

## Universal instructions for the repair of VDO dual gears

If the odometer on your vehicle has failed, then this gear is almost always the cause. The original beige-brown gear wheels crumble after years due to a material defect and have to be replaced.

**Speedometer repairs are not witchcraft.** Nevertheless, one should be aware that work is being done on a sensitive instrument. With a little bit of tact and skill, a speedometer repair is no problem. Please keep your eyes open and use common sense. All instructions from us are only suggested measures for the repair of speedometers.

**We assume no responsibility for damage caused by improper repair! Please read this introduction carefully before starting the repair!**

### Important notes/tips for installation:

- The reason for the wear of the original gears is, in most cases, the combination of urethane and mineral oil. The original gears are lubricated with petroleum-based grease that dissolves the urethane gears. They become waxy and break away. The waxy substance leaves a film on components such as shafts, gears, housings and the pins of the gears, which must be removed.  
→ We therefore recommend replacing all urethane gears at the same time.
- A clean and well-lit work area is very helpful.
- Keep small boxes ready to store the sometimes very small screws.
- Have the necessary tools ready. Depending on the vehicle, the following tools may be required: small slotted screwdrivers, small cross-head screwdrivers, a set of Torx screwdrivers, side cutters, 1/4" socket wrench set.
- The new gear wheels do not require lubricant!
- Before mounting the new gears, the speedometer and odometer must be cleaned with compressed air! Please do this step also when all the broken parts of the old gearwheel have been found! Omitting this step is the most common reason for the odometer not functioning even after the gears have been replaced. Recommended air pressure: approx. 7 bar.
- All surfaces around the gearwheels must be cleaned with a clean cloth and cleaning alcohol before installation, also the motor shaft and all other shafts on which the gearwheels rotate. Any residue from old gears can cause the new gear to stick and the odometer to not run properly.
- It is recommended to take photos during disassembly to facilitate assembly.

### **Note on removing the speedometer needle**

You must remove the speedometer needle to remove the speedometer disc. Do not lever off the speedometer needle with a screwdriver, because the needle is pressed onto a very, very thin shaft (pin). This shaft must not be bent!

Grasp the speedometer needle in the middle and turn it counterclockwise. At the same time pull up the needle. Slowly turn the needle further counterclockwise and pull it while doing so.

Friction is all that keeps the needle on the shaft.

### **Note on the tachometer reading**

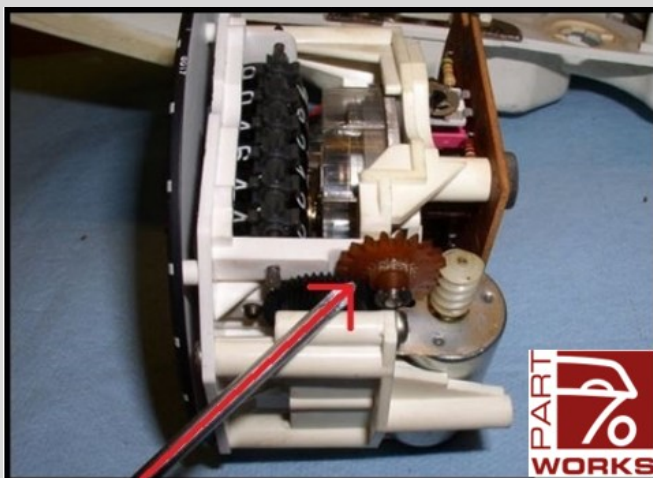
We offer no instructions on how to change your speedometer reading. We do not support tachograph manipulation in any case and we explicitly point out that false information is illegal when selling a vehicle!

### **Note for all units with a combined epicyclic/planetary and disk gear**

Please mount the gear wheels into the housing first and only then the motor unit. Before you tighten the screws holding the motor and the circuit board, please take a small screwdriver and carefully jerk the ten digits of the odometer back and forth. This will allow the gears to settle in the correct position and the motor unit will lock into place.

Instructions for removing the instrument cluster from your model can be found on Google or YouTube.

### **VDO double gear wheels:**





Only one of the gears in the drive is vulnerable.

The large gear rim is constant with 20 teeth, the small one varies from 21-32 in six variations. The correct number of teeth is determined by the number of teeth of the partner gear. The sum always adds up to 70. The partner wheel is the one in which the smaller gear rim of the double gear wheel engages.

Example: Partner gear has 38 teeth  $\rightarrow 70 - 38 = 32 \rightarrow$  You need a 20x32

We can say with great certainty, but not with 100% certainty, which model used which gear size. There are too many influencing factors (engine type / gearbox type / transmission / differential type / year / model).

**Should you, contrary to expectations, need a different gear, we offer a free exchange service:**

Just send us your gear wheel back with a note. You are also welcome to include the remains of the original in the letter. At the end of these instructions, you will find a corresponding return bill which can help you to find the right gear wheel.

This manual is suitable for electronically driven VDO odometers from the years of manufacture ~1980-1995, e.g. for Porsche 944/928/911, older Mercedes-Benz MB-trac/truck, Rolls Royce, Bentley, Lamborghini.

**Procedure:**

The instrument cluster is removed from the dashboard and you only work on the speedometer display.

**Step 1:** You must remove the speedometer needle to remove the speedometer disc. However, before removing the front panel and the speedometer needle, pay special attention to where the needle is aligned on the speedometer disc. It must be reinstalled later in the exact same position. Make a small mark on the speedometer display for this purpose.

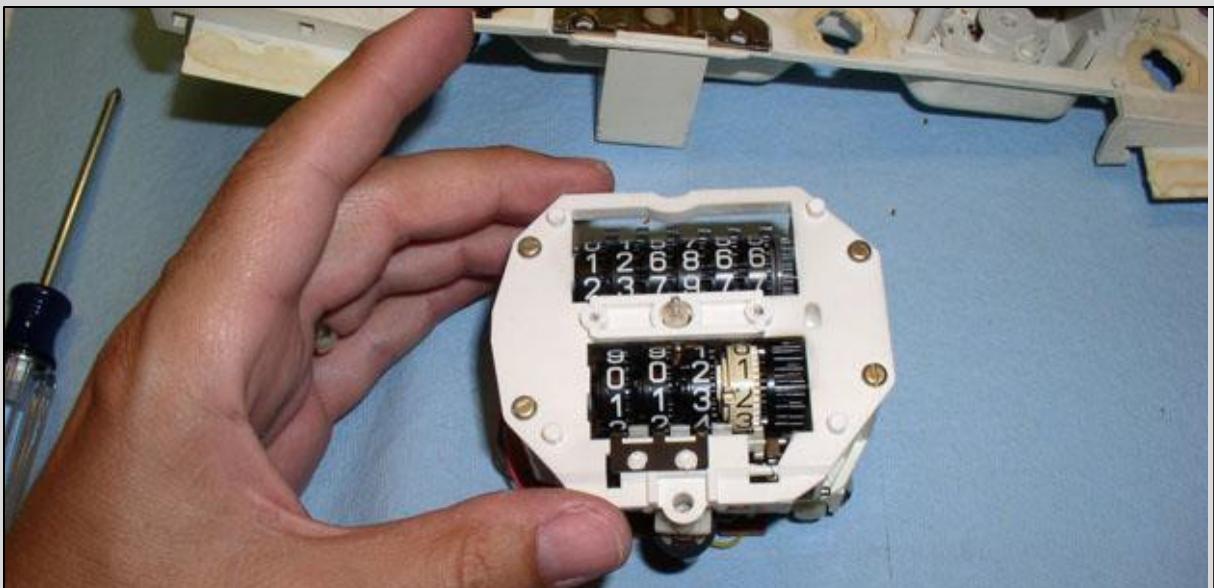


**Step 2:** Do not lever off the speedometer needle with a screwdriver, because the needle is pressed onto a very, very thin shaft (pin). This shaft must not be bent!

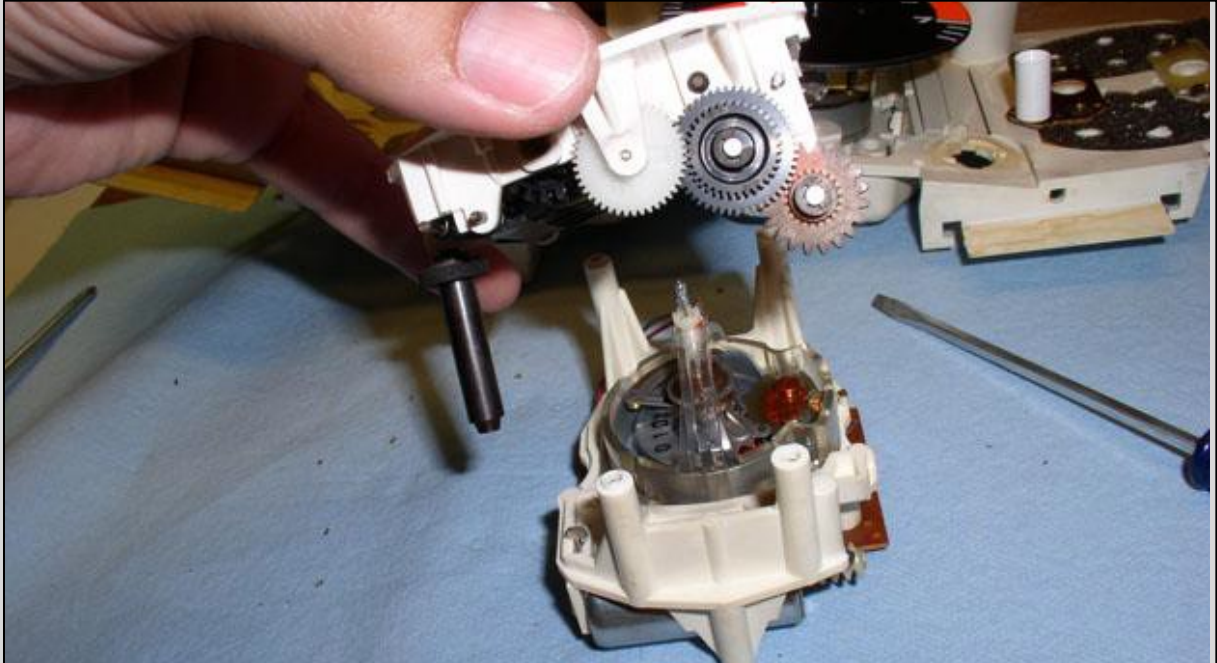
Grasp the speedometer needle in the middle and turn it counterclockwise. At the same time pull up the needle. Slowly turn the needle further anticlockwise and pull it while doing so. Friction is all that keeps the needle on the shaft.



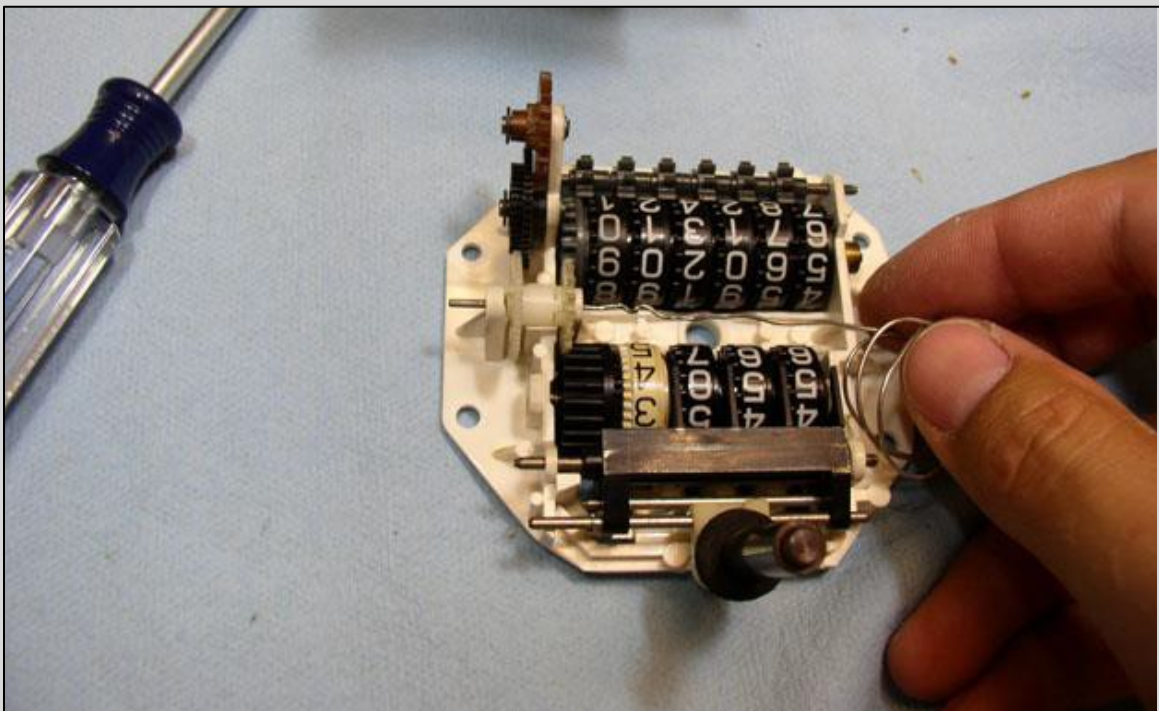
**Step 3:** After loosening two very small screws, the speedometer disk can be lifted off. The two counters become visible.



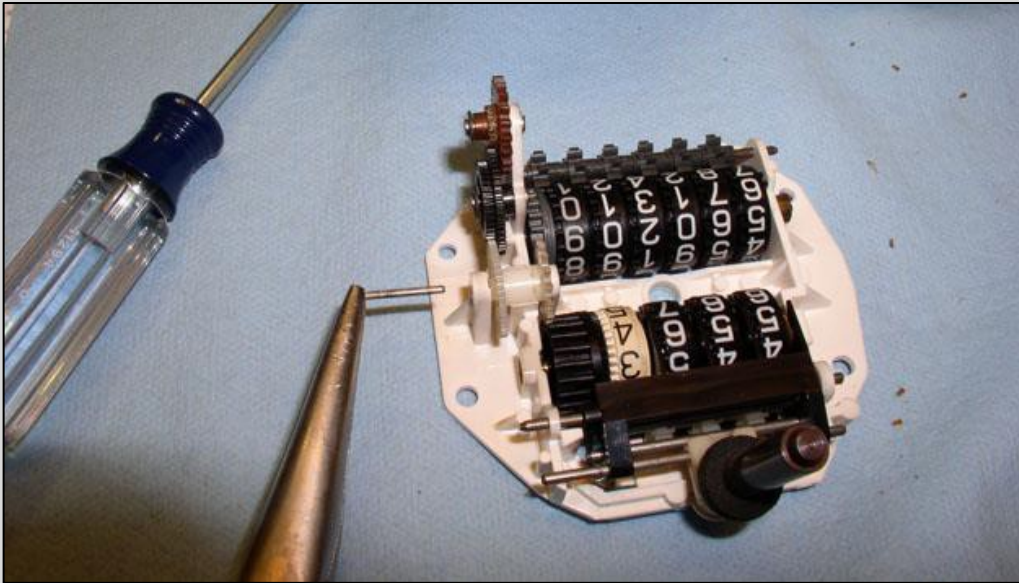
**Step 4:** Loosen the screws to separate the mechanical part with the counters from the electronic part of the speedometer.



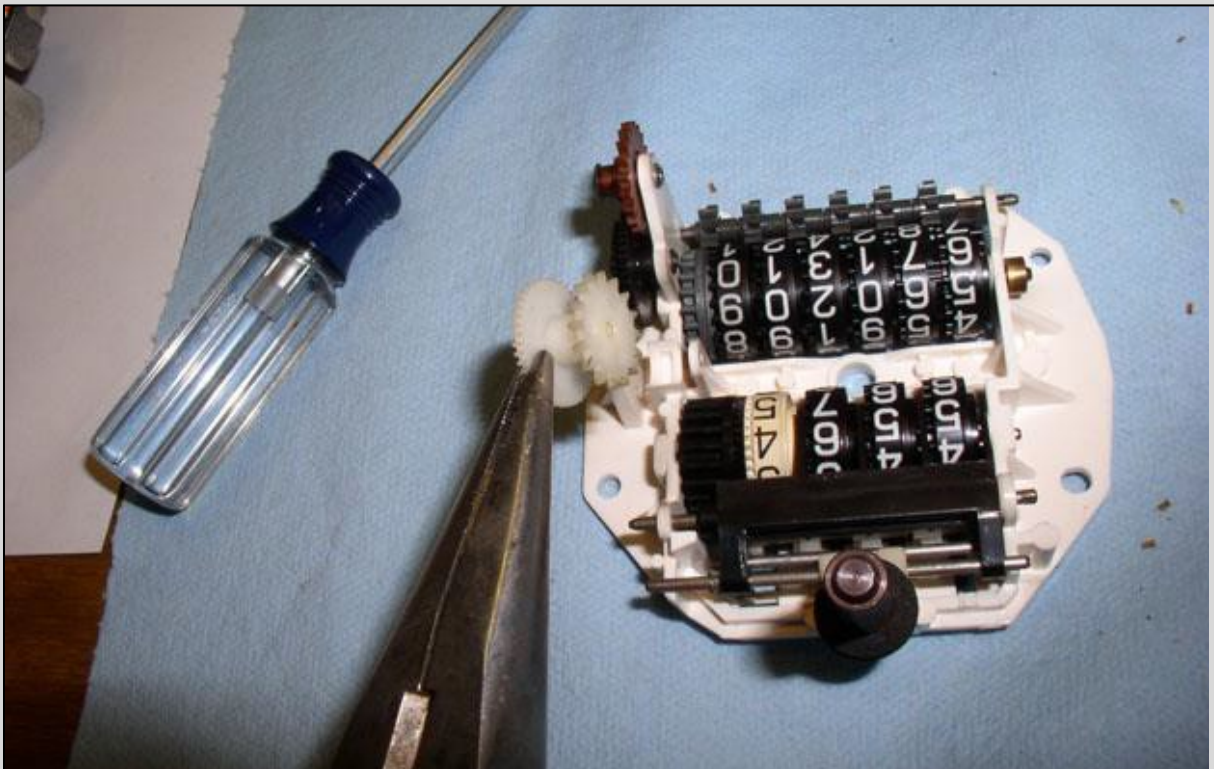
**Step 5:** To get to the defective gear wheel, two gear wheels must first be removed. To do this, carefully press out the shaft of the drum gearwheel with a wire.



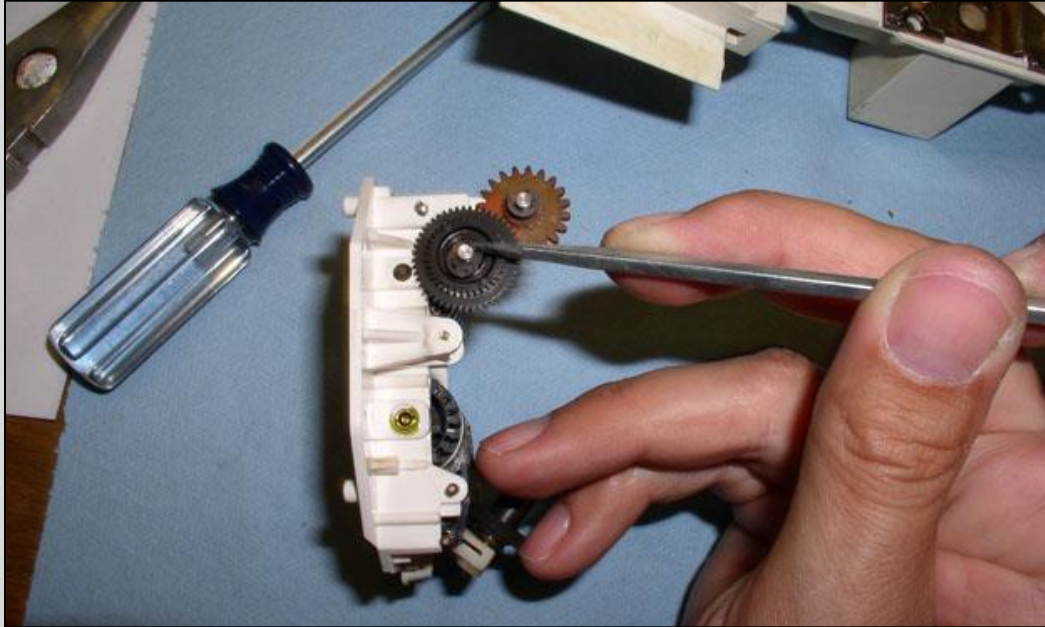
**Step 6:** If the pin sticks out a little at the side, pull the shaft out completely with small pliers.



**Step 7:** Now grip the drum gear wheel with the pliers and take it out.



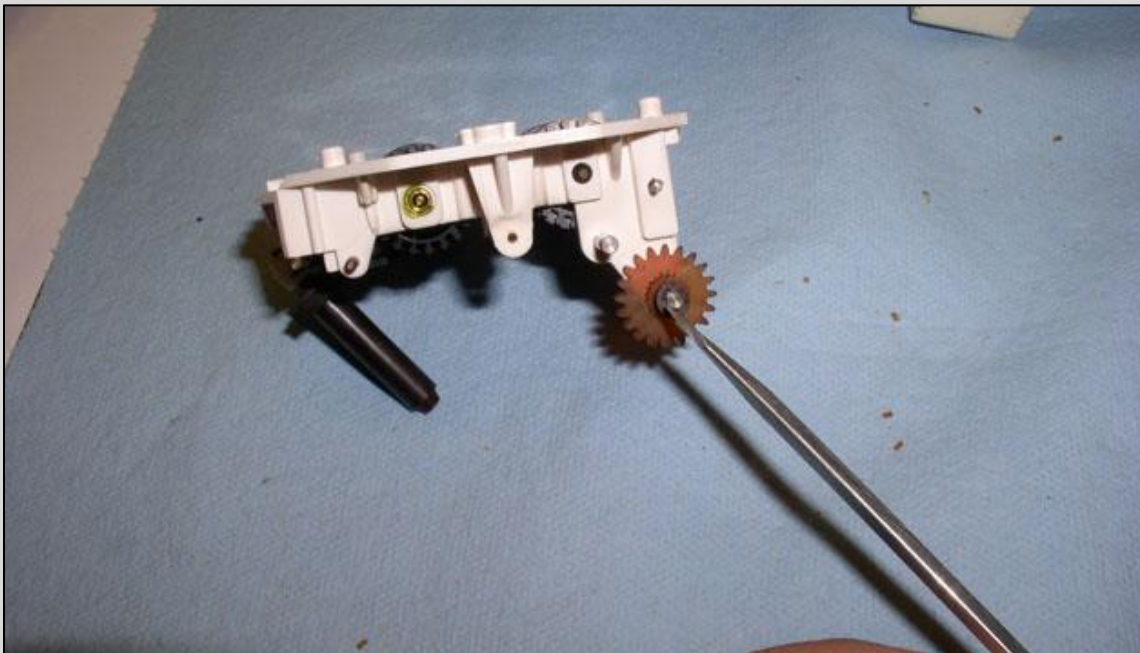
**Step 8:** The black center wheel is secured by a small snap ring. Remove this ring carefully (it can jump off the shaft quickly before you grab it with pliers) from the groove and remove it with pointed pliers.



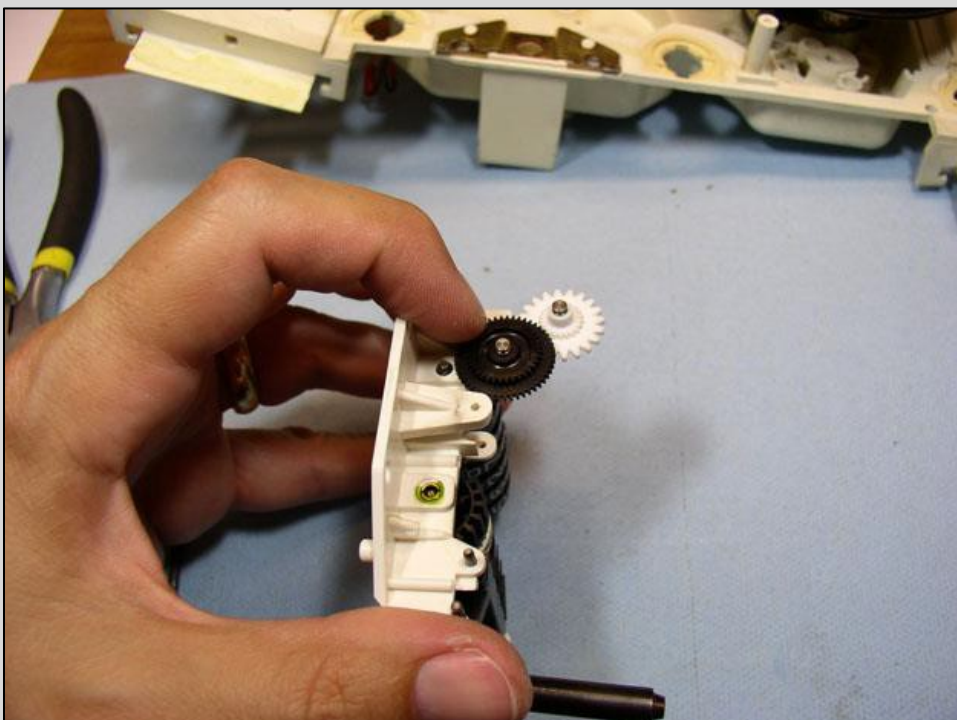
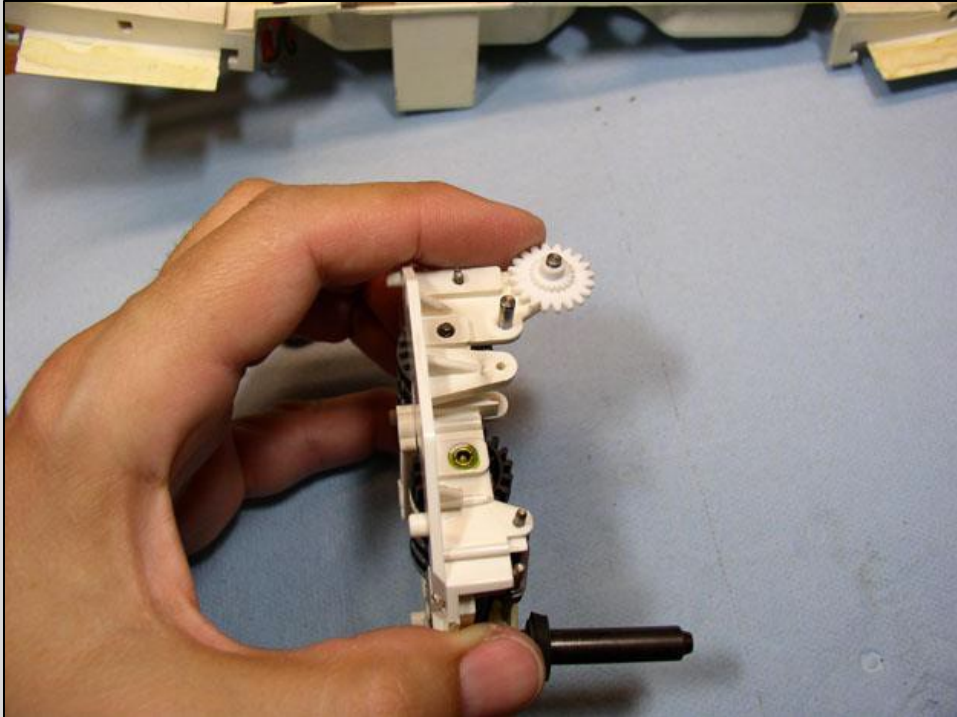
**Step 9:** Then the black gear wheel can be pulled off the shaft.



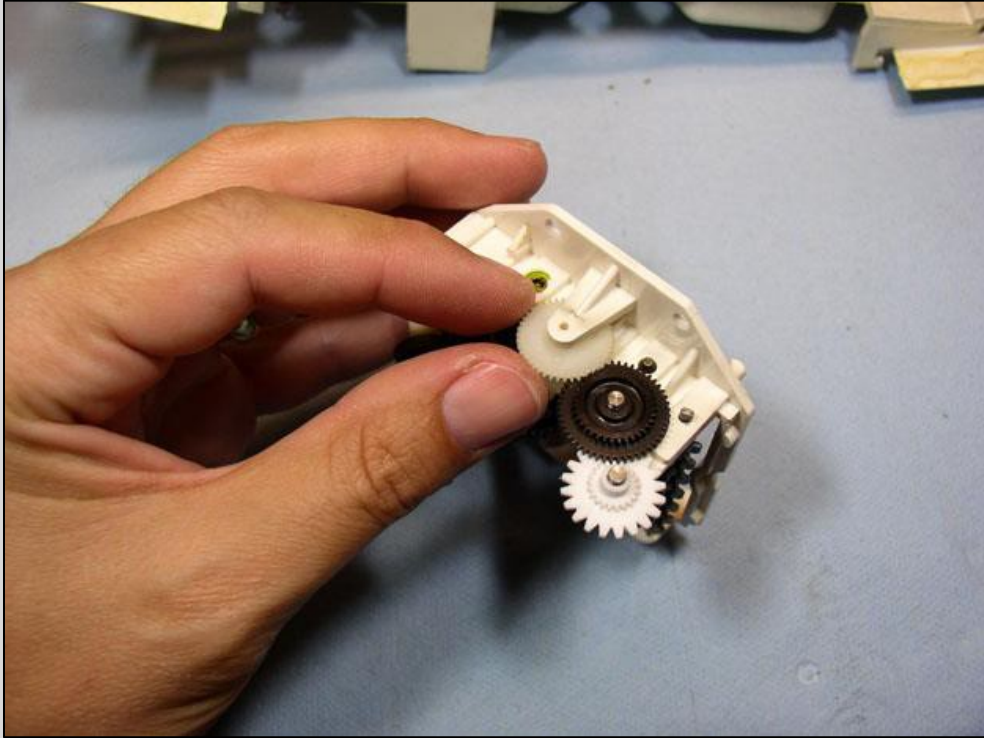
**Step 10:** The removal of the defective gear wheel is done analogously.



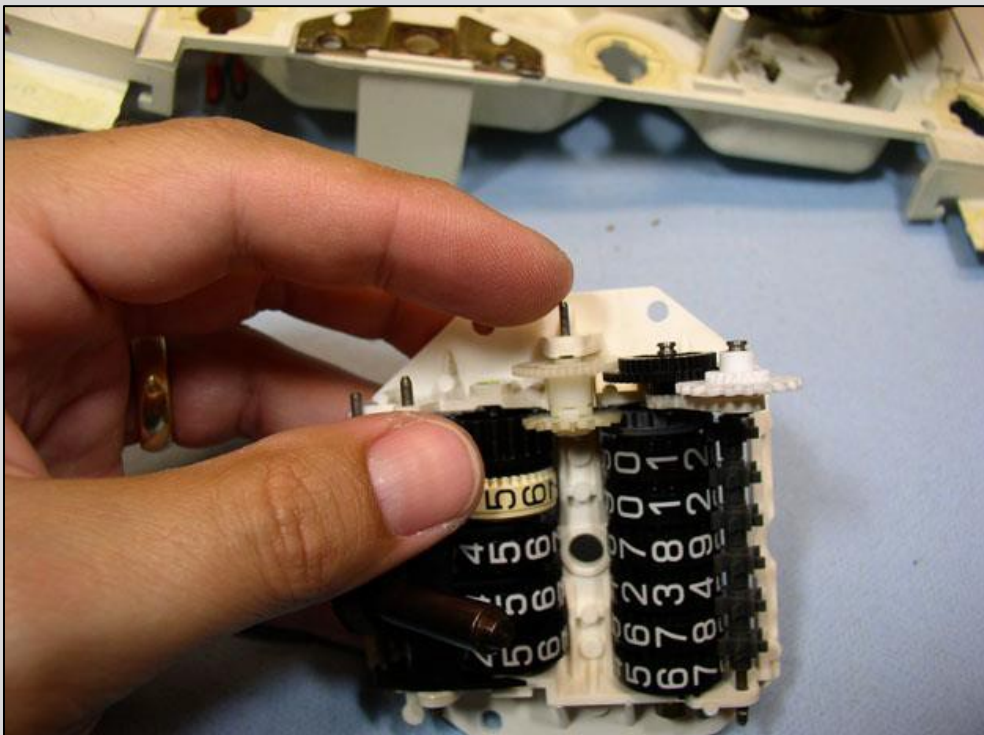
**Step 11:** Clean all parts with a clean cloth and some alcohol before mounting. Also clean the speedometer and odometer with compressed air! Please do this step also when all the broken parts of the old gear wheel have been found! Omitting this step is the most common reason for the odometer not functioning even after the gears have been replaced.



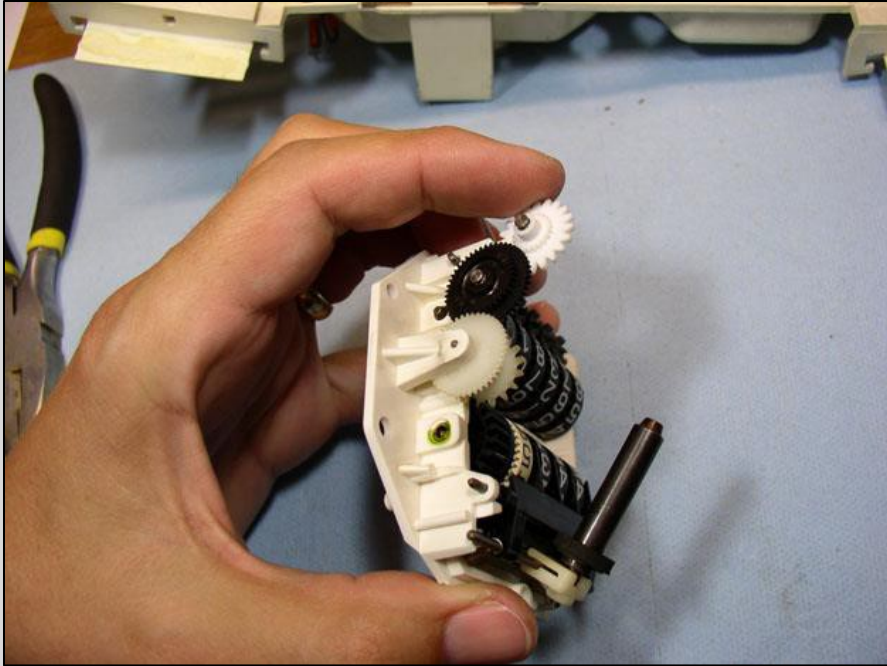
**Step 18:** After mounting the first two gear wheels, check this gear wheel pairing for smooth running. If necessary, small unevenness must be reworked.



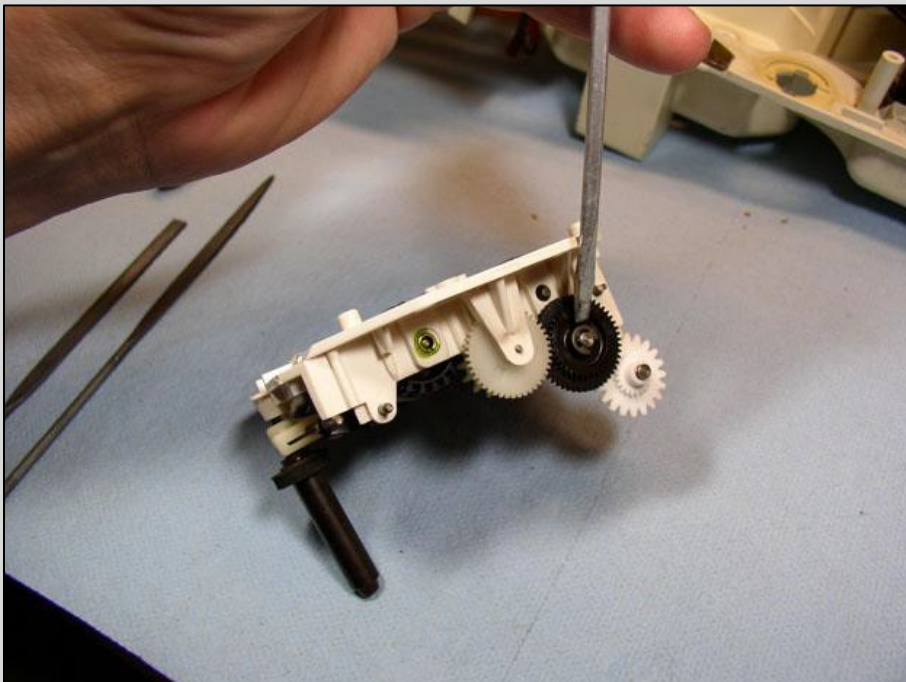
**Step 19:** Fix the drum gear wheel with the shaft.



**Step 20:** Repeated test for smooth running.



**Step 21:** Use the circlips to secure the new and black gearwheel on the shaft.



**Step 22:** Perform steps 1-4 to reassemble in reverse order. When reassembling the speedometer needle, make sure that it is again seated exactly at its mark.

### Return form

Thank you very much for your gear purchase! The size does not fit and you need another gear wheel? No problem! Just tick the appropriate box and send the gear back to us. This way we can determine the right variant for you.

#### Details of your purchase

I have ordered and received the following gear / set: \_\_\_\_\_

Invoice no.: \_\_\_\_\_

Telephone.: \_\_\_\_\_

#### Information about your vehicle

Brand, model, series, year of construction (MM/YYYY): \_\_\_\_\_

Part numbers and markings on the instrument (VDO/manufacture): \_\_\_\_\_

*Note: Unfortunately, the chassis numbers do not contribute to identification.*

#### Double gear wheels

I need the following gear:

20x21  20x22  20x23  20x29  20x30  20x32

The partner gear (arrow) has the following number of teeth:

38  40  41  47  48  49



#### Other gear type

Do you need a different gear type than the one you ordered? Describe the gears using the following information and send us pictures if possible.

Number of teeth: \_\_\_\_\_

Outer diameter: \_\_\_\_\_

Inner diameter: \_\_\_\_\_

Thickness of gearwheel: \_\_\_\_\_

Ledge: \_\_\_\_\_

Hand-drawn sketch:

If you have any questions or uncertainties, please do not hesitate to contact us:

Please send us an e-mail to [info@partworks.de](mailto:info@partworks.de) and add your phone number. This way we can support you as quickly as possible and with the right information.

**The exchange is free of charge for you according to the legal periods!**

**Return address: partworks GmbH – Otto-Stadler-Straße 9c – 33100 Paderborn – Germany**