



# ))) FirstLook™

Engine Analysis for the 20<sup>th</sup> Century

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## **Put an End to Chasing False Trouble Codes and Stop the Part Swapping Boogie!**

*First make sure the basic engine is in good shape!* Use the FirstLook Automotive Engine Diagnostic Sensor ADS ES 100 (AES# sx-100) and any good lab scope to dynamically verify cylinder compression, valve condition and valve timing before pulling the trouble codes. It only takes a few minutes to do this, but a few quick tests may save hours of wasted effort!

## **Why is a Dynamic Compression Test So Important to the Automotive Technician?**

Today's onboard computer systems monitor almost everything necessary about the sensors and electronics operating under the hood of an automobile. But they do not reveal basic engine conditions such as cylinder compression, valve condition, valve timing, and injector flow balance. How many times has a simple basic engine problem like one of these caused hours of work chasing parts that the scanner is saying are bad, when it turns out they really aren't the problem?

Although modern engines are very reliable in general, one of the biggest problems facing the technician is detecting early in a diagnosis problems caused by a bad valve or compression loss in a single cylinder. Today's engine designs make it almost impossible to get to all the plugs to do a complete conventional compression test in a reasonable time. This is a test that would show these problems, but it just takes too long.

Now the FirstLook ADS ES 100 sensor provides a major step forward for the technician needing to resolve these sorts of issues quickly. In just minutes, using the ADS ES 100 and any good labscope, one can do a dynamic compression and valve test. At the same time it is also possible to see other problems like slipped cam belts, worn cams and leaking head gaskets. (The internal cleanliness of the engine is also evident, and may point out the need for a good engine cleaning using one of several good cleaning systems...and makes it easy to show the customer good results as a follow up!)

## **The FirstLook Cold Crank Dynamic Compression Test**

By simply inserting the ADS ES 100's probe into the tailpipe, disabling the fuel system, and turning the engine over, most core engine problems will be apparent if wide variations are seen between cylinders in the pulse patterns on the lab scope screen. But if all appears to be in balance across the cylinders, and no major differences between any cylinders stand out for attention, the basic engine is sound, and the scan tool recommendations may probably be trusted.

*Catch a Wave!*



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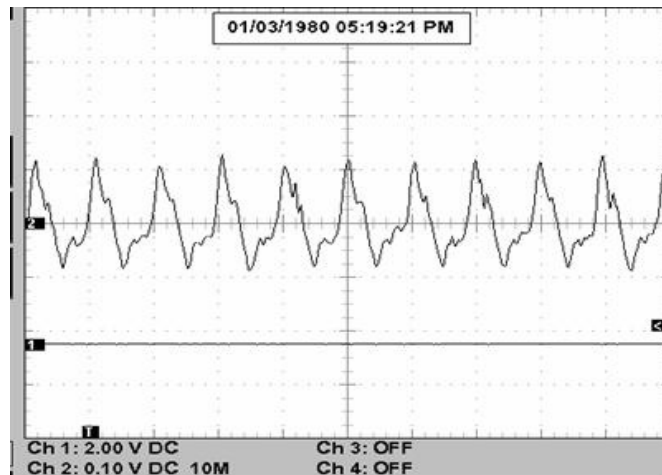
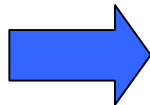
## Cold Crank Dynamic Compression Test

Using any lab scope, quickly and accurately check dynamic compression, cylinder balance and performance checks at the tailpipe in less than 10 minutes on both gasoline and diesel engines.

1. Setup scope for 1 second sweep total screen.
2. Set voltage range to AC and 1 volt plus and minus to start.
3. Insert sensor into tailpipe and connect to diagnostic scope input channel
4. Disable fuel or ignition so engine can be cranked but not started.
5. Crank engine over and observe waveform on scope.
6. Adjust voltage levels for maximum display on screen and repeat test.
7. Freeze scope screen to examine waveform.

**This wave form is typical of an engine with no basic mechanical problems.**

A good engine will always have a stable and repeatable series of waveforms with each cylinder contributing about the same energy into each exhaust pulse. The waveform below is typical of an engine with reasonably good compression and valves. The trouble codes generated from this engine's problems would most likely be valid.



*Catch a Wave!*



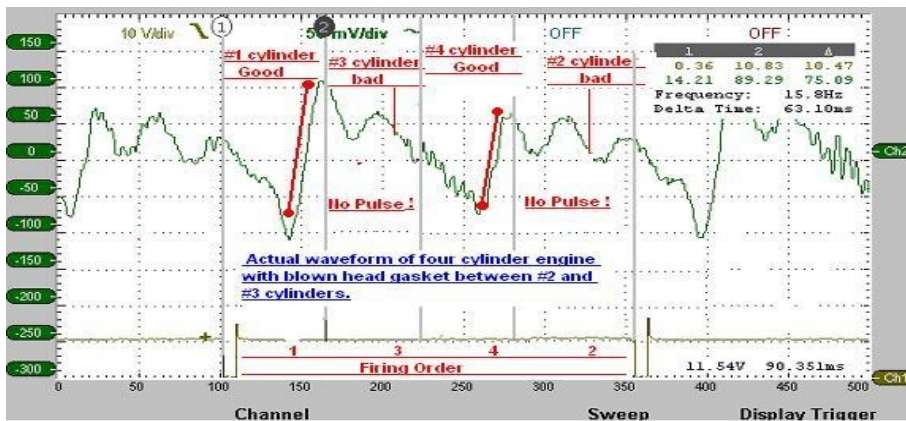
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**This waveform is typical of an engine with a big basic mechanical problem!**

Each cylinder should generate nearly the same pulse pattern through every cycle of operation. In this case the pulse pattern is repeatable, but in this case is very irregular. Only the #1 and #4 cylinders are generating a strong exhaust pulse. The gasses in the compression stroke for #3 and #2 cylinders are actually leaking off into each other and not going cleanly into the exhaust system.

The trouble codes that resulted were totally wrong and *the part swap boogie continued for more than two weeks* before a full compression test finally verified that the initial ADS ES 100 based diagnosis of a blown head gasket was correct. The initial diagnosis was done by an independent technician, and took about ten minutes. This was not a happy customer!



Like a doctor's stethoscope, the FirstLook ADS ES 100 is a very important tool for the technician when examining the basic mechanical health of any gasoline or diesel engine!

Article courtesy of SenX Technology.

More product information available online:

AES# SX-100

FirstLook™ Engine Diagnostic Pulse Sensor

Link: <http://www.aeswave.com/products/Product.asp?i=343>



*Catch a Wave!*

Available from: <http://www.AESwave.com>