

Relative compression testing made easy

Correct functioning of an engine depends on many things like correct sensor readings and good functioning actuators. But the engine itself also needs to be in good condition. A relative compression test can easily determine whether all cylinders of an engine have the same compression. A.D.S outlines how to do this test easily with a scope.

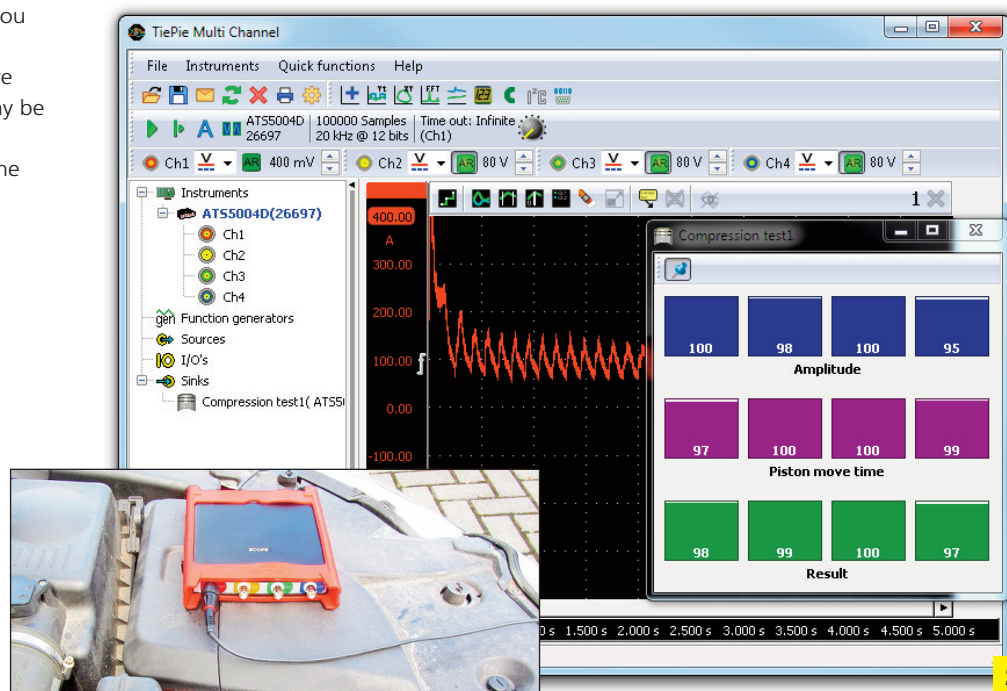
A relative compression test allows you to perform a quick check on compression, without having to remove the spark plugs, or glow plugs that may be seized and difficult to remove.

A relative compression test uses the starter motor current to determine the comparative compression values of all cylinders. The advantage of a relative compression test is that no pressure sensors are needed to check each individual cylinder, all cylinders can be tested at once, with just a scope and a current clamp.

The idea of measuring current flow to the starter to determine compression is pretty simple. The amount of energy (current required from the battery) needed to turn over the engine while a cylinder is in its compression stroke, gives an indication of how much that cylinder is compressing, or leaking. The current needed for one cylinder alone is really meaningless, but when you compare cylinders you can see if one is weaker than the others. If the compression is about the same in each cylinder, good or weak, then the scope trace will show even peaks.

Before performing the relative compression test, the engine needs to be prepared so it will not start during cranking. This can be done by disconnecting something to prevent the engine from firing. Connect the current clamp (part TP-CC600) to the automotive scope with a lead (part TP-C812B) and place the current clamp around the wire from the battery to the starter motor (see figure 1). The direction of the wire through the clamp must be such, that the starter current will introduce a positive output voltage on the clamp.

Open the compression test preset on



An amp clamp and a scope is all that's needed for a relative compression test. The trace above shows a weak cylinder where the peak is lower than others.

the scope software. Switch on the current clamp and zero out the current clamp. Start the measurement by pressing the start button or the hotkey S. Crank the engine for 2 to 4 seconds to record the current data. The relative compression test is now ready and will look like figure 2.

The relative compression test in the figure above shows a 4 cylinder engine with even compression across all of the cylinders. Some variations in the result of the relative compression test is acceptable. The higher the current trace on the scope is, the higher the compression is. A cylinder with lower compression than the others, will have a lower current draw when that

cylinder is in its compression stroke.

If there is a lower (or higher) peak in the scope trace, you can use a signal from cylinder 1, or any cylinder you choose, to synch with the current trace. The first peak will be the cylinder you have selected, and by following the firing order, you will quickly be able to determine which cylinder has the abnormal compression. You can verify the cylinder by selecting it and redoing the test to verify the abnormal cylinder is the selected one.