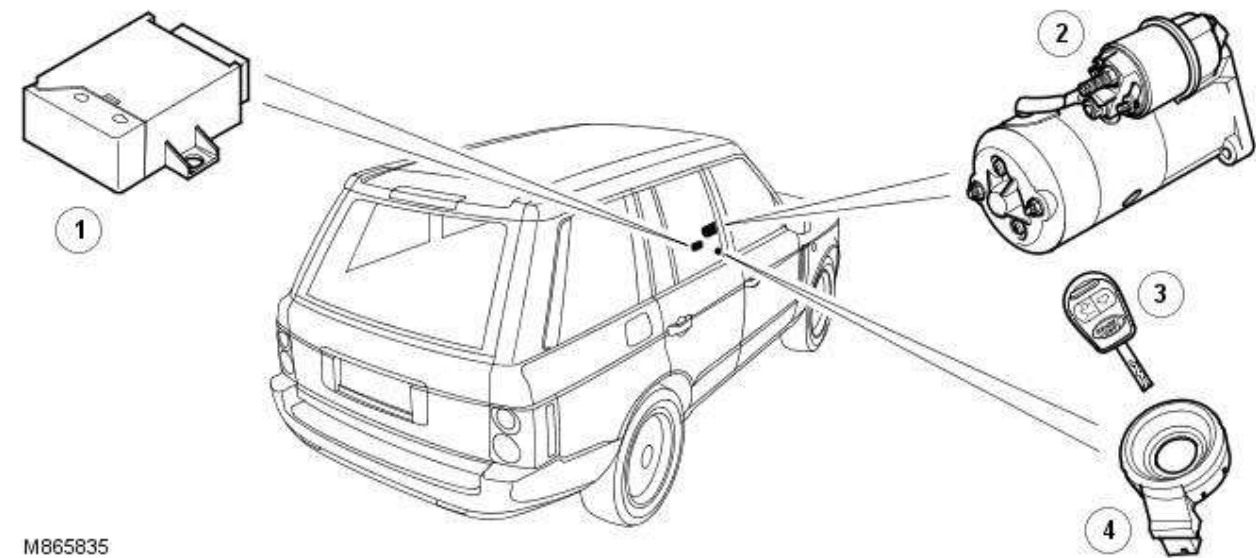


# Anti-Theft - Passive - Anti-Theft - Passive

Description and Operation  
COMPONENT LOCATIONS

• NOTE: RHD installation shown, LHD installation similar



Item	Part Number	Description
1	-	passive anti-theft system (PATS) module
2	-	Starter motor
3	-	Ignition key/remote handset (pre 07MY shown)
4	-	Transponder coil

## GENERAL

The PATS provides a secure interface, between the ignition key and the engine control module (ECM), to prevent unauthorized starting of the vehicle. The system consists of the following:

- A transponder in the head of each ignition key.
- A transponder coil around the ignition switch.
- A PATS module.

The PATS also uses the instrument cluster, as a gateway for communications with the steering lock control module.

Operation of the PATS is automatic and requires no input from the driver. The PATS only allows the engine to start when a valid key is in the ignition switch, the steering lock is disengaged and the transmission is in Park or Neutral. The starter motor is controlled by the ECM, so authorization from the PATS allows the ECM to both operate the starter motor and support starting.

## TRANSPONDER

The transponder is a stand alone wedge device located within the head of the ignition key. For additional information, refer to: [Handles, Locks, Latches and Entry Systems](#) (501-14 Handles, Locks, Latches and Entry Systems, Description and Operation).

The transponder is powered by the field from the coil and is contained within the processor on the PCB (printed circuit board), which also controls the remote operation of the CLS (central locking system). The coil on the PCB is used by the transponder to receive the signals from the transponder coil on the ignition switch. The coil

is also used to generate the current required to recharge the battery. The transponder has a 256 byte electrically erasable programmable read only memory (EEPROM), which is programmed with vehicle identification data and a unique identification code. This information is stored in one of 30 key 'slots' within the PATS module. When energized, the transponder emits the coded information which is received by the PATS module. The PATS module checks that the key is valid by confirming the received data before granting permission to start the engine. The information programmed into the transponder cannot be overwritten. If a key is lost or is no longer required, the Land Rover approved diagnostic system can be used to disable the key to prevent it being used on the vehicle.

## TRANSPONDER COIL



**CAUTION:** The drive for the transponder coil is not capable of carrying battery voltage and care must be taken when fault finding and probing the system otherwise permanent damage to the PATS module may result.

The transponder coil is located in a plastic housing which surrounds the ignition switch barrel. The transponder coil is connected via two wires to the PATS module. The PATS module emits electrical energy to the transponder coil which transmits data at a frequency of 125 kHz. This electrical energy excites the transponder in the ignition key when it is within 20 mm (0.78 in) of the transponder coil.

## PATS MODULE

The PATS module is the main component in the system and is mounted on the cross car beam, behind the instrument panel. The PATS module is powered by a permanent battery feed from the central junction box (CJB). It also receives an auxiliary power feed from the ignition switch.

The PATS module is connected to the medium speed controller area network (CAN) bus, which it uses to communicate with the steering lock control module via the instrument cluster and the K bus. The medium speed CAN bus is also used to communicate with the ECM via the instrument cluster and the high speed CAN bus.

When the vehicle K bus wakes the instrument cluster, the instrument cluster wakes the medium speed CAN bus and, as a result, the PATS module wakes-up. Now, when a valid ignition key is placed in the ignition switch key barrel, the PATS interrogates the key for validity to the vehicle. The transponder coil is activated causing the transponder to transmit its identity. The PATS module validates the identity and transmits another request for validation (encoded) data. When this is correctly received the PATS module confirms the key as valid and enables ignition key rotation to position I (auxiliary) and beyond. Should the vehicle systems be allowed to sleep, i.e. key in ignition for several minutes without any other vehicle activity, then a subsequent attempt to turn the key will be inhibited until the PATS module is fully awake, possibly requiring a second rotation attempt before the key will turn.

When it detects a valid key, the PATS module outputs a 'valid key in ignition lock' message on the medium speed CAN bus. The message is then transmitted on the K bus by the instrument cluster. When it detects the valid key in ignition lock message, the steering lock control module disengages the steering column lock and, provided it is also receiving a Park/Neutral signal from the transmission control module (TCM), sends a hardwired release signal to the PATS module.

When the ignition switch is turned to position II (ignition), the ECM sends a start authorization request to the PATS module. If the key is valid the PATS module grants the request and, when it subsequently detects the crank input from the ignition switch, the ECM will crank and run the engine.

Replacement PATS modules are not stock items and can only be installed on the vehicle for which they were ordered. After replacement of a PATS module:

- Car configuration information from the instrument cluster is automatically transferred to the new PATS module.

- Existing keys will automatically work with the replacement PATS module.

- The Land Rover approved diagnostic system must be used to ensure that only those ignition keys currently in use with the vehicle are enabled in the PATS module.