The “Original Secondary Air Injection System Bypass Kit”

SAISBM V34AW 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 generated by mechanical malfunctions can be cleared and prevented from returning. In general, the bypass module cannot clear codes that are caused by electrical faults or circuit malfunctions which can be the result of an electrically damaged component or wiring. The exhaust block off plates are an integral part of the “Original SAIS Bypass Kit” and should always be installed with the bypass module. 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 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, any and 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 vehicle emission 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 the most common trouble codes that the bypass kit is able to let you clear once the kit is installed and the codes are initially reset. 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 into “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

In general, the SAIS Bypass Kit cannot clear codes that are related to electrical faults or circuit malfunctions. If you have a code that is not listed here, the kit can usually still greatly reduce the cost of repair and most of the time still keep you out of “Limp Mode”. For a compiled list of SAIS trouble codes check our Trouble Code section at [www.Hewitt-tech.com](http://www.Hewitt-tech.com). 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 secondary air injection pump is short or open circuited and almost always require replacement of the air injection pump motor to get them to clear. If you have one of these codes, it is generally recommended to install the bypass kit first and then replace the pump motor with either a new pump or one of our Pump Replacement Packs as it is still much less expensive than replacing the entire system. This also ensures that the system will not fail again as has happened many times with systems that have been completely or partially replaced. If you have any questions about your codes, what the bypass kit can do for you, or the Pump Replacement Packs please visit our website [www.Hewitt-Tech.com](http://www.Hewitt-Tech.com) or send us an email.

**SAIS Bypass Module operation:**

The SAIS Bypass Module prevents the SAIS from operating at a cold start by intercepting and altering the IAT signal. The Bypass Module is triggered when the vehicle ignition is first switched to the “ON” position and again whenever it senses a 5-12V signal on its starter relay input wire (energized when the starter is engaged). The **starter relay wire** eliminates the need to crank the engine as soon as the ignition is turned from “On”. It is always best to install the starter relay wire and not worry about any timing or module triggering requirements; install it and forget about it.
Tools/Supplies Needed:

- Wire Stripper/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) Review all module installation warnings and module operation information. Contact us with any questions. Gather needed tools and installation materials before starting installation. Installation of the bypass module will take about 1hr. on average.

2) Locate the Intake Air Temperature/ Mass Air Flow Sensor (IAT/MAF Sensor) usually located 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 similar to the one circled in red of Figure 1.

![Figure 1 - IAT/MAF Sensor Location](image1)

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.

![Figure 2 - Choosing a Suitable Mounting Location](image2)

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 come into contact with moving parts such as accessory drive belts or the engine cooling fan.

After a mounting location has been chosen prep the mounting surface by cleaning it of any dirt or oil. The mounting tape is high quality 3-M Automotive Acrylic double sided adhesive tape but even it won’t stick to a dirty or oily surface. Clean the mounting location with a bit of isopropyl alcohol if needed and let dry. Peel the red backing film off of the adhesive and press the module firmly to the mounting surface.
4) Remove the IAT/MAF harness connector from the sensor and any harness mounting clips that will make it easier to split the wires out of the wire loom. Pull the wiring harness 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.

6) Using the SAISBM Wiring Diagram included with the kit, begin to make the connections with the exception of the violet starter relay wire. If your wire colors do not match, contact us or look on our website under the installation tab for the correct wiring diagram for your vehicle. **Pay special attention when connecting the module wires that will lead to each side of the cut factory E2- signal IAT wire from pin #5 of the IAT/MAF sensor.** If the connection of these two wires is reversed the module will not function properly and may damage it. The other connections can be tapped into the factory wires without cutting them. You may also want to stagger your connections along the IAT/MAF wires to reduce bulk and the chance of electrical faults between adjacent connections.

Soldering the connections is recommended but quality tap and butt-splice crimp connectors can also be used. Soldering is preferred since it will provide a more reliable connection while minimizing added resistance and reduces the overall bulk of the connections. Not using bulky crimp connectors will make it easier to place the wires back in the factory loom when you are finished for a more stock look.

If using crimp connectors, it is important to use the correct size connectors and a proper crimping tool. Using dielectric grease with crimp connectors will help ensure good connections and prevent corrosion. Crimp connections should be checked by lightly tugging on the wires to ensure they are properly crimped and will not pull out of the connector. The connections must be completely secure to avoid intermittent or sensor performance issues. **Twisting the wires together and taping them with electrical tape is NOT an acceptable installation method.**

It is essential to verify all of the connections before, during and after installation to prevent damage to the module, IAT/MAF sensor or ECM. At this point, all of your module connections should be completed except for the violet starter relay wire that will be connected to the starter relay. This connection will be completed in the next step which requires starting the engine. Before proceeding make sure no wires will come into contact with any moving parts or cause a short.
7) 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 similar to the one shown in Figures 6-9.

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! If the relay is not pulled straight out, you may need to straighten the blade terminals and tighten the socket terminals with a pair of needle nose pliers.

8) With the relay removed, strip and temporarily connect one end of the starter relay wire, included with the module, to the terminal as shown in Figure 8. **DO NOT connect the starter relay wire to either of the larger copper terminals of the relay.** Now, firmly seat the relay back in its socket (remember how hard it was to remove). Make sure the wire is not preventing it from seating completely and that the wire is not creating a short to another terminal. If the relay is not properly reinstalled, it may cause intermittent starting problems.

For testing, strip the other end of the starter relay wire and with a multi-meter or test probe check that there is less than 1V measured to ground on the wire when the ignition is switched to the “ON” position. While still checking for voltage on the starter relay wire start the vehicle. If you are connected to the correct terminal, you will measure between 5-12V on the wire while the starter is engaged. Some meters are slow so as long as you see the voltage go above 5V for a moment you are ok. If you do not get any voltage change, you’re connected to the other silver terminal.
of the relay and will have to check again. After you have verified the correct voltage signal on the starter relay wire its installation can be completed.

Soldering the wire to the terminal is not recommended to avoid melting the plastic case. Route the starter relay wire to the bypass module and complete the connection to the violet module wire. You can route the starter relay wire out of the fuse box by running it up through one of the holes in the bottom or by drilling a more convenient hole in the housing. Alternatively, the starter relay wire can be tapped directly into the wire connected to the terminal you just identified by tracing it to where it exits the box. When routing the starter relay wire keep it away from any moving parts are high temperature areas like the exhaust manifolds, accessory drive or cooling fans. To finish the installation, you can cover the wire with wire loom and attach using zip-ties as needed.

9) Once you have completed all of the connections to the bypass module, **carefully verify** that your installation matches the wiring diagram. Pay close attention that the bypass module wires are connected to the correct sides of cut E2- Signal IAT wire. If the SAIS Bypass Module is connected incorrectly the module circuitry can be damaged or destroyed and could possibly result in damage to your IAT/MAF sensor, the ECU or blow a fuse.

10) Now that the wires are thoroughly checked it is time to finish the installation of the module wiring. Use electrical tape to wrap any exposed wires while trying to keep the wraps from overlapping so the bundle will remain flexible. Next, lightly wrap the harness wires with electrical tape as they were when initially removed from the wire loom. This will make it easier to work the wires back into the factory wire loom. Finally, reconnect the IAT/MAF sensor harness.

![Figure 10 - Lightly Wrap in Electrical Tape](image1.jpg)

![Figure 2 - Finish Up Wiring Installation](image2.jpg)

11) With the module installed it is time to install the exhaust block off plates. The block off plates should **always** be installed with the bypass module. The exhaust block off plates are the only way to ensure the vehicle will never enter limp mode again by completely isolating the entire SAIS from the exhaust. Their installation is covered in a separate set of instructions, specified for your vehicle, included in the kit.

12) Clear any existing engine codes by using an OBDII scanner.

13) 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.

If you have questions or trouble before, during or after installation please contact us directly

**www.hewitt-tech.com**