P020A: CYLINDER 1 INJECTION TIMING

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Advanced
Repair Cost	:	**$350-$850**
Can I Still Drive?	:	No

What Does The P020A Code Mean?

A stored code P020A means that the powertrain control module (PCM) has detected a malfunction in the injection timing circuit for a particular cylinder of the engine.

In this case, the cylinder in question is cylinder one. Consult a reliable vehicle information source for the exact location of cylinder number one for the vehicle in which the P020A has been stored.

It has been my experience that a code P020A is stored exclusively in vehicles equipped with diesel engines. Today's clean burning (direct injection) diesel engines require extreme levels of fuel pressure.

Because of this high degree of fuel pressure, only qualified personnel should attempt to diagnose or repair the high-pressure fuel system.

When unit injectors are utilized, the high pressure injection pump is driven by the engine timing chain and timed according to the position of the crankshaft and camshaft/s. Every time the engine crankshaft and camshaft/s reach a certain point, the high pressure injection pump is pulsed; resulting in an extreme degree (up to 35,000 psi) of fuel pressure.

Common rail direct injection systems are timed using a common high-pressure fuel rail and individual solenoids for each cylinder. In this type of application the PCM or a stand-alone diesel injection controller is used to control injector timing.

Variations in camshaft and/or crankshaft timing alert the PCM of inconsistencies in specific cylinder injection timing and prompt a stored code P020A. Some vehicles may require multiple ignition cycles with a failure for this type of code to be stored and a malfunction indicator lamp to be illuminated.

Related injection timing codes include from cylinders 1 through 12: P020B, P020C, P020D, P020E, P020F, P021A, P021B, P021C, P021D, P021E, and P021F

What Are The Symptoms Of The P020A Code?

Symptoms of a P020A engine code may include:

- Engine misfire, sag, or stumble
- General lack of engine performance
- Distinctive odor of diesel fuel
- Reduced fuel efficiency

What Are The Potential Causes Of The P020A Code?

Possible causes for this P020A code include:

- Defective fuel injection solenoid
- Open or shorted wiring and/or connectors in fuel injector control circuit
- Bad fuel injector
- Engine timing component failure
- Crankshaft or camshaft position sensor (or circuit) failure

How Can You Fix The P020A Code?

Tools

I would require a diagnostic scanner, a digital volt/ohmmeter (DVOM), and a reliable vehicle information source to diagnose a code P020A.

Fixing

Begin with a visual inspection of high-pressure fuel system related components and wiring harnesses. Look for signs of fuel leakage as well as damage to wiring or connectors.

Check for technical service bulletins (TSB) which pertain to the vehicle, symptoms, and code/s in question. If such a TSB is located, it will provide very helpful information for diagnosing this code.

Now, I would connect the scanner to the vehicle diagnostic port and retrieve all stored trouble codes and freeze frame data. I like to make a note of this information as it may prove beneficial as

the diagnosis unfolds. Next, I would clear the codes and test-drive the vehicle to see if the code is reset. If there are crankshaft sensor and/or camshaft position sensor codes stored, diagnose and repair those before attempting to diagnose the injector timing code.

If the code is reset:

If the vehicle in question is equipped with a common rail injection system, utilize the DVOM and the vehicle information source to test the injector solenoid for the cylinder in question. Any component which fails to comply with manufacturer's specifications should be replaced before proceeding.

After suspicious parts are repaired/replaced, clear any codes which may have been stored during testing and test drive the vehicle until the PCM enters readiness mode or the code is reset. If the PCM does enter readiness mode you know that the repair was successful. If the code is reset – you can assume that you still have a problem.

If the injector solenoid is within specs, unplug the controller and use the DVOM to test system circuits for shorts or opens. Repair or replace system circuits which do not conform to manufacturer's specifications according to the pin-out chart located in your vehicle information source.

Unit injector failure can almost always be attributed with engine timing component failure or some type of high-pressure fuel system leak.

Note:

- A P020A should be diagnosed only by a qualified technician due to extreme fuel pressure
- Determine which type of high-pressure fuel system the vehicle is equipped with before beginning your diagnosis

Severity Description

All codes related to the high-pressure fuel injection system should be considered severe and addressed with a degree of urgency.

Reference Sources

P020A: Cylinder 1 Injection Timing, OBD-Codes.