Toyota 3K Carburetor to Stock Samurai Manifold
(Rev 5) Oct 2022

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These instructions are provided as a guideline to installing a Toyota 3K Carburetor onto a stock Suzuki Samurai manifold using products provided by Certified Machine. These are not all inclusive and may require additional items to complete the project – some vehicles may have customer modifications that may require additional work. It is assumed the installer has basic mechanical abilities and Certified Machine does not take any responsibility for any missing information which may be assumed as common knowledge. Read these instructions completely and decide if you are able to perform these tasks or if this project should be handled by a competent mechanic.

These items are to be used only on Off-Road vehicles and we do not represent anything provided as being allowed by any law or jurisdiction. User assumes all responsibility for compliance to local laws and jurisdictions.

Enough of the legal stuff, let's get to work.

You will be installing your carburetor using products provided in this kit. We sell Tested and Tuned 3K Carburetors which we highly recommend. These have been adjusted for a "Plug and Play" installation and make for quick install and instant driving. Some of you should have already purchased an Asian Carburetor P/N 21100-24034 (National Carburetor Number TOY250) which are compatible with our kit but you will need to tune the carburetor for best operation. These

instructions do not contain information on tuning carbs, just instructions on installing our Swap Kit.

Rev 5 - Kit Contents:

Gasket, Two Port Stock Manifold
Gasket, 3K Two Port with Vacuum Channel
Gasket, EGR Plate
Hose Barb with o-ring
Spacer Insulator with beveled bore
Throttle Bracket
EZ Glide Choke Cable
EGR Block-Off Plate
(1) 3/8-24 Hex Nut for Choke Cable
(2) Bolts for EGR Plate
(1) Pan Head Screw for Throttle Cable
(1) Lock Nut for Throttle Cable Screw
(2) 3/16" / 6mm Spring Clamps for fuel line
6" long, 3/16" id x 5/16" od Tygon Fuel Line
7" long, 1/8" id x ¼" od Tygon Vacuum Line
(4) 1/8 Vacuum Caps
(1) ¼ Vacuum Cap
(1) Wix #3011 Fuel Filter rated at 12 micron
(2) Pieces of rubber fuel line for Filter
(2) Hose Clamps for fuel filter

Choke Cable

Start by locating a convenient spot on the dash for the choke. I prefer the left side of the steering wheel so I may pull the choke and turn the key at the same time. Use a Uni-bit or a 3/8" diameter drill bit to drill a hole in the plastic dash. Remove the cable nut from the cable. Thread the cable through the hole. Before the cable goes too far, place the cable nut back on the cable. Thread the cable thru the dash board (thru a new hole or along with the wire bundle). When the cable is threaded into the engine bay, install and tighten the cable nut to secure

the cable to the dash. The engine bay work will be finished when the carburetor is installed. For now, just let the cable “run wild” in the engine bay.

Step drill hole for Choke Cable

Remove nut and thread thru hole

Routed thru firewall

Installed with nut on backside of dash

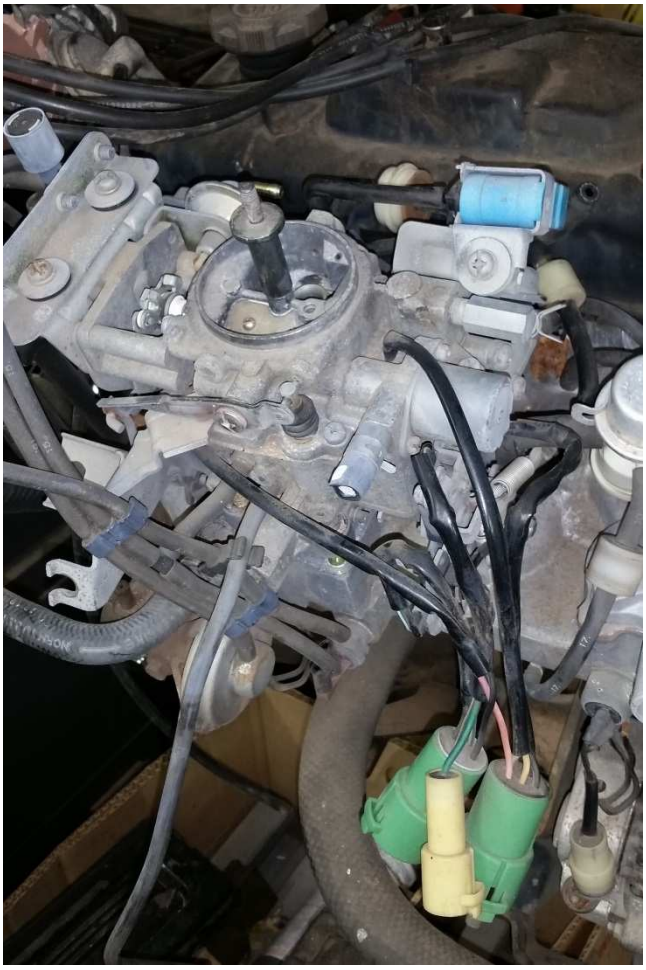
Remove the Stock Factory Carburetor

Do the following with the engine completely cooled off. You will be opening the coolant lines and **hot water will burn you. Hot motor parts will burn you.** Use caution. Start by removing/cutting the vacuum lines as shown in the picture. Remove/cut the fuel line – be careful the line may contain fuel under pressure – **HANDLE WITH CARE** - Disconnect all the electrical plugs from the carb. When removing the water hoses from the stock choke, be aware that coolant will spill out. Have a 5/16" bolt handy to plug the hose to prevent excess coolant loss. Remove the (4) carburetor nuts and pull the carb off. Carefully remove the gaskets and stock insulator from the manifold. Roll up some paper towels, shop rags or similar and carefully install into the manifold bores to avoid getting old gasket debris into the engine. Clean the manifold gasket surface with a gasket scraper (avoid gouging into the soft aluminum manifold). Finish the manifold with a scotch-brite pad to remove the entire old gasket. I used soda straw to blow debris away from the manifold bores before I remove the bore plugs.

Weber Carburetors use an adapter to mate the Weber to the Samurai manifold. This adapter needs to be removed to expose the Factory mounting surface. This adapter has flat head screws which, when remove, expose the second half of the adapter. Remove this plate to expose the Factory manifold surface. You will need to add the Factory Studs to mount the 3K Carburetor. Certified Machine will provide these ($1.00) when requested at time of order. We will ship them to you (after your order) for the price of postage (contact us for current postage).

Cut the fuel line – CAREFUL OF GASOLINE

Cut vacuum lines from Thermo Switch



All electrical connectors disconnected

Using soda straw to clear debris

There are several solenoids that will not be used with the 3K carburetor. Use the pictures as a guide to remove these. You will be leaving the water temperature sender (small fitting below the thermostat housing). The hoses for the PCV Valve will remain the same as stock. Most everything else will not be used. Some of these are unusual fittings and threads. It is recommended these sensors be left in place as the "plug".

Remove Solenoid Bracket

Bracket Removed

Remove EGR Valve

Remove the two bolts that hold the EGR Valve onto the manifold. With the bolts removed, it may be necessary to give the EGR Valve a 'love tap' with a hammer as shown. This will dislodge the EGR. Use a gasket scraper and scotch-brite pad to clean the EGR pad on the manifold. Avoid allowing debris to fall into the hole on the right side – it leads into the engine. The left side is the exhaust gas inlet and debris will not harm anything down that hole.

2 bolts on EGR removed

Little tap to free EGR from Manifold

Remove EGR Gasket

Cleaner Manifold

Gasket and Cover in place

Block Off Plate tightened

Use the supplied Block off Plate, Gasket and hardware to cover these ports. No gasket sealant should be used.

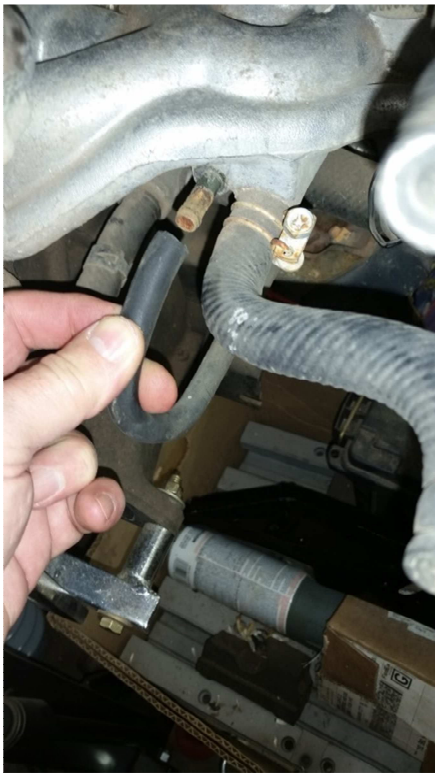
Location and Plugging Vacuum Sources

Use the pictures to identify and plug the unused manifold ports as shown. Use (4) 1/8" rubber caps and (1) ¼" rubber caps to plug these locations (if you need more than those provided, rubber caps are available from most auto stores). One of the stock carb choke water hoses (the longest one, from below the manifold) will be looped back to the manifold, next to the heater hose connection.

Be aware that all these vacuum and coolant ports and plugs will need to be watched over the next couple of heat cycles to check for leaks. Most rubber plugs will become hard and crack over time and therefore these will need to be replaced sometime in the future. If your engine begins to run rough, check these vacuum locations. Even a small leak can cause noticeable problems preventing the engine from running smoothly.

Vacuum Ports Identified

Vacuum Ports Identified



Rerouted Coolant line from Coolant Log (from Stock Water Choke) into Manifold

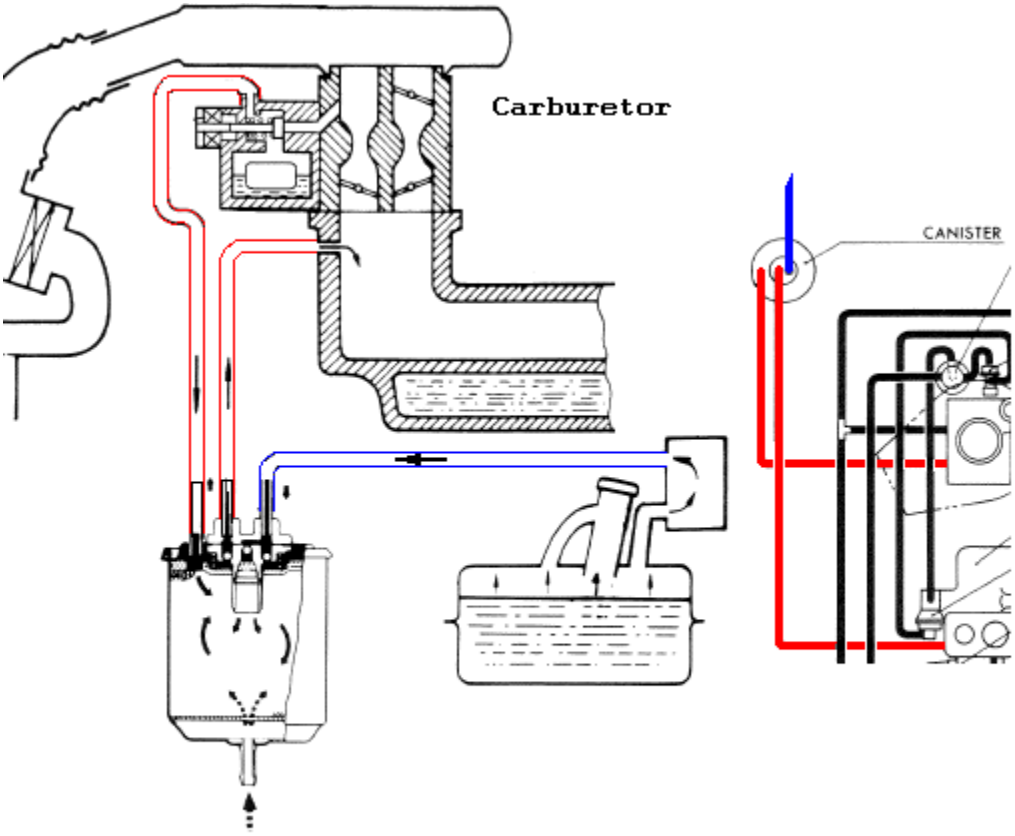
Re-route coolant hose going to choke on stock carb to this location – where the second choke coolant hose was located. The water will now just make a loop, by passing the carburetor (soon to be removed completely).

Charcoal Canister Hoses

You will find three hoses on top of the charcoal canister. The one hose closest to the engine is a vent line for the fuel tank – this one will be left in place (from the canister downward to a metal fuel tank line locate along frame). The other two will be removed from the canister. These are no longer used with the 3K carburetor (middle line went to the intake manifold, providing a source of vacuum to suck gas fumes into the manifold, the line closet to fender goes to the stock carburetor fuel bowl to vent gas fumes from the carburetor, thru the charcoal and into the manifold). These two open canister lines must be left open to allow the

gas tank to “breathe”. Should you be worried about high water or mud entering these two lines and plugging the canister, use two small lawnmower fuel filters and short lengths of hose to re-route the canister ports to ‘higher ground’. But do not plug these ports. If plugged, the fuel pump may suck a vacuum in the gas tank and prevent gasoline from being pumped to the engine (extreme cases).

Alturnative to keeping this canister is to use a vented gas cap – available at auto parts store or on-line. If the vented gas cap is used, the metal vent line from the gas tank must be plugged (to avoid water entering the gas tank when running in deep water) and then canister may be removed from the firewall.



Samurai Vapor Storage Cannister lines (FSM page 5.6 figure 5.1.5)

Installing the Your New 3K Carburetor

With a cleaned Intake Manifold surface, install the manifold gasket from the kit first. It is identified by having no vacuum notch from the bores. The two holes are different sizes and the larger hole is positioned closes to the valve cover, away from the battery. Next install the new Insulator from the kit with the vacuum notch facing up. Lastly the 3K gasket is installed. It is the gasket with the vacuum notch which will line up with the vacuum notch in the insulator. No gasket sealants or glue should be required if your manifold is true and flat. There is no harm in using sealants – these sealants just make removal and clean-up more difficult (at a later date should removal be required). Be sure to choose a sealant that will work with gasoline. Some RTV's are not intended for gasoline. A sealant named "Right Stuff" is a good choice. As well as "Indian Head" and "Permatex" gasket cement.

Manifold Gasket goes on first - Larger Hole towards Head

Insulator installed as shown

Match Carb Gasket to Insulator

Place the new carb over the studs. Install the throttle bracket over the (2) studs closest to the valve cover. Thread all (4) nuts onto the studs before any single nut is tightened. You may need to move the carb around as the nuts are tightened. Tighten these nuts snuggly. Avoid overtightening and pulling a stud out of the aluminum manifold.

Throttle Cable and Choke Cable Installation

You may wish to drill/ream out the small hole on the 3K carb bell crank to accept the throttle cable end, but this can be tricky and we do not recommend it. We have provided a small screw and Nylon lock nut as an alternative. Pictures show how the cable is routed and secured without using the drill/ream method.

Mount Throttle cable and Bracket

Locate Cable end as shown

Install Bolt and Lock Nut as shown

Allow cable to lay in groove

With the cable is installed be sure to check for adjustment. There should be – zero- tension on the cable with the throttle closed and the foot pedal should allow for full open throttle. There is a small Stop Bolt located under the foot pedal that limits travel (to some degree). This may require adjustment to allow full throttle (it takes two people to check this – one person for mashing the gas pedal to the floor board, the second person to watch the carburetor linkage. If the throttle does not travel enough to allow full opening, grab the foot pedal and pull upward, towards the steering wheel (to bend the round pedal arm rod). This small foot pedal arm may have become bent over years of use and limit the pedal travel. Pulling it out will restore the travel (or increase travel). Adjust the throttle cable at the new bracket to achieve proper operation (pedal to the floor, linkage at carburetor full open).

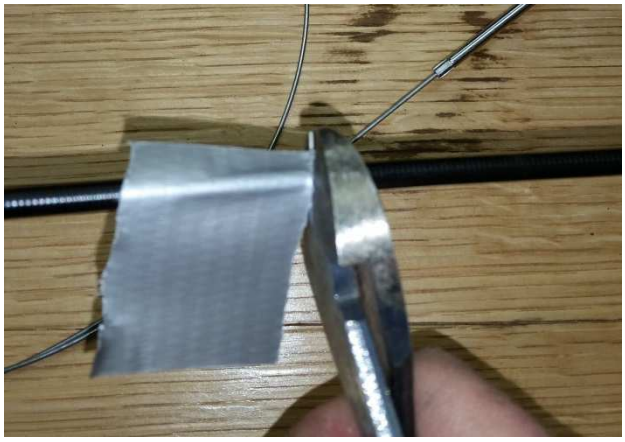
The choke cable may now be inserted through the choke bracket (this comes with the carburetor). With the cable positioned as you wish (nice sweeping curves and no sharp bends), mark the cable for trimming (if required or desired). View pictures for this process.

Cut Bent end off

Mark where to cut housing
Here tape is used to mark

Pull inner cable out of housing

Wire/Cable out of Housing



Cut housing with side cutters

Housing burr free

With the cable marked, the inner cable/wire may be pulled out of the outer cable housing. With the wire withdrawn far enough to clear the necessary cut, use diagonal pliers/side cutters to cut the cable housing. Look at the end to be sure

the opening is clear. Replace the choke cable wire all the way into the housing. The cable has a confirmed stop at the end of the stroke (as it is pushed into the cable housing). The knob has a small detent to hold the choke off.

Replace the shortened cable housing into the bracket and thread inner cable into the cable wire clamp (back the screw out to accept the wire). With the knob in the “choke off” position (all the way pushed in) and the choke on the carburetor is off (all the way towards the Samurai battery). Now tighten the cable wire clamp and check operation. If the cable is difficult, make sure you have no hidden sharp turns binding the cable housing. If all is operational, trim excess wire off at the cable wire clamp.

Trim off excess choke wire/cable

If the choke ‘creeps off’ when driving cold, the cable may need to be ‘crimped’ to hold the choke-on position. To do this, disconnect the choke wire from the carburetor. From inside the Samurai, pull the choke knob out to expose the wire portion of the choke cable. Put a slight bend in this wire – about 15 degree bend

– just enough to add ‘drag’ to the wire inside the cable housing. This added ‘drag’ will hold the choke in position with the engine running and driving. Should it still ‘creep off’, add a second bend. Should the choke be too difficult to operate, you may need to ‘unbend’ the wire to reduce ‘drag’.

Finishing up

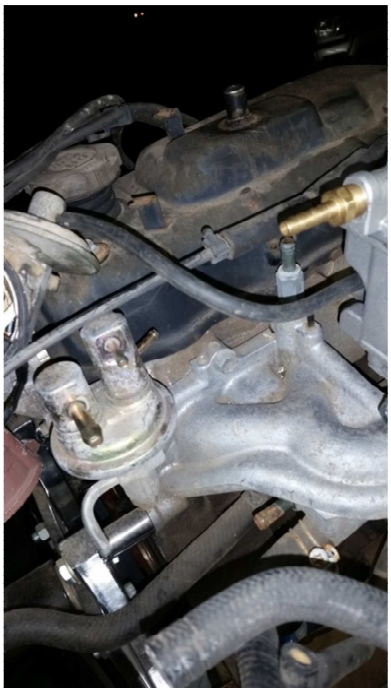
Our Swap Kit now includes a 12 micron fuel filter (factory fuel filter is 150 micron – a spec of salt is 100 micron). **The number one “killer” of 3K carburetors is unclean fuel system.** Years of operation, dirty gas, old gas, rusty fuel tanks, and rusty fuel lines tend to have particles migrate into the carburetor and plug up the tiny orifices in these carbs. This new, additional filter will be positioned between the metal lines from the frame, to the mechanical fuel pump. If you happen to have an electric pump (for whatever reason) this filter needs to be just before the carburetor. Installation involves removing the original rubber line and replacing it with the new fuel filter and supplied fuel line (and clamps). Note the small arrow on the filter which indicates fuel flow – the arrow needs to be pointing to the fuel pump.

With most of the installation completed, it is recommended to ‘bleed’ the fuel system before starting the engine. Use an empty plastic water bottle to catch the fuel as it comes out of the fuel pump – simply disconnect the fuel line going to the carburetor and insert this line into the water bottle. Use the engine starter to turn the engine over (attempt to start) and fill the water bottle ½ to ¾ full with ‘pumped gas’ from the fuel pump. This will remove any debris which may be residual from the carburetor installation.

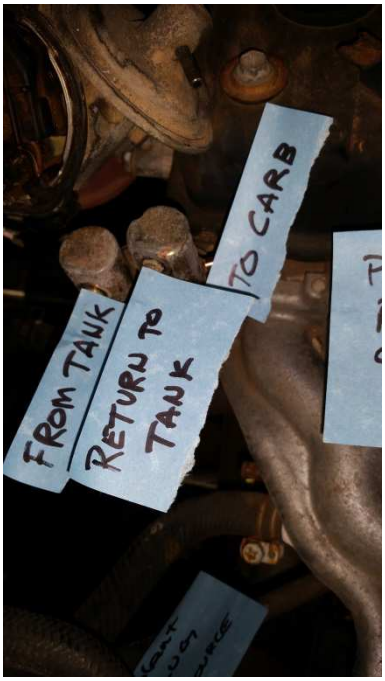
The vacuum advance line may now been connected between the small brass tube on the carburetor and the distributor. The fuel line may be connected between the fuel pump and carburetor fuel barb. Use clamps on the fuel lines. It is not necessary to use clamps on the vacuum advance. We provide high quality yellow Tygon fuel lines that will last a very long time. The fuel barb (either brass or

aluminum) seals into the carburetor by an inverted flare, metal to metal seal. The o-ring on the fuel barb is for a second seal. The fuel barb is installed “snug” and no massive amount of torque is required.

Fuel Barb Installed



Fuel Pump Ports

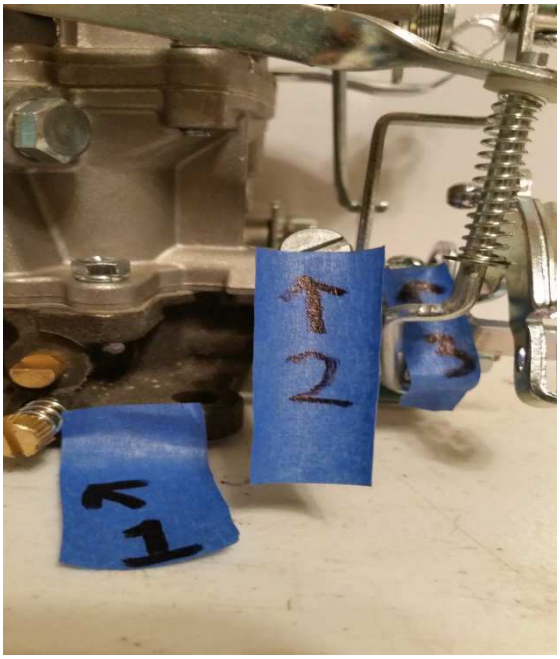


Ports Identified

Check all the bolts, clamps, vacuum plugs for confirmed installation. Top off the radiator with coolant if too much was lost during installation. The Certified Machine 3K Carburetor will come properly adjusted, ready to run**. You may need to adjust the idle speed and the High idle speed (when choke is pulled).**

In the picture below, **Screw #1 is for Air/Fuel adjustments – DO NOT ADJUST this screw if you have a Certified Machine Carburetor.** This adjustment has been adjusted on our Samurai for best performance. You take full responsibility if you adjust this screw and the Carburetor fails. Screw #2 is for the idle speed when the engine is warmed up to operating speed. Correct idle speed should be 850 to 925 RPM (the factory tachometer may not be accurate enough to set this speed correctly). Screw #3 is the idle speed for a cold engine and is engaged when the

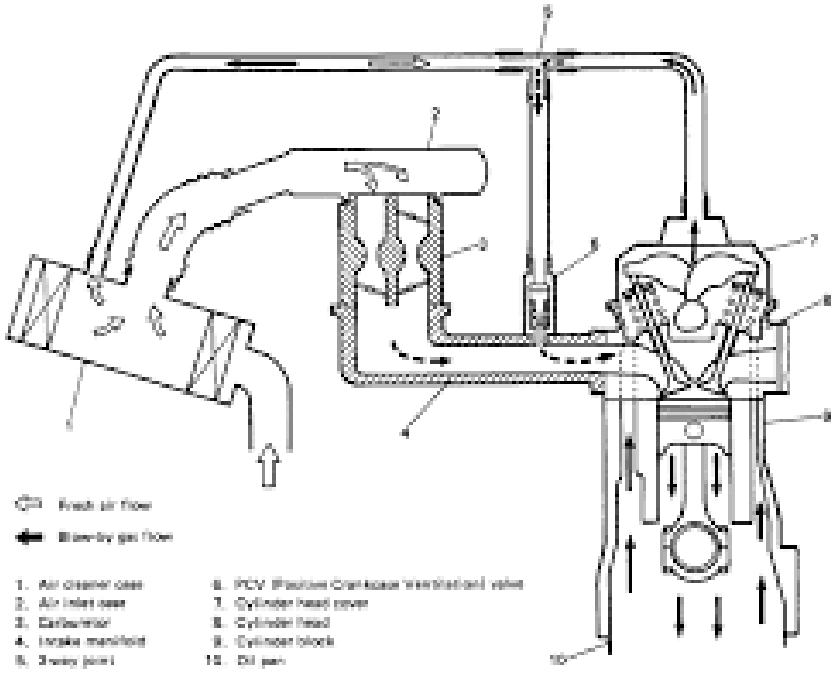
choke is pulled. Correct idle speed for a cold engine 1200 to 1300 RPM. This screw should only be adjusted when the engine is cold, on a cold day, with the choke pulled out.



Positive Crank Case Ventilation – PCV

The PCV system is instrumental in having a correct operating carburetor. The PCV valve removes crank case vapor/fumes and burns them in the combustion process. Without the PCV system being in working order, the carburetor will not operate correctly – it contributes to the amount of air entering the engine. Without this bit of air, the air/fuel ratio will be skewed to the rich side. These vapors/fumes are a normal part of engine operation. They consist of combustion by-products which work their way past the piston rings. When mixed with vapors in the crankcase from spinning engine parts, acids and other corrosive materials are created. These are not wanted inside the engine. These lead to corrosion inside the engine, contamination of the clean oil and if left unchecked will shorten engine life. The ideal crankcase pressure is a vacuum – constantly pulling these

by-products out of these confined spaces and burning them in the combustion process. Below is the Factory Service Manual diagram of the PCV System.



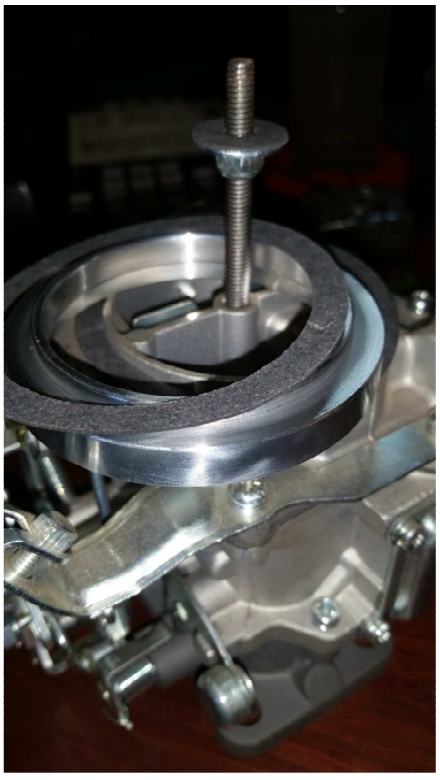
From this diagram, you can see the valve cover hose is connected to both the PCV valve in the manifold (Item 6) and the Air Cleaner Assembly (on the left) with a plastic Tee fitting (Item 5). During engine idle, the vacuum in the manifold is high and fumes from the crank case are sucked through the PCV valve, and into the manifold/engine to be burnt. At higher RPM operation, vacuum in the manifold is low, however the vacuum in the air cleaner is now high and the fumes are sucked through the carburetor, into the engine to be burnt.

Some have used a small air filter installed in the PCV line instead of the air cleaner assembly. While this will certainly work to vent the crankcase these tend to leave a nasty, oily mess around the small air cleaner. We prefer to “close the loop” and route these vapors/fumes back into the engine to be burnt and not allow them to vent into the engine bay. Consider this when selecting an air filter assembly for your Samurai. Suzuki has spent thousands of dollars developing the stock assembly – it is the best option. Weber filter assemblies have provisions for the

PCV system and should be used, as designed. Other after-market assemblies may not have provisions for the PCV system – if you use these, we recommend you connect the PCV system in a similar manner as the stock system (pictured above).

Air Cleaner Spacer Ring Installation

Our 3K Swap Kits come with our Air Cleaner Spacer Ring Kit. The Air Cleaner Ring spaces up the Stock Air Cleaner Hat enough to clear the linkage of the 3K carburetor. This Kit comes with (2) large ring gaskets, (2) steel washers with gaskets glued in place, (1) stud assembly with a nylon lock nut positioned on the stud, and (1) wing nut. The assembly sequence can be seen in the following photo.



All Pieces shown

Stacked, ready for the Hat

A large ring gasket goes on first onto the carb, followed by the aluminum ring, then another large ring gasket. The stud/nut assembly is installed into the carb

and threaded in as far as it will go. A washer/gasket is placed onto the stud with the gasket surface facing up.

With the items installed, place the stock hat onto the carb. The washer/gasket should just touch the inside surface of the hat. If the washer gasket holds the hat up from sealing onto the aluminum ring, simply thread the nut down the stud until the hat can seal. With the hat in place, install the second washer/gasket onto the stud with the gasket facing down. Top it off with the wing nut. The wing nut should compress the hat onto the gaskets onto the carb to hold it securely. You may need to adjust the nylon lock nut accordingly to get a good snug fit.

Washer with Gasket down

Wing Nut Installed

Avoid vehicle operation without an air filter. Dirt down the carb can destroy an engine quickly. With the engine running, driving and up to operating temperature, check all the clamps and bolts for tightness and that there are no fuel or water leaks. Happy Wheeling! Any questions, comments, concerns or feedback, drop me an email – gary@certifiedmachine.us – or call 405-672-9607.