

WARNING: HIGH VOLTAGE!

DISCONNECT THE BATTERY BEFORE INSTALLING OR SERVICING ANY IGNITION SYSTEMS COMPONENTS.

Failure to follow these instructions and the vehicle owners' handbook and shop manual could result in serious personal injury, death and or damage to property. This part is designed to be installed by a mechanic that is familiar with European automobiles and safety standards.

The Model 911SC903 is the fifth generation version of the original Perma-Tune ignition system co designed by Ferdinand Porsche and Theodore Sturm in the late 1960's. The original Perma-Tune "blue box" was made in Newport Beach, California and was installed at the Porsche factory on the 1974 Porsche 911. The new Gen 5 Perma-Tune has a brand new Bosch look alike housing made in Germany. The internal components are all new parts and are of the very latest American Perma-Tune design and manufacture. This ignition module is intended for use on cars that are judged on originality and functionality and will provide increased ignition performance over the original ignition module. This Perma-Tune is ready to plug in and bolt up to the 911SC engine harness. It is also Bluetooth ready for easy customization. Use the Perma-Tune 90506 Bluetooth Antenna to program it with any Android device or smart phone. Use the 90508 Bluetooth Antenna to program it with Apple devices and smart phones. The programming App is free and downloadable from the internet. Programmable features are: multiple strike (how many strikes and at what RPM), signal smoothing, soft RPM limiting, timing advance, vacuum advance and much more.

Contact Perma-Tune for software updates.

General Information

If the connector does not match that of the car, you have the wrong model Perma-Tune box for that car. In either case contact Perma-Tune for assistance with exchanges. The dealer you purchased your Perma-Tune from is not authorized to issue warranty replacement or exchange units. Please contact the factory for technical and warranty assistance. If your alternator light glows slightly, chances are your vehicle has a ground fault. Refer to the factory shop manual and the Perma-Tune web site for more information on trouble shooting ground faults. Spark plug gap can be increased to .065", (except on turbo charged cars with special spark plugs that cannot be re gapped) and copper core, unshielded copper spark plug wire can be used without causing radio noise problems. The 911SC903 Perma-Tune module RPM limit is preset to 8,000 RPM. Refer to the Bluetooth Antenna installation instructions on how to change this setting.

SERVICE NOTES

Warning! High Voltage may be present at the ignition coil primary AND/OR secondary circuit. Do not connect a dwell meter or test light to the coil primary terminals. Serious personal injury, death and or damage to property could result. Always disconnect the battery at the negative terminal before working on the car. **To avoid damage to your Perma-Tune and voiding your warranty:** Do not connect 12 volts to the coil. If the ignition coil shows signs of oil leakage, replace it before installing a new Perma-Tune. Do not use a test light or jumper wire on the Perma-Tune, tachometer or ignition coil. Make sure the relay panel ground cable, engine ground cable and battery negative cable connections are not defective. **Beware of misdiagnosis:** Do not troubleshoot the vehicle by swapping components, you may do damage to the parts or the donor vehicle in the process. If the car does not run with the Perma-Tune but does run with another brand of ignition, read the "Onboard Diagnostics" section of this document. Remove any radio noise suppressers or condensers that may be attached to the ignition system, they are not needed and may cause intermittent ignition problems. Check spark plug wires, spark plug connectors (resistor type), and distributor cap for corrosion and carbon tracking. Check the rotor for shorts, defective resistor and/or defective rotor RPM limiter components. Check fuel for water contamination; check fuel pump pressure and fuel injection settings. Unlike the stock ignition systems, Perma-Tune ignitions make no

Perma-Tune 9197 Darrow Rd. Twinsburg, OH 44087

Phone (631) 909-1011

www.permatune.com E-mail: info@permatune.com

audible sounds when the ignition switch is on. The Gen 5 Perma-Tune makes no heat of its own under normal operating conditions. The aluminum fins on the housing are for aesthetic appeal only.

Installation Instructions

1. Remove the old ignition module from the car according to the shop manual for this car. Perform a bench check of the original ignition unit according to the manufacturers' specifications. Perform any maintenance procedure needed, if the bench check procedure indicates so, to prevent damaging the new ignition module upon its installation and voiding your warranty. In most cases, examining the old ignition box will reveal if a defective ignition coil or a shorted wiring harness caused it to cease functioning. Replace the ignition coil if it is defective and / or correct shorts before installing a new Perma-Tune. We recommend either the Perma-Tune coil P/N SC010 or factory German made coil with your Perma-Tune. High turns ratio "high performance" coils can cause Voltage flash over in the distributor cap and are not recommended for use with your Perma-Tune.

NOTE: On some cars, the relay panel where the ignition box is located must be unbolted from the car so that the nuts can be retained while the bolts for the ignition box are unscrewed. One of the screws for the relay panel mounting also holds the braided ground strap that provides the ground for the relay panel. This ground strap can be easy to forget to hook back up because when it is removed from the relay panel it will fall forward between the fuel filter and fuel accumulator where it cannot be seen. It is extremely important that this ground strap be reconnected when the relay panel is bolted back to the car. Failure to reconnect this ground strap may result in damage to the car or your new ignition box and will void your warranty.

2. Perform an ignition coil resistance test. Replace the coil if the coil does not test to specifications or if there is evidence of oil or tar leaking from the coil.

Note: To avoid potential damage to your new ignition box and voiding your warranty, we recommend that you replace the ignition coil when the ignition box is replaced. Use only the Perma-Tune coil part number SC010 or the original German made OE coil.

3. Perform the distributor pick up resistive test and mechanical wear tests as instructed in the Porsche 911SC shop manual. If the tests indicate a fault or excessive wear exists, repair the distributor before you plug in your new Perma-Tune. If the distributor and electrical connections are OK, plug in your new Perma-Tune and reconnect the battery.

Note: We recommend that the distributor resistive test measure 600 Ohms plus or minus 25 Ohms and that the rotor end play not exceed 0.025" (0.6 mm).

4. Perform the onboard diagnostics checks as described below, then disconnect the battery again.

5. Bolt the ignition box to the relay panel. Then reconnect the battery. Start the engine and verify ignition timing with a strobe light according to the shop manual and engine bay placards for this car. **Note: Some brands of dial back timing lights may not be compatible with Perma-Tune ignitions.**

Troubleshooting Using the Onboard Diagnostics

The diagnostics displays are concealed under the ignition module so as to keep the appearance of the original equipment. This requires that you dismount the Perma-Tune to observe the diagnostics components. When performing diagnostics, a jumper must be placed between the Perma-Tune housing and the relay panel where the ignition box is usually mounted. Failure to connect this jumper may result in a misdiagnosis. After dismounting the Perma-Tune, lay it in a secure location on the air dam. Then connect the battery and start the engine and observe the LEDs. Shut off the engine and disconnect the battery and then check the PTCs to see if they got hot.

Warning: Do not drive the car while the ignition module is dismounted. Do not touch anything under the hood of the car while performing diagnostics. CAUTION: The PTC parts protrude from the bottom of the Perma-Tune and may become hot to the touch. Avoid bending the PTC parts or they may become damaged.

Flashing green light: All systems normal and the controller is ready for operation, diagnostics or programming.

No green light: This could be caused by no power applied to the Perma-Tune or that the Perma-Tune has no ground connection. If power and ground of at least 8 VDC is present and the light still fails to illuminate, then there is an internal fault that is preventing the controller from functioning. Note: this reading must be made while your Perma-Tune is plugged into the car.

Steady green light: A steady green light indicates that the controller is powered up but is detecting a fault that is preventing it from operating. Refer to the Power Sensor section of this document.

No red light: There is no trigger signal is being received from the distributor.

Turbo Cars

If you have a Porsche 930 turbo car, make certain that the speed relay or tachometer circuit did not cause the failure of the original ignition box before you install the new Perma-Tune box. A defective speed relay or tachometer circuit short can destroy an ignition box over time. Perform an Ohm test between pins 1 and 2, and pins 1 and 5 of the ignition system **engine** harness per the factory shop manual before installing a new Perma-Tune ignition box. All turbo cars are equipped with an ignition run on relay that can cause the ignition box to cease functioning or to function intermittently. Turbo boost switch failures can mimic ignition system fault symptoms. Refer to the factory shop manual for exact specifications and procedures on diagnosing the tachometer, boost switch, speed relay and run on relay for your particular year Porsche 930.

NOTE: European specification 930 cars may not be equipped with a speed relay or intercooler. Euro cars may be equipped with an 8 pin ignition box instead of the US version 6 pin ignition box. The Perma-Tune 8 pin ignition box part number is 930903. Contact the Perma-Tune factory for exchanges.

Onboard Diagnostics

The Gen 5 Perma-Tune makes diagnostics easier by providing onboard diagnostics. The Perma-Tune runs diagnoses programs automatically that are displayed by two colored LED function lights viewable from underneath the Perma-Tune. These LED lights assist the mechanic in diagnosing your ignition system. There are three PTC Self Resetting fuses that assist in troubleshooting while protecting your Perma-Tune from damage.

Green Power Indicator Light

The green LED indicates the status of the controller inside your Perma-Tune. When the LED flashes ½ second off and ½ second on, the controller is signaling that all is normal. No green light indicates that the controller is not powered up. A steady green light indicates that the controller is getting power but is detecting a fault that prevents it from operating.

Red RPM Indicator Light

The red LED light illuminates every time your Perma-Tune discharges energy to the ignition coil presenting a visual representation of engine RPM. It is useful for performing engine diagnostics as it indicates when the Gen 5 is receiving a trigger signal. During very slow cranking RPM, the light appears to flash because the time between the pulses is long enough that human eye can distinguish each flash. At faster RPM, as when the engine is idling, the light appears to be dimly lit because the human eye cannot distinguish each flash of the LED. When viewing the red LED under normal conditions, the light will appear to be flashing during cranking of the engine, it will appear dimly lit when the engine is running at low RPM and will appear brighter as the RPM increases. When the programmed RPM limit is reached, the discharge pulses will be curtailed by the Perma-Tune controller and so the LED appears to flash. At this point the controller has sensed an over rev situation and so the soft RPM function becomes active to hold the engine at the programmed RPM. If the engine exceeds 3% of the programmed RPM limit, then the controller senses that the rear wheels of the vehicle are over accelerating the engine, as in a missed shift situation. At this point the controller will shut off the discharge pulses completely and so the LED will not illuminate at all. The reverse happens as the engine RPM falls. The default RPM setting for the 911SC903 is 8,000 RPM. Refer to the Bluetooth / USB installation instructions on how to change this setting.

PTC Sensor Self Resetting Fuses

There are three orange components that stick out of the bottom of the Perma-Tune and are labeled Power, Ground and Tacho. These are self resetting fuses that protect your Perma-Tune and car from harmful wiring shorts. They are called Protective Thermal Components (PTC) sensors that indicate problems by getting hot. Under normal conditions they will be no warmer than their surroundings. We recommend that you use an infrared thermometer to read them as they will become hot to the touch when tripped.

Power Sensor: This is a thermistor type, self-resetting fuse that will cut off power to the ignition system in case of a power overload without effecting the rest of the ignition circuit. There are several conditions that could cause this PTC to trip but the most common on is if reverse DC power has been accidentally applied to the vehicle battery. Refer to our online guide for the 911SC for more information. Once the fault has been corrected, the PTC will automatically reset itself allowing your Perma-Tune to continue functioning without being damaged. You can tell when the PTC has tripped by its temperature. When the PTC has initially tripped it will be very hot to the touch. After it trips it will stay off but remain slightly warmer than ambient temperatures as long as the circuit fault and power are still present. When the power to the circuit is cut or when the wiring fault is corrected, the PTC cools down to ambient temperatures and will automatically resume operation.

Ground Sensor: This is a thermistor type, self-resetting fuse that will cut off the ground connection between the housing of your Perma-Tune and the vehicle harness that plugs into your Perma-Tune. This will only happen in the event of excessive current flow between the chassis of the vehicle and the engine due to a ground circuit wiring fault within the vehicle. Refer to our online guide for the 911SC for more information. When the PTC has initially tripped it will be very hot to the touch. After it trips it will stay off and cool down but be warm to the touch as long as the key power remains on. Whenever the ignition key is cycled, and, if required, the wiring on the car is corrected, the PTC will cool to ambient temperature and will automatically resume operation.

Tacho Sensor: This is a thermistor type, self-resetting fuse that will cut off the tachometer connection from your Perma-Tune in case the tachometer wiring on your 911SC has shorted to ground or to power. Refer to our online guide for the 911SC for more information. Once the wiring fault on the car has been corrected, the PTC will automatically reset itself allowing your Perma-Tune to continue functioning without being damaged. When the PTC has initially tripped it will be very hot to the touch. After it trips it will stay off and cool down to ambient temperatures. Whenever the ignition key is cycled, and, if required, the wiring on the car is corrected, the PTC will self-reset.

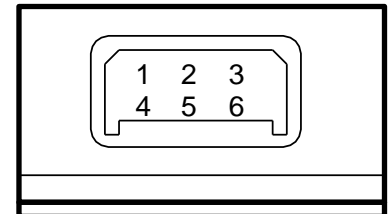
Bluetooth / USB Connector: This is a serial communications port used for diagnostics and programming of all Gen 5 Perma-Tunes. It is Bluetooth ready and compatible with RS232 serial communications protocol host computers. You can use your smart phone to set special ignition functions like an RPM limit. Order the P/N 90506 Bluetooth Antenna for Android phones and the P/N 90508 for I Phones. Refer to your Bluetooth Antenna instructions on what settings are available to you and how to change them.

NOTE: No program changes are required to use your Perma-Tune as a repair / replacement part, it is preprogrammed for the stock 911SC Porsche engine.

The connector pin outs below are provided for trouble shooting purposes on the Perma-Tune module. Note: The diagram is of the ignition module sitting on the work bench.

No rewiring of the vehicle is required.

1 = System ground	4 = Coil + Hot (coil - connects to ground at the coil bracket bolt)
2 = Tachometer signal	5 = Power
3 = Signal ground (distributor pin B) Green wire shield	6 = Signal (distributor pin A) Green wire center conductor



BENCH CHECK OF THE IGNITION BOX. (Perma-Tune only)

Pin 1 to Pin 3 = Zero Ohms is normal. These pins are connected together inside the Perma-Tune.

Pin 1 to Housing = Zero to 0.5 Ohms. Greater than 0.5 Ohms between pin 1 and the housing indicates that the Chassis PTC has tripped.

Pin 1 to Pin 4 = 3,700 Ohms +/- 100 is normal. Readings outside this specifications indicates that the Perma-Tune has been damaged by a defective ignition coil or ignition coil wiring.

Pin 2 to Pin 5 = 6 to 8 Ohms is normal. More than 8 Ohms resistance indicates that the Tach PTC has tripped.

Pin 1 to Pin 5 = 200uF to 575uF, this reading requires the use of a meter capable of reading capacitance. Polarity sensitive; Pin 5 is positive. Any other reading indicates damage to the spike suppression circuit of the Perma-Tune or that the power PTC has tripped. This condition may be caused by battery terminal reversal, defective alternator, ground fault or other wiring problems outside the Perma-Tune.

Refer to the charts to connect the Perma-Tune harness to the correct wires of the distributor installed in your engine.

Note: Reversal of the trigger wires on Pins 3 and 6 will cause incorrect rotor phase and result in poor engine performance.

Distributor ROTATION CCW	Distributor ROTATION CW	JB Distributor Connection
Black Wire PIN 3	Yellow Wire PIN 6	Orange Wire
Yellow Wire PIN 6	Black Wire PIN 3	Violet Wire

Distributor ROTATION CCW	Distributor ROTATION CW	Bosch Distributor Connection
Black Wire PIN 3	Yellow Wire PIN 6	B Terminal
Yellow Wire PIN 6	Black Wire PIN 3	A Terminal

Distributor ROTATION CCW	Distributor ROTATION CW	MSD Distributor Connection
Black Wire PIN 3	Yellow Wire PIN 6	Black & Green Wire
Yellow Wire PIN 6	Black Wire PIN 3	Black & Violet Wire

