

A TiePie engineering automotive oscilloscope with differential inputs avoids damaging car electronics as result of a wrong connection during measuring.

No differential inputs

In a standard automotive scope without differential inputs, the ground terminals of all input channels are connected to each other. Suppose channel 1 of the automotive scope is used to measure an injector, but the channel 1 probes are accidentally swapped. And channel 2 of the scope is used to measure a second injector. When channel 2 is connected, a short circuit is created via the grounds of the scope. A large current will flow that can damage the car wiring, car electronics and the oscilloscope. Because of using an automotive scope **without** differential inputs, much damage is caused as result of connecting the automotive oscilloscope wrong.

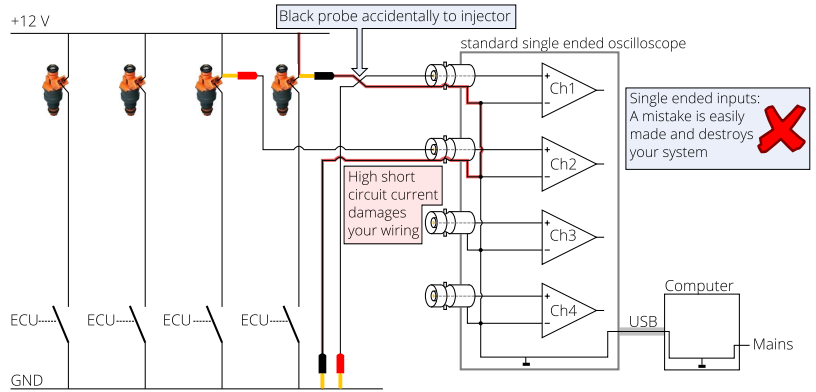


Figure 1: No differential inputs: short circuit due to wrong connection.

With differential inputs

All TiePie engineering automotive oscilloscopes, like the Automotive Test Scope ATS610004DW-XMSG, have differential input channels. The ground terminals of the inputs are **not** connected to each other and also **not** connected to the ground of the PC. When the instrument is accidentally connected wrong, **no** short circuit is created, there will flow **no** short circuit current and expensive extra repairs because of damaged car electronics are history.

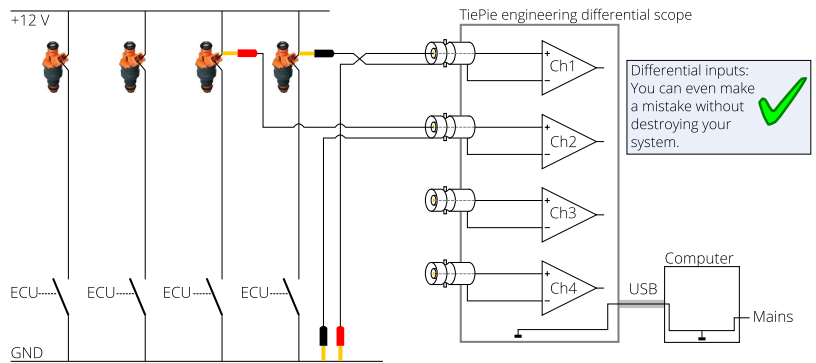


Figure 2: With differential inputs no short circuit.

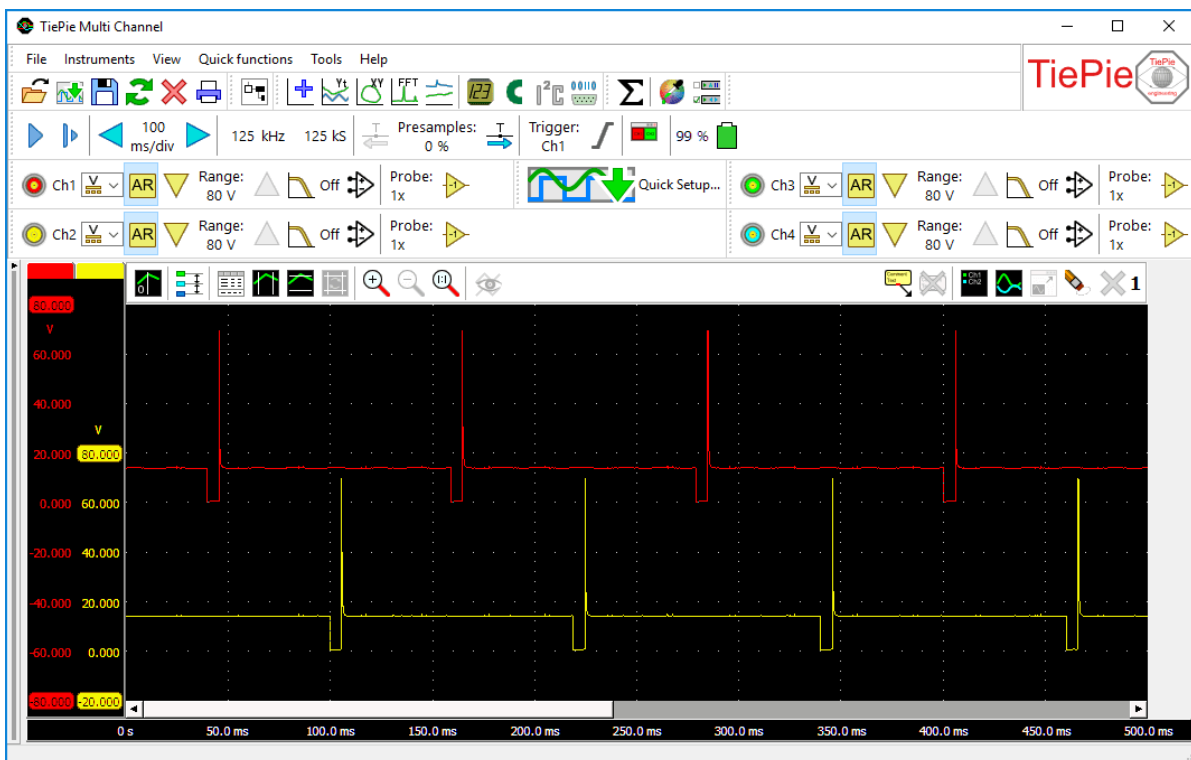


Figure 3: Two injectors successfully measured

Using additional tools

When besides the automotive oscilloscope also e.g. a fault code scanner is connected to the computer, differential inputs on the automotive oscilloscope are even more important.

The fault code scanner is connected to the ground of the car battery and also to the ground of the computer. With a standard automotive oscilloscope, the input channels are connected to the ground of the battery. When the fault code scanner is connected to the car, and the ground of an input channel of the automotive oscilloscope is accidentally connected to a point carrying a voltage, not to ground, a short circuit is created. The car wiring, the computer and the fault code scanner can be damaged by the very large current that will flow.

When using a TiePie engineering automotive oscilloscope with differential inputs, no short circuit will be created, so no large current will flow and no damage will occur.

Conclusion

Always use an automotive oscilloscope with differential inputs to prevent damage on your car caused by a connection mistake, because differential inputs have the following advantages:

- the ground terminals of the input channels are not connected to each other
- both input and ground terminal of each input channel have a high input impedance

It is therefore highly recommended to always use an automotive oscilloscope with differential inputs to avoid short circuits and expensive damage to the car electronics.

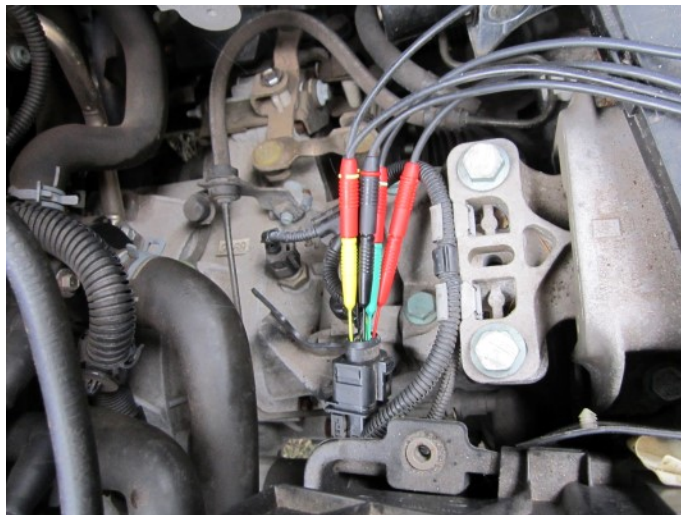


Figure 4: A wrong connection is easily made.

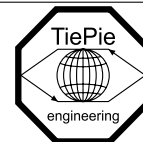
For all information on the TiePie engineering Automotive Test Scopes, see:

Automotive Test Scope ATS610004DW-XMSG	www.tiepie-automotive.com/ATS610004DW
Automotive Test Scope ATS605004DW-XMS	www.tiepie-automotive.com/ATS605004DW
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