FAQs FOR PORSCHE VEHICLE DIAGNOSIS SYSTEMS.

These notes relate to the first generation of Porsche cars fitted with on board diagnostics. These officially started with the 1988 Model Year, and these FAQs end with the 1994 models.

In 1988, Porsche introduced a fault diagnostic system for their models 928S4 and 944S. This system uses the fault diagnosis facility introduced by Bosch into the “LH Jetronic” and “Motronic” engine fuel and ignition control computers used on those vehicles. The 1987 MY 928 S4’s were also wired for diagnostics, and it is possible to easily upgrade the ECUs to allow diagnosis. Contact JDS Porsche for further details.

Q: How do the on board diagnostics work?
A: The various ECUs used in the cars can detect implausible signals from the various actuators and sensors in the car. When it encounters such a situation, a fault code is stored in a memory chip in the ECU. The fault codes can be retrieved by the diagnostic tester. These systems were introduced in order to monitor emissions critical systems, in response to increasing environmental regulations. The diagnostic facility was also a great benefit to workshop personnel, face with increasingly complex electronic systems. So the “intelligence” lies in the ECUs in the vehicle, the diagnostic tester just retrieves that information.

These stored fault codes are held in volatile memory in the ECUs are the information stored there is lost if the vehicle battery is disconnected for a few seconds.

Q: Anything else? It sounds as though the ECUs in these cars are rather clever
A: The ECUs can also be programmed with a suitable tester, to test the various actuators and switches on the vehicle, under operator control. It is also possible to clear stored fault codes, reset the idle speed on some cars, and count knocks (detonation “pinking” knocks) while driving the car.

Q: What would I need to read these codes?
A: Here is a little history on Porsche Diagnostic testers, starting with the 9268.

The 9268 Diagnostic tester:

This was the first Porsche Diagnostic tester, introduced for the 1988 model year. At that time, the only Porsche models equipped with on board diagnostics were the new 928S4 and the 944S. The tester was capable of reading stored fault codes, and also testing various actuators and switches on the vehicle, under operator control. It could also clear stored fault codes, reset the idle speed of the 928, and count knock (detonation “pinking” knocks) while driving the car.

The operator interface was a four digit numerical display and two buttons. When a fault code was displayed, it was necessary to look up the code in the manual. The factory workshop manuals for these cars give excellent fault finding checks for each of the fault code numbers.
Q: This tester would do what I want, can I buy one?
A: No, not a new one, they have long been superseded by more capable testers such as the KTS300 “Hammer”, and newer units. They rarely come onto the second hand market.

Q: I didn’t even know my car had a diagnostic socket, where is it?
A: For 1988 MY 928 cars, it is a 12 way rectangular connector located on the mounting plate that hold the LH and EZK ECUs, in the passenger side footwell. In the 1988 MY 944, it is mounted above the DME engine management ECU. 1987 928S4 was also fitted with this connector, but their LH and EZK ECUs weren’t fitted with the software required for diagnosis. However, it is possible to easily upgrade the ECUs to allow diagnosis. Contact JDSPorsche for further details.

For the 1989 and later 928 cars, the connector changed to a special (unique to Porsche) 19 way connector, which is located under the cover at the side of the passenger seat, between the seat and the door.

Q: What about the later cars, didn’t they also have on board diagnosis?
A: Yes, all the models introduced since 1988 have had diagnosis systems. So the 944S2, 944 Turbo, 968, and the 964 Carrera 2 and Carrera 4 (911s) also have diagnosis., using the same 19 way circular connector. More details on these cars later.

Q:……and the later cars?
A: When vehicle manufacturers started fitting on board diagnosis systems, they all had their own proprietary versions. There were some attempts at industry standards in the early 1990’s , and by about 1995 most cars were then fitted with the OBDII system (On Board Diagnostic second version, which has become a mandatory industry standard). This document does not cover these later vehicles, for which generic fault code readers are readily available.

Q: What about the “Check Engine” lamp on the dash of some cars, can’t that be used to read fault codes?
A: Yes, on some cars it is enabled, and can be made to flash out some of the fault codes that relate to emissions problems. Although common on US market cars after about 1992, this option was not always activated on other market cars. Refer to the Workshop manual for your car for more details.

Q: You mentioned the early 9268 tester was superseded by the KTS 300 “Hammer”? 
A: Yes, just a year later in 1989, Bosch produced for Porsche a version of their KTS 300 tester, which was known as the KTS301, with special diagnostic software for the Porsche ECUs. Porsche refer to this tester as the 9288. The Bosch reference number is the KTS 301.
Q: So what is the difference between the KTS300 and the KTS 301?
A: For the KTS 300 Bosch produced software for the KTS tester for many makes of cars. This software is in the form of plug in modules. They also produced the various types of diagnostic leads for the various vehicles, because at that time each manufacturer had their own version of connector. Each software module contains test software for many makes of vehicle.

The KTS 301 was Porsche specific. It had a Porsche only software module, and the special 19 way circular connector, which was also specially made for Porsche, and not generally available.

Q: So can I just plug a different software module in to any KTS 300 or 301, and with a suitable lead diagnose any car?
A: Yes. The modules and leads are just plug in.

Q: What are typical fault codes?
A: Here is a list of possible fault codes from the 928 LH (fuel injection) ECU

1500 No faults stored
1111 Supply voltage too high or low
1112 Idle throttle switch faulty
1113 Full load throttle contact fault
1114 Engine water temperature sensor fault
1121 Airflow sensor fault
1122 Idle stabiliser circuit fault
1123 Lambda sensor signal too rich
1124 Lambda sensor signal too lean
1125 Lambda sensor fault
1131 Ignition monitor relay closed
1132 Ignition monitor relay ground terminal AL.
1141 LH ECU faulty
1000 LH ECU output end

For the EZK (ignition) ECU, the following fault codes are reported:

2500 No faults stored
2112 Idle contact fault
2113 Full load contact fault
2114 Engine temperature sensor (second section) fault
2115 Idle/full load contact fault
2121 Load signal from LH fault
2126 Auto transmission safeguard switch fault
2131 Knock sensor 1 (front) fault
2132 Knock sensor 2 (rear) fault
2133 Knock control in EZK faulty
2134 Hall sensor fault
2141 EZK control unit faulty
2000 EZK output end

Q: you mentioned actuator tests?
A: yes, the tester will allow you to individually test various actuators and switches, to help with fault diagnosis. For example, you can switch the fuel injectors repeatedly on and off, so you can check they are all clicking. If not, then you can measure the voltages on the connectors, while they are being activated. This is very useful for fault finding.

The fuel injectors are pulsed while fault finding takes place.
The idle actuator is switched across its range to enable fault finding
The inlet plenum resonance flap is actuated repeatedly to enable fault finding in the vacuum feed, or the actuating solenoid.
The vent valve for the petrol tank carbon canister filter is repeatedly activated.
The function of the throttle closed switch is verified.
The function of the wide open throttle switch (WOT) is verified.
The function of the idle speed correction when the aircon is activated is verified.

Q: There are a number of other ECUs that can be diagnosed as well, aren’t there?
A: Yes, on the 928, there is the PDS electronically controlled limited slip differential ECU that can be diagnosed, and also the Airbag ECU and the RDK tyre pressure monitoring system

The 964 Carrera models have a heater/aircon ECU, and the PDAS s ECU which controls the 4 wheel drive system of the Carrera 4. The 964 also has an ECU for the Tiptronic option, where fitted.

Q: I would like a diagnostic tester for my Porsche, but I can’t find one I can afford……………..
A: Check out the JDSPorsche diagnostic tester. This is affordable for the home mechanic or Independent Porsche Specialist garage.

Alternatively, We sell KTS301 “Hammers” and also diagnostic equipment for later cars.