

Anti-Theft - Active -

Torque Specifications

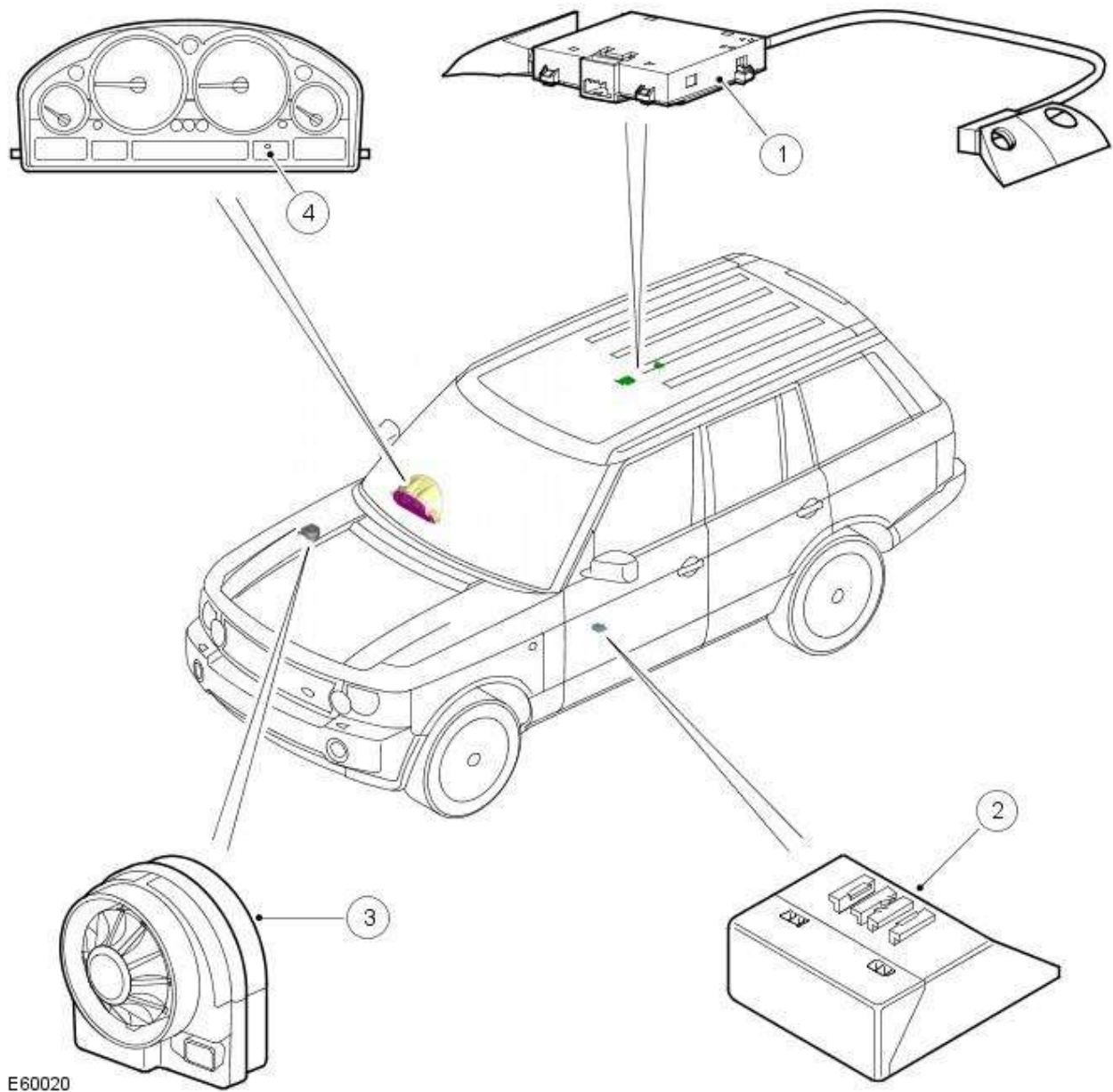
Description	Nm	lb-ft
RH Hood latch Torx bolts	10	7
Security antenna	6	4

Anti-Theft - Active - Anti-Theft - Active

Description and Operation

COMPONENT LOCATIONS

- NOTE: right-hand drive (RHD) installation shown, left-hand drive (LHD) installation similar



Item	Part Number	Description
1	-	Volumetric sensor (if fitted)
2	-	Tilt sensor (if fitted)
3	-	BBUS (battery back up sounder)
4	-	Alarm indicator

GENERAL

The active anti-theft system monitors the hinged panels for unauthorized opening. On some vehicles, the active anti-theft system also incorporates interior monitoring and vehicle tilt sensing functions. If an alarm event is detected, the active anti-theft system generates audible and visual alarm signals. The active anti-theft system is controlled by the generic electronic module (GEM) and is configured to automatically arm and disarm with operation of the CLS (central locking system).

For additional information, refer to: [Handles, Locks, Latches and Entry Systems](#) (501-14 Handles, Locks, Latches and Entry Systems, Description and Operation).

The active anti-theft system incorporates:

- An alarm indicator.

- A BABUS.

- A volumetric sensor (if fitted).

- A tilt sensor (if fitted).

The active anti-theft system also uses:

- The GEM.

For additional information, refer to: [Module Controlled Functions](#) (419-10 Multifunction Electronic Modules, Description and Operation).

- The hood, door and tailgate ajar switches.

For additional information, refer to: [Handles, Locks, Latches and Entry Systems](#) (501-14 Handles, Locks, Latches and Entry Systems, Description and Operation).

ALARM INDICATOR

The alarm indicator is installed in the instrument cluster to provide a visual indication of the active anti-theft system status. Operation of the alarm indicator is controlled by a hardwired input from the GEM, which pulls the input to ground to illuminate the alarm indicator.

System Status Indications

Alarm Mode	Alarm Indicator
Disarmed	Off
Armed	Flashes at 0.5 Hz (slow flashing)
Arming	Rapid flashing for 10 seconds maximum, then begins flashing at 0.5 Hz.
Alarm triggered	Rapid flashing for 5 minutes then continues flashing at 0.5 Hz.
Re-arming less than 10 seconds after disarming	On for 1 second
Disarming	Off
Disarming after alarm	Rapid flashing for 10 seconds then off
Emergency disarming	On for 10 minutes
Vehicle locked (alarm not coded in GEM)	On for 10 seconds
Unauthorized engine start detected by passive anti-theft system (PATS)	Rapid flashing until PATS deactivated

BBUS

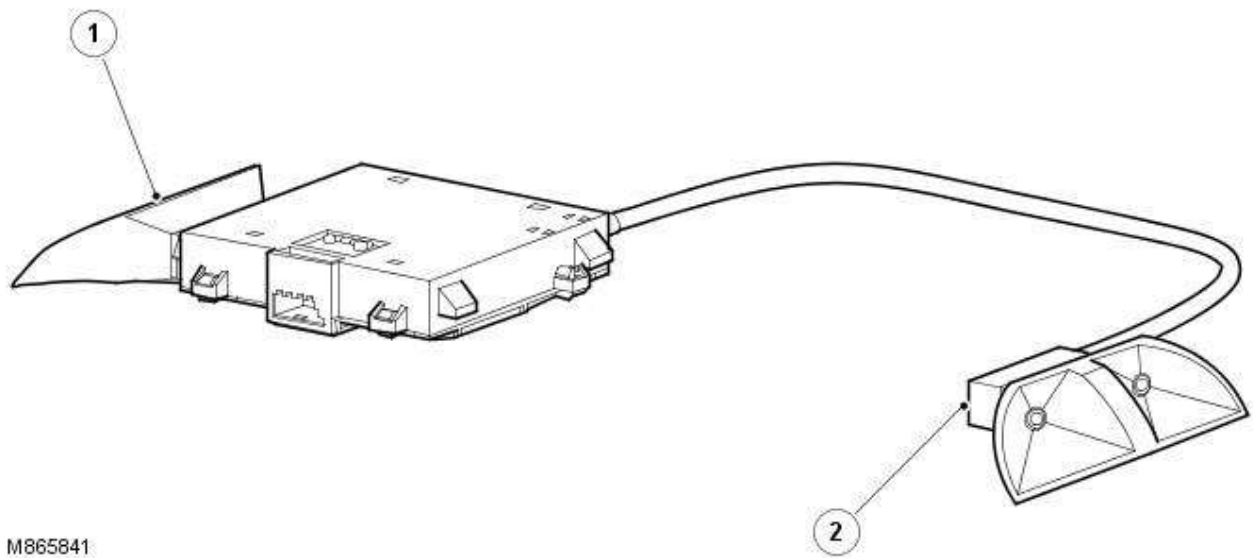
The BBUS is installed in the rear corner of the engine compartment, on the driver side, on a bracket attached to the front fender. In some markets, the BBUS is covered by a shield for added security. Depending on the GEM configuration, the BBUS can be used to produce the audio acknowledgment for arming and disarming of the active anti-theft system as well as the audio warning after an alarm has been triggered.

The BBUS is normally operated by a permanent battery feed from the central junction box (CJB). An integral 7.2 V rechargeable battery powers the BBUS if it is disconnected from the vehicle battery.

The BBUS sounds when it receives an alarm or acknowledgment signal from the GEM. While the active anti-theft system is armed, the BBUS also monitors the battery power supply and the arm/disarm signal line from the GEM, and operates the sounder if the battery power supply or the arm/disarm signal line is disconnected. The GEM arms and disarms the BBUS together with the rest of the active anti-theft system.

Once an alarm has been triggered, the BBUS cycles the sounder on for 30 seconds and off for 15 seconds, for 5 minutes or until it receives a disarm signal from the GEM. If the alarm trigger is still present, the 5 minutes of on/off cycles is repeated a further 2 times. The alarm output from the BBUS is either a constant tone or a modulated tone, depending on the market. The continuous tone has a nominal value of 113 dBA when powered by the vehicle battery and 108 dBA when powered by the integral battery. The modulated tone has a nominal value of 109 dBA when powered by the vehicle battery and 104 dBA when powered by the integral battery.

VOLUMETRIC SENSOR (IF FITTED)



Item	Part Number	Description
1	-	Front transmitter/receiver pair
2	-	Rear transmitter/receiver pair

The volumetric sensor is installed behind openings in the rear interior lamp and monitors for intrusion into the passenger compartment when the alarm is armed.

The volumetric sensor consists of a microcontroller, two acoustic transmitters and two acoustic receivers. One transmitter/receiver pair faces forwards and one transmitter/receiver pair faces rearwards to ensure complete coverage of the passenger compartment. The front transmitter/receiver pair are in a rubber mounting attached to the microcontroller housing. The rear transmitter/receiver pair are in a remote rubber mounting and connected to the microcontroller housing by a four wire lead.

The volumetric sensor is powered by a permanent battery feed from the CJB. The GEM activates and de-activates the volumetric sensor when it arms and disarms the active anti-theft system. When the volumetric sensor is active it outputs ultrasonic pulses from the transmitters and checks the echoes picked up by the receivers for changes to the passenger compartment profile. If it detects a change of profile indicating movement in the passenger compartment the volumetric sensor reports the alarm to the GEM.

Each time the volumetric sensor is activated it performs a self test. If there are no faults the volumetric sensor sends an acknowledgment signal to the GEM. If the GEM does not receive the acknowledgment signal it de-activates the volumetric sensor.

TILT SENSOR (IF FITTED)

The tilt sensor monitors for changes of vehicle attitude while the alarm is armed. The tilt sensor is installed under the front passenger seat in the GEM bracket.

The tilt sensor incorporates a two axis sensor controlled by a microprocessor. A permanent battery feed from the CJB powers the tilt sensor. The GEM activates and de-activates the tilt sensor when it arms and disarms the active anti-theft system. The tilt sensor receives activation and de-activation signals from the GEM.

The tilt sensor measures the longitudinal and transverse angles of the vehicle over a range of ± 16 degrees from the horizontal. When the tilt sensor is activated, it stores the current angles in memory. If the vehicle changes attitude in either direction by more than the limit the tilt sensor sends an alarm signal to the GEM, which triggers the BBUS. After an alarm, the alarm limit is reduced to make the system more sensitive to any further change of attitude.

Alarm Triggering Limits

Alarm	Limit, Degrees	
	Longitudinal	Transverse
First alarm	1.2 ± 0.55	1.4 ± 0.55
Second alarm	1.1 ± 0.55	1.3 ± 0.55

Each time the tilt sensor is activated it performs a self test. If there are no faults the tilt sensor sends an acknowledgment signal to the GEM. If the GEM does not receive the acknowledgment signal it de-activates the tilt sensor.

SYSTEM OPERATION

The active anti-theft system arms and disarms in conjunction with the locking and unlocking of the CLS. Depending on the configuration of the GEM, the active anti-theft system can be armed and disarmed when the locking system is activated with the driver door lock or the remote handset, or only with the remote handset. Visual and audible confirmation of the active anti-theft system arming and disarming, using the direction indicators and the BBUS, are also configurable in the GEM.

When the vehicle is superlocked, the GEM sends an arming signal to the tilt sensor, the BBUS and the volumetric sensor. If the GEM does not receive an acknowledgment signal from the tilt sensor and the volumetric sensor within 1 second, the GEM disables the associated alarm feature for the remainder of the armed cycle.

If the GEM detects two superlocking signals within 10 seconds, it disables volumetric sensing and tilt sensing. This feature prevents accidental triggering of the active anti-theft system during transportation of the vehicle or if a pet is left in the vehicle.

Perimetric Sensing

When the active anti-theft system arms, the GEM waits for 3 seconds before it begins monitoring the door status switches and the bonnet switch for perimetric sensing. If a door or the bonnet have been left open, the GEM indicates this by flashing the alarm light emitting diode (LED) for approximately 10 seconds. The input from the open switch is ignored until 3 seconds after it changes to the closed state.

Volumetric Sensing

The GEM begins volumetric sensing 30 seconds after receipt of the superlock signal, the last door closes, or convenience closing stops, whichever occurs last.

If the alarm has been triggered, the GEM will ignore further volumetric sensor signals for the duration of the alarm. The GEM resumes volumetric sensing 30 seconds after the alarm has stopped sounding.

Volumetric sensing and tilt sensing are disabled if the GEM receives a tail door open signal from the ignition key/remote handset. The GEM resumes volumetric sensing and tilt sensing 30 seconds after the upper tail door closes again.

Emergency Disarming

If the alarm has been triggered and cannot be disarmed with the driver door lock or the ignition key/remote handset, it can be disarmed with the ignition switch as follows:

Use the ignition key to unlock the driver door.

Sit in the vehicle and ensure all the doors are closed.

While the BBUS is still sounding, put the ignition key in the ignition switch and turn it to position I. The alarm indicator stays on instead of flashing.

After 10 minutes, the BBUS stops sounding, the alarm indicator goes off, the locking system unlocks and the PATS is made inactive.

Emergency disarming is configurable in the GEM.