

## Engine Information and Options for Upgrading

### **Suzuki Engines**

G13A – The original Samurai engine, with a displacement of 13xx CC. This is a single overhead cam, normally aspirated engine. In the United States, this engine was normally fueled via a Hitachi carburetor. Called a Carb-jector by some, because of its complex metering system.

G13B – The second generation Samurai engine. 1298cc single-overhead cam normally aspirated. Samurais produced from 1990 onward substituted a throttle-body fuel-injection system for the original carburetor.

### **Engine Options for the Samurai**

There are a number of possibilities for changing the engine in your Samurai, depending on where you live and what you want to accomplish.

***Suzuki Sidekick or Geo Tracker I (1989-1995)*** - The block from the 1.6 8-valve Sidekick or Tracker can be swapped in easily. This is by far the simplest upgrade, requiring modified engine mounts, transmission adapter plate, and provision (some sort of lift, or an adaptation from a G12 series engine) for the oil pan. Intake and Exhaust Manifold will fit, and finally the addition of an electronic fuel pump since the 1.6 head does not have lobes on it for the fuel pump.

Petroworks can supply almost all necessary parts required for this task. Motors are a little harder to come by though.

The next level to this swap would be the use of the Sidekick/Tracker Throttle Body intake system. This is a much more complex task and requires the complete under hood wiring harness, parts of the under dash harness, and computer from a donor car. Modification of the harness is required to install it into the Samurai.

Also, the Speedometer cluster needs to be modified on the Samurai to add in a Vehicle Speed Sensor (VSS). This is needed by the computer to adjust timing during operation.

***Suzuki Swift*** – This is a G13 series engine with a counterbalanced crankshaft, twin overhead cams and fuel injection. One of the easier swaps to make, requiring only some minor wiring changes and a hole in the Samurai's firewall for the horizontally mounted distributor (this engine was originally designed for a transverse mounting).

***Suzuki Sidekick or Geo Tracker II (1993-1995)*** – The motor from these cars are 1.6 16v, multiport fuel-injected. These motors are usually found in 4 door cars and will say "16 Valve" On the valve cover, Timing Belt cover or injector manifold. This is a much more complicated swap and requires a lot of wiring to interface with the Samurai harness. Just

like the 8v swap the addition of a high pressure fuel pump, and modification of the Gauge Cluster for a VSS.

When searching for parts for this project it is very important to get the entire wiring harness and computer from the donor car. Also, make sure to get the distributor, coil, igniter, exhaust manifold and down tube to the cat, the O2 sensor, Air Box, MASS Air Flow sensor and relays on the computer for the fuel pump.

***Suzuki Sidekick of Geo Tracker (1996-1998)*** – Essentially the same as the 1993-1995 except that these motors are ODBII. They have no Coil/Igniter setup, it is inside of the Distributor. You still need to get the entire wiring harness. But unlike the earlier models you will need to find a Computer from a 1993-1995 car to make it work. This is due to the emissions standards.

The 1.6 16v motor swap is the best bang for the buck. This is the motor that should have been put into the Samurai. Highway drivability is significant, and off road the smoothness of the fuel injection system makes driving the car fun.

*Petroworks can provide the installation kits for these installs, along with wiring harness modifications and Gauge Cluster modification. We also do turn key swaps at our location.*

***VW Diesel*** – Uses the engine from a 19xx Rabbit, Scirocco, Jetta. A 1.6 or 1.9 TD motor is preferred. A number of other parts are also needed from a number of other diesel vehicles from the late 1970's early 1980's. An adapter kit to mount the Samurai transmission to the motor, along with motor mounts is also needed.

Performance wise this is not a good swap. Fuel economy is not that much better, and top end speeds are generally no greater than with a stock motor. Where this motor shines is off road. The low end torque concurs all.

### **Commonly Needed Data (G13 engines)**

Valve Lash – Cold (coolant temp. 59-77F)

Intake 0.13 – 0.17mm (0.0051 – 0.0067 in.)

Exhaust 0.16 – 0.20mm (0.0063-0.0079 in.)

Valve Lash – Hot (coolant temp. 140-154F)

Intake 0.23 – 0.27mm (0.009 – 0.011in.)

Exhaust 0.26 – 0.30mm (0.0102 – 0.0118in.)

## **Torque Specification**

Valve adjusting screw lock nut  
15-19 N-m (1.5 – 1.9 kg-m, 11.0-13.5 ft-lb)

Cylinder head cover (valve cover)  
4-5 N-m (0.4 – 0.5 kg-m, 2.0 – 3.5 ft-lb)

Cylinder head bolts  
63-70 N-m (6.3 – 7.0 kg-m, 46-50.5 ft-lb)

Water pump bolts and nuts  
9-12N-m (0.9 1.2 kg-m, 7.0 – 8.5 ft-lb)

Oil drain plug  
30-40 N-m (3.0 – 4.0 kg-m, 22.0 –28.5 ft-lb)

Oil filter  
12-16 N-m (1.2 – 1.6 kg-m, 8.5 – 11.5 ft-lb)

Oil Capacity  
4 liters (4.2 US quarts, 7 Imp. Pt.)

Coolant Capacity  
5 liter (5.3 US quarts, 8.8 Imp. Pt.)