

# The “Original Secondary Air Injection System Bypass Kit”

## SAISBM V36W Installation Instructions

All Applicable Toyota/Lexus Vehicles



### Introduction:

The Secondary Air Injection System (SAIS) bypass module is used to prevent the operation of the SAIS that is found on Toyota/Lexus vehicles. By preventing the operation of the SAIS many of the trouble codes that are caused by mechanical malfunctions can be cleared and are prevented from returning. In general, the bypass module will not let you clear trouble codes that are the result of electrical faults/circuit malfunctions caused by damaged wiring or electrical components. The exhaust block off plates are an integral part of the “Original SAIS Bypass Kit” and should always be installed with the bypass module to prevent future problems with leaking air switching valves. Block off plate installation instructions are included separately for your specific engine. If you have any questions about the installation or use of this kit, please visit us at: [www.Hewitt-Tech.com](http://www.Hewitt-Tech.com) to view our Trouble Codes and FAQ pages or use the “Contact Us” page to contact us directly.

### Warnings:

Installation of this kit involves modification to the factory wiring harness. Before installing the SAIS Bypass Kit, all risks associated with its use are to be carefully evaluated by the vehicle owner, operator and installer. Improper installation may damage the module or vehicle and cause a potential risk of fire. Please note that it is illegal to remove, dismantle or otherwise cause to be inoperative any pollution control device required by federal or state law that is to be maintained in or on a motor vehicle; as such, the SAIS Bypass Kit is to be installed only on vehicles that are exempt from emissions laws or that are intended for off-road use only. By installing or using the SAIS Bypass Kit the vehicle owner and or installer assumes ALL risks associated with its use.

## SAIS Failure and Trouble Codes:

A failure of any component of the SAIS will generally set the check engine light (CEL) and cause the Engine Control Module (ECM) to store trouble codes. Many of these mechanical failures will also cause the vehicle to enter “limp-mode” where throttle operation is limited to 50% to protect the engine from damage. Before installing the bypass module, it is highly recommended to address any codes not related to the SAIS. The codes below are some of the most common trouble codes that the bypass kit will let you clear and prevent from coming back. Many of these codes can be caused by a failing SAIS Air Pump which causes a loud vacuum cleaner noise for 20-30 seconds after a cold start. After the kit is installed, the system is prevented from operating and the below codes should not come back on, set the CEL or let the vehicle enter “Limp Mode”

P1441 TOYOTA Secondary Air Injection System Switching Valve No.2 Stuck Open Bank 1  
P1442 TOYOTA Secondary Air Injection System Switching Valve No.2 Stuck Close Bank 1  
P1444 TOYOTA Secondary Air Injection System Switching Valve No.2 Stuck Open Bank 2  
P1445 TOYOTA Secondary Air Injection System Switching Valve No.2 Stuck Close Bank 2  
P2440 TOYOTA Secondary Air Injection System Switching Valve Stuck Open Bank 1  
P2441 TOYOTA Secondary Air Injection System Switching Valve Stuck Closed Bank 1  
P2442 TOYOTA Secondary Air Injection System Switching Valve Stuck Open Bank 2  
P2443 TOYOTA Secondary Air Injection System Switching Valve Stuck Closed Bank 2  
P2444 TOYOTA Secondary Air Injection System Pump Stuck ON Bank 1  
P2445 TOYOTA Secondary Air Injection System Pump Stuck OFF Bank 1

For a list of SAIS trouble codes check our Trouble Code section at [www.Hewitt-tech.com](http://www.Hewitt-tech.com). If you have a code for the SAIS that is not listed here, contact us for options. Typically, the bypass kit will still greatly reduce the cost of repair and keep you out of “Limp Mode” and prevent further trouble from the system. In general, the bypass kit cannot clear codes that are related to electrical faults or circuit malfunctions the best example of codes that cannot be cleared by the kit alone are:

P0418 – Secondary Air Injection System Control “A” Circuit Bank 1  
P0419 – Secondary Air Injection System Control “A” Circuit Bank 2

These two codes usually indicate the motor of the bank 1 or bank 2 secondary air injection pump is electrically damaged and will require an extra part to clear the code. We now have pump replacement packs that can be installed with the bypass module to clear these codes as well. In certain instances, the bypass kit can also address some of the SAIS pressure sensor codes with modification of the factory sensor wiring. Contact us if you also have a pressure sensor code for details.

## SAIS Bypass Module operation:

The Bypass Module is triggered and active when the vehicle’s ignition is first switched to the “ON” position and again whenever it senses a 5-12V signal on its starter relay sense input (5-12V ONLY when the starter is engaged). The **starter relay sense wire** eliminates the need to crank the engine as soon as the ignition is switched “On”. It is always best to install the starter relay wire and not worry about any timing or module triggering requirements; just install it and forget about it.

## Tools/Supplies Needed:

- Wire Strippers /Cutters
- Soldering Iron and Solder or (Crimp Tool and quality 18-22AWG Crimp Wire Taps/Splices)
- Wire Loom and Mounting Supplies
- Good quality high temp electrical tape (we recommend 3M™ Brand)
- Dielectric grease for crimp connectors (optional)
- Access to an OBDII Scanner to Reset any Trouble Codes/CEL and for troubleshooting (recommended)
- Good Quality Multi Meter
- Test Light/Probe
- 0.5-1.5 hours

## Installation Steps:

- 1) Completely read through these instructions before proceeding and contact us with any questions.
- 2) Locate the Mass Air Flow Sensor (IAT/MAF Sensor) usually found at the front left of the engine compartment on the air box or the front left of the intake under the engine cover. The sensor on all vehicles will be like the one shown in the red circle of Figure 1.



Figure 1 - IAT/MAF Sensor Location



Figure 2 - Choosing a Suitable Mounting Location

- 3) Find a mounting position that is close enough to the IAT/MAF sensor harness to allow for the necessary connections to the module's wires. The side of the air box or back of the PCV intake (resonance chamber) is a good place to mount the module as shown in Figure 2.

Do not mount the module to the engine block, cylinder head, valve cover or other surface that reaches high temperature. Do not mount the module in a way that there will be stress placed on the wires or in a location that the wires/harness may contact moving parts such as accessory drive belts or the engine cooling fan.

Prep the mounting surface with a solvent if needed. The mounting tape is high quality 3-M™ Automotive Acrylic double sided tape but even it will not stick to a dirty or oily surface. Peel the red backing film off the adhesive and press the module firmly to the mounting surface.

- 4) Remove the IAT/MAF harness connector from the sensor by depressing the locking tab and pull straight off. Remove any harness mounting clips and pull the wiring out of the wire loom. It is not necessary to completely remove the loom but the more wire that is exposed the easier it is to work with. The electrical tape that is loosely wrapped around the harness can be cut out of the way and discarded.



Figure 3 - Wire Pulled from Harness

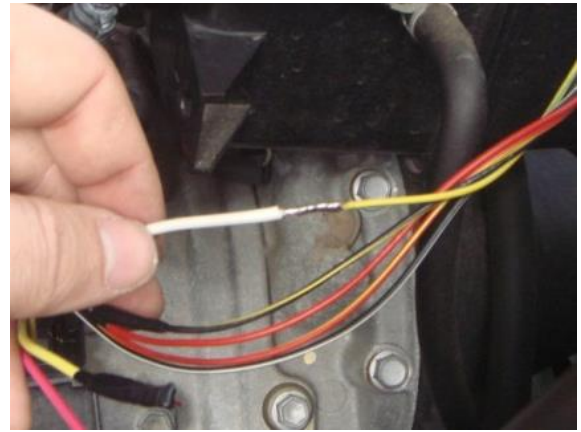


Figure 4 - Example of a Soldered Butt Splice

6) Using the included wiring diagram, begin to make the electrical connections for the bypass module. Soldering the connections is recommended but quality tap and butt-splice crimp connectors can also be used. If done correctly, soldering will provide a more reliable connection while minimizing resistance and bulk of the connections. If using crimp connectors, it is important to use the correct size connectors and a proper crimping tool. Using dielectric grease with crimp connectors or sealing with liquid electrical tape will help prevent corrosion. Crimp connections should be checked by lightly tugging on the wires to ensure they are properly crimped. The connections must be completely secure to avoid intermittent or sensor performance related issues. **Twisting the wires together and covering them with electrical tape is NOT an acceptable installation method.**

If your wire colors do not match the diagram that came with your kit, contact us or look under the installation page of our website for the correct wiring diagram for your vehicle. You will only need to cut one of the factory wires in the IAT/MAF sensor harness. This cut wire will create two separate butt splice (end to end) connections going to the bypass module. **Pay special attention to which side of the cut factory E2- signal IAT wire that your module wires connect to. One goes towards the connector the other towards the factory harness.** The other wire connections can be made by tying into the factory wires without cutting them. You may want to stagger your connections out along the IAT/MAF wires to reduce bulk and the chance of electrical faults between adjacent connections.

7) Once you have completed all the connections, except the starter relay sense wire, **carefully verify** that your installation matches the wiring diagram exactly. Incorrect connections can destroy the bypass module, damage your IAT/MAF sensor or the ECU (highly unlikely but don't chance it). Damage caused by improper installation is not covered under our limited lifetime replacement warranty of the module. Correct any wiring errors before proceeding.

8) Insulate each of your soldered connections with a few wraps of electrical tape. At this point, all your module connections should be completed except for the violet starter relay sense wire.

9) Lightly wrap the wire bundle with electrical tape as they were when initially removed from the wire loom leaving the wire exposed between wraps. This will make it easier to work the wires back into the factory wire loom while maintaining flexibility of the bundle.

10) Work the wire bundle back in to the factory wire loom, reinstall any loom mounting clips and reconnect the IAT/MAF sensor harness.



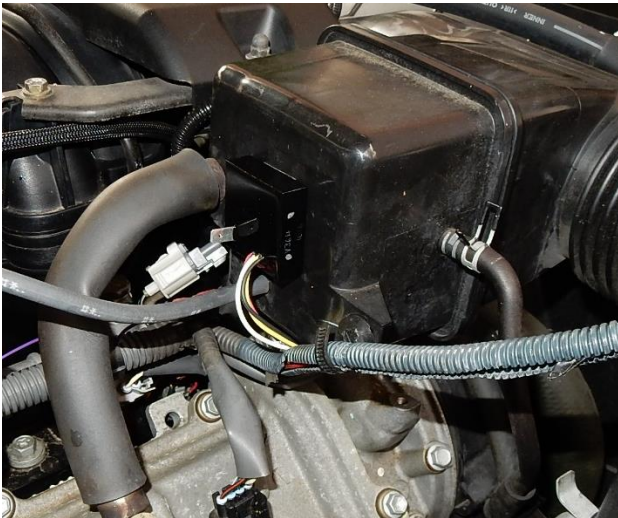


Figure 5 - Wires Reinstalled in Factory Wire Loom

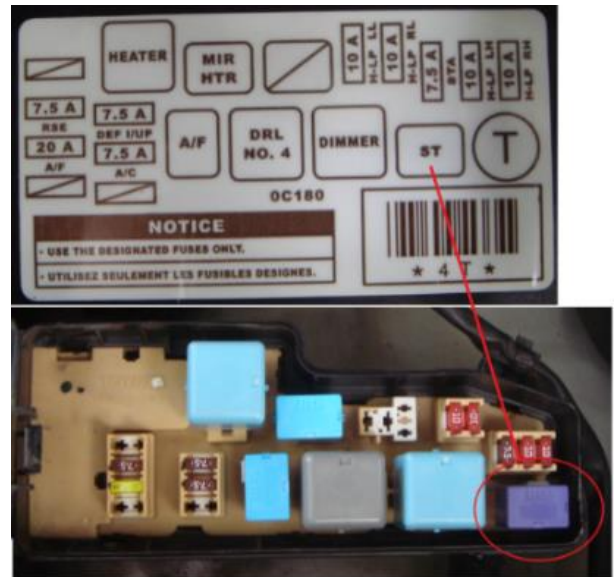
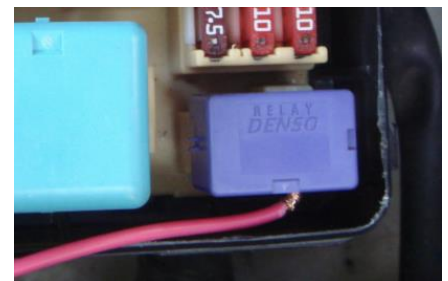
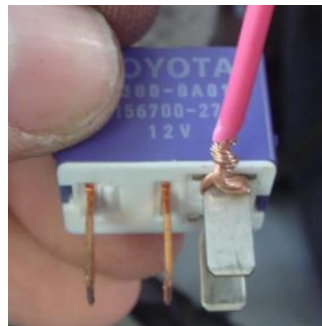


Figure 6 - Fuse/Relay Label and Starter Relay Location for a 4.7L 05 Tundra DC

11) To install the starter relay wire, begin by locating the starter relay in one of the fuse boxes under the engine hood. In the fuse box shown in Figure 6, notice how the location of the starter relay does not match the fuse/relay label exactly. The location and arrangement of the fuse/relay box may be different on your vehicle but the shape and color of the relay should be the same or very like the one shown in Figures 6-9. Certain Lexus and Landcruisers may use a large tan, cube style relay instead of the violet one shown here, in that case you will be connecting to terminal 1 on the relay.

Once you have identified the starter relay, carefully remove it by pulling it straight up and out of the terminals. The relay can be very difficult to remove so take your time and use a tool that can get under both sides of the relay. You may need to pry against the housing and work it out a little bit at a time from side to side. Do not pull on the plastic cover only!



Figures 7, 8, 9 – Starter Relay, Twisted wire Connection to Correct Starter Relay Terminal, Starter Relay Reinstalled.

12) With the relay removed, connect the bare end of the starter relay sense wire to the relay terminal as shown. **DO NOT connect the starter relay wire to either of the larger copper terminals of the relay as this can damage the module.** Soldering the wire to the terminal is not recommended to avoid melting the plastic case. Reinstall the relay by firmly pressing into the relay socket. If there is little resistance when reinserting the relay, you may need to tighten the terminal sockets to prevent an intermittent or no start condition.

13) Test the starter relay wire by connecting a multi-meter to the female spade connector of the starter sense wire. Turn the ignition to the "ON" position. You should be able to measure about 0.6V to ground on the starter sense wire. Now bump the ignition to "Start" and the voltage on the starter sense wire should go up to between 5-12V while the starter is engaged and then drop back down to about 0.6V when the engine is running and the starter disengages. **If you do not any voltage or have constant 12V on the starter relay sense wire you are on the wrong terminal.**

Sometimes a multi-meter is not fast enough to register the full 12V change as expected. You may only see a spike up to something like 10V before it drops back down. If the spike goes above 5-6V this is ok and is just a limitation of your multi-meter.

14) Route the starter relay sense wire to the bypass module and connect it to the ¼" quick disconnect terminal. There is already dielectric grease applied to the female terminal. To finish the installation, you can cover the wire with wire loom and attach using zip-ties as needed. You may also want to work your way backwards from the bypass module and shorten the wire as needed and reconnect to the starter relay for a more custom and less conspicuous installation.

15) Clear any existing engine codes by using an OBDII scanner or by disconnecting the negative battery terminal for a min or two. Clearing the codes with an OBDII tool is preferable. Using the battery method works but will also clear some engine tuning data and may cause the engine to run very rough and even stall the first time it is started afterwards. It will take a bit of normal driving for the computer to rebuild this tuning information.

16) Install the block off plate instructions for installing the pair of exhaust block off plates that came with the kit. The block off plates are the only way to prevent physically stuck open valves from resetting valve stuck open codes and the only way to prevent good valves from leaking in the future and causing issues. Like the starter sense wire just install them and forget about it.

17) Congratulations! If you have cleared the engine codes and no codes are set after 2 or more cold starts (ignition off for more than 7hrs) you have successfully bypassed operation of the SAIS and should have no more issues with the system.

**If you have questions or trouble before, during or after installation please contact us directly**  
**[www.hewitt-tech.com](http://www.hewitt-tech.com) or Toll Free 844-307-7671**