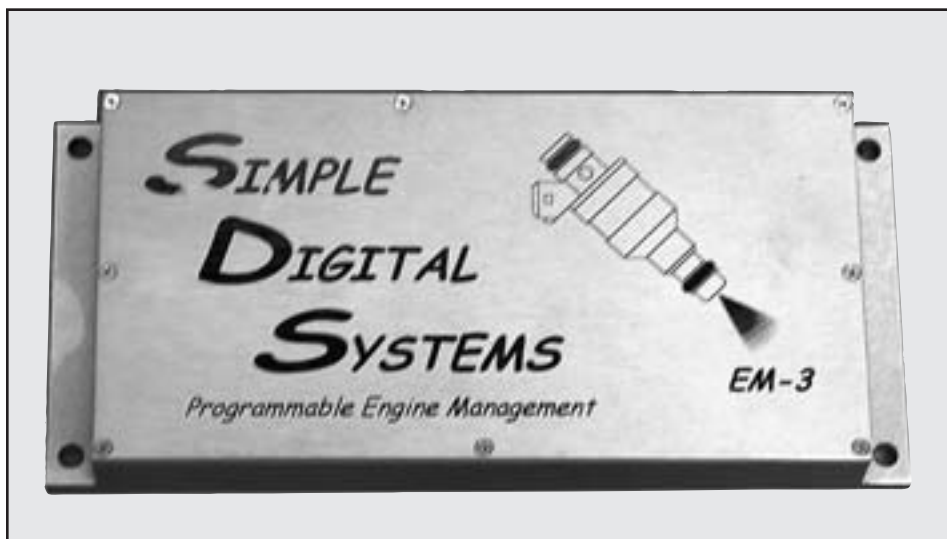


CHAPTER 17



SIMPLE DIGITAL SYSTEMS (SDS)



SDS

COST: Approximately \$900 to \$1,600

FEATURES: SDS makes simple systems for simple applications, without too many frills.

EASE OF INSTALLATION AND TUNING: The SDS system utilizes an easy-to-use hand-held tuning module, but typically the user must connect their own wire harness.

SDS, or Simple Digital Systems, is committed to building reliable fuel-injection systems for those who want the benefit of electronic engine control without all the complexity of tuning with a laptop, and without all the fancy extras. They like to keep it simple, and they do a good job of that!



SDS has maintained their keep-it-simple attitude towards engine control. The SDS units do not use a laptop for control, and they are not compatible with factory OEM trigger patterns, or idle air control valves. The units do not contain any data-logging capability, and do not use any sort of RS-232 serial cable for computer interface. Most Volkswagen owners agree that keeping it simple is the way to go, at least when it comes to fuel-injection systems.

Simple Digital Systems, or SDS, as it has become known, is now in its tenth year of supplying affordable, easy-to-use fuel-injection systems for the performance market. Their theory is quite simple in that they wanted to build a no-frills system that could be easily installed and even more easily programmed by the end user without a laptop computer. To accomplish this task, the company has built several models of ECUs that can control 4-, 6-, or 8-cylinder engines. They control both fuel and ignition timing and also allow the user to completely tune the engine through the use of a handheld calibration unit.



The SDS units are very easy to install and operate. Each one comes with all its own sensors, including a crank-trigger system, which the user will need to mount on the crank pulley.

In a time when most engine-management companies are racing towards a feature war where each company strives to bring to market more functions and features than the next guy, SDS has maintained their keep-it-simple attitude towards engine control. The SDS units do not use a laptop for control. They are not compatible with factory OEM trigger patterns, or idle air control valves. The units do not contain any data-logging capability, and do not use any sort of RS-232 serial cable for computer interface. The systems are also not compatible with engines using Siamese intake runners or uneven firing patterns.

The system is aimed at those in the performance market place who have wanted to update their engines to fuel injection in a simple fashion, but did not care to use or learn anything about laptop computer operation. The SDS units are very easy to install and operate. Each one comes with all its own sensors, including a crank trigger system, which the user will need to mount on the crank pulley.

A custom wire harness is shipped along with the ECU, handheld LCD programmer, intake air temperature sensor, coolant temperature sensor, and optional throttle position and MAP sensors. Other options include knock sensors, oxygen sensors for closed-loop control, fan relays, injectors, fuel pump, and a backlit LCD display unit.

The units are designed to fire injectors in a batch-fire mode; sequential operation is not available with the SDS systems.

The SDS computer can use either throttle position or MAP sensor information as a load reference signal when programming. It is recommended that engines using radical camshafts or individual throttle bodies apply the TPS value as the load signal, while engines using turbochargers or superchargers should use the MAP.



Fuel or Ignition Problem?

When I was young and just starting out tuning engines, an old man said to me: "Ninety percent of all your carburetor problems will be found in the distributor." At the time, I thought he was just a kooky old man. After years of tuning, my own experience seems to have proven him right. Many tuning issues with both carburetors and modern fuel-injection systems are mistakenly blamed on the fuel system.

One thing to watch out for when tuning an engine using a modern fuel-injection system is false information from an oxygen sensor when an engine misfires. When an ignition event fails to happen, or the engine misfires, the oxygen sensor will want to read a leaner mixture than what really exists. This is due to the fact that the oxygen sensor can only read burned hydrocarbons. When the engine misfires, the unburned fuel doesn't get recognized by the sensor, so it seems that there is a large excess of oxygen in the exhaust system.

Many novice tuners immediately begin to add fuel to the base fuel tables in an attempt to correct a lean mixture induced by a misfire. Not only does this not usually correct the problem, it often serves to make matters worse. Having too much fuel can cause a misfire. You can see how the viscous cycle can get started.

Always be sure that the ignition system is in good working order. Visually inspect spark plug gaps and set them according to the manufacturer's recommendations. Also check that the spark plug wires are not burned or melted by the hot exhaust manifolds, or simply worn out.

It is also a good idea to check all the power and ground wires to the ignition system and the high-voltage leads to the ignition coils. While it is certainly possible for an engine to misfire due to a lean mixture, I have found that going back to the basics and thoroughly inspecting the ignition system will almost always rectify the problem.