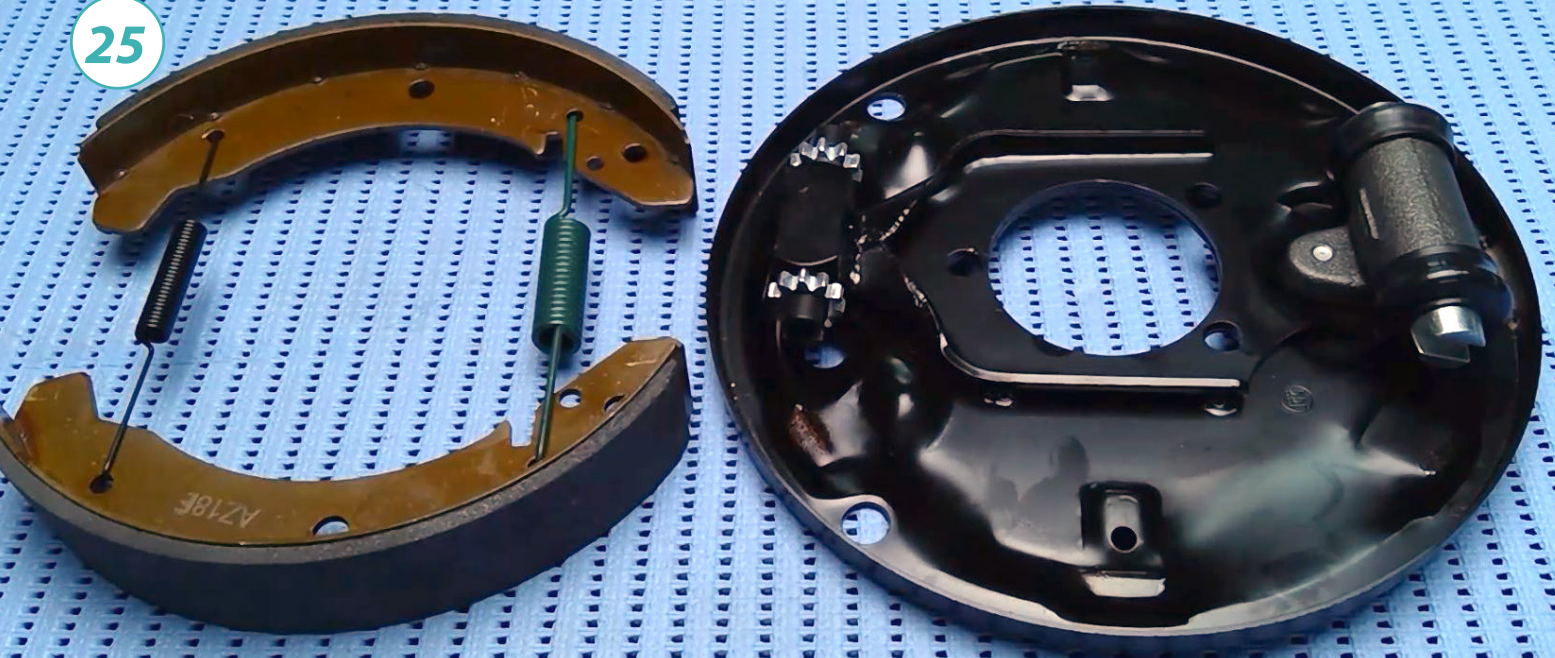
The pictures on the left show how to position the adjustment bolt in relation to the brake shoe, with its deepest side towards the inside of the brake shoe. It isn't immediately noticeable, but the brake shoes have a straight side and a slanted side (picture on the right). The straight side should be against the wheel brake cylinder and the slanted side against the adjusting nut.



not correct



25



26



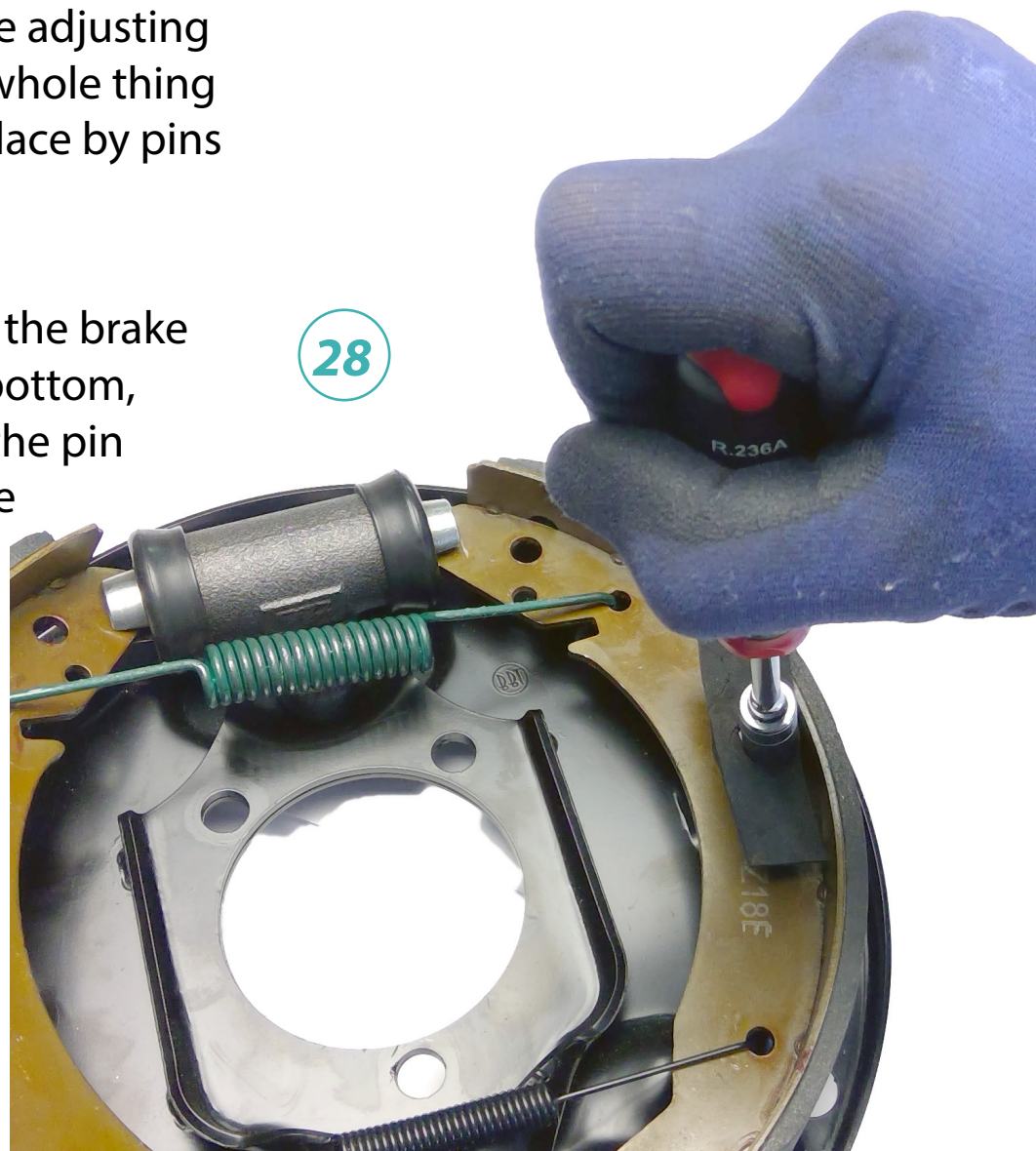
The brake shoe friction material must not come into contact with grease. Use clean work gloves!



replacing front drum brakes

Attach the brake shoe retraction springs as shown in picture 25. Make sure the adjustment bolts are fully screwed in, this will reduce the tension on the springs. Slide one brake shoe into the wheel brake cylinder and the adjusting screw on one side, while the springs are already in place. Pull the other brake shoe and also slide it into the wheel brake cylinder and the adjusting nut (picture 26). The whole thing will soon be held in place by pins and springs.

Slide the pin through the brake backing plate at the bottom, slide the spring over the pin (photo 27), and secure the whole (photo 28) with the metal retainer. We have already shown on page 36 with which tools this can be done. Do the same with the second brake shoe.

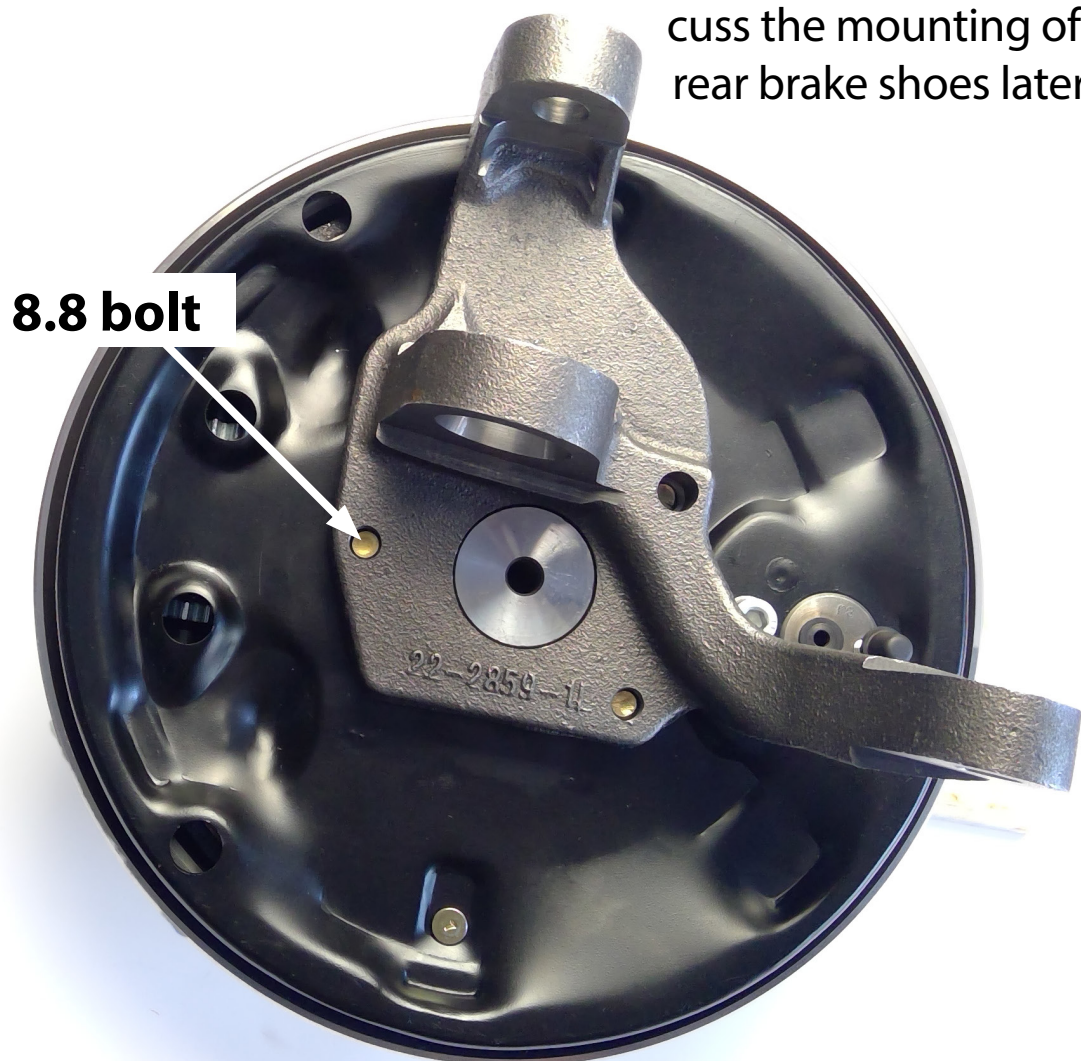


replacing front drum brakes

I left this project for a few days to order the right bolts. You can order them at specialized assembly shops. Using the right bolts is crucial for the safety of the car. Then connect the hydraulic brake line to the wheel brake cylinder at the back of the brake backing plate. Mount the drum as explained in [edition 21](#).

Use suitable rubber caps (inspection plugs) for the inspection holes and the adjustment holes of the brake backing plates (not all models have four holes like here).

Bleeding and adjustment of the brakes will be discussed in detail in a next article. We will also discuss the mounting of the rear brake shoes later on.





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