Keyless Vehicle Module

The keyless vehicle module controls signal transmissions to and from the Smart Key and provides authorization to allow the vehicle to be started. The module has a medium speed CAN connection to the CJB for authorizing vehicle starting.

Radio Frequency Receiver

The Radio Frequency (RF) receiver transmission is received from the Smart Key to enable key identification.

DIAGNOSTIC PROCEDURES

ANTI-THEFT - PASSIVE

PRINCIPLES OF OPERATION

For a detailed description of the anti-theft - passive system and operation, refer to **Component Location** and **Overview** and **System Operation And Component Description**.

INSPECTION AND VERIFICATION

The best method to confirm the correct operation of the Passive Anti-Theft System (PATS) is to check the LED (located in the centre of the instrument panel). The LED should illuminate solid for 3 seconds, when the ignition status is set to ON, and then extinguish. This validates all PATS functions (i.e. the key transponder matches a stored key code, the challenge/response sequence between the respective modules was successful resulting in the EMS being enabled).

Ignition fails to operate

Check that the smart key is located within the vehicle interior, and that it is the correct one for the vehicle.

Insert the smart key into the start control unit, this is an alternative method to allow Ignition On/Engine Start.

Check that the start button circuit to the Central Junction Box is not open circuit or short circuit to power.

Check that the Low Speed CAN network is not malfunctioning, i.e. open circuit or short circuit. This would mean that the remote keyless entry module, Central Junction Box and instrument cluster would be unable to communicate.

Engine fails to crank

If a PATS fault is detected, the LED will flash for 60 seconds at 4Hz with a 50% duty cycle. At the end of this period, the LED will flash a 2 digit code; this code is repeated 10 times. The meaning of these fault codes along with the frequency of flashing is given in the accompanying table. As a general rule a fault code of 16 or less will cause the vehicle not to crank. Additionally, the manufacturer approved diagnostic system should be used to check the instrument cluster, Central Junction Box & Engine Control Module for Diagnostic Trouble Codes (DTCs).

One potential occurrence for failing to crank could be due to the P & N start switch (input to the Engine Control Module).

Check the Crank Request output from the Central Junction Box to Engine Control Module is not short circuit to ground or open circuit.

Check the Starter Relay circuit.

NOTE: On petrol engine variants, due to Smart Start, both sides of Relay Coil are switched directly from Engine Control Module (If conditions correct). On diesel engine variants the low side only is switched directly from the Engine Control Module.

Check that the Steering Column Lock correctly operates and the steering wheel can turn freely.

Check that the High Speed CAN network is not malfunctioning, i.e. the CAN circuit is open or short circuit. This would mean that the instrument cluster and Engine Control Module would be unable to communicate resulting in no Challenge being performed to enable the Engine Control Module. This would be supported by LED Flash Code 24.

Also check the CAN network between the ABS module and the Central Junction Box. The Central Junction Box uses the CAN_BrakePressureTMC signal to determine if the brake pedal has been pressed in order to allow an engine crank. The Central Junction Box uses a value of 0x05, if the Central Junction Box sees a value less than this, it will not enable the Crank Request Output.

Engine cranks but will not start

If the Engine is cranking it means that the Engine Control Module has passed the authorization required with the Instrument Cluster. If this authorization failed, the Engine Control Module would not engage the starter relay. This could be confirmed by verifying the PATS LED prove out (illuminated solid for 3 seconds) or by reading DTCs from the instrument cluster and Engine Control Module.

In this case, the fuel pump circuit should be verified. The Fuel Pump Delivery Module (FPDM), which is supplied via the Rear Junction Box (authentication required with the instrument cluster) and controlled by the Engine Control Module, supplies the fuel pump.

In all cases of suspected non-start issues, the most logical failure modes should be eliminated first. i.e.

- Check all relevant supplies and grounds to the relevant modules listed herein.
- Note any unusual behavior from other systems/functionality.
- Note any functions that are not operating as expected.

If the cause is not visually evident, check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

DTC INDEX