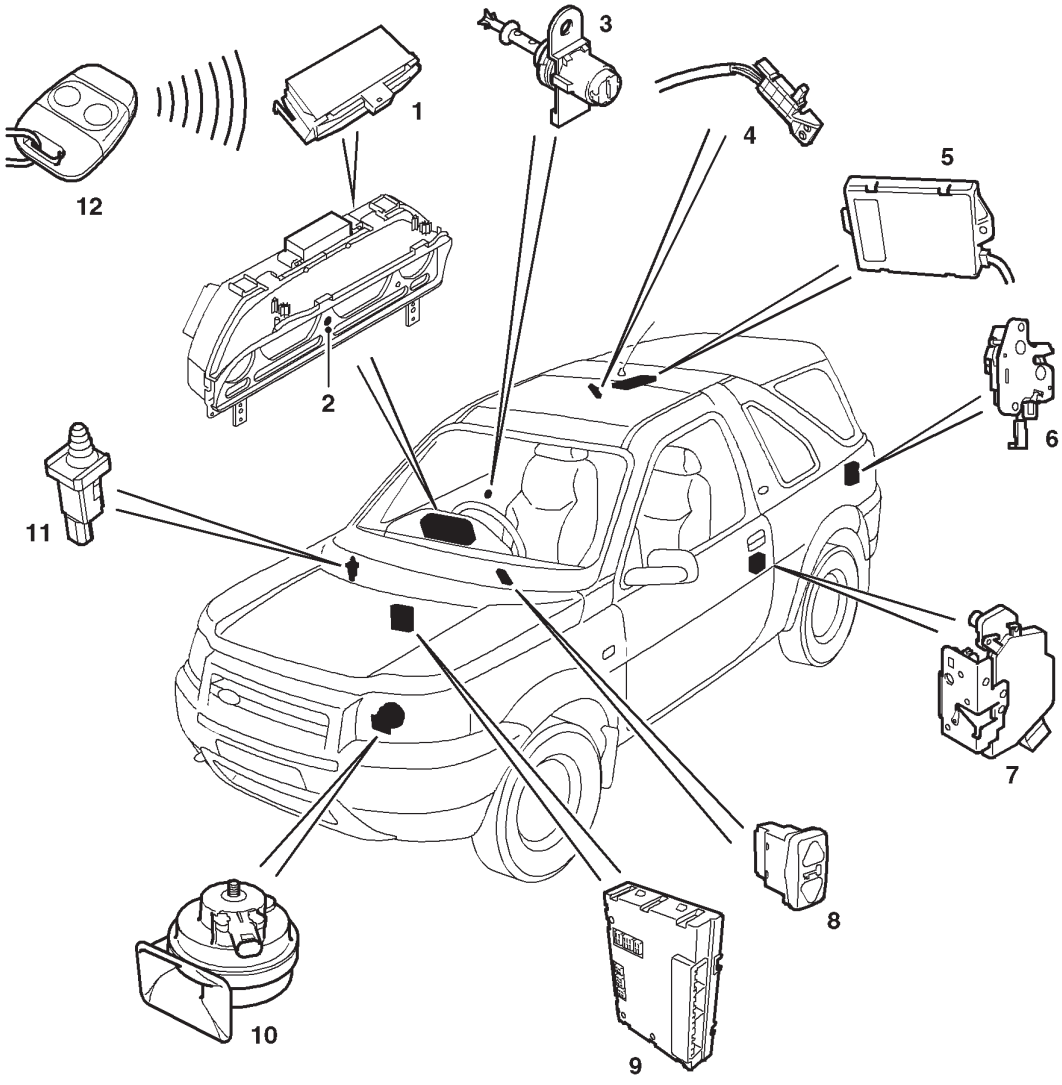
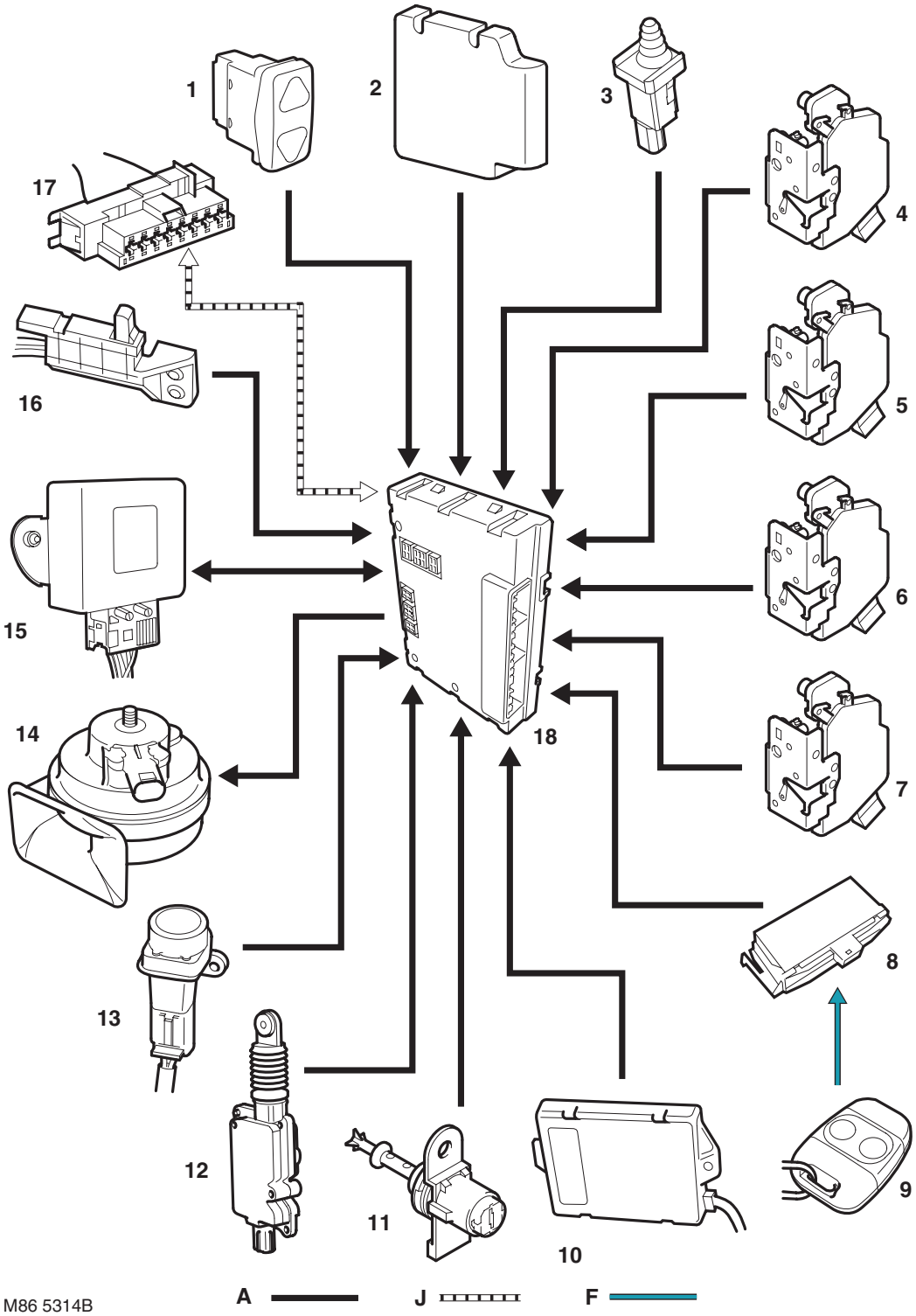
Locking and Alarm System Component Layout



M86 5313C

1 RF receiver
2 Alarm LED
3 Driver's door key barrel switch
4 Roof switch (3 door only)
5 Volumetric sensor
6 Tail door latch
7 Door latch
8 CDL switch
9 CCU
10 Horn
11 Bonnet switch
12 Remote handset

Locking and Alarm System Control Diagram



A = Hardwired connection; F = RF transmission; J = Diagnostic ISO 9141 K line bus

1 CDL switch
2 ABS ECU
3 Bonnet switch
4 Driver's door actuator and switch
5 Front passenger door actuator and switch
6 Left hand rear door actuator and switch
7 Right hand rear door actuator and switch
8 RF receiver
9 Remote handset
10 Volumetric sensor
11 Driver's door key barrel switch
12 Tail door switch and actuator
13 Inertia switch
14 Horn or BBUS
15 Immobilisation ECU
16 Roof switch (3 door only)
17 Diagnostic socket
18 Central control unit

Description

General
This description covers all aspects of the vehicle locking and alarm system.

The vehicle locking and alarm system is controlled by the central control unit (27VT) located on the back of the passenger compartment fusebox below the fascia.

Locking and Alarm System
The locking and alarm system comprises:
- Central door locking master switch
- Door switches
- Roof switch (3 door only)
- Remote handset (RF transmitter)
- RF receiver
- Driver's door key barrel
- Door lock actuators
- Tail door switch
- Tail door release actuator
- Bonnet switch
- Inertia switch
- Horn or BBUS
- Alarm LED
- Immobilisation ECU
- ABS ECU Speed input
- Volumetric sensor

Central Locking
The vehicle can be locked and unlocked by three methods; CDL switch, vehicle key or remote handset.

CDL Switch
The CDL switch is located in the centre console. The CDL switch allows the occupants to CDL lock the vehicle from inside without arming the alarm. The CDL switch is inoperative if the inertia switch is tripped. The CDL locked state can be removed by operation of the CDL switch, remote handset or by a key unlock operation in the driver's door key barrel.

If the inertia switch is tripped while the doors are CDL locked and the ignition is on, all doors will automatically unlock.

Key Locking
The vehicle can be CDL locked using the vehicle key in the driver's door key barrel. Turning the top of the key to the rear of the vehicle will CDL lock all doors. Turning the key a second time, within one second of the first turn, will superlock all doors.

Key Unlocking
Single point entry is a programmable feature and its selection affects how the vehicle responds to key unlock requests:

- Turning the top of the key once towards the front of a vehicle which is in a CDL state, with the alarm disarmed, will unlock all the doors irrespective of their existing lock status
- Turning the top of the key once towards the front of a vehicle in a superlocked state without SPE selected and the alarm armed, will unlock all the doors irrespective of their existing lock status
- Turning the top of the key once towards the front of a vehicle in a superlocked state with SPE selected and the alarm armed, will unlock the driver's door. The remaining doors will unlock to the CDL state and can be unlocked with a further key unlock operation

Remote Locking
On vehicles with superlocking selected the vehicle can be superlocked by pressing the lock button on the remote handset once. On vehicles with superlocking not selected (market option) the vehicle can be CDL locked by pressing the lock button on the remote handset once.

Remote Unlocking
With the vehicle CDL locked, pressing the unlock button on the remote handset once will unlock all doors.

If the vehicle is superlocked, pressing the unlock button once on the remote handset will only unlock the drivers door for SPE. The remaining door(s) will unlock to the CDL state. If the button is pressed a second time, the remaining door(s) will unlock.

NOTE: If the vehicle is superlocked and SPE has not been selected in the CCU, pressing the unlock button once on the remote handset will unlock all the doors.

Central Locking Notes
Locking or unlocking using the vehicle key or remote handset is prevented if the CCU senses that the ignition is 'on'. Using the key to lock the vehicle via the driver's key lock with the ignition 'on' will mechanically lock the driver's door.

Superlocking is prevented if the CCU senses that one or more doors are open. In this instance the CCU will attempt to CDL lock all doors.

Inertia Switch
The inertia switch is located on the bulkhead in the engine compartment. The switch is mounted vertically and has a reset button on its top surface, covered by a rubber boot.

If the inertia switch is tripped, with the ignition 'on' and the alarm disarmed, all the doors will be unlocked regardless of their locked state at that time. Further locking is disabled unless:

1. the ignition is switched off and the driver's door is opened and closed
2. the driver's door is opened and closed and the inertia switch is manually reset

The inertia switch can be reset by depressing the button on the top of the switch.

Tail Door
The CCU also controls the tail door release. The tail door can only be opened if the vehicle is unlocked, the alarm is not armed and the vehicle is travelling at not more than 3 mph (5 km/h).

Slam Locking
The driver's door is designed to prevent slam locking. The remaining door(s) can be slam locked.

Latch Motor Protection

To protect the door lock latches from damage, the CCU will only allow eight changes of state of the locks in any sixteen second period or less. If eight changes of state occurs within the sixteen second period, the CCU will prevent further operation of the latch motors for a further sixteen second period. The CCU will always prevent further operation only when the latch motors are in an unlocked condition. If SPE is operational, the CCU will override the SPE function and all doors will unlock if eight operations is exceeded in the sixteen second period.

The alarm system will continue to operate during the latch motor protection period.

Alarm System

The alarm system can be armed and disarmed using the vehicle key or the remote handset. The alarm system monitors the driver's door, passenger door(s), tail door, bonnet and roof (3 door models only) using perimetric sensing. It also monitors movement within the passenger compartment using volumetric sensing.

In certain countries, the alarm system is programmed not to arm under any circumstances.

NOTE: Hazard warning light confirmation of alarm arm or disarm is market programmable and therefore may not be operative on certain market variants.

Perimetric Sensing

Perimetric sensing is invoked by the CCU to monitor entry to the vehicle after the alarm has been set. The panel open switches on the driver's door, passenger door(s), tail door, bonnet and roof (3 door only) are all monitored by the CCU.

If a panel is opened after the alarm has been set, the alarm will be triggered. The horn or BBUS will sound and the hazard warning lights will operate. On 3 door models, if the roof is off when the alarm is armed, further operation of the roof off switch will not trigger the alarm.

Volumetric Sensing

The volumetric sensor is located in a central position on the roof panel, behind the headlining. The volumetric sensor is a microwave sensor which monitors movement inside the vehicle to detect any possible intrusion. The vehicle can be armed with the volumetric sensor disabled to avoid accidental triggering of the alarm if a pet is in the vehicle for instance. The volumetric sensor is also inoperative if the CCU senses that a panel has been left open, with the exception of the bonnet.

A fifteen second delay is initiated after arming of the alarm before signals from the volumetric sensor are interpreted as an intrusion. This precaution is included in the CCU software to avoid accidental or nuisance triggering of the alarm.

If the alarm has been triggered, the CCU will ignore further volumetric sensor signals for the duration of the alarm sounding. The CCU will delay volumetric sensing for a further 15 seconds after the alarm has stopped sounding, unless ten triggers have been sensed by the volumetric sensor since the alarm was last armed.

The volumetric gain setting is controlled by the VIN stored in the CCU. The VIN informs the CCU of the vehicle body and roof type to avoid under or over sensitivity.

If battery supply voltage falls to below 9 Volts, the CCU will ignore inputs from the volumetric sensor.

Alarm - Key Operation

Arming and disarming using the vehicle key in the driver's door key barrel will be ignored if the CCU senses that the ignition is 'on'. In certain markets the alarm system is programmed not to arm under any circumstances, in these cases key operation will only operate the door locking facility as described in Key Locking/Unlocking.

NOTE: Using the vehicle key in the driver door key barrel will not enable volumetric sensing.

Key Arm

The vehicle alarm can be fully armed by turning the top of the key to the rear of the vehicle once with all panels closed. The Vehicle will be CDL locked, the hazard warning lights will flash three times. The alarm LED will fast flash for ten seconds and then change to slow flash. Perimetric sensing will be activated.

The vehicle alarm can also be fully armed by turning the top of the key to the rear of the vehicle a second time, within one second of the first turn, with all the panels closed. The vehicle will be superlocked, the hazard warning lights will flash three times. The alarm LED will fast flash for ten seconds and then change to slow flash. Perimetric sensing will be activated.

Key Disarm

The vehicle can be disarmed by turning the top of the key towards the front of the vehicle. The vehicle will unlock all the doors, if the vehicle is being unlocked from the superlock state with SPE active, the driver's door will unlock, the remaining doors will enter the CDL state. Also the hazards will flash once and the alarm LED will extinguish.

Alarm Remote Handset Operation

In certain markets, the alarm system is programmed not to arm under any circumstances. In these cases the remote handset will only operate the door locking facility as described in remote handset lock/unlock.

Remote Handset Arm

The vehicle alarm can be fully armed by pressing the lock button on the remote handset once with all panels closed. The Vehicle will be superlocked, the hazard warning lights will flash three times. The alarm LED will fast flash for ten seconds and then change to slow flash. Perimetric and volumetric sensing will be activated.

Remote Handset Disarm

The vehicle can be fully disarmed by pressing the unlock button once on the remote handset. The hazard warning lights will flash once and the alarm LED will go off. Perimetric and volumetric sensing will be disabled.

Partial Arming

If one or more of the panels is left open, the CCU will attempt to partially arm as much of the vehicle as possible. If a failure of a panel open switch or wiring occurs, the CCU will partially arm the alarm in the same manner as if a panel is left open.

When the alarm is armed with one or more panels open, the CCU will sound a mislock warning from the horn or BBUS to tell the driver that a panel is open.

The mis-lock warning sound is market selectable and therefore may not be operative in specific markets. When the CCU enters a partially armed state, there is no hazard warning flasher operation, the alarm LED will be extinguished for 10 seconds and will then slow flash.

The CCU will partially alarm the vehicle according the priority of the panel left open. The panel priority is driver's door, passenger door(s), tail door and bonnet with the driver's door being the highest priority and the bonnet being the lowest.

Drivers Door
If the driver's door is open and a lock request is made, the CCU will CDL lock the closed doors, give a mislock sound, suspend superlocking and volumetric sensing and monitor the panel(s) left open. With the driver's door open CDL centre console switch lock requests are ignored.

Vehicle state changes:
- If the driver's door is open and a lower priority panel closes, the CCU will give a mis-lock sound and remain in the driver's door partial arm condition
- If the driver's door closes, the CCU will sound a mis-lock warning and remain in the driver's door partial arm condition. If the driver's door is opened, the alarm will be triggered
- If the driver's door closes and one or more lower priority panels are open and a lock request is made, the CCU will CDL lock the closed door(s) and enter the partial arm state of the panel open with the next highest priority
- If the driver's door closes and all other panels are closed and a lock request is made, the CCU will lock the doors and arm the alarm

Passenger Door(s)
If one or more of the passenger doors are open and the driver's door is closed and a lock request is made, the CCU will CDL lock the closed door(s), suspend superlocking and volumetric sensing and monitor the panel(s) left open.

Vehicle state changes:
- If one or more passenger door(s) are open and a lower priority panel closes, the CCU will sound a mis-lock warning and remain in the passenger door partial arm condition
- If the passenger door(s) close(s) and one or more lower priority panels remain open, the CCU will sound a mis-lock warning and enter the partial arm condition of the panel with the next highest priority
- If the passenger door(s) close(s) and all other panels are closed, the CCU will arm the alarm door sense switches for the closed door(s)

Tail Door
If the tail door is open and all higher priority panels are closed and a lock request is made, the CCU will allow superlocking of the passenger and driver's doors, suspend volumetric sensing and monitor the panel(s) left open.

Vehicle state changes:
- If the tail door is open and the bonnet closes, the CCU will sound a mis-lock warning and remain in the tail door partial arm condition
- If the tail door closes and the bonnet remains open, the CCU will suspend operation of the tail door open actuator until the next unlock request is made and enter the bonnet partial arm condition
- If the tail door closes and the bonnet and all other panels are closed, the CCU will lock the doors and arm the alarm

Bonnet
If the bonnet is open and all higher priority panels are closed and a lock request is made, the CCU will allow superlocking of the passenger and driver's doors and volumetric sensing and monitor the panel left open.

Vehicle state changes:
- If the bonnet closes and all other panels are closed, the CCU will enter the locked and armed condition

Mislock Warning
When the CCU enters a partial armed condition or the alarm is armed with the tail door window down, the CCU will sound a mis-lock warning. The mis-lock warning is market selectable. The mis-lock warning is sounded from either the vehicle horn for a period of 0.02 seconds or from the BBUS for a period of 0.1 seconds.

Alarm Activated
The audible and visual warnings are activated by the CCU when an alarm trigger is received by the CCU, is market selectable. The audible warning can be a constant tone from the horn for a period of 30 seconds or an intermittent tone from the horn for 30 seconds, with the horn sounding for 0.5 seconds and off for 0.5 seconds. The visual warning is flashing of the hazard warning lights for 30 seconds.

When a BBUS is fitted, all alarm and miss-lock warnings will be sounded via the BBUS.

Alarm Reset
When the alarm has been activated, it can be silenced, with the ignition 'off', by either disarming or repeat arming using the vehicle key or the remote handset.

Battery Backed Up Sounder
The BBUS is market programmable and when fitted will provide security warnings: alarm sounder and mislock.

In the event of a tamper detection i.e. power loss to the BBUS, the sounder can only be silenced with reconnection of power to the BBUS and a disarm request followed by an arm request.

In the alarm armed condition the BBUS will sound if it detects a power supply/battery disconnection. If the alarm is not armed the BBUS can be disconnected without the device sounding. Therefore, to prevent the BBUS sounding inadvertently, before any work on the vehicle which requires battery disconnection is carried out, ensure the alarm is not armed.

It is recommended that the BBUS is changed after three years due to limits of battery life.

Remote Handset (RF Transmitter)
Two remote handsets are supplied with each vehicle. Two buttons on the handset control the locking and unlocking and alarm arm and disarm functions remotely. The remote handset transmits a coded signal which is recognized by the RF receiver. If the handset battery is removed or changed, or the vehicle battery is disconnected, the synchronization of the handset and the RF receiver will be lost.

Remote Handset Re-synchronization
Re-synchronization can be achieved using the handset by operating either handset button five times in quick succession with the ignition off.

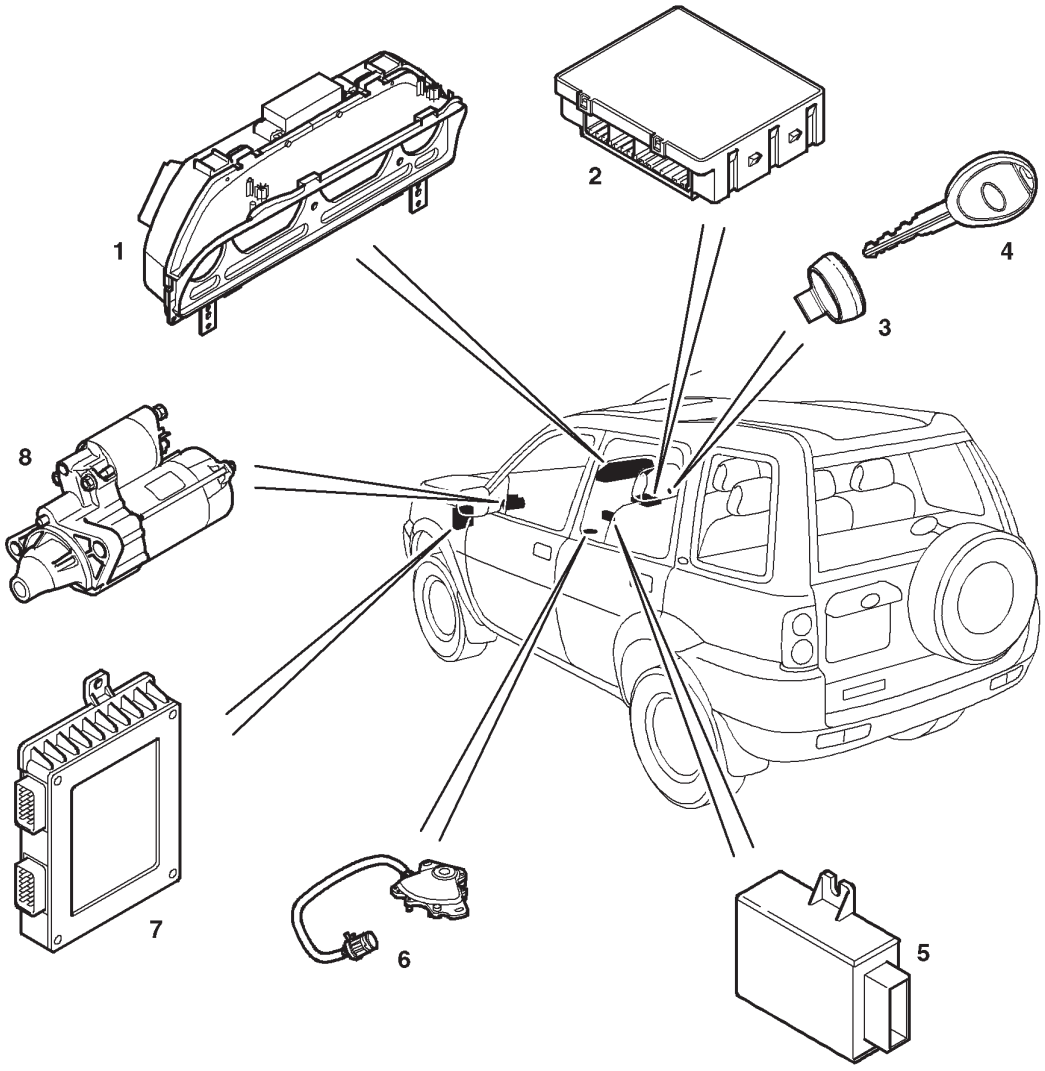
Remote Handset Battery Low Warning
If the remote handset battery voltage becomes low, when the handset transmits a signal to the CCU, it also transmits a low battery signal when the driver's door is opened. The CCU buzzer sounds a 10 second warning and the alarm LED flashes for 10 seconds to signify to the driver that the handset battery requires replacement. When the battery is replaced, the remote handset will require re-synchronization with the CCU.

Replacement Handset Programming
Remote handset replacements will require synchronising. This is achieved using TestBook/T4 (security diagnostics) to enter two bar code serial numbers, supplied on a label with the handset, into one of four code positions in the CCU.

Diagnostics
A diagnostic socket allows the exchange of information between the CCU and TestBook/T4. The diagnostic socket is located in the driver's footwell and is constructed to ISO standard. A dedicated diagnostic bus is connected between the socket and the CCU and allows the retrieval of diagnostic information and programming of certain functions to be performed using TestBook/T4.

The CCU monitors all inputs and outputs and if a fault is detected a code for that fault is stored in a fault log. The CCU has two fault logs for internal and external faults. The CCU is capable of detecting short or open circuits. The CCU will disable certain functions when faults are detected and reinstate functions when faults are corrected and the function is again requested.

Immobilisation System Component Layout



M86 5275B

1 Instrument pack
2 Central control unit
3 Transponder coil (ring antenna)
4 Key transponder
5 Immobilisation ECU (up to VIN 242163 shown)
6 Automatic transmission selector and inhibitor switch
7 Engine Control Module (ECM)
8 Starter motor