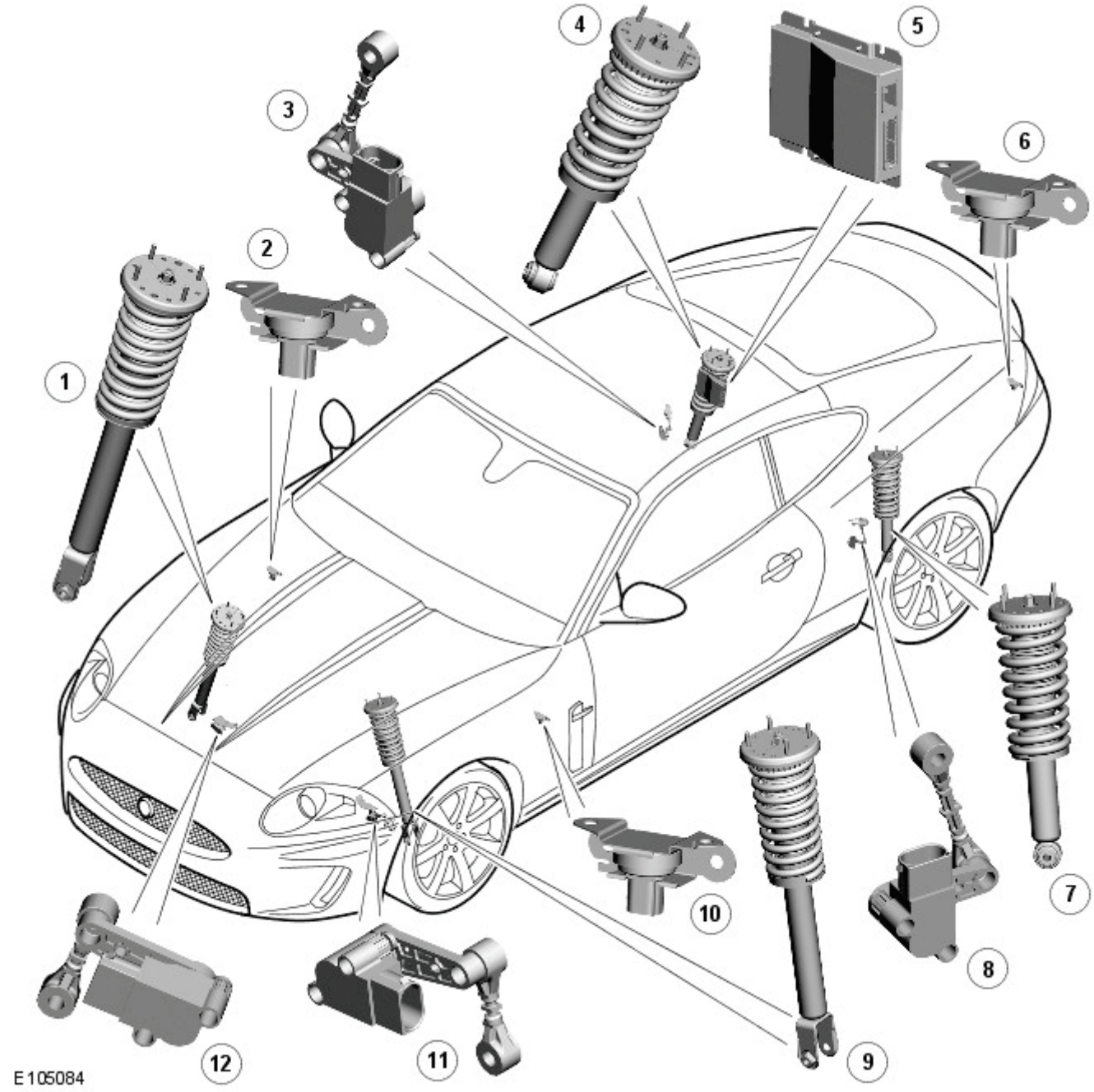
Published: 18-Dec-2013

Vehicle Dynamic Suspension - Vehicle Dynamic Suspension

Description and Operation

COMPONENT LOCATION



Item	Part Number	Description
1	-	RH (right hand) front spring and damper assembly
2	-	RH front accelerometer
3	-	RH rear suspension height sensor
4	-	RH rear spring and damper assembly
5	-	ADCM (adaptive damping control module)
6	-	Rear accelerometer
7	-	LH (left hand) rear spring and damper assembly
8	-	LH rear suspension height sensor
9	-	LH front spring and damper assembly
10	-	LH front accelerometer
11	-	LH front suspension height sensor
12	-	RH front suspension height sensor

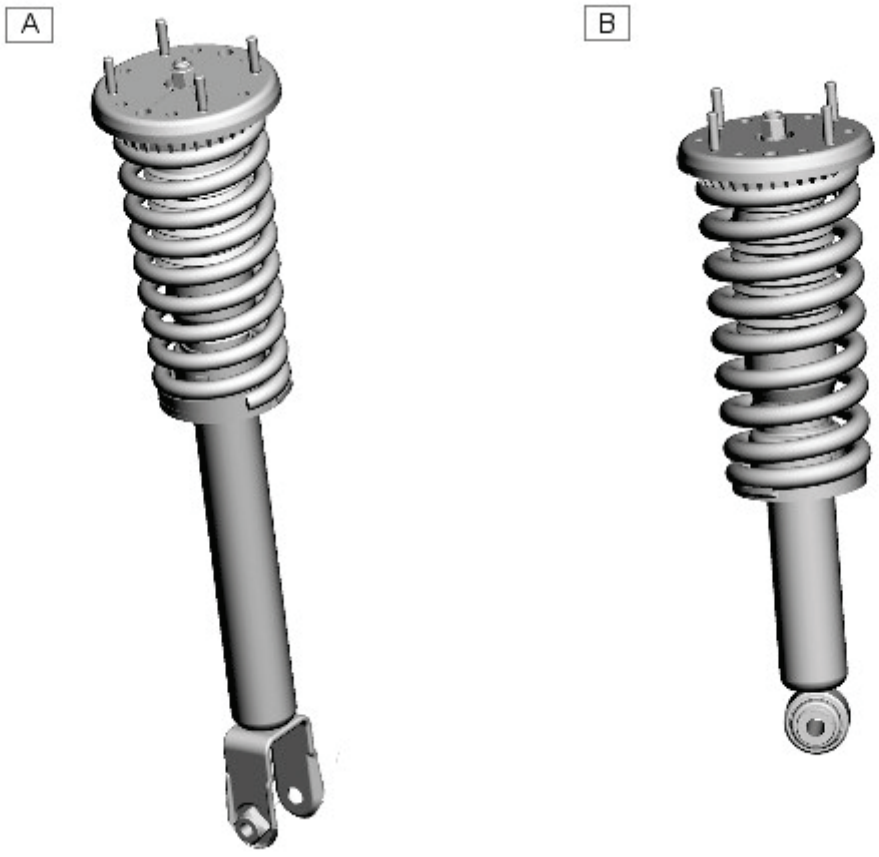
INTRODUCTION

A continuously variable damping system, known as adaptive dynamics, is available on certain models. Adaptive dynamics is an electronically controlled suspension system which continuously adjusts the damping characteristics of the suspension dampers in reaction to the current driving conditions.

The system is controlled by an ADCM (adaptive damping control module). The ADCM receives signals from three accelerometers, four suspension height sensors and from other vehicle systems to determine vehicle state, body and wheel motions, and driver inputs. These signals are used by the ADCM to continuously control the damping characteristics of each damper to the appropriate level, to give the optimum body control and vehicle ride.

The ADCM also contains the controller for the electronic differential, if fitted.

DAMPERS



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Item		Description
A		Front spring and damper assembly
B		Rear spring and damper assembly

CAUTION: The dampers look identical to those on the CATS (computer active technology suspension) system of 4.2L vehicles, but have a different part number. Resistance across the solenoid pins of an adaptive dynamics damper should be 2 to 3.5 ohms; if more than 5 ohms, you should suspect that the damper is from a CATS system.

The adaptive dynamics dampers are monotube, nitrogen gas and oil filled units. The dampers are continuously variable, which allows the damping force to be electrically adjusted when the vehicle is being driven. The dampers provide the optimum compromise between vehicle control and ride comfort.

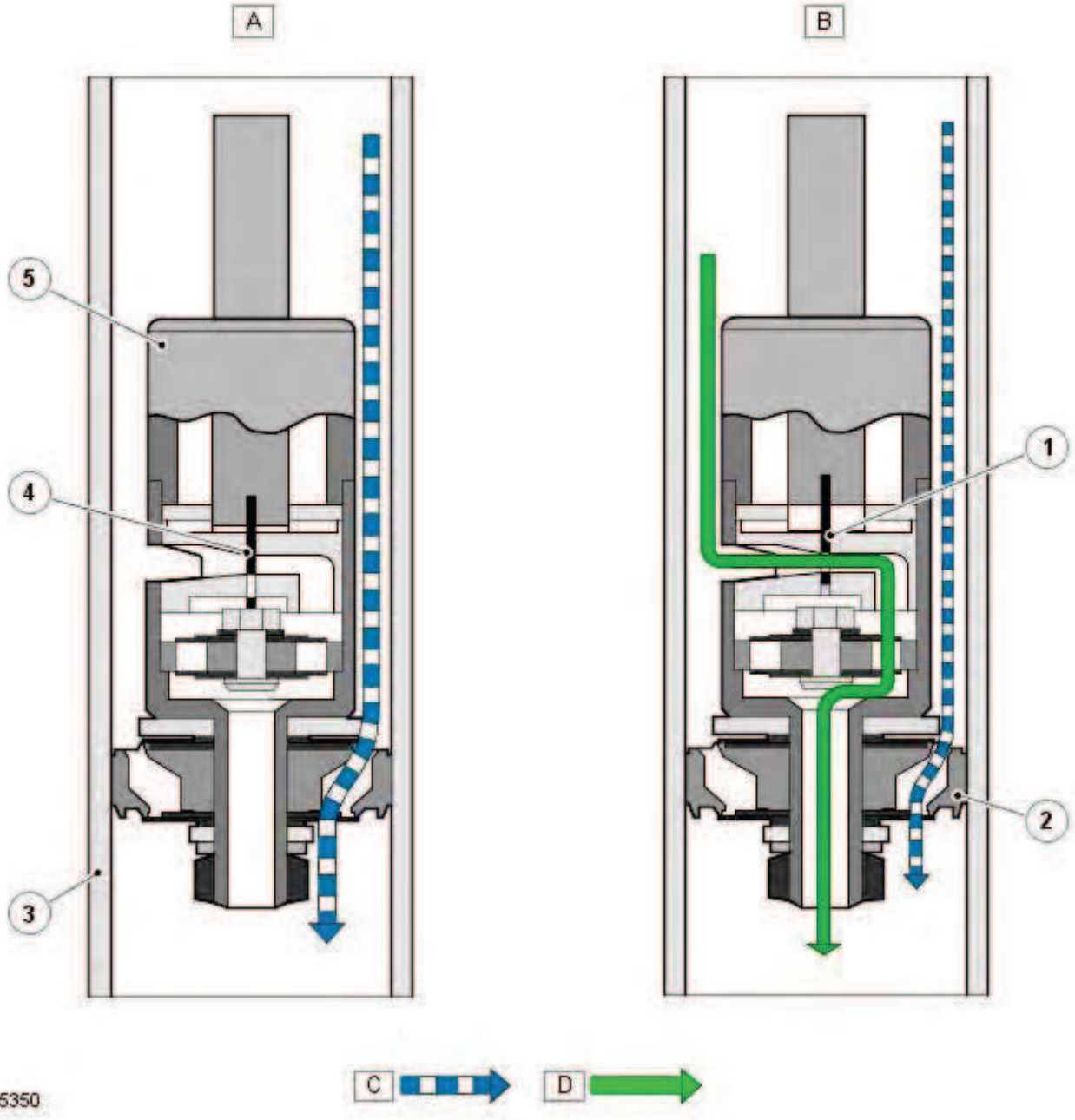
The dampers have an electrical connector on the end of the piston rod, in the center of the top mount.

In each damper, the damping adjustment is achieved by a solenoid operated variable orifice, which opens up an alternative path for oil flow within the damper. When de-energized the bypass is closed and all the oil flows through the main (firm) piston. When energized the solenoid moves an armature and control blade, which work against a spring. The control blade incorporates an orifice which slides inside a sintered housing to open up the bypass as required. In compression, oil flows from the lower portion of the damper through a hollow piston rod, a separate soft (comfort) valve, the slider housing and orifice and into the upper portion of the damper, thereby bypassing the main (firm) valve. In rebound the oil flows in the opposite direction.

In the firm setting oil flows through the main (firm) valve only, but when the bypass is opened by any amount the oil flows through both valves in a pressure balance. When fully energized the solenoid moves the armature and therefore the slider to the maximum extension and opens the orifice completely. The damper operates continuously between these two boundary conditions.

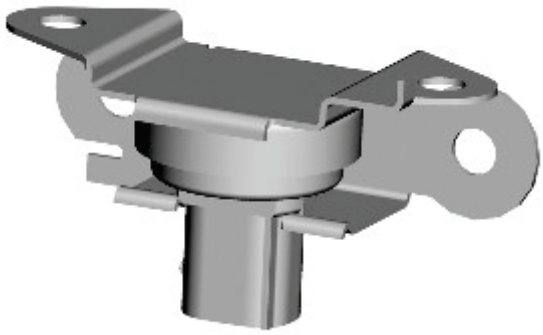
The solenoid in each damper is operated by a 526 Hz PWM (pulse width modulation) signal from the ADCM. The ADCM controls the PWM duty ratio to provide 1.5 A to operate the damper in the soft setting. When de-energized (0.0 A) the damper is in the firm setting. The current varies continuously as required to increase and decrease the damping individually in each of the dampers.

Sectioned Views of Damper Operating States



Item		Description
A		Firm setting
B		Soft setting
C		Main oil flow
D		Bypass oil flow
1		Bypass valve (open)
2		Main valve
3		Tube
4		Bypass valve (closed)
5		Piston and rod assembly

ACCELEROMETERS



E105087

Three accelerometers are used in the adaptive dynamics system. The accelerometers are located as follows:

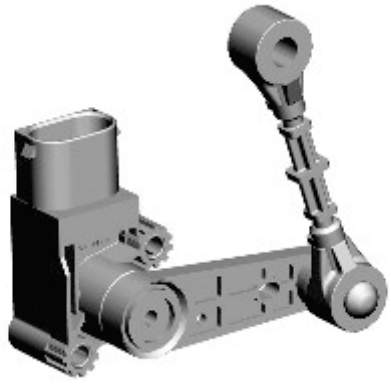
- One each on the front edge of the LH (left-hand) and RH (right-hand) A pillars.
- One in the luggage compartment, in the rear LH corner adjacent to the rear lamp assembly.

The accelerometers measure acceleration in the vertical plane and output a corresponding analogue signal to the ADCM. The algorithms in the ADCM calculate the heave, pitch and roll motions of the vehicle, which are used by the controller to control road induced body motion.

Each accelerometer is connected to the ADCM via three wires, which supply ground, 5 V supply and signal return.

The sensing element comprises a single parallel plate capacitor, one plate of which moves relative to the other dependant on the force (acceleration) applied. This causes the capacitance to change as a function of applied acceleration. This capacitance is compared with a fixed reference capacitor in a bridge circuit and the signal is processed by means of a dedicated integrated circuit to generate an output voltage that varies as a function of applied acceleration. The sensors output a signal voltage of approximately 1 V/g ± 0.05 V/g. When the vehicle is stationary, each accelerometer outputs approximately 2 volts.

SUSPENSION HEIGHT SENSORS



E105088

Four suspension height sensors are used in the adaptive dynamics system, two for the front suspension and two for the rear suspension. A front suspension height sensor is attached to each side of the front subframes and connected by a sensor arm and sensor link to the related lower lateral arm of the front suspension. A rear suspension height sensor is attached to each side of the rear subframe and connected by a sensor arm and sensor link to the related upper control arm of the rear suspension.

The RH suspension height sensors are dual output, with separate outputs for the adaptive damping system and for the AFS (adaptive front lighting system). The LH suspension height sensors are single output, for the adaptive damping system only.

On each suspension height sensor, the sensor arm and sensor link convert linear movement of the suspension into rotary movement of the sensor shaft. The suspension height sensors measure suspension displacement at each corner of the vehicle and output a corresponding analogue signal to the ADCM. The algorithms in the ADCM calculate the position, velocity and frequency content of the signals and use the results for wheel control.

Each suspension height sensor is connected to the ADCM via three wires, which supply ground, 5 V supply and signal return.

The sensing element consists of an array of Hall effect devices arranged to measure the direction of the magnetic field of a small magnet attached to the end of the sensor shaft. As the sensor shaft rotates, so do the lines of magnetic flux from the magnet. The signals from the Hall effect elements are processed by means of a dedicated integrated circuit to generate an output voltage that varies as the sensor shaft is rotated. The sensor has a measurement range of ± 40° around its nominal position and the nominal sensitivity is 57 mV/° of shaft rotation.

ADAPTIVE DAMPING CONTROL MODULE (ADCM)

E105086

The ADCM is installed on the right side of the luggage compartment, behind the RH rear seat back (and behind the RH roll over protection hoop on convertible models).

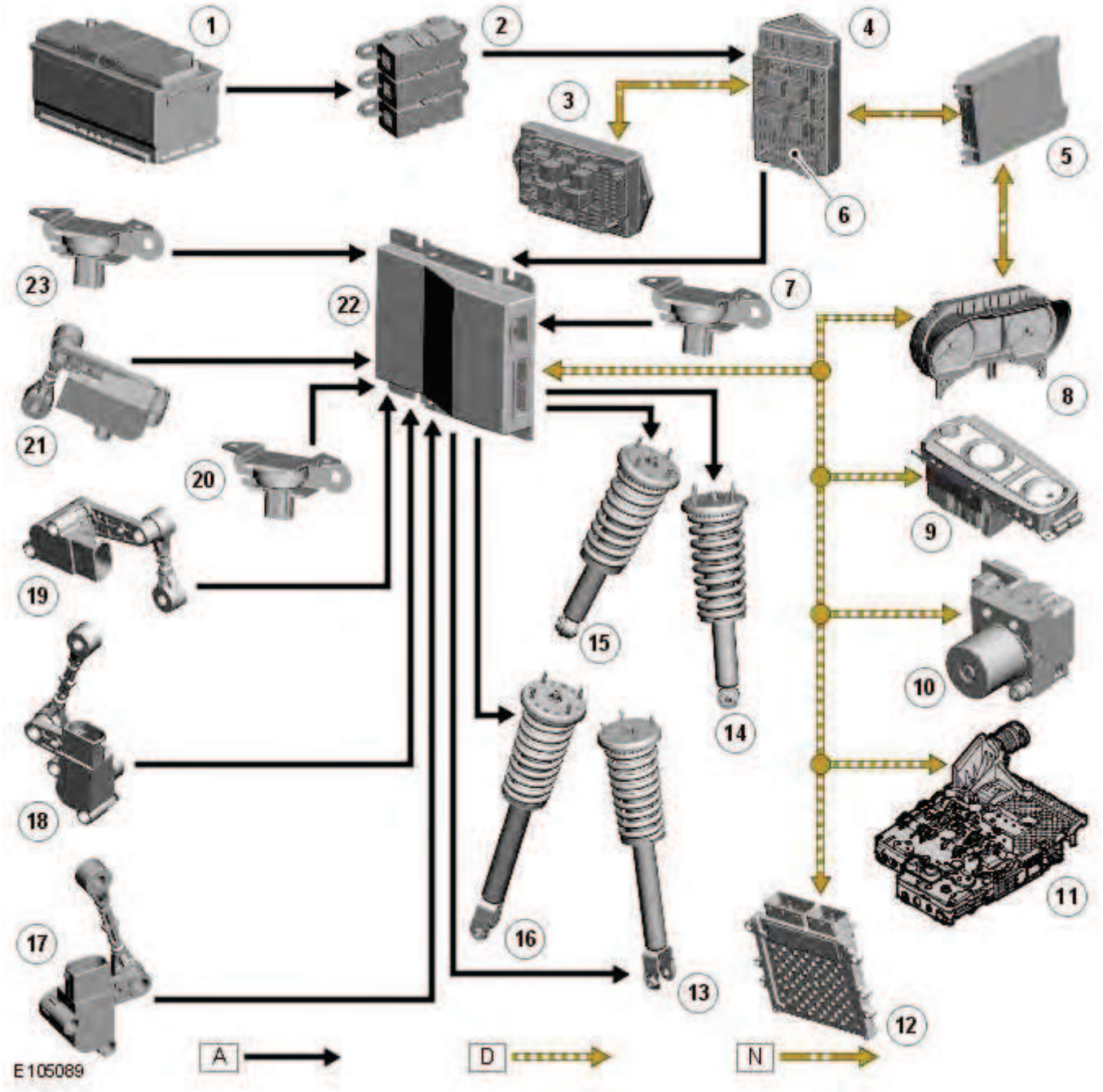
System Fault Message

If a fault is detected by the ADCM, a message is sent via the high speed CAN (controller area network) to the instrument cluster and the message ADAPTIVE DYNAMICS FAULT is displayed. The ADCM also logs an appropriate DTC (diagnostic trouble code). The ADCM can be interrogated using a Jaguar approved diagnostic system.

When a fault is detected, the ADCM implements a strategy based on the type of fault. If there is an electrical power fault, or the ADCM cannot control the dampers, they default to the firm condition. If a sensor fails that only affects one or more control modes then an intermediate damper setting is used as the lower threshold and the remaining working modes can demand higher damping as required. In the event of a high speed CAN bus fault, the dampers are fixed at an intermediate setting (no control) or default to the firm condition, depending on the severity of the fault.

CONTROL DIAGRAM

NOTE: **A** = Hardwired; **D** = High speed CAN bus; **N** = Medium speed CAN bus



Item		Description
1		Battery
2		BJB (battery junction box) (175 A megafuse)
3		AJB (auxiliary junction box)
4		CJB (central junction box)
5		ATC (automatic temperature control) module
6		Fuse 14 (15 A) - from delayed power-off relay
7		Rear accelerometer
8		Instrument cluster
9		JaguarDrive selector module
10		ABS (anti-lock brake system) module
11		TCM (transmission control module)
12		ECM (engine control module)
13		RH rear damper
14		RH front damper
15		LH front damper
16		LH rear damper
17		LH rear suspension height sensor
18		RH rear suspension height sensor

19		LH front suspension height sensor
20		RH front accelerometer
21		RH front suspension height sensor
22		ADCM
23		LH front accelerometer

PRINCIPLES OF OPERATION

The ADCM uses a combination of information from other system modules and data from the accelerometers and suspension height sensors to measure the vehicle and suspension states and driver inputs. Using this information, the ADCM applies algorithms to control the dampers for the current driving conditions.

The ADCM receives the following signals on the high speed CAN bus from the stated system components:

- Brake Pressure - ABS (anti-lock brake system) module.
- Brake Pressure Quality Factor - ABS module.
- Car Configuration Parameters - AJB (auxiliary junction box).
- Center Differential Range Actual - ECM (engine control module).
- Engine Speed - ECM.
- Engine Speed Quality Factor - ECM.
- Engine Torque Flywheel Actual - ECM.
- Engine Torque Flywheel Actual Quality Factor - ECM.
- Gear Position Target - TCM (transmission control module).
- Lateral Acceleration - ABS module.
- Power Mode (Ignition Signal) - CJB (central junction box).
- Power Mode Quality Factor - CJB.
- Roll Stability Control Mode - ABS module.
- Steering Wheel Angle - ABS module.
- Steering Wheel Angle Speed - ABS module.
- Steering Wheel Angle Status - ABS module.
- Terrain Mode Requested - JaguarDrive selector.
- Torque Converter Slip - TCM.
- Vehicle Information Parameters HS - AJB
- Vehicle Speed - ABS module.
- Vehicle Speed Quality Factor - ABS module.
- Front Left Wheel Speed - ABS module.
- Front Left Wheel Speed Quality Factor - ABS module.
- Front Right Wheel Speed - ABS module.
- Front Right Wheel Speed Quality Factor - ABS module.
- Rear Left Wheel Speed - ABS module.
- Rear Left Wheel Speed Quality Factor - ABS module.
- Rear Right Wheel Speed - ABS module.
- Rear Right Wheel Speed Quality Factor - ABS module.

The ADCM also outputs information on the high speed CAN bus for use by other systems as follows:

- Fault Message - instrument cluster.
- Terrain Mode Change Status - JaguarDrive selector.
- Terrain Mode - JaguarDrive selector.

The ADCM monitors the input signals and operates the damper solenoids. The input signals are used in control functions and a force required for each damper, for each function, is calculated. An arbitrator monitors the force requirements from each function and apportions a force to a damper. The force is converted to the appropriate current and sent to the damper.

The control functions are as follows:

- Body Control – Uses CAN and accelerometer inputs. Calculates road induced body motions 100 times a second and sets each damper to the appropriate level to maintain a flat and level body.
- Roll Rate Control – Uses CAN inputs. Predicts vehicle roll rate due to driver steering inputs 100 times a second and increases damping to reduce roll rate.
- Pitch Rate Control – Uses CAN inputs. Predicts vehicle pitch rate due to driver throttle and braking inputs 100 times a second and increases damping to reduce pitch rate.
- Bump Rebound Control – Uses suspension height sensor inputs. Monitors the position of the wheel 500 times a second and increases the damping rate as the damper approaches the end of its travel.
- Wheel Hop Control – Uses suspension height sensor and CAN inputs. Monitors the position of the wheel 500 times a second and detects when the wheel begins to vibrate at its natural frequency and increases the damping to reduce vertical wheel motion.

Under normal road conditions when the vehicle is stationary with the engine running, the dampers are set to the firm condition to reduce power consumption.

The ADCM receives its power supply via a relay and fuse in the CJB. The relay remains energized for a period of time after the ignition is off. This allows the ADCM to record and store any DTC relating to adaptive dynamics system faults.

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Vehicle Dynamic Suspension - Vehicle Dynamic Suspension

Diagnosis and Testing

Principle of Operation

For a detailed description of the adaptive damping system operation, refer to the relevant Description and Operation section of the workshop manual. REFER to: Vehicle Dynamic Suspension (204-05 Vehicle Dynamic Suspension, Description and Operation).

Inspection and Verification

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

1. Verify the customer concern.

2. Visually inspect for obvious signs of damage and system integrity.

Mechanical	Electrical
• Coil spring(s) • Shock absorber(s) • Accelerometer(s) installation • Height sensor(s) installation	• Fuse(s) • Wiring harness/electrical connectors • Accelerometer(s) • Adaptive Damping Control Module • Height sensor(s)

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4. If the cause is not visually evident, check the system for any logged Diagnostic Trouble Codes (DTCs) and refer to the DTC index.

DTC Index

CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00.

NOTE: If a control module fault is suspected and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module.

NOTE: Generic scan tools may not read the codes listed, or may read only five-digit codes. Match the five-digits from the scan tool to the first five-digits of the seven-digit code listed to identify the fault (the last two digits give additional information read by the manufacturer approved diagnostic system).

NOTE: When performing electrical voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

NOTE: Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE: Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

NOTE: If DTCs are logged and, after carrying out the pinpoint tests, a fault is not identified, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
C101D-12	Left Front vertical acceleration sensor - short to power	• Left Front vertical acceleration sensor circuit short to power	Refer to the electrical circuit diagrams and check left front vertical acceleration sensor circuit for short to power or another circuit. Repair circuit, clear the DTC and retest the system

C101D-14	Left Front vertical acceleration sensor - short to ground, open circuit	• Left Front vertical acceleration sensor circuit short to ground, open circuit • Vertical acceleration sensor fault	Refer to the electrical circuit diagrams and check front vertical acceleration sensor circuit for short to ground, open circuit. If no fault found on wiring suspect sensor. Replace sensor, clear DTC and retest the system
C101D-22	Left Front vertical acceleration sensor - signal amplitude > maximum	• Left front vertical acceleration sensor insecurely mounted • Left front vertical acceleration sensor signal circuit short to another circuit • Left front vertical acceleration sensor internal fault	With vehicle parked on a level surface, read Left Front Vertical Accelerometer voltage and check it lies in range 1.9 to 2.1 volts. If not OK then check electrical wiring for shorts, loose connections and repair as required. If wiring OK then suspect faulty sensor/incorrectly fitted sensor. Check the sensor is correctly mounted, secure or replace sensor as required. Refer to the new module/component installation note at the top of the DTC Index, clear DTC and retest system
C101D-26	Left Front vertical acceleration sensor - signal rate of change below threshold	• Left front vertical acceleration sensor signal circuit short to another circuit • Left front vertical acceleration sensor internal fault	Refer to the electrical circuit diagrams and check Left Front Vertical Accelerometer signal circuit for faults, if circuit is correct suspect faulty sensor, refer to the new module/component installation note at the top of the DTC Index. Replace the sensor, clear the DTC and retest the system
C101D-78	Left Front vertical acceleration sensor - alignment or adjustment incorrect	• Left front vertical acceleration sensor bracket bent • Left front vertical acceleration sensor damaged	Check Left Front Vertical Accelerometer for location and security, if correct suspect faulty Accelerometer, refer to the new module installation note at the top of the DTC Index. Replace the sensor/bracket as required, clear the DTC and retest the system
C101E-12	Right Front vertical acceleration sensor - short to power	• Right Front vertical acceleration sensor circuit short to power	Refer to the electrical circuit diagrams and check right front vertical acceleration sensor circuit for short to power or another circuit. Repair circuit, clear the DTC and retest the system
C101E-14	Right Front vertical acceleration sensor - short to ground, open circuit	• Right Front vertical acceleration sensor circuit short to ground, open circuit • Vertical acceleration sensor fault	Refer to the electrical circuit diagrams and check right front vertical acceleration sensor circuit for short to ground, open circuit. If no fault found on wiring suspect sensor. Replace sensor, clear DTC and retest the system
C101E-22	Right Front vertical acceleration sensor - signal amplitude > maximum	• Right front vertical acceleration sensor insecurely mounted • Right front vertical acceleration sensor signal circuit short to another circuit • Right front vertical acceleration sensor internal fault	With vehicle parked on a level surface, read Right Front Vertical Accelerometer voltage and check it lies in range 1.9 to 2.1 volts. If not OK then check electrical wiring for shorts, loose connections and repair as required. If wiring OK then suspect faulty sensor/incorrectly fitted sensor. Check the sensor is correctly mounted, secure or replace sensor as required. Refer to the new module/component installation note at the top of the DTC Index, clear DTC and retest system
C101E-26	Right Front vertical acceleration sensor - signal rate of change below threshold	• Right front vertical acceleration sensor signal circuit short to another circuit • Right front vertical acceleration sensor internal fault	Refer to the electrical circuit diagrams and check Right Front Vertical Accelerometer signal circuit for faults, if circuit is correct suspect faulty sensor, refer to the new module/component installation note at the top of the DTC Index. Replace the sensor, clear the DTC and retest the system
C101E-78	Right Front vertical acceleration sensor - alignment or adjustment incorrect	• Right front vertical acceleration sensor bracket bent • Right front vertical acceleration sensor damaged	Check Right Front Vertical Accelerometer for location and security, if correct suspect faulty Accelerometer, refer to the new module installation note at the top of the DTC Index. Replace the sensor/bracket as required, clear the DTC and retest the system
C1024-00	System Temporarily Disabled Due To Power Interruption During Driving - no sub type information	• Loss of power to control module whilst driving	Refer to the electrical circuit diagrams and check power and ground circuits to Adaptive Damping Control Module for intermittent or poor connection. Repair wiring circuits as required, clear DTC and retest the system

C1030-12	Left Rear vertical acceleration sensor - short to power	• Left Rear vertical acceleration sensor circuit short to power	Refer to the electrical circuit diagrams and check left Rear vertical acceleration sensor circuit for short to power or another circuit. Repair circuit, clear the DTC and retest the system
C1030-14	Left Rear vertical acceleration sensor - short to ground, open circuit	• Left rear vertical acceleration sensor circuit short to ground, open circuit • Vertical acceleration sensor fault	Refer to the electrical circuit diagrams and check left Rear vertical acceleration sensor circuit for short to ground, open circuit. If no fault found on wiring suspect sensor. Replace sensor, clear DTC and retest the system
C1030-22	Left Rear vertical acceleration sensor - signal amplitude > maximum	• Left Rear vertical acceleration sensor insecurely mounted • Left Rear vertical acceleration sensor signal circuit short to another circuit • Left Rear vertical acceleration sensor internal fault	With vehicle parked on a level surface, read Left Rear Vertical Accelerometer voltage and check it lies in range 1.9 to 2.1 volts. If not OK then check electrical wiring for shorts, loose connections and repair as required. If wiring OK then suspect faulty sensor/incorrectly fitted sensor. Check the sensor is correctly mounted, secure or replace sensor as required. Refer to the new module/component installation note at the top of the DTC Index, clear DTC and retest system
C1030-26	Left Rear vertical acceleration sensor - signal rate of change below threshold	• Left Rear vertical acceleration sensor signal circuit short to another circuit • Left Rear vertical acceleration sensor internal fault	Refer to the electrical circuit diagrams and check Left Rear Vertical Accelerometer signal circuit for faults, if circuit is correct suspect faulty sensor, refer to the new module/component installation note at the top of the DTC Index. Replace the sensor, clear the DTC and retest the system
C1030-78	Left Rear vertical acceleration sensor - alignment or adjustment incorrect	• Left Rear vertical acceleration sensor bracket bent • Left Rear vertical acceleration sensor damaged	Check Left Rear Vertical Accelerometer for location and security, if correct suspect faulty Accelerometer, refer to the new module installation note at the top of the DTC Index. Replace the sensor/bracket as required, clear the DTC and retest the system
C1A03-12	Left Front Height Sensor - circuit short to power	• Height sensor circuit shorted to another cable • height sensor internal fault	Refer to the electrical circuit diagrams and check Front Left Height Sensor circuit for short to power, If circuit correct suspect Sensor internal fault, replace as required
C1A03-14	Left Front Height Sensor - circuit short to ground or open	• Wiring to sensor (signal) open circuit • Wiring to height sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor internal electrical fault	Disconnect electrical connector to height sensor and inspect connector pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply connection should be ~5v All voltages should be within ± 0.15v
C1A03-21	Left Front Height Sensor - signal amplitude < minimum	• Height sensor linkage not connected • Height sensor or bracket loose • Height sensor bracket bent • Incorrect height calibration • Height sensor linkage toggled • Height sensor water ingress • Wiring to height sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault • Height sensor linkage bent • Incorrect height	Inspect for damage or loose fixings. NOTE If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Confirm that the correct height sensor part number is fitted, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply connection should be ~5v All voltages should be within ± 0.15v. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at rebound to gain access to height sensor. Access may be

		sensor fitted	improved by removing road wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A03-22	Left Front Height Sensor - signal amplitude > maximum	• Height sensor linkage not connected • Height sensor or bracket loose • Height sensor bracket bent • Incorrect height calibration • Height sensor linkage toggled • Height sensor water ingress • Wiring to height sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault • Height sensor linkage bent • Incorrect height sensor fitted	Inspect for damage or loose fixings. NOTE If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Confirm that the correct height sensor part number is fitted, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply connection should be ~5v All voltages should be within ± 0.15v. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at rebound to gain access to height sensor. Access may be improved by removing road wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A03-76	Left Front Height Sensor - wrong mounting position	• Incorrect height calibration	Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C1A03-78	Left Front Height Sensor - alignment or adjustment incorrect	• Incorrect height calibration	Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C1A04-12	Right Front Height Sensor - circuit short to power	• Height sensor circuit shorted to another cable • height sensor internal fault	Refer to the electrical circuit diagrams and check Front Right Height Sensor circuit for short to power, If circuit correct suspect Sensor internal fault, replace as required
C1A04-14	Right Front Height Sensor - circuit short to	• Wiring to sensor (signal) open circuit • Wiring to height	Disconnect electrical connector to height sensor and inspect connector pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control

	ground or open	sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor internal electrical fault	Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply connection should be ~5v All voltages should be within ± 0.15v
C1A04-21	Right Front Height Sensor - signal amplitude < minimum	• Height sensor linkage not connected • Height sensor or bracket loose • Height sensor bracket bent • Incorrect height calibration • Height sensor linkage toggled • Height sensor water ingress • Wiring to height sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault • Height sensor linkage bent • Incorrect height sensor fitted	Inspect for damage or loose fixings. NOTE If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Confirm that the correct height sensor part number is fitted, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply connection should be ~5v All voltages should be within ± 0.15v. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at rebound to gain access to height sensor. Access may be improved by removing road wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A04-22	Right Front Height Sensor - signal amplitude > maximum	• Height sensor linkage not connected • Height sensor or bracket loose • Height sensor bracket bent • Incorrect height calibration • Height sensor linkage toggled • Height sensor water ingress • Wiring to height sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault • Height sensor linkage bent • Incorrect height sensor fitted	Inspect for damage or loose fixings. NOTE If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Confirm that the correct height sensor part number is fitted, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply connection should be ~5v All voltages should be within ± 0.15v. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at rebound to gain access to height sensor. Access may be improved by removing road wheel. Carefully disconnect the

			height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A04-76	Right Front Height Sensor - wrong mounting position	• Incorrect height calibration	Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C1A04-78	Right Front Height Sensor - alignment or adjustment incorrect	• Incorrect height calibration	Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C1A05-12	Left Rear Height Sensor - circuit short to power	• Height sensor circuit shorted to another cable • height sensor internal fault	Refer to the electrical circuit diagrams and check Rear Left Height Sensor circuit for short to power, If circuit correct suspect Sensor internal fault, replace as required
C1A05-14	Left Rear Height Sensor - circuit short to ground or open	• Wiring to sensor (signal) open circuit • Wiring to height sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor internal electrical fault	Disconnect electrical connector to height sensor and inspect connector pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply connection should be ~5v All voltages should be within ± 0.15v
C1A05-21	Left Rear Height Sensor - signal amplitude < minimum	• Height sensor linkage not connected • Height sensor or bracket loose • Height sensor bracket bent • Incorrect height calibration • Height sensor linkage toggled • Height sensor water ingress • Wiring to height sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault • Height sensor linkage bent • Incorrect height sensor fitted	Inspect for damage or loose fixings. NOTE If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Confirm that the correct height sensor part number is fitted, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply connection should be ~5v All voltages should be within ± 0.15v. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at rebound to gain access to height sensor. Access may be improved by removing road wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do

			not change smoothly then replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A05-22	Left Rear Height Sensor - signal amplitude > maximum	• Height sensor linkage not connected • Height sensor or bracket loose • Height sensor bracket bent • Incorrect height calibration • Height sensor linkage toggled • Height sensor water ingress • Wiring to height sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault • Height sensor linkage bent • Incorrect height sensor fitted	Inspect for damage or loose fixings. NOTE If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Confirm that the correct height sensor part number is fitted, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply connection should be ~5v All voltages should be within ± 0.15v. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at rebound to gain access to height sensor. Access may be improved by removing road wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A05-76	Left Rear Height Sensor - wrong mounting position	• Incorrect height calibration	Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C1A05-78	Left Rear Height Sensor - alignment or adjustment incorrect	• Incorrect height calibration	Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C1A06-12	Right Rear Height Sensor - circuit short to power	• Height sensor circuit shorted to another cable • height sensor internal fault	Refer to the electrical circuit diagrams and check Rear Right Height Sensor circuit for short to power, If circuit correct suspect Sensor internal fault, replace as required
C1A06-14	Right Rear Height Sensor - circuit short to ground or open	• Wiring to sensor (signal) open circuit • Wiring to height sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor internal electrical fault	Disconnect electrical connector to height sensor and inspect connector pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply

			connection should be ~5v All voltages should be within ± 0.15v
C1A06-21	Right Rear Height Sensor - signal amplitude < minimum	• Height sensor linkage not connected • Height sensor or bracket loose • Height sensor bracket bent • Incorrect height calibration • Height sensor linkage toggled • Height sensor water ingress • Wiring to height sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault • Height sensor linkage bent • Incorrect height sensor fitted	Inspect for damage or loose fixings. NOTE If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Confirm that the correct height sensor part number is fitted, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply connection should be ~5v All voltages should be within ± 0.15v. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at rebound to gain access to height sensor. Access may be improved by removing road wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A06-22	Right Rear Height Sensor - signal amplitude > maximum	• Height sensor linkage not connected • Height sensor or bracket loose • Height sensor bracket bent • Incorrect height calibration • Height sensor linkage toggled • Height sensor water ingress • Wiring to height sensor partial short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault • Height sensor linkage bent • Incorrect height sensor fitted	Inspect for damage or loose fixings. NOTE If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Confirm that the correct height sensor part number is fitted, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • Voltage to sensor ground connection should be ~0v • Voltage to sensor signal connection should be ~0v • Voltage to sensor supply connection should be ~5v All voltages should be within ± 0.15v. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at rebound to gain access to height sensor. Access may be improved by removing road wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then replace sensor. NOTE: For angles of

			movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A06-76	Right Rear Height Sensor - wrong mounting position	• Incorrect height calibration	Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C1A06-78	Right Rear Height Sensor - alignment or adjustment incorrect	• Incorrect height calibration	Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C110C-01	Left Front Damper Solenoid - General electrical failure	• Left front damper solenoid circuit fault	Refer to the electrical circuit diagrams and check Front Left damper solenoid circuit for faults, If no faults are evident suspect a faulty control module, refer to the new module installation note at the top of the DTC Index
C110C-18	Left Front Damper Solenoid - circuit current below threshold	• Front Left Damper Actuator open circuit at startup	Refer to the electrical circuit diagrams and check Front Left Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110C-19	Left Front Damper Solenoid - circuit current above threshold	• Front Left Damper Solenoid circuit current above threshold	Refer to the electrical circuit diagrams and check Front Left Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110C-14	Left front damper solenoid - short to ground, open circuit	• Left front damper solenoid circuit - short to ground, open circuit • Left front damper failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left front damper solenoid circuit for short to ground, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect
C110C-1D	Left front damper solenoid	• Left front damper solenoid circuit - short to ground/power, open circuit • Left front damper failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left front damper solenoid circuit for short to ground, power, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect
C110C-64	Left Front Damper Solenoid - signal plausibility failure	• Front Left Damper Solenoid Measured Current control loop failed • Front Left Damper Solenoid open circuit	Refer to the electrical circuit diagrams and check Front Left Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110D-01	Right Front Damper Solenoid - General electrical failure	• Right front damper solenoid circuit fault	Refer to the electrical circuit diagrams and check Front Right damper solenoid circuit for faults, If no faults are evident suspect a faulty control module, refer to the new module installation note at the top of the DTC Index
C110D-18	Right Front Damper Solenoid - circuit current below threshold	• Front Right Damper Actuator open circuit at startup	Refer to the electrical circuit diagrams and check Front Right Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110D-19	Right Front Damper Solenoid - circuit current above threshold	• Front Right Damper Solenoid circuit current above threshold	Refer to the electrical circuit diagrams and check Front Right Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110D-14	Right front damper solenoid - short to ground, open circuit	• Right front damper solenoid circuit - short to ground, open circuit • Right front damper failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check Right front damper solenoid circuit for short to ground, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect
C110D-1D	Right front damper solenoid	• Right front damper solenoid circuit - short	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the

		to ground/power, open circuit • Right front damper failure	electrical circuit diagrams and check Right front damper solenoid circuit for short to ground, power, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect
C110D-64	Right Front Damper Solenoid - signal plausibility failure	• Front Right Damper Solenoid Measured Current control loop failed • Front Right Damper Solenoid open circuit	Refer to the electrical circuit diagrams and check Front Right Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110E-01	Left Rear Damper Solenoid - General electrical failure	• Left Rear damper solenoid circuit fault	Refer to the electrical circuit diagrams and check Rear Left damper solenoid circuit for faults, If no faults are evident suspect a faulty control module, refer to the new module installation note at the top of the DTC Index
C110E-18	Left Rear Damper Solenoid - circuit current below threshold	• Rear Left Damper Actuator open circuit at startup	Refer to the electrical circuit diagrams and check Rear Left Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110E-19	Left Rear Damper Solenoid - circuit current above threshold	• Rear Left Damper Solenoid circuit current above threshold	Refer to the electrical circuit diagrams and check Rear Left Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110E-14	Left Rear damper solenoid - short to ground, open circuit	• Left Rear damper solenoid circuit - short to ground, open circuit • Left Rear damper failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left Rear damper solenoid circuit for short to ground, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect
C110E-1D	Left Rear damper solenoid	• Left Rear damper solenoid circuit - short to ground/power, open circuit • Left Rear damper failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left Rear damper solenoid circuit for short to ground, power, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect
C110E-64	Left Rear Damper Solenoid - signal plausibility failure	• Rear Left Damper Solenoid Measured Current control loop failed • Rear Left Damper Solenoid open circuit	Refer to the electrical circuit diagrams and check Rear Left Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110F-18	Right Rear Damper Solenoid - circuit current below threshold	• Rear Right Damper Actuator open circuit at startup	Refer to the electrical circuit diagrams and check Rear Right Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110F-19	Right Rear Damper Solenoid - circuit current above threshold	• Rear Right Damper Solenoid circuit current above threshold	Refer to the electrical circuit diagrams and check Rear Right Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110F-14	Right Rear damper solenoid - short to ground, open circuit	• Right Rear damper solenoid circuit - short to ground, open circuit • Right Rear damper failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check Right Rear damper solenoid circuit for short to ground, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect
C110F-1D	Right Rear damper solenoid	• Right Rear damper solenoid circuit - short to ground/power, open circuit • Right Rear damper failure	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check Right Rear damper solenoid circuit for short to ground, power, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect
C110F-64	Right Rear Damper Solenoid - signal plausibility failure	• Rear Right Damper Solenoid Measured Current control loop failed • Rear Right Damper Solenoid open circuit	Refer to the electrical circuit diagrams and check Rear Right Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms

C1B14-1C	Sensor Supply Voltage A - out of range	• Left Front Height Sensor or Right Front Height Sensor or Left Rear Height Sensor or Right Rear Height Sensor supply partial short to other circuit or ground • Left Front Height Sensor or Right Front Height Sensor or Left Rear Height Sensor or Right Rear Height Sensor internal failure • Internal control module failure	Refer to the electrical circuit diagrams and check sensor supply for circuit fault. Check all height sensors. Check module sensor supply output voltage measured voltage should be between 4.995 volts and 4.85 volts
C1B15-1C	Sensor Supply Voltage B - out of range	• Left Front Vertical Acceleration Sensor or Right Front Vertical Acceleration Sensor or Left Rear Vertical Acceleration Sensor or Right Rear Vertical Acceleration Sensor supply partial short to other circuit or ground. Left Front Vertical Acceleration Sensor or Right Front Vertical Acceleration Sensor or Left Rear Vertical Acceleration Sensor or Right Rear Vertical Acceleration Sensor supply partial short to other circuit or ground • Left Front Vertical Acceleration Sensor or Right Front Vertical Acceleration Sensor or Left Rear Vertical Acceleration Sensor or Right Rear Vertical Acceleration Sensor internal failure • Internal control module failure	Refer to the electrical circuit diagrams and check sensor supply for circuit fault. Check all Vertical Acceleration Sensors. Check control module sensor supply output voltage Measured voltage should be between 4.995 volts and 4.85 volts
U0001-88	High speed CAN communication bus - bus off	• Lost Communication With Engine Control Module (ECM) (CAN Bus circuit fault)	Check Engine Control Module for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus circuit for faults, check CAN circuits for open circuits or shorts to power, ground or other circuits
U0100-00	Lost Communication With ECM/PCM A - no sub type information	• Missing message from ECM	Check Engine Control Module for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus for circuit fault
U0101-00	Lost Communication with TCM - no sub type information	• Lost Communication with Transmission control module (TCM) (CAN Bus circuit fault)	Check Transmission Control Module for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus for circuit fault
U0103-00	Lost Communication With Gear Shift Control Module A - no sub type information	• Lost Communication With Gear Shift Module (GSM) (CAN Bus circuit fault)	Check Gear Shift Module for stored DTCs. Refer to the electrical circuit diagrams and check Can Bus for circuit faults
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - no sub	• Lost Communication With Anti-Lock Brake System (ABS) Control Module (CAN Bus circuit fault)	Check Anti lock Brake System Control Module for stored DTCs. Refer to the electrical circuit diagrams and check Can Bus circuit to Anti lock Brake System Control Module for circuit faults

	type information		
U0132-00	Lost Communication With Suspension Control Module A - no sub type information	• Lost Communication With Air Suspension Control Module (CAN Bus circuit fault	Check Air Suspension Control Module for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus circuit to Air Suspension Control Module for circuit faults
U0136-00	Lost Communication With Differential Control Module - Rear - no sub type information	• Lost Communication With Rear Differential Control Module (CAN Bus circuit fault)	Check Rear Differential Control Module for stored DTCs. Refer to the electrical circuit diagrams and check Can Bus circuit to Rear Differential Control Module for circuit faults
U0140-00	Lost Communication With Body Control Module - no sub type information	• Lost Communication With Body Control Module (Front Smart Junction Box) (CAN Bus circuit fault)	Check Body Control Module for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus circuit to Body Control Module for faults
U0142-00	Lost Communication With Body Control Module B - no sub type information	• Lost Communication rear smart junction box (CAN Bus circuit fault)	Check Rear Smart Junction Box for stored DTCs. Refer to the electrical circuit diagrams and check Can Bus circuit to Rear Smart Junction Box for faults
U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - no sub type information	• Lost Communication With Instrument Panel Cluster (IPC) Control Module (CAN bus circuit fault)	Check Instrument Panel Cluster for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus to Instrument Panel Cluster for circuit fault
U0300-00	Internal control module software incompatibility	• CAN master configuration ID incorrect	Check Front Smart Junction Box vehicle configuration file, check part number of adaptive damping control module
U0401-68	Invalid Data Received from ECM/PCM A - event information	• Invalid Data Received from Engine Control Module	Check Engine Control Module for DTCs. Refer to the relevant DTC index
U0402-68	Invalid Data Received from TCM - event information	• Invalid Data Received from Transmission control module	Check for Transmission Control Module DTCs. Refer to relevant DTC index
U0404-68	Invalid Data Received from Gear Shift Control Module A	• Invalid data received from gear shift control module	Check Gear Shift Control Module for DTCs. Refer to the relevant DTC index
U0415-68	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - event information	• * Invalid Data Received From Anti-Lock Brake System (ABS) Control Module	Check for Anti lock Brake System DTCs. Refer to the relevant DTC index
U0421-68	Invalid Data Received from Suspension Control Module A event information	• Invalid Data Received From Air Suspension Control Module	Check Air Suspension Control Module for stored DTCs. Refer to the relevant DTC index
U0422-68	Invalid Data Received From Body Control Module - event information	• Invalid Data Received From Body Control Module (Front Smart Junction Box)	Check Body Control Module (Front Smart Junction Box) for stored DTCs. Refer to the relevant DTC index
U0437-68	Invalid Data Received From Differential Control Module - Rear - event information	• Invalid Data Received From Rear Differential Control Module	Check Rear Differential Control Module for stored DTCs. Refer to the relevant DTC index

U0443-68	Invalid Data Received From Body Control Module B - event information	• Invalid Data Received From body control module B (Rear Smart Junction Box)	Check rear smart junction box for DTCs and refer to relevant DTC index
U1A14-00	CAN initialization failure - no sub type information	• CAN network harness short, disconnected	Refer to circuit diagrams and check CAN Bus circuit for fault (short to power, ground or open circuit)
U2100-00	Initial Configuration Not Complete - no sub type information	• Car Configuration Data not loaded (New Body Control Module (Front Smart Junction Box) fitted to vehicle and not initialized) • Internal Body Control Module (Front Smart Junction Box) failure	Install car config to Front Smart Junction Box. Clear DTC and retest systems
U2101-00	Control Module Configuration Incompatible - no sub type information	• Car Configuration Data transmitted over CAN does not match adaptive damping control module internal config	Carry out the new module software installation procedure
U3000-01	Control module - General Electrical Failure	• General electrical failure	Check integrity of electrical connectors and pins to module. Check damper negative circuits for short to Ground. Refer to the new module installation note at the top of the DTC Index. Install a new Adaptive Damping Control Module.
U3000-04	Control Module - System Internal Failure	• Module Internal failure	Refer to the electrical wiring diagrams and check all damper solenoid circuits for short to power. If no harness faults are found suspect adaptive damping control module. Install a new module, refer to new module installation note at top of DTC Index
U3000-43	Control Module - special memory failure	• Module Internal failure	Suspect Adaptive Damping Control Module internal failure. Install a new module, refer to the new module/component installation note at the top of the DTC Index
U3000-45	Control Module - program memory failure	• Module Internal failure	Refer to the electrical circuit diagrams and check power and ground circuit for fault. Clear DTC turn off ignition, wait 1 minute. Turn on ignition, check for DTCs. If DTC returns suspect Adaptive Damping Control Module internal failure. Install a new module, refer to the new module/component installation note at the top of the DTC Index
U3000-47	Control Module - watchdog / safety Micro controller failure	• Module Internal Failure	If this DTC is logged contact your local in-market support
U3000-52	Control Module - not activated	• Adaptive Damping Control Module has been replaced and not programmed	Install the latest software / Carry out the new-module (software) install procedure
U3000-54	Control Module - missing calibration	• Adaptive damping control module has been replaced and no software is installed	Refer to the workshop manual. Install the latest software / Carry out the new-module (software) install procedure
U3003-1C	Battery voltage - circuit voltage out of range	• Circuit voltage out of range (Supply Voltage at adaptive damping control module < 10.5v or Supply Voltage at adaptive damping control module > 18v for 30s)	Check the battery is in good condition and fully charged, refer to the battery care manual. Refer to the starting and charging section of the workshop manual and check the performance of the charging system. Refer to the electrical circuit diagrams and check power and ground circuit to adaptive damping control module for faults, including intermittent high resistance
U3003-62	Battery Voltage - signal compare failure	• High Resistance Connections • Adaptive Damping Control module Internal Failure	Check the battery is in good condition and fully charged, refer to the battery care manual. Refer to the starting and charging section of the workshop manual and check the performance of the charging system. Refer to the electrical circuit diagrams and check power and ground circuit to adaptive damping control module for faults, including intermittent high resistance

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Vehicle Dynamic Suspension - Adaptive Damping Module Convertible

Removal and Installation

Removal

WARNINGS:

To avoid accidental deployment, the restraints control module backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS), or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.

Always wear safety glasses when working on an air bag equipped vehicle and when handling an air bag module. Failure to follow this instruction may result in personal injury.

To minimize the possibility of premature deployment, do not use radio key code savers when working on the supplemental restraint system. Failure to follow this instruction may result in personal injury.

To minimize the possibility of injury in the event of premature deployment, always carry a live air bag module with the bag and trim cover pointed away from the body. Failure to follow this instruction may result in personal injury.

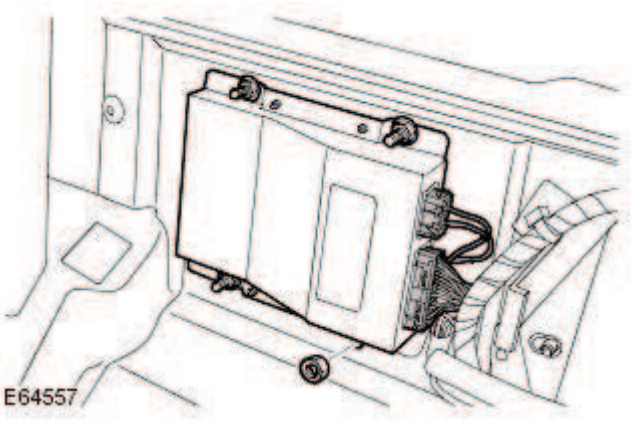
To minimize the possibility of premature deployment, live air bag modules must only be placed on work benches which have been ground bonded and with the trim cover facing up. Failure to follow these instructions may result in personal injury.

Never probe the electrical connectors of air bag modules or any other supplemental restraint system component. Failure to follow this instruction may result in personal injury.

Painting over the driver air bag module trim cover or instrument panel could lead to deterioration of the trim cover and air bags. Do not for any reason attempt to paint discolored or damaged air bag module trim covers or instrument panel. Install a new component. Failure to follow this instruction may result in personal injury.

1. Remove the cover and disconnect the battery ground cable.
   For additional information, refer to: Specifications (414-01 Battery, Mounting and Cables, Specifications).
2. WARNING: Make sure that sufficient time has elapsed after disconnecting the battery ground cable(s), before commencing work on the supplemental restraint system (SRS). Failure to follow these instructions may result in personal injury.

   Make the air bag supplemental restraint system (SRS) safe.
3. Remove the RH roll over protection unit.
   For additional information, refer to: Rollover Protection Unit (501-20B Supplemental Restraint System, Removal and Installation).
4. Remove the active damping module.
   - Remove the 4 nuts.
   - Disconnect the 2 electrical connectors.



Installation

1. Install the active damping module.
   - Tighten the nuts to 10 Nm.
   - Connect the electrical connectors.
2. Install the RH roll over protection unit.
   For additional information, refer to: Rollover Protection Unit (501-20B Supplemental Restraint System, Removal and Installation).
3. Connect the battery ground cable and install the cover.
   For additional information, refer to: Specifications (414-01 Battery, Mounting and Cables, Specifications).

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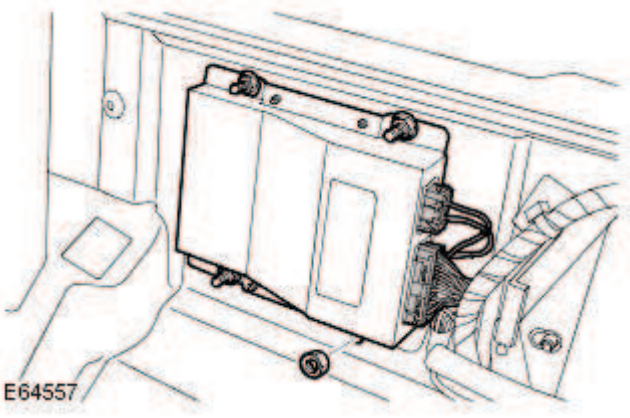
Vehicle Dynamic Suspension - Adaptive Damping Module 2-Door

Removal and Installation

Removal

1. Remove the rear seat backrest.
   For additional information, refer to: Rear Seat Backrest (501-10 Seating, Removal and Installation).



2. Remove the active damping module.
   - Remove the 4 nuts.
   - Disconnect the 2 electrical connectors.

Installation

1. Install the active damping module.
   - Tighten the nuts to 10 Nm (7 lb.ft).
   - Connect the electrical connectors.
2. Install the rear seat backrest.
   For additional information, refer to: Rear Seat Backrest (501-10 Seating, Removal and Installation).

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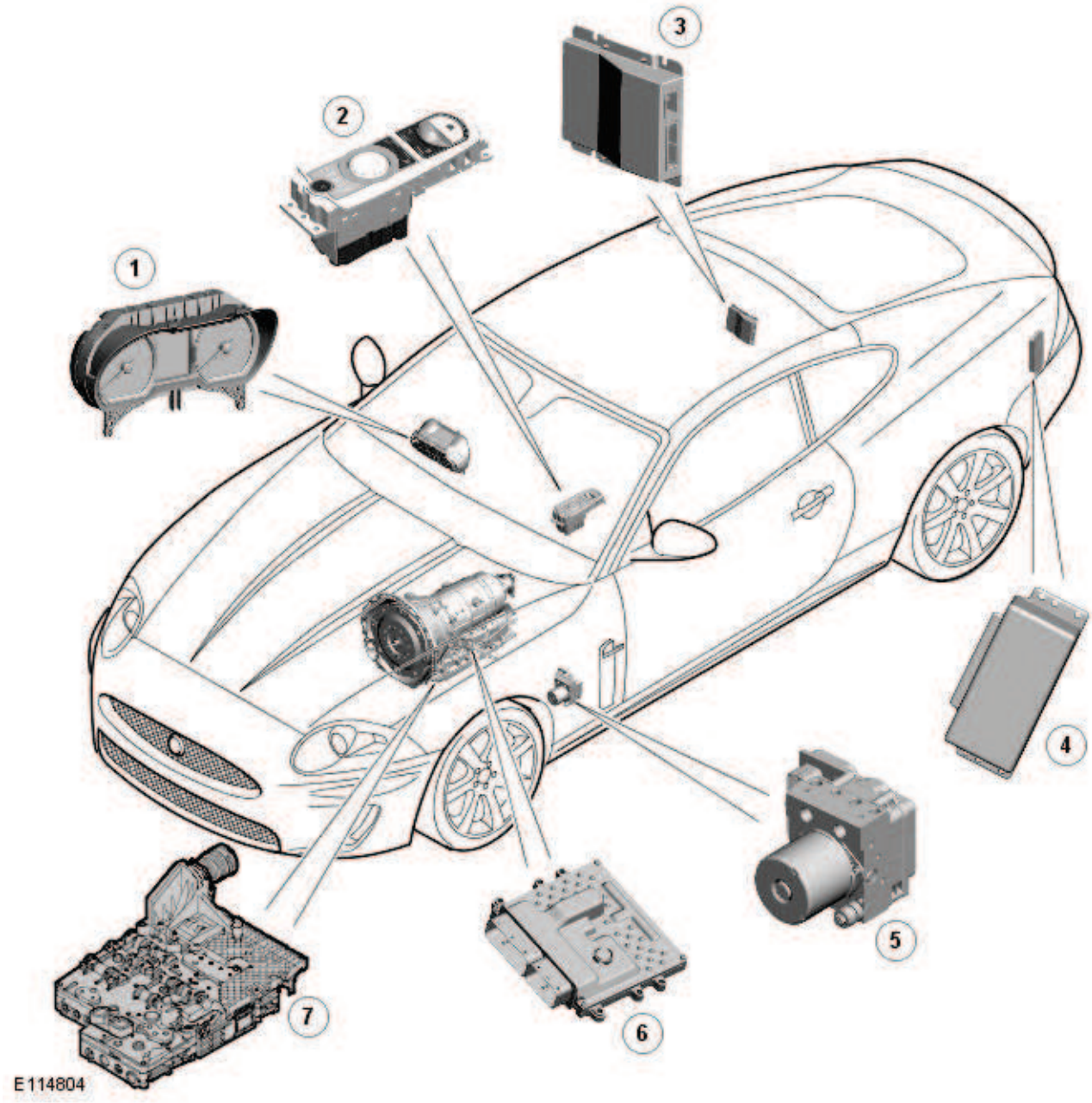
Ride and Handling Optimization - Ride and Handling Optimization

Description and Operation

COMPONENT LOCATION

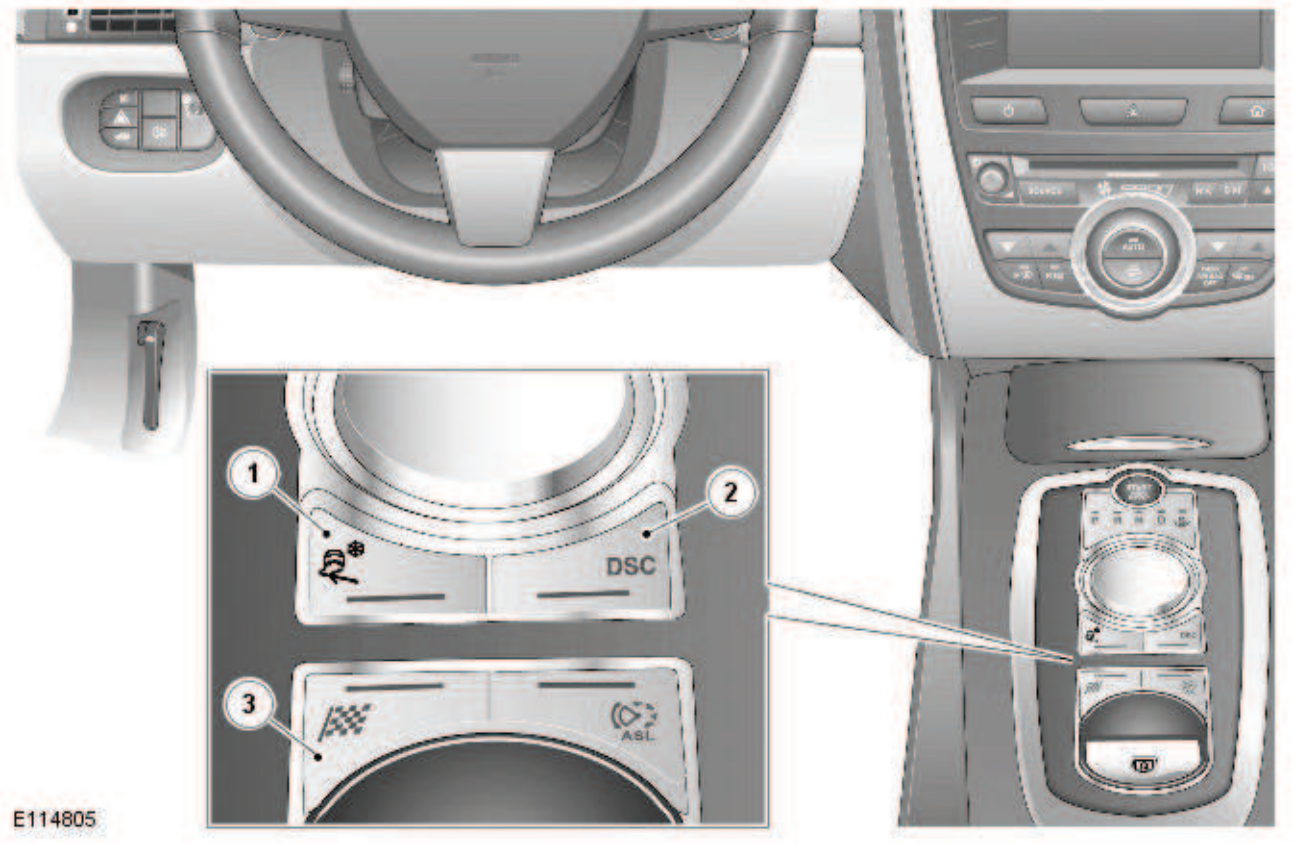


Item	Part Number	Description
1	-	Instrument cluster
2	-	JaguarDrive selector module
3	-	ADCM (adaptive damping control module)
4	-	DLM (differential locking module)
5	-	ABS (anti-lock brake system) module
6	-	ECM (engine control module)
7	-	TCM (transmission control module)

INTRODUCTION

JaguarDrive control is a selectable vehicle optimization system designed to fine-tune the driving characteristics of the vehicle by accommodating different driving conditions or driving styles. The system allows the performance envelope of the vehicle to be stretched and prevents the necessity for a single, compromised configuration for all conditions. JaguarDrive control increases the vehicle's abilities by changing the characteristics of engine mapping, transmission shifts, stability and traction interventions, suspension settings and, on SC (supercharger) vehicles, the electronic differential settings.

JAGUARDRIVE CONTROLS



Item	Part Number	Description
1	-	Winter mode button
2	-	DSC/TracDSC mode button
3	-	Dynamic mode button

The system is controlled by buttons adjacent to the JaguarDrive selector on the floor console. The buttons allow the selection of one of the following three modes:

- Special modes off.
- Winter mode.
- Dynamic mode.

The instrument cluster will display the selected JaguarDrive control mode in the message center.
For additional information, refer to: Instrument Cluster (413-01 Instrument Cluster, Description and Operation).

The JaguarDrive control system uses a combination of a number of vehicle sub-systems to achieve the required vehicle characteristics for the mode selected. The following sub-systems make up the JaguarDrive control system:

- EMS (engine management system). For additional information, refer to:
  Electronic Engine Controls (303-14A Electronic Engine Controls - V8 S/C 5.0L Petrol, Description and Operation),
  Electronic Engine Controls (303-14B Electronic Engine Controls - V8 5.0L Petrol, Description and Operation).
- Automatic transmission.
  For additional information, refer to: Transmission Description (307-01 Automatic Transmission/Transaxle - V8 5.0L Petrol/V8 S/C 5.0L Petrol, Description and Operation).
- Brake system.
  For additional information, refer to: Anti-Lock Control - Stability Assist - V8 5.0L Petrol/V8 S/C 5.0L Petrol (206-09 Anti-Lock Control - Stability Assist, Description and Operation).
- Adaptive dynamics.
  For additional information, refer to: Vehicle Dynamic Suspension (204-05 Vehicle Dynamic Suspension, Description and Operation).
- Electronic differential control (SC vehicles only).

For additional information, refer to: Rear Drive Axle and Differential - V8 5.0L Petrol/V8 S/C 5.0L Petrol (205-02 Rear Drive Axle/Differential, Description and Operation).

The JaguarDrive control software is stored in the JaguarDrive selector module located below the JaguarDrive selector. The module detects the selection made using the buttons and transmits a signal on the high speed CAN (controller area network) bus, which is received by each of the sub-system control modules.

Each of the affected sub-system control modules contain software, which applies the correct operating parameters to their controlled system for the JaguarDrive control mode selection made.

Each sub-system control module also provides feedback for the selected mode so that the JaguarDrive control software can check that all systems have changed to the correct operating parameters.

NOTE: The JaguarDrive control system is a co-ordinating system only. It CANNOT generate a fault in one of the participating sub-systems. All participating sub-systems should be FULLY diagnosed before assuming a fault with JaguarDrive control. The JaguarDrive selector module should not be replaced until all other options have been exhausted.

Winter Mode

To activate winter mode, press the winter mode button briefly (not less than 500 ms) to activate or de-activate the mode.

NOTE: Winter mode cannot be active at the same time as dynamic mode.

When active the winter mode icon and message appear in the instrument cluster message center to confirm the activation.

Dynamic Stability Control

Press the DSC (dynamic stability control) mode button briefly (not less than 300 ms) to switch between DSC and TracDSC. The instrument cluster message center will display either DSC ON or TRAC DSC depending on which selection is made. When TracDSC is selected, the DSC warning lamp in the instrument cluster is illuminated and the DSC button is illuminated. TracDSC is intended only for use on dry tarmac by suitably experienced drivers.
For additional information, refer to: Anti-Lock Control - Stability Assist - V8 5.0L Petrol/V8 S/C 5.0L Petrol (206-09 Anti-Lock Control - Stability Assist, Description and Operation).

DSC can be manually switched off by pressing the DSC mode button for more than 10 seconds. Confirmation is given by a chime from the instrument cluster, DSC OFF is displayed in the instrument cluster message center and the DSC warning lamp in the instrument cluster is illuminated.

NOTE: DSC is operational at all times when the engine is running unless manually switched off.

Dynamic Mode

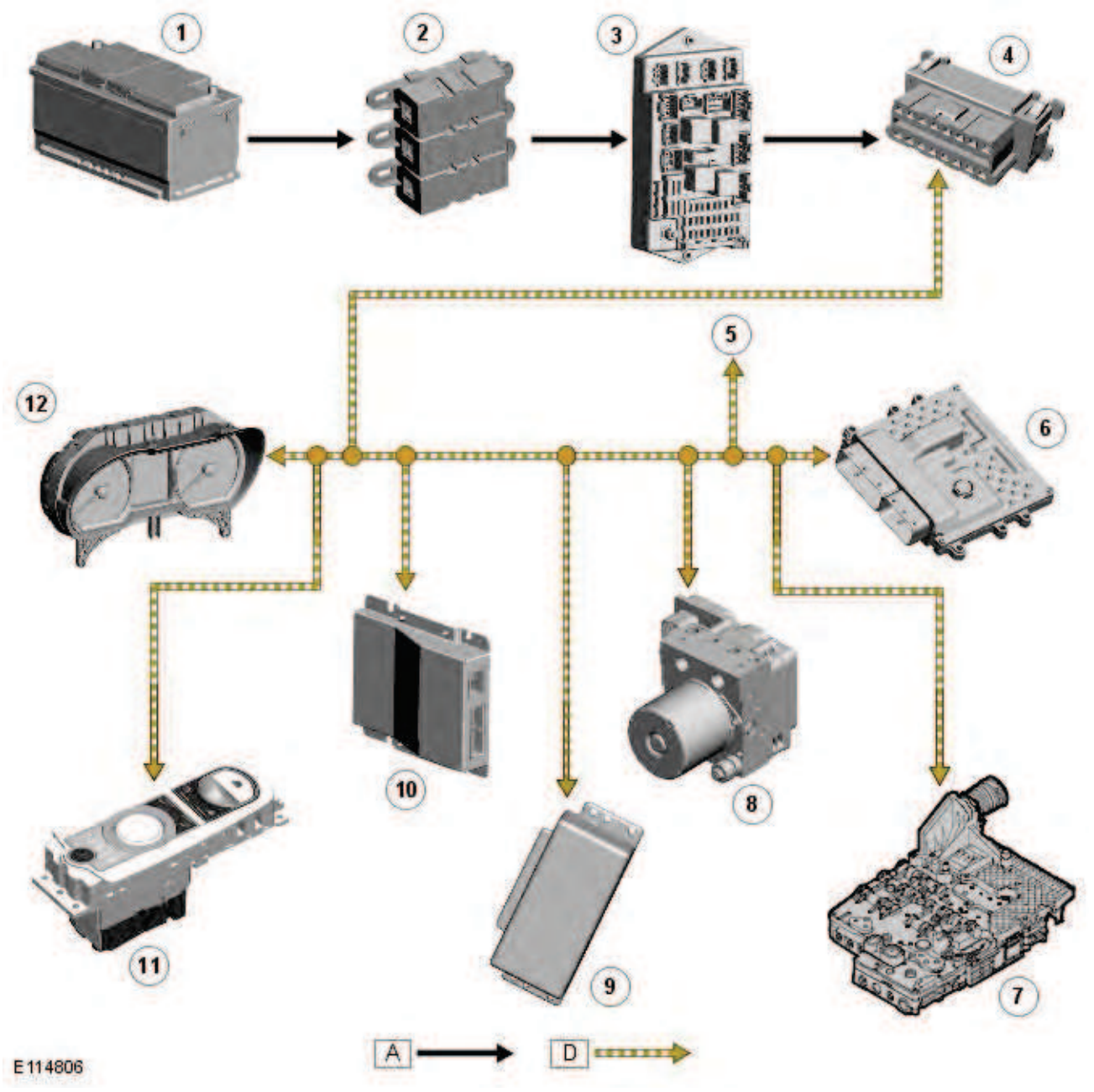
To activate dynamic mode, press the button briefly. The dynamic mode button is illuminated. Dynamic mode confirmed message is displayed in the instrument cluster message center.

NOTE: Dynamic mode cannot be active at the same time as winter mode.

In transmission sport mode and manual mode, the driver has full control over the transmission shift points and the TCM (transmission control module) will not intervene to prevent engine overspeed (i.e. automatic upshifts are inhibited). In this setting, the gear indicator in the instrument cluster will turn amber at high engine speeds to indicate an appropriate manual upshift point.

CONTROL DIAGRAM

NOTE: **A** = Hardwired; **D** = High speed CAN bus



Item	Part Number	Description
1	-	Battery
2	-	175 A megafuse
3	-	CJB (central junction box) fuse 17
4	-	Diagnostic socket
5	-	High speed CAN connection to other systems
6	-	ECM
7	-	TCM

8		-	ABS module
	9	-	DLM
10		-	ADCM
11		-	JaguarDrive selector module
12		-	Instrument cluster

PRINCIPLES OF OPERATION

Engine Management System

The EMS varies the accelerator pedal maps to change the amount of torque per percentage of pedal travel. The EMS can also change the accelerator pedal response to control the allowed torque change relative to the speed of pedal travel.

Each driving mode uses a combination of operating parameters for each sub-system. Changing between driving modes initiates a different set of operating characteristics, which will be noticeable to the driver. The driver will notice differences in engine response when, for example, the accelerator pedal is held in a constant position and the driving mode is changed from winter to dynamic, the driver will notice the torque and engine speed increase. Similarly, if the mode is changed from normal or dynamic to winter, the driver will notice a reduction in torque and engine speed.

NOTE: The change in torque and engine speed can take approximately 30 seconds and care must be taken not to confuse the JaguarDrive control system operation with an EMS fault.

Transmission Control

The TCM changes the shift maps for the JaguarDrive control mode selected. This changes the shift points providing early or late upshifts and downshifts. For example, on slippery surfaces in winter mode the transmission will select 2nd gear for starting from a standstill on a flat surface to minimize wheel slip.

Anti-Lock Braking System Control

The ABS (anti-lock brake system) module controls several vehicle functions and adjusts the operating parameters of these functions to optimize the selected JaguarDrive control mode. Traction control uses different slip/acceleration thresholds to improve traction and vehicle composure. For example, the system sensitivity is increased on slippery surfaces to reduce wheel spin.

If TracDSC is selected or DSC is switched off, then subsequently the JaguarDrive control mode is changed, DSC is automatically switched back on.

The stability control uses different threshold values for the selected mode, reducing the requirement for the driver to change the DSC system mode for optimum performance in various driving scenarios.

Incorrect Mode Usage

Selection of an inappropriate mode is discouraged in the following ways:

- The active mode icon is continually displayed in the instrument cluster message center.
- In dynamic mode, when the ignition has been in the off position continuously for more than 6 hours, the JaguarDrive control system defaults to the special modes off (DSC on).

Selection of an inappropriate mode for the conditions will not endanger the driver or immediately cause damage to the vehicle. Continued use of an inappropriate mode may reduce the life of some components. The driver may notice a different vehicle response, with the engine and transmission responses being different than in the special modes off.

Driver Information

The message center contains the JaguarDrive control mode icons, which display the currently selected mode. If no symbol is displayed, no special mode is selected and the system is in special modes off.

In dynamic mode when the transmission is in sport and manual mode, the gear information is displayed in amber when the appropriate engine speed is reached for the optimum sporty change point.

Diagnostics

The JaguarDrive control system relies on the correct functionality of the sub-systems. If one of the sub-systems develops a fault, the JaguarDrive control system will not function, even though the fault is not in the JaguarDrive control system.

The JaguarDrive selector module and the mode buttons should only be investigated if there are no apparent faults in any of the sub-systems. If a fault in a sub-system is subsequently corrected, the JaguarDrive control system will function normally after an engine on and off cycle.

JaguarDrive Control Sub-System Faults

If a fault occurs in a sub-system, the driver is alerted by the illumination of a warning indicator and/or an appropriate message for that sub-system in the instrument cluster message center. No JaguarDrive control message will be shown when a failed sub-system displays its own message.

When a sub-system fault is present and the driver attempts to select a different JaguarDrive control mode or at the next ignition on cycle, a message WINTER MODE FAULT or DYNAMIC MODE FAULT will appear in the message center. This generally implies that the JaguarDrive control system has a fault, but only because a sub-system fault is preventing its operation. This message will be displayed once per ignition cycle, but is repeated if a further selection is made by the driver using the JaguarDrive control buttons or at the next ignition on cycle.

NOTE: The message WINTER MODE FAULT or DYNAMIC MODE FAULT can also in very rare circumstances be generated by a fault in the JaguarDrive selector module.

NOTE: It is not possible for the JaguarDrive selector module to cause any fault behavior (warning indicator illumination or message generation) in any of the sub-systems. Illumination of a sub-system warning indicator and/or a sub-system related message will never be associated with a JaguarDrive selector module or JaguarDrive control system fault.

The sub-system control modules can detect a fault with the CAN bus signal from the JaguarDrive selector module. If a fault in the JaguarDrive control system is detected, the sub-system control modules will operate in the special modes off setting. The sub-system control modules will record a fault code for a failure of the JaguarDrive control CAN signal. These faults can be retrieved using the Jaguar approved diagnostic tool and will provide useful information to indicate investigation of the JaguarDrive selector module or the CAN bus network.

JaguarDrive Control System or Selector Module Fault

If a fault occurs in the JaguarDrive control system, all button icon LED (light emitting diode) will be turned off (if applicable, background illumination will remain on) and pressing of the JaguarDrive control buttons is ignored. The instrument cluster message center will display a message WINTER MODE FAULT or DYNAMIC MODE FAULT when the fault occurs, if the fault is present and the driver attempts to select a special mode (if the control module is able to do this) or at the next ignition on cycle.

The JaguarDrive control buttons and selector module are an integrated unit. If a fault occurs in either component, the whole unit will require replacement, however, this is extremely unlikely.

CAN Bus Faults

If a CAN bus fault exists and prevents JaguarDrive control system operation, all of the JaguarDrive control button icon LED will be illuminated and pressing of the JaguarDrive control buttons is ignored.

If the instrument cluster does not receive a JaguarDrive control system CAN bus message from the JaguarDrive selector module, the message SPECIAL MODE UNAVAILABLE will be displayed when the fault occurs and will be repeated at every ignition on cycle.

User Error

A special mode change will not occur while DSC or ABS is active (including ABS cycling). This may be misinterpreted as a system fault.