JAGUAR

Technical Guide

X-TYPE Sedan
Introduction

BY APPOINTMENT TO
HER MAJESTY QUEEN ELIZABETH II
MANUFACTURERS OF DAIMLER AND JAGUAR CARS
JAGUAR CARS LIMITED COVENTRY

BY APPOINTMENT TO
HER MAJESTY QUEEN ELIZABETH
THE QUEEN MOTHER
MANUFACTURERS OF DAIMLER AND JAGUAR CARS
JAGUAR CARS LIMITED COVENTRY

BY APPOINTMENT TO
HIS ROYAL HIGHNESS THE PRINCE OF WALES
MANUFACTURERS OF DAIMLER AND JAGUAR CARS
JAGUAR CARS LIMITED COVENTRY

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X-TYPE Sedan
Introduction

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Preface

This Technical Guide introduces the Jaguar X-TYPE. It is intended to give Jaguar Dealer workshop personnel an overview of the vehicle and is for information purposes only. The contents of this Technical Guide must not be used as a reference source for servicing procedures; all servicing must be carried out in accordance with the appropriate JTIS disc.

This Technical Guide will not be updated. While every effort is made to ensure accuracy, changes may occur between going to press and the equipment being introduced to the market. Once the equipment is in service, details of the changes can be obtained from Service Bulletins and revisions to the JTIS disc.

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Glossary

The following abbreviations and acronyms are used in this publication:

Abbreviation / Acronym	Description
ABS	anti-lock braking system
ABSCM	ABS control module
ac	alternating current
ALR	automatic locking retractor
AM	amplitude modulation
AMR	anisotropic magneto resistive
AWD	all-wheel drive
CAN	controller area network
CCM	climate control module
CD	compact disc
cm	centimeter
CPCM	cellular phone control module
D2B	digital data bus
dc	direct current
DSC	dynamic stability control
DTC	diagnostic trouble code
DVD	digital versatile disc
ECM	engine control module
FM	frequency modulation
GECM	general electronic control module
GPS	global positioning system
GVW	gross vehicle weight
in	inch
ISO	International Standards Organization
JTIS	Jaguar technical information system
kbps	kilobits per second
km/h	kilometers per hour
kV	kilovolt
LCD	liquid crystal display
LED	light emitting diode
LH	left-hand
LHD	left-hand drive
MHz	megahertz
MIL	malfunction indicator lamp
mile/h	miles per hour
mm	millimeter
ms	millisecond
MY	model year
N	newton
NAS	North American specification
NCM	navigation control module
NVH	noise, vibration and harshness
OBD	on-board diagnostics
PATS	passive anti-theft system
RCM	restraints control module
RF	radio frequency
RH	right-hand

RHD	right-hand drive
SCP	standard corporate protocol
SRS	supplementary restraints system
TCS	traction control system
TG	technical guide
VACM	voice activation control module
VEMS	vehicle emergency messaging system
VICS	vehicle information communications system
VIN	vehicle identification number
W	watt
WDS	worldwide diagnostic system

Introduction

The Jaguar X-TYPE is an all-wheel drive (AWD), elegant small luxury sedan, which combines the contemporary expression of traditional Jaguar product attributes with excellent driving dynamics, package and functionality.

The powertrain comprises a V6 (2.5 liter or 3.0 liter) transversely mounted petrol engine, derived from the engine currently used in S-TYPE, coupled with either a five-speed automatic transmission or a five-speed manual transmission. More information about the V6 engine and transmission units can be found in the **X-TYPE Powertrain Introduction Technical Guide**, a separate publication which compliments this guide.

Like previous Jaguar models, X-TYPE utilizes CAN, SCP and ISO9141 communication networks but in addition uses an optical network (D2B) for very high speed transfer of audio data to support features such as navigation, voice activation and television.

In addition to the powertrain alternatives, the X-TYPE has three model options: 2.5 liter VA SE/Executive and Sports.

NOTE: Many features are vehicle or market specific.

Standard features for the 2.5 liter V6 model include:

- Front seat-mounted side air bags
- Side curtain air bags
- Driver seat-track position sensing
- Passenger seat weight-sensing
- All-wheel drive

The SE/Executive model has many additional features including:

- Leather seats
- Leather gear shift knob (manual)
- Wood gear shift knob (automatic)
- Rear electric windows
- Power driver/passenger seats
- Steering wheel controls
- Wood door trim (front/rear)
- Automatic air conditioning with pollution filter
- Front center sliding armrest
- Chrome exterior trim

The Sports model comprises a similar range of features but 17" sports wheels and a sports suspension are fitted as standard.

Introduction

Optional features, which vary depending on market and vehicle specification, include:

- Dynamic stability control which assists the driver in maintaining directional control of the vehicle.
- Xenon, high-intensity discharge lamps (for improved driver visibility) supplied complete with automatic headlamp leveling and headlamp power wash.
- Autolamp which, when selected, automatically activates the headlamps should the ambient light fall below a predetermined level.
- A message center (integral to the instrument cluster) that displays warnings and information for use by both the driver and the technician.
- Telematics display which provides a user interface to support navigation, television, climate control, cellular phone and entertainment systems.
- Parking aid, a system giving the driver audible warning of obstructions that could damage the vehicle during reversing.
- Manual or automatic climate control.
- Single CD player or CD changer.
- Mini-disc player.
- Power lumbar support.
- Voice activation system.
- Vehicle emergency monitoring system.
- Power foldback mirrors.
- Sliding roof.
- Premium entertainment system.

As with current vehicles, the X-TYPE is fitted with variable ratio power steering and ABS brakes as standard.

Security features include immobilizer and alarm. Intruder sensors and the inclination sensor available as options.

The key fob transmitter has radio frequency operation with an encrypted rolling code to help prevent theft of the vehicle.

Dimensions

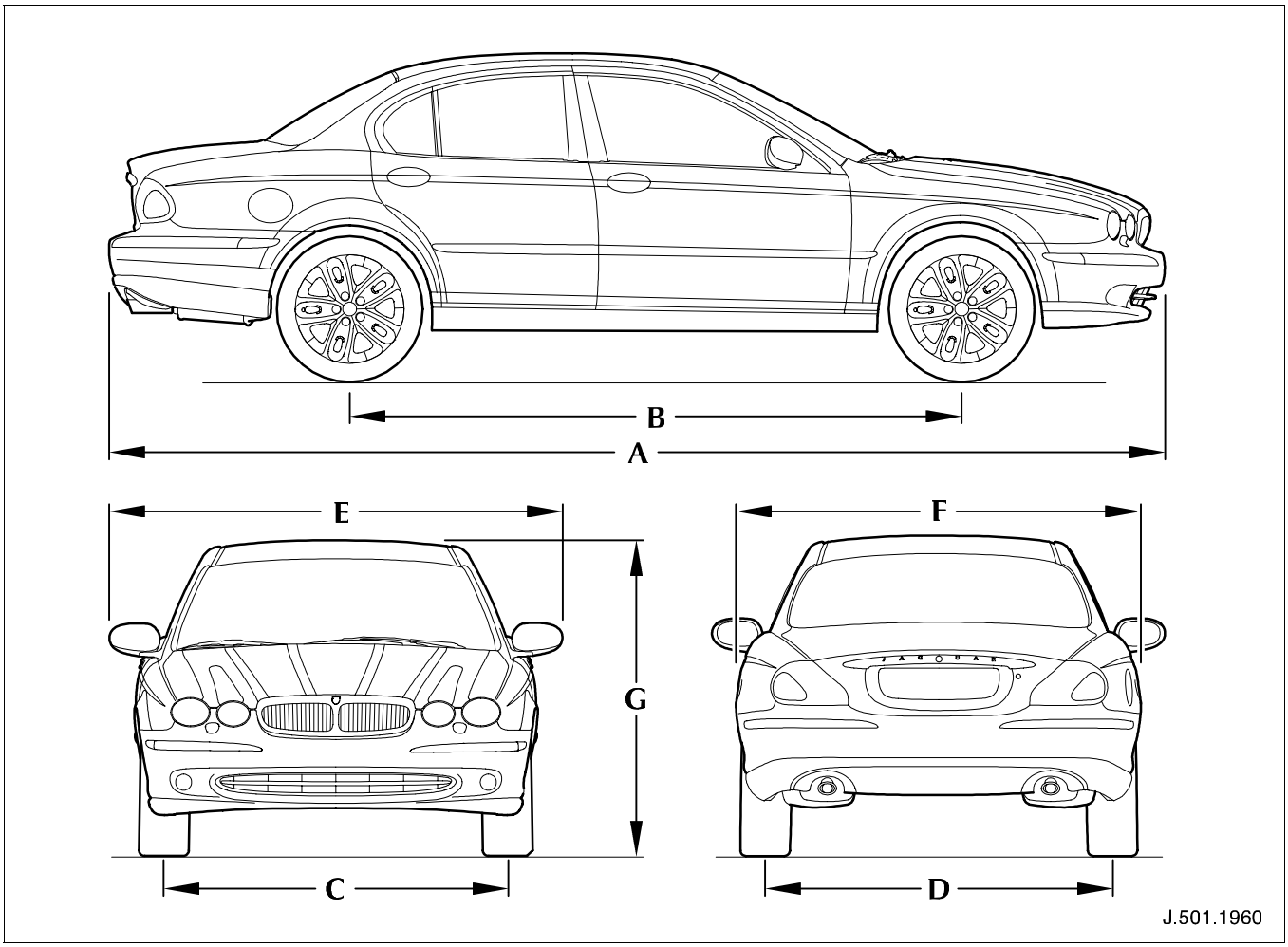

Fig. 1 External dimensions

Dimension	inches	millimeters
A	184	4672
B	107	2710
C	60	1522
D	60.5	1537
E	79	2003
F	70	1789
G	55	1392

Table 1 External dimensions (refer to Fig. 1)

Measurement **G** is at *design weight condition* which refers to a vehicle at *curb weight* including 33% optional equipment, plus occupant load dependent upon the number of seats in vehicle.

NOTE: Measurement **G** for curb weight condition (complete vehicle with all fluids filled to capacity without occupants, optional equipment or luggage) = 56 in (1422 mm).

Minimum ground clearance
(fuel tank undertray to ground) measured at gross vehicle weight (GVW) = 4.4 in (112.90 mm).

Identification Codes

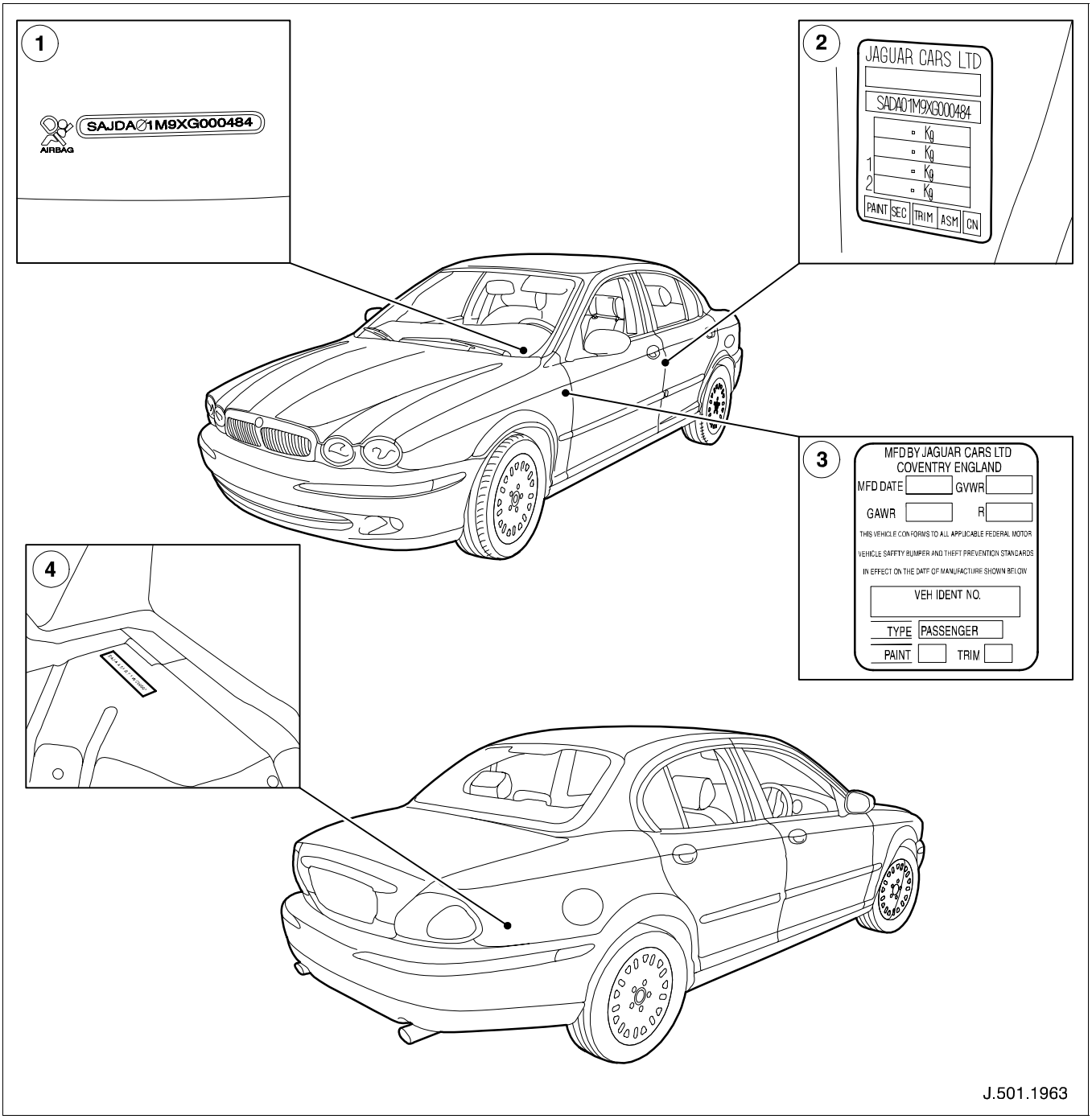

Fig. 2 Location of vehicle identification number (VIN) plates

1. Quick reference plate
2. Certification label (Europe and Rest of the World)
3. Certification label (America)
4. Official VIN plate

Jacking and Lifting

CAUTION:

- **Jacking and lifting points are critical.**
- **Vehicle support stands should only be used in conjunction with cushioned pads.**

Refer to JTIS for detailed information.

Vehicle Recovery and Towing

CAUTION: It is critical that the correct recovery method is always employed; refer to JTIS for detailed information.

Suspension

Introduction

The X-TYPE has an all-new suspension designed with traditional Jaguar refinement and offering the option of either comfort or sport ride performance. Both front and rear suspensions are assembled on independent subframes which provide a quiet and highly receptive suspension system.

CAUTION: Do not use jacking equipment on suspension components, use identified jacking points only; refer to General Information.

Front Suspension

- The front suspension is assembled on a steel fabricated subframe which is bolted at four points to the body through rubber mountings. This type of suspension design isolates the subframe from the body to enhance the suspension's noise, vibration and harshness (NVH) damping capabilities.

NOTE: Subframe bushes are oriented and must be installed correctly to maintain their ratings, the subframe must also be correctly aligned to the vehicle's body to ensure the correct operating angle of the driveshaft; refer to **JTIS** for installation procedures.

- The wheel knuckle connects to the 'L' shaped lower control-arm, via a ball joint which acts as the suspension's lower pivot. The lower control arm is attached to the subframe through two bushes:
  - one vertically mounted hydrabush;
  - and one horizontally mounted rubber bush;
  - both bushes are specially rated to provide optimum ride, handling and NVH performance.
- The front suspension is interconnected by a stabilizer bar which is attached to the subframe's front cross-member through two clamped rubber bushes and connects to the suspension struts via drop links.
- Front road springs are cold formed and 'S' shaped to provide optimum side-load compensation. As a result of the 'S' shape the springs can only be installed in one position: locating in the lower spring-pan on the suspension strut.
- Front road springs and stabilizer bar are tuned to provide Jaguar's unique ride and handling characteristics.
- The wheel hub and bearing are press-fit components, the wheel-bearing seal incorporates an integral sensor-ring for wheel-speed sensor monitoring.

NOTE: The wheel speed sensor ring must be correctly oriented; refer to **JTIS** for the installation procedure.

- Castor and camber are pre-set and require no adjustment.
- Refer to **JTIS** for information regarding serviceable components.

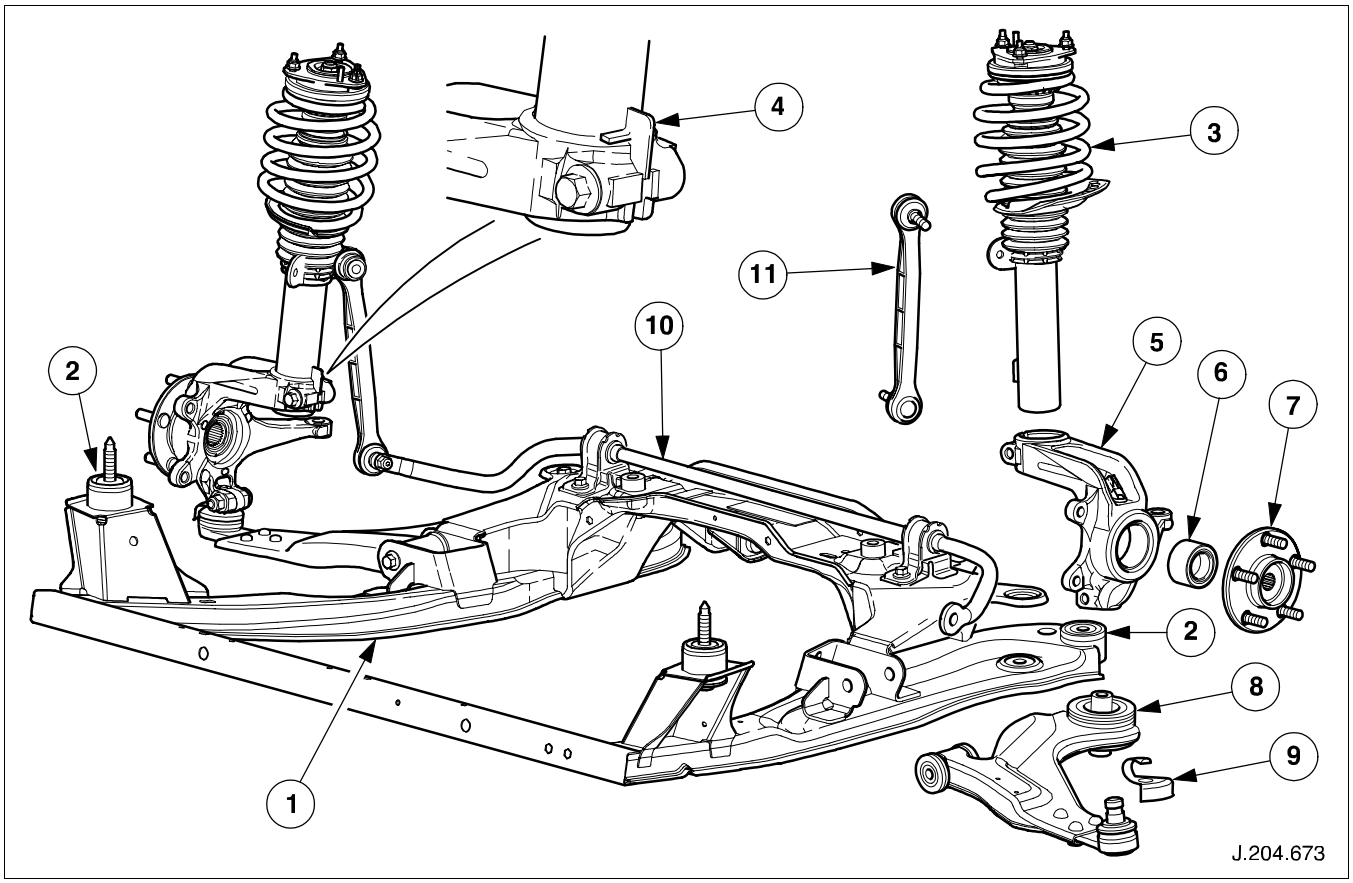

Fig. 3 Front suspension

1. Subframe
2. Subframe mounting
3. Suspension strut
4. Shark-fin locator
5. Wheel knuckle
6. Hub bearing
7. Wheel hub
8. Lower control arm
9. Ball-joint heat shield
10. Stabilizer bar
11. Stabilizer-bar drop link

Front Suspension Strut

- The suspension employs an independent MacPherson strut design which is pivoted at the upper suspension mount and rigidly connected to the wheel knuckle at the lower end. A unique shark-fin locator is used to prevent strut slippage at the wheel knuckle and to provide ease of assembly, refer to **Fig. 3**.
- The strut incorporates a damper and 'S' shaped spring both of which are tuned to meet Jaguar ride specification. The struts and springs are rated for the option of either comfort or sport suspension and are color coded to distinguish between the two ratings; refer to **JTIS** for details.
- The 'S' shape of the spring has two functions: firstly it provides side-load compensation and secondly reduces strut rod friction.
- Unique to Jaguar is the upper suspension mount which incorporates two bearings. One bearing is situated on top of the road spring and the second bearing is located in the upper mount. The second bearing helps to further reduce friction when rotating the strut during steering, therefore improving steering feel.
- Spring aids are manufactured to Jaguar specification in both rating and profile to provide enhanced load and deflection characteristics. Spring-aid platforms are profiled to prevent noise being emitted from the spring-aid in the event of a suspension bounce.

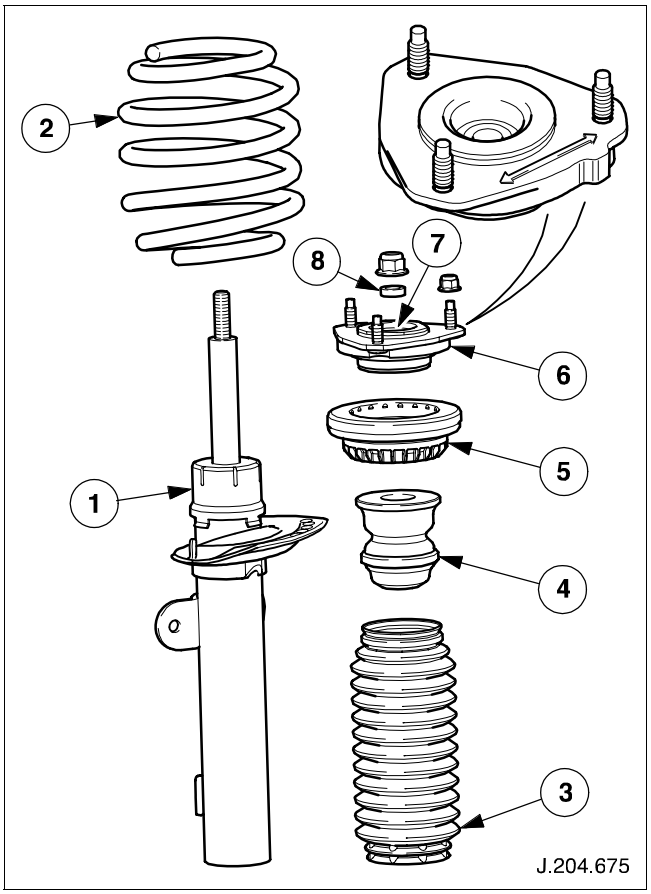

Fig. 4 Front suspension strut

1. Strut damper
2. Spring
3. Gaiter
4. Spring aid
5. Bearing
6. Upper mount
7. Second bearing
8. Spacer

- To reduce road noise the upper suspension mount's lateral rating is different to the fore-and-aft rating, correct orientation of the upper mount is ensured through the use of:
  - a moulded arrow in the fore-and-aft direction, refer to **Fig. 4**;
  - a blue paint spot on the inboard stud (arrowed);
  - a white paint band on top of the mount in the fore-and-aft direction.

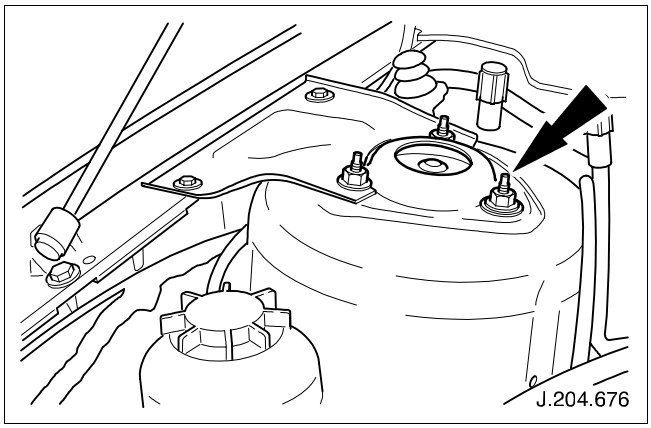

Fig. 5 Upper mount

Rear Suspension

- The rear suspension is assembled on a tubular steel fabricated subframe which is bolted at four points to the body through rubber mountings. This type of suspension design isolates the subframe from the body to enhance the suspension's NVH damping capabilities. On the rear subframe only, the front mountings have different ratings to the rear mountings to provide optimum ride and handling characteristic.

NOTE: Subframe bushes are oriented and must be installed correctly to maintain their ratings, the subframe must also be correctly aligned to the vehicle's body to ensure the correct operating angle of the driveshaft; refer to **JTIS** for installation procedures.

- The independent rear suspension is a multi-link, tie-blade design which incorporates separate springs and dampers.
- Dampers are installed inclined between the body and wheel knuckle and are tuned to meet Jaguar ride specifications, the dampers are color coded to distinguish between the option of either comfort or sport suspension, refer to **JTIS** for details.
- Springs are installed between the subframe and lower-rear control arms and are rated for the option of either comfort or sport suspension. The springs are color coded to distinguish between the two ratings; refer to **JTIS** for details.
- Spring aids are manufactured to Jaguar specification in both rating and profile to provide enhanced load and deflection characteristics.
- The wheel knuckle is attached to the upper and lower control arms, the arms are installed with rubber bushes designed to provide optimum ride and handling performance. A tie-blade installed between the body and wheel knuckle maintains fore-and-aft location of the road wheel.
- The rear suspension is interconnected by a stabilizer bar which is attached to the subframe's rear cross-member through two clamped rubber bushes and connects to the lower-rear control arms via links. A unique link design is incorporated to accommodate the stabilizer bar configuration. The road springs, stabilizer bar, links and bushes are all tuned to provide Jaguar's unique ride and handling characteristics.
- The wheel hub and bearing assembly is bolted to the wheel knuckle and unlike the front suspension the wheel-speed sensor ring is attached to the axle shaft.
- Castor and camber are pre-set and require no adjustment.
- Refer to **JTIS** for toe setting procedure.
- Refer to **JTIS** for information regarding serviceable components.

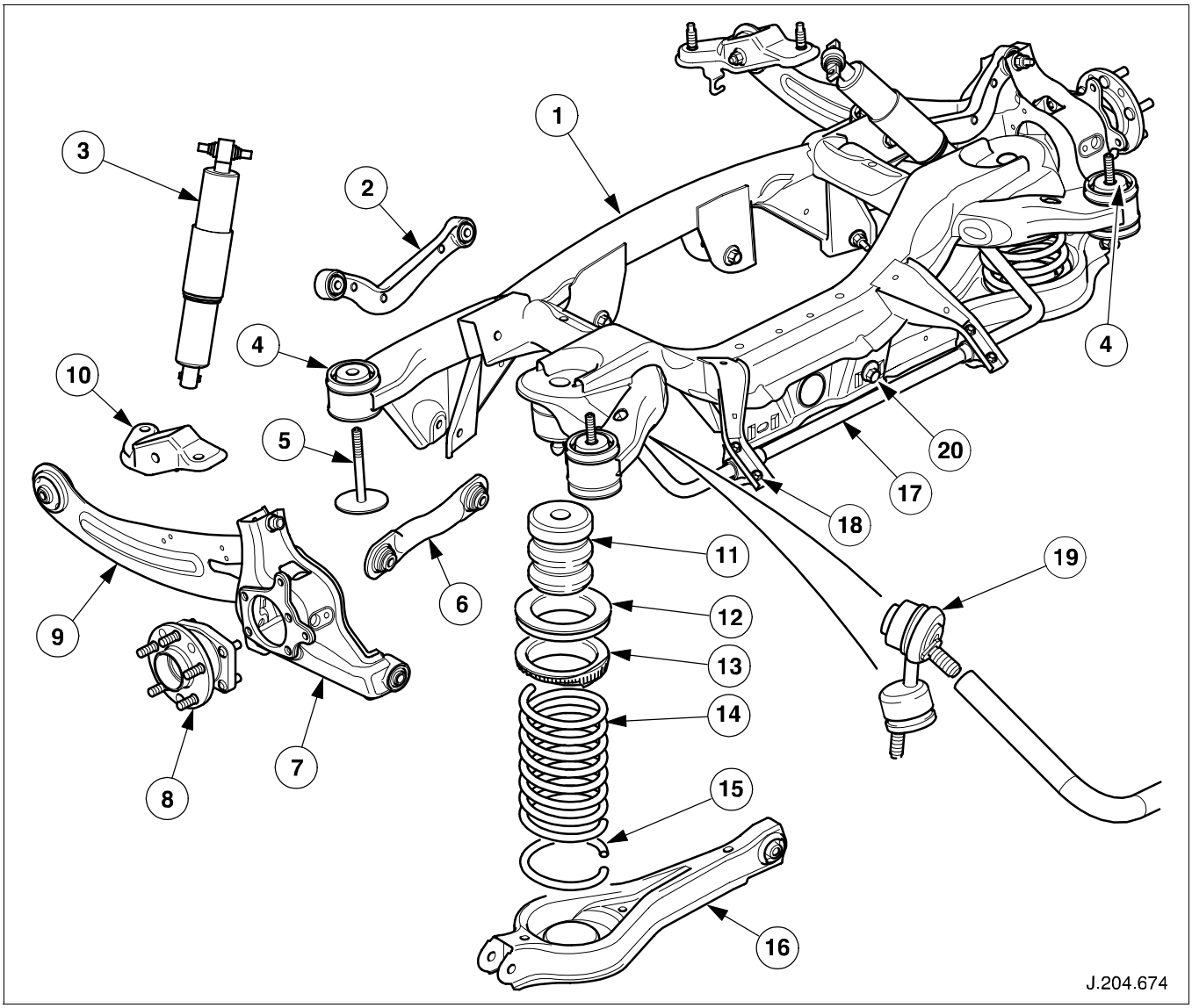

Fig. 6 Rear suspension

1. Subframe
2. Upper control arm
3. Damper
4. Subframe mounting
5. Mounting bolt
6. Lower-front control arm
7. Wheel knuckle
8. Wheel hub and bearing assembly
9. Tie-blade
10. Tie-blade body mounting bracket
11. Spring aid
12. Spring isolator
13. Spring seat
14. Spring
15. Lower spring-isolator
16. Lower-rear control arm
17. Stabilizer bar
18. Stabilizer-bar clamp
19. Stabilizer-bar link
20. Toe adjustment eccentric-bolt

Driveline

Driveline System

For information concerning the all-wheel drive (AWD) system refer to; **X-TYPE Powertrain Introduction TG, Transfer Case**.

Refer to **JTIS** for information concerning serviceable components.

Driveshaft

- The driveshaft which transfers the drive from the transfer-case to the rear differential, is a two-piece design with a central hookes joint.
- The same design of driveshaft is used for both automatic and manual transaxles. Although the driveshaft has a shorter installed length on the automatic derivative due to the transfer-case coupling being slightly further rearward than that of the manual derivative. This difference in installed length is compensated by the sliding effect of the front constant-velocity joint.
- The driveshaft is supported by a rubber isolated centre-bearing which is mounted to the body. The centre bearing must be centralized on installation to accommodate either the automatic or manual powertrain; refer to **JTIS** for the installation procedure.
- Sliding constant velocity joints at the front and rear of the driveshaft provide the driveshaft's plunge capability.
- The driveshaft couplings are open-ended, this exposes the lubrication grease of the constant velocity joints when the driveshaft is disconnected. Gasket seals are fitted to both driveshaft coupling joints to prevent lubricant leakage when the driveshaft is installed.
- The front section of the driveshaft is of swage construction which enables the driveshaft to collapse in the event that the vehicle is involved in a front-end collision.
- The driveshaft is balanced at production and there is no requirement for on vehicle balancing.

Rear Differential

- The differential is mounted at three-points, two at the front and one at the rear, through rubber bushes to the rear subframe. This mounting and the subframe to vehicle-body mounting arrangement, refer to **Suspension**, provides the rear driveline with double isolation from the vehicle's body.
- The differential is constructed of an iron main casing with an aluminum rear cover.
- Bearings are located in the differential casing to provide full bearing support.
- The differential ratio is 2.53:1.
- The differential has a fill for life lubricant system.

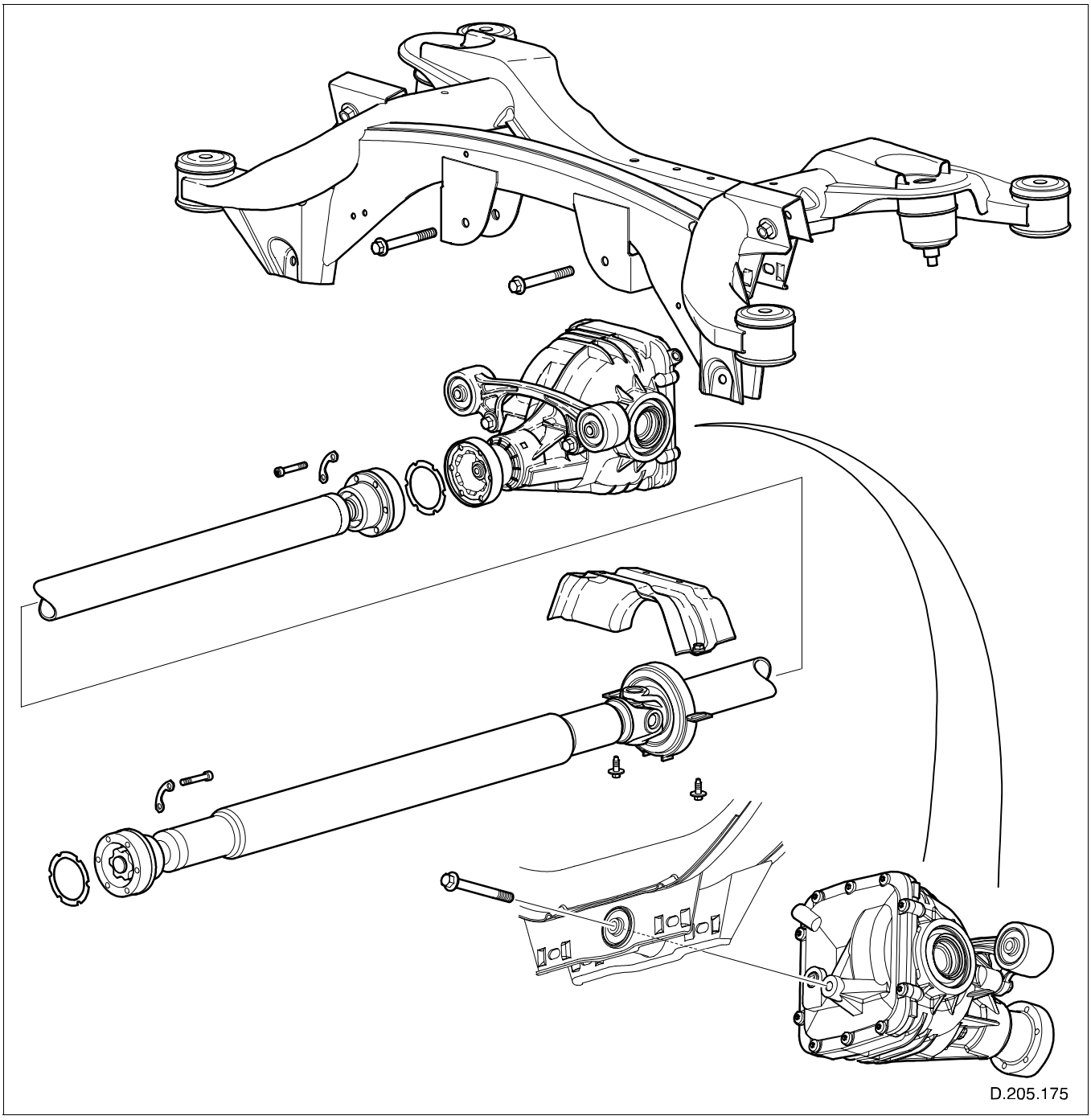

Fig. 7 Driveshaft and rear differential

Rear Axle Shafts

- The left-hand and right-hand axle shafts are different lengths.
- Inboard and outboard sliding constant-velocity joints provide the axle shaft's plunge capability.
- Wheel-speed sensor rings are located on the outer universal joints.
- The axle shafts are retained in the differential by spring clips.

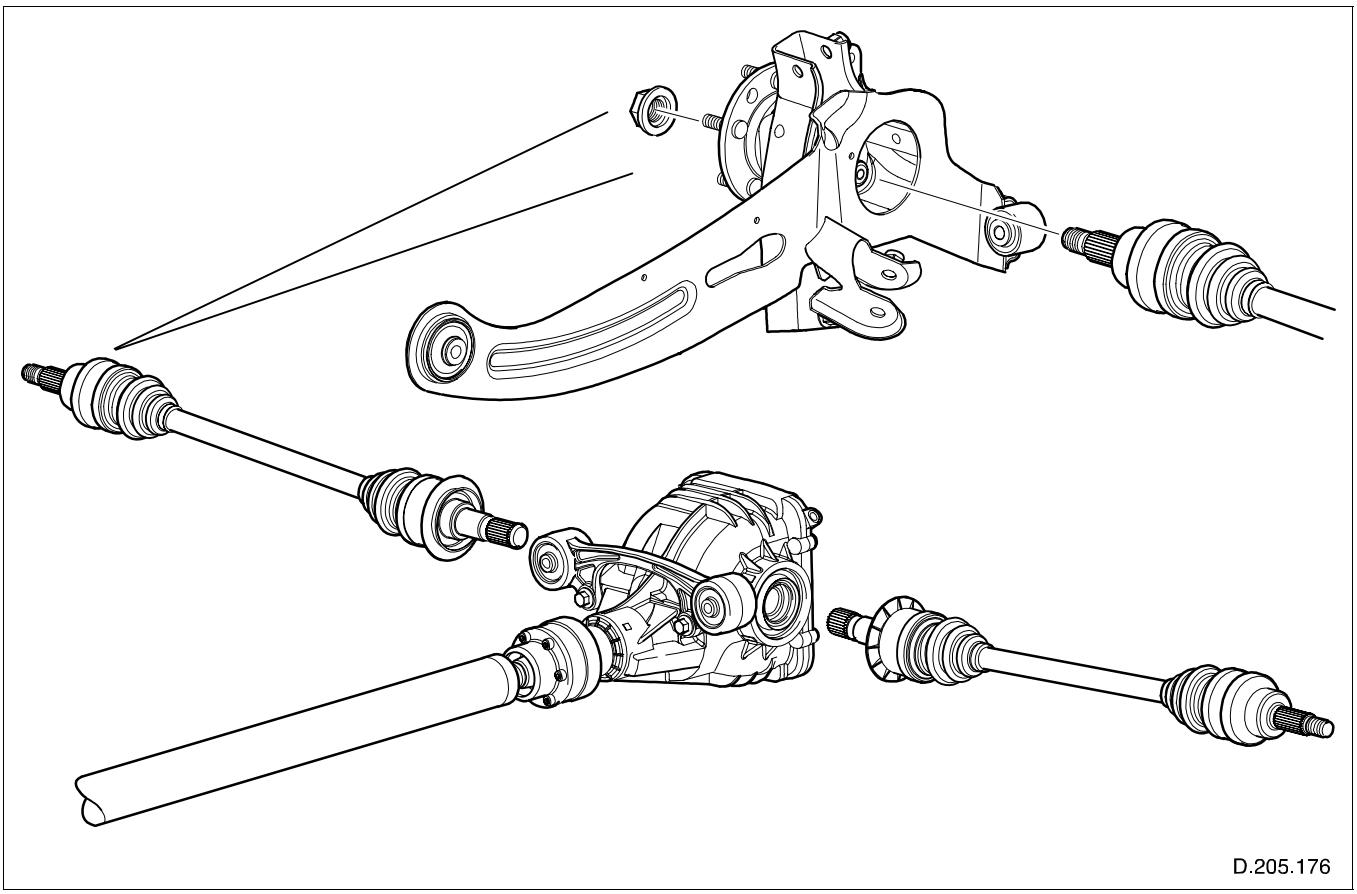

Fig. 8 Rear axle shafts

Front Axle Shafts

- The left-hand axle shaft is retained in the transaxle's differential by a spring clip.
- The right-hand axle shaft is retained in the transfer case by a spring clip.
- The axle shafts have fixed outboard, and sliding inboard constant-velocity joints, the inboard joints provide the axle shaft's plunge capability.
- The inboard universal joint on the right-hand axle shaft is fitted with a heat resistant boot to protect it from exhaust temperatures.

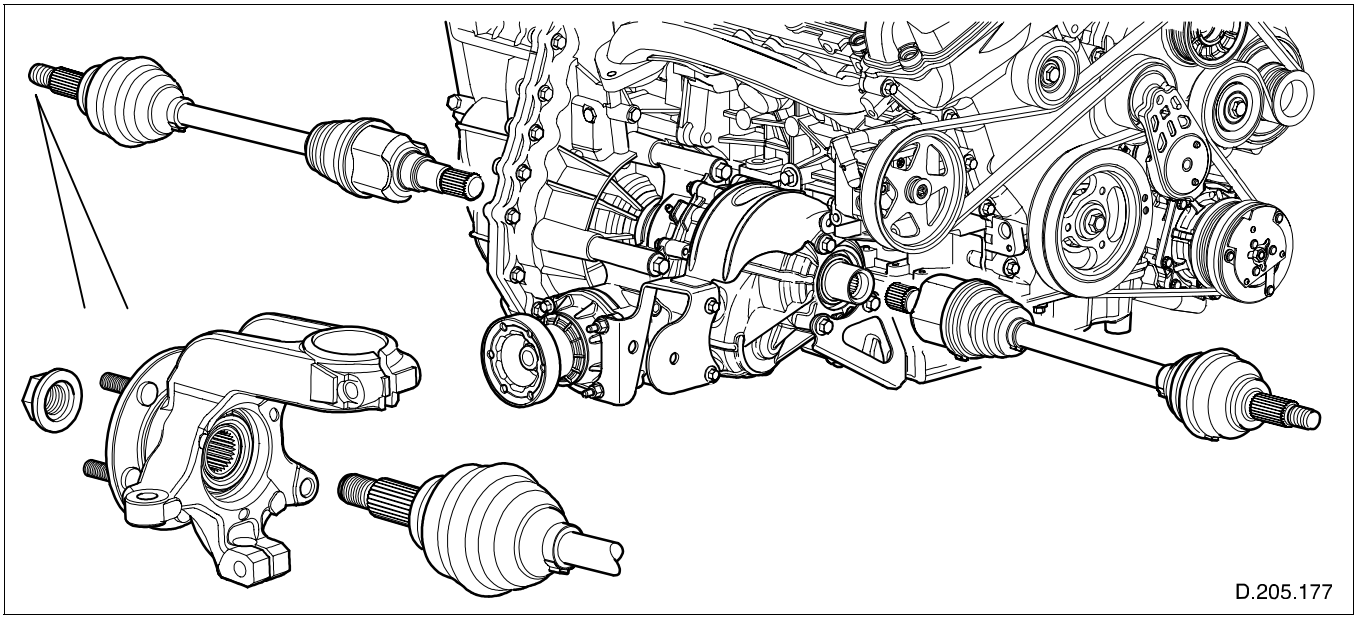

Fig. 9 Front axle shafts

Brake System

Introduction

The braking system is of a diagonally split, dual circuit design, having separate circuits for each pair of diagonally opposed wheels (left front, right rear and right front, left rear). The front and rear brake calipers are both single sliding piston designs which ensure equal force is applied to the brake disc through both brake pads. The rear caliper incorporates a self adjusting mechanism within the piston, which has to be wound back when installing new brake pads.

The brake master cylinder is of a tandem design and is linked to a brake booster which reduces the brake pedal effort. The tandem design will make sure that in the event of one brake circuit failing the other will remain fully operational. The master cylinder which shares a common fluid reservoir with the clutch system on manual derivative vehicles, incorporates an integral fluid-level switch.

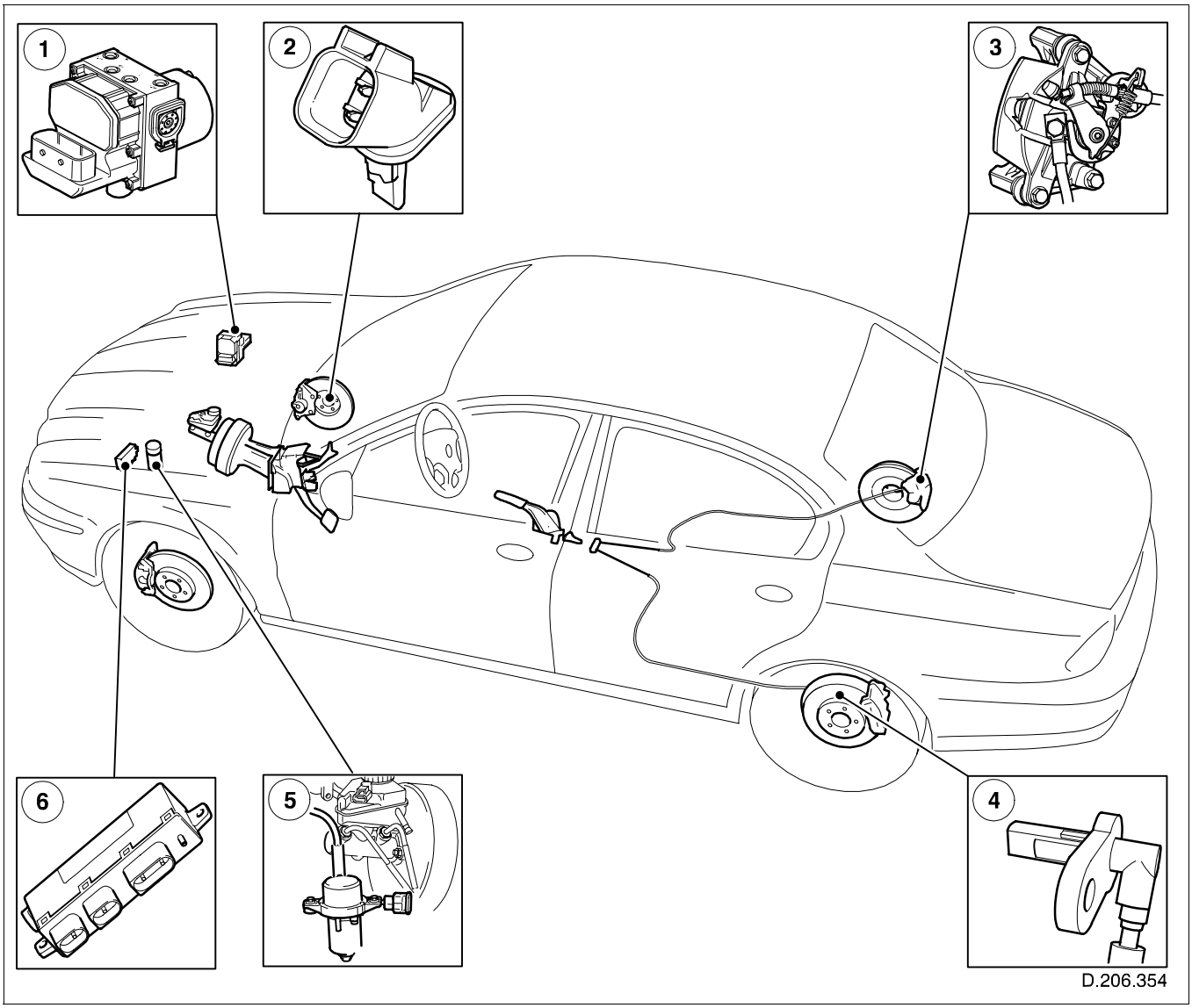

Fig. 10 Braking system

1. Hydraulic control unit and brake control module (ABS unit shown)
2. Front-wheel speed sensor
3. Rear brake caliper — showing parking brake mechanism
4. Rear-wheel speed sensor
5. Vacuum pump
6. Vacuum pump, control module

Parking Brake

The parking brake lever which is mounted between the front seats, operates the rear brakes through a cable system. The lever is attached to a short single cable which attaches to two main cables via an equalizer which maintains an even load to both rear calipers.

The parking brake comprises a steel coil-band-spring wrapped around a steel drum, which combine as a one-way friction clutch and automatic adjustment device.

- The clutch spring touching the stopper triggers the self-adjusting mechanism.
- A clock spring coiled inside the drum applies the parking brake tension.

Lever travel variation is minimized by the automatic adjustment mechanism combined with the automatic adjustment of the rear calipers.

Application of the parking brake will illuminate the parking brake / brake fluid low-warning light on the instrument cluster, when the ignition is on.

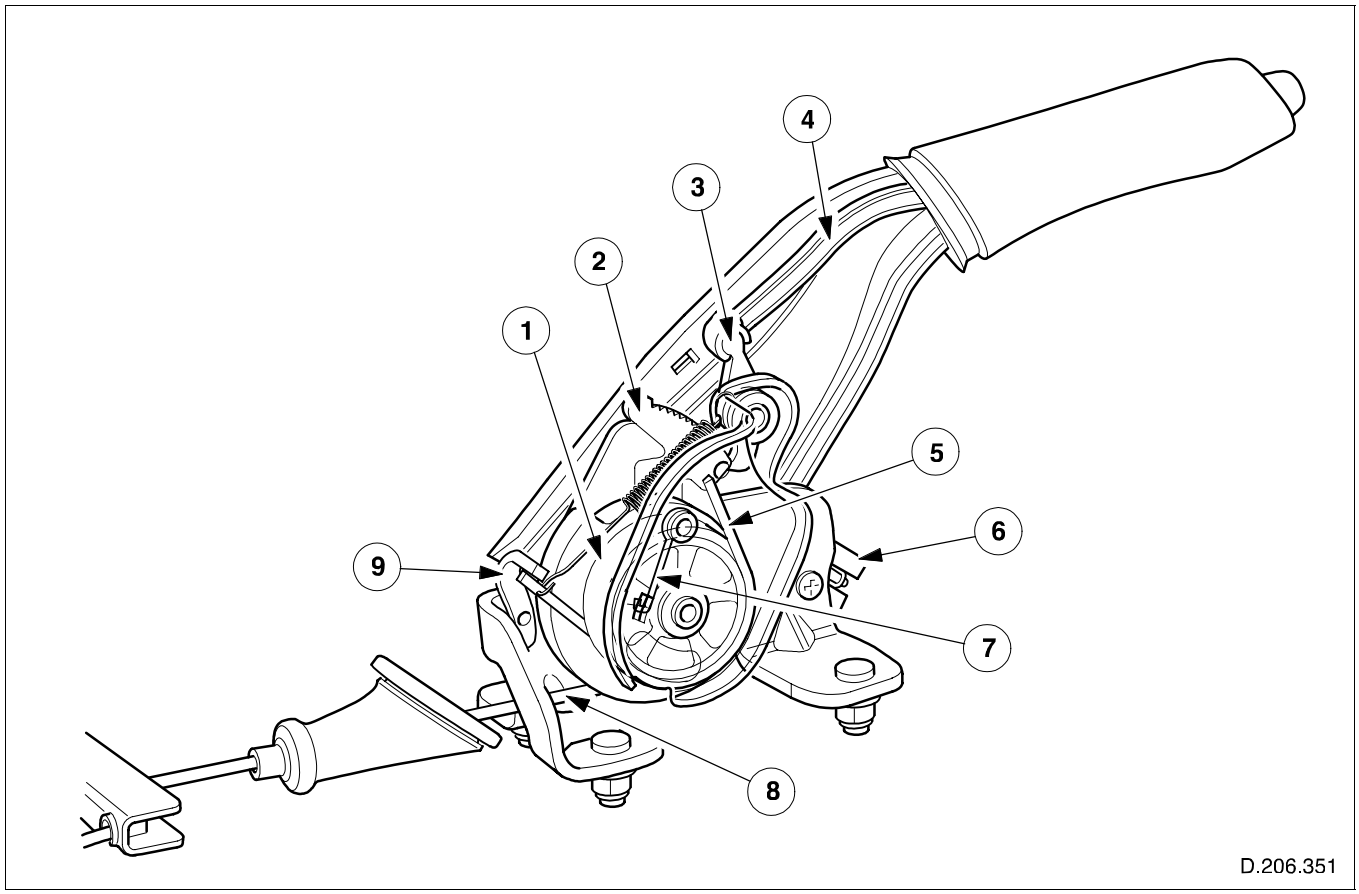

Fig. 11 Parking brake lever

1. Clutch drum with internal clock spring / cable guide
2. Ratchet plate
3. Pawl
4. Release rod
5. Clutch spring
6. Parking brake signal switch
7. Pulley lock
8. Cable
9. Stopper

Brake Pedal

The brake pedal employs a safety device to reduce the risk of lower leg injuries to the driver.

In the event that the vehicle is involved in a severe frontal collision the push-rod that connects the brake pedal to the brake booster 'breaks'. This de-couples the brake pedal from the brake booster, allowing the brake pedal to pivot to the vehicle's floor.

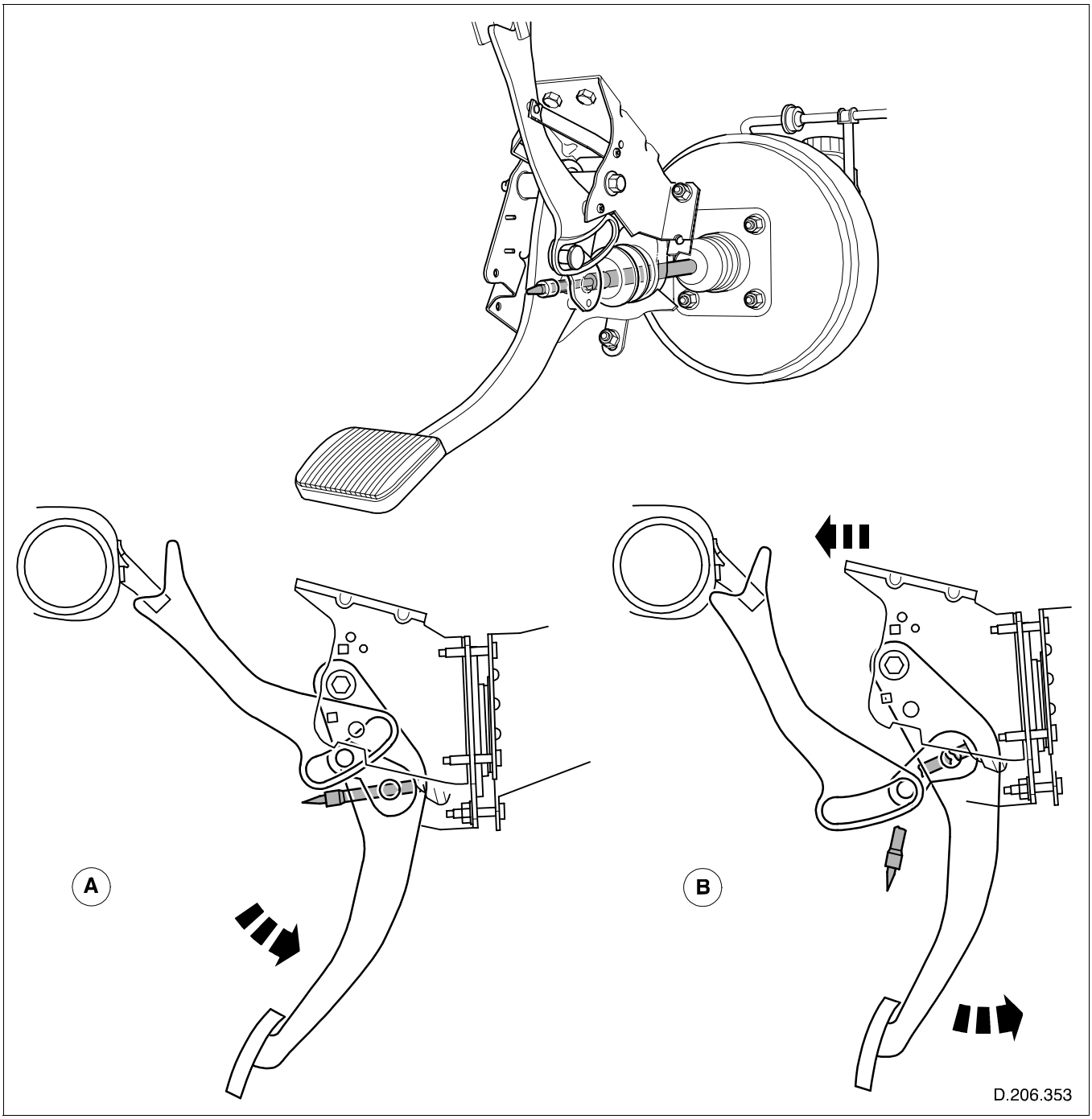

Fig. 12 Brake pedal

A. Brake pedal depressed

B. Brake pedal de-coupling

Vacuum Pump

Due to emission tuning the intake manifold cannot always provide the required vacuum pressure for the brake booster to function effectively. To compensate for this, an auxiliary vacuum pump is employed to provide the additional vacuum pressure, when required.

The vacuum pump is controlled by a module, located beneath the battery tray, which monitors the vacuum pressure through a link pipe connected between the intake manifold and brake booster. At a preset threshold the module signals the vacuum pump to supply the additional vacuum pressure.

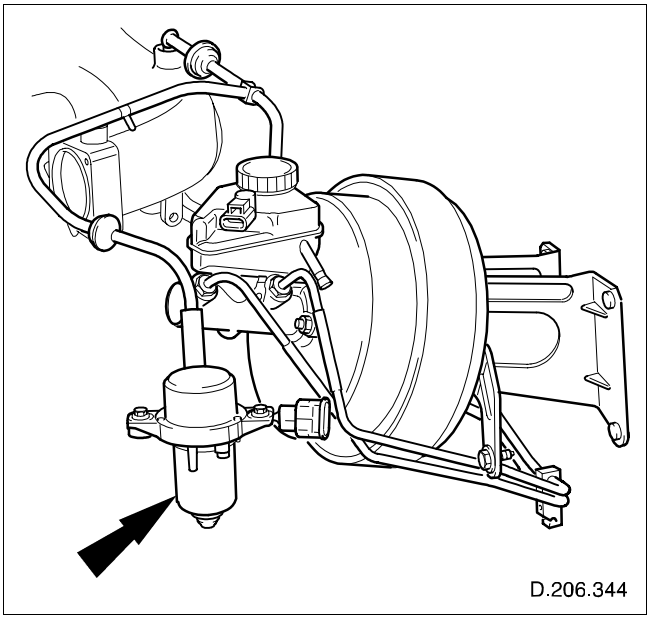

Fig. 13 Vacuum pump

Anti-lock Braking System

The anti-lock braking system (ABS) is a four channel system having independent inputs from all four wheels. ABS is controlled by the ABS control module (ABSCM) which monitors signals from the wheel speed sensors to calculate the brake slip and the acceleration and deceleration of individual wheels. When the brake pedal is depressed, and the ABSCM detects incipient wheel lock-up from the incoming signals, it triggers the recirculation pump inside the hydraulic modulator and the solenoid valves for the wheel(s) concerned. Brake pressure is then modulated to increase/decrease or remain constant at the wheel(s) concerned until wheel lock-up is eliminated.

The ABS provides self-diagnosis and any malfunction within the system will be indicated to the driver by the anti-lock warning light illuminating. Should a fault develop within the ABS, the brake system will operate conventionally and with the same standard of performance as a vehicle not equipped with ABS.

Dynamic Stability Control

Introduction

Dynamic Stability Control (DSC) is a closed-loop system designed to enhance driving safety by improving vehicle handling when the tires are at the limits of their grip capabilities. This is achieved through instantaneous electronically controlled reduction of engine torque and strategic application of the brakes at individual wheels.

By using the principle that by controlling the brakes individually, it is possible, to an extent, to steer the vehicle. This principle can then be used to enhance driving safety by correcting the vehicle's yaw moment (turning force) when the vehicle fails to follow the driver's steering inputs.

Examples of DSC capabilities are listed below:

- When the vehicle fails to follow the driver's steering input, the DSC generates precisely defined braking forces at individual wheels to pull the vehicle into line. For example, in a left-hand bend a vehicle that oversteers tends to 'slide out' with the rear wheels, this motion is counteracted by applying the brake at the right-hand front wheel. This provides a corrective yaw moment and can reduce side forces at that wheel in order to stabilize the vehicle.
- Similarly in the same left-hand bend when the vehicle understeers, the vehicle tends to 'slide out' with the front wheels, this motion can be counteracted by applying the brakes at the left-hand rear wheel to generate a corrective yaw moment which helps to turn the vehicle.
- Even when the tires are at the limits of their grip, such as in sharp steering manoeuvres due to panic responses, DSC can intervene to reduce the dangers of skidding or breakaway.
- If understeer or oversteer is caused by excessive engine torque, the DSC will reduce the engine torque to provide the corrective yaw moment.

DSC can be switched OFF by pressing the switch on the centre console. A warning light will illuminate and, if fitted, a message will be shown to indicate that the system has been switched OFF. When the system is ON the warning light will flash when the system is active.

NOTE: If speed (cruise) control is engaged, it will automatically disengage when DSC activates.

Dynamic Stability Control Concept

Satisfactory handling is determined according to whether a vehicle maintains a path, which accurately reflects the driver's input (steering wheel angle) while at the same time remaining stable.

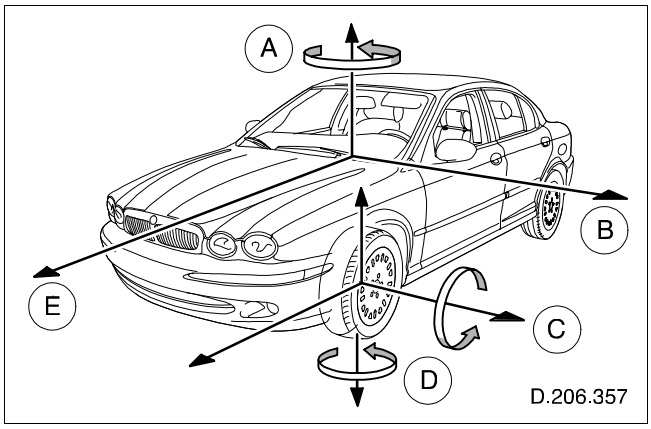

Fig. 14 Vehicle travel directions

A. Yaw rate
B. Lateral acceleration
C. Wheel roll
D. Steering motion
E. Longitudinal acceleration

The DSC module measures the vehicle's motion using the sensors below and processes the information to maintain vehicle control and stability within its ultimate control limits, which are determined, by the physical limits set by the tire's grip.

- Longitudinal acceleration as measured through the wheel speed sensors;
- lateral acceleration as measured through the lateral acceleration sensor;
- and the yaw rate, defined as the rotation around the vertical axis, as measured by yaw rate sensor.

When there is insufficient tire grip for the driving situation (for example, the driver has entered a corner too fast) the DSC will maintain stability and optimize the cornering and stopping performance, but cannot always prevent the vehicle from running wide.

Driver demand is measured by using the steering wheel angle sensor and vehicle speed to calculate the optimum yaw rate. This is compared to the actual measured yaw-rate and a yaw-rate calculated from the lateral acceleration and the vehicle speed. If the deviation between these measurements is too great, an understeer or oversteer correction is made.

The first step in this process is to determine how the vehicle should respond to driver demand (ideal response) and how it actually does respond (actual response). Hydraulic control valves can then be activated to generate brake pressure and/or engine torque reduction can be used, to maintain the difference between the ideal and actual response within a tolerance band. This directly influences the forces on the tires to generate a corrective yaw moment; or reduces the side forces of the tires where appropriate.

System Overview

The DSC system embraces capabilities far beyond that of ABS or ABS and traction control system (TCS) combined, while relying on the components of these systems. It also incorporates these additional sensors for measuring the vehicle's motion:

- yaw rate sensor,
- lateral acceleration sensor,
- steering angle sensor,
- brake master cylinder pressure sensor,
- and a control module to modulate braking and tractive forces where required to maintain vehicle stability.

The DSC control module supports data exchange with other vehicle electronic systems via the CAN; which also enables DTC interrogation via WDS.

The following components register driver demand and the DSC control module processes their signals as a basis for defining an ideal response:

- Electronic engine control system: position of accelerator pedal.
- Brake master cylinder pressure sensor: driver's braking effort.
- Steering angle sensor: position of steering wheel.

There are many supplementary parameters also included in the processing calculations these include the coefficient of friction and vehicle speed. The DSC control module monitors these factors based on signals transmitted by the sensors for:

- wheel speed,
- lateral acceleration,
- brake pressure,
- and yaw rate.

Using these parameters, the function of the DSC control module is to determine the current vehicle status based on the yaw-rate signal and the slip as estimated by the DSC control module. It then maintains the vehicle response within a tolerance of the 'normal' behavior, which is easily controlled by the driver.

In order to generate the desired yaw behavior the DSC control module controls the selected wheels using the ABS hydraulic system and engine control system. In the event of engine intervention the DSC control module calculates the torque which should be supplied by the engine to the wheels, and relays this request signal to the engine control module (ECM) which implements the torque request.

The electronic engine control system in response to signals from the DSC reduces engine torque in three ways:

- The throttle is positioned to provide the requested engine target torque.
- During the transient phase of torque reduction caused by mechanical and combustion delays the other alternative torque reduction methods are used to provide a quicker response.
- The ignition is retarded and/or the fuel is cut-off at the injectors at selected cylinders.
- Ignition and fuelling are reinstated when the engine torque controlled by the throttle reaches the requested value.

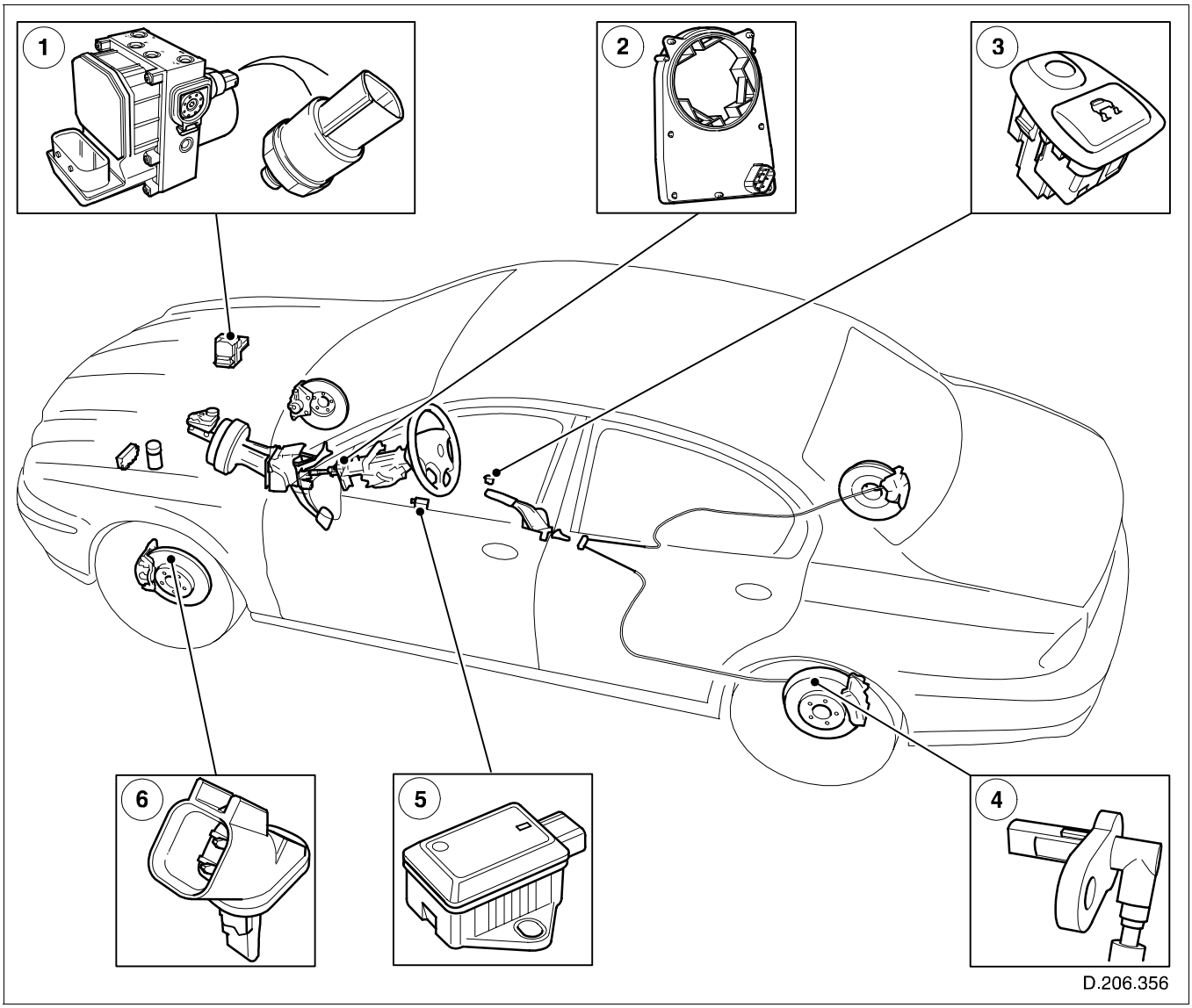

Fig. 15 Dynamic stability control components

1. Hydraulic control unit with brake control module and brake hydraulic pressure sensor
2. Steering angle sensor
3. DSC switch
4. Rear-wheel speed sensor
5. Yaw rate and lateral acceleration sensor
6. Front-wheel speed sensor

Sensors

Steering angle sensor

The DSC system relies on the steering angle sensor as the basis for advance calculations of the vehicle's intended course. This type of sensor exploits the special physical properties found in crystals featuring strip layers with opposed magnetic orientations - anisotropic magneto resistive (AMR) elements.

A ring gear surrounding the steering column rotates in unison with the steering wheel. As this gear moves it turns two measuring gears, both of which are fitted with a magnet. These magnets are scanned by AMR elements to register the rotation of the gears which are generated as output signals via the CAN to the DSC control module.

The gears on which the magnets are located have a different number of teeth and therefore turn at different rates, which makes it possible to register the absolute steering angle (the number of steering wheel turns) and the speed at which the steering wheel is turning.

NOTE: The steering angle sensor must be re-calibrated after any work or adjustment has been performed on the steering system.

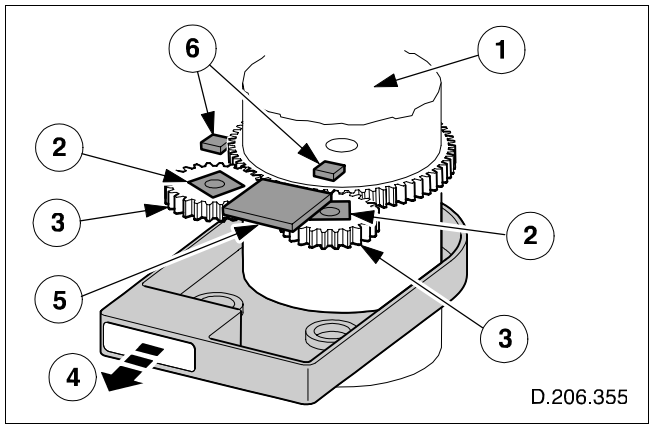

Fig. 16 Steering angle sensor

1. Steering column
2. magnets
3. Measuring gears
4. Output signal
5. Microprocessor
6. AMR elements

Yaw rate and lateral acceleration sensor

This is a dual sensor combining a micro-mechanical yaw rate sensor (rotation speed) with a lateral acceleration sensor within one unit. The lateral acceleration sensor allows a cross-checking calculation of the yaw rate with the vehicle speed supplied from the wheel speed sensors.

To protect the sensors from environmental influences they are installed in a hermetically sealed housing filled with nitrogen.

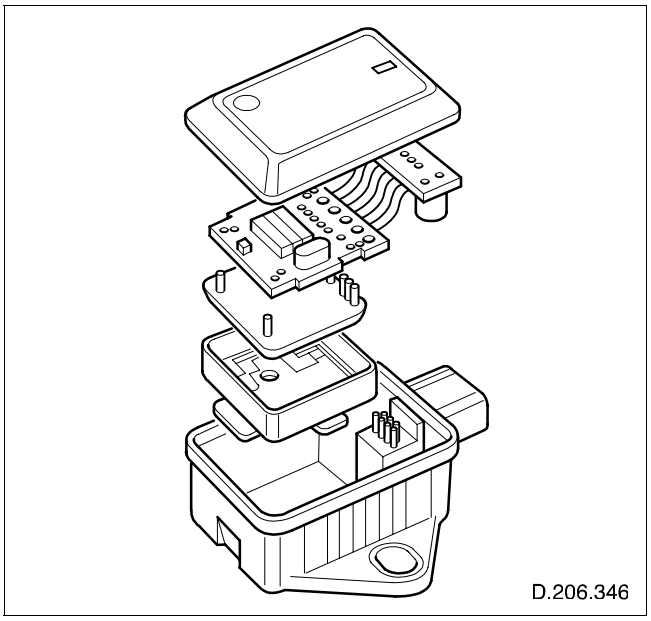

Fig. 17 Yaw rate and lateral acceleration sensor

Brake hydraulic pressure sensor

The pressure sensor relies on pressure-induced expansion in a diaphragm as the basis for measurement. These pressure expansion rates are converted into a voltage output which varies to reflect the pressure level. The DSC system requires the sensor to be capable of withstanding hydraulic-system pressures of up to 350 bar throughout an extended temperature range because of its installation in the engine compartment.

Wheel speed sensors

- The front-wheel speed sensors are the active type, which monitor rotation of a magnetically coded wheel-bearing seal at each front wheel.
- The rear-wheel speed sensors are also active and are fitted with a magnet, which monitors a metal tooth wheel located on the axle-shafts outer universal joints, as the reference element of the rotation of the rear wheels.

Wheel rotation is detected by the effects of changes in the magnetic fields generated by the magnets as wheel rotation is accompanied by a continuous alteration in magnetic flux. The sensor generates a current signal, which is interpreted by the DSC control module.

Steering System

Power Steering

The Servotronic power steering system operates using a conventional hydraulically operated rack and pinion. Equipped with a rotary valve and added electronics to control the system's hydraulics. This system provides the driver with steering assistance proportional to the vehicle's speed:

- with full hydraulic power assistance provided at low vehicle speeds, for example when parking the vehicle;
- and a gradual reduction of hydraulic steering assistance as the vehicle speed increases, allowing the driver a precise feel of road contact.

Road speed as measured by the electronic speedometer is fed to a microprocessor in the instrument cluster. The microprocessor analyzes the signal and transforms it into a current pulse which is fed to the electro-hydraulic transducer. On the basis of this pulse the transducer, which is directly attached to the rotary valve housing, controls the hydraulic reaction of the rotary valve, which determines the amount of torque the driver has to apply to the steering wheel at various vehicle speeds.

A further advantage of the Servotronic system is the fact that the oil pressure and flow are never reduced and can therefore be utilized immediately in emergencies where sudden and unexpected steering corrections become necessary.

Depending on vehicle specification, the steering is electronically programmed at vehicle production to compliment the characteristics of either the 16 or 17 inch wheels. This provides a tuned balance of the vehicle's steering to befit the size of the wheels.

The power steering pump is mounted to the engine and is driven by the accessory drive belt. The pump provides a constant flow rate of 8 liters per minute and has a maximum pressure of 110 bars. The fluid reservoir incorporates a 10 micron, internal filter to ensure cleanliness of the system.

Steering Rack

The steering rack is a compact unit, mounted rigidly to the subframe, which from lock-to-lock requires 2.6 steering-wheel turns. The rotary motion of the steering wheel is transformed by the pinion into an axial motion of the rack. The tie rods, which are attached at each end of the rack, transmit the motion to the wheel knuckles.

The steering rack is a variable ratio design, providing ease of parking manoeuvrability while maintaining the on-center steering precision required at high vehicle speeds.

A heatshield is installed to protect the steering rack and other components in the bulkhead area from exhaust temperatures.

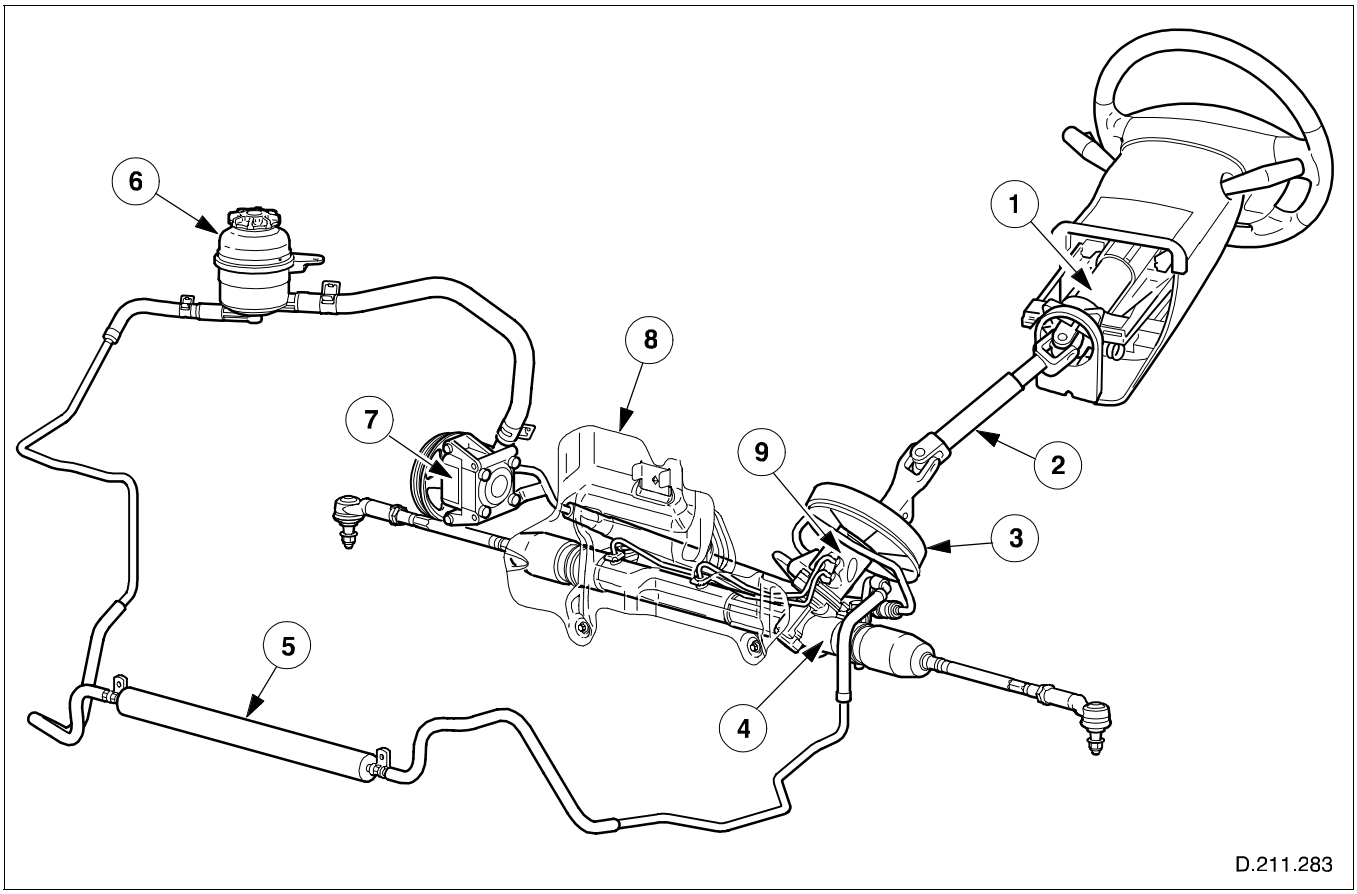

Fig. 18 Steering system assembly

1. Upper steering column
2. Lower steering column
3. Body seal
4. Rack and pinion
5. Fluid cooler
6. Fluid reservoir
7. Power steering pump
8. Heat shield
9. Rotary valve housing and electro-hydraulic transducer

Steering Column

The steering column comprises an upper column attached via brackets to the in-vehicle cross-member and a lower column which attaches to the steering-rack pinion via the pinion extension coupling.

The column has both manual reach and rake adjustment:

- reach adjustment is +/- 25 mm from the nominal setting,
- rake adjustment is +/- 20 mm from the nominal setting,

the column adjustment lock-lever is located on the underside of the column.

The upper steering column employs two crash mechanisms which in the event of a frontal collision reduces the intrusion of the upper steering column into the vehicle occupant cell:

1. The break-away mechanism, is incorporated within the column's two front securing bolts and capsules which break-away at a pre-determined load.
2. The ride-down mechanism, incorporated within the column is friction-based controlled by a tuneable energy absorption system, designed to collapse 90 mm axially from the nominal reach and rake settings.

The crash mechanism of the lower steering column is a tube-in-tube arrangement, where the inner tube is designed to break-away from the crimped fixing of the outer tube at a pre-determined load.

A rubber isolator incorporated in the lower column controls axial and torsional movements between the steering and suspension systems while also providing noise, vibration and harshness (NVH) damping.

Steering Column Shroud

The shroud comprises an upper and lower section. Contained in the lower shroud section is an energy absorbing foam-pad which is designed to reduce leg injury in the event of an accident.

NOTE: If the foam pad is found to be damaged the lower shroud assembly must be replaced.

Steering Angle Sensor

NOTE: If the vehicle is fitted with dynamic stability control (DSC), refer to **Brake System**, the steering angle sensor must be re-calibrated after any work or adjustment has been performed on the steering system.

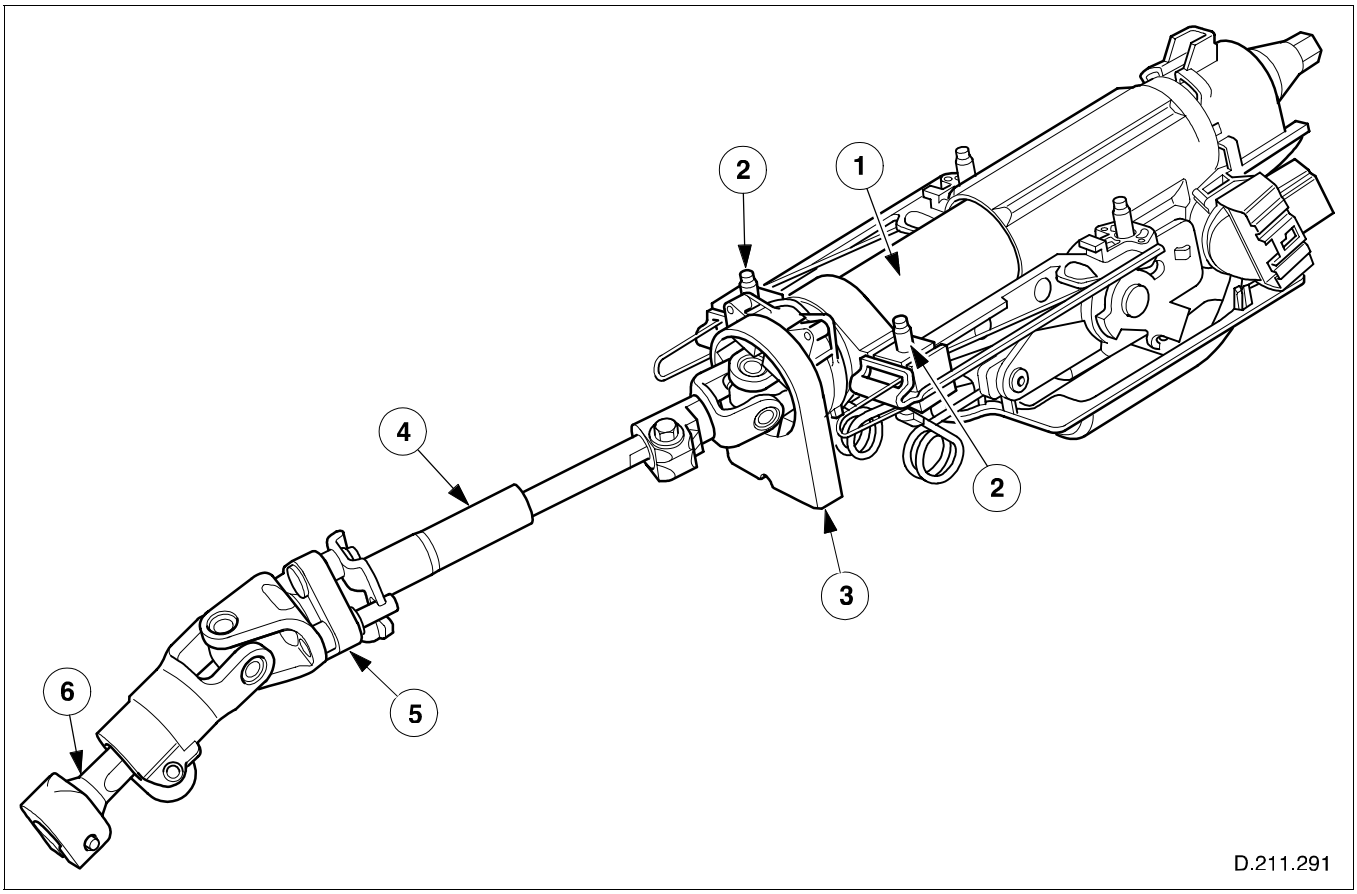

Fig. 19 Steering column

1. Upper column
2. Securing bolts and break-away capsules
3. Steering angle sensor (vehicles with DSC only)
4. Lower column
5. Rubber isolator
6. Pinion extension coupling

Climate Control System

Introduction

Specific climate control features will vary depending on both vehicle and market specification.

The X-TYPE climate control system software includes a number of self-test and calibration features at power-on, involving the cycling of motors and consequent movement of doors.

NOTE: The system may take control of the motors to minimize 'misting' and to maintain the correct in-car climate conditions; sometimes this control may continue after the key has been removed from the ignition.

The climate control system will have been configured to offer either of the following:

- Manual climate control.
- Automatic climate control.

NOTE: The automatic climate control system will also respond to spoken commands if the optional voice control system is fitted; refer to **Voice Activated Control System**. The manual climate control system responds to a single spoken command: 'RECIRC'.

Recirculated and fresh air

A complex strategy is employed to prevent window misting and although the climate control system comprises many automatic features, the basic recirculation functionality is controlled as follows:

All climate control systems

- 'Briefly pressing' the recirculation button engages the recirculation feature for a period of time that will vary depending on climatic conditions and is specifically designed to prevent 'misting'.

NOTE: When latched recirculation has been selected, to reduce condensation, the air conditioning will operate automatically.

Automatic climate control

- 'Pressing and holding' the recirculation button for 2 seconds, latches the recirculation feature (does not time-out).
- Confirmation is indicated by an audible 'double beep'.
- The button LED will remain illuminated.

Manual climate control

- 'Pressing and holding' the recirculation button for 2 seconds, latches the recirculation feature (does not time-out).
- Confirmation is indicated by 4 flashes of the button LED.
- The button LED will remain illuminated.

Manual Climate Control

The manual climate control system comprises:

- Climate control assembly; refer to **Heating and Ventilation**.
- Air conditioning components; refer to **Air Conditioning**.
- Combined manual control panel and climate control module (**Fig. 20)**.

The temperature, airflow distribution and volume of air from the interior registers are set using the rotary controls. Push buttons permit selection of the air conditioning, screen heating and fresh or recirculated air. Each button has an integral illumination LED (amber or red) that confirms which function has been selected.

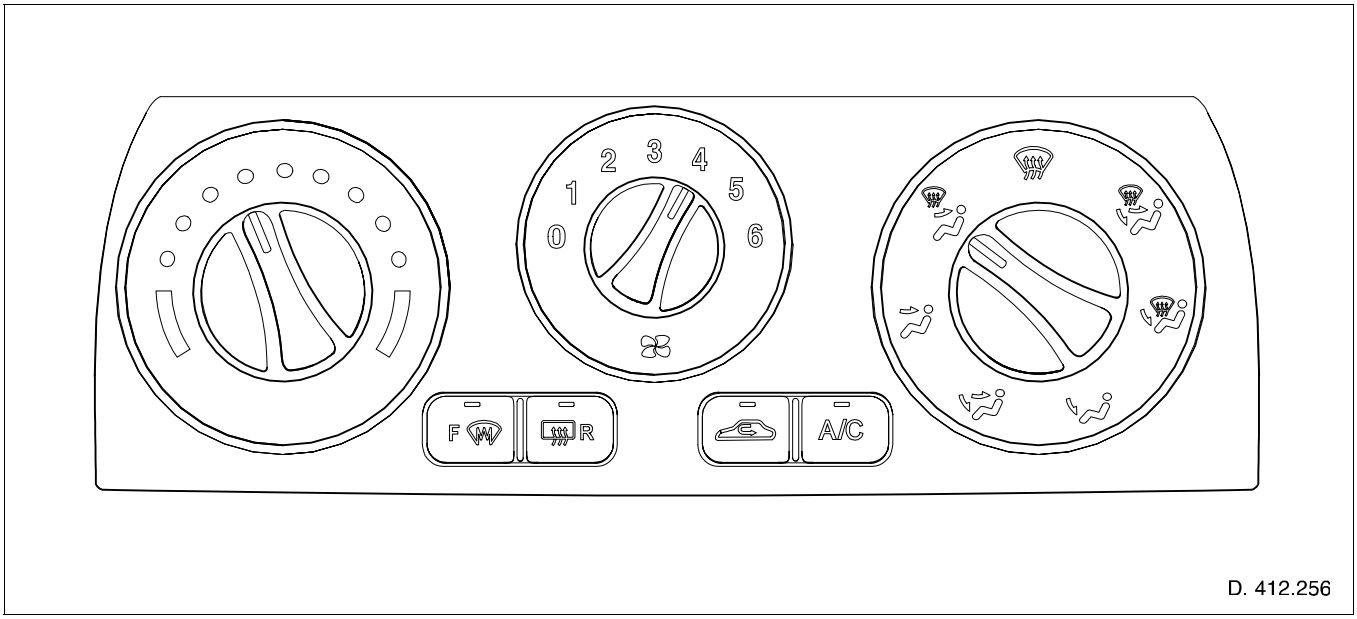

Fig. 20 Manual control panel

A strategy has been developed that is designed to 'teach' the user how to optimize the controls to minimize screen misting. The major features of the strategy are summarized by reference to **Table 2** in conjunction with **Fig. 21**.

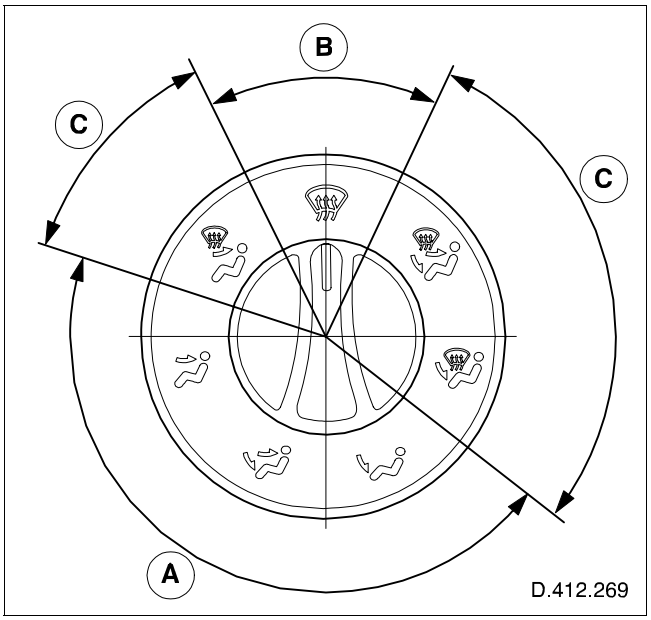

Fig. 21 Mode zones

A. Zone A (All non-screen modes)
B. Zone B (Defrost mode)
C. Zone C (All partial screen modes)

	Zone A	Zone B	Zone C
Effect on RECIRC and A/C when entering zone	RECIRC unaffected	RECIRC cancelled	RECIRC cancelled
	A/C unaffected	A/C activated	A/C activated
Effect when pressing RECIRC or A/C in zone	RECIRC functional	RECIRC inhibited	RECIRC functional
	A/C functional	A/C cannot be deselected	A/C functional
Effect on RECIRC and A/C when leaving zone	RECIRC unaffected	Fresh remains selected	RECIRC unaffected
	A/C unaffected	A/C remains activated	A/C unaffected

Table 2 A/C and RECIRC defaults versus mode positions

Key to **Table 2**:

- 'RECIRC' refers to the recirculation of air within the vehicle.
- 'A/C' refers to the air conditioning system.
- 'unaffected' means a feature remains in its previous state.
- 'cancelled' means a feature is deactivated.
- 'functional' means a feature can be activated or deactivated.
- 'inhibited' means a feature cannot be activated.
- 'activated' means a feature will become activate (assuming it is not already active).

Automatic Climate Control

The automatic climate control system comprises:

- Climate control assembly; refer to **Heating and Ventilation**.
- Air conditioning components; refer to **Air Conditioning**.
- Discrete temperature sensors; refer to **Control Components**.
- Combined control panel with LCD and climate control module (**Fig. 22**).

or

- Control panel with touch screen (telematics display module) and remote climate control module (**Fig. 23**).

The automatic climate control system maintains the interior of the vehicle at the selected temperature by controlling:

- heat input;
- air conditioning;
- fan speed;
- air intake and distribution.

NOTE: Following battery reconnection and with the ignition key at position 'II', the climate control system will default to OFF but with a stored value of 23°C. In circumstances when the display shows either HI or LO instead of a value, the default value can also be established by 'Pressing and holding' the AUTO button for 2 seconds.

Control panel with LCD

The climate control functions are selected by push buttons and a rotary control. When a function button is pressed, selection is confirmed by a 'beep' and illumination of the button LED. The LCD uses graphic symbols to provide additional confirmation of the system status.

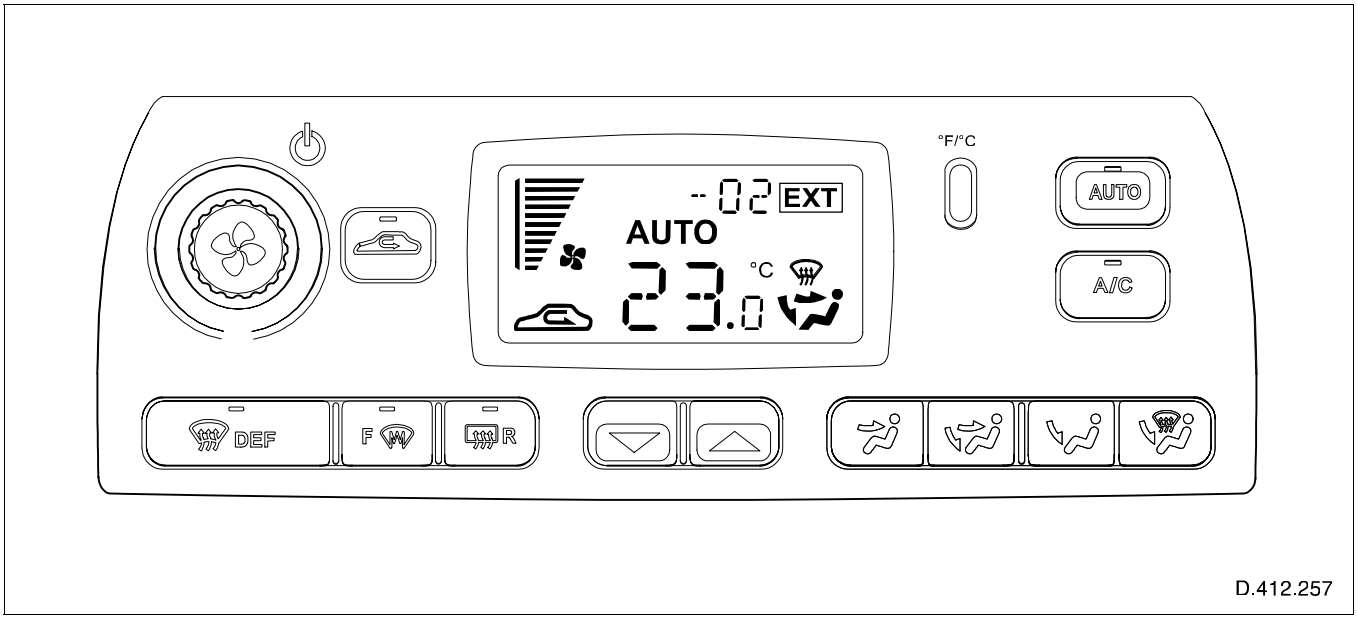

Fig. 22 Control panel with LCD

Control panel with touch screen

The control panel with touch screen is a multifunction touch screen console which comprises on-screen simulated buttons (soft buttons) and perimeter buttons (hard buttons); refer to **Telematics Display Module** for further information.

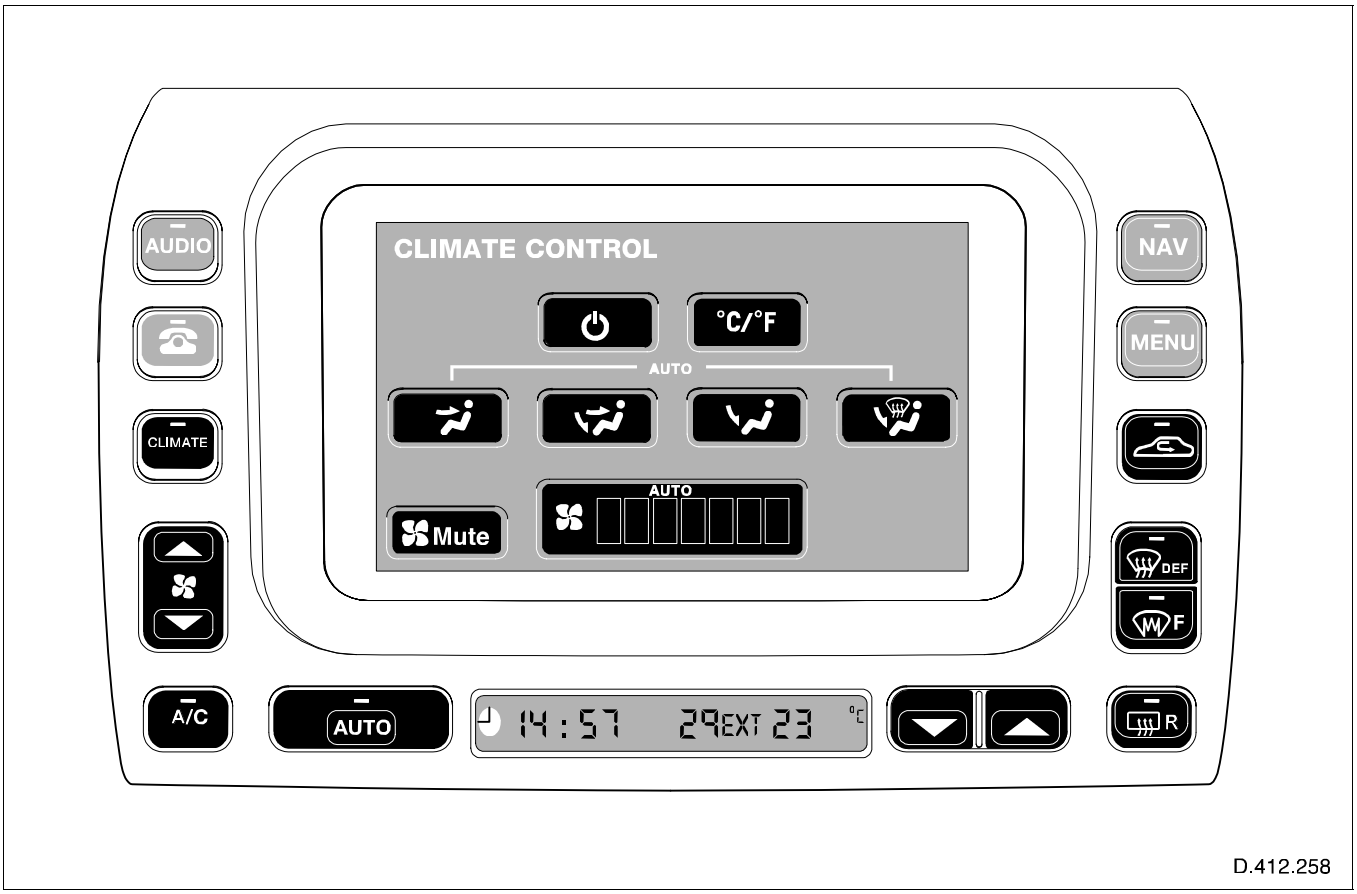

Fig. 23 Climate control buttons

Time and temperature LCD

When the climate control system is operational, the small, integral LCD, located below the touch screen, provides confirmation of:

- time;
- external (EXT) ambient temperature;
- required interior temperature (selected by the occupant).

General

Air recirculation can be manually selected either for an automatically timed period or to operate continuously (latched recirculation).

Fig. 24 provides an indication of the input/output flow of electrical data between climate control components; refer to **X-TYPE Electrical Guide** for detailed information.

NOTE: The CCM (2) is common to all configurations and is remotely mounted when the telematics display module (1) is installed. When either control panels (22) or (23) are installed, the CCM is integrated into the control panel housing.

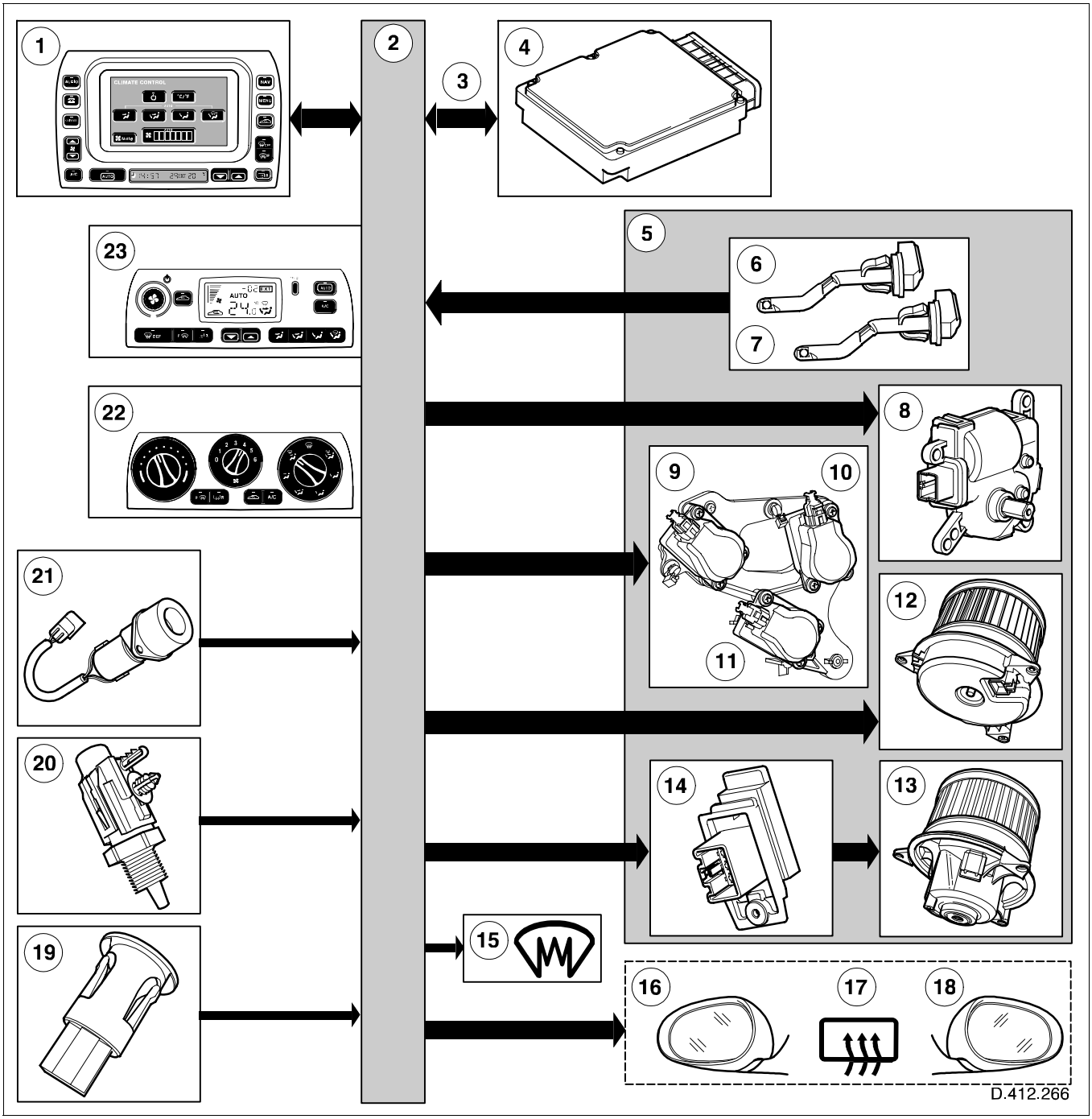

Fig. 24 Climate control system (composite diagram)

Key to Fig. 24

1. Telematics display module [3]
2. Climate control module (remote or combined)
3. Controller area network (CAN)
4. Electronic control module (ECM)
5. Climate control assembly
6. Discharge temperature sensor
7. Evaporator temperature sensor
8. Recirculation motor
9. Face/floor motor
10. Defrost motor
11. Temperature blend motor
12. Brushless blower motor [1]
13. Blower motor [2]
14. Blower motor resistor pack [2]
15. Heated front screen (where fitted)
16. Heated left-hand mirror
17. Heated rear screen
18. Heated right-hand mirror
19. Solar sensor [1]
20. Ambient temperature sensor [1]
21. In-car temperature sensor [1]
22. Manual control panel (combined with item 2) [2]
23. Control panel with LCD (combined with item 2) [1]

[1] automatic climate control only

[2] manual climate control only

[3] option

Diagnostics

The climate control system does not have a self-diagnostics facility but:

- constantly monitors the status of the system;
- where appropriate, stores a DTC within the climate control module for analysis using WDS.

Air Distribution and Filtering

Air distribution and filtering is achieved using the following:

- Particle / combination filter.
- Instrument panel registers.
- Rear foot ducting.
- Footwell ducting.
- Defrost ducting.
- Defrost door.
- Face/floor door.
- Temperature blend door.
- Recirculation door.

Two types of filter are available:

- The particle filter is designed to limit the size of particles entering the vehicle via the air distribution system.
- The combination filter provides particle filtration but in addition prevents certain odors entering the vehicle via the air distribution system.

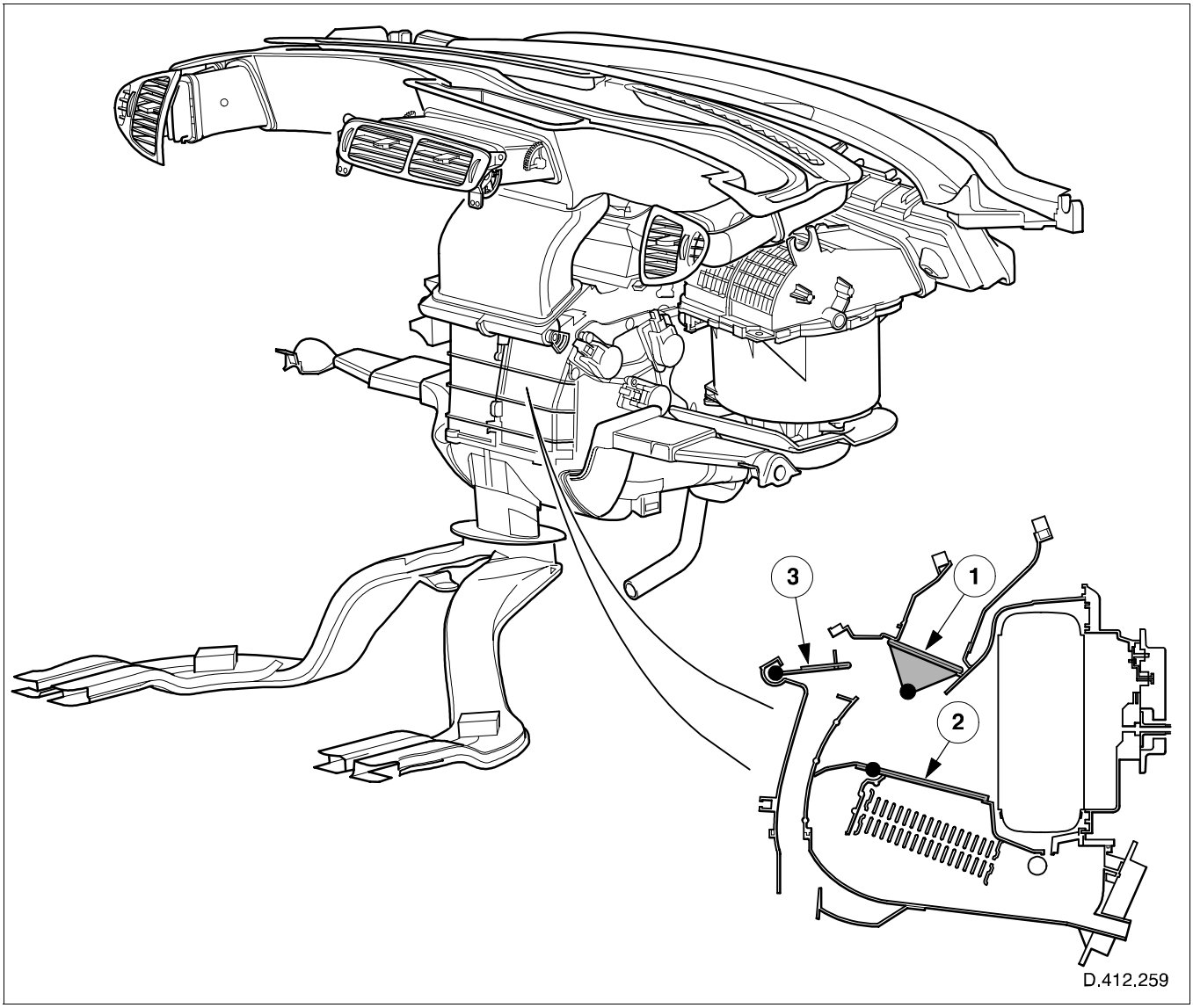

Fig. 25 Air distribution and filtering

1. Defrost door
2. Temperature blend door
3. Face/floor door

Heating and Ventilation

Heating and ventilation is determined by the climate control assembly which comprises the following:

- Evaporator core; refer to **Air Conditioning**.
- Heater core.
- Blower motor.
- Door actuators; refer to **Control Components**.
- Airflow doors; refer to **Air Distribution and Filtering**.
- Evaporator and discharge sensors; refer to **Control Components**.

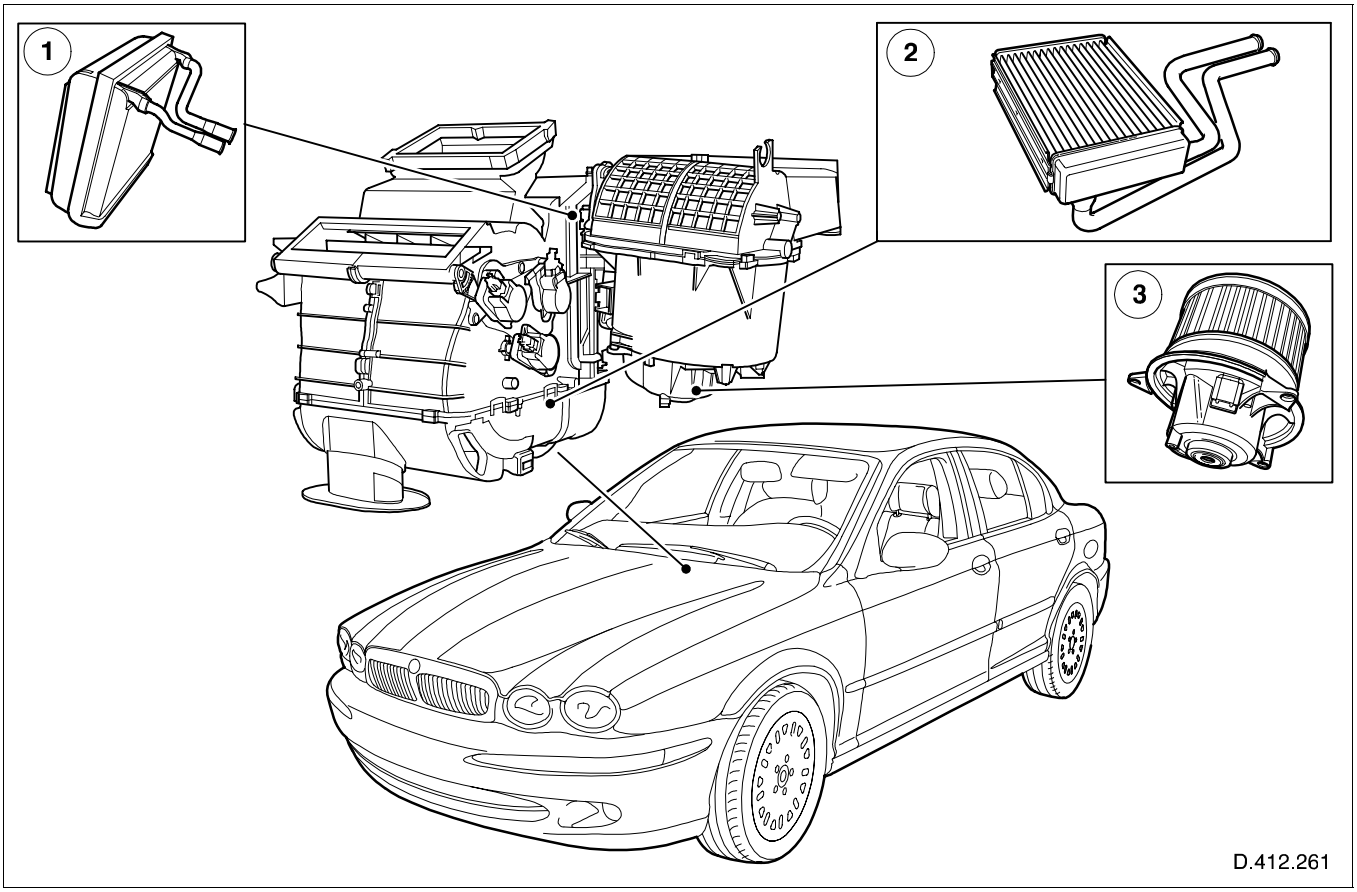

Fig. 26 Heating and ventilation components

1. Evaporator core
2. Heater core
3. Blower motor (standard-type)

Heater Core

The heater core is located within the climate control assembly but is part of the engine cooling system; refer to **X-TYPE Powertrain Introduction TG, Engine, Engine Cooling**.

Blower Motor

Two types of blower motor are employed depending whether the manual or automatic climate control system is fitted:

- The manual system uses a standard-type motor connected to a separate resistor pack that provides a choice of six blower motor speeds.
- The automatic system uses a brushless motor controlled directly by the climate control module and provides:
  - finer speed control;
  - increased reliability;
  - greatly improved electrical efficiency;
  - reduced maintenance.

Heated Screens and Mirrors

The heater elements will only be activated after data has been exchanged between the climate control module (CCM) and the engine control module (ECM):

- CCM sends request to ECM.
- ECM confirms or denies request.
- CCM activates the appropriate relay, provided the request has been confirmed.

Basic functionality

The rear screen heater and both door mirror heaters will operate when selected, provided the engine is running; operation will halt after 10 minutes or can be manually halted.

The front screen heater (if fitted), will operate when selected, provided the engine is running; operation will halt after 4 minutes or can be manually halted.

Air Conditioning

Air conditioning comprises the following system components:

- Condenser.
- Fixed orifice tube (part of evaporator intake line but serviceable separately).
- Compressor and clutch assembly.
- Suction accumulator.
- Evaporator core.
- Liquid line.
- Suction discharge line.
- Evaporator discharge line with integral low charging port.
- Evaporator intake line with integral high charging port.
- Pressure transducer (part of liquid line but serviceable separately).

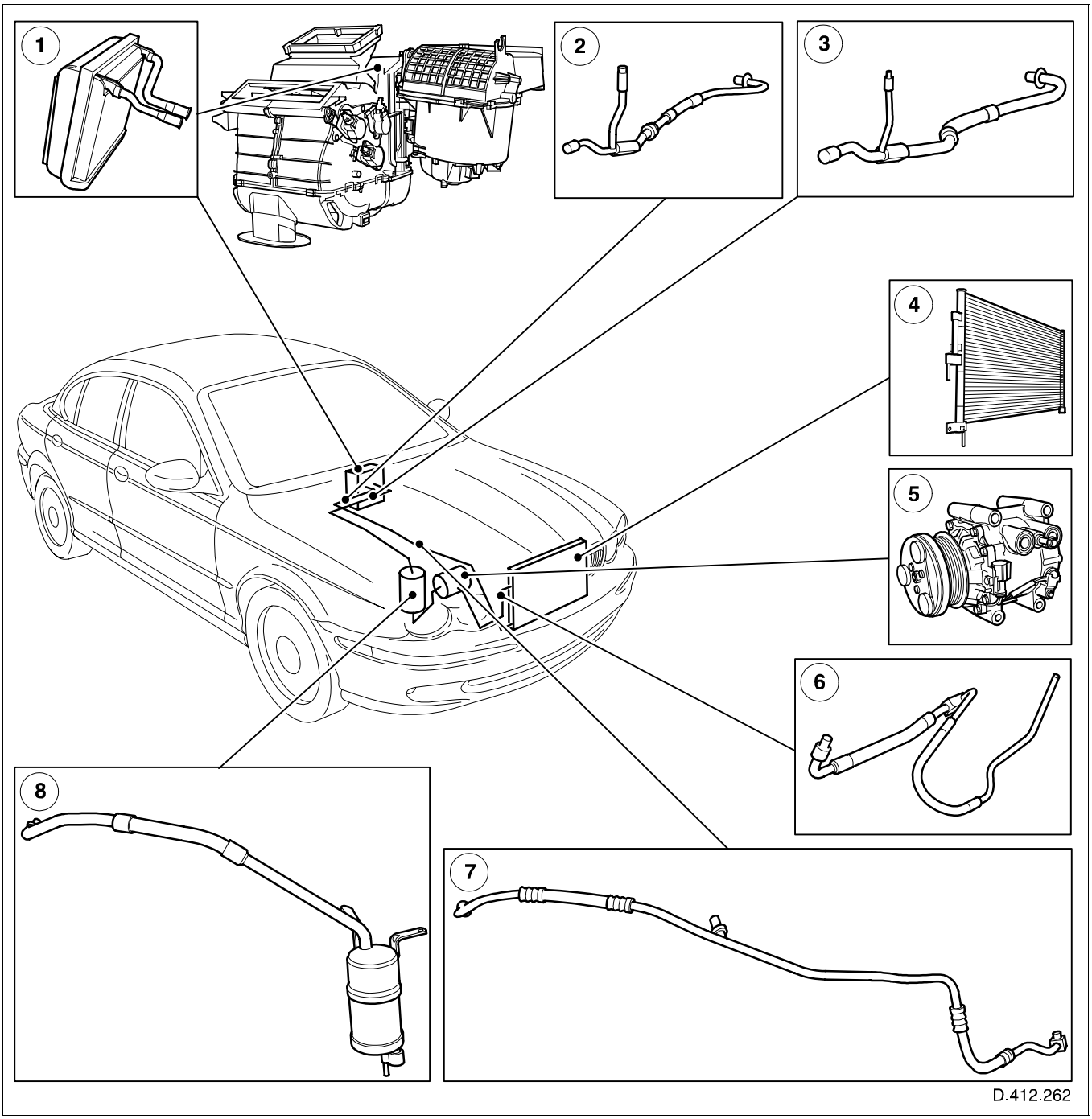

Fig. 27 Air conditioning components

1. Evaporator core
2. Evaporator intake line
3. Evaporator discharge line
4. Condenser
5. Compressor and clutch assembly
6. Suction discharge line
7. Liquid line
8. Suction accumulator

Operation

With reference to **Fig. 29**:

- The compressor (3) is mounted directly to the engine and driven by the accessory drive belt. The compressor primes the low-pressure, gaseous refrigerant from the suction accumulator (5) and compresses it. The refrigerant is discharged from the compressor to the condenser (4) as a high-pressure vapor at a temperature higher than the ambient air.

NOTE: The compressor has an integral pressure release valve and a sensing element for over-temperature conditions.

- The condenser converts the high-pressure vapor back to a liquid by utilizing the cooling effect of the air flowing over the condenser. The high-pressure liquid leaves condenser and travels along the liquid line and enters the fixed orifice tube (2).
- The orifice tube (**Fig. 28**) restricts the flow and provides a low-pressure (low temperature) input of refrigerant to the evaporator core (1).

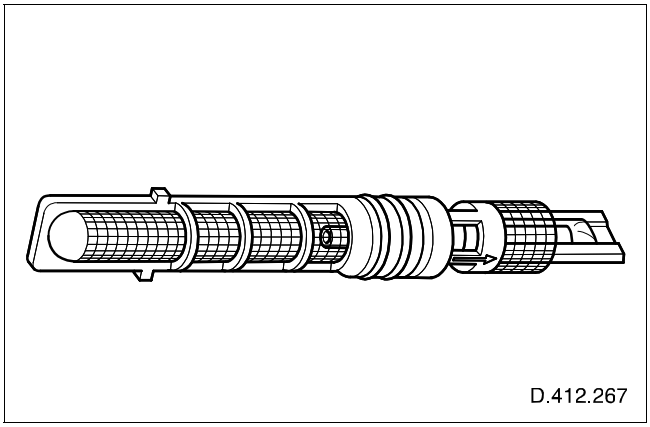

Fig. 28 Fixed-orifice tube

- The refrigerant lowers the temperature of the evaporator core causing heat and humidity to be removed from the air being circulated in the passenger compartment. The heat transfer causes the refrigerant to boil and vaporize before leaving the evaporator core.

NOTE: Moisture from the atmosphere condenses on the fins of the evaporator before draining to the outside of the vehicle via the drain tube.

- The suction accumulator removes any remaining liquid refrigerant that may have left the evaporator without vaporizing, to prevent excessive liquid entering the compressor.

NOTE: Under normal conditions for systems employing the orifice tube, the refrigerant leaving the evaporator will always contain a small amount of liquid whereas the thermal expansion valve, used for other Jaguar models, the refrigerant will always be gaseous.

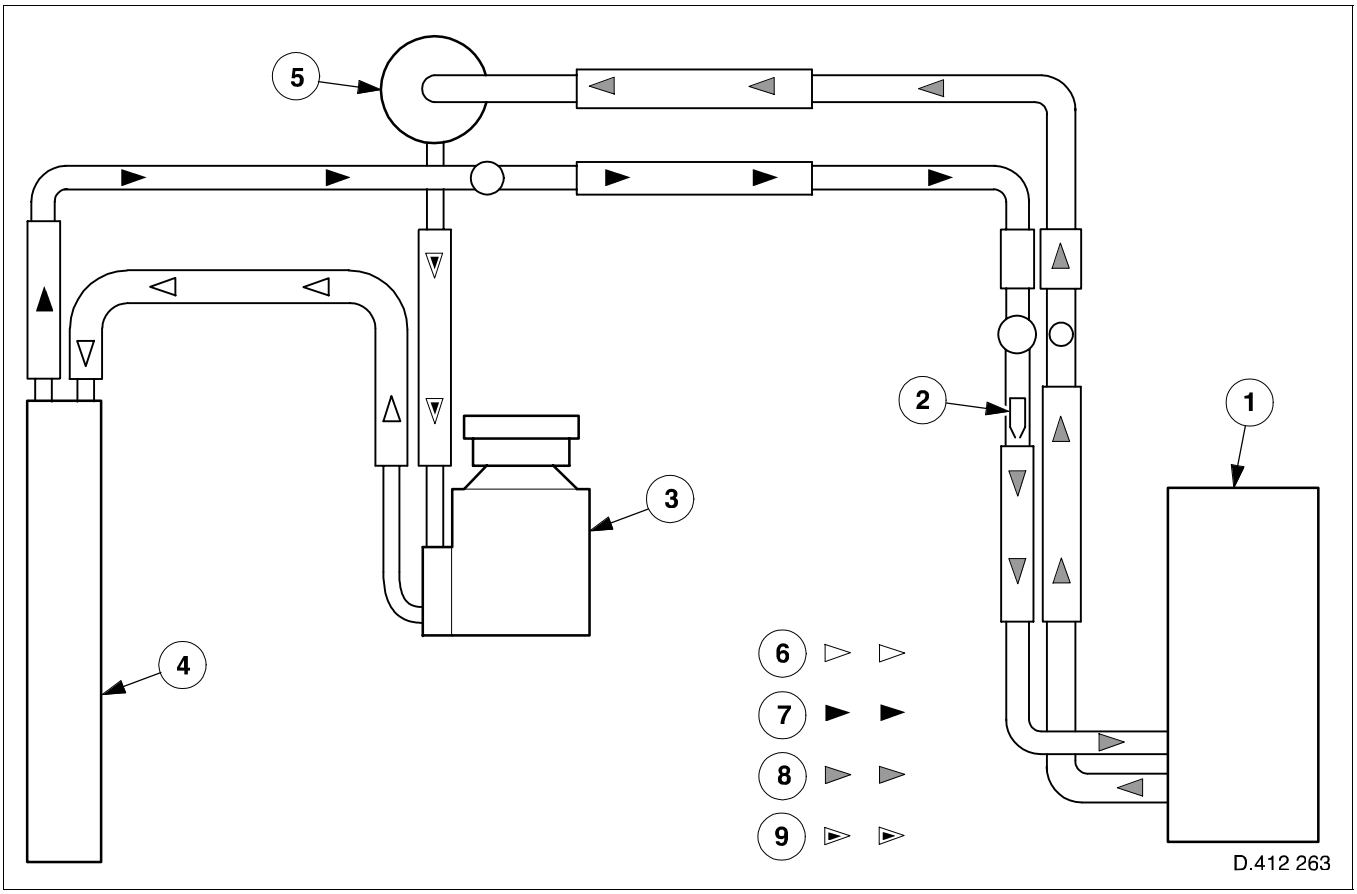

Fig. 29 Air conditioning refrigerant flow

1. Evaporator core
2. Fixed-orifice tube
3. Compressor
4. Condenser
5. Suction accumulator
6. High-pressure refrigerant (gaseous and hot)
7. High-pressure refrigerant (liquid and warm)
8. Low-pressure refrigerant (gaseous/liquid)
9. Low-pressure refrigerant (gaseous and cold)

Compressor clutch and relay

The compressor clutch relay is controlled by the engine control module (ECM), based on requests from the climate control module.

NOTE: Under certain conditions like 'wide open throttle' the ECM will override the 'clutch request' from the climate control module by disengaging the compressor clutch.

The air conditioning circuit is protected by a pressure transducer (**Fig. 30**), installed in the liquid line. When the signal from the pressure transducer rises above a predetermined threshold, the climate control module will cancel the 'clutch request' and the ECM will deactivate the relay.

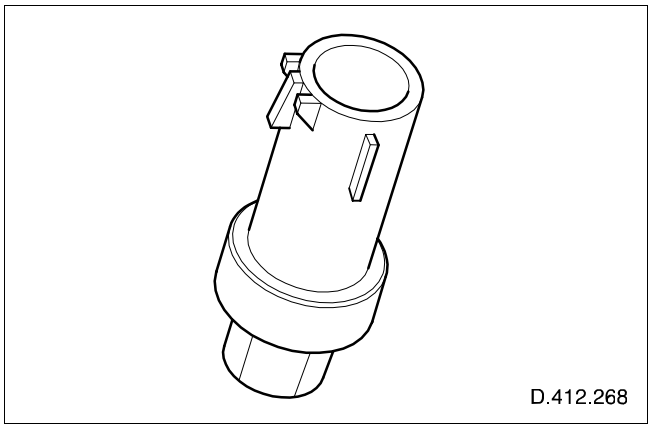

Fig. 30 Pressure transducer

NOTE: If, for any reason, the climate control module malfunctions, the ECM will deactivate the relay and disengage the compressor at a second, slightly higher threshold.

Control Components

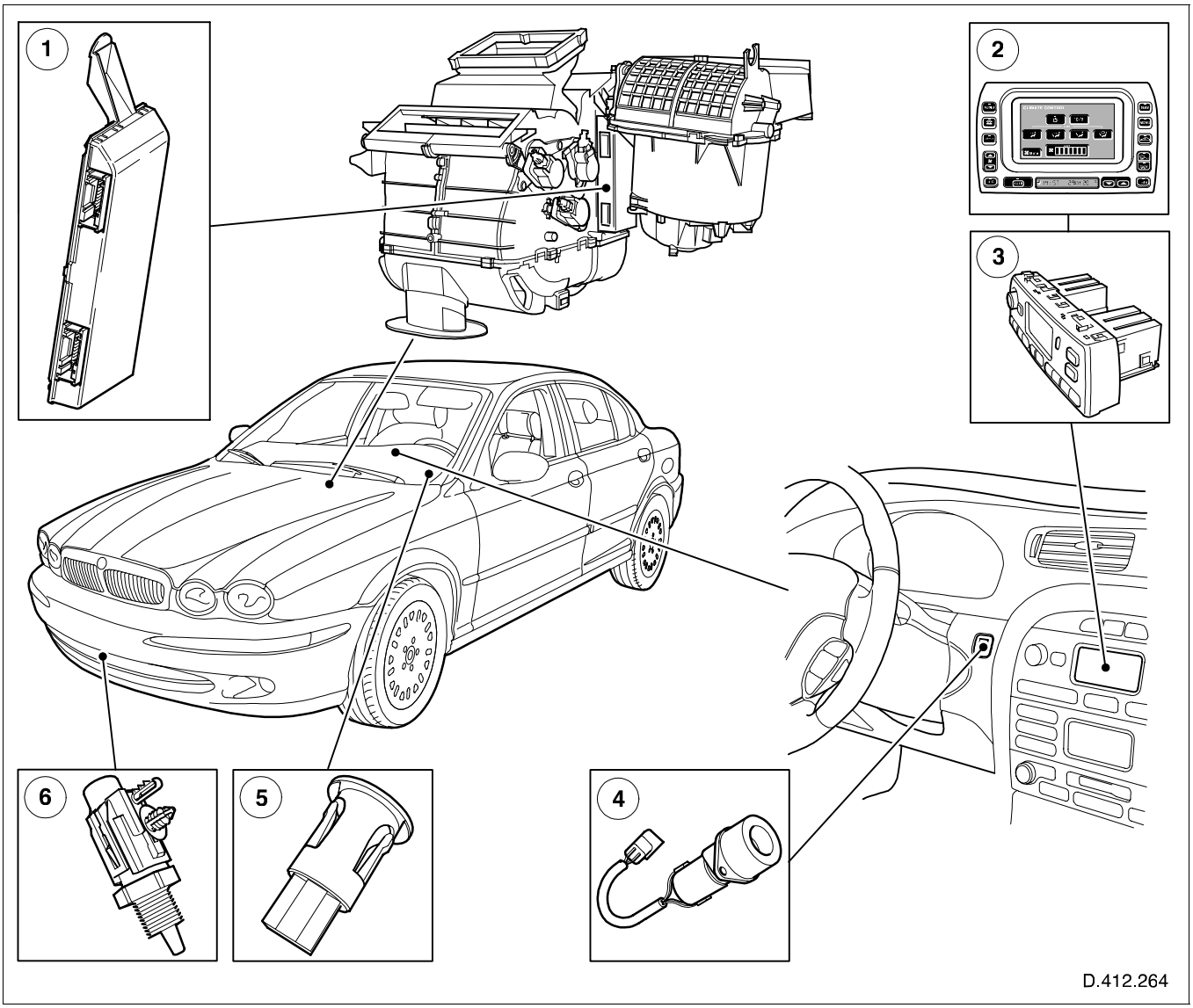

Fig. 31 Automatic climate control components

1. Remote climate control module (optional installation)
2. Telematics display module (optional installation)
3. Combined control panel with LCD and climate control module
4. In-car sensor
5. Solar sensor
6. Ambient sensor

Climate Control Module

Depending on vehicle specification the climate control module (CCM) is:

- mounted remotely to the right-hand side of the climate control assembly;

NOTE: A remote mounted climate control module is only necessary for vehicles fitted with the touch screen (telematics display module) option and forms part of the automatic climate control system.

- combined with the control panel to form a single unit.
- The combined control panel with LCD and climate control module provides an alternative configuration for the automatic climate control system.
- The combined manual control panel and climate control module forms part of the manual climate control system.

Temperature Sensors

The climate control module uses feedback from the following temperature sensors where applicable:

All systems

- Evaporator temperature sensor.

NOTE: The evaporator temperature sensor provides primary feedback to the climate control module, which in turn supplies signals to the ECM to control cycling of the compressor clutch.

- Discharge sensor.

NOTE: The discharge temperature sensor is strategically placed to measure the temperature of the air (after blending and just prior to discharge into the vehicle interior) and provide feedback to the climate control module, to enable the system to make any necessary adjustments.

Automatic climate control systems

- In-car temperature sensor.
- Ambient temperature sensor.

NOTE: The ambient temperature sensor requires airflow in order to provide effective feedback to the system. The airflow must not be hindered by the addition of accessories.

- Solar sensor.

NOTE: Obstructing the solar sensor will reduce feedback to the climate control module and will significantly affect the behavior of the system.

Signal processing and CAN

The climate control module processes input signals from the control panel and the temperature sensors and then provides, where appropriate, output signals to the actuators and display modules. In addition data are sent bidirectionally between the engine control module and the climate control module using the CAN.

Signals provided by the ECM to the CCM include:

- engine speed;
- air conditioning system pressure;
- engine coolant temperature;
- heated screen inhibit.

Signals provided by the CCM to the ECM include:

- compressor torque;
- compressor clutch command;
- heated screen request;
- cooling fan request.

Actuators

All actuators are mounted to the climate control assembly and control the following:

- Recirculation door.
- Defrost door.
- Face/floor door.
- Temperature blend door.

The recirculation door actuator is a dc motor (controlled by the CCM) that operates the recirculation door to determine whether fresh or recirculated air enters the car. The other three actuators are stepper motors, also controlled by the CCM, that position the appropriate door to reflect the settings selected by the occupant.

NOTE: The adaptor plate on which the stepper motors are mounted, is set during manufacture for correct gear wheel engagement. To ensure continued correct operation of the system, the precise positioning of the plate must be maintained; refer to **JTIS**.

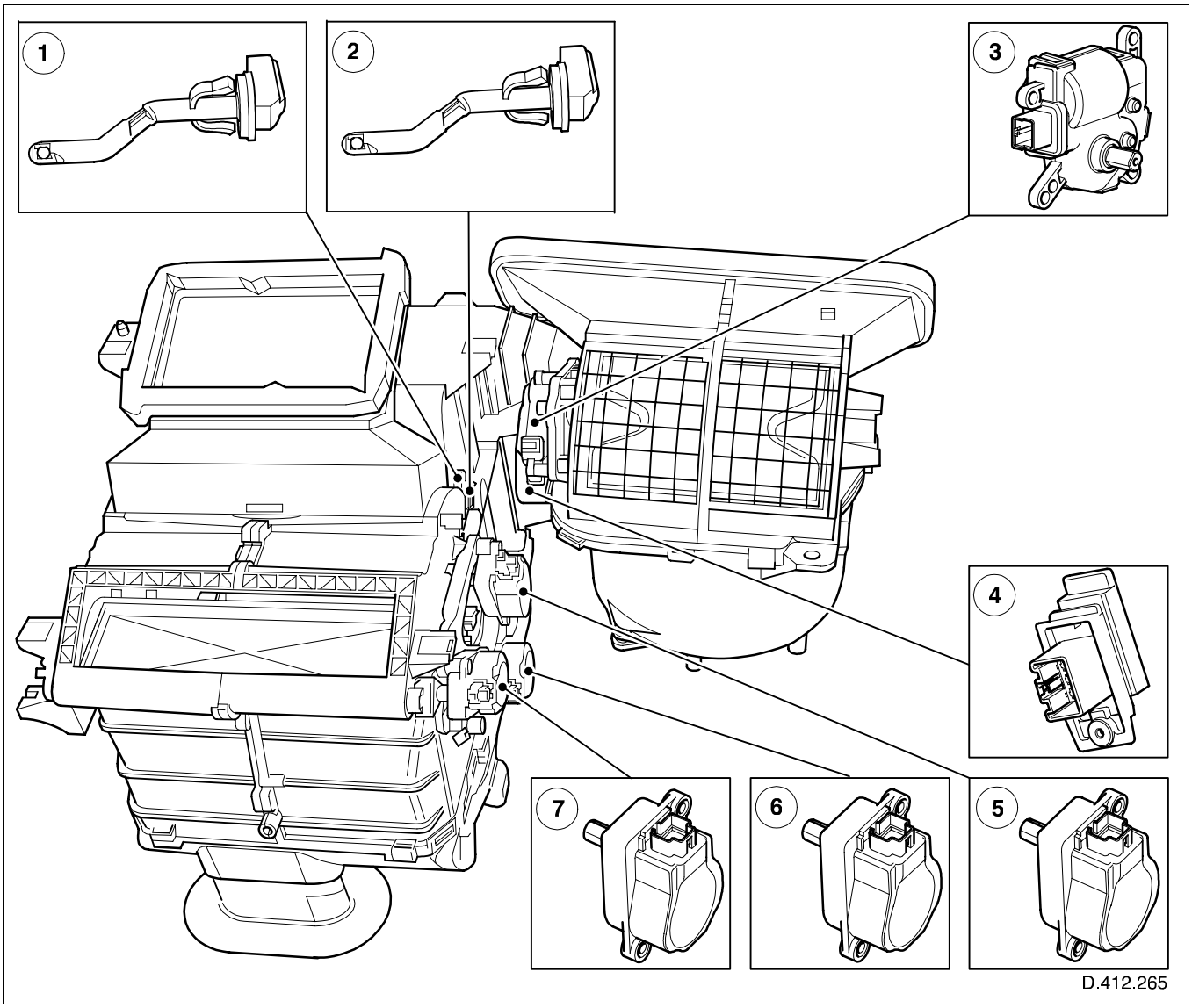

Fig. 32 Control components - climate control assembly

1. Discharge sensor
2. Evaporator sensor
3. Recirculation door actuator
4. Blower motor resistor pack (manual climate control only)
5. Defrost door actuator
6. Temperature blend door actuator
7. Face/floor door actuator

Instrumentation and Warning Systems

Instrument Cluster and Panel Illumination

The dimmer control is used to adjust the level of backlighting for the following:

- Instrument cluster.
- Hazard / seat heater switches.
- Cigar lighter.
- Climate control assembly.
- Telematics display module.
- Audio unit.
- J-gate module.
- Dynamic stability control switch.
- Steering wheel mounted switches.
- Roof console switches.
- Window switches.

NOTE: Pushing and releasing the dimmer control knob releases it from the stowed position for ease of operation.

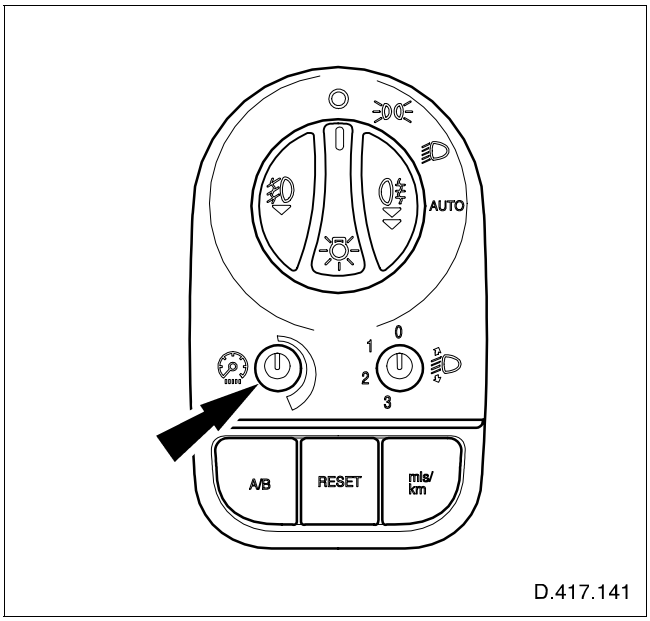

Fig. 33 Dimmer control

Instrument Cluster

Detailed instrument cluster features vary depending on market and vehicle specification.

The instrument cluster:

- Provides multiplex network gateway functionality for CAN and SCP; refer to **Module Communications Network**.
- Provides an interface between the passive anti-theft system (PATS) transceiver and the engine control module to enable the immobilization feature.
- Processes the speed sensitive steering inputs (where applicable).

The cluster comprises four gauges, warning lamps and either a dot matrix message center or liquid crystal display (LCD); refer to **Odometer, Trip Odometer / Trip Computer**.

Vehicles fitted with the message center have two warning lamps, one red, the other amber, located above the message center. The warning lamps alert the driver to the status of the warning message simultaneously displayed:

- The 'RED' warning lamp indicates a primary warning message that requires immediate investigation by the driver or a Jaguar Dealer.
- The 'AMBER' warning lamp indicates a secondary warning message requiring:
  - appropriate response by the driver;
  - the reporting of any associated malfunction to a Jaguar Dealer at the earliest opportunity.

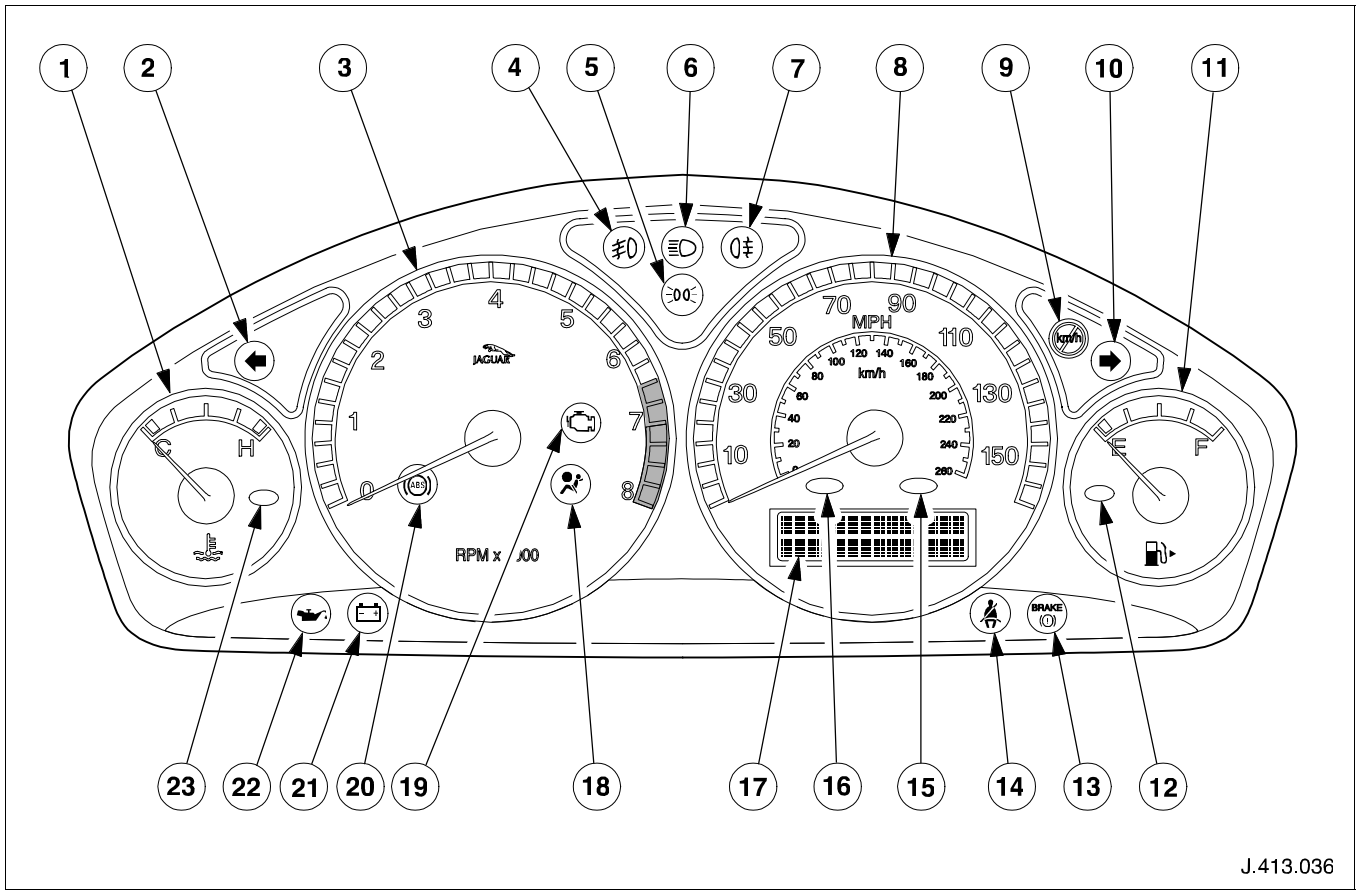

Fig. 34 Instrument Cluster

1. Engine temperature gauge
2. Turn signal indicator (LH)
3. Tachometer
4. Front fog lamps indicator
5. Side (parking) lamps indicator
6. High beam indicator
7. Rear fog lamps indicator
8. Speedometer
9. Overspeed warning indicator (where applicable)
10. Turn signal indicator (RH)
11. Fuel gauge
12. Low fuel level indicator
13. Parking brake/brake indicator
14. Safety belt warning indicator
15. Warning message amber indicator
16. Warning message red indicator
17. Message center
18. SRS indicator
19. Engine malfunction indicator
20. Anti-lock brake system (ABS) warning indicator
21. Charging system warning indicator
22. Low oil pressure warning indicator
23. High engine temperature indicator

Depending on market and vehicle specifications, the following warnings do not illuminate indicators on the cluster but instead, display the appropriate text via the message center:

- Engine malfunction.
- Door ajar warnings.
- Low washer fluid.
- Traction control warning.
- Speed (cruise) control.

Odometer, Trip Odometer / Trip Computer

Odometer

Depending on vehicle specification, odometer readings will be displayed by either the message center or the liquid crystal display (LCD). The trip reading is reset by pressing for longer than 2 seconds, the switch located at the end of the left-hand column stalk.

Trip Computer (where applicable)

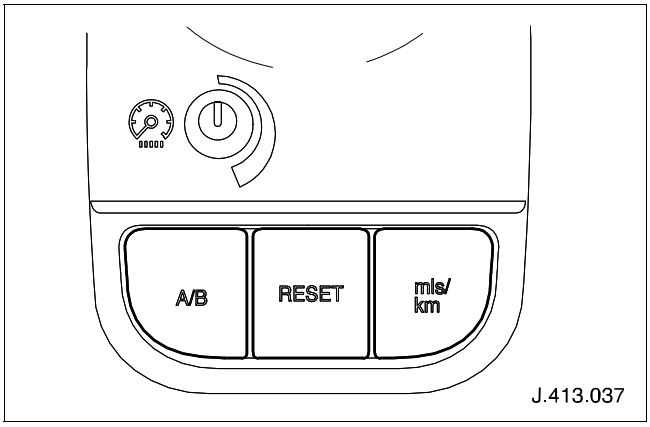

Fig. 35 Trip computer control switches

The trip computer is an integral part of the instrument cluster and is controlled by the three switches located at the bottom of the main lighting switch.

Selection of A or B switches permit the tracking of two separate journeys. The following calculations and readings are possible for both journeys:

- trip distances;
- average fuel economy;
- average speed;
- range.

Pressing the switch located at the end of the left-hand column stalk will cycle the trip computer information and messages.

The reset button is used to reset/clear the currently displayed trip computer.

Information and Message Center

The message center (where fitted) is a dot matrix type comprising 14 lines in 2 character rows with each character consisting of 5 x 7 dots.

NOTE: The message center is an integral part of the instrument cluster and cannot be serviced separately.

The primary function of the message center is to provide the driver with text messages including:

- warnings;
- temporary alerts;
- general information.

NOTE: The message center also displays messages for the benefit of the service technician.

Multiple messages will cycle in order of priority until they either expire or are cleared (temporary alerts) from the display.

NOTE: Warning messages are suppressed temporarily while the message center is cycling.

Warning Devices

The warning device system uses the general electronic control module (GECM) to control audible and visual warnings for the benefit of the driver and occupants. Warnings are associated with the following:

- Key-in ignition warning switch;
- Door ajar switches including luggage and engine compartment;
- Safety belt sensor;
- Headlamp switch;
- SRS malfunctions;
- J-gate park switch (where applicable).

The driver audible warnings sounder is integral to the GECM.

The visual warnings, where appropriate, are displayed via the instrument cluster using illuminated icons or the message center; refer to **Instrument Cluster**.

Parking Aid

Introduction

The system comprises:

- Parking aid control module.
- Speaker.
- Ultrasonic sensors.

The parking aid control module is mounted in the left-hand corner of the luggage compartment near the spare wheel.

NOTE: The module cannot be configured and the system cannot be disabled.

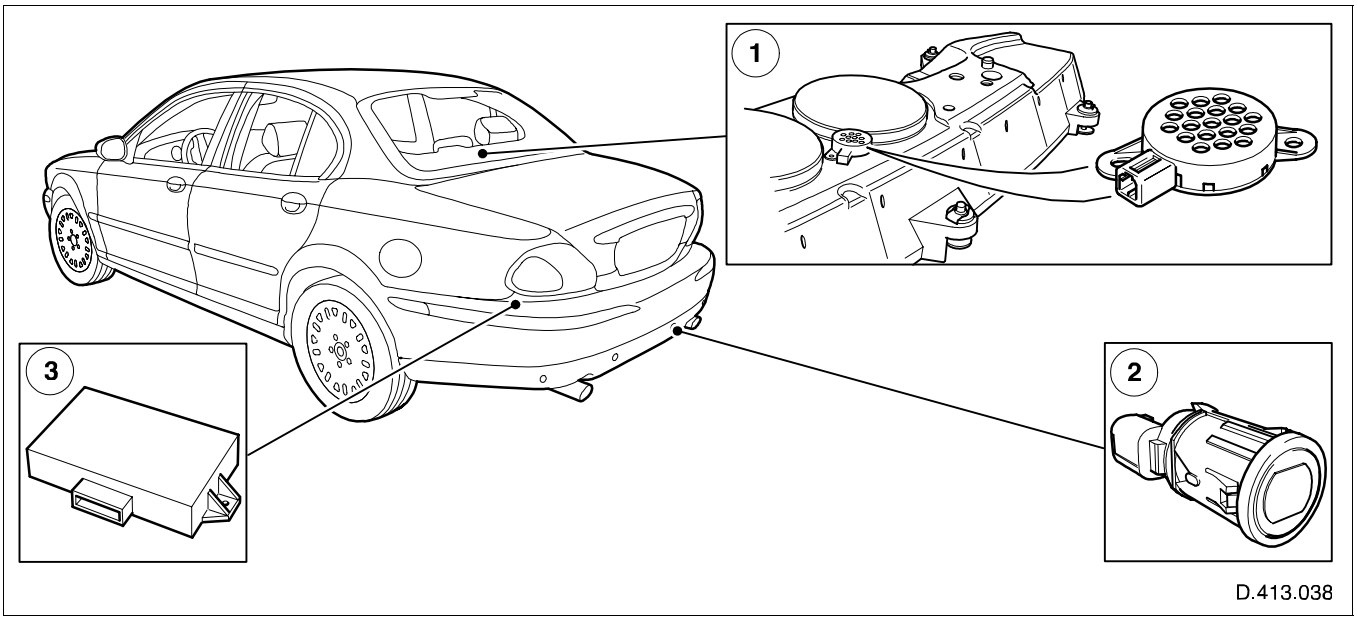

Fig. 36 Parking aid components

1. Speaker
2. Ultrasonic sensor
3. Parking aid control module

Operation

The parking aid system is activated when reverse gear is selected. The ultrasonic sensors are positioned to detect the presence of objects as the vehicle is reversed. Should an object be detected within the sensor range of 1.8m (70.9 inches) from the rear of the vehicle, the speaker should emit an intermittent audible warning. As the vehicle moves closer to the object, at a distance of 0.2m (7.9 inches), the intermittent audible warning should change to a continuous audible warning.

When trying to establish whether the system is behaving correctly, the following points should be taken into account:

- The range reduces to 0.6m (23.6 inches) at the vehicle corners.
- The vertical range is designed to protect the highest and lowest points at the rear of the vehicle.
- Curbs that are low enough to pass under the vehicle will not be detected.
- Curbs that are higher than 0.18m (7 inches) will be detected.

NOTE: The system is automatically inhibited when the trailer socket is connected; refer to **Towing Module**.

System Malfunction

A system malfunction will cause a continuous audible warning to be emitted for 3 seconds after reverse is selected and a DTC to be stored.

NOTE: Retrieval of the DTC and subsequent diagnosis of the system should be undertaken using WDS.

Battery and Charging Systems

Battery, Mounting and Cables

Battery

Unlike other current Jaguar models, the battery is located in the engine compartment. The battery is housed in a box and covered by a lid to provide protection from excessive temperatures.

The battery uses 'silver calcium technology' which features a specially formulated silver calcium alloy that is designed to operate at higher temperatures to reduce battery gassing and corrosion.

NOTE: The battery has no special service requirements, however disconnecting the battery will inevitably affect the cars electrical systems; refer to **Battery Disconnection**.

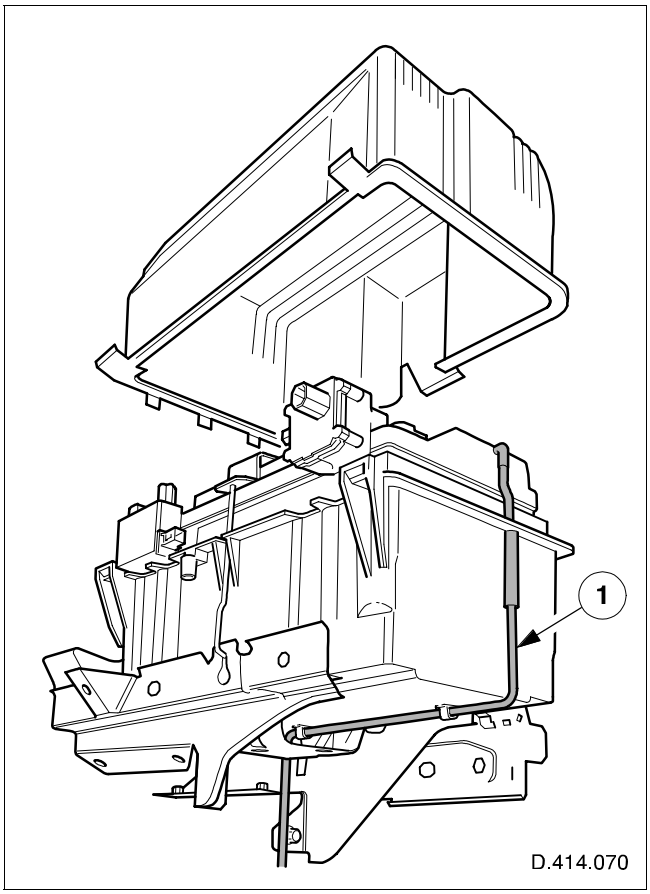

Fig. 37 Battery box and mounting brackets

1. Vent pipe

Battery Disconnection

The following electrical systems are affected when the battery is disconnected; refer to **JTIS** for details of effects and reconnecting information:

- Climate Control.
- Entertainment.
- Electronic Engine Control.
- Security / Locking.
- Transmission Control Module.
- Windows.
- Instrument Cluster / Trip Computer.
- Navigation.
- VEMS.

The following electrical systems are not affected by battery disconnection:

- Rain Sensitive Wipers.
- Voice Control.
- Occupant Restraints.
- Cellular Phone.
- ABS / DSC.
- VICS (Japan).
- Parking Aid.
- Automatic Headlamp Leveling.

Generator and Regulator

Electrically the generator is similar to previous models except for the voltage regulator functionality.

The engine control module (ECM) can switch the voltage regulator between two voltages to optimize the charging of the battery:

- The low voltage regulator setting is 13.6 volts
- The high voltage regulator setting is 15.3 volts

NOTE: The values, which will decrease with a rise in temperature or current flow, are measured with the generator at 25°C (77°F) and charging at a rate of 5 amps.

The ECM:

- Determines the voltage setting of the voltage regulator.
- Always selects the high voltage setting once the vehicle has started.
- Determines the period of time that the high voltage remains selected.

The ECM selects one of three different time periods dependent upon the operating conditions when the vehicle is started:

- The longest time period is selected if the ECM determines that the vehicle has been 'soaking' for sufficient time to allow the engine coolant temperature (ECT) and the intake air temperature (IAT) to fall within 3°C (37°F) of each other.
- The intermediate time period is selected when the ECT and the IAT fall below 5°C (41°F).
- The shortest time period is the default and is used to provide a short period of boost charge.

NOTE: At the end of these time periods the voltage is always set to the low voltage setting to prevent the battery from being overcharged.

The time periods are variable depending upon the temperature and the battery voltage.

The target voltage of the battery varies between 14 volts and 15 volts depending upon the ambient temperature and the vehicle operating conditions.

NOTE: Once this target voltage has been achieved, providing the vehicle has been operating for at least the shortest time period, the ECM will reduce the voltage regulator to the minimum setting of 13.6 volts.

There are three connections between the ECM and the generator; refer to **X-TYPE Electrical Guide** for details:

1. The voltage regulator request setting from the ECM to the generator.
2. A pulse width modulated (PWM) signal from the generator to the ECM which enables the ECM to monitor the generator load on the engine.
3. A charging system indicator signal wire from the generator to the ECM.

If the voltage regulator request line is open circuit or short circuit to battery voltage, the generator will permanently charge at 15.3v. If it is short to ground, it will permanently charge at the lower voltage, 13.6v.

NOTE: A DTC will be generated if a circuit malfunction is detected in any of the three lines connecting the ECM to the generator or if the connector is disconnected. The charging system indicator will also illuminate.

Entertainment Systems

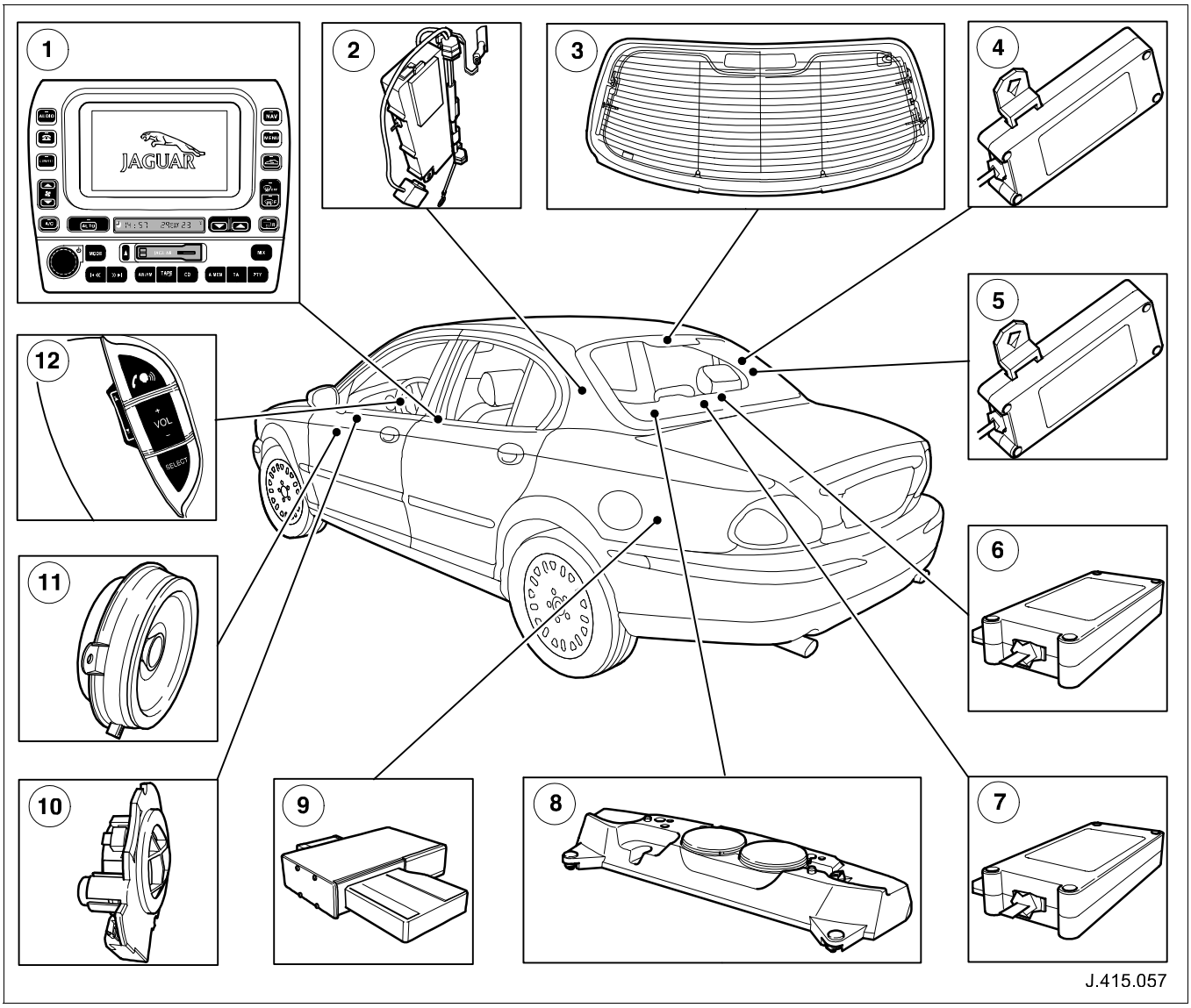

Fig. 38 Entertainment system components

1. Audio unit (telematics version)
2. Antenna amplifier and wavetrap
3. Antennas
4. Television antenna amplifier
5. Television antenna amplifier
6. Television antenna amplifier
7. Television antenna amplifier
8. Sub-woofer enclosure
9. CD changer
10. Tweeter
11. Speaker
12. Steering wheel telematics controls

Specific components will vary according to vehicle and market specifications.

The entertainment systems comprise:

- Audio system
- Antenna
- Speakers
- Video system

NOTE: The entertainment system may also be operated by spoken commands if the optional **Voice Activated Control System** is installed.

Audio System

The audio system comprises:

- Audio unit.
- CD changer.
- Steering wheel telematics controls.

Audio Unit

Depending on vehicle specification, the audio unit is integrated with the telematics display module (telematics version, **Fig. 39**) or integrated with the phone keypad and small LCD (non-telematics version, **Fig. 41**).

The audio unit:

- Manages the D2B network and provides the gateway to the SCP network; refer to **D2B network**.
- Stores diagnostic trouble codes for itself and the CD changer (where installed).

NOTE: The installation of new components within the audio system will necessitate the reconfiguration of the system using WDS.

Fig. 39 Audio unit - telematics version

Telematics version

The telematics version of the audio unit is integrated with the telematics display module and comprises:

- radio cassette;
- integral amplifier (4 x 35W output).

NOTE: The telematics display module is used in conjunction with the audio unit to control entertainment system functions but also provides the ability for the user to control such features as climate control; refer to **Telematics Display Module**.

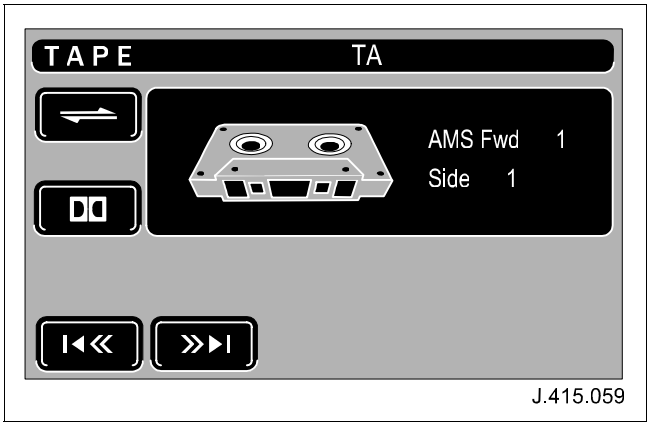

Fig. 40 Tape cassette - telematics display screen

Non-telematics version

The non-telematics audio unit comprises:

- radio cassette;
- liquid crystal display (LCD) including clock;
- integrated phone keypad;
- integral amplifier (4 x 35W output).

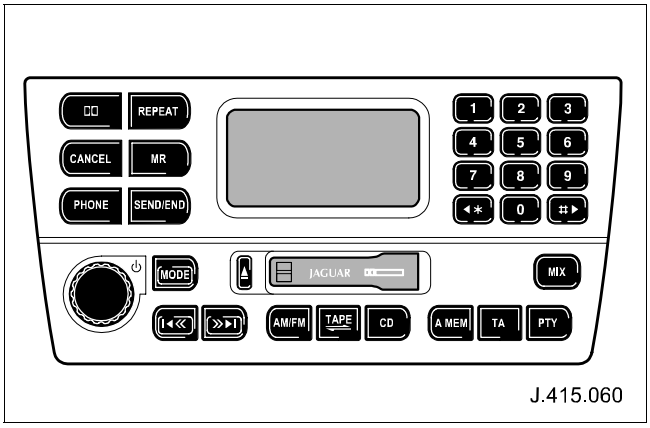

Fig. 41 Audio unit - non-telematics version

NOTE: The non-telematics version of the audio unit is complimented by the climate control panel/module; refer to **Climate Control System**.

CD Changer

The CD changer (where installed) is:

- located in the luggage compartment to the left-hand side;
- operated from either version of the audio unit; refer to **Audio Unit**.

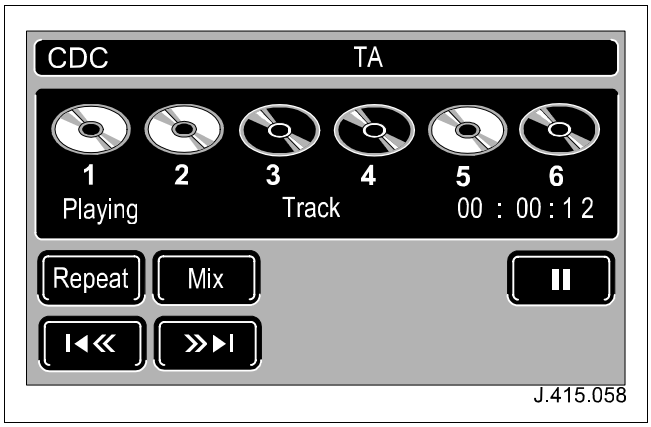

Fig. 42 CD changer - telematics display screen

Steering Wheel Telematics Controls

To ensure minimum disruption to concentration when driving, limited control of audio, telephone and voice activation systems is possible using the steering wheel telematics controls.

The controls provide the following functionality:

- Answer phone call, mute, or select voice activation.
- Increase or decrease volume.
- Selection of radio FM, AM, tape cassette, CDs, and phone ready mode.
- Cycle through preset radio stations, the next CD track or tape AMS (automatic music search).

Antenna

The following antennas (where applicable) are integrated into the rear window glass:

- FM element.
- AM element.
- Four television antenna patterns (each requiring a separate antenna amplifier).

NOTE: The television receiver uses '4-part antenna diversity' to obtain the optimum signal.

There are four television antenna amplifiers to suit, two are located on the parcel tray and two at the right-hand C-post.

- The radio antenna amplifier is located at the left-hand C-post.

NOTE: For Japan, the vehicle information communications system (VICS) module, replaces the television antenna amplifier (item 4, **Fig. 38**). Although television reception can now only be achieved using '3-part antenna diversity', this is still adequate.

Speakers

The premium audio sound system comprises:

- Four lightweight mid-bass door speakers.
- Four door-mounted tweeters.
- Sub-woofer enclosure.

The base audio sound system comprises:

- Four full range door speakers

Video System

The video system is optional and dependent on market and vehicle specification, it comprises:

- Telematics display module; refer to **Telematics Display Module**.
- Television antennas and amplifiers; refer to **Antenna**.

The television receiver is integrated into the telematics display module (where applicable) and teletext is available in appropriate markets.

Lighting

Exterior Lighting

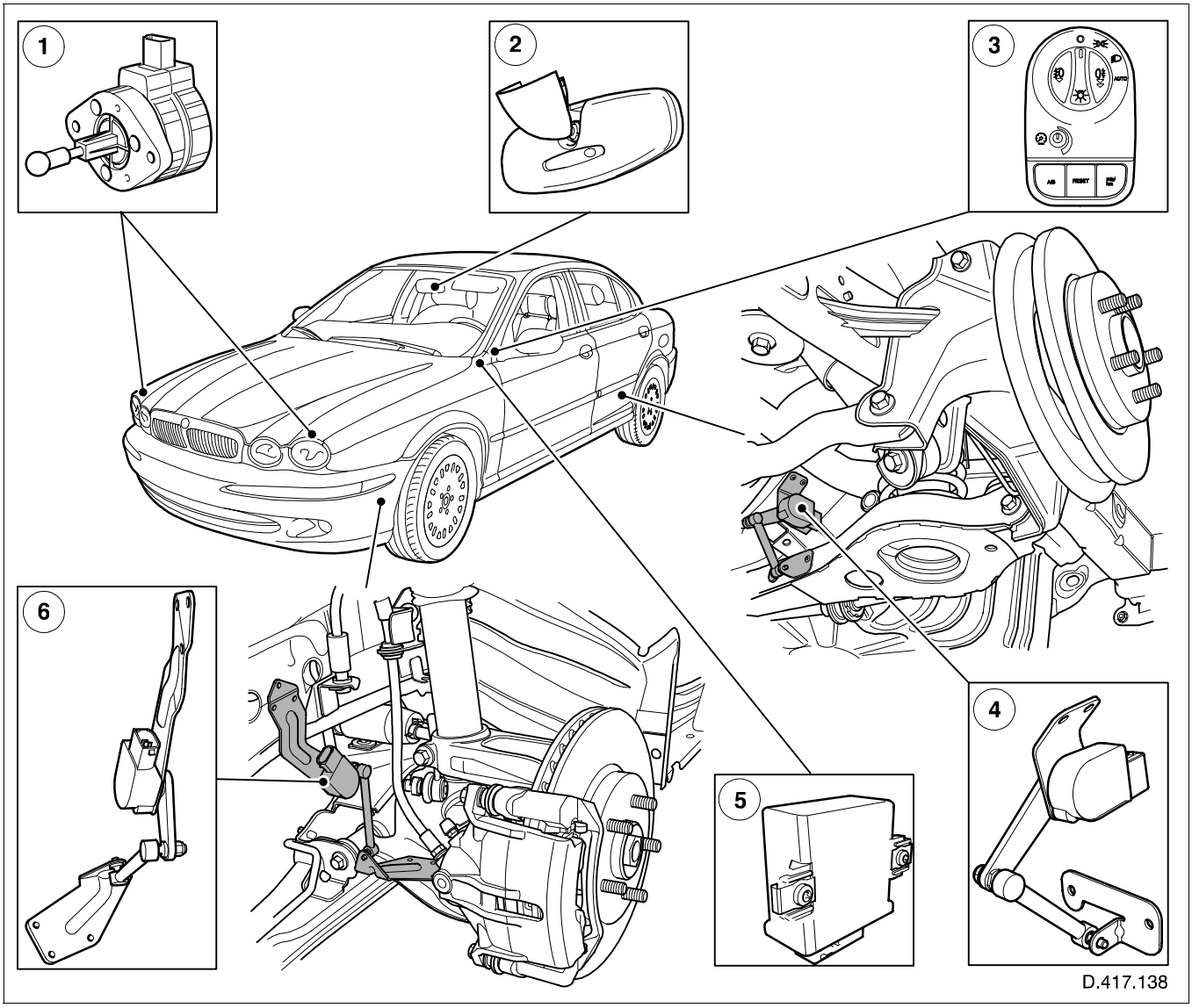

Fig. 43 Headlamp features

1. Motor (automatic headlamp leveling)
2. Autolamp sensor
3. Main lighting switch
4. Rear-axle level sensor assembly
5. Headlamp leveling control module
6. Front-axle level sensor assembly

Depending on market and vehicle specification, X-TYPE has only two major deviations from a standard exterior lighting arrangement: autolamp and high-intensity discharge headlamps (complete with automatic headlamp leveling).

The exterior lighting is activated by the main lighting switch and where appropriate, the left-hand column switch (high beam).

NOTE: Due to the 'warm-up time' experienced with xenon lamps, the low beam lamp is not used for the headlamp flash feature; the high beam is used instead.

Switching is via allocated fuses and relays, with the exception of the turn signal lamps/ hazard warning lamps, which are controlled by the general electronic control module (GECM); refer to **X-TYPE Electrical Guide** for detailed information.

Main Lighting Switch

The main lighting switch assembly comprises:

- Rotary switch.
- Dimmer switch; refer to **Instrument Cluster and Panel Illumination**.
- Headlamp leveling switch (where applicable); refer to **Headlamp Leveling** .
- Trip computer switchpack; refer to **Odometer, Trip Odometer / Trip Computer**.

The rotary switch is used to activate the following:

- Side lamps
- Headlamps
- Autolamp
- Front fog lamps
  - The lamps are activated when the rotary switch is 'pulled' to its first position, provided the side lamp or headlamp position is also selected.

NOTE: The front fog lamps will not operate if main beam is selected.

- Rear fog lamps
  - The lamps are activated when the rotary switch is 'pulled' to its second position, provided the rotary switch is not at the OFF position.

NOTE: The front fog lamps will automatically operate when the rear fog lamps are selected provided the main beam is not selected.

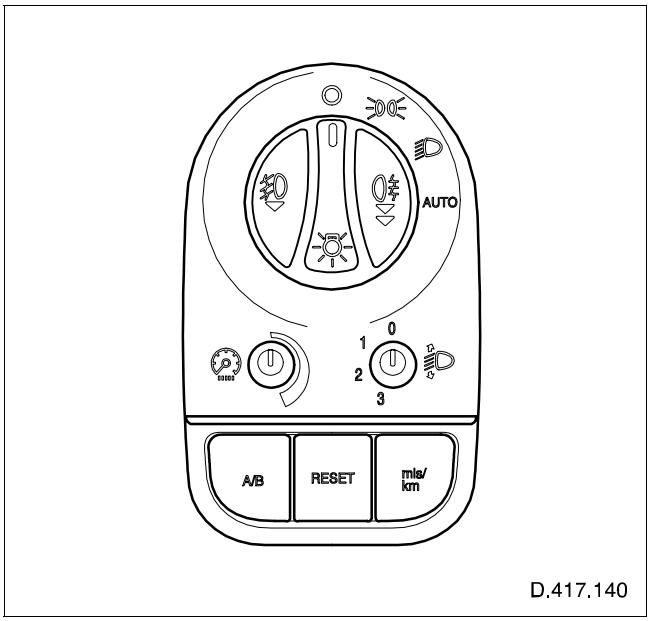

Fig. 44 Main lighting switch

Halogen Headlamps

NOTE: After approximately 5 minutes a noticeable fall in light output may be observed. The effect is due to a voltage boost feature that has been introduced; refer to **Generator and Regulator**.

High Intensity Discharge Headlamps (where applicable)

The high-intensity discharge headlamp assembly comprises:

- Low beam lamp (xenon)
- High beam lamp (halogen)
- Side lamp
- Turn signal lamp
- Xenon lamp control module
- Ignitor
- Headlamp leveling motor

Vehicles fitted with the high-intensity discharge lighting system use xenon lamps for the low beam instead of standard halogen lamps.

- The functionality of the low beam remains unchanged.
- The high beam, turn signal and side lamps are all conventional lamps.

NOTE: Due to national legislation, vehicles equipped with xenon lamps require the installation of **Automatic Headlamp Leveling** and a **Headlamp Cleaning System**; refer to the appropriate section.

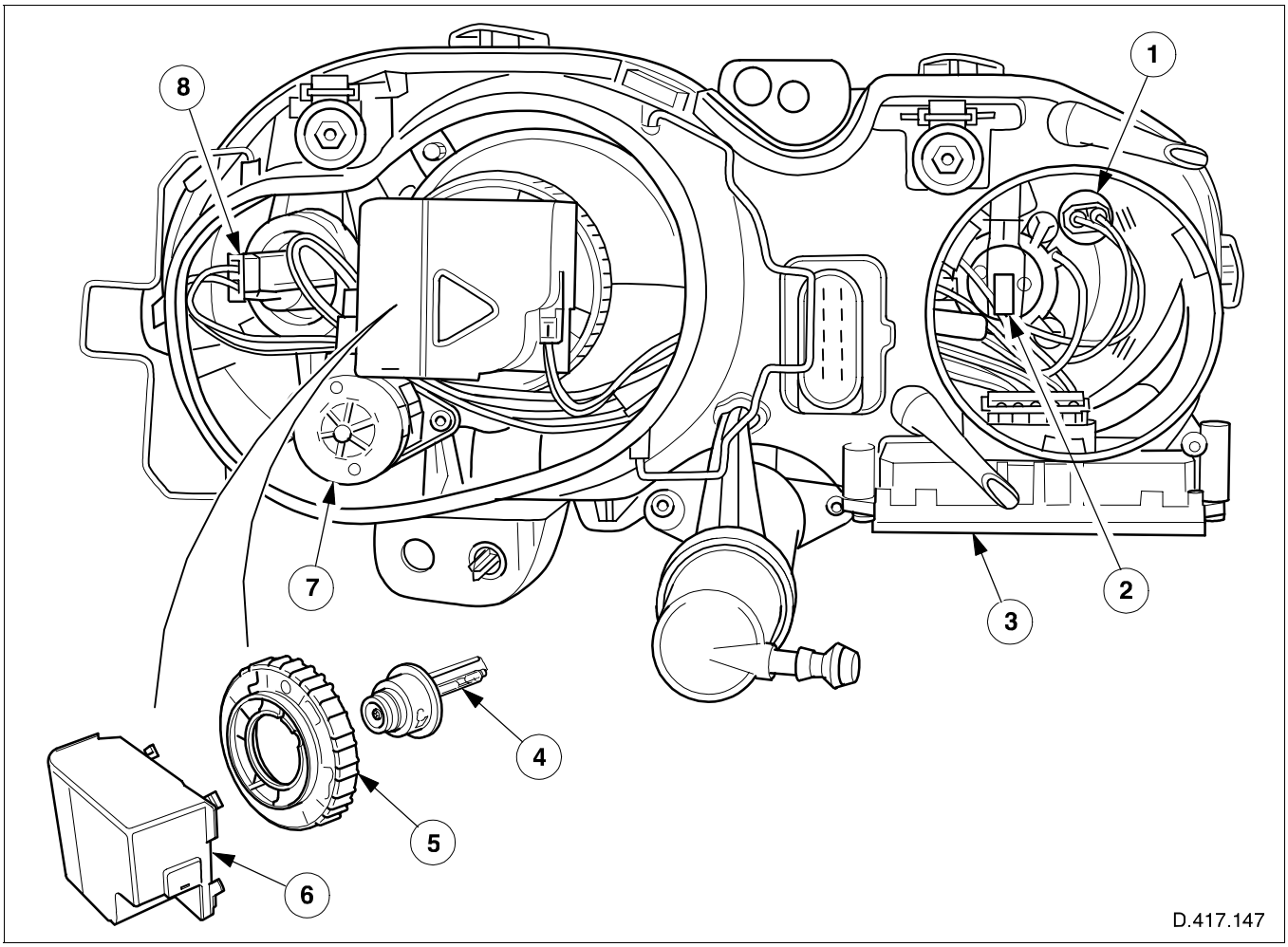

Fig. 45 High-intensity discharge lamp assembly

1. Side lamp
2. High beam lamp
3. Xenon lamp control module
4. Low beam lamp
5. Clamping ring
6. Ignitor
7. Motor (automatic headlamp leveling)
8. Turn signal lamp

Xenon Lamp

WARNING: Electrical voltages of up to 30kV are possible at the xenon lamp, therefore suitable safety precautions must be observed; refer to JTIS.

The 35 watt xenon lamp produces a beam with an intensity that is approximately three times that produced by a conventional lamp of the same wattage.

The chamber, item 1 (**Fig. 46**) contains xenon gas and a mixture of metal halide salts.

High voltage (typically 20kV) ignition is provided by the xenon lamp control module and an arc forms in the chamber as the gap between the two electrodes is bridged. After ignition there is a warm-up period of approximately 3 three seconds during which the metal-halide salts evaporate. This brief excess-current phase is followed by stabilization of the arc and the regulation of the lamp output at 35W by the control module.

NOTE: Unlike conventional lamps, xenon lamps do not deteriorate and so should last the lifetime of the vehicle.

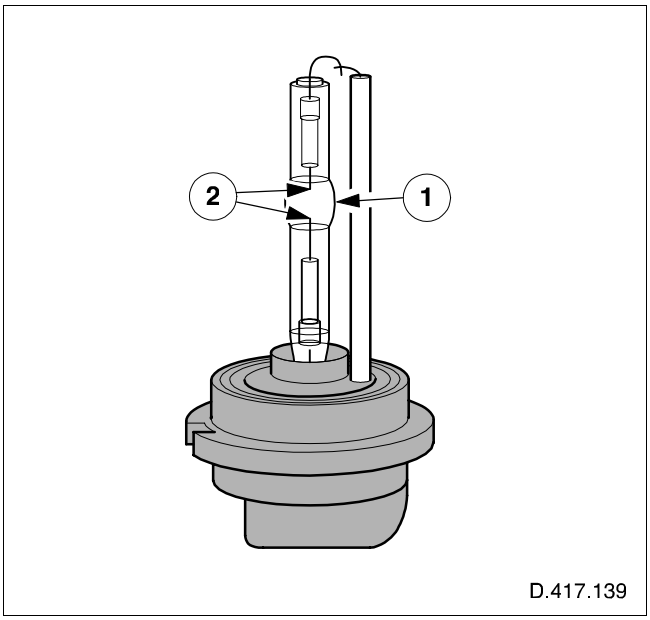

Fig. 46 Xenon lamp

1. Gas-filled chamber
2. Electrodes

Xenon Lamp Control Module

The module is a complex piece of electronics that in addition to regulating start-up and stabilizing output, provides circuit protection by recognizing malfunction conditions such as:

- Power supply deviations.
- Absence of light source.
- Short circuits.

NOTE: The high-voltage stage will be deactivated unless all system components are functional and correctly connected.

Headlamp Beam Position

A lever-operated shutter has been incorporated into the headlamp assembly to permit simple switching of the headlamp beam position to meet foreign driving regulations.

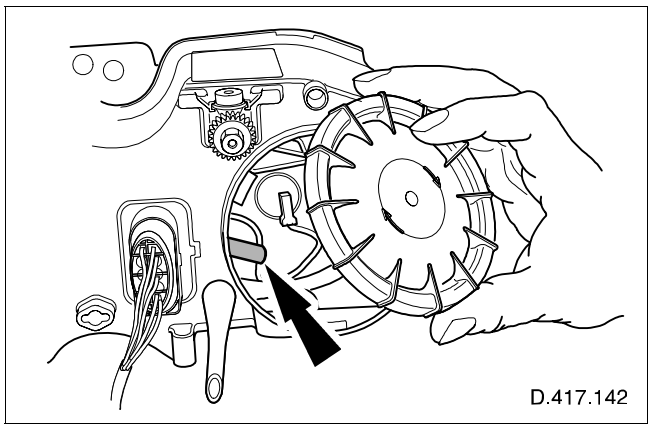

Fig. 47 Headlamp beam position lever

Headlamp Leveling

- Headlamp leveling is fitted as standard for halogen lamps and features the normal arrangement whereby a potentiometer (part of the main lighting switch) is used to activate the headlamp leveling motors and consequently alter the position of the headlamps.
- 'Automatic headlamp leveling' has been developed to support vehicles fitted with xenon lamps. The feature automatically maintains the headlamps within the legally required angular position to avoid dazzling other drivers as a result of vehicle acceleration, deceleration or variation in terrain.

Automatic Headlamp Leveling

The system comprises:

- Front-axle level sensor assembly
- Rear-axle level sensor assembly
- Headlamp leveling module
- Left-hand headlamp leveling motor
- Right-hand headlamp leveling motor

Automatic headlamp leveling is operational when the main lighting switch is set to the headlamp, rear fog lamp or autolamp position and the ignition key is at position 'II'.

The headlamp leveling module is located at the left-hand side of the instrument panel and is accessible after removing the side and lower panels.

The axle level sensors are inductive devices that respond to the vertical position of the vehicle and supply feedback signals to the module. The module processes the data and supplies appropriate signals to the headlamp leveling motors causing the position of the headlamps to be adjusted accordingly.

NOTE: After disconnecting any element of the automatic headlamp leveling system, recalibration will be necessary using WDS.

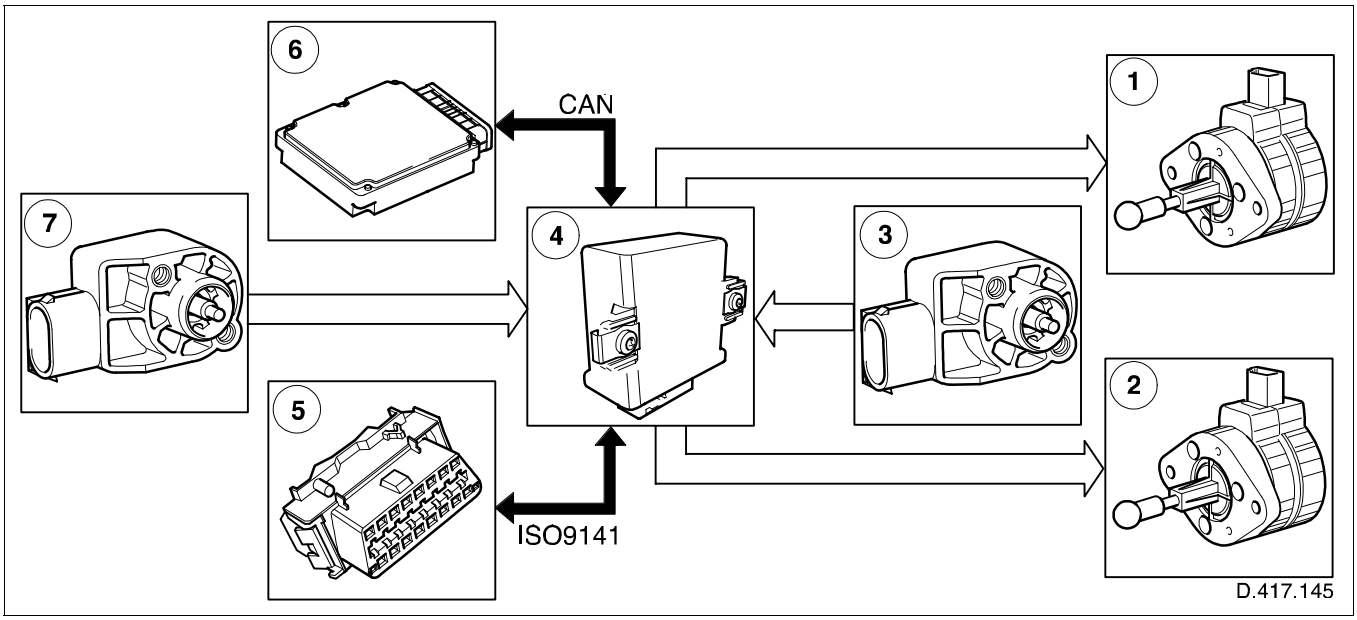

Fig. 48 Automatic headlamp leveling system

1. Left-hand headlamp leveling motor
2. Right-hand headlamp leveling motor
3. Front-axle level sensor
4. Headlamp leveling module
5. Diagnostic connector
6. Engine control module
7. Rear-axle level sensor

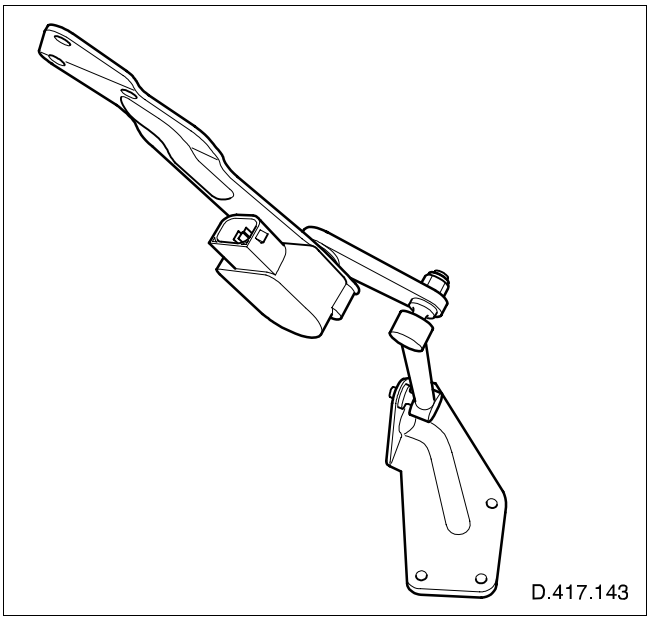

Fig. 49 Front-axle level sensor assembly

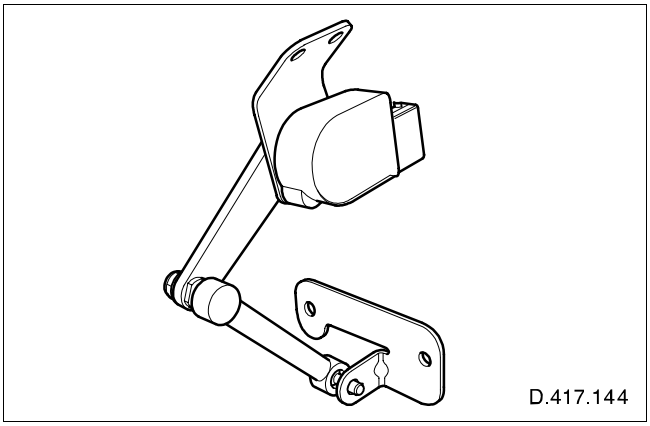

Fig. 50 Rear-axle level sensor assembly

Diagnostics

System malfunctions will cause a DTC to be stored in the ECM. Retrieval of the DTC and subsequent diagnosis of the system should be undertaken using WDS.

Autolamp (where applicable)

A sensor monitors ambient light levels and provides feedback that will permit the automatic control of the side lamps and low beam headlamps where appropriate, providing:

- The ignition key is at position II.
- The AUTO option on the main lighting switch is selected.

NOTE: The sensor is integral to the interior rear view mirror (but is only available when the electrochromic mirror is fitted), therefore obstruction of the sensor, including failure to keep the windshield clean, will affect the operation of the lamps.

The sensor is calibrated to monitor ambient light levels:

- Detection of darkness for 2 seconds continuously, will cause the low beam and side lamps to be activated.
- Detection of daylight for 15 seconds continuously, will cause the exterior lighting to be extinguished.

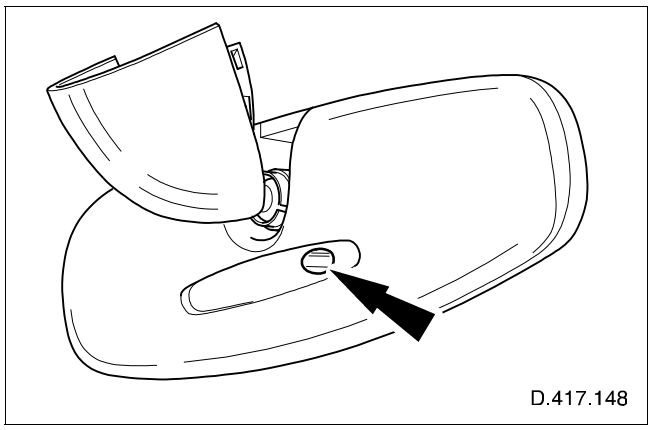

Fig. 51 Autolamp sensor

Headlamp Convenience

The headlamp convenience feature is controlled by the general electronic control module (GECM) and is activated when the headlamp convenience button on the key fob transmitter is pressed. The main beam will illuminate for 30 seconds or until the convenience button is pressed again or the ignition key is turned to position 'II'.

NOTE: This facility only functions when the ignition key has been removed.

Towing Module (where applicable)

The towing module is mounted in the luggage compartment at the right-hand side of the spare wheel well. The module provides a convenient method of interfacing the vehicle lighting system to a trailer; refer to **X-TYPE Electrical Guide** for connection details.

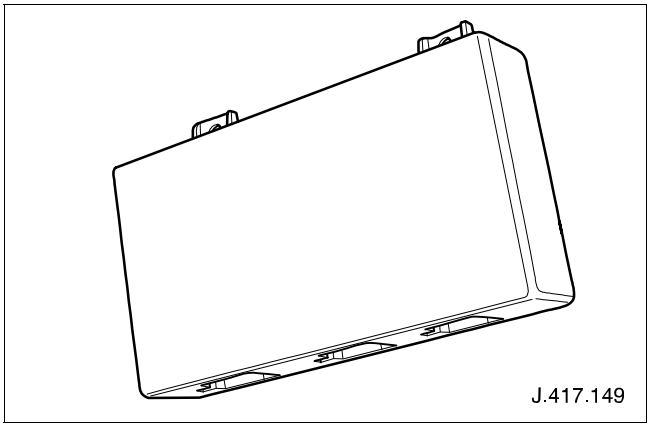

Fig. 52 Towing Module

Interior Lighting

The interior lighting comprises:

- Footwell lamps
- Front interior lamp and switch
- Map lamps and switches
- Vanity mirror lamps and switches
- Rear interior lamp and switch
- Puddle lamps
- Luggage compartment lamp and switch
- Glovebox lamp and switch

Except for the glovebox lamp which receives battery supply voltage only when the main lighting switch is active, all lamps receive battery supply voltage via the battery saver relay (located in the central junction fusebox); refer to **Battery Saver**.

The glovebox lamp and luggage compartment lamp have direct ground returns. The courtesy lamps have a separate ground return via the general electronic control module (GECM). All other interior lights receive a ground return via the GECM in the form of a controlled signal that provides progressive illumination and deactivation during normal operation.

NOTE: Refer to **X-TYPE Electrical Guide** for detailed connection information.

Battery Saver

A timer function within the GECM controls the battery saver relay:

- The timer is initialized when the ignition key is turned to position ‘0’ or ‘I’.
- After a 30 minute period, the GECM will deactivate the battery saver relay which will remove the battery voltage from all interior lighting and the warning chime feature.

The GECM will reactivate the battery saver relay when:

- The ignition key position is changed.
- Any door (including the luggage compartment door) becomes ajar or is opened.
- An external unlock is activated using either the door lock cylinder or the key fob transmitter.

Courtesy Lighting

The courtesy lamps are controlled by the general electronic control module in the following circumstances:

- Any of the vehicle's doors are open.
- An external unlock is activated using either the door lock cylinder or the key fob transmitter.

The courtesy lighting feature extinguishes the courtesy lamps when all the vehicle's doors are closed and any of the following occurs:

- Twenty-five seconds has elapsed since either an external unlock or the last door has closed, whichever occurs last.
- The ignition key is turned from position '0' or 'I' to position 'II' or 'III'.
- An external lock is activated using the door lock cylinder or key fob transmitter.

In addition, the courtesy lighting feature extinguishes the courtesy lamps when the battery saver timer has expired; refer to **Battery Saver**.

During normal operation (but not when switched manually) the courtesy lamps:

- Progressively illuminate when activated.
- Progressively extinguish when deactivated.

NOTE: When the battery saver feature is active the lamps will extinguish immediately.

Electrical Distribution

Module Communications Network

The X-TYPE is the most complex Jaguar to date in terms of both the number of harness variants and the possible combinations necessary to achieve given vehicle specifications.

The most significant deviation from the distribution system used for other Jaguar models is the introduction of optical fiber cables to accommodate the transfer of very high-speed, real-time audio data.

The optical fibers provide an optical network that interfaces to the SCP network via the audio unit; refer to **D2B network** for detailed information.

NOTE: The optical network currently uses a transfer protocol known as D2B. Although this protocol may change in the future, the optical network will be referred to as 'D2B' throughout this and other Jaguar technical publications.

SCP, CAN and ISO9141 networks

The standard corporate protocol (SCP), controller area network (CAN) and ISO9141 networks are configured in a similar way to current Jaguar models to accommodate different data types and flow rates as required for the various vehicle features; refer to **Table 3**

Network	Communication between	Speed (kbps)
CAN	Engine, Transmission, Braking System	500
SCP	Lower Speed Body Systems	41.6
ISO9141	Diagnostic connector and ECM; control modules with self-diagnostic capability not connected to CAN or SCP	10.4

Table 3 Network communication

Fig. 53 provides a representation of the major network interconnections; refer to **X-TYPE Electrical Guide** for detailed information.

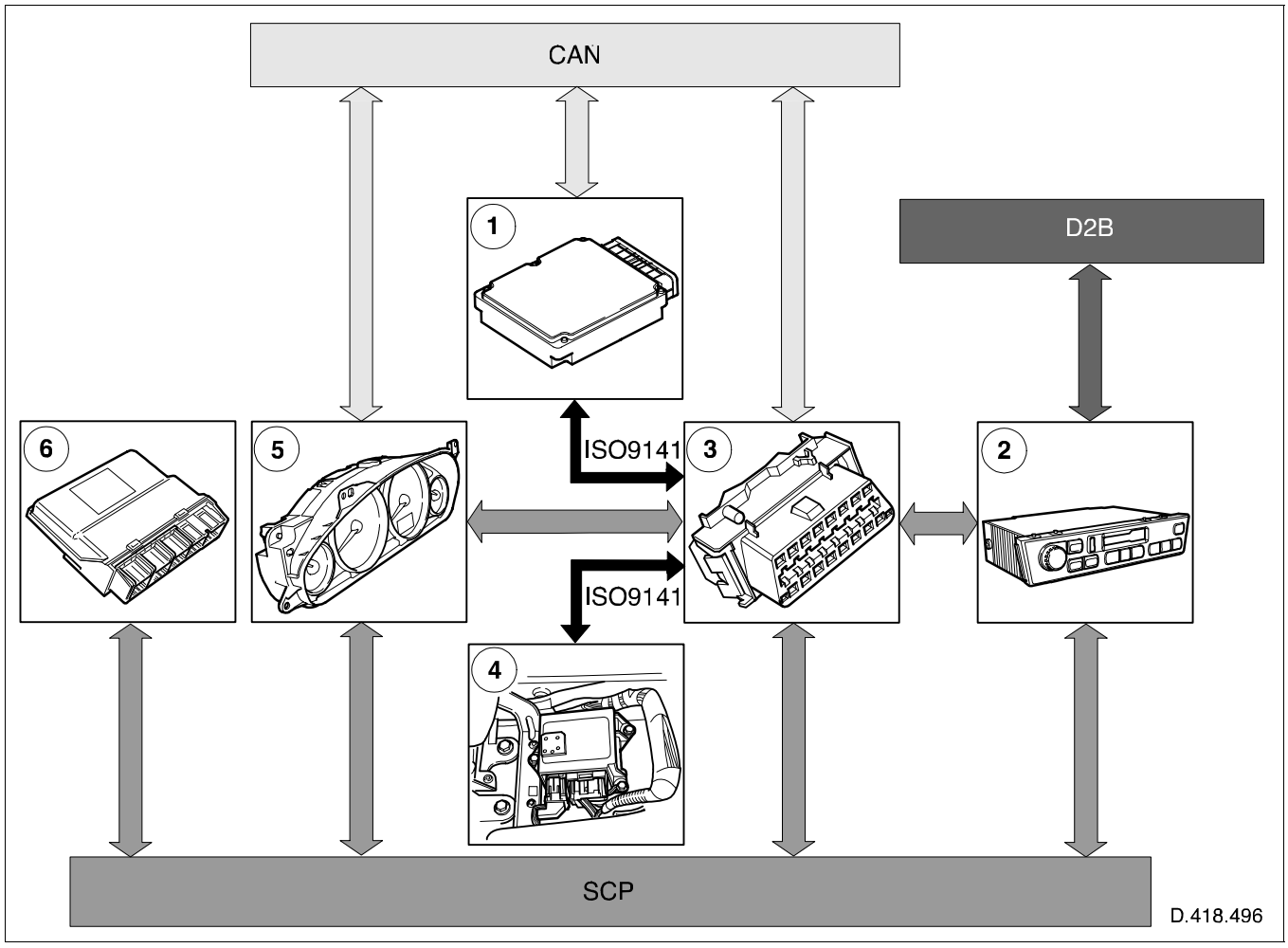

Fig. 53 Network interconnections

1. Engine control module
2. Audio unit
3. Diagnostic connector
4. Restraints control module
5. Instrument cluster
6. General electronic control module

Network modules

Fig. 54 shows the main modules and locations; refer to the appropriate section and to **X-TYPE Electrical Guide** for detailed information.

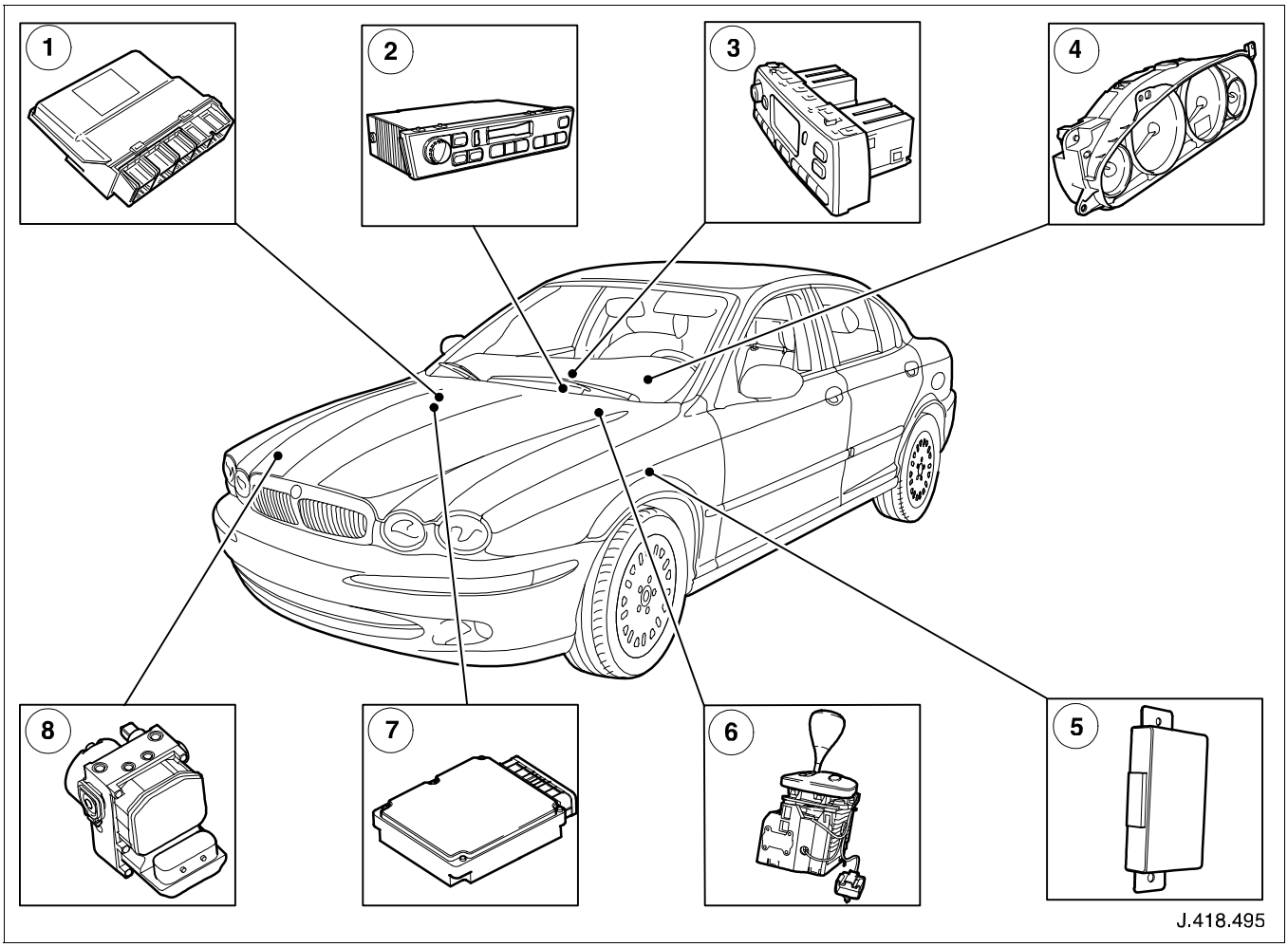

Fig. 54 Location of network modules

1. General electronic control module
2. Audio unit
3. Climate control module
4. Instrument cluster
5. Transmission control module (automatic only)
6. J-gate module (automatic only)
7. Engine control module
8. ABS module

D2B network

The D2B network comprises:

- Optical fiber.
- Wake-up wire.
- Master module (audio unit).
- Slave module(s).
- Intermediate connectors.

The network:

- is structured as a unidirectional ring;
- uses plastic optical fiber to transport data from one module to another in ring order.

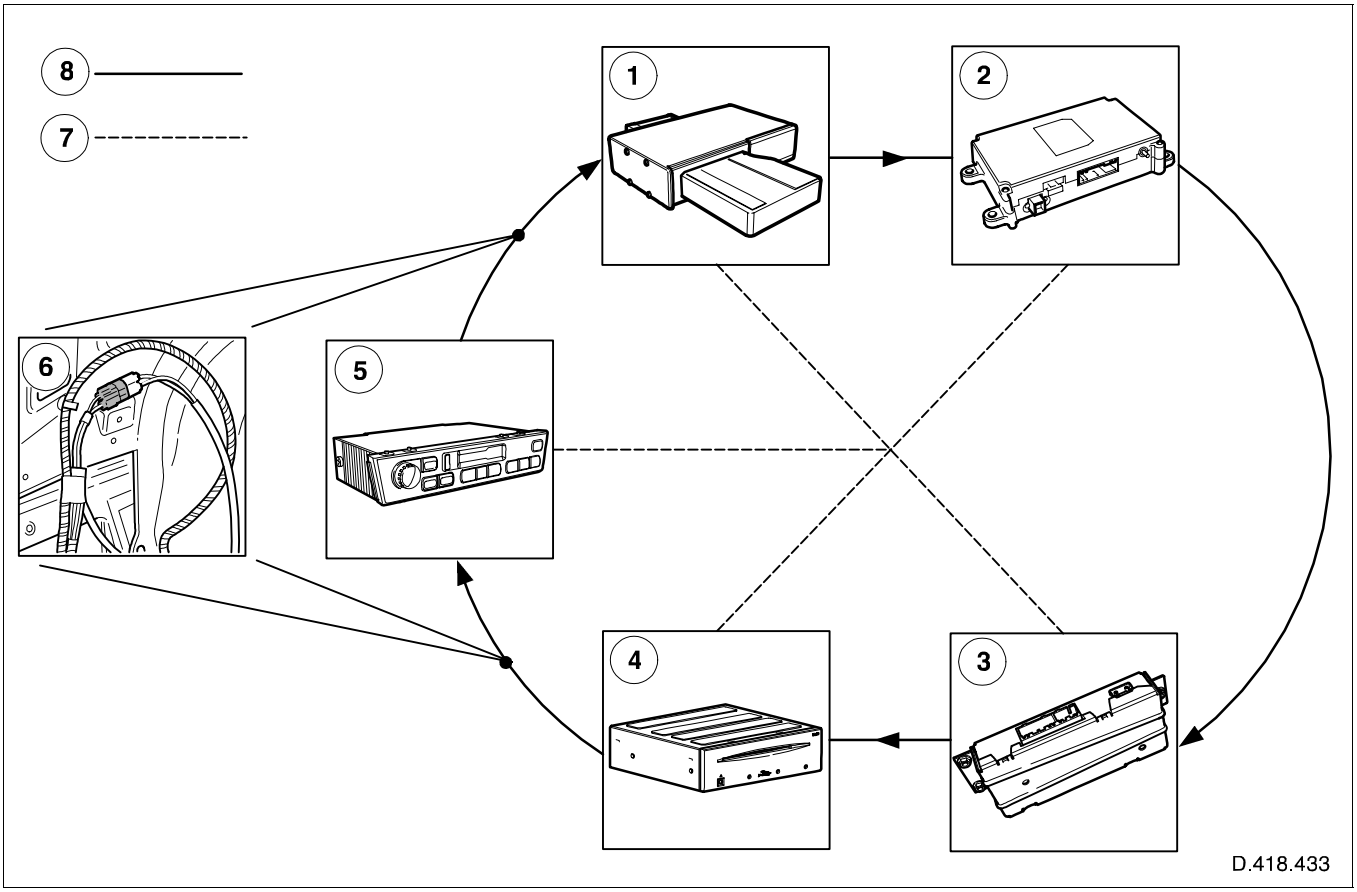

Fig. 55 D2B network

1. CD changer
2. Cellular phone control module
3. Voice activation control module
4. Navigation control module
5. Audio unit (master module)
6. D2B intermediate connector
7. Wake-up wire
8. Optical fiber

Optical fiber

The fiber comprises a 1mm polymer core with a 3.5mm diameter outer protective jacket.

The fiber facilitates the transport of data in the form of pulses of light which are too fast to be seen by the eye, at a data bit rate of approximately 5.5M bits per second.

Wake-up wire

The wake-up wire comprises copper wire configured in a star-like arrangement that connects to a single pin on each of the modules; refer to **Fig. 55**.

- The audio unit sends a wake-up command (an electrical pulse) via the copper wire to initialize the slave module(s).
- The wake-up pulse is sent when the ignition key is turned to position 'I'.
- The pulse triggers slave modules to look at the preceding module for a 'light signal' (originated by the audio unit) and to participate with the audio unit in network initialization.
- At the end of this initialization procedure, the modules are ready for full network operation.

NOTE: Any malfunction during the initialization stage will cause a DTC to be stored by the audio unit.

Master module

The master module is the audio unit; it manages the D2B network and provides the gateway to the SCP network.

Slave module(s)

A slave module is any other system module that is connected to the D2B network and includes:

- Navigation control module
- CD changer
- Cellular phone control module
- Voice activation control module

Intermediate Connector

There are two D2B intermediate connectors, one (located at the left-hand A-post) provides harness interconnection only; the other one (located in the luggage compartment to the left-hand side) provides the interconnection point for the slave modules.

NOTE: For vehicles that have modules already installed that utilize the optical network, the D2B intermediate connector may be accessible only after removing the installed module(s); refer to appropriate **Accessory Fitting Instructions** for details.

Modules that connect to the D2B network, use special optical fiber assemblies which interface with the D2B intermediate connector in the luggage compartment; the assemblies may vary depending on the particular combination of modules connected to the network.

NOTE: Optical fibers are incorporated into the instrument panel and cabin harnesses during manufacture to support dealer installation of the CD changer, voice control and cellular phone systems.

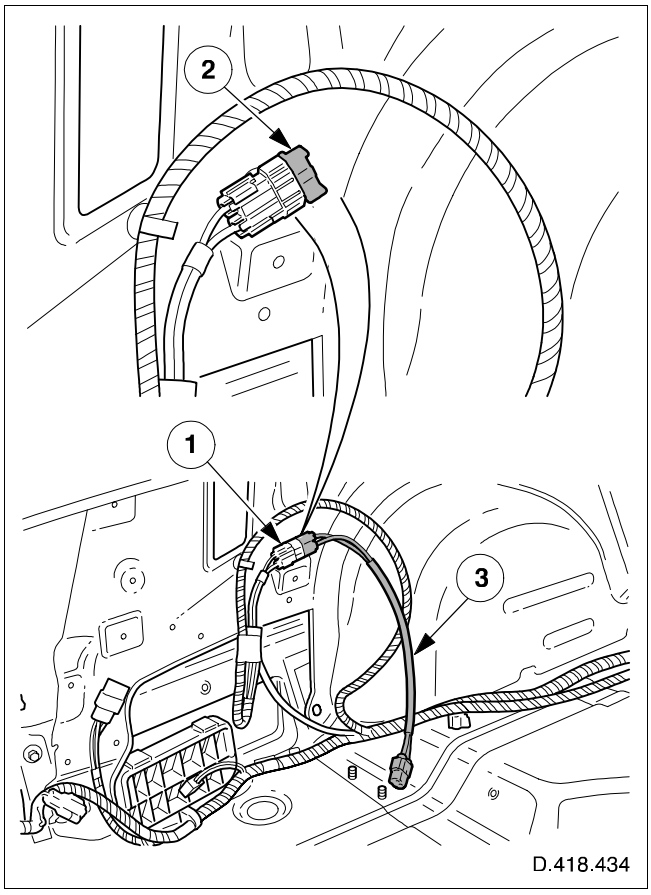

Fig. 56 Location of D2B intermediate connector

1. D2B intermediate connector
2. Dust cap
3. Slave connecting harness

Differences between D2B and CAN or SCP

- D2B provides multiple communications channels instead of one channel.
- D2B has a control channel (which operates in a similar way to CAN or SCP) but in addition has three source data channels which can be used to transport up to three separate streams of 16-bit digital stereo data.

Optical fiber cables and connectors

Under normal installation conditions, the system is robust and failures should not occur, however since the optical fibers convey data using light, it is vital that the passage of light down the fiber is unobstructed. Obstruction of light can be caused by:

- contamination of the fiber ends;
- damage to the fiber ends;
- bending, kinking or damaging the cable.

NOTE: Fibers damaged by kinking or exposure of the optical core due to abrasion must be replaced.

Handling

Take special care to avoid damage or contamination when handling or working in the vicinity of fiber optical cables and connectors.

NOTE: Damage or contamination includes scratches to the cable ends and pollution caused by dust, dirt or oil.

CAUTION: When handling optical fibers, cleanliness is of paramount importance. The fiber ends should not be touched even with clean bare hands, as the natural oils deposited from the skin may penetrate the fiber or may cause dirt to adhere to the fiber end.

System malfunctions and unnecessary warranty claims can be minimized by following these guidelines:

- After disconnection of any cables, carefully install an appropriate dust cap to protect the mating face of the connectors from damage or contamination.
- Avoid introducing tight bends (less than 25mm radius) or kinks into the optical fiber during service or repair. Tight bends or kinks could:
  - impair system operation;
  - cause immediate system failure;
  - cause future system failure.
- Avoid excessive force, strain or stress on the fibers and connectors, especially permanent stress after reinstallation.

Optical network diagnostics

Unlike the other networks that communicate with WDS via the diagnostic connector, the optical network interfaces with the diagnostic connector via the audio unit and the SCP network.

NOTE: Diagnosis and Testing is quite complex and specific; refer to **JTIS** for details.

Electronic Feature Group

Anti-Theft

Anti-theft options depend on market specification and include a perimeter alarm system and a passive anti-theft system (PATS). The X-TYPE incorporates the following, either as standard or dealer installed options:

- Key barrel on driver's side only.
- Encrypted instrument cluster/engine control module immobilization system, controlled by the ignition key transceiver/transponder.
- Radio frequency remote transmitter integrated into main key.
  - Four control buttons (lock, unlock, luggage compartment lid release, headlamp convenience / panic).
- Double locking by key and remote transmitter (not North America or Japan).
- Central locking by key, remote transmitter and interior handle.
- Auto-locking
  - Drive-away locking (standard, except Japan).
  - Auto-relock.
- Perimeter alarm of doors, hood and luggage compartment lid.
- Intrusion sensing, ultrasonic sensors integrated into overhead console.
- Inclination sensing - (part of security pack in Netherlands, option in Europe).
- Panic alarm - remote transmitter operated.
- Integrated security system indicator lamp (dual function - indicates vehicle alarm system armed and PATS fault codes).
- Two-stage unlocking (certain markets).
- Separate security horn or battery backed security sounder (market dependent).

Definition of terms:

- Double-locking - the vehicle cannot be unlocked via the interior door handles.
- Auto-locking (drive-away locking) - the doors will lock automatically when the vehicle is driven away, at a speed in excess of 7 km/h (4 mile/h).
- Auto-relock - the vehicle is centrally locked and armed following a remote control unlock if no door was opened or if the ignition key remained at position '0'for 45 seconds.
- Two-stage unlocking - a security feature where only the driver's door unlocks under normal operation of key or transponder remote (passenger door can be unlocked with a second unlock operation).

The perimeter alarm system consists of several core components:

- General electronic control module (GECM).

NOTE: The GECM performs many other functions; refer to **General Electronic Control Module**.

- Vehicle horn.
- Hood ajar switch.
- Door ajar switches.
- Luggage compartment lid ajar switch.
- Security system indicator lamp.

Market dependent components include:

- Security horn or battery backed sounder.
- Inclination sensor.
- Intrusion sensor.

The security system is armed by locking the vehicle using the driver's door lock or by pressing the lock button on the key fob transmitter.

Once armed (25 seconds after locking), any of the following will trigger an alarm:

- Opening a door/hood/luggage compartment lid.
- Using an invalid PATS ignition key.
- Movement inside the vehicle (with intrusion sensor fitted and vehicle double locked).
- Excessive movement of vehicle (with inclination sensor fitted and vehicle double locked).

When an alarm is in progress, the turn signals flash and the vehicle horn sounds. Where fitted, the security horn or battery backed sounder sound in conjunction with the vehicle horn.

The security system can be disarmed by unlocking the driver's door lock (not in Europe), pressing the unlock button on the key fob transmitter, or turning a valid key in the ignition.

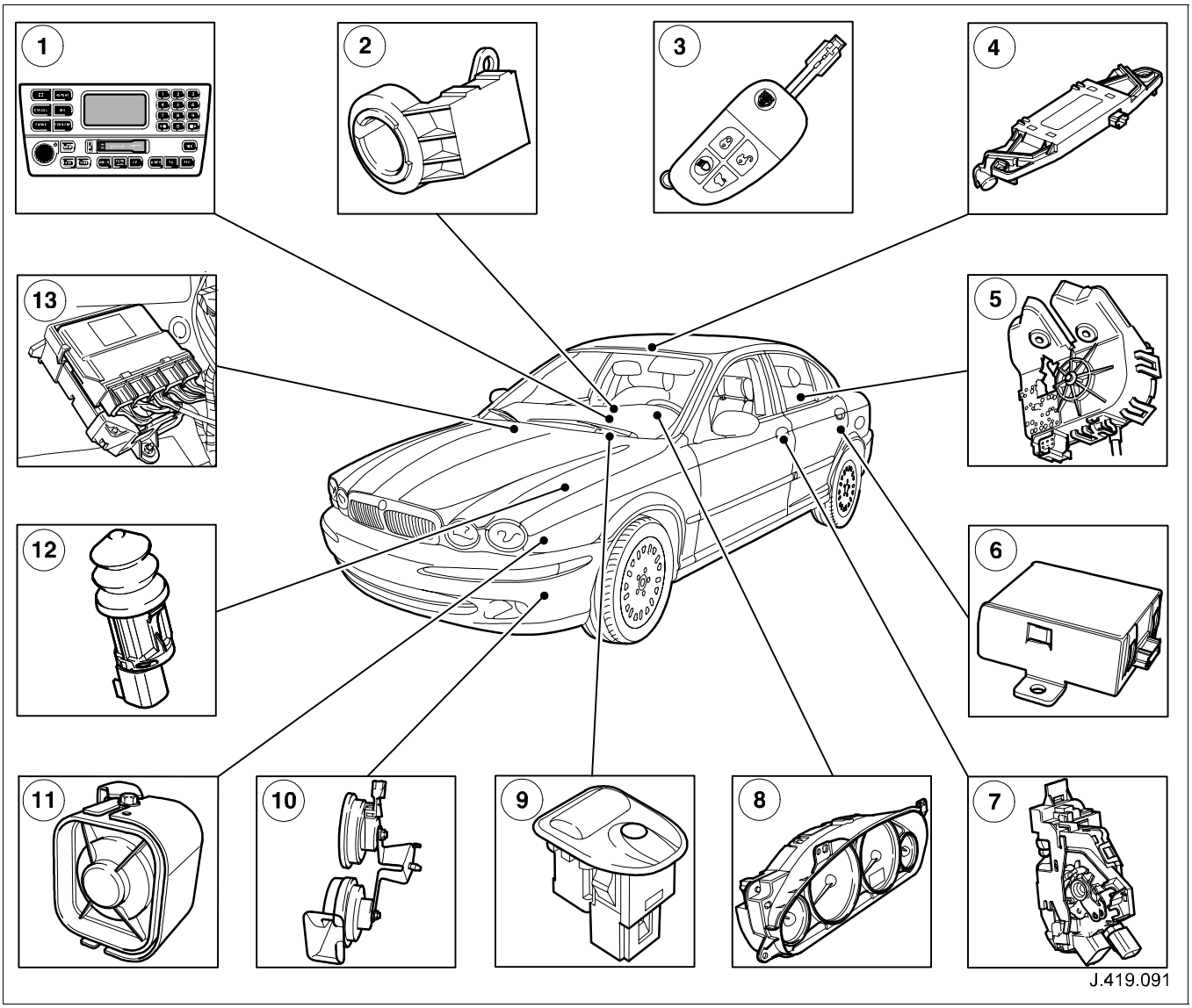

Fig. 57 Component locations

1. Audio unit (non-telematics version)
2. Transceiver coil
3. Key fob transmitter
4. Intrusions sensors (where applicable)
5. Luggage compartment lid ajar switch
6. Inclination sensor (where applicable)
7. Door ajar switch
8. Instrument cluster
9. Security system indicator lamp
10. Horns
11. Battery-backed sounder (where applicable)
12. Hood ajar switch
13. Electronic control module and general electronic control module

Telematics

Telematics refers to the convergence of telecommunications and information technology within the vehicle, enabling the seamless transport of information and data to provide various services to and from the vehicle (or mobile communications devices).

Telematics Display Module

The telematics display module is the principle user interface for the following subsystems:

- Navigation; refer to **Navigation System**.
- Climate control; refer to **Climate Control System**.
- Entertainment; refer to **Entertainment Systems**.
- Cellular phone/JaguarNet (optional); refer to **Cellular Phone**.
- Television (optional); refer to **Video System**.
- Voice training modes (optional): refer to **Voice Activated Control System**.

NOTE: The telematics display module is integrated with the audio unit and cannot be serviced separately; refer to **Audio Unit**.

When the ignition key is at position 'I' or 'II' the touch screen will display the Jaguar logo followed by activation and display of the audio mode previously used. Display of touch screen options for other systems is obtained by pressing the appropriate perimeter button.

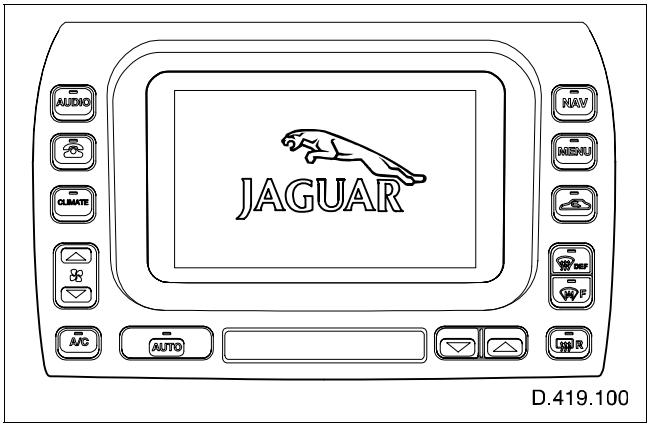

Fig. 58 Telematics display module

NOTE: The touch screen and inner bezel must be kept clean to maintain optimum performance. Finger marks and attracted dust should be regularly removed using a soft cloth and a Jaguar approved cleaning agent.

Touch screen features are designed to be user-friendly and intuitive like a personal computer. The tables show typical examples of the text displayed using the screen menus.

MENU	
Brightness/Contrast	Volume Preset
System Setup	TV
Screen OFF	Screen Saver

Table 4 Menu text displayed

SYSTEM SETUP	Cancel
Set Clock	
User Settings	

Table 5 System setup text displayed

USER SETTINGS			Cancel
Audible Feedback	Yes	Soft keys	No
Units	Metric	Imperial	
Language	Flag		

Table 6 User settings displayed

Voice Activated Control System

Where installed, the voice activated control system for X-TYPE is an expansion of the S-TYPE system and offers the user the option to voice activate certain features for the following:

- Entertainment system.
- Cellular phone system.
- Climate control system.
- Navigation system.
- Television (where installed) and teletext (where available).

The system components comprise:

- Voice activation control module (VACM) located in the luggage compartment to the left-hand side.
- Microphone, shared with the phone and integrated into the roof console.
- Push-to-talk button, mounted on the steering wheel, shared with the phone and wired through the audio unit.

NOTE: Where applicable, it is possible to initiate a training mode which enables the voice activation control system to fine-tune the voice recognition capability.

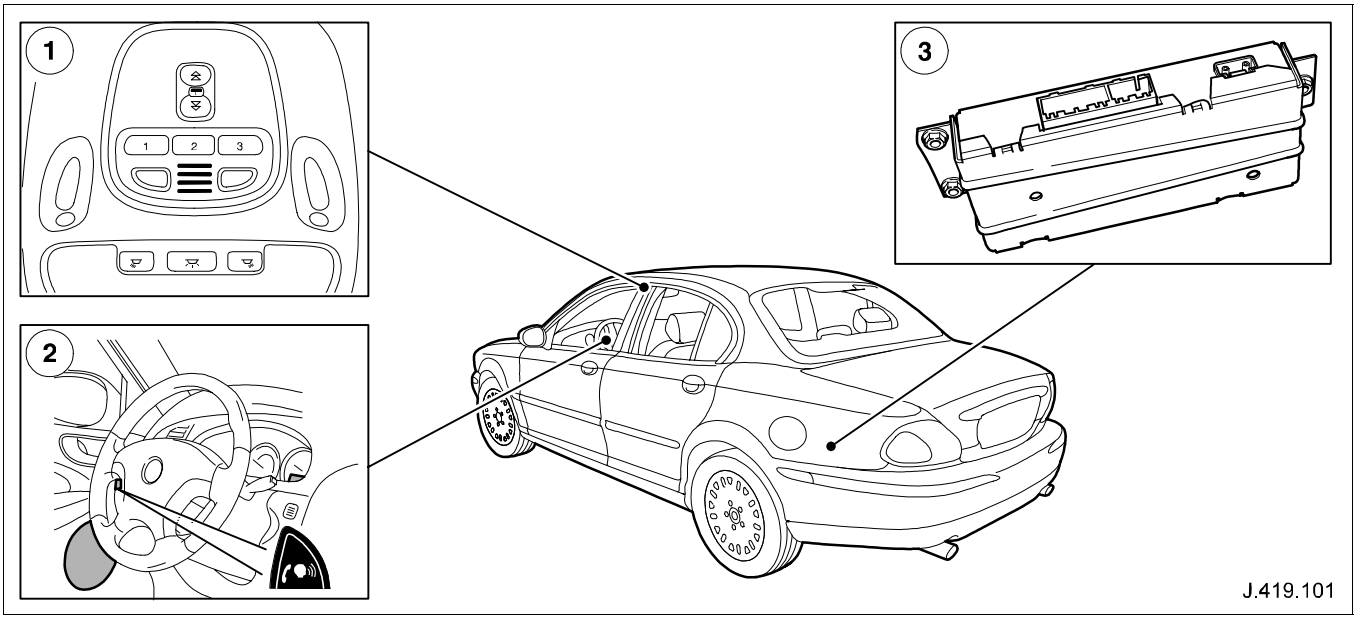

Fig. 59 Voice control - component locations

1. Push-to-talk button
2. Microphone
3. Voice activation control module

NOTE: The voice activated control system can only be installed during manufacture, it is not available as an accessory.

The VACM is not serviceable but will need to be reconfigured using WDS if changes are made to the systems it controls; for example after the installation of a CD changer.

NOTE: VACM is part of the optical network; refer to **D2B network**.

Navigation System

The navigation system comprises:

- Navigation control module complete with DVD reader.
- Navigation system antenna.
- Navigation data DVD.
- Navigation system display module (audio unit - telematics version).

NOTE: The navigation system uses the **Telematics Display Module** (the display component of the telematics version of the **Audio Unit**) as the navigation system display module; refer to the appropriate section for more information.

The vehicle location/direction is determined using the following:

- global positioning system (GPS);
- vehicle speed;
- gyroscope to detect directional changes; refer to **Navigation Control Module**;
- navigation software integral to the **Navigation Control Module**.

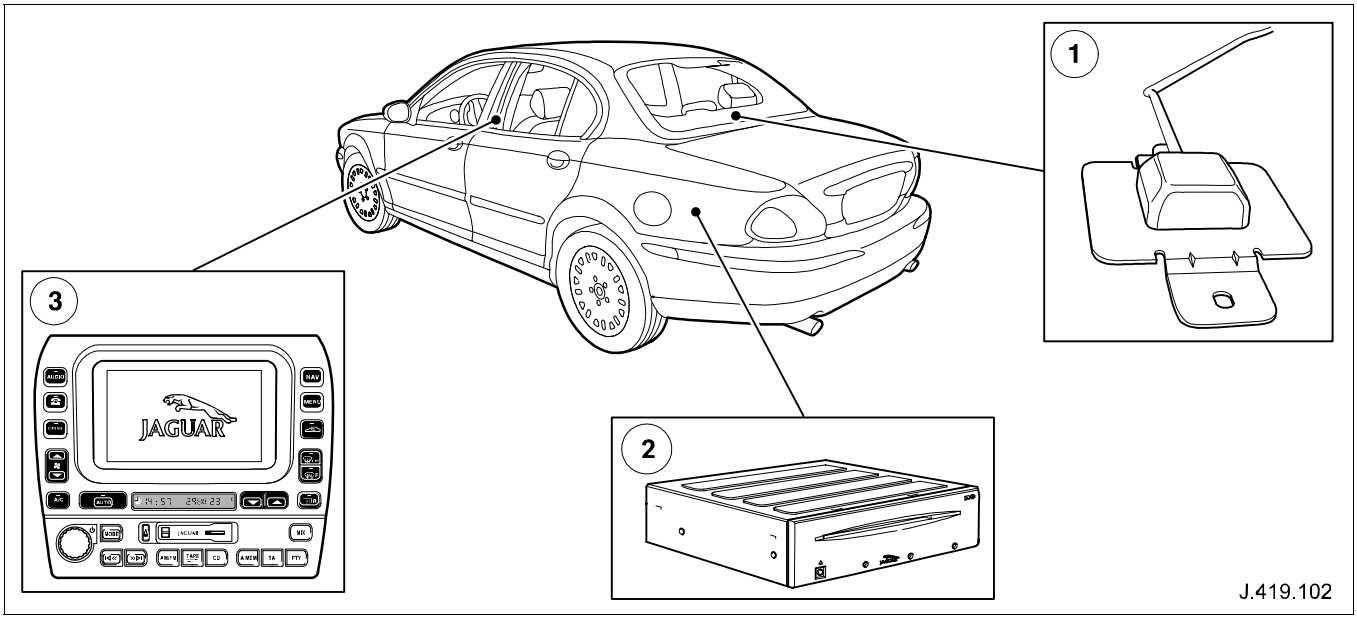

Fig. 60 Navigation system component location

1. Navigation system antenna
2. Navigation control module
3. Audio unit - telematics version

Navigation Control Module

The NCM is:

- located in the luggage compartment to the left-hand side;
- fixed to a bracket which also supports (where applicable) the voice activation control module (VACM) and the cellular phone control module (CPCM).

The navigation control module (NCM) comprises:

- Navigation software which controls:
  - generation of map display;
  - routing functions.
- Graphics display driver.
- D2B output of audio data for voice guidance and television.
- SCP link for communications between other modules.
- Subsystem control software to generate control screens for other modules and support communications.
- GPS decoder which amplifies and decodes the GPS signal received from the antenna.
- Gyroscope to monitor vehicle direction.
- DVD drive which reads the map database stored on disk.
- Diagnostic software.

NOTE: Japan uses a different NCM that incorporates a Japanese VACM that permits extensive recognition of navigation system commands (including the ability to enter full addresses) and the display of traffic information.

Navigation System Display Module

The display module is a multifunction touch screen console which comprises on-screen simulated buttons (soft buttons) and perimeter buttons (hard buttons). Unlike other Jaguar models, the display module is not dedicated to navigation, it is also:

- the principal interface for several subsystems; refer to **Telematics Display Module**;
- an integral component of the **Audio Unit**.

Navigation System Antenna

The navigation system antenna is a satellite GPS type. It is common to all models and is mounted on the parcel shelf to optimize reception. The coaxial cable links the antenna module to the NCM and:

- provides 5V dc power from the NCM to the active receiver circuits of the antenna via the inner coaxial conductor;
- transfers incoming signals from the antenna to the NCM.

NOTE: Signal reception may be affected by the presence of metal objects or foil on or near the parcel shelf or rear screen.

Cellular Phone

The cellular phone system comprises:

- Cellular phone control module.
- Cellular phone antenna.
- JaguarNet antenna (where applicable).
- Navigation (GPS) system antenna (where applicable)
- Cellular phone handset and cradle.
- Microphone.
- Steering wheel telematics controls.
- Audio unit.

NOTE: The user interface for the cellular phone is the audio unit; refer to **Audio Unit** for details.

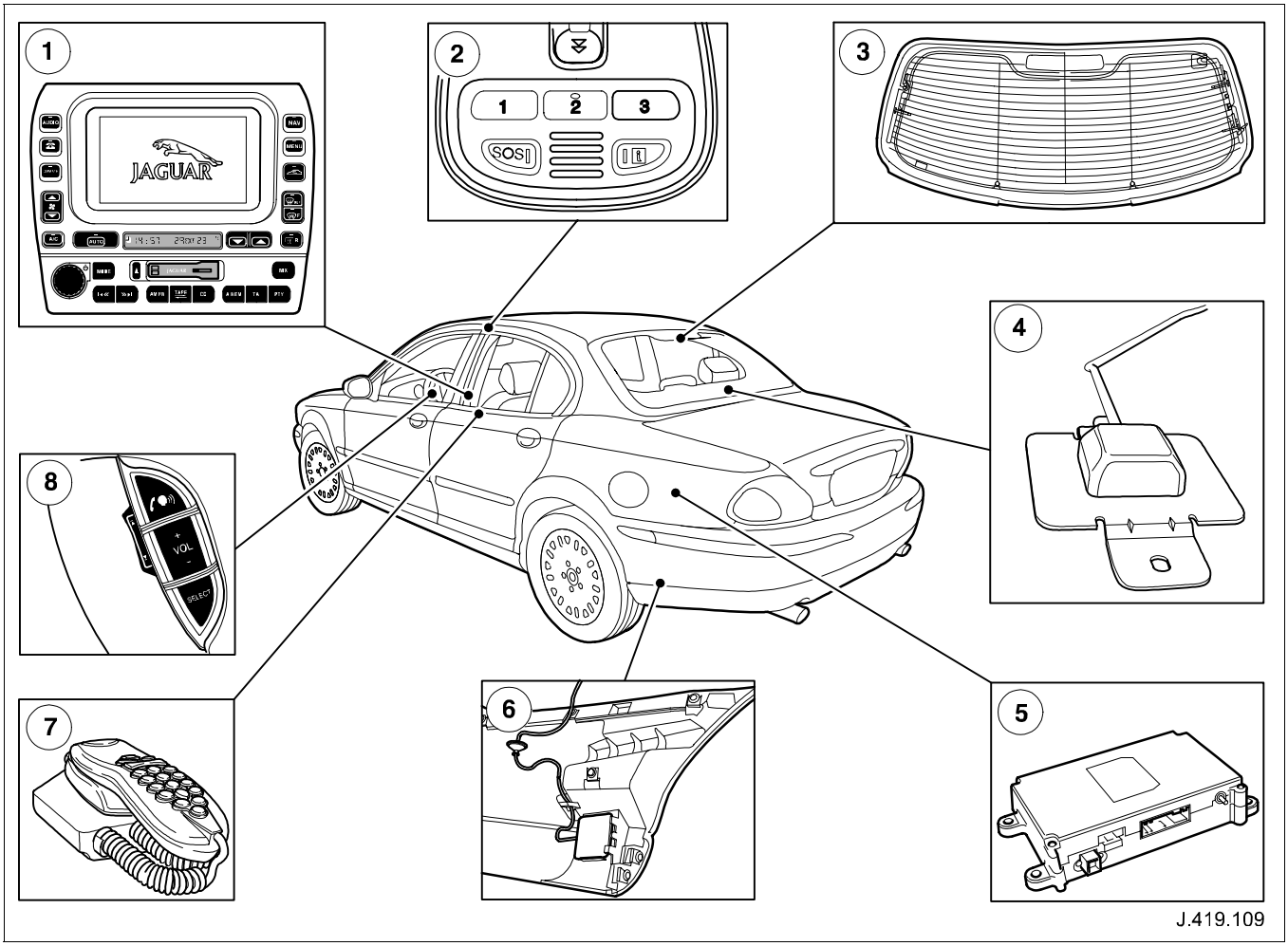

Fig. 61 Cellular phone system component location

1. Audio unit - telematics version
2. Microphone
3. JaguarNet antenna (option)
4. Navigation (GPS) system antenna (option)
5. Cellular phone control module
6. Cellular phone antenna
7. Cellular phone handset and cradle
8. Steering wheel telematics controls

Cellular Phone Control Module

The CPCM is market dependent and:

- located in the luggage compartment to the left-hand side;
- fixed to a bracket which also supports (where applicable) the voice activation control module (VACM) and the navigation control module (NCM);
- has one electrical connector, one optical connector;
- has one antenna connector (cellular phone only).

NOTE: Where JaguarNet is available, the module has an additional connector for the navigation (GPS) system antenna.

Steering Wheel Telematics Controls

To ensure minimum disruption to concentration when driving, limited control of audio, telephone and voice activation systems is possible using the steering wheel telematics controls.

The controls provide the following phone functionality:

- Answer phone call/end handsfree calls.
- Increase or decrease volume.
- Selection of phone ready mode.
- Cycle through phone memory.

JaguarNet

JaguarNet is available as an option in certain markets (but is not available as a dealer-installed accessory). After pressing the appropriate button, JaguarNet permits quick access to emergency services, roadside assistance or local information. JaguarNet can be used wherever a cellular phone service is available and uses the Jaguar in-car phone installation to communicate with the Jaguar security response center.

NOTE: The Jaguar phone must be installed and working correctly.

In addition to the standard cellular phone system components, JaguarNet uses:

- GPS (global positioning system) antenna.
- Information / SOS buttons (part of roof console).

NOTE: JaguarNet uses an antenna that is integral to the rear window glass instead of the bumper-mounted antenna used by the standard cellular phone system.

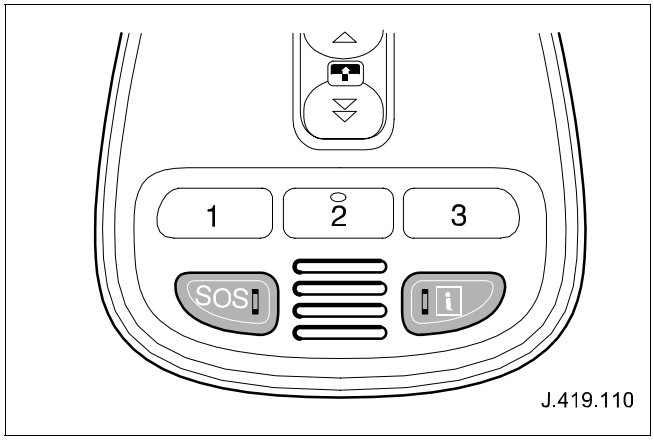

Fig. 62 SOS / Information buttons

Limitations of the system

WARNING: It is important that the customer fully understands the operation of the system before attempting to use it. Note the following summary of limitations:

- **The system will only operate in areas with cellular phone coverage and when connection to the network is established. This can be affected by adverse weather conditions, geographical features or tall buildings.**
- **A roaming airtime agreement is required so that the system can be used in all areas.**
- **Loss of contact with the global positioning system (GPS) could result in an inaccurate vehicle position being sent to the response center.**
- **If the vehicle is involved in an accident, components could be damaged rendering the system inoperative.**

Emergency assistance (SOS)

The emergency assistance feature allows rapid access to the emergency services (police, fire, or ambulance).

GPS is used to identify the position and direction of travel of the vehicle.

Data message

When contact with the response center is established, an electronic data message is automatically transmitted to the response center computer. This data message will include:

- Type of alarm (information, emergency or air bag deployed).
- Latitude and longitude coordinates.
- Vehicle position history.
- 'Time tag' identifying when last position was taken.

Information assistance (Info)

Information assistance may be used to request help, breakdown assistance or services from the response center operator. The list of services will depend upon facilities available to the response center operator, which may include information regarding local hotels, local petrol stations, shops and services and traffic information.

Operation of the system

NOTE: The ignition key must be turned to position 'I'.

The system is operated from the controls on the audio unit or the overhead console buttons. While in use, the audio unit displays a sequence of messages and the red lamps in the overhead console buttons will flash to indicate activation.

NOTE: The phone handset will be switched off during an assistance call.

Call activation and termination

Operation will continue even if the ignition key is turned to position '0' during an activation.

NOTE: Once a call has been initiated, attempts to crank the engine may cancel the activation.

Making an emergency call (SOS)

Emergency assistance can be summoned by:

- Pressing and holding the 'SOS' button in the overhead console for 2 seconds or
- Touching and holding the 'SOS' button in the JaguarNet menu on the audio unit for 2 seconds.

A call to the response center is automatically sent using the Jaguar in-car phone.

NOTE: If a call is initiated and the operator cannot establish voice communication, police assistance will be despatched to the vehicle, based on the vehicle location when the button was pressed.

The audio unit shows 'SOS REQUEST' and the red lamp in the **SOS** button starts to flash.

Operator contact

After the data message transmission has been completed, voice contact with an operator is established. The operator has the details of the vehicle available, including its present location. The operator verbally obtains details of the emergency and, if necessary, establishes a three-way phone call with Jaguar Roadside Assistance or other emergency service. The appropriate assistance will then be dispatched to the vehicle location.

Requesting Information

A call to the response centre is automatically sent using the Jaguar in-car phone by:

- Pressing and holding the 'i' button in the overhead console for 2 seconds or
- Touching and holding the 'Info' button on the JaguarNet menu on the audio unit for 2 seconds.

Terminating assistance calls

When the operator is satisfied that the situation has been dealt with, the call will be terminated and the red lamp in the SOS button will extinguish.

NOTE: Normally, only the response center can terminate an 'SOS' call.

Terminating an information call

An information call may be terminated via the audio unit or by the response center.

On-screen messages

During an assistance call, various status messages are displayed on the audio unit, which enable the progress of the call to be followed.

While in contact with the response center, the vehicle location messages (LATITUDE and LONGITUDE) are displayed in sequence, except when the display of another message is required.

System self-test

The system will perform a self-test each time the ignition key is turned to position 'II'. This is indicated by the illumination of a red lamp in the Information button. The lamp will remain illuminated for the duration of the test. If the lamp does not extinguish within 10 seconds, a DTC will be recorded.

Cellular phone interface

The cellular phone must be connected to the vehicle, and registered with a cellular network for the system to work. If the phone is in use when the system is activated (for example an air bag deployment) that call will be terminated and the response center will be called in the usual way.

When an activation is terminated, the phone is left unlocked, in the 'On' state, and may not return to its previous call restriction or system selection setting. It can be reprogrammed to the previous settings as desired. The phone user's manual provides further information.

Battery disconnection

If the battery has been disconnected, the vehicle location will be lost.

NOTE: On reconnection, it may take up to approximately 15 minutes to re-establish vehicle position.

Multifunction Electronic Control Modules

General Electronic Control Module

The general electronic control module (GECM) is clipped into the engine control module (ECM) bracket, above the ECM; there are no separate fixings.

The GECM and ECM assembly is mounted on the right-hand side of the passenger compartment beneath the instrument panel and close to the A-post.

There are five electrical connectors which are color coded and have unique keyways.

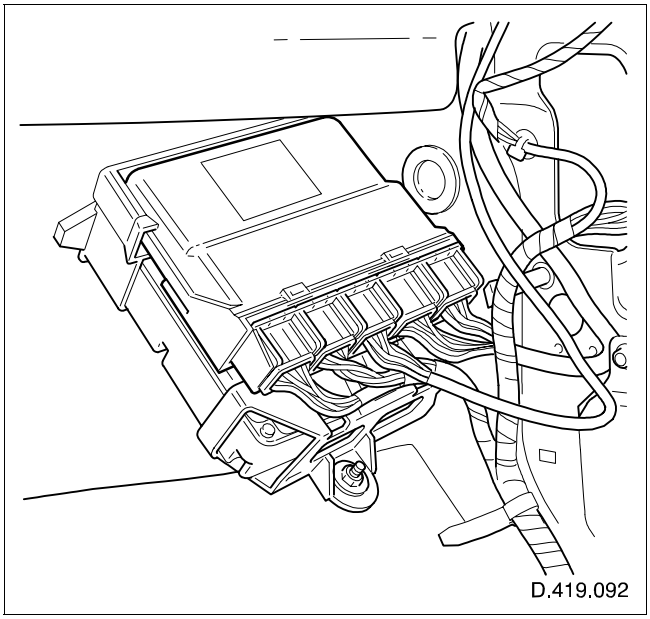

Fig. 63 General electronic control module

The GECM is configured for market options and where appropriate controls the following:

- Main beam relay.
- Interior lights with battery saver.
- Turn signals, hazard warning lamps (and generation of sound to support these two features).

  NOTE: The sounder is integrated into the left-hand column stalk.
- Intermittent wipers.
- Programmed windscreen wipe during wash.
- Headlamp powerwash.
- Driver audible warnings sounder (integral to the GECM).
- Security; refer to **Anti-Theft**.
- Luggage compartment lid release.
- Horn.
- Locking and unlocking with key and key fob transmitter; refer to **Anti-Theft**.

NOTE: The RF receiver is an integral part of the GECM.

Body System

X-TYPE employs a typical steel monocoque structure with the following features:

- Unique low speed crash structure, designed for service.
- Two-piece rear floor.
- Crush can structure for aluminium rear bumper beam.

Protective liners fitted in the wheel arches each incorporate a readily detachable panel for access to the fog lamp assembly. An injection moulded plenum cover is secured to the bodywork by clips. The plenum cover gives easy access to the windscreen wiper components and the pollen filter.

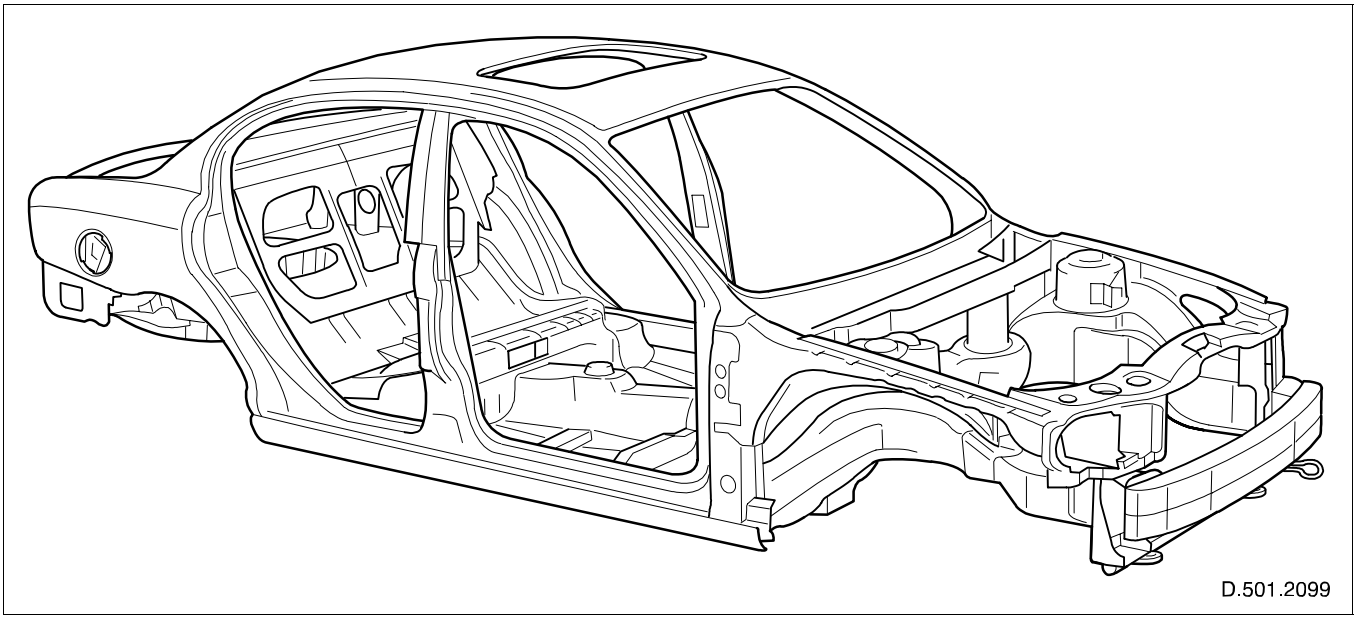

Fig. 64 Body structure

Body Closures

Hood

The hood assembly consists of a one piece inner and outer panel, clinched and bonded together with a bead sealant applied to each clinch joint. The hood opens from the front and is secured by means of a double catch in the hood latch.

Doors

The passenger compartment doors each comprise an inner and outer panel, clinched and bonded together to form a door assembly. Both panels incorporate extensions, spot welded together to form a cheater assembly. A sealant is applied in cosmetic bead form to all clinch joints.

The doors are of a conventional latch to striker plate design with the strikers located on the body pillars.

A joint-less single profile bulb seal is installed on each door together with a water shedder and separate vacuum formed speaker cup. Upper and lower door hinges and multi-stage check-straps require no lubrication throughout vehicle life.

Luggage Compartment Lid

The luggage compartment lid comprises of an inner and outer panel clinched and bonded together to form a complete assembly. A cosmetic bead sealant is applied to all clinch joints.

Hinge reinforcements and a latch striker mounting reinforcement are attached to the lid inner panel and a combined hinge and gas strut mounting assemblies are secured by bolts and nuts to the inner panel and the luggage compartment flange at each side.

The luggage compartment lid utilizes a conventional lock to striker plate design, with the striker located centrally on the edge of the load space floor.

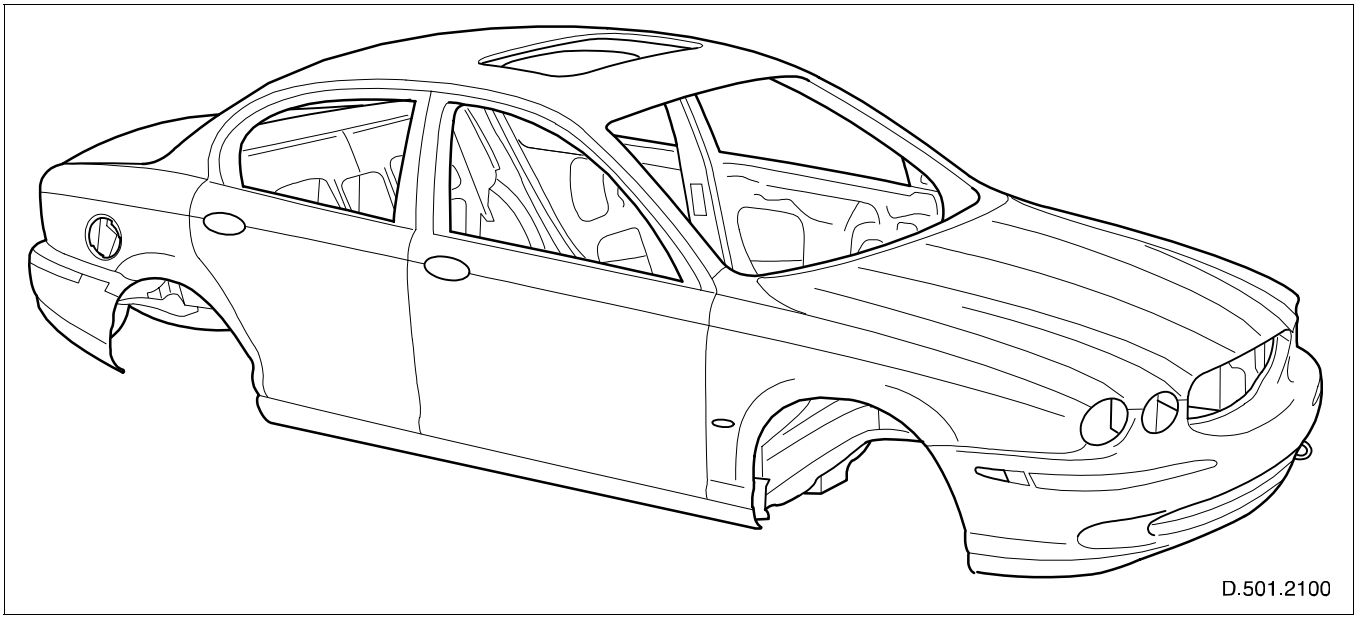

Fig. 65 Body closures

Rear View Mirrors

Interior

The electrochromic mirror (where installed) comprises:

- a forward facing sensor for the autolamp feature; refer to Electrical, **Exterior Lighting**;
- a rearward facing sensor for the auto-dimming feature;
- a button for switching the auto-dimming feature on and off.

Auto-dimming (when the feature is selected) is designed to reduce the glare from a following vehicle's headlamps. The mirror is manufactured using an electronically controlled reflective surface (electrochromic). The auto-dimming feature is initialized when the button is pressed. A sensor mounted in the mirror surround responds to light intensity; when the intensity rises above predetermined levels the mirror surface is energized causing a darkening effect. During daytime driving, the electrochromic mirror provides a full, clear reflection.

NOTE: When reverse gear is selected the auto-dimming feature is disabled.

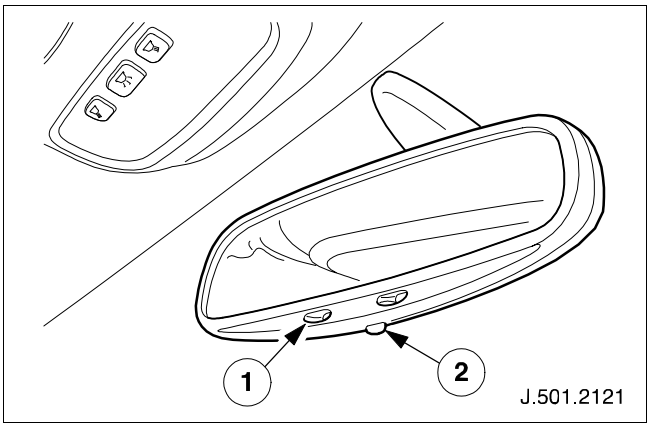

Fig. 66 Electrochromic mirror

1. Auto-dimming sensor
2. Auto-dimming on/off button

Exterior

The exterior mirrors are color-coded, electrically adjustable and heated. Adjustment of both exterior mirrors is carried out from the driver's door switch pack. A slider switch is used to select the mirror to be adjusted and a 4-way switch is used to adjust the selected mirror to the required position.

Where installed, power fold-back mirrors can be operated by the fold-back button incorporated in the driver door switch pack.

NOTE: The power fold-back mirrors only operate when the mirror select switch is in the center position and the vehicle speed is below 19 km/h (12 mile/h).

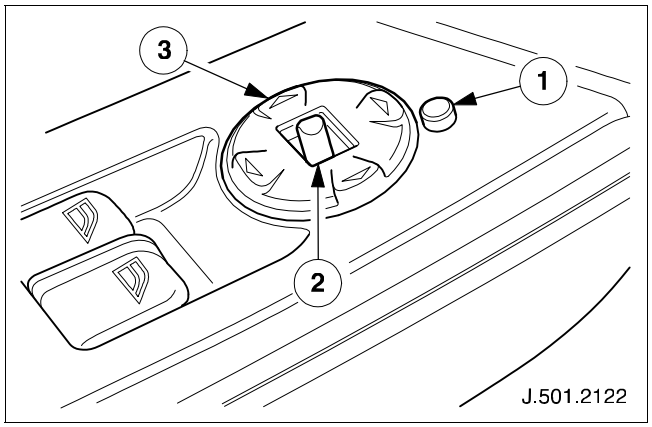

Fig. 67 Fold-back mirror button

1. Fold-back button
2. Mirror select switch
3. Mirror adjust switch

Seats

Front Seats

WARNING: Prior to seat removal and before disconnecting the seat harness (which includes air bag connectors), the vehicle battery should be disconnected and a period of at least one minute allowed to elapse. The same amount of care should be taken when handling and storing these seats, as would be taken when handling and storing vehicle air bags in isolation.

All front seats are fitted with the following features as standard:

- Integral side air bags; refer to **Occupant Safety, Air Bag Modules**.
- Head restraints.
- Safety belt buckle/pretensioner; refer to **Occupant Safety, Safety Belts**.

The driver and passenger seats, although almost identical, have some unique components fitted: the driver's seat has a seat track position sensor and the passenger's seat has a weight-sensing system. In both instances the components form an integral part of the occupant safety system; refer to **Occupant Safety, Sensors**.

NOTE: The seat cushion is an integral part of the seat weight-sensing system. Individual components of the seat weight-sensing system are not serviceable and must be replaced as a complete unit; refer to **Occupant Safety, Sensors**.

Power Front Seat

In addition to the standard features, depending upon the vehicle specification, one or more of the following options may be available:

- Electrically adjustable seat position.
- Heated seat.
- Electrically adjustable lumbar support.

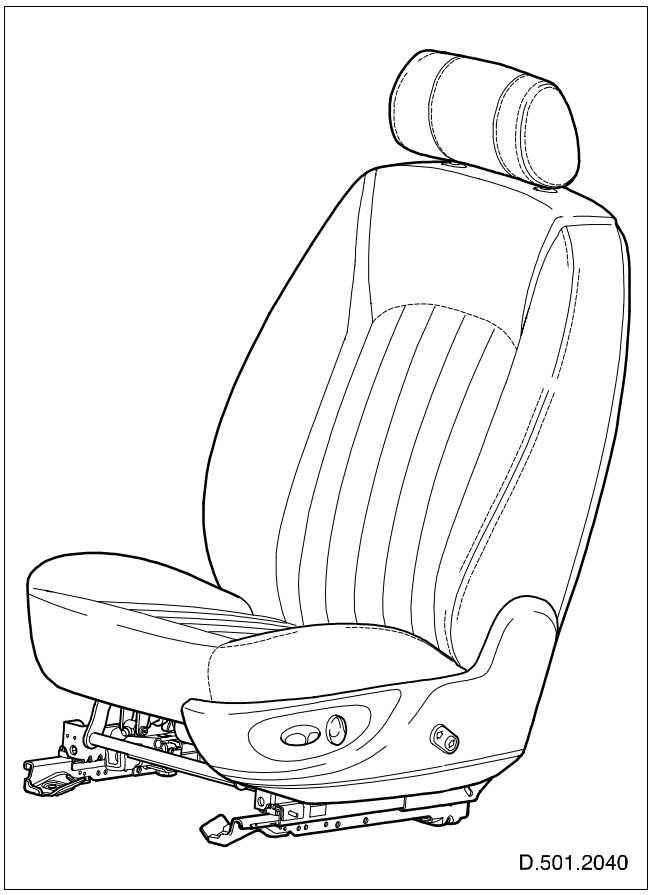

Fig. 68 Power front seat (LHD)

Power seat adjustment

- Switch A controls the seat position, cushion height and tilt.
- Switch B controls the seat back angle.
- Switch C controls the lumbar support.

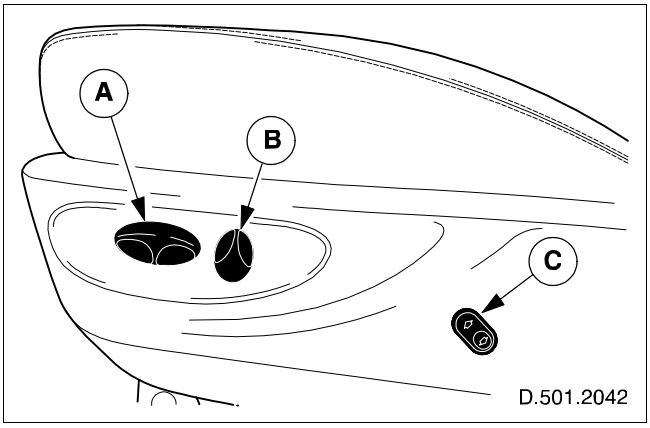

Fig. 69 Power front seat - controls

Power lumbar

The power lumbar is a self-contained unit controlled directly by the seat-mounted switch; refer to **X-TYPE Electrical Guide**.

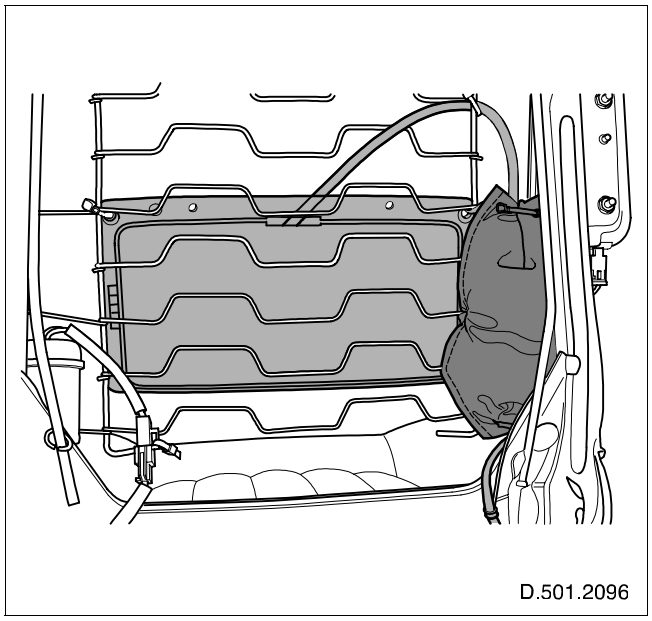

Fig. 70 Power lumbar

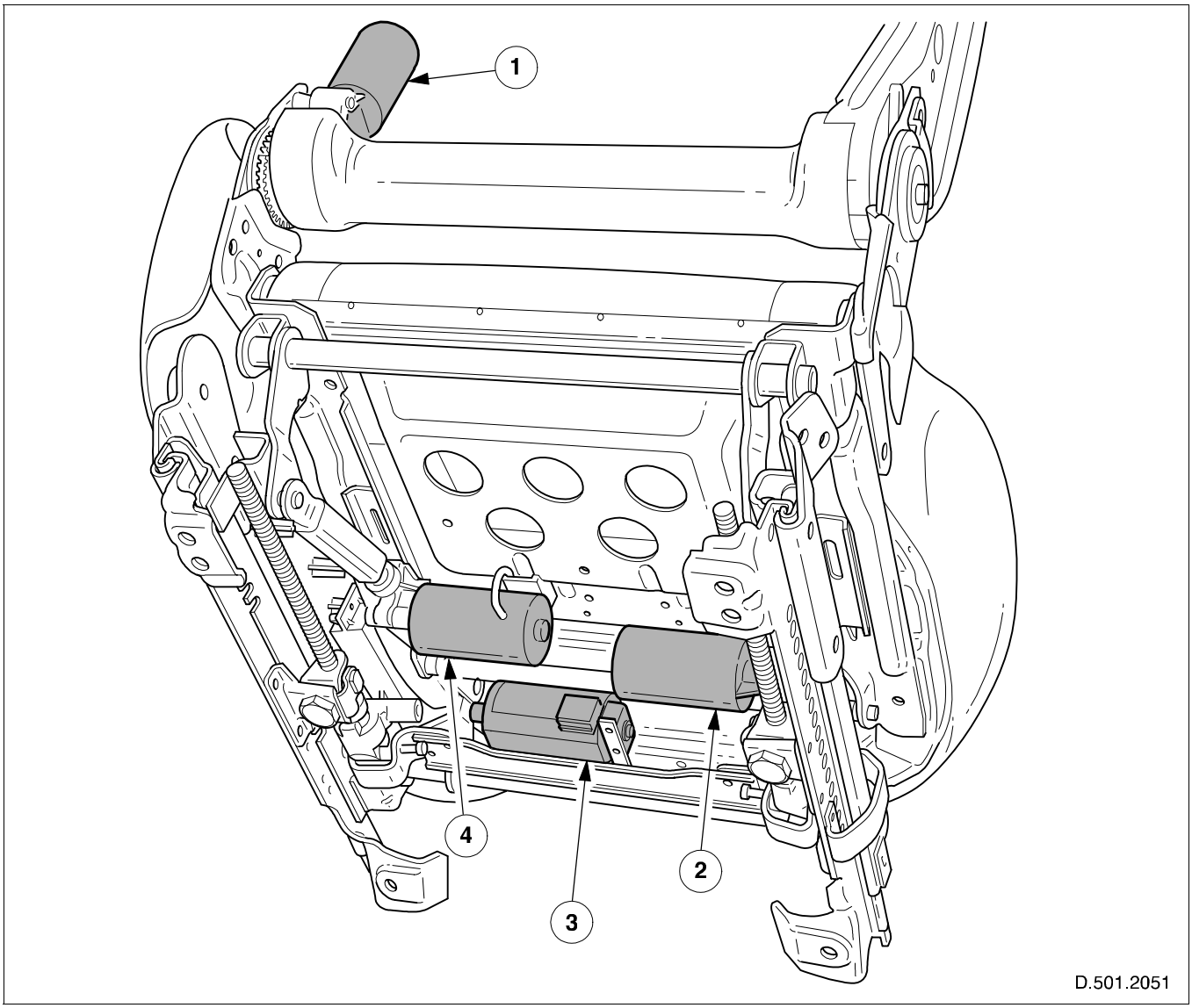

Fig. 71 Driver power seat - component locations

1. Recline motor
2. Seat height-adjustment motor (front)
3. Seat fore/aft motor
4. Seat height-adjustment motor (rear)

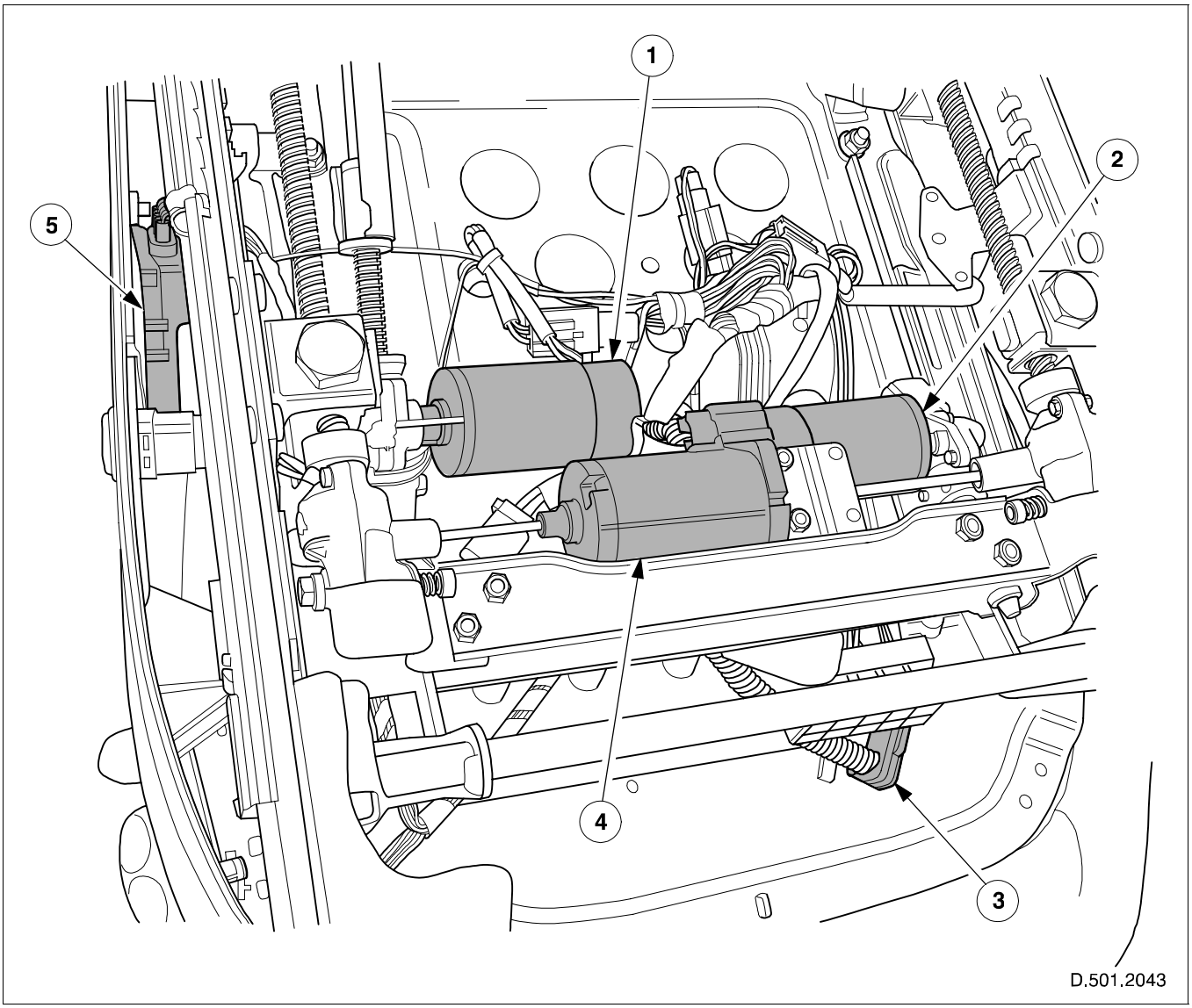

Fig. 72 Passenger power seat - component locations

1. Seat height adjustment motor (rear)
2. Seat height adjustment motor (front)
3. Seat weight-sensing sensor and hose
4. Seat fore/aft motor
5. Seat weight-sensing module

Basic Front Seat

In addition to the standard features, depending upon the vehicle specification, one or more of the following options may be available:

- Electrically adjustable seat height position (driver seat only).
- Heated seats.

Basic seat adjustment

- Locking bar (A) permits forward and rearward adjustment of the seat.
- Switch (B) is used for adjusting the height of the seat (driver seat only).
- Handwheel (C) controls the angle of the seat back.

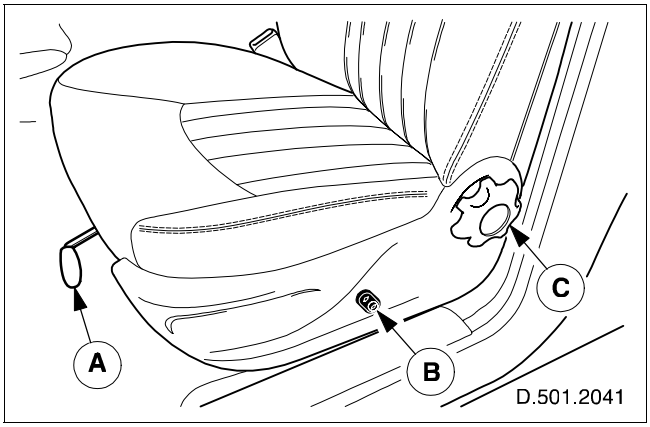

Fig. 73 Basic front seat - controls (driver seat only)

Head Restraints

The head restraints are height adjustable only.

Heated Seats

The heated seat system comprises:

- Heated seat switches.
- Heated seat module.
- Seatback heater element
- Cushion heater element and thermostat

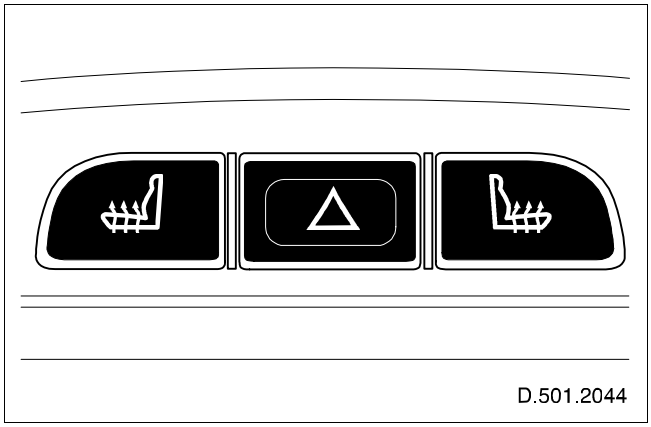

Fig. 74 Heated seat switches

The heated seat function (when selected) permits the electrical heating of the seat back and cushion on the driver and front passenger seats. The heating system of each seat is selected by separate switches located at the top of the center console.

Pressing the appropriate switch facilitates the three stage operation of the heated seat function:

- One press of the switch activates the high setting (providing a seat surface temperature of approximately 42°C).
- A second press of the switch activates the low setting (providing a seat surface temperature of approximately 37°C).
- A third press of the switch deactivates the heating function.

Once the heated seat function has been activated, it will persist until one of the following conditions have been satisfied:

- A fixed period of time has expired (10 minutes)
- The function is deactivated by pressing the switch for a third time.
- The ignition key is not at position II.
- A malfunction is detected by the heated seat module.

Confirmation that the heated seat function is active is provided by the illumination of the relevant switch:

- a yellow light indicates the low temperature setting;
- a red light indicates the high temperature setting.

NOTE: The seat heaters are designed to operate at temperatures below a predetermined limit and therefore operation may be inhibited due to: storing the vehicle in a heated garage, body heat or warm ambient temperatures.

Heated seat module

The module is located under the front edge of seat.

The module controls the seat heating function by providing the appropriate response depending on the status of the heated seat switches; refer to **X-TYPE Electrical Guide** for detailed connection information.

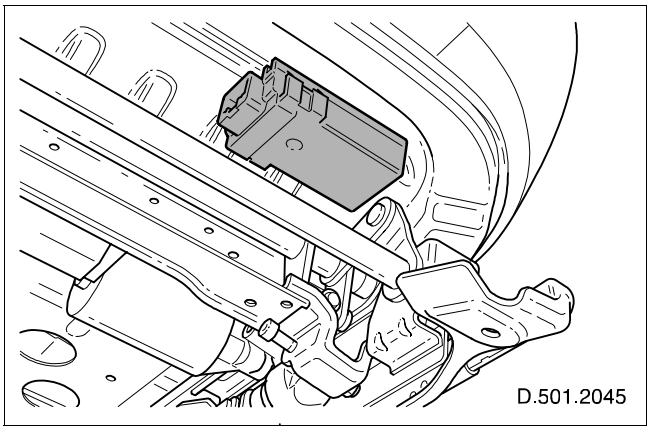

Fig. 75 Heated seat module

Sliding Armrest

The sliding armrest is hinged at the rear and has two release buttons located on the front of the armrest. Pressing the right-hand button and lifting the top of the armrest provides access to the top storage compartment, or phone if fitted. Pressing the left-hand button and lifting the complete armrest provides access to the cubby box. The top of the armrest can be moved forwards or rearwards for the most comfortable position.

Fig. 76 Sliding armrest

Rear Seats

Depending on market specification the rear seats will be one of the following:

- Fixed bench style.
- Split style (70/30).

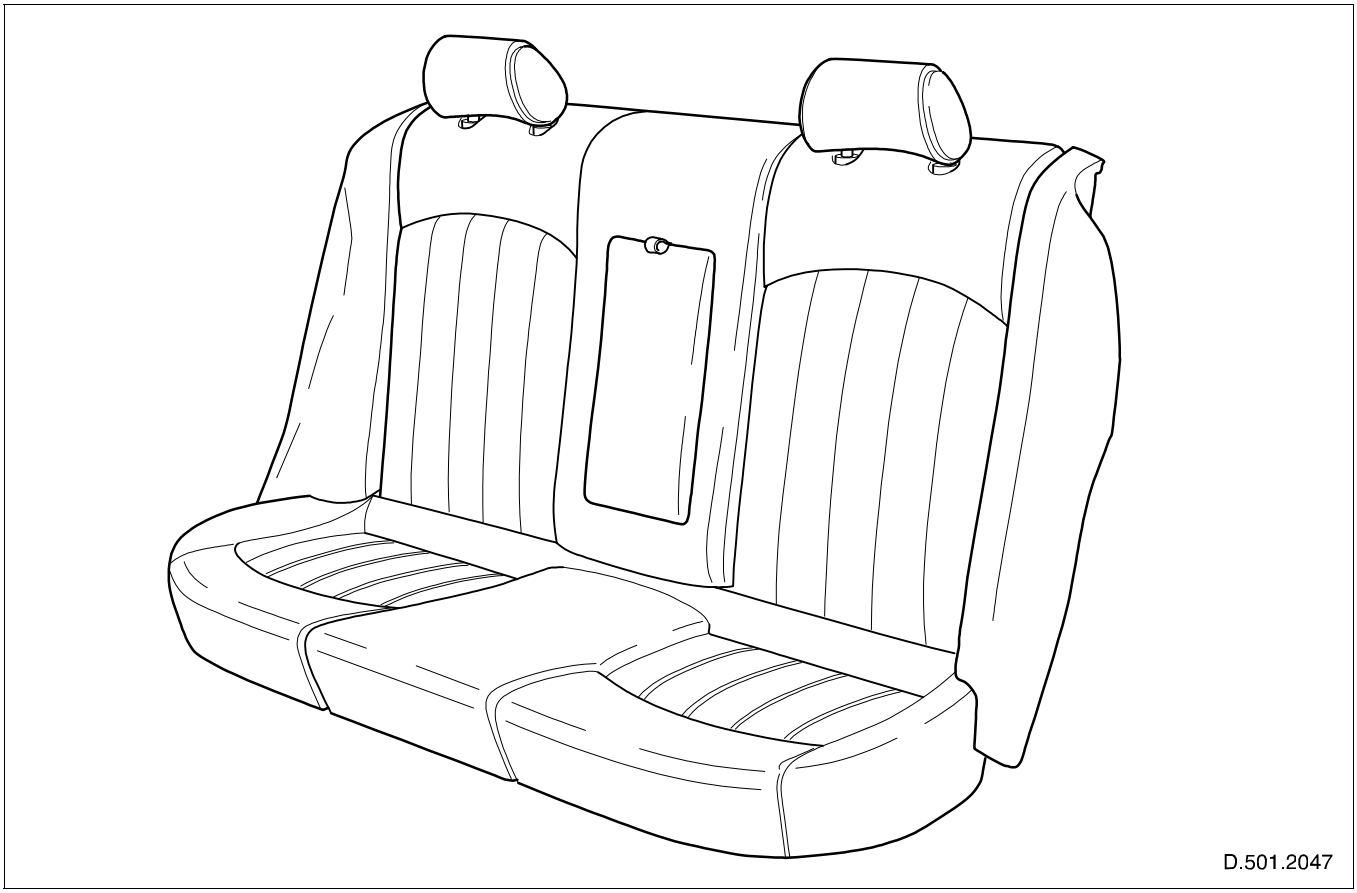

Fig. 77 Rear seats

Folding Seatbacks (where applicable)

The rear seatbacks can be folded forward to provide additional luggage space if required. Release handles for each seat back are located in the luggage compartment under the parcel shelf.

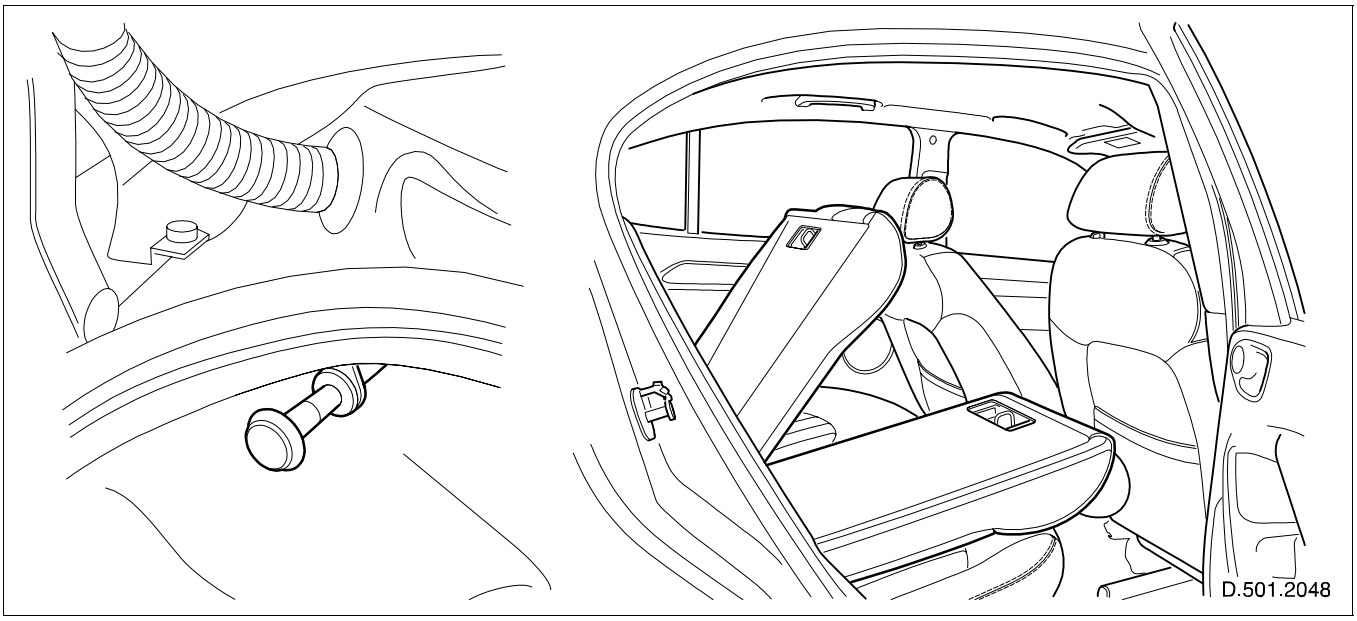

Fig. 78 Folding seatbacks

Head Restraints

The rear head restraints can only be set to one of two available heights.

Armrest

The fold-down armrest has integral cup holders.

Ski hatch

Skis or similar objects can be stowed in the vehicle by utilizing the two-door hatch fitted (as an option) to the rear seat. The inner door is accessible after folding down the armrest; the other door is accessible from inside the luggage compartment. A sack complete with strap is provided for holding the stored items; the strap connects to the center rear seat belt buckle to secure the sack and contents.

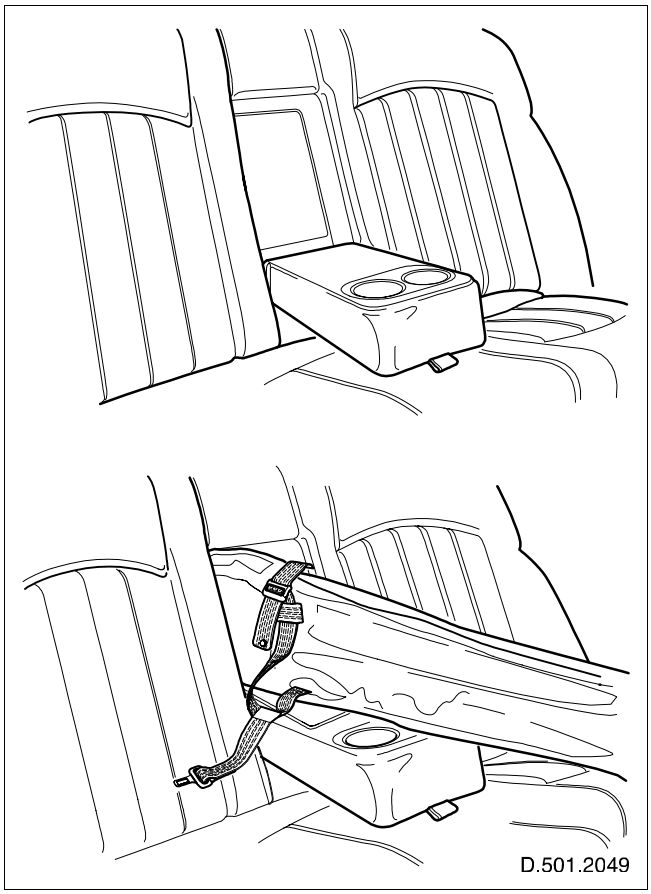

Fig. 79 Folding armrest and ski hatch

Glass, Frames and Mechanisms

Front and Rear Windows

The front window glass is fully bonded and laminated. The type of glass installed depends on the vehicle specification including features such as the integral heater, rain sensor or the type of mirror fitted (standard or electrochromic).

The rear window glass is fully bonded and toughened. The particular glass installed will incorporate features such as integral heater and antennas, depending on market and vehicle specification.

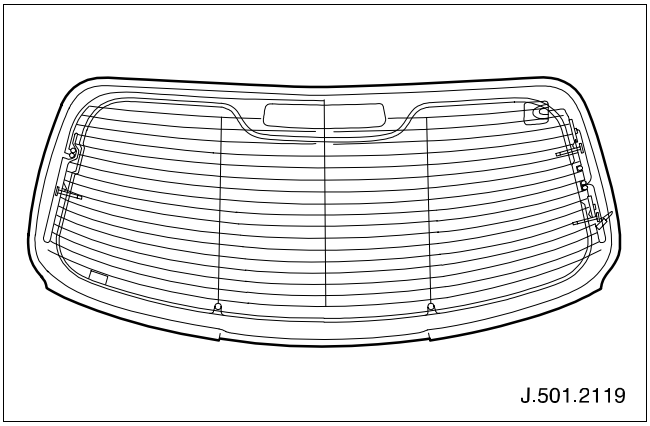

Fig. 80 Rear window glass

Door Windows

The front windows are electrically operated and the rear can be electrically or manually operated. Each electrically powered window can be operated individually or from the main window control switch.

NOTE: Activation of the rear window override switch will prevent operation of the rear window control switches.

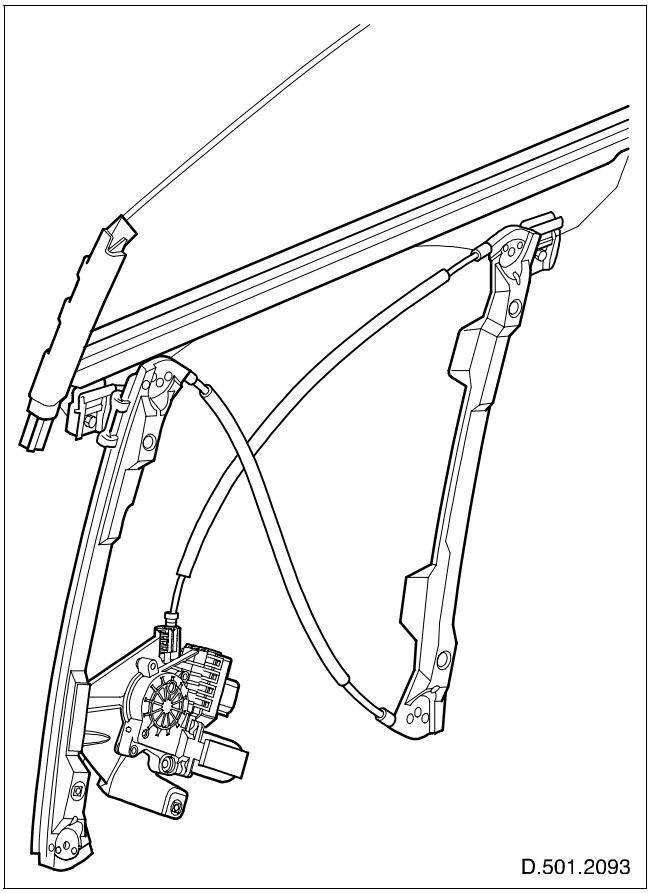

Fig. 81 Front electrically-operated window

All window switches have two positions:

- Position one enables ‘proportional’ control.
- Position two enables ‘one-touch’ control.

Window Control System Features

The window control system has several integrated features, some of which may produce uninitiated actions which may be misinterpreted by the driver:

Anti-trap

The anti-trap feature is activated when the 'one-touch up' option is selected. The feature is designed to detect obstacles that may prevent the window glass reaching the closed position. Should an obstacle be detected, the window motor will stop and reverse to leave the window open at least 200 mm (7.87 in).

NOTE: Disconnection of the battery or the door harness will deactivate the 'one-touch up' option but not affect the 'one-touch down' option. Side-effects such as a rattle when the door is closed may also be noticed. In this situation, after all connections have been remade, the system will need to 'relearn' the parameters for the 'one-touch up' feature; refer to JTIS for details.

Ice Override

The ice override feature causes the system to behave initially in a similar manner to an anti-trap situation. Assuming the system has not reacted to a visible obstruction during the closing cycle, then the likely cause is ice forming (due to ambient conditions), damage in the glass run channel, or an incorrectly located seal. In this situation it is possible to repeat the 'one-touch up' sequence and the same result will occur. A third attempt will result in the door glass operating in the proportional mode only (stopping if the switch is released). If the switch is not released the glass will continue to rise until it meets the obstacle again. The ice override feature will be initiated and a further operation of the switch (within 500ms of the last) will exert an increased force. This attempt to overcome the blockage should cause the glass to move a small distance (approximately 12mm) where possible.

NOTE: If the third attempt is not performed within 10 seconds of the 'bounce-back' arising from the second attempt, the complete procedure will have to be recommenced.

Thermal Overload

The thermal overload feature is a protective mechanism in the window system electronics which ensures the motor is not damaged by overheating. This situation could arise should someone (perhaps a child) repeatedly operate:

- the power window switches;
- activate the global operations using the key fob transmitter, central door locking switch or key barrel.

NOTE: The feature will be activated only after a minimum of 7 open/close operations without interruption and will reset to allow further operations within a short time period.

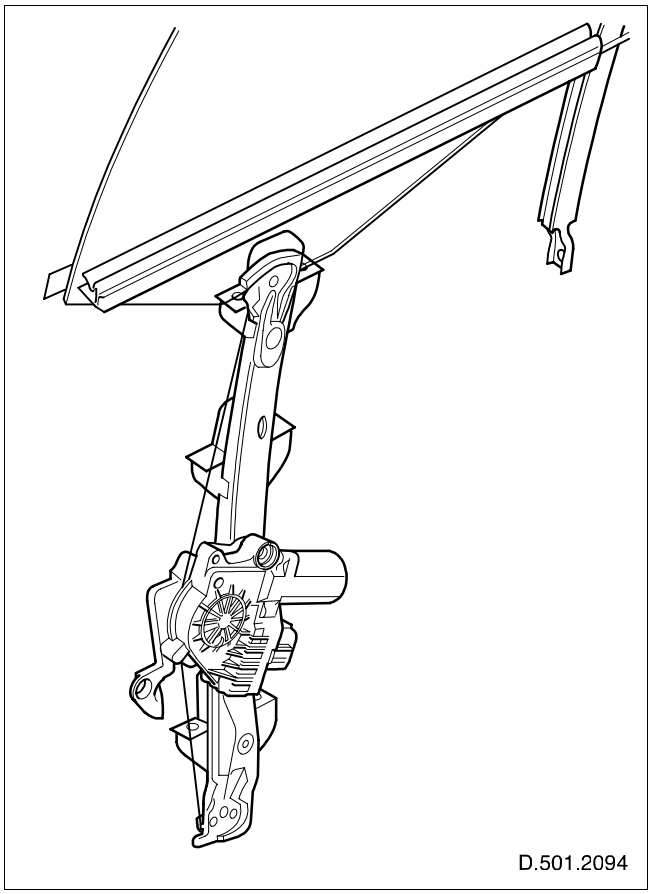

Fig. 82 Rear electrically-operated window

Instrument Panel and Console

The instrument panel assembly houses the instrument cluster, passenger air bag module, glove compartment, climate control panel/module, audio unit, air distribution registers.

The floor console is located between the front seats and depending upon vehicle specification consists of the ashtray, cigar lighter and armrest. The center section of the console forms a deep stowage box with a secondary cup holder. The in-car phone (where installed) is located beneath within the armrest. A dynamic stability control switch (where applicable) is situated adjacent to the gear shift.

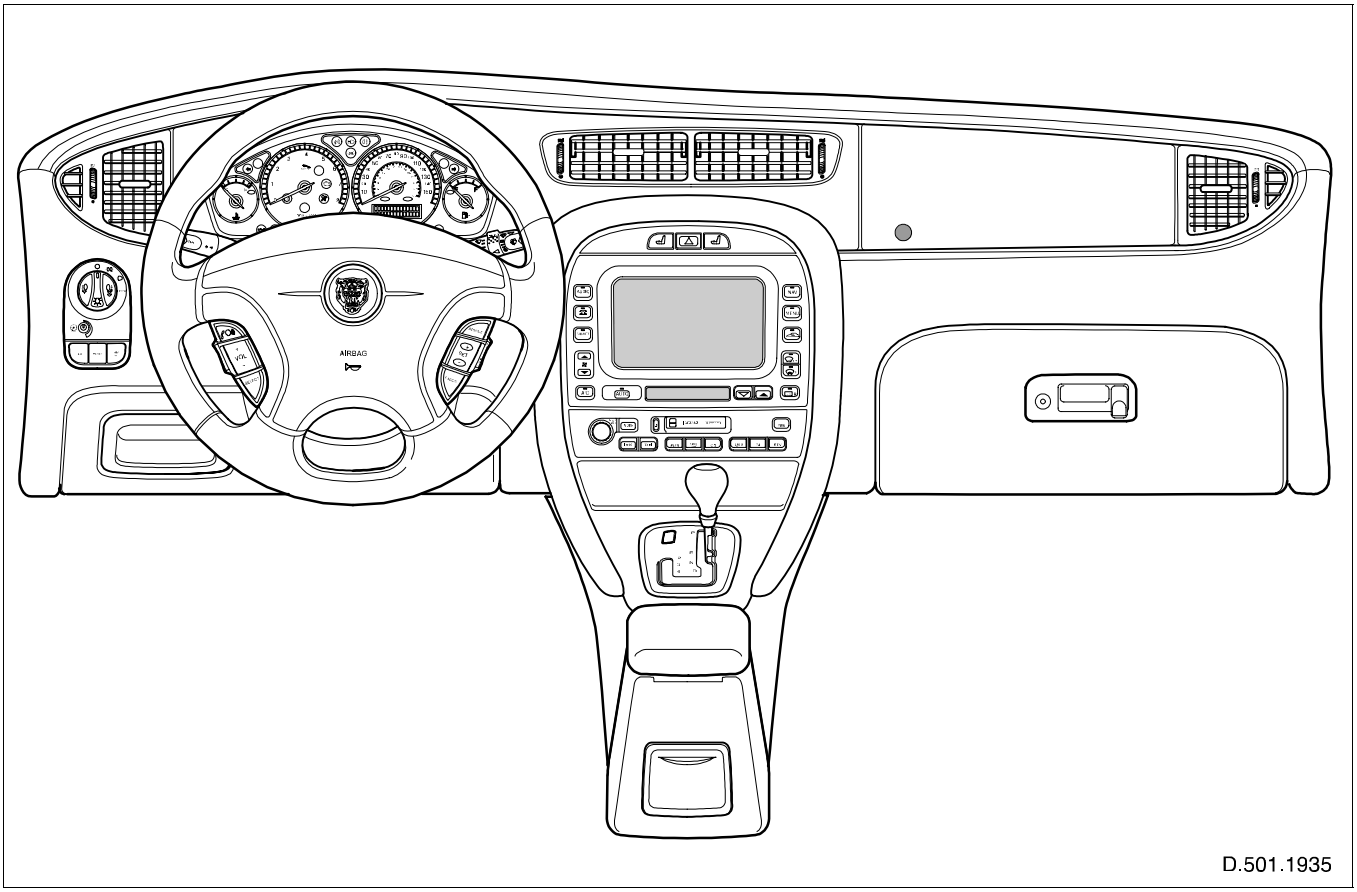

Fig. 83 Instrument panel

The roof console depending on market and vehicle specification houses front overhead courtesy lamps, reading/map lamps, remote convenience buttons, roof opening panel switch, emergency messaging buttons and a microphone.

Handles, Locks, Latches and Entry Systems

The central locking system employs single-key access to the driver door, ignition switch and steering column lock.

Depending on market and vehicle specification the remote central locking system may incorporate a double locking facility for optimum security. The key fob transmitters are synchronized to the engine immobilization system by using the approved Jaguar diagnostic system.

The key fob transmitter performs the following functions:

- unlocks the driver door;
- unlocks/locks all doors;
- releases the luggage compartment lid;
- activates/deactivates the double locking;
- arms/disarms the anti-theft system including intrusion and inclination sensors (where applicable);
- activates global closing;
- deactivates a triggered alarm.

In addition, the following convenience features are included; either standard or optional features:

- remote transmitter operated headlamp convenience;
- global close (roof opening panel and all windows), both key and remote transmitter operated;
- lockable glovebox.
- mechanical child locks on rear doors;
- release lever for the fuel filler flap.

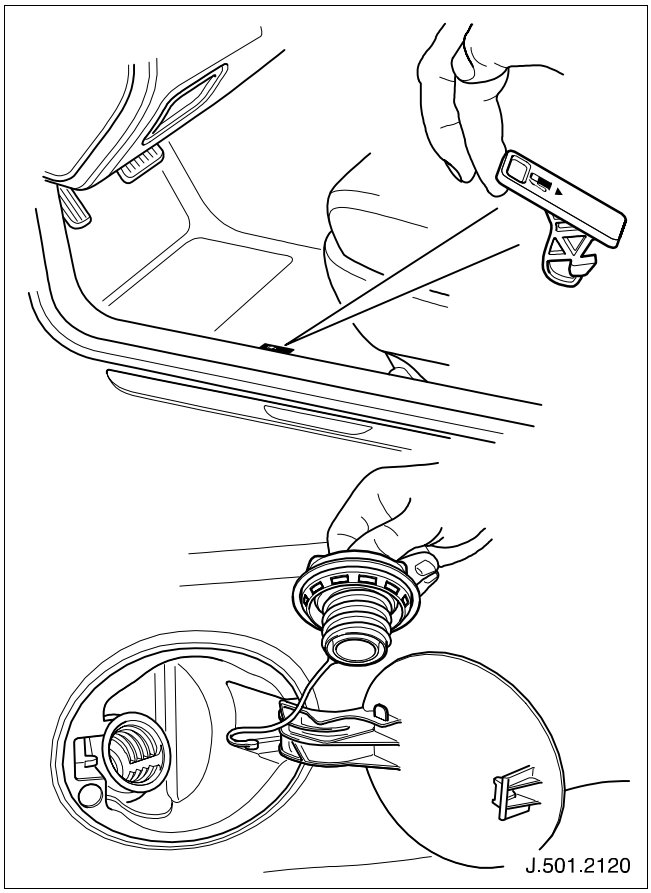

Fig. 84 Release lever - fuel filler flap

Transmitter, Keyless Entry Remote

The keyless entry/remote operated lock system is completely independent in function but fully integrated within the GECM. The remote control system consists of a transmitter and an antenna (radio frequency system).

The key fob transmitter for the radio frequency system will operate without the transmitter being directed at the vehicle. The range between the transmitter and the antenna is:

- up to 10 meters for the USA, Canada and the rest of the world;
- up to five meters for the UK and Europe;
- three meters for Japan.

Before the remote control system can be used, each transmitter must be initialized to the vehicle. A maximum number of four transmitters can be initialized to any vehicle and all must be initialized at the same time.

NOTE: The keyless entry/remote operated locks will not operate when the ignition key is in the ignition switch.

Locking and Unlocking

The remote transmitter is integrated into the key fob. Four buttons (lock, unlock, luggage compartment lid release, headlamp convenience) operate the system:

- Pressing the lock button once, activates the central locking system and the alarm system.
- Pressing the lock button twice within three seconds, activates the central locking system, double locking system, alarm system and the interior scanning system (where applicable).
- Pressing the unlock button once, deactivates the double locking and the alarm system but only the driver door is fully unlocked (this is a programmable feature using the approved Jaguar diagnostic system).
- Pressing the unlock button twice within three seconds, will unlock the remaining doors (this is programmable using the approved Jaguar diagnostic system).
- Pressing the luggage compartment lid release button once, releases the lid.

NOTE: The vehicle must be unlocked and at vehicles speeds below 7 km/h (4 mile/h).

- Pressing the headlamp convenience button once, activates the headlamp main beam function, pressing the headlamp convenience button again, deactivates the headlamp main beam function.

NOTE: This function will automatically deactivate after 30 seconds.

- Pressing the headlamp convenience button three times within three seconds, activates the alarm, pressing the headlamp convenience button again three times within 3 seconds, deactivates the alarm.

Double Locking

Double locking:

- prevents the unlocking of the vehicle by using the interior door handles;
- is activated by turning the key to the unlock position and then to the lock position within three seconds or by pressing the lock button on the remote transmitter twice within three seconds;
- is confirmed when the turn signals flash twice (one short flash followed by a long flash);
- will be inhibited if any door is open or ajar.

NOTE: If the vehicle battery becomes discharged after the double locking has been activated, entry to the vehicle will only be possible after unlocking the driver's door with the key. This will mechanically deactivate the double locking for the drivers door only.

Inputs and Outputs

The general electronic control module (GECM) receives inputs from the following:

- ignition switch (positions I and II);
- door ajar switches;
- hood switch;
- luggage compartment switch;
- key fob transmitter.

The GECM distributes outputs to the following:

- door lock actuators;
- double locking motors;
- turn signals;
- alarm horn;
- luggage compartment latch;
- power window motors for global closing.

Wipers and Washers

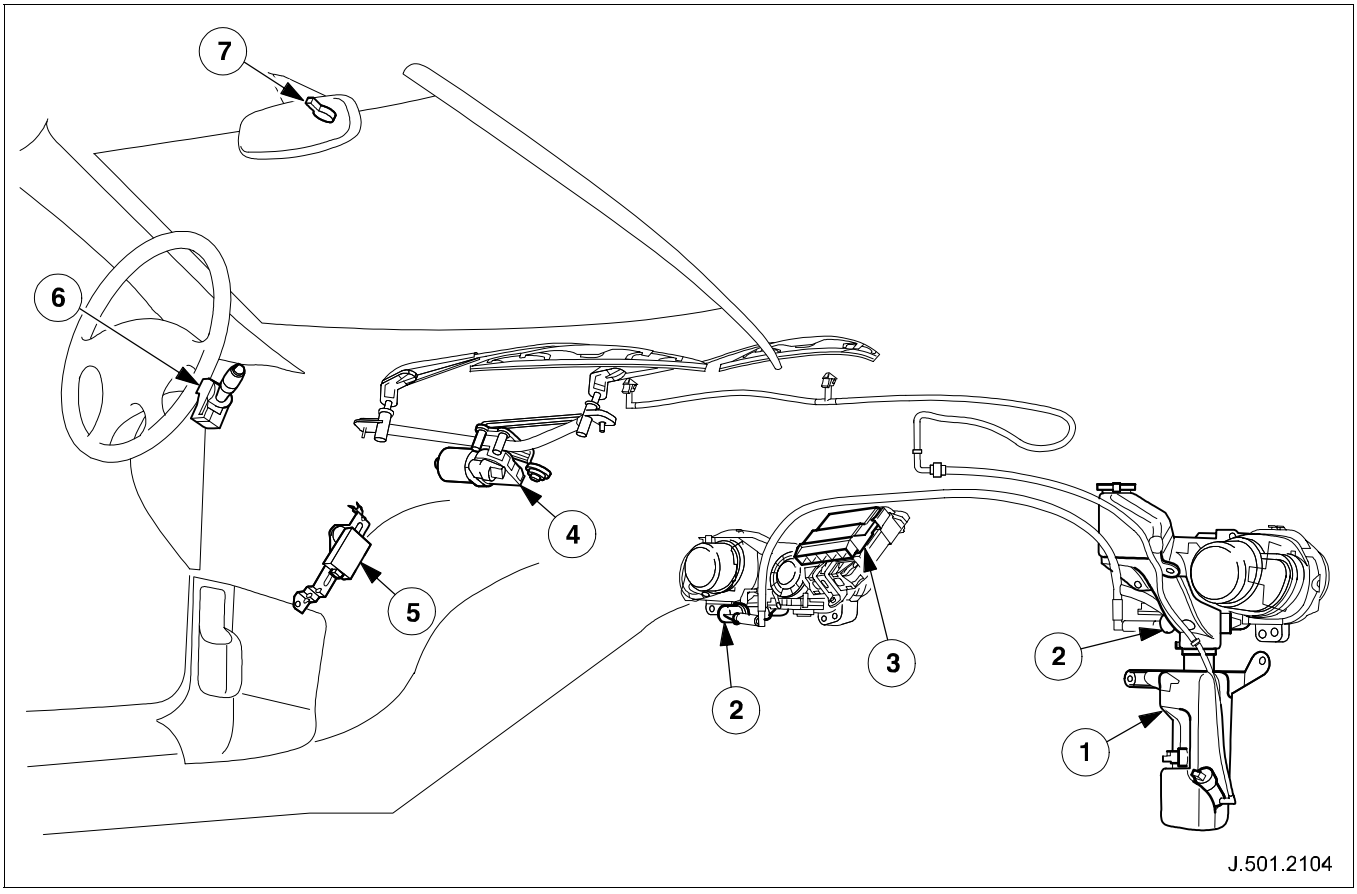

Fig. 85

1. Washer reservoir
2. Telescopic powerwash
3. General electronic control module
4. Wiper motor
5. Rain sensing module
6. Wiper switch
7. Rain sensor

The wipers and washers system comprises:

- Wiper motor.
- Washer fluid reservoir.
- Washer fluid pump.
- Mounting arm and pivot shaft
- Telescopic powerwash (where installed).
- Rain sensing module (where installed).
- Rain sensor (where installed).

The system is controlled by the general electronic control module (GECM). The windscreen wipers and screen wash functions are driver-determined by the right-hand column stalk and only operate with the ignition key at position 'II'.

The column stalk provides the following options:

- Flick wipe.
- Programmable intermittent wipe.
- Slow wiper operation.
- High speed wiper operation.
- Moisture sensitive wiping.

The wipers automatically return to the park position when the ignition key is turned to position '0' or the wiper control switch 'OFF' position is selected.

Moisture Sensitive Wiping

Where installed, moisture sensitive wiping is controlled using a combination of the GECM, rain sensing module, rain sensor and wiper switch; refer to **X-TYPE Electrical Guide** for connection details.

The rain sensor is located within the base of the interior rear view mirror on the inner surface of the front window glass. A spring within the base of the mirror holds the sensor against the glass.

The rain sensing module is located on a bracket, forward of the left-hand A-post.

Moisture sensitive wiping will be initiated providing:

- the ignition key is at position 'II';
- PARK or NEUTRAL gear is not selected (gear engaged for manual vehicles);
- the wiper switch is set to the AUTO position and intermittent wipe is selected.

When the sensor detects the presence of rain or moisture on the window glass, an electrical signal is sent to the rain sensing module. The rain sensing module responds by sending an appropriate output signal to the wiper motor.

Headlamp Cleaning System

A headlamp cleaning system is a legal requirement for vehicles installed with high-intensity discharge (xenon) headlamps.

The headlamp powerwash feature can be operated if the ignition key is at position 'II' and side lamps are selected.

NOTE: The feature will not operate if the washer fluid level is low.

When the windscreen wash/wipe button is pressed, the headlamp powerwash directs a short burst at the headlamps. If the wash/wipe button is held, the screen wash-cycle will continue for up to 20 seconds. The headlamp powerwash will operate the first time the wash/wipe button is pressed and thereafter every sixth succeeding wash/wipe operation. If the headlamps or ignition are switched OFF and ON again, the powerwash will operate on the next press of the wash/wipe button.

NOTE: If the washer fluid level is low in the reservoir the wipers will not operate when windscreen wash is selected even though there may be washer fluid remaining in the reservoir and sprayed onto the screen. This is to prevent damage to the blades, or scratching of the glass, or smearing dirt across the screen. Flick wipe should be selected to clear the sprayed fluid from the screen.

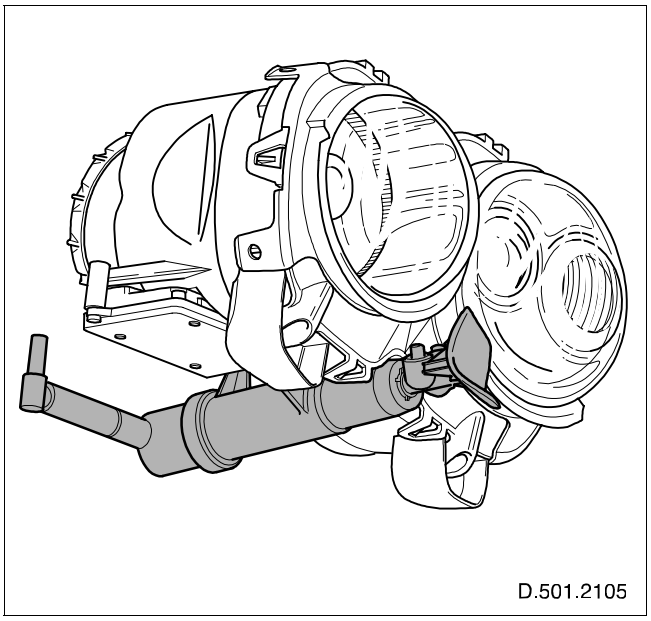

Fig. 86 Telescopic powerwash

Roof Opening Panel

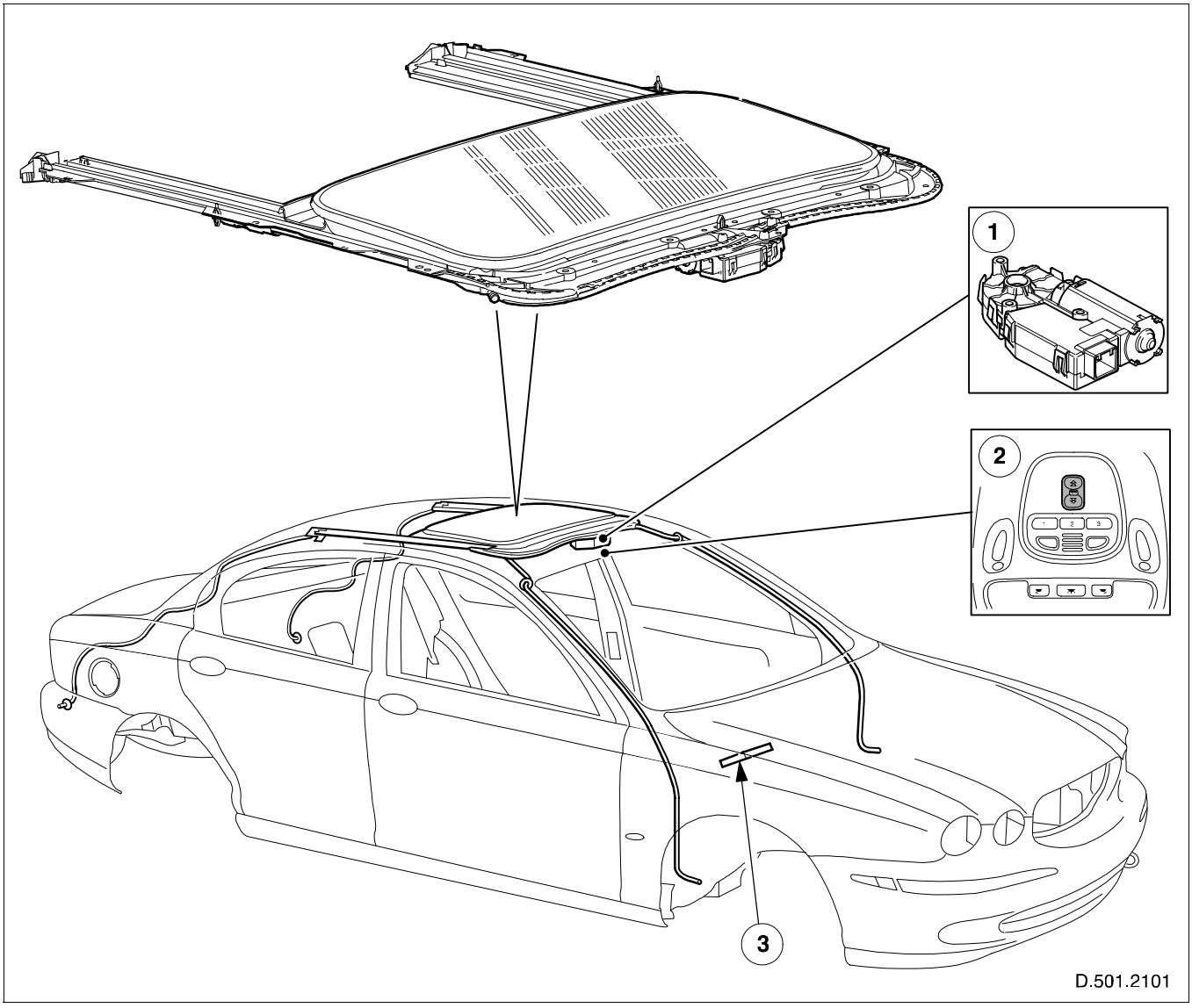

Fig. 87 Roof opening panel

1. Roof opening panel control module
2. Roof opening panel switch
3. General electronic control module

The roof opening panel (where installed) system comprises:

- Roof opening panel assembly.
- Roof opening switch.
- Roof opening control module.
- Drain tubes.

Roof Opening Panel Switch

The roof opening panel switch is mounted in the overhead console. The switch has two forward positions and two rear positions:

- The first forward and first rear positions provide expected functionality for operating the roof panel (the panel will move until the switch is released or until the stop position is reached).
- The second forward and second rear positions provide 'express'operation (the panel will move until the stop position is reached or until the switch is operated again).

NOTE: The roof opening panel can be activated by the 'global close' feature which is controlled by the general electronic control module (GECM).

Roof Opening Panel Control Module

The control module has an integral motor for driving the roof opening panel. The module is calibrating during manufacture and thereafter can automatically determine the position of the roof panel; refer to **X-TYPE Electrical Guide** for connection information.

NOTE: After replacing the roof opening panel or module the system will require calibration; refer to JTIS.

Bumpers

Front bumper

The bumper:

- is a chassis-mounted steel beam;
- forms part of the low speed crash structure which is designed to be serviceable.

The bumper cover:

- is one piece and color co-ordinated;
- incorporates the energy absorbing foam;
- includes air management and brake cooling ducts;
- incorporates brackets for mounting the fog lamps;
- has chrome inserts, side marker lights;
- a color co-ordinated removable splitter vane for access to the towing eye.

An undertray is secured to the bottom of the bumper cover and the body front cross-member.

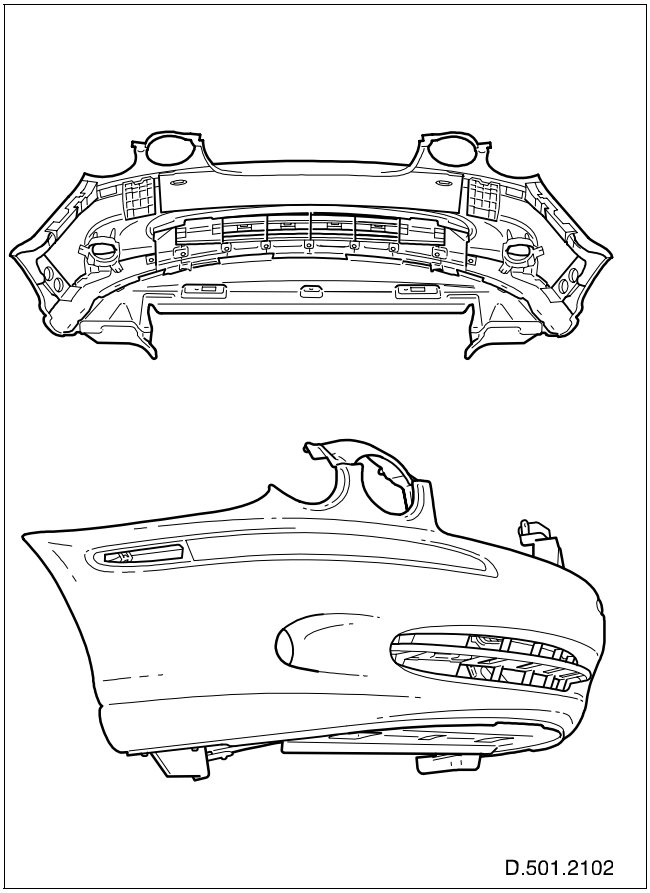

Fig. 88 Front bumper cover

Rear bumper

The bumper:

- is a chassis-mounted aluminium beam;
- forms part of the low speed crash structure which is designed to be serviceable.

The bumper cover:

- is one piece and color co-ordinated;
- incorporates the energy absorbing foam and lower blackout panel;
- has chrome inserts, side marker lights;
- has a removable cover for access to the towing eye.

NOTE: The parking aid sensors (where applicable) are mounted in the lower blackout panel.

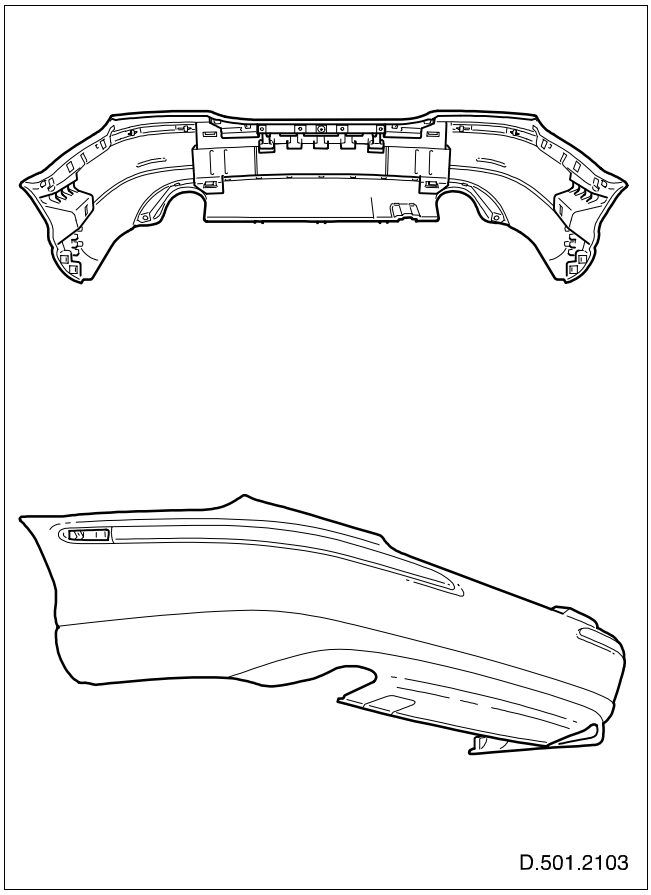

Fig. 89 Rear bumper cover

Advanced Restraints System

Introduction

New technologies have permitted the development of an 'Advanced Restraint System' that provides an improved overall level of crash protection for vehicle occupants. The system analyzes the occupancy scenario and crash severity before activating the appropriate safety devices to help better protect a range of occupants in a variety of crash situations. Benefits of the new system include:

- Optimization of the deployment restraint devices and the reduction in potential for air bag induced injuries.
- The significant reduction in passenger air bag deployments (particularly when passenger seats are unoccupied) and a general reduction in all air bag deployments.

In order to support the advanced restraint system requirements, a restraint control architecture has been introduced comprising the following systems or components:

- All-electronic crash sensing with including frontal crash severity sensing and advanced restraints management.
- Driver air bag with twin stage inflator.
- Passenger air bag with twin stage inflator.
- Child seat lower ISOfix anchors for rear seats.
- Safety belt system including: front belt use detection, load limiting retractors and buckle pre-tensioner
- Front seats including: driver seat track position sensor and passenger seat weight-sensing system.
- Lower steering column.
- Front seat-mounted side air bags.
- Side curtain air bag

The systems diagram **Fig. 90** provides an indication of how the electrical component parts interact with each other; refer to **X-TYPE Electrical Guide** for detailed information.

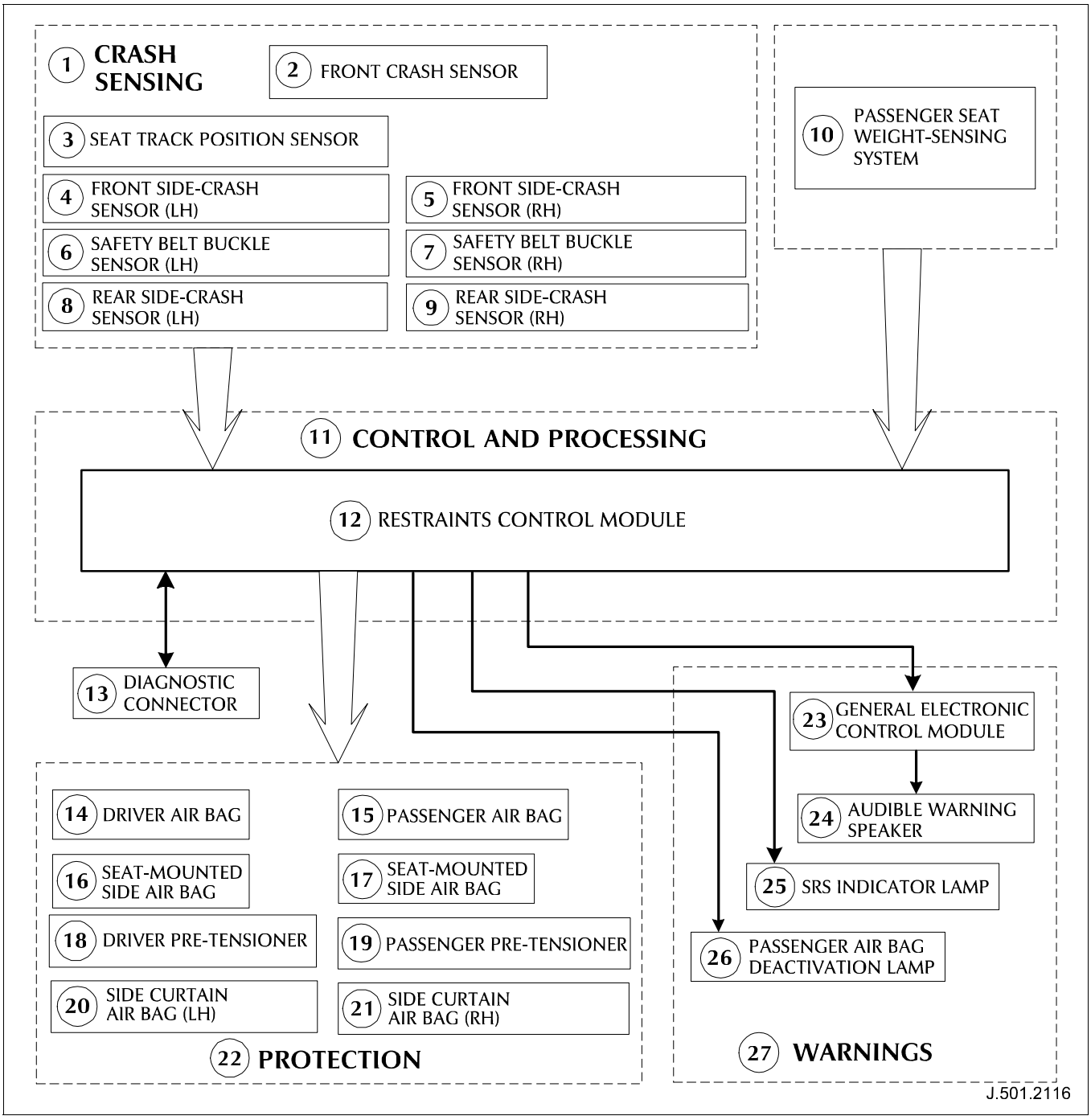

Fig. 90 Advanced restraints system diagram

Key to Fig. 90

1. Crash sensing
2. Front crash sensor
3. Seat track position sensor
4. Front side-crash sensor (LH)
5. Front side-crash sensor (RH)
6. Safety belt buckle sensor (LH)
7. Safety belt buckle sensor (RH)
8. Rear side-crash sensor (LH)
9. Rear side-crash sensor (RH)
10. Passenger seat weight-sensing system
11. Control and processing
12. Restraints control module
13. Diagnostic connector
14. Driver air bag
15. Passenger air bag
16. Seat-mounted side air bag
17. Seat-mounted side air bag
18. Driver pre-tensioner
19. Passenger pre-tensioner
20. Side curtain air bag (LH)
21. Side curtain air bag (RH)
22. Protection
23. General electronic control module
24. Audible warning speaker
25. SRS indicator lamp
26. Passenger air bag deactivation lamp
27. Warnings

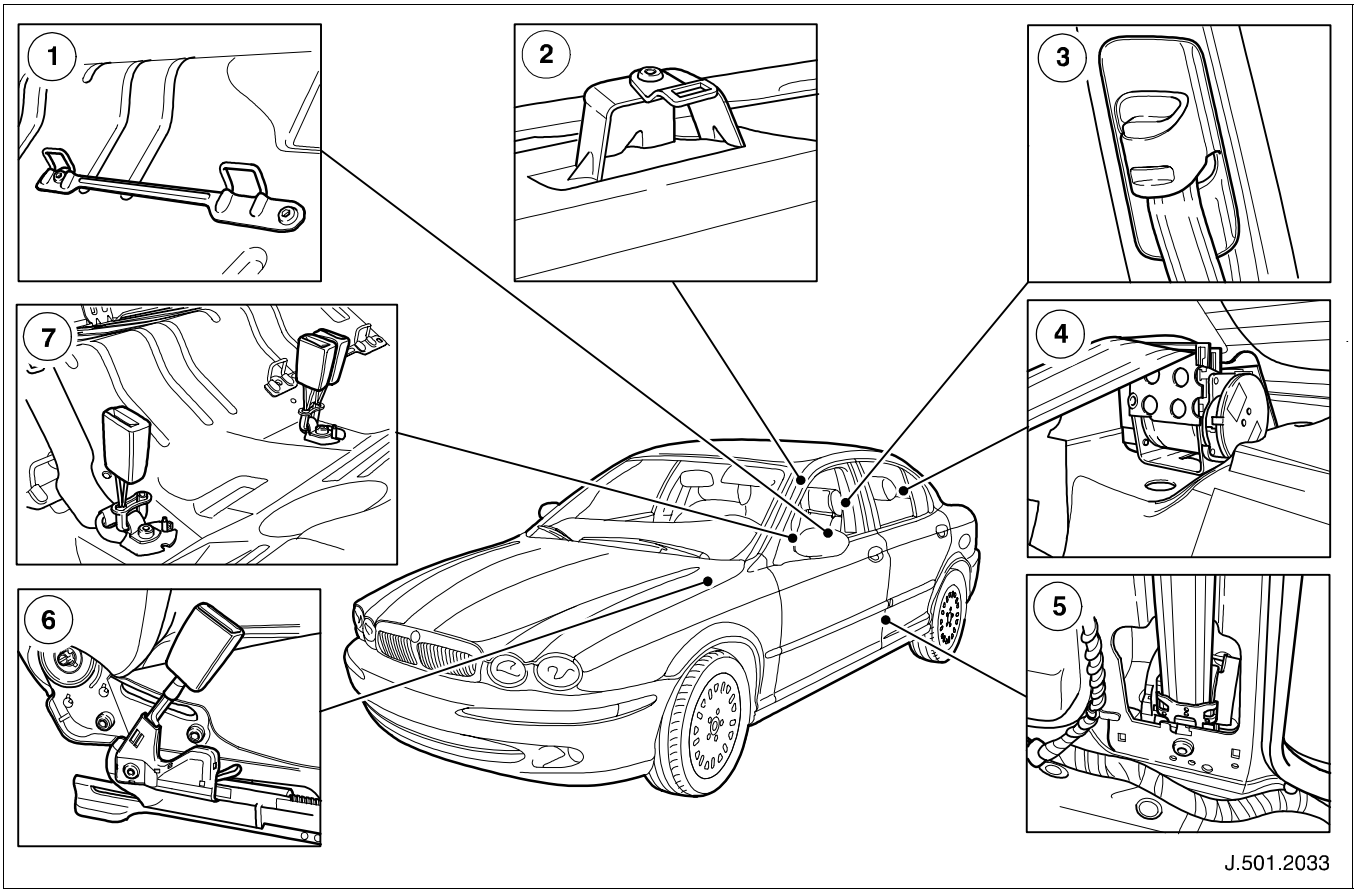

Fig. 91 Occupant restraints - location of active components

1. Child seat lower ISOfix anchors
2. Child seat upper anchor
3. Front safety belt upper anchor
4. Rear safety belt retractor
5. Front safety belt retractor
6. Front safety belt buckle/pre-tensioner
7. Rear safety belt buckles

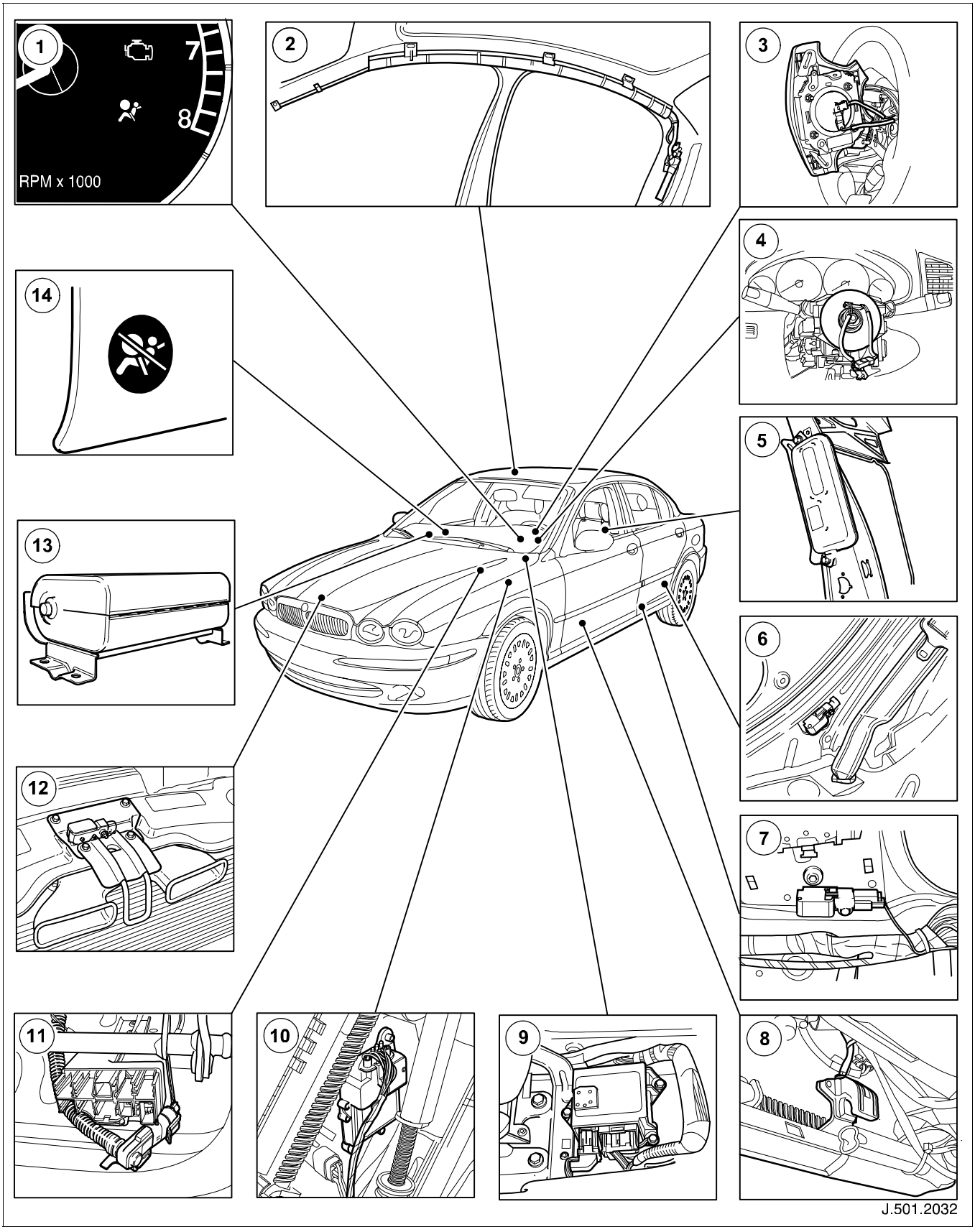

Fig. 92 Occupant restraints - location of passive components

Key to Fig. 92

1. SRS indicator lamp
2. Side curtain air bag
3. Driver air bag module
4. Clockspring
5. Seat-mounted side air bag module
6. Rear side crash sensor
7. Front side crash sensor
8. Seat track position sensor
9. Restraint control module
10. Passenger seat weight-sensing module
11. Passenger seat weight-sensing pressure sensor
12. Front crash sensor
13. Passenger air bag module and lower mounting bracket
14. Passenger air bag deactivation indicator lamp

Sensors

WARNING: Before commencing work on any part of the restraint system, the vehicle battery should be disconnected and a period of at least one minute allowed to elapse.

- The sensors do not contain any serviceable parts.
- Serial numbers of new parts should be logged against VIN for traceability.

Front Crash Scenario

The restraints control module (RCM), controls air bag deployment decisions by using signals from its internal accelerometer and the following sensors:

- Front crash sensor.
- Seat track position sensor.
- Safety belt buckle sensor.
- Passenger seat weight-sensing system.

Front Crash Sensor

The front crash sensor:

- is mounted on a bracket which is located in the center of the upper mounting crossmember;
- collects acceleration data from the front of the vehicle and sends it back to the RCM as an analogue signal;
- provides the main source of data that enables the RCM to gauge the severity of a frontal impact.

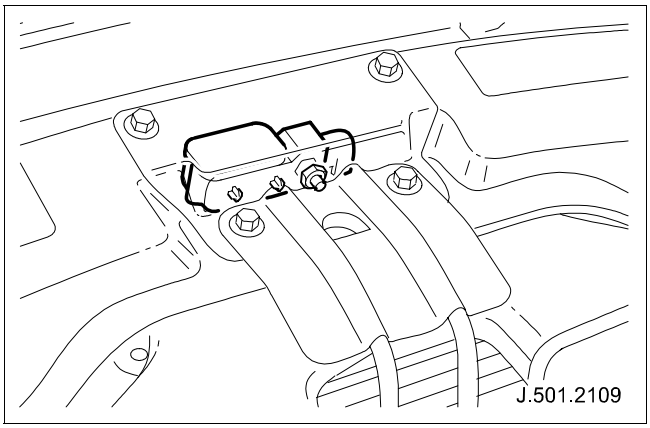

Fig. 93 Front crash sensor

Seat Track Position Sensor

The seat track position sensor, a 'Hall effect' type, is fitted to the underside of the driver's seat. The sensor is actuated by the steel bracket that is attached to the seat slide; refer to **Fig. 94**. The magnetic field disturbance caused, when the steel bracket passes through the sensor, creates an output signal for the RCM. On receipt of this signal, which indicates when the seat is forward of a defined point in its travel, the RCM disables the second stage output of the driver air bag. Malfunction of the sensor or associated circuits will cause the SRS indicator lamp to illuminate. Diagnosis must be undertaken using WDS.

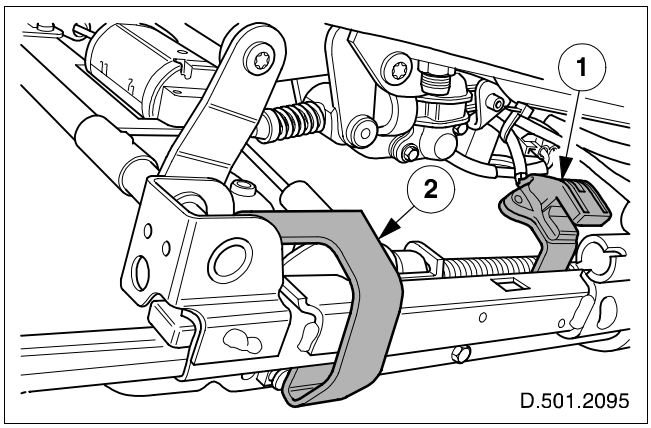

Fig. 94 Seat track position sensor

1. Hall effect sensor
2. Steel bracket

Safety Belt Buckle Sensor

The safety belt buckle sensor is a 'Hall effect' type, which provides an output signal in response to the magnetic field disturbance caused by the insertion of the safety belt tongue into the buckle. The output signal from the sensor is used by the RCM to determine whether the front seat occupants are correctly restrained. Malfunction of the sensor or associated circuits will cause the SRS indicator lamp to illuminate. Diagnosis should be undertaken using WDS.

The Hall effect sensor is used in conjunction with the other components of the advanced restraint system to ensure that air bag and safety belt deployment only occurs where necessary.

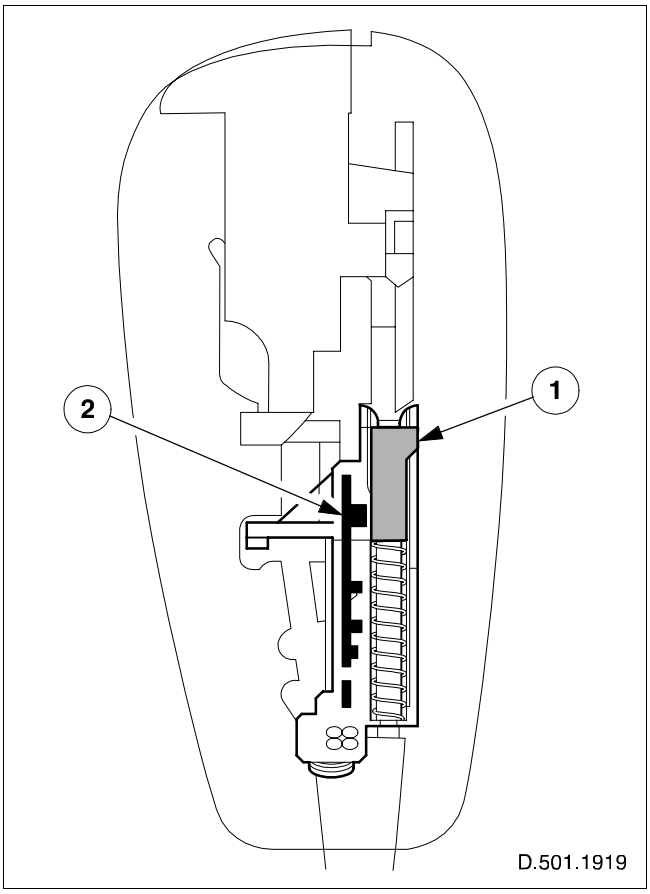

Fig. 95 Safety belt buckle sensor

1. Magnet
2. Hall effect sensor

Passenger Seat Weight-Sensing System

NOTE: The seat weight-sensing system does not comprise any serviceable items.

The following components are combined and calibrated during manufacture to form the seat weight-sensing system:

- Passenger seat pan and cushion.
- Silicone-filled bladder (integrated into the passenger seat cushion).
- Seat weight-sensing module (mounted under the seat).
- Pressure sensor (attached to the bladder and mounted under the seat).

Locations for the seat weight-sensing components are shown in Body, Seats, **Fig. 72**.

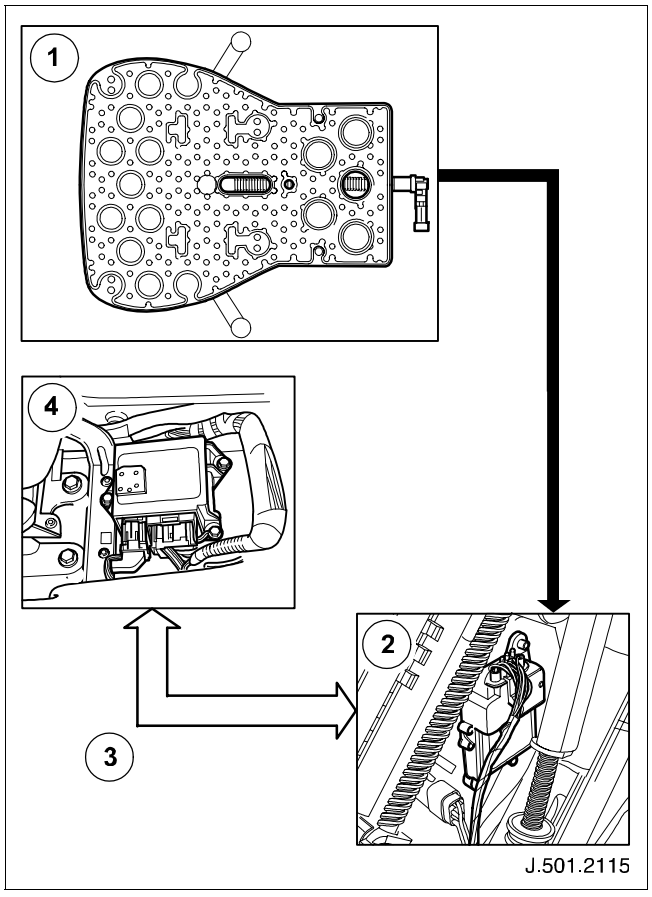

Fig. 96 Passenger seat weight-sensing system

1. Silicon bladder, hose and pressure sensor
2. Seat weight-sensing module
3. Local controller area network (CAN)
4. Restraints control module

The silicone-filled bladder responds to weight changes on the passenger seat. The pressure sensor responds to these pressure changes and provides an appropriate signal to the seat weight-sensing module. The seat weight-sensing module, processes the input signal received from the pressure sensor and makes it available to the restraints control module (RCM) via the local CAN. In addition, the module performs self-diagnostic functions on the system, with any malfunctions being notified to the RCM accordingly. Malfunction of the sensing system or associated circuits will cause the SRS indicator lamp to illuminate. Diagnosis of the system can only be undertaken using WDS; refer to **JTIS** for further information.

The seat weight-sensing system responds to the occupancy of the front passenger seat in accordance with **Table 7**. The advanced restraints system via the RCM, monitors and processes the data from the seat weight-sensing system and several other sensors, before making a deployment decision; refer to the advanced restraints system diagram **Fig. 90**. The system is designed to take account of several variables in addition to weight, including: inclination of the vehicle; exact position and structure of the weight on the seat.

NOTE: The seat weight-sensing system cannot discriminate between a passenger and an object.

Passenger seat status	Passenger air bag status	Passenger air bag deactivation lamp status
Empty	OFF	OFF
Occupied (small occupant)	OFF	ON
Occupied (large occupant)	ON	OFF

Table 7 Passenger seat weight-sensing system

Service Kit

Individual components of the seat weight-sensing system are not serviceable; the system must be replaced as a complete unit. Due to the sophistication of the weight-sensing system, each replacement system requires calibration. To avoid the need to provide each dealer with calibration equipment, a pre-calibrated service kit assembly is available. The kit has two fixed connectors and a single connector to interface with the vehicle harness. After installation, the system will require initialization by WDS; refer to **JTIS** for further information.

Side Crash Scenario

Data from the side crash sensors are used by the restraints control module (RCM), in conjunction with acceleration data from the RCM's internal accelerometer to make a deployment decision. The RCM processes the acceleration data and subject to an impact being of high enough severity, decides whether the seat-mounted side air bag should be deployed. The decision is forwarded to the deployment handler (within the RCM) which responds appropriately; for example: in the case that the passenger seat weight-sensing system calculates that the seat is empty, or occupied by a small person, the passenger side air bag will be disabled.

NOTE: The appropriate side curtain air bag will still deploy to afford protection for any corresponding rear occupant.

Side Crash Sensors

The side crash sensors:

- Comprise accelerometer and processing circuits but, unlike XJ Series and S-TYPE, the sensors do not make deployment decisions.
- The front side-crash sensor is mounted behind the B-post trim close to the safety belt retractor fixing.
- The rear side-crash sensor is mounted directly to the vehicle body at a rear mid-wheel location, close to the rear lower safety belt anchor.

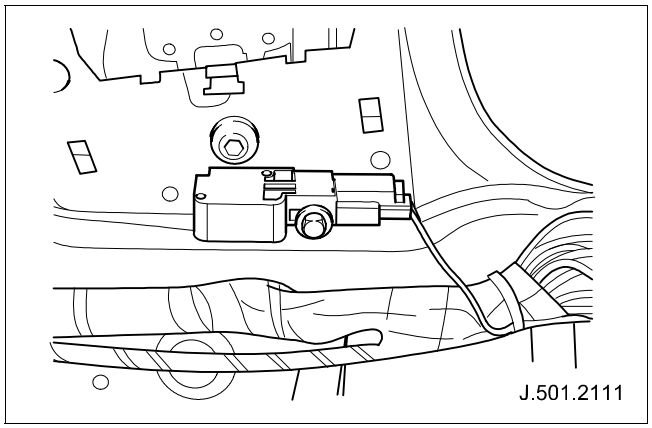

Fig. 97 Front side-crash sensor

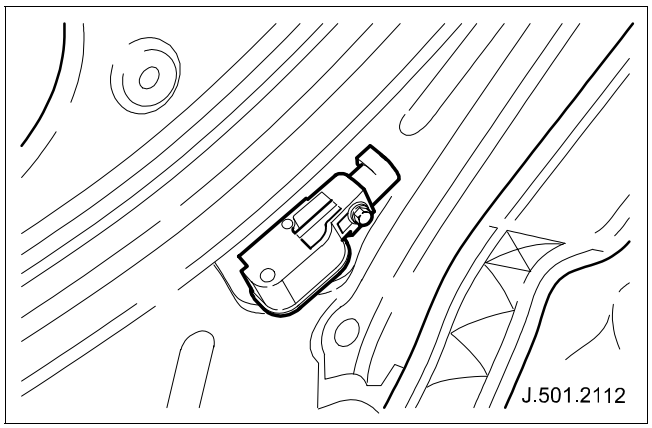

Fig. 98 Rear side-crash sensor

Control and Processing

Restraints Control Module

Internally, the RCM has two areas that determine which elements of the restraint system are to be deployed:

Area 1 - Crash severity evaluation

The first area evaluates crash severity by using data from the RCM's internal accelerometer, the front crash sensor and the safety belt buckle sensor. Based on this data, the RCM decides which level of air bag deployment is required and forwards the information to the second area, the deployment handler.

Area 2 - Deployment handler

The status of the seat track position sensor, seat weight-sensing system and safety belt buckle sensors are examined before a decision is made about which restraints should finally be deployed. For instance, if the seat weight-sensing system indicates that the passenger seat is empty, then no restraint deployment will take place on the passenger side, even if full deployment takes place for the driver.

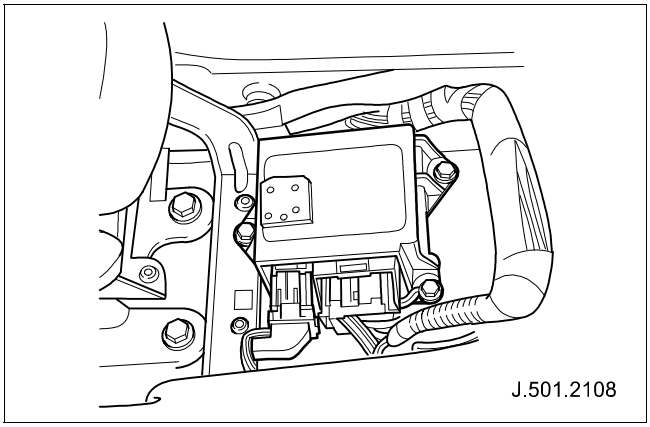

Fig. 99 Restraints Control Module

The restraints control module (RCM):

- Is fixed to the top of the driveshaft tunnel below the center console.

NOTE: Due to the importance of the module being securely fixed to the vehicle body, the ground connection is made via the fixings and is monitored by the diagnostic system. A bad connection causes a diagnostic trouble code (DTC) to be generated. Refer to **JTIS** for the correct torque figures.

- Identifies severity and direction of impact and makes decision on deployment of air bags and pre-tensioners.
- Provides firing signals to all air bags and pre-tensioners.
- Performs on board testing of the air bag and pre-tensioner firing circuits, warning indicator circuits and module status (the front and side crash sensors perform basic self-tests).
- Stores DTCs.
- Drives the SRS indicator lamp on the instrument cluster: if the warning lamp fails and there is an additional malfunction within the system (DTC recorded) a secondary warning tone is sounded.
- In the event of a crash, sends a signal to the vehicle emergency message system (VEMS) and the ECM to indicate that a crash has occurred.
- Is connected to the diagnostic connector via the ISO data bus to enable communication with WDS or scan tool.
- In the event of loss of battery supply in crash conditions, provides a temporary back-up power supply (100ms after the RCM loses its supply) to operate the front air bag modules and pre-tensioners.
- In the event of a crash, records certain data for subsequent access via the diagnostic connector. This data includes deceleration information, firing delay and DTCs.

NOTE: Diagnosis of any malfunctions relating to the adaptive restraints system must always be undertaken using WDS.

Safety Belts

In appropriate markets, all passenger safety belts (not the driver's) have an integral automatic locking retractor (ALR), providing a 'static reel mode' for use with child seats. When activated, the static reel mode prevents further extraction of the belt and locks the child seat firmly in position.

The static reel mode is activated by pulling the belt to its full extension to engage the ratchet mechanism. After ensuring the child seat is in the required position the belt tongue should be inserted into the buckle and the belt allowed to slowly retract back onto the reel (a ratchet operation may be felt as the belt retracts) until it fits snugly around the child seat.

Unbuckling the belt and allowing the webbing to fully retract will disengage the ALR feature.

Front Safety Belts

WARNING: Prior to the removal of front safety belts and before disconnecting front safety belt connectors, the vehicle battery should be disconnected and a period of at least one minute allowed to elapse. The same amount of care should be taken when handling and storing front safety belts, as would be taken when handling and storing air bag modules.

The front safety belt retractors incorporate a load limiting device, that allows progressive 'payout' of additional safety belt webbing when the force exerted exceeds a predetermined limit.

The front safety belt buckle assembly incorporates:

- a 'Hall effect' sensor; refer to **Sensors**;
- a pyrotechnic pre-tensioner.

The pre-tensioner will only be activated when the restraints control module (RCM) sends an appropriate firing signal; refer to **Control and Processing**.

The pre-tensioners are:

- designed to remove excess webbing from the safety belt in the event of a crash;
- deploy very quickly and early on in the crash before the occupant starts loading the safety belt.

NOTE: Safety belts are not serviceable items. As with all electronically monitored, occupant safety components, the SRS indicator lamp will illuminate if a DTC has been stored. Diagnosis must be undertaken using WDS.

Rear Safety Belts

The rear safety belts retractors and buckles are of the conventional type.

ISOfix Standardized Child Seat Anchorage System

The ISOfix standardized child-seat anchorage system also known as LATCH is a universal system, which allows the child seat to be secured directly and easily to the vehicle body without the use of adult safety belts. Dependant on vehicle and market, the ISOfix system will be either fitted as standard, or fitted by the dealer if ordered as an accessory.

Anchors

For each rear outboard seat position, the ISOfix system uses two lower anchors bolted to the body in the seat pan area. To ensure universal compatibility, the size, position and orientation of the lower anchors are controlled by an ISO standard specification.

Upper anchors, which are usually used in conjunction with the lower anchors to secure the child seat, are fitted as standard to Jaguar vehicles in both Australian and North American markets. In other markets, if the lower anchors are fitted as an accessory the upper anchors will be supplied in the accessory kit.

NOTE: Care must be taken not to damage or scratch the anchors; the anchors must be serviced by replacement only.

The anchor hoops are designed to protrude discretely into the gap between the rear-seat back and cushion. Before installing the child seat, plastic guides should be located to protect the upholstery from damage; refer to **Fig. 100**.

The child seat, which must be designed to ISOfix specification, is clipped onto the anchors by either rigid extendible rails or flexible tether straps. A quick release mechanism is incorporated to allow easy removal of the child seat. It should be emphasized that in all markets the use of the ISOfix system must be used in conjunction with the upper anchor on forward facing child seats and some rearward facing child seats. Always refer to the child-seat fitting instructions.

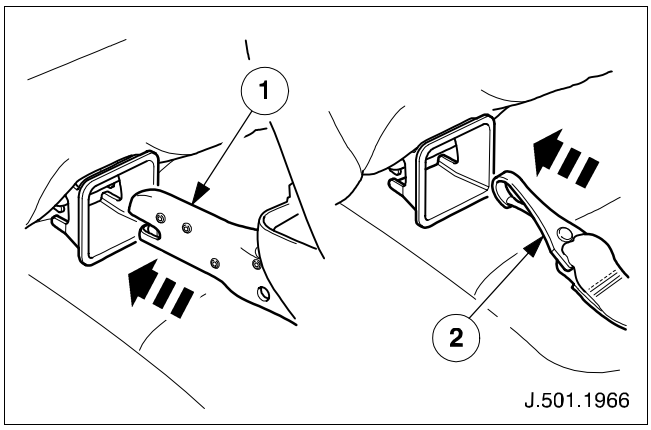

Fig. 100 Types of child seat fixings

1. Rigid extendible rail
2. Tether strap

Air Bag Modules

Driver Air Bag Module

The driver air bag module is controlled by the restraints control module (RCM), which chooses between first or second stage deployment, depending on driver seat buckle usage, seat track position and crash severity.

NOTE: Variation in passenger air bag deployment is determined by the timing of the first and second stage ignition signals. This facilitates adaptation of the stiffness and timing of the air bag to optimize occupant protection.

The module comprises:

- A twin stage inflator as opposed to the single stage inflator.
- Separate chambers for the two inflation stages, each independently activated by the RCM.
- Two air bag connectors, that have foolproof mechanical keying and are color coded to the respective plug on the inflator.
- A non-azide propellant that reduces particulates and effluents.

The air bag deploys radially, to reduce the risk of air bag induced injury to a driver that is positioned close to the steering wheel.

NOTE: Disposal of twin stage air bags is different to single stage air bags; refer to **JTIS**.

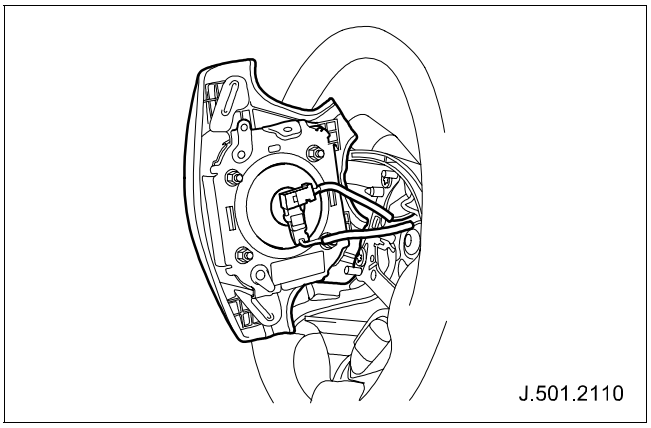

Fig. 101 Driver air bag module

Passenger Air Bag Module

The module comprises:

- A twin stage inflator as opposed to the single stage inflator.
- Two air bag connectors to accommodate the twin stage inflation.

The heated gas inflator:

- Comprises a high-pressure mix of clean air and hydrogen gas, triggered by two separate igniters.
- Produces a controlled generation of clean gas to rapidly fill the air bag.
- Is classified as a stored flammable gas (not as an explosive) and as such, has less restrictive storage and transportation requirements.
- Produces a very clean burn and almost no particulates.
- Is almost free of any toxins, making disposal or recycling much easier.

NOTE: Disposal of twin stage air bags is different to single stage air bags; refer to **JTIS**.

The passenger air bag module is controlled by the restraints control module (RCM), which chooses between first or second stage deployment, depending on occupant status and crash severity.

NOTE: Variation in passenger air bag deployment is determined by the timing of the first and second stage ignition signals. This facilitates adaptation of the stiffness and timing of the air bag to optimize occupant protection.

NOTE: The passenger air bag module can be removed through the glovebox aperture; refer to **JTIS**.

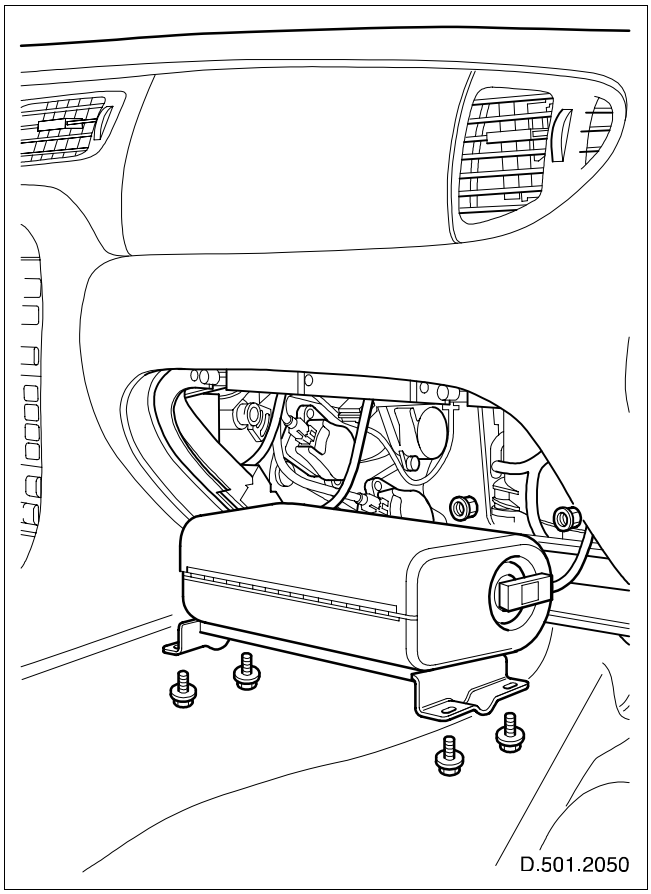

Fig. 102 Passenger air bag module

Passenger Air Bag Deployment Door

The passenger air bag deployment door is clipped into the instrument panel and tethered to the upper mounting bracket via webbing straps and a 'tether bar'.

NOTE: Removal of the door complete with webbing straps and tether bar can only be achieved after removing the passenger air bag module; refer to **JTIS**.

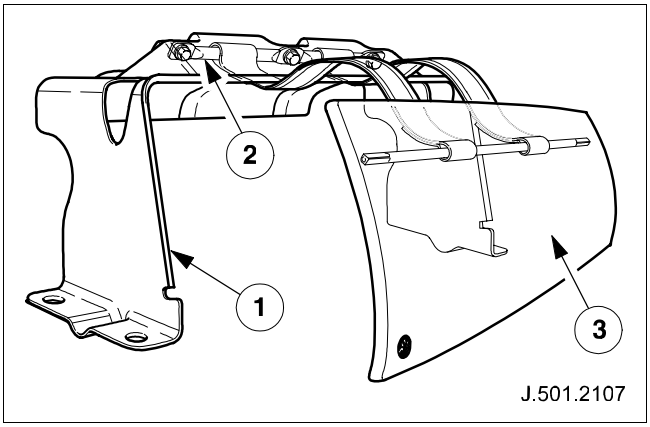

Fig. 103 Passenger air bag door

1. Passenger air bag module - upper mounting bracket
2. Tether bar
3. Deployment door

The passenger air bag deployment door incorporates a lens that displays the air bag deactivated symbol. The symbol is backlit by the air bag deactivation indicator lamp, which is mounted in a separate housing attached to the instrument panel. The illumination of the symbol is designed to inform the front seat occupants whether or not the passenger air bag has been deactivated; refer to **Sensors**.

NOTE: The lamp is not a serviceable item; the complete housing must be changed; refer to **JTIS**.

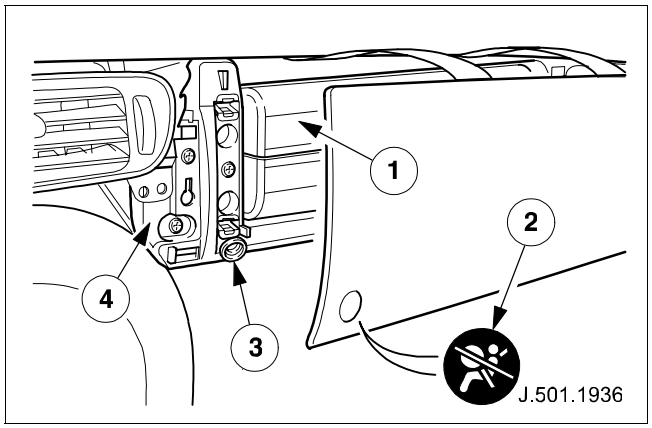

Fig. 104 Passenger air bag deactivation

1. Air bag module
2. Air bag deactivation indicator lens
3. Air bag deactivation indicator lamp
4. Air bag deactivation indicator lamp housing

Seat-Mounted Side Air Bag Module

The seat-mounted side air bag module is designed to provide protection for the thorax (the part of the torso between the neck and the abdomen). The module:

- is mounted in the outboard bolster of each front seat;
- is standard fit and specification in all markets;
- does not require routine maintenance;
- has no serviceable parts;
- uses compressed argon to inflate the bag.

NOTE: As with all occupant safety components, the SRS indicator lamp will illuminate if a DTC has been stored. Diagnosis must be undertaken using WDS.

In an air bag deployment situation, the air bag deploys through the stitched seam in the side bolster. A chute has been designed into the inside of the trim cover to ensure the air bag always emerges at the same point.

WARNING: In a service situation, the module must be correctly located in the chute. Failure to follow the service procedure could result in incorrect air bag deployment; refer to JTIS.

NOTE: In the event of a side impact that is sufficient to deploy the bag, it will be necessary to replace the complete seat.

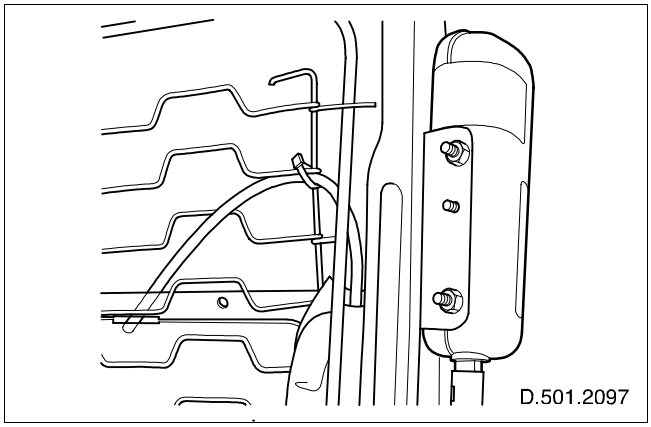

Fig. 105 Seat-mounted side air bag module

Side Curtain Air Bag

The side curtain air bag has been designed uniquely for X-TYPE and comprises:

- Attachment brackets (p-clips).
- Fill tube.
- Air bag.
- Housing.
- Inflator.
- Front/rear tethers.

The side curtain air bag:

- is standard fit and specification in all markets;
- is located under the headliner and stabilized at the A-post and C-post by tethers;
- does not require routine maintenance;
- has no serviceable parts;
- uses compressed argon to inflate the air bag;
- deploys to coincide with seat-mounted side air bag deployment.

NOTE: If the passenger air bag is deactivated, the corresponding seat-mounted side air bag is also deactivated, however the side curtain air bag will still deploy to afford protection to any corresponding rear occupant.

- After deployment, the side curtain air bag extends down to approximately shoulder height providing head protection for both the front and rear occupants.

The inflator:

- generates the gas needed to fill the air bag;
- consists of a high strength steel casing filled with a solid propellant charge, an electrically activated igniter and a cold gas bottle containing pressurized gas.

When appropriate, the restraints control module (RCM) sends a signal to the igniter causing the following sequence of events:

- The propellant is ignited
- The burning propellant opens the membrane of the cold gas bottle and heats the pressurized gas.
- The expanding gas is directed into the fill tube by the inflator housing assembly.
- The gas emerges through holes in the fill tube and enters the front and rear side curtain air bag chambers.

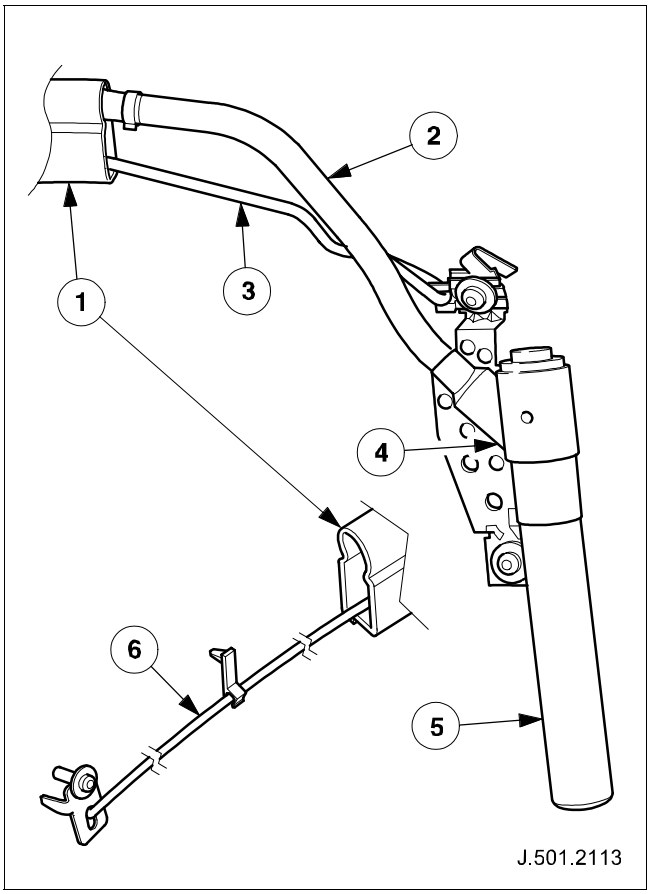

Fig. 106 Side curtain air bag

1. Housing
2. Fill tube
3. Rear tether
4. Inflator housing assembly
5. Inflator
6. Front tether

Steering Column

The steering column is an integral part of the occupant safety system; refer to Chassis, Steering System, **Steering Column**.

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