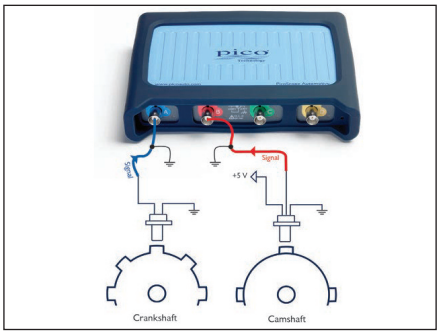
Fundamental scope tests part 2

An oscilloscope is a versatile tool that can be used in a variety of ways. PicoScope has details on some of these diagnostic tests, where a scope can be used to help you in everyday tasks.

Camshaft and Crankshaft sync



Used to check synchronization between the camshaft and crankshaft. Guided test AT151.

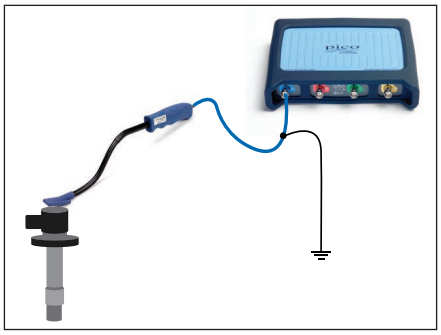
Locate sensors using your vehicle's technical data. We recommend you use either back-pinning probes or breakout leads to make the connection.

Use technical data to identify the signal wire. You may need to check multiple connections to get a signal.

The engine must be idling to complete this test. Start the PicoScope when you are ready to capture the signal.

There should be a consistent pattern that develops as you capture data throughout 720° of crankshaft rotation. With cam and crank signals, this consistent pattern can provide invaluable data for waveform comparisons. Remember to extend the timebase to allow you to see multiple revolutions together. If each 360° camshaft revolution is consistent, it is likely that the synchronization between the camshaft and the crankshaft is correct, and that both sensors are working correctly. Inconsistencies will highlight probable valve timing issues, sensor faults or short circuits within the associated wiring looms.

Ignition Coil-On-Plug Test

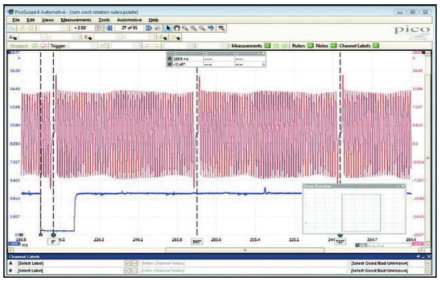


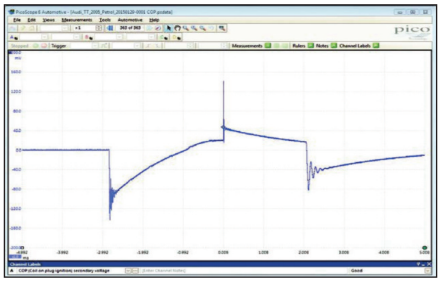
Used to check vehicle single ignition coil packs. Guided test AT077.

Locate the top of the coil packs. Connect the Coil-On-Plug and Signal Probe to the PicoScope and earth to the vehicle.

The engine must be idling for this test. Start PicoScope and place the end of the COP probe on the top of the coil pack to capture the signal. You should see a clear signal.

The waveform will look something like the example below. Now you can see every detail. In our example you can clearly see the 'burn time' from the spark plug. It also shows the coil oscillation period.





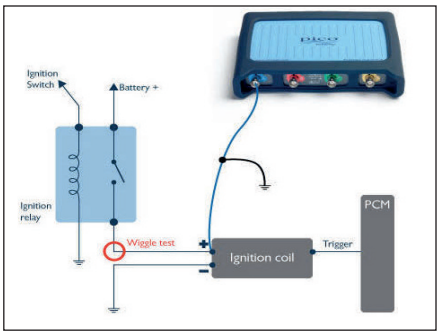
Remember how easy it is to use rulers to measure the different parts of the waveform, and our reference waveforms, to compare with different coil packs.

Wiggle Test

Used to detect suspected wiring loom or connection faults.

The PicoScope captures data so fast, it is easy to identify wiring or connection issues quickly.

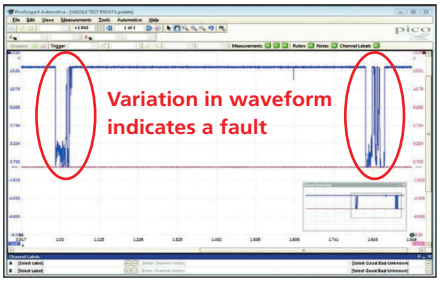
Simply wiggling a wire (arguably an easy test that can often be overlooked) can reveal a wiring fault. This test is used when you have spotted an intermittent fault with a signal (so a connection is already made).



Start the PicoScope when you are ready to capture the signal, and gently wiggle the wiring loom attached to the component.

Reducing the capture rate is recommended to make it easier to spot problems within a single screen capture. Masks and alerts can be used to automate detection when signals go outside normal limits.

Stop the PicoScope and scroll back through the data with the buffer controls.



Often wiring or connection faults will create an inconsistent pattern as illustrated in the example above.

When we scrolled back through our captured data, it was easy to spot the signal faults from the ignition coil. In this example, it turned out that a fault in the wiring loom was causing an ignition misfire.

Remember to retest after the repair, to make sure that you have a reliable fix.

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