

How to convert the Citroen GS Tachometer to work on the 2CV engine - by Ivor Spark

What You Need:-

- a large supply of patience
- one working GS tachometer
- a selection of screwdrivers
- a small soldering iron
- some solder
- some tinned copper wire (or the legs cut from a resistor will do)
- pliers
- artists paint brush
- some matt black paint

Converting the GS tachometer isn't hard at all. The difficult bit is getting the tachometer out of it's case and putting it back without breaking anything. This is because the bezel on top of the case is rolled on when the tachometer is made. To get the bezel off, you need to start by pushing a small screwdriver between the casing and the bezel and prising or twisting them apart. Move around the case doing this until you have opened the gap up enough to get a larger screwdriver in. Then do the same again until you can get an even larger screwdriver in and work that around until the bezel can be levered off. To reach this stage can take up to an hour, but do not rush things because you could break the glass or buckle the bezel, which you need to put back afterwards. Having got the bezel off, you can take off the glass, the rubber gasket, and the black and white ring surround.

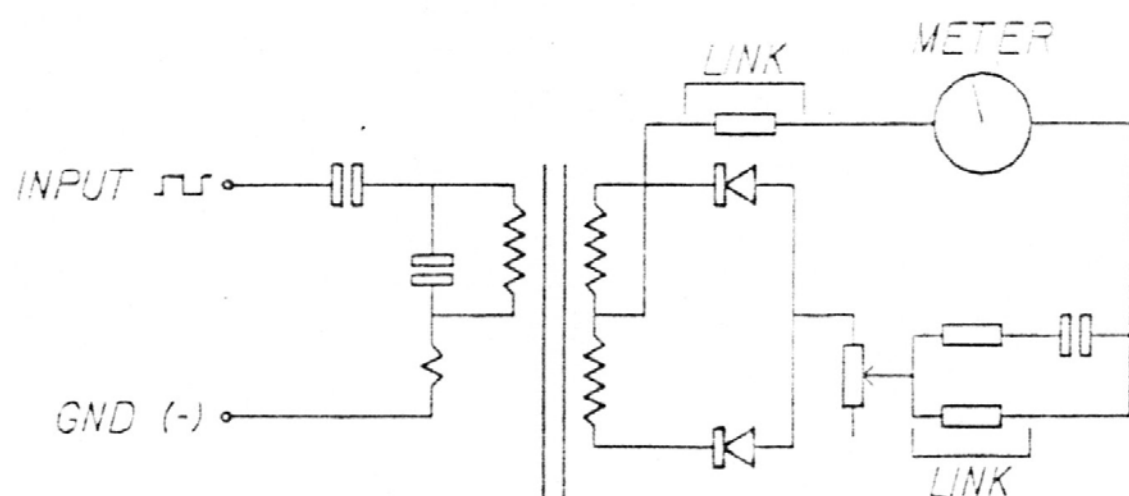
Now turn the tachometer over so that the bottom is facing you. You will see the two terminals which are used to connect the tachometer to the engine, plus two screws. One of the terminals

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has brass washers under the nuts - this is the one that is connected to earth. The other terminal has insulating plastic washers under the nuts - this one is connected to the "points" side of the ignition coil. Undo the nuts and take off the washers. Remember which terminals they belong to. Mark them with a felt tip pen if you are not sure that you can remember to put them back on the correct terminals. Now undo the two screws on the back of the case. You can now take the case off the tachometer, which will be left lying on its face. Handle the tachometer gingerly - the needle is easily bent.

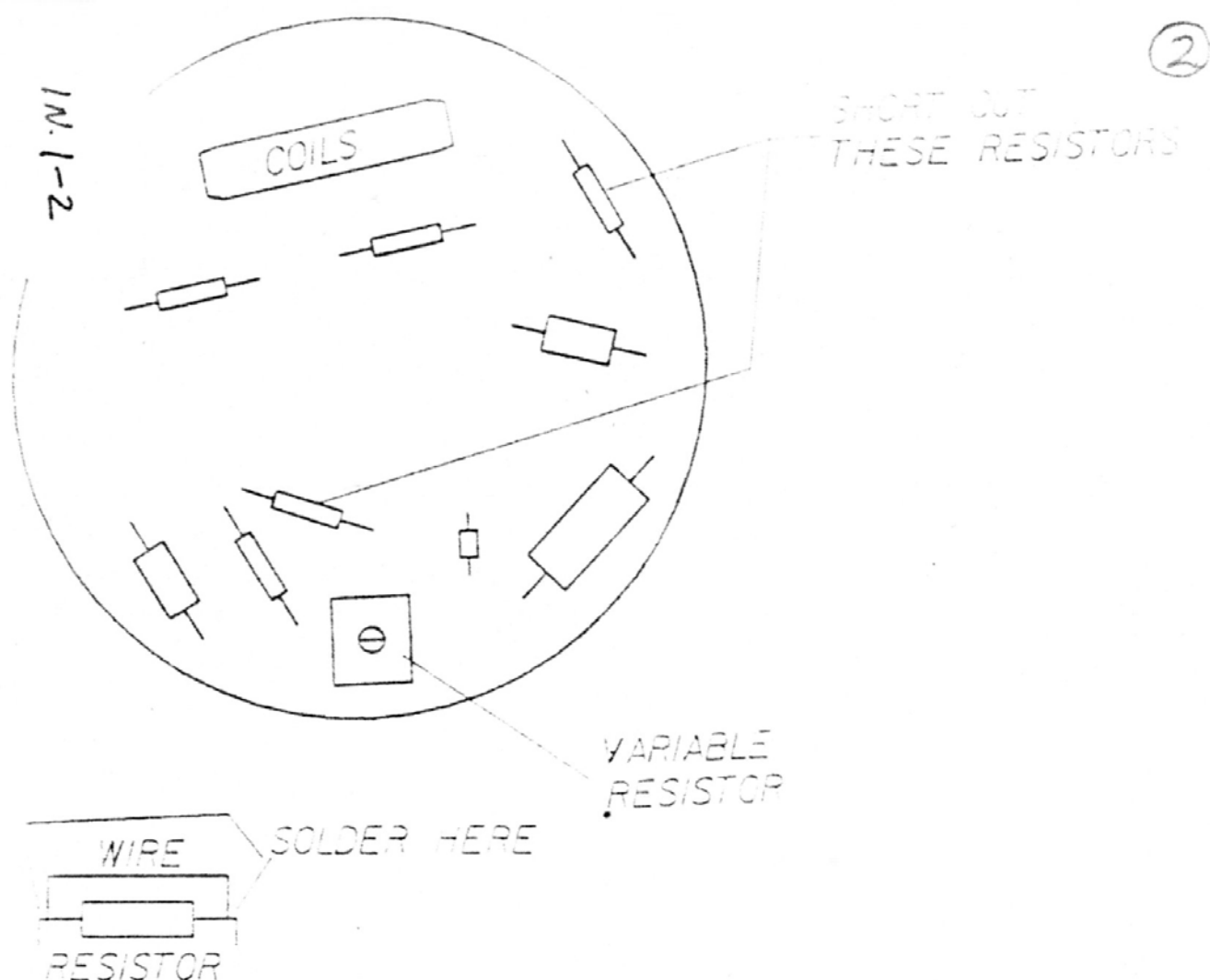
If you look at the back of the tacho, you will see some electronic components on a circular printed circuit board (behind the dial). Among these are four resistors. Three of these are small round-section components, beige in colour with coloured wasp stripes painted on them. The fourth is a variable resistor, which is a sort of horseshoe shape and has a screwdriver slot which you can turn to adjust the resistance. This has a spot of red paint on it, put there when the tacho was set at the factory. All you have to do to make the tacho work on two cylinders is to short out two of the resistors and possibly adjust the variable one. You may even find that the variable resistor doesn't need adjusting at all. The resistors are shorted out by soldering a piece of tinned copper wire across the resistor legs so that the current takes a short cut through the wire instead of the resistor. Looking at the back of the tacho with the variable resistor at the six o'clock position, the two resistors that you need to short out are at about two o'clock (near the outside edge), and nearest the middle at the seven o'clock position. You do not need to do anything to the other resistor at the seven o'clock position, but if you are not sure which to short out you can short out all three - it will do no harm. Bend up some small pieces of copper wire so that they look like squared-off upturned "U"s. Attach these to

the legs of the resistors with a blob of solder. Try not to burn any of the other components when doing this. You can support the wires with tweezers or radio pliers while soldering them on.

Now you will need to try the tachometer out so that you can adjust it. To calibrate it you can use either an already modified GS tacho, an unmodified GS tacho, or a test tacho, depending on what you can get hold of. The best option is to find someone who has a ready-modified tacho you can compare exactly with yours. If you can do this, connect your tacho in parallel with the modified one so that they are both connected to the same engine and both dials can be seen clearly. Get an assistant to start the engine and watch the dials of both tachos as the engine is revved. Ideally, they should read the same, but the chances are that yours may read too high or too low. To adjust the reading on your tacho to match the one that you are checking it against, use a small screwdriver to turn the variable resistor. Turning the screw clockwise **DECREASES** the reading; anti-clockwise **INCREASES** the reading.



CIRCUIT DIAGRAM FOR GS TACHO



If you cannot find a ready-calibrated tacho, you can use another unmodified GS one. Because it is intended for a four cylinder engine, it will read HALF the true engine speed when connected to the 2CV twin. This is because the twin only makes half the number of sparks per revolution, and the tachometer works by counting the sparks. Therefore, an unmodified tacho reading 1500 rpm is equivalent to a modified tacho reading 3000 rpm when they are connected to the same engine. Since most tachos sold for temporary testing only are also for four cylinder engines, calibrating your modified tacho against one of these will also involve doubling the readings to find the true engine speed. Once you are happy that your tacho is reading correctly, you can put it back in it's case. Should find that it needs further adjustment once it is inside the case, this is no problem. There is a red sticky label on the back of the case and under this

is a small hole. Under the hole is the variable resistor you previously adjusted and if you can get a small screw driver in, you can adjust the tacho from outside. Put the tacho on it's face and slip the case back over it.

Fit the terminal nuts and washers remembering which side had the insulating washers and which side had the brass washers. Put back the two screws which hold the case to the rear of the instrument. Then turn the tacho over so that you can see the face, and check that the needle can move by flicking it GENTLY. Replace the black and white ring surround with the black side facing you. Now for the rubber gasket, glass and bezel. Getting the bezel back on is even more fiddly than taking it off. It is rather like fitting a motorbike tyre to a wheel. The first three-quarters of the bezel is easily pushed back into place. It is the last quarter that causes the problems. The best way to tackle this is to go around the outside of the bezel beforehand with a pair of pliers, bending it out. It is very tough and will not bend much, but every little helps. Push the bezel onto the case with your thumbs as far round as you can. Then insert a small screwdriver blade between the case and the bezel (not easy) and using a pair of pliers, force the remainder of the bezel onto the casing. It is impossible to do this without scratching the bezel, but to minimise this, pad the plier jaws with some rag.

Once the bezel is on, go round the outside crimping it back onto the case with the pliers. Apply some matt black paint to the scratches on the bezel, and you can fit the tachometer to your car. Connect the terminal with the brass washers to any earth point on the car, and the terminal with the insulating washers to the POINTS side of the ignition coil (marked "-"). Start the engine and check that the tacho is working properly.

There you are, all finished! There is however one problem, not ALL GS/GSA tachometers are of this design, later versions have three terminals and operate differently.

But no problems, read the next issue for Part Two - The Three Terminal Tachometer!!