Repair of a tc electronic BG250-208 bass combo
Summer thunderstorms and rainy weather in July 2020 - time for an overdue repair.

My beautiful, small, light, reliable, high quality and yet inexpensive Bassamp tc electronic BG250-208 suddenly stopped working. No operational signs, no LED, no fan - absolutely dead.

The bass combo has been available since 2012 in different versions with one 12 or 15 inch or two 8 or 10 inch speakers. All models are equipped with a 250W Class-D amp with simple bass, mid, treble tone control, tuner (also for 5 and 6-string) and two toneprint effects. The larger combos have a slightly wider amplifier variant with two controllers instead of one in the small amp. The amplifiers themselves are still being produced - modified (BH250 and BQ250), but unfortunately the combos have either disappeared from the market or are no longer in production.

Fig. Right: BG250-208, Source: tc electronic

Fig. Below: BG250 Different Amplifier Modules, Source: tc electronic

The smallest and lightest variant with two 8 inch speakers seemed the best choice to me as a practice amp or for small sessions - less than 12 kilograms and for less than 250 Euros! An absolutely bargain compared to Markbass, Ibanez Promethean or even Phil Jones.
The combo had always served me reliably since I bought it in 2015: As a practice amp with, in my opinion, very good sound, effective tone control, good connection options for foot switch, line-out and additional sources, variability through the TonePrint effects (usually filled with the Spectracomp or Sub'n'up) or for sessions, mostly in combination with any 1x15 8Ohm box often found in rehearsal rooms. Always reliable and powerful – great.

Until yesterday…

I actually knew that this defect would come one day and it had recently announced itself several times by sparks and pops when it was switched on. The spare part costs little and the repair is also feasible for ambitious, tech-savvy bass players and is therefore described in the following. It goes without saying that the mains plug (and the loudspeaker or Speakon plug) must be pulled out for all work on the device.

Digital amps are handy and lightweight, but like their heavy, older brothers, the "iron monsters" also have the unpleasant peculiarity of a very high inrush current. A thermistor (NTC = negative temperature coefficient) is therefore often used as the simplest current

limitation: A variable resistor that reduces the inrush current and decreases with increasing temperature - it practically 'disappears'. The so-called 'inrush current limiter' or 'surge protection' NTC behind the main fuse (5A) in this amplifier has unfortunately already been discussed extensively and frequently in many bassist discussion forums on the Internet. Although the circuit diagram here expressly specifies an NTC from EPCOS, tc electronics apparently carried out a "cost optimization" which leads to an inferior component installed NTC 10D-11, which is specified with a maximum current of 3 Amps instead of 3.5 Amps. That doesn't really fit the main fuse with 5 Amps.

The replacement of the suspected defective component turned out to be - let's say, time-consuming, due to the very good workmanship of the amplifier. In order to remove the amplifier, which, as already described, is also sold separately as a top, the loudspeaker(s) must first be removed. The amp is screwed to the inside of the speaker box with six M5x24mm T20 Torx screws. The screws have also been fixed and secured with a special paste. Presumably, any loosening of the screws due to vibrations should be safely avoided. A good idea, but unfortunately the deliberate loosening of the screws is also reliably prevented, which is very service-unfriendly.

So when you have somehow got rid of the six M5 screws without damage (ideally with a Torx, the size of which depends on how much of the really rock-hard locking paste you get out of the screw heads) the amplifier can be removed. But anyone who thinks that it can now simply be removed from the back wall has not yet got to know the threaded sleeves, which are probably also sunk into black painted wooden strips for safety, and the bitumen adhesive strips. So pull it off very carefully and with gentle force!

Fig. Left: back of the box before (source: tc electronic), middle: with the amplifier module detached,
Right: M5 threaded sleeves and bitumen adhesive on the amplifier module

The amplifier module is also very well made and stable. In order to open the device, **all** visible Torx screws (20 pieces T8) must be removed (including those around the fan and on the XLR socket D.I. Out, but not those of the Speakon speaker socket), as well as the screw sleeve of the TRS jack socket. The lid is a 3-side folded profile made of sheet steel. If you are not well versed in soldering work, you should consult your specialist friend if necessary.

If the amplifier is open, the interior is also neatly processed. There are three circuit boards connected with different cables: The amplifier module with heat sink, rear left seen from the front, the power supply unit, in which the defect is suspected, on the right and the circuit board for the front operating and display elements (input socket, switch, pots, and LEDs) at the bottom of the picture.

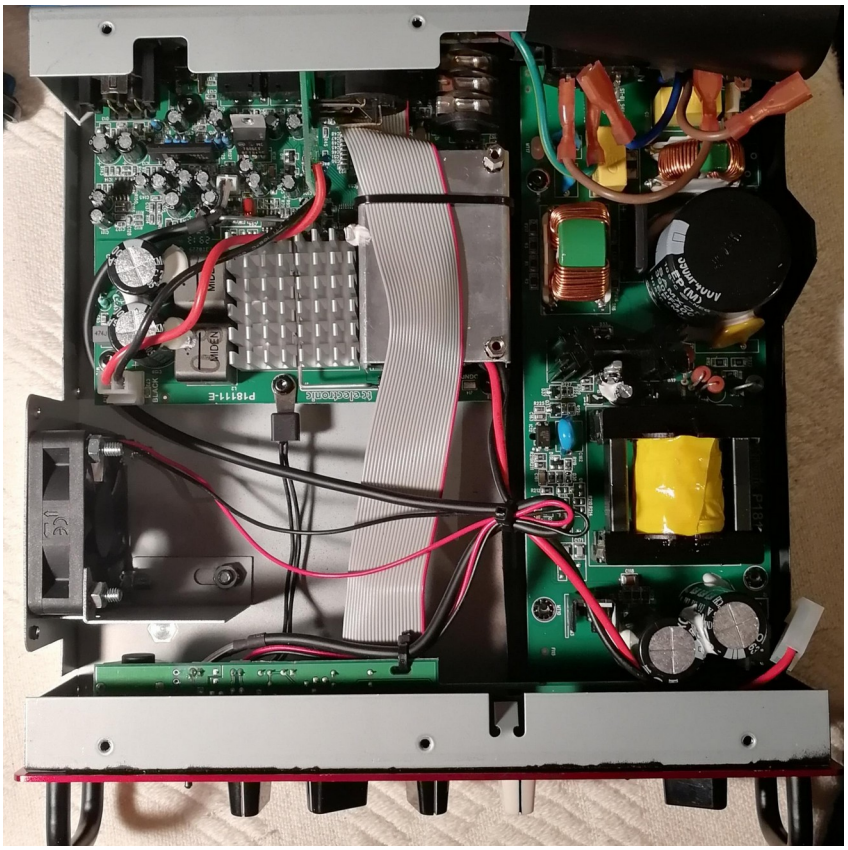
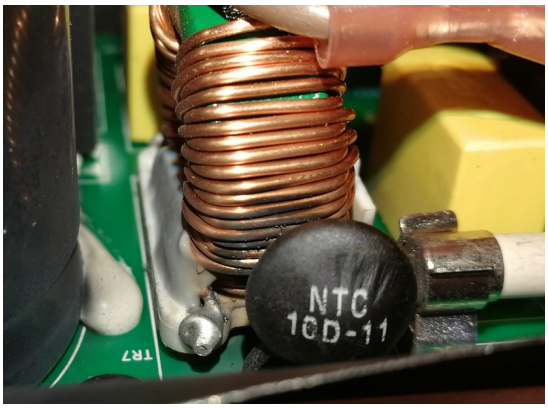


Fig. Left: Amp (inside)

Fig. Below: NTC in front of coil nearby mains fuse



Before the amplifier is dismantled further, the suspected defect should be checked. In addition to the smoke traces on the windings of the coil behind the NTC, which can be seen in the picture, the mains fuse in the rear section (near the mains socket and switch) should first be checked with the multimeter or ohm meter. The resistance should be almost zero. The disk-shaped capacitor look-a-like component nearby this fuse, marked as R4 on the circuit board, should also have a low resistance (maximum 10 Ohms at 25°C according to the specification). This can be measured quite easily with the test probes of the measuring device from above or from the component side of the board. If one of these components has a higher resistance, it must be replaced. In most cases, however, the microfuse should be intact (therefore not accessible from the outside). If it does, it should be replaced with a new 250V 5A H fuse. The “H” stands for the (high) switching capacity, which is specified.with at least !1500Amps! In no case should a microfuse with glass body be

used, but only one in a ceramic body. It is also to be feared that in this case further damage to the device has occurred.

The NTC, which is unfortunately often blown, should best be replaced by one

- EPCOS/TDK B57236S0100 (3,5A according to Specification) or
- EPCOS/TDK B57237S0100 (3,7A) or even
- EPCOS/TDK B57238S0100 (5A).

These components are listed on the TDK website as NTC inrush current limiters with the abbreviation S236, S237 or S238. The technical data sheets are available there with all the information.
On the one hand, it should be noted that a 10 Ohm type is selected (... S0100). Only the S236 has the intended grid dimension (distance between the legs) of 5mm and a housing diameter of 11.5mm, like the defective NTC. The more powerful variants S237 and S238 have a grid dimension of 7.5mm and a housing diameter of 15-16mm. The soldering points on the board are 6mm apart. Due to the dense assembly in this area and some non-insulated, live components such as fuse and coil connection, you should work with the utmost care and caution and if necessary, insulation should be added (no insulating tape, but plastic, silicone or shrink tubing).
To remove the power supply, the surrounding plastic cover must first be loosened (only attached to the front profile with adhesive tape) and four more T8 Torx screws removed. Now loosen the cable connections: Pull off the cable lugs on the primary side, i.e. at the rear of the IEC socket and the power switch (insulated flat cable lugs blue and brown) and the locked plug connection on the secondary side of the power supply unit at the front (Molex plug with thick black and red cables). Now the power supply board can be removed and the defective component NTC 10D-11 can be unsoldered and the replacement type S236 soldered in. Since it is a semiconductor component, it can be damaged if the temperature is too hot and too long. I therefore recommend keeping a distance of the component to the board and to the soldering eyes of at least 6mm. If the distance is greater, the legs of the component should be provided with short silicone hoses, if necessary. Then do not solder too hot or too long! EPCOS specifies 4 seconds at 260°C, which should be easy with a temperature-controlled soldering station. Alternatively, 2 seconds (at 360°C) are specified, which, however, should be a very short time for a hand soldering process even for experienced people. In any case, enough time should be allowed between the two soldering processes to allow the NTC to cool down. Reinstall the power supply unit, connect it, screw it tight and do not forget the surrounding plastic cover. After that, you're actually done.

A functional check or check whether the repair was successful should only be carried out with the housing closed (perhaps not tighten all 20 screws ...)

For me, the NTC actually looked pretty good from the front, the lettering is still easy to see (see photo on page 2).
Two small craters are only visible on the back, which suggest the defect and flaking of the housing material. Together with the smoke traces on the inductance coil (see photo on page 3), which I cleaned before

soldering in the replacement type, this component was clearly damaged. One more thing: The M5 Torx screws for connecting the box and amplifier can be freed from the hardened safety paste to some extent with WD40. However, if the screw heads had to be drilled out, new screws are required.

Many bass players wrote that the combo had been rebuilt in such a way that the amplifier could be more easily removed from the speakercab in order to be used as a top. This may be an alternative for one or the other of you. (Source: Bassic.de, Onkel Bennat)

(Fig. BG250-208 Modification, Source: Bassic.de, Onkel Bennat)

I also had to repair some of the larger BG250 Amps which was very easy compared to the small brick of the BG250-208. By principle the repair itself is just the same, but you do not encounter any rock-hard filled screw heads or massive bitumen, just easy to handle torx screws of the same size.

Since I can of course not guarantee the success, these instructions are only intended as support for those of you, who are faced with the decision to scrap such an amplifier, sell it to hobbyists as a spare part donor or simply have not had the courage so far to perform this repair. Trust yourself! In many cases, known to me from forums, it was in most cases only the defective NTC and the devices then run reliably and permanently again.

Good luck and godspeed!

My very personal conclusion (Attention: Contains my very personal opinion!)

As a customer you might appreciate low price and the manufacturer benefits by high sales and profit which is certainly one aim, but other things also play an important role in this context. Unfortunately, it cannot be ruled out that this systematic defect, to which the production stop of the combos may at least have a part, is due to an alleged "cost optimization". A decision in the production process of the manufacturer tc electronic with undoubtedly negative effects. But it is certainly not an isolated case, as many European and American manufacturers have good engineers develop ever more fascinating musical electronics and instruments. As a rule, production takes place in countries with lower wage costs, mostly in China, and with reasonable quality control, the production costs can certainly be reduced. The service centers, however, are by time outsourced and not mostly in Europe or the United States. The staff here is expensive and there is a trade-off between uneconomical and economical repairs.

It is very regrettable that this is a very cheap component that even private customers can get for less than one euro and that the amplifier works well for some time even with a component that is a little underrated. Another disadvantage is the low level of service friendliness of the bass amp, which (hopefully) can only be traced back to the developers' fear of vibrations and loosening screws or creaking and rattling. As an end customer, one can then perhaps accept that the repair (in this country) must be assessed as uneconomical due to the higher wage levels (costs exceed the new value of the device). Perhaps tc electronic has also seen in numerous service repairs that it is actually a guarantee case, even if the failures often only occurred after the end of the guarantee period. Word goes that components or software are consciously and deliberately installed to shorten the service life of a device. Ultimately, the engineers develop numerous other devices during such a period that have to be brought to the customer. Whether it is the aborted firmware update that leads to a "brick" or the small component that is deliberately overloaded with every switch-on process and then fails after 3-4 years.

With 50+ life and 30+ engineering and 1000+ repair experience, this realization makes me very angry to be honest. In terms of consumer behavior, the consumer is repeatedly asked to buy only those products that have either been classified as good by a dubious traffic light system (by whom?) or are considered particularly sustainable. There is still no such thing in music electronics, as it is always a luxury product. If climate change can still be counteracted and we will be still interested in such problems, sustainability, environmental compatibility and, ultimately, the lifespan and repairability of electrical appliances will play a greater role. The sole fixation on sales and profit always leads to the exploitation of nature and people and the production of single-use, disposable devices for a lifespan defined (by the manufacturer). In my opinion, this is also no longer up-to-date in music electronics or endangers the future of all of us. Electrical devices should again be produced for life cycles of 8-10 years or more with good care and possible economic repairs of real wear parts, instead of being designed, engineered, and build for only 3-4 years. I think that many end customers with reliable but supposedly outdated devices will be happier than they 'have to' buy new devices. Think of all the reliable, servicable, 30+ years or more vintage tube amps...