

# iea™

Intelligent Engine Analyzer

## Training

### Cam Gear Boogie - 2002 Dodge Stratus 2.7 Vin R

Bob Powell - Bob Powell's Auto Repair

A local shop brought this car in after a remain engine was installed. The complaint was that the car would not start unless the Cam sensor was unplugged. Otherwise, it ran OK. They figured that much out but were unable to pinpoint the cause of the fault.

The first thing I wanted to do was see if the cam and crank sensors were in sync. I was able to start the car with the sensor unplugged, then plug it back in and get some signals. Here is what I saw (Figure 1) Note the cam waveform pattern is 1-2-3-2-1-3 which will be important information. I could not find any known good patterns that matched my cam and crank signatures so at this point the jury was still out.

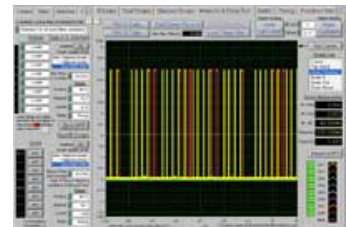


Fig. 1

Next I decided to hook up a pressure transducer in one spark plug hole on each bank to verify whether or not the cams were physically in sync. The patterns indicated that things were in proper sync mechanically. (Figures 2 & 3)

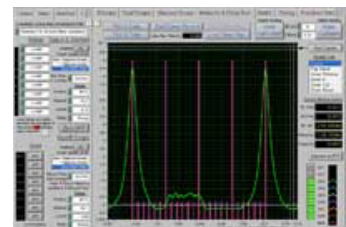


Fig. 2

OK, now I'm getting somewhere. The engine is mechanically synced so I must have a sensor problem. The crank sensor reluctor on this car is on the flywheel. The tech told me the same flywheel was used from the original engine. I next asked him about the cam gear reluctor. This is where things got real interesting. He informed me that the engine came with new chain and gears in a box and had to be installed. I asked if he had the original gear. He did and agreed to drop it off at the shop so I could inspect it.

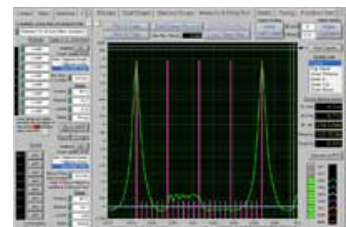


Fig. 3

The original reluctor slot pattern was 1-2-3-1-3-2. This did not match the cam pattern I saw on my scope. At this point I knew the problem was an incorrect cam gear for this application. I instructed the tech to install the correct cam gear/ and his problem would be solved.

One week later he comes back and says, "I replaced the gear but I have the SAME problem". I can't believe it so I hook up my scope again to see what's what. Here is what I see from the cam sensor now. (Figure 4) Big chunks of the signal are totally missing. Time to quiz the tech again. After some discussion and checking, the "new" problem was discovered. I found if I took the cam sensor hold down bolt out and tilted the sensor toward the reluctor ring, the car would start and the cam signature was correct.

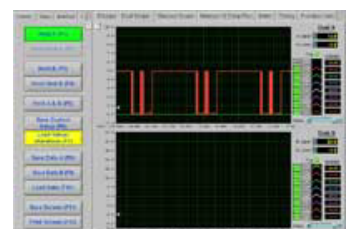


Fig. 4