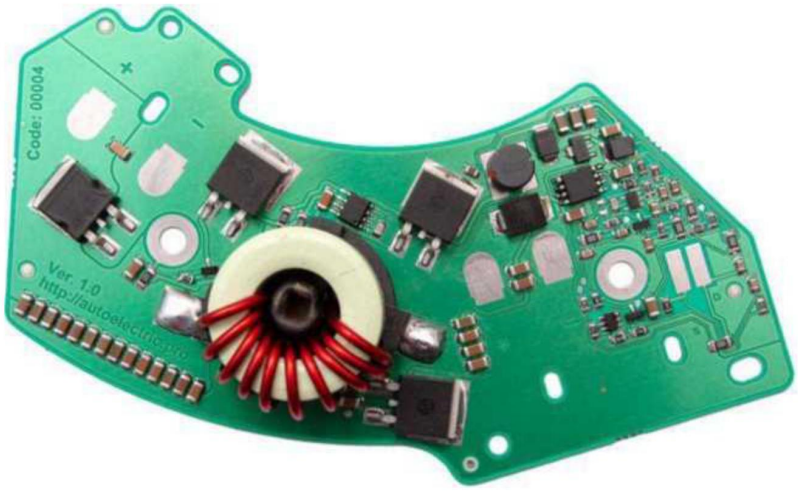
Instruction manual for replacing electronic control unit (ECU) for Peugeot&Citroën engine cooler electric fans and air conditioners (manufactured after 2008).

1) Repair kit consists of:

1.1 Electronic Control Unit (ECU):

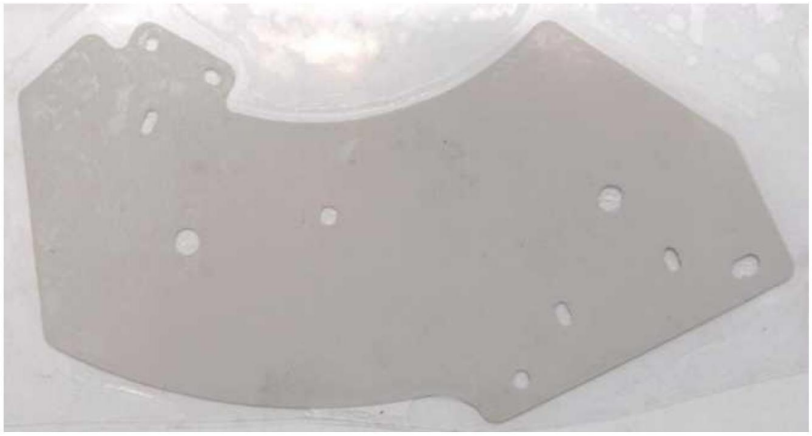


This ECU is an improved alternative version of the original one.

Key improvements:

- Protection against polarity reversal.
- Two powerful transistorized output cascades.
- Improved heat sink and resistance to mechanical destruction due to a solid aluminum-based board.
- Improved corrosion protection due to organic-silicon filling compound.

1.2 Thermal pad with adhesive coating.



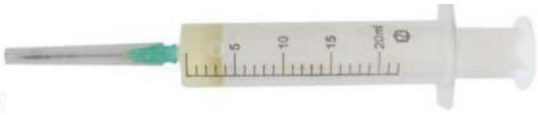
Thermal pad is protected by a special film on both sides.
Thickness: 0.3 mm. Heat-transfer capacity (W/mK): NLT 1.40

1.3 Two-component organic-silicon filling compound Viksint PK-68 (TR 38.103508-81).

Filling compound, 40 ml:

Hardening agent, 4 ml (in 5 ml or 20 ml syringes):

or



The agent is used to protect electronic and radio devices that durably operate in aerial environment and under conditions of high humidity.

If intermediate layer of P-11 is applied, Viksint PK-68 adhesion force with metal is at least 0.29 (0.3) kN/m (kgf/cm).

Viksint PK-68 compound volume and electrical resistivity at +20C to + 25C and relative humidity 60-65% is NLT 110/13 ohm/cm.

Contact with Viksint PK-68 compound within operating temperature range does not cause corrosion of anodized, unclad aluminum alloys, cadmium-plated and galvanized steel with chromate passivation, brass and silver coating. If warmed to 60, 100, 150°C it does not cause corrosion of tin coating and copper; and if warmed to 200 and 250°C it does not increase copper corrosion.

Previously, we used EDP epoxy adhesive as a filling, but we finally decided to stop using it, since when solidifying at sharp temperature variations, as well as after solidifying, cracks sometimes appear after strokes. Viksint PK-68 is devoid of all these drawbacks, since it remains elastic after vulcanization.

2) Required tools

Folding and flaring tools:

Small hammer:

Flat screwdriver 4-6 mm or a similar tool

Chisel with body width 8-10 mm and length about 15 cm or a similar tool

Hexagon bit 5 mm HEX, long L=75 mm (FORCE 1747505) or a similar tool

Vice with maximum opening at least 10 cm or two metal plates of equal thickness at least 1.5 cm.

Tools to mount the new board:

Strong cross screwdriver T15

Flat screwdriver 4-6 mm or a similar tool

100W soldering tool with a narrow tip.
(and if possible one more 50W soldering tool).

POS-61 solder and acidless flux paste (our recommendation: "TT Indicator Gel Flux "),

Cotton buds, solvent (we recommend Vershina 646 solvent, as solvents of other manufacturers often have a terrible smell).

Iron brush, NOT rigid, hand-scrubbing brush or a drill attachment (though it is not handy to use a drill). Most convenient way is to use an engraver with a mini-attachment: *"Brush, stainless steel, on a pin, d 15x3, 2mm, L 42 mm"*

Needle file (diamond-tipped is preferable)

Small pliers.

3) Preparation process

First, remove the impeller and case from the electric motor.

To remove the impeller, undo the screw with a **left-handed thread**. Left-handed thread is used to prevent the screw from loosening during rotating movements of the impeller, and to tighten it even stronger.

Red arrow in the photo below shows the direction of screwdriver rotation (clockwise) when loosening the screw that holds the impeller. It is the same as the impeller rotation direction.

After undoing the screw, try to remove the impeller. You may find it unyielding, as luck would have it. Very often the impeller is attached very tightly, and you will have to put efforts to take it off, the key point here is not to use force, or you can break it. Typically, it may be removed by gentle twitching and pulling actions or gently tapping by a rubber hammer (or something of the like) on the back. This process may take a few minutes. The key point here is to be patient, not to panic, and not to apply force under no circumstances, and you will make it.

After the left-hand thread screw is undone and the impeller is removed, **we strongly recommend that you tighten up the screw to the very end**, since if you lose this left-hand thread screw it could be pain in the neck to find the one to replace it.

Please refer to Chapter “Unforeseen Situations" to know what to do if you cannot undo the screw with a left-handed thread, or if you have damaged or lost it.

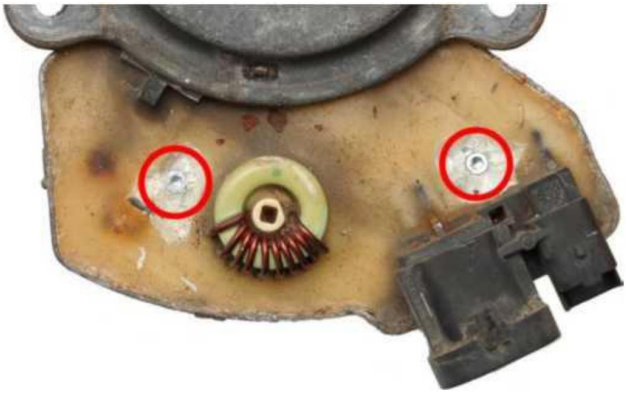
Then undo three self-tapping screws that attach the electric motor to the case. We recommend screwing these screws back in the case as well. Although, if lost it will be much easier to find a replacement than in case of the left-hand thread screw.

Finally, you will get: a case with three snugged-up self-tapping screws, impeller and electric motor with a snugged-up left-hand thread screw.

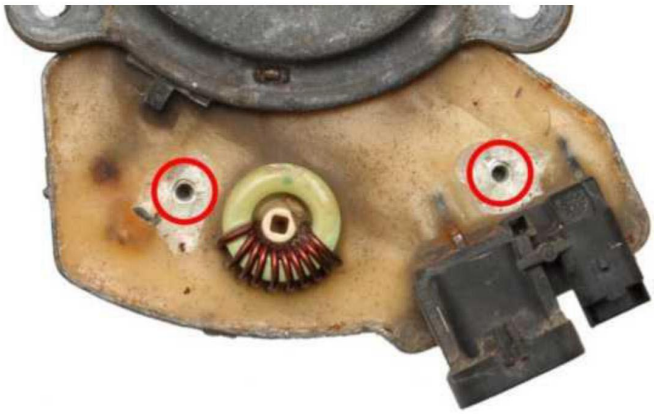
4) Remove protective metal casing and undo two screws with sealing.

Using a flat screwdriver 4-6 mm wide or a similar tool pick away the metal cover trying not to damage the plastic connector.

With the help of any sharp tool clear away the sealant in places marked with red circles in the photo below until you see screw heads. Clear away the sealant on the inside surface of the heads where the screwdriver will be applied.



Using a **strong** (sometimes it is not easy to undo these screws) **T15 cross screwdriver** undo the screws, leaving the holes open.



Retain these screws, as you will use them to mount the new ECU.

Unforeseen situations:

a) Impossible to undo the screws due to severe corrosion:

- First of all, smooth out the screw head, tinplate it using solder and flux paste (this will significantly increase the heat contact between the soldering tool and the screw head). Then properly warm up the head with the soldering tool and try to undo it.
- If the screw is still resistant, the edges are stripping, you can make a notch for a flat screwdriver using an engraver (graver, drill) with a mini-abrasive cutting wheel (d 32 x 2.0 x 1.0 mm). For example, we use a small 12W motor from the fan of WEBASTO self-contained heating unit (EBERSPÄCHER can be used as well, but that motor is designed for lower voltage) with a special collet attachment that can be found in the radio market.

or

b)

If inner edges are stripped you can make a notch for a flat screwdriver using the engraver (graver, drill) with a mini-abrasive cutting wheel (d 32 x 2.0 x 1.0 mm).

5) Remove the back cover.

5.1 Why should I need to remove the back cover:

a) To ensure easy soldering of the brush assembly to the board.
b) To check the state of brushes and brush holders.
c) To check the state of the sliding bearing and its spring holder in the back cover.
d) To check the state of winding.
e) To check the state of magnets with holders.
f) To check the state of manifold.
g) To check the free play and fixation of the front ball bearing.

If you have already removed the back cover and/or are confident of the integrity of all the above you can skip this operation. However, in this case it will be a bit more complicated to replace the ECU board. Refer to the Chapter "Unforeseen Situations" to know how to replace the ECU without removing the back cover.

5.2 Folding process (bending the blades):

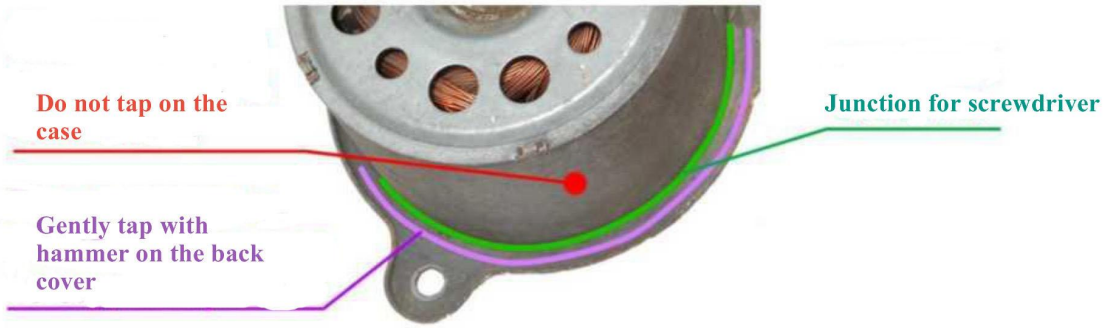
Attention! All strokes must be gentle and only as specified in the instructions below, otherwise you can damage the magnets. During all the manipulations, try not to bend the front cover of the electric motor, otherwise the rotor may be jammed due to a squint, leading to higher power demand of the electric motor and its possible failure.

Using a small hammer and chisel with body width 8-10 mm and length about 15 cm or a similar tool gently fold he blades. Gently tap with the hammer to couple all the blades trying not to damage them.

The cover is attached by 5 ledges, each having 2 blades (10 blades altogether).

Refer to the chapter “Unforeseen Situations" to know what to do if someone has already taken off the back cover and folded the blades too hard, or flattened the ledges, or welded the cover on these ledges.

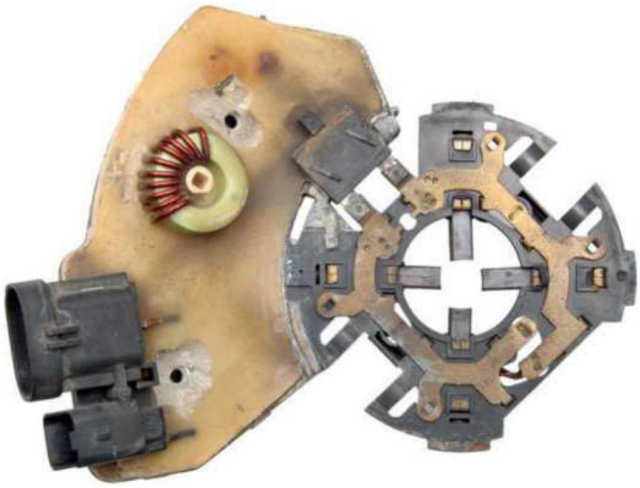
After you couple all 10 blades on metal ledges, try to gently remove the back cover. Using a small hammer and flat screwdriver 4-6 mm (or a similar tool) try to pick away the back cover at the joint, trying not to bear against the plastic ledges of the brush assembly. The tool must be as sharp as possible so as to easier thrust in the gap between the case and the back cover. If necessary, tap **very gently** around the perimeter of the back cover using the hammer, trying not to deform it. Do not tap on the case of the electric motor, otherwise you can damage the magnets. If the cover does not ease up, check the blades, maybe you have not coupled them to the end.



After you detach the back cover, carefully remove the brush assembly together with ECU (ECU must remain in a metal enclosure). Be very careful when removing the brush assembly from the ECU, as the plastic case of the brush assembly is very fragile.

Along with the faulty ECU, check the following elements in the brush assembly:

a) Integrity of brushes. The brushes must not be jammed or worn out by more than half.
b) Integrity of brush holders. Brass brush holders must not be destroyed under the influence of corrosion. The strings must not be damaged.
c) Connector integrity. The connector must be intact without chips and cracks.

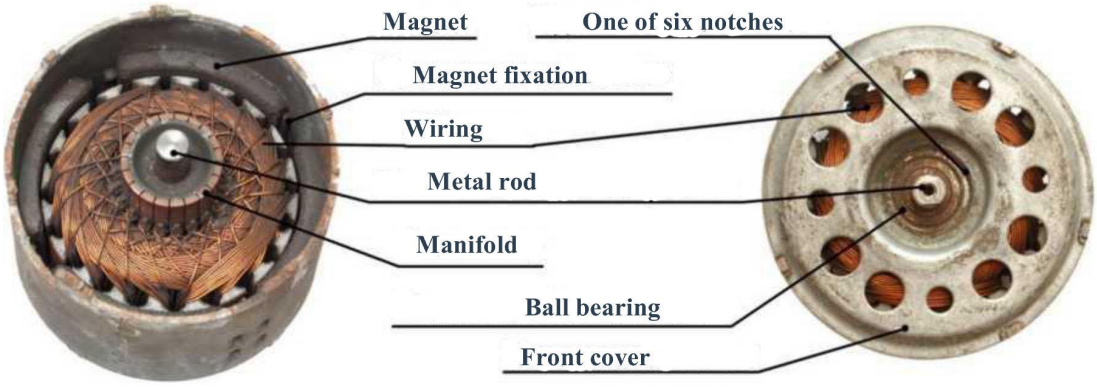


Refer to the Chapter "Unforeseen Situations" to know what to do if the brushes are jammed or worn by more than half, and if at least one of the brush holders, plastic brush holders or connector is damaged.

5.2 Electric motor and back cover integrity check

Perform the following checks inside the motor casing:

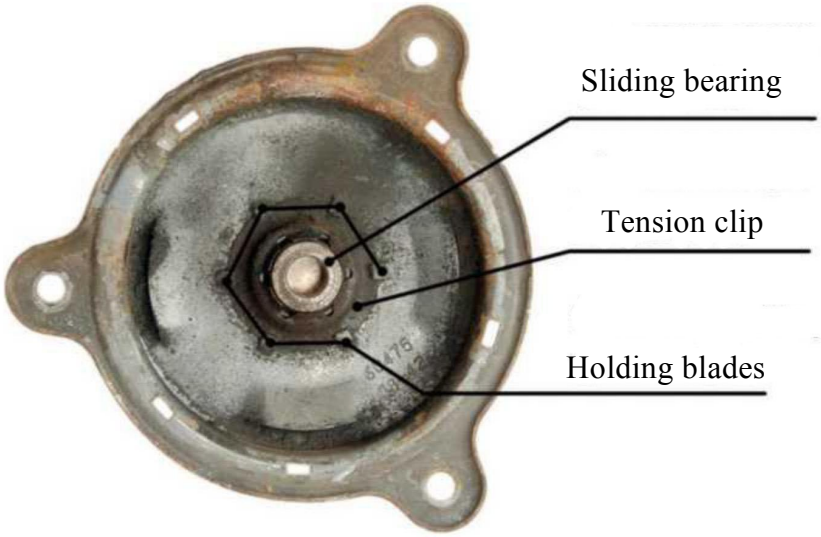
a) Magnet integrity. The magnets must be intact without cracks.
b) Magnet holder integrity. Magnet holders must properly fix the magnets preventing their shifting.
c) Winding integrity. The winding must not be scratched or blackened due to overheating.
d) Manifold integrity. The manifold must be clean. All manifold metal sectors must be intact.
e) Sliding bearing must not adhere to the metal rod. It must remain in the back cover.
f) Front sliding bearing bracing. The bearing in the front cover must not come out of the recess, it must be fixated by six notches. You can check it by slightly pulling the rotor in different sides to ensure that the front bearing does not come out.



Perform the following checks in the back cover:

a) Tension clip integrity. The bearing must be tightly fixated inside the tension clip without sliding. The clip blades must be intact, without cracks and chips, nor must they be destroyed under the influence of corrosion.
b) Back cover integrity. Back cover fixing blades must tightly clamp down the clip, preventing it from sliding. If the spring slides, a squeak sound will be heard during fan operation.

(c) Sliding bearing integrity. The bearing must be tightly (without free play) slipped over the metal rod of the rotor without sliding inside the tension clip.



Refer to the Chapter "Unforeseen Situations" to know what to do if the bearing is broken, the tension clip is damaged, and if the bearing slides inside the tension clip, or the tension clip itself slides under the fixing blades.

5.3 Prepare to install the new ECU.

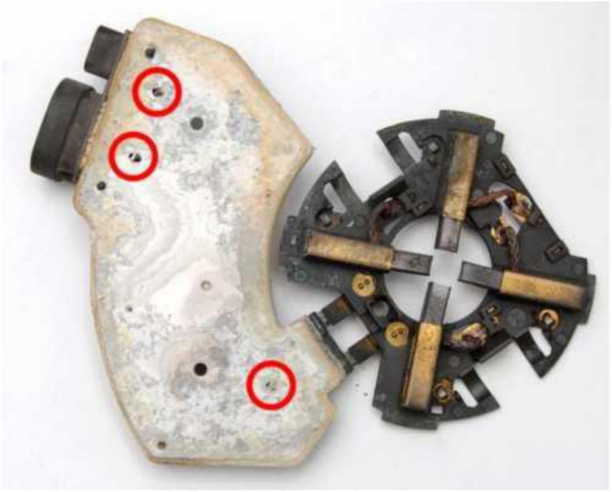
We will need the following components: brush assembly, connectors, and aluminum casing which houses the faulty ECU.

First, use flat screwdriver 4-6 mm or a similar tool to remove the faulty ECU from the aluminum casing, gently picking it it around the perimeter, trying not to damage the plastic case of the brush assembly and the connector. It is at this very point that the plastic case of the brush assembly is most often damaged – when it is removed from the aluminum case. Thus, you should be very careful.

This image shows the place where the plastic case of the brush assembly is snapped into the ECU aluminum casing. In this moment – when trying to slide plastic element out – most damages occur.

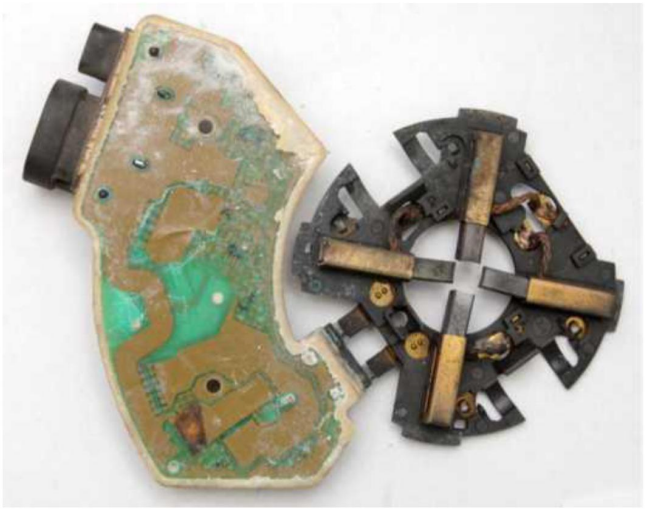
However, if you make a slight damage to the plastic, it is no big deal, it may only result in some inconvenience in future assembly.

Then tear off the aluminum pad from the faulty ECU board, having previously flatten metal blades with small pliers (one blade on the brush assembly and two on the connectors – marked with red circles)



We do not need this aluminum plate anymore.

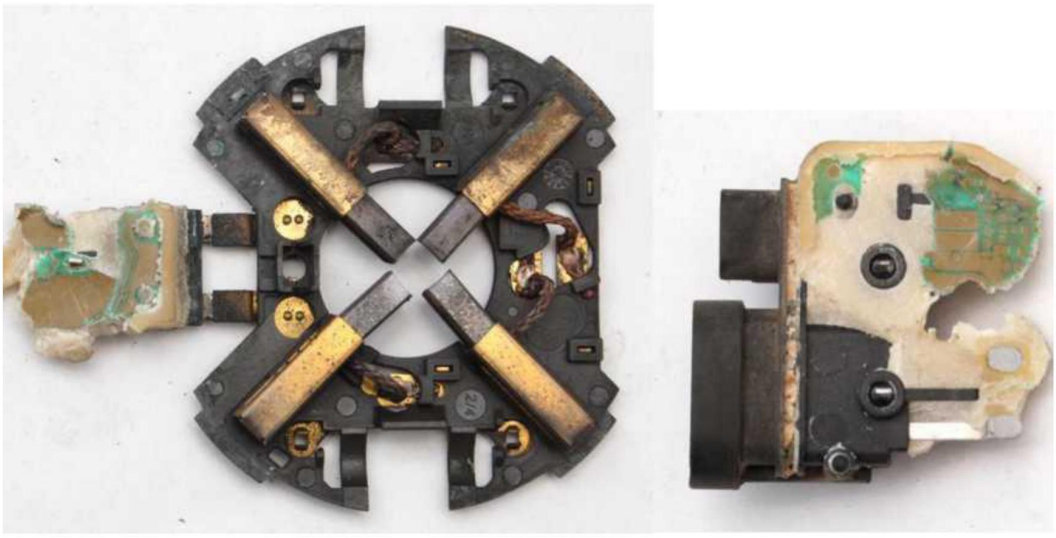
After tearing off the aluminum pad, the brush assembly with the faulty ECU will look as follows.



Now gently clear away the sealant around the pins using any sharp tool, and smoothly tear away the connector and the brush assembly from the faulty ECU film board. You may tear the film itself, we won't need it.

We won't need this faulty ECU any more.

Finally, we have the following: aluminum case for the ECU, T15 star head screws, brush assembly and connector (possibly with torn residues of the faulty ECU film board)



Refer to the Chapter "Unforeseen Situations" to know what to do if the electric pins of the connector or brush assembly are damaged, as well as if you did not manage to undo the screws from the aluminum case.

Now clean the aluminum cover for the ECU from oxides and anything else. To do this, you will need a non-rigid iron brush, either a hand-scrubbing brush or a drill attachment (it is not handy to use a drill).

But the easiest way is to use the engraver with a mini-attachment: *"Brush, stainless steel, on a pin, d 15x3.2 mm, L 42 mm."*

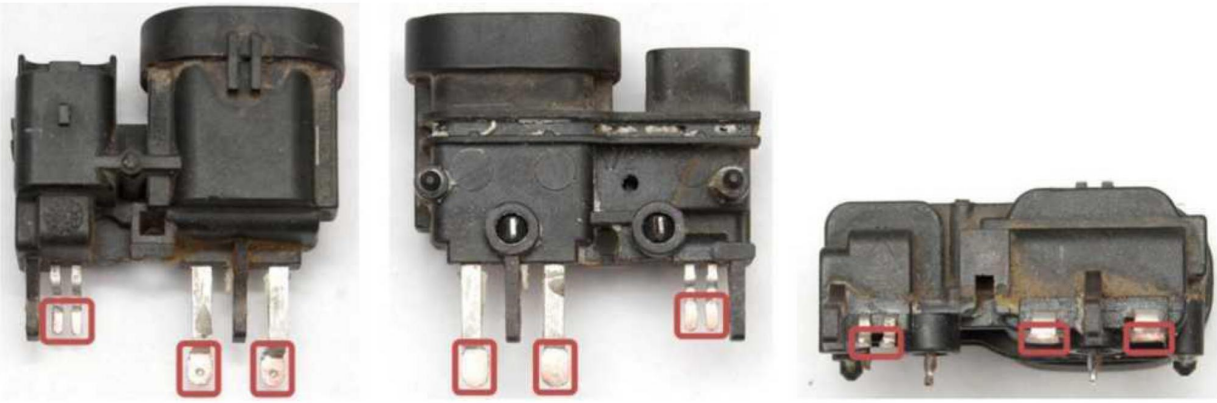
BEFORE **AFTER**

Try to clean the inside surface as thoroughly as possible, as it will serve as a heat sink for the new ECU. The better the heat sink will be, the lower the ECU heating rate will be, and, thus, the more reliable your fan will be. Do not use rigid brushes, otherwise you will leave deep scratches, which will have a negative impact on the heat sink.

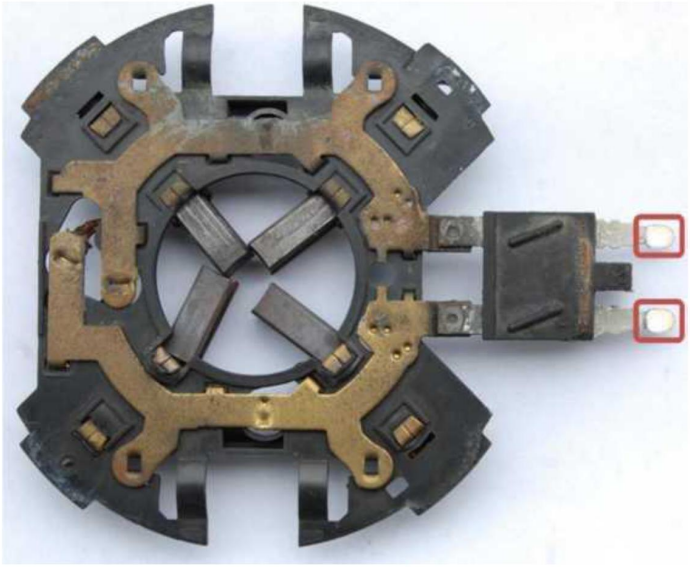
Once again, the easiest way to clean the inner surface of the aluminum casing for the ECU, especially at corners, is to use the engraver with a mini attachment. Cleaning with a hand-scrubbing brush or a drill brush attachment will not bring you the same pleasure as cleaning with an engraver.

Next, clean the brush assembly and the connector from sealant and film board residues. Smooth out all contacts ("butts") in soldering points in all directions using a needle file until you see yellow glitter (including on the sides, around the perimeter). The key point here, is not to overdo, otherwise the contacts will become much thinner than previously.

The places that you need to clean up with the needle file are marked with red squares below. The third image shows that the contacts are smoothed out on the sides around the perimeter.

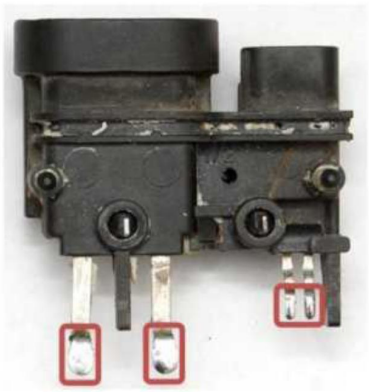


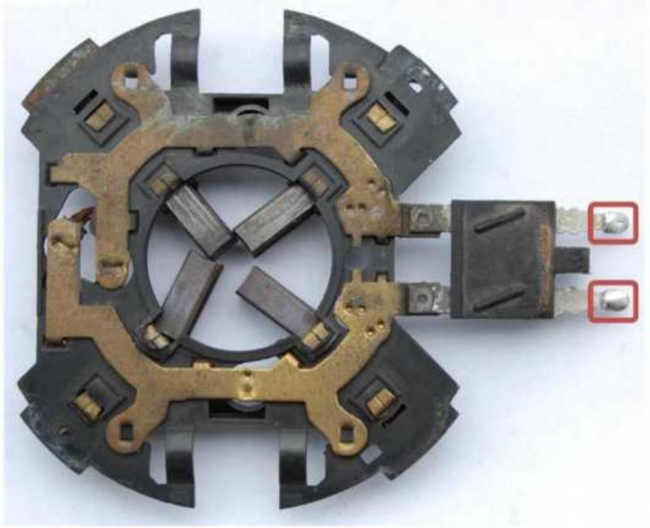
Contact sites of the brush assembly are smoothed out in the same way as the connector – on all sides, on the top, bottom, and around the perimeter.



Then tinplate contacts with a soldering tool, acidless flux paste and POS-61 solder. Contacts must be tinplated immediately after smoothing out with a needle file, as the smoothed surface rapidly oxidizes, darkens and becomes more difficult for soldering. 50 W soldering tool is all you will need for tinplating. You must ensure that the solder evenly covers all the contacts without gaps. The solder must cover them from all sides, top, bottom, and around the perimeter. The more evenly the solder covers the surface of the contacts, the better the soldering quality is. If the solder is not spreading evenly across the surface, then the temperature is too low, you should take a more powerful soldering tool. Moreover, the solder may poorly spread out due to poor cleaning of contacts with a needle file or insufficient flux paste (or inadequate flux).

The places where you need to solder the contacts are marked with red squares. The third image shows that the contacts must be soldered around the perimeter as well.



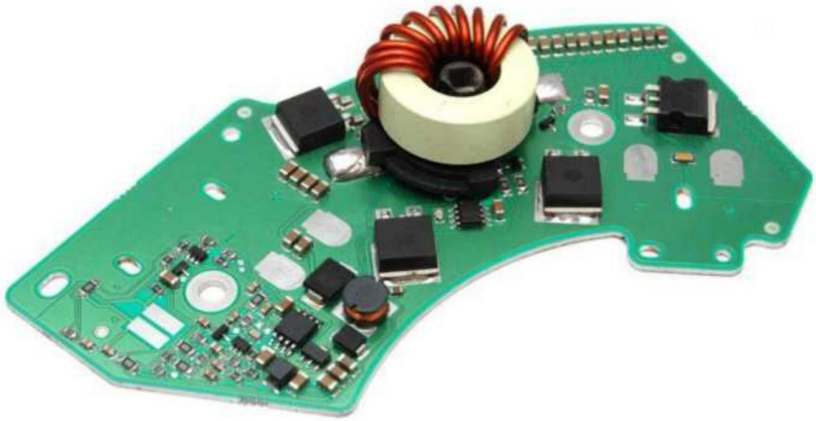


Connection points of the brush assembly are tinplated in the same way as the connector – on all sides, on the top, bottom, and around the perimeter.

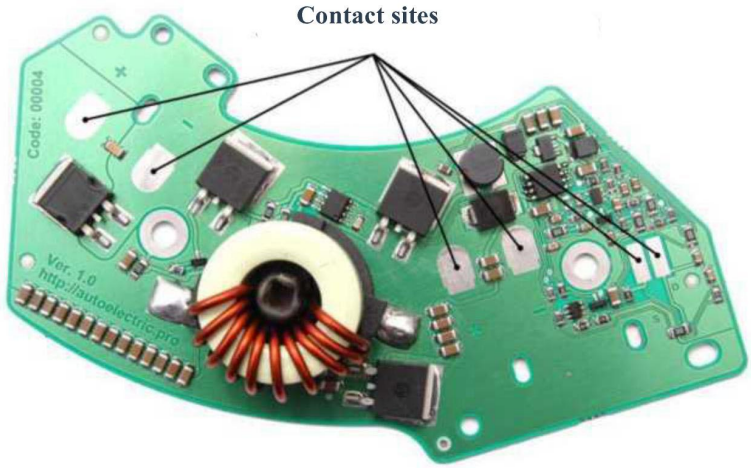
We strongly recommend that you use acidless fluxes or rosin (however, rosin soldering is more difficult), since many years of practice have proved that acid fluxes, especially in autoelectrics, are very harmful. Over time, acid flux begins to eat the soldering area, it facilitates oxidation of contacts, even in case of good cleaning and subsequent insulation of the soldering place. Acid flux is initially left inside the soldered joints and eventually begins to leak out, destroying everything in its path. Thus, grounding on our practice, we advise you to use TT Indicator Gel Flux. It is cheap and helps to achieve a proper soldering quality, and it does not destroy the soldering place. The only thing you should do after using this flux is to clean the place of soldering with a solvent, since this flux shows a slight conductivity.

Now what concerns the solder. We strongly recommend that you use POS-61 solder, because, for example, leadless solders destroy the soldering place over time as a result of temperature drops and vibration. Lead solders have a greater elasticity and longevity of the soldering place. Similarly, it is not recommended to use high-lead solders, as they require high temperatures and you will need a very powerful soldering tool, which may lead to excessive overheating of adjacent components. There are also alloys that may be fused at temperatures below 100°C (Wood's Alloy, d'Arcet's alloy, Rose's alloy). They are also not recommended for use because the operating temperature of the board may theoretically reach 100°C, and these soldering alloys will turn into fluid – the consequences can only be guessed.

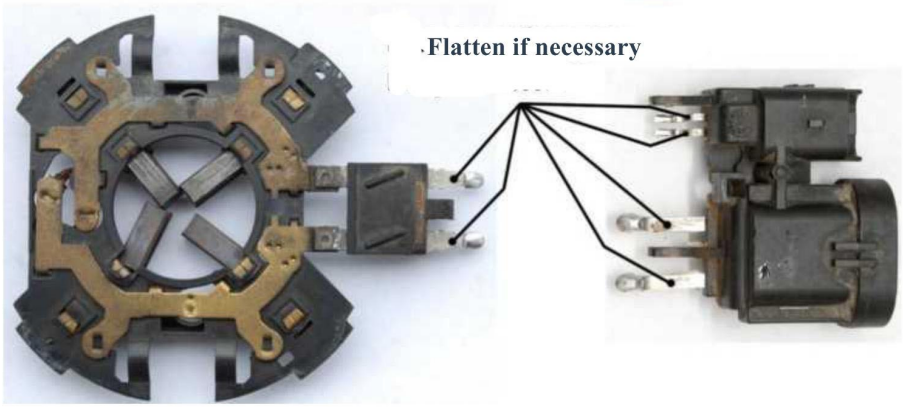
5.3 Install the new ECU.



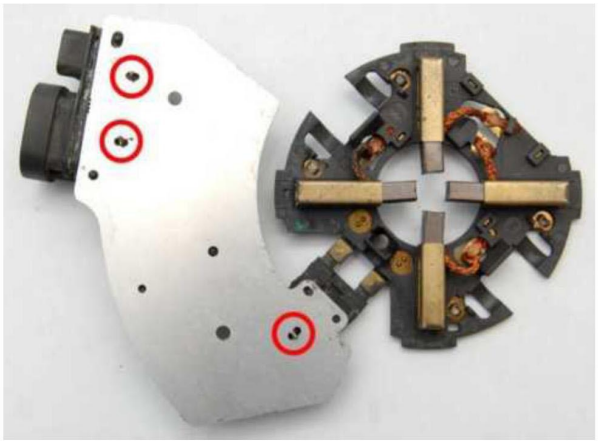
First, apply the brush assembly and connector to the board in the mounting points, and ensure that the pins exactly match the contact sites on the board.



If the pins on the connector and the brush assembly do not match the contact sites on the board, fold them using small pliers. Ensure that the pins match the contact sites not only in the plane – they must also touch the contact sites on the board.



Once you match the pins of the connector and the brush assembly with the contact sites on the board (in all 3 dimensions), attach the connector and brush assembly to the board using metallic latches, rotating them with the help of small pliers.

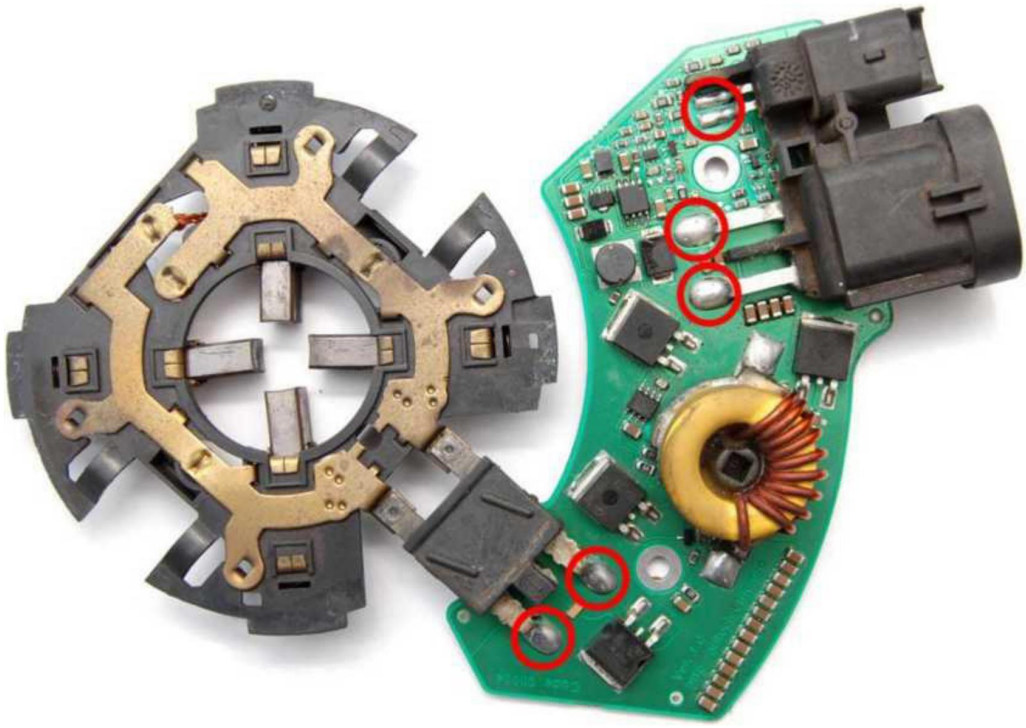


Refer to the Chapter "Unforeseen Situations" to know what to do if the metal latches are damaged.

Now it is one of the most crucial points. We need to solder the connector and the brush assembly to the board. As the aluminium board has a very strong heat sink, we will need rather a powerful soldering tool of at least 100 W. The tip of the soldering tool must be narrow, otherwise the soldering process will not be handy. For soldering use the above POS-61 solder and an acidless flux paste (our recommendation: "TT Indicator Gel Flux".

If you have a soldering station (or an induction station, which is even better), you will need a special tip, which is a truncated cylinder at 45° with a diameter of 4-5 mm. This tip has a very good heat output. It may not be possible to solder tidy and evenly using other types of tips. Mainly this tip and suitable heating temperature will ensure the best quality of soldering.

You should be very careful when soldering, try not to touch, either by the soldering tool or by the solder droplets, the adjacent parts. You should ensure that the solder has evenly spread around the contacts and contact sites. To achieve a good quality of soldering, allow the contacts and contact sites to warm up properly, and the solder will become liquefied enough to spread out evenly.



If there is a gap between the pins and the contact sites, you can press on it while soldering, for example, with a screwdriver and then remove it after the solder will cool down. Try to ensure that the tip of the soldering tool is clean, has no soot deposits, otherwise the soldering process will become a torture. There must be no excess solder on the tip of the soldering tool, or it can drip on the board at the wrong place. The tidier and more even the soldering place is, the better the electric contact will be. Broad contacts will provide 50A electrical current, but in case of bad contacts due to poor soldering the pin and the place where it touches the contact site

will be overheated, which can result in loss of contact because of burning, as well as the connector melting. The temperature in the room below the room temperature, as well as the draught, may hinder the soldering process considerably.

Attention! If you do not have any experience in soldering or you are not sure you will manage to get a proper soldering quality, it is better to entrust this operation to a professional, as aluminum board soldering requires a particular care.

Now, carefully clean the soldering place from flux and other dirt using cotton buds and solvent (our recommendation: Vershina 646 solvent, solvents of other manufacturers often have a terrible smell).

If the flux is poorly cleaned, there may be slight parasitic currents, since the fluxes may have some resistance, and the presence of flux residues may disturb the adhesion with epoxy resin.

Next, mount the board with the connector and the brush assembly in the aluminum casing. First, clean the inside surface of the aluminum casing from all dirt and mud using solvent wetted cloth or cotton pads. Any tiny piece of dirt may prevent firm adherence to the casing and thus worsen the heat sink.

Then, carefully remove protective films from the thermal pad and place the pad inside the aluminum casing so that the holes in the thermal pad match the holes in the case. Ensure that there is no dirt or mud on the thermal pad and on the inside surface of the casing.

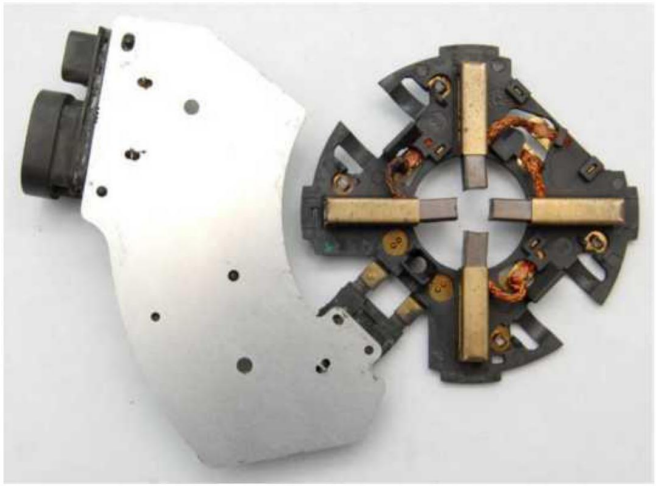
Holes may not be visible under protective films, but they have to be there.

If you do not have a thermal pad, you can use thermal grease. Apply it evenly to the inner surface of the aluminum casing.

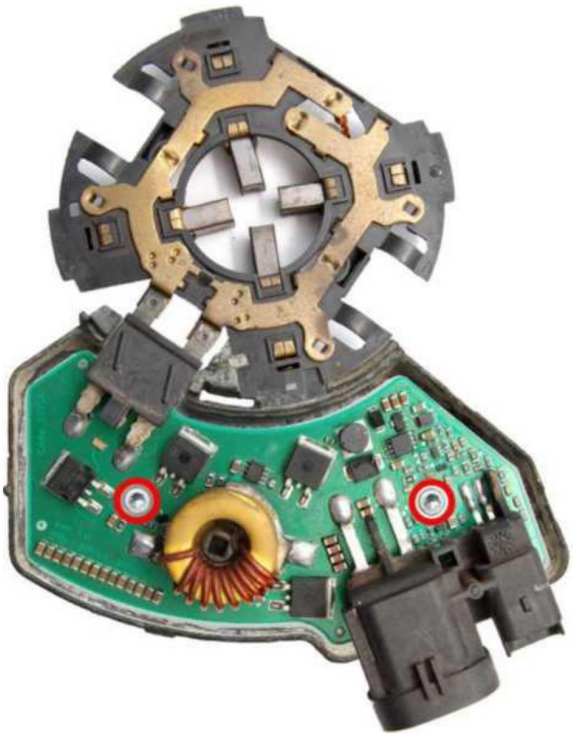
The main purpose of the thermal pad is to fill all the ridges and wrinkles in the aluminum surface through its elastic properties, thereby increasing the efficiency of the heat sink.

There shall be no wrinkles on the thermal pad (it is handy to use tweezers to locate the pad).

Next, wipe the back of the ECU (from the aluminum side) from mud and dirt with solvent wetted cloth or cotton pads.

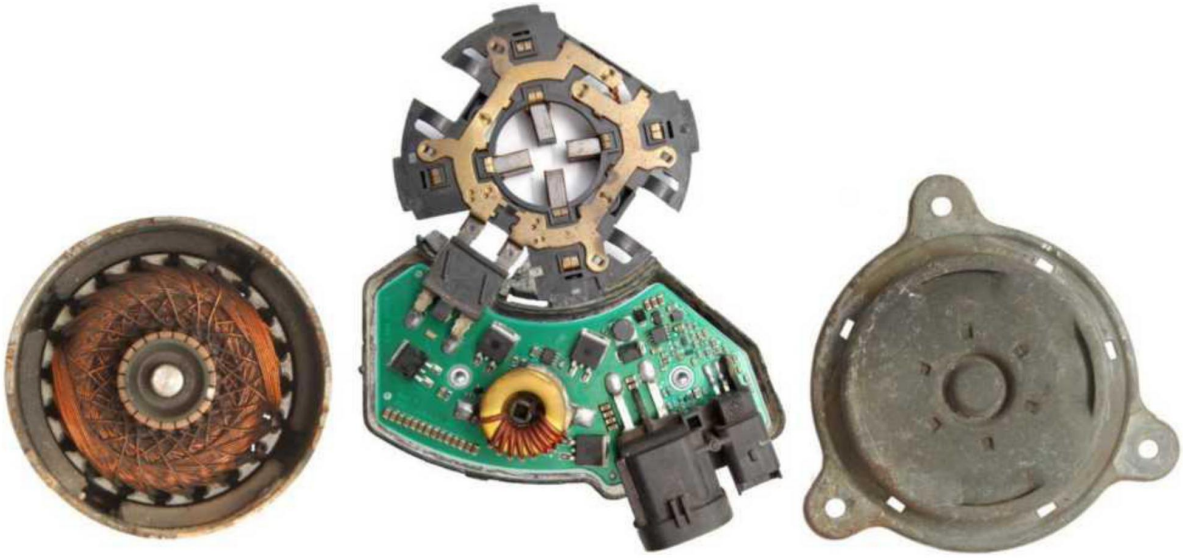


Finally, place the entire structure (board, connector and brush assembly) into the aluminum casing with a thermal pad inside and screw in two T15 star head screws (which originally fixed the faulty ECU board).

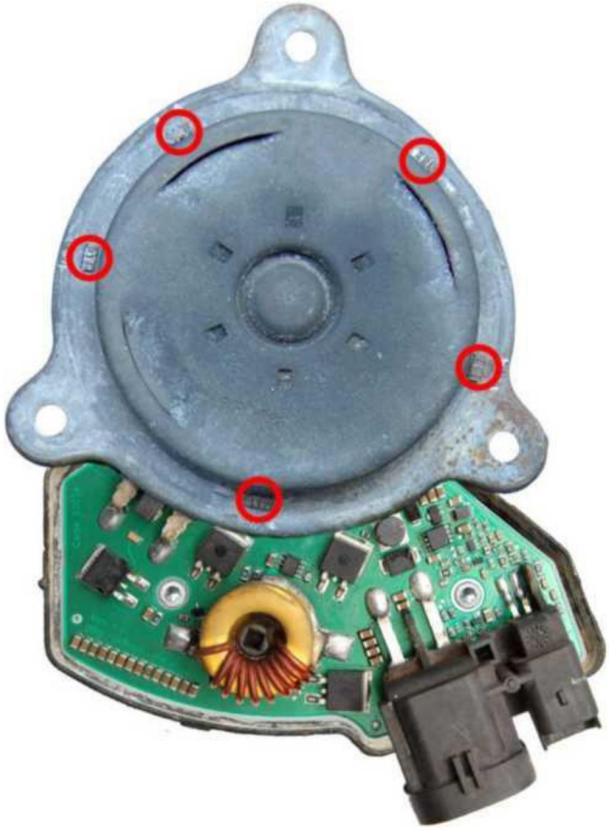


Refer to the Chapter "Unforeseen Situations" to know what to do, if T15 star head screws were lost or damaged or if you did not manage to undo at least one screw.

Now take the electric motor, brush assembly with the ECU and the back cover. Use your fingers to pull aside the brushes, and put the brush assembly on the manifold, then fix the ECU casing on the electric motor enclosure. Then, mount the back cover by inserting the metal axis in the sliding bearing and allowing the electric motor case ledges go through the holes on the cover all the way in.



Now we need to open out the blades to fix the back cover.



To open out the blades to fix the back cover, use the front cover as a support. This step must be given special attention.

To do this we will need the following tools: small hammer, chisel with body width 8-10 mm and length about 15 cm or a similar tool, hexagon bit 5 mm HEX, long L=75 mm (FORCE 1747505) or a similar tool, vice with maximum opening at least 10 cm or two metal plates of equal thickness at least 1.5 cm.

In the picture below the red circle indicates the area that can never be crossed over when you use the vice or metal plates, otherwise you will deform the front cover, which will result in rotor buckle, excess friction of the metal axis on the back cover and the sliding bearing. Such excess friction leads to heat expansion of the metal axis and sliding bearing jamming, and this in its turn results in even greater friction. Among the consequences may be the damage of the tension clip, sliding bearing and, as the worst case scenario, overheating and wiring burning.

The **green** circle marks the area which shall be used as support when opening the vice or metal plates. This area corresponds to the vice opening (or the distance between metal plates) from 9.4 cm to 9.6 cm.

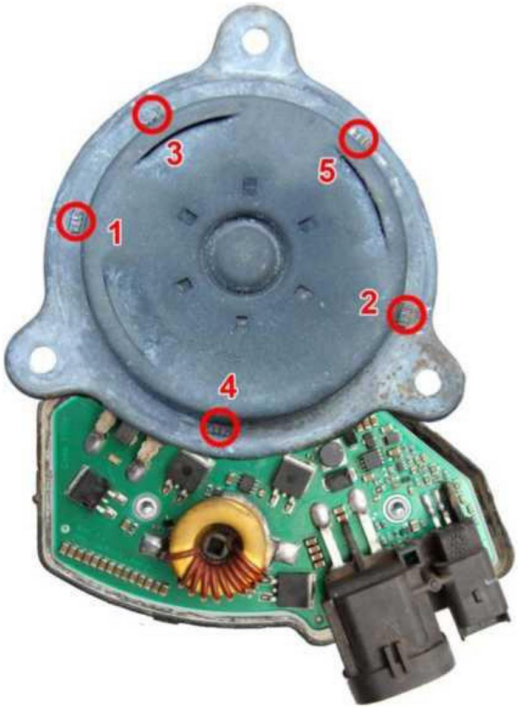
If the distance is less than 9.4 cm, the bulge part of the front cover will be affected leading to its deformations (the consequences are described above).

If the distance is greater than 9.6 cm, the electric motor will come

off the vice or metal plates. The ideal distance is 9.5 cm. When placing the electric motor on the vice or metal plates, ensure that the bulge part of the front cover is not affected.

After you create a reliable support, you can continue with the flaring process itself. This process may require some creative thinking. Much will depend on the condition of the blades after the folding step when the cover was removed. At this point, you need to make sure that you have a reliable fixation of the back cover, but do not overdo. Turn the motor on the vice or metal plates so that the part opposite to the ledge position is used as a support and with the help of chisel with body width 8-10 mm and length about 15 cm or a similar tool, and hexagon bit 5 mm HEX, long L=75 mm (FORCE 1747505) or a similar tool open out blades along with slight taps by the hammer. We do not recommend tapping heavily, as the magnets in the electric motor case may creak as a result of heavy strokes. If you did not manage to unbend the blades, you can use the chisel to make a notch in the center of the ledge, which will expand the ledge itself to all sides and create a reliable back cover fixation. You may need only one of these tools: only chisel or only a bit. The key point here is not to overdo. After you expand one of the ledges, continue with expanding the next one locating on the opposite side, having previously changed the position of the electric motor, so that the place where the ledge is to be expanded is used as a support, ensuring that the bulge part of the front cover is not affected.

The numbers in the picture below show the preferred sequence of ledge expanding in order to avoid unnecessary distortions of the back cover.

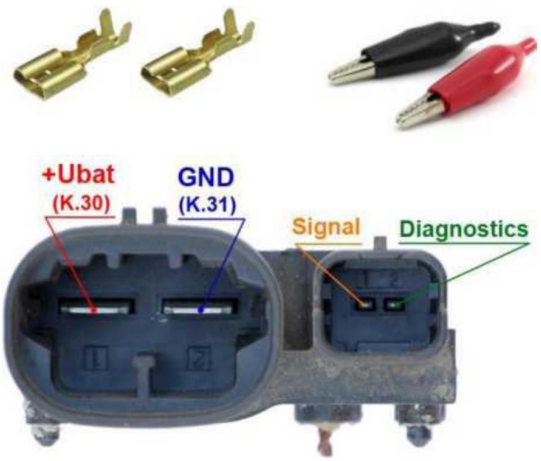


Refer to the Chapter "Unforeseen Situations" to know what to do if you deformed the front cover or if you did not managed to expand at least one ledge.

2) Functional test

Now, before you fill the ECU board with epoxy resin, perform functional test of the electric motor together with the ECU. We will need a voltage source of 12-14V: car battery, power supply (for example, computer power supply). You will also need current and voltage meter: tester, current pliers or a power supply source with a built-in volt- and ampermeter.

To test the electric motor and the ECU, it will be enough to apply current of 12-14V on power connector "+" to Contact No. 1 (+Ubat) and "-" to contact No. 2 (GND). You do not have to connect anything to a signal (small) connector. After the above manipulations, the electric motor must smoothly spin to the maximum speed. In order to conduct this test, the wires must be sufficiently wide (at least 4 mm^2) and not too long.



Otherwise, voltage slump may take place and the ECU under-voltage protection will be activated resulting in motor stop.

The contact with the connector must be good as well, you can use the appropriate alligator clips, terminals, just make sure they do not create short circuit. The right socket will be even better. Motor spinup to the maximum speed when the power is supplied without a control signal corresponds to the emergency mode for all Peugeot&Citroën fans.

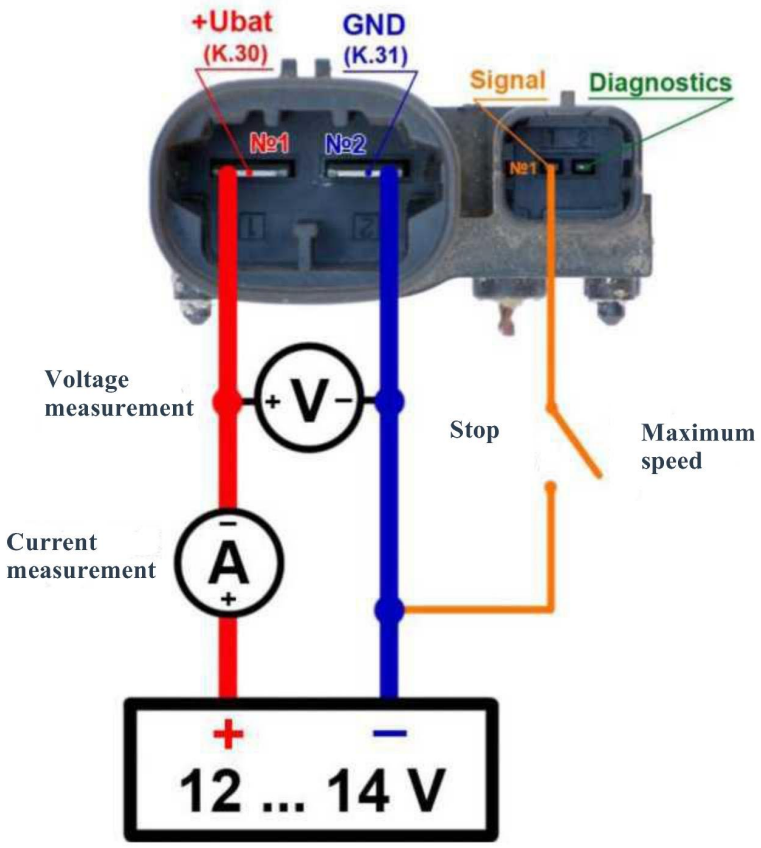
At maximum speed without the impeller, electric motor consumption current at 12-14 V shall not exceed 8-9 A.

Ideally, it should be 5-6 A. If this value is greater than 9 A

this means that, perhaps due to the deformation of the front cover, rotor or sliding bearing jamming has occurred or short circuit occurred in the winding due its damage. The winding might have been slightly burnt, but you did not pay attention to it. Maybe one of the magnets has chipped off and created rotor jamming (a magnet chip or any other dirt). Another reason, which occurs very rare, is when someone has already dismantled the motor and affixed the unfastened magnets not the way they should be. However, too heavy current will be prevented by the ECU current protection.

After you ensure that the current tested is within the specified limits, you can check the control. After the motor spins up to the maximum speed, apply "-" (GND) to contact **No. 1 ("Signal")** of the control connector. At this point, the fan speed must reduce smoothly until the motor is completely stopped. If you remove "-" (GND) from Contact **No. 1 ("Signal")**, the fan will start to gradually gain speed up to the maximum.

Connection diagram to conduct a test.



Attention! If the source voltage is greater than 16 V, the motor will not rotate, as the excess voltage protection will be activated. If the source voltage is greater than 18-20 V, this may lead to ECU failure. Be careful to check the voltage with the voltmeter before connecting the power source.

If you do not know how to use metering devices, or if you do not understand the procedure for measuring current and voltage, we recommend that you contact a professional.

Refer to the Chapter "Unforeseen Situations" to know what to do if the motor current at the maximum speed without the impeller exceeds 9 A or if the motor does not spin, or does not stop when applying "-" (GND) to contact No. 1 ("Signal") of the control connector.

3) Final assembly step

After a successful test, continue with the final step – ECU board sealing to protect from the aggressive environmental impact using organosilicon filling compound.

Before filling, ensure that there are no gaps between plastic connector and the ECU aluminum casing, otherwise the glue will leak out. If there is a gap you can fill it with a sealant or clay.

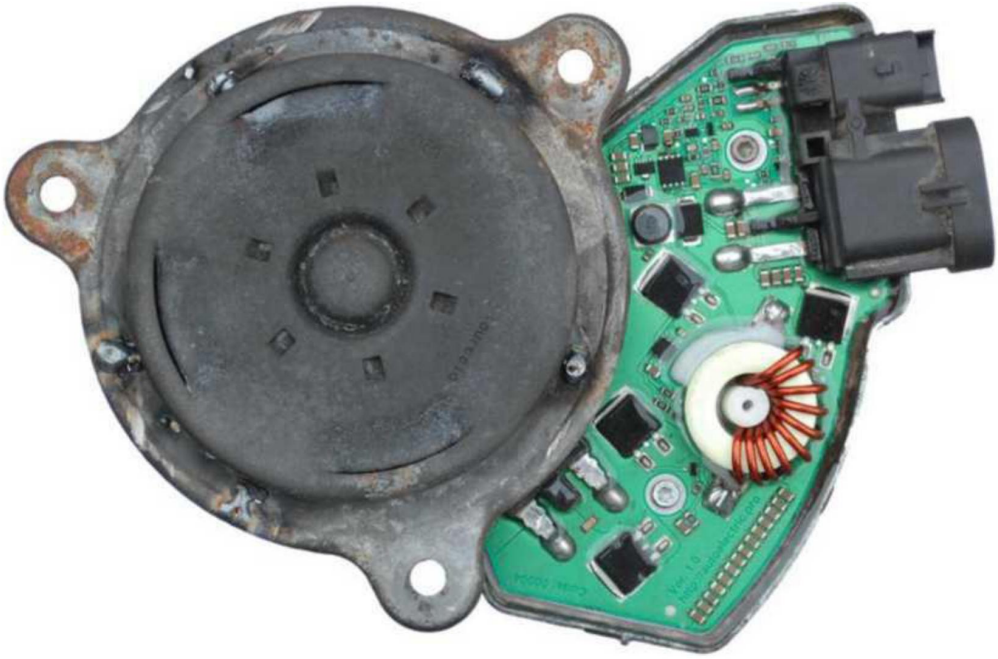
Now place the electric motor on any rigid support strictly horizontal to the surface. If possible, place a film under the motor, as drops of filing compound can flow out.

Take the hardener in 4 ml syringe from the repair kit and squeeze it in a plastic vessel with 40 ml filling compound. Thoroughly mix everything. Indoor temperature must be close to the room temperature.

After thorough mixing, pour the compound mixed with hardener (44 ml) on the coil area (marked with an arrow in the picture below). This will create a protective film on the coil surface, and the rest of the compound will spread evenly across the board, filling all the cracks. Leave the unit in such position to dry for 24 hours at a temperature not below the room temperature, otherwise hardening will require even more time. Do not place the coil close to heat sources above 30°C under no circumstances. After solidifying the compound must not be hard, it should be like rubber.

5.3 Fan assembly.

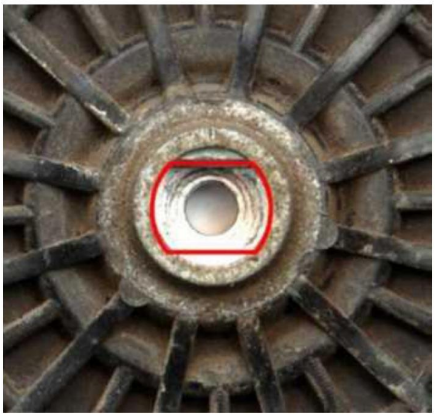
After hardening of the compound (it will take about 24 hours), you can continue with assembling the fan, and put the impeller on.



There should not be any problems with locating the unit in the case, but you may find it difficult to mount the impeller, as luck would have it.

Sometimes it may take some pains to mount the impeller, because it should be put on the rotor axis with practically no gaps. The key point here is not to panic and not to use force, all the more so not to tap with heavy objects in an attempt to drive it in. If the impeller resists, then the slots do not match, in which case, turn and sway it a little to the left, then to the right, slightly pushing, and it will snap.

Slot for the metal axis of the rotor in the inner part of the impeller.



Then draw the screw up, keeping in mind that it is left threaded, so screwing will be counterclockwise (opposite rotation direction).

Do not overdo when screwing up the screw so as not to strip the inner edges.

If it is possible, grease the screw thread with sealant before screwing up. Although it should not unscrew on its own, we still had one such case.

Refer to the Chapter "Unforeseen Situations" to know what to do if you have lost or damaged the left-hand thread screw, as well as if the thread or metal axis of the rotor is damaged.

Attention! The below list of unforeseen situations does not include all the cases described above. They will be added later. If you have any questions, suggestions, tips, remarks, please contact us: ediabas@tut.by.

Unforeseen Situations.

In some unforeseen circumstances, you may need the following:

a) 4-mm metal drill.
b) 3 mm screws with nuts.
c) Engraver with mini abrasive wheel: *Cutting-off abrasive reinforced wheel, d 32 x 2.0 x 1.0 mm*
d) Angle grinder.
e) Welding machine.

It is not uncommon for the so-called "experts" to break the inside edges of the screw, and even worse, to break the head, trying to undo it, believing that it has a right-handed thread, but screwing it up even more tight.

If nobody has tried to undo this screw before you, there should be no problems with it. Typically, in 95% of cases, no problems with undoing this left-hand thread screw occur.

If inner edges are stripped, you can make a notch for a flat screwdriver using an engraver with a mini-abrasive wheel (d 32 x 2.0 x 1.0 mm).

If the head is broken, but the rest of the screw reliably holds the impeller, or if it is not possible to undo the screw for some reason, the repair process can be continued without removing the impeller, but it will create some inconvenience in repair.

The photograph shows an impeller screw with a broken head, but the impeller is held tight.

If you did not manage to remove the impeller, then it will be inconvenient to unscrew the electric motor from the outer case. You will have to hold the screwdriver at a certain angle, but since these screws are twisted in plastic, there will be no problems with unscrewing.

Once you undo the left thread screw and three self-tapping screws, we strongly recommend that you screw them back, because the loss of the left thread screw may cause you much trouble. However, if this screw have been lost or damaged, you will have to replace it or cut left-handed thread in an appropriate bar.

Parameters of this screw: Left-handed thread M4x 0.7 mm, 11 mm long, material – steel.

Alternatively, if you cannot remove the impeller: casing with three snugged-up self-tapping screws, electric motor with impeller.