**Relative Compression Test on a**
2007 Honda Accord SE 4CYL

A relative compression test is performed by monitoring the electrical current to the starter while cranking the engine over. The amount of current drawn by the starter is proportional to the load on the motor. Therefore, as each cylinder is compressed, the starter current increases momentarily. By monitoring the relative current drawn by the starter while compressing each cylinder, the relative compression between each of the cylinders can be gauged. This provides a very quick (a few seconds!) and efficient way to look for any major compression issues in an engine.

In this case, I used a Hantek CC-650 Current Probe which can monitor currents up to 650 amps. The current clamp simple clamps around the starter wire as shown below (it is non-contact – it monitors current via the magnetic field induced by the current flow). An oscilloscope (or "scope") is required to convert the waveforms into a viewable form. In my case, I used a Pico Scope 2000 which interfaces to a PC via USB to display the captured waveforms, but any cheap scope will do.

Current Clamp, clamped around the starter wire.

Pico Scope
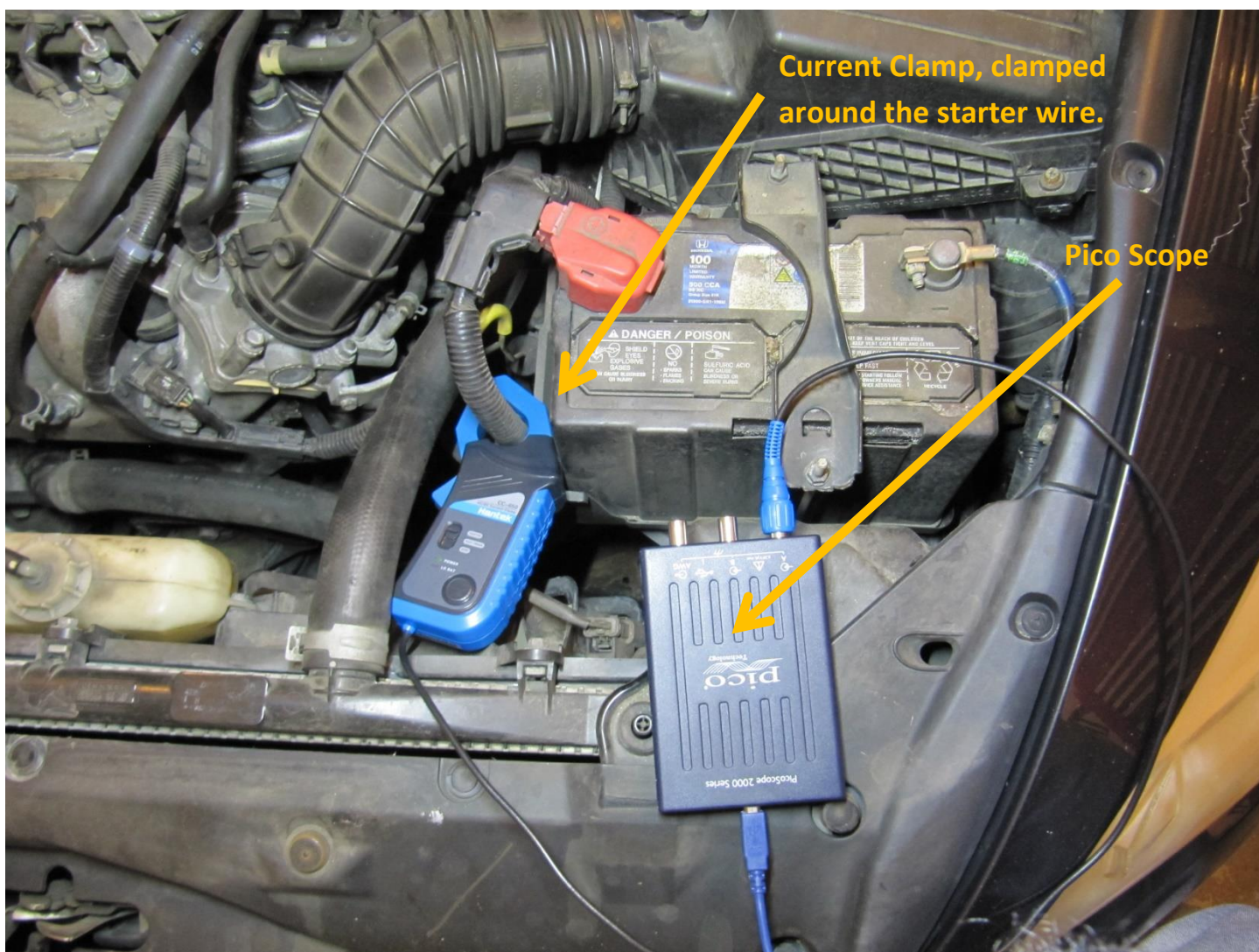
With the current clamped around the starter motor wire as shown above, the engine was cranked over to produce the following waveform (I also disconnected all the fuel injector connectors to avoid flooding the engine). The peak of each bump represents the point of maximum compression in an individual cylinder. In this case, there are no major compression differences between cylinders since all of the bumps have about the same amplitude (height).
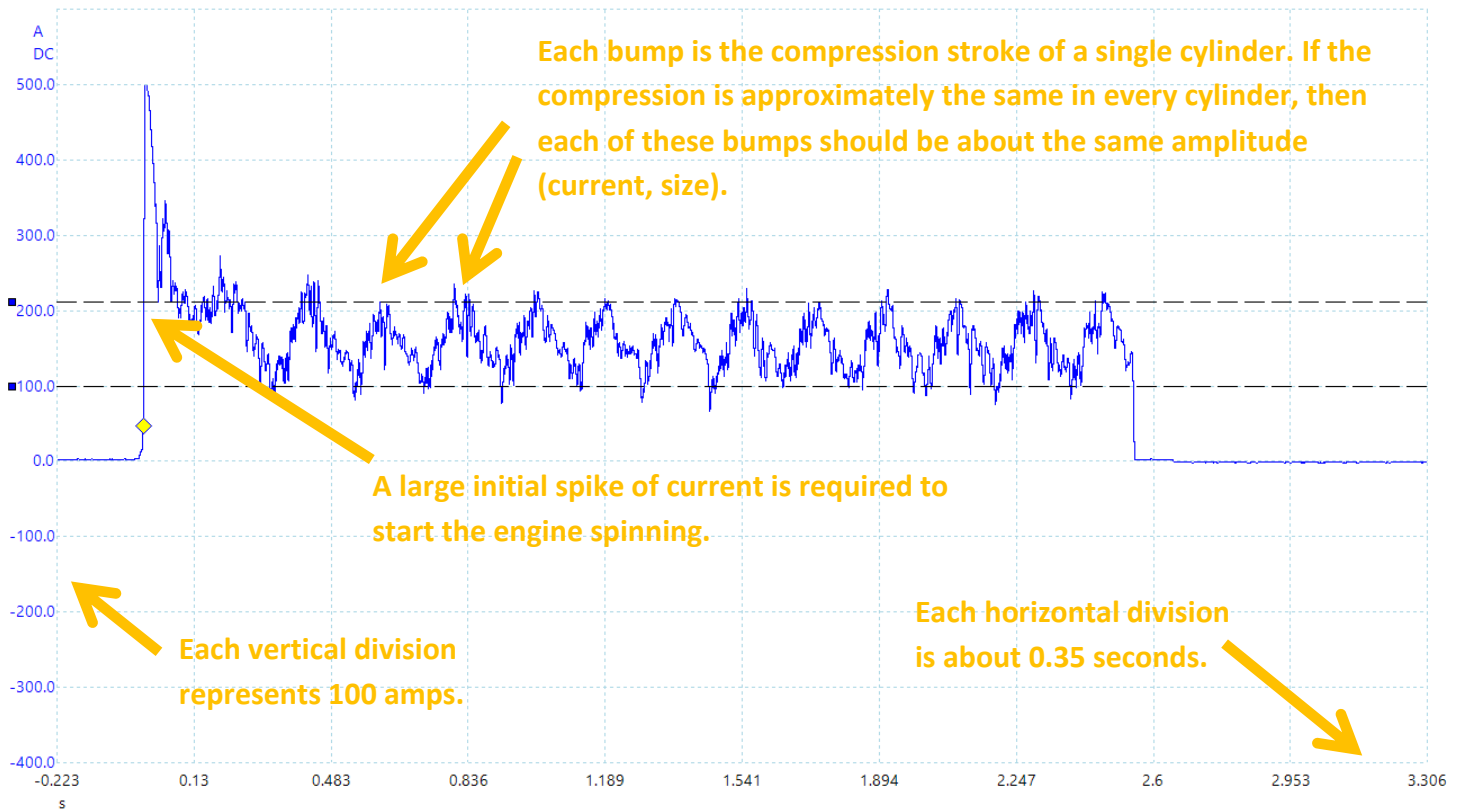

How can we determine which cylinder is which in this waveform?

In order to do this, we can simultaneously monitor the ignition coil control input to determine when the #1 cylinder fires. First, we need to know the pin-out for the ignition coil.

As shown in the following Honda ignition wiring diagram, the ignition coil has three wires: black = ground, black/white = switched power, and yellow/green = control input for firing:

#1 Cylinder Ignition Coil control input
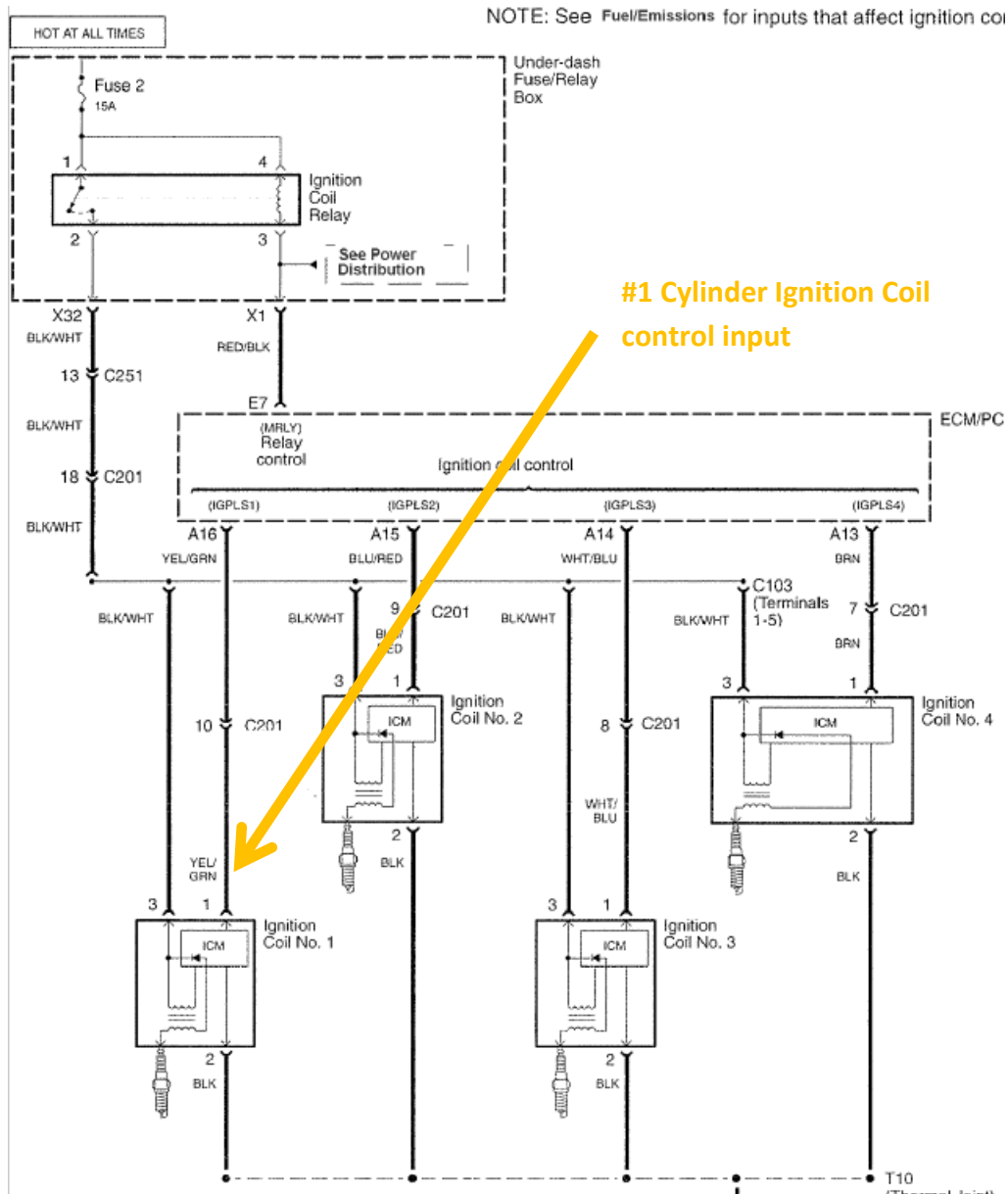
Back-probes can be used to probe the ignition control input to the #1 cylinder ignition coil via the back of the connector as shown below. The scope probe is hooked to the control wire (green/yellow) and the scope ground is hooked to the ground wire (solid black). Notice that cylinder #1 is closest to the crank pulley (Serpentine belt) and the cylinders are number 1,2,3,4 across with 4 being on the transmission side of the engine.
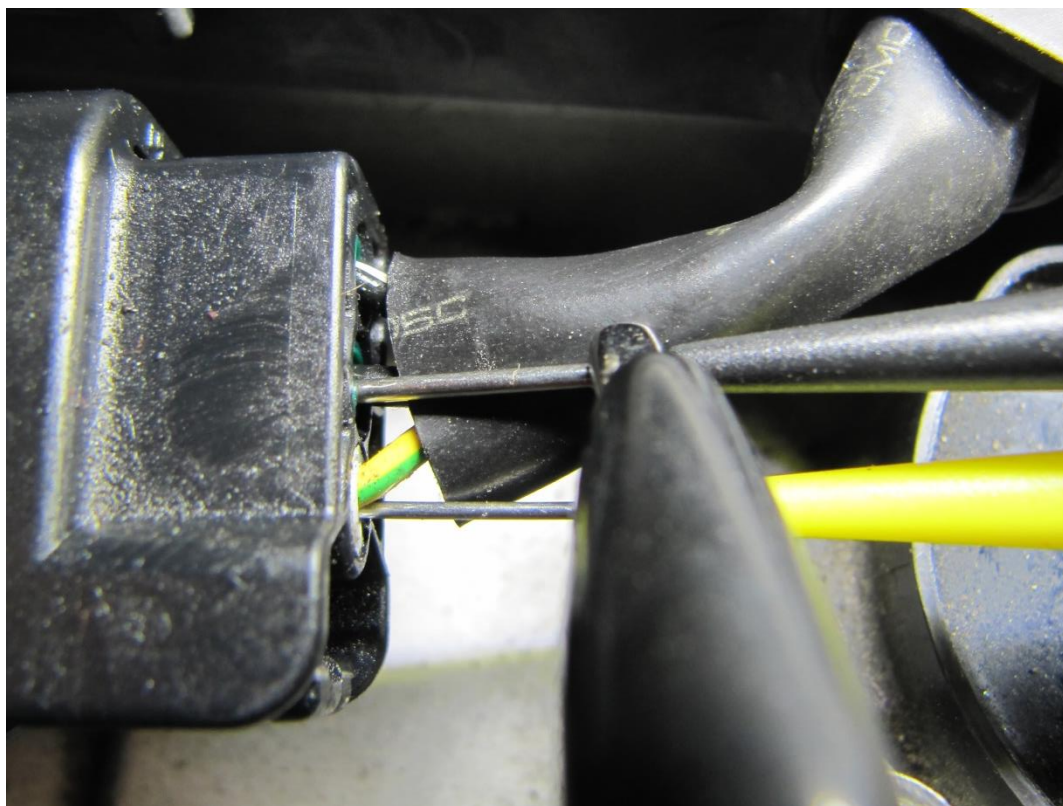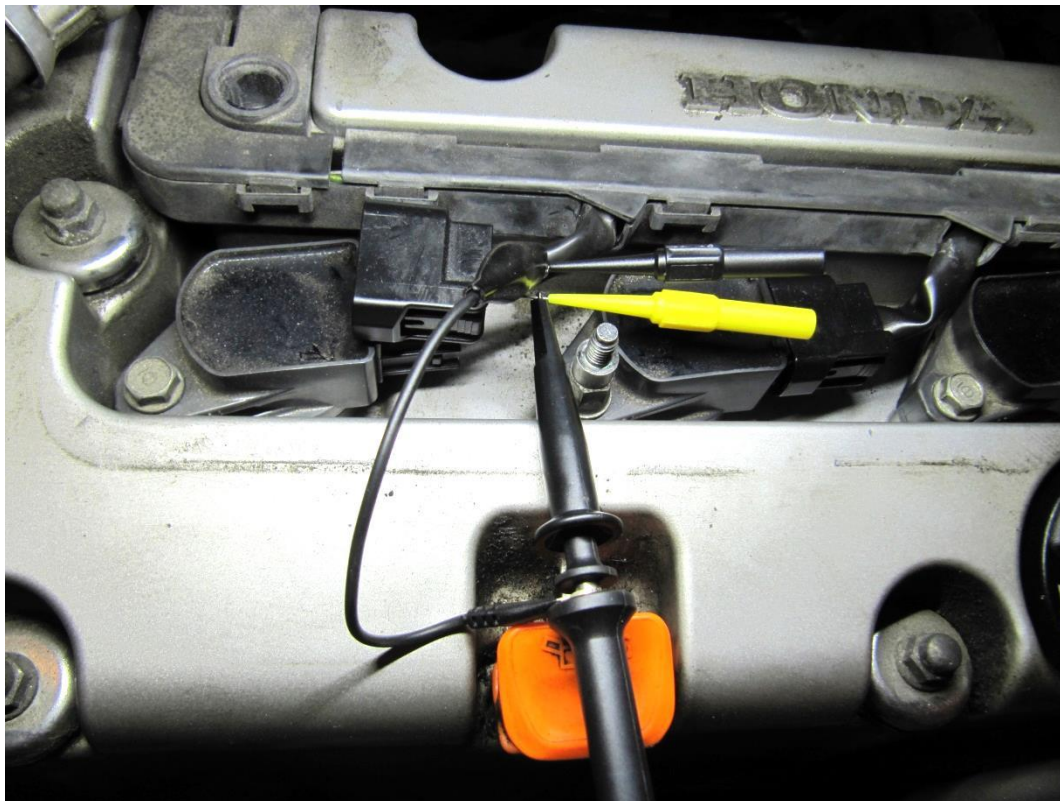
As shown below, with the ignition coil #1 input plotted, we can easily identify cylinder #1, and from it all the other cylinders given that the firing order is 1 – 3 – 4 - 2. In this manner, we could quickly identify a compression problem in any individual cylinder.
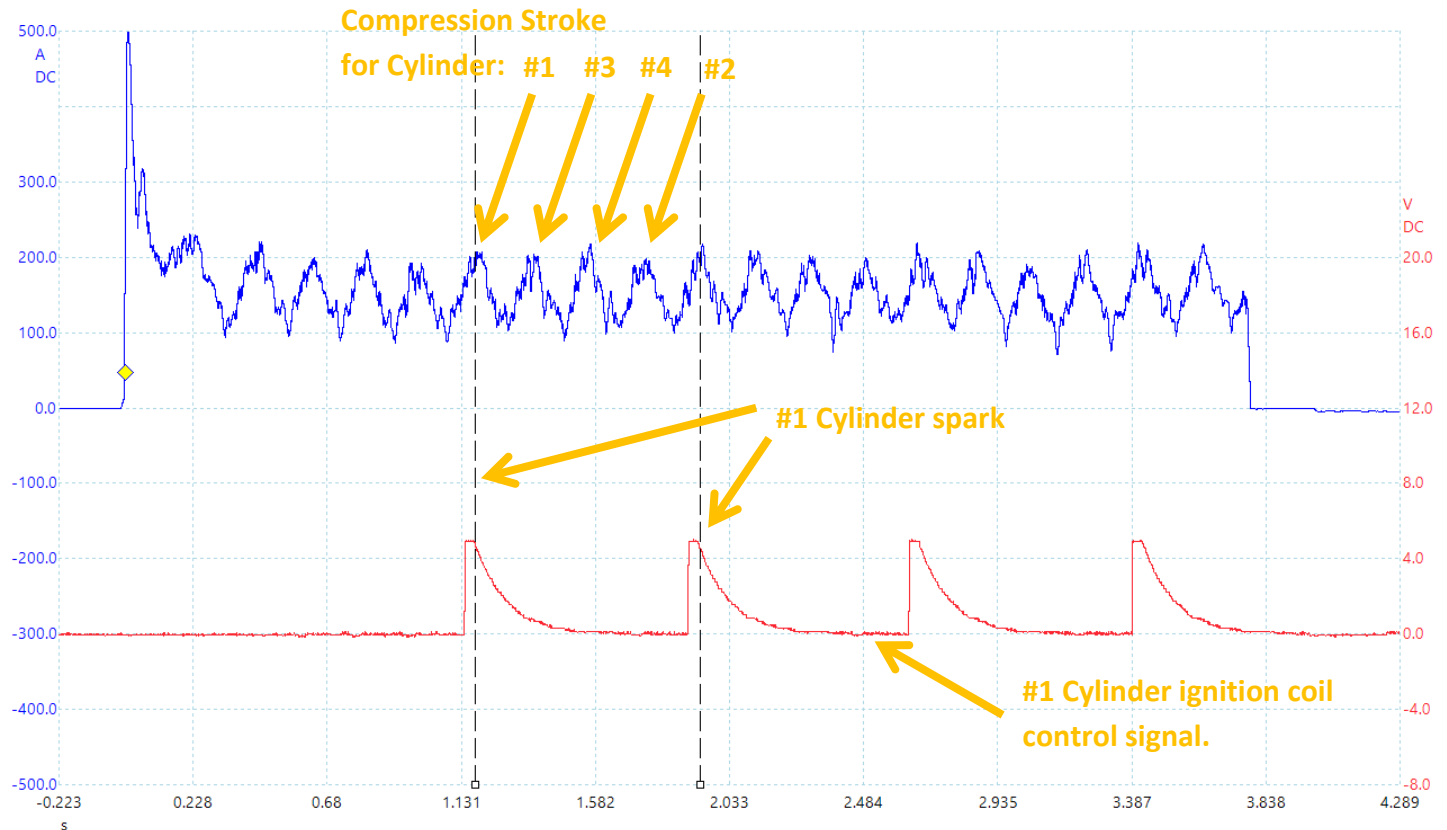
What does it look like if there is a compression problem in a cylinder?

To emulate a massive compression problem, the #3 cylinder spark plug was removed and the relative compression test was repeated as shown below.

With the spark plug on the #3 cylinder removed, the relative compression test clearly shows the lack of any starter current pulse where the #3 cylinder should be in its compression cycle: