



FirstLook[®]

DIAGNOSTIC PULSE SENSORS

Automotive Injector Diagnostic Sensor Quick Setup Guide



Model ADS ES 300

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Version 2.1

The supplied quick disconnect fittings allow the FirstLook® Fuel Injection Sensor to be used with virtually any commercially available Fuel Pressure Test Kit and adaptors.

Using the FirstLook® sensor is in addition to the necessary electrical tests that need to be performed before condemning any injector. This sensor checks flow of a given injector. With that said low flow can come from a voltage drop in the injector circuit, or a faulty driver in the PCM. The use of a low amps current probe and or a voltage drop test to confirm circuit integrity is crucial to get the full picture of what is going on with any injector. Remember low flow can be caused by an electrical problem as well as a flow problem within the injector. It is up to you to determine where the low flow problem area is. What this sensor does is locate which injector is having the problem. To get the whole picture one needs to know both the electrical and the physical information to make this decision. This sensor will finally give you the piece of the puzzle you have never had before.

IMPORTANT: The sample line and sensing cavity must be purged of air for the signal to be a true reaction to pressure changes in the fuel rail.

The physical difference between injectors.

It is important to discuss some of what you might find using this sensor to head off any false conclusions. First, practice on a known good vehicle. Depending on how you trigger your scope (#1 injector, #1 ignition or cam sensor) you will notice that #1 injector can start from before the trigger point or after the trigger point. The best way to know for sure is to have the correct firing order for the engine. Next with the key off, disconnect one of the injectors. Follow the firing order and see if the pattern reflects the cylinder you think it is. With this confirmed you can be very confident you have located the problem injector. Now it is up to you to diagnose if it is the injector itself or an electrical problem with the harness or PCM.

You will find that with practice you will develop your own routine procedure depending on whether you favor using a current ramping probe, ignition or even voltage signature to sync the firing order of the injectors.

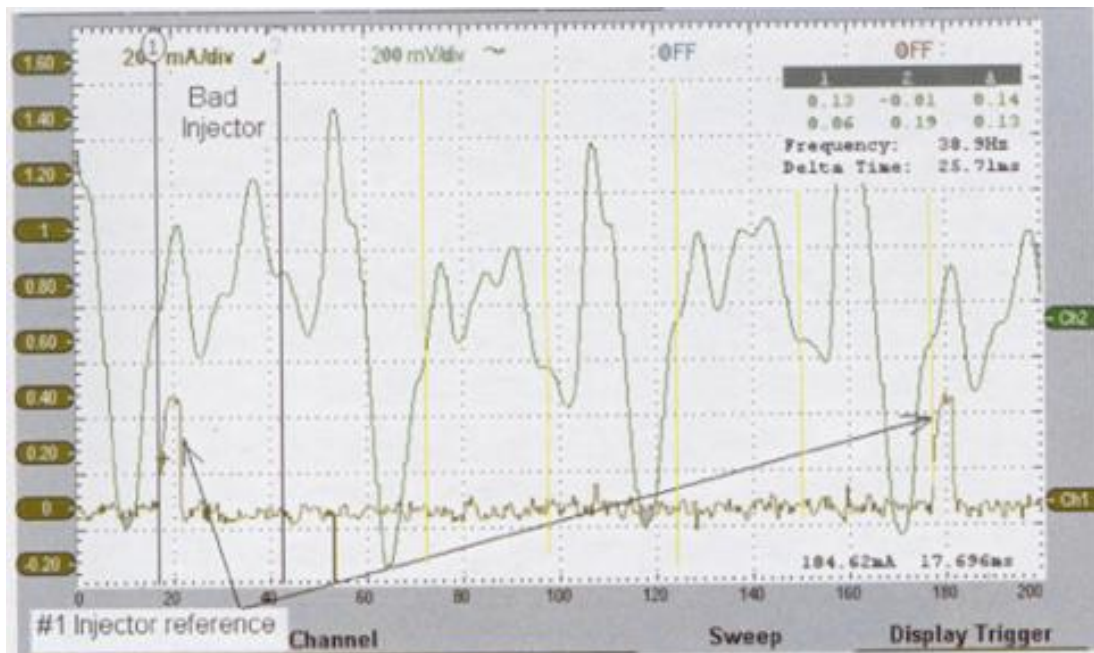
Connect FirstLook® Injection Sensor using the quick disconnect fitting supplied in the kit and when necessary the appropriate fitting from your fuel pressure test kit to connect to the fuel injection rail of vehicle being tested.

WARNINGS

- **DO NOT MODIFY THE SENSOR AND CONNECTOR ASSEMBLY**
- **DO NOT USE ON DIESEL ENGINES**
- **ALWAYS WEAR OSHA APPROVED EYE PROTECTION**
- **NO SMOKING, NO OPEN FLAMES, NO ELECTRICAL SPARKS**
- **USE EXPLOSION PROOF ELECTRICAL DROPLIGHTS**
- **LOOSEN GAS CAP AND RELIEVE FUEL PUMP PRESSURE**
- **TIGHTEN ALL CONNECTIONS TO ELEMIMATE LEAKS**
- **AVOID FUEL CONTACT WITH HOT ENGINE PARTS**
- **FOLLOW OUR INSTRUCTIONS AND AUTO MAKERS TEST PROCEDURES**
- **WRAP ADAPTER IN SHOP TOWEL BEFORE DISCONNECTING**
- **WIPE UP FUEL SPILLS AND PUT RAGS IN APPROVED CONTAINER**
- **REMOVE ANY FUEL IN THE SENSOR HOSE BEFORE STORING**

Turn ignition on and check for leaks. If no leaks are detected proceed with tests.

The best way to understand how the FirstLook® Fuel Injection Sensor works is to start with a known good engine. See how the injectors work at both idle and during the 1500 RPM load test. Next disable an injector and run the same test. Always remember injector problems can also be caused by a bad electrical driver. It is just as important to know the electrical condition of your injectors as it is to know their mechanical condition. Current ramp testing of the fuel injector electrical system is the best way to verify proper electrical condition. An engine with oversize fuel rails can cause you to see two different sets of patterns. The injectors closest to you will appear to have different waveforms than the injectors on the opposite side of the engine. Remember what you are looking for is a repeatable pattern. The Nissan fuel rail below notes this type of waveform. The firing order here is 1-2-3-4-5-6. You will see 1, 3, 5 appear differently than 2, 4, and 6. This is a normal condition on many cars. The bad injector is marked between the cursers. See www.senxtech.com for more.



Scope settings for Idle Test

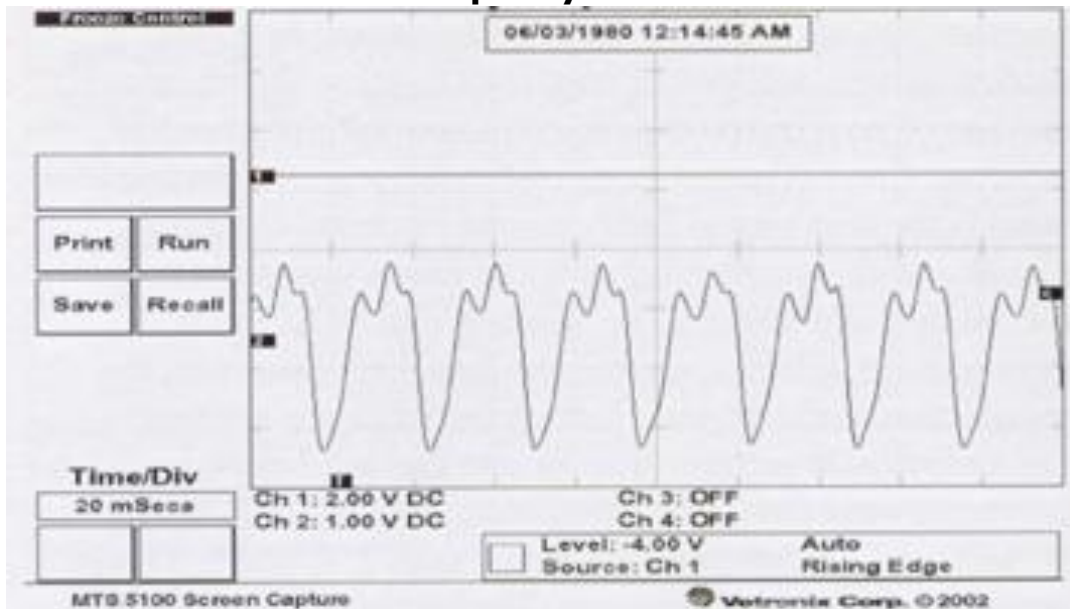
Idle test... 650 to 700 RPM...Scope settings.

Voltage settings... +1 Volts to - 1 Volts

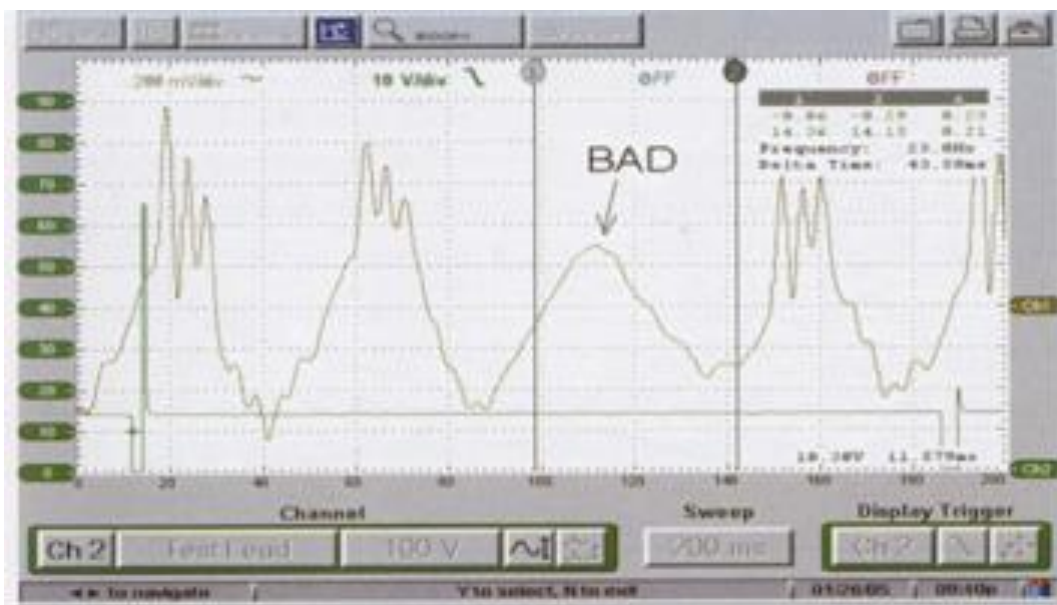
Time base ... 200 ms

Start engine and allow to warm up to operational temperature. Observe wave forms for irregular injector operation.

Good injector waveform not triggered 96 Jeep 6 Cylinders



96 Accord 2.2 bad injector triggered from injector #1



Scope settings for 1500 RPM...Power Brake Test

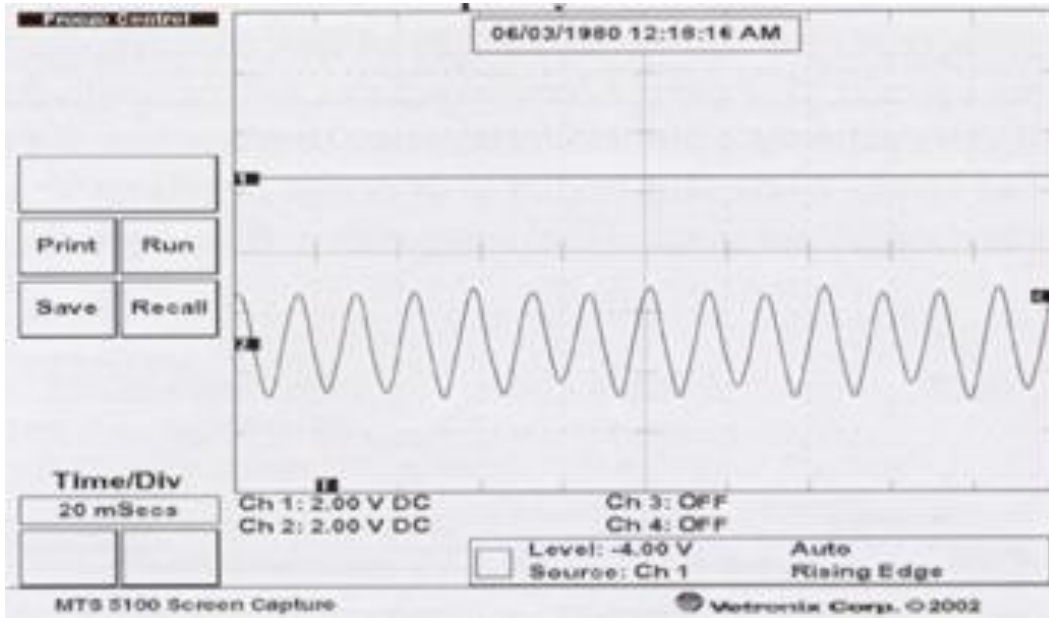
Power brake test...1500 RPM...Scope settings.

Voltage settings... +1 volts to -1 Volts

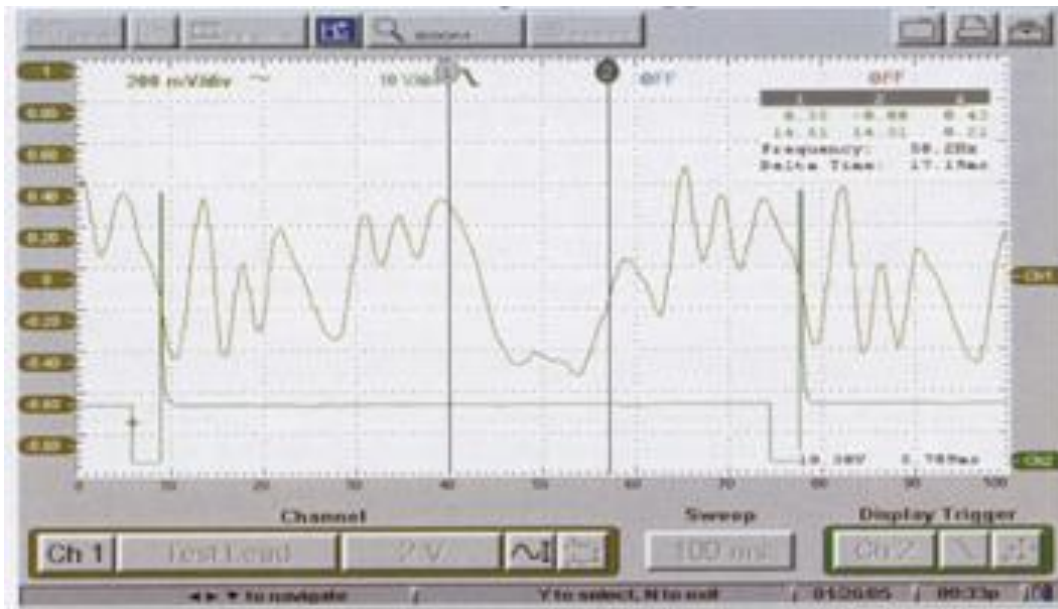
Time base...100ms

Put vehicle in gear and **apply brakes**, slowly increase RPM to 1500. Most flow problems will show up as irregularities in the scope pattern at 1500 RPM.

Good waveform not triggered 96 Jeep 6 Cylinders



96 Honda Accord 2.2 Bad Injector triggered from Injector #1



For most complete view of Fuel Injection System.

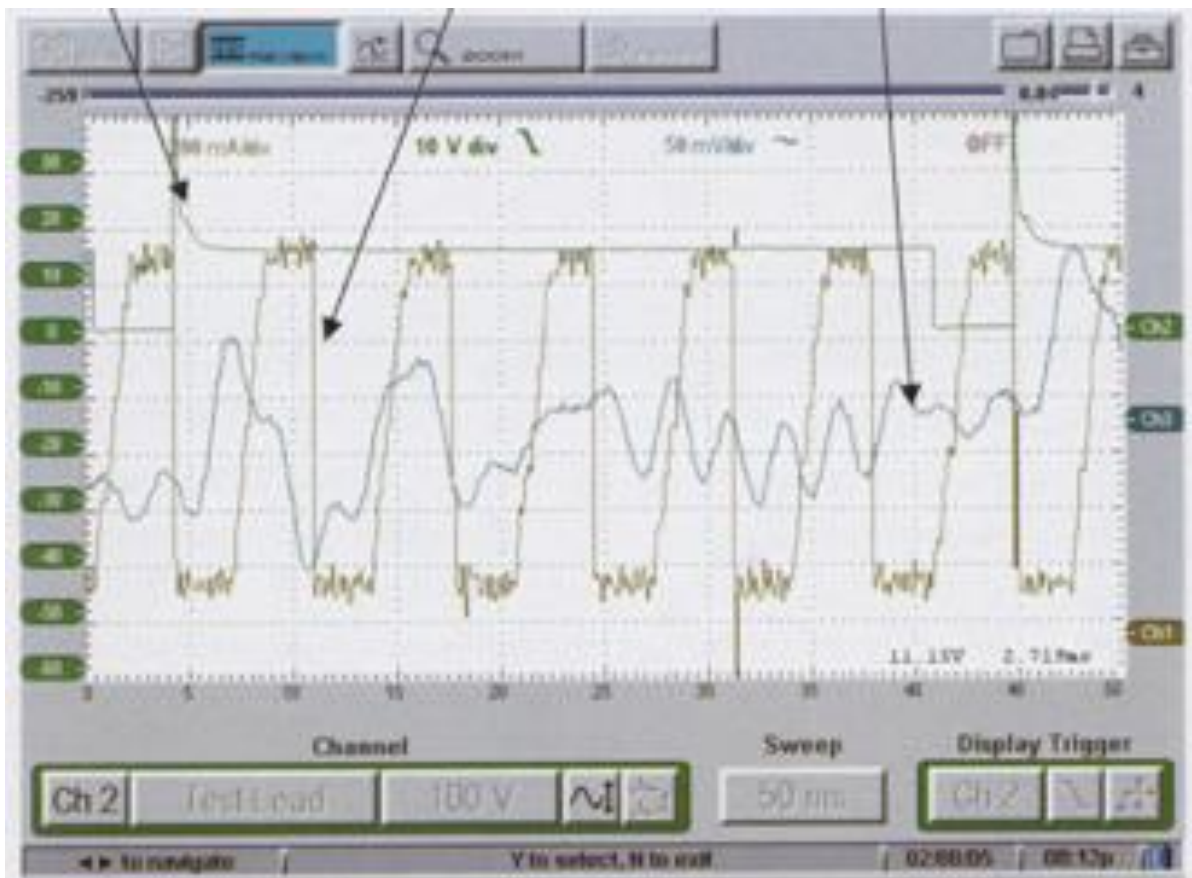
1. Trigger scope using injector #1 as reference point
2. Connect low current probe to the wire feeding voltage to the injectors.
3. Hook up FirstLook® Fuel Injection Sensor to fuel rail.

Run both Idle test and 1500 RPM Power Brake test. This lets you look at the system at idle and under a working load. With the current probe hooked to the main line supplying voltage to the injectors you also can see the current draw conditions for the injectors. The current draw waveforms will track with the injector pulse wave forms allowing you a complete look at the fuel injector system and helping to determine if problem is electrical drivers or actual fuel flow issues with the injectors.

Trigger

Current Probe

FirstLook® Sensor



Support

For support questions or warranty assistance contact:

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