Curriculum Training

# Introduction to Jaguar

## General Information

Technical Training

INTR 05 en 08/2005

INTR: General Info

Please remember that our training literature has been prepared for TRAINING PURPOSES only. Repairs and adjustments MUST always be carried out according to the instructions and specifications in the workshop literature. Please make full use of the training offered by Technical Training to gain extensive knowledge of both theory and practice.

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## Workshop safety

This page highlights the general observations expected while attending this training program, and its continuation upon returning to your place of work.

## General

While working on all vehicles, the following items where available should always be used:

- Fender covers
- Seat covers
- Floor protection

## Safety

All precautions must be taken and observed at all times, to prevent injury or damage to the following:

- Yourself
- Customer's property
- Workshop equipment
- Work place colleagues

## Operating guidelines

While using any piece of workshop equipment:

The manufacturer's guidelines and warning labels must be followed.

This will ensure correct use and application at all times.

Seek the necessary advice or training where equipment usage is unclear.

## Chemicals, Oils and Solvents

Follow all manufacturer's warnings and labels; also take into account local disposal regulations when working with chemicals, oils or solvents.

Ensure that all risks are completely minimized.

Make sure that all protective items of clothing are worn where required e.g.

- Eye protection
- Gloves
- Coveralls
- Footwear

## System capping

Upon disconnecting components from a system, take all precautions necessary to prevent system contamination or environmental leakage.

Fit relevant plugs or caps i.e. to pipes, unions and component orifices etc.

## Updates

Keep abreast of all relevant changes that affect your role within the dealership, by monitoring all factory issued documentation.

## Driving

Operating vehicle features, such as ICE, mobile phones and CD player equipment etc., can cause a momentary distraction while driving.

Follow all traffic regulations when operating vehicle systems or using diagnostic equipment while on the move.

Mobile diagnostic equipment operation may require the use of an assistant.

### A Welcome Message to the New Jaguar Technician

Introduction to Jaguar is intended not only to provide you with the information you need on an ongoing basis, but also to give a historical and cultural perspective on the Jaguar Marque. You might have already noticed a difference between the Jaguar training center and other automotive training centers. The Jaguar training environment is sophisticated yet comfortable, so that you will enjoy your stay while you gain important job-related skills and knowledge. Jaguar trainers are highly experienced and prepare their classrooms and lesson plans carefully for each class they teach. You will find that the course presentations and student materials are designed to respect you as a professional and to adjust to your individual training needs.

We hope the training that your are about to experience begins to express how Jaguar customers and their vehicles need to be treated in your dealership. Of course, fixing cars right the first time is important and expected but Jaguar also offers distinction in the marketplace. The Jaguar difference is that of individual attention to detail and of treating customers and fellow employees with the utmost respect.

Over the next few days, we ask that you look, listen, and participate. If you are not already a Jaguar enthusiast, you soon will be. Welcome to Jaguar.

**The Jaguar University Team**

## ACRONYMS

The following acronyms are used in this course book. The majority of the acronyms conform to SAE J1930 standards.

| Acronym | Definition |
|---|---|
| **AAI** | Air Assist Injection |
| **ABS** | Anti-Lock Braking System |
| **ABS/TCCM** | Anti-Lock Braking and Traction Control Control Module |
| **A/C** | Air Conditioning |
| **A/CCM** | Air Conditioning Control Module |
| **ACP** | Audio Control Protocol Network |
| **ADCM** | Adaptive Damping Control Module |
| **AMM** | Aftersales Market Manager |
| **APP** | Accelerator Pedal Position |
| **ARTS** | Advanced Restraints Control Module |
| **ASE** | Automotive Service Excellence |
| **ASM** | Air Suspension Module |
| **ATF** | Automatic Transmission Fluid |
| **AWD** | All-Wheel Drive |
| **AWS** | Anti Whiplash System |
| **BPM** | Body Processor Module |
| **CAN** | Controller Area Network |
| **CATS** | Computer Active Technology Suspension, or Customer Assistance Tracking System |
| **CHT** | Cylinder Head Temperature |
| **CKP** | Crankshaft Position |
| **CM** | Control Module |
| **CMP** | Camshaft Position |
| **CSI** | Customer Satisfaction Index |
| **D2B** | Digital Data Bus |
| **DATC** | Dual Automatic Temperature Control |
| **DDCM** | Driver Door Control Module |
| **DIN** | Deutsche Industrie Normen |
| **DLC** | Data Link Connector |
| **DSC** | Dynamic Stability Control |
| **DSCM** | Dynamic Stability Control Module |
| **DTC** | Diagnostic Trouble Code |
| **DVOM** | Digital Volt/Ohm Meter |
| **EATC** | Electronic Automatic Temperature Control |
| **ECATS** | Enhanced Computer Active Technology Suspension |
| **ECM** | Engine Control Module |
| **ECT** | Engine Coolant Temperature |
| **EFT** | Engine Fuel Temperature |
| **EGR** | Exhaust Gas Recirculation |
| **EMS** | Engine Management System |
| **EOT** | Engine Oil Temperature |
| **EPQR** | Electronic Product Quality Report |
| **EEPROM** | Electrically Erasable Programmable Read Only Memory |
| **EPB** | Electronic Parking Brake |
| **EPROM** | Erasable Programmable Read Only Memory |
| **FAQ** | Frequently Asked Question |
| **FRED** | Fixed Right Enhanced Diagnostics |
| **FSE** | Field Service Engineer |

| Acronym | Definition |
|---|---|
| **GECM** | General Electronic Control Module |
| **GPS** | Global Positioning System |
| **GTR** | Global Technical Reference |
| **HID** | High-Intensity Discharge (Headlamps) |
| **H02S** | Heated Oxygen Sensor |
| **IAT** | Intake Air Temperature |
| **ICE** | In-car Entertainment |
| **IDS** | Integrated Diagnostic System |
| **ISO** | International Standards Organization |
| **ITT** | Institute of Transmission Technology |
| **JBN** | Jaguar Business Network |
| **KTM** | Key Transponder Module |
| **LCD** | Liquid Crystal Display |
| **LED** | Light Emitting Diode |
| **LEV** | Low Emissions Vehicle |
| **LF** | Left Front |
| **LH** | Left Hand |
| **LR** | Left Rear |
| **LWB** | Long Wheelbase |
| **MAF** | Mass Air Flow |
| **MIL** | Malfunction Indicator Lamp |
| **MY** | Model Year |
| **N/A** | Normally Aspirated |
| **NAS** | North American Specification |
| **NVH** | Noise, Vibration and Harshness |
| **OBD** | On-Board Diagnostics |
| **OEM** | Original Equipment Manufacturer |

| Acronym | Definition |
|---|---|
| **ORVR** | On-Board Refueling Vapor Recovery |
| **PAS** | Power Assisted Steering |
| **PATS** | Passive Anti-Theft System |
| **PBA** | Panic Brake Assist |
| **PCM** | Powertrain Control Module |
| **PDCM** | Passenger Door Control Module |
| **PDF** | Portable Document Format |
| **PDI** | Pre-Delivery Inspection |
| **PSE** | Portable Support Electronics |
| **PTEC** | Powertrain Electronic Control |
| **RCM** | Restraints Control Module |
| **RCCM** | Remote Climate Control Module |
| **RDS** | Radio Data System |
| **RECM** | Rear Electronic Control Module |
| **RF** | Right Front, or Radio Frequency |
| **RH** | Right Hand |
| **ROW** | Rest Of World |
| **SAE** | Society of Automotive Engineers |
| **SCP** | Standard Corporate Protocol (Network) |
| **SC** | Supercharged |
| **SLCM** | Security and Locking Control Module |
| **SPS** | Single-Point Sensor |
| **SRS** | Supplemental Restraint System |
| **SWB** | Short Wheelbase |
| **TC** | Traction Control |
| **TCM** | Transmission Control Module |
| **TP** | Throttle Position |

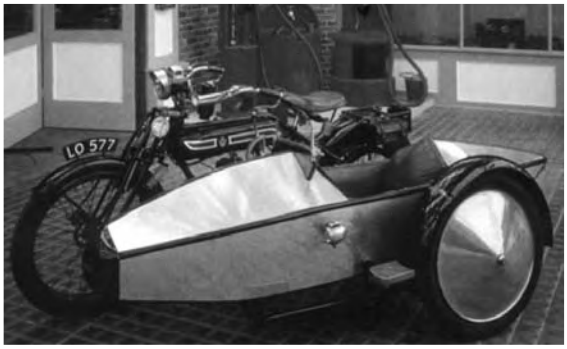
| Acronym | Definition |
|---|---|
| **VCATS** | Vehicle Configuration and Test System |
| **VAPS** | Variable-Assist Power Steering |
| **VDP** | Vanden Plas |
| **VEMS** | Vehicle Emergency Message System |
| **VIN** | Vehicle Identification Number |
| **VVA** | Vehicle Vibration Analyzer |
| **VVT** | Variable Valve Timing |
| **WDS** | Worldwide Diagnostic System |
| **WSM** | Workshop Manual |
| **WOT** | Wide-Open Throttle |

## MILESTONES: THE 1920s AND 30s

- **1922 –** William Lyons and William Walmsley partner to found the Swallow Sidecar Company
- **1928 –** Swallow Sedan introduced
- **1935 –** SS 100 sports car introduced
- **1935 –** Jaguar name chosen for SS cars

WILLIAM LYONS

SWALLOW SIDECAR




SWALLOW SEDAN


SS100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## MILESTONES: THE 1940s AND 50s

- **1940-45 –** XK engine designed
- **1945 –** Company name changed to Jaguar Cars Ltd.
- **1948 –** XK 120 introduced
- **1950 –** Mark VII Sedan introduced
- **1951-57 –** Jaguar wins Le Mans five times
- **1954 –** Jaguar Cars of North America established
- **1955 –** Mk I Sedan and XK 140 introduced
- **1957 –** XK 150 introduced

XK 120

MK I SEDAN

XK 150

## MILESTONES: THE 1960s

- **1960 –** Mark IX Sedan introduced
- **1961 –** E-TYPE and Mark X Sedan introduced
- **1964 –** 3.8 S-TYPE introduced
- **1966 –** Jaguar merges with British Motors Corporation and later with British Leyland Motor Company
- **1967 –** 420 Sedan introduced
- **1969 –** Series I XJ6 Sedan introduced

E-TYPE

3.8 S-TYPE

SERIES I XJ6

E66665

## MILESTONES: THE 1970s

- **1971 –** 5.3-liter V12 engine introduced with the Series III V12 E-Type
- **1972 –** Sir William Lyons retires
- **1972 –** XJ12 introduced
- **1976 –** XJS introduced with 5.3-liter V12 engine
- **1977 –** Bob Tullius wins first of two consecutive SCCA Trans Am championships in an XJS
- **1979 –** Series III XJ6 Sedan introduced

SERIES III V12 E-TYPE

XJS


SCCA CHAMPIONS

SERIES III XJ6

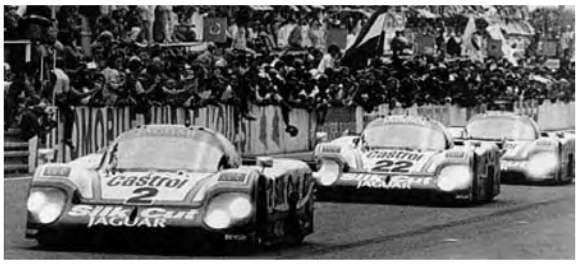
E66666

## MILESTONES: THE 1980s

- **1983 –** Jaguar becomes independent company as Jaguar Cars Ltd.
- **1985 –** Sir William Lyons dies
- **1987 –** XJ40 introduced in North America (1988 MY)
- **1988 –** Jaguar wins Le Mans for a sixth time
- **1988 –** Jaguar-built XJS convertible introduced (1989 MY)
- **1989 –** Ford Motor Company buys Jaguar Cars Ltd.

XJ40

LE MANS 1988




XJS CONVERTIBLE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## MILESTONES: THE 1990s

- **1994 –** X300, a new range of restyled XJ Sedans, introduced (1995 MY), including the XJR Supercharged Sedan
- **1996 –** X100, the XK8 Coupe and Convertible, introduced with new AJV8 engine (1997 MY)
- **1997 –** X308, the XJ8 Sedan, introduced (1998 MY)
- **1999 –** X200, the S-TYPE Sedan, introduced (2000 MY)

1995 XJ6


XK8

XJ8

S-TYPE


E66668

## MILESTONES: THE NEW MILLENNIUM

- **2001 –** X400, the X-TYPE Sedan, introduced (2002 MY)
- **2002 –** Aston Martin, Jaguar and Land Rover join to form AMJLR
- **2003 –** X350, an aluminum-bodied XJ8 Sedan, introduced (2004 MY)

X-TYPE

2004 XJ8

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## OVERVIEW

In the increasingly competitive luxury car market, auto manufacturers must continuously strive to maintain, and increase, their share of that market. For Jaguar, a key component in this effort is an attention to customer satisfaction – satisfaction with both the quality of the vehicles and the quality of the dealerships that sell and service those vehicles. Understanding who those customers are and seeking their feedback helps Jaguar to identify both strengths and weaknesses in manufacturer and dealership performance, and to make improvements where necessary.

### Jaguar Customers

Jaguar cars appeal to a distinctive group of people: independent, highly successful individuals who have achieved a substantial measure of professional and personal accomplishment. They appreciate the refined elegance and performance of their Jaguar automobile and expect competent professional service and courteous personal treatment from their Jaguar dealer.

| Jaguar Demographic – US Market | | | | |
|---|---|---|---|---|
| | **XK** | **XJ** | **S-TYPE** | **X-TYPE** |
| **Median Age** | 58 | 62 | 59 | 53 |
| **Median Household Income** | $237K | $227K | $143K | $102K |
| **% Male** | 67% | 74% | 54% | 50% |
| **% Married** | 64% | 86% | 78% | 75% |
| **% College Graduate** | 73% | 66% | 64% | 66% |
| **% With Children** | 20% | 24% | 20% | 26% |

## JAGUAR CUSTOMER SATISFACTION INDEX (CSI)

Jaguar acquires dealership performance data through customer surveys. The collected data is analyzed and calculated into the Customer Satisfaction Index (CSI). A summary of the CSI data is updated monthly in a report available online.

**What does the Jaguar CSI measure?**

- Customer satisfaction
- Effectiveness of retail process
- Dealer diagnostics that improve customer handling
- Indications of how well we are building and sustaining our evolving relationships with customers

## Jaguar CSI Survey Process

The following outlines the survey process from the customer experience to CSI reporting.

- Customer has a dealership experience
  - New vehicle purchase
  - Pre-owned vehicle purchase
  - Vehicle lease
  - Warranty claim is paid (service)
- Telephone call is made to the customer within seven days to assess overall satisfaction
  - If the customer cannot be contacted after 6 attempts, a survey is mailed
  - Customer's comments are posted on the CSI website within 48 hours
- Customer will receive a survey via mail within 2 weeks of telephone call
- Customer has 6 weeks from time survey is mailed to return survey
  - Surveys returned outside the 6-week period will be posted but will not count toward CSI score
- Month is closed on the last business day of the month
  - All surveys posted by the 3rd business day of the following month
  - Monthly reports posted by 7th business day of the following month

**Sample Customer Survey**

JAGUAR

77654 201
PAT SAMPLE
12345 DUSTY ROAD
SOMEWHERE, CA 90123-1234

VIN 0000000000000000

name/address corrections:

☐ Mark here if you NO LONGER OWN this vehicle, and kindly return the survey in the enclosed postage-paid envelope. Thank You!

Marking Instructions: To indicate your selection, place an "X" in the appropriate response box. ☒

Please provide your email address so that Jaguar and your retailer can communicate news updates, special offers and product information to you in the future.

## YOUR OVERALL SERVICE EXPERIENCE

| | Very Poor | Poor | Good | Very Good | Outstanding |
|---|---|---|---|---|---|
| 1. How would you rate your satisfaction with your overall service experience for your Jaguar [Model] at [ABC Retailer ABC Retailer ABC Retailer]? | ☐ | ☐ | ☐ | ☐ | ☐ |

2. Is there anything in particular that influenced the above rating? _____

## YOUR JAGUAR RETAILER

3. Did [ABC Retailer ABC Retailer ABC Retailer] provide you an appointment for service that met your desired date and time?
   - ☐ Yes
   - ☐ No → How many days beyond your desired date did you have to wait? _____ day(s)

| | Very Poor | Poor | Good | Very Good | Outstanding |
|---|---|---|---|---|---|
| 4. How would you rate your Jaguar retailer on convenience of their service hours? | ☐ | ☐ | ☐ | ☐ | ☐ |

5. Did you personally drop off or pick up your vehicle at [ABC Retailer ABC Retailer ABC Retailer]?
   - ☐ Yes
   - ☐ No (SKIP TO QUESTION 7)

| | Very Poor | Poor | Good | Very Good | Outstanding |
|---|---|---|---|---|---|
| 6. How would you rate the following aspects of your recent service experience? | | | | | |
| a. Being promptly attended to | ☐ | ☐ | ☐ | ☐ | ☐ |
| b. Cleanliness and appearance of the service facility | ☐ | ☐ | ☐ | ☐ | ☐ |
| c. Comfort and amenities of the waiting area | ☐ | ☐ | ☐ | ☐ | ☐ |

7. Did you require alternate transportation while your Jaguar was in for servicing?
   - ☐ Yes → Was alternate transportation offered to you? ☐ Yes ☐ No
   - ☐ No (SKIP TO QUESTION 8)

J.D. POWER AND ASSOCIATES®

PLEASE DETACH HERE AND RETURN SURVEY ONLY

Sample

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**Sample Customer Survey (continued)**

## YOUR SERVICE ADVISOR

| | Very Poor | Poor | Good | Very Good | Outstanding | N/A |
|---|---|---|---|---|---|---|
| **8.** How would you rate your overall experience in working with your service advisor? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **9.** How would you rate your service advisor on the following aspects of your experience: | | | | | | |
| **a.** Providing you with courteous, friendly service | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **b.** Treating you as a valued customer | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **c.** Fulfilling all commitments made to you | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

## YOUR SERVICE EXPERIENCE

| | Very Poor | Poor | Good | Very Good | Outstanding |
|---|---|---|---|---|---|
| **10.** Please rate the overall quality of the work performed on your [model model]: | ☐ | ☐ | ☐ | ☐ | ☐ |

☐ Yes ☐ No → How long did you have to wait? _____ day(s)

☐ Yes ☐ No → What was not repaired and why? _____

| | Very Poor | Poor | Good | Very Good | Outstanding |
|---|---|---|---|---|---|
| **13.** How would you rate the service area personnel on the following: | | | | | |
| **a.** Providing a clear explanation of work performed | ☐ | ☐ | ☐ | ☐ | ☐ |
| **b.** Amount of time required to get your vehicle | ☐ | ☐ | ☐ | ☐ | ☐ |

**14.** Were you satisfied with the cleanliness of your [model model] after service? ☐ Yes ☐ No

**15.** Did [ABC Retailer ABC Retailer ABC Retailer] advise you of any future service needs required on your [model model]? ☐ Yes ☐ No

**16.** Did [ABC Retailer ABC Retailer ABC Retailer] follow up with you after service? ☐ Yes ☐ No

## YOUR RECOMMENDATIONS

| | Definitely Will Not | Probably Will Not | Probably Will | Definitely Will |
|---|---|---|---|---|
| **17.** Based on your service experience, how likely are you to: | | | | |
| **a.** Recommend [ABC Retailer ABC Retailer ABC Retailer] for service or repair | ☐ | ☐ | ☐ | ☐ |
| **b.** Recommend [ABC Retailer ABC Retailer ABC Retailer] as a place to purchase/lease a Jaguar | ☐ | ☐ | ☐ | ☐ |
| **c.** Recommend a Jaguar to others | ☐ | ☐ | ☐ | ☐ |

**18.** At Jaguar, we are committed to continuous improvement. Is there anything you would like to add that will help us to enhance our service process?

_____

_____

**THANK YOU FOR TAKING THE TIME TO PROVIDE YOUR VALUABLE FEEDBACK.**

**Please return to:** J.D. Power and Associates • 2625 Townsgate Road •Suite 100 • Westlake Village, CA 91361-2702

77654/0705



J.D. POWER AND ASSOCIATES®

JAGUAR



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### CSI Summary Reports

The online CSI report summarizes the overall performance, sales performance, service performance, and mail survey sample dispositions.

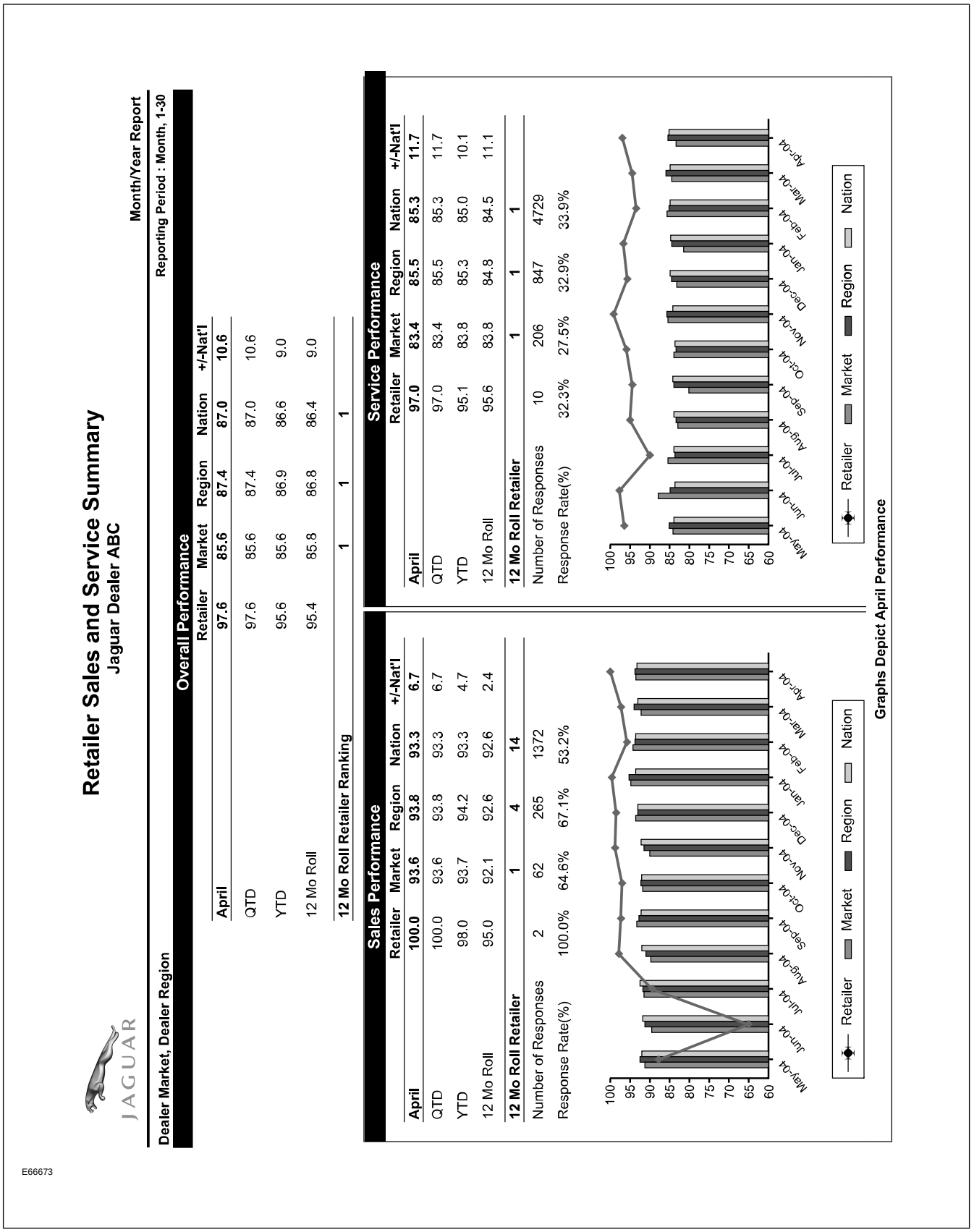
- Published monthly
- Summarizes most recent month, previous 11 months and 12-month averages for the sales and service mail survey
- Provides trends, graphs, and tables to make it easy to track dealership performance.
- Provides performance scores for each sales consultant, service advisor and service technician
- Displays dealership's national rank based on a 12-month rolling average (Note: dealership must have a minimum of 30 returns for the 12-month period to be ranked; 'N/A' will appear instead of a value if this is not the case)

Dealer, district, and national scores for overall CSI, sales CSI, and service CSI are displayed.

### Site Access

- Log on to the secure Jaguar Business Network (JBN) online system using your unique user ID and password
- Select the "Customer Satisfaction Programs: Jaguar CSI Site" link

**Typical Jaguar CSI Summary**



# JAGUAR SERVICE TRAINING

The Jaguar Service Training program is designed above all else to increase customer satisfaction by helping the technician to develop the specialized skills and knowledge required to keep Jaguar vehicles operating at peak performance levels.

Professional training is available at five strategically located training centers in North America. Each Jaguar training center provides an ideal learning environment and is equipped to Jaguar dealer standards of appearance, tools, and equipment.

## Training Center Locations

- Atlanta, Georgia
- Irvine, California
- Mahwah, New Jersey
- Toronto, Ontario
- Chicago, Illinois

## Instructor-Led Jaguar Training Courses

Jaguar Service Training courses are designed to offer the optimum mix of hands-on vehicle and component exercises combined with classroom presentation to develop a thorough understanding of the vehicle systems. Each course is finely tuned and concisely presented to provide information and develop new skills that technicians can put to work when they return to their dealerships. For a complete listing and description of current courses, visit the Jaguar Training and Development System online through the Jaguar Business Network (JBN).

## Web-Based Training

A series of web-based training courses are available online at the Jaguar Training and Development website. The majority of these courses consist of system fundamentals or new product introduction courses. Many of these online courses are prerequisites for the instructor-led courses.

## Enrolling for Training Courses

Jaguar Service Training Schedules are released every 4 months and are available online at the Jaguar Training and Development website. Shortly after a new schedule is posted, Jaguar provides the training schedule in a four-color PDF, from which each month's schedule can be printed at the dealership on an as-needed basis. The schedule shows the classes offered at each of the five Jaguar Training Centers. There are no geographical restrictions for participating in the training program; dealers anywhere in North America may register their staff at any training center depending on availability. For New Product classes, training seats are allocated to dealerships based on service volume and training gap for initial enrollment. After the initial enrollment period, there are no restrictions and requests are filled on a first come, first served basis.

Along with each course listed on the training schedule will be the date(s), location, spaces available, and a link for enrollment.

Web-based training courses are also listed and are available 24/7.

## Jaguar Employee Certification Planner

The Jaguar Training and Development website includes a Jaguar Employee Certification Planner that will guide employees through the tasks required to gain certification. Certification goal(s) that have been assigned to an employee are listed on the planner. Each goal will list the tasks required to achieve the goal. Current status of each goal and the tasks required to achieve each goal is displayed in the planner.

## THE JOURNEY TO EXCELLENCE

Jaguar recognizes the accomplishments of service technicians through the Journey to Excellence Program.

Technicians are recognized by Jaguar for completion of training with Automotive Service Excellence (ASE) certifications at three levels:

- Bronze
- Silver
- Gold

The requirements for each level are based on completion of Jaguar technical courses and ASE certifications.

Gold Certified Technicians can earn Jaguar Master Status, by completing additional training courses, ASEs 1-8 and L1, meeting experience milestones, and by participating in annual on-line quizzes known as Information Quizzes (IQs).

Master technicians have the opportunity to compete annually in a hands-on technical competition for two additional levels of recognition:

- Master Technician Guild Member
- Marque of Distinction Winner

This hands-on competition is open to the Master technicians that score highest on the IQs in their region. Of the competitors, those that score the highest at the competition will be named Guild Members, and the one technician with the overall best score is named the Marque of Distinction winner.

In order to participate in The Journey to Excellence, the technician must be listed as an active employee in Jaguar Training & Development.

The Journey website, accessed via JBN Online, provides full details of the program. Included on the website are the program criteria, a list of possible rewards, access the online quizzes, and Personal Achievement Reports (PARs).

# TECHNICAL SERVICE HELPLINE

The Jaguar Technical Service Helpline is an important part of the Jaguar commitment to quality. The Helpline provides, at no charge, a direct communications link between the retailer technician and the manufacturer. Its purpose is to give the technician additional assistance to help quickly resolve customer and dealer technical product concerns. In return, the helpline provides Jaguar with immediate feedback about service problems that may be occurring within Jaguar retailers.

The Technical Service Helpline is for **designated** Jaguar technicians employed by authorized Jaguar retailers. If customers or independent repair shop personnel wish to contact Jaguar, they should call the Jaguar Cars Customer Assistance Center at 1-800-4-JAGUAR (1-800-452-4827) and select option three on their touch-tone telephones.

## Technical Helpline Precall Worksheet (Form S88)

The Technical Helpline Precall Worksheet was designed to help organize requests for technical assistance through the Helpline and is necessary for repairs that require direct Jaguar assistance.

## Calling the Helpline

Before calling the Helpline to request assistance, the following MUST be performed:

- Fill in the Retailer, Vehicle Information, and Section 1 of the Precall Worksheet
- All applicable Technical Service Manual / GTR, Service Bulletin, and WDS diagnostics must be performed.
- All other applicable service procedures must be performed.

When you contact the Helpline for assistance, the following must be at hand:

- The Precall Worksheet with the Retailer, Vehicle Information, and Section 1 completed.
- All Service Bulletins, Electrical Guides and other publications relevant to the concern.

**Technical Helpline Telephone Menu Options**

After dialing 1-888-JAG-DLRS (1-888-524-3577), select Menu Option 2 to access the Technical Service Helpline. Then choose from the following options:

- Press 1 to close a case
- Press 2 for ZF transmission support
- Press 3 for JATCO transmission support
- Press 4 for all other technical support
- Press 8 to repeat all options
- Press 9 to return to the main menu

**NOTE:** The Technical Helpline Menu options and selections may be periodically updated without notice. Each time you call, listen carefully to the recorded menu before making a selection.

Record the Jaguar Cars Technical Representative's name, recommendations, and the CATS case number, if one is assigned.

- Technical Service Helpline CATS Case Numbers are only given out to dealers who require technical assistance to resolve a concern.
- A CATS Case Number DOES NOT automatically justify additional warranty paid diagnostic time. It is the dealer's responsibility to properly document all diagnostic and repair procedures on the hard copy of the repair order in accordance with the Jaguar Warranty Policies and Procedures Manual.

The assigned technician is responsible for follow-up with the Technical Helpline to advise them of case progress.

- When the problem is rectified, the technician should close the case by calling the Helpline selecting option 1 from the Technical Service Helpline main menu.
- To provide the most effective assistance it may be necessary for the Helpline Technical Representative to work with the technician at the vehicle. In such cases a cordless telephone is an asset.

**NOTE:** Feedback and input is vital to the Helpline. Please take the time to submit an Electronic Product Quality Report on all Helpline cases.

JAGUAR SERVICE

Issue Date April 2004

# TECHNICAL HELPLINE PRECALL WORKSHEET

S88
Page 2 of 2

**RETAILER INFORMATION**

| RETAILER NAME | RETAILER # | DATE |
|---|---|---|
| CALLER NAME | PHONE # | |

**VEHICLE INFORMATION**

VIN | | | | | | | | | | | | | | | | | ODOMETER

**SECTION 1 – COMPLETE THIS SECTION BEFORE CALLING THE TECHNICAL HELPLINE.**

PROBLEM DESCRIPTION (INCLUDE ALL RELEVANT INFORMATION)

RECORD ANY FLAGGED DTCS

PREVIOUS REPAIRS, CASES AND/OR DIAGNOSIS

**CALL THE TECHNICAL HELPLINE**

ONCE THE INFORMATION ABOVE IS COMPLETE, YOU MAY CALL THE TECHNICAL HELPLINE AND DISCUSS THE PROBLEM WITH THE HELPLINE REPRESENTATIVE. DIAL **1-888-JAG-DLRS (1-888-524-3477)** AND SELECT MENU OPTION 4. REFER TO PAGE 1 FOR FURTHER MENU OPTIONS.

**SECTION 2 – COMPLETE THIS SECTION WHILE ON THE PHONE WITH THE HELPLINE REPRESENTATIVE.**

| TECHNICAL HELPLINE REPRESENTATIVE | *CATS CASE # |
|---|---|

HELPLINE RECOMMENDATIONS

* **NOTE:** A TECHNICAL SERVICE HELPLINE CATS CASE NUMBER IS ONLY ASSIGNED TO VEHICLES WHEN THE RETAILER REQUIRES SPECIAL TECHNICAL ASSISTANCE TO RESOLVE A CONCERN. THE ASSIGNMENT OF A CATS CASE NUMBER DOES NOT AUTOMATICALLY JUSTIFY ADDITIONAL WARRANTY PAID DIAGNOSTIC TIME. IT IS THE RETAILER'S RESPONSIBILITY TO PROPERLY DOCUMENT ALL DIAGNOSTIC AND REPAIR PROCEDURES ON THE HARD COPY OF THE REPAIR ORDER IN ACCORDANCE WITH THE JAGUAR WARRANTY POLICIES AND PROCEDURES MANUAL.

E66670

## FIELD SERVICE ENGINEERS

Jaguar provides on-site technical assistance through Field Service Engineers (FSE). Each FSE is "home based" and serves multiple market areas. FSEs are responsible for preventing reacquired vehicles by providing technical assistance in cases where in-dealer resources have been exhausted and the Technical Helpline has been unable to assist in resolving the vehicle fault. In addition to the Technical Helpline, FSEs also have access and support of Product Investigation and Engineering. FSEs also make routine visits to all the dealers within their markets. During these visits, they will analyze operational procedures utilized by service departments and offer recommendations, which will improve "fixed right first time" scores. When FSE assistance is required, the dealer's Aftersales Market Manager (AMM), Service Manager, or Technical Helpline can initiate the visit.

## ELECTRICAL GUIDES

Electrical schematics and associated information are contained in the Electrical Guides. Electrical Guides are available in print from Helm Incorporated and online at the Global Technical Reference (GTR) website. Electrical Guides are specific to individual models and, in most cases, individual model years.

### Electrical Guide Format

All current Jaguar Electrical Guides are made up of two major sections. The first section, at the front of the guide, provides general information for and about the use of the guide, and information and illustrations to aid in the understanding of the vehicle electrical/electronic systems, as well as location and identification of components. It is STRONGLY recommended that technicians read thoroughly through this section of the guide to develop familiarity with the layout and use of the guide.

The second section includes figures (wiring diagrams), which are the basis of each Electrical Guide. Each figure is identified by a Figure Number (i.e. Fig. 01.1) and Title, and is accompanied by a page of data containing information specific to that figure. The figures are organized by major vehicle system.

| Major Electrical Guide Headings | |
|---|---|
| **Section** | **Description** |
| Introduction | Description of Electrical Guide format, interpretation of commonly used acronyms, description of vehicle electrical system architecture |
| Table of Contents | Listing of each wiring diagram and associated Figure number |
| Component Index | Listing of all major components with Figures in which they appear |
| User Instructions | Detailed explanation of information on Data and Figure pages |
| Symbols and Codes | Interpretation of the many symbols used in the figures and a guide to understanding wiring, harness and component numbering and codes |
| Network Configuration | A schematic illustration showing network connections between various control modules |
| Main Power Distribution | Illustration of battery harness routing through vehicle |
| Ground Point Locations | Illustration of ground point locations |
| Harness Layout | Illustration of harness routing through vehicle |
| Control Module Location | Illustration of module locations |
| Control Module Pin Identification | Illustration of control module connectors with detailed pin numbering and wire color information |

| Major Electrical Guide Headings | |
|---|---|
| **Section** | **Description** |
| Relay and Fuse Box Location | Illustration of relay and fuse box locations |
| Figures | Electrical wiring diagrams with associated data pages |
| Appendix | Network message matrix: listing of multiplex messages used on the associated networks |

### Electrical Guide Usage

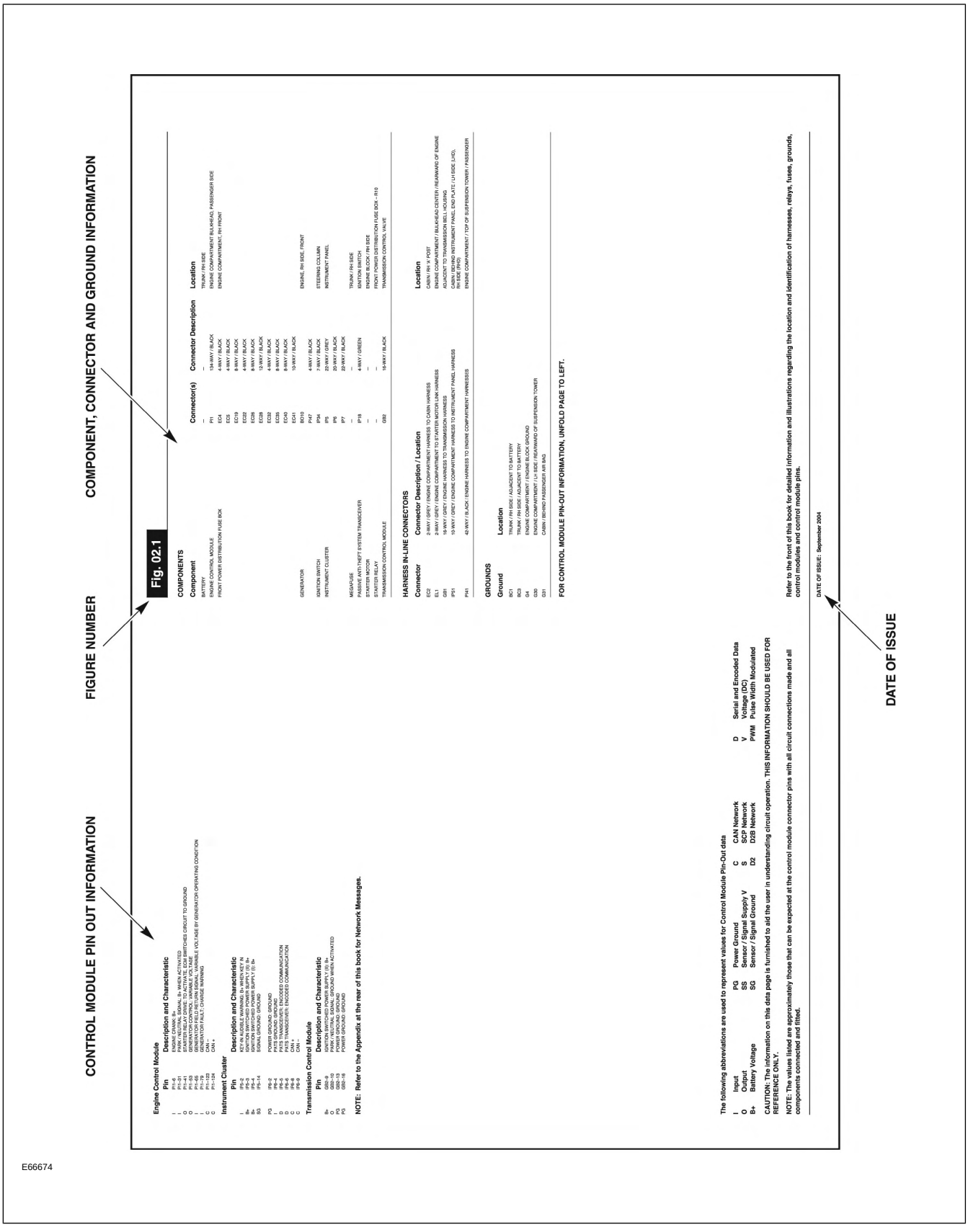
In most circumstances, the technician will begin using an Electrical Guide by referring to the Table of Contents for the appropriate Figure Number of the desired wiring diagram. Turning to the appropriate figure, the tri-fold page for the wiring diagram should be unfolded to the right side and the tri-fold data page should be unfolded to the left side. This will display both the figure and data pages simultaneously. As needed, the technician can refer back to the first section of the Electrical Guide for additional information (i.e. location illustrations, control module pin information, etc.).

The technician can also refer to the Component Index in order to locate information for a specific component.

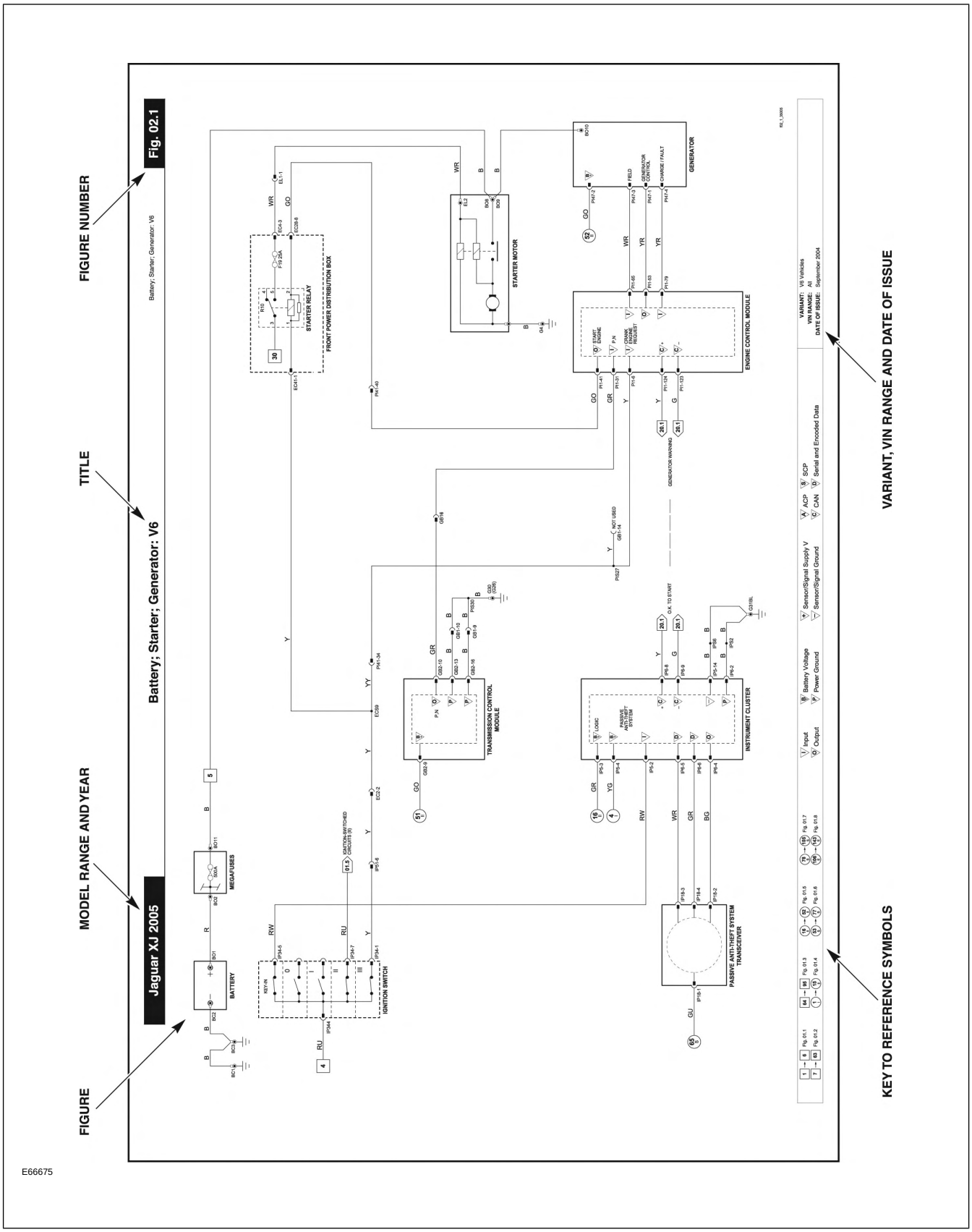
**NOTE:** Electrical Guides are not market-specific; all variants for the particular model / model year are included. For this reason, the user must pay close attention when referencing information in an Electrical Guide.

**For some systems, different variants will be addressed in separate figures. For some systems, several variants are addressed in a single figure, in which case subtle differences are indicated by "Notes" included throughout the figure. Care should be taken to read all Notes.**

**Typical Data Page**



**Typical Figure Page**



## TECHNICAL GUIDES

Technical Guides are publications designed to provide technicians with product information.

Two types of Technical Guides are produced: Technical Introductions and Model Year Updates. Technical Introductions provide a comprehensive technical overview of new models or powertrains while Model Year Updates cover changes in existing models that have undergone significant changes.

Technical Guides are available online at the Global Technical Reference (GTR) website.

**Typical Technical Guide – Cover**

JAGUAR

Technical Guide


# X-TYPE Estate Introduction

# Plus X-TYPE, S-TYPE, XK

# 2005 Model Year Updates

E66676

**Typical Technical Guide – Contents**

## Contents





E67121

## DIAGNOSTIC TROUBLE CODE (DTC) SUMMARIES

DTC Summaries are a compilation of diagnostic trouble codes for all major vehicle systems that support onboard diagnostics. DTC Summaries include detailed information for each code.

| DTC Table Column Headings | |
|---|---|
| **Heading** | **Description** |
| DTC | Code number |
| SYS | The system with which the DTC is associated |
| FAULT DESCRIPTION | Describes the fault and the component associated with the DTC |
| MONITORING CONDITIONS | Operating conditions under which a system self-test will be performed on described system or subcomponent |
| CK ENG | Indicates the drive trip(s) required to activate the CHECK ENGINE MIL |
| OTHER | Lists driver warnings associated with DTC (if any) |
| DEFAULT ACTION | Lists default actions initiated by system control module in response to the DTC |
| CM PIN | Lists the possible control module pin(s) associated with the fault |
| POSSIBLE CAUSES | Lists possible faults that could cause the DTC |

**NOTE:** A detailed explanation of the table headings is included in the introduction pages of each DTC Summary section. Not all Summaries use all of the headings described.

The following code prefixes are used:

- **P –** Powertrain
- **B –** Body
- **C –** Chassis
- **U –** Network

All model year DTC Summaries are available online at the Global Technical Reference (GTR) website.

**Typical DTC Table**

| DTC | SYS | FAULT DESCRIPTION | MONITORING CONDITIONS | CK ENG | OTHER | DEFAULT ACTION | CM PIN | POSSIBLE CAUSES |
|---|---|---|---|---|---|---|---|---|
| P0125 | EMS OBD II | ECT Sensor response (for closed loop fuel control)<br>(Coolant thermostat monitor) | Engine coolant temperature and ambient temperature within 10 °C (20 °F) of each other<br>Start engine and drive the vehicle steadily in 4th or 5th gear above 1700 rpm until the engine coolant temperature reaches 80 °C (176 °F)<br>CAUTION: Overheating is possible if the ECT sensor is faulty and cooling fans do not operate. | 2 | A | ECM Default:<br>– EOT value substituted (no greater than 95 °C (203 °F)<br>– Closed loop fuel metering inhibited<br>– Adaptive fuel metering inhibited<br>– Catalyst warm-up ignition retard inhibited<br>– Canister purge inhibited<br>– Maximum engine speed reduced | PI1<br>–070 | ECT Sensor disconnected<br>Low coolant level<br>Contaminated coolant<br>Engine coolant thermostat failure<br>ECT Sensor to ECM sensing circuit: high resistance, open circuit or short circuit to high voltage<br>Engine cooling fan stuck on high speed<br>Above normal air flow through engine compartment due to accident damage and / or missing panels |
| P0128 | EMS OBD II | Coolant thermostat range / performance | Engine OFF; coolant temperature <35 °C (95 °F)<br>Start engine and drive until normal engine operating temperature >85 °C (180 °F) | 2 | N | None | — | Contaminated coolant<br>Engine coolant thermostat failure<br>ECT Sensor failure (ECT Sensor DTC(s) also flagged) |
| P0131 | EMS OBD II | HO2 Sensor sense circuit low current – bank 1, upstream (1/1)<br>(Universal oxygen sensor: lean condition at ECM – high current at sensor) | Heated oxygen sensors monitor drive cycle – page 5<br>(Upstream oxygen sensors) | 2 | N | None | PI1<br>–083<br>–084 | HO2 Sensor 1/1 disconnected<br>HO2 Sensor 1/1 to ECM variable current circuit fault (HO2 Sensor pin 3)<br>ECM to HO2 Sensor 1/1 constant current circuit fault (HO2 Sensor pin 4)<br>HO2 Sensor 1/1 failure |

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## SERVICE BULLETINS

Service bulletins are categorized as Technical Bulletins and Administration Bulletins. Technical bulletins contain the latest service information, updates to specifications and repair procedures, special repair procedures and other information that is directly related to the technical job of diagnosing and repairing vehicles. Administration Bulletins cover non-technical service matters such as changes and updates to service programs, tool and literature information, training information and general workshop administrative issues.

Service bulletins are routinely updated with the latest service information and are available online. Technical Bulletins can be accessed at the Global Technical Reference (GTR) website. Administrative Bulletins can be accessed at the Jaguar Cars North America Product Support website.

Service bulletins are organized in numbered groups by subject and are numbered sequentially within each subject group. For example, Technical Bulletin 100-4 would be the fourth bulletin in the 100 group. Group numbering for each bulletin category is detailed in the sections that follow.

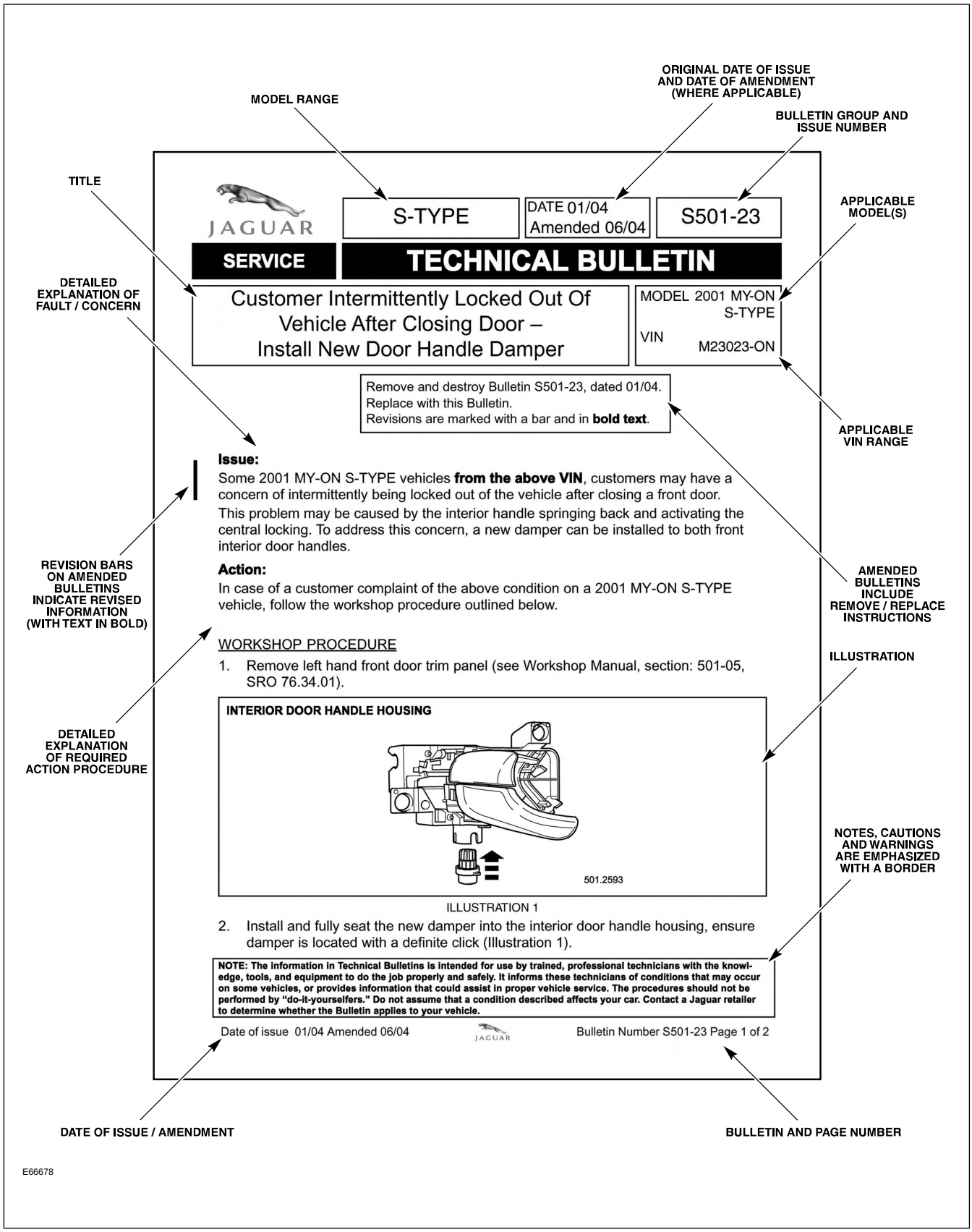
### Technical Bulletins

Technical bulletins are organized into four separate groups for ease of access; XJ, XK, S-Type, and X-Type. The numbering system for all four groups is the same.

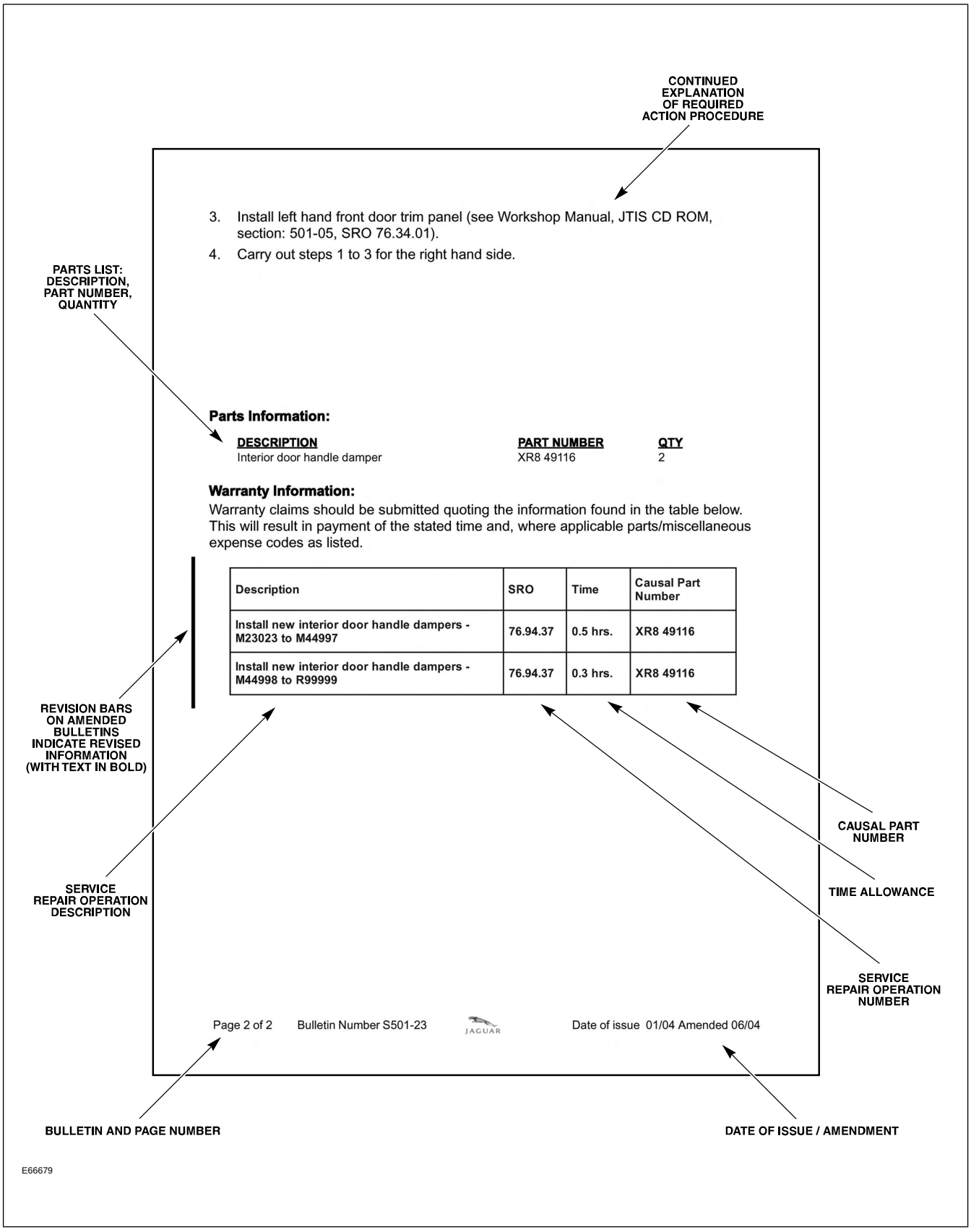
**NOTE:** XJ (2004 MY on), S-Type and X-Type bulletin group numbers are preceded by an XJ, S, or X, respectively.

| Technical Bulletin Group Numbering System | |
|---|---|
| **Group** | **Subject** |
| 100 | General Information, ID Codes, Jacking & Lifting, NVH |
| 204 | Suspension System |
| 205 | Driveline System |
| 206 | Brake System |
| 211 | Steering System |
| 303 | Engine System |
| 307 | Automatic Transmission |
| 308 | Manual Transmission and Clutch |
| 309 | Exhaust Components |
| 310 | Fuel System |
| 412 | Climate Control |
| 413 | Instrument Panel |
| 414 | Charging System |
| 415 | Entertainment System |
| 417 | Lighting System |
| 418 | Electrical Distribution/Control |
| 419 | Electronic Feature Group |
| 501 | Body System |
| 600 | Maintenance |
| 910 | Squeaks and Rattles |
| 920 | WDS |

**Typical Technical Bulletin**



**Typical Technical Bulletin (continued)**

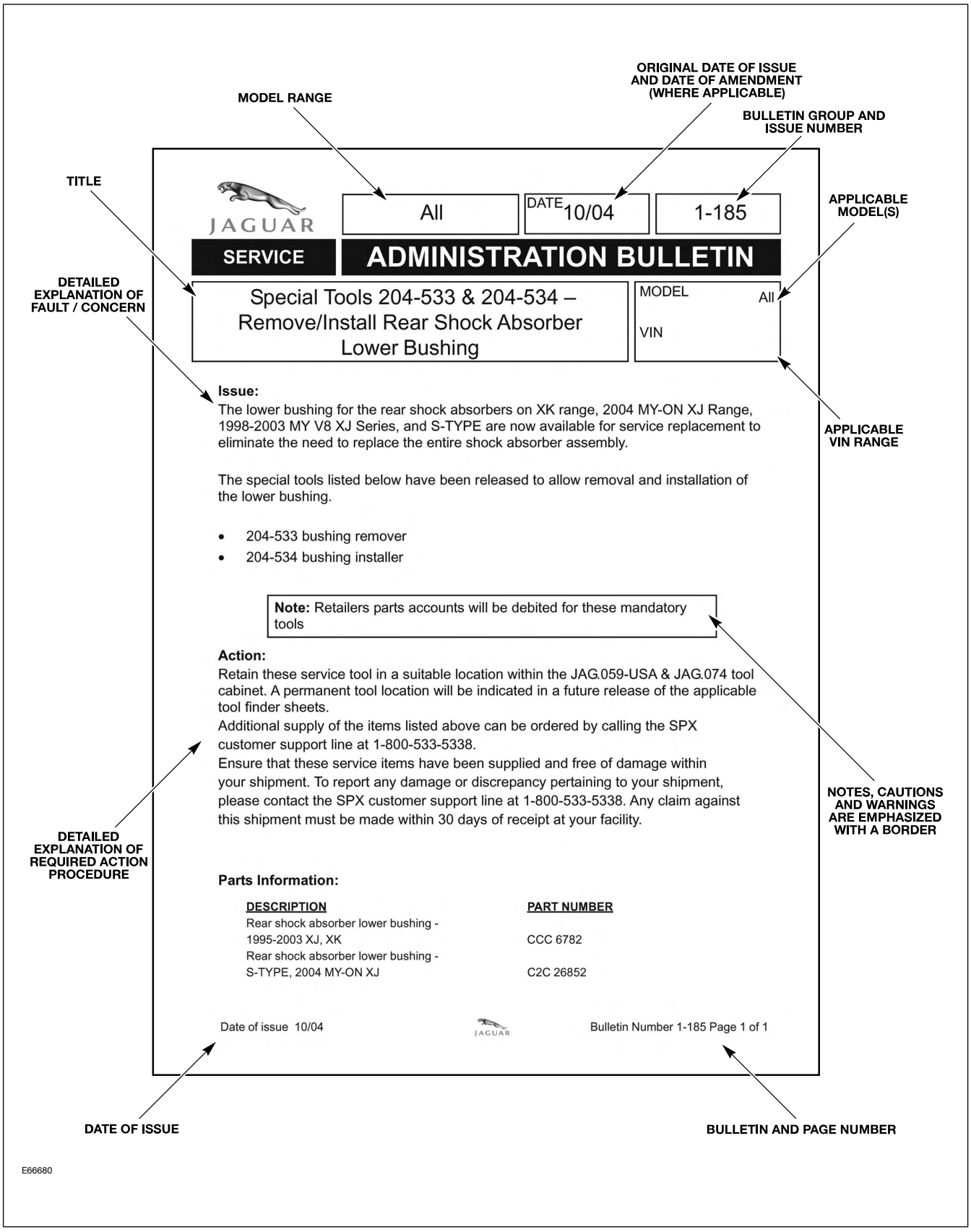


## Administration Bulletins

Administration bulletins are organized with a different group numbering system than the technical bulletins.

| Administration Bulletin Numbering System | |
|---|---|
| **Group** | **Subject** |
| 1 | Tools and Equipment (i.e. WDS) |
| 2 | Training |
| 3 | Warranty |
| 4 | Maintenance and PDI Schedules |
| 5 | Repair Operation Times |
| 6 | Workshop Administration (i.e. GTR, EPQR) |
| 7 | Recalls and Campaigns |

**Typical Administration Bulletin**



## Campaigns

A campaign is a category of warranty transaction. It is used as in general communications around "Types of Warranty Transactions". There are two types of campaigns: **Service Actions** and **Recalls**. Notification of Campaigns is made via Administrative Bulletins – Group 7 (Recalls and Campaigns).

### Service Actions

A Service Action is a repair to a specific product concern. There is no customer notification. A Service Action is performed either upon a customer complaint (the problem MAY occur) or at the first service opportunity (the problem WILL occur sooner or later). In time, all Service Actions will be closed. Service Actions are claimable only while the vehicle is within the terms of the New Vehicle Limited Warranty.

### Recalls

A Recall is also a repair to specific product concerns, although vehicle owners/drivers are notified in this case. There will also be reporting of completion rates to Federal agencies, State Agencies or both. Short of a 100% completion rate, Recalls are never closed. Recalls are claimable regardless of the New Vehicle Limited Warranty status.

## PARTS BULLETINS

Parts bulletins are published primarily to support the parts department, by providing information about parts supercession and availability. While categorized into over 20 alphabetized groups, only one group, “X: Accessories/Consumables” will be important resources for technicians who are performing accessory installations. Parts bulletins can be found on the Jaguar Cars North American Product Support Website.

**Typical Parts Bulletin**

JAGUAR

| All | DATE 05/05<br>Amended 07/05 | X-37NAS |
|---|---|---|

**PARTS** **INFORMATION BULLETIN**

| Jaguar Bluetooth System – Applicable Part Numbers | MODEL See below<br>VIN |
|---|---|

Remove and destroy Bulletin X-37NAS, amended 05/05
Replace with this Bulletin.
The X-TYPE link lead chart has been revised.

**Issue:**

This bulletin covers the following vehicles;

- **XJ** 2004 MY and up
- **XK** 2003 MY and up
- **S-TYPE** 2003 MY and up from VIN M89854
- **X-TYPE** 2003 MY and up from VIN D31148 –
  (EXCEPT those in the range: E37149 – E46479. These vehicles will not be able to have a phone system installed. The phone/voice pre-wire was deleted)

**INSTALLATION TIME**

**Installation time for a new system is 2.0 hrs.**

Several resources are available to you for support:

- **Website - www.jagdigitalphones.com -** username: jagphones and the password: digital

  This website is for dealer use only. The website was designed to help understand the different phone programs and help select the proper carrier for each customer based on their zip code, plus much more.
- **Technical Bulletins** can be found on Global Technical Reference (GTR) *https://hub.franchise.jaguar.com* or internet: *http://www.jaguartechinfo.com*
- **Parts Bulletins** can be found at *https://web.jagtech.dealerconnection.com*
- **Fitting Instructions –** Will no longer be printed. **Go to GTR web site/ view owner information/ select accessory fitting instructions**
- **Motorola Hotline:** 1-877-MOT-SUPPORT – The Motorola hotline is for handset questions.
- **Jaguar Technical Hotline** at 1-888-JAGDLRS – The Jaguar hotline is for technical support of the phone system in the vehicle.

This bulletin includes dedicated vehicle lists showing all parts needed to install the Bluetooth system as a new installation (page 2) and as a conversion from V60 to Bluetooth (page 5).
Phones listed in this bulletin are those supported by the accessory Bluetooth installation only, not the factory installed Bluetooth system.

Date of issue 05/05 Amended 07/05 JAGUAR Bulletin Number X-37NAS Page 1 of 11

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## OVERVIEW

Jaguar provides a variety of technical information online through the following websites:

- Global Technical Reference (GTR)
- Jaguar Cars North American Product Support
  - Electronic Product Quality Report (EPQR)
  - Jaguar Business Network (JBN)

Jaguar's primary technical information website is the Global Technical Reference (GTR) website. The Jaguar Cars North American Product Support website provides additional resources for the Jaguar technician. By providing electronic documents from common websites, Jaguar can more readily update information and monitor access to information in a cost-effective manner.

Technicians access the Jaguar websites from the dealership using the MyVPN portal. User names and passwords are assigned at the dealership.

## GLOBAL TECHNICAL REFERENCE (GTR)

Launched in 2003, GTR provides technicians with the technical information necessary to properly repair and maintain Jaguar vehicles. GTR is administered from the UK (United Kingdom) and is accessible via the internet (public access), extranet (dealer hub), or intranet (manufacturer employees). Dealer access is through the MYVPN Portal.

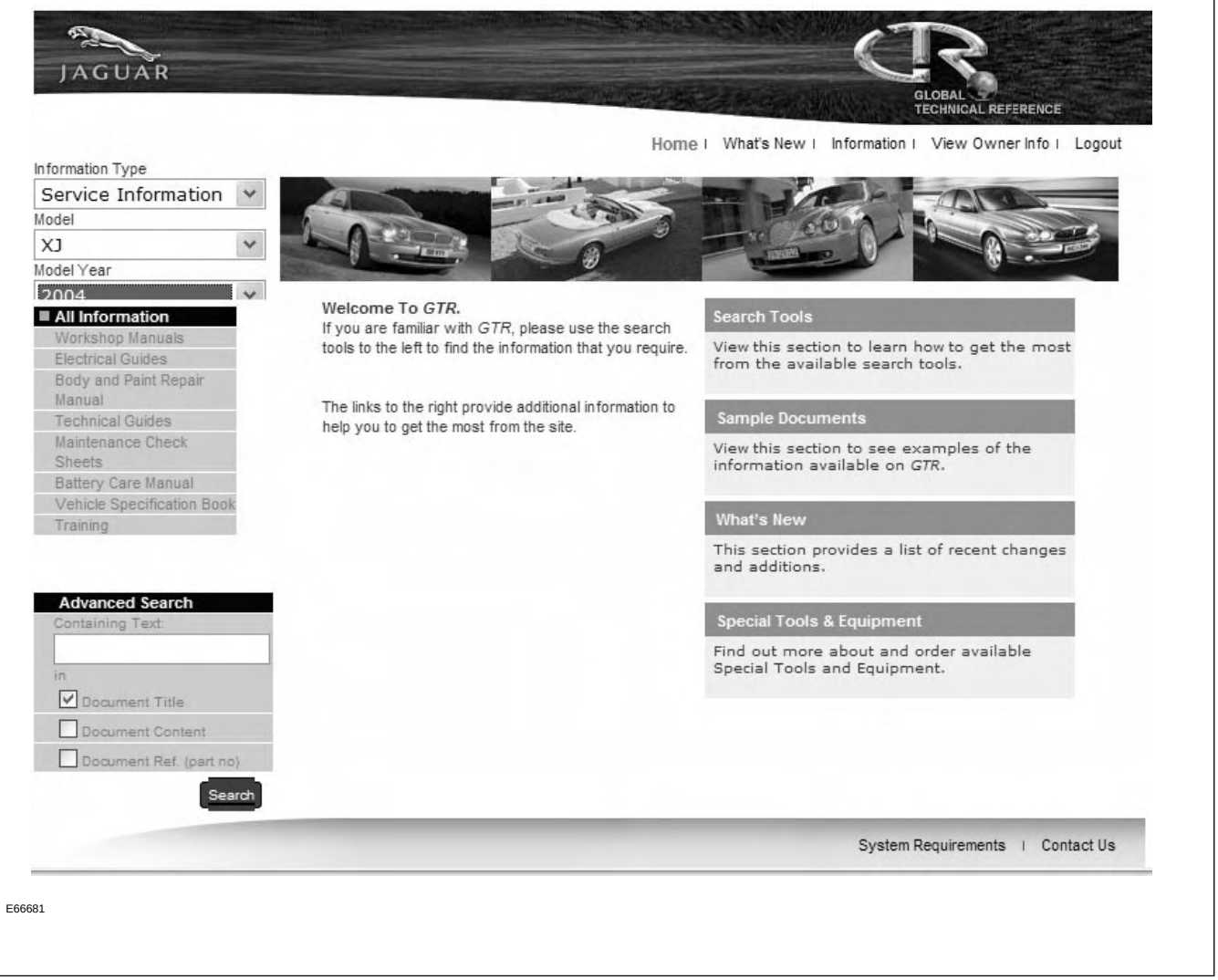
GTR provides 24/7 access to the following information types:

- Workshop Manuals
- Electrical Guides
- DTC Summaries
- Technical Guides
- Maintenance Check Sheets
- Technical Bulletins – OBD II equipped vehicles
- Administration Bulletins (limited to Recalls and Service Actions)
- Vehicle Specifications Book
- Technical Training Manuals
- Special Tools and Equipment (link to SPX website)

### Using GTR

After accessing GTR, a region selection page is displayed offering the user the choice of North America or Rest of the World. Select North America and the home page will be displayed. To the right of the home page are quick links that enable the user to access pages that provide more information about GTR.

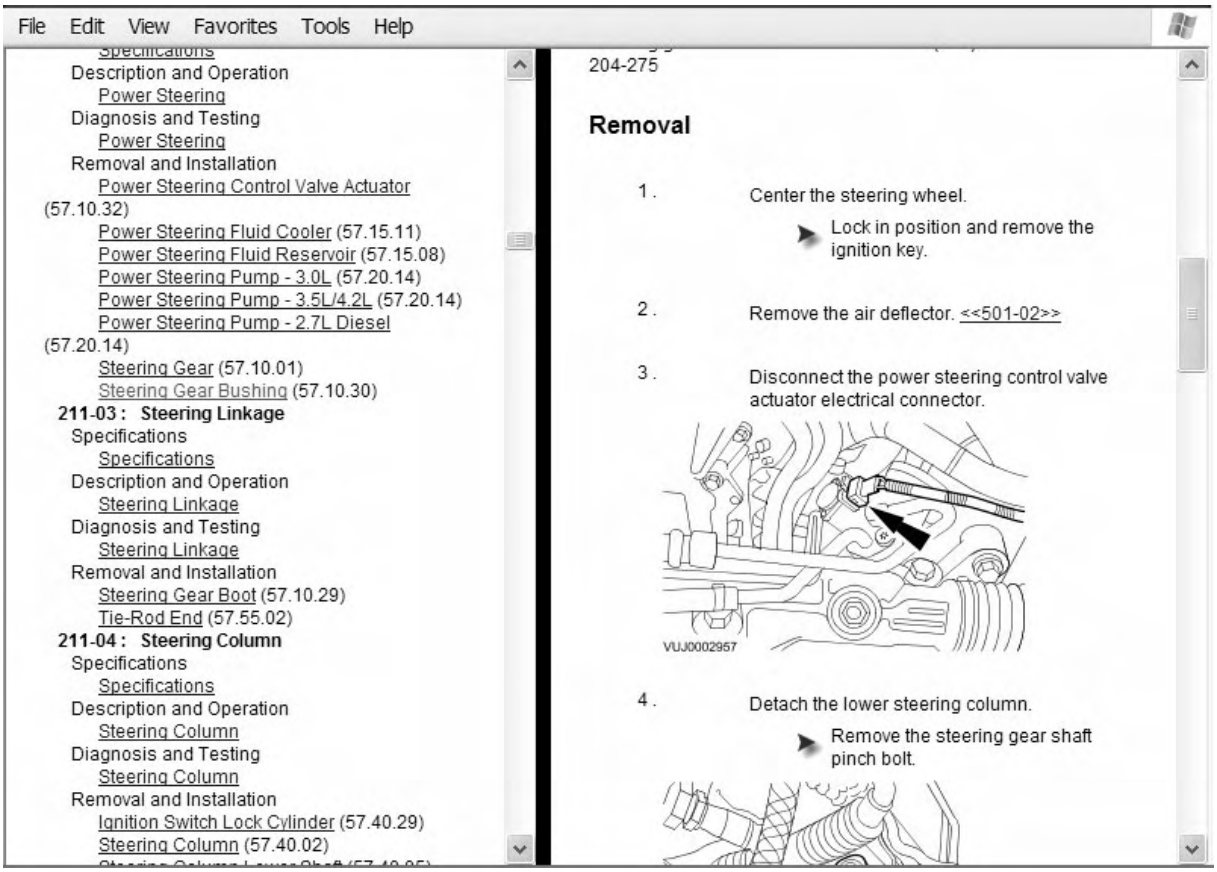
**GTR Home Page**




Typically, the user will select the appropriate type of service information, model, and model year for which they require information. This will result in a drop-down selection of information groups that match the criteria entered. These groups are typically information types that will have multiple documents available. By selecting one of the groups, a list of individual documents that fall within the selected group will be listed in the center of the web page.

Selecting a document will cause the document to be displayed in a separate window. Service manuals will display an index on the left side of the split window and the selected information of the right side.

**Typical Service Information Display (Workshop Manual shown)**

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Once information is displayed, the user has the ability to print and, in the case of PDF (Portable Document Format) files, save the section locally.

## JAGUAR CARS NORTH AMERICAN PRODUCT SUPPORT

Based in the U.S., the Jaguar Cars North American Product Support website provides 24/7 access to the following information types:

- Administration Bulletins
- TechLines (monthly notes and technical tips about Jaguar products)
- Links to:
  - Jaguar Service Support Partner sites (i.e. Motorola, Helm, and SPX)
  - Electronic Product Quality Report Website
  - Jaguar Business Network (JBN Online)
- Online forms (parts, service, and warranty forms)
- Material Safety Data Sheet search engine
- Technical Bulletins – Pre-OBD II vehicles
- Job aids

**Product Support Home Page**


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## Electronic Product Quality Report (EPQR)

The EPQR website provides technicians with a forum to communicate technical feedback on vehicle faults experienced in the field. Engineers will typically respond to submitted EPQRs. It also allows technicians to search a database of previously diagnosed vehicle faults for possible solutions for vehicle faults they may be currently servicing. Finally, approval for the replacement of parts included in the Fixed Right Enhanced Diagnostics (FRED) is accessed through the EPQR website.

The following options are available on the EPQR website:

- EPQRs
  - Submit
  - Search
  - Outstanding
- Fixed Right Enhanced Diagnostics (FRED)
  - Submit
  - Search
  - Outstanding
  - Affected parts listing
- Frequently Asked Questions (FAQs)
  - Search
  - New
- S93 (OBD II Freeze Frame Data)
  - Submit – alternative to typical method of sending directly from WDS via internet connection

**EPQR Home Page**

## Jaguar Business Network (JBN)

The Jaguar Business Network provides Jaguar professionals with a host of links to valuable sites. For service technicians, the site offers three groups of resources:

- Customer Satisfaction Programs
  - New Jaguar CSI Program website
- Jaguar University & Training
  - Jaguar Training and Development System
  - The Journey
- Product Support

These resources were explained previously in this chapter.

**JBN Home Page**


E67122

## Forms

Several forms exist to assist Jaguar service technicians. These forms insure complete reporting and proper procedure for various service operations. Below is a listing of forms more commonly used by technicians.

A complete list of current forms is available online at the Jaguar Cars North American Product Support site.

**NOTE:** Selected repair operations require proper form submission for warranty reimbursement.

| Form No. | Title |
|---|---|
| JAG8009 | Complimentary Safety and Maintenance Inspection |
| NFF-1 | No Fault Found – Service Advisor Worksheet |
| NFF-2 | No Fault Found – Diagnostic Questionnaire |
| PDI | Pre Delivery Inspection Form – revised 05/05 |
| S18 | Vehicle Maintenance Checklist: XJ6 and Vanden Plas 1988 – 1989 MY |
| S18/4 | Vehicle Maintenance Checklist: Sedan Range 1990 – 1994 MY |
| S18/97SED | Vehicle Maintenance Checklist: Sedan Range 1995 – 1997 MY |
| S18/XJS | Vehicle Maintenance Checklist: XJS Range (through 1994 MY) |
| S18/95 XJS | Vehicle Maintenance Checklist: XJS Range (1995 MY) |
| S18/96 XJS | Vehicle Maintenance Checklist: XJS Range (1996 MY) |
| S18/97 XK8 | Vehicle Maintenance Checklist: XK8 Range (1997 MY) |
| S18/98 | Vehicle Maintenance Checklist: All 1998 Models |
| S18/99 | Vehicle Maintenance Checklist: All 1999 Models |
| S18/00 | Vehicle Maintenance Checklist: All 2000 Models |
| S18/01 | Vehicle Maintenance Checklist: All 2001 Models |
| S18/02 | Vehicle Maintenance Checklist: All 2002 Models |
| S18/03 | Vehicle Maintenance Checklist: All 2003 Models |
| S18/04 | Vehicle Maintenance Checklist: All 2004 Models |
| S18/05 | Vehicle Maintenance Checklist: All 2005 Models |
| S31 | Paint Quality Report: XJS |
| S88 | Technical Helpline Precall Work Sheet |
| S95 | Vibration Report: All Jaguar Vehicles 1988 MY on |
| S96 | Tire Optimization Form: All Jaguar Vehicles 1997 MY on |

| Form No. | Title |
|---|---|
| S97 | Alignment Report: 1995 MY on |
| SNAV | S-TYPE Navigation Exchange Program – Product Problem Report |
| SQR | Squeaks And Rattles Diagnostic Checklist |
| W27 | In-Car Entertainment Warranty Parts Return Form |
| W28 | Automatic Transmission Evaluation Report and Helpline Precall Worksheet |
| W29 | PAS Rack and Pinion Evaluation Form |
| WDS | WDS Software Error Report Form |

## SPECIAL TOOLS

Special tools are designed for service operations that cannot be performed proficiently, properly, or safely using general hand tools or shop equipment. Special tools are numbered using a global numbering system. This system utilizes a six-digit numbering system; the first three digits are the service group, the last three digits are the tool number within the group (i.e. 303-536 is the number for AJV8 engine lifting plates).

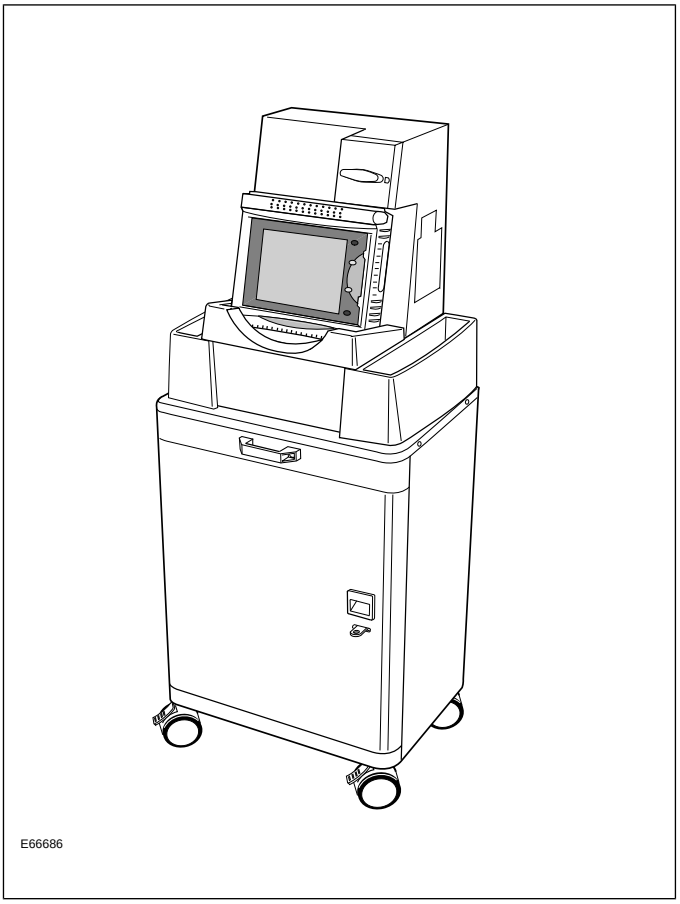
| Special Tools Numbering System | |
|---|---|
| **Group** | **Subject** |
| 100 | Miscellaneous |
| 204 | Suspension |
| 205 | Driveline |
| 206 | Brakes |
| 211 | Steering |
| 303 | Engine |
| 307 | Transmission |
| 310 | Fuel System |
| 412 | Climate Control |
| 418 | Electrical |
| 501 | Body |

Storage and organization of most tools are facilitated through the Jaguar Tools Storage System. This system consists of mobile storage cabinets for XK8/XJ8, S-Type, and X-Type special tools.

Special tools are divided into two groups: mandatory and optional. Dealerships are required to have mandatory tools. Mandatory special tools are automatically sent to each dealership whenever introduced. Additional mandatory tools and optional special tools can also be purchased directly from the SPX Corporation. Special tools listings and descriptions are available via printed catalogues or online at the SPX website (link available at GTR and Jaguar Cars North American Product Support websites). Tools not utilizing the global numbering system are identified by a Jaguar part number and may be available through the Jaguar Parts Department.

## WORLDWIDE DIAGNOSTIC SYSTEM (WDS)

Introduced in 2000, WDS is a comprehensive diagnostic system utilized by Jaguar. Operating on a Windows 98 platform, WDS utilizes a Pentium II microprocessor, a 6.4-gigabyte hard drive, and a 12" color, touch-sensitive screen. Most vehicle systems interfacing is achieved through the Data Link Connector (DLC).




WDS capabilities include:

- Guided diagnostics
- Monitor/record system signals (Datalogger)
- Extract/clear fault codes
- Control Module (CM) reflashing
- Connector information (Connector Viewer)
- Control Module (CM) programming
- Vehicle Vibration Analyzer (VVA)
- Digital Multimeter
- Four-trace oscilloscope
- On Demand Self Test (ODST)
- Output State Control (OSC)
- Vehicle setup
- CM interrogation
- Data Recorder access

WDS software is updated regularly to provide coverage of all current Jaguar models. All applications are contained on a single CD that is updated every 30-90 days.

| WDS Vehicle Coverage | |
|---|---|
| **Model** | **Model Years** |
| Sedan Range | 1995 – 1997 |
| XJS | 1996 – 1997 |
| XK8 | 1997 on |
| XJ8 | 1998 on |
| S-TYPE | 2000 on |
| X-TYPE | 2002 on |

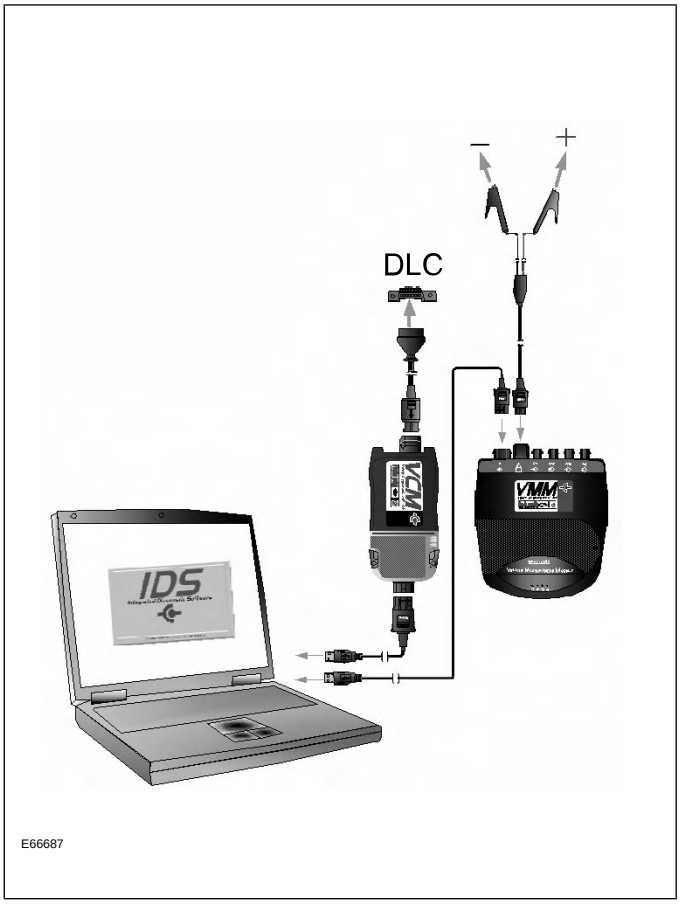
**NOTE:** Refer to the latest Administration Bulletin for current WDS vehicle coverage.

Jaguar Service Training offers a two-day, instructor-led WDS course.

# INTEGRATED DIAGNOSTIC SOFTWARE (IDS)

Integrated Diagnostic Software (IDS) is Jaguar's latest generation diagnostic tool. IDS integrates WDS software modified to run on an off-the-shelf laptop with the use of Vehicle Communication Module (VCM) and Vehicle Measurement Module (VMM) interface devices.

**IDS System**




## Interface Devices

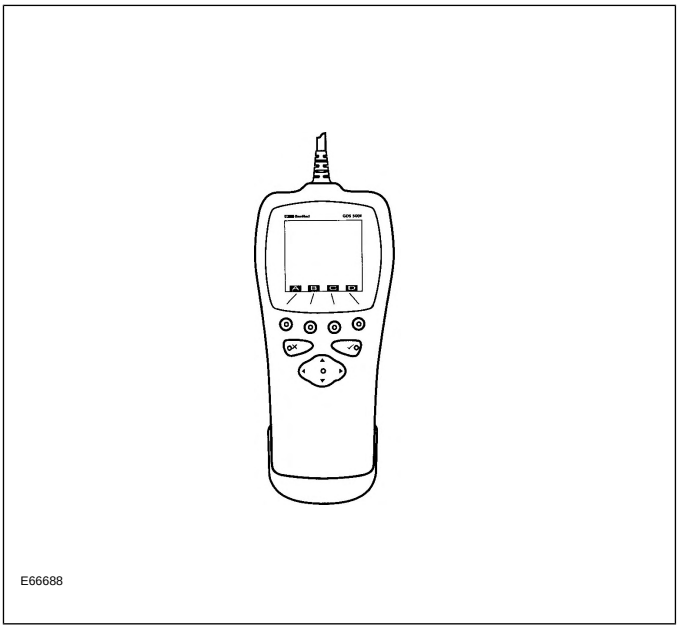
The interface devices used with this application are:

- Vehicle Communication Module – provides all link based functionality including:
  - Datalogger
  - Selftest
  - Service Functions
  - Module Configuration and Programming
- Vehicle Measurement Module – provides the following functionality:
  - Oscilloscope
  - Digital Multi-Meter
  - Ignition System Test
  - Fuel System Test

Note that the application will detect the interface device that is connected to the laptop. Indicator icons will appear at the bottom right-hand corner of the IDS screen when the VCM and/or VMM are connected.

# HANDHELD SCANNERS

## GDS 500E




Introduced in 1997, GDS 500E is Jaguar's first generic scan tool. While GDS 500E was specifically designed for use on Jaguar vehicles, it will also work on most other foreign and domestic OBDII-compliant vehicles. The tool is not mandatory and is not designed to replace WDS. GDS 500E has limited functionality when compared to WDS, but is smaller, faster and easier to use. The unit is equipped with a programmable read-only memory (PROM) that contains all operating and application software and therefore does not require software application download before interfacing with vehicles. The PROM is serviceable, allowing for GDS 500E upgrading. The final upgrade PROM was made available in 2001.

GDS 500E is for use on 1995 – 2001 MY Jaguar vehicles and includes the following capabilities on most vehicles:

**OBDII Operations Menu**

- Monitor powertrain data
- Monitor freeze frame data
- Request emissions trouble codes
- Clear emissions trouble codes
- Request oxygen sensor test results
- On-board monitoring system test results
- Control on-board system

**JAGCOM Operations Menu (engine/transmission/ABS)**

- Parameter monitor
- Stored codes
- Clear stored codes
- Diagnostic control

**NOTE:** While the final PROM upgrade was released in 2001, GDS 500E still retains limited functionality on later vehicles.

## GDS 510

Introduced in 2002, GDS 510 is the successor to the GDS 500E. As with the GDS 500E, the GDS 510 is an optional tool. The GDS 510 capabilities are expanded over the GDS 500E with the addition of the following features:

- Flash programming of select control modules
- Vehicle configuration setup
- Expanded systems self test
- JAGCOM Operations expanded to include:
  - Engine management
  - Transmission
  - Anti-lock/traction control
  - Instrumentation
  - Adaptive cruise control

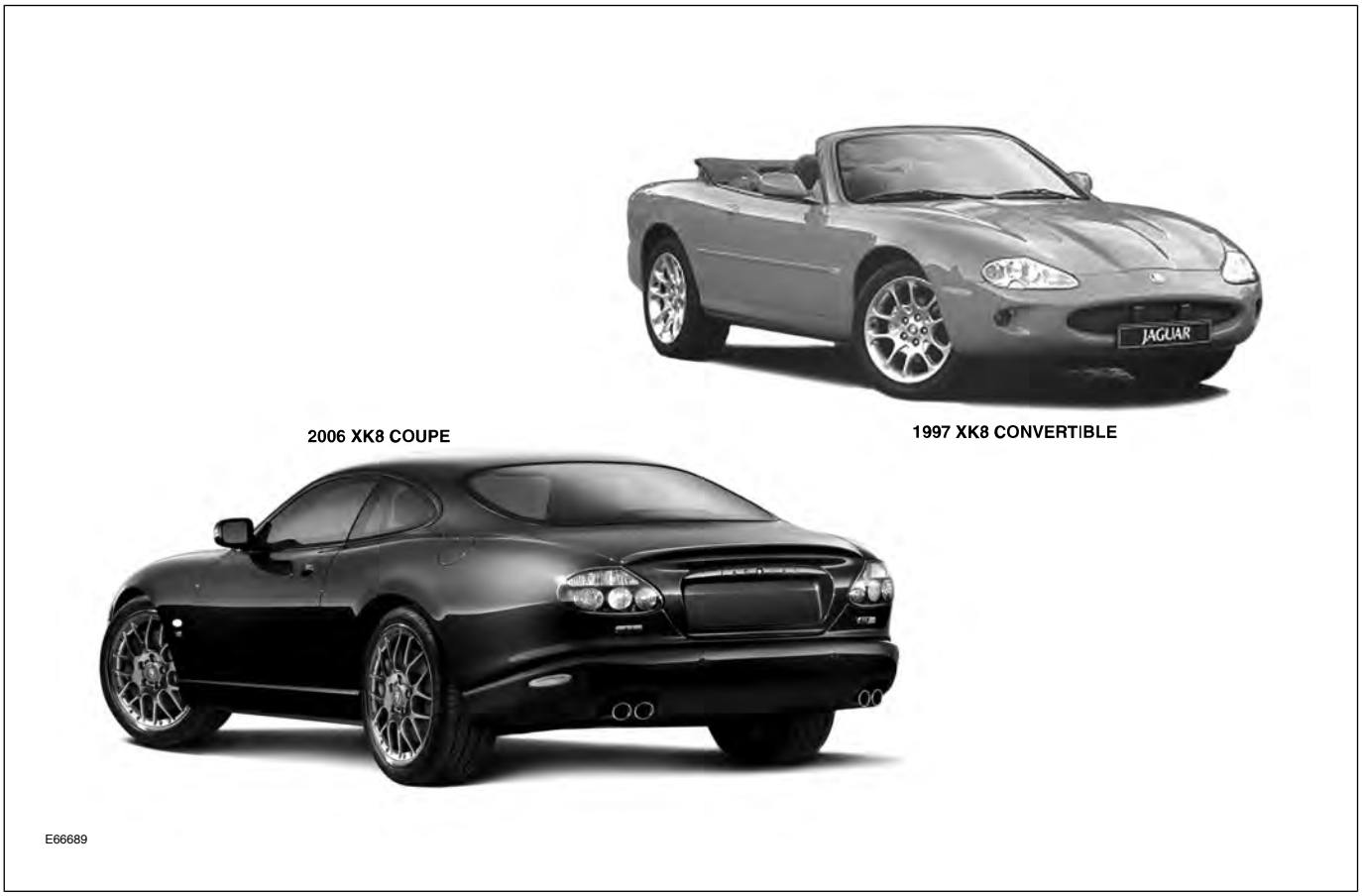
**NOTE:** GDS 500E and GDS 510 are no longer supported by the manufacturer (Teradyne).

## CURRENT MODEL HISTORY

The Jaguar brand currently offers 4 vehicle lines: the XK, XJ, S-TYPE and X-TYPE. What follows is a brief chronology of each line.

## XK MODELS

- **1997 – 1999: XK8 Coupe and Convertible** (X100)
  - Normally aspirated 4.0-liter 290HP V8 engine
  - ZF 5HP24 5-speed automatic transmission
- **2000 – 2002: XK8 Coupe and Convertible, supercharged XKR Coupe and Convertible** (X100)
  - Normally aspirated 4.0-liter 290HP V8 engine (XK8)
  - Supercharged 4.0-liter 370HP V8 engine (XKR)
  - ZF 5HP24 5-speed automatic transmission (XK8)
  - MB W5A580 5-speed automatic transmission (XKR)
- **2003 – 2006: XK8 Coupe and Convertible, supercharged XKR Coupe and Convertible** (X103 – 2003/4; X105 – 2005/6)
  - Normally aspirated 4.2-liter 300HP V8 engine (XK8)
  - Supercharged 4.2-liter 390HP V8 engine (XKR)
  - ZF 6HP24 6-speed automatic transmission

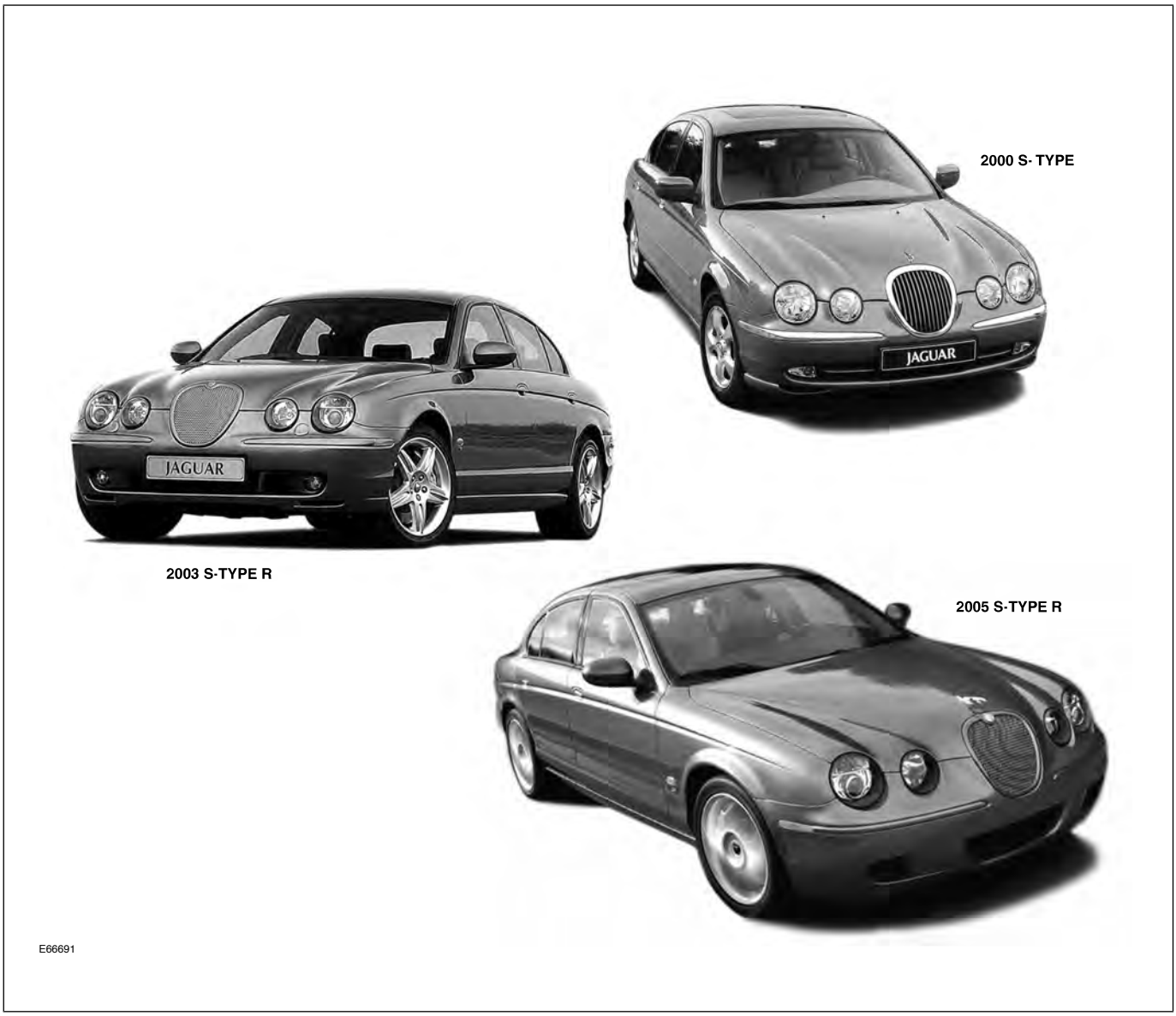


# XJ MODELS

- **1998: XJ8, XJ8L (LWB), Vanden Plas (LWB)** (X308 [SWB], X338 [LWB])
  - Normally aspirated 4.0-liter 290HP V8 engine
  - ZF 5HP24 5-speed automatic transmission
- **1999 – 2003: XJ8, XJ8L (LWB), Vanden Plas (LWB), supercharged XJR (SWB) and Super V8 (LWB)** (X308 [SWB], X338 [LWB])
  - Normally aspirated 4.0-liter 290HP V8 engine (XJ8, XJ8L and VDP)
  - Supercharged 4.0-liter 370HP V8 engine (XJR and Super V8)
  - ZF 5HP24 5-speed automatic transmission (XJ8, XJ8L and VDP)
  - MB W5A580 5-speed automatic transmission (XJR and Super V8)
- **2004: XJ8, Vanden Plas, supercharged XJR** (X350)
  - Normally aspirated 4.2-liter 300HP V8 engine (XJ8 and VDP)
  - Supercharged 4.2-liter 390HP V8 engine (XJR)
  - ZF 6HP24 6-speed automatic transmission
- **2005 – 2006: XJ8, XJ8L (LWB), Vanden Plas (LWB), supercharged XJR (SWB) and Super V8 (LWB)** (X350 [SWB], X355 [LWB] – 2005; X356 [All] – 2006)
  - Normally aspirated 4.2-liter 300HP V8 engine (XJ8, XJ8L and VDP)
  - Supercharged 4.2-liter 400HP V8 engine (XJR and Super V8)
  - ZF 6HP24 6-speed automatic transmission

## S-TYPE MODELS

- **2000 – 2002: S-TYPE** (X200)
  - Normally aspirated 3.0-liter 240HP V6 engine
  - Normally aspirated 4.0-liter 281HP V8 engine
  - Ford 5R55N 5-speed automatic transmission
- **2003 – 2004: S-TYPE, supercharged S-TYPE R** (X202)
  - Normally aspirated 3.0-liter 240HP V6 engine
  - Normally aspirated 4.2-liter 300HP V8 engine
  - Supercharged 4.2-liter 390HP V8 engine (S-TYPE R only)
  - ZF 6HP26 6-speed automatic transmission (V6 or V8)
  - Getrag 221 5-speed manual transmission (V6 only)
- **2005 – 2006: S-TYPE, S-TYPE VDP, supercharged S-TYPE R** (X204)
  - Normally aspirated 3.0-liter 235HP V6 engine
  - Normally aspirated 4.2-liter 300HP V8 engine
  - Supercharged 4.2-liter 400HP V8 engine (S-TYPE R only)
  - ZF 6HP26 6-speed automatic transmission



# X-TYPE MODELS

- **2002 – 2004: X-TYPE Sedan** (X400 – 2002/3; X404 – 2004)
  - Normally aspirated 2.5-liter 194HP V6 engine
  - Normally aspirated 3.0-liter 231HP V6 engine
  - Ford MTX-75 5-speed manual transaxle (AWD)
  - JATCO JF506E 5-speed automatic transaxle (AWD)
- **2005 – 2006: X-TYPE and X-TYPE VDP Sedan, X-TYPE Wagon** (X404)
  - Normally aspirated 2.5-liter 192HP V6 engine (2005 MY only)
  - Normally aspirated 3.0-liter 227HP V6 engine
  - Ford MTX-75 5-speed manual transaxle (AWD) (2005 MY only)
  - JATCO JF506E 5-speed automatic transaxle (AWD)

## VEHICLE IDENTIFICATION NUMBERS (VIN)

The 17-digit Vehicle Identification Number, or VIN, is an essential identifier and is required when ordering parts and in all correspondence regarding a particular vehicle.

The following table provides a useful guide for deciphering VIN numbers.

**Typical VIN:** SAJDA01R?4FL00001

| Position | Definition | Characters |
|---|---|---|
| **1 – 3** | **World Manufacturer ID** | SAJ = Jaguar Cars |
| **4** | **Market Restraint System** | B, F, G, X = Canada |
| | | P, R, T, Y = Mexico |
| | | D, E, J, W = USA |
| **5** | **Transmission / Steering** | A = Automatic, LHD |
| | | B = Manual, LHD |
| **6 – 7** | **Model Line / Body Type** | 01 = S-TYPE 4-door Sedan |
| | | 03 = S-TYPE Sport 4-door Sedan |
| | | 41 = XK8/XKR Coupe |
| | | 42 = XK8/XKR Convertible |
| | | 51 = X-TYPE 4-door Sedan |
| | | 53 = X-TYPE Sport 4-door Sedan |
| | | 54 = X-TYPE Wagon |
| | | 56 = X-TYPE Sport Wagon |
| | | 71 = XJ (2004/2005 MY) |
| | | 73 = XJ Sport/XJR (2004/2005 MY) |
| | | 74 = XJ VDP (SWB) (2004 MY) |
| | | 79 = XJ (LWB) (2005 MY) |
| | | 82 = XJ VDP/Super V8 (LWB) (2005 MY) |
| **8** | **Emission Control System** | A – X |
| **9** | **Check Digit** | ? |

| Position | Definition | Characters |
|---|---|---|
| 10 | Model Year | X = 1999 |
| | | Y = 2000 |
| | | 1 = 2001, 2 = 2002, 3 = 2003, etc. |
| 11 | Model Line / Assembly Plant | 1 = 4.2L S-TYPE R; Castle Bromwich |
| | | 2 = 4.2L XK; Browns Lane |
| | | 3 = 4.2L SC XK; Browns Lane |
| | | F = 3.0L S-TYPE; Castle Bromwich |
| | | H = 4.2L S-TYPE; Castle Bromwich |
| | | S = 4.2L XJ; Browns Lane |
| | | T = 4.2L SC XJ; Browns Lane |
| | | W = 3.0L X-TYPE; Halewood |
| | | X = 2.5L X-TYPE; Halewood |
| 12 | Model Line | A, B = XK |
| | | F, G, H = XJ |
| | | L, M, N, P, R = S-TYPE |
| | | C, D, E, J, K, S, T, V = X-TYPE |
| 13 – 17 | Serial Number | 00001, 00002, 00003, etc. |

Curriculum Training

# Introduction to Jaguar

## Introduction to XK/XJ: X100/X308

JAGUAR

Technical Training

INTR 05 en 08/2005

INTR: X100/X308

Please remember that our training literature has been prepared for TRAINING PURPOSES only. Repairs and adjustments MUST always be carried out according to the instructions and specifications in the workshop literature. Please make full use of the training offered by Technical Training to gain extensive knowledge of both theory and practice.

# Table of Contents

## Lesson 11 – Infotainment

## Workshop safety

This page highlights the general observations expected while attending this training program, and its continuation upon returning to your place of work.

## General

While working on all vehicles, the following items where available should always be used:

- Fender covers
- Seat covers
- Floor protection

## Safety

All precautions must be taken and observed at all times, to prevent injury or damage to the following:

- Yourself
- Customer's property
- Workshop equipment
- Work place colleagues

## Operating guidelines

While using any piece of workshop equipment:

The manufacturer's guidelines and warning labels must be followed.

This will ensure correct use and application at all times.

Seek the necessary advice or training where equipment usage is unclear.

## Chemicals, Oils and Solvents

Follow all manufacturer's warnings and labels; also take into account local disposal regulations when working with chemicals, oils or solvents.

Ensure that all risks are completely minimized.

Make sure that all protective items of clothing are worn where required e.g.

- Eye protection
- Gloves
- Coveralls
- Footwear

## System capping

Upon disconnecting components from a system, take all precautions necessary to prevent system contamination or environmental leakage.

Fit relevant plugs or caps i.e. to pipes, unions and component orifices etc.

## Updates

Keep abreast of all relevant changes that affect your role within the dealership, by monitoring all factory issued documentation.

## Driving

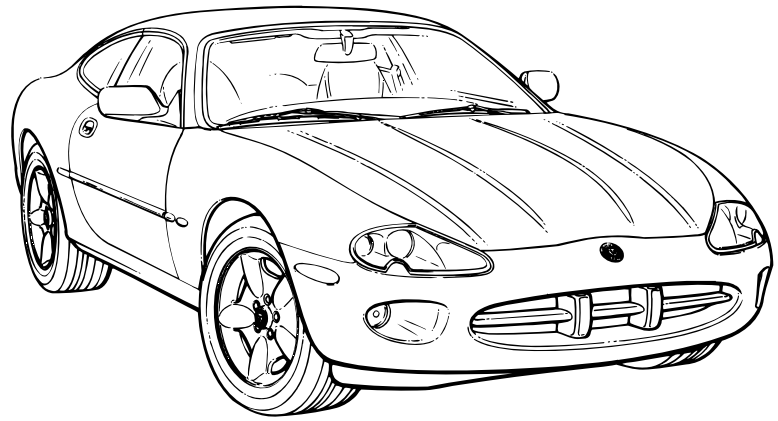
Operating vehicle features, such as ICE, mobile phones and CD player equipment etc., can cause a momentary distraction while driving.

Follow all traffic regulations when operating vehicle systems or using diagnostic equipment while on the move.

Mobile diagnostic equipment operation may require the use of an assistant.

# OVERVIEW

## XK Overview



E64172

Introduced in 1997 MY, the XK luxury sports car is available in both coupe and convertible forms. It was the launch vehicle for the AJ-V8 engine and the ZF 5-speed transmission. The supercharged XKR variant was added to the model lineup for the 2000 MY.

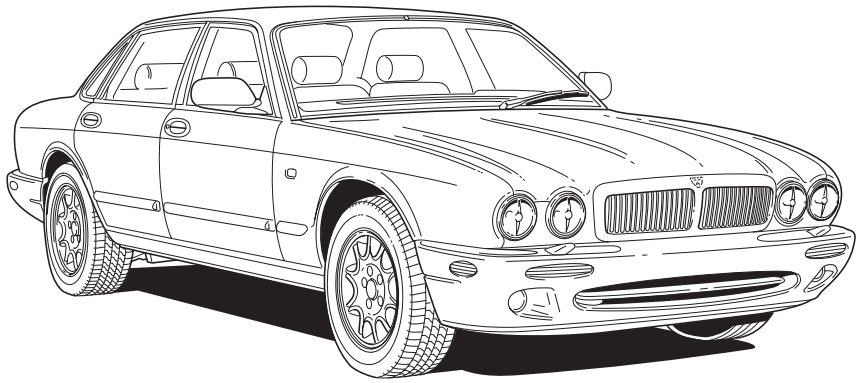
Available features include (dependent on MY and variant):

- Speed-sensitive, variable ratio, power steering system
- Power latching convertible top
- Four button remote key-ring transmitter
- Navigation
- Rain sensing windshield wipers

### Engineering Codes and VIN Ranges

| 1997 – 2002 MY XK | | |
|---|---|---|
| **Variant** | **Engineering Code** | **VIN Range** |
| XK8 Coupe and Convertible | X100 | 1997 MY: 001246 – 018107<br>1998 MY: 018108 – 031302<br>1999 MY: 031303 – 042775<br>2000 MY: A00116 – A11139<br>2001 MY: A11140 – A24195<br>2002 MY: A25196 – A30644 |

## XJ Overview



E64171

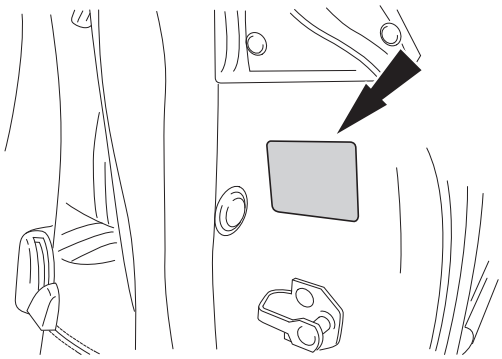
Introduced in 1998 MY, the XJ V8 Series Sedan was available in four model variants; XJ8, XJ8L (long wheel base), XJR (supercharged) and Vanden Plas (long wheel base). A fifth variant, Super V8 (supercharged Vanden Plas) was added for the 1999 MY. Emphasis was placed on commonality with components and operation of the related systems in the XK.

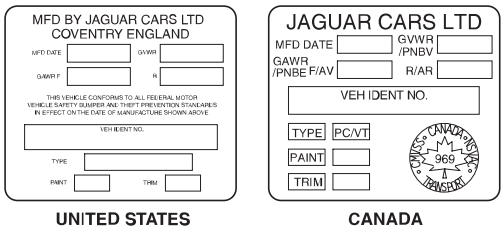
### Engineering Codes and VIN Ranges

| 1998 – 2003 MY XJ | | |
|---|---|---|
| **Variant** | **Engineering Code** | **VIN Range** |
| XJ8 | X308 (Standard Wheel Base)<br>X338 (Long Wheel Base) | 1998 MY: 812317 – 853935<br>1999 MY: 853936 – 878717<br>2000 MY: F00103 – F20644<br>2001 MY: F20645 – F41862<br>2002 MY: F41863 – F49790<br>2003 MY: F49791 – F59525 |

# IDENTIFICATION LABELS

## XK Identification Plate and Label Location

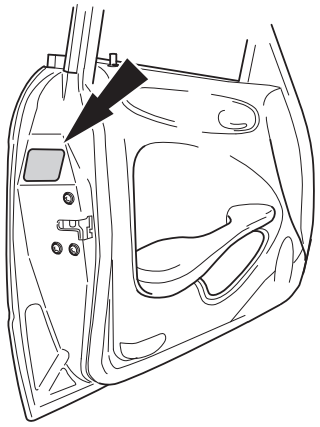


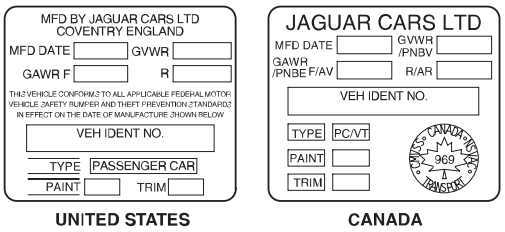



UNITED STATES CANADA

E64174

## XJ Identification Plate and Label Location






UNITED STATES CANADA

E64173

## LIFTING AND JACKING

**CAUTIONS:**

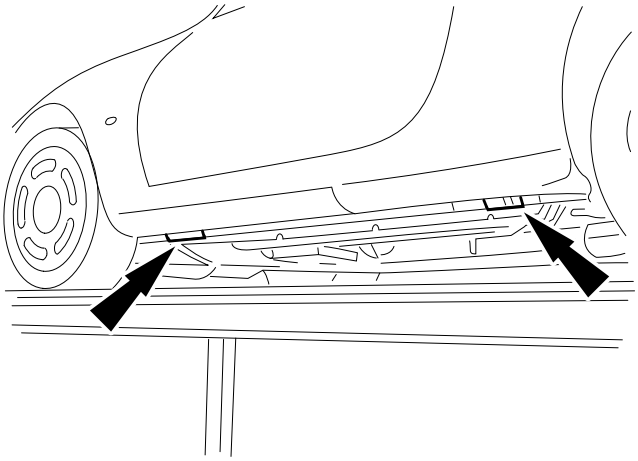
⚠ **Do not allow the hoist adapters to contact the steering linkage, suspension arms, stabilizer bar, or rear subframe stabilizer brackets, or to compress the lower suspension arm stabilizer bar insulator. Damage to the suspension, exhaust and steering linkage components may occur if care is not exercised when positioning the hoist adapters of two-post hoists prior to lifting the vehicle.**

⚠ **Never use the differential housing as a lift point. Damage to the differential housing and cover may occur.**

⚠ **When using a floor jack, a cushioned pad must be used to avoid body damage.**

⚠ **On XK models, the aluminum suspension cross beam should not be used for jacking the front of the car. Use only the car jacking points or the steel cross member below the radiator package.**

**XK Vehicle Jacking Points**



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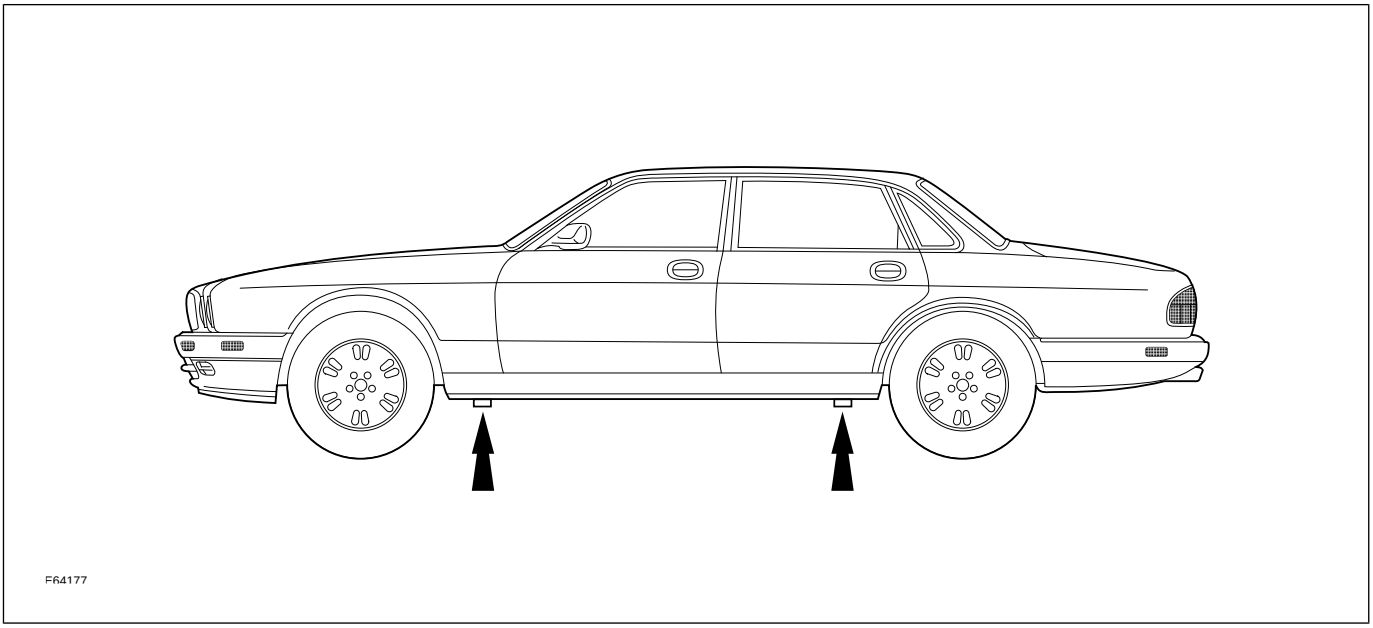
**XJ Vehicle Jacking Points**

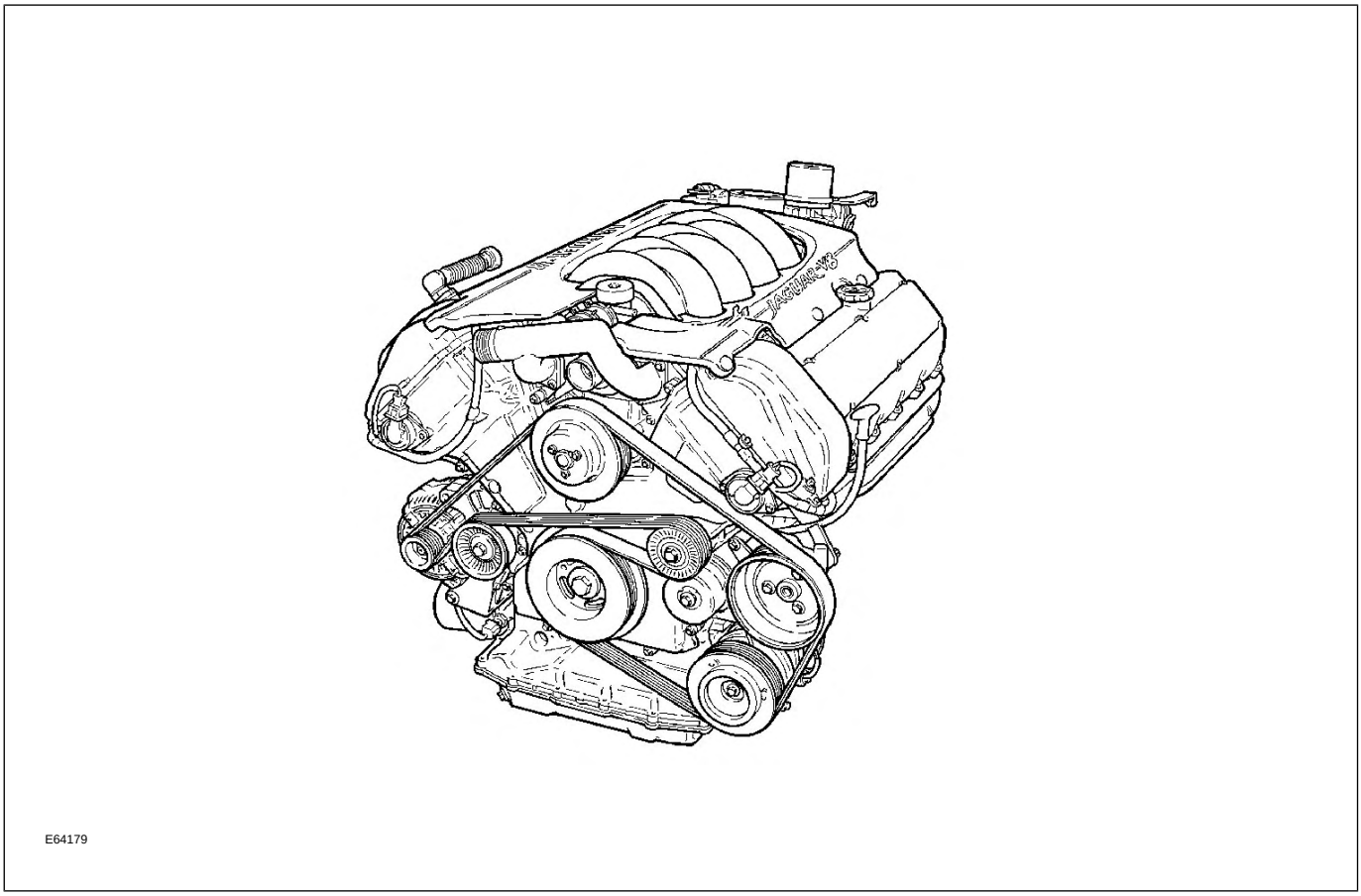


# ENGINES OVERVIEW

## AJ26 and AJ27 V8 Engines

The 4.0-liter AJ26 engine was the first V8 engine to be offered by Jaguar; AJ27 is a further refinement of the AJ26. Both engines are available in normally aspirated (N/A) and supercharged (SC) versions.

**AJ26 4.0L N/A V8 Engine**

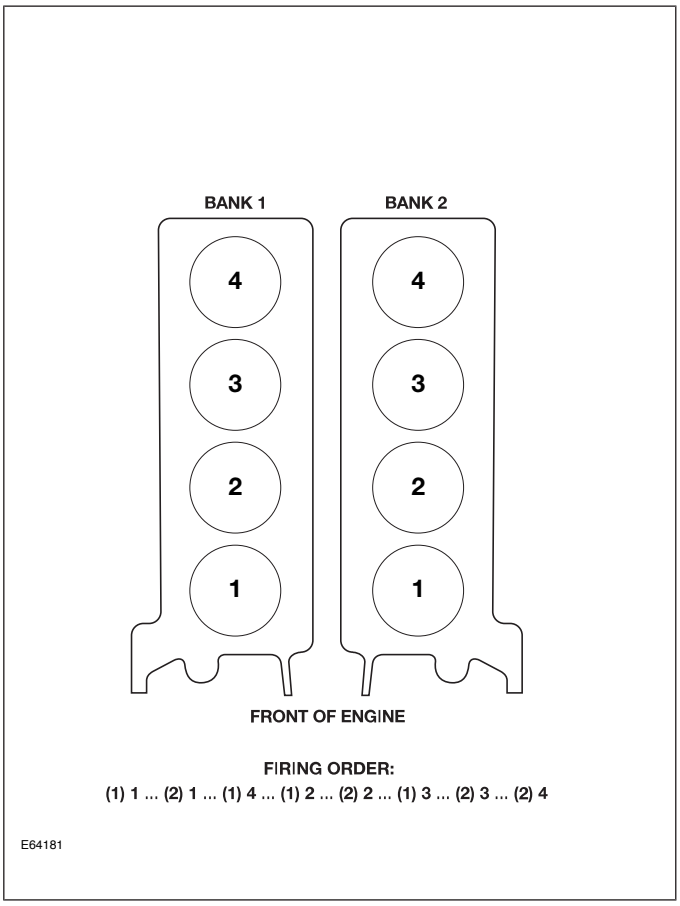


# DETAILS

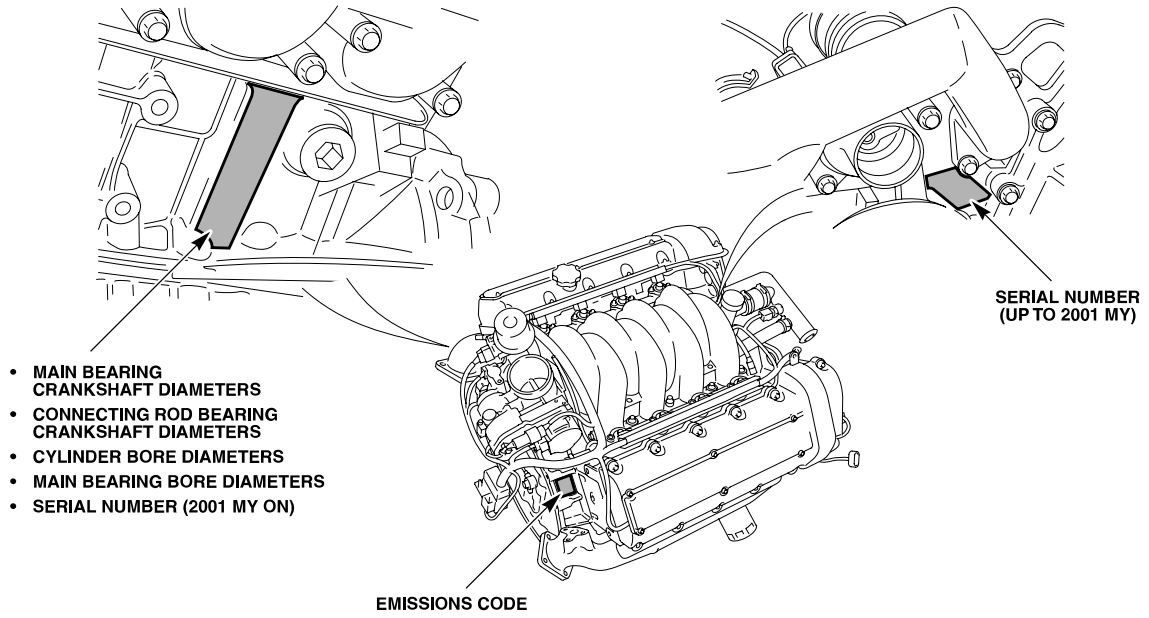
## Engine Specifications

| | AJ26 and AJ27 4.0L N/A | AJ26 and AJ27 4.0L SC |
|---|---|---|
| **Configuration** | 90° V8 | 90° V8 |
| **Cylinder Head** | – Dual overhead camshafts<br>– 4 valves per cylinder | – Dual overhead camshafts<br>– 4 valves per cylinder |
| **Valve Clearances (cold)** | Intake: 0.18 – 0.22 mm (0.007 – 0.009 in.)<br>Exhaust: 0.23 – 0.27 mm (0.009 – 0.011 in.) | Intake: 0.18 – 0.22 mm (0.007 – 0.009 in.)<br>Exhaust: 0.23 – 0.27 mm (0.009 – 0.011 in.) |
| **Bore** | 86 mm (3.386 in.) | 86 mm (3.386 in.) |
| **Stroke** | 86 mm (3.386 in.) | 86 mm (3.386 in.) |
| **Displacement** | 3.996 liters (244 $in^3$) | 3.996 liters (244 $in^3$) |
| **Compression Ratio** | 10.75 : 1 | 10.75 : 1 |
| **Maximum Power (DIN)** | 280 BHP at 6100 rpm | 258 BHP at 6150 rpm |
| **Maximum Torque (DIN)** | 276 lb. ft. at 4250 rpm | 372 lb. ft. at 3600 rpm |
| **Engine Oil Capacity** | Up to VIN A00366 (XK), F00463 (XJ): 6.0 liters (6.4 qt.)<br>From VIN A00367 (XK), F00464 (XJ): 7.0 liters (7.4 qt.) | Up to VIN A00366 (XK), F00463 (XJ): 6.0 liters (6.4 qt.)<br>From VIN A00367 (XK), F00464 (XJ): 7.0 liters (7.4 qt.) |
| **Coolant Capacity (approx.)** | 10 liters (10.6 qt.) | 10 liters (10.6 qt.) |

## Engine Numbering and Firing Order



## Engine Data Locations



## ENGINE MANAGEMENT OVERVIEW

The AJ26 Denso engine management system was designed for the introduction of the V8 engine to the Jaguar range of vehicles starting with the 1997 MY XK. A supercharged version was added for the 1998 MY.

The AJ27 Denso engine management system is a further development of the AJ26 system designed to meet more stringent emission control standards and enhance engine performance. The normally aspirated AJ27 system was introduced for the 1999 MY; the supercharged AJ27 system was introduced for the 2000 MY.

System application is as follows:

| Engine Management System | Model Year | Models |
|---|---|---|
| **AJ26** | 1997 | XK Normally Aspirated |
| | 1998 | XK & XJ Normally Aspirated |
| | 1999 | XJ Supercharged |
| **AJ27** | 1999 | XK & XJ Normally Aspirated |
| | 2000 | XK & XJ Normally Aspirated and Supercharged |
| | 2001 | XK & XJ Normally Aspirated and Supercharged |
| | 2002 | XK & XJ Normally Aspirated and Supercharged |
| | 2003 | XJ Normally Aspirated and Supercharged |

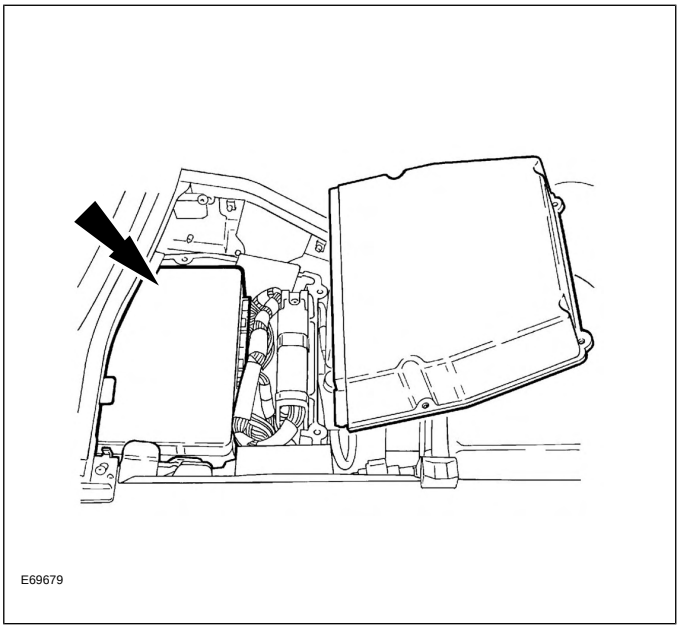
## ENGINE CONTROL MODULE

Both systems are built around a dual microprocessor Engine Control Module (ECM). The ECM is linked to and communicates with other powertrain control modules and other vehicle systems via the Controller Area Network (CAN).

The ECM governs all operating functions including:

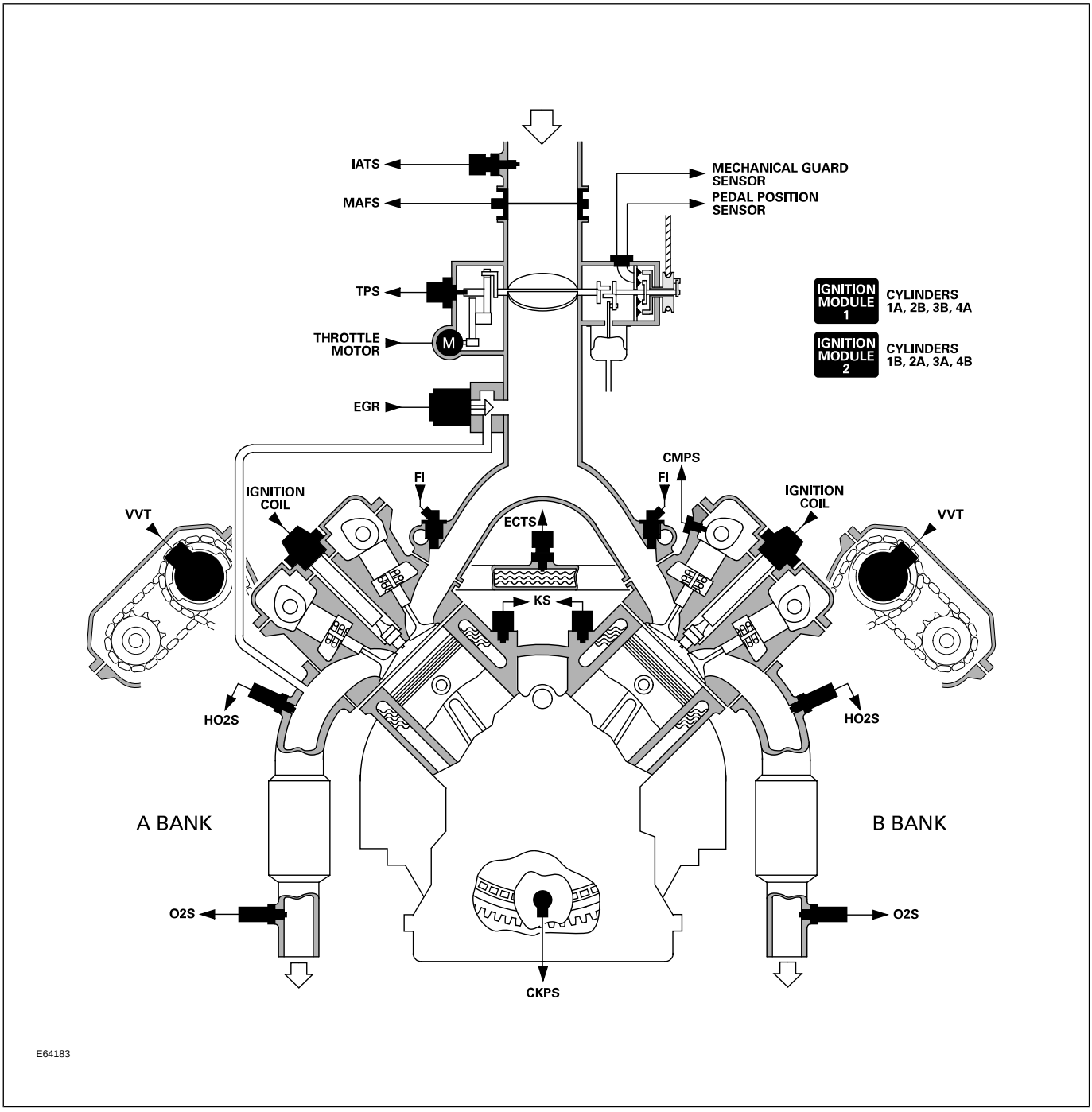
- Air induction via an electronically controlled throttle
- Fuel delivery
- Sequential fuel injection
- Ignition via on-plug ignition coils
- Idle speed control
- Emission control
- Evaporative emission control
- Intake valve timing
- Exhaust gas recirculation (certain variants only)
- Cooling system radiator fan control
- Air conditioning compressor control
- Cruise control
- Engine speed limiting
- Engine torque reduction to aid transmission shift quality and enhance traction / stability control
- EMS and OBD II diagnostics
- Default operating modes including engine speed and throttle limits

**ECM Location**

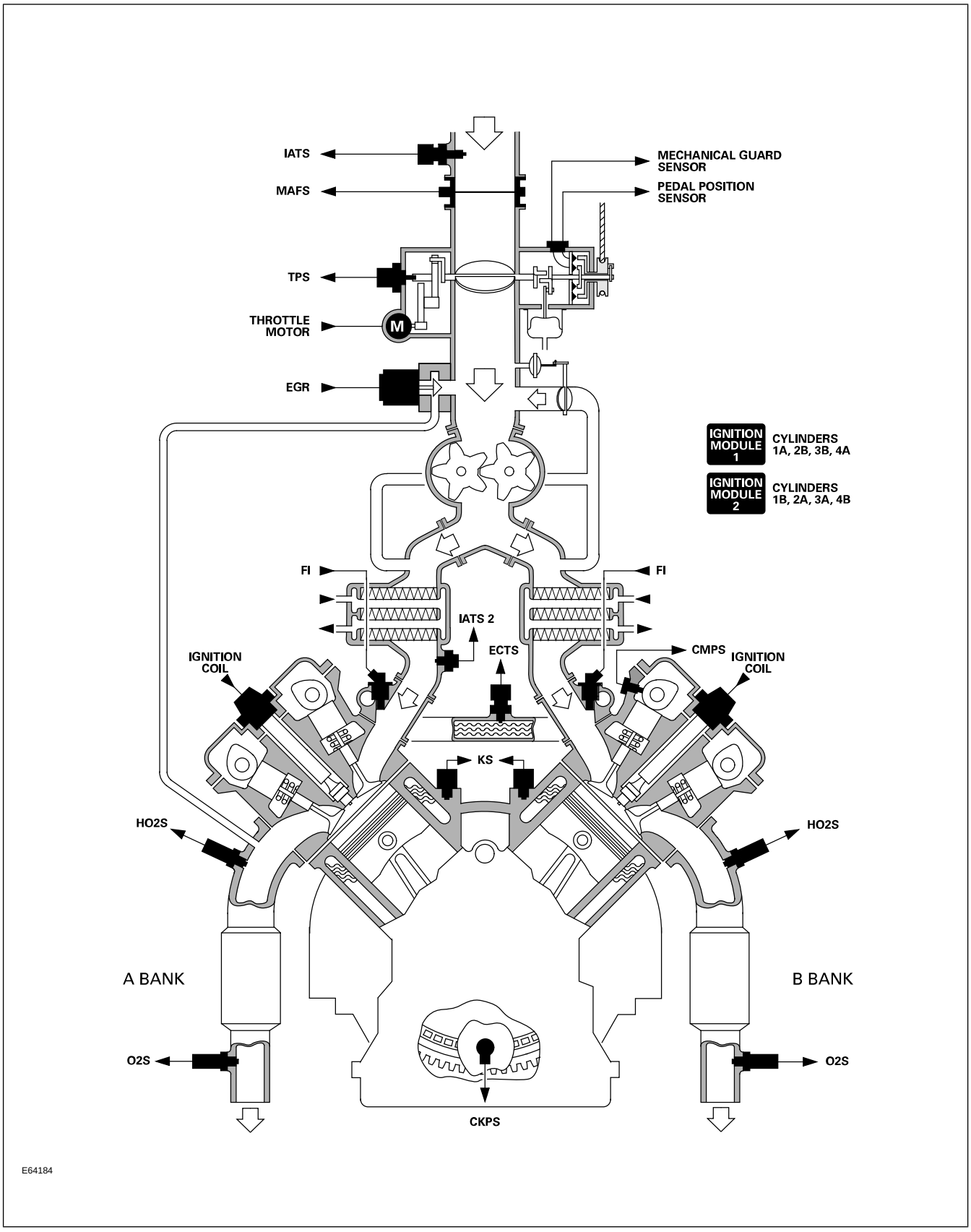


# COMPONENTS

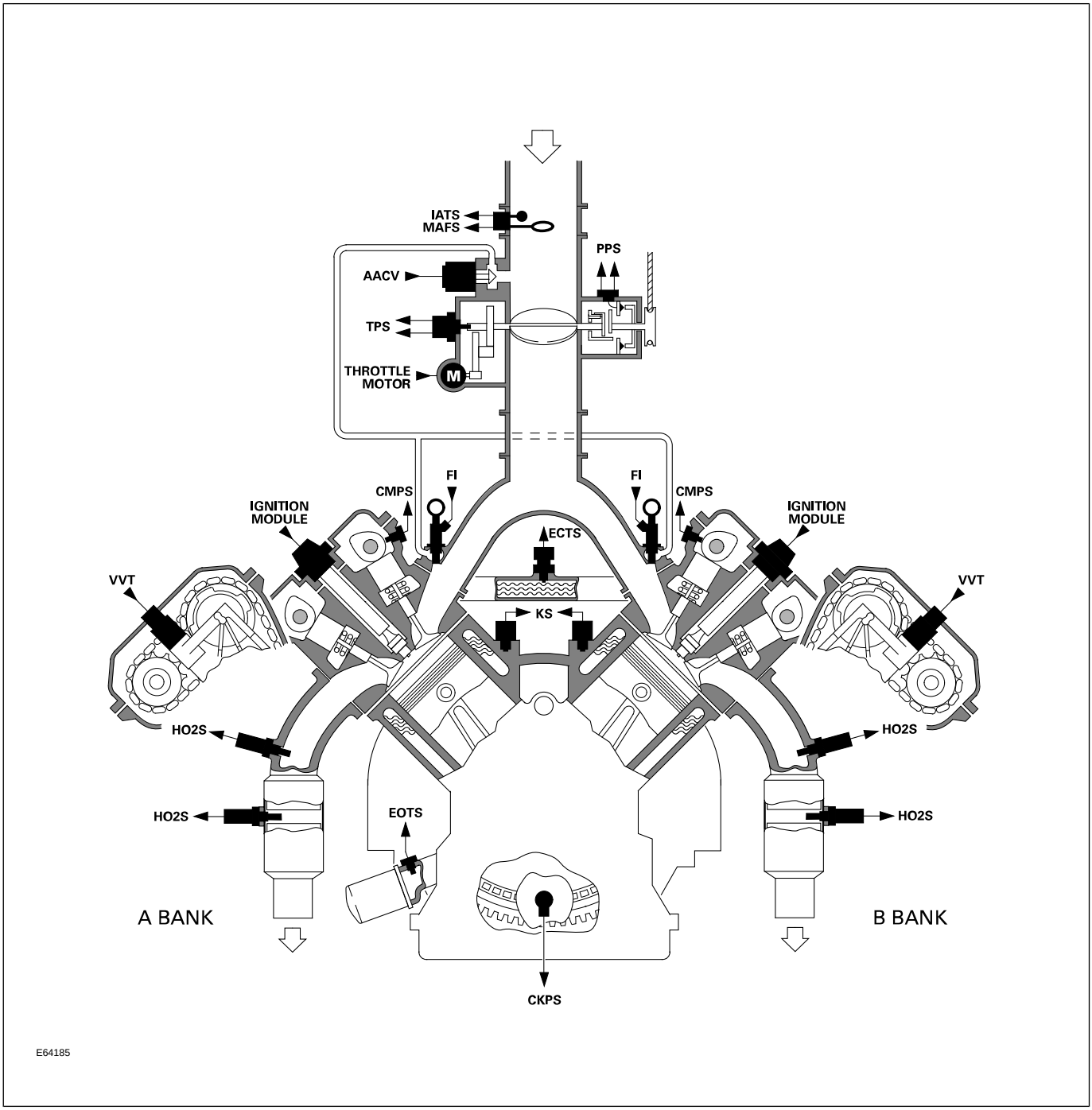
**AJ26 N/A Engine Management Components**



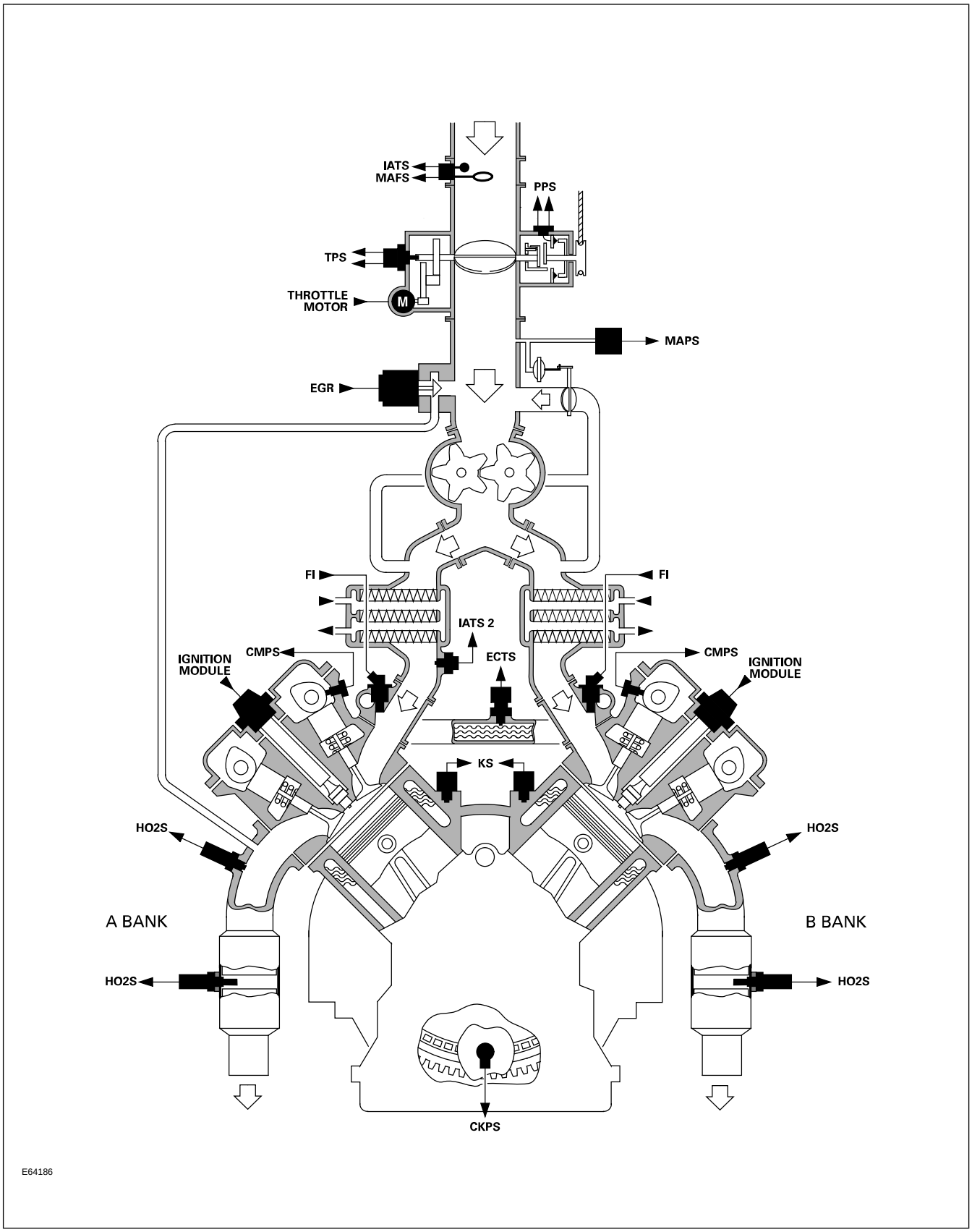
**AJ26 SC Engine Management Components**



**AJ27 N/A Engine Management Components**



**AJ27 SC Engine Management Components**



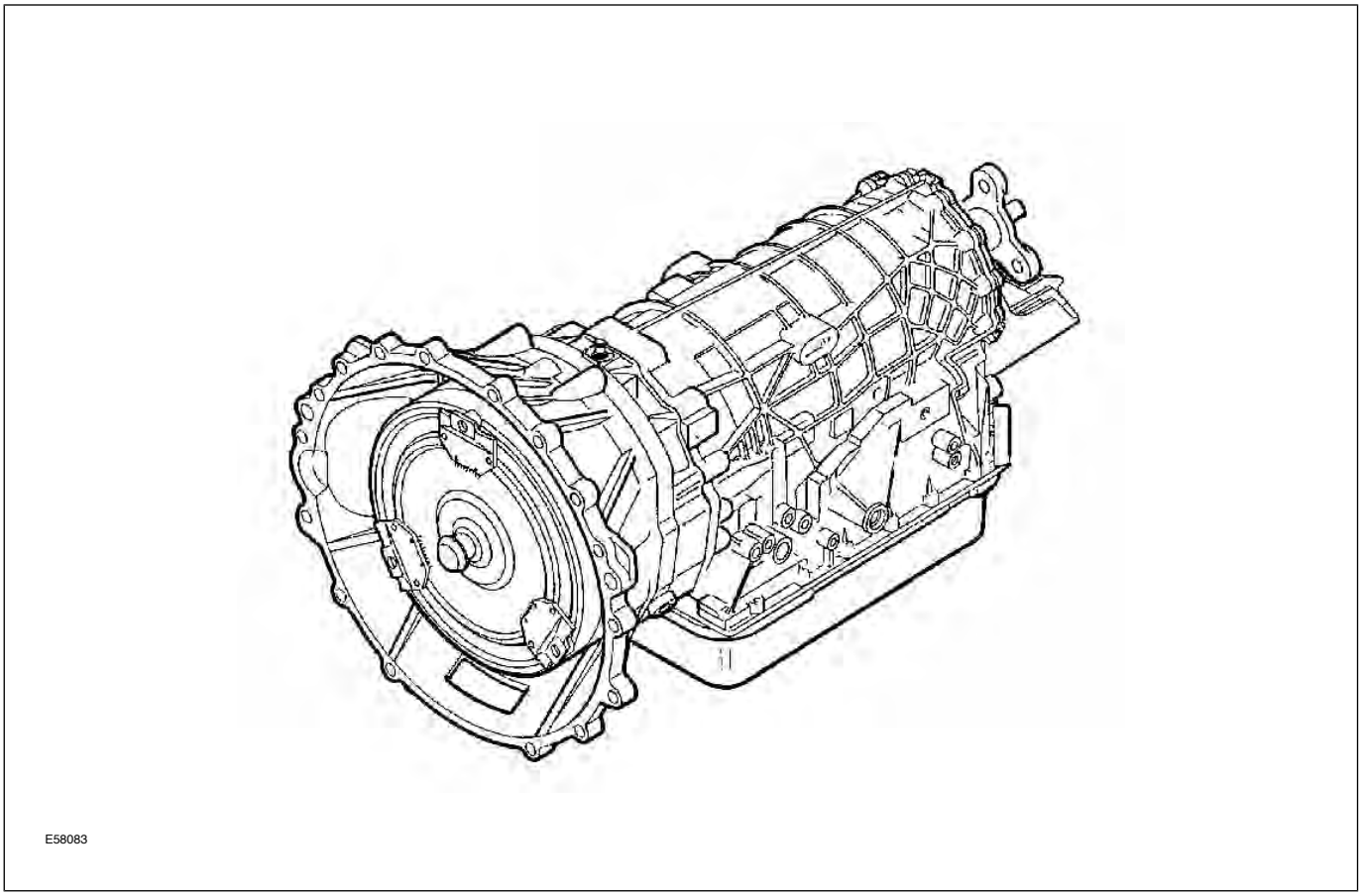
## ZF 5HP24 TRANSMISSION

Normally aspirated V8 XK and XJ vehicles are equipped with the ZF 5HP24 five-speed automatic transmission. The transmission and most of the vehicle interface components are mechanically identical for both vehicles.

ZF 5HP24 is interpreted as follows:

- **ZF** – Transmission manufacturer
- **5** – 5 forward gears
- **HP** – Hydraulic Planetary type transmission
- **24** – Maximum torque designation (no units; higher number = greater torque)

**ZF 5HP24 Automatic Transmission**



| ZF 5HP24 Specifications | | | | | | |
|---|---|---|---|---|---|---|
| **Transmission weight** | 95 kg (210 lb.) with torque converter and fluid | | | | | |
| **Mechanical features** | Transmission case in three sections – torque converter housing, main case and rear extension housing<br>Torque converter with single-plate controlled slip lock-up clutch<br>Planetary gear train (no brake bands) | | | | | |
| **Transmission fluid** | Capacity – 10 liters (10.6 quarts); filled for life<br>Type – Esso ATF LT7114 | | | | | |
| **Transmission fluid cooler** | External liquid-to-liquid cooler integral with the left hand side radiator tank | | | | | |
| **Stall Test** | There is no stall test specification for the 5HP24 transmission | | | | | |
| **Gear ratios** | **1st** | **2nd** | **3rd** | **4th** | **5th** | **Reverse** |
| | 3.57 | 2.20 | 1.51 | 1.00 | 0.80 | 4.10 |

## Service

There are no provisions for owners to verify the transmission fluid level, as the ZF 5HP24 transmission is not equipped with a transmission fluid dipstick. Fluid level is checked using a special dipstick tool while the engine is running; fluid temperature must be monitored during the procedure. To inspect the fluid level and integrity, carefully follow the inspection procedure found in the Transmission section of the WSM, available on the GTR website.

**NOTE:** There are no scheduled fluid level inspections required for ZF 5HP24. Fluid level should only be checked if there are signs of an external fluid leak, or as part of the diagnostic process for customer complaint of poor shift quality.

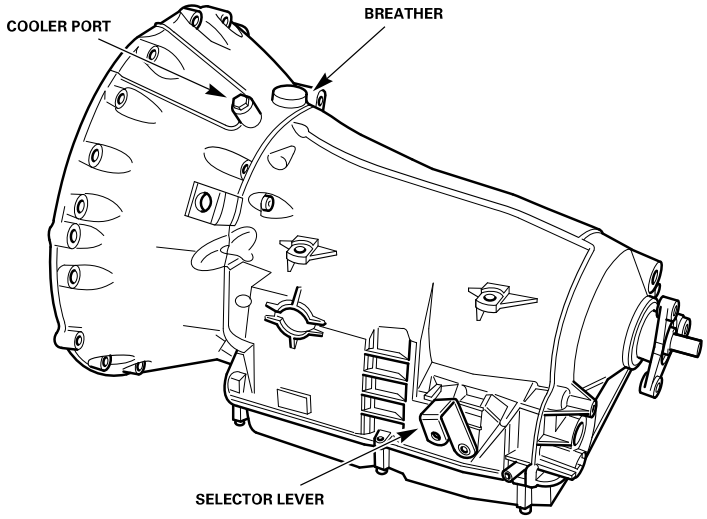
## W5A 580 TRANSMISSION

Supercharged V8 XJ and XK vehicles are equipped with the W5A 580 five-speed automatic transmission. The transmission and most of the vehicle interface components are mechanically identical for both vehicles.

W5A580 is interpreted as follows:

- **W** – Wandler (German, means 'Torque Converter')
- **5** – 5 forward gears
- **A** – Version
- **580** – Maximum torque, in Nm

**W5A 580 Automatic Transmission**




E58107

| W5A 580 Specifications | | | | | | |
|---|---|---|---|---|---|---|
| **Transmission weight** | 81 kg (179 lb) with torque converter | | | | | |
| **Mechanical features** | Transmission case in two sections – torque converter housing and main case<br>Torque converter with two-plate, controlled slip lock-up clutch<br>Planetary gear train (no brake bands) | | | | | |
| **Transmission fluid** | Capacity – 9.4 liters (10 quarts); Filled for life<br>Type – Shell LA, Jaguar Part Number JLM 20292 (1 liter) | | | | | |
| **Transmission fluid cooler** | External liquid-to-liquid cooler integral with the left hand side radiator tank | | | | | |
| **Stall test** | Due to throttle limitation at low vehicle speed, a stall test cannot be performed on the W5A580 system | | | | | |
| **Towing** | Maximum 30 miles (50 km) at less than 30 mph (50 km/h) | | | | | |
| **Gear ratios** | **1st** | **2nd** | **3rd** | **4th** | **5th** | **Reverse** |
| | 3.59 | 2.19 | 1.41 | 1.00 | 0.83 | 1.93 (Normal)<br>3.16 (Sport) |

## Service

There are no provisions for owners to verify the transmission fluid level, as the W5A 580 transmission is not equipped with a transmission fluid dipstick. Fluid level is checked using a special dipstick tool while the engine is running; fluid temperature must be monitored during the procedure. To inspect the fluid level and integrity, carefully follow the inspection procedure found in the Transmission section of the WSM, available on the GTR website.

**NOTE:** There are no scheduled fluid level inspections required for W5A 580. Fluid level should only be checked if there are signs of an external fluid leak, or as part of the diagnostic process for customer complaint of poor shift quality.

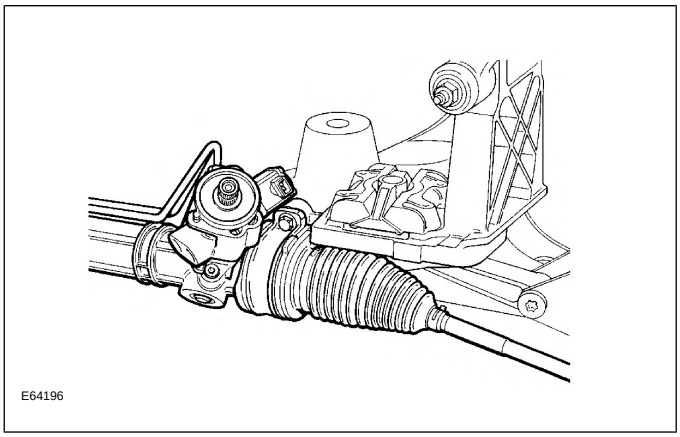
## POWER ASSISTED STEERING (PAS)

Both the XK and XJ are fitted with the ZF-manufactured Servotronic rack and pinion assembly. The rack features both variable ratio and variable assistance.

Control of the variable assistance is regulated by the power assisted steering control module (PASCM). The PASCM receives a signal from the instrument cluster and sends a variable current signal to the rotary valve located on the rack and pinion assembly. The PASCM is mounted in the right side of fascia (XK) or LH lower 'A' post (XJ).

The fluid reservoir is fitted with a non-serviceable 10 micron filter; if any major PAS component is changed, the filter must be replaced.

### Steering Rack



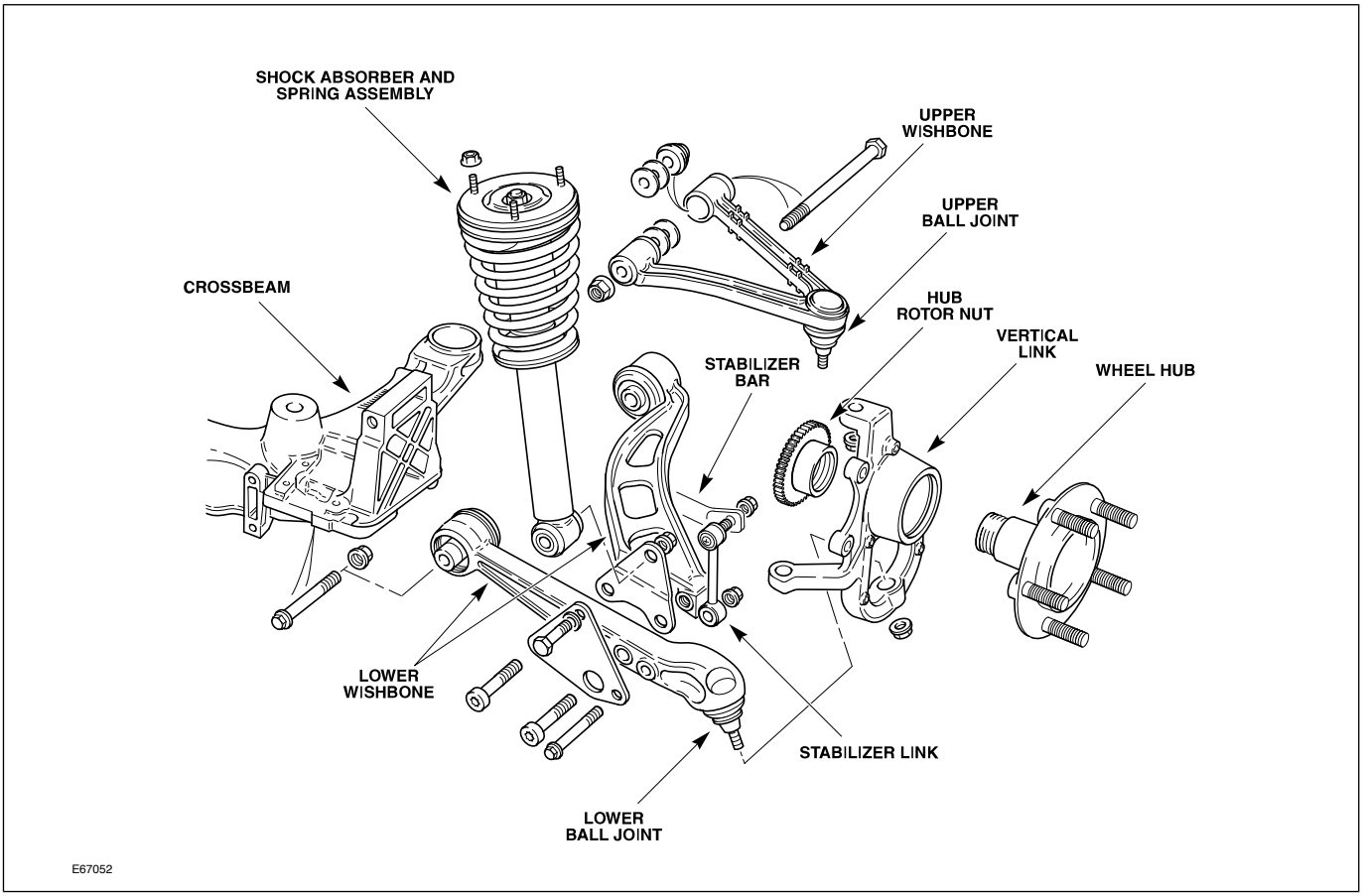
# FRONT SUSPENSION

## XK Front Suspension

The front suspension is a double-wishbone design assembled on an aluminum subframe. Control arms and vertical links are manufactured from steel. The wheel bearing is a sealed cartridge assembly.

**CAUTION: Do not jack the vehicle on the front subframe. Do not attempt to weld or repair the subframe; if the subframe is damaged, it must be replaced.**

**XK Front Suspension Components**




### Front Wheel Alignment

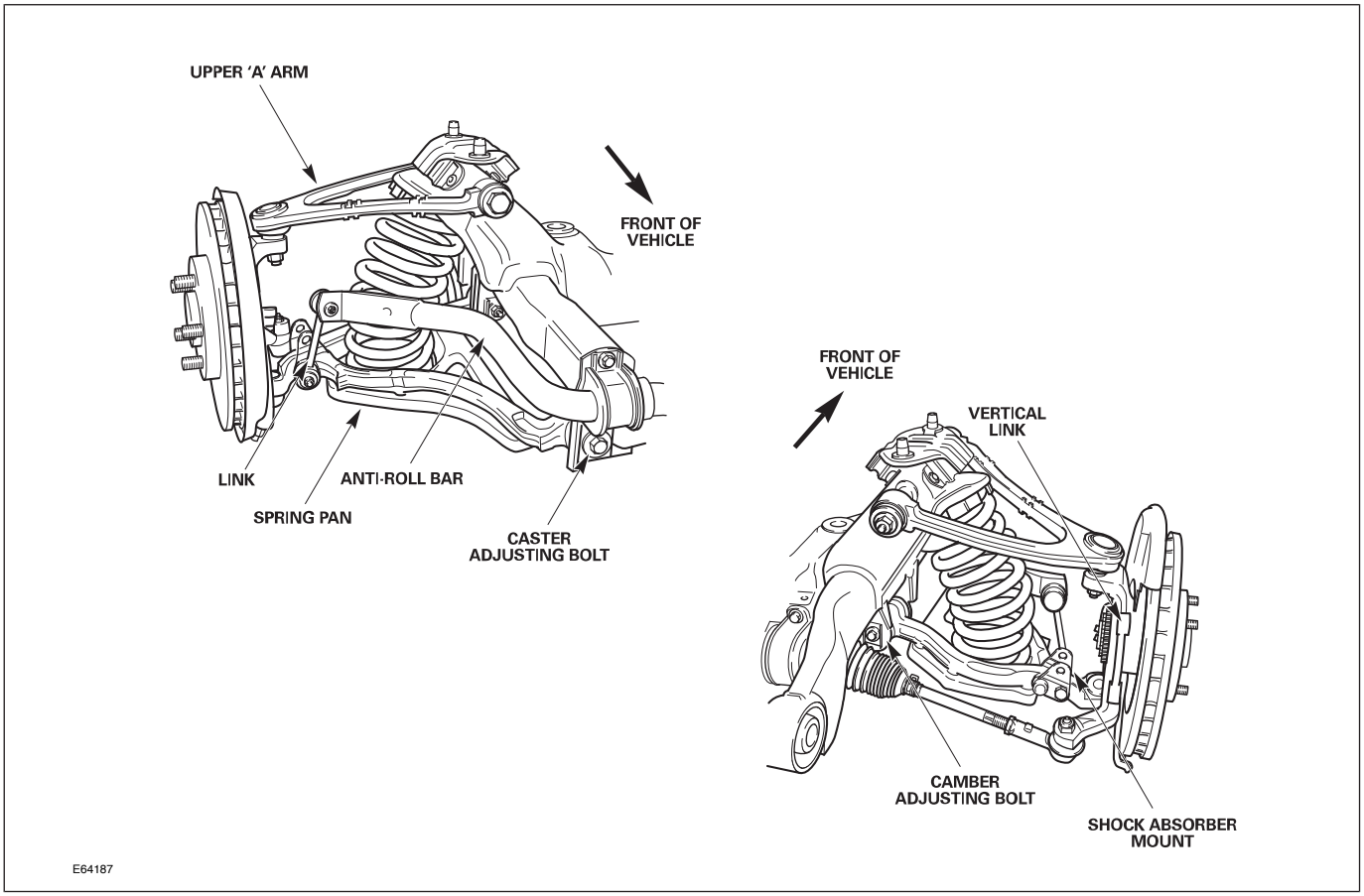
Camber can be minimally adjusted with the installation of a non-factory-fitted eccentric camber bolt in the rear mounting of the lower control arm. Caster can be adjusted by transferring shims between the two shim packs at each upper control arm mounting. Toe is adjusted via threaded tie rod ends.

**CAUTION: Upper control arm shims cannot be added or removed, only transferred between the front and rear shim packs.**

## XJ Front Suspension

The XJ8 front suspension maintains the Jaguar pattern of unequal-length ‘A’ arms mounted to a subframe.

**XJ Front Suspension System: Right Front View**



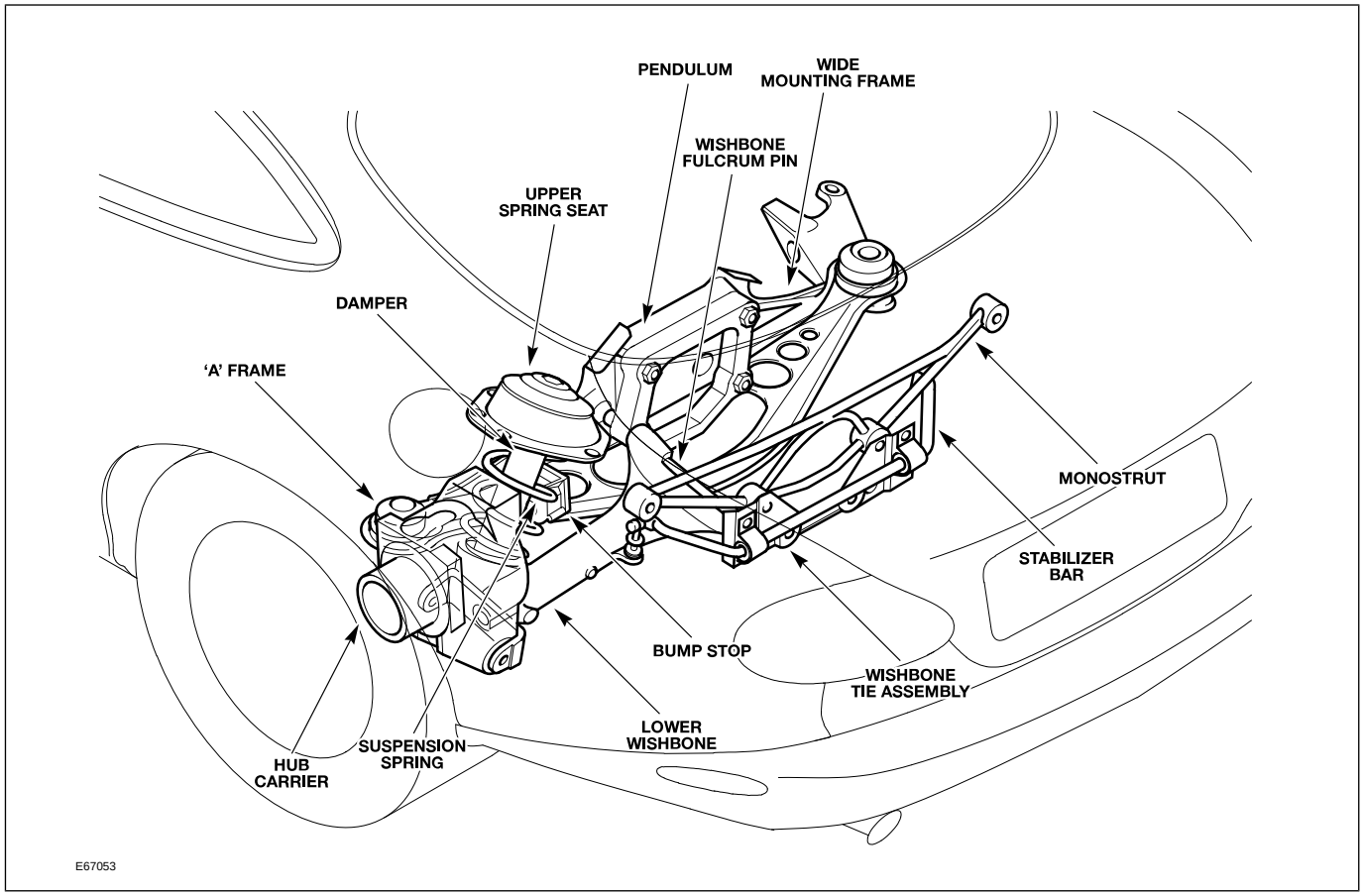

### Front Wheel Alignment

Camber is adjustable via an eccentric bolt located in the rear mounting of the lower control arm. Caster is adjustable via an eccentric bolt located in the front mounting of the lower control arm. Toe is adjusted via threaded tie rod ends.

# REAR SUSPENSION (XK and XJ)

The independent rear suspension incorporates co-axial spring and shock absorber units, a steel subframe, monostrut, cast iron wishbones and aluminum hub carriers.

**Rear Suspension Components (XK Shown)**




## Rear Wheel Alignment

Camber is adjustable by exchanging the selectable-thickness shim located between the differential output flange and the axle with one of a different thickness. Toe is adjustable via an eccentric fulcrum bolt fitted to the bottom of the hub carrier assembly.

## BRAKES

All vehicles are fitted with the Teves Mk 20-I anti-lock braking system (ABS). 2000 – 2002 MY XK and 2000 – 2003 MY XJ ABS systems were enhanced with the addition of ABS Plus, which is designed to improve dynamic stability when braking.

| XK Brake Systems Summary | | | |
|---|---|---|---|
| **Model Year** | **ABS System** | **Automatic Stability Control** | **Traction Control** |
| 1997 – 1999 | Teves Mk20-I | Standard | Optional |
| 2000 – 2002 | Teves Mk20-I w/ABS Plus | Standard | Standard |

| XJ Brake Systems Summary | | | |
|---|---|---|---|
| **Model Year** | **ABS System** | **Automatic Stability Control** | **Traction Control** |
| 1998 – 1999 | Teves Mk20-I | Standard | Optional |
| 2000 – 2003 | Teves Mk20-I w/ABS Plus | Standard | Standard |

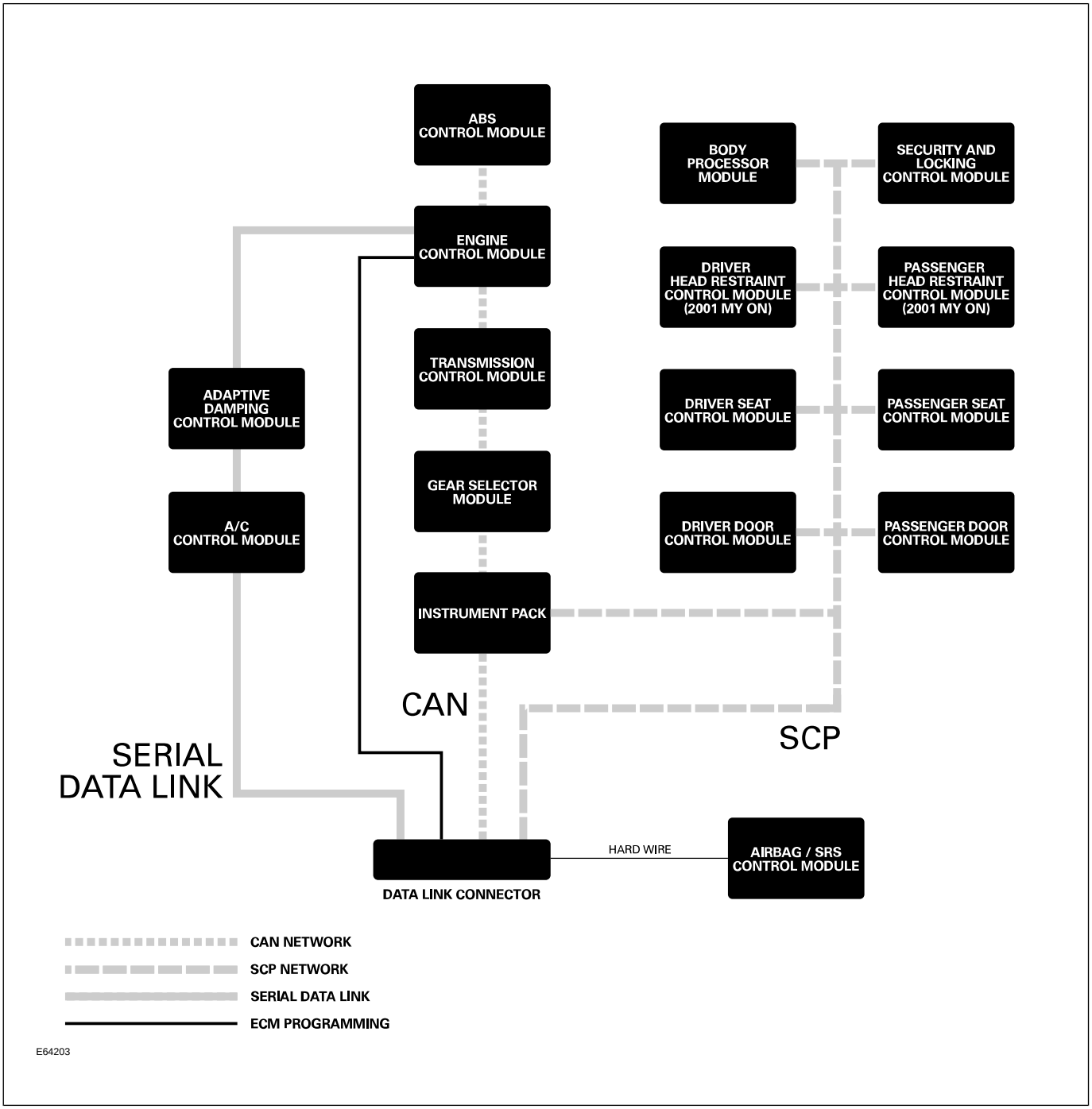
## CONTROL MODULES AND NETWORKS OVERVIEW

Two communication networks are used for control module intercommunication.

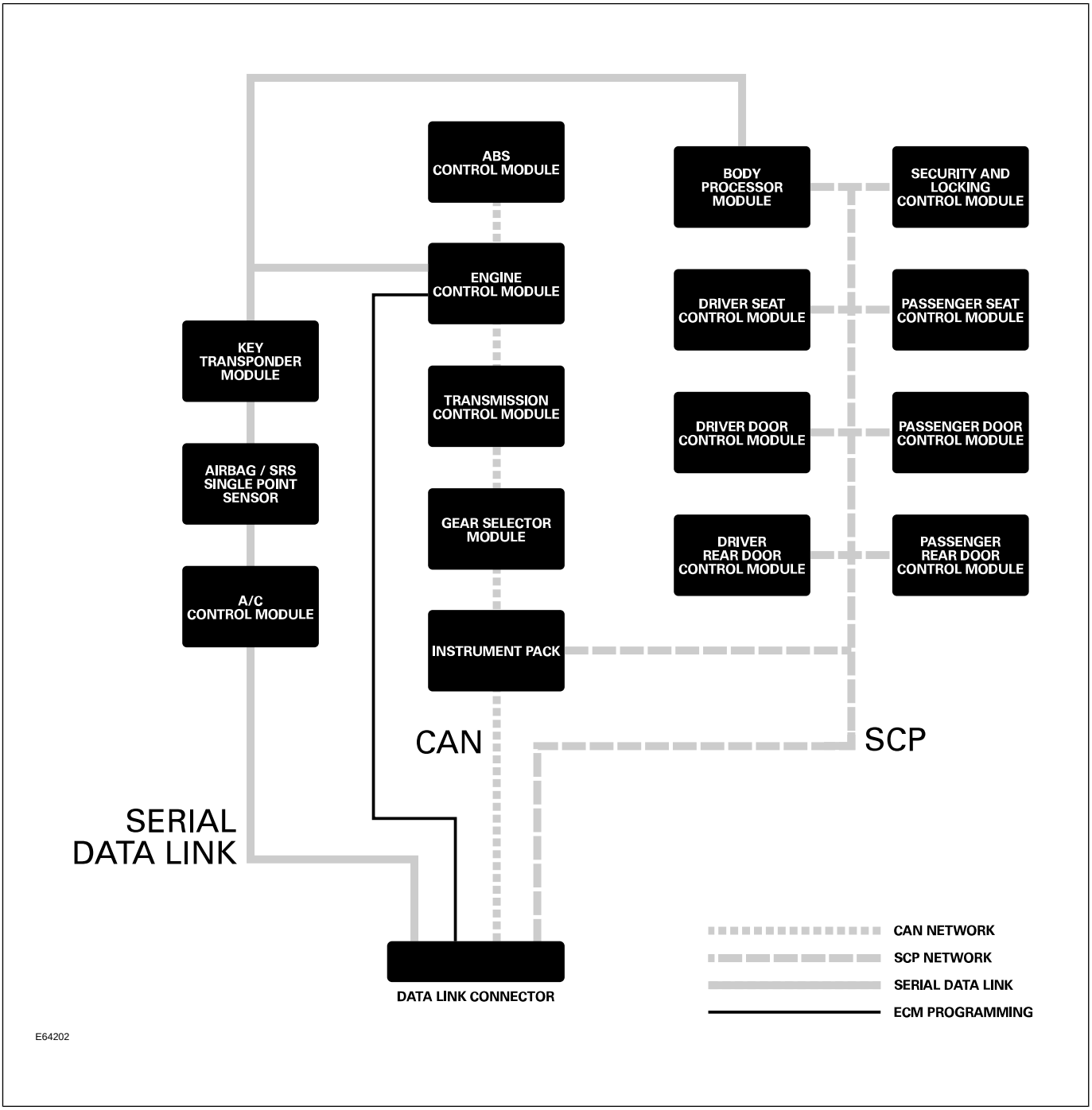
| Communication Networks | | | |
|---|---|---|---|
| **Network** | **Class** | **Speed** | **Communication Medium** |
| Controller Area Network (CAN) | C | 500 KBaud | Twisted pair copper wire |
| Standard Corporate Protocol Network (SCP) | B | 41.6 KBaud | Twisted pair copper wire |

A third network – ISO 9141 (Serial Data Link) – allows diagnostic interrogation via the data link connector (DLC) but does not allow control module intercommunication. The ISO network communicates at 10.4 KBaud.

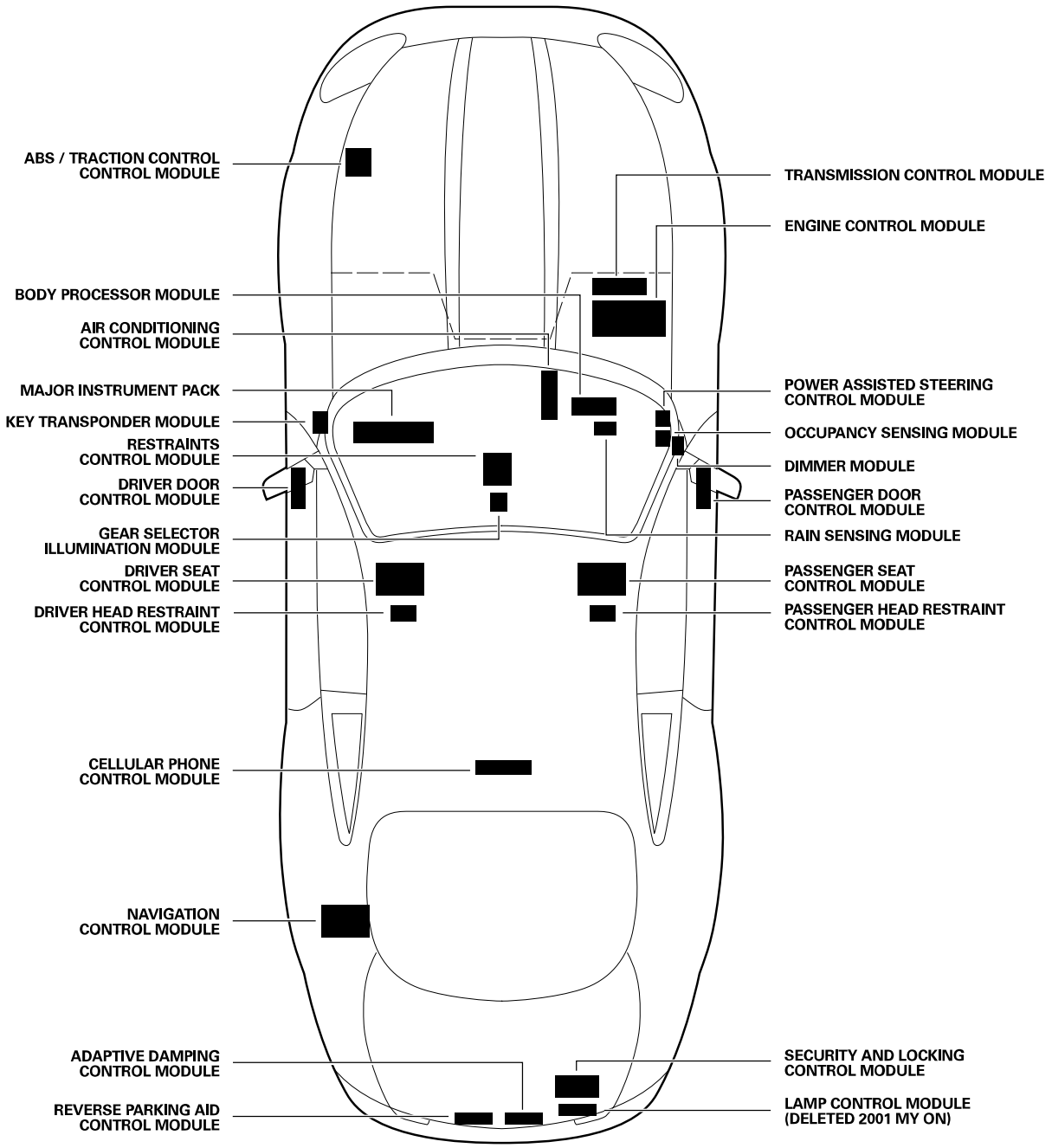
**XK Communication Network Layout**



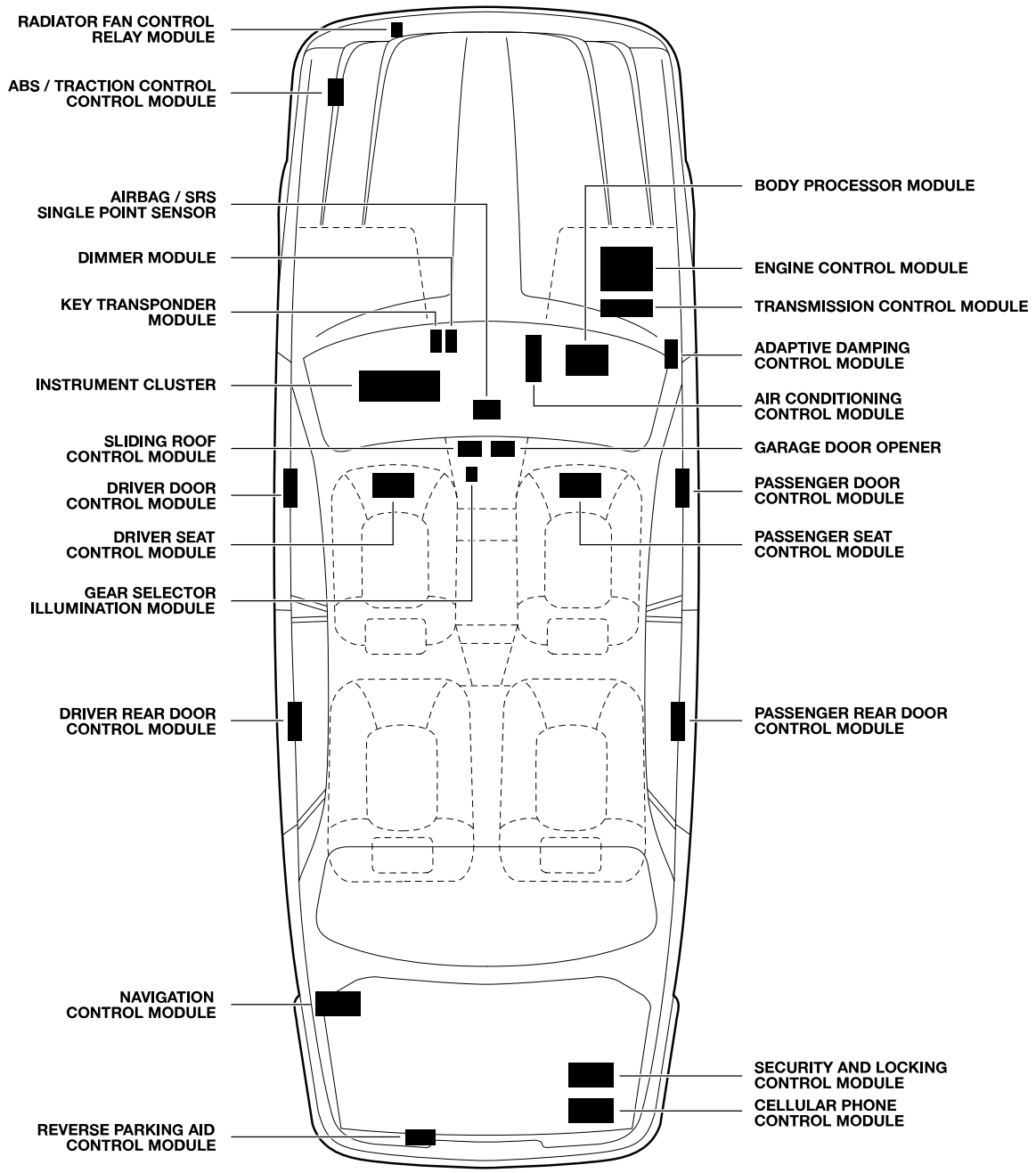
**XJ Communication Network Layout**



**XK Control Module Locations**



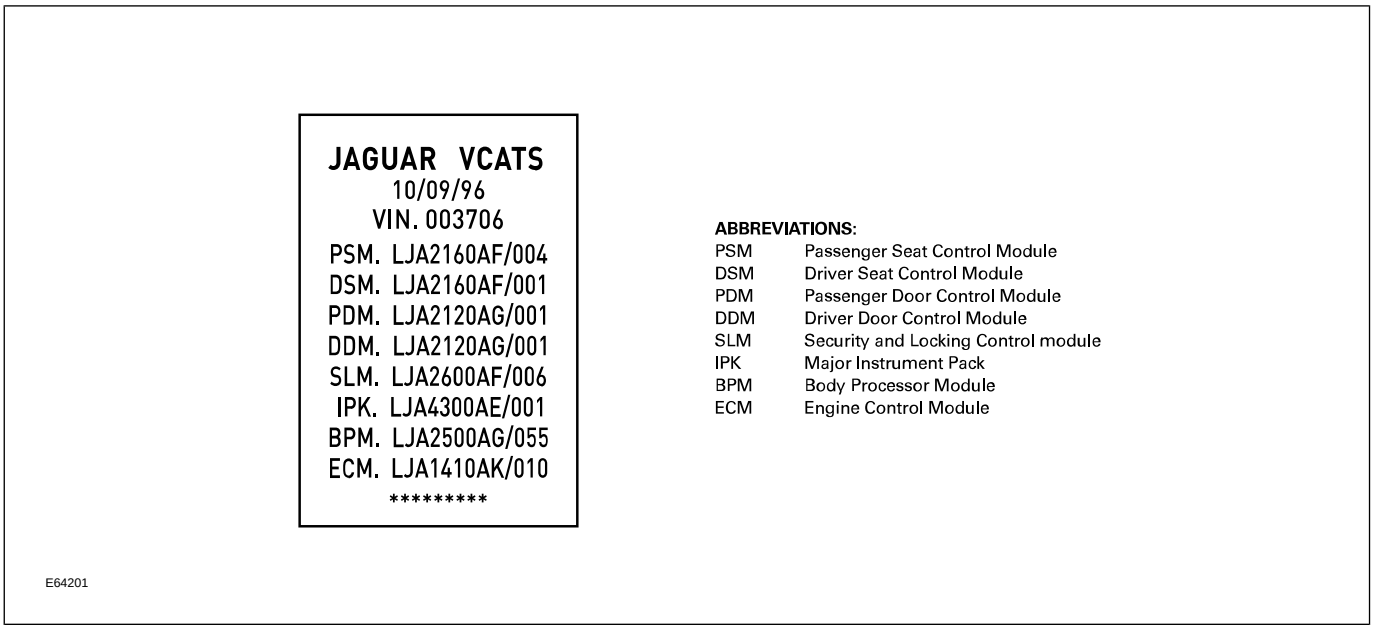
**XJ Control Module Locations**

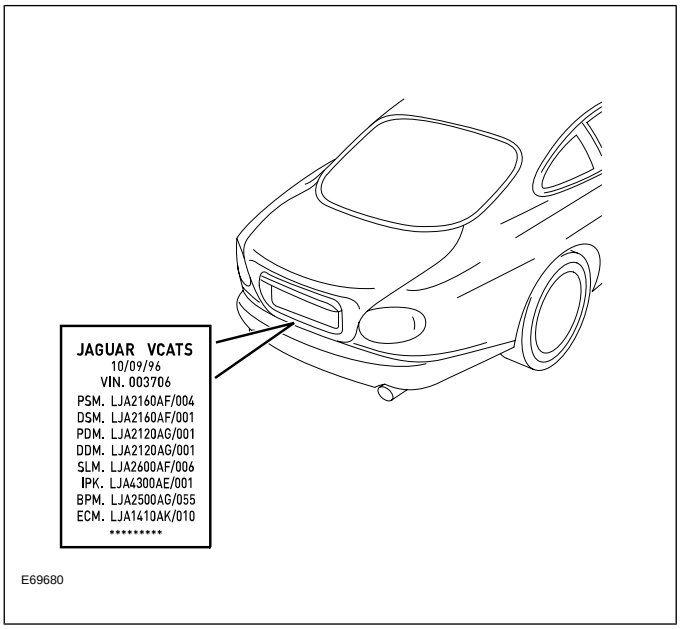


## Vehicle Configuration and Test System (VCATS)

VCATS data has to be supplied to Jaguar for some control module market-specific configurations. The data is added to the Control Module at the factory. VCATS matches hardware part numbers with the correct software. The VCATS label is located in the trunk.

**Typical VCATS Label**

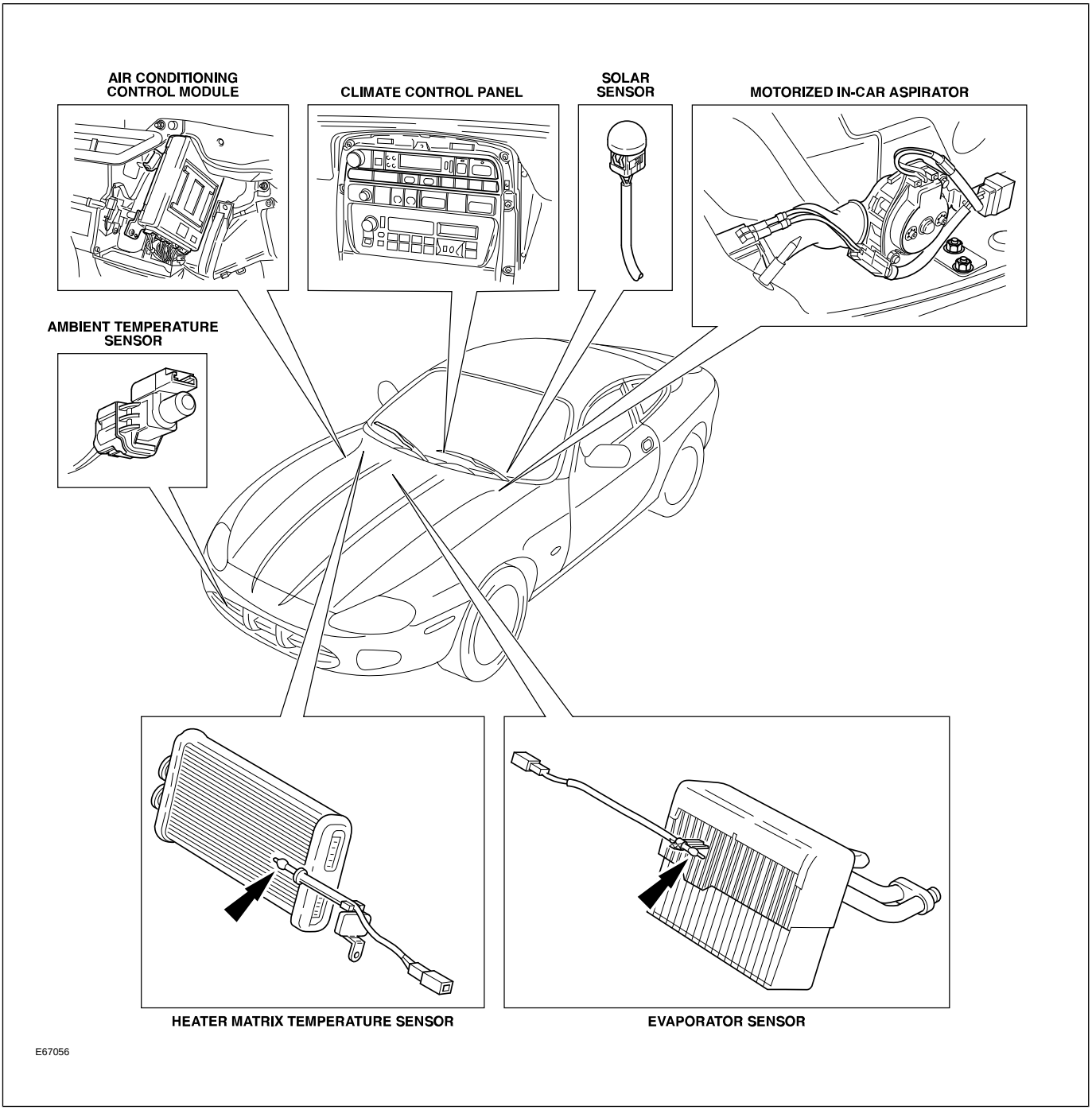


## CLIMATE CONTROL OVERVIEW

The Jaguar Denso Climate Control System is standard equipment on XK and XJ models. The system is controlled through a microprocessor-based electronic control module and a microprocessor-based control panel. To control cabin temperature, the system uses a heater valve to regulate the heater matrix temperature. The windshield, rear window, and mirror heater circuits are integral with the climate control system. Diagnostic routines and fault code extraction are available through control panel diagnostics.

**Climate Control Components (XK shown)**

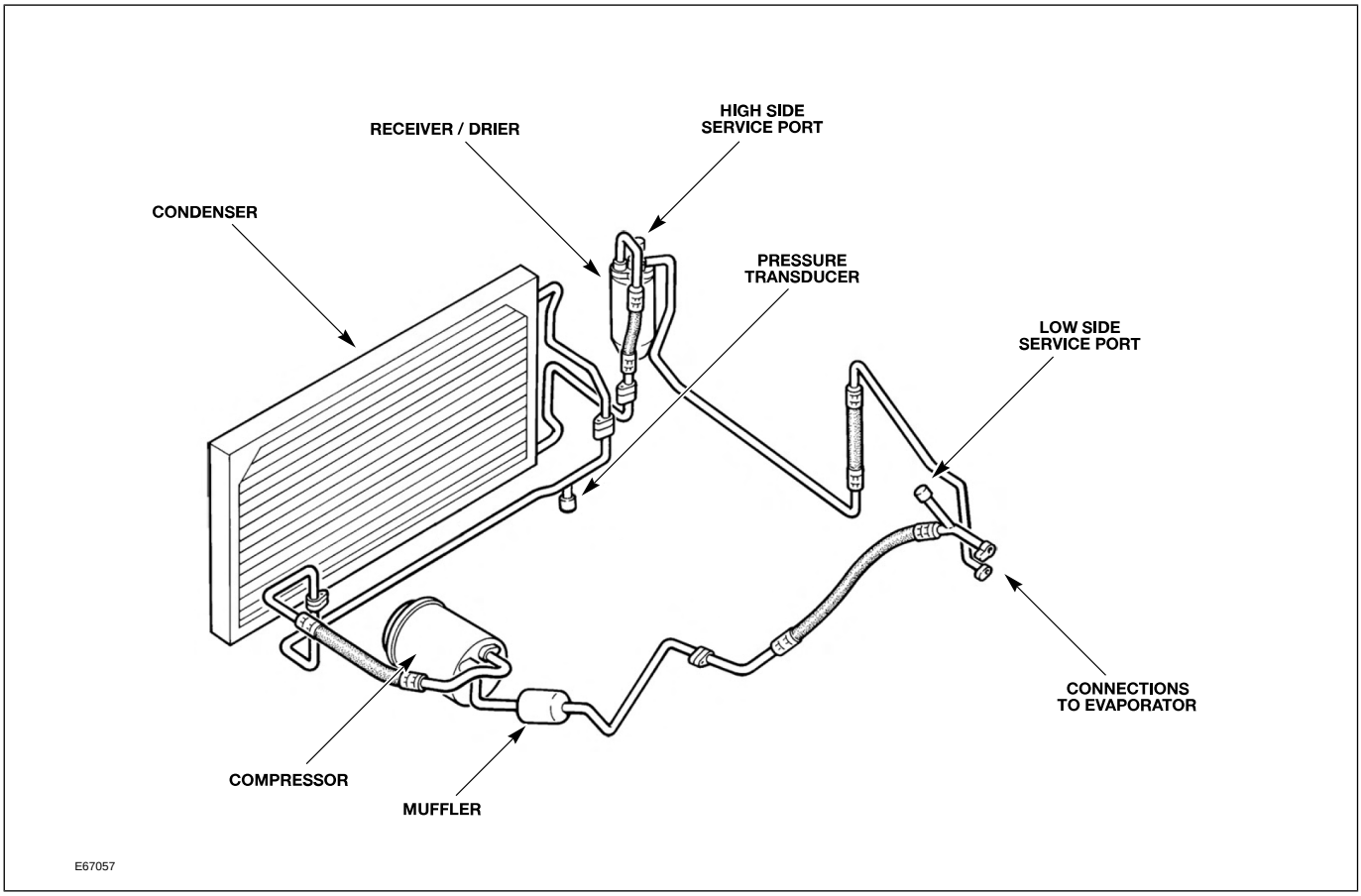


# SERVICE

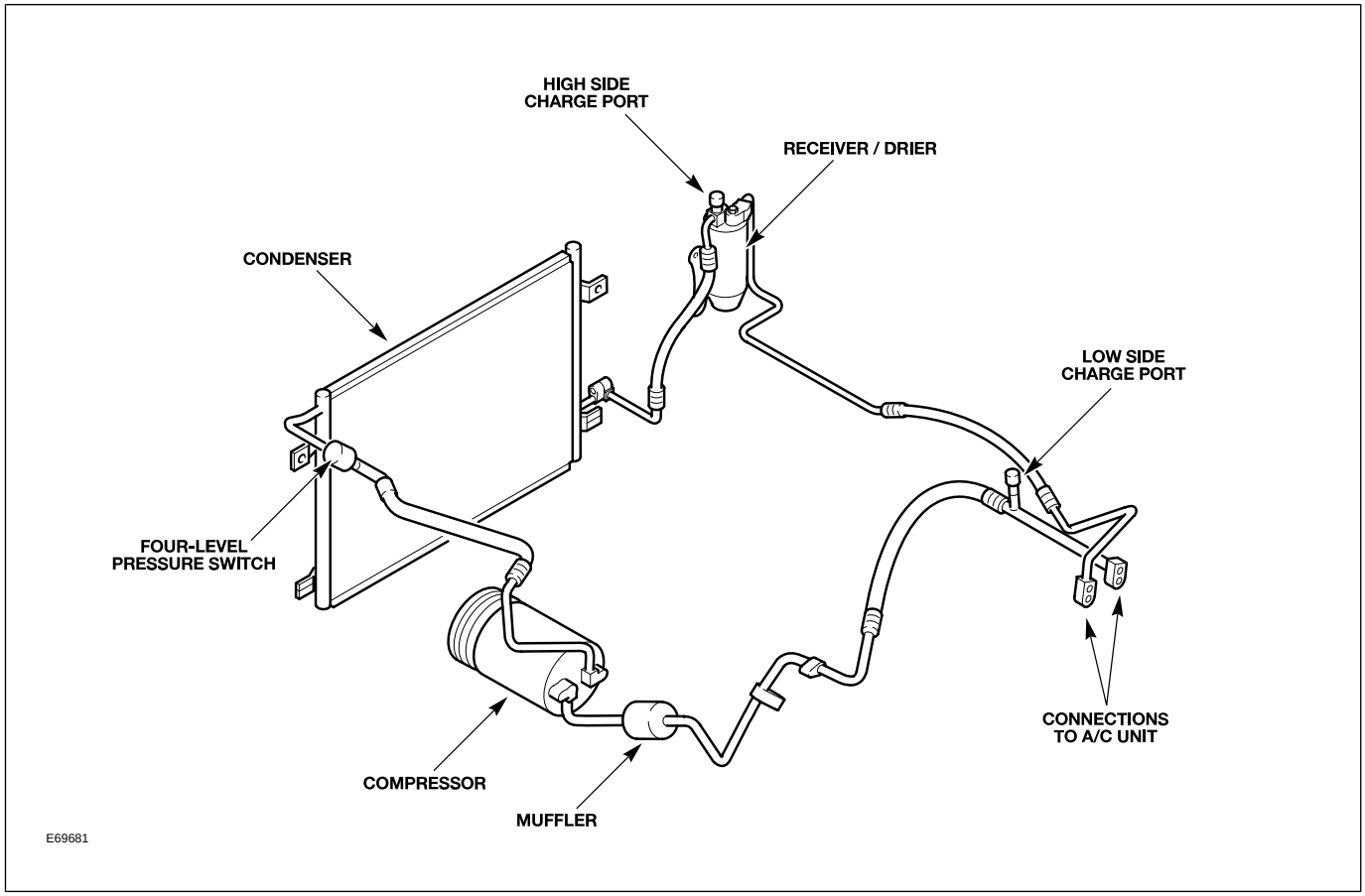
## Refrigerant Service Ports

The high-pressure service port is located on the receiver-dryer assembly. The low-pressure service port is located near the evaporator end of the evaporator-to-compressor hose/pipe assembly.

**XK Refrigeration System**



**XJ Refrigeration System**



# POWER WINDOWS

## XK Power Windows

All windows are equipped with one-touch down functionality. A brief press of a window switch will fully lower the respective window. A brief press of the ROOF switch will lower both rear quarter windows. The ROOF switch and the door window switches must be held throughout the duration of their respective window closings.

To provide for proper seating of the frameless door glass into the roof/convertible top seal, each door glass is also equipped with a window drop feature. This feature lowers the window 15 mm (0.060 in.) when the door is opened (provided the window was fully raised). Closing the door will cause the window to return to the fully raised position, provided it was fully raised when the door was opened.

If the vehicle power supply is disrupted, the window drop feature will not function correctly. To restore proper operation the door windows will need to be re-programmed.

### Door Window Re-programming

1. Close both doors
2. On convertible vehicles, fully close the convertible top.
3. Press and hold the lower part of the window switch; when the window is fully lowered, continue to hold the switch for 5 seconds.
4. Release the switch.
5. Press and hold the upper part of the window switch; when the window is fully raised, continue to hold the switch for 5 seconds.
6. Carry out this procedure for driver and passenger windows.

**NOTE:** This procedure can be carried out either from the individual window switches or from the driver's switch pack. Quarter windows do not require programming.

⚠ **CAUTION: Disconnect the battery before servicing internal door components or inadvertent glass movement may occur.**

## XJ Power Windows

All windows are equipped with one-touch down functionality. A brief press of a window switch will fully lower the corresponding window. Windows are not equipped with a window drop feature or one-touch up functionality. If the vehicle power supply is disrupted, normal operation will resume when power is restored; no initialization is required.

## SUNROOF (XJ ONLY)

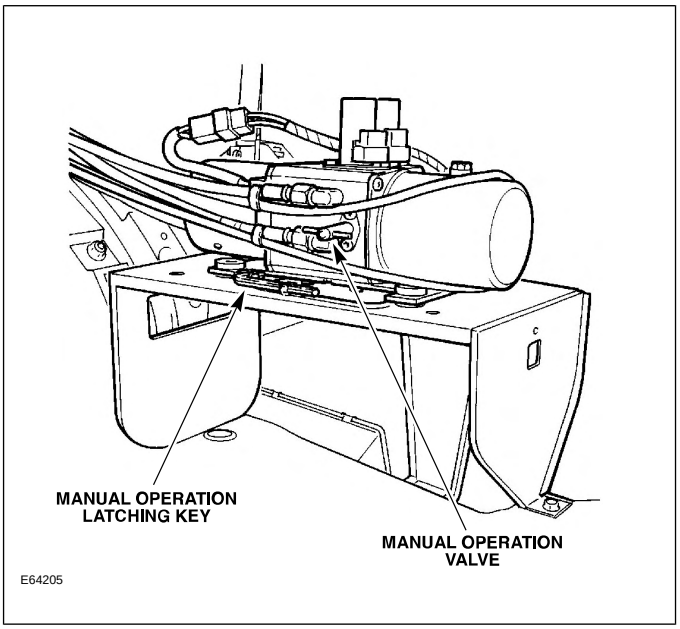
The XJ sunroof is equipped with one-touch open and one-touch close. If an obstruction blocks the sunroof during one-tough closing, the sunroof will reverse direction and continue to the fully opened position. If the vehicle power supply is disrupted, normal operation will resume when power is restored; no initialization is required.

## CONVERTIBLE TOP (XK Only)

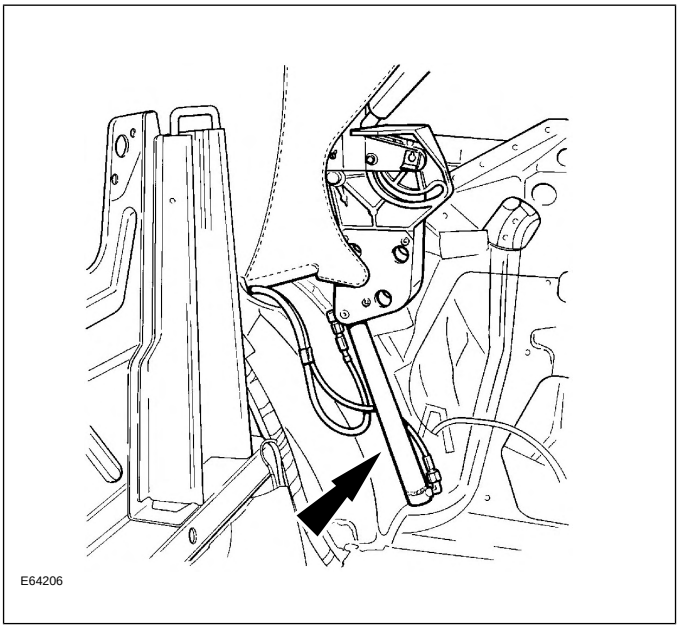
The convertible top is fully lined, padded and fitted to an aluminum frame which has steel linkages. Hydraulic actuation is used to open, close and latch the top. A single hold-down switch (ROOF) is located on the center console. The ROOF switch also operates the rear quarter windows. The convertible top is fitted with a heated rear window.

The hydraulic convertible top operating pump is located in the right-hand side of the trunk, mounted on a steel pressing which also houses the CD changer, audio amplifier and navigation unit (where fitted). The pump operates at a maximum pressure of 140 bar (2030 psi) and is equipped with solenoid valves to direct fluid to both hydraulic cylinders for the top movement and the header rail for the latch mechanism.

**Convertible Top Operating Pump**




**Convertible Top Operating Cylinder**




The top and quarter windows are operated by the ROOF switch when the ignition is in position I or II and vehicle speed is below 10 mph. The ROOF switch must be held

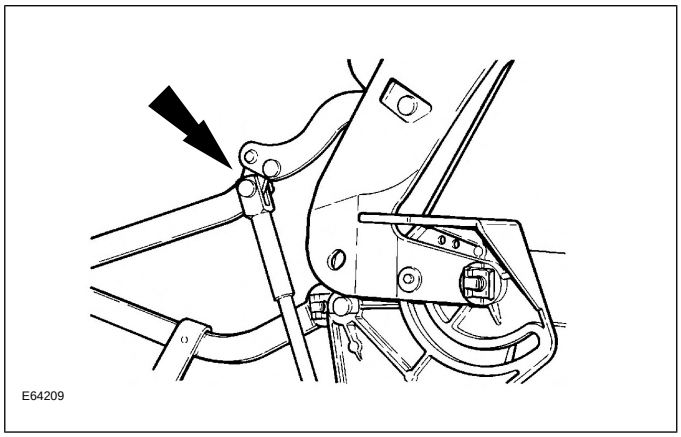
active throughout the raise or lower operation. The top can also be operated using the global open/close functions of the door lock key.

## Manual Operation

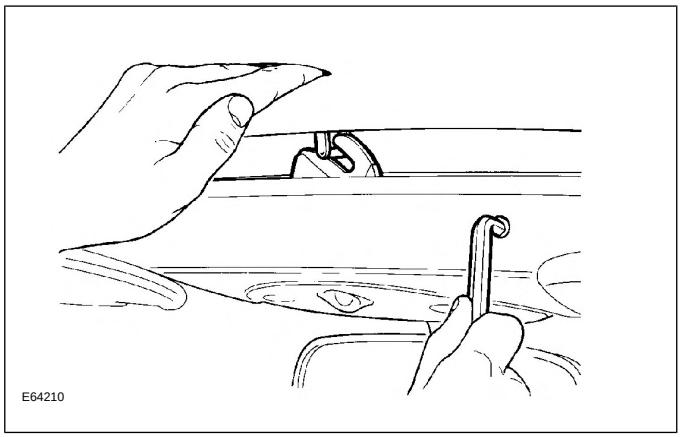
In the event that the top cannot be powered to the raised or lowered position, provision is made for manual operation.

**NOTE:** The convertible top frame uses an over-center link to lock the frame in its forward position. It is essential to carry out the following procedure to manually lower the vehicle convertible top. Because of the possibility of damaging the frame, manual lowering of the convertible top is only recommended as a Dealer function and not an Owner/Driver function. Manual lowering has been deleted from the Driver Handbook.

**Unlocking Over-Center Link**




**Convertible Top Manual Latching**




1. Lower the rear quarter lights by pressing the ROOF switch once.
2. Gain access to the pump (located in the trunk; the right hand side trunk trim carpet must be removed for access to the pump) and turn the manual override valve on the pump body fully counterclockwise to place the pump into MANUAL mode.
3. The windscreen header trim has a small round plug, adjacent to the header console, which has to be removed to gain access to the latching mechanism. Insert either the latching key – which is retained in

clips on the pump mounting base – or an 8mm Allen key, and unlatch the hood by turning the key clockwise.

- **CAUTION: Do not attempt to lower the convertible top further at this stage.**

4. Prior to lowering the hood, reach behind the headlining rear quarter curtains and locate both of the convertible top cylinder rams and the linkage to which they are fixed.
5. In turn, push down both the left and right hand cylinders and linkage as far as possible. Significant force may be required.
6. Manually lower the top to its stowed position. (If the hood resists movement repeat step 5).

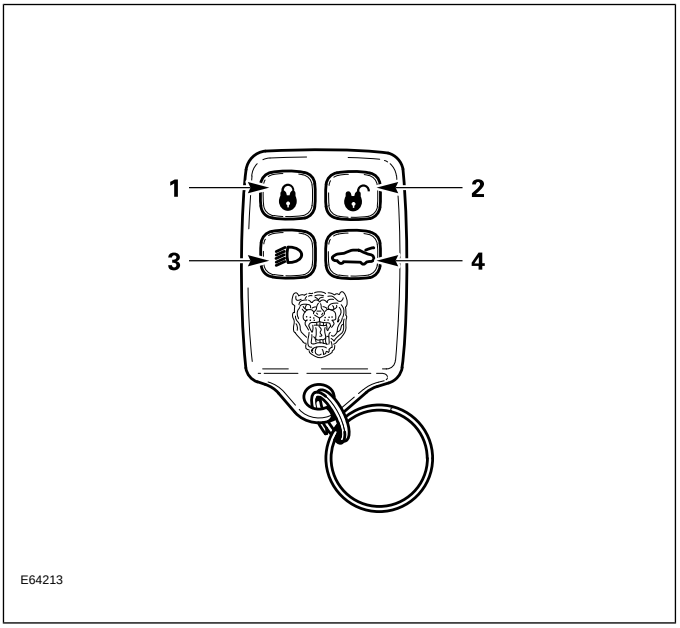
⚠ **CAUTION: Failure to carry out steps 4 and 5 will result in severe damage to the convertible top frame and/or linkages.**

## REMOTE CONTROL KEYHEAD RF TRANSMITTER

The radio frequency (RF) transmitter is operational only when the key is removed from the ignition barrel. The RF transmitter allows remote control of the following features:

- Security system arming/disarming
- Door locking/unlocking
- Headlight convenience
- Panic alarm
- Trunk lid release
- Valet mode (deactivation only)

**Remote Control Keyhead RF Transmitter**




RF transmitter button functions are as follows (numbers correspond to the illustration):

1. Lock
2. Unlock
3. Headlamp convenience / panic alarm
4. Trunk lid release

# SYSTEM OPERATION

## Arming/Disarming and Locking/Unlocking

When the vehicle is locked via the door key barrel or the RF transmitter LOCK button, the security system will fully arm. At this point, if a door, the hood, or the trunk (XK only) is opened without disarming the system, the alarm will sound for 60 seconds. The alarm can be cancelled by pressing the RF transmitter UNLOCK button or by turning the ignition key to position II.

### Single-Stage and Two-Stage Unlocking

Unlocking the vehicle with the key in the driver's door lock barrel initiates single-stage unlocking: turning the key to the unlock position will disarm the security system and unlock all the doors.

Unlocking the vehicle with the UNLOCK button on the RF transmitter initiates two-stage unlocking: the first press disarms the security system and unlocks the driver's door only. A second press of the UNLOCK button unlocks the remaining doors.

On XK vehicles, the RF transmitter can be toggled between the single and two-stage unlocking modes using WDS.

## Window, Sunroof, and Convertible Top Control

The opening and closing of the windows and sunroof (XJ) or convertible top (XK, if fitted) can be initiated from the driver's door key.

### Global Opening

To initiate global opening, rotate the key in the driver's door lock barrel to the unlock position and hold for longer than two seconds. The windows and sunroof (XJ) or convertible top (XK, if fitted) will begin their opening operation and will continue to open as long as the key is held in the unlock position. Remote global opening is not available.

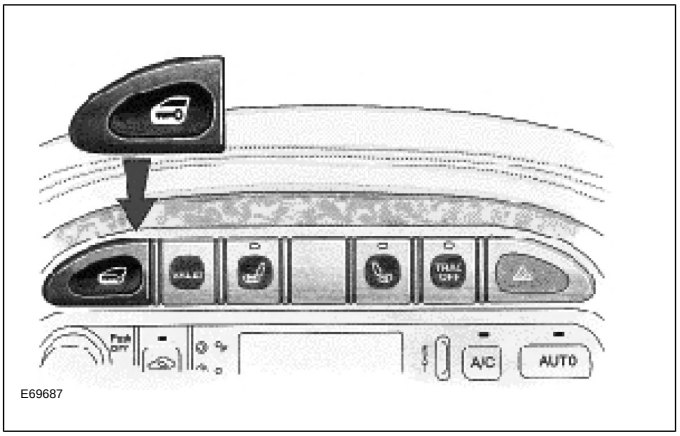
### Global Closing

To initiate global closing, rotate the key in the driver's door lock barrel to the lock position and hold for longer than two seconds. The windows and sunroof or convertible top will begin their closing operation and will continue to close as long as the key is held in the lock position. Remote global closing is not available.

## Central Locking (XJ only)

The console-mounted central locking button can be used for door locking when the ignition switch is in position I or II and all doors and the trunk closed. A single press of the button will lock all doors. Pressing and holding the button for longer than three seconds will close all open windows and the sunroof (the button must be held throughout the closing sequence). If all the doors are locked, pressing the central locking button will unlock the doors; the windows and sunroof cannot be opened using the central locking button.

**Central Locking Button (XJ only)**



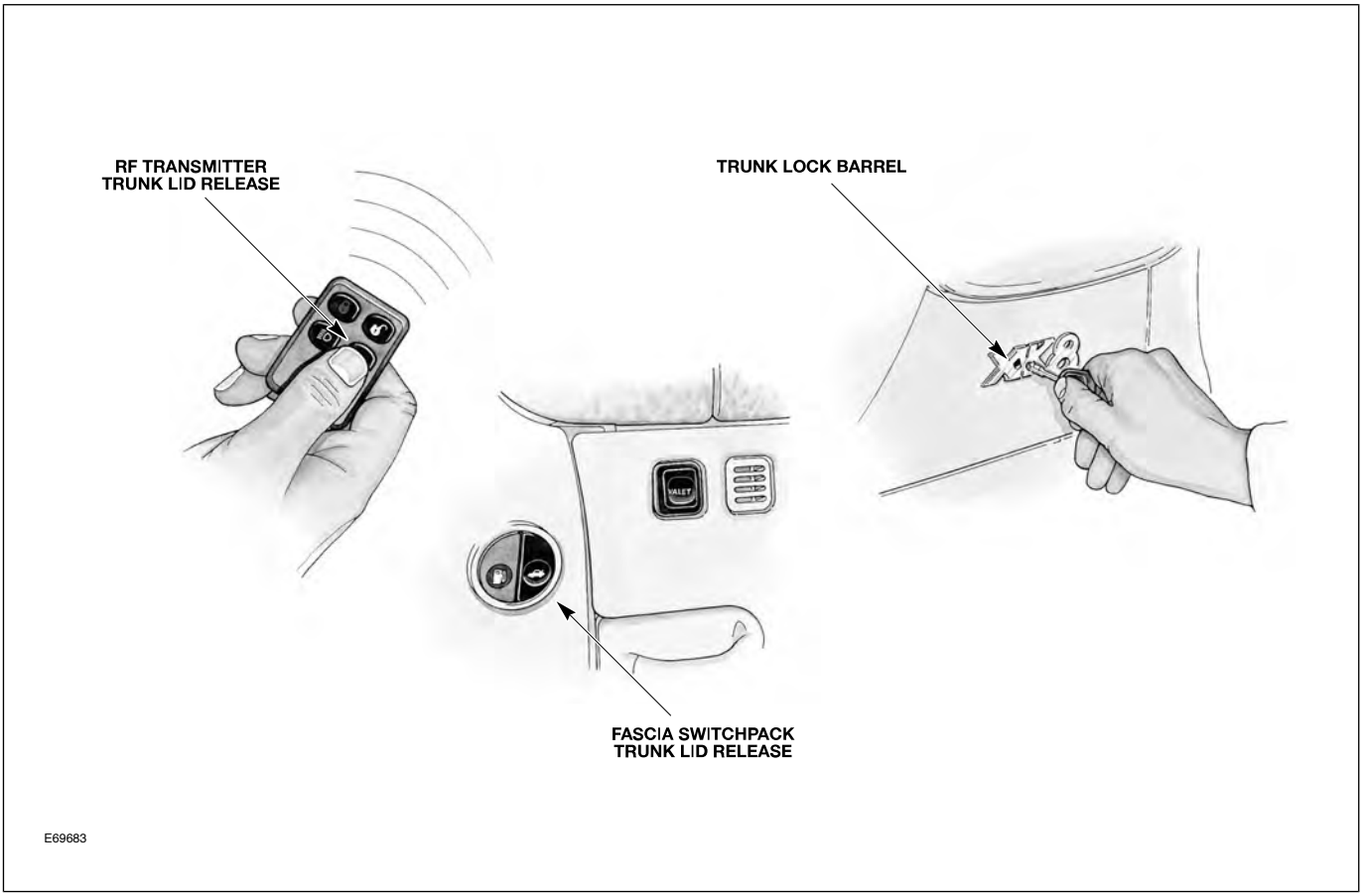
## Headlight Convenience

When the RF transmitter HEADLIGHT CONVENIENCE button is pressed, the headlights will illuminate for 25 seconds. A second press of the button will extinguish the headlights.

## Panic Alarm

Pressing the RF transmitter HEADLIGHT CONVENIENCE button three times within three seconds will activate the panic alarm for 60 seconds. The alarm can be cancelled by inserting the key into the ignition and turning the key to position I or II.

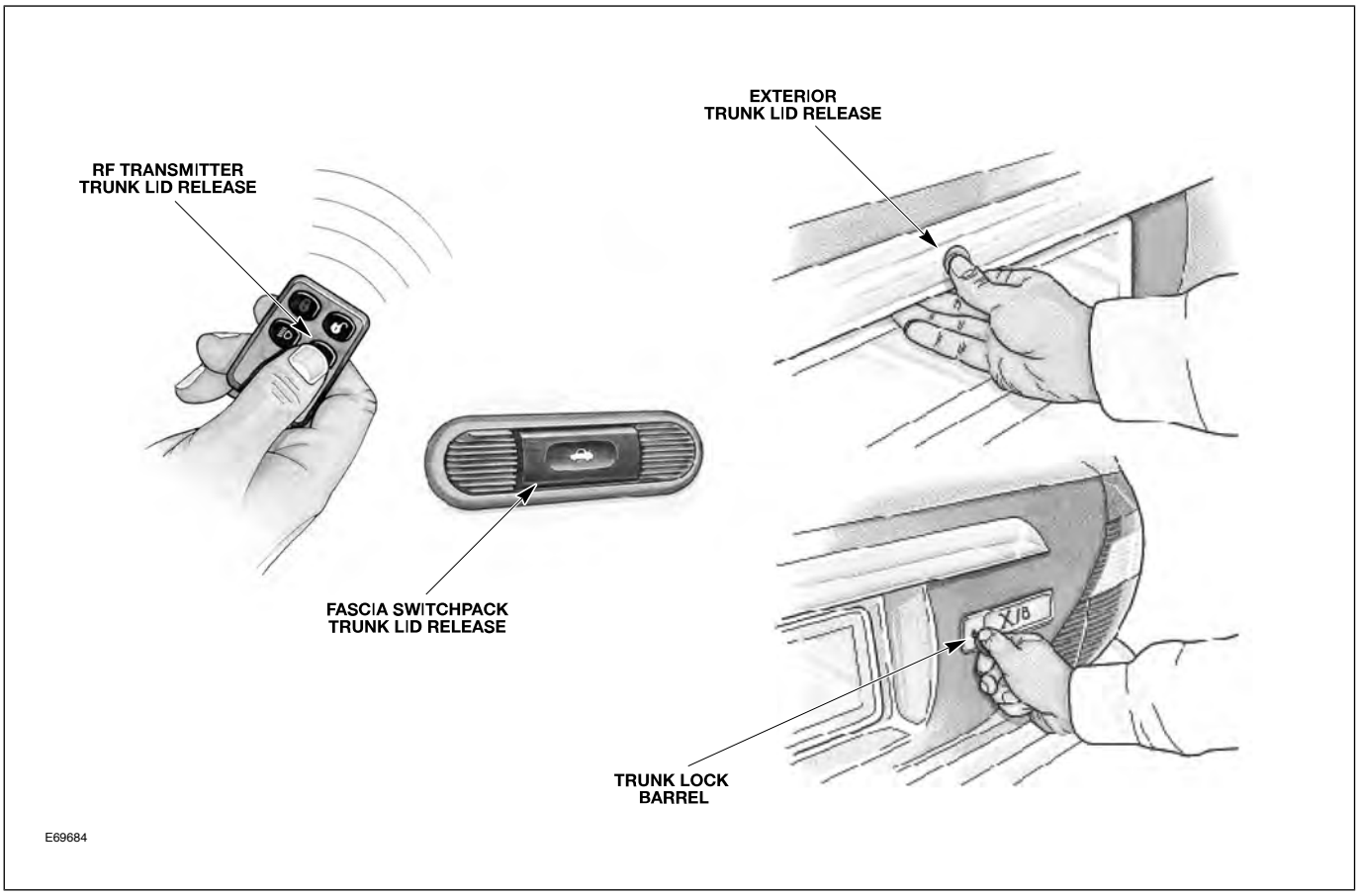
## Trunk Release (XK)




On XK vehicles, the trunk can be opened three ways:

- Pressing the RF Transmitter TRUNK LID RELEASE button. If the security system is armed, the trunk will be released without the alarm sounding. When the trunk is closed, the security system will resume in the armed state.
- Using an integrated transmitter key or black-headed key in the trunk lock barrel. This will cause the alarm to sound if the vehicle is armed. The green-headed valet key will not operate the trunk lock barrel.
- Pressing the fascia switchpack trunk release button (valet mode inactive).

## Trunk Release (XJ)



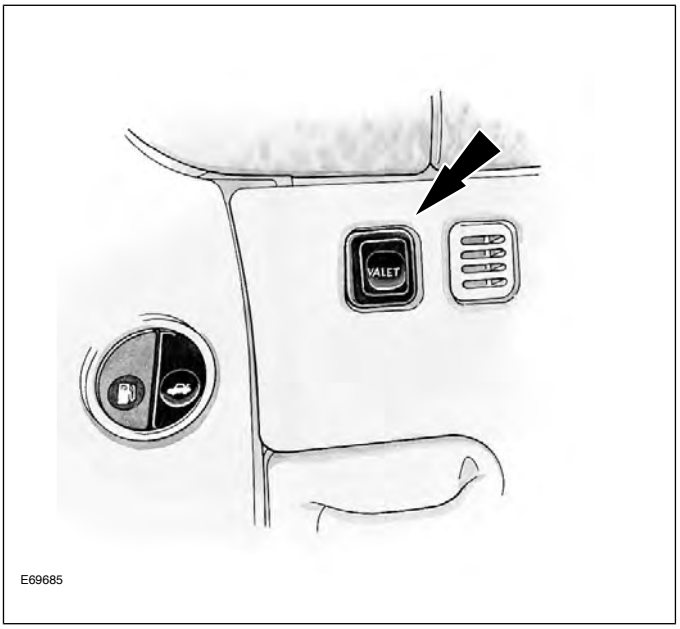

On XJ vehicles, the trunk can be opened four ways:

- Pressing the RF Transmitter TRUNK LID RELEASE button. If the security system is armed, the trunk will be released without the alarm sounding. When the trunk is closed, the security system will resume in the armed state.
- Using an integrated transmitter key or black-headed key in the trunk lock barrel. This will cause the alarm to sound if the vehicle is armed. The green-headed valet key will not operate the trunk lock barrel.
- Pressing the fascia switchpack trunk release button (valet mode inactive).
- Pressing the release button on the trunk lid (valet mode inactive).

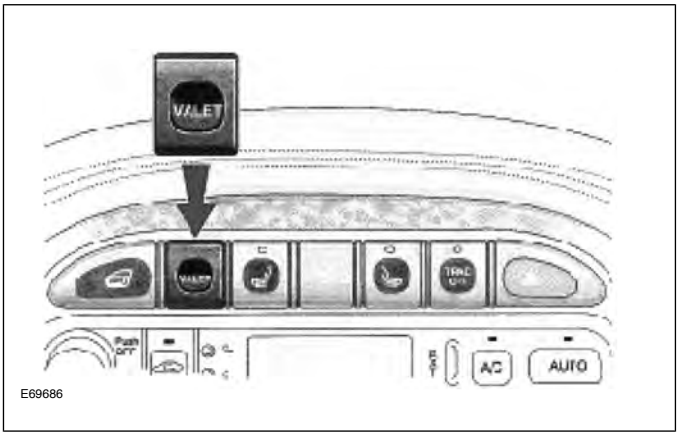
## Valet Mode

Valet mode is activated when the fascia VALET button is pressed. A valet mode chime will sound and a valet mode message will be displayed in the message center (message will only appear if the key is in position II). When in valet mode, trunk opening from the fascia and trunk-mounted release buttons is inhibited. Locking the glove compartment with the black-headed key will further minimize valet driver access.

**XK Valet Button**




**XJ Valet Button**




If the vehicle is in valet mode and a green-headed key is given to the valet driver, the driver will only be able to:

- Unlock (disarm) and Lock (arm) the vehicle via the driver's door lock barrel.
- Start and drive the car.

Valet mode can be cancelled by:

- Using a remote to unlock (disarm) the vehicle.
- Using a black-headed or remote-control key to open the trunk via the trunk lock barrel.

# SERVICE

## RF Transmitter Service

### Battery Replacement

Each transmitter contains one type CR2032 battery. The battery is fitted with the positive symbol (+) facing downwards in the battery receptacle.

**NOTE:** Changing the remote's battery will not affect its operation or require the remote to be reprogrammed.

E67061

### RF Transmitter Programming

Two methods exist for programming transmitters. Prior to programming, ensure that all transmitters for the vehicle are present. Transmitters not present will be erased from alarm memory and will no longer function.

**Programming transmitters without WDS:**

1. Insert key into ignition.
2. Hold headlight stalk in the FLASH position.
3. While holding headlight stalk in the FLASH position, rotate the ignition key to position I (AUX).
4. Release headlight stalk and then flash the headlights four times.
5. An audible confirmation and a flash of the security LED in the J-gate will confirm the alarm system is in transmitter "learning" mode.
6. Activate each remote transmitter by pressing any button on the transmitter once. A chirp will sound for each remote transmitter signal received (LED will also flash); allow 15 seconds maximum between each press.
7. The alarm system will exit the learning mode when the key is turned to position 0 (OFF), or 15 seconds after the alarm enters learning mode.

**Programming transmitters using WDS:**

1. Select the "Vehicle Configuration" main menu tab.
2. Select "Security".
3. From here, as many as 5 transmitters can be programmed.

# ENGINE IMMOBILIZATION

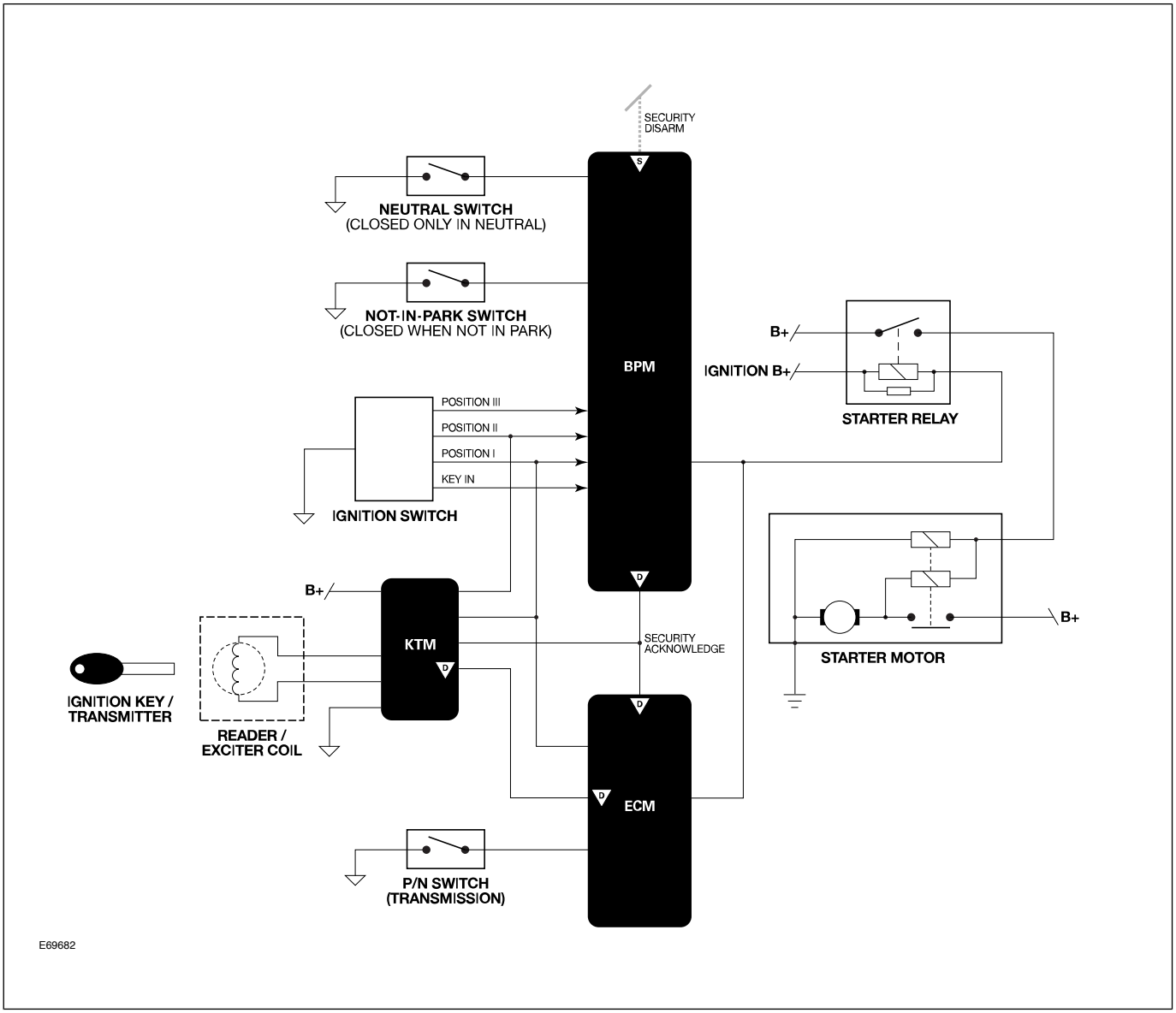
The engine immobilization system ensures that the engine can only be started using a valid ignition key.

## Key Transponder Module System

Engine immobilization is achieved through the use of a key transponder module (KTM) which “reads” a code transmitted by a transponder in the key head. The engine starting sequence is as follows:

- KTM receives a signal from the ignition switch position I as key is turned
- KTM energizes the reader/exciter which causes the key transponder to broadcast its security code
- If the key transponder code matches the programmed KTM code, the KTM outputs an OK TO START signal to the ECM via a serial data link
- ECM receives the OK TO START signal and P/N signal (hardwired from the transmission), and enables fueling and ignition
- ECM outputs a SECURITY ACKNOWLEDGE signal to the body processor module (BPM) via a serial data link
- BPM receives a park signal from the gear selector not-in-park switch and enables cranking (provided the security system has been disarmed)

**KTM Staring Circuit**




If additional keys are requested, they must be programmed to the vehicle so that the KTM will "recognize" the code transmitted by the key transponder. If a KTM is replaced, all keys will need to be reprogrammed. WDS is required to program keys. As many as 5 keys can be programmed for one vehicle; all keys must be present when programming additional keys.

**NOTE:** 1997 MY XK vehicles were not equipped with a KTM system. Replacement keys for the 1997 MY XK do not require programming.

### Key Transponder Programming Using WDS

Key transponders can only be programmed using WDS.

Ensure that all of the vehicle's keys are available for this procedure. Ensure that only the key being programmed is in or near the ignition; if the other vehicle keys are near the reader/exciter, they may also be detected, causing the KTM to interpret an invalid signal.

1. Load the latest software for the vehicle into WDS.
2. Access "Vehicle Setup".
3. Select "Security System Setup".
4. Select "Program New Transponders".
5. Follow the onscreen prompts to program each of the keys.

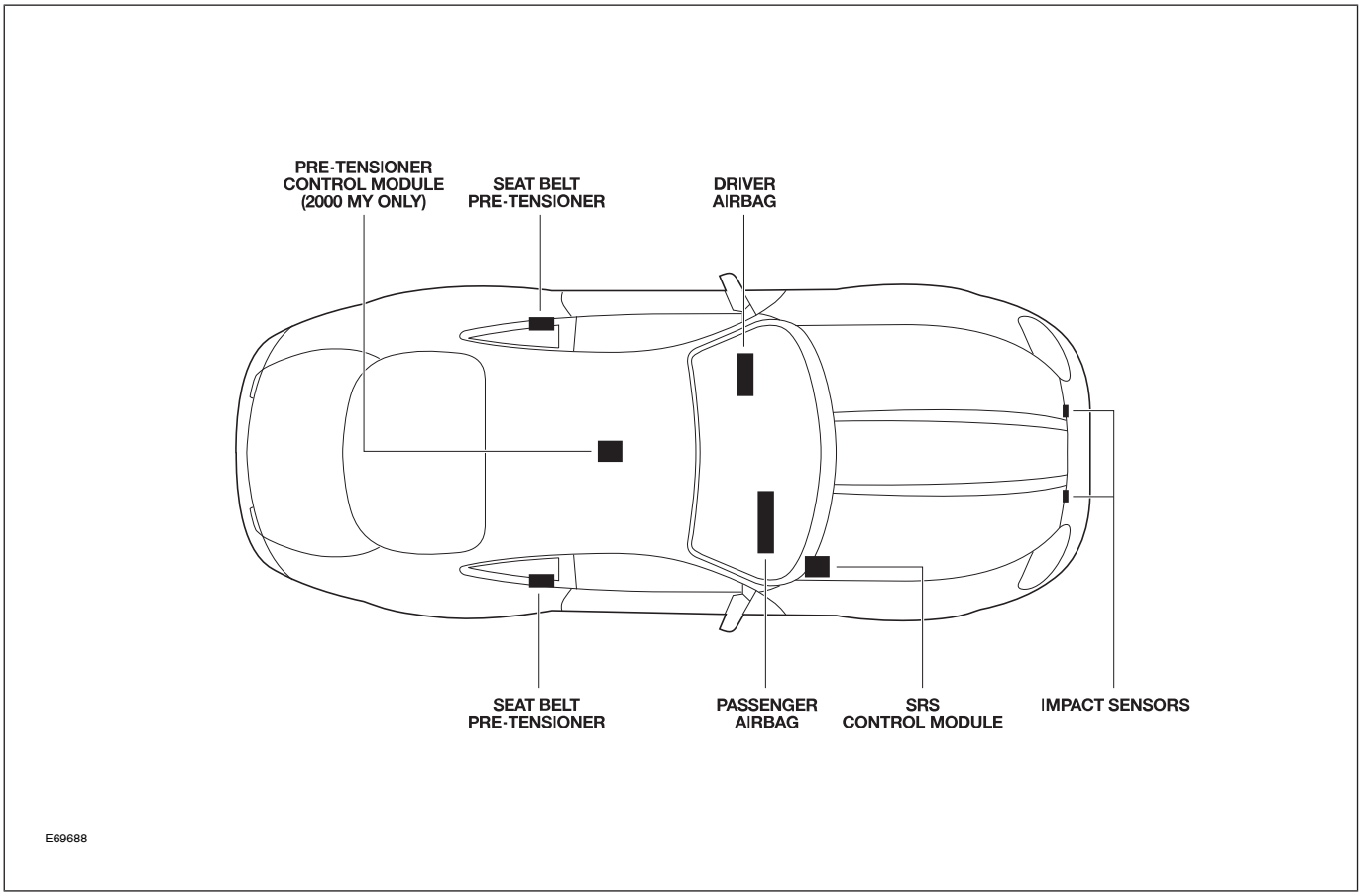
## XK ELECTROMECHANICAL SRS: 1997 – 2000 MY

Jaguar XK vehicles from 1997 – 2000 MY are equipped with an electromechanical supplemental restraint system (SRS).

An airbag is fitted to both the steering wheel and the passenger side fascia. In addition, the front seat belt retractors include pyrotechnic pre-tensioners. 1997 – 1999 MY XK vehicles are equipped with mechanically triggered pre-tensioners; 2000 MY vehicles use electrically triggered pre-tensioners which are activated by the pre-tensioner control module. Side airbags are not fitted.

In a frontal impact of sufficient force, both frontal airbags will be deployed. Each pre-tensioning seat belt will be deployed if the seat belt(s) are in use at the time of impact.

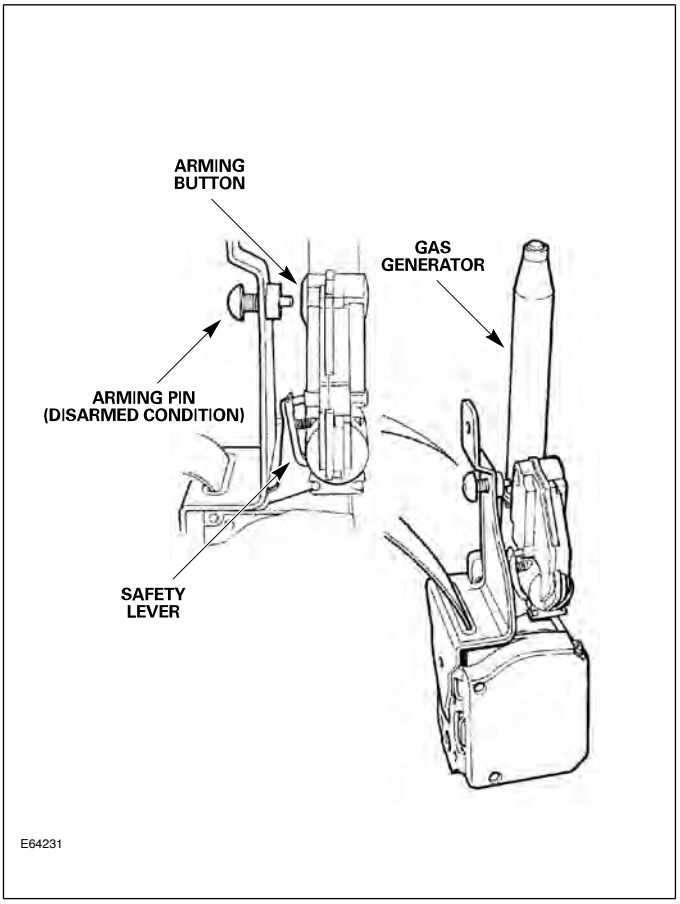
**XK SRS Component Locations**



## Mechanically Triggered Pre-Tensioners

The pre-tensioner is armed at installation by screwing in the arming pin to fully depress the red arming button. Once installed, a safety lever prevents the impact sensor from activating the pre-tensioner when the seat belt is fully retracted (not in use). When the seat belt is pulled from the retractor reel, the safety lever moves and the unit is ready to activate if an impact occurs.

**Front Seat Belt Pre-Tensioner: 1997 – 99 MY**




**WARNINGS:**

⚠ **When handling the retractor unit, the piston must always be pointed down and away from anyone. Keep fingers away from the retractor reel mechanism.**

⚠ **If a pre-tensioning unit is dropped from a height greater than 0.3 m (12 in.), it must not be fitted to a vehicle.**

## XK ADAPTIVE RESTRAINTS TECHNOLOGY SYSTEM: 2001/02 MY

2001 – 2002 MY XK vehicles use Jaguar's Adaptive Restraint Technology System (ARTS). ARTS can be divided into three subsystems:

- Crash severity sensing and analysis
  - Three impact sensors (one behind the radiator grill and one mounted at the base of each 'B/C' pillar) provide a signal to the Restraints Control Module (RCM) that is proportionate to the crash severity
- Occupant analysis
  - Position of the driver's seat and seatbelt engagement is monitored
  - Weight, position and seatbelt engagement of the front passenger is monitored
- Deployment handling
  - Based on crash severity and occupant analysis, the RCM will determine which restraints to deploy and the deployment strength (frontal impact airbags only).

## Components

The ARTS in XK vehicles uses three control modules:

### Weight Sensing Module

Mounted to the underside of the front passenger seat, the weight sensing module processes the signal from the seat pressure transducer attached to the silicone filled bladder in the cushion.

### Occupancy Sensing Module

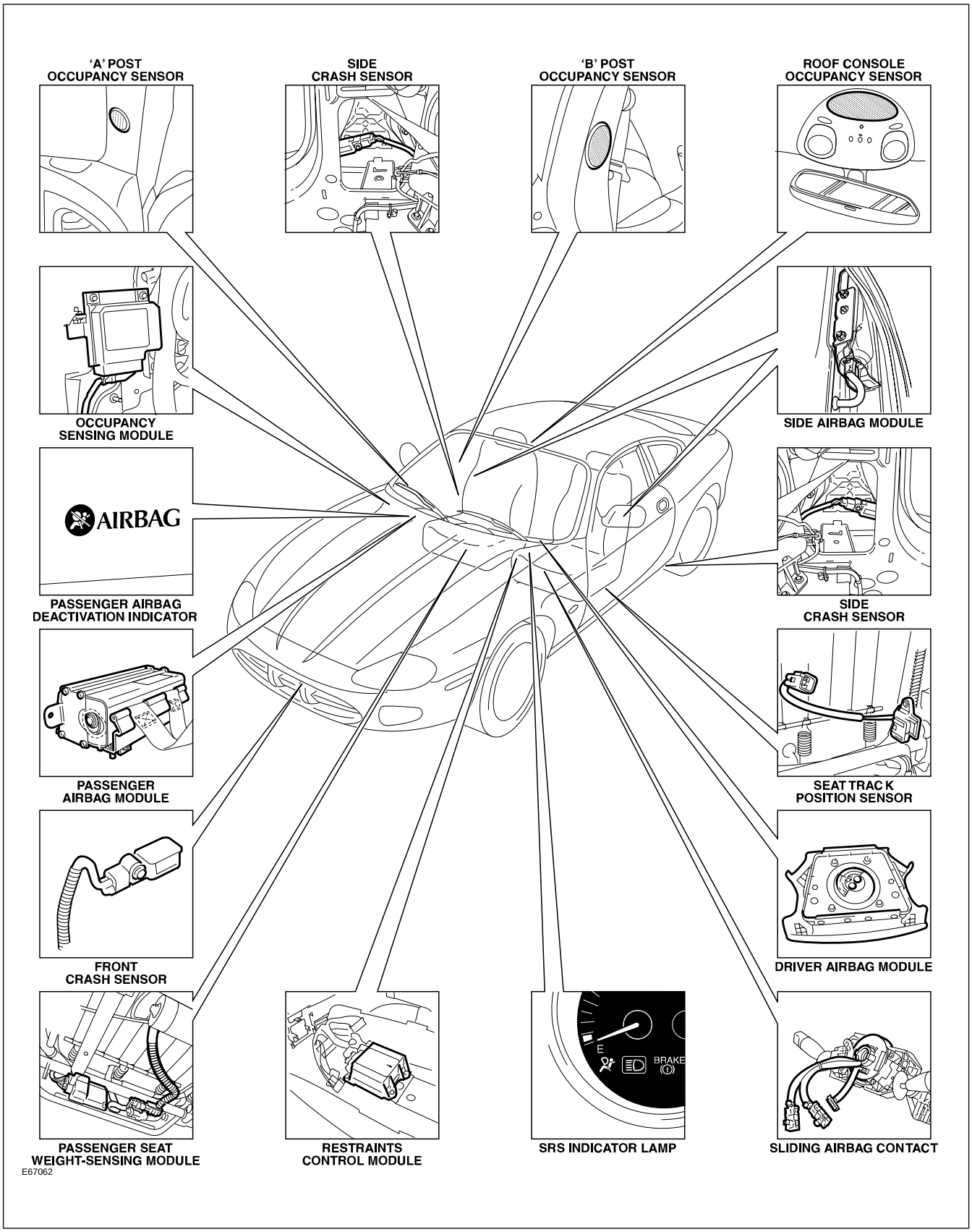
Mounted to the RH 'A' post, the occupancy sensing module processes signals from the four ultrasonic sensors. These sensors emit an ultrasonic signal operating at 40 KHz to monitor occupancy of the passenger seat.

### Restraints Control Module

Mounted on the transmission tunnel, the restraints control module is responsible for deploying restraints based on signals from the weight sensing module, occupancy sensing module, front seat belt buckle sensors, driver's seat position switch and crash sensors.

The three modules communicate via a local (dedicated) CAN network, which is not part of the vehicle's main CAN network.

**ARTS Component Locations**

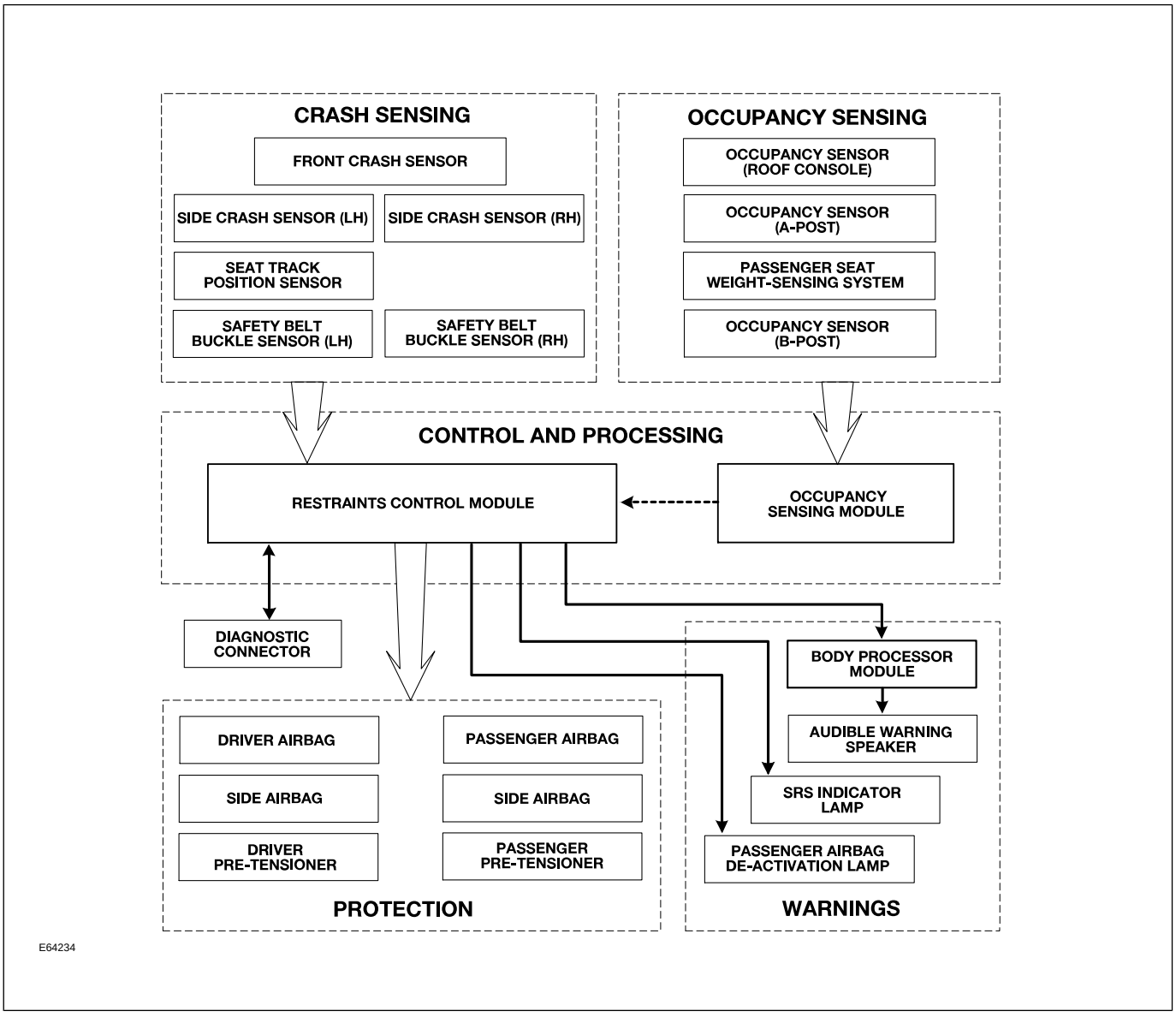


## System Operation

The ARTS can deploy the following restraints:

- Front seat belt reel pre-tensioners (2)
- Two-stage driver and front passenger airbags (2)
- Seat-mounted side airbags for front occupants (2)

**Adaptive Restraints Technology System Diagram**




⚠ **WARNING: Read and observe all safety precautions in GTR (Global Technical Reference) and service bulletins before attempting to service the SRS.**

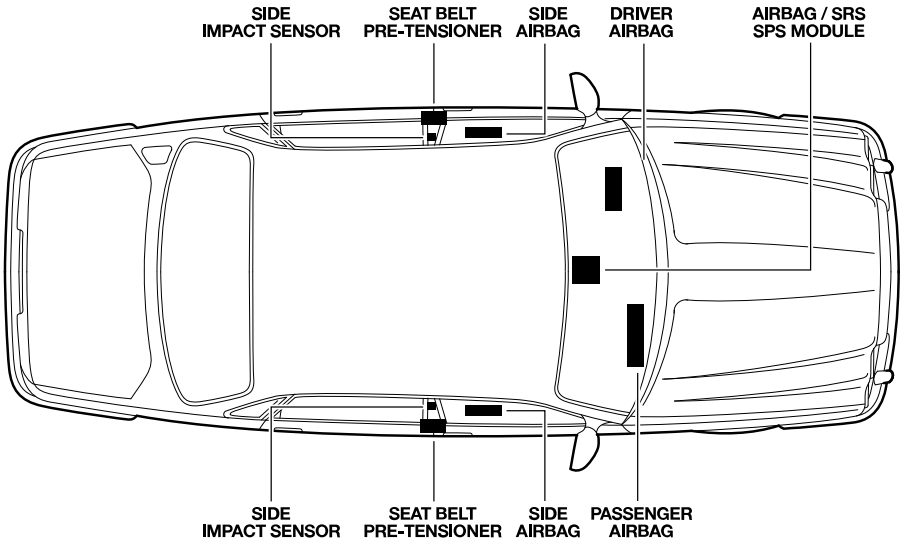
**Do not attempt to measure the circuit resistance through the airbag modules or pre-tensioners with a DVOM. Doing so may trigger airbag deployment and result in personal injury.**

**To disarm the SRS, disconnect the battery negative cable and wait a minimum of two minutes for the reserve power charge to dissipate.**

## XJ SINGLE-POINT SENSOR SRS

XJ vehicles are equipped with an electronic single-point sensor airbag / SRS system. The microprocessor controlled system uses a single-point sensing module (SPS) to control deployment of front and side airbags and front seat belt pre-tensioners. Separate side impact sensors provide input to the SRS for side airbag deployment.

**XK SRS Component Locations**

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Three-point active seat belts with pyrotechnic pre-tensioning retractors are fitted to the driver and front passenger positions. Pyrotechnic front airbags for the driver and passenger deploy to additionally protect the occupants during frontal impacts. Argon gas inflated side airbags located in the outboard frames of the driver and front passenger seats deploy to protect the occupants in the event of a severe side impact. Active three-point seat belts are provided for the rear seat passengers.

The system connects to the data link connector (DLC) for WDS diagnosis, the instrument cluster for the AIRBAG / SRS MIL, and the body processor module (BPM) for an audible backup warning in case of MIL failure. The SPS airbag / SRS system is not part of the vehicle multiplex circuitry.

**WARNINGS:**

⚠ **Read and observe all safety precautions in GTR (Global Technical Reference) and Service Bulletins before attempting to service the front or side airbags, the steering wheel, the area around the passenger airbag, the front seat belt pre-tensioning retractors, the front seats, or any airbag / SRS components.**

⚠ **Observe all safety precautions when handling or transporting airbag modules.**

⚠ **Do not attempt to measure circuit resistance through the airbag modules or the seat belt pre-tensioning retractor units with a DVOM. Doing so may trigger deployment and result in personal injury.**

⚠ **Do not attempt to replace the airbag / SRS battery power fuse unless the system is disarmed.**

⚠ **To disarm the SRS system, disconnect the negative battery cable and wait a minimum of TWO minutes for the reserve power charge to dissipate.**

# IN-CAR ENTERTAINMENT (ICE)

## Selectable Features

Simultaneously pressing and holding the AM/FM and EJECT button will display the audio system selectable features on the radio display or navigation screen (if fitted). The following options are selectable through the following preset buttons:

- **Preset 1 –** Toggles Radio Broadcast Data System (RBDS) on/off.
- **Preset 2 –** Toggles the TAPE CLEAN reminder on/off.
- **Preset 3 –** Toggles the AERIAL CLEAN reminder on/off.
- **Preset 4 –** Toggles the automatic mute facility on/off. This should be ON if the vehicle is fitted with a telephone.
- **Preset 5 –** Toggles the automatic tape eject when key is turned OFF.
- **Preset 6 –** Not used.
- **Preset 7 –** Toggles the diversity antenna on/off. This should be OFF, as the diversity antenna was not fitted to X100 or X308 vehicles.
- **Preset 8 –** Toggles the Alternate Frequency (AF) on/off. Used when reception problems occur with RBDS stations. Toggling AF ON/OFF will eliminate drop-out on RBDS channels.
- **Preset 9 –** Not used.
- **Preset 0 –** Not used.

## Setting the Clock

XK vehicles without navigation and all XJ vehicles are fitted with an analog clock. The time can be adjusted by pressing the '+' and '-' buttons on the front of the dial.

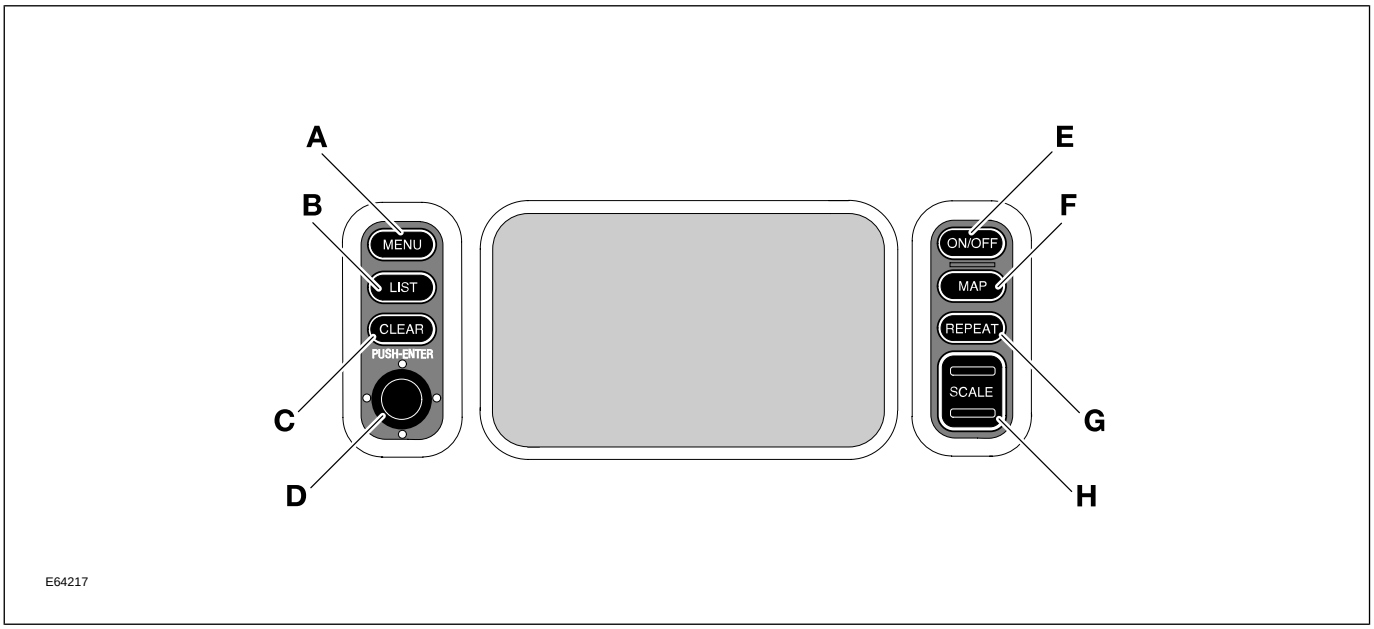
On XK vehicles fitted with navigation, time is displayed via digital clock in the lower left of the navigation screen. The correct time is maintained automatically from the GPS satellite signals and no manual adjustment is required. Ensure that the proper time zone and summer time (Daylight Savings Time) settings are correct for the current location and time of year. These options are accessible by pressing the MENU button while the navigation map is displayed. Select SETUP from the on-screen menu.

## NAVIGATION SYSTEM

The navigation system is an optional fitment. XK vehicles use a 5.5" color navigation display with control buttons located on each side of the display, while on the XJ, the navigation display and controls are integrated into the audio unit.

With the aid of DVD map data, the navigation module calculates the position of the vehicle using signals from the GPS antenna, the ABS control module and the GYRO sensor. After entering the desired destination, the driver is guided along by both visual guidance and voice instructions. If the driver strays off the route, the system calculates a new route showing the easiest way back to the original destination. The system can also point out useful landmarks such as gas stations, restaurants, hotels, and Jaguar dealers.

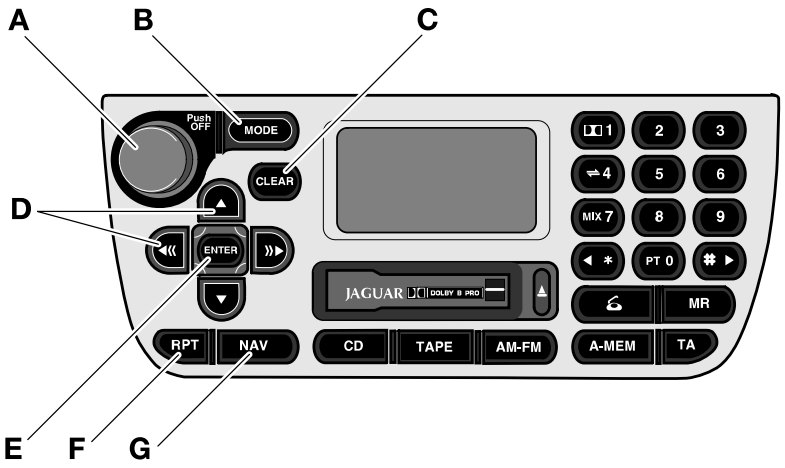
**XK Navigation Display**




XK navigation controls are as follows:

- **Main MENU (A) –** display choice of Destination, Set-up, Options, Route
- **LIST (B) –** list turn information for calculated route
- **CLEAR (C) –** return to previous screen or change map orientation
- **Joystick/enter (D) –** highlight menu items, characters and scrolls map: enter commands and selections
- **ON/OFF (E) –** turn screen on or off
- **MAP (F) –** switch to, or return from map display and toggle map/arrow view when under guidance
- **REPEAT (G) –** repeat last voice instruction
- **SCALE (H) –** change map scale and scrolls previous or next page

**XJ Audio Unit with Navigation Controls**

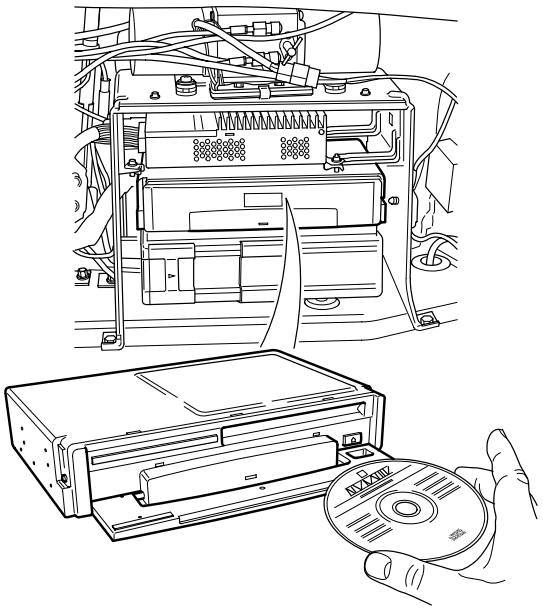



XJ navigation controls are as follows:

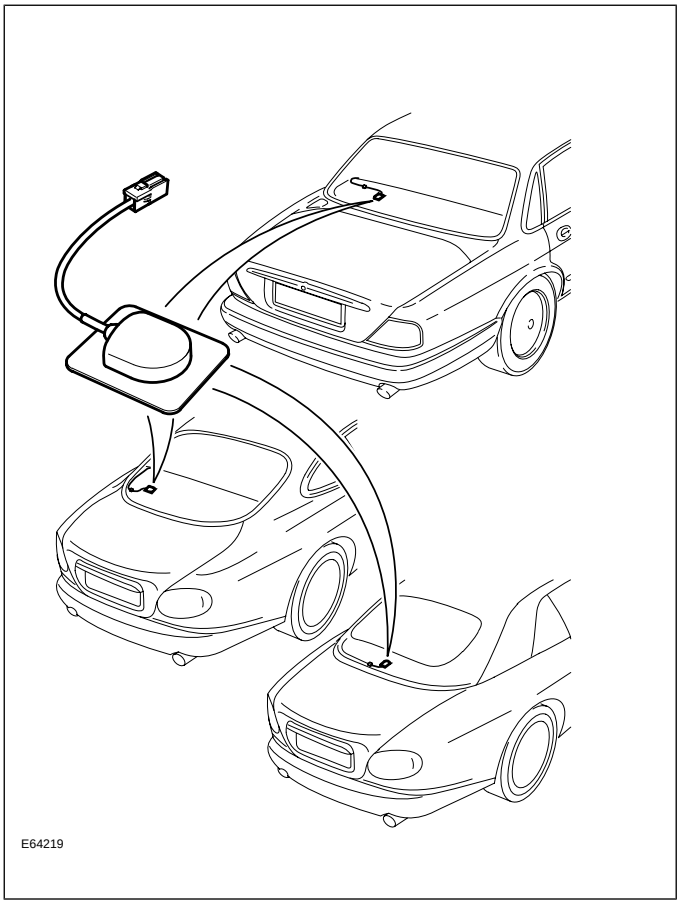
- **Volume control (A) –** adjusts audio system volume and audio/navigation voice guidance balance
- **MODE button (B) –** select navigation volume adjust
- **CLEAR (C) –** return to previous menu, character or text; clear screen at end of route
- **Cruciform scroll keys (D) –** move cursor up/down and left/right
- **ENTER (E) –** enter command for selected menu, character of prompt acknowledge
- **RPT (F) –** repeat last voice instruction
- **NAV (G) –** activate navigation system

The navigation module is mounted in the trunk between the CD changer and audio power amplifier. The Global Positioning System (GPS) antenna is located below the parcel shelf trim (coupe/sedan) or convertible top recess (convertible).

**Navigation System DVD Reader (XK Shown)**



**GPS Antenna Locations**



Curriculum Training

# Introduction to Jaguar

## Introduction to XK: X103/X105

JAGUAR

Technical Training

INTR 05 en 08/2005

INTR: X103/X105

Please remember that our training literature has been prepared for TRAINING PURPOSES only. Repairs and adjustments MUST always be carried out according to the instructions and specifications in the workshop literature. Please make full use of the training offered by Technical Training to gain extensive knowledge of both theory and practice.

# Table of Contents

## Lesson 6 – Control Modules and Networks



## Lesson 7 – Climate Control



## Lesson 8 – Body Systems



## Lesson 9 – Security System



## Lesson 10 – Supplemental Restraint System



## Lesson 11 – Infotainment

## Workshop safety

This page highlights the general observations expected while attending this training program, and its continuation upon returning to your place of work.

## General

While working on all vehicles, the following items where available should always be used:

- Fender covers
- Seat covers
- Floor protection

## Safety

All precautions must be taken and observed at all times, to prevent injury or damage to the following:

- Yourself
- Customer's property
- Workshop equipment
- Work place colleagues

## Operating guidelines

While using any piece of workshop equipment:

The manufacturer's guidelines and warning labels must be followed.

This will ensure correct use and application at all times.

Seek the necessary advice or training where equipment usage is unclear.

## Chemicals, Oils and Solvents

Follow all manufacturer's warnings and labels; also take into account local disposal regulations when working with chemicals, oils or solvents.

Ensure that all risks are completely minimized.

Make sure that all protective items of clothing are worn where required e.g.

- Eye protection
- Gloves
- Coveralls
- Footwear

## System capping

Upon disconnecting components from a system, take all precautions necessary to prevent system contamination or environmental leakage.

Fit relevant plugs or caps i.e. to pipes, unions and component orifices etc.

## Updates

Keep abreast of all relevant changes that affect your role within the dealership, by monitoring all factory issued documentation.

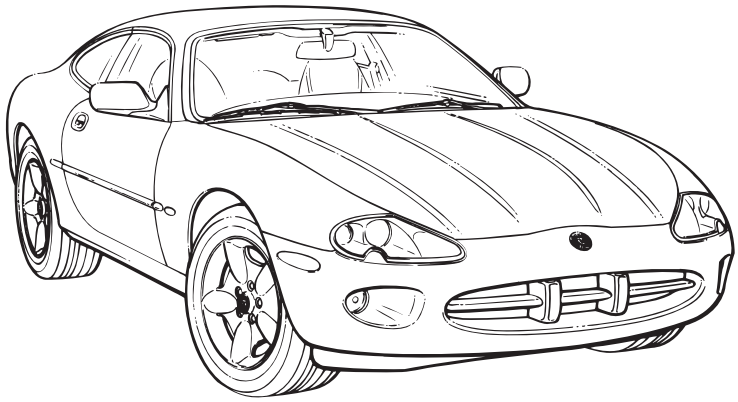
## Driving

Operating vehicle features, such as ICE, mobile phones and CD player equipment etc., can cause a momentary distraction while driving.

Follow all traffic regulations when operating vehicle systems or using diagnostic equipment while on the move.

Mobile diagnostic equipment operation may require the use of an assistant.

## OVERVIEW



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Six years after its introduction, the XK received a significant number of changes for the 2003 MY. Major powertrain changes included the introduction of new 4.2-liter V8 normally aspirated and supercharged engines, a six-speed automatic transmission and the Teves MK 25 ABS system.

High Intensity Discharge (HID) headlamps and Adaptive Cruise Control (ACC) were also introduced to the XK as optional or standard depending on model variant.

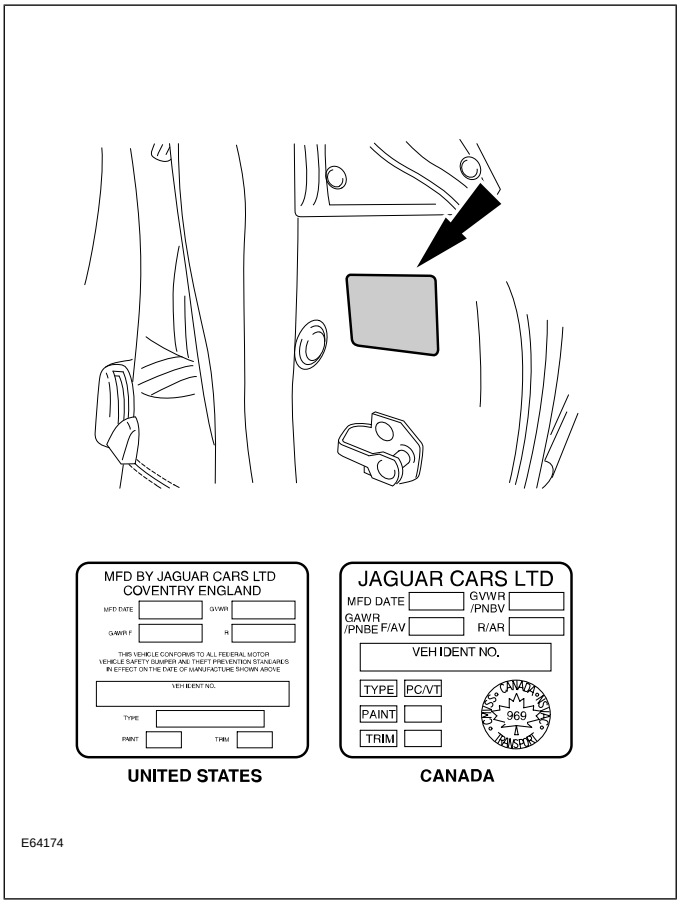
For the 2005 MY, the XK body was “freshened” with revised bumper covers, sill panels, rear spoilers and exhaust tips.

## Engineering Codes and VIN Ranges

| 2003 MY XK | | |
|---|---|---|
| **Variant** | **Engineering Code** | **VIN Range** |
| XK8 Coupe and Convertible | X103 | A30645 – A35154 |
| XKR Coupe and Convertible | X103 | |
| **2004 MY XK** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| XK8 Coupe and Convertible | X103 | A35155 – A40264 |
| XKR Coupe and Convertible | X103 | |
| **2005 MY XK** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| XK8 Coupe and Convertible | X105 | A40265 – A44685 |
| XKR Coupe and Convertible | X105 | |
| **2006 MY XK** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| XK8 Coupe and Convertible | X105 | A44686 – A48684 |
| XKR Coupe and Convertible | X105 | |

# IDENTIFICATION LABELS

**Identification Label Location**



## LIFTING AND JACKING

**CAUTIONS:**

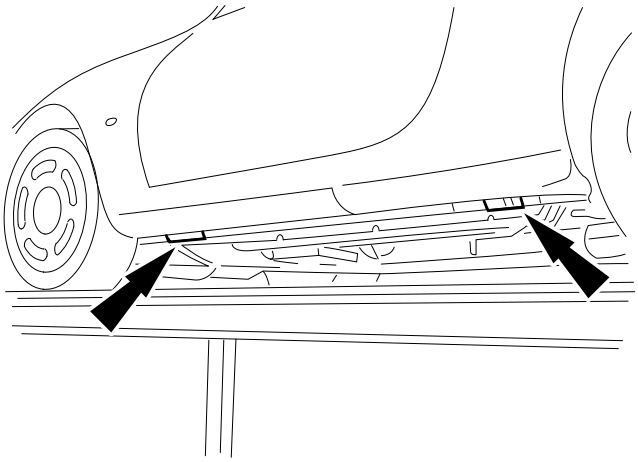
⚠ **Do not allow the hoist adapters to contact the steering linkage, suspension arms, stabilizer bar, or rear subframe stabilizer brackets, or to compress the lower suspension arm stabilizer bar insulator. Damage to the suspension, exhaust and steering linkage components may occur if care is not exercised when positioning the hoist adapters of two-post hoists prior to lifting the vehicle.**

⚠ **Never use the differential housing as a lift point. Damage to the differential housing and cover may occur.**

⚠ **Never use the front subframe as a lift point.**

⚠ **When using a floor jack, a cushioned pad must be used to avoid body damage.**

**Vehicle Jacking Points**



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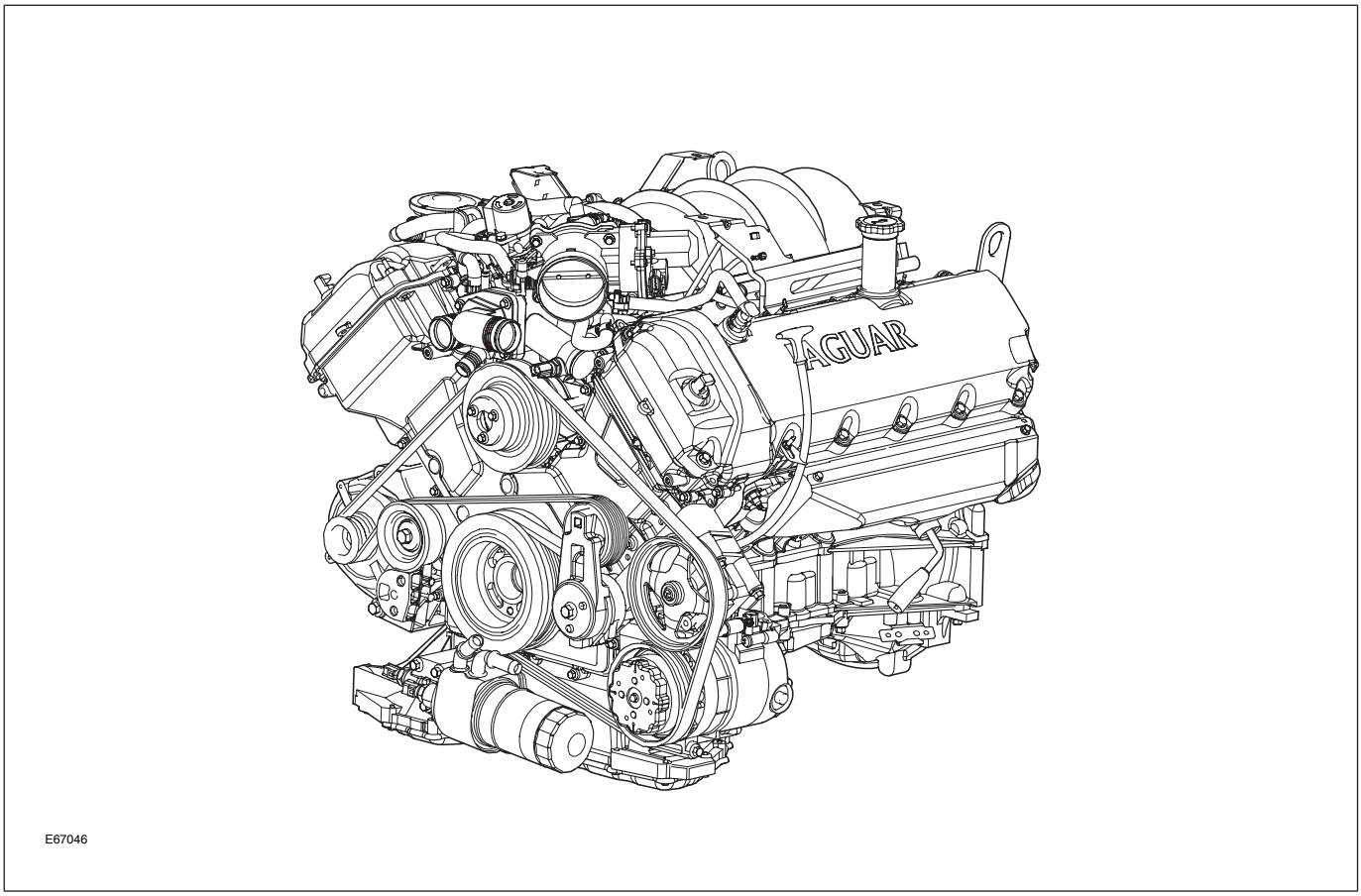
## ENGINES OVERVIEW

The AJ34 4.2-liter V8 engine is fitted to the XK in normally aspirated and supercharged variants. The engine is designated AJ34 due to minor changes from the AJ33, such as intake and throttle position and a new oil sump.

## AJ34 4.2L Normally Aspirated Engine

The normally aspirated (N/A) 4.2-liter engine develops 293 bhp (SAE) at 6000 rpm, a useful 7% boost over the 4.0-liter engine. Its maximum torque of 303 lb.ft. (SAE) represents an 8% torque increase spread evenly over the entire engine speed range.

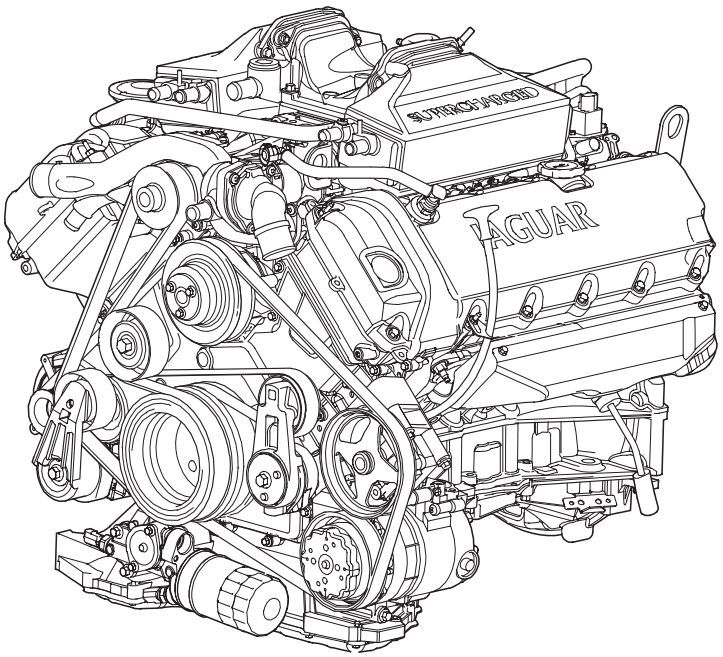
**AJ34 4.2L N/A Engine**



## AJ34 4.2L Supercharged Engine

The supercharged (SC) version of the AJ34 engine shares several of the advanced technical features of its naturally aspirated counterpart. With the help of an Eaton supercharger, it develops 390 bhp (SAE) at 6100 rpm and 399 lb.ft. (SAE) of torque at 3500 rpm. This is a 33% increase over the 4.2 liter N/A engine.

**AJ34 4.2L SC Engine**

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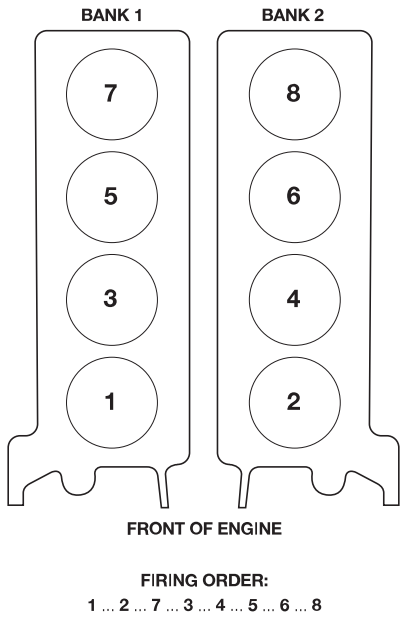
# DETAILS

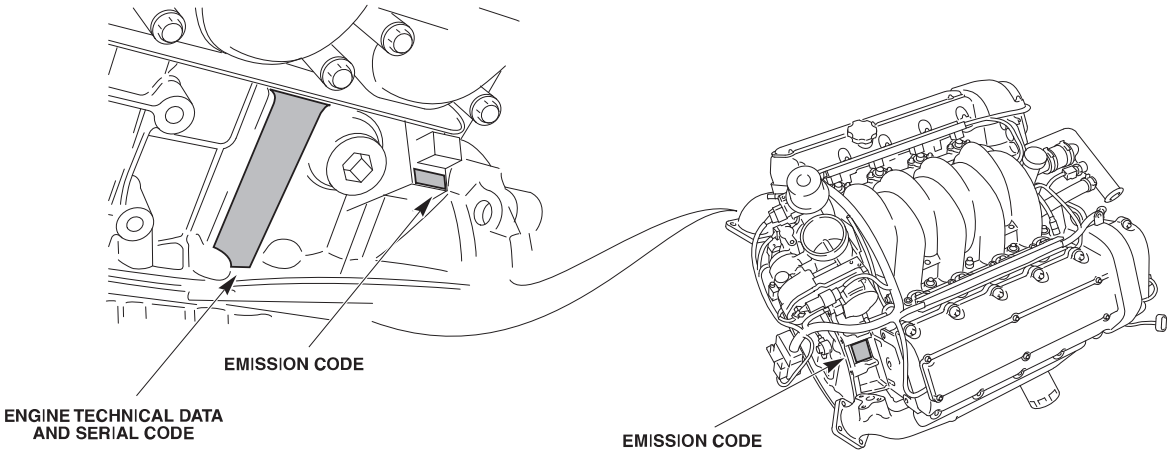
## Engine Specifications

| | AJ34 4.2L N/A | AJ34 4.2L SC |
|---|---|---|
| **Configuration** | 90° V8 | 90° V8 |
| **Cylinder Head** | – Dual overhead camshafts<br>– 4 valves per cylinder | – Dual overhead camshafts<br>– 4 valves per cylinder |
| **Valve Clearances (cold)** | Intake: 0.18 – 0.22 mm (0.007 – 0.0085 in.)<br>Exhaust: 0.23 – 0.27 mm (0.009 – 0.011 in.) | Intake: 0.18 – 0.22 mm (0.007 – 0.0085 in.)<br>Exhaust: 0.23 – 0.27 mm (0.009 – 0.011 in.) |
| **Bore** | 86 mm (3.386 in.) | 86 mm (3.386 in.) |
| **Stroke** | 90.3 mm (3.555 in.) | 90.3 mm (3.555 in.) |
| **Displacement** | 4.196 liters (256 $in^3$) | 4.196 liters (256 $in^3$) |
| **Compression Ratio** | 11.0 : 1 | 9.1 : 1 |
| **Maximum Power (SAE)** | 293 BHP at 6000 rpm | 390 BHP at 6100 rpm |
| **Maximum Torque (SAE)** | 303 lb. ft. at 4100 rpm | 399 lb. ft. at 3500 rpm |
| **Engine Oil Capacity** | 7.0 liters (7.4 qt.) | 7.0 liters (7.4 qt.) |
| **Coolant Capacity (approx.)** | 9.5 liters (10 qt.) | 11.5 liters (12.1 qt.) |

## Engine Numbering and Firing Order




## Engine Identification Numbers



## ENGINE MANAGEMENT OVERVIEW

The Jaguar/Denso 32-bit Engine Management System (EMS) was designed as a generic system applicable to all Jaguar engines in use across the model ranges. The system is built around a dual-processor Engine Control Module (ECM). One microprocessor is dedicated to throttle control and diagnostics; the other microprocessor handles all other ECM functions, controls and diagnostics.

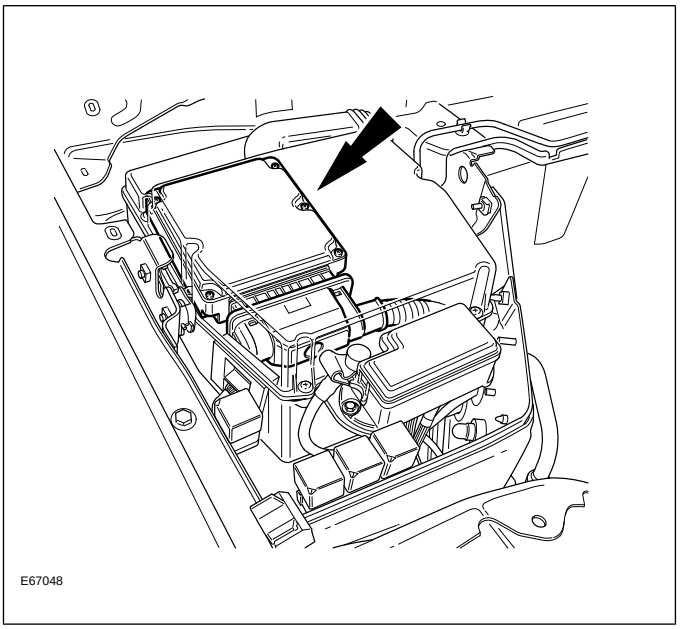
## ENGINE CONTROL MODULE

The Engine Control Module (ECM) is located in the engine compartment cool box.

The ECM is at the center of the system and provides overall engine control. Its function is dependent on the driver's requirements and the engine and vehicle state at any moment in time. Control can be subdivided as follows:

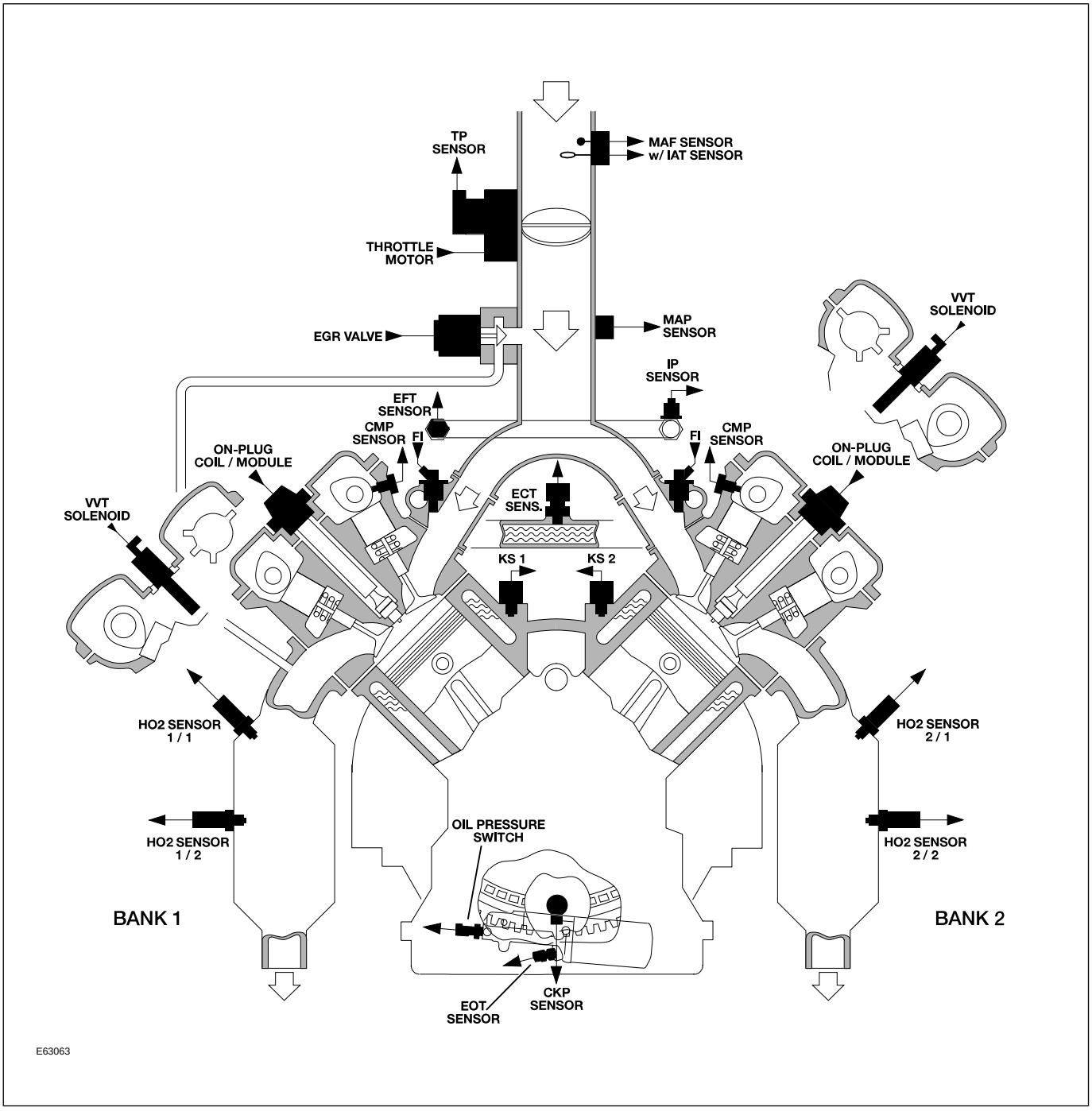
- Starting – ensures that conditions are safe to crank the engine
- Engine – controls the rate of air and fuel flow into the engine cylinders; controls the ignition and inlet camshaft timing, injector 'on' time and timing
- Fuel Supply – controls the variable-speed fuel pump used on the returnless fuel system
- Air conditioning and heated windshield – controls the speed of the engine when these additional loads are added, and disables the air conditioning when it is beneficial to reduce the load on the engine
- ECM data recorder – records data to assist with fault diagnosis

**ECM Location**

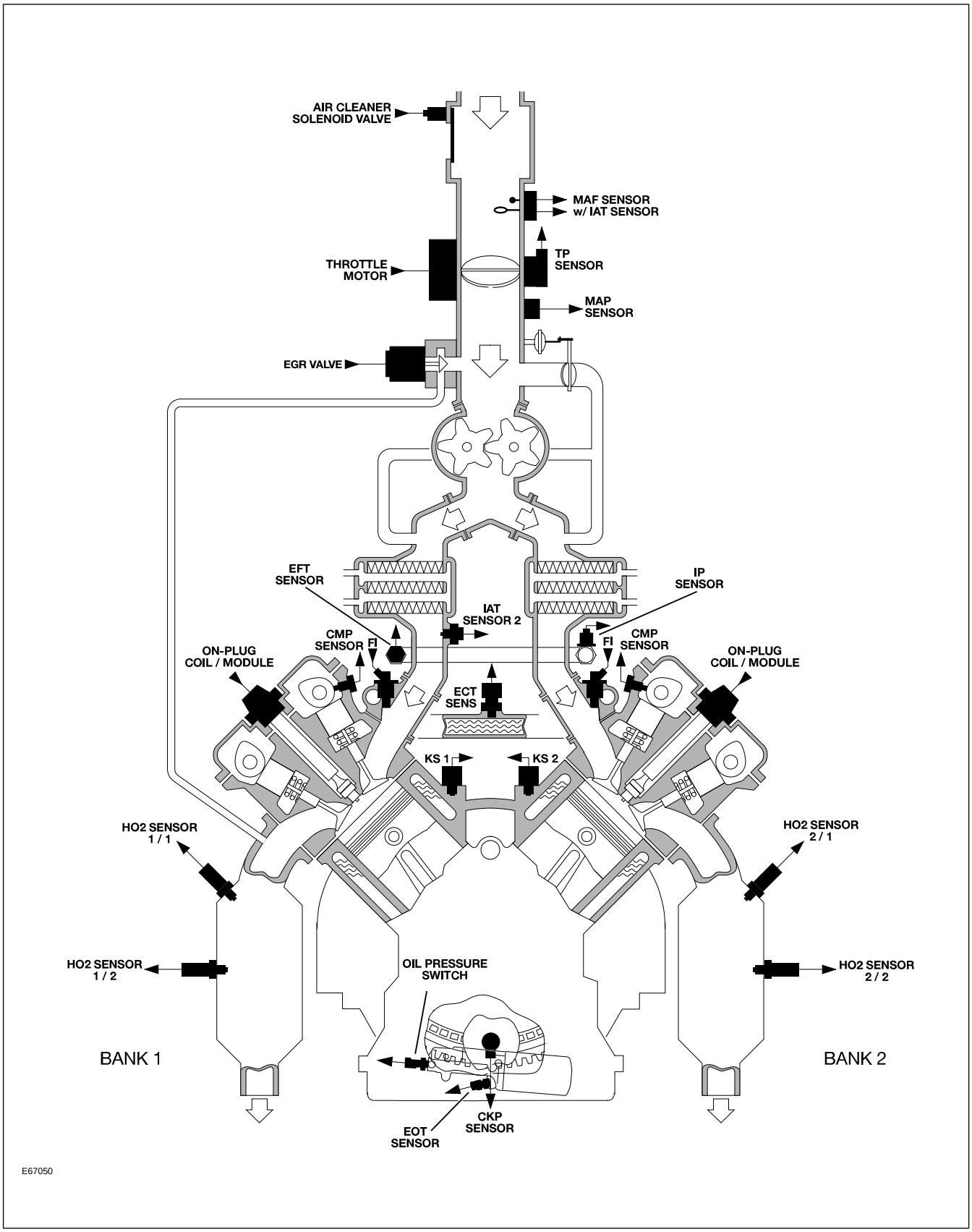


# COMPONENTS

**AJ34 N/A Engine Management Components**



**AJ34 SC Engine Management Components**



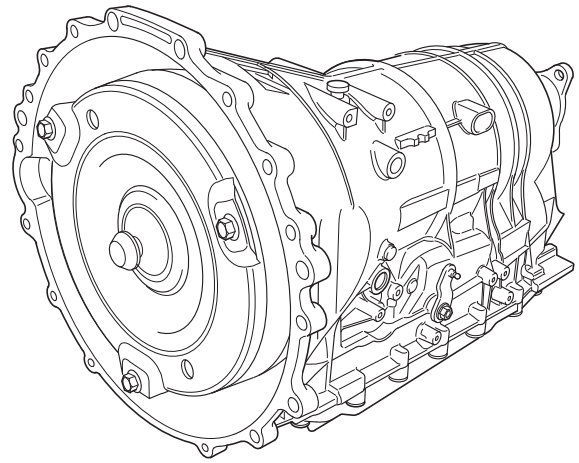
## TRANSMISSION OVERVIEW

The ZF manufactured 6HP26 is the first six-speed automatic transmission utilized by Jaguar and is fitted to all 2003 – 2005 MY XK variants.

ZF 6HP26 is interpreted as follows:

- **ZF** – Transmission manufacturer
- **6** – 6 forward gears
- **HP** – Hydraulic Planetary type transmission
- **26** – Maximum torque designation (no units)

**ZF 6HP26 Transmission**



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| ZF 6HP26 Specifications | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Transmission weight** | NA – 83 kg (184 lbs) with torque converter and fluid<br>SC – 88.0 kg (194 lbs) with torque converter and fluid | | | | | | |
| **Mechanical features** | Die cast aluminum transmission case in two sections – torque converter housing and main case<br>Torque converter with single-plate, controlled slip lock-up clutch<br>Mechatronic valve body with integral TCM<br>Lepelletier double planetary gear set<br>Contactless internal gear selector position switch | | | | | | |
| **Transmission fluid** | Capacity – 10 liters (10.6 quarts); Filled for life<br>Type – Shell 1375.4, part # C2C8432 | | | | | | |
| **Transmission fluid cooler** | External liquid-to-liquid cooler integral with the left hand side radiator tank. | | | | | | |
| **Towing** | Maximum 0.5 miles @ 30 m.p.h. (advise flatbed recovery) | | | | | | |
| **Stall Test** | There is no stall test specification for the 6HP26 transmission. | | | | | | |
| **Gear ratios** | **1st** | **2nd** | **3rd** | **4th** | **5th** | **6th** | **Reverse** |
| | 4.17 | 2.34 | 1.52 | 1.14 | 0.87 | 0.69 | 3.40 |

## Service

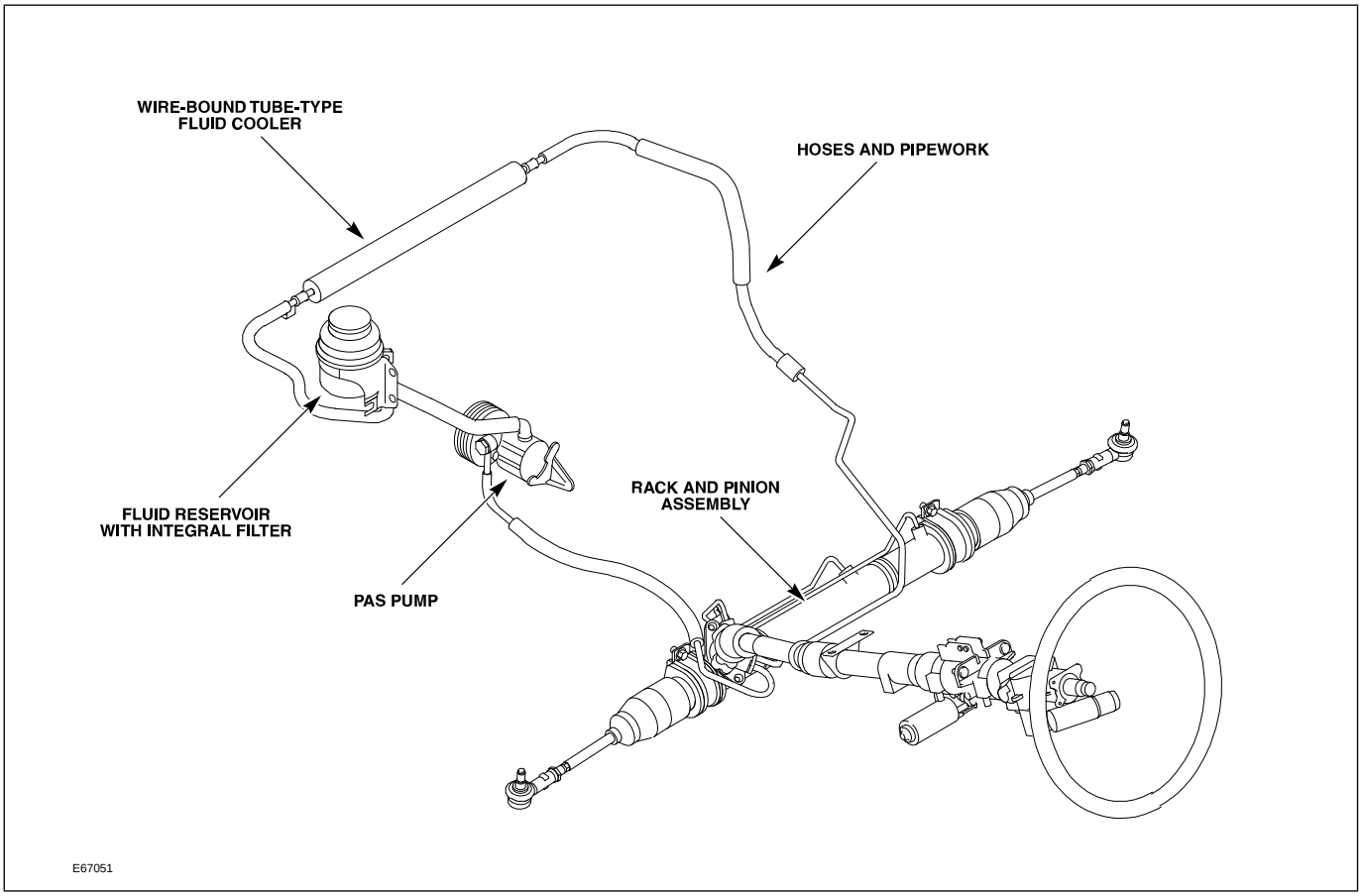
There are no provisions for owners to verify the transmission fluid level, as the ZF transmission is not equipped with a transmission fluid dipstick. To inspect the fluid level and integrity, carefully follow the inspection procedure found in the Transmission section of the WSM, available on the GTR website.

**NOTE:** There are no scheduled fluid level inspections required for ZF 6HP26. Fluid level should only be checked if there are signs of an external fluid leak, or as part of the diagnostic process for customer complaint of poor shift quality.

## POWER ASSISTED STEERING

The XK is fitted with the ZF-manufactured Servotronic rack and pinion assembly. The rack features both variable ratio and variable assistance. Control of the variable assistance is regulated by the power assisted steering control module (PASCM). The fluid reservoir is fitted with a non-serviceable 10-micron filter.

**Power Assisted Steering Components**

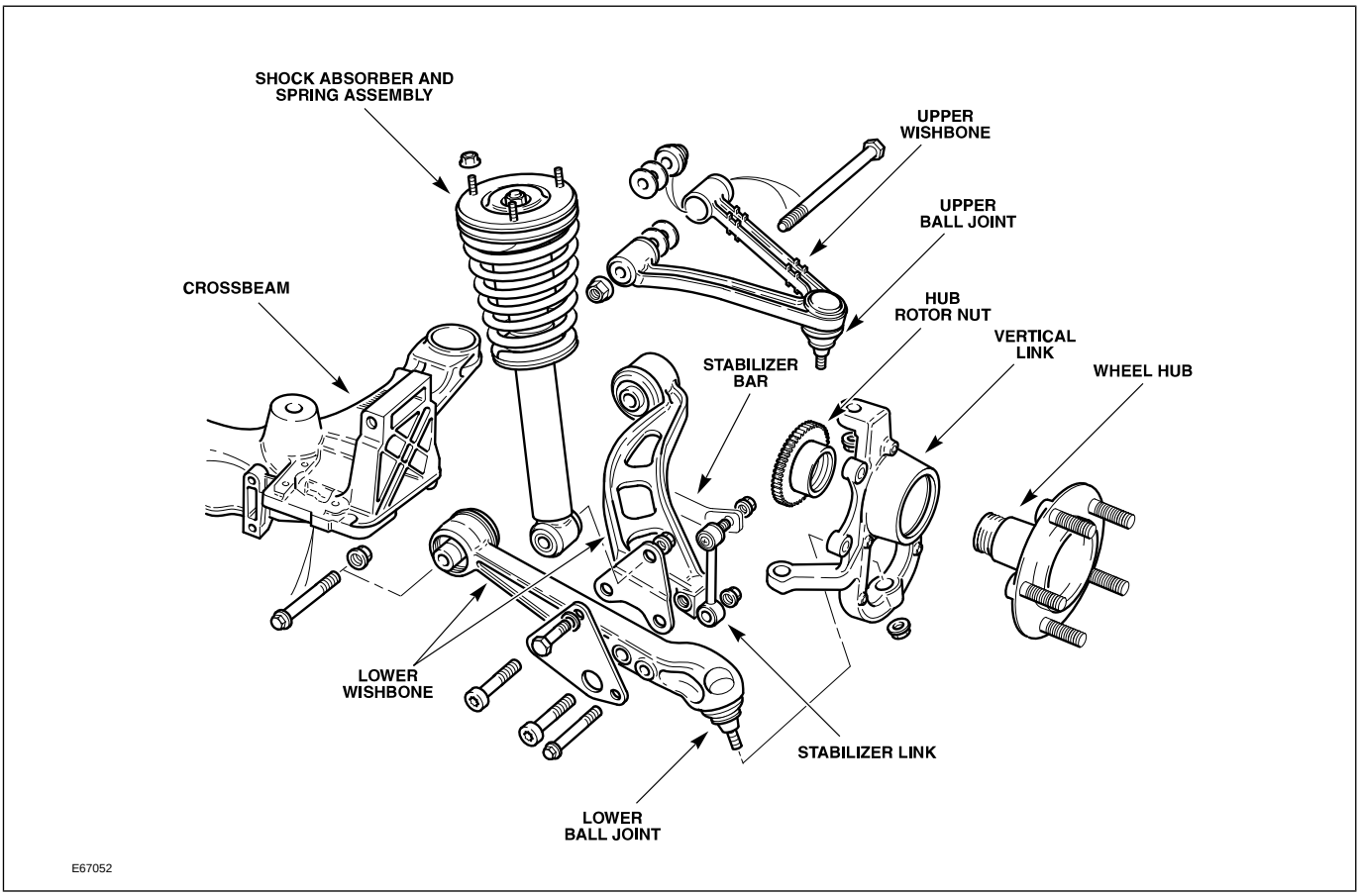


## FRONT SUSPENSION

The front suspension is a double-wishbone design assembled on an aluminum subframe. Control arms and vertical links are manufactured from steel. The wheel bearing is a sealed cartridge assembly.

⚠ **CAUTION: Do not jack the vehicle on the front subframe. Do not attempt to weld or repair the subframe; if the subframe is damaged, it must be replaced.**

**Front Suspension Components**




### Front Wheel Alignment

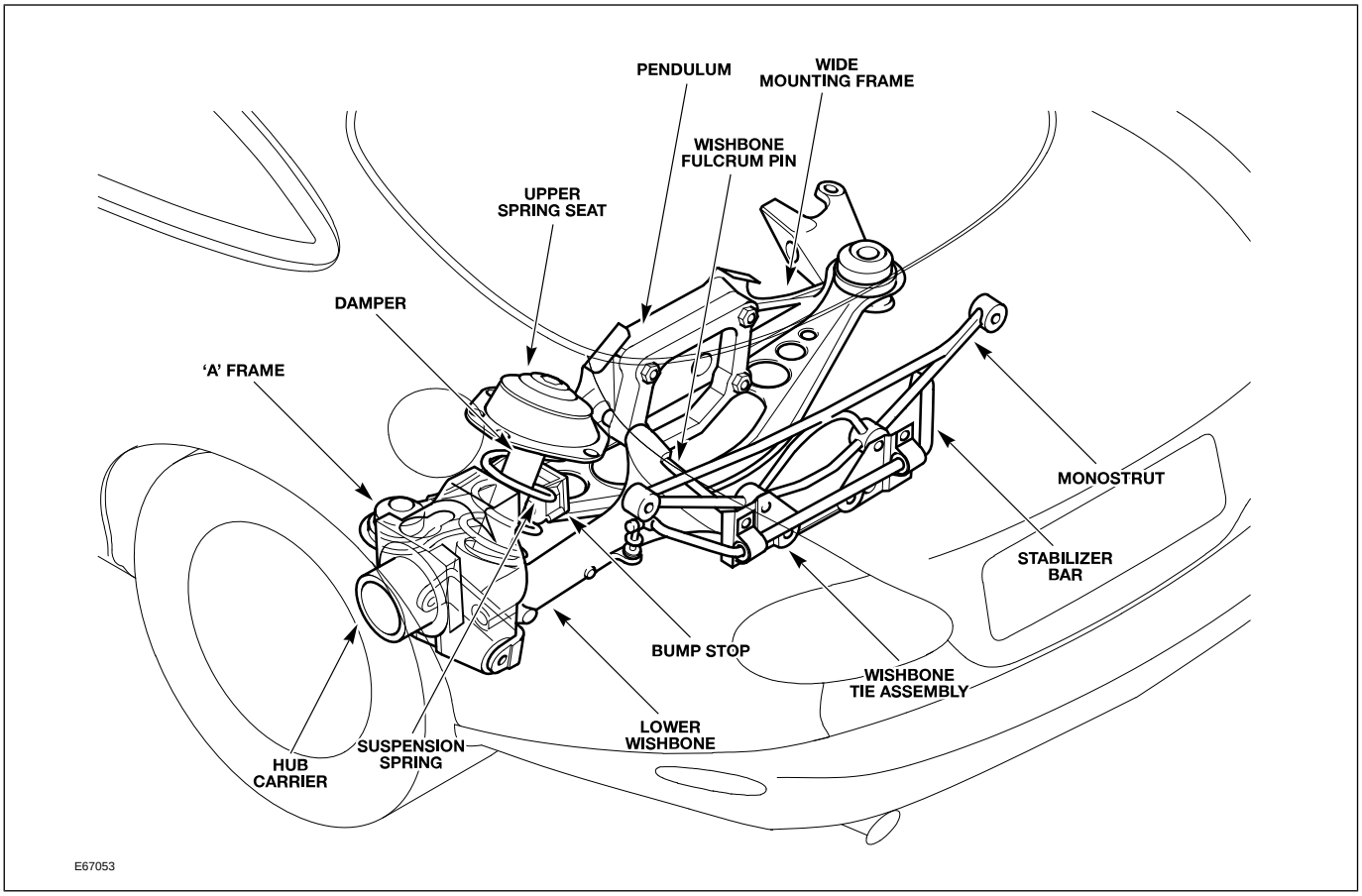
Camber can be minimally adjusted with the installation of a non-factory-fitted eccentric camber bolt in the rear mounting of the lower control arm. Caster can be adjusted by transferring shims between the two shim packs at each upper control arm mounting. Toe is adjusted via threaded tie rod ends.

⚠ **CAUTION: Upper control arm shims cannot be added or removed, only transferred between the front and rear shim packs.**

# REAR SUSPENSION

The independent rear suspension incorporates co-axial spring and shock absorber units, a steel subframe, monostrut, cast iron wishbones and aluminum hub carriers.

**Rear Suspension Components**




## Rear Wheel Alignment

Camber is adjustable by exchanging the selectable-thickness shim located between the differential output flange and the axle with one of a different thickness. Toe is adjustable via an eccentric fulcrum bolt fitted to the bottom of the hub carrier assembly.

## BRAKES

All 2003-2005 MY XK vehicles are fitted with the Teves MK25 ABS system. The main system components are as follows:

- Teves MK25 modulator and control module
- Active wheel speed sensors
- High resolution steering angle sensor
- Yaw rate sensor
- Teves active brake booster

The Teves MK25 ABS system has the following features as standard equipment:

- Anti-lock Braking (ABS)
- Traction Control System (TCS)
- Dynamic Stability Control System (DSC)
- Panic Brake Assist (PBA)

Normally aspirated variants are fitted with steel floating calipers. Supercharged (XKR) vehicles are fitted with Brembo high-performance fixed aluminum brake calipers and larger discs.

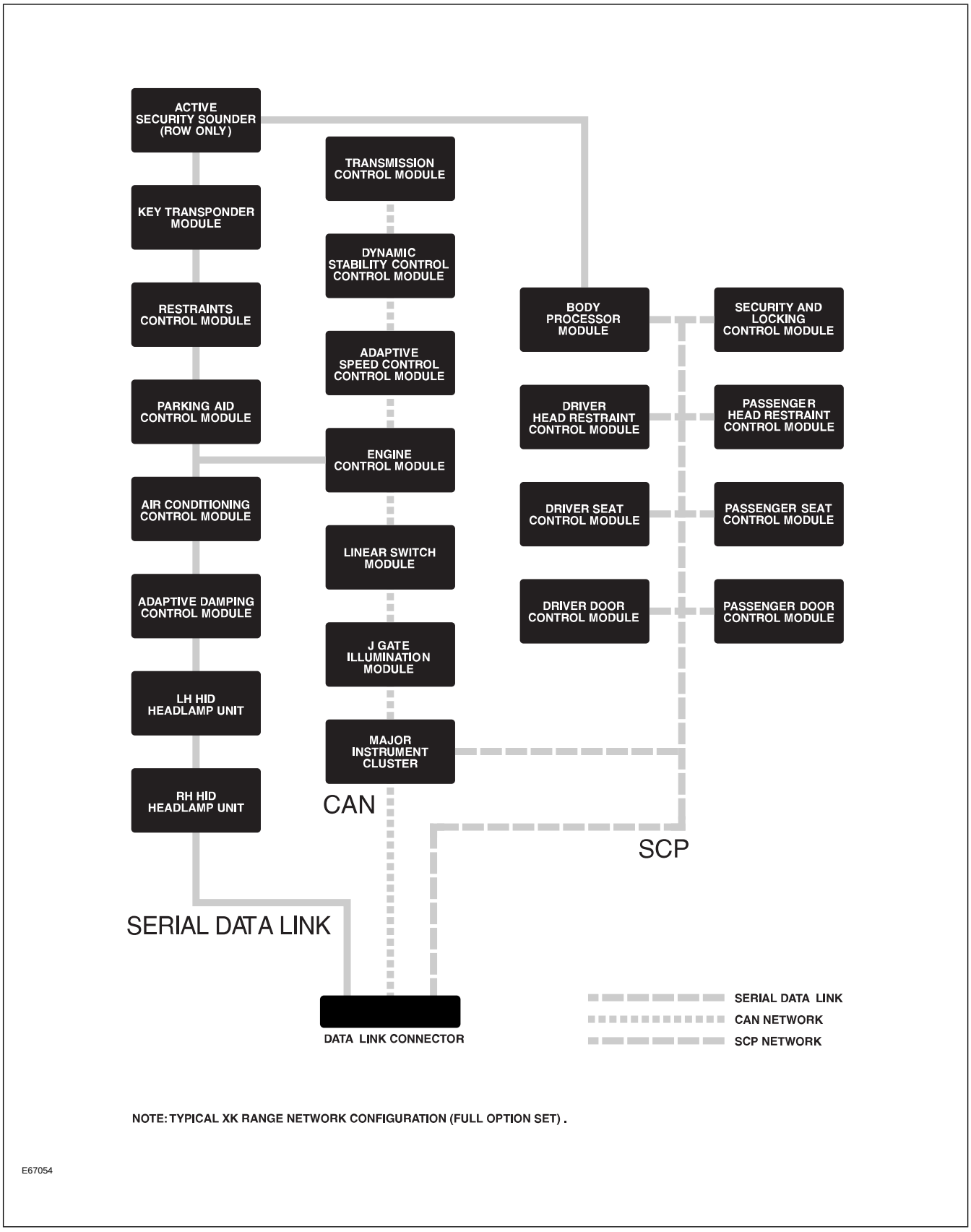
## CONTROL MODULES AND NETWORKS OVERVIEW

Two communication networks are used for control module intercommunication.

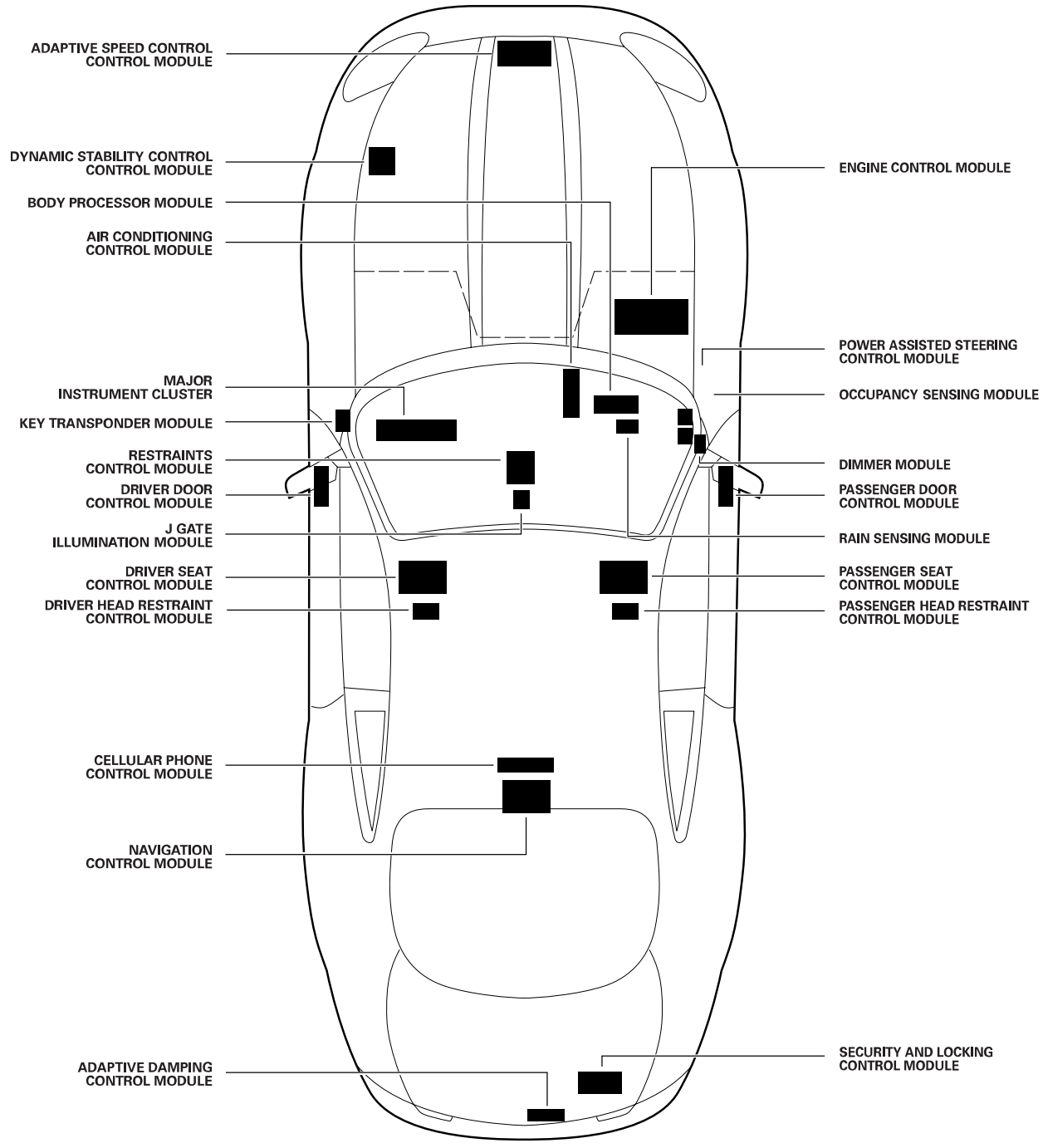
| Communication Networks | | | |
|---|---|---|---|
| **Network** | **Class** | **Speed** | **Communication Medium** |
| Controller Area Network (CAN) | C | 500 KBaud | Twisted pair copper wire |
| Standard Corporate Protocol Network (SCP) | B | 41.6 KBaud | Twisted pair copper wire |

A third network – ISO 9141 (Serial Data Link) – allows diagnostic interrogation via the data link connector (DLC) but does not allow control module intercommunication. The ISO network communicates at 10.4 KBaud.

**Communication Network Layout**



**Control Module Locations**




NOTE: THE TRANSMISSION CONTROL MODULE IS CONTAINED WITHIN THE TRANSMISSION.

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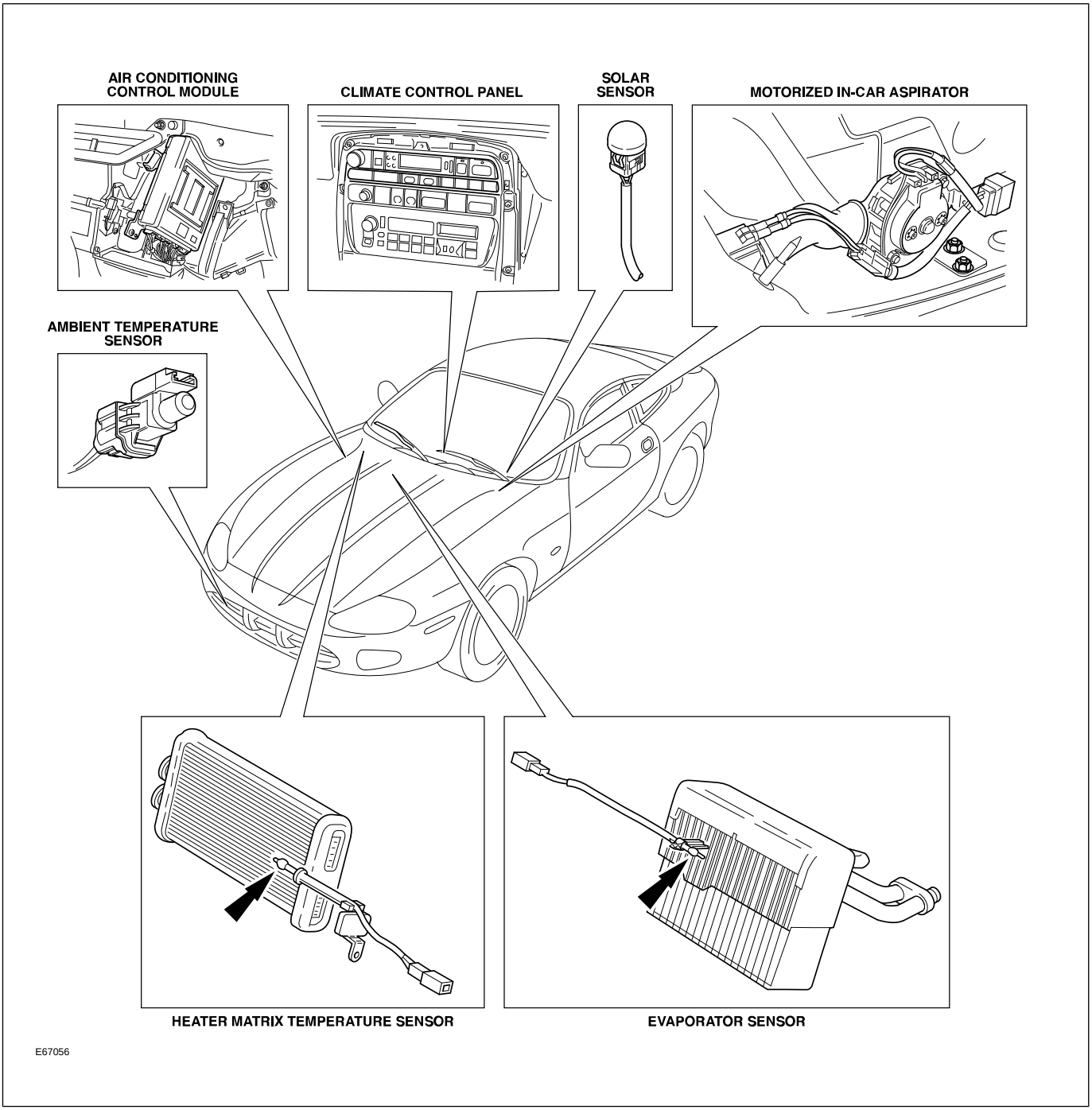
## CLIMATE CONTROL OVERVIEW

XK vehicles use the Denso automatic climate control system. The system is controlled through a microprocessor-based electronic control module and a microprocessor-based control panel. The heart of the refrigeration system is a fixed-displacement 10-cylinder compressor. The system provides occupants with the selected comfort level by controlling air flow volume, distribution and temperature. Diagnostic routines and fault code extraction are available through control panel diagnostics.

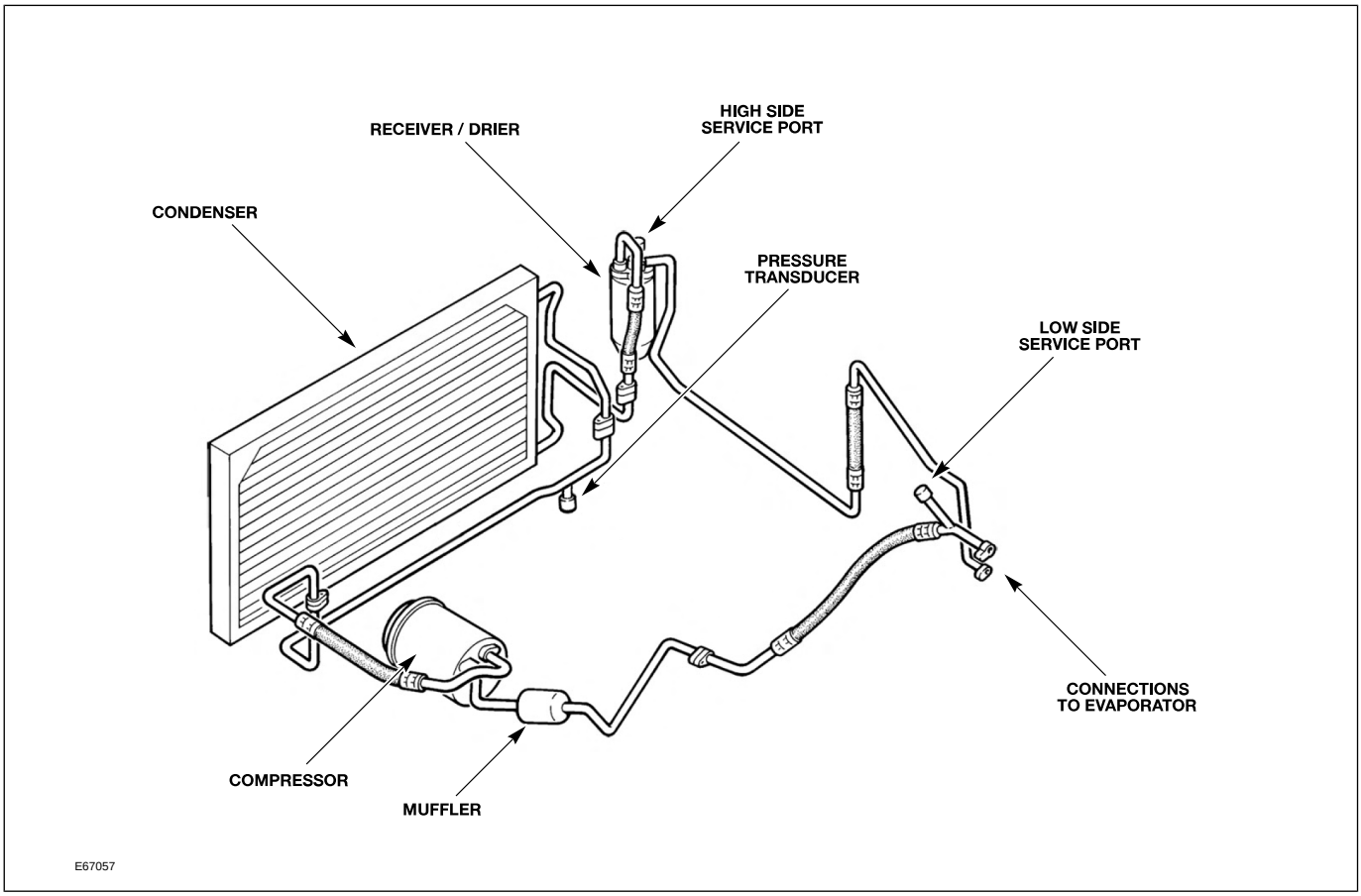
**Automatic Temperature Control Components**



# SERVICE

## Refrigerant Service Ports

The high-pressure service port is located on the receiver-dryer assembly. The low pressure service port is located near the evaporator end of the evaporator-to-compressor hose/pipe assembly.



## POWER WINDOWS

All windows are equipped with one-touch down functionality. A brief press of a window switch will fully lower the respective window. A brief press of the ROOF switch will lower both rear quarter windows. The ROOF switch and the door window switches must be held throughout the duration of their respective window closings.

To provide for proper seating of the frameless door glass into the roof/convertible top seal, each door glass is also equipped with a window drop feature. This feature lowers the window 15 mm (0.060 in.) when the door is opened (provided the window was fully raised). Closing the door will cause the window to return to the fully raised position, provided it was fully raised when the door was opened.

If the vehicle power supply is disrupted, the window drop feature will not function correctly. To restore proper operation the door windows will need to be re-programmed.

### Door Window Re-programming

1. Close both doors
2. On convertible vehicles, fully close the convertible top.
3. Press and hold the lower part of the window switch; when the window is fully lowered, continue to hold the switch for 5 seconds.
4. Release the switch.
5. Press and hold the upper part of the window switch; when the window is fully raised, continue to hold the switch for 5 seconds.
6. Carry out this procedure for driver and passenger windows.

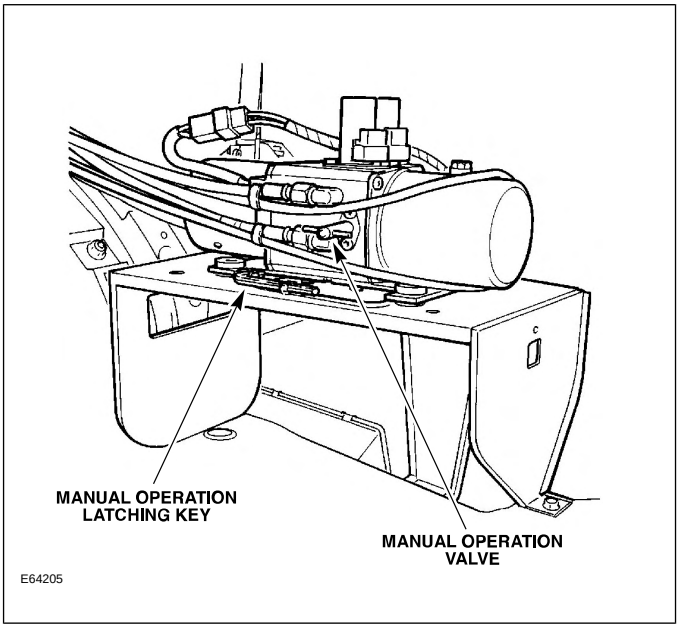
**NOTE:** This procedure can be carried out either from the individual window switches or from the driver's switch pack. Quarter windows do not require programming.

## CONVERTIBLE TOP

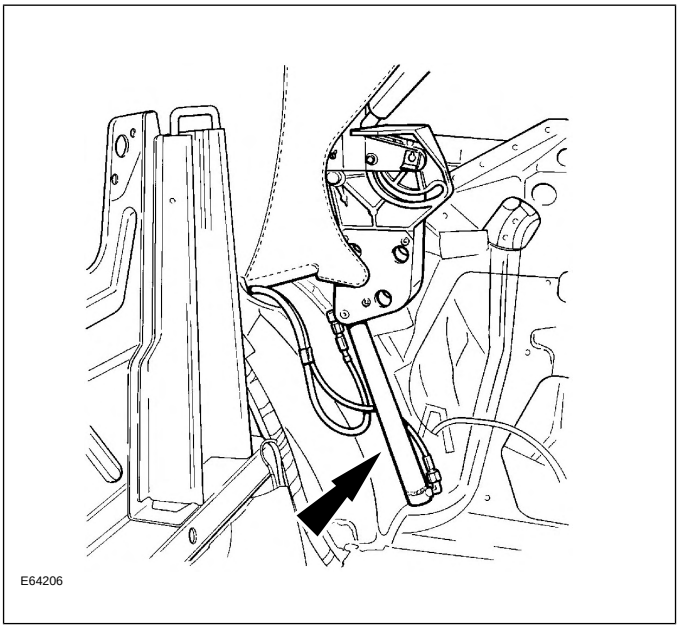
The convertible top is fully lined, padded and fitted to an aluminum frame which has steel linkages. Hydraulic actuation is used to open, close and latch the top. A single hold-down switch (ROOF) is located on the center console. The ROOF switch also operates the rear quarter windows. The convertible top is fitted with a heated rear window.

The hydraulic convertible top operating pump is located in the right-hand side of the trunk, mounted on a steel pressing which also houses the CD changer, audio amplifier and navigation unit (where fitted). The pump operates at a maximum pressure of 140 bar (2030 psi) and is equipped with solenoid valves to direct fluid to both hydraulic cylinders for the top movement and the header rail for the latch mechanism.

**Convertible Top Operating Pump**




**Convertible Top Operating Cylinder**




The top and quarter windows are operated by the ROOF switch when the ignition is in position I or II and vehicle speed is below 10 mph. The ROOF switch must be held

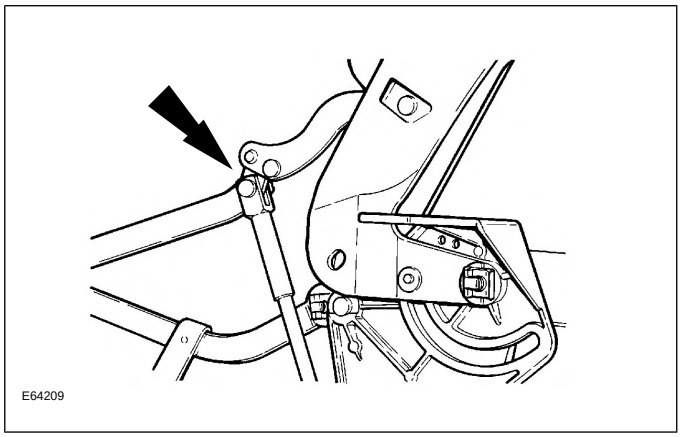
active throughout the raise or lower operation. The top can also be operated using the global open/close functions of the door lock key.

## Manual Operation

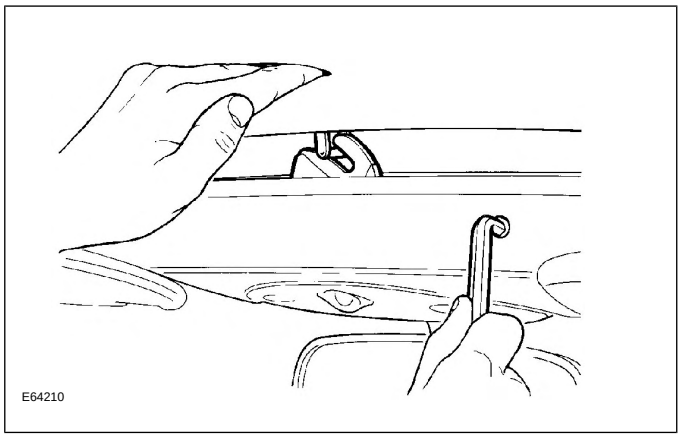
In the event that the top cannot be powered to the raised or lowered position, provision is made for manual operation.

**NOTE:** The convertible top frame uses an over-center link to lock the frame in its forward position. It is essential to carry out the following procedure to manually lower the vehicle convertible top. Because of the possibility of damaging the frame, manual lowering of the convertible top is only recommended as a Dealer function and not an Owner/Driver function. Manual lowering has been deleted from the Driver Handbook.

**Unlocking Over-Center Link**




**Convertible Top Manual Latching**




1. Lower the rear quarter lights by pressing the ROOF switch once.
2. Gain access to the pump located in the trunk, (the right hand side trunk trim carpet must be removed for access to the pump) and turn the manual override valve on the pump body fully counterclockwise to place the pump into MANUAL mode.
3. The windscreen header trim has a small round plug, adjacent to the header console, which has to be removed to gain access to the latching mechanism. Insert either the latching key – which is retained in

clips on the pump mounting base – or an 8mm Allen key, and unlatch the hood by turning the key clockwise.

– **CAUTION: Do not attempt to lower the convertible top further at this stage.**

4. Prior to lowering the hood, reach behind the headlining rear quarter curtains and locate both of the convertible top cylinder rams and the linkage to which they are fixed.
5. In turn, push down both the left and right hand cylinders and linkage as far as possible. Significant force may be required.
6. Manually lower the top to its stowed position. (If the hood resists movement repeat step 5).

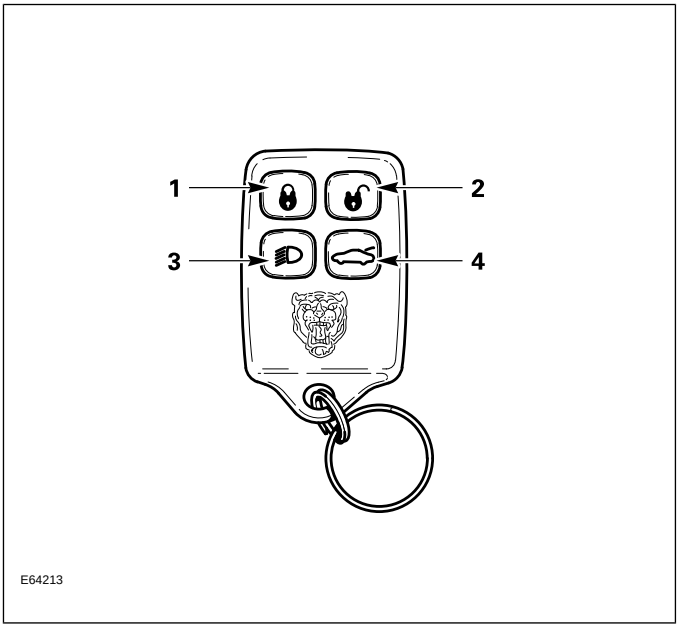
⚠ **CAUTION: Failure to carry out steps 4 and 5 will result in severe damage to the convertible top frame and/or linkages.**

## REMOTE CONTROL KEYHEAD RF TRANSMITTER

The radio frequency (RF) transmitter is operational only when the key is removed from the ignition barrel. The RF transmitter allows remote control of the following features:

- Security system arming/disarming
- Door locking/unlocking (single or two-stage)
- Headlight convenience
- Panic alarm
- Trunk lid release
- Valet mode (deactivation only)

**Remote Control Keyhead RF Transmitter**




RF transmitter button functions are as follows (numbers correspond to the illustration):

1. Lock
2. Unlock
3. Headlamp convenience / panic alarm
4. Trunk lid release

# SYSTEM OPERATION

## Arming/Disarming and Locking/Unlocking

When the vehicle is locked via the door key barrel or the RF transmitter LOCK button, the security system will fully arm. At this point, if a door, the hood, or the trunk is opened without disarming the system, the alarm will sound for 60 seconds. The alarm can be cancelled by pressing the RF transmitter UNLOCK button or by turning the ignition key to position II.

### Single-Stage and Two-Stage Unlocking

With the alarm system in single-stage unlocking mode, a single rotation of the door lock barrel to the unlock position or a single press of the RF transmitter UNLOCK button will unlock both doors.

With the alarm system in two-stage unlocking mode, a single rotation of the door lock barrel to the unlock position or a single press of the RF transmitter UNLOCK button will unlock the driver's door. A second rotation of the door lock barrel to the unlock position or a second press of the RF transmitter UNLOCK button will unlock the passenger's door.

#### Selecting Unlocking Modes

The alarm system can be toggled between the single and two-stage unlocking modes using WDS. Select the unlocking mode from the "Dealer Options" submenu within the "Vehicle Configuration" main menu.

## Window and Convertible Top Control

The opening and closing of the windows and convertible top (if fitted) can be initiated from the driver's door key. Remote opening and closing of the driver and passenger door windows can be enabled/disabled using WDS. Remote global opening and closing is not available.

### Global Opening

To initiate global opening, rotate the key in the driver's door lock barrel to the unlock position and hold for longer than two seconds. The windows and convertible top will begin their opening operation and will continue to open as long as the key is held in the unlock position.

### Global Closing

To initiate global closing, rotate the key in the driver's door lock barrel to the lock position and hold for longer than two seconds. The windows and convertible top will begin their closing operation and will continue to close as long as the key is held in the lock position.

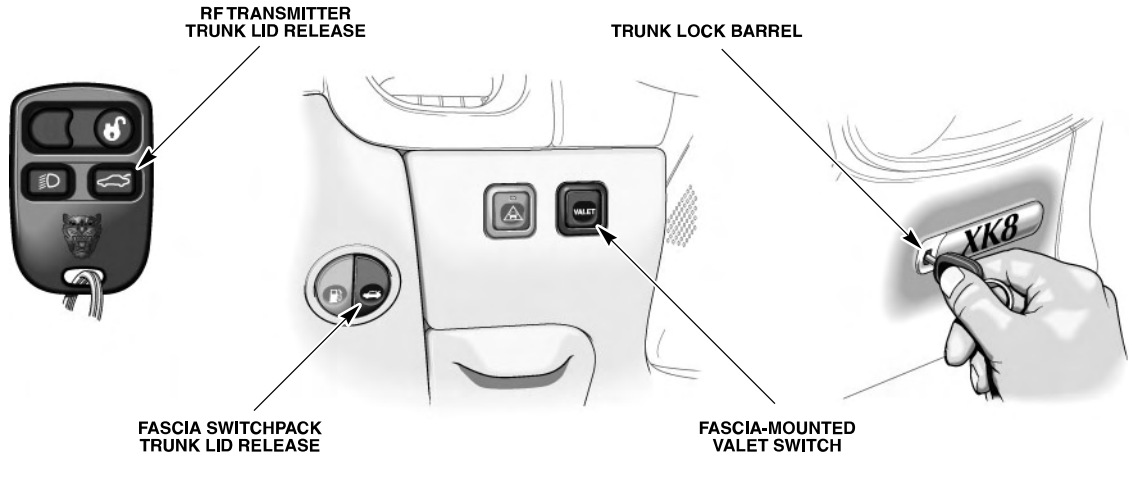
## Headlight Convenience

When the RF transmitter HEADLIGHT CONVENIENCE button is pressed, the headlights will illuminate for 25 seconds. A second press of the button will extinguish the headlights.

## Panic Alarm

Pressing the RF transmitter HEADLIGHT CONVENIENCE button three times within three seconds will activate the panic alarm for 60 seconds. The alarm can be cancelled by inserting the key into the ignition and turning the key to position I or II.

## Trunk Release

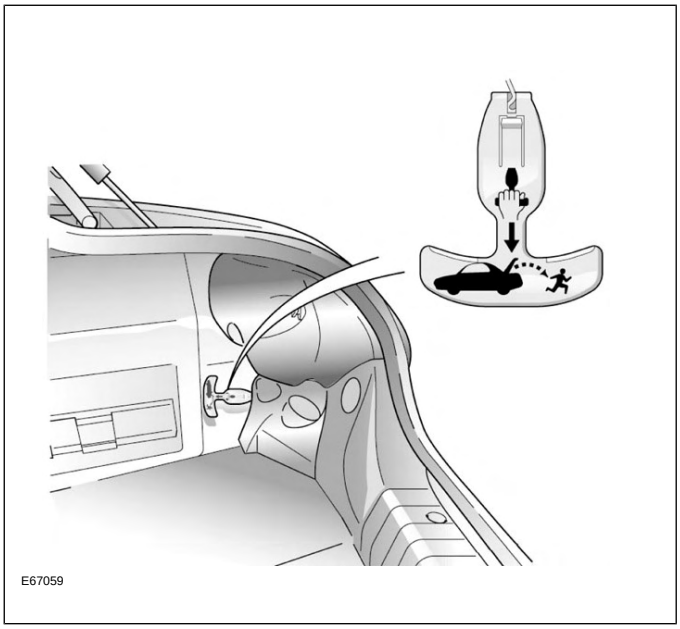



The trunk can be opened five ways:

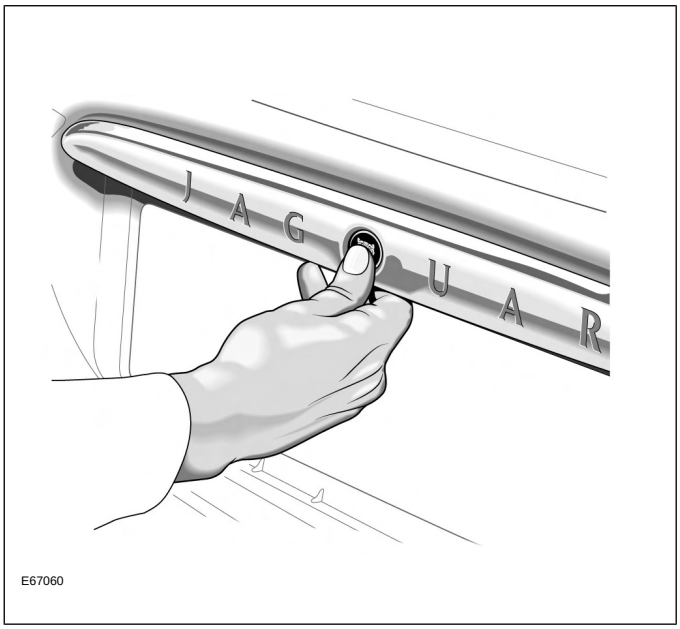
- Pressing the RF Transmitter TRUNK LID RELEASE button. If the security system is armed, the trunk will be released without the alarm sounding. When the trunk is closed, the security system will resume in the armed state.
- Using an integrated transmitter key or black-headed key in the trunk lock barrel. This will cause the alarm to sound if the vehicle is armed. The green-headed valet key will not operate the trunk lock barrel.
- Pressing the fascia switchpack trunk release button (valet mode inactive).

- Pulling the internal trunk release handle.
- Pressing the release button on the trunk lid (valet mode inactive).

**Internal Trunk Release Handle**




**Trunk Lid Release Button**




## Valet Mode

Valet mode is activated when the fascia VALET button is pressed. A valet mode chime will sound and a valet mode message will be displayed in the message center (message will only appear if the key is in position II – RUN). When in valet mode, trunk opening from the fascia and trunk-mounted release buttons is inhibited. Locking the glove compartment with the black-headed key will further minimize valet driver access.

If the vehicle is in valet mode and a green-headed key is given to the valet driver, the driver will only be able to:

- Unlock (disarm) and Lock (arm) the vehicle via the driver's door lock barrel.
- Start and drive the car.

Valet mode can be cancelled by:

- Using a remote to unlock (disarm) the vehicle.
- Using a black-headed or remote-control key to open the trunk via the trunk lock barrel.

# SERVICE

## RF Transmitter Service

### Battery Replacement

Each transmitter contains one type CR2032 battery. The battery is fitted with the positive symbol (+) facing downwards in the battery receptacle.

**NOTE:** Changing the remote's battery will not affect its operation or require the remote to be reprogrammed.

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### RF Transmitter and Key Transponder Programming

Two methods exist for programming transmitters. Prior to programming, ensure that all transmitters for the vehicle are present. Transmitters not present will be erased from alarm memory and will no longer function.

Key transponders can only be programmed using WDS.

**Programming transmitters without WDS:**

1. Insert key into ignition.
2. Hold headlight stalk in the FLASH position.
3. While holding headlight stalk in the FLASH position, rotate the ignition key to position I (AUX).
4. Release headlight stalk and then flash the headlights four times.
5. An audible confirmation and a flash of the security LED in the J-gate will confirm the alarm system is in transmitter "learning" mode.
6. Activate each remote transmitter by pressing any button on the transmitter once. A chirp will sound for each remote transmitter signal received (LED will also flash); allow 15 seconds maximum between each press.
7. The alarm system will exit the learning mode when the key is turned to position 0 (OFF), or 15 seconds after the alarm enters learning mode.

**Programming transmitters and key transponders using WDS:**

1. Select the "Vehicle Configuration" main menu tab.
2. Select "Security".
3. From here, as many as 5 key transponders and transmitters can be programmed.

## SUPPLEMENTAL RESTRAINT SYSTEM OVERVIEW

The XK uses Jaguar's Adaptive Restraint Technology System (ARTS). ARTS can be divided into three subsystems:

- Crash severity sensing and analysis
  - Three impact sensors (one behind the radiator grill and one mounted at the base of each 'B/C' pillar) provide a signal to the Restraints Control Module (RCM) that is proportionate to the crash severity
- Occupant analysis
  - Position of the driver's seat and seatbelt engagement is monitored
  - Weight, position and seatbelt engagement of the front passenger is monitored
- Deployment handling
  - Based on crash severity and occupant analysis, the RCM will determine which restraints to deploy and the deployment strength (frontal impact airbags only).

## COMPONENTS

The ARTS in XK vehicles uses three control modules:

### Weight Sensing Module

Mounted to the underside of the front passenger seat, the weight sensing module processes the signal from the seat pressure transducer attached to the silicone filled bladder in the cushion.

### Occupancy Sensing Module

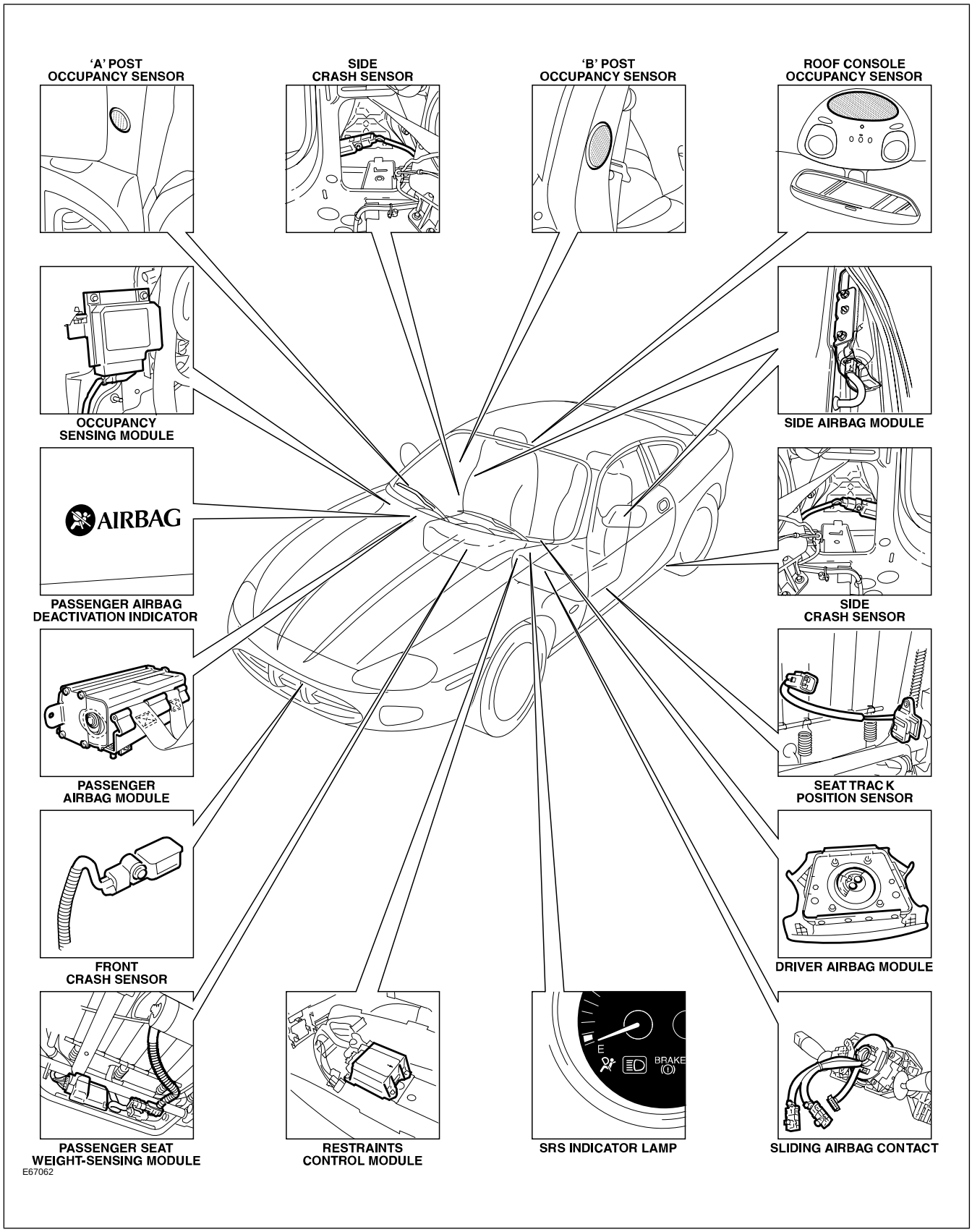
Mounted to the RH 'A' post, the occupancy sensing module processes signals from the four ultrasonic sensors. These sensors emit an ultrasonic signal operating at 40 KHz to monitor occupancy of the passenger seat.

### Restraints Control Module

Mounted on the transmission tunnel, the restraints control module is responsible for deploying restraints based on signals from the weight sensing module, occupancy sensing module, front seat belt buckle sensors, driver's seat position switch and crash sensors.

The three modules communicate via a local (dedicated) CAN network, which is not part of the vehicle's main CAN network.

**ARTS Component Locations**

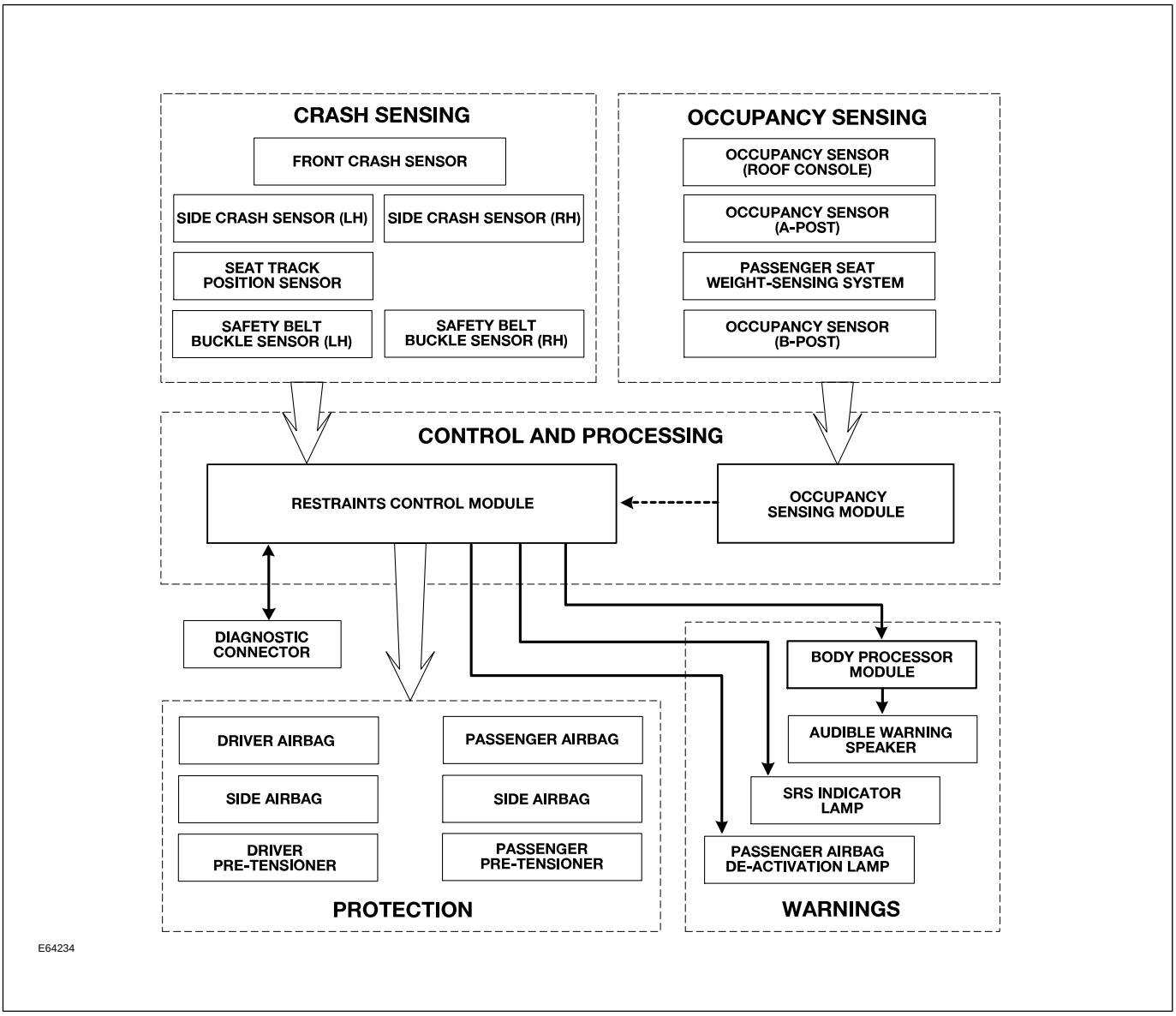


## SYSTEM OPERATION

The ARTS can deploy the following restraints:

- Front seat belt reel pre-tensioners (2)
- Two-stage driver and front passenger airbags (2)
- Seat-mounted side airbags for front occupants (2)

**Adaptive Restraints Technology System Diagram**




⚠ **WARNING: Read and observe all safety precautions in GTR (Global Technical Reference) and service bulletins before attempting to service the SRS.**

**Do not attempt to measure the circuit resistance through the airbag modules or pre-tensioners with a DVOM. Doing so may trigger airbag deployment and result in personal injury.**

**To disarm the SRS, disconnect the battery negative cable and wait a minimum of two minutes for the reserve power charge to dissipate.**

# IN-CAR ENTERTAINMENT (ICE)

## Selectable Features

Simultaneously pressing and holding the AM/FM and EJECT button will display the audio system selectable features on the radio display or navigation screen (if fitted). The following options are selectable through the following preset buttons:

- **Preset 1 –** Toggles Radio Broadcast Data System (RBDS) on/off.
- **Preset 2 –** Toggles the TAPE CLEAN reminder on/off.
- **Preset 3 –** Toggles the AERIAL CLEAN reminder on/off.
- **Preset 4 –** Toggles the automatic mute facility on/off. This should be ON if the vehicle is fitted with a telephone.
- **Preset 5 –** Toggles the automatic tape eject when key is turned OFF.
- **Preset 6 –** Not used.
- **Preset 7 –** Toggles the Alternate Frequency (AF) on/off. Used when reception problems occur with RBDS stations. Toggling AF ON/OFF will eliminate drop-out on RBDS channels.
- **Preset 8 –** Not used.
- **Preset 9 –** Toggles FADE ENABLE/DISABLE. Disabling fade removes FADE from the MODE button menu.
- **Preset 0 –** Toggles radio between markets (USA, Europe, Japan…).

## Setting the Clock

On vehicles without navigation, an analog clock is fitted to the minor instrument panel. The time can be adjusted by pressing the '+' and '-' buttons on the front of the dial.

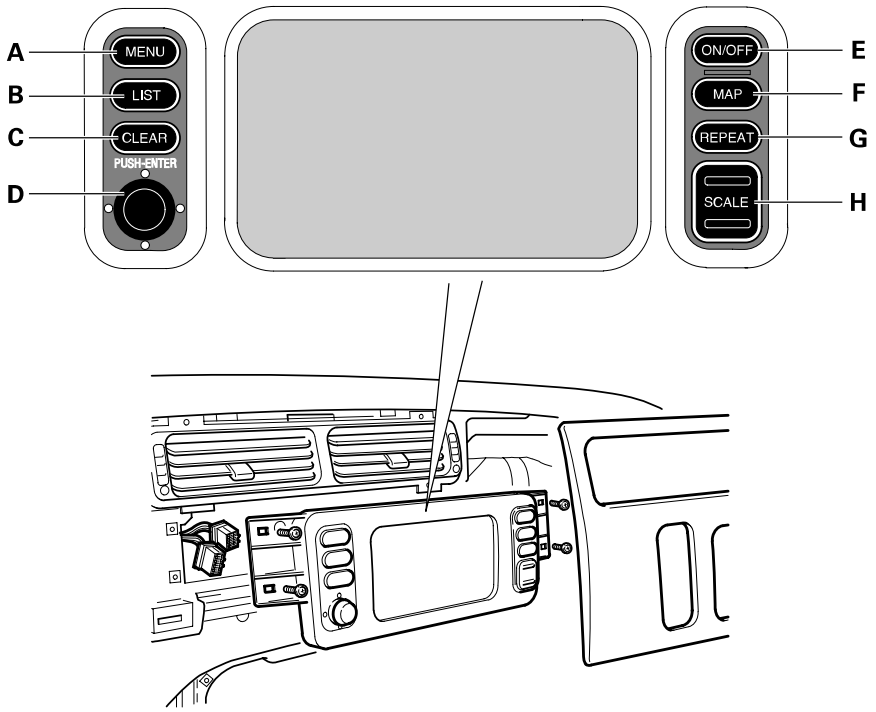
On vehicles fitted with navigation, the start-up screen shows a large analog clock. The correct time is maintained automatically from the GPS satellite signals and no manual adjustment is required. Ensure that the proper time zone and summer time (Daylight Savings Time) settings are correct for the current location and time of year. These options are accessible by pressing the MENU button while the navigation map is displayed. Select SETUP from the on-screen menu.

## NAVIGATION

The navigation system is an optional fitment. The navigation screen comprises a 5.5” color display (non-touch-screen). All operator inputs are made using the button panels located on each side of the display. The navigation module is located in the right side of the trunk. The Global Positioning System (GPS) antenna is located below the parcel shelf trim (coupe) or convertible top recess (convertible).

With the aid of DVD map data, the navigation module calculates the position of the vehicle using signals from the GPS antenna, the ABS control module and the GYRO sensor. After entering the desired destination, the driver is guided along by both visual guidance and voice instructions. If the driver strays off the route, the system calculates a new route showing the easiest way back to the original destination. The system can also point out useful landmarks such as gas stations, restaurants, hotels, and Jaguar dealers.

**Navigation Display**

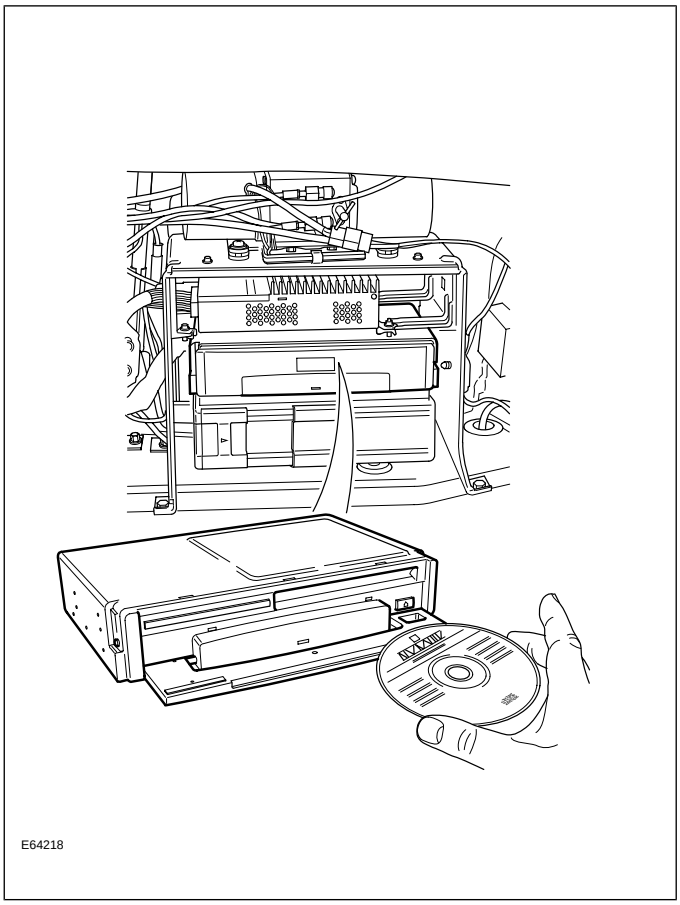



All navigation information is shown in full color on the large display screen. The navigation controls are located on both sides of the screen and are as follows:

- **Main MENU (A) –** display choice of Destination, Set-up, Options, Route
- **LIST (B) –** list turn information for calculated route
- **CLEAR (C) –** return to previous screen or change map orientation
- **Joystick/enter (D) –** highlight menu items, characters and scrolls map: enter commands and selections
- **ON/OFF (E) –** turn screen on or off

- **MAP (F) –** switch to, or return from map display and toggle map/arrow view when under guidance
- **REPEAT (G) –** repeat last voice instruction
- **SCALE (H) –** change map scale and scrolls previous or next page

**Navigation System DVD Reader**



Curriculum Training

# Introduction to Jaguar

## Introduction to S-TYPE: X200

JAGUAR

Technical Training

INTR 05 en 08/2005
INTR: X200

Please remember that our training literature has been prepared for TRAINING PURPOSES only. Repairs and adjustments MUST always be carried out according to the instructions and specifications in the workshop literature. Please make full use of the training offered by Technical Training to gain extensive knowledge of both theory and practice.

# Table of Contents

## Workshop safety

This page highlights the general observations expected while attending this training program, and its continuation upon returning to your place of work.

## General

While working on all vehicles, the following items where available should always be used:

- Fender covers
- Seat covers
- Floor protection

## Safety

All precautions must be taken and observed at all times, to prevent injury or damage to the following:

- Yourself
- Customer's property
- Workshop equipment
- Work place colleagues

## Operating guidelines

While using any piece of workshop equipment:

The manufacturer's guidelines and warning labels must be followed.

This will ensure correct use and application at all times.

Seek the necessary advice or training where equipment usage is unclear.

## Chemicals, Oils and Solvents

Follow all manufacturer's warnings and labels; also take into account local disposal regulations when working with chemicals, oils or solvents.

Ensure that all risks are completely minimized.

Make sure that all protective items of clothing are worn where required e.g.

- Eye protection
- Gloves
- Coveralls
- Footwear

## System capping

Upon disconnecting components from a system, take all precautions necessary to prevent system contamination or environmental leakage.

Fit relevant plugs or caps i.e. to pipes, unions and component orifices etc.

## Updates

Keep abreast of all relevant changes that affect your role within the dealership, by monitoring all factory issued documentation.

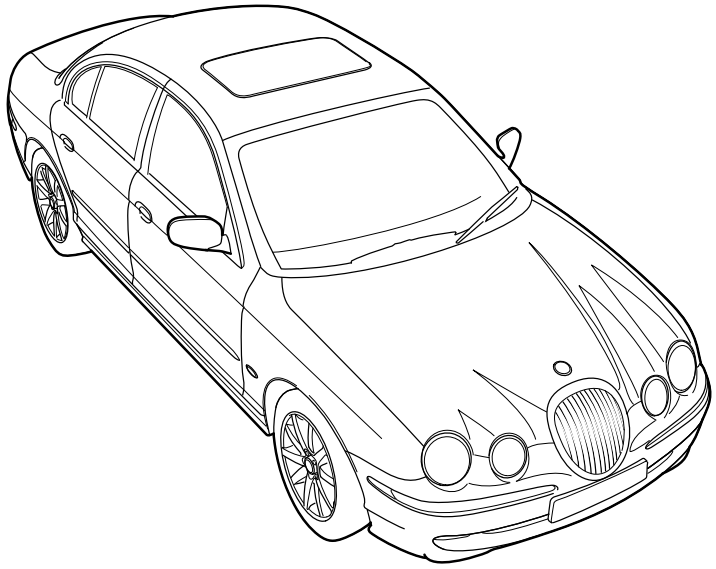
## Driving

Operating vehicle features, such as ICE, mobile phones and CD player equipment etc., can cause a momentary distraction while driving.

Follow all traffic regulations when operating vehicle systems or using diagnostic equipment while on the move.

Mobile diagnostic equipment operation may require the use of an assistant.

## OVERVIEW



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Introduced in the 2000 model year, the Jaguar S-TYPE is a luxury sports sedan with a distinctive style, refined power, agile handling, supple ride and luxurious comfort.

Powertrains are a 4.0-liter V8 engine ( designated AJ28), derived from the engines used in XJ/XK vehicles, and a 3.0-liter V6 engine (designated AJ60). Both engines are coupled to a five-speed automatic transmission.

Variable rate steering control is fitted and all vehicles have ABS brakes with traction control as standard. A new optional feature introduced with the S-TYPE is Dynamic Stability Control (DSC) – yaw control – which assists the driver in maintaining directional control of the vehicle. Unlike other Jaguar vehicles, the hood is hinged at its rear with a safety catch provided at the front of the hood. A tilt-and-slide power sunroof with sunshade is available as an optional feature.

Both front seats have electrically-operated 8-way adjustments as standard equipment; seat position memory is available as an option. To allow a greater load to be carried in the luggage compartment, the rear seats can be folded forward and are split in a 60/40 configuration.

Automatic climate control, with dual temperature control for the driver and front passenger, is a standard feature on all vehicles. Reverse parking aid, a system which warns the driver of obstructions which could damage the vehicle during reversing, is optional.

A standard fit radio/cassette unit provides in-car entertainment; a CD autochanger is also available. Other options include a phone, navigation system, vehicle emergency message system and voice-activation of some systems. Optional cruise control and audio

switches are fitted to the steering wheel. All vehicles have a trip computer system and a vehicle information message center in the instrument cluster.

Security features are an engine immobilizer and alarm system. A 4-button key-ring transmitter has a radio frequency operation with an encrypted rolling code to help prevent theft of the vehicle.

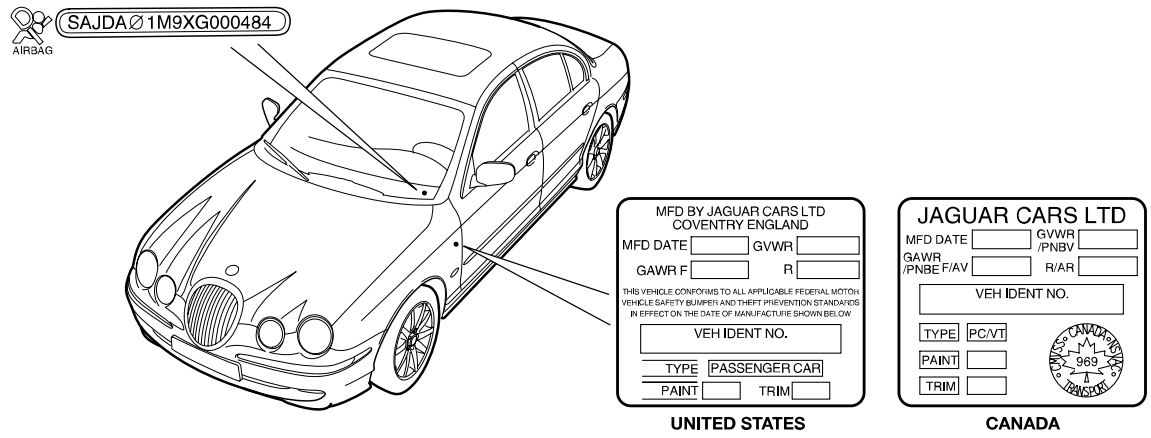
The Standard Corporate Protocol (SCP) Network is the primary network used for control module communication; CAN is not used.

## Engineering Codes and VIN Ranges

| **2000 MY S-TYPE** | | |
|---|---|---|
| **Variant** | **Engineering Code** | **VIN Range** |
| S-TYPE Sedan | X200 | L00001 – L77677 |
| **2001 MY S-TYPE** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| S-TYPE Sedan | X200 | L77678 – L86901 |
| **2002 MY S-TYPE** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| S-TYPE Sedan | X200 | L86902 – M44997 |

# IDENTIFICATION PLATES AND LABELS

**Identification Label Locations**



## LIFTING AND JACKING

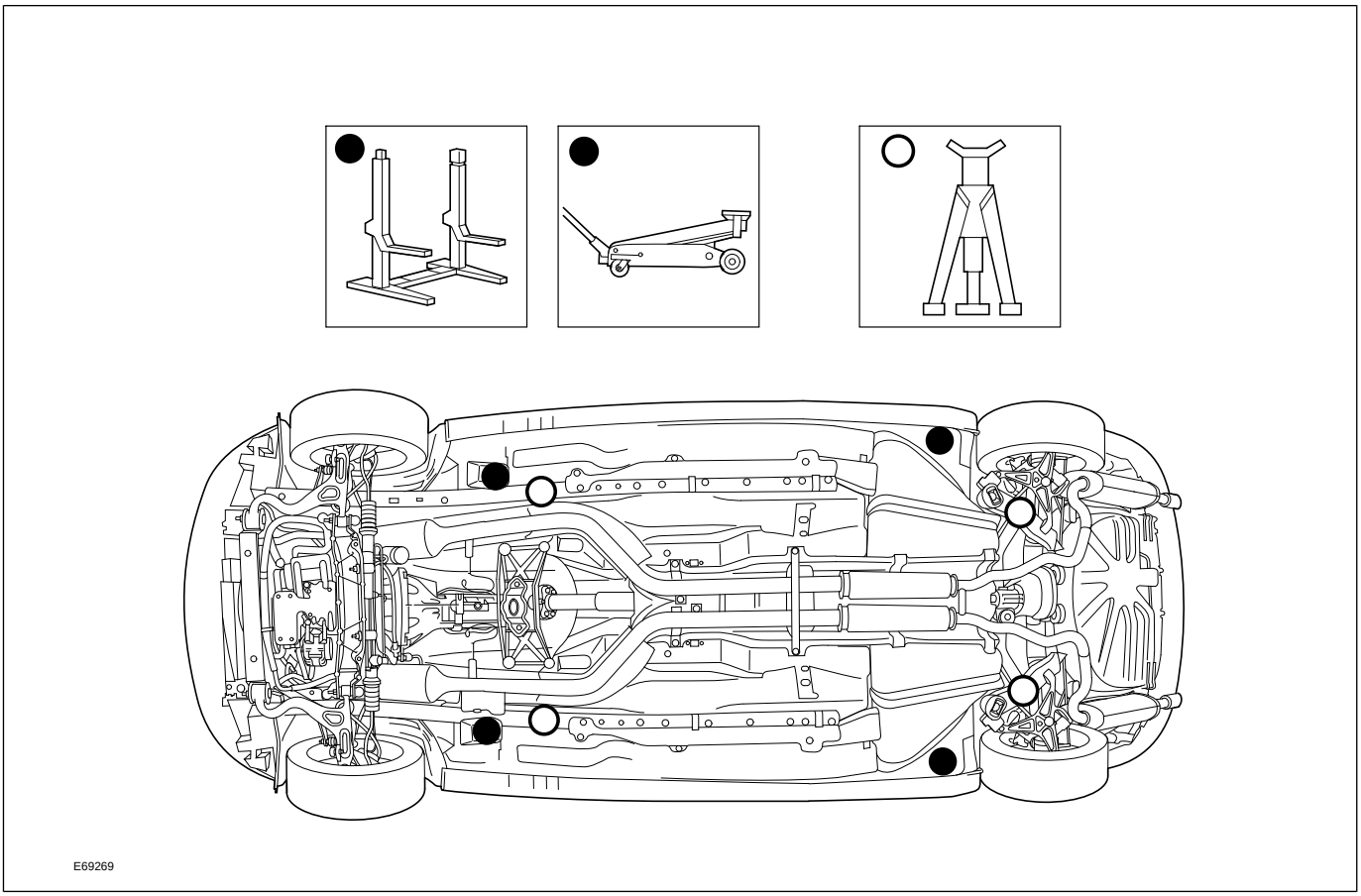
**CAUTIONS:**

⚠ **Do not allow the hoist adapters to contact the steering linkage, suspension arms, stabilizer bar, or rear subframe stabilizer brackets, or to compress the lower suspension arm stabilizer bar insulator. Damage to the suspension, exhaust and steering linkage components may occur if care is not exercised when positioning the hoist adapters of two-post hoists prior to lifting the vehicle.**

⚠ **Never use the differential housing as a lift point. Damage to the differential housing and cover may occur.**

⚠ **When using a floor jack, a cushioned pad must be used to avoid body damage.**

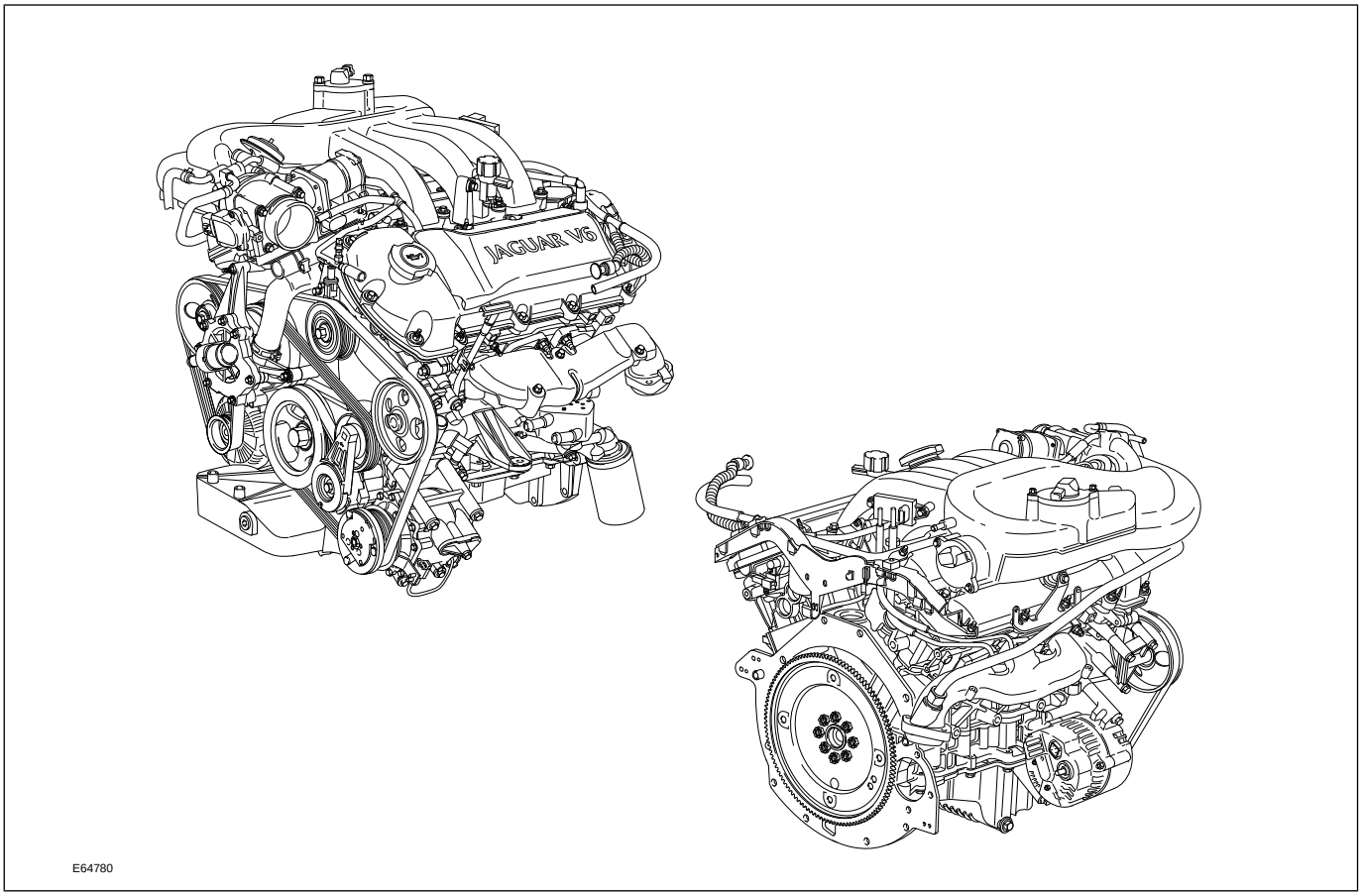
**Vehicle Jacking Points**



## OVERVIEW

The S-TYPE sedan has a longitudinal powertrain providing rear-wheel drive. The vehicle is available with either a 3.0-liter V6 or a 4.0-liter V8 engine, both normally aspirated. The V6 engine, designated AJ60, was introduced to the Jaguar range with the S-TYPE. The engine is of a lightweight but rigid design with particular attention paid to minimizing noise and vibration. A major innovation is the use of a variable geometry air intake manifold, which provides various combinations of tuned plenum volumes and flow paths. Two valves are controlled by the engine management system to fully open or fully close, dependent on engine speed, to the combination which maximizes volumetric efficiency. A two-stage variable valve timing system is also fitted. These two systems work together to achieve high torque delivery across a wide engine speed range.

**AJ60 3.0L V6 Engine**




The V8 engine, designated AJ28, is a development of the established V8 engine fitted to XJ and XK vehicles. The AJ28 incorporates the latest modifications fitted to the AJ27 variant – in particular the continuously-variable valve timing system and air-assisted fuel injection.

Both the V6 and the V8 engine are fitted with a common electronic throttle which does not require a mechanical cable. Another feature, common to both engines, is the returnless fuel system, which reduces the formation of fuel vapor (evaporative emissions).

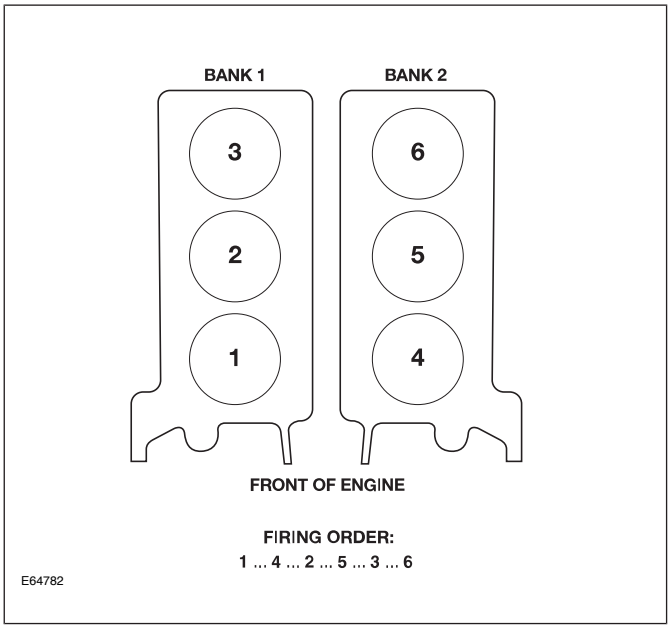
# DETAILS

## Engine Specifications

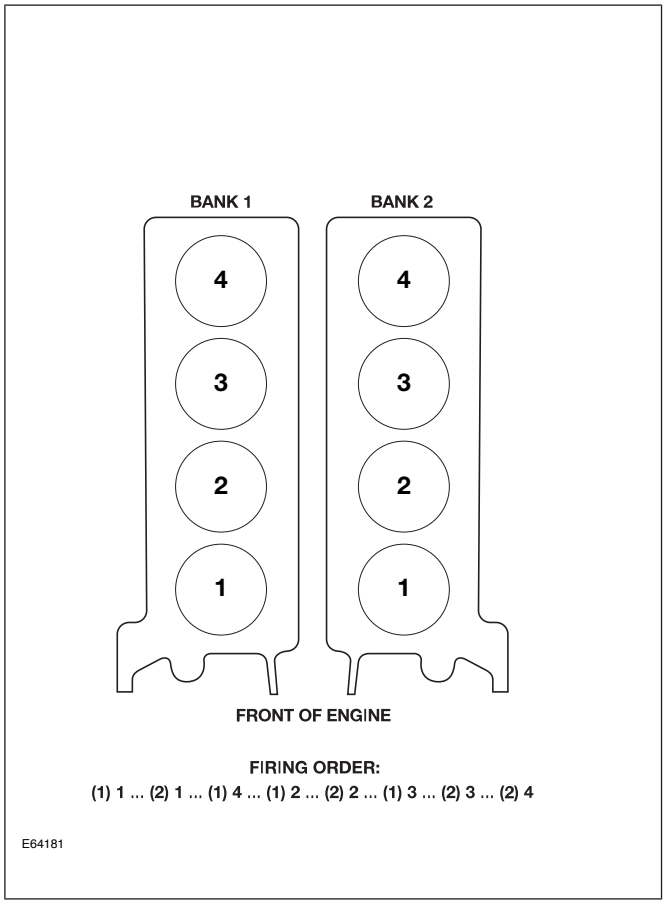
| | AJ60 3.0L V6 | AJ28 4.0L V8 |
|---|---|---|
| **Configuration** | 60° V6 | 90° V8 |
| **Cylinder Head** | – Dual overhead camshafts<br>– 4 valves per cylinder | – Dual overhead camshafts<br>– 4 valves per cylinder |
| **Valve Clearances (cold)** | Intake: 0.175 – 0.225 mm (0.007 – 0.009 in.)<br>Exhaust: 0.325 – 0.375 mm (0.013 – 0.015 in.) | Intake: 0.18 – 0.22 mm (0.007 – 0.0085 in.)<br>Exhaust: 0.23 – 0.27 mm (0.009 – 0.011 in.) |
| **Bore** | 89 mm (3.504 in.) | 86 mm (3.386 in.) |
| **Stroke** | 79.5 mm (3.13 in.) | 86 mm (3.386 in.) |
| **Displacement** | 2.967 liters (181 $in^3$) | 3.996 liters (244 $in^3$) |
| **Compression Ratio** | 10.5 : 1 | 10.75 : 1 |
| **Maximum Power (SAE)** | 235 BHP at 6800 rpm | 272 BHP at 6100 rpm |
| **Maximum Torque (SAE)** | 216 lb. ft. at 4500 rpm | 279 lb. ft. at 4300 rpm |
| **Engine Oil Capacity** | Up to VIN L37177: 5.7 liters (6.0 qt.)<br>VIN L37178 ON: 6.5 liters (6.9 qt.) | 6.0 liters (6.4 qt.) |
| **Coolant Capacity (approx.)** | 10.4 liters (11 qt.) | 10 liters (10.6 qt.) |

# Engine Numbering and Firing Order

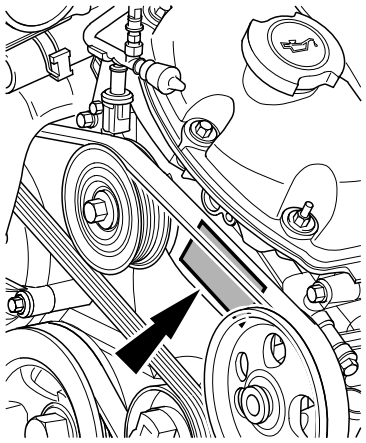
**AJ60 V6 Engine**



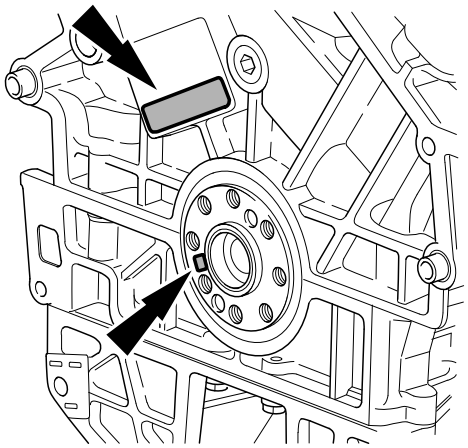

**AJ28 V8 Engine**



**Engine Data Locations (AJ60 Shown)**



ENGINE IDENTIFICATION CODE



MAIN BEARING SELECTION CODES

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## OVERVIEW

The Powertrain Electronic Control (PTEC) system is a comprehensive combined engine and transmission control system. The system is used on both the AJ60 3.0L V6 and the AJ28 4.0L V8 engine installed in the Jaguar S-TYPE. There are detailed sensor and control differences between V6 and V8, however the majority of the system is identical in its functions. PTEC complies with OBD II.

PTEC has several features that are unique from other Jaguar engine management systems:

- **Single control module**
  - A single Powertrain Control Module (PCM) performs both engine and transmission control functions.
- **SCP Network**
  - PTEC communicates only on the vehicle SCP (Standard Corporate Protocol) multiplex network.
- **Returnless fuel system**
  - The fuel delivery system is a supply-only system with no provision for returning unused fuel from the fuel rail to the fuel tank.
- **Full authority throttle**
  - PTEC employs a full authority electronic throttle assembly with no cable connection between the accelerator pedal and the throttle. The throttle assembly incorporates a separate control module with diagnostic capabilities.
- **Variable intake system (V6)**
  - V6 engines are equipped with a variable length air intake manifold that optimizes engine torque across the entire speed/load range.
- **Fail safe cooling (V6)**
  - V6 engines have a PCM “fail safe cooling” strategy that allows for limited engine operation with low or no coolant.

## Control Summary

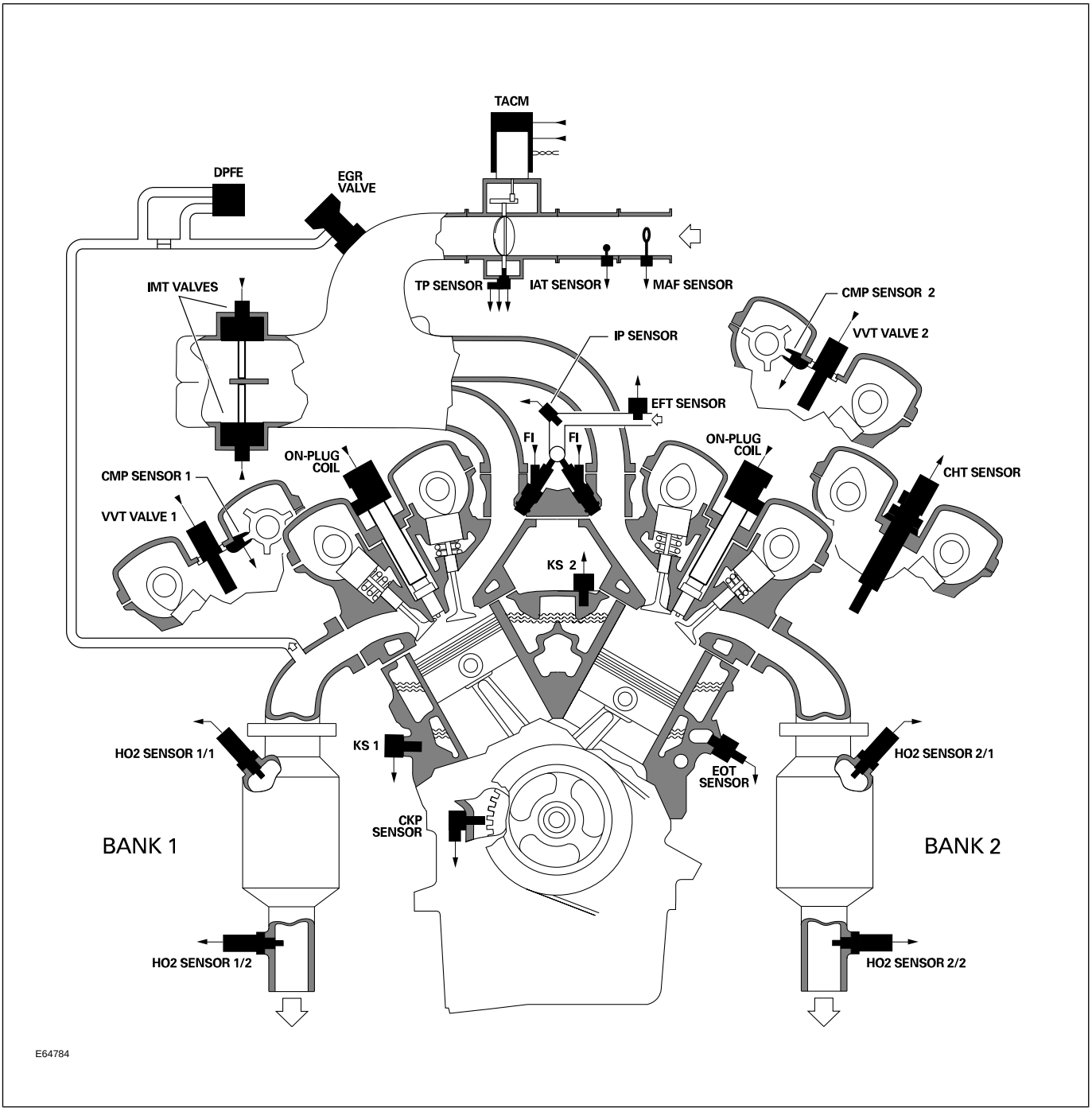
The engine management systems for the AJ60 3.0L V6 engine and the AJ28 4.0L V8 engine vehicles are virtually identical in function with differences in the control module parameters and the location of some components.

The major differences between the two systems are as follows:

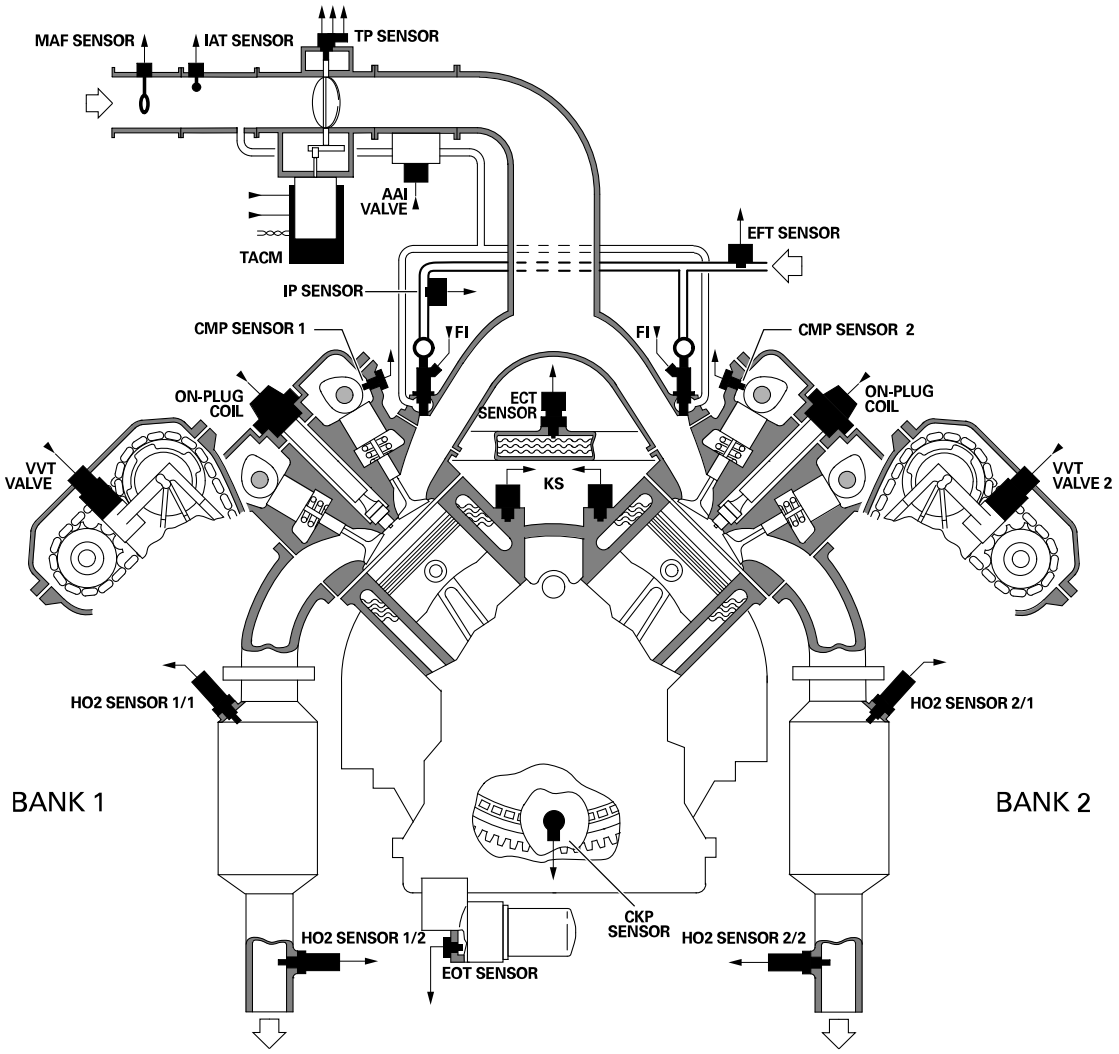
- **AJ60 V6**
  - Two-position variable valve timing (VVT)
  - Variable air intake system
  - EGR (exhaust gas recirculation) – 2000 MY only
- **AJ28 V8**
  - Continuously variable VVT
  - AAI (air assisted injection)

# COMPONENTS

**AJ60 3.0L V6 PTEC Components**



**AJ28 4.0L V8 PTEC Components**



## OVERVIEW

V6 and V8 Jaguar S-TYPE vehicles are equipped with the 5R55N 5-speed automatic transmission system.

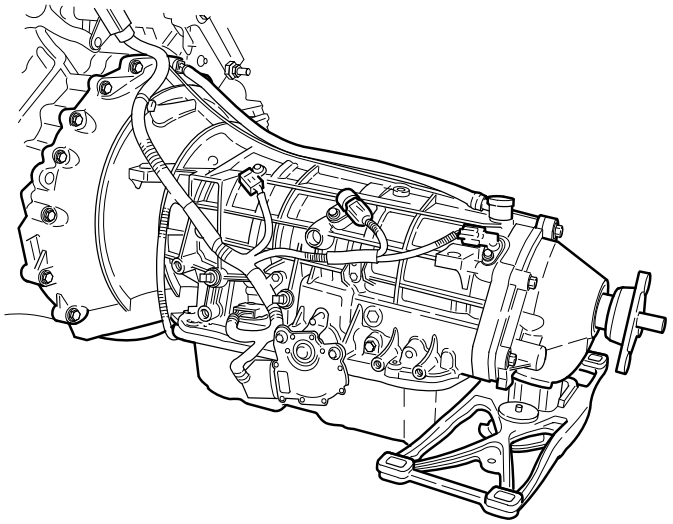
5R55N is interpreted as follows:

**5** – Five forward gears

**R** – Rear wheel drive

**55** – Torque capability code number

**N** – Type code



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| 5R55N Specifications | | | | | | |
|---|---|---|---|---|---|---|
| **Transmission weight** | 90 kg (198 lb.) with fluid | | | | | |
| **Mechanical features** | Torque converter with single-plate lock-up clutch<br>Three compound planetary gear sets<br>Three brake bands<br>Four multi-plate clutches<br>Three one-way clutches | | | | | |
| **Transmission fluid** | Capacity – 9 liters (9.5 quarts); Filled for life<br>Type – Mercon V Semi-Synthetic; Jaguar Part Number JLM 21044 (1 liter) | | | | | |
| **Transmission fluid cooler** | External, separate air-to-liquid cooler located below the air conditioning condenser | | | | | |
| **Towing** | 35 m.p.h. for 50 miles (flatbed recovery recommended) | | | | | |
| **Stall test** | Test in R, D, Manual 2, 3, 4; Maximum WOT – 5 seconds<br>V6 stall speed: 2533 – 3025 rpm; V8 stall speed: 2584 – 3009 rpm | | | | | |
| **Gear ratios** | **1st** | **2nd** | **3rd** | **4th** | **5th** | **Reverse** |
| | 3.25 | 2.44 | 1.55 | 1.00 | 0.75 | 3.07 |

## Service

There are no provisions for owners to verify the transmission fluid level, as the 5R55N transmission is not equipped with a transmission fluid dipstick. To inspect the fluid level and integrity, carefully follow the inspection procedure found in the Transmission section of the WSM, available on the GTR website.

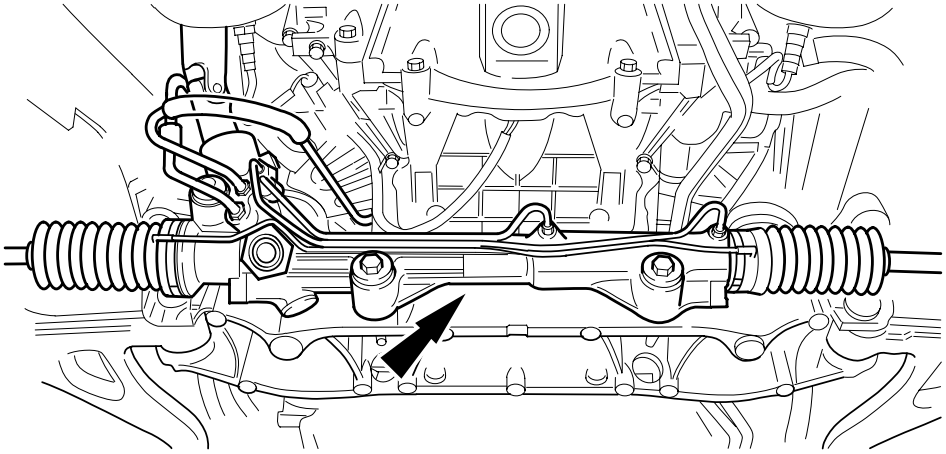
**NOTE:** There are no scheduled fluid level inspections required for 5R55N. Fluid level should only be checked if there are signs of an external fluid leak, or as part of the diagnostic process for customer complaint of poor shift quality.

## POWER ASSISTED STEERING (PAS)

The Jaguar S-TYPE has a variable-assist rack and pinion steering gear and variable rack ratio. Steering assistance decreases smoothly at a calibrated rate to raise driver steering efforts as vehicle speed increases.

**NOTE:** Refer to GTR for special bleeding procedures for the 2000 MY power steering system.

**Steering Rack**



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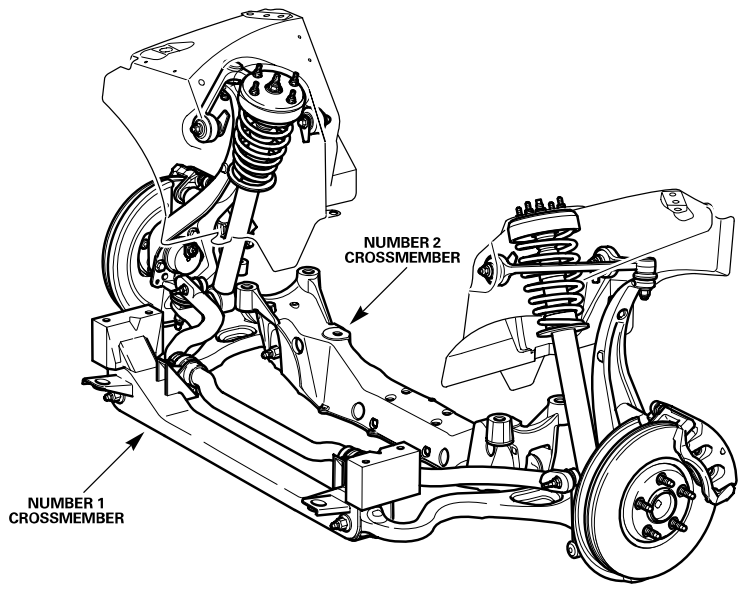
## FRONT SUSPENSION

The independent front wheel suspension is a double wishbone axle arrangement with aluminum control arms. The two arms are of different lengths, which minimizes the changes in track and camber. Inclination of the upper control arm axis provides anti-dive front suspension action. There are two front cross members, known as Number 1 and Number 2.

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Number 1, the forward cross member, is a steel fabrication, non-isolated, which locates the lower control arm front mounting, the anti-roll bar and the cooling module.

The rear cross member, Number 2, is an aluminum casting, non-isolated and it locates the lower control arm rear mounting, the power steering rack and the engine hydro-mounts.

No attempt should be made to weld or repair the aluminum crossmember. If it is damaged, a new one must be installed.

### Front Wheel Alignment

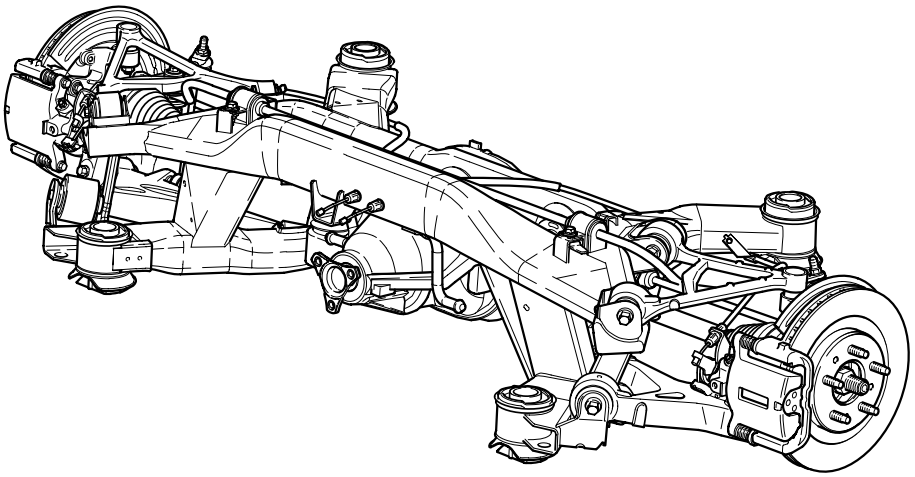
Special tool 501 F006 has been designed to enable correct alignment of the suspension to the body.

Service adjustments for caster and camber can be made to the lower control arm geometry with the addition of cam bolts (not supplied with the vehicle).

## REAR SUSPENSION

The rear suspension is a double wishbone arrangement with aluminum control arms. The rear crossbeam is steel fabricated and isolated to the body with four bushes.

The crossbeam locates the upper and lower control arms and the anti-roll bar. The control arms are aluminum castings.



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### Rear Wheel Alignment

Camber is not adjustable. Toe is adjustable via the threaded toe link.

## BRAKES

All X200 vehicles are equipped with the Teves Mk 20E anti-lock braking system (ABS).

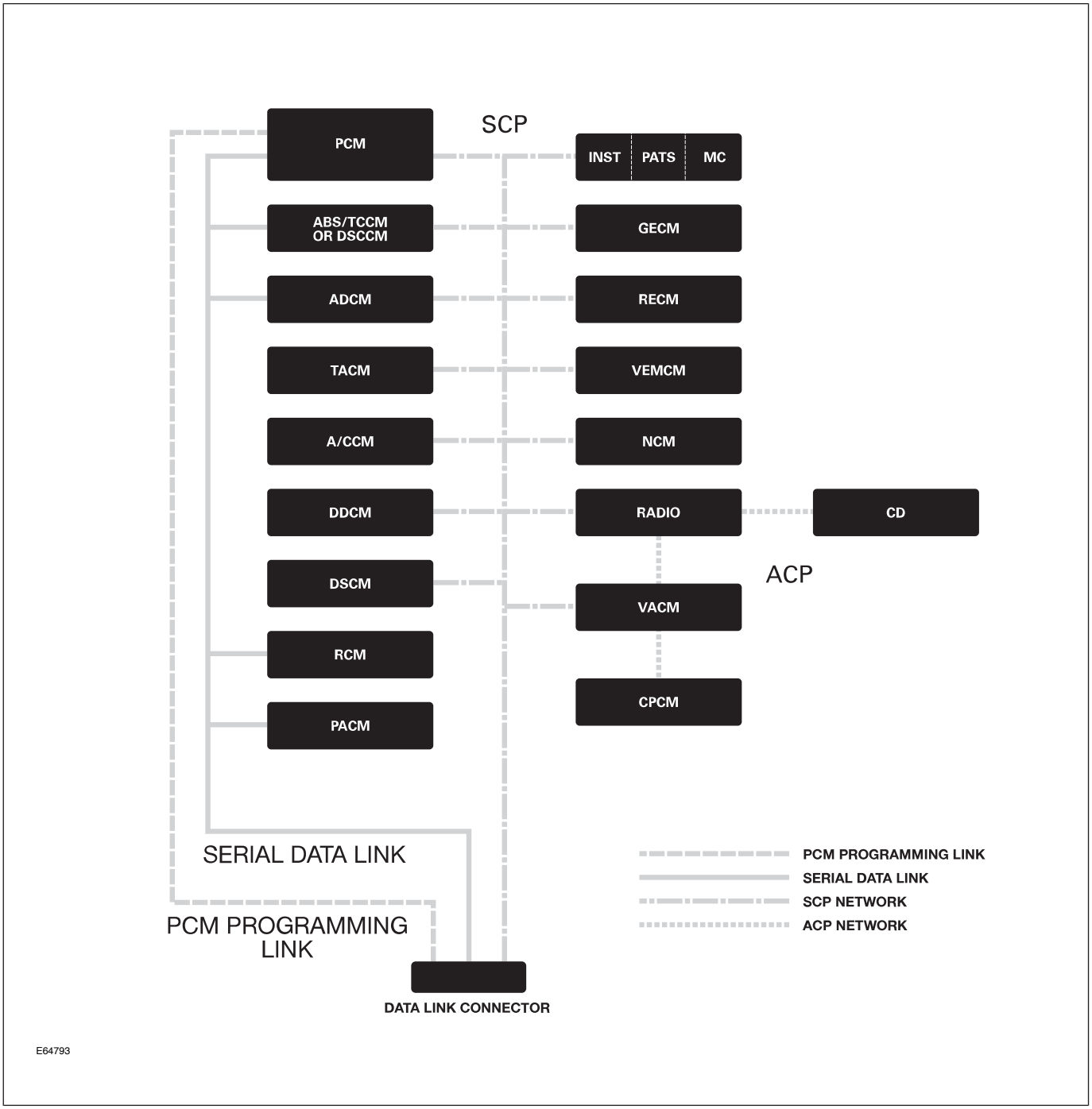
## CONTROL MODULES AND NETWORKS OVERVIEW

Three communication networks are used for control module intercommunication.

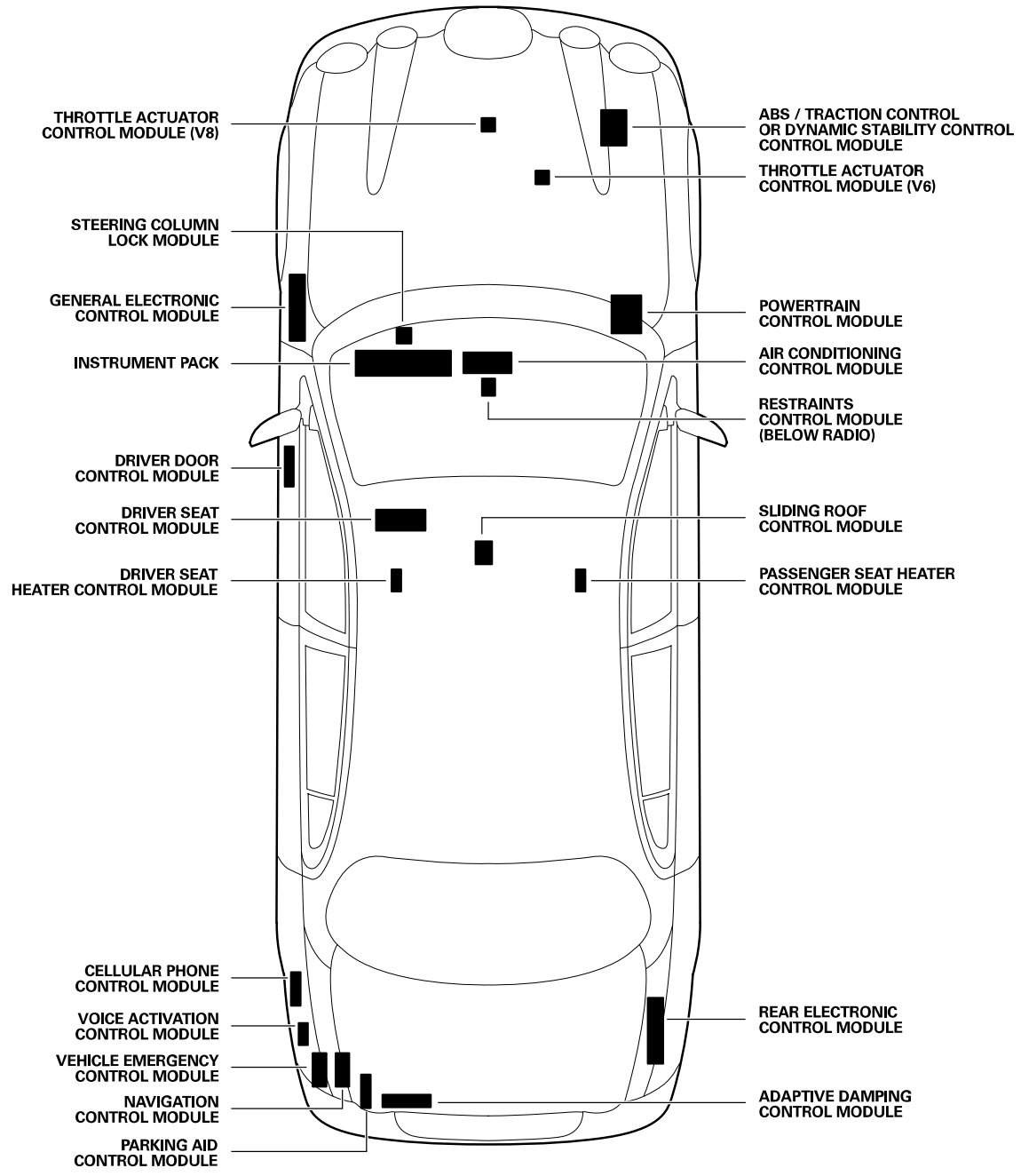
| Communication Networks | | | |
|---|---|---|---|
| **Network** | **Class** | **Speed** | **Communication Medium** |
| Controller Area Network (CAN) | C | 500 KBaud | Twisted pair copper wire |
| Standard Corporate Protocol Network (SCP) | B | 41.6 KBaud | Twisted pair copper wire |
| Audio Control Protocol Network (ACP) | B | 9.6 KBaud | Twisted pair copper wire |

A fourth network – ISO 9141 (Serial Data Link) – allows diagnostic interrogation, via the data link connector (DLC), but does not allow control module intercommunication. The ISO network communicates at 10.4 KBaud.

**Communication Network Layout**



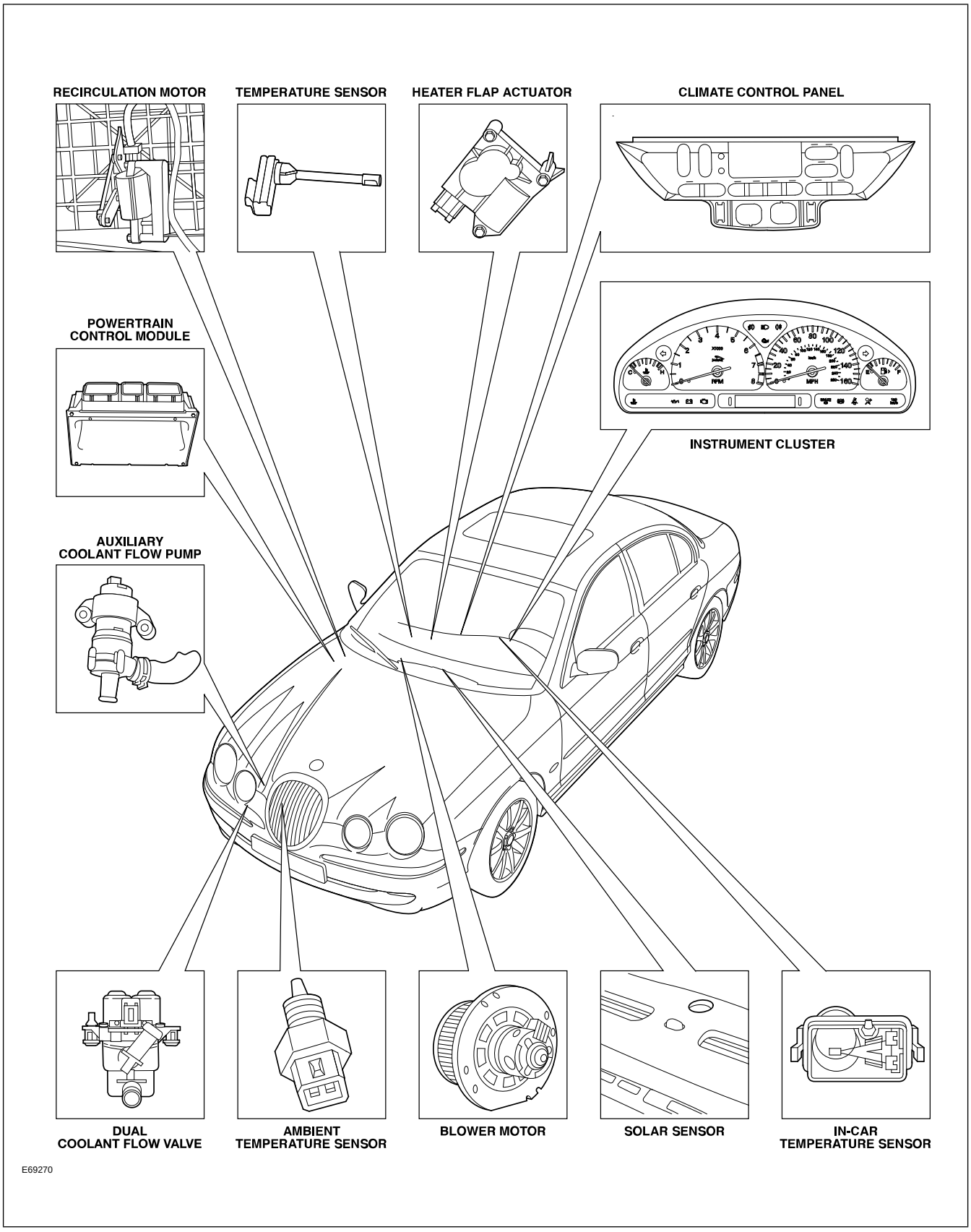
**Control Module Locations**



## CLIMATE CONTROL OVERVIEW

The Dual Automatic Temperature Control (DATC) climate control system is a compact system that provides a complete selection of driver controlled functions and additional automatic functions. The system was designed by Visteon for the Jaguar S-TYPE; most of the DATC functions and controls are similar to the existing Jaguar systems.

**DATC System Components**



## Control Summary

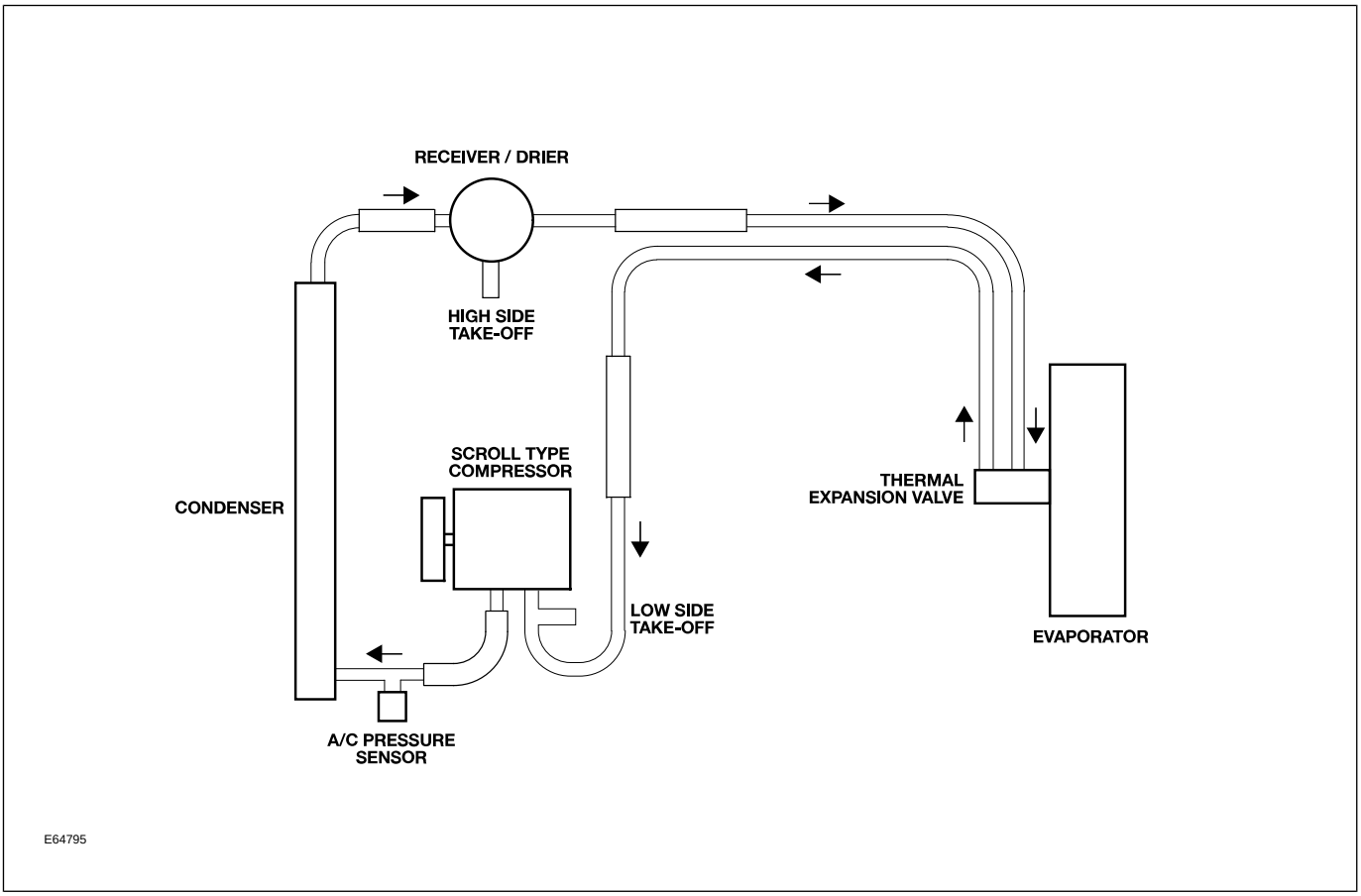
The A/CCM automatically maintains the selected driver and passenger interior temperatures and regulates the volume of airflow between the various system outlets. Separate driver and passenger discharge temperatures are made possible by the heater system that incorporates a partitioned dual zone heater core and dual coolant flow control valve.

### Discharge Air Temperature

The A/CCM attempts to provide both the driver and the passenger with their selected air temperature. If both of the selected temperatures cannot be achieved, the system is biased in favor of the driver. The rear seat passengers receive the air temperature selected for the person seated directly in front. Fan speed and air distribution are centrally controlled. Pressing and holding the AUTO button for two seconds equalizes the driver and passenger temperature selections.

## REFRIGERATION SYSTEM

The S-TYPE has a conventional R134a air conditioning refrigeration system. The installation of a variable displacement scroll-type compressor and the use of an air conditioning pressure sensor are components new to Jaguar. The system does not require the installation of mufflers.

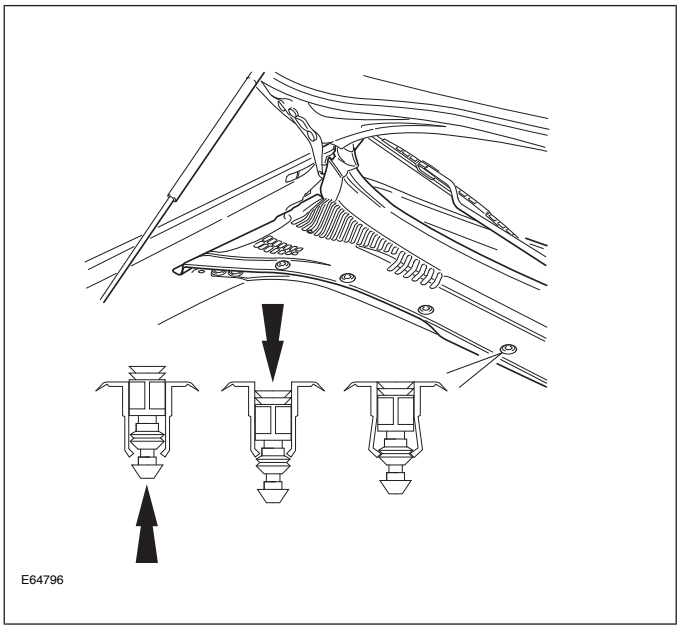


# SYSTEM DETAILS

## Climate Control Intake Air

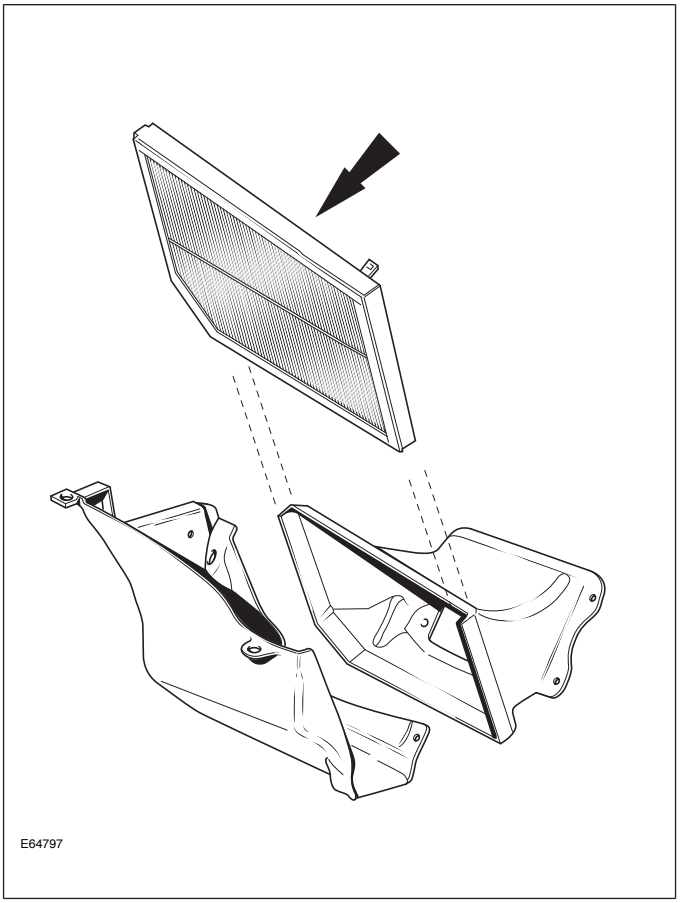
Exterior air enters the climate control system via the grill located at the base of the windshield on the passengers side of the vehicle. The grill can be removed by releasing the integral fasteners.

**Air Intake**




A serviceable climate control air filter is located in the duct connecting the air intake to the blower housing. The filter should be changed at 10,000 mile service intervals.

**Intake Air Filter**



## Power Windows

Only the drivers door window is equipped with one-touch down function. No initialization is required should the vehicle power supply be disrupted.

## Sunroof

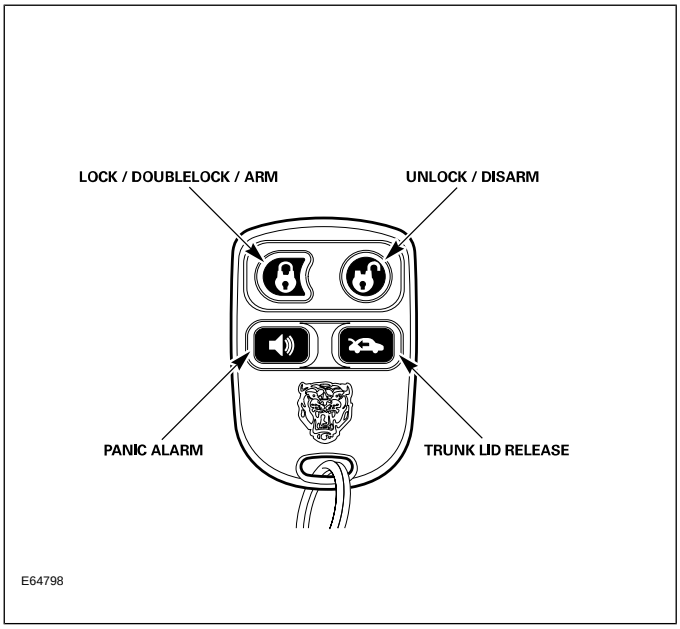
The sunroof has the following features:

- One-touch open
- Tilt open

## SECURITY SYSTEM OVERVIEW

The security system is controlled by a driver door control module (DDCM). When the security system is armed, unauthorized entry into the vehicle is detected by the courtesy lamp switches. When the alarm is triggered, the system flashes the turn signal lamps and sounds the alarm system horns.

### Key-ring Transmitter




The security system is controlled remotely by a battery-operated radio frequency (RF) transmitter. The transmitter is activated by pointing it towards the vehicle and pressing one of the operating buttons. RF transmitters will not operate if a key is in the ignition switch.

### Keys

Two black-headed keys and one green-headed key are supplied with the vehicle. The key number is recorded on a plastic tag which is attached to each key.

Each black-headed key will operate the ignition switch and lock the doors, luggage compartment and the glove box. The green-headed key is a valet key which will only unlock the doors (and not the glove box or trunk lid). The interior and exterior trunk switches will not unlock the trunk lid when the valet switch has been set.

An electronic device is fitted in the head of each key which is programmed to the vehicle electronics. When the key is placed in the ignition switch, the vehicle electronics recognize the correct key and allow engine start. The engine cannot be started with a key not programmed to the vehicle electronic systems.

Up to eight keys can be used provided the dealer programs them all to the vehicle.

## RF Transmitter Programming

As many as 5 transmitters can be programmed for each vehicle. All transmitters should be present for programming; transmitters not present will be erased from memory and will no longer function.

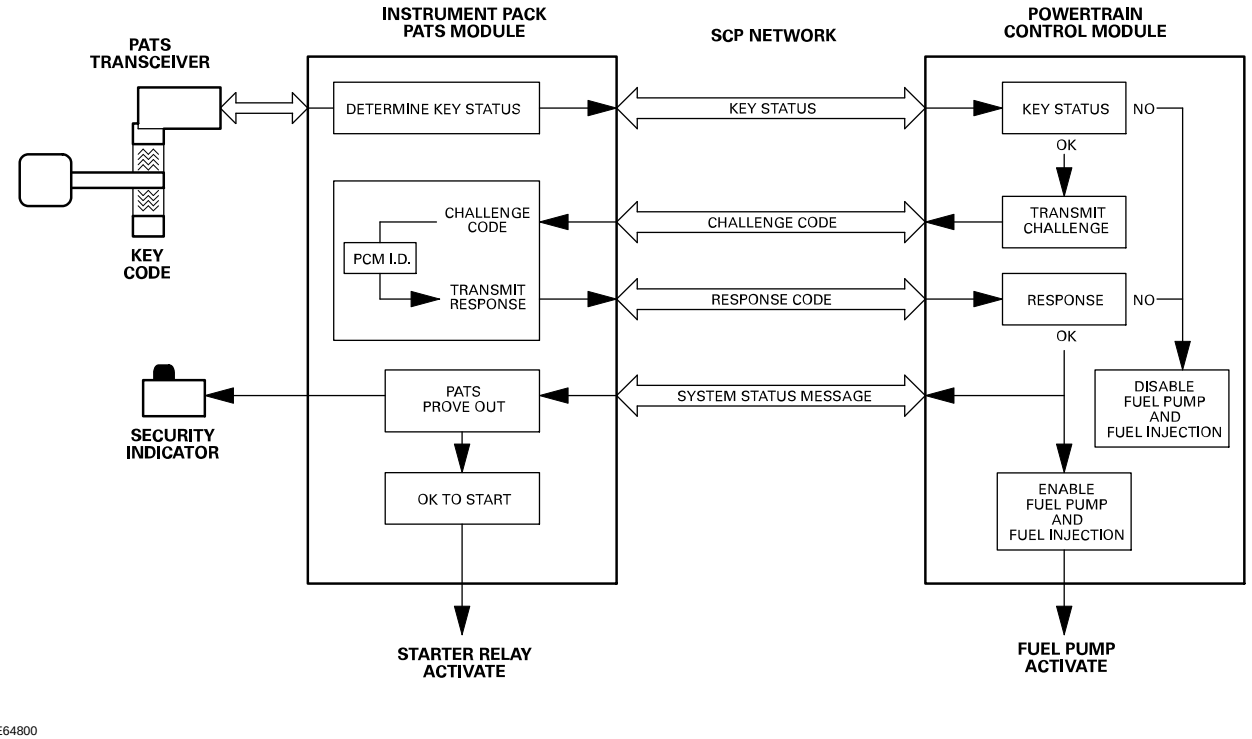
**Programming remote transmitters:**

1. Insert ignition key
2. Hold headlight stalk switch in the “flash” position while turning ignition key to position I (Auxiliary)
3. Flash headlamp switch 4 times. A confirmation chirp will sound and LED will flash once to indicate “Learn Mode” has been entered.
4. Activate each Remote Transmitter by pressing any button on the transmitter once. A confirmation chirp will sound and the LED will flash for each remote transmitter signal received.

## PASSIVE ANTI-THEFT SYSTEM

The Passive Anti-Theft System (PATS) function is split between the instrument cluster and the PCM. In order for the engine to crank and start, the instrument cluster must have read a valid ignition key code, and the correct information flow must have occurred between the instrument cluster and the PCM. Correct PATS operation can be determined by observing the security LED indicator flash response (illuminating for 3 seconds, then extinguishing). The security indicator, located on top of the fascia, will also flash fault code information.

### PATS Operation




When the driver inserts the ignition key into the ignition switch key barrel, the Key-In switch closes and applies B+ voltage to the instrument cluster. This signal causes the instrument cluster to read the PATS key transponder code stored in the ignition key and compare it with those stored in memory.

The result of this comparison is transmitted to the PCM via the SCP network. If the key code is OK, the PCM will send a challenge code to the instrument cluster. If the correct response to the challenge code is received within one second, the PCM will enable fuel pump operation and fuel injection. Simultaneous with the PCM challenge, if the key code is OK, the instrument cluster will complete the starter relay coil circuit to ground when the ignition switch is moved to position III (START).

The PCM will not enable fuel pump operation or fuel injection if any of the following conditions exist:

- The ignition key code is not recognized (theft signal).
- A response to a challenge code has not been received within one second.
- An incorrect response to a challenge code has been received.

## Key Transponder Programming

At least two functional keys must be present to program up to 6 additional key transponders, for a total of 8 functional key transponders. ALL keys intended for use must be present for programming sequence with or without WDS.

**Programming additional transponders without WDS:**

1. Insert the first key and switch the ignition to II (RUN). Remove the key within 5 seconds.
2. Within 5 seconds from removing the first key, insert the second key and switch the ignition to II (RUN).
3. If additional keys are to be programmed, insert one of the remaining keys within 10 seconds from the preceding key removal. Switch the ignition to II (RUN). Remove the key within 5 seconds.

Repeat step 3 with each key to be programmed. All keys must be programmed within a 30-second window, from the first to the last key.

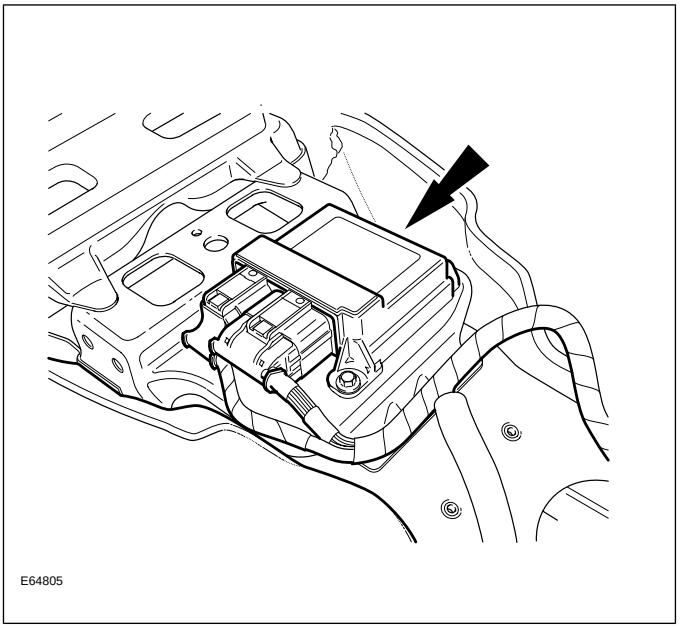
**Programming additional transponders with WDS:**

1. Select “Guided Diagnostics” from the Main WDS Menu, then select “Vehicle Setup”.
2. Select “Vehicle CM Set Up/Configuration”. Follow the on-screen prompts for key programming.

## OVERVIEW

The Supplemental Restraint System (SRS) provides impact sensing, control of deployment and fault diagnosis of the control module, airbags, seat belt pre-tensioners and associated circuits. Most of these functions are carried out by the Restraints Control Module (RCM).

**Restraints Control Module**




A front impact triggers the driver and passenger airbags and both seat belt pre-tensioners, provided the impact is above the set threshold as detected by the two longitudinal sensors in the RCM.

When a side impact occurs, the lateral safing sensor in the RCM must also agree with an impact detection signal received from either the LH or RH Side Impact Sensor in order to deploy the corresponding airbag.

**NOTE:** An impact at an oblique angle may cause both frontal and side airbags to deploy, depending on how much lateral acceleration is sensed.

The RCM is bolted to the top of the driveshaft tunnel below the center stack. Due to the importance of the module being securely fixed to the vehicle body, the ground connection is made via a fixing bolt and is monitored by the diagnostic system. A bad connection causes a fault code to be generated.

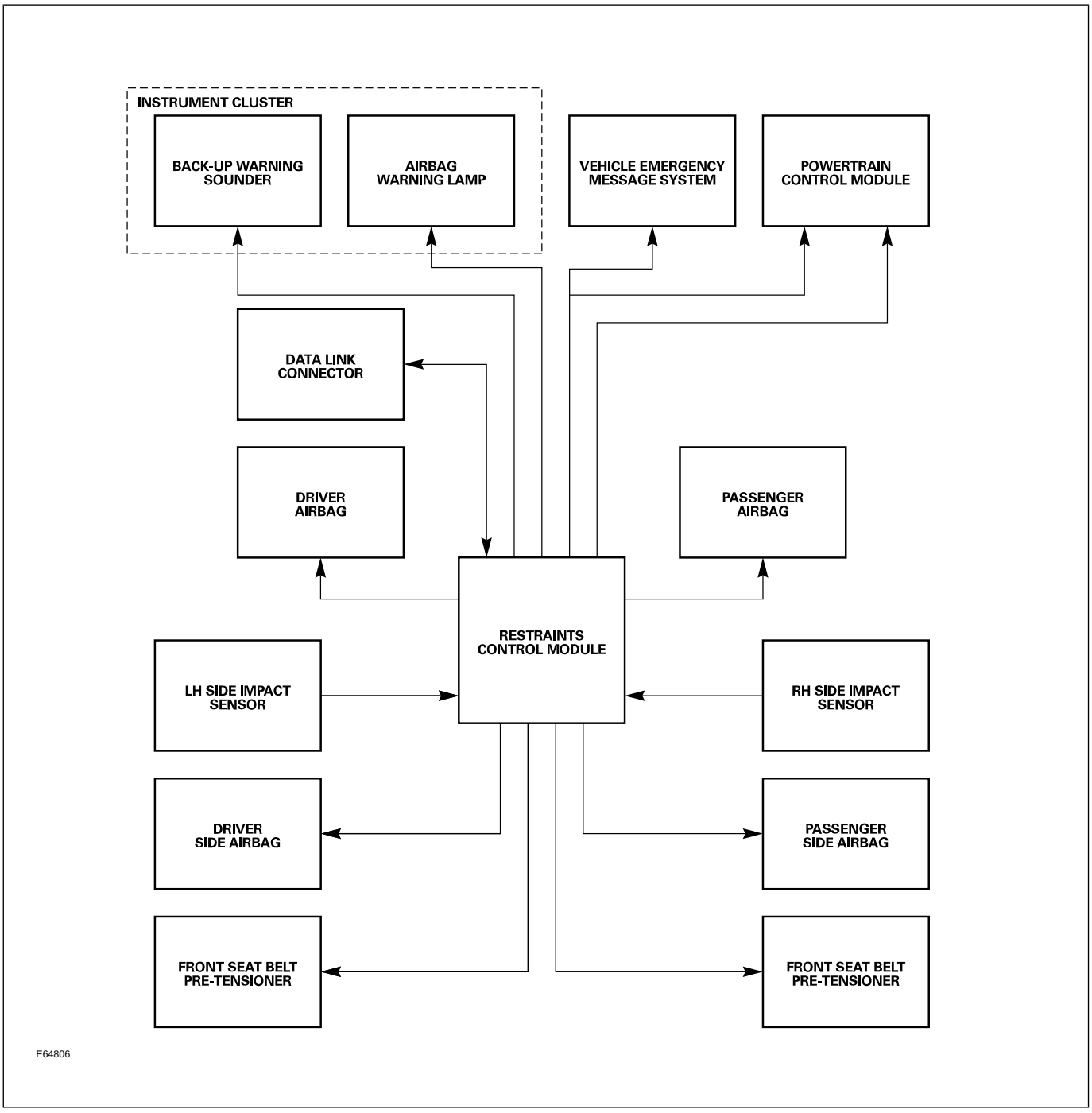
**NOTE:** The torque settings are safety-critical and the figures given in GTR Service Instructions must be adhered to.

⚠ **WARNING: Read and observe all safety precautions in GTR (Global Technical Reference) and service bulletins before attempting to service the SRS.**

**Do not attempt to measure the circuit resistance through the airbag modules or pre-tensioners with a DVOM. Doing so may trigger airbag deployment and result in personal injury.**

**To disarm the SRS, disconnect the battery negative cable and wait a minimum of two minutes for the reserve power charge to dissipate.**

## Restraint System Control



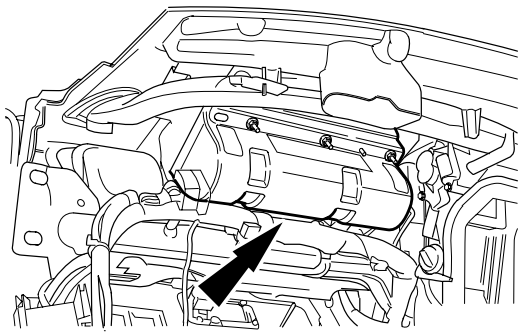
# AIRBAGS

## Driver Airbag

The driver airbag module is fitted in the center of the steering wheel and is of conventional design. A reduced charge propellant ("de-powered") is used to minimize impact effects where the driver is seated close to the wheel.

The module is secured by two side screws on the left and right underside of the steering wheel.

## Passenger Airbag


E64807

⚠ **WARNING: Do not place objects on the passenger airbag deployment panel. Injury could occur if the airbag contacts an object during inflation.**

The passenger airbag uses a heated gas inflator (HGI) system instead of a solid propellant. This system is inherently "clean" since the inflation gas is a lean hydrogen/air mixture and the by-products are water vapor and air. Although the gas is not classified as an explosive, the possible effects of accidental deployment when handling or working close to the unit are similar to those of other types of airbag. It is recommended that current safety procedures are also followed when handling the HGI modules.

The HGI airbag module has fewer components than previous types, consisting of:

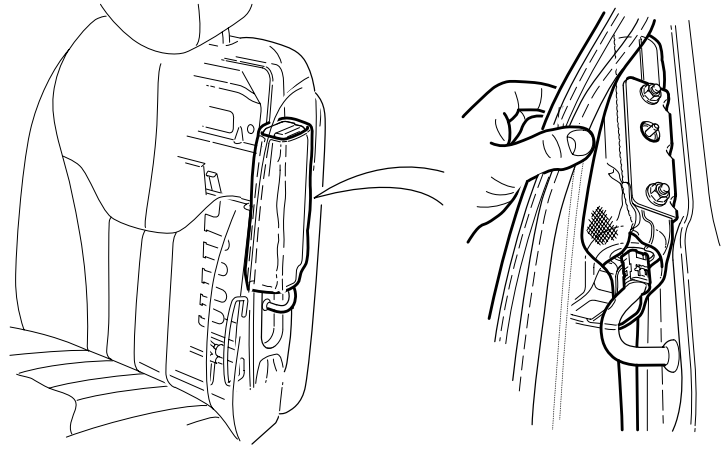
- 140-liter bag
- Aluminum pressure vessel containing a mixture of 12% hydrogen/88% air at a pressure of 180 bar
- Pressure vessel end plug with burst disc
- Pyrotechnic igniter assembly fitted to pressure vessel end plug

The igniter is electrically triggered from the Restraints Control Module (RCM). When triggered, the igniter fires a high speed "dart" along the length of the pressurized cylinder, producing a heated trail (due to friction) which causes rapid and even combustion of the gas throughout the cylinder. The igniter also ruptures the burst disc in the end plug, allowing the expanding gases from the pressure vessel to inflate the airbag. The airbag is a top mounted assembly and deploys in an upwards direction, climbing the windshield before folding downwards. After deployment, the bag deflates through two vents.

The airbag deployment door is an integral part of the top fascia molding. The airbag module is bolted to the underside of the fascia via a steel deployment chute and is also bolted to two brackets on the tubular cross car beam which supports the fascia assembly.

**NOTE:** The module is not "handed". To access the airbag module, the complete fascia assembly must be removed.

## Side Airbag



E64808

Side airbags are incorporated into the driver and front passenger seat squabs and are similar to those fitted to the XJ Series, using compressed argon to provide the inflation gas. The bag has a capacity of 19 liters and provides protection to both the head and chest regions.

The side airbag module is fixed to the outer seat frame and is located within a fabric deployment pocket. The pocket is stitched to the seat cover seam and when the module is triggered, this length of seam bursts to provide the deployment exit for the airbag.

If a damaged seat cover is to be replaced, the side airbag module must be removed and re-located in the deployment pocket of the new seat cover.

The complete seat must be replaced if the airbag has been deployed.

# IN-CAR ENTERTAINMENT (ICE)

## Selectable Features

The selectable features menu can be accessed by depressing and holding the menu button for 2 seconds.

The following options are available:

- 12/24 hour clock
- Traffic Announcement (TA)
- Alt Frequency (radio tunes to odd (for U.S. market) or even digits)
- Radio Data System (RDS) Time ON / OFF

## Setting the Clock

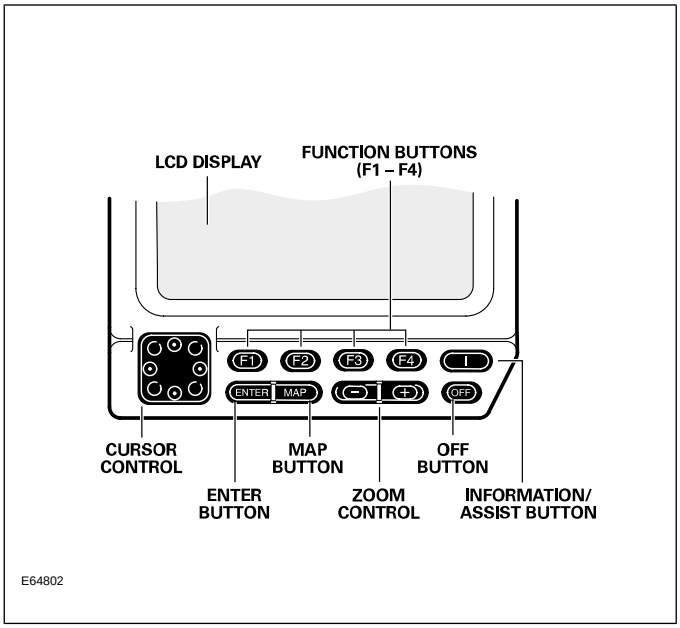
1. Press and hold the MENU button for at least two seconds
2. Press button 1 to adjust clock hours
3. Press button 2 to adjust clock minutes

## NAVIGATION SYSTEM (NAVITEK)

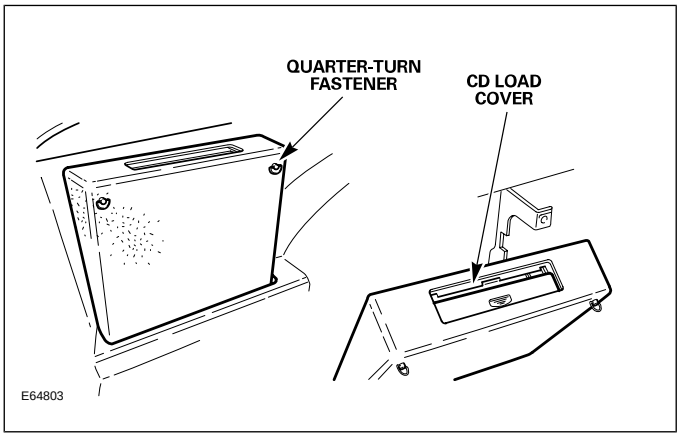
The navigation head unit is designed as an integral unit of the center stack, comprising a 5” full-color screen and the control switch assembly. The navigation control module/CD map loader is mounted in the rear LH side of the trunk and covered by a dedicated styled trim panel. The GPS antenna is located above the rear parcel shelf but hidden underneath the interior trim. Digital map information is held on a compact disk (CD) which is loaded into the navigation control module.

The LCD provides full information for operating the system by means of menus, text prompts and map displays. Screen selections are made by the controls on the front panel.

**Navigation Head Unit**




**Navigation Control Module / CD Loader**



Curriculum Training

# Introduction to Jaguar

## Introduction to S-TYPE: X202/X204/X206

JAGUAR

Technical Training

INTR 05 en 08/2005

INTR: X202/X204/X206

Please remember that our training literature has been prepared for TRAINING PURPOSES only. Repairs and adjustments MUST always be carried out according to the instructions and specifications in the workshop literature. Please make full use of the training offered by Technical Training to gain extensive knowledge of both theory and practice.

# Table of Contents

## Lesson 6 – Control Modules and Networks



## Lesson 7 – Climate Control



## Lesson 8 – Body Systems



## Lesson 9 – Security System



## Lesson 10 – Supplemental Restraint System

## Lesson 11 – Infotainment

## Workshop safety

This page highlights the general observations expected while attending this training program, and its continuation upon returning to your place of work.

## General

While working on all vehicles, the following items where available should always be used:

- Fender covers
- Seat covers
- Floor protection

## Safety

All precautions must be taken and observed at all times, to prevent injury or damage to the following:

- Yourself
- Customer's property
- Workshop equipment
- Work place colleagues

## Operating guidelines

While using any piece of workshop equipment:

The manufacturer's guidelines and warning labels must be followed.

This will ensure correct use and application at all times.

Seek the necessary advice or training where equipment usage is unclear.

## Chemicals, Oils and Solvents

Follow all manufacturer's warnings and labels; also take into account local disposal regulations when working with chemicals, oils or solvents.

Ensure that all risks are completely minimized.

Make sure that all protective items of clothing are worn where required e.g.

- Eye protection
- Gloves
- Coveralls
- Footwear

## System capping

Upon disconnecting components from a system, take all precautions necessary to prevent system contamination or environmental leakage.

Fit relevant plugs or caps i.e. to pipes, unions and component orifices etc.

## Updates

Keep abreast of all relevant changes that affect your role within the dealership, by monitoring all factory issued documentation.

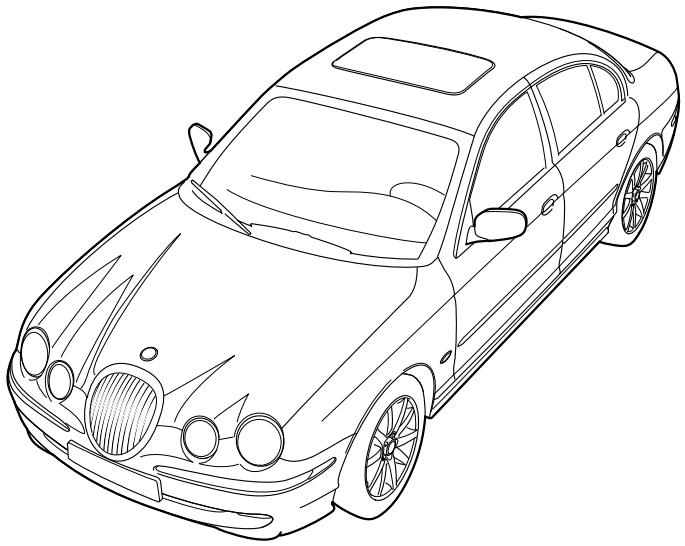
## Driving

Operating vehicle features, such as ICE, mobile phones and CD player equipment etc., can cause a momentary distraction while driving.

Follow all traffic regulations when operating vehicle systems or using diagnostic equipment while on the move.

Mobile diagnostic equipment operation may require the use of an assistant.

## OVERVIEW



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At first glance, the 2003 MY S-TYPE appears to have undergone only subtle changes; in fact there were extensive changes to the vehicle. New engine management systems were used on both the V6 and V8 engines. A new normally aspirated 4.2-liter V8 engine replaced the previous 4.0-liter V8. A supercharged 4.2-liter engine was fitted to the new S-TYPE R variant. The 5-speed automatic transmission was replaced with a 6-speed automatic transmission. A manual transmission was made available for the 3.0-liter V6 engine during the 2003 – 2004 model years. The front suspension was revised to enhance the steering-feel and reduce NVH (noise, vibration and harshness) and was strengthened to accommodate the introduction of the supercharged engine. Jaguar's Adaptive Restraint Technology System (ARTS) was fitted as standard to all 2003 – 2005 MY S-TYPE vehicles. The navigation system was upgraded from the Visteon-supplied CD-based system to a Denso-supplied DVD-based system with a 7” touchscreen.

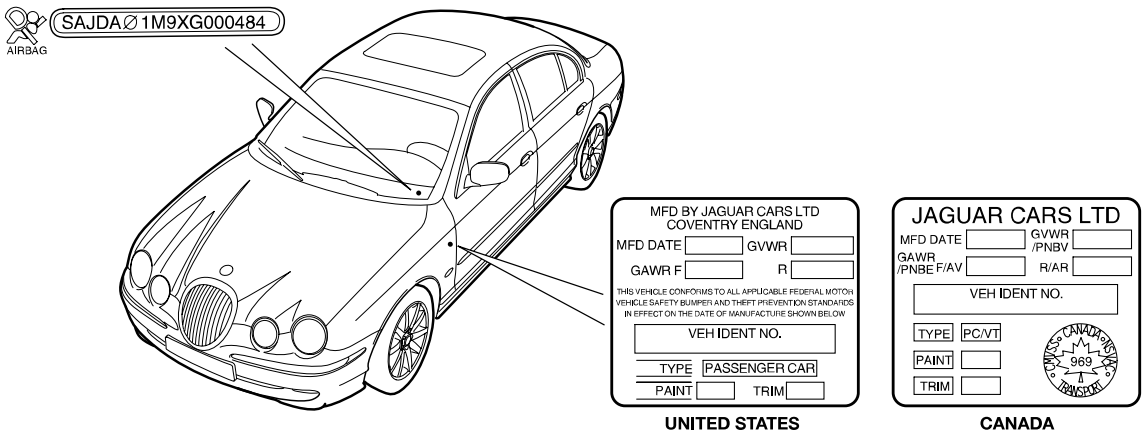
The 2005 MY S-TYPE was further refined with exterior changes that included an aluminum hood, new profile rear compartment lid, and restyled front/rear bumpers.

## Engineering Codes and VIN Ranges

| 2003 MY S-TYPE | | |
|---|---|---|
| **Variant** | **Engineering Code** | **VIN Range** |
| S-TYPE | X202 | M45255 – M94764 |
| S-TYPE R | X202 | |
| **2004 MY S-TYPE** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| S-TYPE | X202 | M94766 – N13088 |
| S-TYPE R | X202 | |
| **2005 MY S-TYPE** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| S-TYPE | X204 | N13089 – N52047 |
| S-TYPE VDP | X204 | |
| S-TYPE R | X204 | |
| **2006 MY S-TYPE** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| S-TYPE | X206 | Starting at N52048 |
| S-TYPE VDP | X206 | |
| S-TYPE R | X206 | |

# IDENTIFICATION LABELS

**Identification Label Location**



## LIFTING AND JACKING

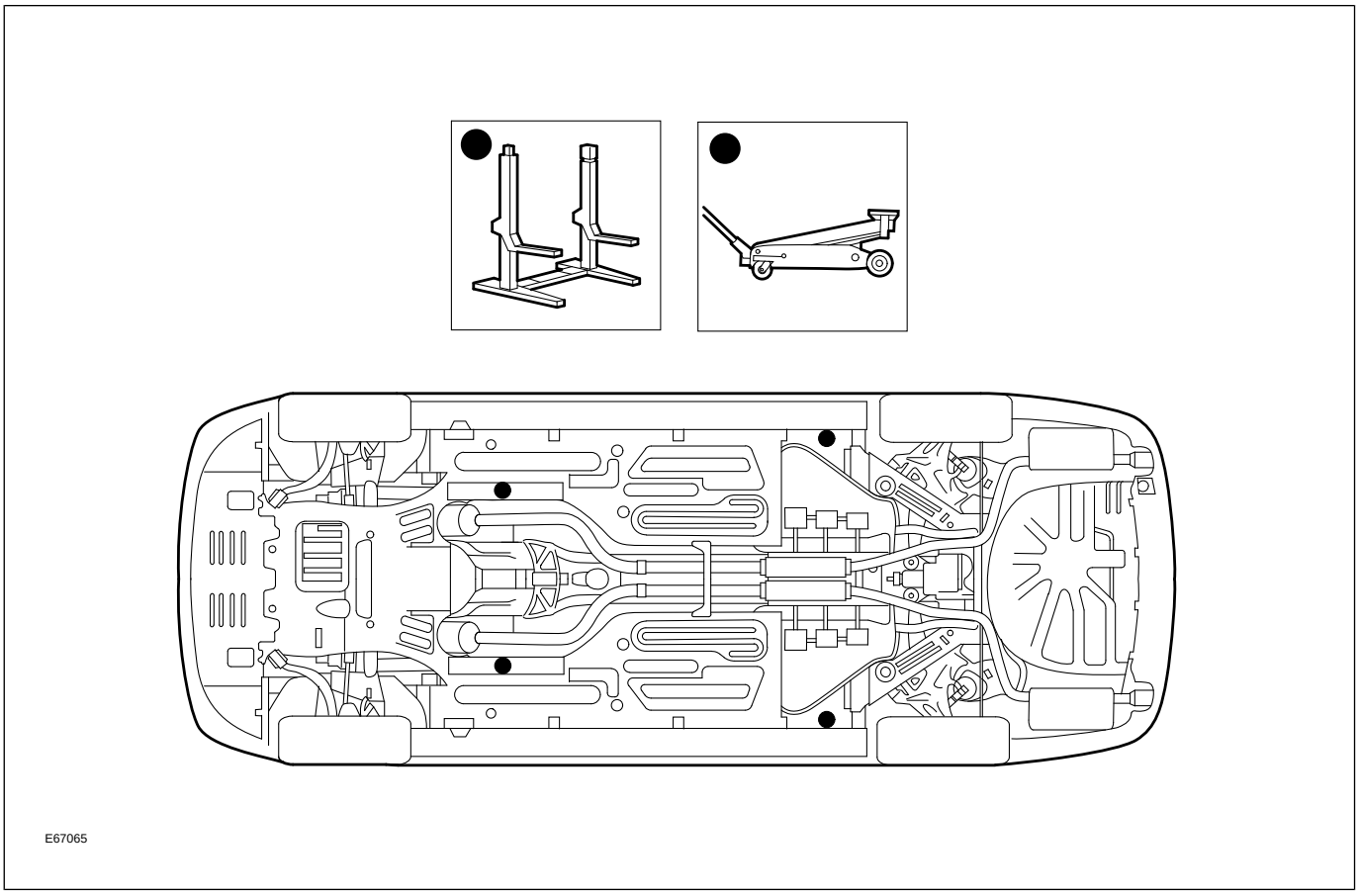
**CAUTIONS:**

⚠ **Do not allow the hoist adapters to contact the steering linkage, suspension arms, stabilizer bar, or rear subframe stabilizer brackets, or to compress the lower suspension arm stabilizer bar insulator. Damage to the suspension, exhaust and steering linkage components may occur if care is not exercised when positioning the hoist adapters of two-post hoists prior to lifting the vehicle.**

⚠ **Never use the differential housing as a lift point. Damage to the differential housing and cover may occur.**

⚠ **When using a floor jack, a cushioned pad must be used to avoid body damage.**

**Vehicle Jacking Points**



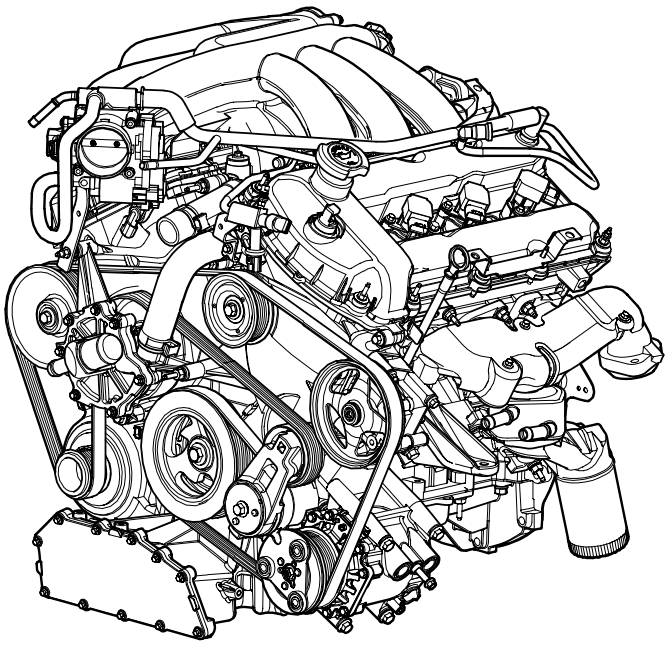
## ENGINES OVERVIEW

The AJ62 3.0-liter V6 and AJ33 4.2-liter V8 engines introduced in the 2003 MY S-TYPE were designed to power a new generation of Jaguar cars.

## AJ62 3.0L V6 Engine

The 3.0-liter V6 engine, designated the AJ62, is a further development of the 3.0L AJ60 engine first used in the 2000 MY S-TYPE. Some of the upgrades to the engine include revisions to the induction, variable valve timing, and engine management systems. The engine produces 235 bhp (SAE) at 6800 rpm and 216 lb.ft. (SAE) of torque at 4100 rpm.

**AJ62 3.0L V6 Engine**

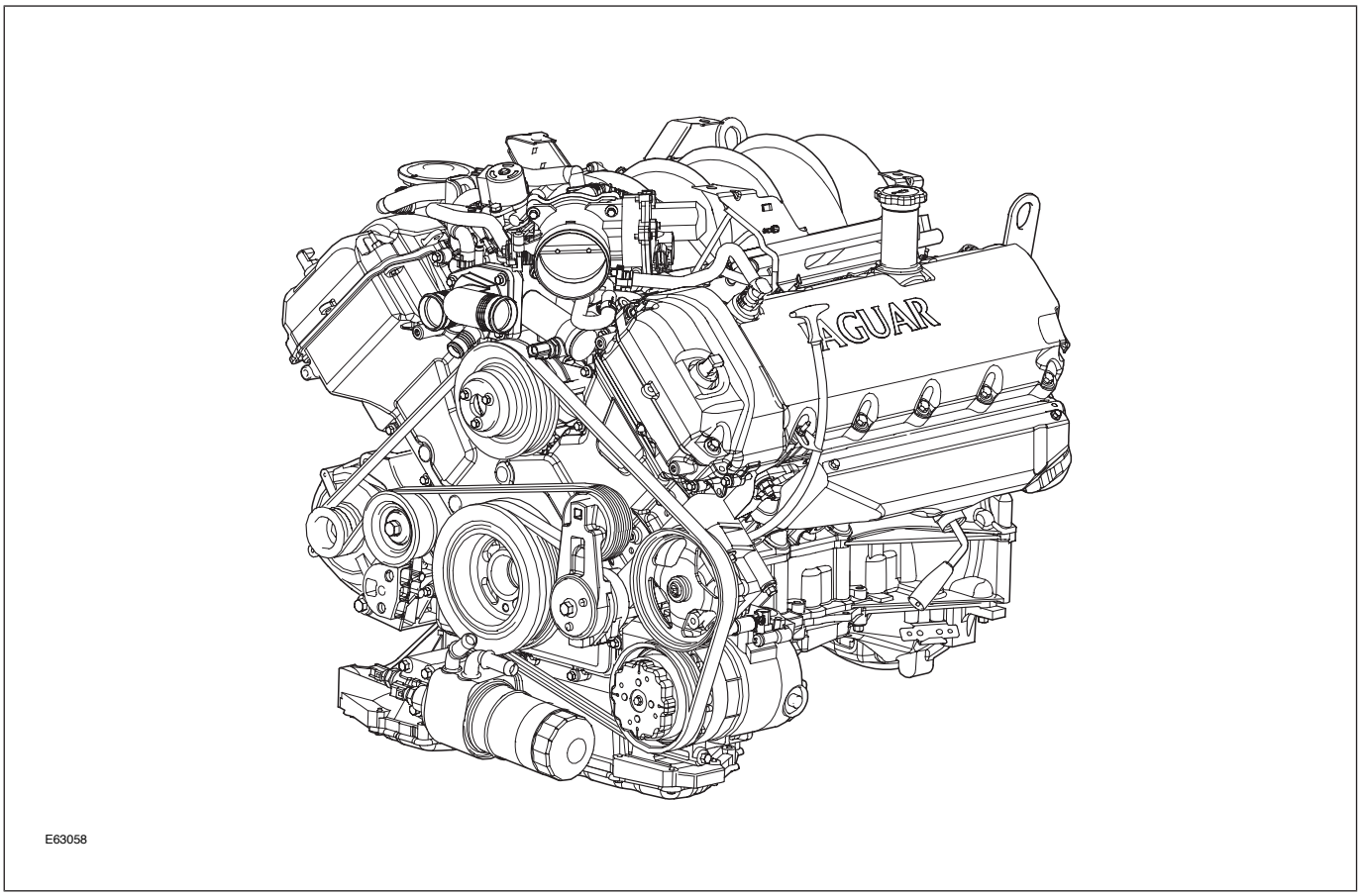


E67066

## AJ33 4.2L Normally Aspirated V8 Engine

The normally aspirated (N/A) 4.2-liter V8 engine develops 293 bhp (SAE) at 6000 rpm, a useful 7% boost over the 4.0-liter engine. Its maximum torque of 303 lb. ft. represents an 8% torque increase spread evenly over the entire engine speed range.

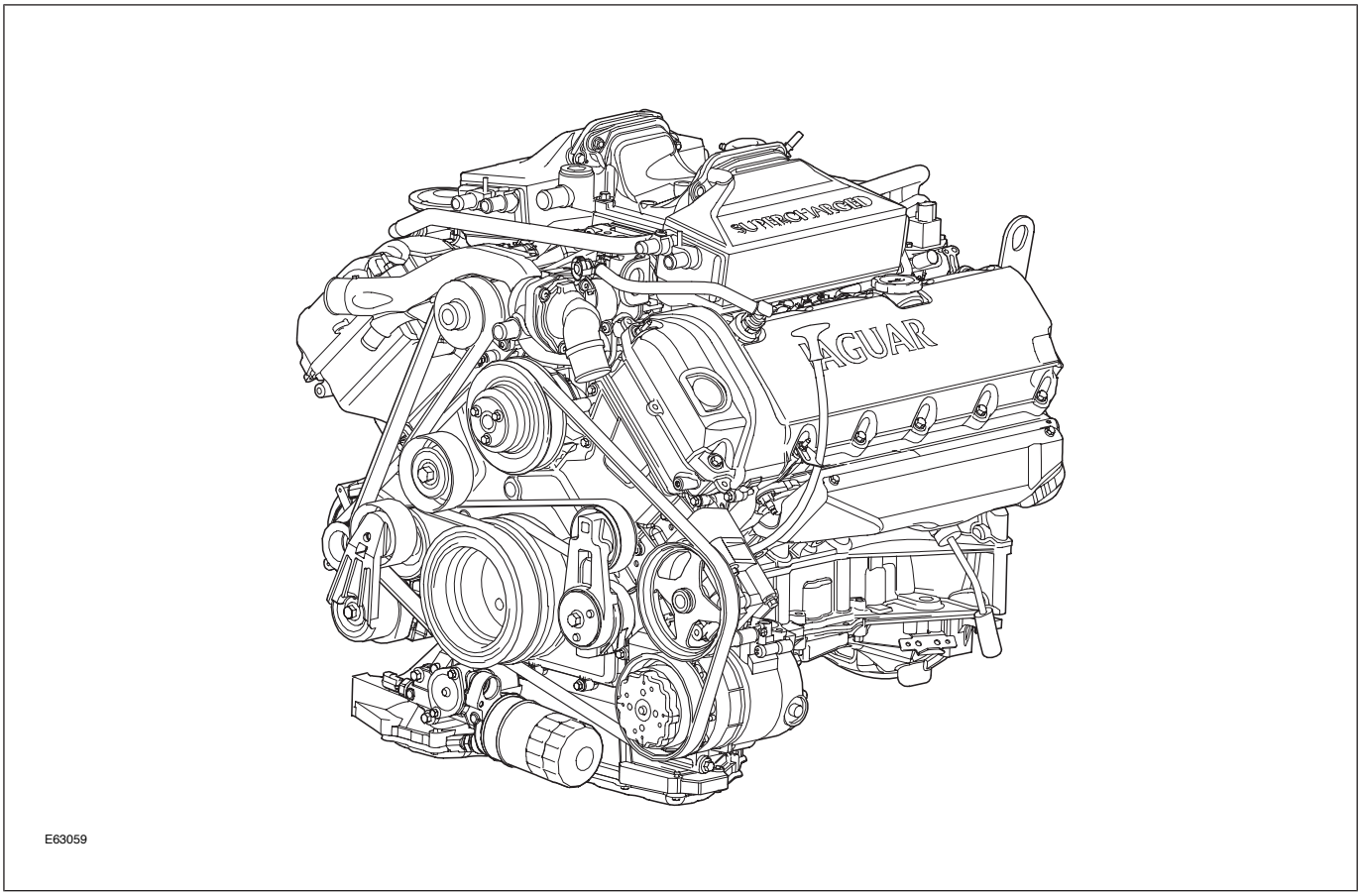
**AJ33 4.2L N/A V8 Engine**



## AJ33 4.2L Supercharged V8 Engine

The supercharged (SC) version of the AJ33 V8 engine shares several of the advanced technical features of its naturally aspirated counterpart. With the help of an Eaton supercharger, it develops 390 bhp (SAE) at 6100 rpm. This is a 33% increase over the 4.2L N/A engine.

**AJ33 4.2L SC V8 Engine**



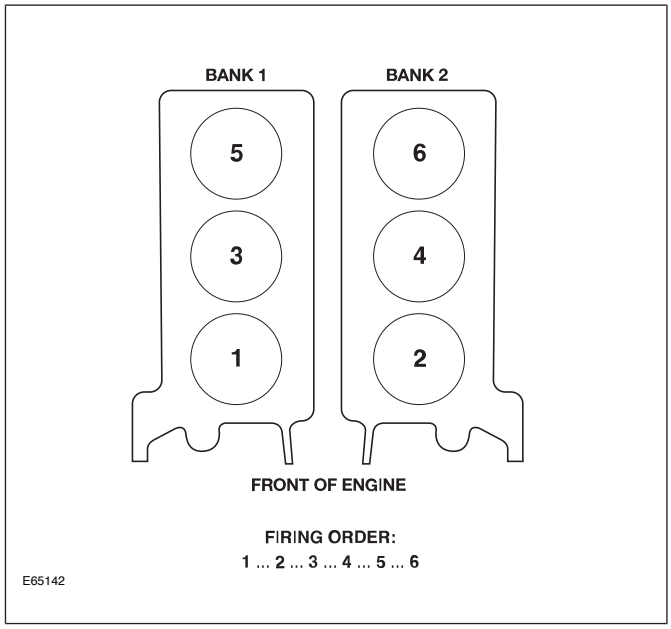
# DETAILS

## Engine Specifications

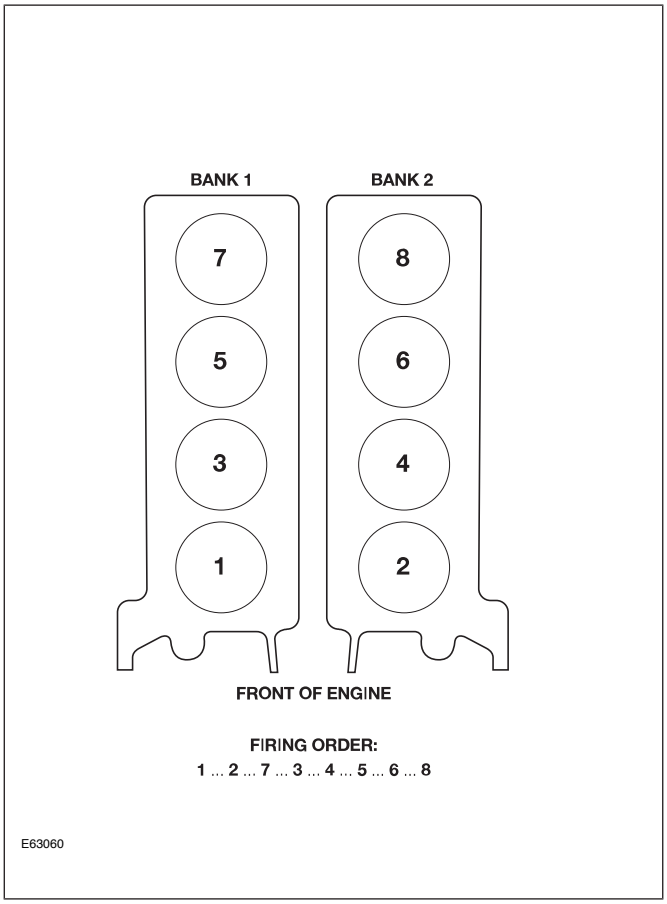
| | AJ62 3.0L V6 | AJ33 4.2L V8 (N/A and SC) |
|---|---|---|
| **Configuration** | 60° V6 | 90° V8 |
| **Cylinder Head** | – Dual overhead camshafts<br>– 4 valves per cylinder | – Dual overhead camshafts<br>– 4 valves per cylinder |
| **Valve Clearances (cold)** | Intake: 0.175 – 0.225 mm (0.007 – 0.009 in.)<br>Exhaust: 0.325 – 0.375 mm (0.013 – 0.015 in.) | Intake: 0.18 – 0.22 mm (0.007 – 0.0085 in.)<br>Exhaust: 0.23 – 0.27 mm (0.009 – 0.011 in.) |
| **Bore** | 89 mm (3.504 in.) | 86 mm (3.386 in.) |
| **Stroke** | 79.5 mm (3.130 in.) | 90.3 mm (3.555 in.) |
| **Displacement** | 2.967 liters (181 $in^3$) | 4.196 liters (256 $in^3$) |
| **Compression Ratio** | 10.5 : 1 | N/A: 11.0 : 1<br>SC: 9.1 : 1 |
| **Maximum Power (SAE)** | 235 BHP at 6800 rpm | N/A: 293 BHP at 6000 rpm<br>SC: 390 BHP at 6100 rpm |
| **Maximum Torque (SAE)** | 216 lb. ft. at 4100 rpm | N/A: 303 lb. ft. at 4100 rpm<br>SC: 399 lb. ft. at 3500 rpm |
| **Engine Oil Capacity** | 6.5 liter (6.9 qt.) | 6.0 liters (6.4 qt.) |
| **Coolant Capacity (approx.)** | 9.4 liters (9.9 qt.) | 9.4 liters (9.9 qt.) |

## Engine Numbering and Firing Order

**V6 Engine**

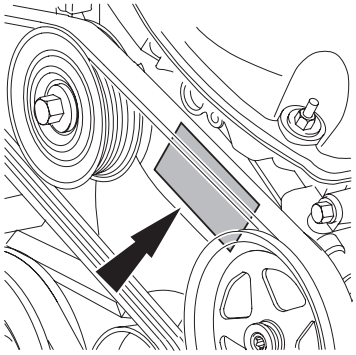



**V8 Engine**

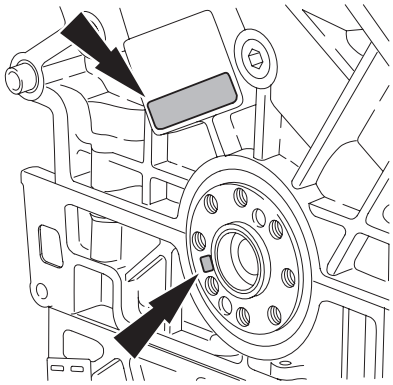


# Engine Identification Numbers

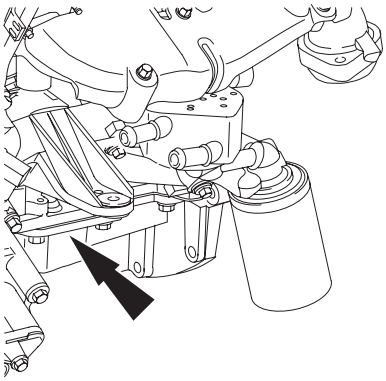
**V6 Engine**



ENGINE IDENTIFICATION CODES



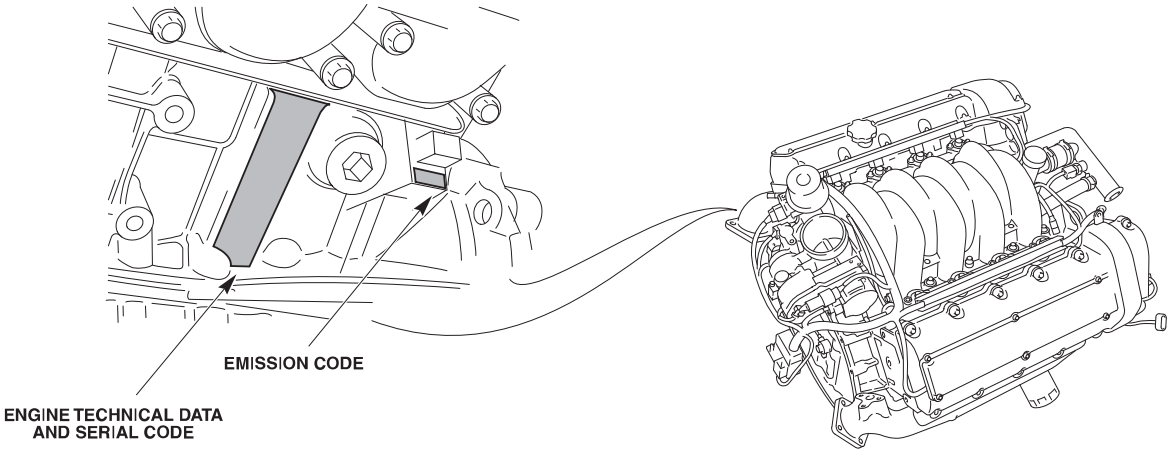
MAIN BEARING SELECTION CODES



SERIAL NUMBER AND EMISSION CODE

E67067

**V8 Engine**




E67413

## ENGINE MANAGEMENT OVERVIEW

The Jaguar/Denso 32-bit Engine Management System (EMS) was designed as a generic system applicable to all Jaguar engines in use across the model ranges. The system is built around a dual processor Engine Control Module (ECM). One microprocessor is dedicated to throttle control and diagnostics; the other microprocessor handles all other ECM functions, controls and diagnostics.

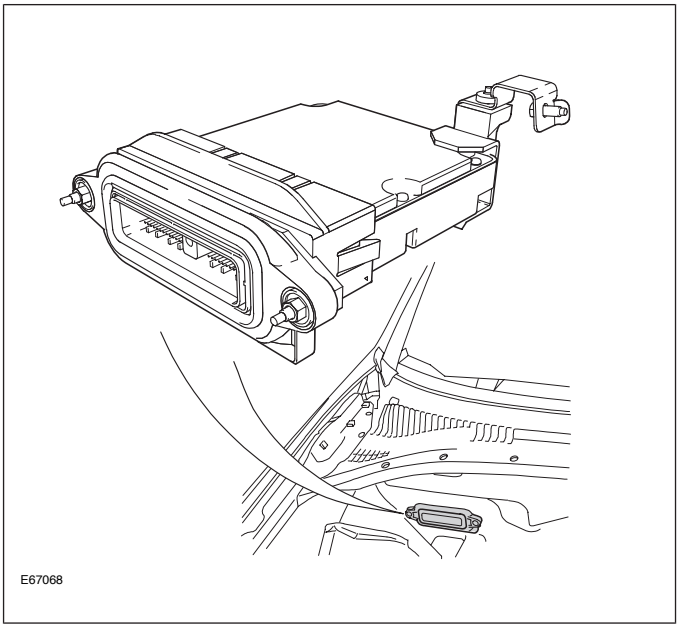
## ENGINE CONTROL MODULE

The Engine Control Module (ECM) is located in a recess into the passenger compartment, but is accessed underhood, on the RH dash panel.

The ECM is at the center of the system and provides overall engine control. Its function is dependent on the driver's requirements and the engine and vehicle state at any moment in time. Control can be subdivided as follows:

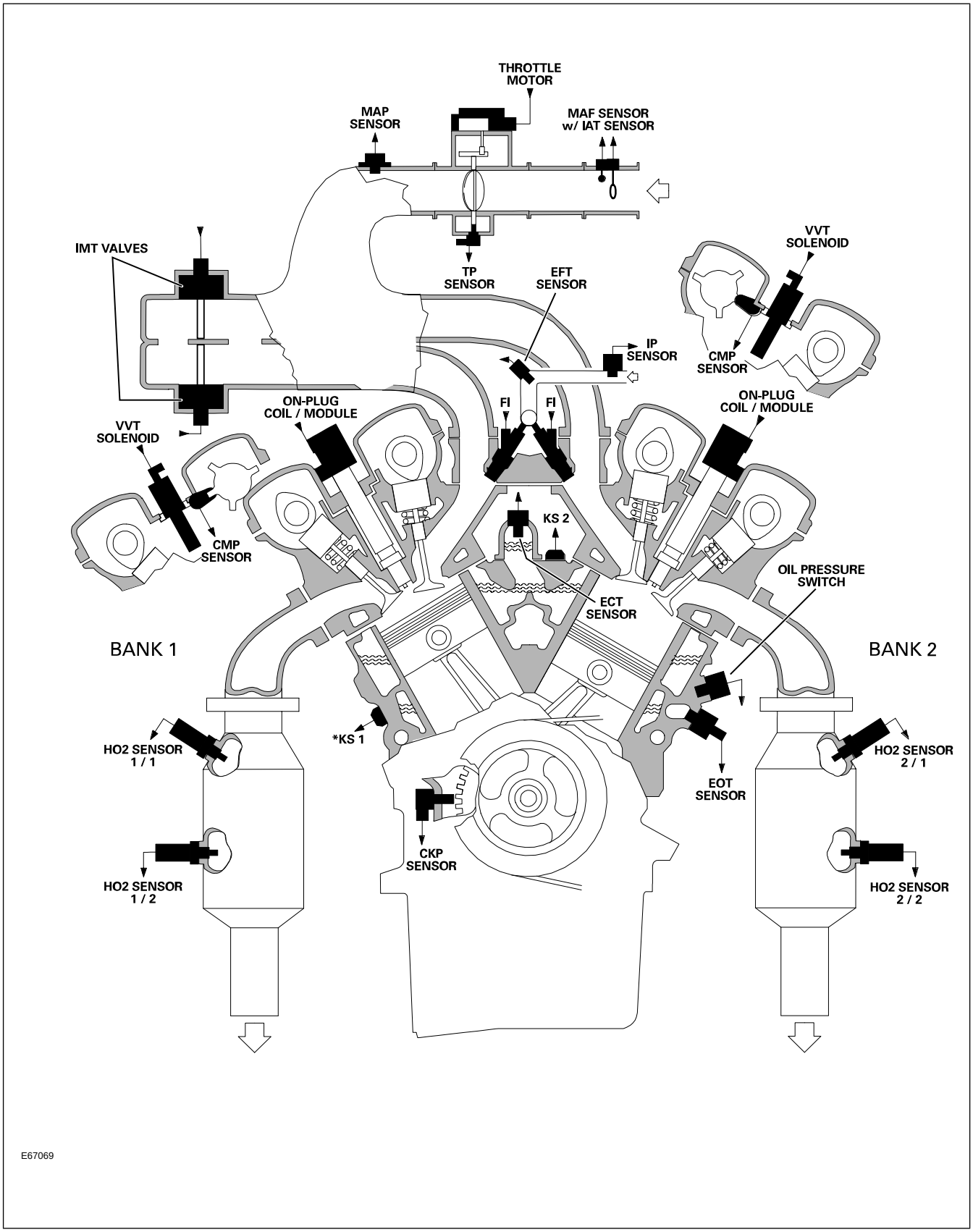
- Starting – ensures that conditions are safe to crank the engine
- Engine – controls the rate of air and fuel flow into the engine cylinders; controls the ignition and inlet camshaft timing, injector 'on' time and timing
- Fuel Supply – controls the variable-speed fuel pump used on the returnless fuel system
- Battery – optimizes battery charging conditions
- Air conditioning and heated windshield – controls the speed of the engine when these additional loads are added, and disables the air conditioning when it is beneficial to reduce the load on the engine
- ECM data recorder – records data to assist with fault diagnosis

**ECM Location**

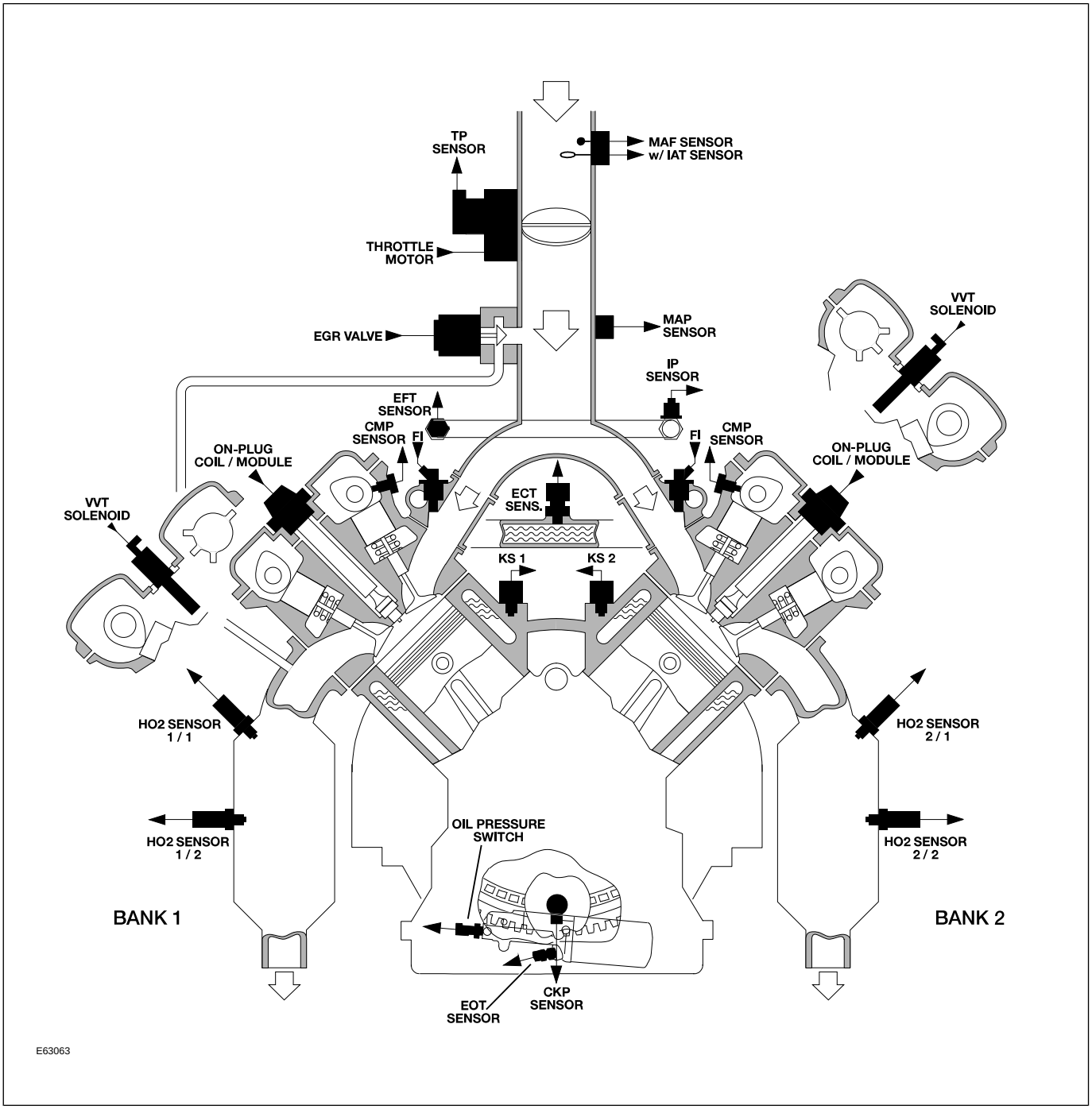


# COMPONENTS

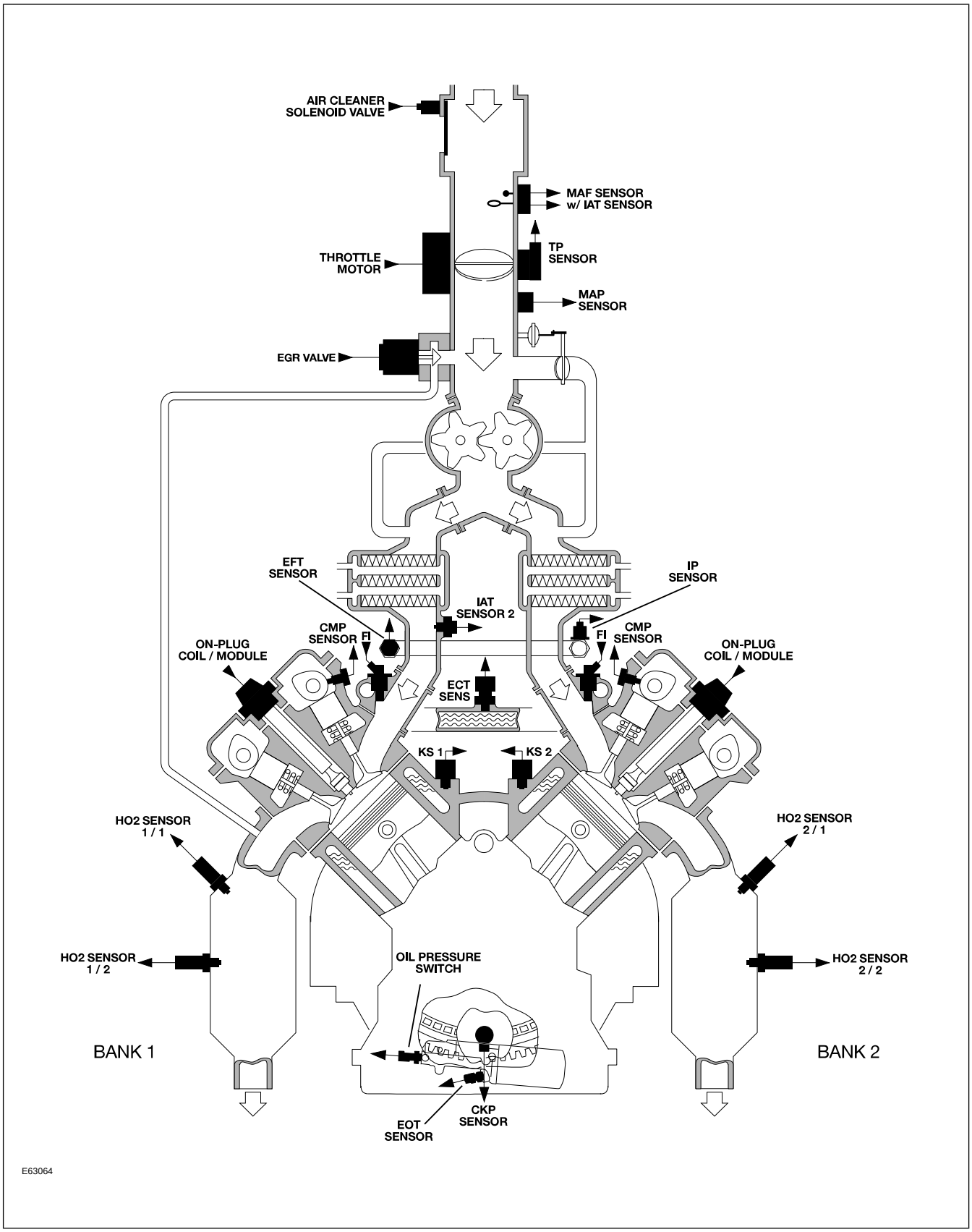
**AJ62 V6 Engine Management Components**



**AJ33 V8 N/A Engine Management Components**



**AJ33 V8 SC Engine Management Components**



# ZF 6HP26 AUTOMATIC TRANSMISSION

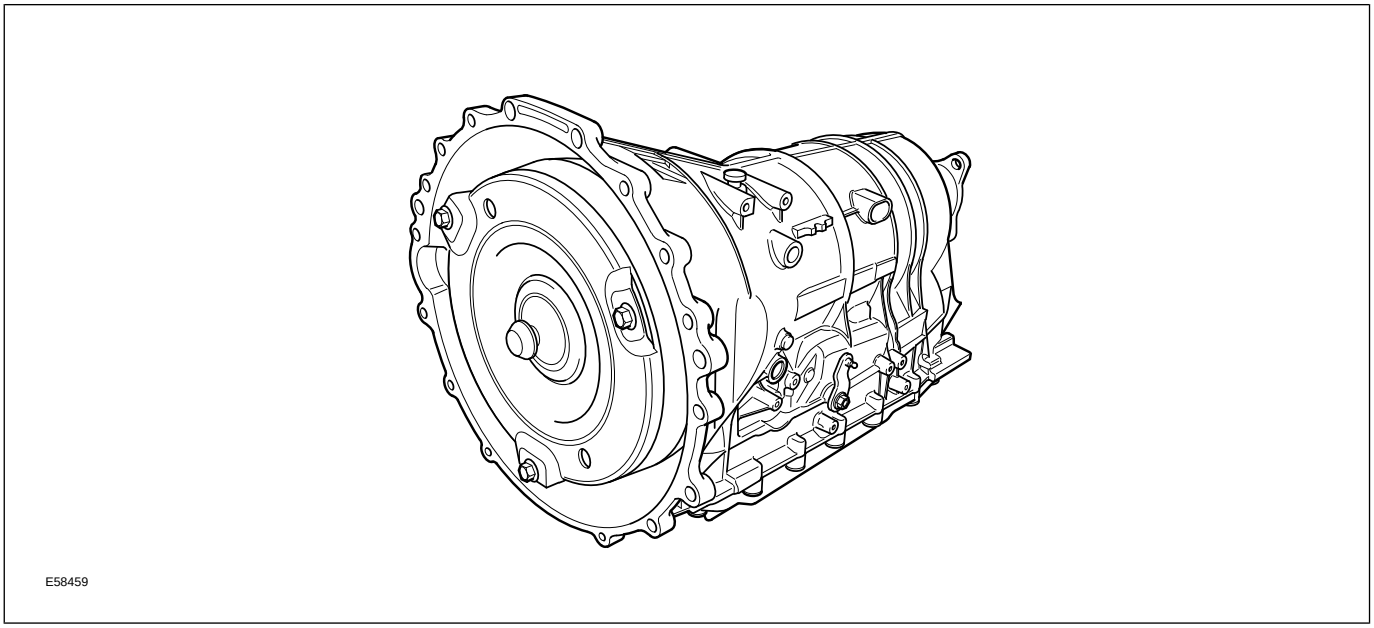
## Overview

The ZF manufactured 6HP26 is the first six-speed automatic transmission used by Jaguar and is fitted to all 2003 – 2005 MY S-TYPE variants.

ZF 6HP26 is interpreted as follows:

- **ZF** – Transmission manufacturer
- **6** – 6 forward gears
- **HP** – Hydraulic Planetary type transmission
- **26** – Maximum torque designation (no units)

**ZF 6HP26 Transmission**



| ZF 6HP26 Specifications | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Transmission weight** | NA – 83 kg (184 lbs) with torque converter and fluid<br>SC – 88.0 kg (194 lbs) with torque converter and fluid | | | | | | |
| **Mechanical features** | Die cast aluminum transmission case in two sections – torque converter housing and main case<br>Torque converter with single-plate, controlled slip lock-up clutch<br>Mechatronic valve body with integral TCM<br>Lepelletier double planetary gear set<br>Contactless internal gear selector position switch | | | | | | |
| **Transmission fluid** | Capacity – 10 liters (10.6 quarts); Filled for life<br>Type – Shell 1375.4, part # C2C8432 | | | | | | |
| **Transmission fluid cooler** | External liquid-to-liquid cooler integral with the left hand side radiator tank. | | | | | | |
| **Towing** | Maximum 0.5 miles @ 30 m.p.h. (advise flatbed recovery) | | | | | | |
| **Stall Test** | There is no stall test specification for the 6HP26 transmission. | | | | | | |
| **Gear ratios** | **1st** | **2nd** | **3rd** | **4th** | **5th** | **6th** | **Reverse** |
| | 4.17 | 2.34 | 1.52 | 1.14 | 0.87 | 0.69 | 3.40 |

## Service

There are no provisions for owners to verify the transmission fluid level, as the ZF transmission is not equipped with a transmission fluid dipstick. To inspect the fluid level and integrity, carefully follow the inspection procedure found in the Transmission section of the WSM, available on the GTR website.

**NOTE:** There are no scheduled fluid level inspections required for ZF 6HP26. Fluid level should only be checked if there are signs of an external fluid leak, or as part of the diagnostic process for customer complaint of poor shift quality.

# GETRAG 221 MANUAL TRANSMISSION

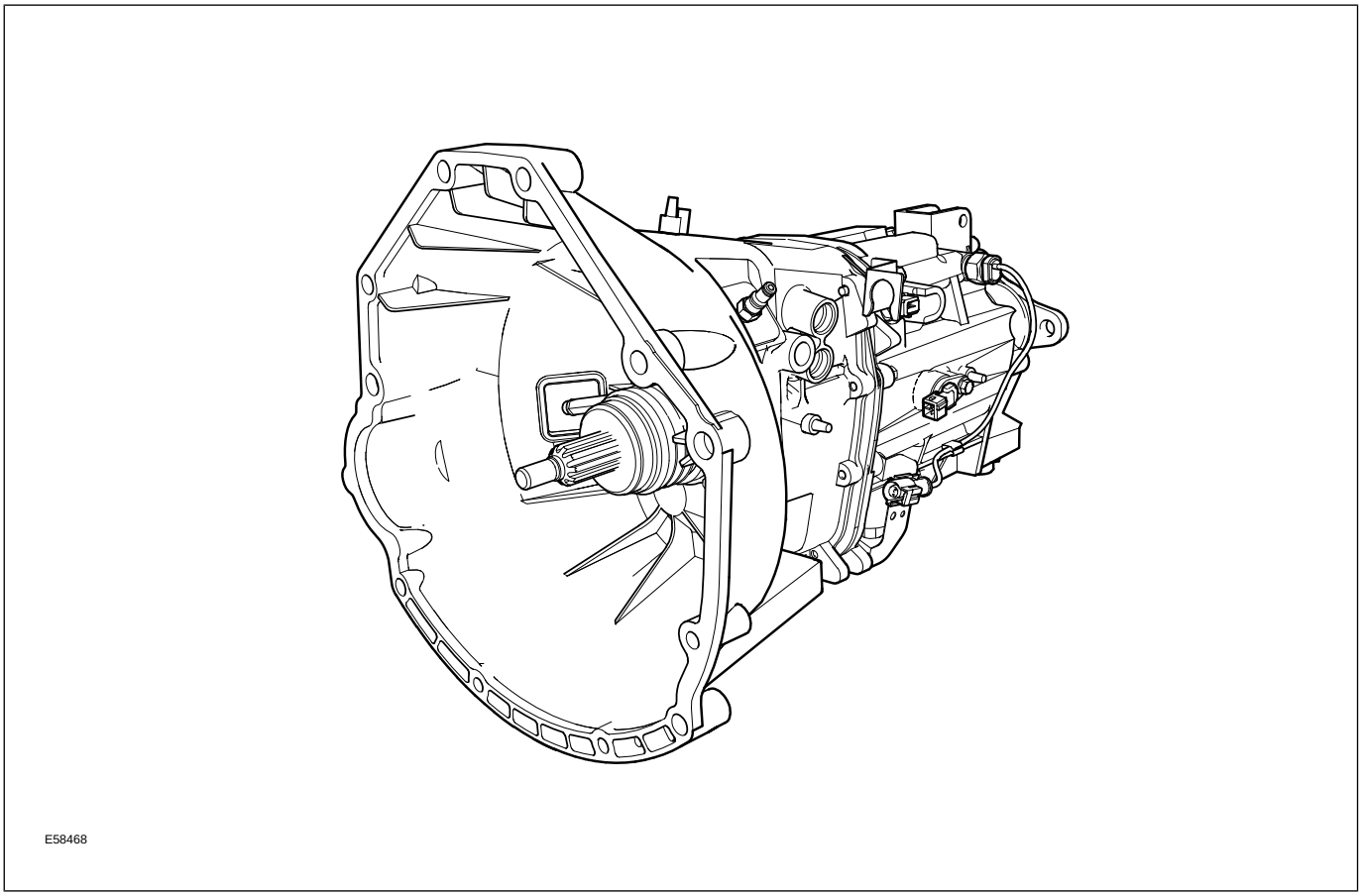
## Overview

The Getrag 221 five-speed manual transmission is fitted as an option on S-TYPE 3.0L V6 models, 2003 – 2004 MY only. The manual transmission is not available for the V8 models.

The Getrag 221 offers the following features:

- Direct gearing (1:1) on 5th gear (rather than 4th) for minimal highway losses
- Double synchronizing cones on 1st and 2nd gears provide smoother shifts
- Four-plane shift gate (R-1-3-5) with ‘knock-over’ protection on the Reverse position

**Getrag 221 5-Speed Transmission**



| Getrag 221 Specifications | | | | | | |
|---|---|---|---|---|---|---|
| **Transmission weight** | 33kg (72 lbs) | | | | | |
| **Mechanical features** | Dual mass flywheel<br>Self adjusting clutch<br>Concentric slave cylinder | | | | | |
| **Transmission fluid** | ESSO Dexron III; Filled for life | | | | | |
| **Clutch fluid** | ITT Super DOT 4 (brake fluid) | | | | | |
| **Gear ratios** | **1st** | **2nd** | **3rd** | **4th** | **5th** | **Reverse** |
| | 4.23 | 2.51 | 1.66 | 1.22 | 1.00 | 4.18 |

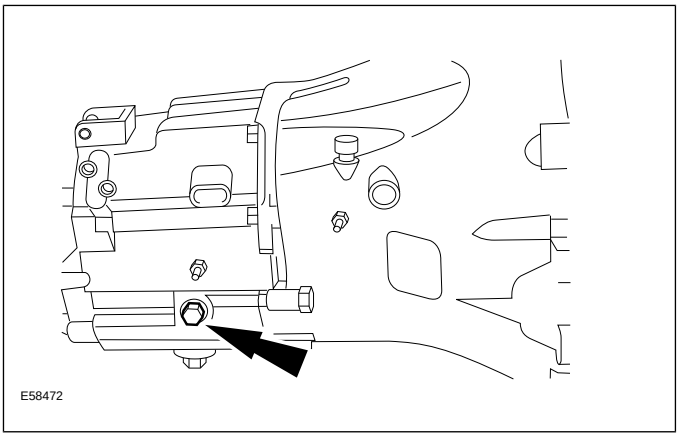
## Service

### Getrag 221 Transmission Fluid Level Check

A traditional fill/level plug is provided on the right side of the transmission case. Fill the transmission to 0.5 mm (0.02 in) below the lower edge of the fill plug bore.

Temperature is not a factor when checking the fill level.

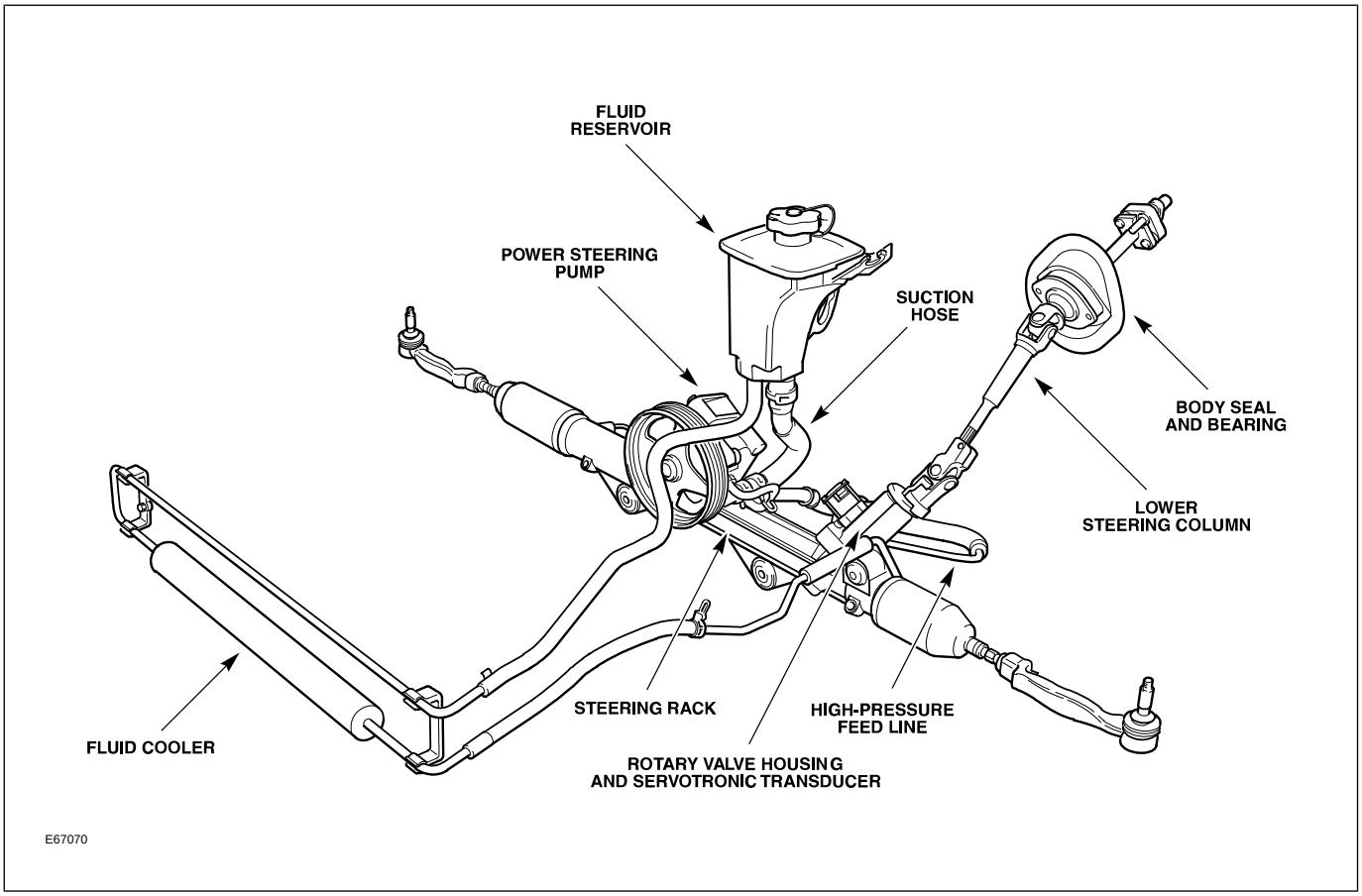
**Transmission Fill/Level Plug**



## POWER ASSISTED STEERING

2003 – 2005 MY S-TYPE vehicles are fitted with the ZF-manufactured Servotronic II rack and pinion assembly. The rack features both variable ratio and variable assistance. Control of the variable assistance is integrated into the general electronic control module (GECM). The fluid reservoir is fitted with a non-serviceable 10-micron filter.

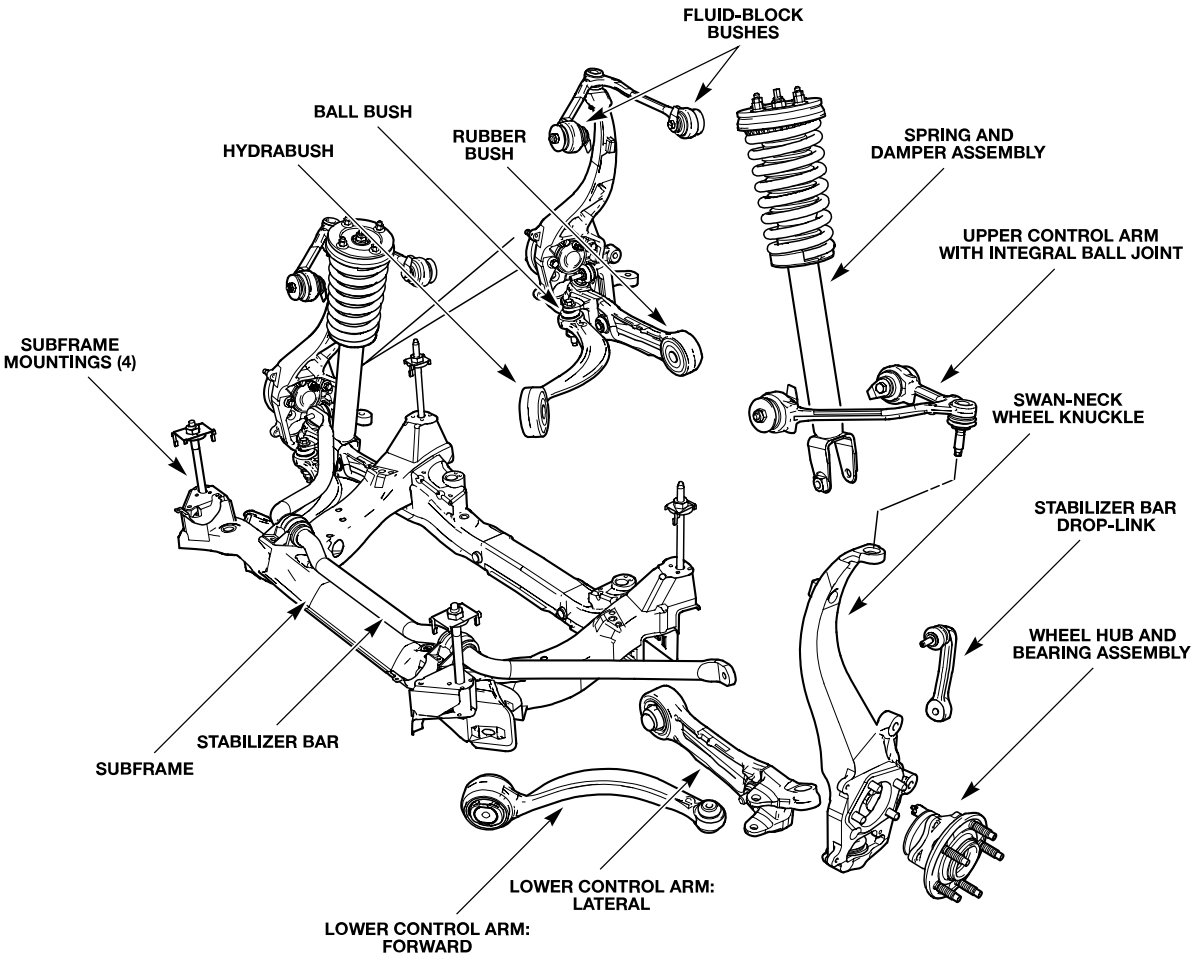
**Power Assisted Steering Components**



## FRONT SUSPENSION

The front suspension is a double-wishbone design assembled on a steel subframe which replaces the two separate crossmembers previously used on the 2000 – 2002 MY S-TYPE. Control arms and knuckles are manufactured from aluminum. Special tool 502-005 (in the form of two shouldered bolts) is used to align the subframe to the body.

**Front Suspension Components**



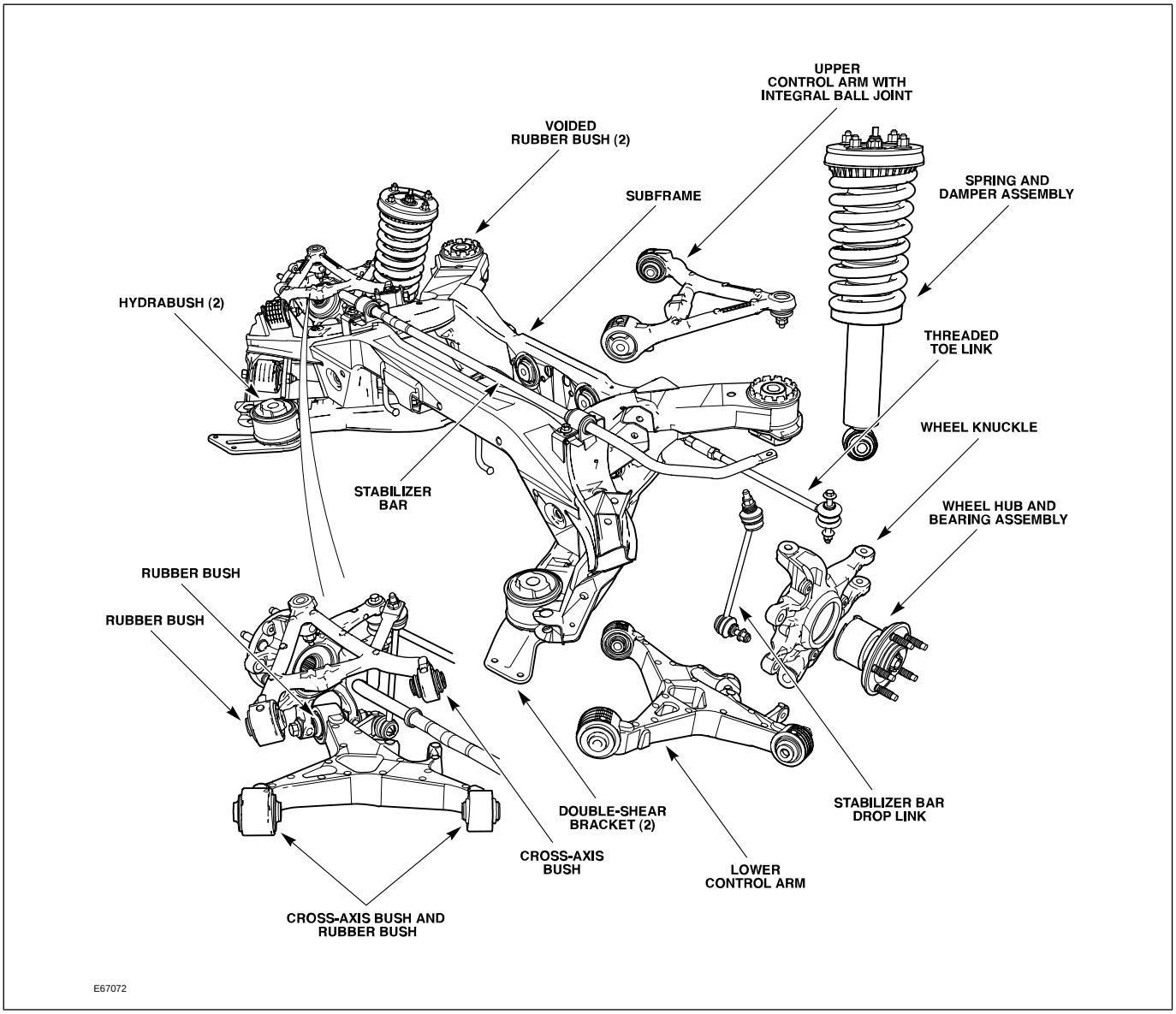

### Front Wheel Alignment

Camber and caster are adjustable via the factory-fitted eccentric mounting bolts on the lower control arms. Toe is adjustable via threaded tie-rod ends.

## REAR SUSPENSION

The rear suspension is a double-wishbone design using lightweight aluminum for greater unsprung weight. The steel subframe is mounted to the body via four large bushings. No alignment procedure exists for the subframe. The rear hub is fitted with a serviceable sealed cartridge bearing.

**Rear Suspension Components**




### Rear Wheel Alignment

Camber is not adjustable. Toe is adjustable via threaded toe links.

## BRAKES

All 2003-2005 MY S-TYPE vehicles are fitted with the Teves MK25 ABS system. The main system components are as follows:

- Teves MK25 modulator and control module
- Active wheel speed sensors
- High resolution steering angle sensor
- Yaw rate sensor
- Teves active brake booster

The Teves MK25 ABS system has the following features as standard equipment:

- Anti-lock Braking (ABS)
- Traction Control System (TCS)
- Dynamic Stability Control System (DSC)
- Panic Brake Assist (PBA)

Normally aspirated variants are fitted with floating calipers. Supercharged vehicles (S-TYPE R) are fitted with Brembo high-performance brake calipers and larger discs.

## Electronic Parking Brake

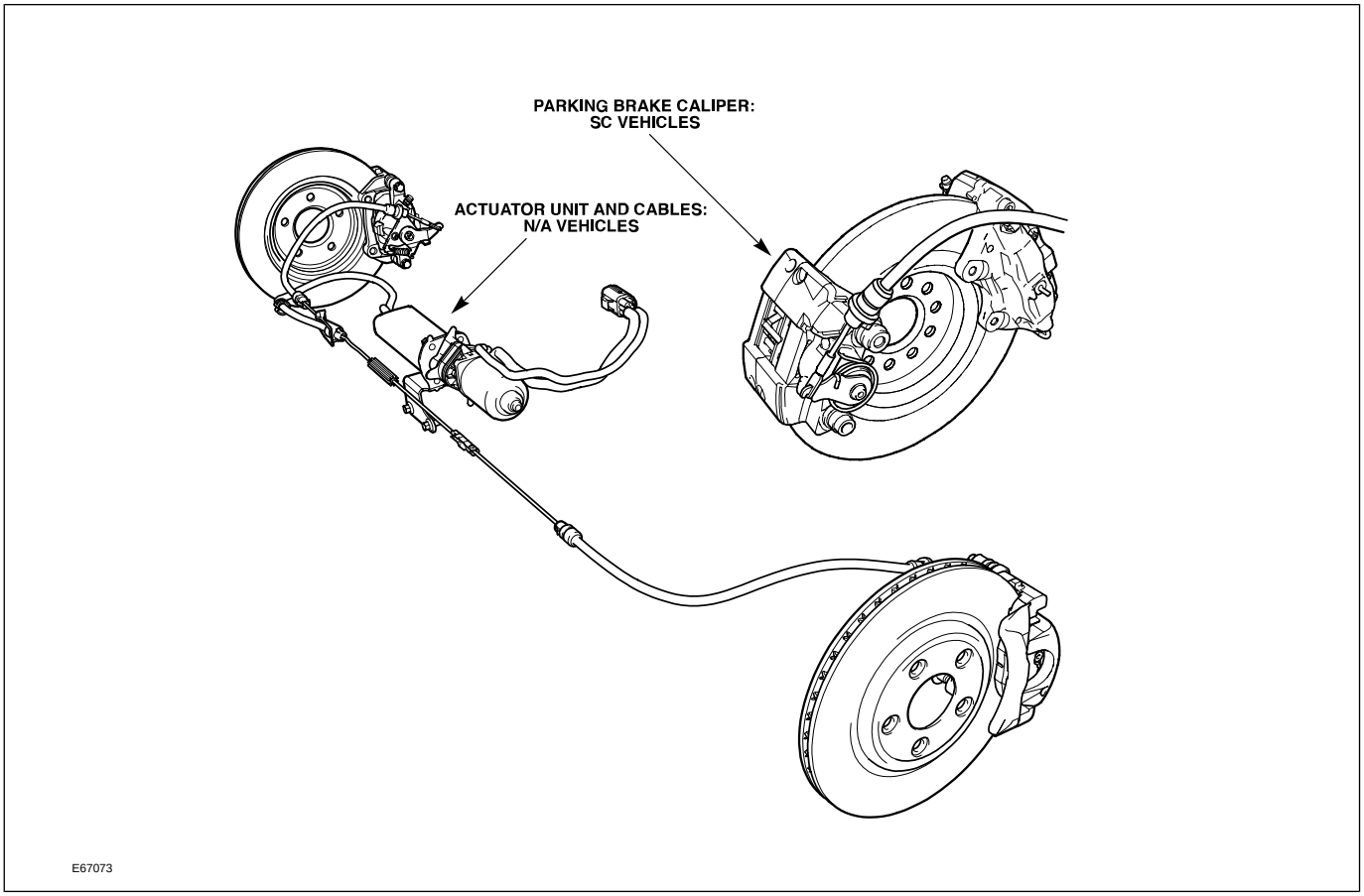
The Electronic Parking Brake (EPB) system fitted to S-TYPE vehicles offers the following benefits:

- Increased interior space (formerly occupied by a traditional parking brake handle)
- Fully automatic activation/deactivation
- Driver strength plays no part in parking brake activation

The system comprises the following components:

- **Parking Brake Actuator**
  - Located above the rear subframe, the actuator consists of a motor, hall-effect position sensor, gearbox mechanism and linkage.
- **Electronic Parking Brake Control Module**
  - Fitted in the trunk by the right quarter panel, the EPB module controls the actuator based on vehicle and driver inputs.
- **Center Console Switch**
  - A three-way switch is mounted rearward of the J-gate.

**EPB Actuator and Calipers**



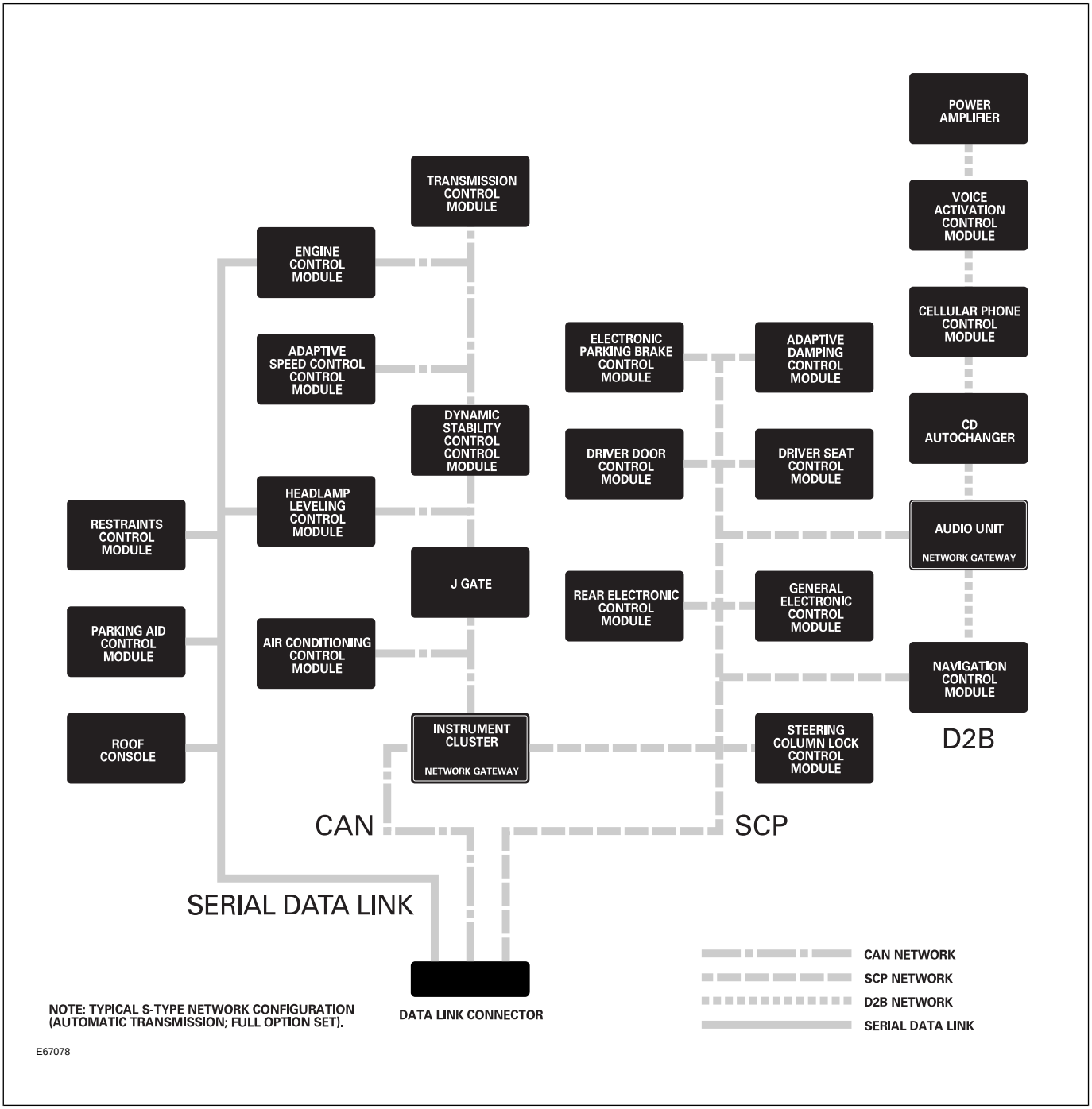
## CONTROL MODULES AND NETWORKS OVERVIEW

Three communication networks are used for control module intercommunication.

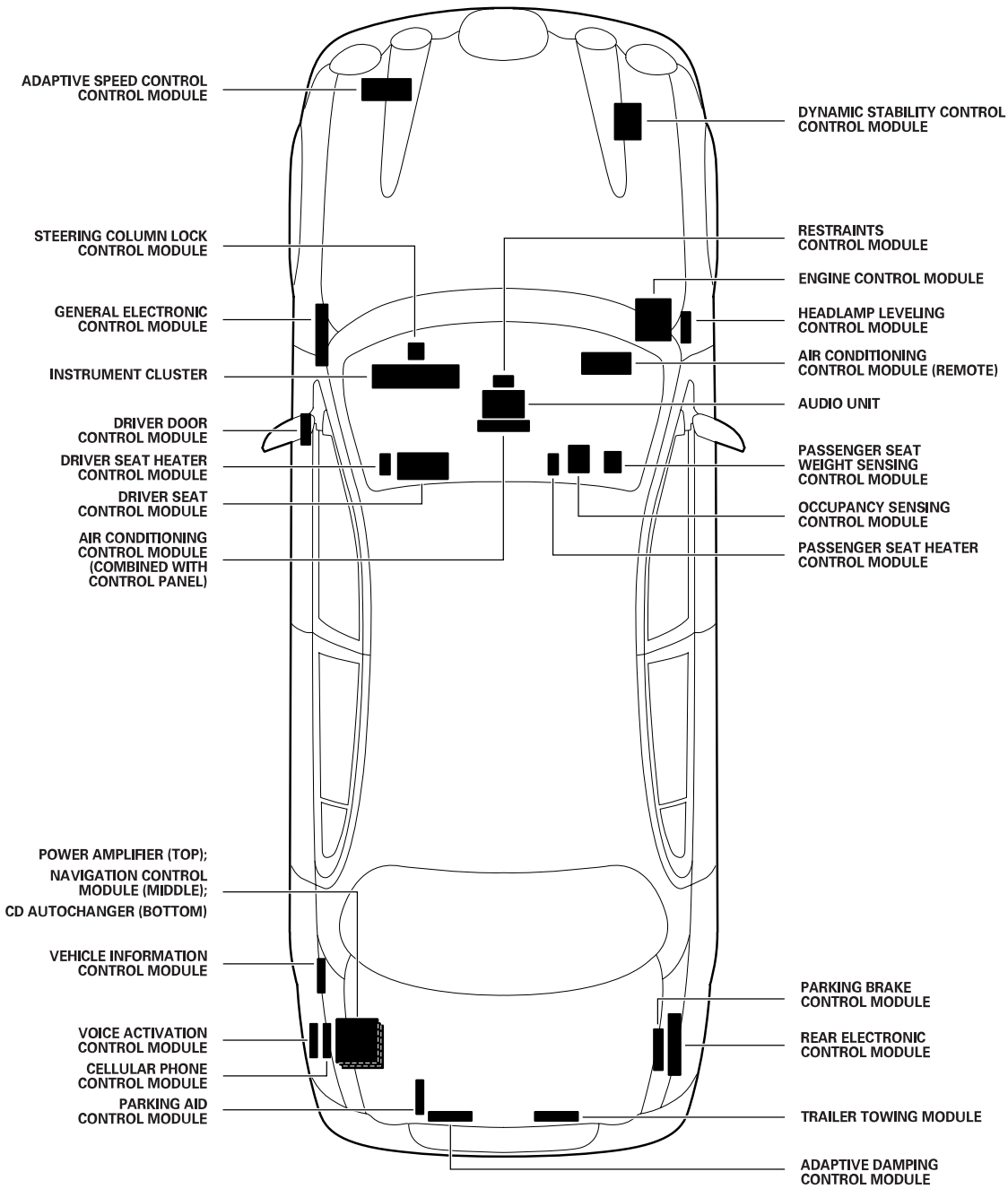
| Communication Networks | | | |
|---|---|---|---|
| **Network** | **Class** | **Speed** | **Communication Medium** |
| Controller Area Network (CAN) | C | 500 KBaud | Twisted pair copper wire |
| Standard Corporate Protocol Network (SCP) | B | 41.6 KBaud | Twisted pair copper wire |
| Digital Data Bus (D2B) | n/a | 5.6 MBaud | Fiber optic cable |

A fourth network – ISO 9141 (Serial Data Link) – allows diagnostic interrogation via the data link connector (DLC), but does not allow control module intercommunication. The ISO network communicates at 10.4 KBaud.

**Communication Network Layout (X202 Shown)**



**Control Module Locations (X202 Shown)**



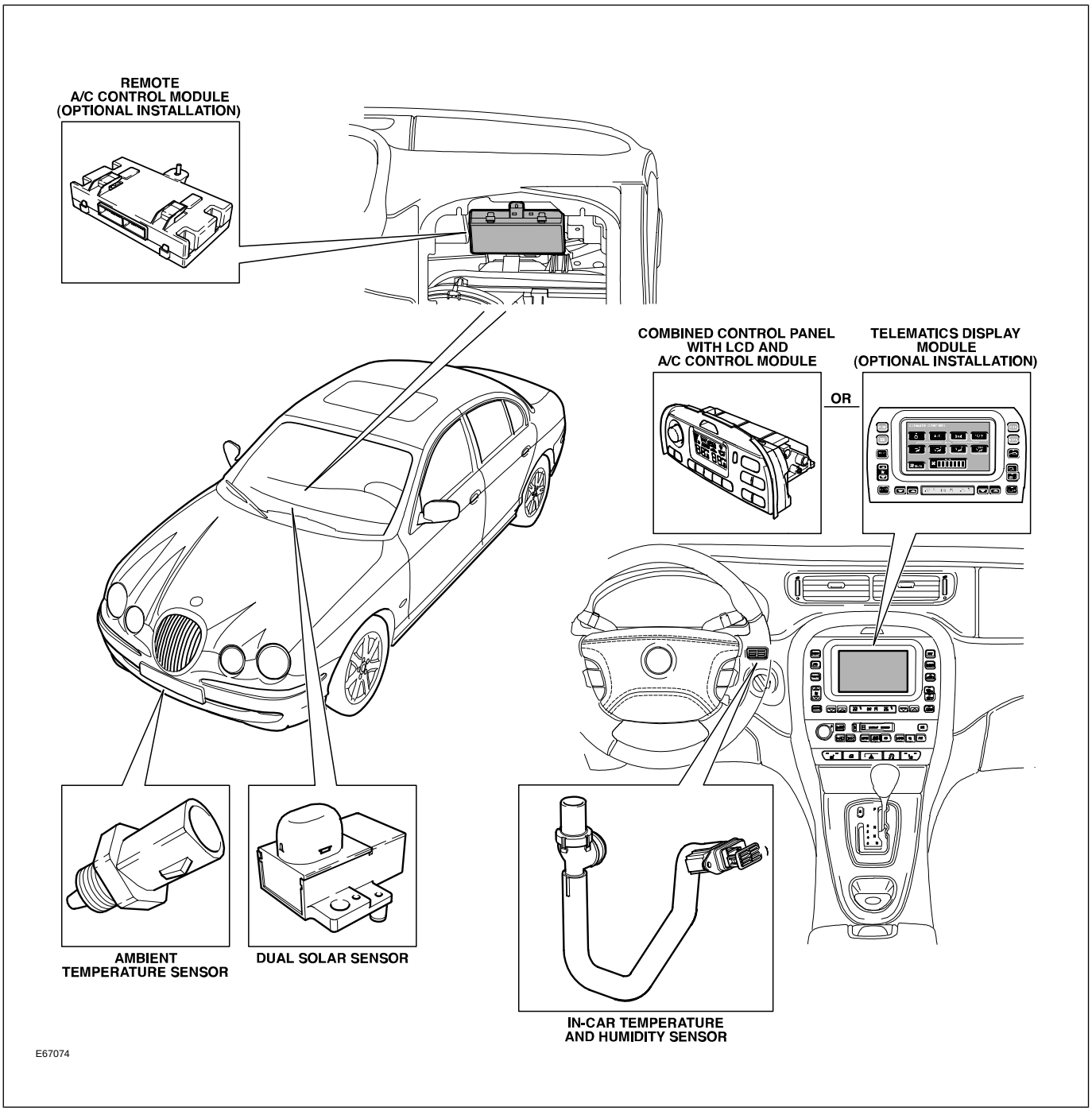

NOTE: THE TRANSMISSION CONTROL MODULE IS CONTAINED WITHIN THE TRANSMISSION.

E67079

## CLIMATE CONTROL OVERVIEW

A Visteon-supplied Dual Automatic Temperature Control (DATC) system is fitted as standard. Dual zone temperature control is achieved via a partitioned heater core. Coolant flow through each side of the heater core can be individually controlled to provide separate outlet temperatures for left and right air outlets. The heart of the refrigeration system is a variable displacement scroll-type compressor which is rigidly mounted to the block.

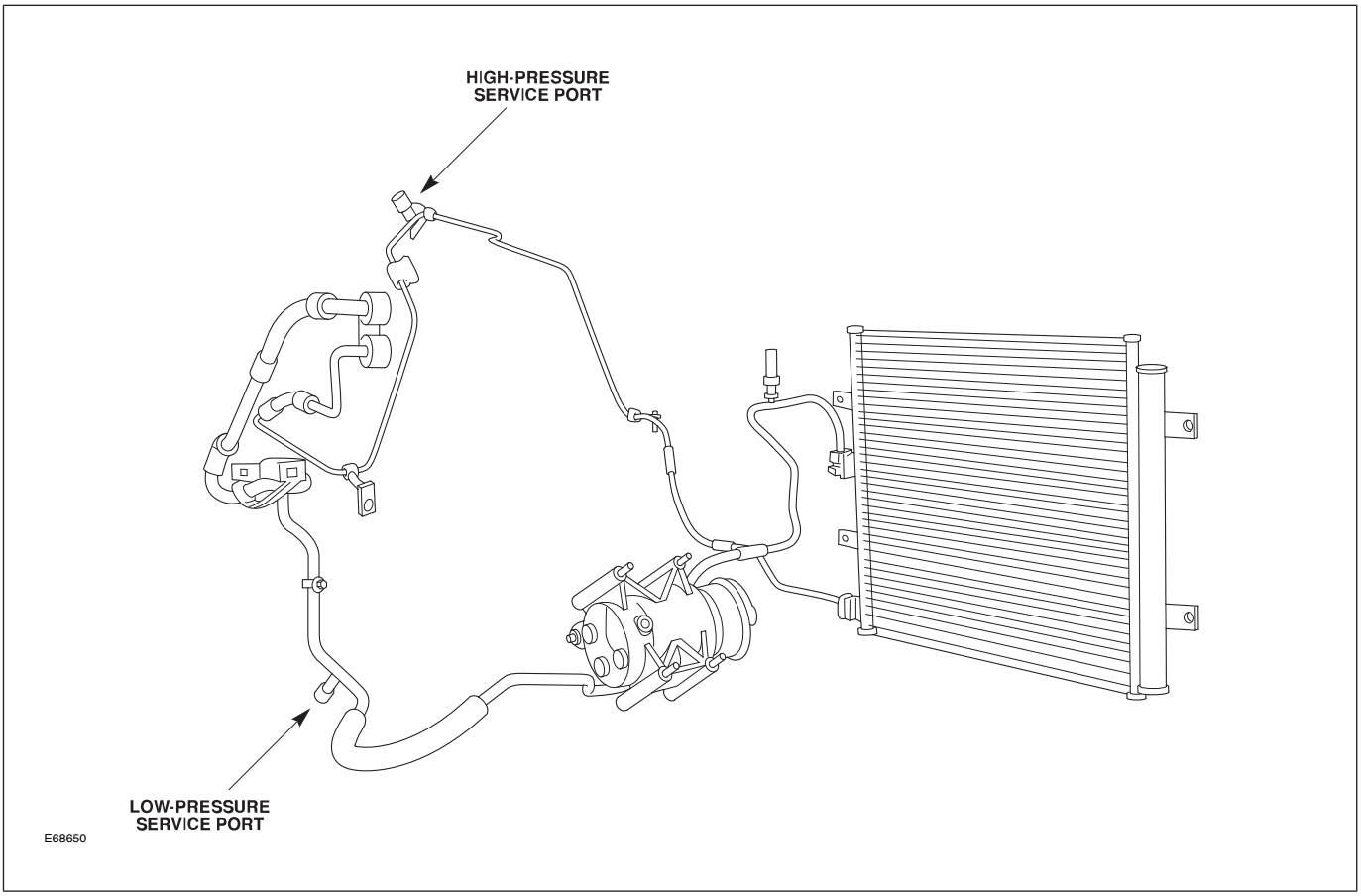
**DATC Components**



## SERVICE

### Refrigerant Service Ports

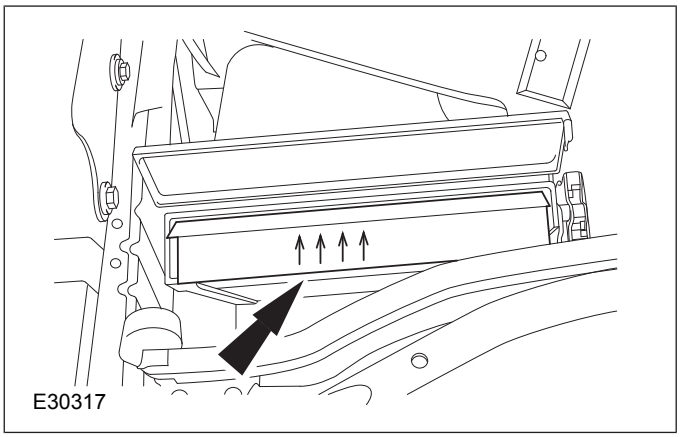
The high-pressure service port is located on the condenser-to-thermostatic expansion valve tube assembly and is accessed from the top of the engine compartment. The low-pressure service port is located on the A/C compressor manifold/tube assembly and is accessed from underneath the vehicle.



## Pollen Filter

Exterior air enters the climate control system via the grill located at the base of the windshield on the passenger side of the vehicle. A serviceable climate control air filter is located in the duct connecting the air intake to the blower housing. The filter should be changed at 10,000 mile service intervals. Arrows on the filter indicate correct direction of installation.

**Pollen Filter Location and Orientation**



## POWER WINDOWS

All windows are equipped with one-touch down and one-touch up functionality. The one-touch up functionality incorporates anti-trap capabilities. Utilizing internal position sensors, the door motor can determine when normal travel is restricted. If an obstruction is detected when raising the window, the motor's internal electronics will reverse the direction of the window.

If the vehicle power supply is disrupted, the one-touch up feature will no longer function when the power supply is restored. The initialization procedure must be carried out to restore operation.

### Power Window Initialization

1. Lift and hold the window switch in the up direction until the window seats completely. Continue to hold the switch for a further two seconds.
2. Release switch and then lift and hold it again for a further two seconds. This ensures the window is fully seated into the seal.
3. Press the window switch to lower the window to its fully open position.
4. Verify the operation of the anti-trap and one-touch up operation.

**NOTE:** This procedure can be carried out either from the individual window switches or from the driver's switch pack.

## SUNROOF

The sunroof has the following features:

- One-touch open and close operation
- Tilt open
- Anti-trap safety
- Memory retention if the battery is disconnected

The sunroof memory is not affected by battery disconnection and will not require re-initializing upon reconnection. However, if power is disconnected while the sunroof is actually being operated, then the memory will be lost and the following initialization procedure will have to be carried out. This procedure will also have to be carried out if the roof motor is replaced.

### Sunroof Initialization

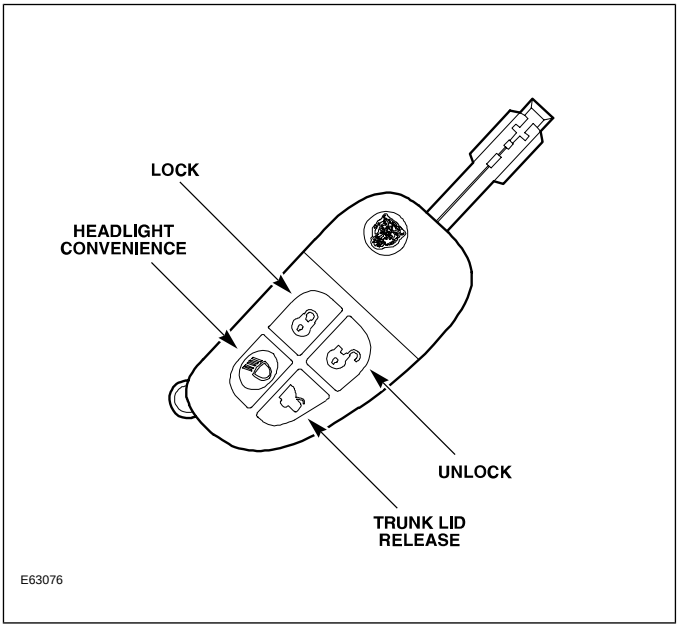
1. Turn the ignition switch to either position I or II.
2. Press the roof switch in the tilt position until the sunroof moves to the fully tilted position and stops.
3. Release the switch.
4. Press and hold the switch in the tilt up position for at least 20 seconds. The roof panel will make a small movement to indicate that the roof has been de-initialized.
5. Release the switch.
6. Within five seconds of releasing the switch, press and hold the switch in the tilt position again. The sunroof will travel automatically to the fully open position, back to the fully closed position, and stop.
7. Verify the operation of the anti-trap and one-touch up feature.

## REMOTE CONTROL KEYHEAD RF TRANSMITTER

The radio frequency (RF) transmitter is operational only when the key is removed from the ignition barrel. The RF transmitter allows remote control of the following features:

- Security system arming/disarming
- Door locking/unlocking (single or two-stage)
- Global opening/closing of windows and sunroof
- Headlight convenience
- Panic alarm
- Trunk lid release

**Remote Control Keyhead RF Transmitter**



# SYSTEM OPERATION

## Arming/Disarming and Locking/Unlocking

20 seconds after the vehicle is locked via the door key barrel or the RF transmitter LOCK button, the security system will fully arm. At this point, if a door, the hood, or the trunk is opened without disarming the system, the alarm will sound.

Pressing the UNLOCK button on the RF transmitter will disarm the alarm system and initiate single-stage or two-stage unlocking.

### Single-Stage and Two-Stage Unlocking

With the alarm system in single-stage unlocking mode, a single rotation of the door lock barrel to the unlock position or a single press of the RF transmitter UNLOCK button will unlock all doors.

With the alarm system in two-stage unlocking mode, a single rotation of the door lock barrel to the unlock position or a single press of the RF transmitter UNLOCK button will unlock the driver's door. A second rotation of the door lock barrel to the unlock position or a second press of the RF transmitter UNLOCK button will unlock the remaining doors.

#### Selecting Unlocking Modes

The alarm system can be toggled between the single and two-stage unlocking modes in the following ways:

- Pressing the RF transmitter LOCK and UNLOCK buttons simultaneously for four seconds. Acknowledgment of the feature toggle is provided by two flashes of the directional indicator lights.
- If the vehicle is fitted with navigation, the unlocking mode can be selected via the "Vehicle Settings" selection within the "System Setup" menu.
- WDS can be used to select the unlocking mode from the "Dealer Options" submenu within the "Vehicle Configuration" main menu.

## Global Window and Sunroof Control

Global opening and closing of the windows and sunroof can be initiated from the driver's door key or the central locking switch. Remote global opening and closing is initiated from the RF transmitter.

**Central Locking Switch**


E68651

### Global Opening/Remote Global Opening

To initiate global opening, rotate the key in the driver's door lock barrel to the unlock position and hold for longer than two seconds. The windows and sunroof will begin their opening operation and will continue to open as long as the key is held in the unlock position.

Global opening can be initiated from within the car using the central locking switch. To initiate global opening from the central locking switch, the ignition switch must be in the run position and the central locking switch held for longer than two seconds. The doors will centrally unlock and the windows and sunroof will start to open. Global opening will cease if the switch is released.

To initiate remote global opening, press and hold the RF transmitter UNLOCK button for longer than two seconds. This will initiate an automatic opening of the windows and sunroof. Once initiated, the button can be released and the windows and sunroof will continue to their fully opened position. To stop the remote global opening sequence, press any button on the RF transmitter.

The remote global opening feature can be enabled/disabled via WDS.

### Global Closing/Remote Global Closing

To initiate global closing, rotate the key in the driver's door lock barrel to the unlock position and hold for longer than two seconds. The windows and sunroof will begin their closing operation and will continue to close as long as the key is held in the lock position.

To initiate remote global closing, press and hold the RF transmitter LOCK button for longer than two seconds. This will initiate an automatic closing of the windows and sunroof. Once initiated, the button can be released and the windows and sunroof will continue to their fully closed position. To stop the remote global closing sequence, press any button on the RF transmitter.

The remote global closing feature can be enabled/disabled via WDS.

**NOTE:** Global closing and remote global closing will not close the windows if the windows have not been initialized.

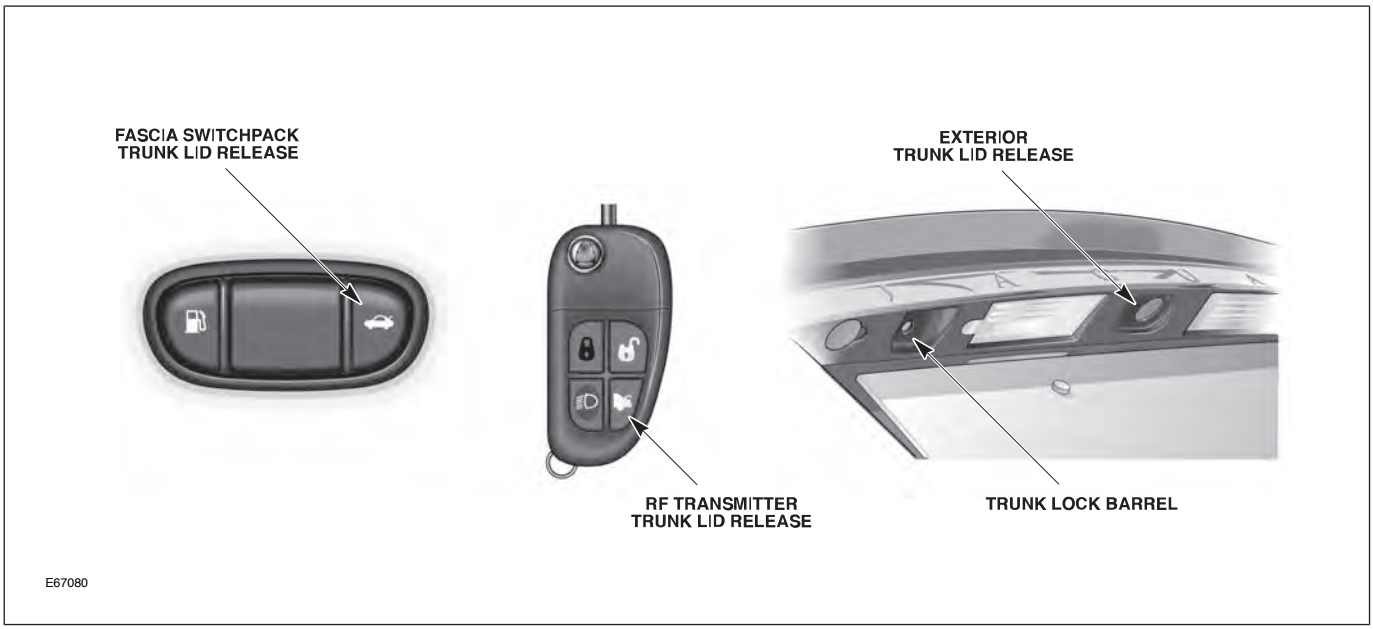
## Headlight Convenience

When the RF transmitter HEADLIGHT CONVENIENCE button is pressed, the headlights will illuminate for 25 seconds. A second press of the button or inserting the key into the ignition switch will extinguish the headlights.

## Panic Alarm

Pressing the RF transmitter HEADLIGHT CONVENIENCE button three times within three seconds will activate the panic alarm. To disable the panic alarm, the key must be inserted into the ignition switch and turned to position II (RUN).

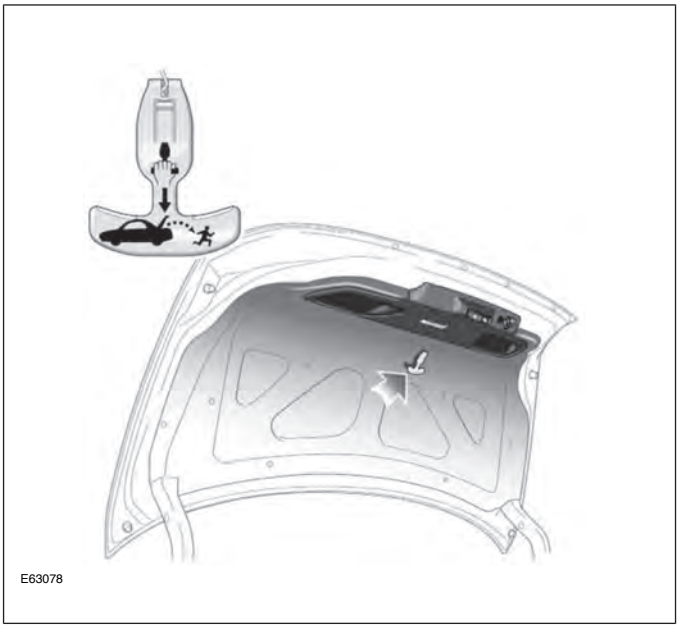
## Trunk Release




The trunk can be opened five ways:

- Pressing the RF Transmitter TRUNK LID RELEASE button.
- Using an integrated transmitter key or black-headed key in the trunk lock barrel. This will cause the alarm to sound if the vehicle is armed. The green-headed valet key will not operate the trunk lock barrel.
- Pressing the release button on the trunk lid (valet mode inactive).
- Pressing the fascia switchpack trunk release button (valet mode inactive).
- Pulling the internal trunk release handle.

**Internal Trunk Release Handle**

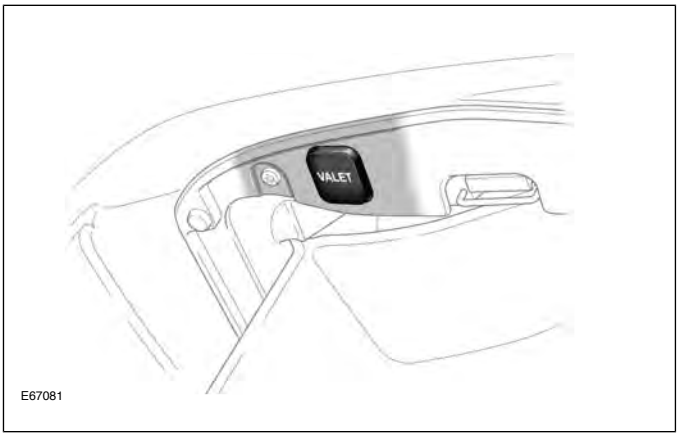


## Valet Mode

The VALET button is located in the glove compartment. When the VALET button is pressed to the latched position (button down), the trunk cannot be opened via the fascia-mounted or trunk-mounted release buttons.

**NOTE:** Once the VALET button has been pressed, the glove compartment should be locked with the black-headed remote-control key to prevent unauthorized deactivation of valet mode.

**Valet Button**




If the vehicle is in valet mode and a green-headed key is given to the valet driver, the driver will only be able to:

- Unlock (disarm) and Lock (arm) the vehicle via the driver's door lock barrel.
- Start and drive the car.

Deactivation of valet mode can be achieved by pressing the valet switch located in the glove compartment.

## Auto Relocking

If a door is not opened within 45 seconds of unlocking the vehicle with the RF transmitter, the vehicle will automatically relock the doors and rearm the security system. The auto relocking feature can be activated/deactivated using WDS.

# SERVICE

## RF Transmitter Service

### Battery Replacement

Each transmitter contains one type CR2032 battery. To separate the key unit from the remote unit, use a small flat screwdriver as illustrated. The battery is fitted with the positive symbol (+) facing downwards in the battery receptacle.

**NOTE:** Changing the remote's battery will not affect its operation or require the remote to be reprogrammed.


### RF Transmitter Programming

S-TYPE transmitters can only be programmed using WDS. Prior to programming, ensure that all transmitters for the vehicle are present. Transmitters not present will be erased from alarm memory and will no longer function.

**Programming transmitters using WDS:**

1. Select the "Vehicle Configuration" main menu tab.
2. Select "Security".
3. From here, transmitters can be programmed.

## PASSIVE ANTI-THEFT SYSTEM

The Passive Anti-Theft System (PATS) is centered around the instrument cluster (IC) and the engine control module (ECM). The engine starting sequence is as follows:

1. Key in ignition
2. Data transfer between the IC and the key transponder to confirm a valid key
3. Ignition turned to position II (RUN)
4. "Key valid" message sent from the IC to the ECM
5. Data transfer between the ECM and IC to confirm encrypted code is correct
6. Engine start

If this sequence is successfully completed, the PATS LED located on top of the fascia will illuminate for three seconds then extinguish.

## PATS Fault Diagnostics

If a fault is detected, the engine will not crank and the PATS LED located on top of the fascia will flash at 4Hz for 60 seconds. At the end of this period, the LED will flash a two-digit code for the current fault. The code will be flashed 10 times. Refer to GTR for code interpretation.

**NOTE:** NOTE: Corresponding DTCs may exist along with PATS codes that may further explain the root cause of a fault. Check for DTCs whenever diagnosing a PATS fault.

## Key Transponder Programming

**Programming additional transponders without WDS:**

1. To enter the manual programming process, all keys for the vehicle will need to be present and two pre-programmed keys will be required.
2. Insert the first customer key into the ignition switch and turn to the position II (RUN) for a maximum of five seconds. Remove the key.
3. Within 10 seconds of removing the first key, insert the second customer key and turn to position II (RUN) for a maximum of five seconds. Remove the key.
4. To program the third key, insert the new key and turn to position II (RUN) within 20 seconds of removing the second key. Allow the PATS LED to prove out for three seconds to confirm storage of the new key.

**Programming transponders using WDS:**

1. Select the "Vehicle Configuration" main menu tab.
2. Select "Security".
3. From here, key transponders can be programmed.

## SUPPLEMENTAL RESTRAINT SYSTEM OVERVIEW

The S-TYPE uses Jaguar's Adaptive Restraint Technology System (ARTS). ARTS can be divided into three subsystems:

- Crash severity sensing and analysis
  - Five impact sensors (one behind the radiator grill and one mounted at the base of each 'B/C' and 'D/E' pillar) provide a signal to the Restraints Control Module (RCM) that is proportionate to the crash severity
- Occupant analysis
  - Position of the driver's seat and seatbelt engagement is monitored
  - Weight, position and seatbelt engagement of the front passenger is monitored
- Deployment handling
  - Based on crash severity and occupant analysis, the RCM will determine which restraints to deploy and the deployment strength (frontal impact airbags only).

## COMPONENTS

The ARTS in S-TYPE vehicles uses three control modules:

### Weight Sensing Module

Mounted to the underside of the front passenger seat, the weight sensing module processes the signal from the seat pressure transducer attached to the silicone filled bladder in the cushion.

### Occupancy Sensing Module

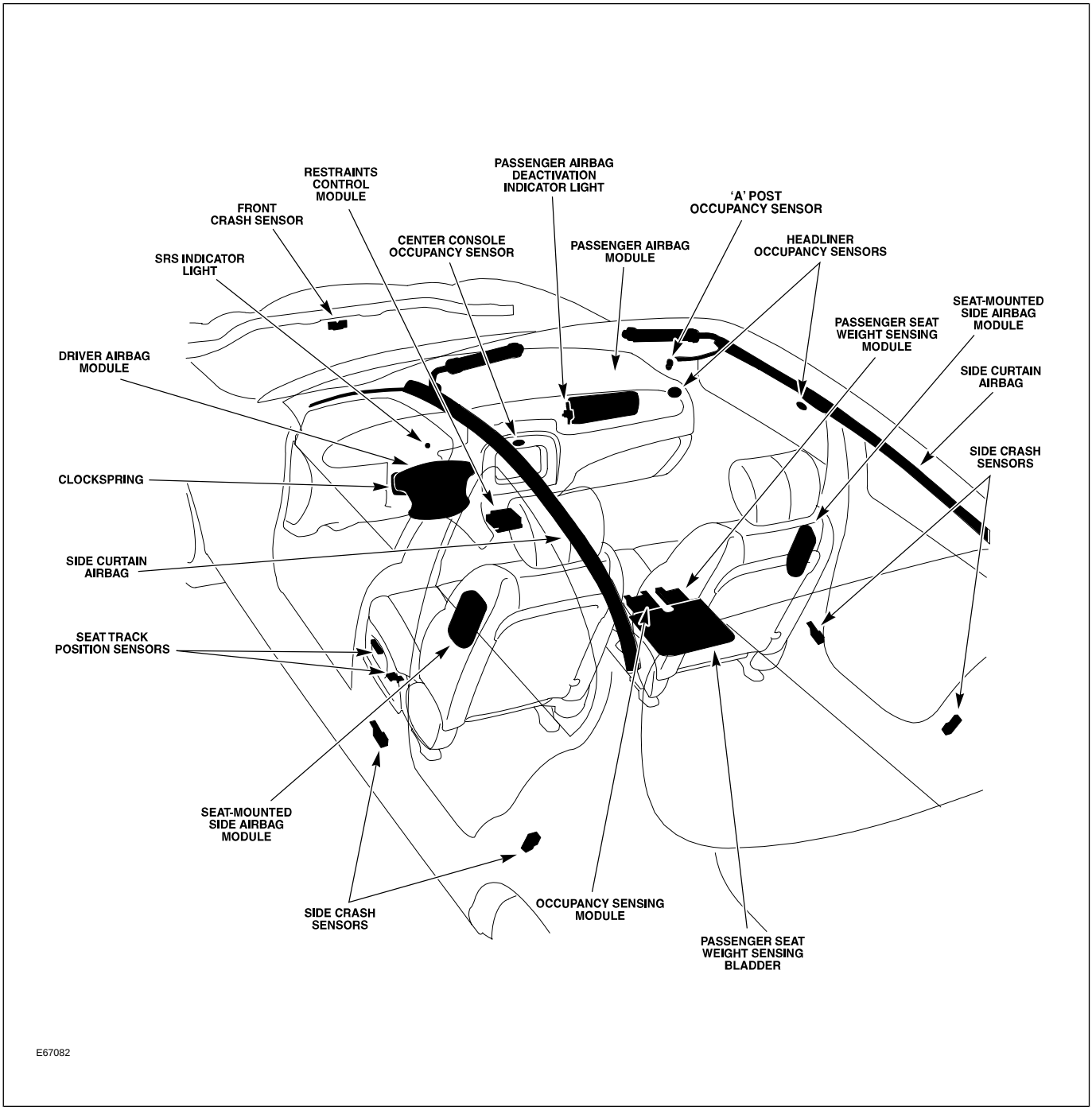
Also mounted to the underside of the front passenger seat, the occupancy sensing module processes signals from the four ultrasonic sensors. These sensors emit an ultrasonic signal operating at 40 KHz to monitor occupancy of the front passenger seat.

### Restraints Control Module

Mounted below the radio on the transmission tunnel, the restraints control module is responsible for deploying restraints based on signals from the weight sensing module, occupancy sensing module, front seat belt buckle sensors, driver's seat position switch and crash sensors.

The three modules communicate via a local (dedicated) CAN network, which is not part of the vehicle's main CAN network.

**ARTS Component Locations**

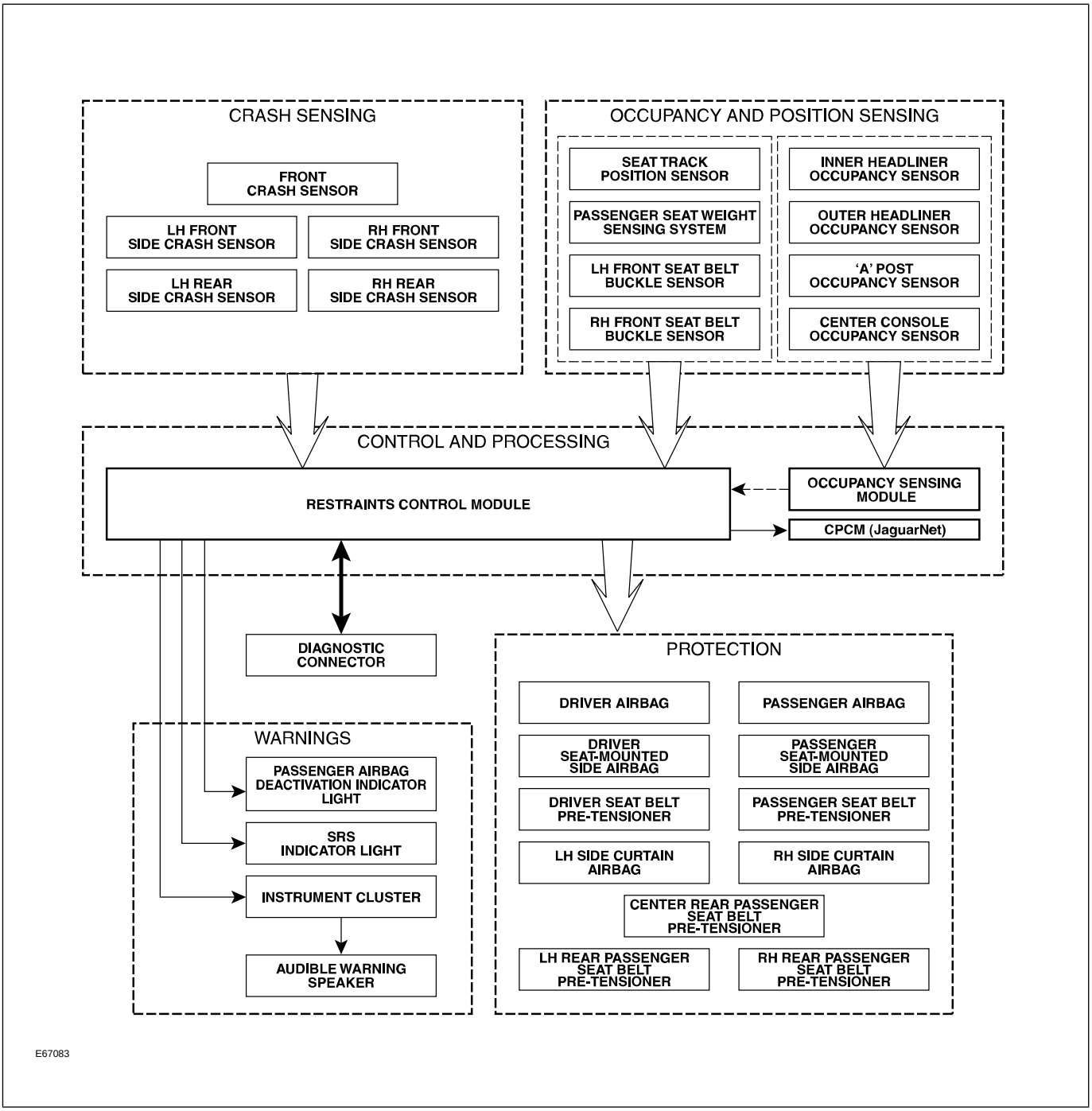


## SYSTEM OPERATION

The ARTS can deploy the following restraints:

- Front seat belt reel pre-tensioners (2)
- Rear seat belt reel pre-tensioners (3)
- Two-stage driver and front passenger airbags (2)
- Seat-mounted side airbags for front occupants (2)
- Roof-mounted side air curtains (2)

**Adaptive Restraints Technology System Diagram**



⚠ **WARNING: Read and observe all safety precautions in GTR (Global Technical Reference) and service bulletins before attempting to service the SRS.**

**Do not attempt to measure the circuit resistance through the airbag modules or pre-tensioners with a DVOM. Doing so may trigger airbag deployment and result in personal injury.**

**To disarm the SRS, disconnect the battery negative cable and wait a minimum of two minutes for the reserve power charge to dissipate.**

# IN-CAR ENTERTAINMENT (ICE)

## Selectable Features

Simultaneously pressing and holding the AM/FM and EJECT buttons will display the audio system selectable features on the navigation screen (if fitted). The following options are available:

- Market (toggled with preset button 1 on vehicles not fitted with navigation)
  - US (no security code function, radio tunes to odd digits i.e. 90.1, 90.3, 90.5 etc.)
  - EU
  - JPN
  - AUS
- RDS/RBDS (Radio Data System/Radio Broadcast Data System) (toggled with preset button 0 on vehicles not fitted with navigation)
  - ON (when tuned to a RDS station, the radio will display station call letters and (depending on station) station name, current song title and artist)
  - OFF (only the radio station frequency is displayed)

## Setting the Clock

Vehicles without navigation:

1. Press and hold the MODE button until TA VOLUME is displayed
2. Repeatedly press the MODE button until CLOCK SET is displayed
3. To select the 12 or 24 hour format, press the SEEK UP/DOWN buttons
4. Press the MODE button to continue
5. If 12 hour is selected, use the # button to denote AM or PM
6. Use the keypad to enter the time in four-digit format
7. To exit, press and hold the MODE button until the display reverts to audio mode

Vehicles with navigation:

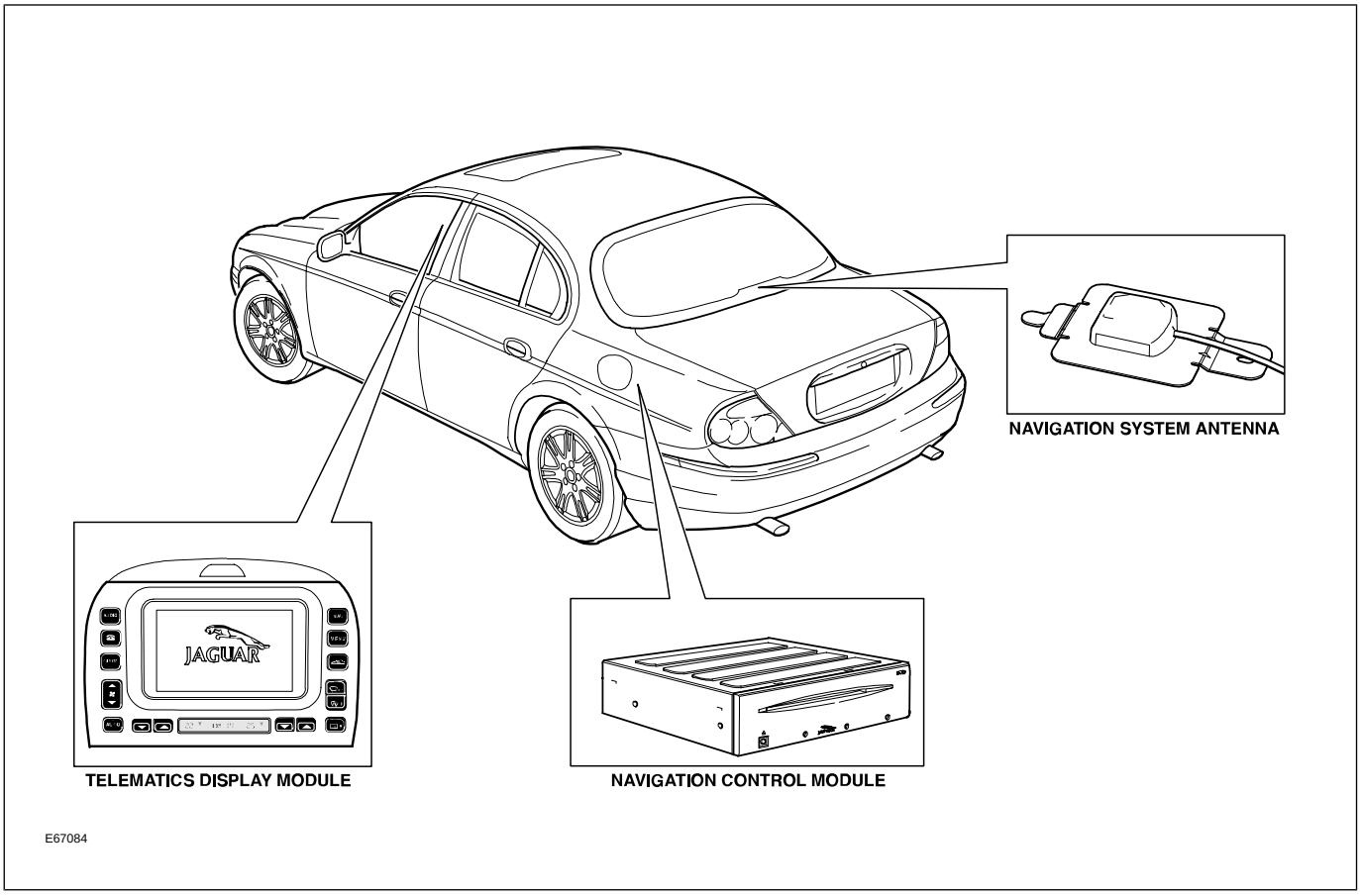
1. Press the MENU button on the touch screen control panel – the system menu screen will be displayed
2. Touch the SYSTEM SETUP button on the MENU screen
3. Touch the SET CLOCK button on the SYSTEM SETUP screen
4. Clock adjustment is made by touching the hour or minute, up or down arrow buttons
5. Touch the 12/24 button to select twelve or twenty-four hour display
6. Confirm the setting by touching the SET button

## NAVIGATION SYSTEM

The navigation system is an optional fitment. The navigation screen comprises a 7" color touch screen which also provides control of the phone, audio system, climate control, and voice control. The navigation module is located in the left side of the trunk. The Global Positioning System (GPS) antenna is located below the parcel shelf trim.

With the aid of DVD map data, the navigation module calculates the position of the vehicle using signals from the GPS antenna, the ABS control module and the GYRO sensor. After entering the desired destination, the driver is guided along by both visual guidance and voice instructions. If the driver strays off the route, the system calculates a new route showing the easiest way back to the original destination. The system can also point out useful landmarks such as gas stations, restaurants, hotels, and Jaguar dealers.

**Navigation System Components**



Curriculum Training

# Introduction to Jaguar

## Introduction to XJ: X350/X355/X356

JAGUAR

Technical Training

INTR 05 en 08/2005
INTR: X350/X355/X356

Please remember that our training literature has been prepared for TRAINING PURPOSES only. Repairs and adjustments MUST always be carried out according to the instructions and specifications in the workshop literature. Please make full use of the training offered by Technical Training to gain extensive knowledge of both theory and practice.

# Table of Contents

## Lesson 11 – Infotainment

## Workshop safety

This page highlights the general observations expected while attending this training program, and its continuation upon returning to your place of work.

## General

While working on all vehicles, the following items where available should always be used:

- Fender covers
- Seat covers
- Floor protection

## Safety

All precautions must be taken and observed at all times, to prevent injury or damage to the following:

- Yourself
- Customer's property
- Workshop equipment
- Work place colleagues

## Operating guidelines

While using any piece of workshop equipment:

The manufacturer's guidelines and warning labels must be followed.

This will ensure correct use and application at all times.

Seek the necessary advice or training where equipment usage is unclear.

## Chemicals, Oils and Solvents

Follow all manufacturer's warnings and labels; also take into account local disposal regulations when working with chemicals, oils or solvents.

Ensure that all risks are completely minimized.

Make sure that all protective items of clothing are worn where required e.g.

- Eye protection
- Gloves
- Coveralls
- Footwear

## System capping

Upon disconnecting components from a system, take all precautions necessary to prevent system contamination or environmental leakage.

Fit relevant plugs or caps i.e. to pipes, unions and component orifices etc.

## Updates

Keep abreast of all relevant changes that affect your role within the dealership, by monitoring all factory issued documentation.

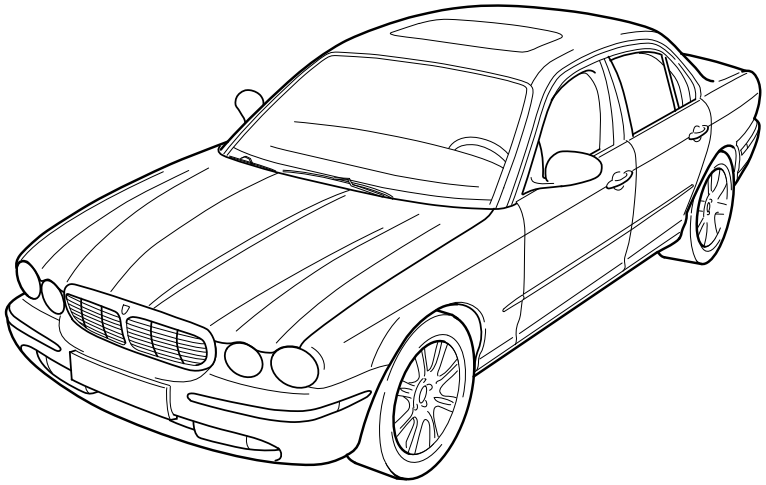
## Driving

Operating vehicle features, such as ICE, mobile phones and CD player equipment etc., can cause a momentary distraction while driving.

Follow all traffic regulations when operating vehicle systems or using diagnostic equipment while on the move.

Mobile diagnostic equipment operation may require the use of an assistant.

## OVERVIEW



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The 2004 MY XJ was the seventh sedan to carry the XJ badge. The aluminum body structure features industry-first use of rivet-bonded joining technology with self-pierce rivets and aerospace-sourced epoxy adhesive joining together the aluminum pressings, castings, and extrusions. With a curb weight of up to 440 lbs. less than the previous XJ (X308/X338), the newest XJ enjoys significant performance and fuel economy advantages in addition to highly capable dynamic qualities.

The range of engines for the North American market comprises the 4.2-liter V8 naturally-aspirated (N/A) for the XJ8 and the 4.2 supercharged (SC) fitted to the XJR and the Super V8. Self-leveling air suspension is standard on all models, as is Jaguar's Enhanced Computer Active Technology Suspension (ECATS). Additional electronic technologies include Dynamic Stability Control, Adaptive Cruise Control with Forward Alert, and Jaguar's renowned Adaptive Restraint Technology System.

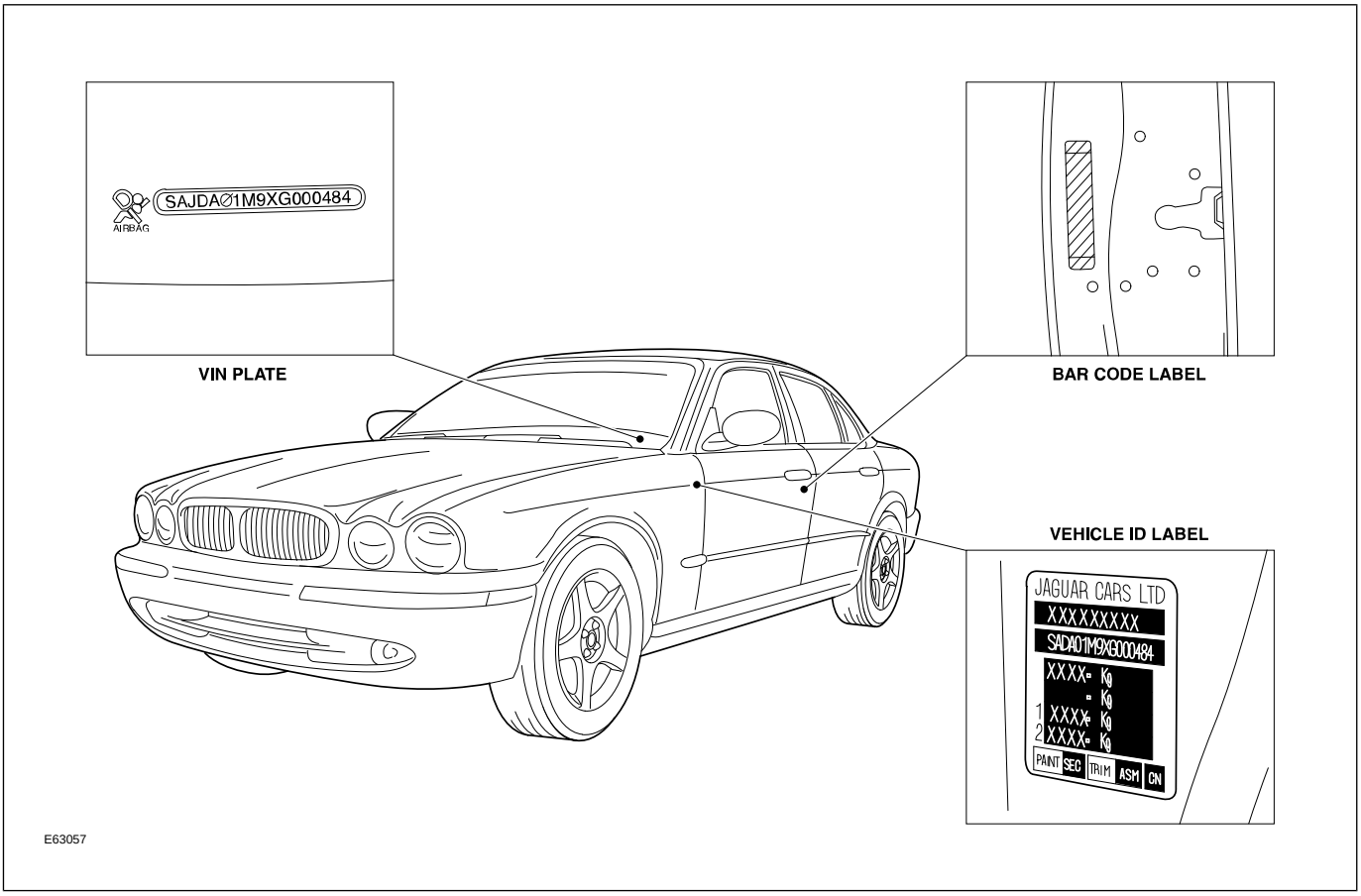
For the 2005 MY, a long wheelbase (LWB) platform was added to the model line, resulting in three new model variants: the long wheelbase VDP, the long wheelbase XJ8 (XJ8L) and the supercharged long wheelbase VDP (Super V8). Including the preexisting XJ8 and XJR, five model variants were available for the 2005 MY.

## Engineering Codes and VIN Ranges

| 2004 MY XJ | | |
|---|---|---|
| **Variant** | **Engineering Code** | **VIN Range** |
| XJ8 | X350 | G00001 – G34526 |
| XJ VDP | X350 | |
| XJR | X350 | |
| **2005 MY XJ** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| XJ8 (SWB) | X350 | G34527 – G49700 |
| XJR (SWB) | X350 | |
| XJ8 L (LWB) | X355 | |
| XJ VDP (LWB) | X355 | |
| XJ SUPER V8 (LWB) | X355 | |
| **2006 MY XJ** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| XJ8 (SWB) | X356 | Starting at G49701 |
| XJR (SWB) | X356 | |
| XJ8 L (LWB) | X356 | |
| XJ VDP (LWB) | X356 | |
| XJ SUPER V8 (LWB) | X356 | |

# IDENTIFICATION LABELS

**Identification Label Locations**



# LIFTING AND JACKING

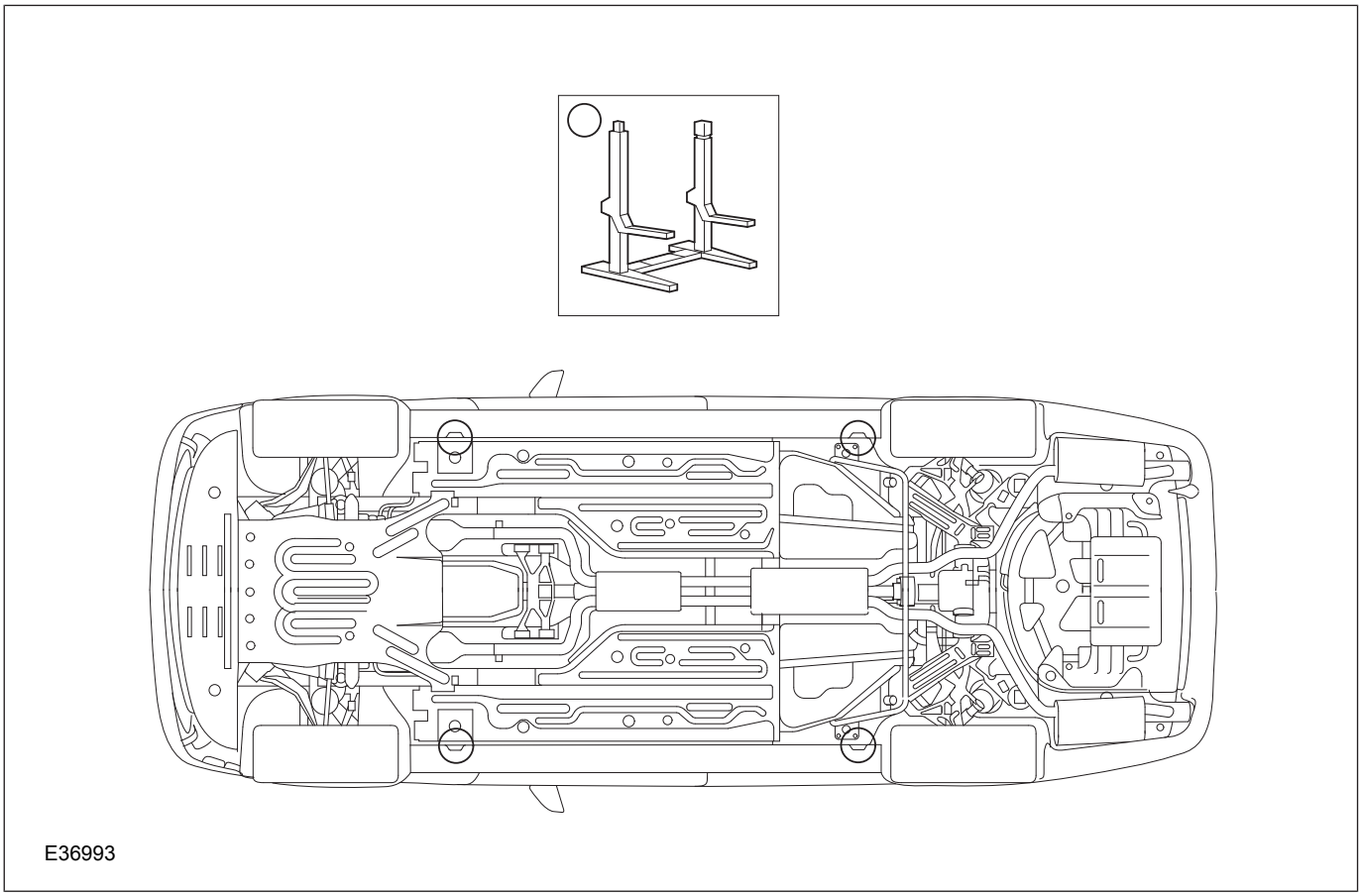
## Twin-Post Lifts

Do not allow the hoist adapters to contact the steering linkage, suspension arms, stabilizer bar, rear subframe stabilizer brackets, or to compress the lower suspension arm stabilizer bar insulator. Damage to the suspension, exhaust and steering linkage components may occur if care is not exercised when positioning the lift pads prior to lifting the vehicle.

Never use the rear axle as a lift point. Damage to the rear axle seals and bushings may occur.

Cushioned lift pads must be used to avoid body damage.

**Lift Points**



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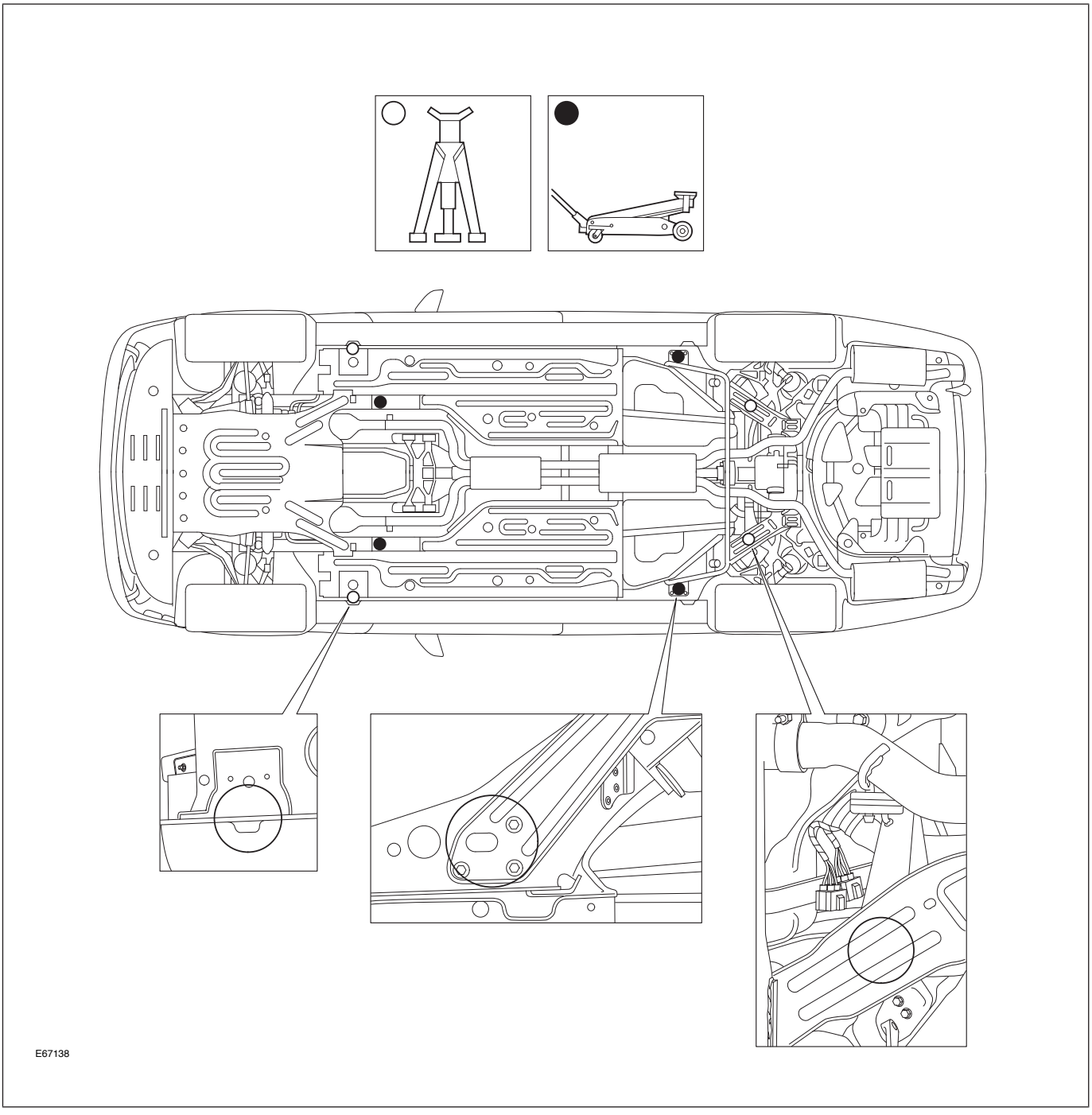
## Floor Jack and Jack Stands

If the vehicle is to be lifted using floor jacks, two jacks must be used to raise either the front or rear of vehicle. If only one jack is used, excessive body twist may occur.

When using a floor jack to jack up the rear of the vehicle, the jack head must be aimed at the NVH bar securing bolts to avoid fuel tank damage or body damage.

Cushioned pads must be used to avoid body damage.

**Jacking Points**



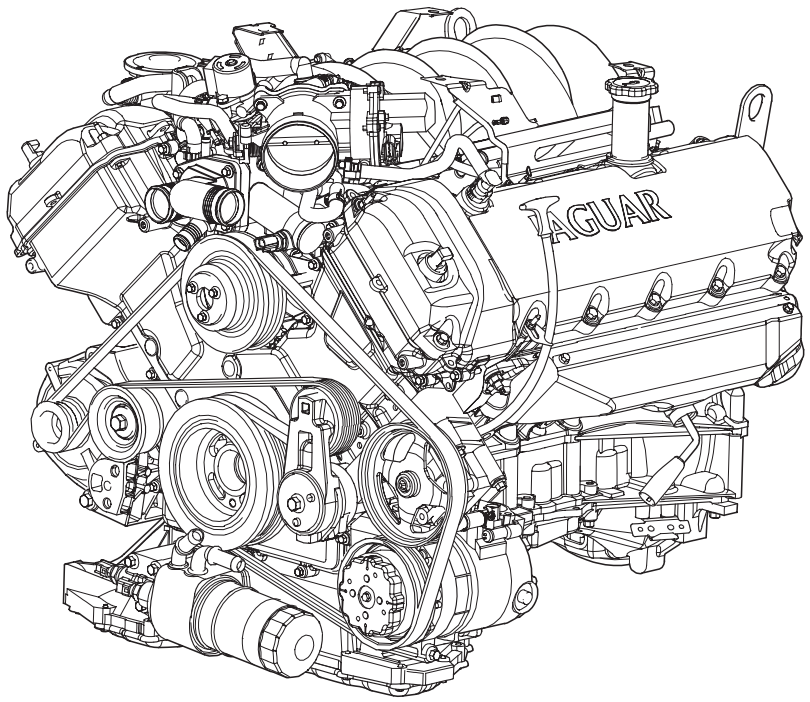
## ENGINES OVERVIEW

The AJ33 4.2-liter V8 engine was designed to power a new generation of Jaguar vehicles. The engine is one of the latest in a line of innovative, thoroughbred Jaguar engine designs, spanning six decades of engineering excellence.

## AJ33 4.2L Naturally Aspirated Engine

The naturally aspirated (N/A) 4.2-liter engine develops 300 bhp (SAE) at 6000 rpm, a useful 7% boost over the 4.0-liter engine. Its maximum torque of 310 lb. ft. represents an 8% torque increase spread evenly over the entire engine speed range.

**AJ33 4.2L N/A Engine**

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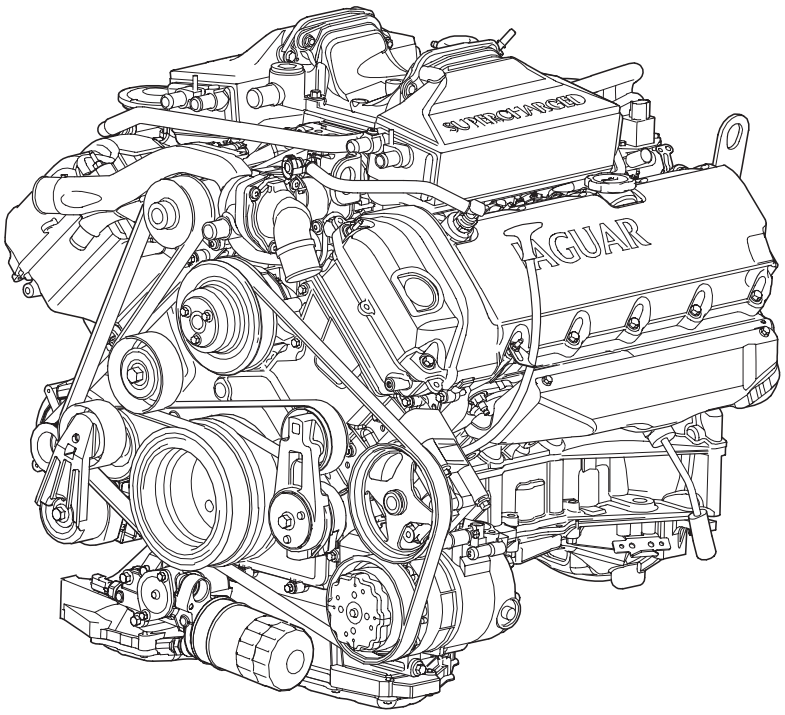
## AJ33 4.2L Supercharged Engine

The supercharged (SC) version of the AJ33 engine shares several of the advanced technical features of its naturally aspirated counterpart. With the help of an Eaton supercharger, it develops 400 bhp (SAE) at 6100 rpm. This is a 33% increase over the 4.2L N/A engine.

**AJ33 4.2L SC Engine**

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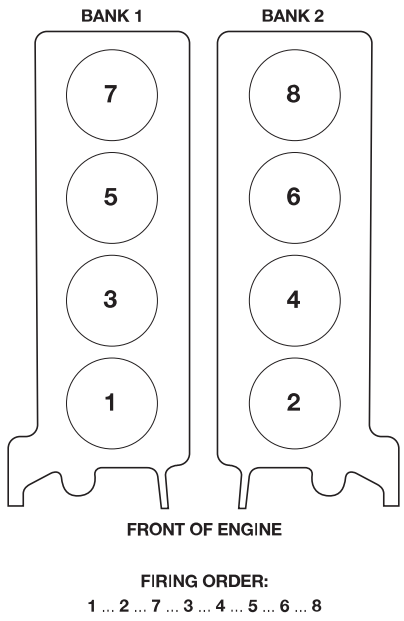
# DETAILS

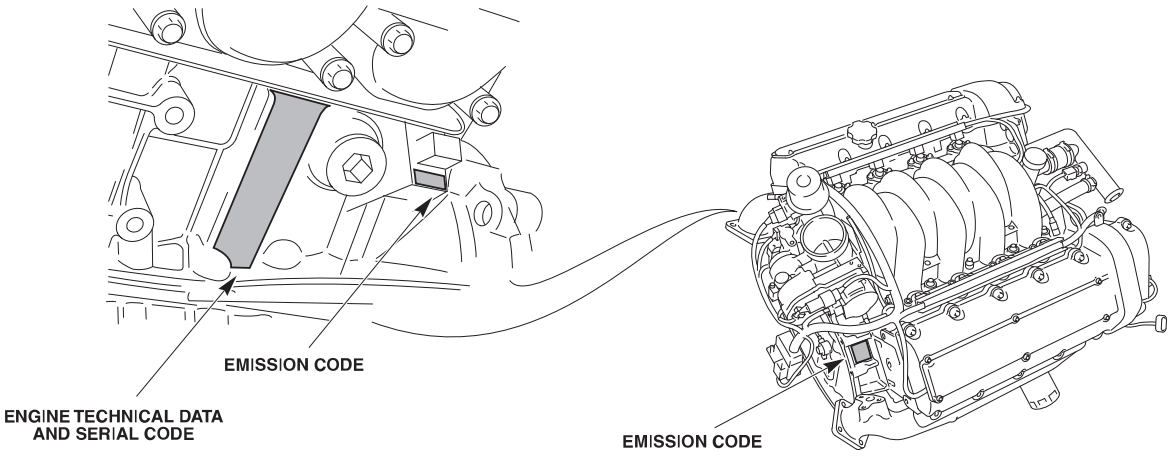
## Engine Specifications

| | AJ33 4.2L N/A | AJ33 4.2L SC |
|---|---|---|
| **Configuration** | 90° V8 | 90° V8 |
| **Cylinder Head** | – Dual overhead camshafts<br>– 4 valves per cylinder | – Dual overhead camshafts<br>– 4 valves per cylinder |
| **Valve Clearances (cold)** | Intake: 0.18 – 0.22 mm (0.007 – 0.0085 in.)<br>Exhaust: 0.23 – 0.27 mm (0.009 – 0.011 in.) | Intake: 0.18 – 0.22 mm (0.007 – 0.0085 in.)<br>Exhaust: 0.23 – 0.27 mm (0.009 – 0.011 in.) |
| **Bore** | 86 mm (3.386 in.) | 86 mm (3.386 in.) |
| **Stroke** | 90.3 mm (3.555 in.) | 90.3 mm (3.555 in.) |
| **Displacement** | 4.196 liters (256 $in^3$) | 4.196 liters (256 $in^3$) |
| **Compression Ratio** | 11.0 : 1 | 9.1 : 1 |
| **Maximum Power (SAE)** | 293 BHP at 6000 rpm | 390 BHP at 6100 rpm |
| **Maximum Torque (SAE)** | 303 lb. ft. at 4100 rpm | 399 lb. ft. at 3500 rpm |
| **Engine Oil Capacity** | 6.0 liters (6.4 qt.) | 6.0 liters (6.4 qt.) |
| **Coolant Capacity (approx.)** | 2-zone: 9.45 liters (9.98 qt.)<br>4-zone: 10.25 liters (10.83 qt.) | 2-zone: 12.35 liters (13.05 qt.)<br>4-zone: 13.15 liters (13.89 qt.) |

## Engine Numbering and Firing Order




## Engine Identification Numbers



## ENGINE MANAGEMENT OVERVIEW

The Jaguar/Denso 32-bit Engine Management System (EMS) was designed as a generic system applicable to all Jaguar engines in use across the model ranges. The system is built around a dual processor Engine Control Module (ECM). One microprocessor is dedicated to throttle control and diagnostics; the other microprocessor handles all other ECM functions, controls and diagnostics.

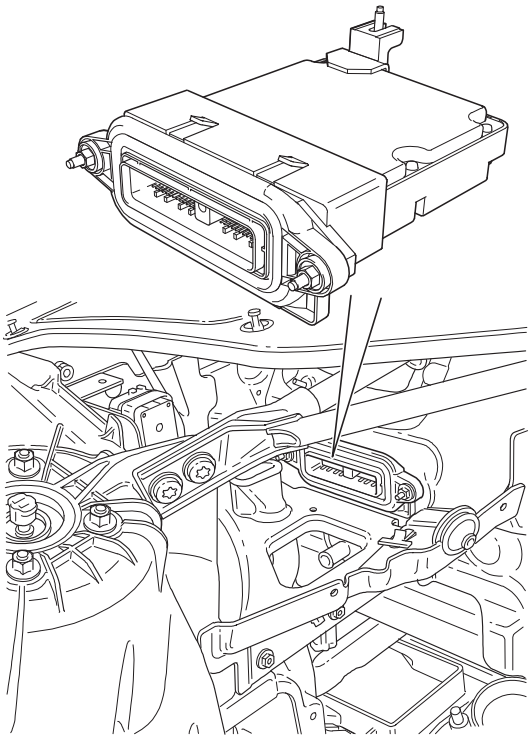
## ENGINE CONTROL MODULE

The Engine Control Module (ECM) is located on the passenger side of the cabin. The 134-way connector housing protrudes through the bulkhead to accept the matching connector from the engine bay harness.

The ECM is at the center of the system and provides overall engine control. Its function is dependent on the driver's requirements and the engine and vehicle state at any moment in time. Control can be subdivided as follows:

- Starting – ensures that conditions are safe to crank the engine
- Engine – controls the rate of air and fuel flow into the engine cylinders; controls the ignition and inlet camshaft timing, injector on time and timing
- Fuel supply – controls the variable-speed fuel pump used by the returnless fuel system
- Battery – optimizes battery charging conditions
- Air conditioning and heated windshield – controls the speed of the engine when these additional loads are added, and disables the air conditioning when it is beneficial to reduce the load on the engine
- ECM data recorder – records data to assist with fault diagnosis

**ECM Location**



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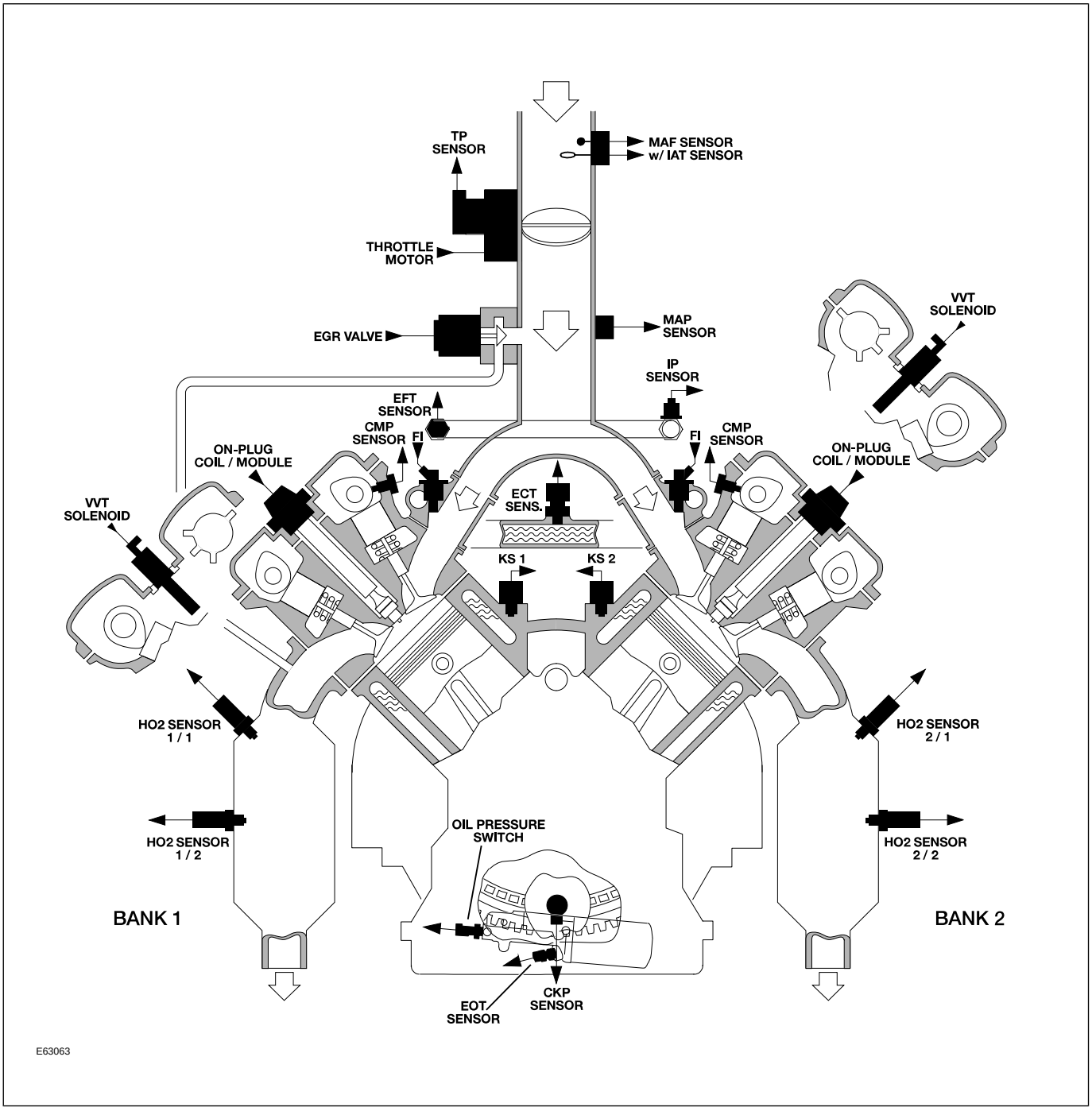
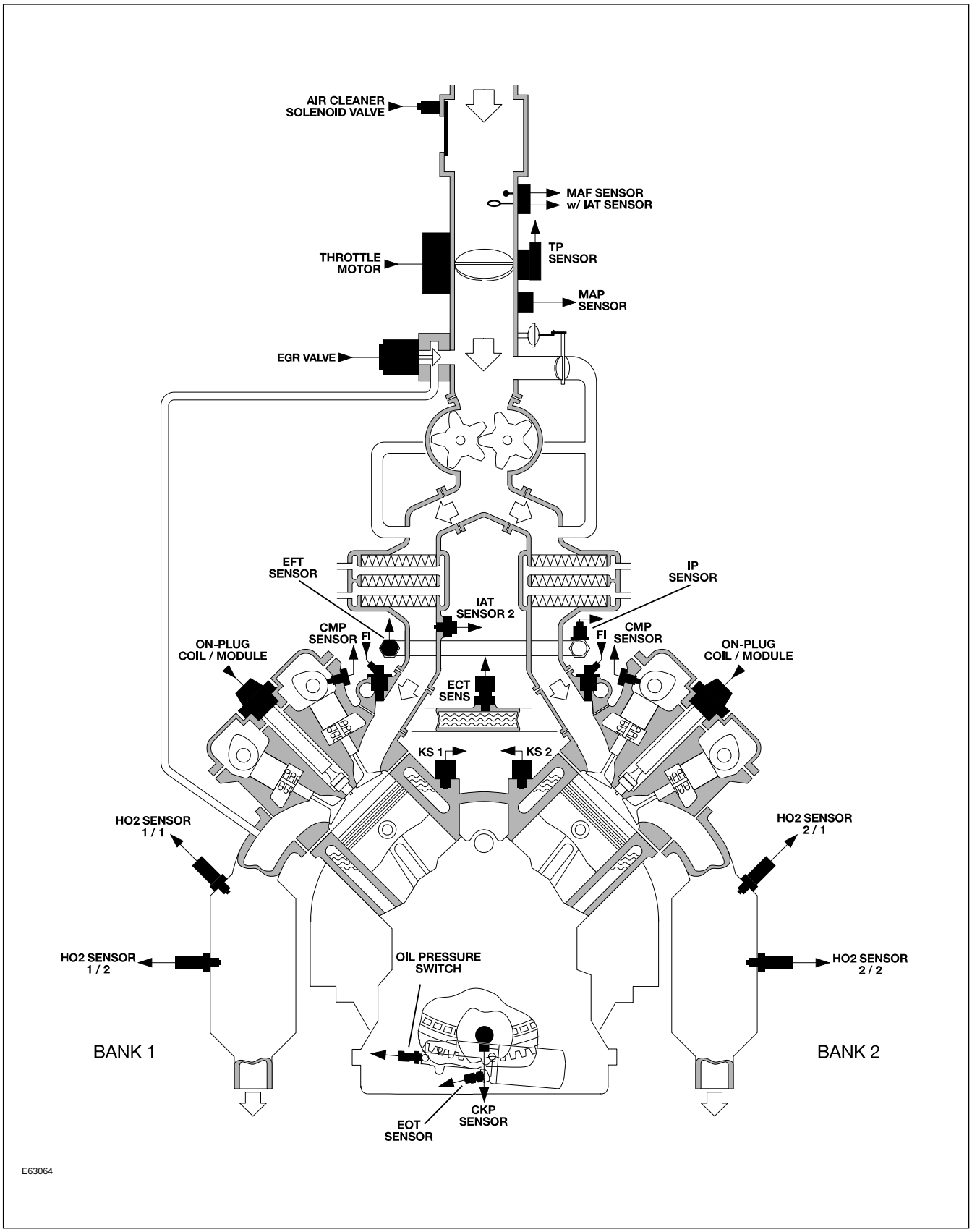
# COMPONENTS

**AJ33 N/A Engine Management Components**



**AJ33 SC Engine Management Components**



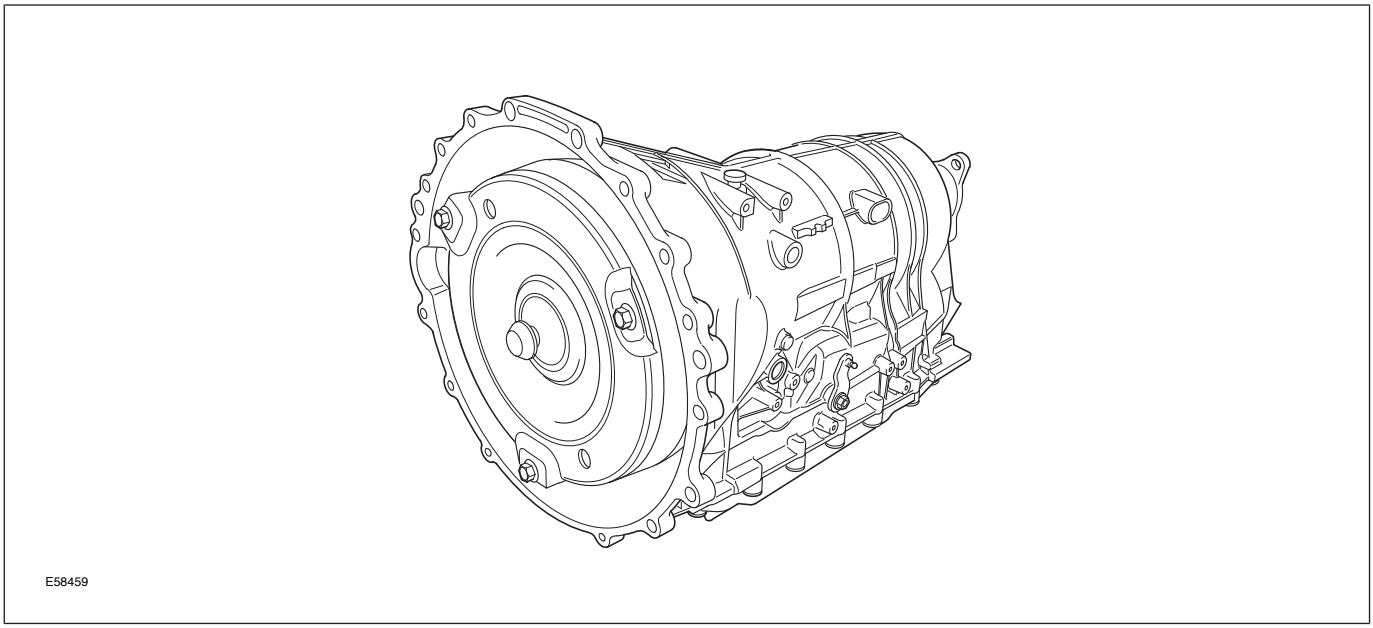
## TRANSMISSION OVERVIEW

The ZF manufactured 6HP26 is the first six-speed automatic transmission utilized by Jaguar and is fitted to all XJ variants.

ZF 6HP26 is interpreted as follows:

- **ZF** – Transmission manufacturer
- **6** – 6 forward gears
- **HP** – Hydraulic Planetary type transmission
- **26** – Maximum torque designation (no units)

**ZF 6HP26 Transmission**



| ZF 6HP26 Specifications | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Transmission weight** | NA – 83 kg (184 lbs) with torque converter and fluid<br>SC – 88.0 kg (194 lbs) with torque converter and fluid | | | | | | |
| **Mechanical features** | Die cast aluminum transmission case in two sections – torque converter housing and main case<br>Torque converter with single-plate, controlled slip lock-up clutch<br>Mechatronic valve body with integral TCM<br>Lepelletier double planetary gear set<br>Contactless internal gear selector position switch | | | | | | |
| **Transmission fluid** | Capacity – 10 liters (10.6 quarts); Filled for life<br>Type – Shell 1375.4, part # C2C8432 | | | | | | |
| **Transmission fluid cooler** | External liquid-to-liquid cooler integral with the left hand side radiator tank. | | | | | | |
| **Towing** | Maximum 0.5 miles @ 30 m.p.h. (advise flatbed recovery) | | | | | | |
| **Stall Test** | There is no stall test specification for the 6HP26 transmission. | | | | | | |
| **Gear ratios** | **1st** | **2nd** | **3rd** | **4th** | **5th** | **6th** | **Reverse** |
| | 4.17 | 2.34 | 1.52 | 1.14 | 0.87 | 0.69 | 3.40 |

## Service

There are no provisions for owners to verify the transmission fluid level, as the ZF transmission is not equipped with a transmission fluid dipstick. To inspect the fluid level and integrity, carefully follow the inspection procedure found in the Transmission section of the WSM, available on the GTR website.

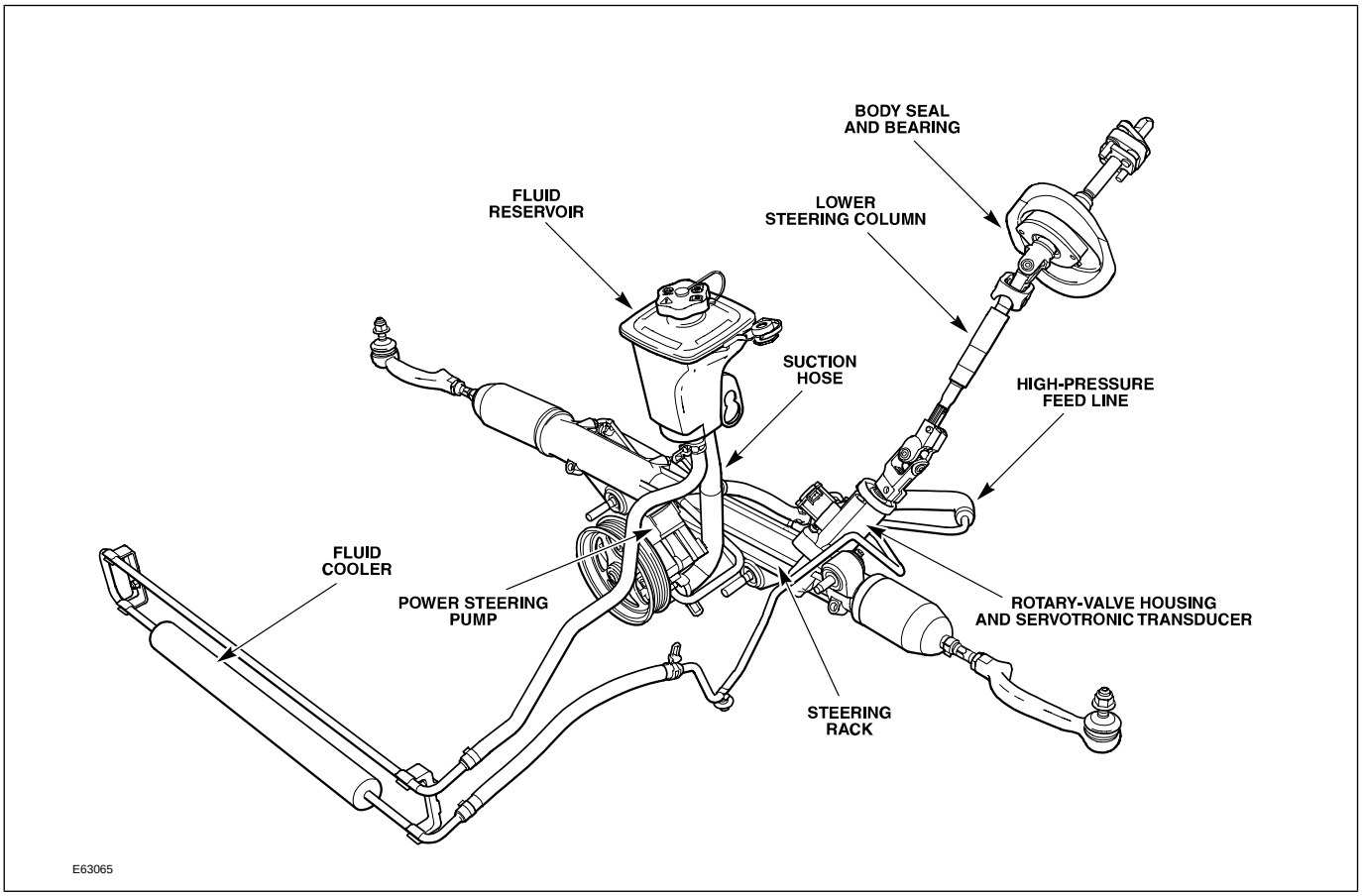
**NOTE:** There are no scheduled fluid level inspections required for ZF 6HP26. Fluid level should only be checked if there are signs of an external fluid leak, or as part of the diagnostic process for customer complaint of poor shift quality.

## POWER ASSISTED STEERING

The XJ is fitted with the ZF-manufactured Servotronic II rack and pinion assembly. The rack features both variable ratio and variable assistance. Control of the variable assistance is integrated into the instrument cluster.

The fluid reservoir is fitted with a non-serviceable 10-micron filter.

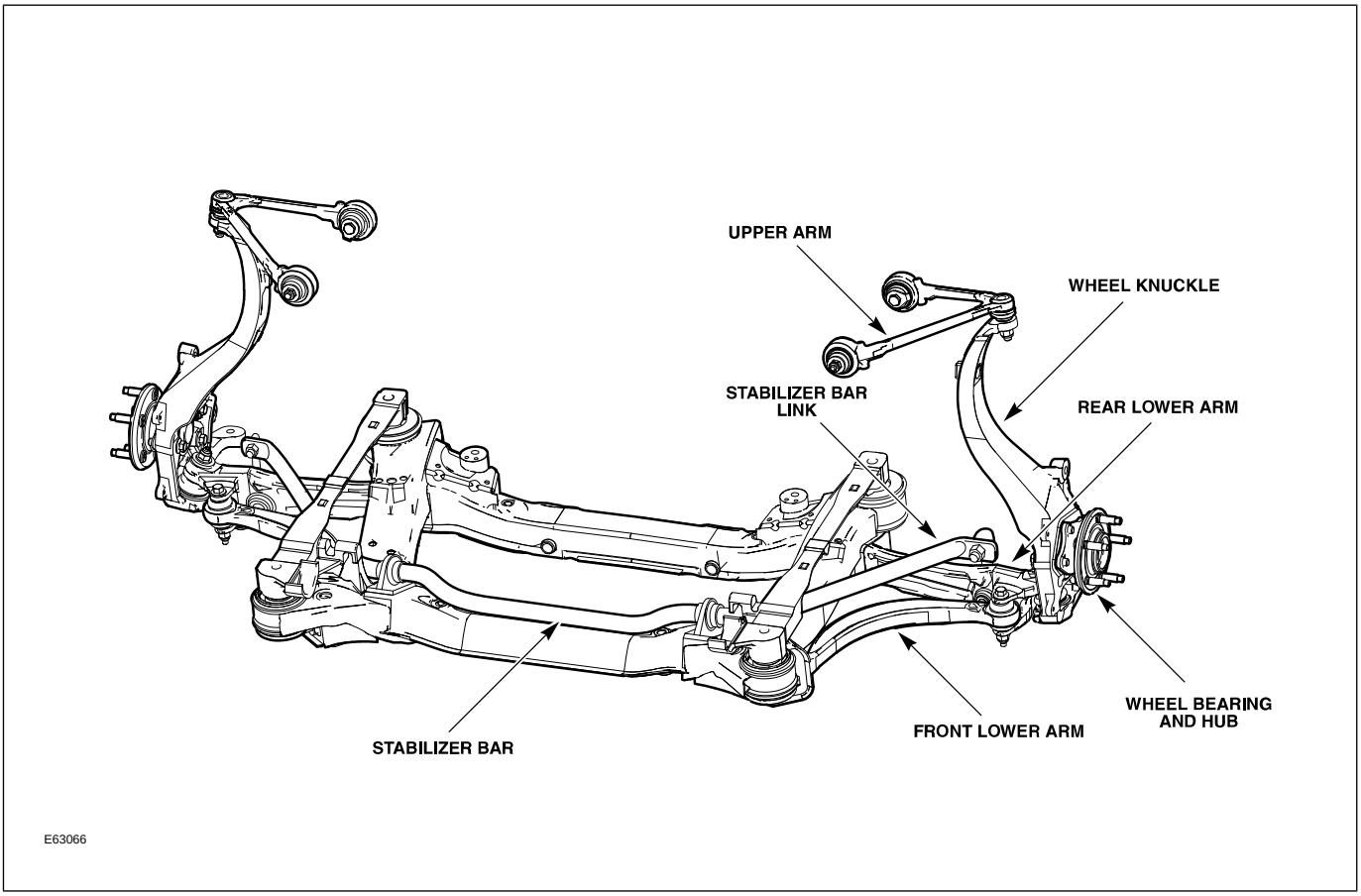
**Power Assisted Steering Components**



## FRONT SUSPENSION

The front suspension design is a double wishbone using lightweight aluminum for reduced unsprung weight. The front subframe is of fabricated steel and is aligned to the body using two tapered locating bolts (special tool 502-007). The front hub assembly is non-serviceable and must be replaced as an assembly.

**Front Suspension Components**




### Front Wheel Alignment

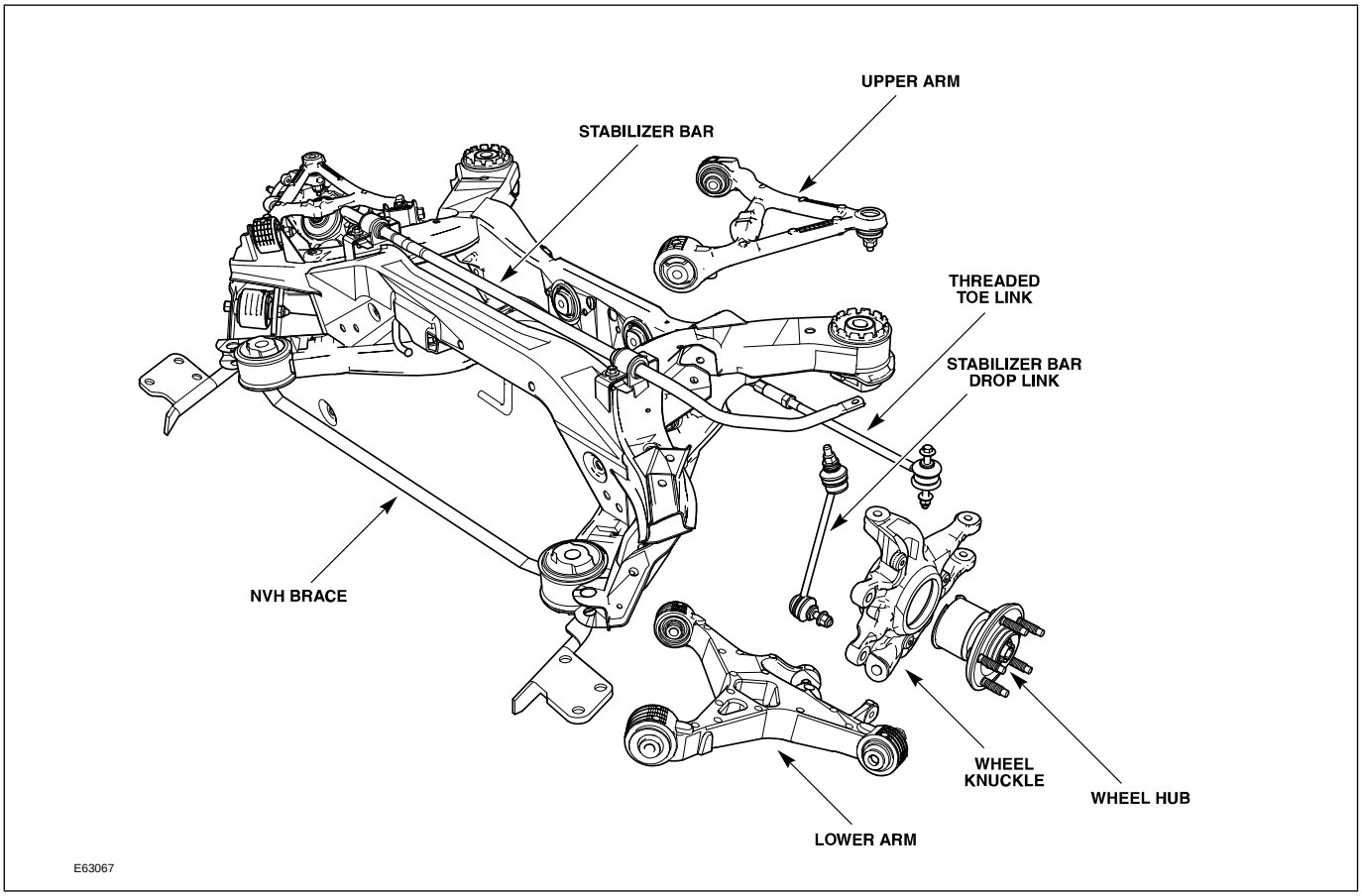
**NOTE:** Prior to performing vehicle alignment, the vehicle must be placed in Pre-Geometry mode using WDS.

Camber and caster are adjustable via the eccentric mounting bolts on the lower control arms. Toe is adjustable via the threaded tie-rod end.

## REAR SUSPENSION

The rear suspension design is a double wishbone using lightweight aluminum for reduced unsprung weight. The steel subframe is mounted to the body via four large bushings. No alignment procedure exists for the subframe. The rear hub is fitted with a serviceable sealed cartridge bearing.

**Rear Suspension Components**




### Rear Wheel Alignment

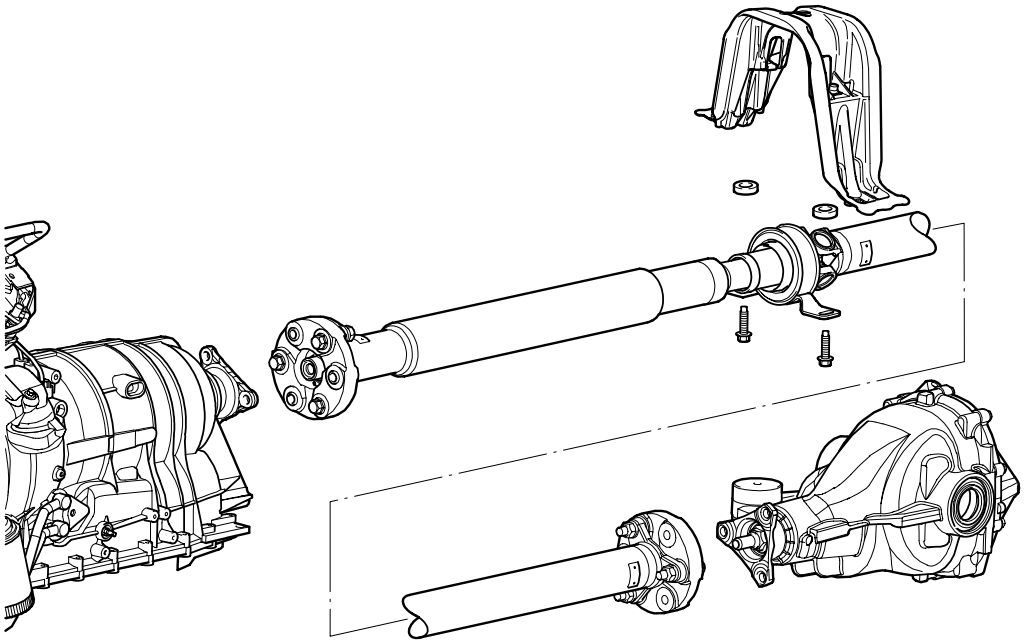
**NOTE:** Prior to performing vehicle alignment, the vehicle must be placed in Pre-Geometry mode using WDS.

Camber is not adjustable. Toe is adjustable via the threaded toe link.

## DRIVELINE

The X350 sedan uses a new two-piece driveshaft manufactured of lightweight steel.

The driveshaft aligns with the centerline of the vehicle's body and is supported in a rubber center bearing. The center bearing is mounted via an adjustable bracket. Alignment of the driveshaft/center bearing is achieved using special tool 205-535. Refer to GTR for the alignment procedure.



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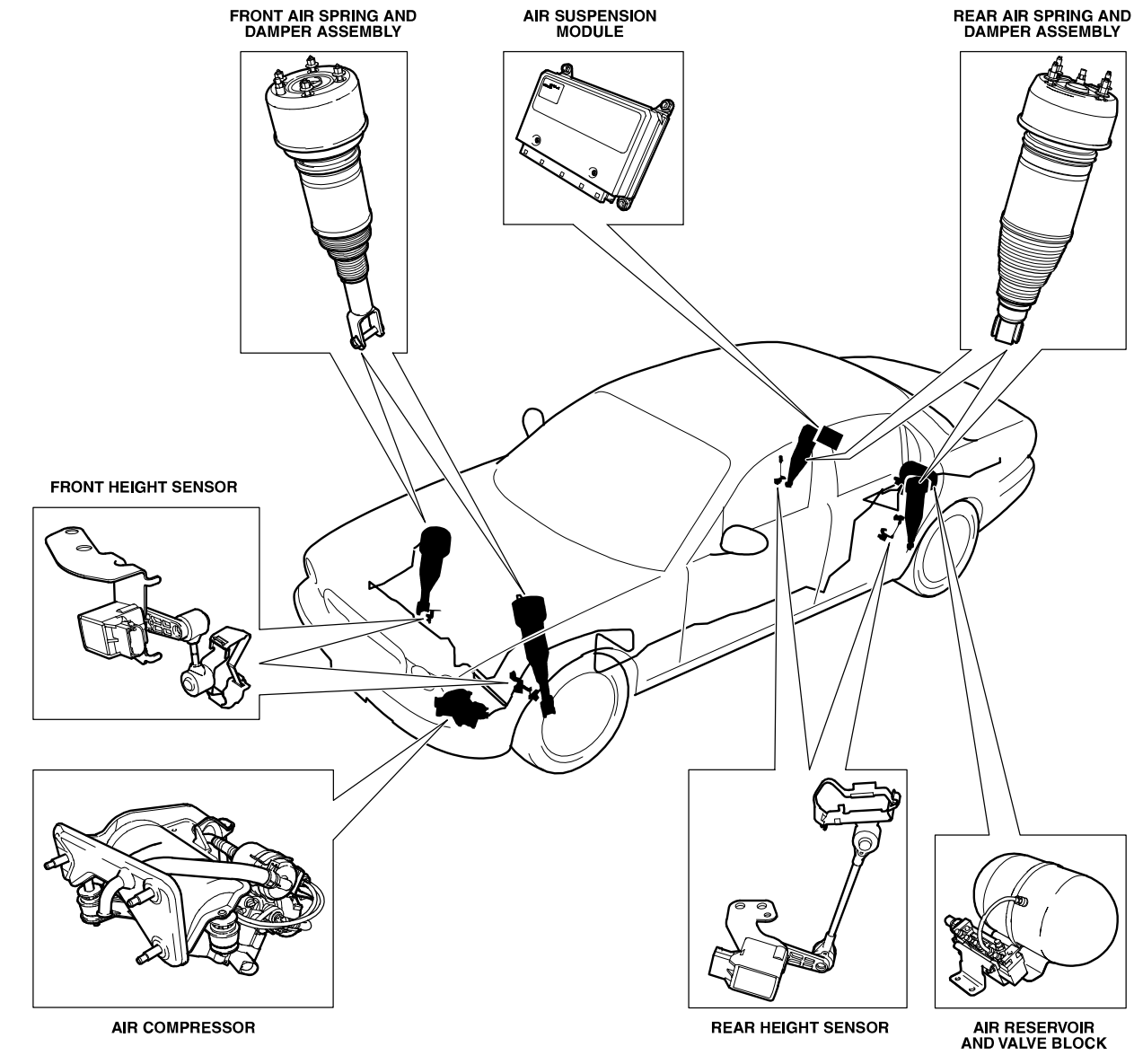
## AIR SUSPENSION

The new air suspension system – which replaces coil springs and shock absorbers with air spring shock absorber assemblies – offers the best ride and handling characteristics, and assists in reducing ride float. This system is standard on all XJ vehicles.

The low weight of the XJ means its payload is a higher percentage of the total vehicle weight. To manage a large payload, a coil-sprung vehicle would need either a high spring rate or an increase in unladen ride height.

The compromises in ride height needed by conventional steel sprung suspension systems do not exist with the XJ air suspension system.

## Air Suspension Components



The air suspension system comprises the following components:

### Air Suspension Module (ASM)

Located behind the right rear seat back, the ASM adjusts the air suspension based on the vehicle height and operating conditions.

### Air compressor

Mounted forward of the left front wheel arch behind the bumper beam, the compressor provides the air suspension with clean, dry air at a nominal 15 bar (218 psi). During normal operation, the air compressor is inhibited from operating until the vehicle exceeds 25 mph.

### Height sensors

The height sensors are Hall-effect sensors that provide the ASM with a voltage proportionate to vehicle height. XJ vehicles up to VIN G26871 are fitted with a sensor at each corner of the car at the front/rear subframe assemblies. Starting at VIN G26872, XJ vehicles are fitted with only three sensors: LF, LR, RR.

### Reservoir

The reservoir has a 4.5 liter (4.8 qt.) capacity and is mounted underneath the spare tire. When fully charged, the reservoir is capable of at least one full lift at gross maximum vehicle weight.

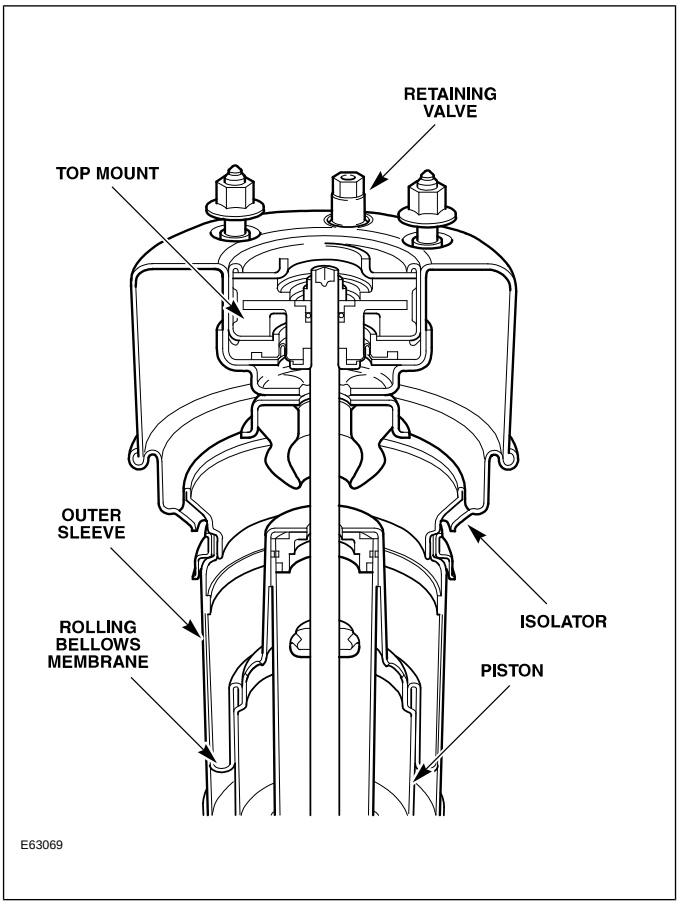
### Valve block

Mounted on the reservoir bracket, the valve block contains five solenoids: one to control air flow to/from each air spring (4 total) and one to control air flow to/from the reservoir. The reservoir is also fitted with a pressure transducer for system pressure monitoring. The ASM controls the activation of the solenoid(s) to either raise or lower the vehicle.

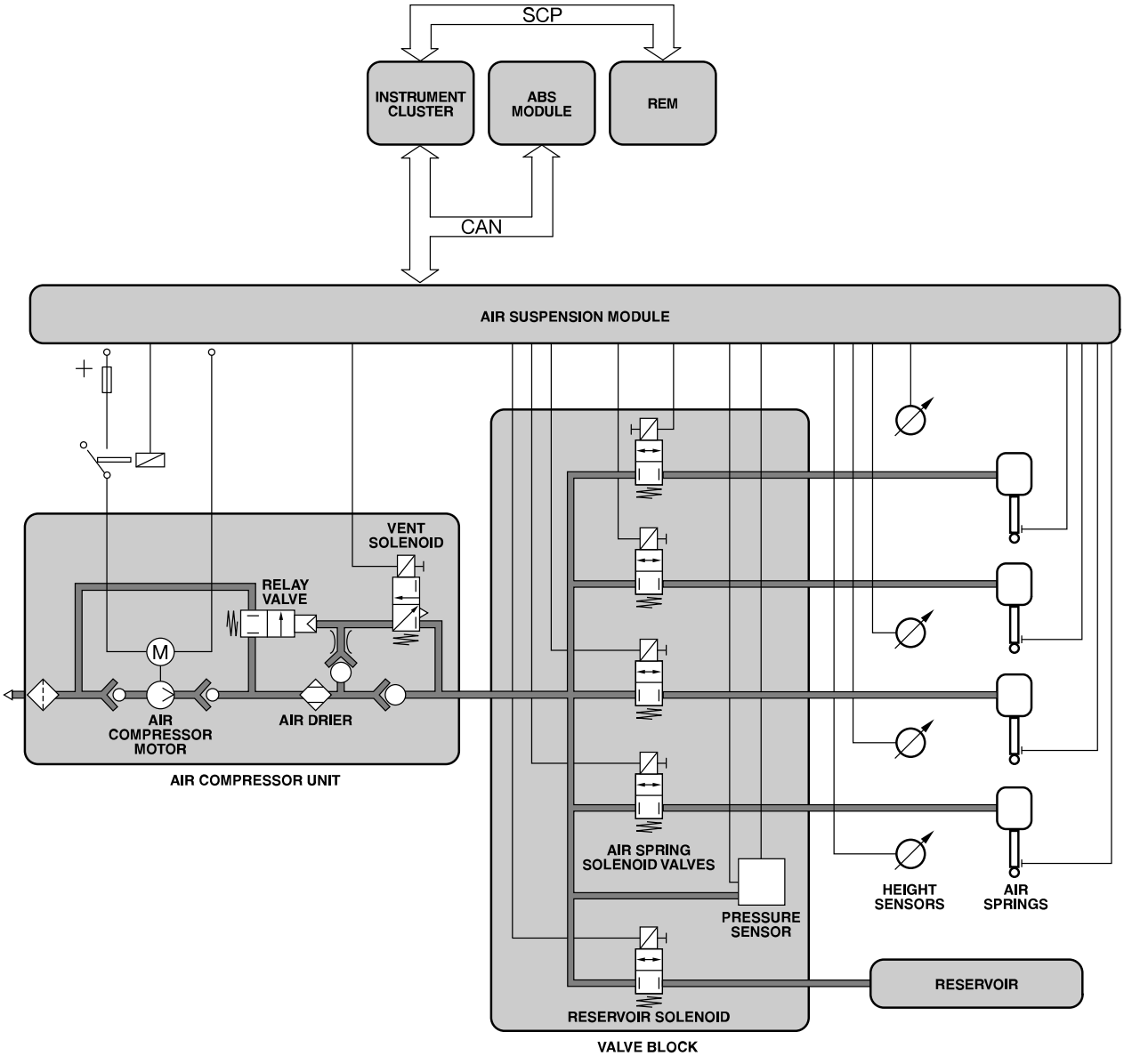
### Air spring and damper

Vehicle attitude is controlled by the operation of four Bilstein air spring and damper units. There are two derivatives of the air spring – Comfort (higher air chamber volume) and Sport (lower air chamber volume). Each damper is also fitted with electrically operated internal solenoids that allow the ASM to control the damping rate of each damper. This is the Enhanced Computer Active Technology Suspension System (ECATS).

**Air Spring Cutaway**



## Air Suspension System Control



## Air Suspension Service Notes

- Depressurization using WDS is required prior to opening the pneumatic system.
- Care must be taken to prevent twisting between the top and bottom mounts of the air spring, as this may damage the internal air bladder.
- Ride height must be calibrated any time suspension components such as air springs, height sensors, or control arms are replaced.
- Vehicles are shipped from the factory in 'Transportation' (or 'Transit') mode, which must be disabled by removing the transit relay before delivery to the customer.
- While in transit mode, the air suspension fault message will illuminate and a DTC will be logged.

## BRAKES

All XJ vehicles are fitted with the Teves MK25 ABS system. The system uses the following components:

- Teves MK25 modulator and control module
- Active wheel speed sensors
- High resolution steering angle sensor
- Yaw rate sensor
- Teves active brake booster

All XJ vehicles have the following features as standard equipment:

- Anti-lock Braking (ABS)
- Traction Control System (TCS)
- Dynamic Stability Control System (DSC)
- Panic Brake Assist (PBA)

Normally aspirated XJ vehicles are fitted with floating calipers. 2004/2005 MY Supercharged variants are fitted with high-performance Brembo brake calipers and larger discs. 2006 MY Supercharged variants are fitted with high-performance Teves floating calipers.

## Electronic Parking Brake

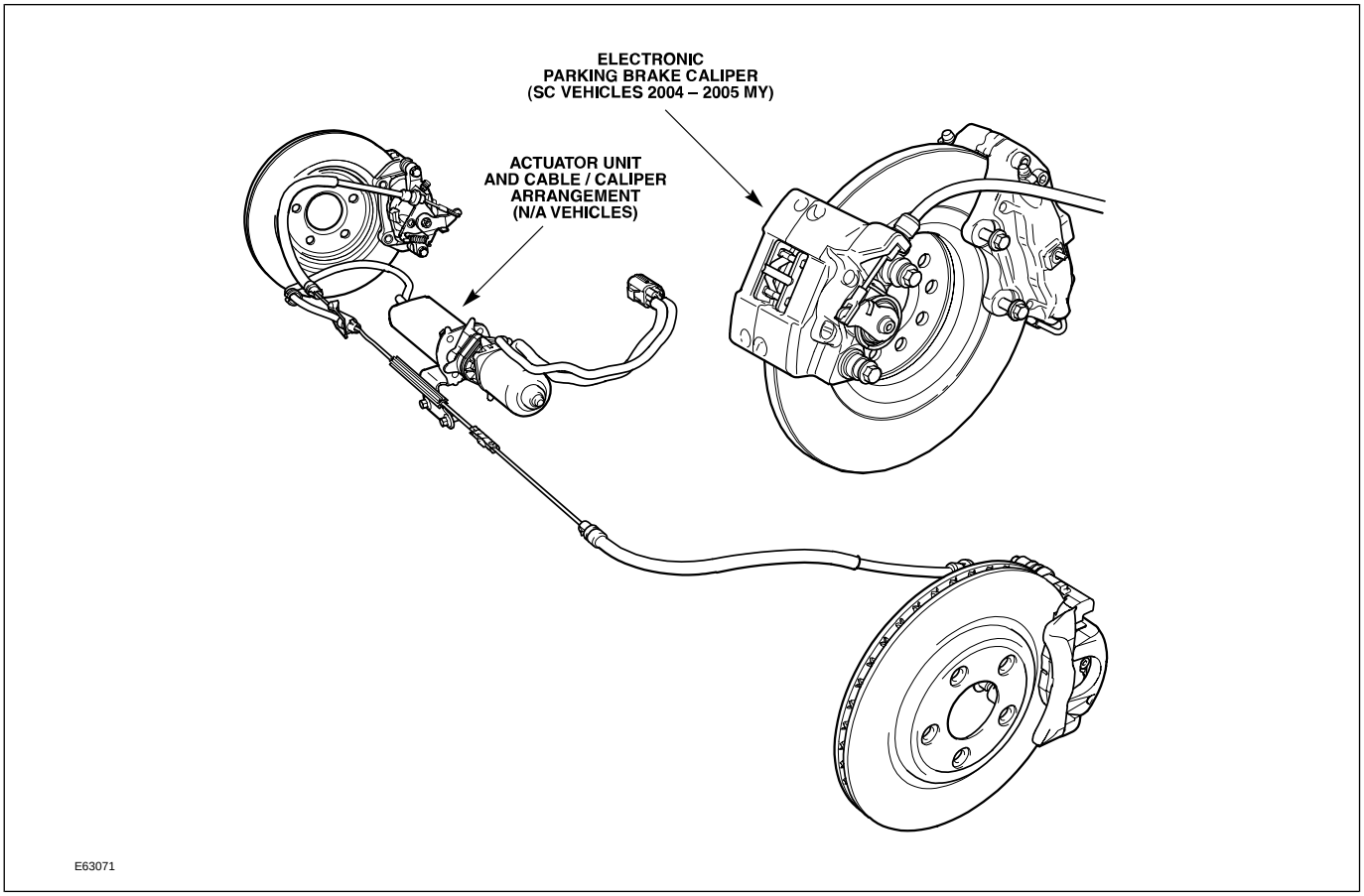
The Electronic Parking Brake (EPB) system fitted to XJ vehicles offers the following benefits:

- Increased interior space (formerly occupied by a traditional parking brake handle)
- Fully automatic activation/deactivation
- Driver strength plays no part in parking brake activation

The system comprises the following components:

- **Parking Brake Actuator**
  - Located above the rear subframe, the actuator consists of a motor, hall-effect position sensor, gearbox mechanism and linkage.
- **Electronic Parking Brake Control Module**
  - Fitted in the trunk by the right quarter panel, the EPB module controls the actuator based on vehicle and driver inputs.
- **Center Console Switch**
  - A three-position switch (apply, neutral, release) is mounted rearward of the J-gate.

**EPB Actuator and Calipers**



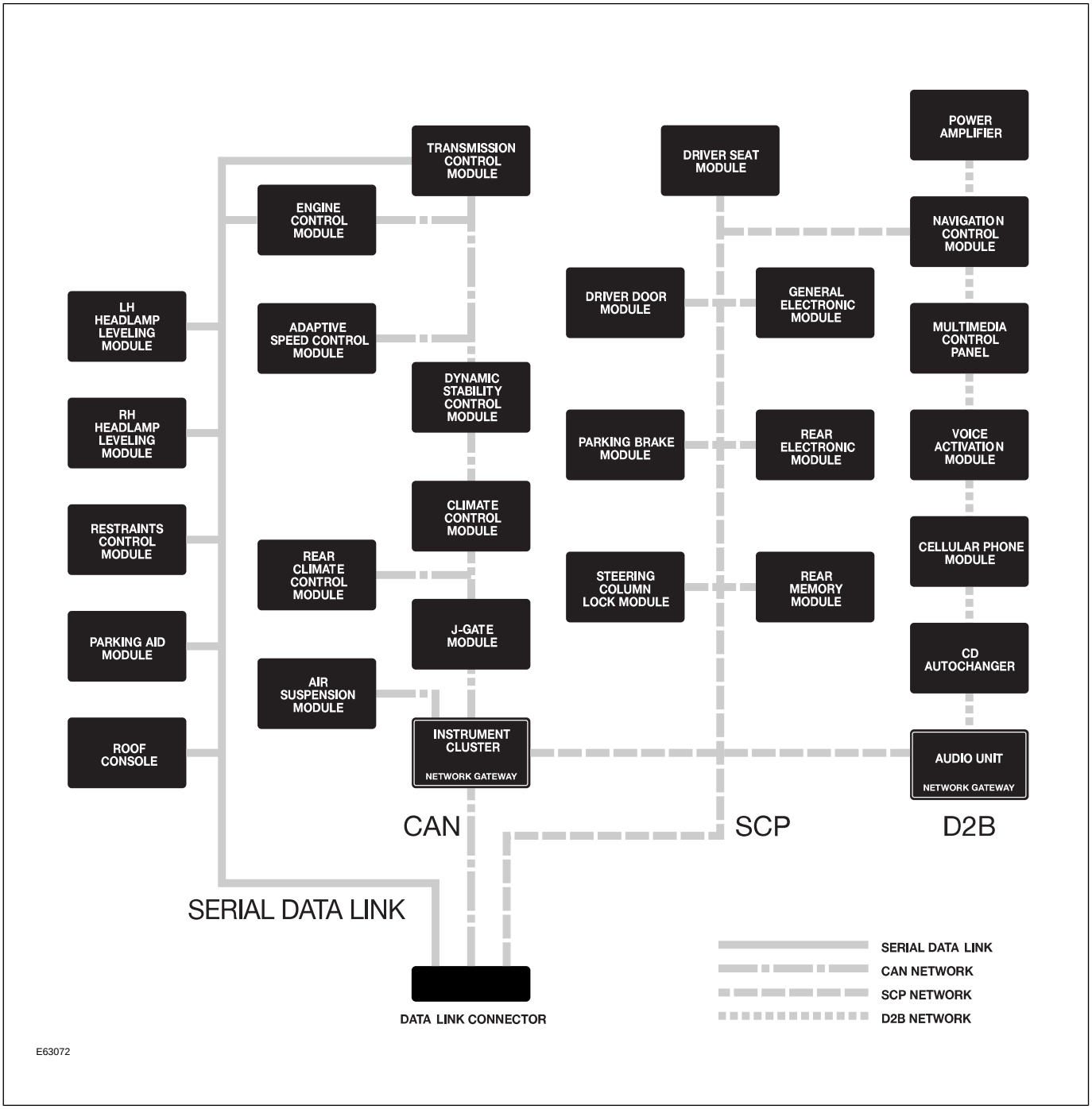
## CONTROL MODULES AND NETWORKS OVERVIEW

Three communication networks are used for control module intercommunication.

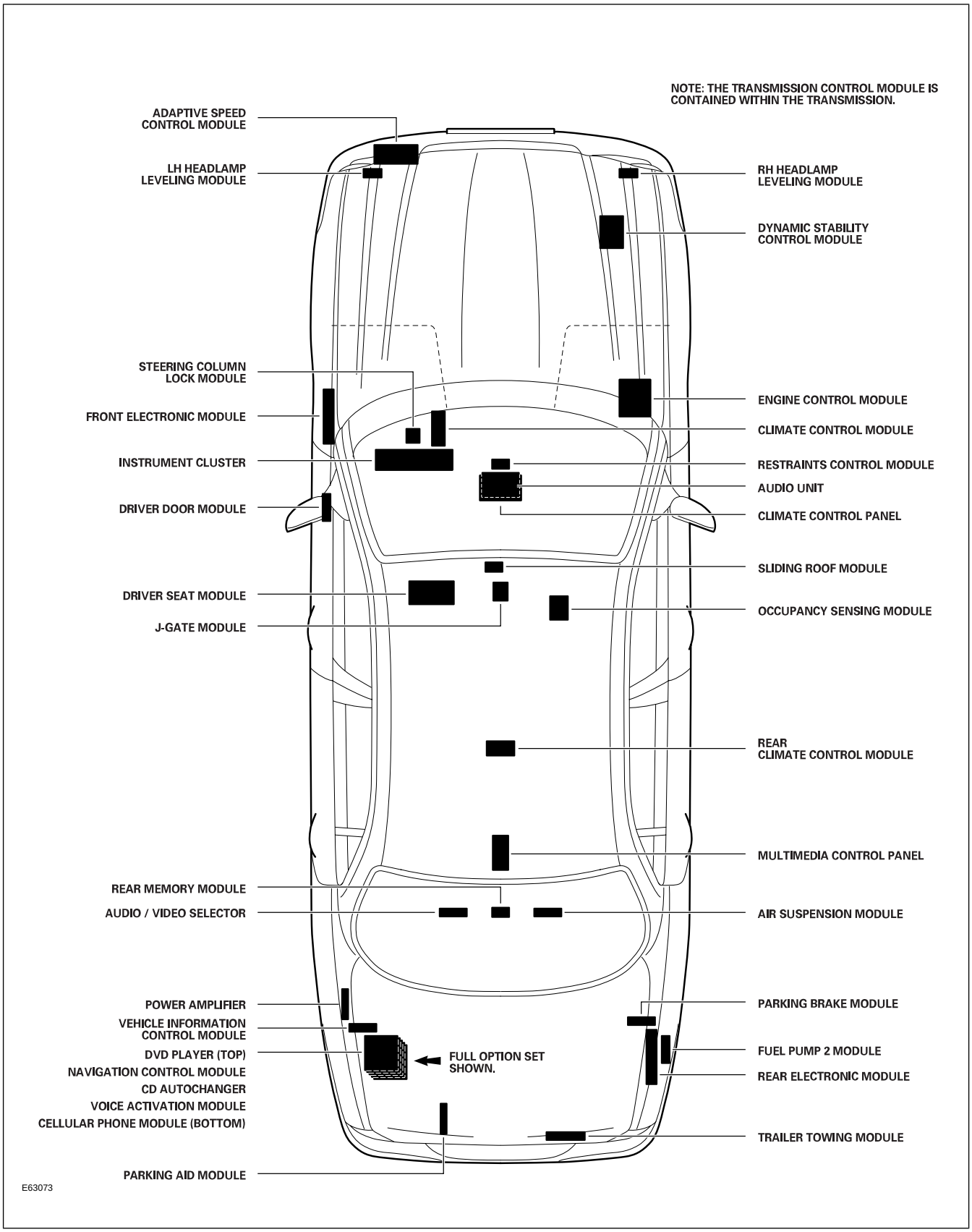
| Communication Networks | | | |
|---|---|---|---|
| **Network** | **Class** | **Speed** | **Communication Medium** |
| Controller Area Network (CAN) | C | 500 KBaud | Twisted pair copper wire |
| Standard Corporate Protocol Network (SCP) | B | 41.6 KBaud | Twisted pair copper wire |
| Digital Data Bus (D2B) | n/a | 5.6 MBaud | Fiber optic cable |

A fourth network – ISO 9141 (Serial Data Link) – allows diagnostic interrogation, via the data link connector (DLC), but does not allow control module intercommunication. The ISO network communicates at 10.4 KBaud.

**Communication Network Layout**



**Control Module Locations**

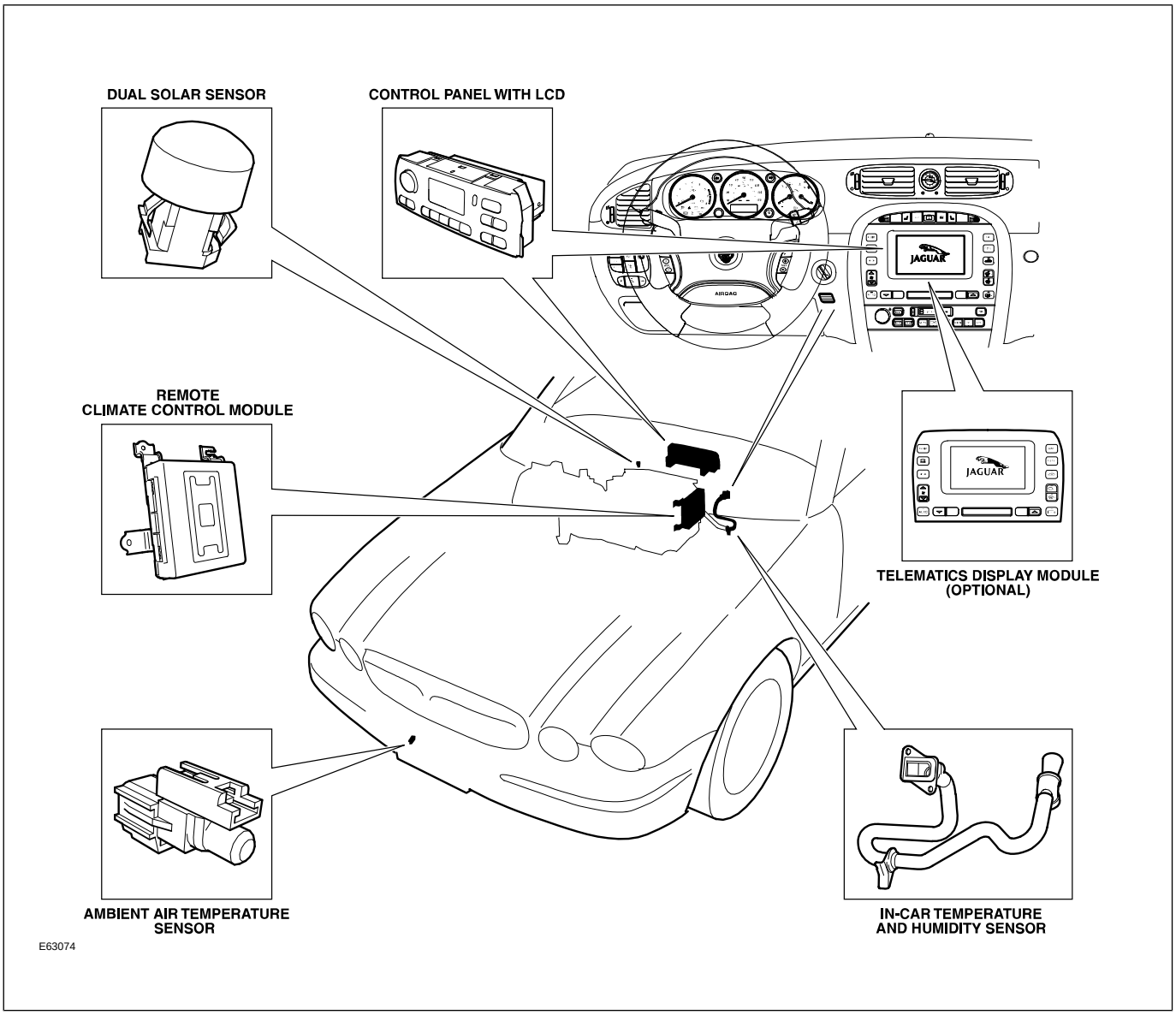


## CLIMATE CONTROL OVERVIEW

A Denso-supplied 2-zone automatic climate control system is fitted as standard, with the availability of an optional 4-zone climate control (rear climate control). 2-zone temperature control is achieved via separate heater/cooler unit flaps for the left and right side of the vehicle, while 4-zone is achieved by adding a dedicated 2-zone heater core and evaporator for the rear passenger area.

A unique feature of the air conditioning system is its use of a clutchless compressor. Displacement of the compressor is variable and controlled by the remote climate control module (RCCM).

**Dual Automatic Temperature Control Components**

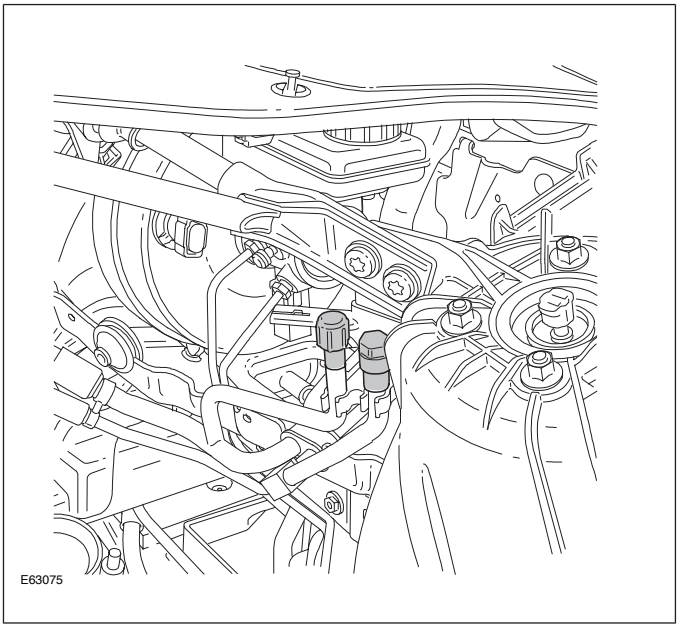


# SERVICE

## Refrigerant Service Ports

Refrigerant service ports are located by the left front strut tower.

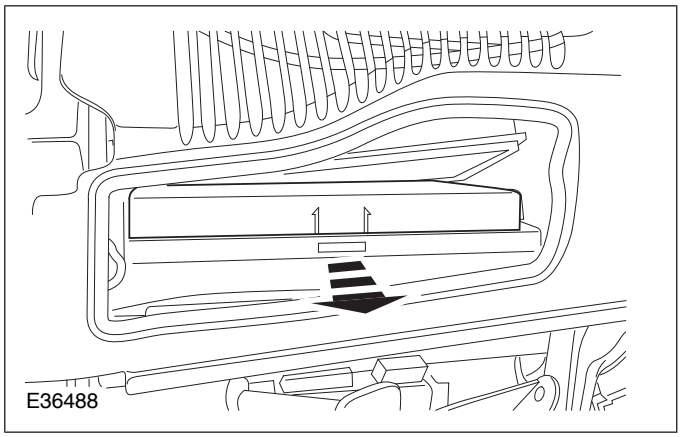
**Service Ports**




## Climate Control Air Filter

Exterior air enters the climate control system via the grill located at the base of the windshield on the passenger side of the vehicle. A serviceable climate control air filter is located in the duct connecting the air intake to the blower housing. The filter is accessed through the right access panel of the plenum chamber cover and should be replaced at 20,000 mile intervals. The charcoal side of the filter faces the cabin.

**Combination Filter**



## POWER WINDOWS

All windows are equipped with one-touch down and one-touch up functionality. The one-touch up functionality incorporates anti-trap capabilities. Utilizing internal position sensors, the door motor can determine when normal travel is restricted. If an obstruction is detected when raising the window, the motor's internal electronics will reverse the direction of the window.

If the vehicle power supply is disrupted, the one-touch up feature will no longer function when the power supply is restored. The initialization procedure must be carried out to restore operation.

### Power Window Initialization

1. Lift and hold the window switch in the up direction until the window seats completely. Continue to hold the switch for a further two seconds.
2. Release switch and then lift and hold it again for a further two seconds. This ensures the window is fully seated into the seal.
3. Press the window switch to lower the window to its fully open position.
4. Verify the operation of the anti-trap and one-touch up operation.

**NOTE:** This procedure can be carried out either from the individual window switches or from the driver's switch pack.

## SUNROOF

The sunroof has the following features:

- One-touch open and close operation
- Tilt open
- Anti-trap safety
- Memory retention if the battery is disconnected

The sunroof memory is not affected by battery disconnection and will not require re-initializing upon reconnection. However, if power is disconnected while the sunroof is actually being operated, then the memory will be lost and the following initialization procedure will have to be carried out. This procedure will also have to be carried out if the roof motor is replaced.

### Sunroof Initialization

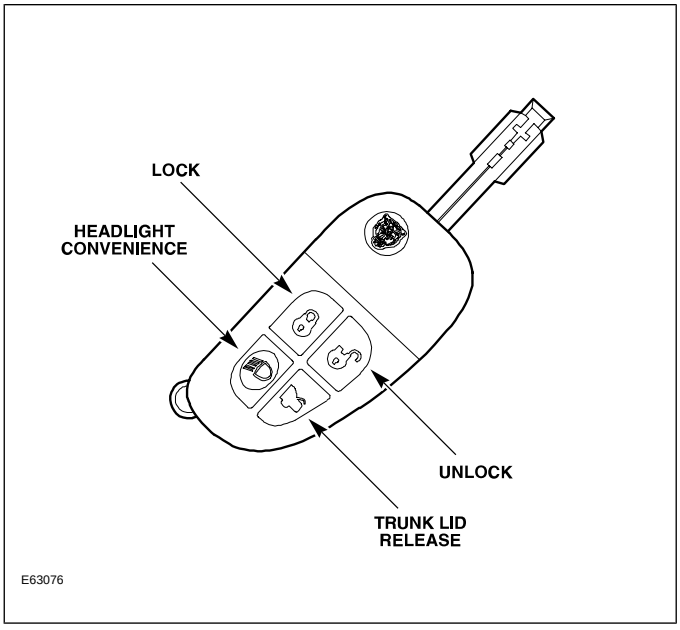
1. Turn the ignition switch to either position I or II.
2. Press the roof switch in the tilt position until the sunroof moves to the fully tilted position and stops.
3. Release the switch.
4. Press and hold the switch in the tilt up position for at least 20 seconds. The roof panel will make a small movement to indicate that the roof has been de-initialized.
5. Release the switch.
6. Within five seconds of releasing the switch, press and hold the switch in the tilt position again. The sunroof will travel automatically to the fully open position, back to the fully closed position, and stop.
7. Verify the operation of the anti-trap and one-touch up feature.

## REMOTE CONTROL KEYHEAD RF TRANSMITTER

The radio frequency (RF) transmitter is operational only when the key is removed from the ignition barrel. The RF transmitter allows remote control of the following features:

- Security system arming/disarming
- Door locking/unlocking (single or two-stage)
- Global opening/closing of windows and sunroof
- Headlight convenience
- Panic alarm
- Trunk lid release
- Mirror auto-fold
- Valet mode (deactivation only)

**Remote Control Keyhead RF Transmitter**



# SYSTEM OPERATION

## Arming/Disarming and Locking/Unlocking

20 seconds after the vehicle is locked via the door key barrel or the RF transmitter LOCK button, the security system will fully arm. At this point, if a door, the hood, or the trunk is opened without disarming the system, the alarm will sound. The glove box release button operation is also inhibited.

Pressing the UNLOCK button on the RF transmitter will disarm the alarm system and initiate single-stage or two-stage unlocking.

### Single-Stage and Two-Stage Unlocking

With the alarm system in single-stage unlocking mode, a single rotation of the door lock barrel to the unlock position or a single press of the RF transmitter UNLOCK button will unlock all doors.

With the alarm system in two-stage unlocking mode, a single rotation of the door lock barrel to the unlock position or a single press of the RF transmitter UNLOCK button will unlock the driver's door. A second rotation of the door lock barrel to the unlock position or a second press of the RF transmitter UNLOCK button will unlock the remaining doors.

**Selecting Unlocking Modes**

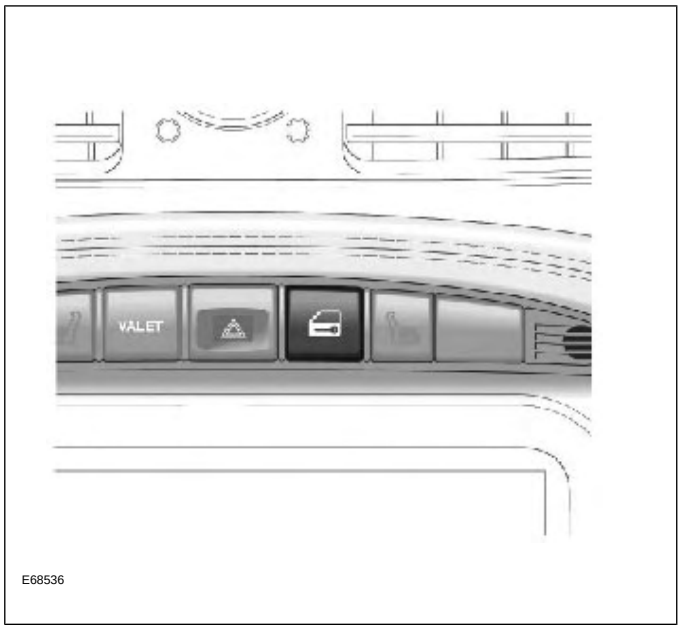
The alarm system can be toggled between the single and two-stage unlocking modes in the following ways:

- Pressing the RF transmitter LOCK and UNLOCK buttons simultaneously for four seconds. Acknowledgment of the feature toggle is provided by two flashes of the directional indicator lights.
- If the vehicle is fitted with navigation, the unlocking mode can be selected via the "Vehicle Settings" selection within the "System Setup" menu.
- WDS can be used to select the unlocking mode from the "Dealer Options" submenu within the "Vehicle Configuration" main menu.

## Global Window and Sunroof Control

Global opening and closing of the windows and sunroof can be initiated from the driver's door key or the central locking switch. Remote global opening and closing is initiated from the RF transmitter.

**Central Locking Switch**



### Global Opening/Remote Global Opening

To initiate global opening, rotate the key in the driver's door lock barrel to the unlock position and hold for longer than two seconds. The windows and sunroof will begin their opening operation and will continue to open as long as the key is held in the unlock position.

Global opening can be initiated from within the car using the central locking switch. To initiate global opening from the central locking switch, the ignition switch must be in the run position and the central locking switch held for longer than two seconds. The doors will centrally unlock and the windows and sunroof will start to open. Global opening will cease if the switch is released.

To initiate remote global opening, press and hold the RF transmitter UNLOCK button for longer than two seconds. This will initiate an automatic opening of the windows and sunroof. Once initiated, the button can be released as the windows and sunroof will continue to their fully opened position. To stop the remote global opening sequence, press any button on the RF transmitter.

The remote global opening feature can be enabled/disabled via WDS.

### Global Closing/Remote Global Closing

To initiate global closing, rotate the key in the driver's door lock barrel to the lock position and hold for longer than two seconds. The windows and sunroof will begin their closing operation and will continue to close as long as the key is held in the lock position.

To initiate remote global closing, press and hold the RF transmitter LOCK button for longer than two seconds. This will initiate an automatic closing of the windows and sunroof. Once initiated, the button can be released and the windows and sunroof will continue to their fully closed position. To stop the remote global closing sequence, press any button on the RF transmitter or press the central locking switch.

The remote global closing feature can be enabled/disabled via WDS.

**NOTE:** Global closing and remote global closing will not close the windows if the windows have not been initialized.

## Headlight Convenience

When the RF transmitter HEADLIGHT CONVENIENCE button is pressed, the headlights will illuminate for 25 seconds. A second press of the button or inserting the key into the ignition switch will extinguish the headlights.

## Panic Alarm

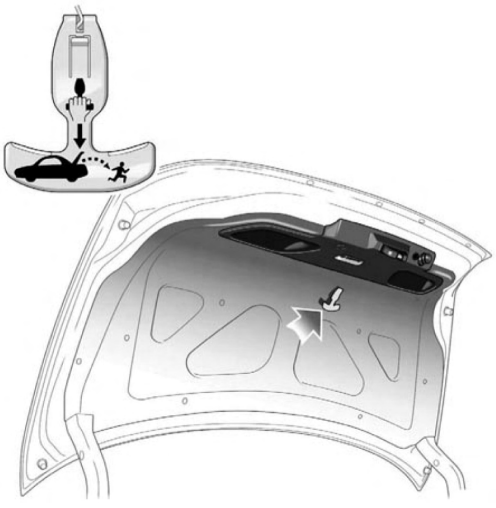
Pressing the RF transmitter HEADLIGHT CONVENIENCE button three times within three seconds will activate the panic alarm. To disable the panic alarm, the key must be inserted into the ignition switch and turned to position II (RUN).

## Trunk Release


The trunk can be opened five ways:

- Pressing the RF Transmitter TRUNK LID RELEASE button.
- Using an integrated transmitter key or black-headed key in the trunk lock barrel. This will cause the alarm to sound if the vehicle is armed. The green-headed valet key will not operate the trunk lock barrel.
- Pressing the release button on the trunk lid (valet mode inactive).
- Pressing the fascia switchpack trunk release button (valet mode inactive).
- Pulling the internal trunk release handle.

**Internal Trunk Release Handle**




## Mirror Auto Fold

Pressing the RF transmitter LOCK button twice within three seconds will active the door mirrors to fold flat. Any unlocking command (key or remote) will unfold the door mirrors.

**NOTE:** The mirrors will not auto-unfold if they have been folded flat via the power fold switch on the driver's door switchpack.

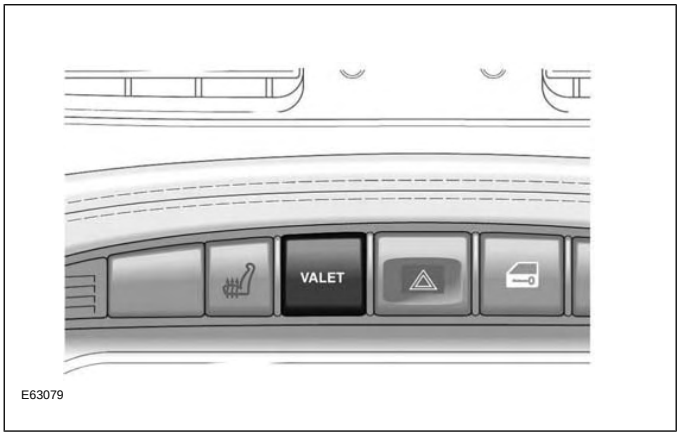
Auto-fold can be enabled/disabled two ways:

- If the vehicle is fitted with navigation, auto-fold mirrors can be selected via the "Vehicle Settings" selection within the "System Setup" menu.
- WDS can be used to select the auto-fold mirrors from the "Dealer Options" submenu within the "Vehicle Configuration" main menu.

## Valet Mode

Valet mode is activated when the fascia VALET button is pressed. A valet mode chime will sound and a valet mode message will be displayed in the message center (message will only appear if the key is in position II – RUN). When in valet mode, trunk opening from the fascia and trunk-mounted release buttons is inhibited. The glove box release button is also inhibited.

**Fascia-Mounted Valet Switch**




If the vehicle is in valet mode and a green-headed key is given to the valet driver, the driver will only be able to:

- Unlock (disarm) and Lock (arm) the vehicle via the driver's door lock barrel.
- Start and drive car.

Deactivation of valet mode can be achieved by:

- Using a remote to unlock (disarm) the vehicle.
- Using a black-headed or remote-control key to open the trunk via the trunk lock barrel.

## Auto Relocking

If a door is not opened within 45 seconds of unlocking the vehicle with the RF transmitter, the vehicle will automatically relock the doors and rearm the security system. The auto relocking feature can be activated/deactivated using WDS.

# SERVICE

## RF Transmitter Service

### Battery Replacement

Each transmitter contains one type CR2032 battery. To separate the key unit from the remote unit, use a small flat screwdriver as illustrated. The battery is fitted with the positive symbol (+) facing downwards in the battery receptacle.

**NOTE:** Changing the remote's battery will not affect its operation or require the remote to be reprogrammed.

E63301

### RF Transmitter Programming

Therre are two methods for programming transmitters. Prior to programming, ensure that all transmitters for the vehicle are present. Transmitters not present will be erased from alarm memory and will no longer function.

**Programming transmitters without WDS:**

1. Insert key into ignition.
2. Hold headlight stalk in the FLASH position.
3. While holding headlight stalk in the FLASH position, rotate the ignition key to position I (AUX).
4. Release headlight stalk and then flash the headlights four times.
5. An audible confirmation and a flash of the security LED on top of the fascia will confirm the alarm system is in transmitter "learning" mode.
6. Press any button on each remote to be programmed. A maximum of five transmitters can be programmed.
7. The alarm system will exit the learning mode when the key is turned to position 0 (OFF), or 15 seconds after the alarm enters learning mode.

**Programming transmitters using WDS:**

1. Select the "Vehicle Configuration" main menu tab.
2. Select "Security".
3. From here, key transponders and transmitters can be programmed.

## PASSIVE ANTI-THEFT SYSTEM

The Passive Anti-Theft System (PATS) is centered around the instrument cluster (IC) and the engine control module (ECM). The engine starting sequence is as follows:

1. Key in ignition
2. Data transfer between the IC and the key transponder to confirm a valid key
3. Ignition turned to position II (RUN)
4. "Key valid" message sent from the IC to the ECM
5. Data transfer between the ECM and IC to confirm encrypted code is correct
6. Engine start

If this sequence is successfully completed, the PATS LED located on top of the fascia will illuminate for three seconds then extinguish.

## PATS Fault Diagnostics

If a fault is detected, the engine will not crank and the PATS LED located on top of the fascia will flash at 4Hz for 60 seconds. At the end of this period, the LED will flash a two-digit code for the current fault. The code will be flashed 10 times. Refer to GTR for code interpretation.

**NOTE:** Corresponding DTCs may exist along with PATS codes that may further explain the root cause of a fault. Check for DTCs whenever diagnosing a PATS fault.

## Key Transponder Programming

As many as 8 transponders can be programmed for one vehicle, but they must all be present at the time of programming.

**Programming additional transponders without WDS:**

1. To enter the manual programming process, all keys for the vehicle will need to be present and two pre-programmed keys will be required.
2. Insert the first customer key into the ignition switch and turn to the position II (RUN) for a maximum of five seconds. Remove key.
3. Within 10 seconds of removing the first key, insert the second customer key and turn to position II (RUN) for a maximum of five seconds. Remove key.
4. To program the third key, insert the new key and turn to position II (RUN) within 20 seconds of removing the second key. Allow the PATS LED to prove out for three seconds to confirm storage of the new key.

**Programming transponders using WDS:**

1. Select the "Vehicle Configuration" main menu tab.
2. Select "Security".
3. From here, key transponders and transmitters can be programmed.

## SUPPLEMENTAL RESTRAINT SYSTEM OVERVIEW

The XJ uses Jaguar's Adaptive Restraint Technology System (ARTS). ARTS can be divided into three subsystems:

- Crash severity sensing and analysis
  - Five impact sensors (one behind the radiator grill and one mounted at the base of each 'B/C' and 'D/E' pillar) provide a signal to the Restraints Control Module (RCM) that is proportionate to the crash severity
- Occupant analysis
  - Position of the driver's seat and seatbelt engagement is monitored
  - Weight, position and seatbelt engagement of the front passenger is monitored
- Deployment handling
  - Based on crash severity and occupant analysis, the RCM will determine which restraints to deploy and the deployment strength (frontal impact airbags only).

## COMPONENTS

The ARTS in XJ vehicles uses three control modules:

### Weight Sensing Module

Mounted to the underside of the front passenger seat, the weight sensing module processes the signal from the seat pressure transducer attached to the silicone filled bladder in the cushion.

### Occupancy Sensing Module

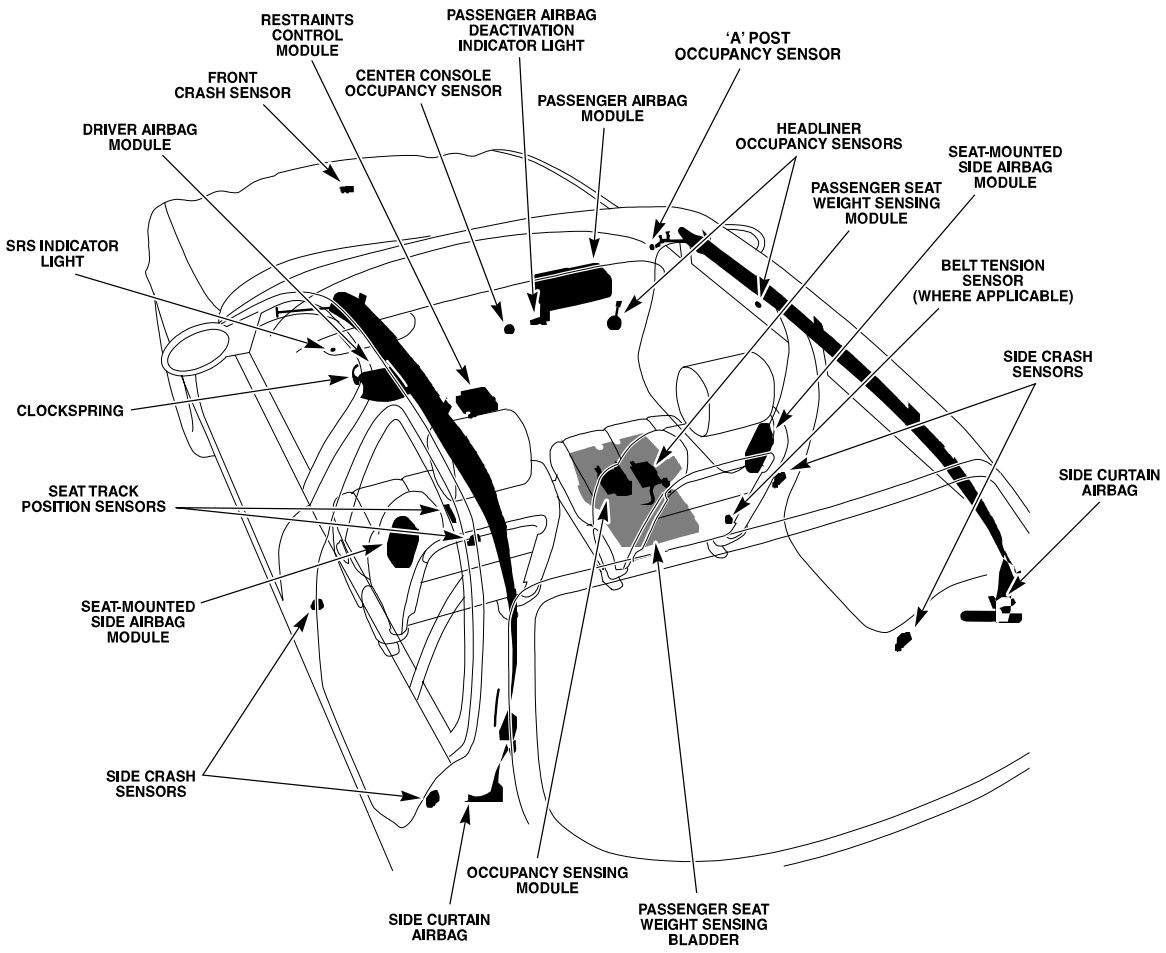
Also mounted to the underside of the front passenger seat, the occupancy sensing module processes signals from the four ultrasonic sensors. These sensors emit an ultrasonic signal operating at 40 KHz to monitor occupancy of the front passenger seat.

### Restraints Control Module

Mounted below the radio on the transmission tunnel, the restraints control module is responsible for deploying restraints based on signals from the weight sensing module, occupancy sensing module, front seat belt buckle sensors, driver's seat position switch and crash sensors.

The three modules communicate via a local (dedicated) CAN network, which is not part of the vehicle's main CAN network.

**ARTS Component Locations**

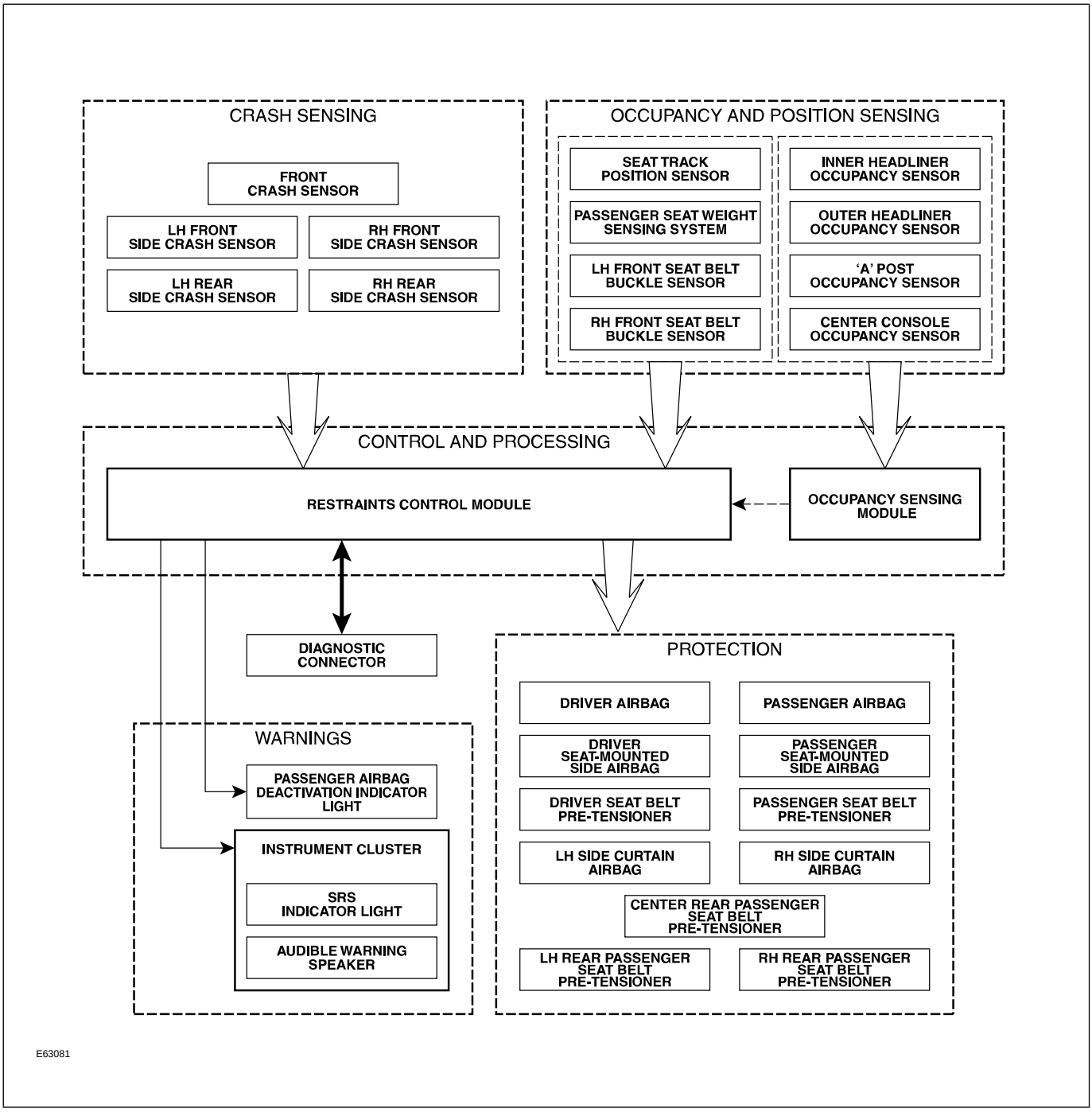


## SYSTEM OPERATION

The ARTS can deploy the following restraints:

- Front seat belt reel pre-tensioners (2)
- Rear seat belt reel pre-tensioners (3)
- Two-stage driver and front passenger airbags (2)
- Seat-mounted side airbags for front occupants (2)
- Roof-mounted side air curtains (2)

**Adaptive Restraints Technology System Diagram**



⚠ **WARNING: Read and observe all safety precautions in GTR (Global Technical Reference) and service bulletins before attempting to service the SRS.**

**Do not attempt to measure the circuit resistance through the airbag modules or pre-tensioners with a DVOM. Doing so may trigger airbag deployment and result in personal injury.**

**To disarm the SRS, disconnect the battery negative cable and wait a minimum of two minutes for the reserve power charge to dissipate.**

# IN-CAR ENTERTAINMENT (ICE)

## Selectable Features

Simultaneously pressing and holding the AM/FM and EJECT buttons will display the audio system selectable features on the navigation screen. The following options are available:

- Market
  - US (no security code function, radio tunes to odd digits i.e. 90.1, 90.3, 90.5 etc.)
  - EU
  - JPN
  - AUS
- RDS/RBDS (Radio Data System/Radio Broadcast Data System)
  - ON (when tuned to a RDS station, the radio will display station call letters and (depending on station) station name, current song title and artist)
  - OFF (only the radio station frequency is displayed)

## Setting Clock

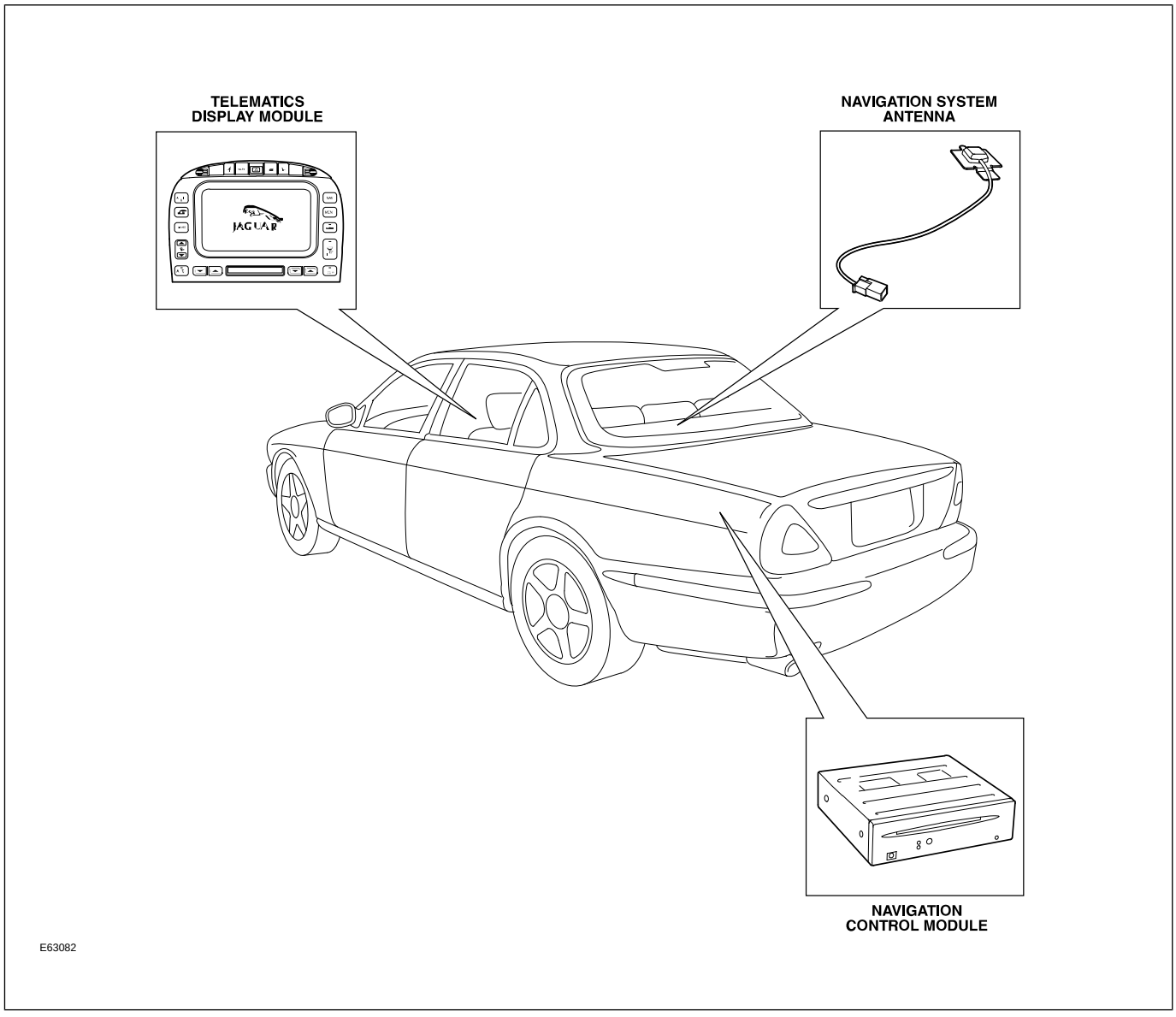
All XJ vehicles are fitted with an analog clock located between the center fascia air outlets. The time can be adjusted by pressing the plus (+) and minus (-) buttons.

## NAVIGATION SYSTEM

The navigation system is an optional fitment. The navigation screen comprises a 7" color touch screen which also provides control of the phone, audio system, climate control, and voice control. The navigation module is located in the left side of the trunk. The Global Positioning System (GPS) antenna is located below the parcel shelf trim.

With the aid of DVD map data, the navigation module uses signals from the following sensors to determine the position of the vehicle: the internal GYRO sensor, the GPS antenna and the ABS wheel speed sensors. After entering the desired destination, the driver is guided along by both visual guidance and voice instructions. If the driver strays off the route, the system calculates a new route showing the easiest way back to the original destination. The system can also point out useful landmarks such as gas stations, restaurants, hotels, and Jaguar dealers.

**Navigation System Components**



Curriculum Training

# Introduction to Jaguar

## Introduction to X-TYPE: X400/X404

JAGUAR

Technical Training

INTR 05 en 08/2005

INTR: X400/X404

Please remember that our training literature has been prepared for TRAINING PURPOSES only. Repairs and adjustments MUST always be carried out according to the instructions and specifications in the workshop literature. Please make full use of the training offered by Technical Training to gain extensive knowledge of both theory and practice.

# Table of Contents

## Lesson 6 – Control Modules and Networks



## Lesson 7 – Climate Control



## Lesson 8 – Body Systems



## Lesson 9 – Security System



## Lesson 10 – Supplemental Restraint System



## Lesson 11 – Infotainment

## Workshop safety

This page highlights the general observations expected while attending this training program, and its continuation upon returning to your place of work.

## General

While working on all vehicles, the following items where available should always be used:

- Fender covers
- Seat covers
- Floor protection

## Safety

All precautions must be taken and observed at all times, to prevent injury or damage to the following:

- Yourself
- Customer's property
- Workshop equipment
- Work place colleagues

## Operating guidelines

While using any piece of workshop equipment:

The manufacturer's guidelines and warning labels must be followed.

This will ensure correct use and application at all times.

Seek the necessary advice or training where equipment usage is unclear.

## Chemicals, Oils and Solvents

Follow all manufacturer's warnings and labels; also take into account local disposal regulations when working with chemicals, oils or solvents.

Ensure that all risks are completely minimized.

Make sure that all protective items of clothing are worn where required e.g.

- Eye protection
- Gloves
- Coveralls
- Footwear

## System capping

Upon disconnecting components from a system, take all precautions necessary to prevent system contamination or environmental leakage.

Fit relevant plugs or caps i.e. to pipes, unions and component orifices etc.

## Updates

Keep abreast of all relevant changes that affect your role within the dealership, by monitoring all factory issued documentation.

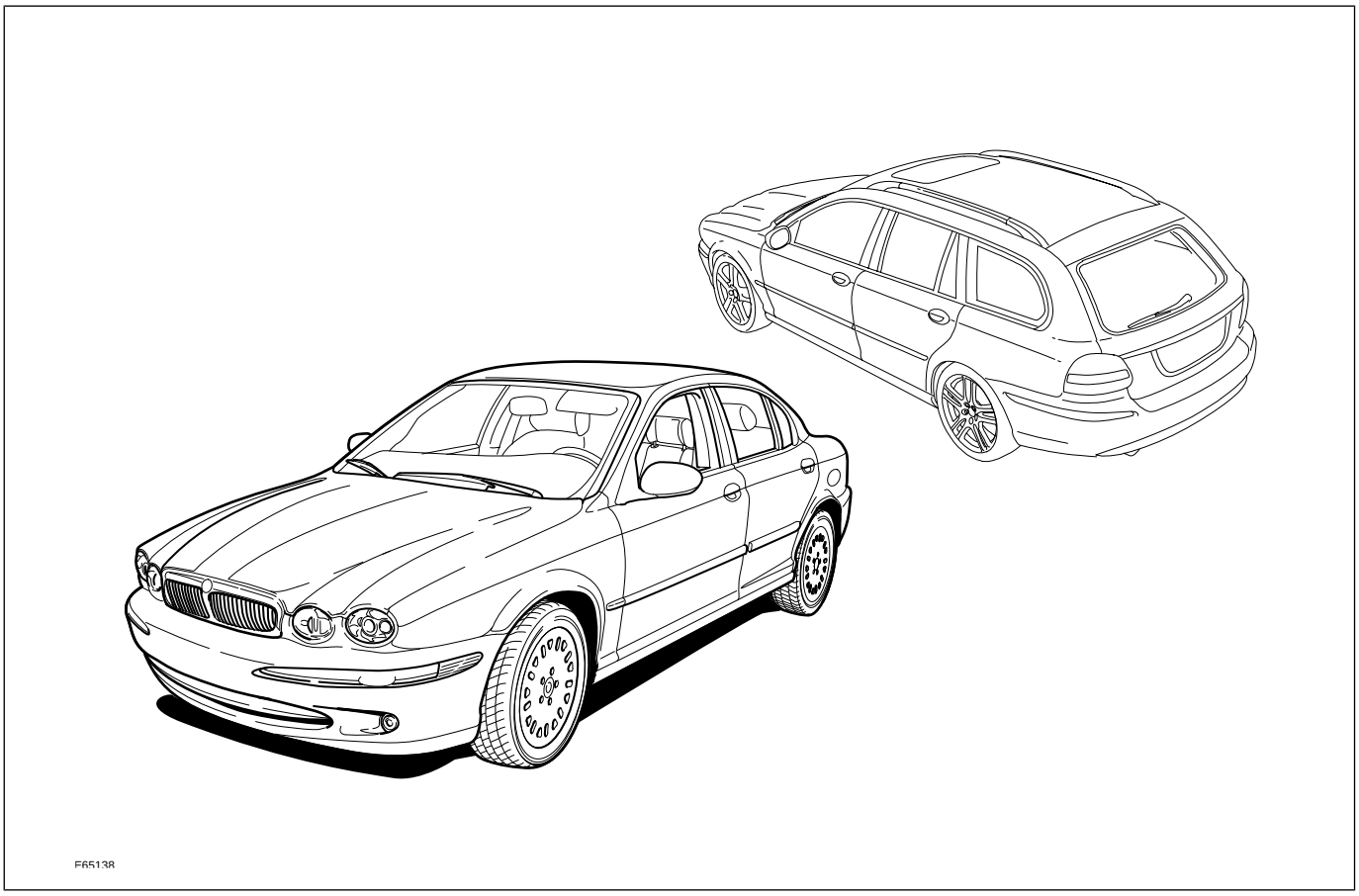
## Driving

Operating vehicle features, such as ICE, mobile phones and CD player equipment etc., can cause a momentary distraction while driving.

Follow all traffic regulations when operating vehicle systems or using diagnostic equipment while on the move.

Mobile diagnostic equipment operation may require the use of an assistant.

## OVERVIEW




The Jaguar X-TYPE was introduced for the 2002 model year as an all-wheel drive (AWD), elegant, small luxury sedan combining the contemporary expression of traditional Jaguar product attributes with excellent driving dynamics, package and functionality. A wagon version was added to the model line for the 2005.5 model year.

The powertrain comprises a 2.5-liter or 3.0-liter transversely-mounted V6 engine, derived from the engine used in S-TYPE, coupled with a five-speed automatic transmission or a five-speed manual transmission.

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

- Dynamic stability control, which assists the driver in maintaining directional control of the vehicle
- Xenon (high-intensity discharge) headlights, supplied with automatic headlight leveling and headlight powerwash

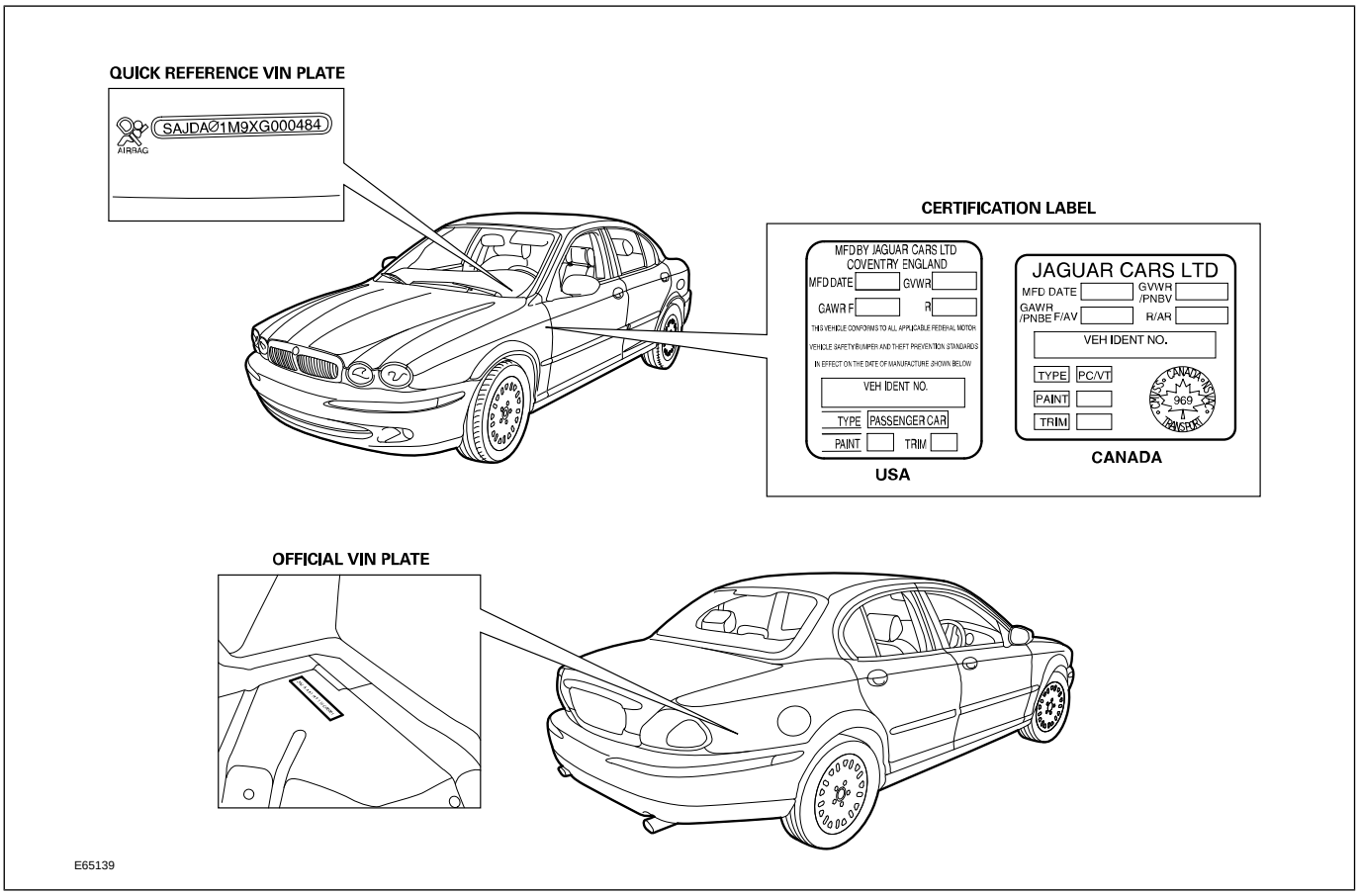
As with other current Jaguar vehicles, the X-TYPE is fitted with variable ratio power steering and ABS brakes as standard.

Security features include an engine immobilizer and alarm; intrusion sensors and the inclination sensor are available as options. The remote keyring transmitter has radio frequency operation with an encrypted rolling code to help prevent theft of the vehicle.

## Engineering Codes and VIN Ranges

| 2002 MY X-TYPE | | |
|---|---|---|
| **Variant** | **Engineering Code** | **VIN Range** |
| X-TYPE Sedan | X400 | C00001 – C86114 |
| **2003 MY X-TYPE** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| X-TYPE Sedan | X400 | D01088 – D55321 |
| **2004 MY X-TYPE** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| X-TYPE Sedan | X404 | D56272 – E19615 |
| **2005 MY X-TYPE** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| X-TYPE Sedan | X404 | E19616 – E66743 |
| X-TYPE Wagon<br>(Introduced for 2005.5 MY) | X404 | |
| **2006 MY X-TYPE** | | |
| **Variant** | **Engineering Code** | **VIN Range** |
| X-TYPE Sedan | X404 | Starting at E67744 |
| X-TYPE Wagon | X404 | |

# IDENTIFICATION PLATES AND LABELS



## VEHICLE JACKING AND TOWING

There are four jacking points, two on each side of the vehicle on the underside of the floor. Two indented triangular jack location points are provided on each sill cover.

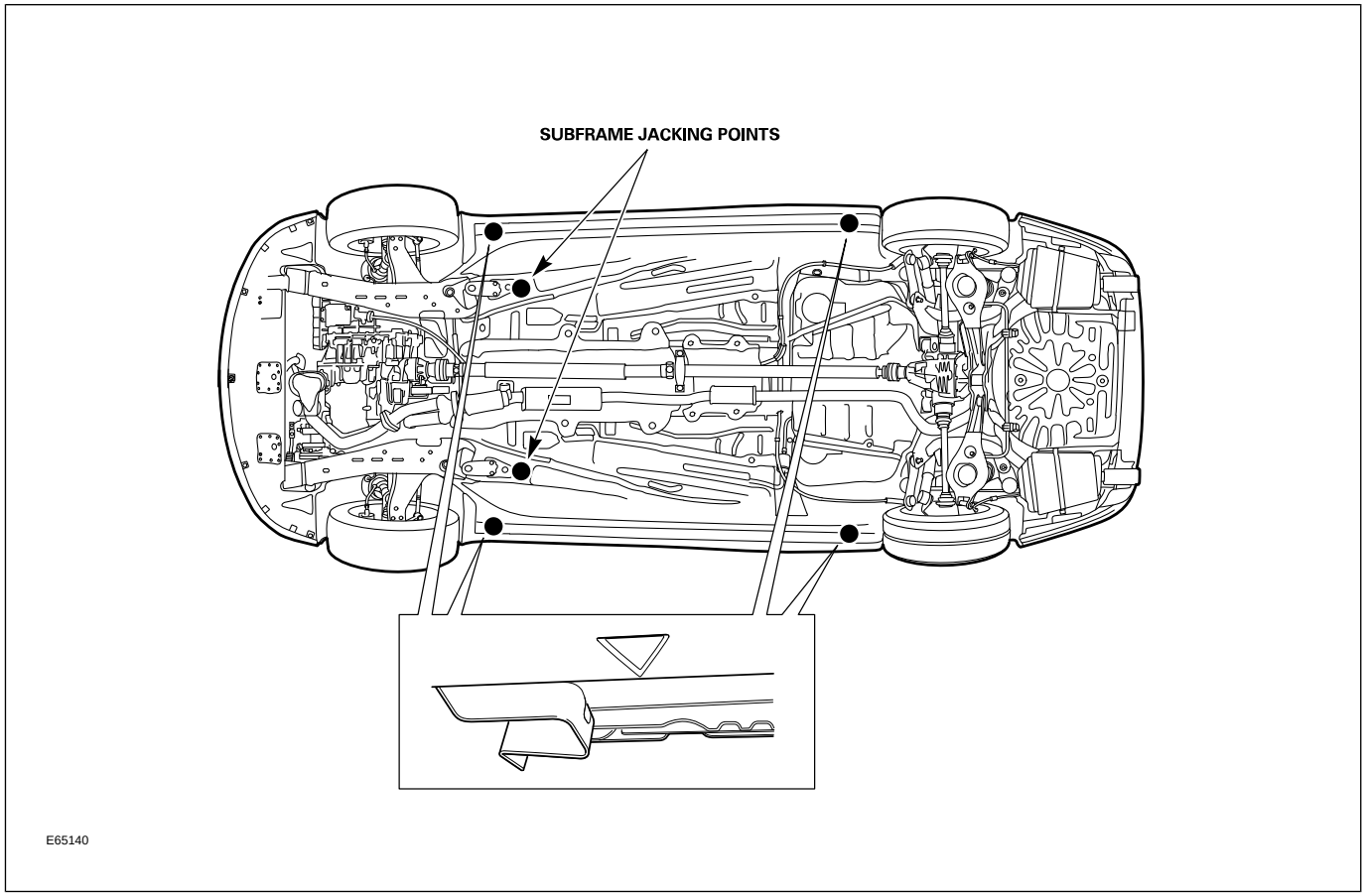
**CAUTIONS:**

⚠ **Jacking and lifting points are critical.**

⚠ **Vehicle support stands should only be used in conjunction with cushioned pads.**

Refer to GTR for detailed information.

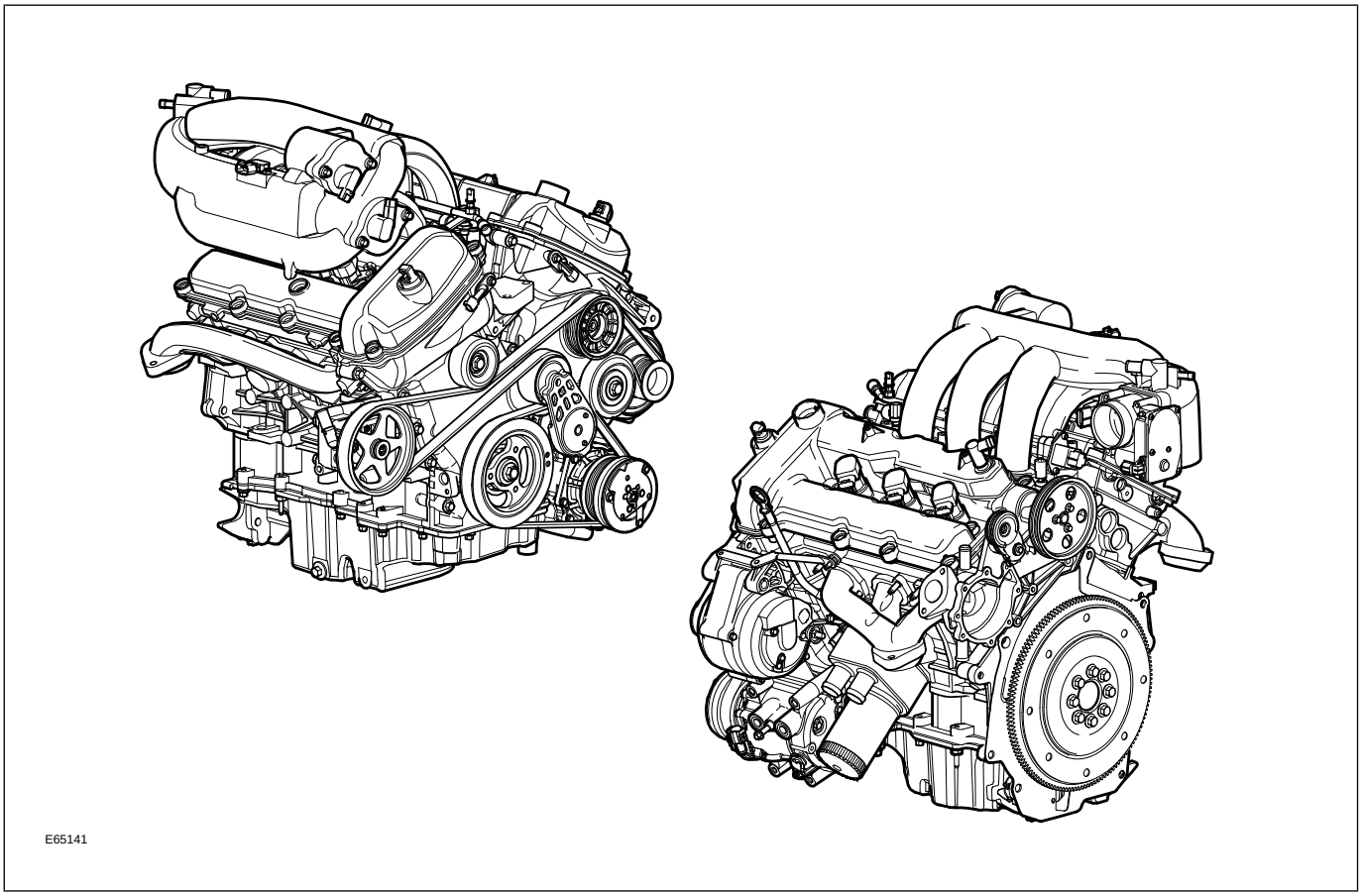
**Vehicle Jacking Points**



## ENGINES OVERVIEW

The X-TYPE is the first Jaguar vehicle range to be fitted with a transverse engine. This modification has resulted in the AJ61 2.5-liter and 3.0-liter V6 engines, which are both variants of the AJ62 3.0-liter V6 engine used in the S-TYPE, redesigned to accommodate the new powertrain configurations.

**AJ61 V6 Engine**

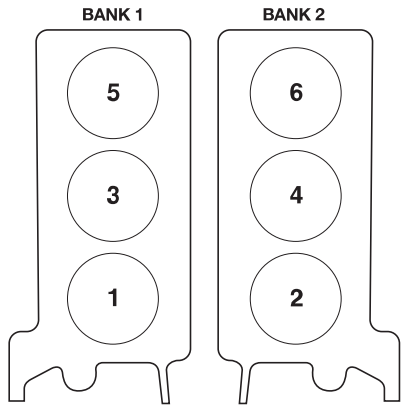


# DETAILS

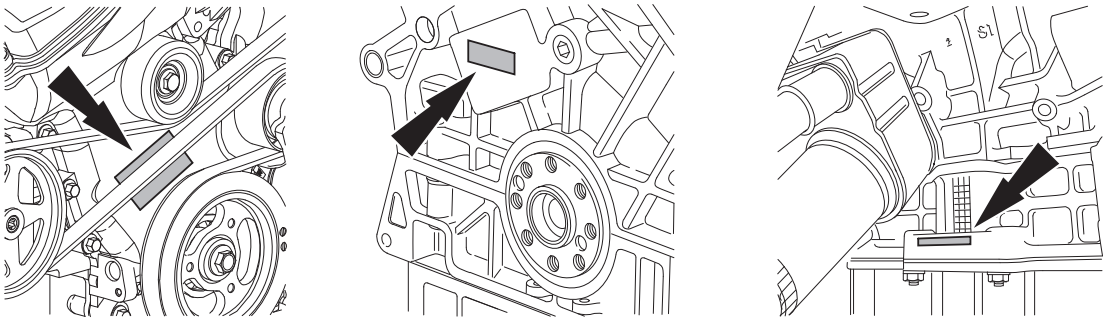
## Engine Specifications

| | AJ61 2.5L V6 | AJ61 3.0L V6 |
|---|---|---|
| **Configuration** | 60° V6 | 60° V6 |
| **Cylinder Head** | – Dual overhead camshafts<br>– 4 valves per cylinder | – Dual overhead camshafts<br>– 4 valves per cylinder |
| **Valve Clearances (cold)** | Intake: 0.175 – 0.225 mm (0.007 – 0.009 in.)<br>Exhaust: 0.325 – 0.375 mm (0.013 – 0.015 in.) | Intake: 0.175 – 0.225 mm (0.007 – 0.009 in.)<br>Exhaust: 0.325 – 0.375 mm (0.013 – 0.015 in.) |
| **Bore** | 81.65 mm (3.214 in.) | 89 mm (3.504 in.) |
| **Stroke** | 79.5 mm (3.130 in.) | 79.5 mm (3.130 in.) |
| **Displacement** | 2.497 liters (152 $in^3$) | 2.967 liters (181 $in^3$) |
| **Compression Ratio** | 10.3 : 1 | 10.5 : 1 |
| **Maximum Power (SAE)** | 192 BHP at 6800 rpm | 227 BHP at 6800 rpm |
| **Maximum Torque (SAE)** | 178 lb. ft. at 3000 rpm | 206 lb. ft. at 3000 rpm |
| **Engine Oil Capacity** | 5.8 liters (6.1 qt.) | 5.8 liters (6.1 qt.) |
| **Coolant Capacity (approx.)** | 10 liters (10.6 qt.) | 10 liters (10.6 qt.) |

## Engine Numbering and Firing Order




## Engine Identification Numbers




### Engine Identification by VIN

The eleventh digit of the VIN indicates which engine is fitted on the vehicle. An 'X' indicates that the vehicle is fitted with a 2.5-liter engine; a 'W' indicates that the vehicle is fitted with a 3.0-liter engine.

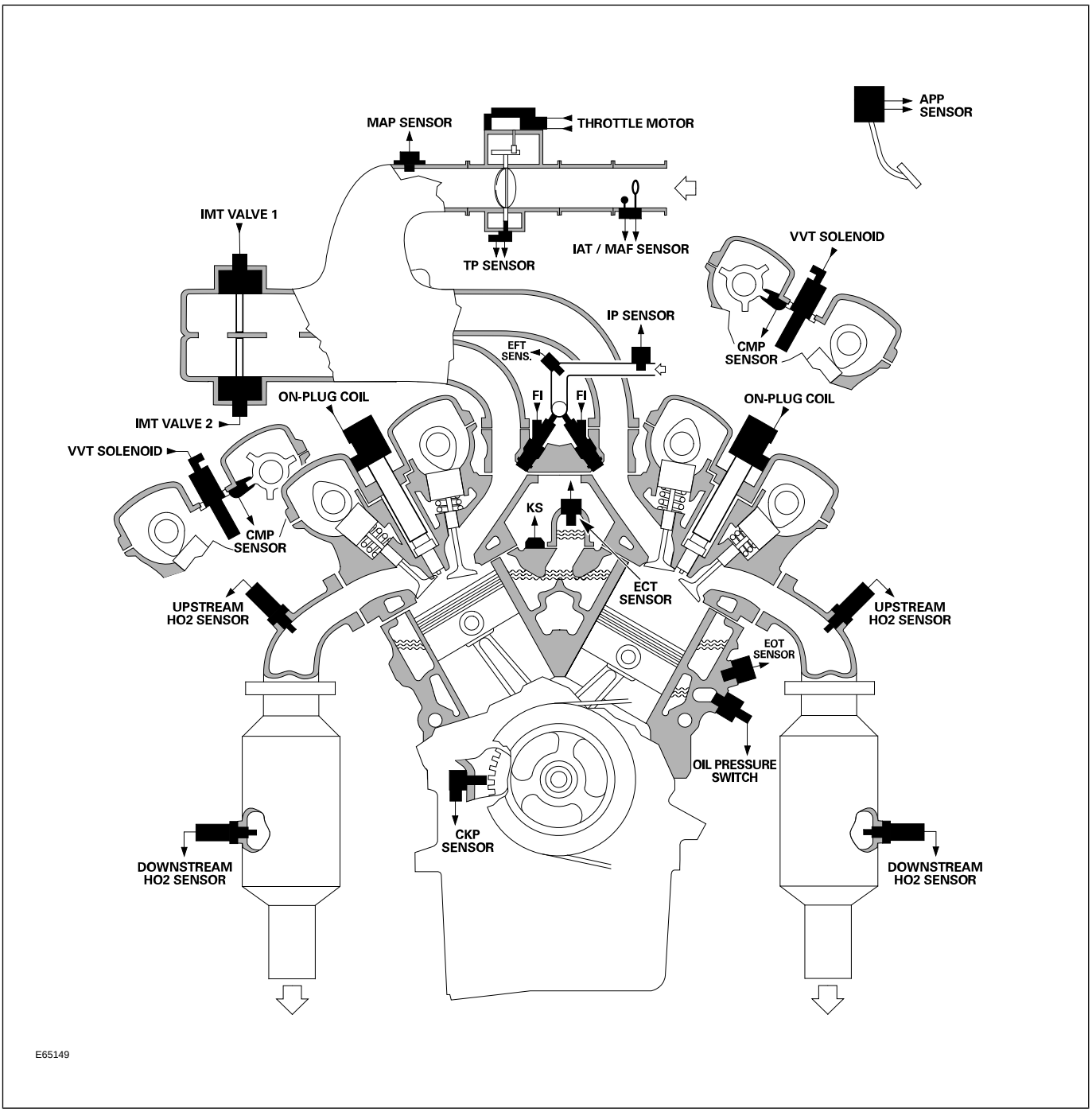
For example:

- SAJEB53D52**X**C000236 = 2.5 liter engine
- SAJEA51CX2**W**C000235 = 3.0 liter engine.

## ENGINE MANAGEMENT OVERVIEW

The Jaguar/Denso 32-bit Engine Management System (EMS) was designed as a generic system applicable to all Jaguar engines in use across the model ranges. The system is built around a dual processor Engine Control Module (ECM). One microprocessor is dedicated to throttle control and diagnostics; the other microprocessor handles all other ECM functions, controls and diagnostics.

**X-TYPE Engine Management Components**



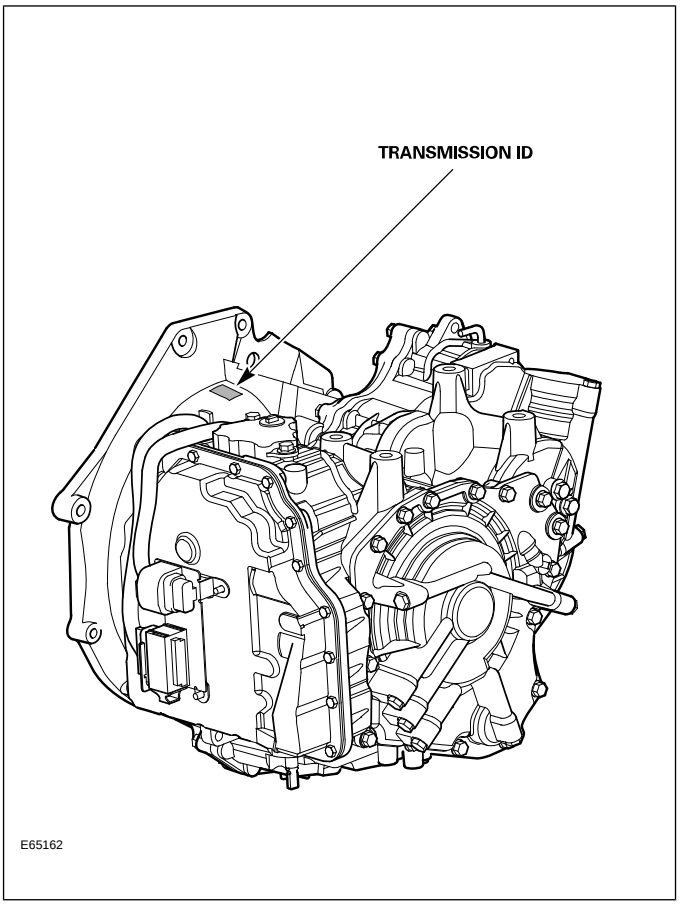
## AUTOMATIC TRANSAXLE

The JF506E automatic transaxle has been developed for use by Jaguar. Made in Japan by JATCO, the transaxle employs a transmission control module (TCM), three rotational speed sensors, and nine shift / pressure solenoids to achieve refined shift control with excellent response to changing driving conditions.

JF506E is interpreted as follows:

- **J** – Japan Automatic Transmission Company
- **F** – Front wheel drive
- **5** – 5 forward gears
- **06** – Version
- **E** – Electronic control

**JF506E Transaxle**




The transmission ID is stamped on the transaxle; PL 000 = 3.0 liter or PL 001 = 2.5 liter. This description is followed by the production year and month and a 5-digit serial number; for example: 08 12345.

| JF506E Specifications | | | | | | |
|---|---|---|---|---|---|---|
| **Transmission weight** | 101 kg (223 lb.) | | | | | |
| **Mechanical features** | Torque converter with single plate lock-up clutch and torsional damper | | | | | |
| **Transmission fluid** | Capacity – 8.8 liters (9.3 qt.); Filled for life<br>Type – IDEMITSU, Jaguar spec WSS-M2C922 – A1 (not compatible with other transmission oils) | | | | | |
| **Transmission fluid cooler** | Air cooler with thermostat | | | | | |
| **Stall speeds** | 2.5 liter – 2610 rpm; 3.0 liter – 2610 rpm | | | | | |
| **Towing** | 0.5 miles @ 30 mph | | | | | |
| **Gear ratios** | **1st** | **2nd** | **3rd** | **4th** | **5th** | **Reverse** |
| | 3.80 | 2.13 | 1.36 | 0.93 | 0.68 | 2.97 |

## Service

There are no provisions for owners to verify the transmission fluid level, as the JF506E transaxle is not equipped with a transmission fluid dipstick. To inspect transmission fluid level and integrity, carefully follow the inspection procedure found in the Transmission section of the WSM, available on the GTR website.

**NOTE:** There are no scheduled fluid level inspections required for the JF506E transaxle. Fluid level should only be checked if there are signs of an external fluid leak, or as part of the diagnostic process for customer complaint of poor shift quality.

## MANUAL TRANSAXLE

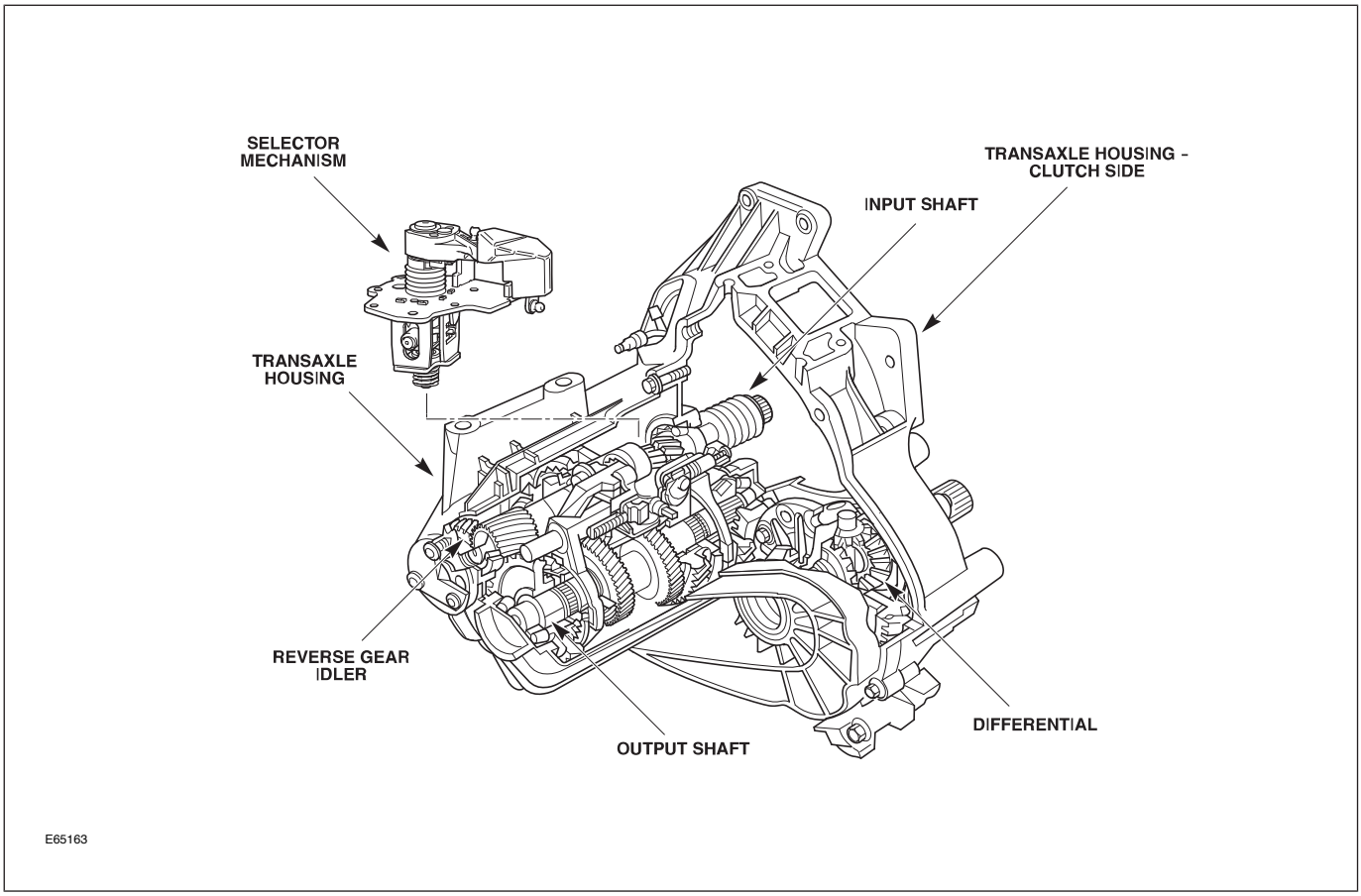
The MTX-75 5-speed manual transaxle combines the manual transmission and differential in one unit.

The MTX-75 is a two-shaft design, with all pairs of gears in continuous mesh. Each forward gear ratio is produced through a single pair of dedicated gears, with the direction of power flow reversed in the transaxle. Rotation of the output shaft is reversed by an idler gear when reverse gear is selected.

MTX-75 is interpreted as follows:

- **MT** – Manual transmission
- **X** – Transaxle (front-wheel drive)
- **75** – the distance, in millimeters, between input and output shafts

**MTX-75 Manual Transaxle**




### Transmission ID

The transmission can be identified from the information on the type data sticker. This label is located on the transmission housing. For example, a label that has the information 1G A 1 9M02 000436 can be interpreted as follows:

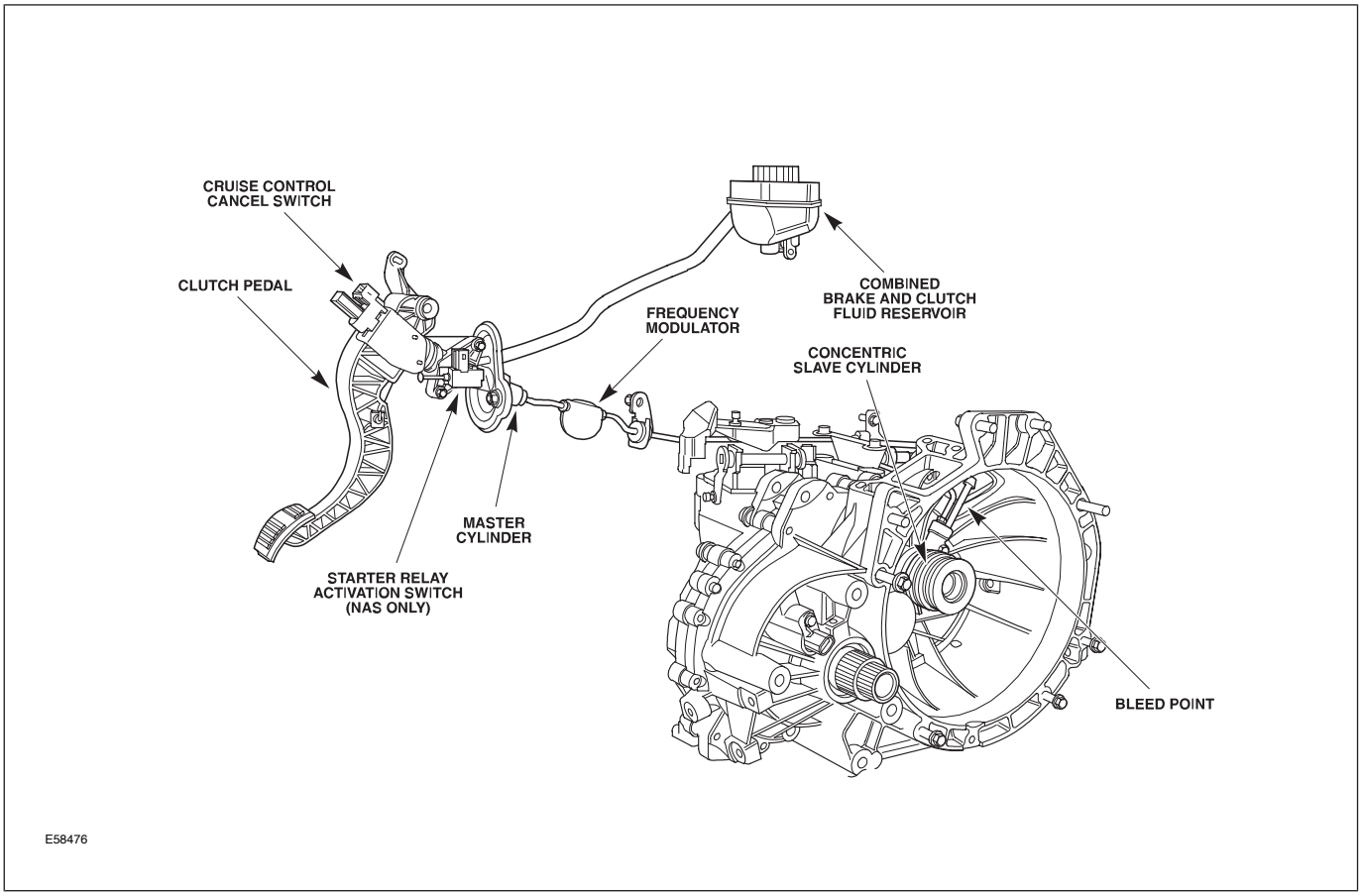
- **1G** – Plant
- **A** – Shift
- **1** – Line
- **9M02** – Build date: 02.12.99
- **000436** – Serial number

| MTX-75 Specifications | | | | | | |
|---|---|---|---|---|---|---|
| **Transmission weight** | 48.6 kg (107.1 lb) | | | | | |
| **Mechanical features** | Transversely-mounted unit with combined transmission /differential<br>Two-part aluminum housing with reinforcing ribs | | | | | |
| **Transmission fluid** | Capacity – 1.75 liters (1.85 qt)<br>Type – ESD-M2C186-A | | | | | |
| **Clutch fluid** | ITT Super DOT 4 (brake fluid) | | | | | |
| **Towing** | 30 miles @ 30 mph (flatbed) | | | | | |
| **Gear ratios** | **1st** | **2nd** | **3rd** | **4th** | **5th** | **Reverse** |
| | 3.42 | 2.14 | 1.45 | 1.03 | 0.77 | 3.47 |

## Clutch

The clutch is a hydraulically-operated, self-adjusting system which improves operation and driver comfort by enabling a constant pedal pressure to be applied as the friction faces of the clutch plate wear.

**Clutch Components**



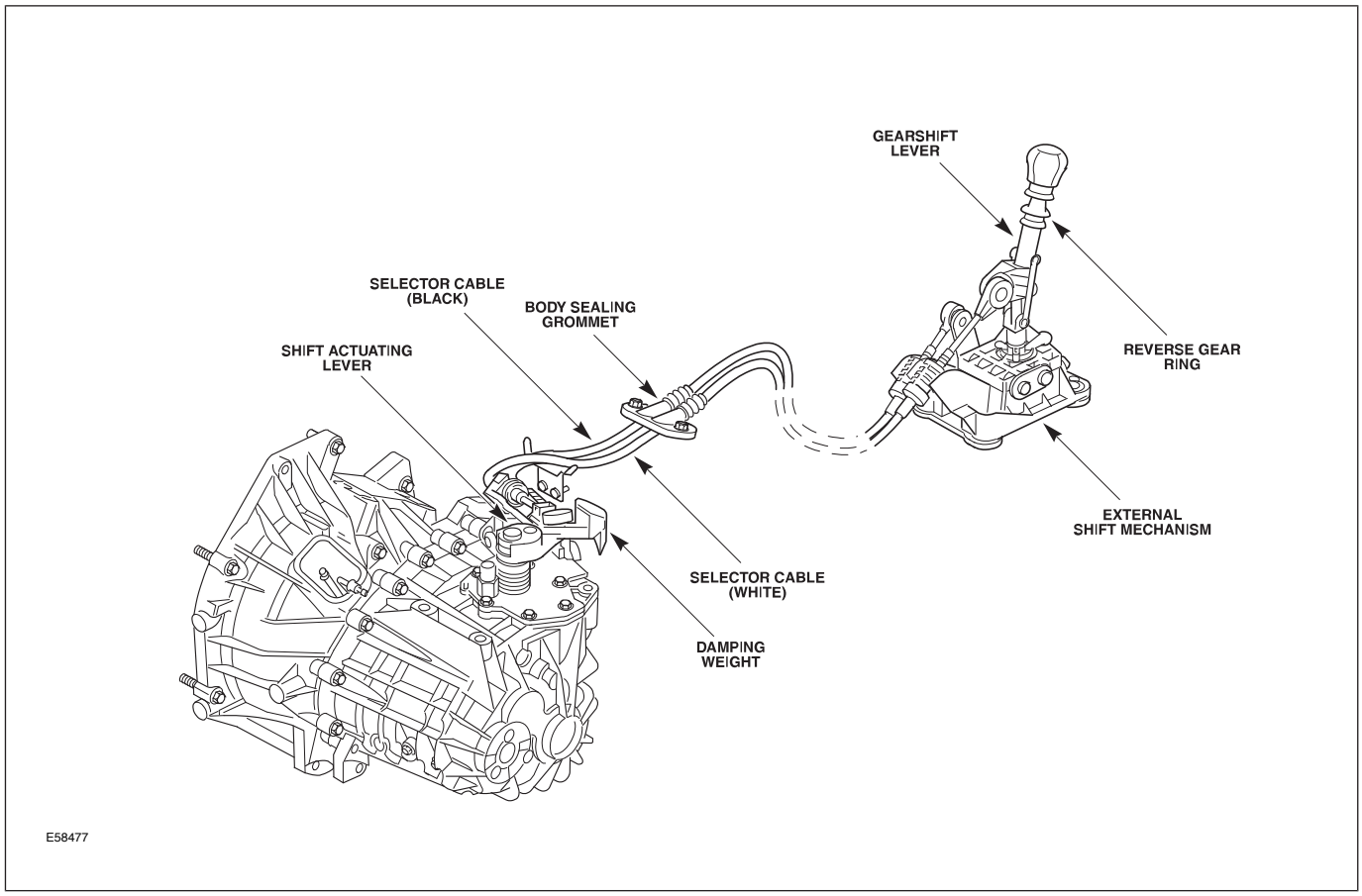

The system employs a concentric slave cylinder, located on the transaxle input shaft behind the pressure plate. The concentric slave cylinder eliminates the need for a release lever mechanism and improves operating efficiency.

At the transmission end, the cable housings are secured to a bracket on the transmission housing by means of quick connect clips; they are attached to the shift shaft by means of an end fitting with a ball socket. The internal shaft mechanism is operated through the shift shaft.

## Shift Mechanism

The external shift mechanism consists of the gear lever housing with the gear lever, the internal shaft mechanism housing – which accommodates the shift shaft with the internal shift mechanism – and two cables.

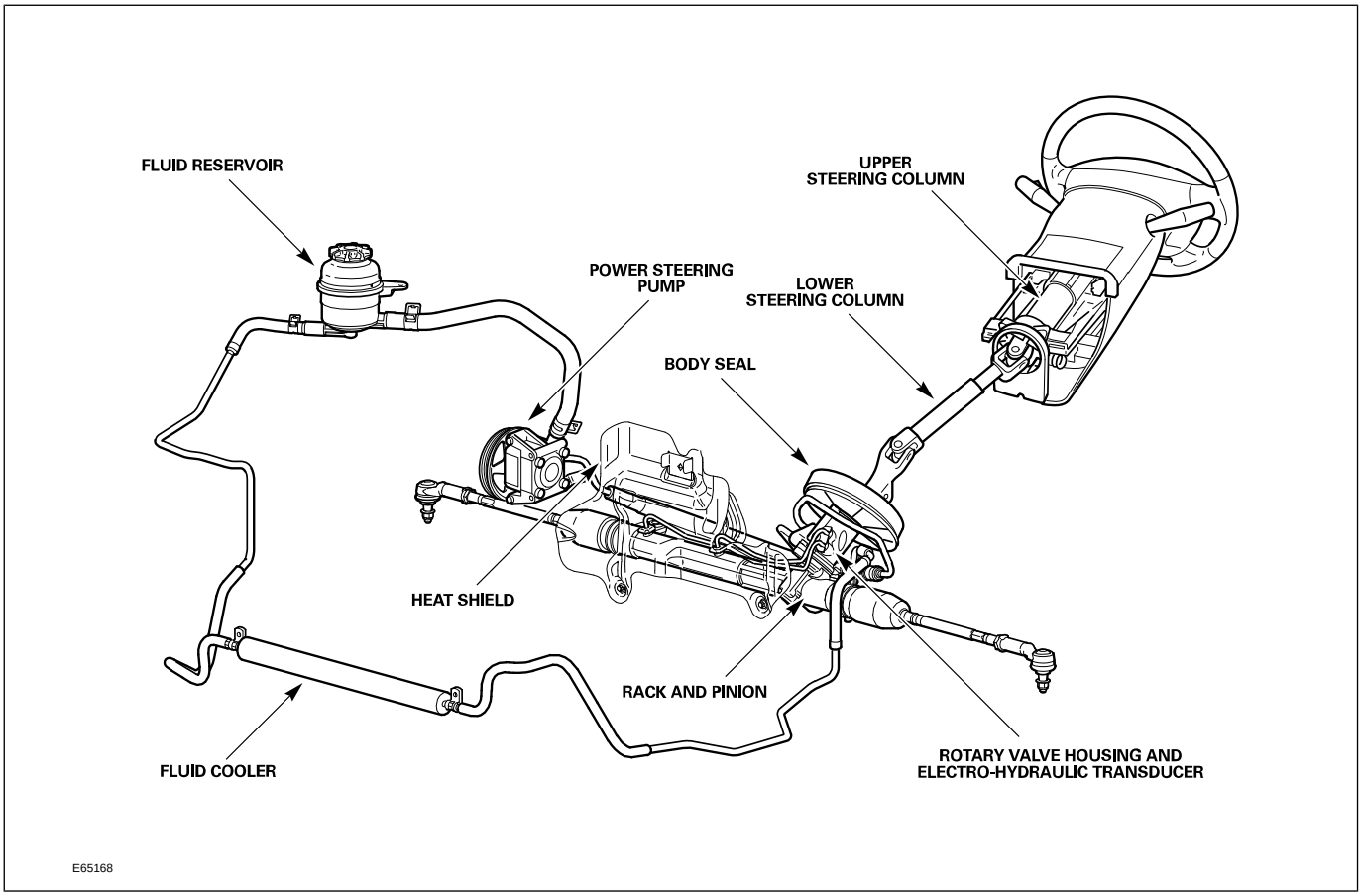
**Shift Mechanism Components**



## POWER ASSISTED STEERING (PAS)

2002 – 2003 MY X-TYPE vehicles are fitted with the ZF-manufactured Servotronic II rack and pinion assembly. The rack features both variable ratio and variable assistance. Control of the variable assistance is integrated into the general electronic control module (GECM). Revised at VIN D83513 during the 2004 MY, the rack maintains the variable ratio but uses constant assist.

**Power Assisted Steering Components**



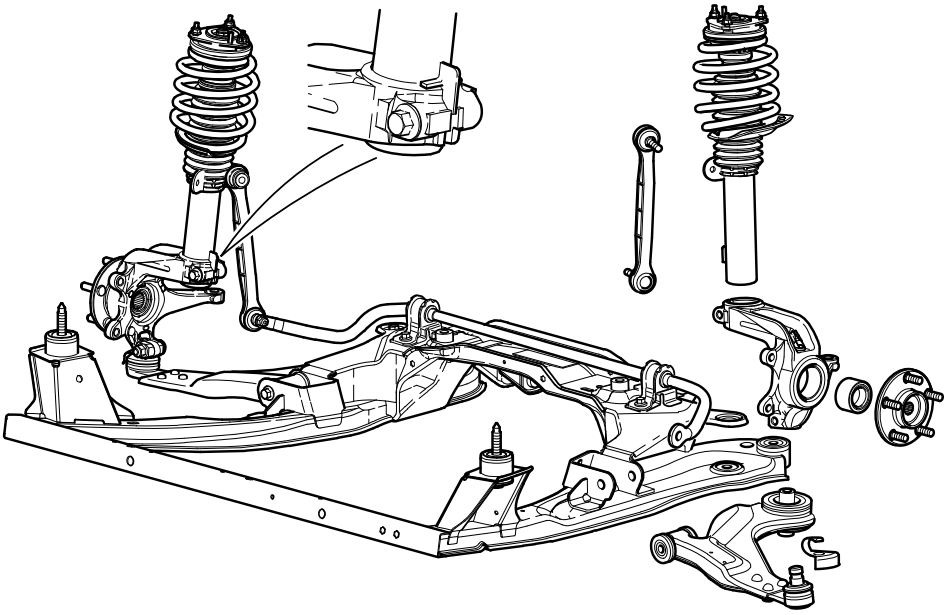

The fluid reservoir incorporates a 10-micron internal filter to ensure cleanliness of the system.

## FRONT SUSPENSION

The suspension system consists of a MacPherson strut arrangement mounted on an isolated subframe, with the power steering rack rigidly mounted to the subframe assembly. The subframe must be correctly aligned for the driveline angle to be maintained. Checks on subframe and engine alignment are performed using special tool 501-081.

There is no adjustment for castor or camber. Toe is adjusted via threaded tie-rod ends. The suspension system has anti-dive and anti-squat characteristics built in to the suspension geometry.

**NOTE:** Jacking should be carried out only on recognized body location points and not on the suspension assembly (refer to GTR).



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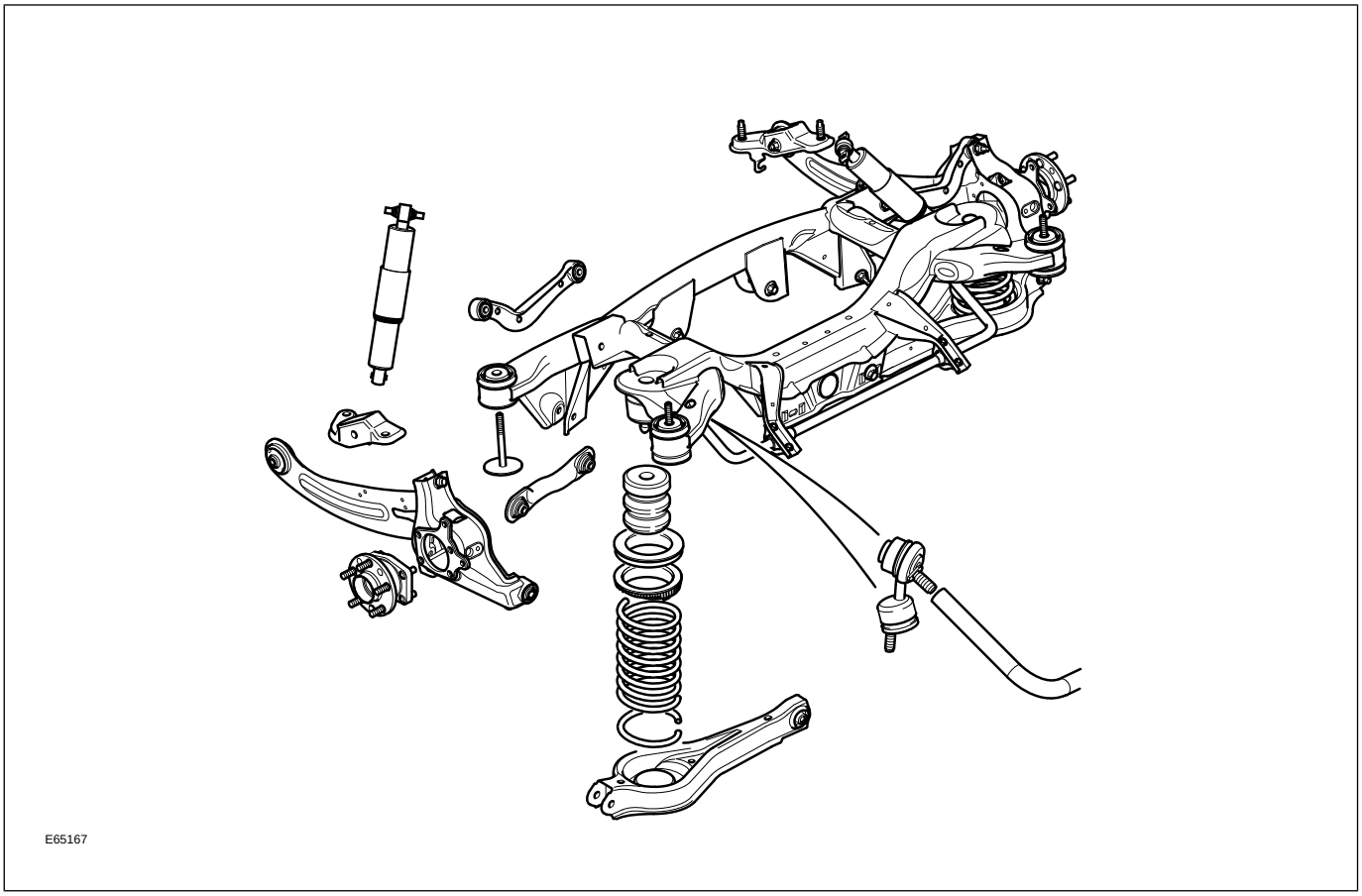
## REAR SUSPENSION

The rear suspension system consists of a multilink coil spring system with a subframe that provides double isolation for the driveline. The Bilstein damper units consist of a single tube with a 46 mm (1.8 in) piston element.

There is no adjustment for castor or camber. Toe is adjustable via rotation of the lower control arm cam bolt.

Correct orientation of the subframe bushes is required, and the whole subframe must be aligned for the correct driveline angle to be maintained. Subframe alignment is performed using special tool 501-081.

**NOTE:** Jacking should be carried out only on recognized body location points and not on the suspension assembly (refer to GTR).



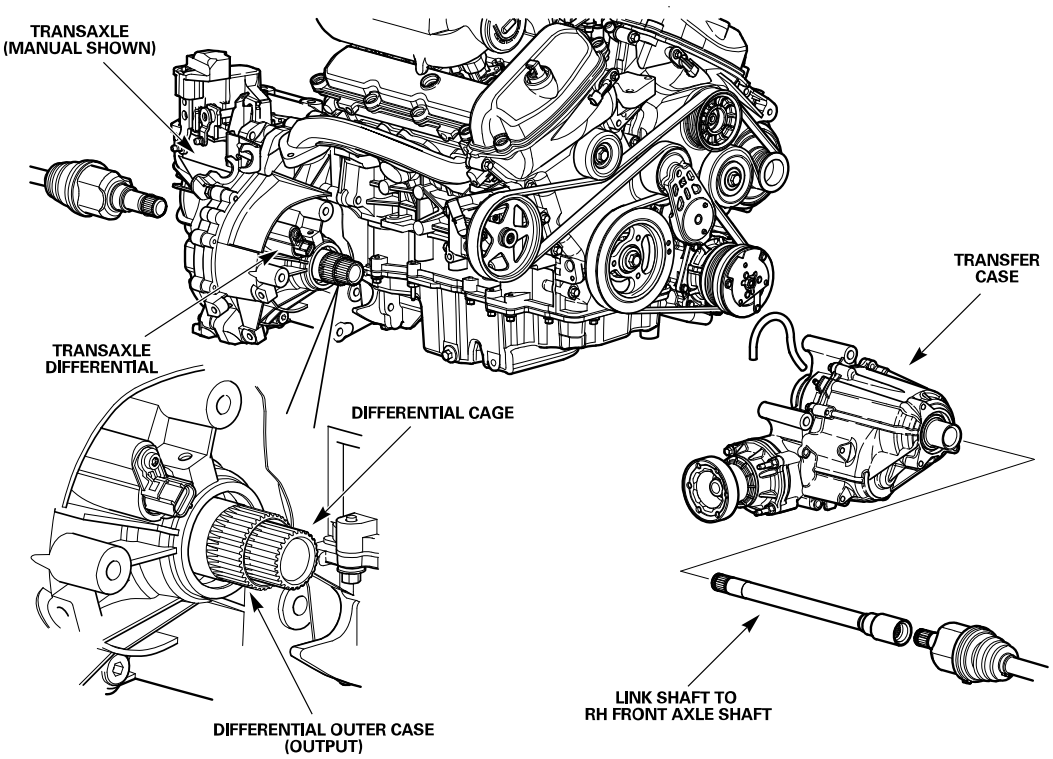
# DRIVELINE

## All-Wheel Drive (AWD) System

A new feature – and a first for Jaguar – is the Visteon all-wheel drive (AWD) system. The AWD system provides superior traction and handling characteristics. A drive split of 40% / 60% is provided, with 40% split to the front road wheels and 60% to the rear wheels.

For the 2002 – 2003 model years, the transfer case uses an epicyclic center differential with a viscous coupling. For the 2004 MY (starting at VIN D56272) the transfer case uses an open epicyclic center differential.

**AWD Transfer Case**



| Transfer Case Specifications | | | |
|---|---|---|---|
| **Weight** | 25.9 kg (57 lbs) | | |
| **Mechanical Features** | Two-piece aluminum unit | | |
| **Transmission fluid** | Capacity – 0.60 liters (0.63 qt), initial fill; 0.55 liters (0.58 qt), drain and refill<br>Type – SAE 75W140 synthetic gear lubricant | | |
| **Gear ratios** | **Helical gear** | **Hypoid bevel gear** | **Overall** |
| | 1.65 : 1 | 1.53 : 1 | 2.526 : 1 |

## BRAKES

All X-TYPE vehicles are equipped with a Bosch-supplied 4-channel anti-lock brake system (ABS) which uses independent inputs from the four wheel speed sensors.

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

ABS with Dynamic Stability Control (DSC) is also available as an option. Starting with the 2005 MY, panic brake assist (PBA) is featured on vehicles equipped with DSC.

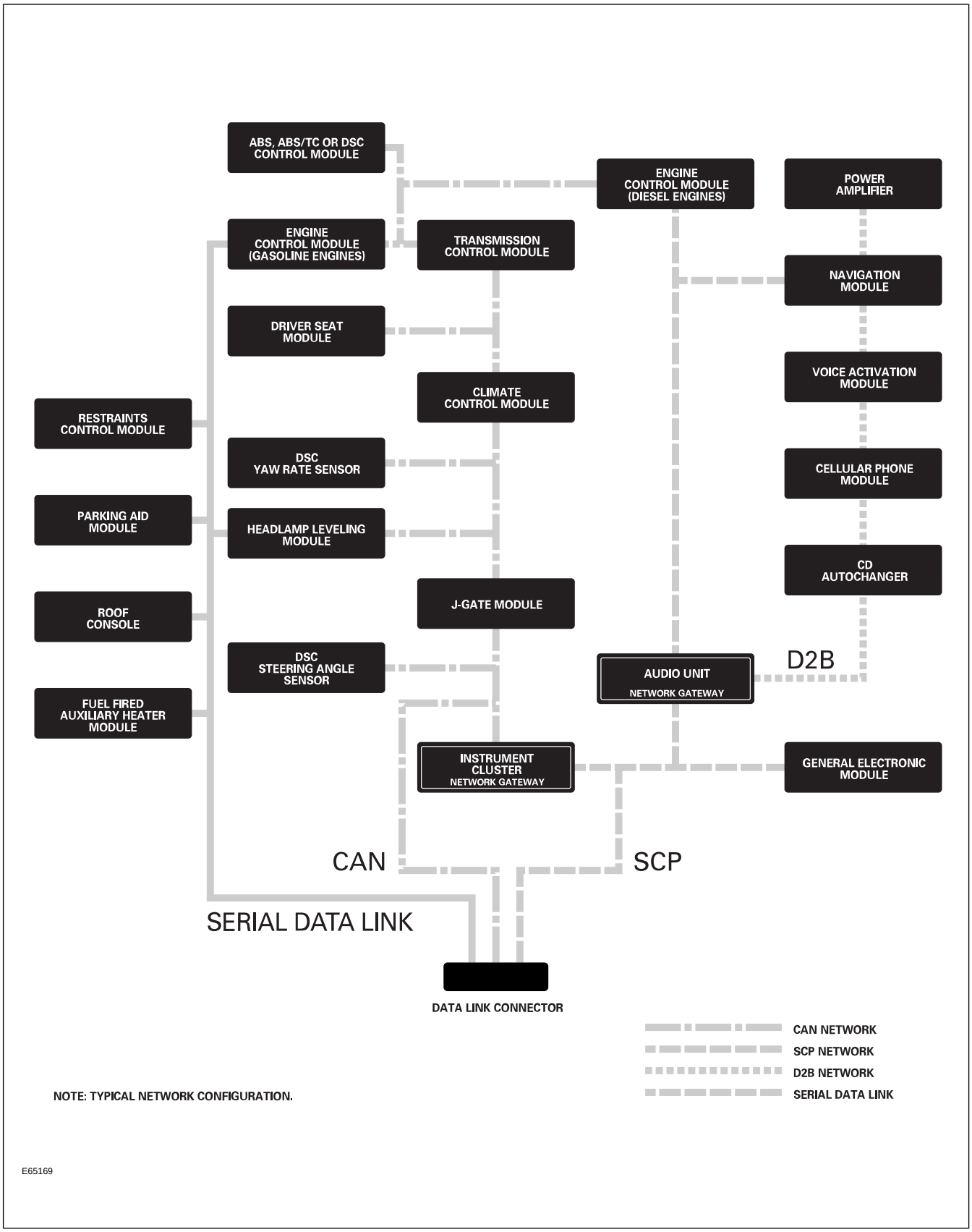
## CONTROL MODULES AND NETWORKS OVERVIEW

Three communication networks are used for control module intercommunication.

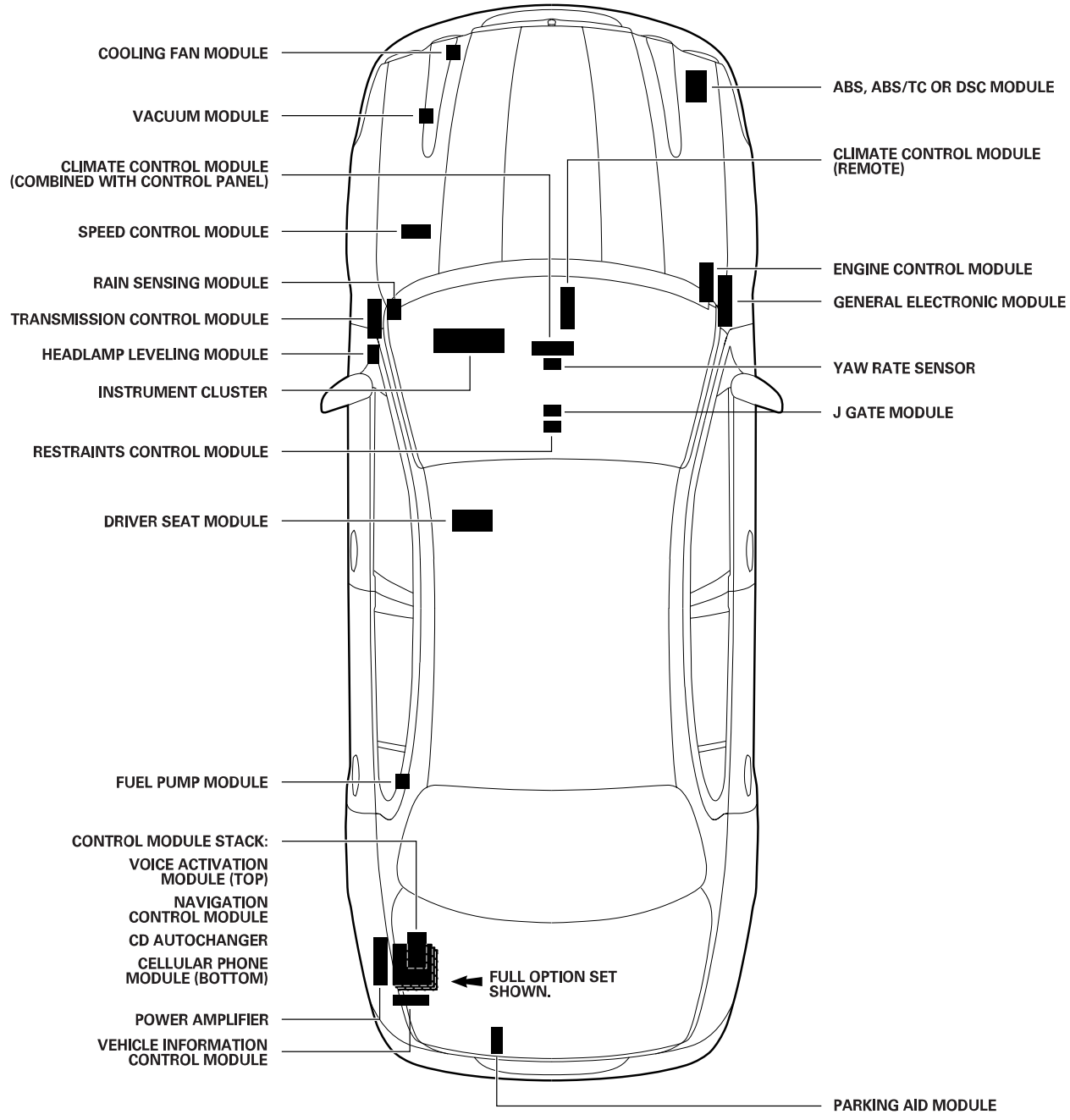
| Communication Networks | | | |
|---|---|---|---|
| **Network** | **Class** | **Speed** | **Communication Medium** |
| Controller Area Network (CAN) | C | 500 KBaud | Twisted pair copper wire |
| Standard Corporate Protocol Network (SCP) | B | 41.6 KBaud | Twisted pair copper wire |
| Digital Data Bus (D2B) | n/a | 5.6 MBaud | Fiber optic cable |

A fourth network – ISO 9141 (Serial Data Link) – allows diagnostic interrogation, via the data link connector (DLC), but does not allow control module intercommunication. The ISO network communicates at 10.4 KBaud.

**Communication Network Layout (X404 shown)**



**Control Module Locations (X404 Sedan shown)**

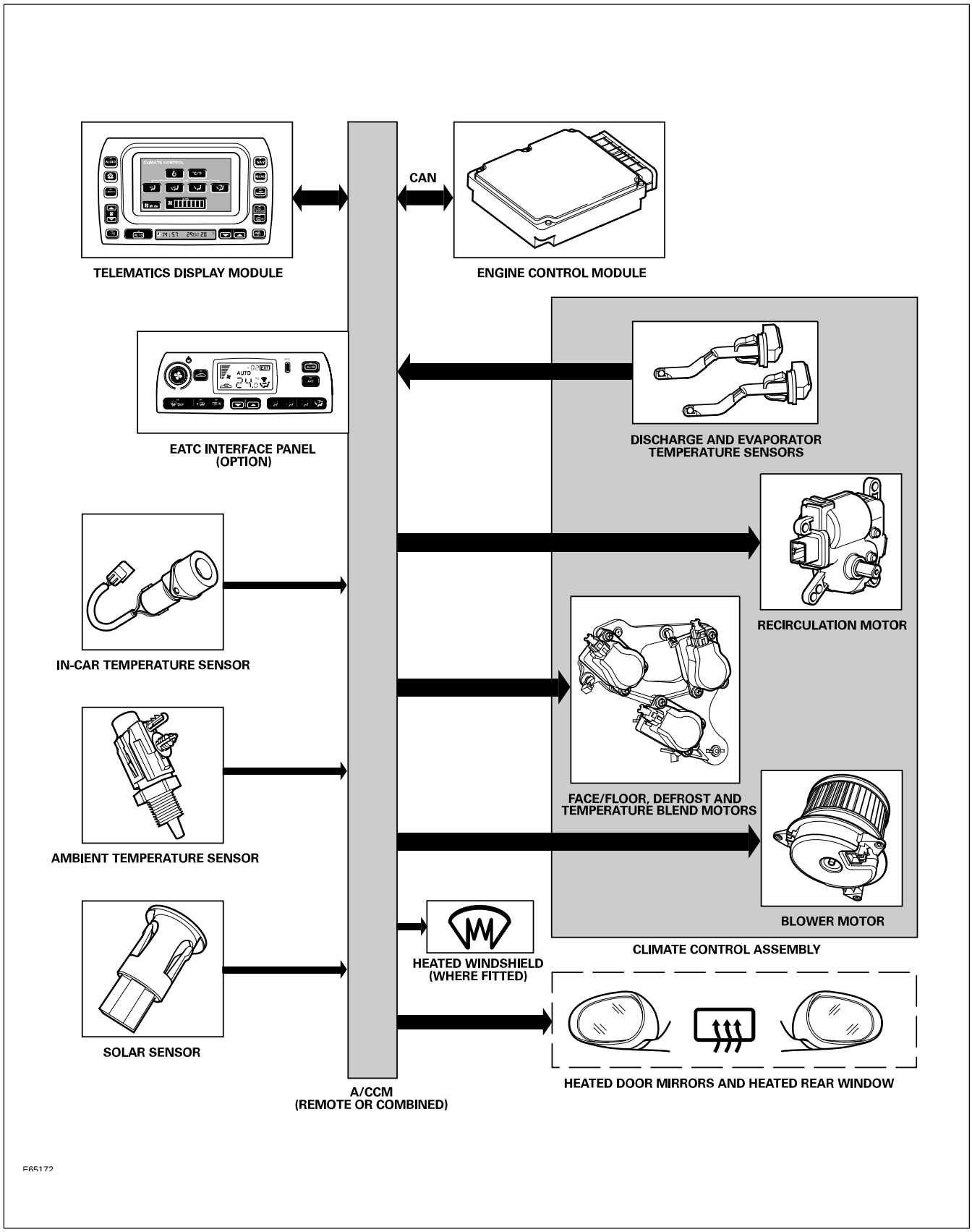


## OVERVIEW

The Electronic Automatic Temperature Control (EATC) climate control system is an air-blend single-zone system, with the majority of components made by Visteon. Two versions of the EATC system are used – non-telematics or telematics – depending on vehicle options.

The basics of the refrigeration system remain the same as on previous systems, except for refrigerant control, which is handled by a fixed orifice tube and suction accumulator instead of the expansion valve and receiver/drier used previously.

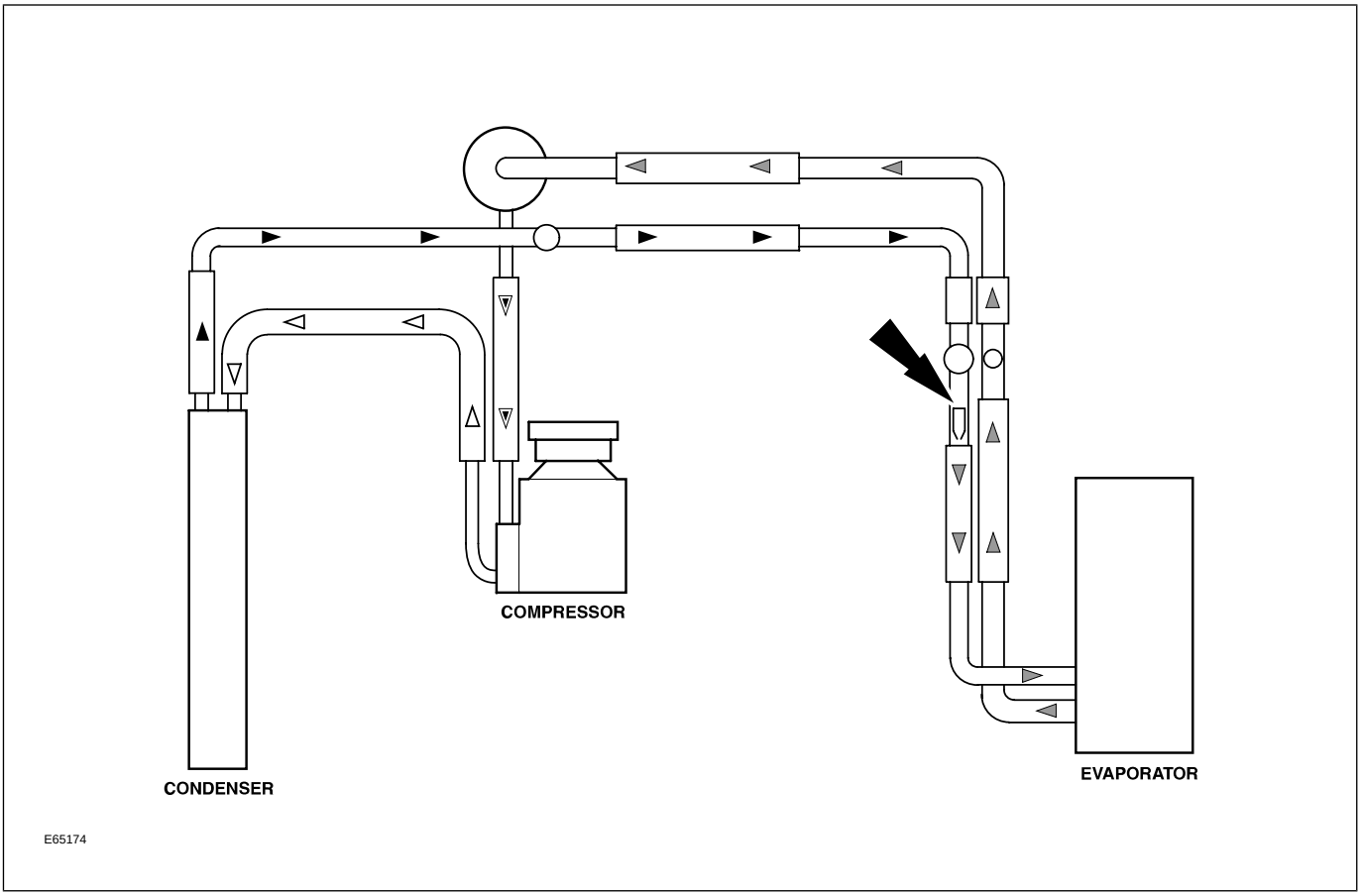
**EATC System Components**



## REFRIGERATION SYSTEM

### Fixed-Orifice Tube

The fixed-orifice tube is a simplified device which replaces the thermostatic expansion valve. The unit is located inside the evaporator inlet pipe and mounted towards the right-hand side of the engine bay bulkhead, as viewed from the driver's seat position. The unit is color coded to identify the flow rate; the X-TYPE uses an orange color-coded unit for this climate control system.



## POWER WINDOWS

All windows are equipped with one-touch down and one-touch up functionality. The one-touch up functionality incorporates anti-trap capabilities. Utilizing internal position sensors, the door motor can determine when normal travel is restricted. If an obstruction is detected when raising the window, the motor's internal electronics will reverse the direction of the window.

If the vehicle power supply is disrupted, the one-touch up feature will no longer function when the power supply is restored. The initialization procedure must be carried out to restore operation.

### Power Window Initialization

1. Lift and hold the window switch in the up direction until the window seats completely. Continue to hold the switch for a further two seconds.
2. Release switch and then lift and hold it again for a further two seconds. This ensures the window is fully seated into the seal.
3. Press the window switch to lower the window to its fully open position.
4. Verify the operation of the anti-trap and one-touch up operation.

**NOTE:** This procedure can be carried out either from the individual window switches or from the driver's switch pack.

## SUNROOF

The sunroof has the following features:

- One-touch open and close operation
- Tilt open
- Anti-trap safety
- Memory retention if the battery is disconnected

The sunroof memory is not affected by battery disconnection and will not require re-initializing upon reconnection. However, if power is disconnected while the sunroof is actually being operated, then the memory will be lost and the following initialization procedure will have to be carried out. This procedure will also have to be carried out if the roof motor is replaced.

### Sunroof Initialization

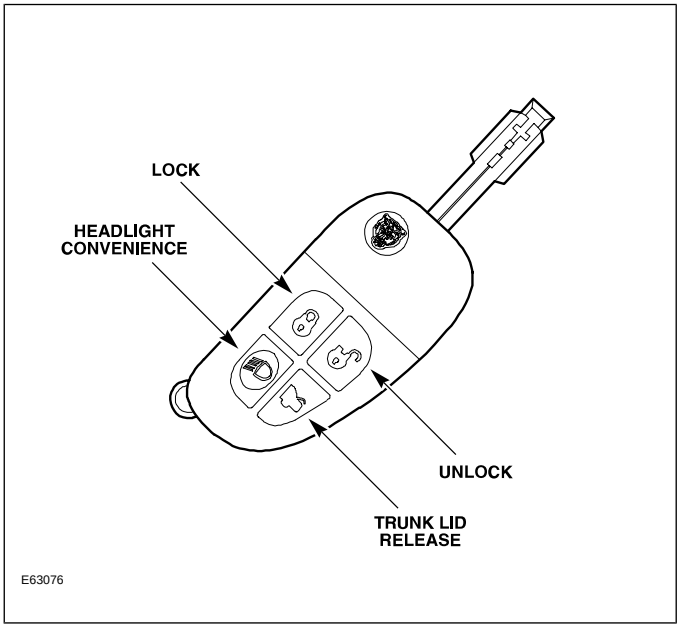
1. Turn the ignition switch to either position I or II.
2. Press the roof switch in the tilt position until the sunroof moves to the fully tilted position and stops.
3. Release the switch.
4. Press and hold the switch in the tilt up position for at least 20 seconds. The roof panel will make a small movement to indicate that the roof has been de-initialized.
5. Release the switch.
6. Within five seconds of releasing the switch, press and hold the switch in the tilt position again. The sunroof will travel automatically to the fully open position, back to the fully closed position, and stop.
7. Verify the operation of the anti-trap and one-touch up feature.

## REMOTE CONTROL KEYHEAD RF TRANSMITTER

The radio frequency (RF) transmitter is operational only when the key is removed from the ignition barrel. The RF transmitter allows remote control of the following features:

- Security system arming/disarming
- Door locking/unlocking (single or two-stage)
- Global closing of windows and sunroof
- Headlight convenience
- Panic alarm
- Trunk lid release

**Remote Control Keyhead RF Transmitter**



# SYSTEM OPERATION

## Arming/Disarming and Locking/Unlocking

The vehicle can be locked in one of three ways:

- Rotating the key in the driver's door lock barrel to the lock position
- Pressing the RF transmitter LOCK button once
- Moving the front interior door handle to the lock position

The vehicle is also equipped with auto (drive-away) locking. When the vehicle is driven at a speed greater than 7 km/h (approx. 4.5 mph), the system will automatically lock all the doors.

20 seconds after the vehicle is locked, the security system will fully arm. At this point, if a door, the hood, or the trunk is opened without disarming the system, the alarm will sound.

Rotating the key in the driver's door lock barrel to the unlock position or pressing the UNLOCK button on the RF transmitter will disarm the alarm system and initiate single-stage or two-stage unlocking.

### Single-Stage and Two-Stage Unlocking

With the alarm system in single-stage unlocking mode, a single rotation of the door lock barrel to the unlock position or a single press of the RF transmitter UNLOCK button will unlock all doors.

With the alarm system in two-stage unlocking mode, a single rotation of the door lock barrel to the unlock position or a single press of the RF transmitter UNLOCK button will unlock the driver's door. A second rotation of the door lock barrel to the unlock position or a second press of the RF transmitter UNLOCK button will unlock the remaining doors.

### Selecting Unlocking Modes

The alarm system can be toggled between the single and two-stage unlocking modes by pressing the RF transmitter LOCK and UNLOCK buttons simultaneously for four seconds.

## Global Window and Sunroof Control

Closing of the windows and sunroof can be initiated from the driver's door key (global closing) or the RF transmitter (remote global closing).

To initiate global closing, rotate the key in the driver's door lock barrel to the lock position and hold for longer than two seconds. The windows and sunroof will begin their closing operation and will continue to close as long as the key is held in the lock position.

To initiate remote global closing, press and hold the RF transmitter LOCK button for longer than two seconds. This will initiate an automatic closing of the windows and sunroof. Once initiated, the button can be released and the windows and sunroof will continue to their fully closed position. To stop the remote global closing sequence, press any button on the RF transmitter or press the central locking switch.

The remote global closing feature can be enabled/disabled via WDS.

**NOTE:** Global closing and remote global closing will not close the windows if the windows have not been initialized.

## Headlight Convenience

When the RF transmitter HEADLIGHT CONVENIENCE button is pressed, the headlights will illuminate for 30 seconds. A second press of the button or inserting the key into the ignition switch will extinguish the headlights.

## Panic Alarm

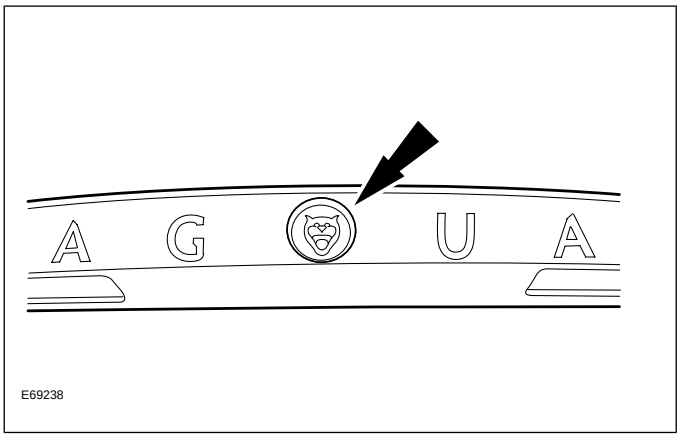
Pressing the RF transmitter HEADLIGHT CONVENIENCE button three times within three seconds will activate the panic alarm. The alarm will continue until the normal alarm cycle is complete or until the HEADLIGHT CONVENIENCE button is pressed again three times within three seconds.

## Trunk Release

The trunk can be opened two ways:

- Pressing the RF Transmitter TRUNK LID RELEASE button.
- Pressing the exterior trunk release button (when the car is unlocked and the security system is disarmed).

**Exterior Trunk Release Button**




## Auto Relocking

If a door is not opened within 45 seconds of unlocking the vehicle with the RF transmitter, the vehicle will automatically relock the doors and rearm the security system. The auto relocking feature can be activated/deactivated using WDS.

# SERVICE

## RF Transmitter Service

### Battery Replacement

Each transmitter contains one type CR2032 battery. To separate the key unit from the remote unit, use a small flat screwdriver as illustrated. The battery is fitted with the positive symbol (+) facing downwards in the battery receptacle.

**NOTE:** Changing the remote's battery will not affect its operation or require the remote to be reprogrammed.

E63301

### RF Transmitter Programming

There are two methods for programming transmitters. Prior to programming, ensure that all transmitters for the vehicle are present. Transmitters not present will be erased from alarm memory and will no longer function.

**Programming transmitters without WDS:**

1. Insert key into ignition.
2. Hold headlight stalk in the FLASH position.
3. While holding headlight stalk in the FLASH position, rotate the ignition key to position I (AUX).
4. Release headlight stalk and then flash the headlights four times.
5. An audible confirmation and a flash of the security LED on top of the fascia will confirm the alarm system is in transmitter "learning" mode.
6. Press any button on each remote to be programmed. A maximum of five transmitters can be programmed.
7. The alarm system will exit the learning mode when the key is turned to position 0 (OFF), or 15 seconds after the alarm enters learning mode.

**Programming transmitters using WDS:**

1. Select the "Vehicle Configuration" main menu tab.
2. Select "Security".
3. From here, key transponders and transmitters can be programmed.

## PASSIVE ANTI-THEFT SYSTEM

The Passive Anti-Theft System (PATS) is centered around the instrument cluster (IC) and the engine control module (ECM). The engine starting sequence is as follows:

1. Key in ignition
2. Data transfer between the IC and the key transponder to confirm a valid key
3. Ignition turned to position II (RUN)
4. "Key valid" message sent from the IC to the ECM
5. Data transfer between the ECM and IC to confirm encrypted code is correct
6. Engine start

If this sequence is successfully completed, the PATS LED located on top of the fascia will illuminate for three seconds then extinguish.

## PATS Fault Diagnostics

If a fault is detected, the engine will not crank and the PATS LED located on top of the fascia will flash at 4Hz for 60 seconds. At the end of this period, the LED will flash a two-digit code for the current fault. The code will be flashed 10 times. Refer to GTR for code interpretation.

**NOTE:** Corresponding DTCs may exist along with PATS codes that may further explain the root cause of a fault. Check for DTCs whenever diagnosing a PATS fault.

## Key Transponder Programming

As many as 4 transponders can be programmed for one vehicle, but they must all be present at the time of programming.

**Programming additional transponders without WDS:**

1. To enter the manual programming process, all keys for the vehicle will need to be present and two pre-programmed keys will be required.
2. Insert the first customer key into the ignition switch and turn to the position II (RUN) for a maximum of five seconds. Remove key.
3. Within 10 seconds of removing the first key, insert the second customer key and turn to position II (RUN) for a maximum of five seconds. Remove key.
4. To program the third key, insert the new key and turn to position II (RUN) within 20 seconds of removing the second key. Allow the PATS LED to prove out for three seconds to confirm storage of the new key.
5. To program a fourth key, follow the sequence as above, but continue as follows: After removing the third key, insert key 1 or 2, turn to position II (RUN) and then remove the key.
6. Insert the fourth key, turn to position II (RUN) and back to off, then remove key.

**Programming transponders using WDS:**

1. Select the "Vehicle Configuration" main menu tab.
2. Select "Security".
3. From here, key transponders and transmitters can be programmed.

## SUPPLEMENTAL RESTRAINTS SYSTEM OVERVIEW

The X-TYPE uses Jaguar's Adaptive Restraint Technology System (ARTS). ARTS can be divided into three subsystems:

- Crash severity sensing and analysis
  - Five impact sensors (one behind the radiator grill and one mounted at the base of each 'B/C' and 'D/E' pillar) provide a signal to the Restraints Control Module (RCM) that is proportionate to the crash severity
- Occupant analysis
  - Position of the driver's seat and seatbelt engagement is monitored – Weight, seat track position and seatbelt engagement of the front passenger is monitored
- Deployment handling
  - Based on crash severity and occupant analysis, the RCM will determine which restraints to deploy and the deployment strength (frontal impact airbags only).

### X404 Updates

Starting at VIN D88099, the X404 SRS was updated with the following:

- Revised passenger weight sensing system with the "Gen 2" sensor
- Revised side curtain airbags
- Addition of a passenger belt tension sensor
- Addition of seat belt reel pretensioners for front occupants
- Addition of a driver's knee bolster airbag

## COMPONENTS

The ARTS in X-TYPE vehicles uses two control modules. The two modules communicate via a local (dedicated) CAN network, which is not part of the vehicle's main CAN network.

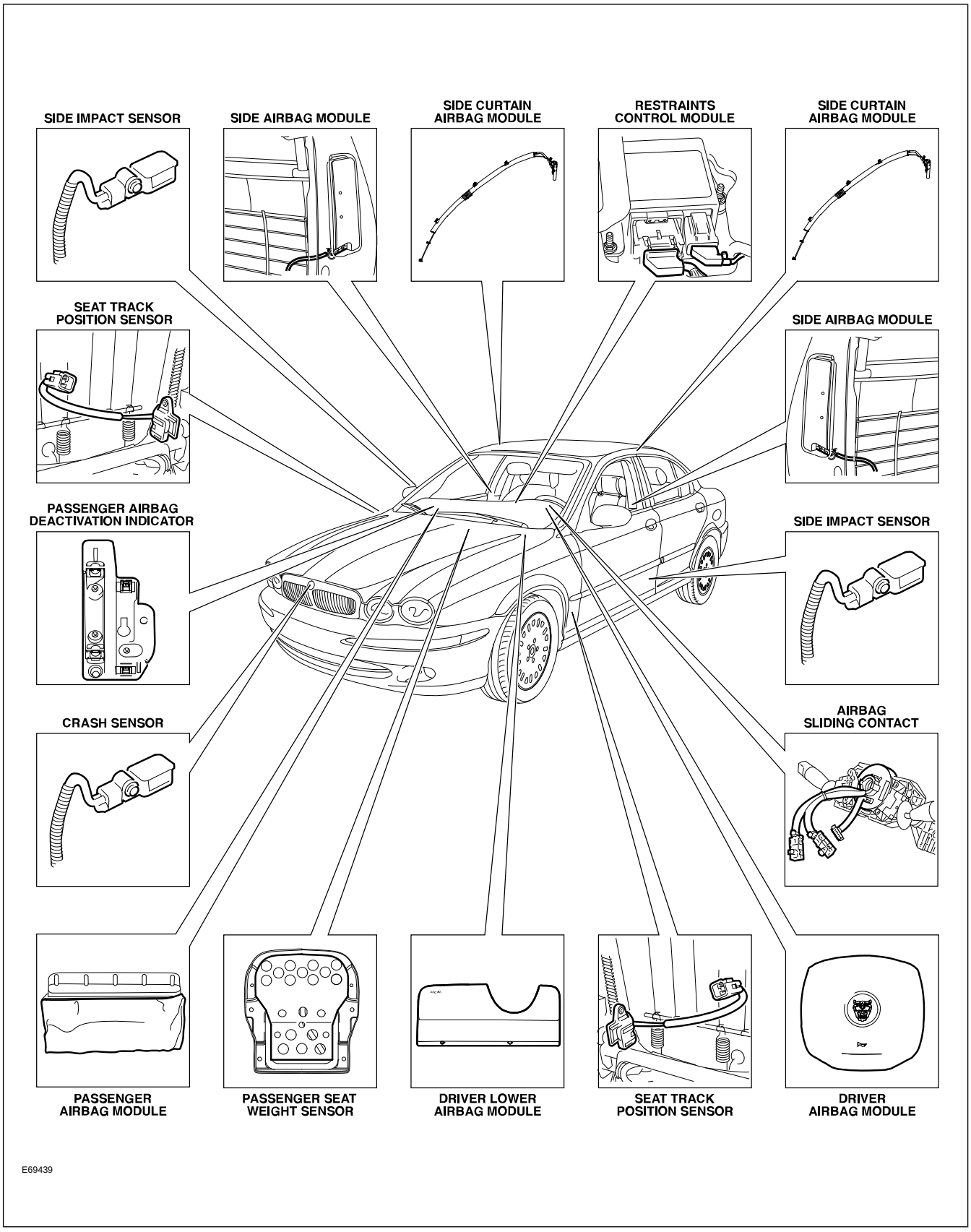
### Weight Sensing Module

Mounted to the underside of the front passenger seat, the weight sensing module processes the signal from the seat pressure transducer attached to the silicone filled bladder in the cushion.

### Restraints Control Module

Mounted below the radio on the transmission tunnel, the restraints control module is responsible for deploying restraints based on signals from the weight sensing module, front seat belt buckle sensors, front seat position switches and crash sensors.

**ARTS Components Locations**

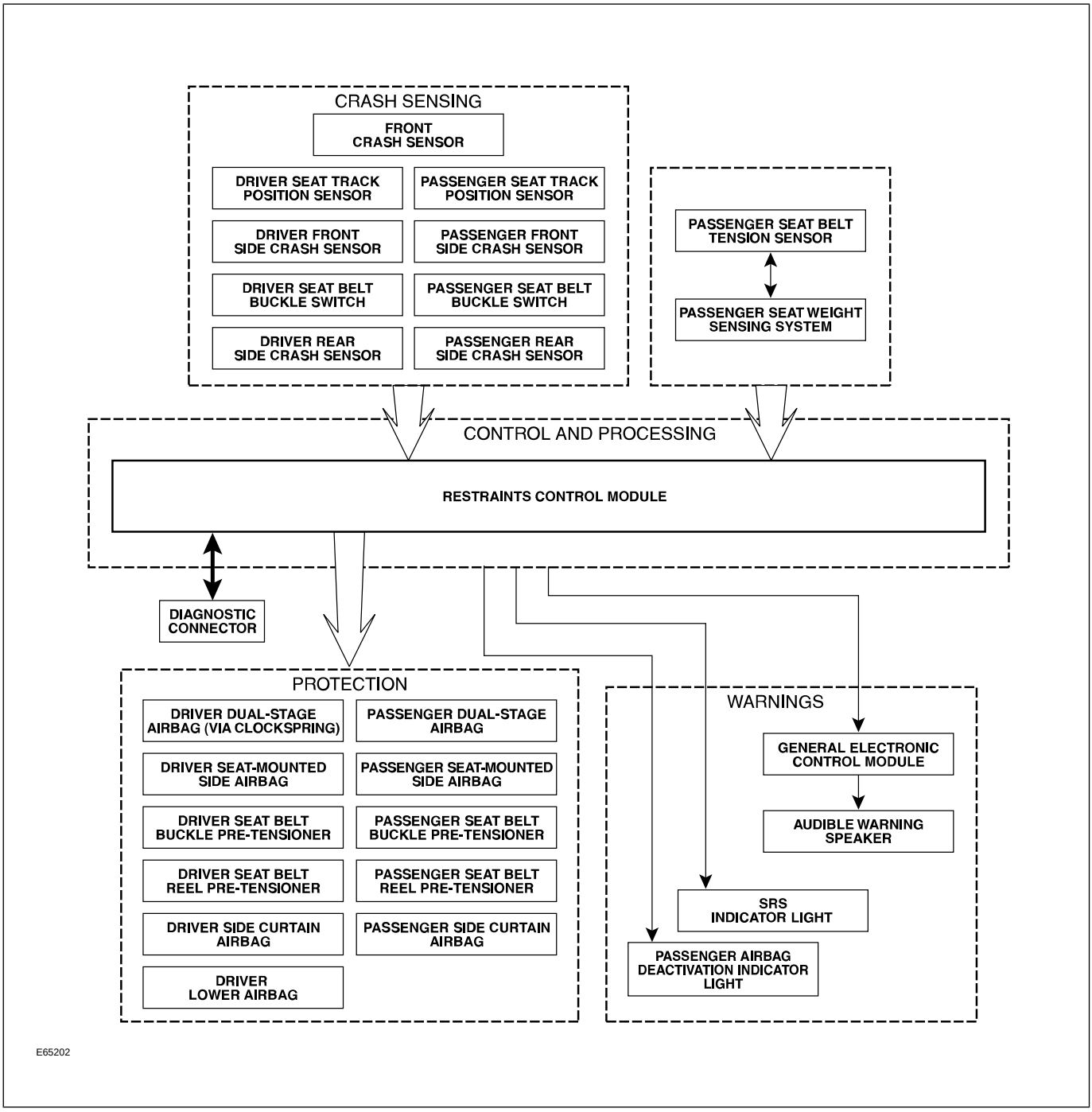


## SYSTEM OPERATION

The ARTS can deploy the following restraints:

- Front seat buckle pre-tensioners (2)
- Front seat belt reel pre-tensioners (2)
- Front passenger and driver's dual stage front air bag (2)
- Driver's side lower front air bag (knee bolster)
- Seat mounted side air bag for front occupants (2)
- Roof-mounted side air curtains (2)

**Adaptive Restraints Technology System Diagram (X404 shown)**



⚠ **WARNING: Read and observe all safety precautions in GTR (Global Technical Reference) and service bulletins before attempting to service the SRS.**

**Do not attempt to measure the circuit resistance through the airbag modules or pre-tensioners with a DVOM. Doing so may trigger airbag deployment and result in personal injury.**

**To disarm the SRS, disconnect the battery negative cable and wait a minimum of two minutes for the reserve power charge to dissipate.**

# IN-CAR ENTERTAINMENT (ICE)

## Selectable Features

Simultaneously pressing and holding the AM/FM and EJECT buttons will display the audio system selectable features on the navigation screen (if fitted). The following options are available:

- Market (toggled with preset button 1 on vehicles not fitted with navigation)
  - US (no security code function, radio tunes to odd digits i.e. 90.1, 90.3, 90.5 etc.)
  - EU
  - JPN
  - AUS
- RDS/RBDS (Radio Data System/Radio Broadcast Data System) (toggled with preset button 0 on vehicles not fitted with navigation)
  - ON (when tuned to a RDS station, the radio will display station call letters and (depending on station) station name, current song title and artist)
  - OFF (only the radio station frequency is displayed)

## Setting the Clock

Vehicles without navigation:

1. Press and hold the MODE button until TA VOLUME is displayed
2. Repeatedly press the MODE button until CLOCK SET is displayed
3. To select the 12 or 24 hour format, press the SEEK UP/DOWN buttons
4. Press the MODE button to continue
5. If 12 hour is selected, use the # button to denote AM or PM
6. Use the keypad to enter the time in four-digit format
7. To exit, press and hold the MODE button until the display reverts to audio mode

Vehicles with navigation:

1. Press the MENU button on the touch screen control panel – the system menu screen will be displayed
2. Touch the SYSTEM SETUP button on the MENU screen
3. Touch the SET CLOCK button on the SYSTEM SETUP screen
4. Clock adjustment is made by touching the hour or minute, up or down arrow buttons
5. Touch the 12/24 button to select twelve or twenty-four hour display
6. Confirm the setting by touching the SET button

## NAVIGATION SYSTEM

The navigation system is an optional fitment. The navigation screen comprises a 7" color touch screen which also provides control of the phone, audio system, climate control, and voice control. The navigation module is located in the left side of the trunk. The Global Positioning System (GPS) antenna is located below the parcel shelf trim.

With the aid of DVD map data, the navigation module uses signals from the following sensors to determine the position of the vehicle: the internal GYRO sensor, the GPS antenna and the ABS wheel speed sensors. After entering the desired destination, the driver is guided along by both visual guidance and voice instructions. If the driver strays off the route, the system calculates a new route showing the easiest way back to the original destination. The system can also point out useful landmarks such as gas stations, restaurants, hotels, and Jaguar dealers.

**Navigation System Components**