



MG *TF*

SERVICE PROCEDURES MANUAL

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INTRODUCTION

How to use this Manual

To assist in the use of this Manual the section title is given at the top and the relevant sub-section is given at the bottom each page.

There is a single contents section at the front of the manual, which is divided by section and sub-section. Each section is numbered from page 1.

The individual items comprising repair operations are to be followed in the sequence in which they appear. Item numbers in illustrations are referred to in the text.

Adjustment, repair and overhaul operations include reference to Service tool numbers and the associated illustration depicts the tool. Where usage is not obvious the tool is shown in use. Adjustment and repair operations also include reference to wear limits, relevant data, torque figures, and specialist information and useful assembly details. Each adjustment or repair operation is given a Repair Operation Time number.

Overhaul procedures for the engine and gearbox with unit removed are contained at the back of the relevant repair sections.

WARNINGS, CAUTIONS and NOTES have the following meanings:

WARNING: Procedures which must be followed precisely to avoid the possibility of injury.

CAUTION: Calls attention to procedures which must be followed to avoid damage to components.

NOTE: Gives helpful information.

References

References to the LH or RH side given in this Manual are made when viewing the vehicle from the rear. With the engine and gearbox assembly removed, the crankshaft pulley end of the engine is referred to as the front.

Operations covered in this Manual do not include reference to testing the vehicle after repair. It is essential that work is inspected and tested after completion and if necessary a road test of the vehicle is carried out particularly where safety related items are concerned.

Dimensions

The dimensions quoted are to design engineering specification with Service limits where applicable.

REPAIRS AND REPLACEMENTS

When replacement parts are required it is essential that only MG recommended parts are used.

Attention is particularly drawn to the following points concerning repairs and the fitting of replacement parts and accessories.

Safety features and corrosion prevention treatments embodied in the car may be impaired if other than MG recommended parts are fitted. In certain territories, legislation prohibits the fitting of parts not to the manufacturer's specification. Torque wrench setting figures given in this Manual must be used. Locking devices, where specified, must be fitted. If the efficiency of a locking device is impaired during removal it must be renewed.

Owners purchasing accessories while travelling abroad should ensure that the accessory and its fitted location on the car conform to legal requirements.

The Terms of the vehicle Warranty may be invalidated by the fitting of other than MG recommended parts.

All MG recommended parts have the full backing of the vehicle Warranty.

MG Dealers are obliged to supply only MG recommended parts.

INTRODUCTION

SPECIFICATION

MG are constantly seeking to improve the specification, design and production of their vehicles and alterations take place accordingly. While every effort has been made to ensure the accuracy of this Manual, it should not be regarded as an infallible guide to current specifications of any particular vehicle.

This Manual does not constitute an offer for sale of any particular vehicle. MG Dealers are not agents of MG and have no authority to bind the manufacturer by any expressed or implied undertaking or representation.



ABBREVIATIONS AND SYMBOLS

ABDC	After Bottom Dead Centre	ISO	International Organisation for Standardization
ATDC	After Top Dead Centre	kg	Kilogramme
A/C	Air Conditioning	km	Kilometre
AFR	Air Fuel Ratio	km/h	Kilometres per hour
ac	Alternating Current	k	KiloOhms
AAT	Ambient Air Temperature	kW	KiloWatts
A	Amperes	LH	Left-Hand
ABS	Anti-Lock Brake System	LHD	Left-Hand Drive
BBDC	Before Bottom Dead Centre	LED	Light Emitting Diode
BTDC	Before Top Dead Centre	LCD	Liquid Crystal Display
BDC	Bottom Dead Centre	l	Litre
BPV	Brake proportioning valve	lc	Low Compression
BS	British Standards	lt	Low tension
CMP	Camshaft Position	MIL	Malfunction Indicator Lamp
CO ₂	Carbon Dioxide	MAP	Manifold Absolute Pressure
CO	Carbon Monoxide	max	Maximum
C	Celsius (Centigrade)	MW	MegaWatts
cm	Centimetre	Hg	Mercury
CFC's	Chlorofluorocarbons	m	Metre
CKP	Crankshaft Position	mph	Miles Per Hour
cm ³	Cubic Centimetres	mA	Milliamp
deg. or °	Degree (angle)	mm	Millimetre
deg. or °	Degree (temperature)	min	Minimum
DCU	Diagnostic Control Unit	-	Minus (of tolerance)
DTI	Dial Test Indicator	'	Minute (angle)
dia.	Diameter	MEMS	Modular Engine Management System
dc	Direct Current	MY	Model Year
DOHC	Double Overhead Camshaft	MFU	Multi-Function Unit
ECT	Engine Coolant Temperature	MPi	Multi-Point Injection
EPAS	Electric Power Assisted Steering	-	Negative (electrical)
EEPROM	Electrically Erasable Programmable Read Only Memory	NTC	Negative Temperature Coefficient
ECU	Electronic Control Unit	Nm	Newton Metre
EACV	Electronic Air Control Valve	NO _x	Nitrous Oxide
e.m.f.	Electromotive force	No.	Number
ECM	Engine Control Module	OBD	On Board Diagnostics
EGR	Exhaust Gas Re-circulation	Ohms	Ohms
EVAP	Evaporative Emission	OAT	Organic Acid Technology
FET	Field Effect Transistor	o.dia.	Outside Diameter
g	Gramme (mass)	%	Percentage
GIU	Gearbox Interface Unit	±	Plus or Minus
HO ₂ S	Heated Oxygen Sensor	+	Plus (tolerance)
Hz	Hertz	+	Positive (electrical)
hc	High Compression	PCV	Positive Crankcase Ventilation
h.t.	High Tension (electrical)	PTC	Positive Temperature Coefficient
h	Hour	lbf/in ²	Pounds Per Square Inch
HCU	Hydraulic Control Unit	psi	Pounds Per Square Inch
HC	Hydrocarbons	lb	Pounds (mass)
HFC	Hydrofluorocarbon	PWM	Pulse Width Modulation
in	Inches	r	Radius
IAC	Idle Air Control	:	Ratio
IMS	Instant Mobility System	ref	Reference
IFS	Inertia Fuel Shutoff	rev/min or rpm	Revolutions Per Minute
IAT	Intake Air Temperature	RH	Right-Hand
i.dia.	Internal Diameter	RHD	Right-Hand Drive

INTRODUCTION

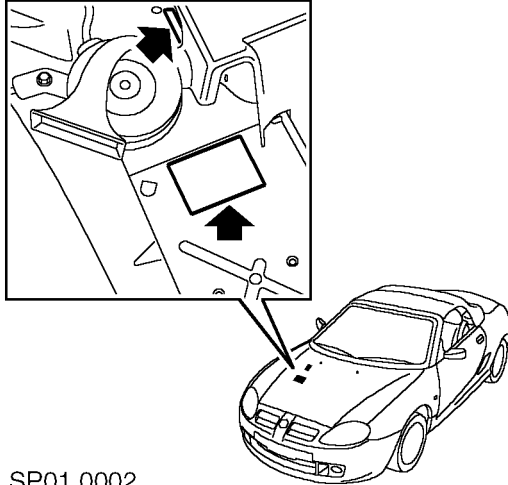
"	Second (angle)
SOHC	Single Overhead Camshaft
sp.gr	Specific Gravity
cm ²	Square Centimetres
in ²	Square inches
std.	Standard
SRS	Supplementary Restraint System
synchro	Synchronizer/Synchromesh
k	Thousand
TP	Throttle Position
TDC	Top Dead Centre
UK	United Kingdom
US	United States
VIN	Vehicle Identification Number
V	Volt
H ₂ O	Water
W	Watt



VEHICLE IDENTIFICATION NUMBER

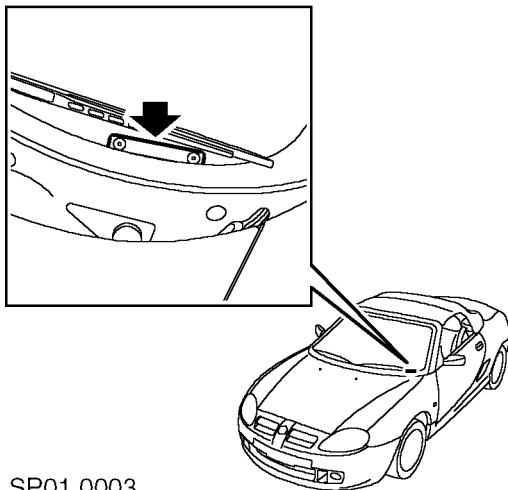
Location

The Vehicle Identification Number (VIN) is provided at the following locations:



SP01 0002

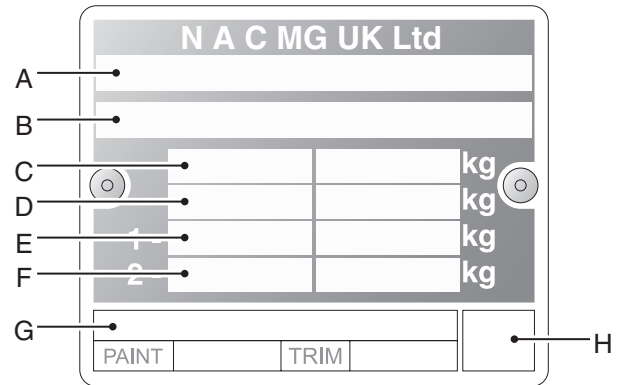
Stamped on a plate attached to the RH side of the under bonnet compartment and stamped into the body above the RH front suspension strut.



SP01 0003

Behind the LH lower corner of the windscreen.

VIN plate details



HB2022

The VIN plate contains the following information:

- a Type approval
- b Vehicle Identification Number (VIN)
- c Gross Vehicle Weight (GVW) - where required
- d Gross train weight (GTW) - where required
- e Maximum front axle load - where required
- f Maximum rear axle load - where required
- g Derivative name
- h Smoke coefficient number - where required

NOTE: Body colour and trim codes are also shown on the VIN plate.

VIN code key

Example: **S D P R D W B K C 8 D 000001**

SDP = World Identifier : MG

R = No meaning

D = Model - TF

W = Trim level

B = Body style

K = Engine - 1800 MPi, 99.3kW

C = Steering and transmission - RHD, Manual

8 = Model Year - 2008

D = Assembly Plant- NACMG UK PLant (Longbridge)

6 figures = Serial number: 000001

Paint and Trim colour codes

3-letter codes identifying the original Paint and Trim colours are stamped on the VIN plate

Paint

K M N

K = Basic colour

M = Mark identifier

GENERAL INFORMATION

N = Colour/Shade name

Trim

L P Q

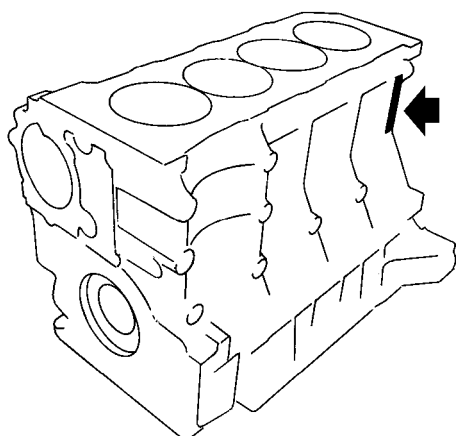
L = Basic colour

Q = Mark identifier

P = Colour/Shade name

IDENTIFICATION NUMBER LOCATIONS

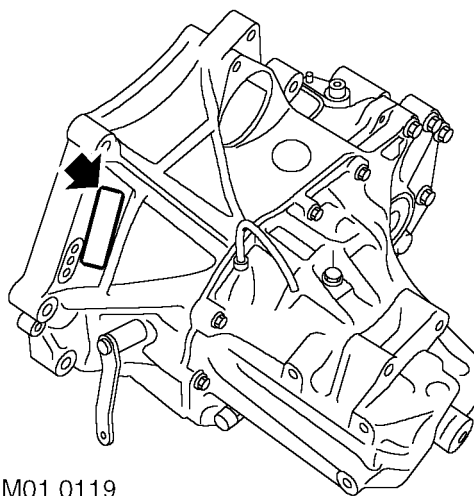
Engine number



M01 0117

'N' Series Engine: Stamped on the front face of the cylinder block adjacent to the gearbox.

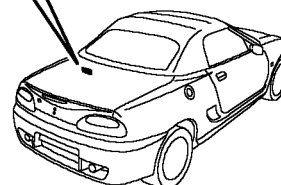
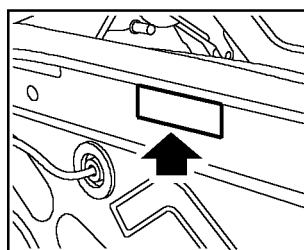
Gearbox number



M01 0119

The gearbox number is stamped on a label attached to the front face of the clutch housing.

Body number



SP01 0004

The body number is stamped on the bulkhead at the back of the boot.



DANGEROUS SUBSTANCES

Modern vehicles contain many materials and liquids which if not handled with care can be hazardous to both personal health and the environment.

WARNING: Many liquids and other substances used in motor vehicles are poisonous and should not be consumed under any circumstances. As far as possible, ensure such substances are prevented from contact with the skin. These liquids and substances include but are not limited to: acid, anti-freeze, asbestos, brake fluid, fuel, windscreen washer additives, lubricants, refrigerant and various adhesives.

WARNING: Always read the instructions printed on labels or stamped on components and obey them implicitly. Such instructions are included for reasons of your health and personal safety. Never disregard them.

Synthetic rubber

Many 'O' rings, seals, hoses, flexible pipes and other similar items which appear to be natural rubber, are in fact made of synthetic materials called Fluoroelastomers. Under normal operating conditions this material is safe and does not present a health hazard. However, if the material is damaged by fire or excessive heating, it can break down and produce highly corrosive Hydrofluoric acid.

Contact with Hydrofluoric acid can cause serious burns on contact with skin. If skin contact does occur:

- Remove any contaminated clothing immediately.
- Irrigate affected area of skin with a copious amount of cold water or lime water for 15 to 60 minutes.
- Obtain medical assistance immediately.

Should any material be in a burnt or overheated condition, handle with extreme caution and wear protective clothing (seamless industrial gloves, protective apron etc.).

Decontaminate and dispose of gloves immediately after use.

Lubricating oils

Avoid excessive skin contact with used lubricating oils and always adhere to the health protection precautions.

WARNING: Avoid excessive skin contact with used engine oil. Used engine oil contains potentially harmful contaminants which may cause skin cancer or other serious skin disorders.

WARNING: Avoid excessive skin contact with mineral oil. Mineral oils remove the natural fats from the skin, leading to dryness, irritation and dermatitis.

Health Protection Precautions

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Do not put oily rags in pockets.
- Avoid contaminating clothes (particularly those next to the skin) with oil.
- Overalls must be cleaned regularly. Discard heavily soiled clothing and oil impregnated footwear.
- First aid treatment should be obtained immediately for open cuts and wounds.
- Apply barrier creams before each work period, to help prevent lubricating oil from contaminating the skin.
- Wash with soap and water to ensure all oil is removed (skin cleansers and nail brushes will help).
- Use moisturisers after cleaning; preparations containing lanolin help replace the skin's natural oils which have been removed.
- Do not use petrol/gasoline, kerosene, diesel fuel, oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practicable, degrease components prior to handling.
- Wear eye protection (e.g. goggles or face shield) if there is a risk of eye contamination. Eye wash facilities should be provided in close vicinity of the work area.

GENERAL INFORMATION

ENVIRONMENTAL PRECAUTIONS

General

This section provides general information which if observed, can help reduce environmental damage caused by activities carried out in workshops.

Emissions to air

Many of the activities that are carried out in workshops emit gases and fumes which contribute to global warming, depletion of the ozone layer and/or the formation of photochemical smog at ground level. By considering how the workshop activities are carried out, these gases and fumes can be minimised, thus reducing the impact on the environment.

Exhaust fumes

Running car engines is an essential part of workshop activities and exhaust fumes need to be ventilated to atmosphere. However, the amount of time engines are running and the position of the vehicle should be carefully considered at all times, to reduce the release of poisonous gases and minimise the inconvenience to people living nearby.

Solvents

Some of the cleaning agents used are solvent based and will evaporate to atmosphere if used carelessly, or if cans are left unsealed. All solvent containers should be firmly closed when not being used and solvent should be used sparingly. Suitable alternative methods may be available to replace some of the commonly used solvents. Similarly, many paints are solvent based and the spray should be minimised to reduce solvent emissions.

Refrigerant

It is illegal to release any refrigerants into the atmosphere. Discharge and replacement of these materials from air conditioning units should only be carried out using the correct equipment.

Checklist

Always adhere to the following:

Engines:

- Don't leave engines running unnecessarily.
- Minimise testing times and check where the exhaust fumes are being blown.

Materials:

- Keep lids on containers of solvents.
- Only use the minimum quantity.
- Consider alternative materials.
- Minimise over-spray when painting.

Gases:

- Use the correct equipment for collecting refrigerants.
- Don't burn rubbish on site.

Discharges to water

Most sites will have two systems for discharging water: storm drains and foul drains. Storm drains should only receive clean water, foul drains will take dirty water.

The foul drain will accept many of the normal waste waters such as washing water, detergents and domestic type wastes but oil, petrol, solvent, acids, hydraulic oil, antifreeze and other such substances should never be poured down the drain. If in any doubt, consult the Water Authority responsible for your locality first.

Every precaution must be taken to prevent spillage of oil, fuel, solvents etc. reaching the drains. All handling of such materials must take place well away from the drains and preferably in an area with a kerb or wall around it, to prevent discharge into the drain. If a spillage occurs, it should be soaked up immediately. Having a spill kit available will make this easier.

Additional precautions

Check whether the surface water drains are connected to an oil/water separator; this could reduce the pollution if an incident was to occur. Oil/water separators do need regular maintenance to ensure effectiveness.

Checklist

Always adhere to the following:

Disposal:

- Never pour anything down a drain without first checking that it is environmentally safe to do so, and that it does not contravene any local regulations or bye-laws.
- Have oil traps emptied regularly.

Spillage prevention:

- Store liquids in a walled area.
- Make sure that taps on liquid containers are secure and cannot be accidentally turned on.
- Protect bulk storage tanks from vandalism by locking the valves.
- Transfer liquids from one container to another in an area away from open drains.
- Ensure lids are replaced securely on containers.
- Have spill kits available near to points of storage and handling of liquids.

Spill kits

Special materials are available to absorb a number of different substances. They can be in granular form, ready to use and bought in convenient containers for storage. Disposal of used spill-absorbing material is dealt with in the **'Waste Management'** section.



Land contamination

Oil, fuels and solvents etc. can contaminate any soil that they are allowed to contact. Such materials should never be disposed of by pouring onto soil and every precaution must be taken to prevent spillage reaching soil. Waste materials stored on open ground could also leak, or have polluting substances washed off them that would contaminate the land. Always store these materials in suitable skips or other similarly robust containers.

Checklist

Always adhere to the following:

- Don't pour or spill anything onto the soil or bare ground.
- Don't store waste materials on bare ground, see 'Spillage prevention' list in '**Additional Precautions Checklist**'

Legal compliance

Some sites may have a discharge consent for effluent discharge to the foul drain for a car wash etc. It is important to know what materials are allowed in the drain and to check the results of any monitoring carried out by the local Water authority.

Where paint-spraying operations are carried out, it may be necessary to apply to the Local Authority for an air emissions licence to operate the plant. If such a licence is in operation, additional precautions will be necessary to comply with the requirements, and the results of any air quality monitoring must be checked regularly.

Checklist

Always adhere to the following:

- Know what legal consents and licences apply to the operations.
- Check that the emissions and discharges comply with legal requirements.

Local issues

A number of environmental issues will be of particular concern to residents and other neighbours close to the site. The sensitivity of these issues will depend on the proximity of the site and the layout and amount of activity conducted at the site.

Noise is a major concern and therefore consideration should be given to the time spent carrying out noisy activities and the location of those activities that can cause excessive noise.

Car alarm testing, panel beating, hammering and other such noisy activities should, whenever possible, be carried out indoors with doors and windows shut, or as far away as possible from local residents and others who may be affected by the disturbance.

Running vehicle engines may be an outside activity which could cause nuisance to neighbours because of noise and smell.

Be sensitive with regards the time of day when these activities are performed, and minimise the time of the noisy operation, particularly in the early morning and late evening.

Another local concern will be the smell from the various materials used. Using less solvent, paint and petrol could help prevent this annoyance.

Local residents and other business users will also be concerned about traffic congestion, noise and exhaust fumes, be sensitive to these concerns and try to minimise inconvenience caused by deliveries, customers and servicing operations.

Checklist

Always adhere to the following:

- Identify where the neighbours who are likely to be affected are situated.
- Minimise noise, smell and traffic nuisance.
- Prevent litter by putting waste in the correct containers.
- Have waste skips emptied regularly.

Use of resource

Another environmental concern is the waste of materials and energy that can occur in day to day activities.

Electricity for heating, lighting and compressed air uses resources and releases pollution during its generation.

Fuel used for heating, running cars or vans and mobile plant is another limited resource which consumes large amounts of energy during its extraction and refining processes.

Water has to be cleaned, piped to site and disposed of; all of which creates more potential pollution.

Oil, spares, paint etc., have all produced pollution in the process of manufacture and they become a waste disposal problem if discarded.

Checklist

Always adhere to the following:

Electricity and heating:

- Keep doors and windows closed in the Winter.
- Switch off machinery or lights when not needed.
- Use energy efficient heating systems.
- Switch off computers and photocopiers when not needed.

Fuel:

- Don't run engines unnecessarily
- Think about whether journeys are necessary and drive to conserve fuel.

Water:

- Don't leave taps and hose pipes running.
- Mend leaks quickly, don't be wasteful.

GENERAL INFORMATION

Compressed air:

- Don't leave valves open.
- Mend leaks quickly.
- Don't leave the compressor running when not needed.

Use of environmentally damaging materials:

- Check whether a less toxic material is available.

Handling and storage of materials:

- Have the correct facilities available for handling liquids to prevent spillage and wastage as listed above.
- Provide suitable locations for storage to prevent frost damage or other deterioration.

Burning used engine oil

Burning of used engine oil in small space heaters or boilers can be recommended only for units of approved design. The heating system must meet the regulatory standards for small burner(s) with a net rated thermal input of less than 3MW. The use of waste oil burners must be licensed by the local authority.

Waste Management

One of the major ways that pollution can be reduced is by the careful handling, storage and disposal of all waste materials that occur on sites. Legislation makes it illegal to dispose of waste materials other than to licensed waste carriers and disposal sites. This means that it is necessary to not only know what the waste materials are, but also to have the necessary documentation and licenses.

Handling and storage of waste

Ensure that waste materials are not poured down the drain or onto soils. They should be stored in such a way as to prevent the escape of the material to land, water or air.

They must also be segregated into different types of waste e.g. oil, metals, batteries, used vehicle components. This will prevent any reaction between different materials and assist in disposal.

Disposal of waste

Disposal of waste materials must only be to waste carriers who are licensed to carry those particular waste materials and all the necessary documentation must be completed. The waste carrier is responsible for ensuring that the waste is taken to the correct disposal sites.

Dispose of waste in accordance with the following guidelines:

- **Fuel, hydraulic fluid, anti-freeze and oil:** keep separate and dispose of to specialist contractor.
- **Refrigerant:** collect in specialist equipment and reuse.
- **Detergents:** safe to pour down the foul drain if diluted.
- **Paint, thinners:** keep separate and dispose of to specialist contractor.
- **Components:** send back to supplier for refurbishment, or disassemble and reuse any suitable parts. Dispose of the remainder in ordinary waste.
- **Small parts:** reuse any suitable parts, dispose of the remainder in ordinary waste.
- **Metals:** can be sold if kept separate from general waste.
- **Tyres:** keep separate and dispose of to specialist contractor.
- **Packaging:** compact as much as possible and dispose of in ordinary waste.
- **Asbestos-containing:** keep separate and dispose of to specialist contractor.
- **Oily and fuel wastes (e.g. rags, used spill kit material):** keep separate and dispose of to specialist contractor.
- **Air filters:** keep separate and dispose of to specialist contractor.
- **Rubber/plastics:** dispose of in ordinary waste.
- **Hoses:** dispose of in ordinary waste.
- **Batteries:** keep separate and dispose of to specialist contractor.
- **Airbags - explosives:** keep separate and dispose of to specialist contractor.
- **Electrical components:** send back to supplier for refurbishment, or disassemble and reuse any suitable parts. Dispose of the remainder in ordinary waste.
- **Electronic components:** send back to supplier for refurbishment, or disassemble and reuse any suitable parts. Dispose of the remainder in ordinary waste.
- **Catalysts:** can be sold if kept separate from general waste.
- **Used spill-absorbing material:** keep separate and dispose of to specialist contractor.
- **Office waste:** recycle paper and toner and ink cartridges, dispose of the remainder in ordinary waste.



PRECAUTIONS AGAINST DAMAGE

Always fit wing and seat covers before commencing work.

Avoid spilling brake fluid or battery acid on paintwork.
Wash off with water immediately if this occurs.

Disconnect the battery earth lead before starting work, see **ELECTRICAL PRECAUTIONS**.

Always use the recommended service tool or a satisfactory equivalent where specified.

Protect exposed bearing and sealing surfaces and screw threads from damage.

SAFETY INSTRUCTIONS

Jacking

The recommended jacking points are given in **LIFTING AND TOWING**

Always ensure that any lifting apparatus has adequate load and safety capacity for the weight to be lifted.

Ensure the vehicle is standing on level ground prior to lifting or jacking.

Apply the handbrake and chock the wheels.

Never rely on a jack as the sole means of support when working beneath the vehicle. Use additional safety supports beneath the vehicle.

Do not leave tools, lifting equipment, spilt oil, etc. around or on the work bench area.

Brake shoes and pads

WARNING: Always fit the correct grade and specification of brake linings and renew brake pads and brake shoes in axle sets only.

GENERAL INFORMATION

Brake hydraulics

Observe the following recommendations when working on the brake system:

- Always use two spanners when loosening or tightening brake pipe or hose connections.
- Ensure that hoses run in a natural curve and are not kinked or twisted.
- Fit brake pipes securely in their retaining clips and ensure that the pipe cannot contact a potential chafing point.
- Containers used for hydraulic fluid must be kept absolutely clean.
- Do not store hydraulic brake fluid in an unsealed container; it will absorb water and in this condition would be dangerous to use due to a lowering of its boiling point.
- Do not allow hydraulic brake fluid to be contaminated with mineral oil, or put new brake fluid in a container which has previously contained mineral oil.
- Do not re-use brake fluid removed from the system.
- Always use clean brake fluid or a recommended alternative to clean hydraulic components.
- After disconnection of brake pipes and hoses, immediately fit suitable blanking caps or plugs to prevent the ingress of dirt.
- Only use the correct brake fittings with compatible threads.
- Absolute cleanliness must be observed when working with hydraulic components.

WARNING: It is imperative that the correct brake fittings are used and that threads of components are compatible.

Cooling system caps and plugs

Extreme care is necessary when removing engine coolant caps and plugs when the engine is hot and especially if it is overheated. To avoid the possibility of scalding allow the engine to cool before attempting coolant cap or plug removal.

GENERAL FITTING INSTRUCTIONS

Component removal

Whenever possible, clean components and surrounding area before removal.

- Blank off openings exposed by component removal.
- Immediately seal fuel, oil or hydraulic lines when apertures are exposed; use plastic caps or plugs to prevent loss of fluid and ingress of dirt.
- Close the open ends of oilways exposed by component removal with tapered hardwood plugs or conspicuous plastic plugs.
- Immediately a component is removed, place it in a suitable container; use a separate container for each component and its associated parts.
- Clean bench and provide marking materials, labels and containers before dismantling a component.

Dismantling

Observe scrupulous cleanliness when dismantling components, particularly when brake, fuel or hydraulic system parts are being worked on. A particle of dirt or a cloth fragment could cause a serious malfunction if trapped in these systems.

- Blow out all tapped holes, crevices, oilways and fluid passages with an air line. Ensure that any 'O' rings used for sealing are correctly replaced or renewed, if disturbed during the process.
- Use marking ink to identify mating parts and ensure correct reassembly. Do not use a centre punch or scribe to mark parts, they could initiate cracks or distortion in marked components.
- Wire together mating parts where necessary to prevent accidental interchange (e.g. roller bearing components).
- Wire labels on to all parts which are to be renewed, and to parts requiring further inspection before being passed for reassembly; place these parts in separate containers from those containing parts for rebuild.
- Do not discard a part due for renewal until after comparing it with a new part, to ensure that its correct replacement has been obtained.

Cleaning components

Always use the recommended cleaning agent or equivalent.

Ensure that adequate ventilation is provided when volatile degreasing agents are being used.

Do not use degreasing equipment for components containing items which could be damaged by the use of this process.



Whenever possible clean components and the area surrounding them before removal. Always observe scrupulous cleanliness when cleaning dismantled components.

General inspection

All components should be inspected for wear or damage before being reassembled.

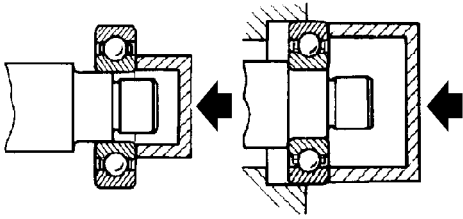
- Never inspect a component for wear or dimensional check unless it is absolutely clean; a slight smear of grease can conceal an incipient failure.
- When a component is to be checked dimensionally against recommended values, use the appropriate measuring equipment (surface plates, micrometers, dial gauges etc.). Ensure the measuring equipment is calibrated and in good serviceable condition.
- Reject a component if its dimensions are outside the specified tolerances, or if it appears to be damaged.
- A part may be refitted if its critical dimension is exactly to its tolerance limit and it appears to be in satisfactory condition. Use 'Plastigauge' 12 Type PG-1 for checking bearing surface clearances.

Ball and Roller Bearings

When removing and installing bearings, ensure that the following practices are observed to ensure component serviceability.

- Remove all traces of lubricant from bearing under inspection by cleaning with a suitable degreasant; maintain absolute cleanliness throughout operations.
- Conduct a visual inspection for markings on rolling elements, raceways, outer surface of outer rings or inner surface of inner rings. Reject any bearings found to be marked, since marking in these areas indicates onset of wear.
- Hold inner race of bearing between finger and thumb of one hand and spin outer race to check that it rotates absolutely smoothly. Repeat, holding outer race and spinning inner race.
- Rotate outer ring gently with a reciprocating motion, while holding inner ring; feel for any check or obstruction to rotation. Reject bearing if action is not perfectly smooth.
- Lubricate bearing with generous amounts of lubricant appropriate to installation.
- Inspect shaft and bearing housing for discoloration or other markings which indicate movement between bearing and seatings.
- Ensure that shaft and housing are clean and free from burrs before fitting bearing.
- If one bearing of a pair shows an imperfection, it is advisable to replace both with new bearings; an exception could be if the faulty bearing had covered a low mileage, and it can be established that damage is confined to only one bearing.
- Never refit a ball or roller bearing without first ensuring that it is in a fully serviceable condition.
- When hub bearings are removed or displaced, new bearings must be fitted; do not attempt to refit the old hub bearings.

GENERAL INFORMATION



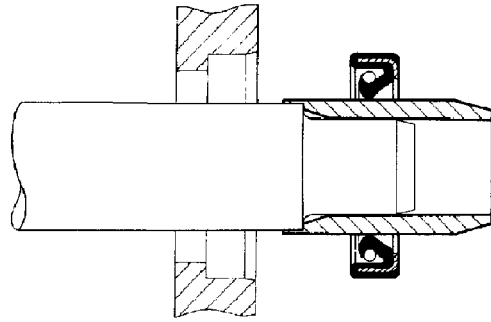
M01 0123

- When fitting a bearing to a shaft, only apply force to the inner ring of the bearing. When fitting a bearing into a housing, only apply force to the outer ring of the bearing.
- In the case of grease lubricated bearings (e.g. hub bearings) fill the space between bearing and outer seal with the recommended grade of grease before fitting seal.
- Always mark components of separable bearings (e.g. taper roller bearings) when dismantling, to ensure correct reassembly. Never fit new rollers in a used outer ring; always fit a complete new bearing assembly.

Oil seals

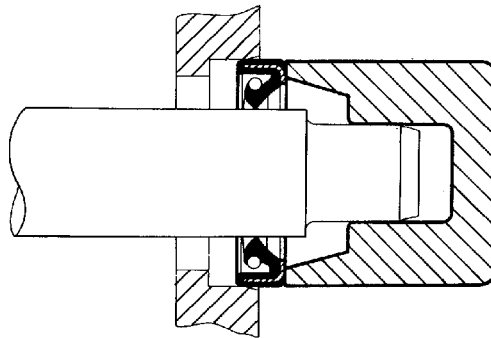
Always renew oil seals which have been removed from their working location (whether as an individual component or as part of an assembly). NEVER use a seal which has been improperly stored or handled, such as hung on a hook or nail.

- Carefully examine seal before fitting to ensure that it is clean and undamaged.
- Ensure the surface on which the new seal is to run is free of burrs or scratches. Renew the component if the original sealing surface cannot be completely restored.
- Protect the seal from any surface which it has to pass when being fitted. Use a protective sleeve or tape to cover the relevant surface.
- Lubricate the sealing lips with a recommended lubricant before use to prevent damage during initial use. On dual lipped seals, smear the area between the lips with grease. **Note:** some oil seals are coated with a protective wax and must be fitted dry, unless instructed otherwise.
- If a seal spring is provided, ensure that it is fitted correctly. Place lip of seal towards fluid to be sealed and slide into position on shaft. Use fitting sleeve where possible to protect sealing lip from damage by sharp corners, threads or splines. If a fitting sleeve is not available, use plastic tube or tape to prevent damage to the sealing lip.



M01 0124

- Grease outside diameter of seal, place square to housing recess and press into position using great care, and if possible a 'bell piece' to ensure the seal is not tilted. In some cases it may be preferable to fit seal to housing before fitting to shaft. Never let weight of unsupported shaft rest in seal.



M01 0125

- Use the recommended service tool to fit an oil seal. If the correct service tool is not available, use a suitable tube approximately 0.4 mm (0.015 in) smaller than the outside diameter of the seal. Use a hammer **VERY GENTLY** on drift if a suitable press is not available.
- Press or drift the seal in to the depth of its housing, with the sealing lip facing the lubricant to be retained if the housing is shouldered, or flush with the face of the housing where no shoulder is provided. Ensure that the seal does not enter the housing in a tilted position.



Joints and joint faces

Fit joints dry unless specified otherwise.

- When jointing compound is used, apply in a thin uniform film to metal surfaces; take care to prevent jointing compound from entering oilways, pipes or blind tapped holes.
- If gaskets and/or jointing compound is recommended for use; remove all traces of old jointing material prior to reassembly. Do not use a tool which will damage the joint faces and smooth out any scratches or burrs on the joint faces using an oil stone. Do not allow dirt or jointing material to enter any tapped holes or enclosed parts.
- Prior to reassembly, blow through any pipes, channels or crevices with compressed air.

Locking Devices

Always replace locking devices with one of the same design.

Tab washers - always release locking tabs and fit new locking washers. Do not re-use locking tabs.

Locking nuts - always use a backing spanner when loosening or tightening locking nuts, brake and fuel pipe unions.

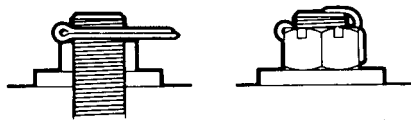
Roll pins - always fit new roll pins of an interference fit in the hole.

Circlips - always fit new circlips of the correct size for the groove.

Keys and keyways - remove burrs from edges of keyways with a fine file and clean thoroughly before attempting to refit key.

Clean and inspect key closely; keys are suitable for refitting only if indistinguishable from new, as any indentation may indicate the onset of wear.

Split pins



1M0057

Always fit new split-pins of the correct size for the hole in the bolt or stud. **Do not slacken back nut to enter split-pin.**

Screw threads

Metric threads to ISO standards are used.

Damaged nuts, bolts and screws must always be discarded.

Cleaning up damaged threads with a die or tap impairs the strength and closeness of fit of the threads and is not recommended.

Castellated nuts must not be slackened back to accept a split-pin, except in those recommended cases when this forms part of an adjustment.

Do not allow oil or grease to enter blind threaded holes. The hydraulic action on screwing in the bolt or stud could split the housing.

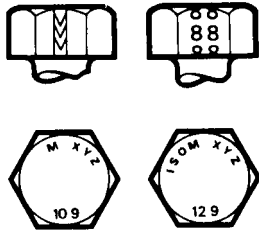
Always tighten a nut or bolt to the recommended torque figure. Damaged or corroded threads can affect the torque reading.

To check or re-tighten a bolt or screw to a specified torque figure, first slacken a quarter of a turn, then retighten to the correct torque figure.

Oil thread lightly before tightening to ensure a free running thread, except in the case of threads treated with sealant/lubricant, and self-locking nuts.

GENERAL INFORMATION

Bolt identification

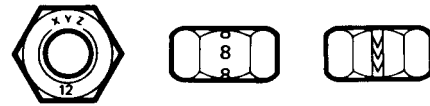
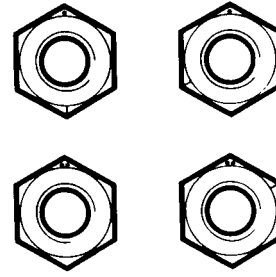


1M0055

An ISO metric bolt or screw made of steel and larger than 6 mm in diameter can be identified by either of the symbols ISO M or M embossed or indented on top of the head.

In addition to marks to identify the manufacturer, the head is also marked with symbols to indicate the strength grade, e.g. 8.8; 10.9; 12.9; 14.9. As an alternative, some bolts and screws have the M and strength grade symbol on the flats of the hexagon.

Nut identification



1M0056

A nut with an ISO metric thread is marked on one face or on one of the flats of the hexagon with the strength grade symbol 8, 12, or 14. Some nuts with a strength grade 4, 5 or 6 are also marked and some have the metric symbol M on the flat opposite the strength grade marking.

A clock face system is used as an alternative method of indicating the strength grade. The external chamfers or a face of the nut is marked in a position relative to the appropriate hour mark on a clock face to indicate the strength grade.

A dot is used to locate the 12 o'clock position and a dash to indicate the strength grade. If the grade is above 12, two dots identify the 12 o'clock position.

When tightening a slotted or castellated nut, never loosen it to insert a split pin except where recommended as part of an adjustment. If difficulty is experienced, alternative washers or nuts should be selected, or the washer thickness reduced.

Where bearing pre-load is involved, nuts should be tightened in accordance with special instructions.



Self-locking nuts



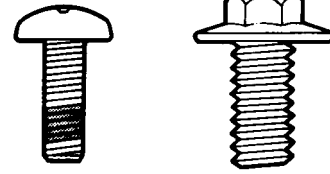
1M0058



Self-locking nuts, i.e. nylon insert or metal stiff nuts can be re-used providing resistance can be felt when the locking portion of the nut passes over the thread of the bolt or stud.

Where self-locking nuts have been removed, it is advisable to replace them with new ones of the same type.

Self-locking bolts and screws



1M0059

Self-locking bolts and screws, i.e. nylon patched or trilobular thread can be re-used providing resistance can be felt when the locking portion enters the female thread.

Nylon patched bolts and screws have a locking agent pre-applied to the threads. They are identified by the presence of a coloured section of thread which extends for up to 180° around the thread.

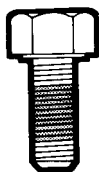
Trilobular i.e. Powerlok bolts have a special thread form which creates a slight interference in the tapped hole or threads of the nut into which it is screwed.

DO NOT re-use self-locking fasteners in critical locations (eg. engine bearings). Always use the correct replacement self-locking nut, bolt or screw.

DO NOT fit non self-locking fasteners in applications where a self-locking nut, bolt or screw is specified.

GENERAL INFORMATION

Encapsulated bolts and screws



1M0062

Encapsulated bolts and screws have a micro-encapsulated locking agent pre-applied to the thread. They are identified by the presence of a coloured section of thread which extends completely around the thread - 360°. The locking agent is released and activated by the assembly process and is then chemically cured to provide the locking action.

Unless a specific repair procedure states otherwise, encapsulated bolts may be re-used providing the threads are undamaged and the following procedure is adopted.

- Remove loose adhesive from the bolt and housing threads.
- Ensure threads are clean and free of oil and grease.
- Apply an approved locking agent.

An encapsulated bolt may be replaced with a bolt of equivalent specification provided it is treated with an approved locking agent.

FLEXIBLE PIPES AND HOSES

General

When removing and installing flexible hydraulic pipes and hoses, ensure that the following practices are observed to ensure component serviceability.

- Before removing and refitting brake or power steering hose, clean end fittings and area surrounding them as thoroughly as possible.
- Obtain appropriate plugs or caps before detaching hose end fittings, so that the ports can be immediately covered to prevent the ingress of dirt.
- Clean hose externally and blow through with airline. Examine carefully for cracks, separation of plies, security of end fittings and external damage. Reject any faulty hoses.
- When refitting a hose, ensure that no unnecessary bends are introduced, and that the hose is not twisted before or during tightening of union nuts.
- Fit a cap to seal a hydraulic union and a plug to its socket after removal to prevent ingress of dirt.
- Absolute cleanliness must be observed with hydraulic components at all times.
- After any work on hydraulic systems, carefully inspect for leaks underneath the vehicle while a second operator applies maximum brake pressure to the brakes (engine running) and operates the steering.

Fuel system hoses

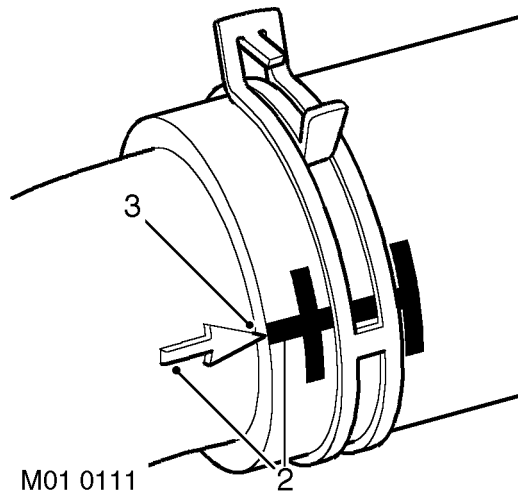
All fuel hoses are made up of two laminations, an armoured rubber outer sleeve and an inner viton core. If any of the fuel system hoses have been disconnected, it is imperative that the internal bore is inspected to ensure that the viton lining has not become separated from the armoured outer sleeve. A new hose must be fitted if separation is evident.

Cooling system hoses

The following precautions **MUST** be followed to ensure the integrity of cooling hoses and their connections to system components are maintained.

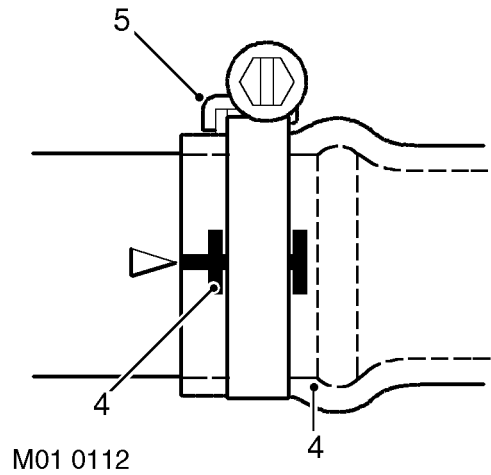


Hose orientation and connection



Correct orientation of cooling hoses is important in ensuring that the hose does not become fatigued or damaged through contact with adjacent components. Where 'timing' marks (2) are provided on the hose and corresponding connection, these must be used to ensure correct orientation. Hoses must be pushed fully onto their connection points. Usually, a moulded form (3) on the stub pipe provides a positive indicator.

Hose clips



Markings (4) are usually provided on the hose to indicate the correct clip position. If no markings are provided, position the clip directly behind the retaining lip at the end of the stub as shown. Worm drive clips should be oriented with the crimped side of the drive housing (5) facing towards the end of the hose, or the hose may become pinched between the clip and the stub pipe retaining lip. Worm drive clips should be tightened to 3 Nm (2lbf.ft) unless otherwise stated. Ensure that hose clips do not foul adjacent components.

Heat protection

Always ensure that heatshields and protective sheathing are in good condition. Replace if damage is evident. Particular care must be taken when routing hoses close to hot engine components, such as the exhaust manifold. Hoses will deflect slightly when hot; ensure this movement is taken into account when routing and securing hoses.

GENERAL INFORMATION

SERVICE TOOLS

General

Special service tools have been developed to facilitate removal, dismantling and assembly of mechanical components in a cost effective and time efficient manner. The use of special tools also helps prevent the potential for damage to components.

Some operations described in this Manual cannot be carried out properly without the aid of the specified service tools.

Special service tools can be obtained from:

SPX UK Ltd
Genoa House
Everdon Park
Daventry
Northants
NN11 8YH

☎ +44 (0) 1327 303401

📠 +44 (0) 1327 706632

sales@servicesolutions.spx.com

MG GDS

MG GDS is a computerised workshop tool which provides your dealership with instant access to the very latest Technical Information from MG, allowing for accurate and effective fault diagnosis and repair of all MG Vehicles.

Where specific garage equipment is required for diagnosis and repair, reference should be made to the Service Tools and Equipment Programme where details of the equipment recommended by MG Service may be found.

Body repairs

Any damage found, that would affect the corrosion resistance of the vehicle during the Warranty period must be rectified by an authorised MG Dealer to the standards, and by the methods, detailed in the Body Repair Manual.

Replacement body panels

Body panels are supplied coated in cathodic electrocoat primer.

DYNAMOMETER TESTING

General

IMPORTANT: Use a four wheel dynamometer for brake testing if possible.

WARNING: Do not attempt to test an ABS function on a dynamometer.

Four wheel dynamometers

Provided that front and rear rollers are rotating at identical speeds and that normal workshop safety standards are applied, there is no speed restriction during testing except any that may apply to the tyres.

Before testing a vehicle with anti-lock brakes on a four wheel dynamometer, disconnect the ABS modulator. The ABS function will not work, the ABS warning light will illuminate. Normal braking will be available.

Two wheel dynamometers

ABS will not function on a two wheel dynamometer. The ABS light will illuminate during testing. Normal braking will be available.

If brake testing on a two wheel dynamometer is necessary, the following precautions should be taken:

- Traction control must be disabled
- Neutral selected in gearbox

When checking brakes, run engine at idle speed to maintain servo-vacuum.



FUEL HANDLING PRECAUTIONS

General

The following information provides basic precautions which must be observed if petrol (gasoline) is to be handled safely. It also outlines other areas of risk which must not be ignored. This information is issued for basic guidance only, if in doubt consult your local Fire Officer.

Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. The vapour is heavier than air and will always fall to the lowest level. The vapour can be easily distributed throughout a workshop by air currents; consequently, even a small spillage of fuel is potentially very dangerous.

Always have a fire extinguisher containing FOAM, CO₂, GAS or POWDER close at hand when handling or draining fuel or when dismantling fuel systems. Fire extinguishers should also be located in areas where fuel containers are stored.

Always disconnect the vehicle battery before carrying out dismantling or draining work on a fuel system.

Whenever fuel is being handled, drained or stored, or when fuel systems are being dismantled, all forms of ignition must be extinguished or removed; any leadlamps must be flameproof and kept clear of spillage.

WARNING: No one should be permitted to repair components associated with fuel without first having specialist training.

WARNING: Do not remove fuel system components while the vehicle is over a pit.

Fuel tank draining

Fuel tank draining should be carried out in accordance with the procedure outlined in the '**FUEL DELIVERY**' section of this manual and observing the following precautions:

WARNING: Fuel must not be extracted or drained from any vehicle whilst it is over a pit.

Draining or extraction of fuel must be carried out in a well ventilated area.

The capacity of containers for fuel must be more than adequate for the full amount of fuel to be extracted or drained. The container should be clearly marked with its contents and placed in a safe storage area which meets the requirements of local authority regulations.

CAUTION: When fuel has been extracted or drained from a fuel tank the precautions governing naked lights and ignition sources should be maintained.

Fuel tank removal

When the fuel line is secured to the fuel tank outlet by a spring steel clip, the clip must be released before the fuel line is disconnected or the fuel tank is removed. This procedure will avoid the possibility of residual fumes in the fuel tank being ignited when the clip is released.

As an added precaution fuel tanks should have a 'FUEL VAPOUR' warning label attached to them as soon as they are removed from the vehicle.

Fuel tank repairs

No attempt should be made to repair a plastic fuel tank. If the structure of the tank is damaged, a new tank must be fitted.

Body repairs

Plastic fuel pipes are particularly susceptible to heat, even at relatively low temperature, and can be melted by heat conducted from some distance away.

When body repairs involve the use of heat, all fuel pipes which run in the vicinity of the repair area must be removed, and the tank outlet plugged, BEFORE HEAT IS APPLIED. If the repair is in the vicinity of the fuel tank, the tank must be removed.

WARNING: If welding is to be carried out in the vicinity of the fuel tank, the fuel system must be drained and the tank removed before welding commences.

Quick fit fuel hose connectors

WARNING: Hose connections between the fuel pump and the fuel rail contain fuel under pressure, which MUST be relieved prior to disconnection of the hoses. See ENGINE MANAGEMENT SYSTEM - MEMS, Adjustments.

- 1 Wipe connection and surrounding area using a lint free cloth.

NOTE: If the connection is heavily soiled with road salt and dirt, gently twist connector while spraying with WD40.

- 2 If necessary use an air line to remove contaminants from the retainer area of the connector.
- 3 Depress collar and disconnect hose.
- 4 Ensure pipe end is clean and free from corrosion.
- 5 Lubricate pipe end with clean engine oil.
- 6 Connect hose to pipe and push firmly into position until a click is heard.
- 7 Check security of connection by pulling on connector.

CAUTION: When checking security of connector pull on connector body NOT on the hose.

GENERAL INFORMATION

ELECTRICAL PRECAUTIONS

General

The following guidelines are intended to ensure the safety of the operator whilst preventing damage to the electrical and electronic components fitted to the vehicle. Where necessary, specific precautions are detailed in the relevant sections of this Manual which should be referred to prior to commencing repair operations.

Equipment

Prior to commencing any test procedure on the vehicle, ensure that the relevant test equipment is working correctly and any harness or connectors are in good condition. It is particularly important to check the condition of the lead and plugs of mains operated equipment.

Polarity

Never reverse connect the vehicle battery and always ensure the correct polarity when connecting test equipment.

High Voltage Circuits

Whenever disconnecting live ht circuits, always use insulated pliers and never allow the open end of the ht lead to contact other components, particularly ECUs. Exercise caution when measuring the voltage on the coil terminals while the engine is running, high voltage spikes can occur on these terminals.

Connectors and Harness

The engine compartment of a vehicle is a particularly hostile environment for electrical components and connectors:

- Always ensure electrically related items are dry and oil free before disconnecting and connecting test equipment.
- Ensure disconnected multiplugs and sensors are protected from being contaminated with oil, coolant or other solutions. Contamination could impair performance or result in catastrophic failure.
- Never force connectors apart using tools to prise apart or by pulling on the wiring harness.
- Always ensure locking tabs are disengaged before disconnection, and match orientation to enable correct reconnection.
- Ensure that any protection (covers, insulation etc.) is replaced if disturbed.

Having confirmed a component to be faulty:

- Switch off the ignition and disconnect the battery.
- Remove the component and support the disconnected harness.
- When replacing the component keep oily hands away from electrical connection areas and push connectors home until any locking tabs fully engage.

Battery disconnection

Before disconnecting the battery, disable the alarm system and switch off all electrical equipment. If the radio is to be serviced, ensure the security code has been deactivated.

CAUTION: To prevent damage to electrical components, ALWAYS disconnect the battery when working on the vehicle's electrical system. The ground lead must be disconnected first and reconnected last.

Always ensure that battery leads are routed correctly and are not close to any potential chafing points.

Battery charging

Only recharge the battery with it removed from the vehicle. Always ensure any battery charging area is well ventilated and that every precaution is taken to avoid naked flames and sparks.

Ignition system safety precautions

The vehicle's ignition system produces high voltage and the following precautions should be observed before carrying out any work on the system.

WARNING: Before commencing work on an ignition system, ensure all high tension terminals, adapters and diagnostic equipment are adequately insulated and shielded to prevent accidental personal contacts and minimise the risk of shock.

WARNING: Wearers of surgically implanted pacemaker devices should not be in close proximity of ignition circuits or diagnostic equipment.

Disciplines

Switch off the ignition prior to making any connection or disconnection in the system to prevent electrical surges caused by disconnecting 'live' connections damaging electronic components.

Ensure hands and work surfaces are clean and free of grease, swarf, etc. Grease collects dirt which can cause electrical tracking (short-circuits) or high-resistance contacts.

When handling printed circuit boards, treat with care and hold by the edges only; note that some electronic components are susceptible to body static.

Connectors should never be subjected to forced removal or refit, especially inter-board connectors. Damaged contacts can cause short-circuit and open-circuit fault conditions.

Prior to commencing test, and periodically during a test, touch a good vehicle body earth to discharge static. Some electronic components are vulnerable to static electricity that may be generated by the operator.



Grease for electrical connectors

Some under bonnet and under body connectors may be protected against corrosion by the application of a special grease during vehicle production. Should connectors be disturbed in service, repaired or replaced, additional grease should be applied.

SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS

General

The SRS system contains components which could be potentially hazardous to the service engineer if not serviced and handled correctly. The following guidelines are intended to alert the service engineer to potential sources of danger and emphasise the importance of ensuring the integrity of SRS components fitted to the vehicle.

WARNING: Always follow the 'SRS Precautions' and the correct procedures for working on SRS components. Persons working on SRS systems must be fully trained and have been issued with copies of the safety guidelines.

WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

WARNING: Some airbag modules contain sodium azide which is poisonous and extremely flammable. Contact with water, acid or heavy metals may produce harmful or explosive compounds. Do not dismantle, incinerate or bring into contact with electricity, before the unit has been deployed.

WARNING: Always replace a seat belt assembly that has withstood the strain of a severe vehicle impact, or if the webbing shows signs of fraying.

WARNING: Always disconnect the vehicle battery before carrying out any electrical welding on a vehicle fitted with an SRS system.

CAUTION: Do not expose an airbag module or seat belt pretensioner to heat exceeding 85°C (185°F).

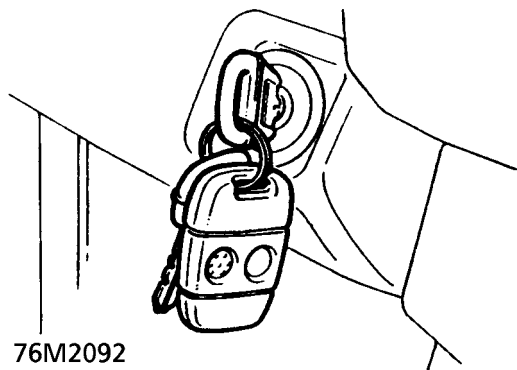
It should be noted that these precautions are not restricted to operations performed when servicing the SRS system, the same care should be exercised when working on ancillary systems and components located in the vicinity of SRS components; these include, but are not limited to:

- **Steering system** - steering wheel airbag, rotary coupler
- **Front fascia** - passenger front airbag (where fitted)
- **Centre console** - SRS DCU and SRS harnesses.
- **Electrical system** - SRS harnesses, link leads and connectors

GENERAL INFORMATION

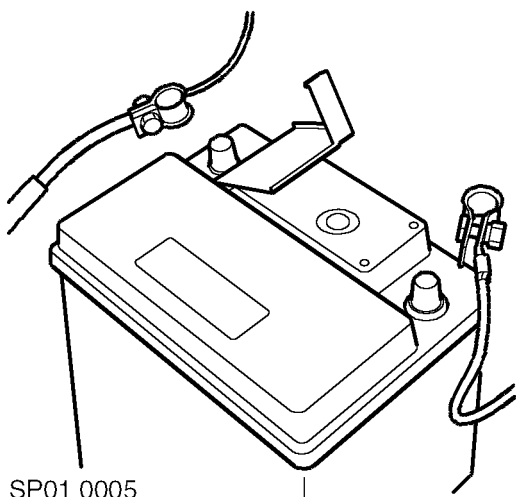
Making the system safe

Before working on, or in the vicinity of SRS components, ensure the system is rendered safe by performing the following procedures:



76M2092

- Remove the ignition key from the ignition switch.



SP01 0005

- Disconnect both battery leads, earth lead first before beginning work.
- Wait 10 minutes for the SRS DCU back-up power circuit to discharge.

The SRS system uses energy reserve capacitors to keep the system active in the event of electrical supply failure under crash conditions. It is necessary to allow the capacitor sufficient time to discharge (10 minutes) in order to avoid the risk of accidental deployment.

WARNING: Always disconnect both battery leads before beginning work on the SRS system. Disconnect the negative battery lead first. Never reverse connect the battery.

INSTALLATION

In order to assure system integrity, it is essential that the SRS system is regularly checked and maintained so that it is ready for effective operation in the event of a collision. Carefully inspect SRS components before installation. Do not install a part that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

WARNING: The integrity of the SRS system components are critical for safety reasons. Ensure the following precautions are always adhered to:

- **Never install used SRS components from another vehicle or attempt to repair an SRS component.**
- **When repairing an SRS system, only use genuine new parts.**
- **Never apply electrical power to an SRS component unless instructed to do so as part of an approved test procedure.**
- **Special Torx bolts are necessary for installing the airbag module - do not use other bolts. Ensure bolts are tightened to the correct torque.**
- **Always use new fixings when replacing an SRS component.**
- **Ensure the SRS Diagnostic Control Unit (DCU) is always installed correctly. There must not be any gap between the DCU and the bracket to which it is mounted. An incorrectly mounted DCU could cause the system to malfunction.**

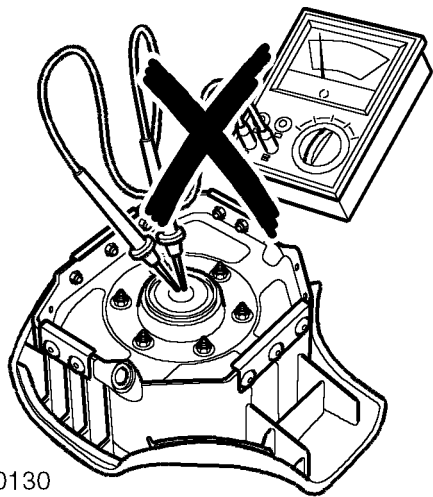
CAUTION: Ensure SRS components are not contaminated with oil, grease, detergent or water.

CAUTION: Torque wrenches should be regularly checked for accuracy to ensure that all fixings are tightened to the correct torque.

NOTE: If the SRS component is to be replaced, the bar code of the new unit must be recorded.

SRS component testing precautions

The SRS components are triggered using relatively low operating currents, always adhere to the following precautions:

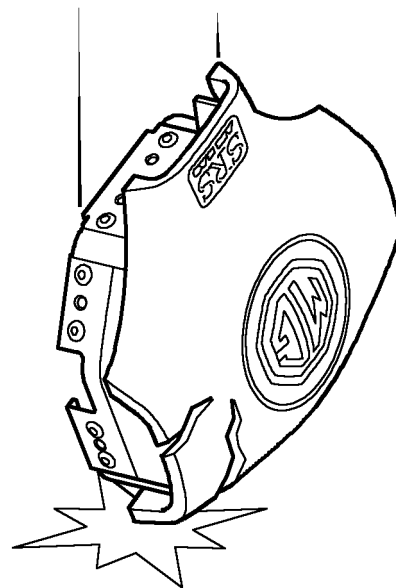


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WARNING: Do not use a multimeter or other general purpose test equipment on SRS system components or accidental deployment may occur. Only use 'MG GDS' to diagnose SRS system faults.

WARNING: Do not use electrical test equipment on the SRS harness while it is connected to any of the SRS system components. It may cause accidental deployment and personal injury.

Handling and storage



76M1812

There are regulations for the safe storage of SRS components which must be observed, consult your local authority for details.

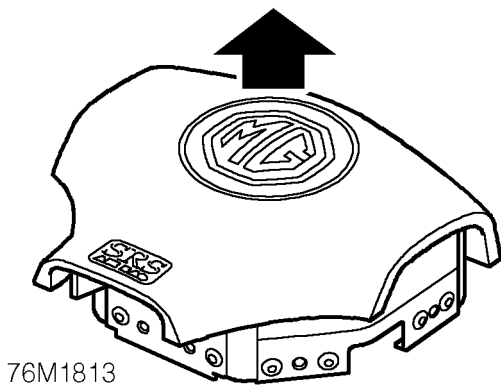
WARNING: The SRS components are sensitive and potentially hazardous if not handled correctly; always comply with the following handling precautions:

- **Never drop a SRS component. The airbag diagnostic control unit is a particularly shock sensitive device and must be handled with extreme care. Airbag modules could deploy if subjected to a strong shock.**
- **Never wrap your arms around an airbag module. If an airbag module has to be carried, hold it by the cover, with the cover uppermost and the base away from your body.**
- **Never transport airbag modules in the cabin of a vehicle. Always use the luggage compartment of the vehicle for carrying airbag modules.**

WARNING: Never attach anything to an airbag cover or any trim component covering an airbag module. Do not allow anything to rest on top of an airbag module.

WARNING: Always keep components cool, dry and free from contamination.

GENERAL INFORMATION

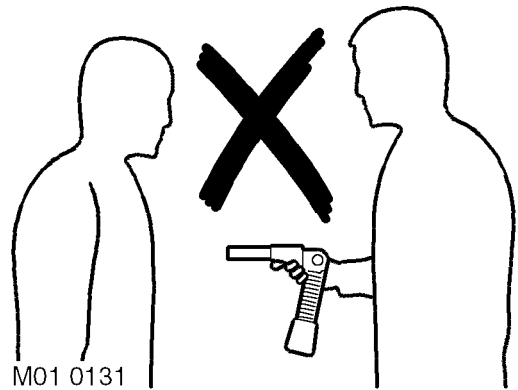


WARNING: Store airbag modules with the deployment side uppermost. If airbag modules are stored deployment side down, accidental deployment will propel the airbag module with enough force to cause serious injury.

WARNING: Airbag modules are classed as explosive devices. For overnight and longer term storage, they must be stored in a secure steel cabinet which has been approved as suitable for the purpose and has been registered by the local authority.

WARNING: Store the airbag module in a designated storage area. If there is no designated storage area available, store in the locked luggage compartment/loadspace of the vehicle and inform the workshop supervisor.

CAUTION: Improper handling or storage can internally damage the airbag module, making it inoperative. If you suspect the airbag module has been damaged, install a new module and refer to the Deployment/Disposal Procedures to determine the correct method for disposal of the damaged module.

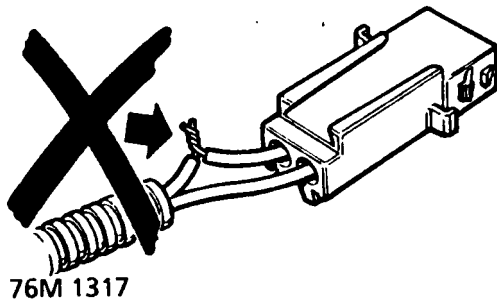


WARNING: When handling front seat belt buckle pre-tensioners, hold by the piston tube, with the open end of the piston tube pointing towards the ground and the buckle facing away from your body.

- **DO NOT** cover the end of the piston tube.
- **DO NOT** hold buckle pre-tensioners by the bracket assembly or steel cable.
- **NEVER** point the piston tube towards your body or other people.



SRS Harnesses and Connectors

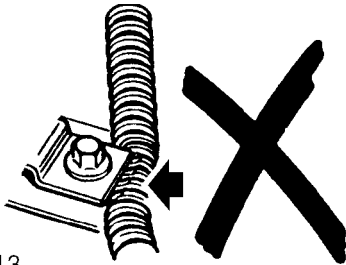


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CAUTION: Always observe the following precautions with regards to the SRS system electrical wiring:

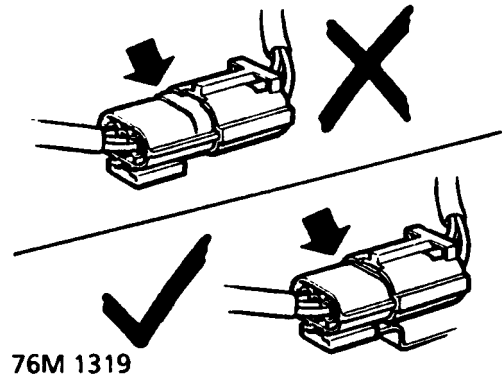
- Never attempt to modify, splice or repair SRS wiring.
- Never install electronic equipment (such as a mobile telephone, two-way radio or in-car entertainment system) in such a way that it could generate electrical interference in the SRS system harness. Seek specialist advice when installing such equipment.

NOTE: SRS system wiring can usually be identified by a special yellow outer sleeve protecting the wires (black with yellow stripe protective coverings are sometimes used).



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WARNING: Always ensure SRS wiring is routed correctly. Be careful to avoid trapping or pinching the SRS wiring. Do not leave the connectors hanging loose or allow SRS components to hang from their harnesses. Look for possible points of chafing.



76M 1319

CAUTION: Ensure all SRS component harness connectors are mated correctly and securely fastened. Do not leave the connectors hanging loose.

Rotary Coupler Precautions

CAUTION: Always follow the procedure for fitting and checking the rotary coupler as instructed in the 'SRS Repairs' section of this manual. Comply with all safety and installation procedures to ensure the system functions correctly. Observe the following precautions:

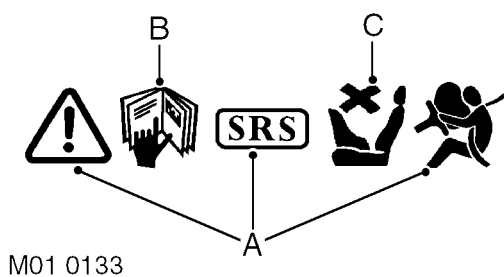
- Do not unlock and rotate the rotary coupler when it is removed from the vehicle.
- Do not turn the road wheels when the rotary coupler is removed from the vehicle.
- Always ensure the rotary coupler is removed and installed in its centred position and with the front road wheels in a straight ahead position - refer to the 'SRS Repairs' section of this manual for the correct removal and installation procedure.
- If a new rotary coupler is being installed, ensure the locking tab holding the coupler's rotational position is not broken; units with a broken locking tab should not be used.

GENERAL INFORMATION

WARNING LABELS

Warning symbols relating to the SRS system are displayed at various positions in the vehicle. SRS components have additional warning labels displayed on them to indicate that particular care is needed when handling them. These include airbag modules, DCU and the rotary coupler.

The following warning labels may be displayed together or individually at various locations on the vehicle:



A - The need for caution when working in close proximity to SRS components.

B - Refer to the publication where the procedures, instructions and advice can be found (usually Workshop Manual or Owner's Handbook) for working on the SRS system.

C - Do not use rear facing child seats in the front passenger seat if the vehicle is fitted with a passenger airbag.

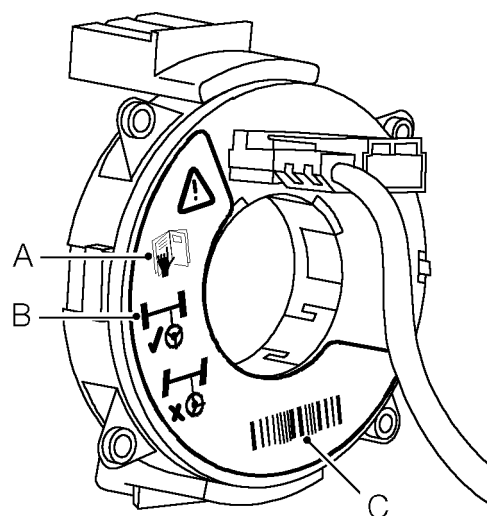
WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

NOTE: The following list indicates current locations for warning labels. Exact positions may vary dependent on legislation and market trends.

Bonnet locking platform

Refer to the Owner's Handbook for information on the airbag system

Rotary Coupler



A - SRS - Refer to the Workshop Manual for detailed instructions.

B - Ensure wheels are in the straight ahead position before removal and refitting of the rotary coupler.

C - MG Part number/Bar code: the code number must be recorded if the rotary coupler is to be replaced.

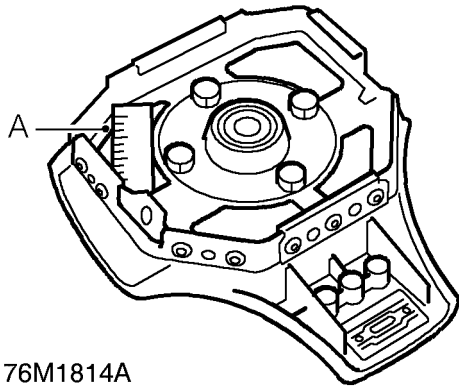
CAUTION: DO NOT ROTATE THE ROTARY COUPLER MECHANISM

Door glass

Refer to the Owner's Handbook for information on the airbag system.



Airbag module - driver

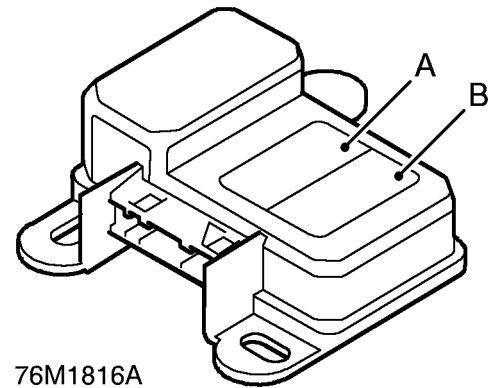


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A - MG Part Number / Bar Code - The code number must be quoted when ordering a replacement module.

An 'SRS AIRBAG' legend is also moulded into the centre pad to identify the presence of a driver's airbag.

Diagnostic Control Unit



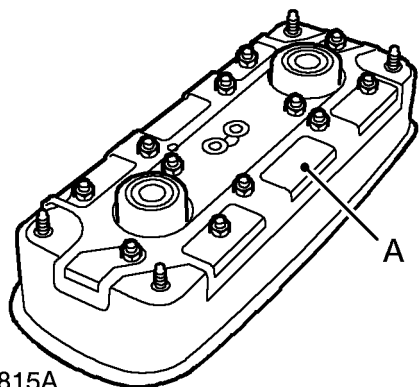
76M1816A

A - Refer to the Workshop Manual for information on the airbag system.

B - MG Part Number / Bar Code - The code number must be recorded if the airbag control and diagnostic unit is to be replaced.

GENERAL INFORMATION

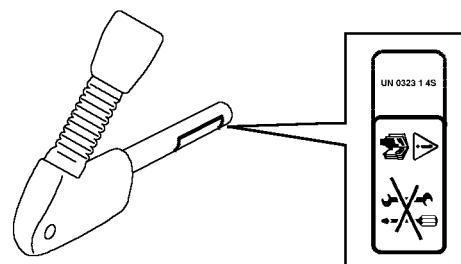
Airbag module - passenger



76M1815A

A - MG Part Number / Bar code - The code number must be quoted when ordering a replacement module.

Front seat belt pre-tensioners



SP01 0006

- Exercise caution.
- Refer to the publication where the procedures, instructions and advice can be found (usually Workshop Manual or Owner's Handbook) for working on the SRS system.
- Do not attempt to repair or disassemble.

Bar codes

Bar codes are fitted to SRS components and other components which are critically related to SRS operation. The code number(s) must be recorded if the component is to be replaced.



VEHICLE RECOVERY

Towing - SRS components not deployed:

Normal towing procedures are unlikely to cause an airbag to deploy. However, as a precaution, switch the ignition off and then disconnect both battery leads. Disconnect the '-ve' lead first.

Towing - SRS components deployed:

If the driver's airbag has been deployed, the vehicle must have a suspended tow. However, as a precaution, switch the ignition off and then disconnect both battery leads. Disconnect the '-ve' lead first.

SRS COMPONENT DEPLOYMENT

Precautions

If a vehicle is to be scrapped and it contains an undeployed airbag or seat belt pre-tensioner module, the module must be manually deployed. Always observe the following precautions:

WARNING: Only personnel who have undergone the appropriate training should undertake deployment of air bag and seat belt pre-tensioner modules.

WARNING: A deployed airbag or seat belt pre-tensioner is very hot, DO NOT return to a deployed airbag module or seat belt pre-tensioner until at least 30 minutes have elapsed since deployment.

WARNING: Only use approved deployment equipment, and only deploy SRS components in a well ventilated and specially designated area. Ensure SRS components are not damaged or ruptured before deployment. Notify the relevant authorities.

WARNING: If a vehicle is to be scrapped, undeployed airbag modules and seat belt pre-tensioner units must be deployed in accordance with the instructions provided in this manual.

WARNING: Contact with chemicals from deployed and damaged SRS components could present a health hazard, wear protective clothing when handling. DO NOT eat, drink or smoke when handling SRS components.

WARNING: Deployment of airbag modules and seat belt pre-tensioners can cause injury to personnel in the close vicinity of the deploying unit. In case of injury seek urgent medical advice. Possible sources of injury include:

- **Impact - due to inflating airbag or deploying seat belt pre-tensioner operation causing component 'kick'.**
- **Hearing - due to noise produced by deploying airbags and seat belt pre-tensioner units.**
- **Burns - hot component parts and gases.**
- **Irritation to eyes and lungs - from deploying gases or combustion residue.**

WARNING: Ensure the SRS component to be deployed is securely fastened to its mounting.

GENERAL INFORMATION

WARNING: Deployment procedures detailed in this manual should be strictly adhered to. Compliance with the following precautions **MUST** be ensured:

- Only use deployment equipment approved for the intended purpose.
- Before commencing deployment procedure, ensure the deployment tool functions properly by performing the self test procedure detailed in the 'SRS Repairs' section of this manual.
- Deployment of airbag / seat belt pre-tensioner modules should be performed in a well ventilated area which has been specially designated for the purpose.
- Ensure the airbag / seat belt pre-tensioner modules are not damaged or ruptured before attempting to deploy
- Notify the relevant authorities of the intention to deploy airbag and seat belt pre-tensioner units.
- When deploying airbag and seat belt pre-tensioner units, ensure that all personnel are at least 15 metres way from the deployment zone.
- Ensure the deployment tool is connected correctly, in compliance with the instructions detailed in this manual. In particular, ensure the deployment tool is not connected to the battery supply before connecting to the airbag or seat belt pre-tensioner module connector.
- When deploying seat belt pre-tensioners in the vehicle, ensure the pre-tensioner unit is fully secured to its fixing point.
- When removing deployed airbag and seat belt pre-tensioner modules, wear protective clothing. Use gloves and seal deployed units in a plastic bag.
- Following deployment of any component of the SRS system within the vehicle, all SRS components must be replaced. **DO NOT** re-use or salvage any parts of the SRS system.
- Do not lean over airbag modules or seat belt pre-tensioner units when connecting deployment equipment.

SRS COMPONENT REPLACEMENT POLICY

The following information details the policy for replacement of SRS components; either as a result of a vehicle accident or as a result of vehicle age.

Impacts which do not deploy the airbags or seat belt pre-tensioners

Check for structural damage in the area of the impact, paying particular attention to bumper armatures, longitudinals, crash cans and bracketry.

Impacts which deploy the airbags or pre-tensioners

The replacement and inspection policy is dependent on the type and severity of the crash condition. The following guidelines are the minimum that should be exercised as a result of the deployment of specific SRS components.

Front airbag deployment (driver and passenger)

If the front airbags are deployed, the following parts must be replaced:

- Driver airbag module
- Passenger airbag module (where fitted)
- Flyleads (where applicable) connecting front airbag modules to SRS harness
- Front seat buckle pre-tensioners
- Driver's seat belt retractor
- Rotary coupler
- SRS DCU

In addition, the following should be inspected for damage and replaced as necessary.

- Front passenger's seat belt retractor (webbing, tongue latching and anchorage point)
- Fascia moulding adjacent to passenger airbag module (where fitted)
- Steering wheel (if damage is evident)
- Front seat frames and head restraints (if there is evidence of damage to the seat frame or cushion pan)
- Steering column (if adjustment is lost or there are signs of collapse)

Rear impacts

Rear impacts may cause the seat belt pre-tensioners to deploy. If this occurs, both pre-tensioner units must be replaced. In addition, the following components should be inspected for damage and replaced as necessary:

- Seat frames
- Seat belts (retractors, webbing, tongue latching and body anchorage points)
- SRS DCU



Periodic replacement of SRS components

The performance of the propellants within airbags and pre-tensioners will deteriorate over a period of time. As a result, it is essential that the airbags and pre-tensioners are periodically replaced to maintain occupant safety. Airbags, seat belt pre-tensioners and the rotary coupler should be replaced at 15 year intervals.

AIR CONDITIONING SYSTEM PRECAUTIONS

General

The air conditioning system contains fluids and components which could be potentially hazardous to the service engineer or the environment if not serviced and handled correctly. The following guidelines are intended to alert the service engineer to potential sources of danger and emphasise the importance of ensuring the integrity of the Air Conditioning operating conditions and components fitted to the vehicle.

Where necessary, additional specific precautions are detailed in the relevant sections of this Manual which should be referred to prior to commencing repair operations.

The refrigerant used in the air conditioning system is HFC-134a (Hydrofluorocarbon) R134a.

WARNING: Servicing must only be carried out by personnel familiar with both the vehicle system and the charging and testing equipment. All operations must be carried out in a well ventilated area away from open flame and heat sources.

WARNING: R134a is a hazardous liquid and when handled incorrectly can cause serious injury. Suitable protective clothing, consisting of face protection, heat proof gloves, rubber boots and rubber apron or waterproof overalls, must be worn when carrying out operations on the air conditioning system.

GENERAL INFORMATION

Remedial actions

If an accident involving R134a should occur, conduct the following remedial actions:

- If liquid R134a enters the eye, do not rub it. Gently run large quantities of eye wash over affected eye to raise the temperature. If an eye wash is not available, cool, clean water may be used to flush the eye. After rinsing, cover the eye with a clean pad and seek immediate medical attention.
- If liquid R134a is splashed onto the skin, run large quantities of water over the affected area to raise the temperature. Implement the same action if the skin comes in contact with discharging cylinders. Wrap the contaminated body parts in blankets (or similar materials) and seek immediate medical attention.
- If the debilitating effects of inhalation of R134a vapour is suspected, seek fresh air. If the affected person is unconscious, move them away from the contaminated area to fresh air and apply artificial respiration and/or oxygen and seek immediate medical attention.

WARNING: Due to its low evaporating temperature, R134a must be handled with care. R134a splashed on any part of the body will cause immediate freezing of that area. Also, refrigerant cylinders and replenishment trolleys when discharging will freeze skin to them if contact is made.

Service precautions

Observe the following precautions when handling components used in the air conditioning system:

- Air conditioning units must not be lifted by their hoses, pipes or capillary lines.
- Hoses and lines must not be subjected to any twist or stress; the efficiency of the system will be impaired by kinks or restrictions. Ensure that hoses are correctly positioned before tightening couplings, and ensure that all clips and supports are utilised.
- Flexible hoses should not be positioned close to the exhaust manifold (less than 100 mm) unless protected by heat shielding.
- Completed assemblies must be checked for refrigeration lines touching metal panels. Any direct contact of components and panels may transmit noise and so must be eliminated.
- The appropriate torque wrench must be used when tightening refrigerant connections to the stipulated value. An additional spanner must be used to hold the union to prevent twisting of the pipe when tightening connections.
- Before connecting any hose or pipe, ensure that refrigerant oil is applied to the seat of the new 'O' rings, **BUT NOT** to the threads of the connection.
- All protective plugs must remain in place to seal the component until immediately prior to connection.
- Ensure components are at room temperature before uncapping, to prevent condensation of moisture from the air that enters it.
- Components must not remain uncapped for longer than 15 minutes. In the event of a delay, the caps must be fitted.
- When disconnecting, immediately cap all air conditioning pipes to prevent ingress of dirt and moisture into the system.
- The receiver/drier contains desiccant which absorbs moisture. It must be positively sealed at all times. A receiver/drier that has been left uncapped must not be used, fit a new unit.
- The receiver/drier should be the last component connected to the system to ensure optimum dehydration and maximum moisture protection of the system.
- Whenever the refrigerant system is opened, the receiver/drier must be renewed immediately before evacuating and recharging the system.
- Use alcohol and a clean lint-free cloth to clean dirty connections.
- Ensure that all new parts fitted are marked for use with R134a.

When a major repair has been completed, a leak test should be conducted; refer to the Air Conditioning section of this manual for the correct procedure.



Refrigerant oil

Refrigerant oil easily absorbs water and must not be stored for long periods. Do not pour unused refrigerant oil back into the container. Always use an approved refrigerant oil.

When replacing components in the A/C system, drain the refrigerant oil from the component being replaced into a graduated container. On assembly, add the quantity of refrigerant oil drained to the new component.

Compressor

A new compressor is sealed and pressurised with Nitrogen gas. When fitting a new compressor, slowly release the sealing cap; gas pressure should be heard to vent as the seal is broken.

CAUTION: A new compressor should always be sealed and could be pressurised with nitrogen gas. To avoid possible oil loss, release the sealing cap(s) slowly. Do not remove the cap(s) until immediately prior to connecting the air conditioning pipes to the compressor.

Rapid refrigerant discharge

If the air conditioning system is involved in accident damage and the system is punctured, the refrigerant will discharge rapidly. The rapid discharge of refrigerant will also result in the loss of most of the oil from the system. The compressor must be removed and all the remaining oil in the compressor drained and refilled as instructed in the air conditioning section of this manual.

Precautions for refrigerant recovery, recycling and recharging

When the air conditioning system is recharged, any existing refrigerant is first recovered from the system and recycled. The system is then charged with the required weight of refrigerant and volume of refrigerant oil.

WARNING: Refrigerant must always be recycled before re-use to ensure that the purity of the refrigerant is high enough for safe use in the air conditioning system.

Recycling should always be carried out with equipment which is design certified by Underwriter Laboratory Inc. for compliance with SAE J1991. Other equipment may not recycle refrigerant to the required level of purity.

A R134a Refrigerant Recovery Recycling Recharging Station must not be used with any other type of refrigerant.

Refrigerant R134a from domestic and commercial sources must not be used in motor vehicle air conditioning systems.

CAUTION: The system must be evacuated immediately before recharging commences. Delay between evacuation and recharging is not permitted.

AIR CONDITIONING COMPRESSOR REPLACEMENT

Air Conditioning Compressor Replacement

A new compressor is supplied filled with a full charge of refrigerant oil. The new compressor must be drained and a calculated quantity of oil added before fitting. To calculate the quantity of oil to be added, carry out the following procedure:

- 1 Remove the filler/drain plug from the old compressor.
- 2 Invert the compressor and gravity drain the oil into a calibrated measuring cylinder. Rotate the compressor clutch to ensure the compressor is completely drained.
- 3 Record the quantity of oil drained, discard the oil.
- 4 Remove the filler/drain plug from the new compressor.
- 5 Invert the compressor and gravity drain the oil into a calibrated measuring cylinder. Rotate the compressor clutch to ensure the compressor is completely drained.
- 6 Add the same amount of oil drained from the old compressor to the new compressor.
- 7 Discard the remaining oil drained from the new compressor.
- 8 Fit and tighten the compressor filler/drain plug.

GENERAL INFORMATION



ENGINE - N SERIES

General

1.8	
Type	16 valve DOHC
Cylinder arrangement	4 in line - transverse, No.1 cylinder at front of engine
Bore - liner	80.00 mm
Stroke	89.30 mm
Capacity	1796 cm ³
Firing order	1 - 3 - 4 - 2
Rotation	Clockwise, viewed from the front of the engine
Compression ratio	10.5 : 1
Idle speed 1.8 MEMS 3 (Manual)	825 ± 50 rpm
Maximum power: Manual Transmission	100 kW (134 bhp) @ 6,750 rev/min.
Maximum torque: Manual Transmission	165 Nm @ 5,000 rev/min.
Maximum engine speed: Manual transmission	6,800 rev/min.

Engine dimensions:

Length (nominal)	654 mm
Width (nominal)	600 mm
Height (nominal)	615 mm
Engine weight - nominal (fully dressed, wet)	108 kg

Cylinder block

Material	Aluminium alloy
Cylinder liner type	Damp, bottom half stepped - sliding fit into lower part of cylinder block
Cylinder liner bore:	80.000 - 80.015 mm

Cylinder head

Material	Aluminium alloy
Maximum warp	0.05 mm
Cylinder head height (New)	118.95 - 119.50 mm
Reface limit	0.20 mm

INFORMATION

Crankshaft

End-float	0.10 - 0.25 mm
Service limit	0.34 mm

Main bearings

Quantity	5
Type	Steel backed, aluminium / tin lined, oil grooves in upper halves, plain in bearing caps
Thrust washers	Halves at No.3 main bearing
Thrust washer halves thickness	2.61 - 2.65 mm
Main journal tolerance:	
Grade 1	48.000 - 48.007 mm
Grade 2	47.993 - 48.000 mm
Grade 3	47.986 - 47.993 mm
Clearance in bearings	0.013 - 0.043 mm
Maximum out of round	0.010 mm

Big-end bearings

1.8:	
Big-end journal diameter	47.986 - 48.007
Big-end journal tolerances:	
Grade A	48.000 - 48.007 mm
Grade B	47.993 - 48.000 mm
Grade C	47.986 - 47.993 mm
Clearance in bearings	0.021 - 0.049 mm
Maximum out of round	0.010 mm

Connecting rods

Type	Horizontally split big-end, plain small end
Big-end bearing / Connecting rod end-float	0.10 - 0.25 mm

Pistons

Type	Aluminium alloy, tin plated, thermal expansion with offset gudgeon pin
Piston diameter:	79.975 - 79.990 mm
Clearance in bore	0.01 - 0.04 mm
Maximum ovality	0.30 mm



Piston rings

Type:	
Top compression ring	Barrel faced, granulite coated
2nd compression ring	Tapered, phosphate coated
Oil control ring	Nitrided ring with radii and spring
New ring to groove clearance:	
Top compression ring	0.040 - 0.072 mm
2nd compression ring	0.030 - 0.062 mm
Oil control ring	0.010 - 0.180 mm
Ring fitted gap 20 mm from top of bore:	
Top compression ring	0.20 - 0.35 mm
2nd compression ring	0.28 - 0.48 mm
Oil control ring	0.15 - 0.40 mm
Piston ring width:	
Top compression ring	0.978 - 0.990 mm
2nd compression ring	1.178 - 1.190 mm
Oil control ring	0.33 - 0.38 mm

Gudgeon pins

Type	Semi-floating, off-set towards thrust side
Fit in connecting rod	Interference fit
Diameter:	17.997 - 18.000 mm
Length	52.3 - 52.6 mm

Camshaft

1.8	
Camshaft position	Camshaft incorporates target / reductor ring for camshaft sensor
Drive	Toothed belt driven from crankshaft gear, automatically tensioned
Bearings	6 per camshaft, direct line bored
Bearing clearance	0.060 - 0.094 mm
Service limit	0.15 mm
End-float	0.06 - 0.19 mm
Service limit	0.3 mm

Tappets

Type	Self-adjusting lightweight hydraulic tappets operated directly from camshafts
Tappet outside diameter	32.959 - 32.975 mm

INFORMATION

Valve Springs

K16	
Colour code	Plain
Free length	50.0 mm
Fitted length	37.0 mm
Load - valve closed	250 ± 12 N
Load - valve open	450 ± 18 N

Valves

Inlet valve stem diameter	5.952 - 5.967 mm
Exhaust valve stem diameter	5.947 - 5.962 mm
Valve guide inside diameter	6.000 - 6.025 mm
Inlet valve stem to guide clearance Service limit	0.033 - 0.063 mm 0.07 mm
Exhaust valve stem to guide clearance Service limit	0.038 - 0.078 mm 0.11 mm
Valve guide fitted height	6.00 mm
Valve stem fitted height Service limit	38.93 - 39.84 mm 40.10 mm
Valve face angle	45°
Valve seat angle (inlet and exhaust)	45°
Valve seat width (inlet)	1.2 mm
Valve seat width (exhaust)	1.6 mm

Valve timing

1.8	
Inlet Opens Closes	11° BTDC 61° ABDC
Exhaust Opens Closes	21° BBDC 51° ATDC
Valve open period	252°
Maximum valve lift	9.5 mm - inlet 9.5 mm - exhaust



ENGINE - LUBRICATION

System type	Wet sump, crankshaft driven eccentric rotor pump
Pump outer rotor to housing clearance	0.28 - 0.36 mm
Pump inner rotor tip clearance	0.05 - 0.13 mm
Pump rotor end-float	0.02 - 0.06 mm
Relief valve opening pressure	4.1 bar
Oil pressure at idle	1.7 to 3.5 bar
Relief valve spring length	38.9 mm
Maximum oil pressure at 6500 rev/min	7.0 bar (below 40°C)
Oil pressure warning light switch opens	0.3 - 0.5 bar
Oil filter	Full flow disposable screw-on canister

INFORMATION

FUEL SYSTEM

General

System	Returnless full flow Fuel Injection system, electronically controlled with electro-mechanical fuel injectors.
Electronic fuel injection data	See INFORMATION, Engine Tuning Data.

Fuel pump

Type	Continuous flow, electrically driven roller vane pump submerged in fuel tank.
Pump maximum pressure at 13.5 V	3.5 bar
Regulated injection pressure	3.0 ± 0.2 bar
Fuel pump delivery	39 litres @ 3.0 bar
Fuel filter	In-tank lifetime fit; mesh area 584 cm ² , mesh size 8 to 10 microns
Air cleaner	Paper element type
Fuel grade	95 RON minimum - UNLEADED fuel to EN228 specification

CAUTION: Serious damage to the engine may occur if a lower octane number fuel than recommended is used. Serious damage to the catalyst will occur if LEADED fuel is used.

COOLING SYSTEM

Pressure cap opens	1.03 bar
Thermostat starts to open	86 to 90°C
fully open	102°C
Cooling fan switch, operating temperature	ON - 102°C, OFF - 96°C
Second cooling fan switch, operating temperature	ON - 117°C, OFF - 112°C
Engine bay fan switch, operating temperature	ON - 75°C, OFF - 65°C
Engine bay ambient air; warning light switch:	ON - 130°C, OFF - 110°C



CLUTCH

Type	Single plate diaphragm spring, hydraulically operated
Clutch plate diameter 1.8	215 mm
Diaphragm finger clearance	1.00 mm
Diaphragm finger height New Service limit	29.1 - 32.0 mm 36.5 mm
Clutch plate thickness New Service limit	7.40 - 6.90 mm 5.60
Rivet depth New Service limit	1.00 mm 0.20 mm
Clutch plate run-out New Service limit	0.80 mm 1.00 mm
Pressure plate warping - service limit	0.18 mm

MANUAL GEARBOX

1.8	
Gearbox code	C4 BP
Gear ratios	
Fifth	0.765 : 1
Fourth	1.033 : 1
Third	1.308 : 1
Second	1.842 : 1
First	3.167 : 1
Reverse	3.000 : 1
Reverse idler gear to selector fork clearance	0.5 - 1.1 mm
Selector fork groove to pin clearance Standard Service limit	0.05 - 0.35 mm 0.05 mm
Selector fork groove width	7.05 - 7.25 mm
Selector fork prong width	13.0 - 13.3 mm
Gearshift arm to guide clearance Standard Service limit	0.2 - 0.3 mm 0.55 mm
Interlock shift guide groove width	8.1 - 8.2 mm
Synchro ring to gear clearance Standard Service limit	0.85 - 1.1 mm 0.4 mm
Selector shaft forks in synchro sleeve grooves clearance Standard Service limit	0.45 - 0.65 mm 1.00 mm
Gearshift arm guide tongue width	11.9 - 12.0 mm

INFORMATION

Gearshift arm guide to selector fork clearance	
Standard	0.2 - 0.5 mm
Service limit	0.8 mm
Gearshift arm guide to interlock assembly clearance	
Standard	0.05 - 0.35 mm
Service limit	0.6 mm
Gearshift arm guide groove width	13.05 - 13.25 mm
Interlock ball to gearshift arm guide clearance	
Standard	0.05 - 0.25 mm
Service limit	0.5 mm
Interlock ball outside diameter	12.05 - 12.15 mm
2nd to 3rd gear clearance	
Standard	0.06 - 0.21 mm
Service limit	0.3 mm
3rd gear thickness	
Standard	35.42 - 35.47 mm
Service limit	35.30 mm
4th to 5th gear clearance	
Standard	0.06 - 0.21 mm
Service limit	0.3 mm
Space collar length	
Standard	26.03 - 26.08 mm
Service limit	26.01 mm
4th gear thickness	
Standard	30.92 - 30.97 mm
Service limit	30.80 mm
5rd gear thickness	
Standard	30.42 - 30.47 mm
Service limit	30.30 mm
1st gear to thrust washer clearance	
Standard	0.03 - 0.08 mm
Service limit	0.18 mm
2nd to 3rd gear clearance	0.03 - 0.10 mm
Input shaft end thrust	0.14 - 0.21 mm
Planet gear backlash	0.05 - 0.15 mm
Differential bearing to circlip clearance (maximum)	0.15 mm

GEARBOX - LUBRICATION

Manual Gearbox

Capacities	
Refill	2.2 litres
Dry	2.4 litres
Fluids and Lubricants	
Gearbox oil specification	MTF 94
Gear linkage grease specification	Multi-purpose lithium grease or equivalent.



FINAL DRIVE

Manual gearbox	
Gearbox code	C4 BP
Ratio	4.200 : 1

STEERING

Type	Speed sensitive, electric power assisted rack and pinion
Front wheel alignment - total toe	-0° 05' ± 0° 5'
Front wheel camber	-0° 10' ± 0° 30'
Maximum cross camber differential	1° 00'
Front wheel caster	5° 16' ± 1° 00'
King pin inclination	11° 24' ± 1° 00'
Rear wheel alignment - total toe	0° 30' ± 0° 5'
Rear wheel camber	-1° 14' ± 0° 30'
Maximum cross camber differential	1° 00'
Steering wheel diameter	360 mm
Overall steering ratio	17.0 : 1
Power Assisted Steering Type	'Quick' rack and pinion assembly with electric motor power assistance to provide Speed Sensitive Steering controlled by a dedicated Electronic Control Unit (ECU) using a torque sensor signal and road speed signal to compute level of steering assistance.

INFORMATION

FRONT SUSPENSION

Type	Coil spring over gas filled damper; located by double wishbones and with anti-roll bar.
Trim height*	358 mm \pm 10 mm
Front coil spring data:	
Total coils	7.7
Active coils	6.45
Wire diameter	12 mm
Free length	241.9 mm
Anti-roll bar diameter	20 mm
* = Height to wheel arch from hub centre at unladen weight	

REAR SUSPENSION

Type	4-link with coil spring over gas-filled damper and with anti-roll bar.
Trim height*	353 mm \pm 10 mm
Front coil spring data:	
Total coils	7.7
Active coils	6.45
Wire diameter	14 mm
Free length	228.3 mm
Anti-roll bar diameter	18 mm
* = Height to wheel arch from hub centre at unladen weight	



BRAKES

Front brakes	
Type	Ventilated disc with multi piston caliper
Disc diameter	304 mm
Disc thickness new	24 mm
Disc minimum thickness	22 mm
Pad minimum thickness	2.5 mm
Rear brakes	
Type	Solid discs with 2 pin-slider caliper
Piston diameter	38 mm
Disc diameter	240 mm
Disc thickness new	10 mm
Disc minimum thickness	8 mm
Pad minimum thickness	3 mm
Brake servo	
Servo boost ratio	4.6 : 1
Anti-lock brake system (where fitted)	Bosch ABS5.3 three-channel electronically controlled
ABS sensor to reluctor ring clearance	0.5 mm
Brake master cylinder	
Bore diameter	23.8 mm
Handbrake	
Type	Cable operated on rear discs
Caliper clearance per side	1 - 2 mm

INFORMATION

WHEELS

Front	6.0J x 15 alloy 7.0J x 16 alloy
Rear	6.0J x 15 alloy 7.0J x 16 alloy
Spare*	5.5J x 14 steel 7.0J x 16 alloy
Road wheel nut torque	70 Nm

TYRE SIZES

Front	185/55 R15 82V 195/45 R16 84V
Rear	205/50 R15 86V 215/40 ZR16 82W
Spare* 5.5J x 14 steel 7.0J x 16 alloy	175/65 R14 82T 195/45 R16 84V

NOTE: * Some vehicles are not fitted with a spare wheel, but come equipped with an Instant Mobility System (IMS) instead. Refer to the Owner's Handbook for details of how to use the IMS.

CAUTION: The space-saver spare wheel is for temporary use only. Maximum road speed should be limited to 50 mph (80 km/h) when a space-saver tyre is in use. No more than one temporary space-saver spare wheel may be fitted at any one time.

CAUTION: Refer to the Owner's Manual for all Cautions and Warnings related to the IMS. Always keep to the recommended speed and adhere to the precautions stipulated when a defective tyre has been inflated using the IMS.



TYRE PRESSURES

Normal driving conditions:		
Front	1.8 bar	26 lbf/in ²
Rear	2.5 bar	36 lbf/in ²
Spare	2.2 bar	32 lbf/in ²
High Speed:		
Front	1.9 bar	28 lbf/in ²
Rear	2.5 bar	36 lbf/in ²

Normal driving conditions: - up to two passengers and luggage

High Speed: - driving at speeds in excess of 100 mph (160 km/h)

WARNING: The spare wheel supplied is for temporary use only and must be changed as soon as possible after fitting. The car **MUST** be driven with caution and speed **MUST NOT** exceed 50 mph (80 km/h) with the spare wheel fitted. No more than one temporary spare wheel may be fitted at any one time. Replacement tyres fitted to the temporary use spare wheel must be of the same make and specification as those originally fitted.

INFORMATION

AIR CONDITIONING

Type	CFC free, sealed, closed loop system incorporating pressure and temperature sensors
Refrigerant type	HFC - R134a
Refrigerant charge quantity*: Manual gearbox Lubricating oil	620 ± 10 grammes SK-20
System oil fill quantity	170 cm ³
Trinary switch operating pressures: Low Closing pressure Opening Pressure Cooling fans switched ON in parallel High Opening Pressure Closing Pressure	 2.0 bar (200 kPa, 29 lbf.in ²) 2.4 bar (240 kPa, 34.8 lbf.in ²) 19 bar (1.90 MPa, 275.5 lbf.in ²) 27 bar (2.7 MPa, 391.5 lbf.in ²) 21 bar (2.1 MPa, 304.5 lbf.in ²)

ELECTRICAL

System	12 volt, negative earth
Battery Type Capacity	Varta 63 Ah
Alternator Type Maximum output	Bosch 85 amp
Starter Motor Type Power	M79 1.4 kW



DIMENSIONS

Overall length	3943 mm	155.2 in
Overall width (excluding door mirrors)	1626 mm	64 in
Overall width (including door mirrors)	1807 mm	71.1 in
Overall height*		
Soft top	1261 mm	49.7 in
Hard Top	1264 mm	49.8 in
Ground clearance*	124 mm	4.9 in
Wheelbase	2375 mm	93.5 in
Turning circle, kerb to kerb	10.56 m	34 ft 7.8 in
Track (except for models fitted with ultralight wheels)		
Front	1403 mm	55.2 in
Rear	1409 mm	55.5 in
Track (models fitted with ultralight wheels)		
Front	1407 mm	55.4 in
Rear	1413 mm	55.6 in
Overhang		
Front	841 mm	33.1 in
Rear	726 mm	28.6 in

INFORMATION

WEIGHTS

Unladen vehicle weight¹

1.8	1105 - 1150 kg	2435 - 2535 lb
-----	----------------	----------------

Maximum gross vehicle weight (GVW)

1.8	1320 kg	2911 lb
-----	---------	---------

Maximum front axle load

1.8	600 kg	1323 lb
-----	--------	---------

Maximum rear axle load

1.8	740 kg	1632 lb
Maximum bootlid load ²	20 kg	45 lb
Optional hard-top weight	20 kg	45 lb

¹ = no occupants and fuel tank 90% full

² = when approved luggage rack is fitted



BULBS

Bulb location	Bulb specification
Headlamp dip beam	12V 55W H7 Halogen
Head lamp main beam	12V 55W HI Halogen
Side light	12V 5W
Front direction indicator	12V 21W
Rear direction indicator	12V 21W
Licence plate	12V 5W
Brake light	12V 21W
Front fog light	12V 55W HI Halogen
Rear fog light	12V 21W
Reverse light	12V 21W
Tail light	12V 5W
Footwell	12V 5W
Glovebox	12V 5W
Front load space	12V 10W
Rear load space	12V 10W
Side repeater lamps	12V 5W
Interior/courtesy lamp	12V 5W

INFORMATION

ENGINE TUNING DATA

Engine

Type/Capacity 1.8	1.8 K16 / 1796 cm ³
Firing order	1-3-4-2
Compression ratio	10.5 : 1 ±0.5
Exhaust gas CO content at idle	0.5 % - maximum

Ignition Coil

Primary resistance	0.7 W
Secondary resistance	10 kW

Spark Plugs

Gap	1.0 ± 0.05 mm
-----	---------------

Engine Management System

Type	MEMS 3 breakerless, electronic
Fuel injection	Indirect multi-port fuel injection
Fuel pressure	3.0 ± 0.2 bar
Sensor Values:	
Total track resistance	4 k ±20%
Sensor supply	5 Volts ± 4%
Fuel grade	95 RON minimum - UNLEADED fuel

CAUTION: Serious damage to the engine may occur if a lower octane number fuel than recommended is used. Serious damage to the catalyst will occur if **LEADED** fuel is used.

* = Ignition timing in crankshaft degrees.

TORQUE WRENCH SETTINGS



ENGINE

Bearing ladder to block bolts	30 Nm *
Big -end bolts	20 Nm + 45°
Camshaft cover; bolts	9 Nm *
Camshaft Cover Plate	12 Nm
Camshaft gear bolt	
- 8 mm bolts	33 Nm
- 10 mm bolts	65 Nm
Crankshaft pulley bolt	205 Nm
Cylinder head bolts, tighten progressively	
- 1st stage	20 Nm *
- 2nd stage	180° *
- 3rd stage	180° *
Dipstick/filler tube mounting bracket	10 Nm
Engine earth lead to cylinder block bolt	25 Nm
Engine harness to oil pump bolt	10 Nm
Flywheel to crankshaft bolts	85 Nm *
Flywheel cover plate	9 Nm
Lifting bracket	9 Nm
Oil pressure relief valve sealing plug	25 Nm
Oil pressure switch	12 Nm
Oil pump to cylinder block bolts	10 Nm +
Sump bolts	25 Nm *
Sump to gearbox, bolts	45 Nm
Sump drain plug	25 Nm
Timing belt tensioner bolt - Automatic timing belt tensioner	25 Nm +
Timing belt, upper front cover	9 Nm
Timing belt, front lower cover	9 Nm
Timing belt rear cover	9 Nm
Torsion damper to flywheel	22 Nm *
Engine LH mounting to bracket bolts	45 Nm
Engine LH mounting bracket to gearbox bolts	45 Nm
Engine LH mounting centre bolt	82 Nm
Engine mounting restraining loop bolts	45 Nm
LH mounting to engine	45 Nm
LH buttress to subframe	45 Nm
Rear engine steady to bracket on sump	85 Nm
Rear engine steady to subframe	85 Nm
Rear engine mounting tie-rod	45 Nm
Rear engine mount to subframe bolts	85 Nm
Rear engine mount to sump	80 Nm
RH buttress to subframe	45 Nm
RH engine mounting bracket to hydramount	82 Nm
RH engine steady to buttress	85 Nm
RH engine steady to engine mounting bracket	85 Nm
Top arm to engine	100 Nm
Top arm to hydramount	82 Nm

* Tighten in sequence

+ New Patchlok bolt must be fitted.

TORQUE WRENCH SETTINGS

MODULAR ENGINE MANAGEMENT SYSTEM - MEMS 3

General

Camshaft position sensor	9 Nm
Crankshaft position sensor	6 Nm
ECM bracket bolts	8 Nm
Engine coolant temperature sensor	6 Nm
Fuel filter, inlet and outlet union	30 Nm
Fuel pump cover bolts	10 Nm
Fuel pump locking ring	35 Nm
Fuel rail to inlet manifold	10 Nm
Fuel rail to fuel feed pipe	8 Nm
HO ₂ Sensors (pre and post catalyst)	55 Nm
Idle air control valve	1.5 Nm
Ignition coil bolts	8 Nm
Ignition coil and ht lead cover bolts	8 Nm
Intake air temperature sensor	7 Nm
Spark plugs	27 Nm
Throttle body	9 Nm *
Throttle position sensor screws	1.5 Nm

* Tighten in sequence

Catalytic Converter

Catalyst overheat sensor	30 Nm
Catalytic converter to front pipe	50 Nm
Catalytic converter to silencer	50 Nm

Fuel Tank

Bulkhead closing panel	9 Nm
Filler hose to tank	3 Nm
Filler neck to wing	3 Nm
Fuel pump cover to body	10 Nm
Fuel pump lock ring	35 Nm
Fuel tank retaining strap	10 Nm

Throttle Cable

Throttle pedal to bulkhead fixing	6 Nm
Throttle pedal bracket to pedal box	22 Nm



COOLING

Coolant pump to cylinder block	10 Nm
Coolant pump to timing belt rear cover	10 Nm
Coolant rail to cylinder block	9 Nm
Engine bay cooling fan to body	9 Nm
Expansion tank to mounting bracket	8 Nm
Radiator to fan motor	3 Nm
Coolant pump rear housing cover	9 Nm
Coolant pump rear housing to cylinder block	9 Nm
Bleed points	
- Radiator bleed screw	5 Nm
- Heater bleed screw	7 Nm
- Radiator return line, bleed screw	9 Nm

MANIFOLD AND EXHAUST

Alternator heat shield	9 Nm
Catalyst to silencer	50 Nm
Coolant hose heat shield	9 Nm
Exhaust manifold heat shield	
- Nut	25 Nm
- Bolts	10 Nm
Exhaust manifold to cylinder head	45 Nm *
Exhaust manifold to front pipe flange nuts	50 Nm
Exhaust mountings to body	25 Nm
Inlet manifold to cylinder head nuts and bolts	25 Nm *
Silencer clamp, nut	30 Nm
Silencer clamp to flange studs	50 Nm
Silencer RH mounting bracket	15 Nm
Silencer heat shield	10 Nm
Stepper motor to inlet manifold	1.5 Nm

* Tighten in sequence

TORQUE WRENCH SETTINGS

CLUTCH

Master cylinder to pedal box	25 Nm
Master cylinder pipe union	18 Nm
Pressure plate to flywheel	25 Nm *
Slave cylinder to mounting bracket	25 Nm
Slave cylinder pipe union	18 Nm
Slave cylinder bleed screw	7 Nm

* Tighten in sequence

MANUAL GEARBOX

Cap bolts - detent balls and springs	22 Nm
Clutch release shaft pivot bolt	29 Nm
Drain plug	45 Nm
Differential housing to gearcase bolts	45 Nm
Filler / level plug	35 Nm
Final drive gear to carrier bolts	110 Nm
Final drive pinion nut	110 Nm
Flywheel closing panel	80 Nm
Gear lever assembly to body	9 Nm
Gearbox to engine	80 Nm
Gearbox to sump	45 Nm
Output shaft bearing retainer bolts	8 Nm
Reverse light switch	25 Nm
Reverse idler shaft bolt	67 Nm
Road speed transducer	12 Nm
Selector shaft guide to selector shaft bolt	28 Nm
Selector cable abutment bracket to gearbox lower bracket	45 Nm

DRIVE SHAFTS

Drive shaft nut	210 Nm, stake nut
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STEERING

EPAS ECU to bracket	10 Nm
EPAS ECU bracket to fascia rail	25 Nm
Ignition lock to steering column	Shear bolts
Pinion cover	8 Nm
Steering rack clamp	22 Nm
Steering rack 'U' bolt	22 Nm
Steering rack to intermediate shaft	22 Nm
Steering column to intermediate shaft	22 Nm
Steering column mounting brackets	22 Nm
Steering wheel to column	63 Nm
Track-rod end to steering arm	30 Nm
Track-rod end lock nut	50 Nm
Universal joint to steering rack pinion	20 Nm

SUSPENSION

Front Suspension

Anti-roll bar clamp bracket	22 Nm
Anti-roll bar link	35 Nm **
Damper upper mounting	45 Nm
Damper lower mounting	100 Nm **
Damper rod self locking nut	25 Nm
Hub nut	210 Nm
Lower arm to subframe	85 Nm **
Lower ball joint to hub	45 Nm
Lower ball joint to lower arm	40 Nm
Upper arm pivot shaft retaining plate	10 Nm
Upper arm pivot shaft	74 Nm
Upper ball joint nut	54 Nm
Upper ball joint to hub	105 Nm

** Vehicle weight must be on the suspension before tightening.

TORQUE WRENCH SETTINGS

Rear Suspension

Anti-roll bar clamp bracket	22 Nm
Anti-roll bar to link	35 Nm **
Anti-roll bar link to trailing arm	35 Nm **
Damper upper mounting	45 Nm
Damper lower mounting to upper arms	100 Nm **
Damper rod self locking nut	25 Nm
Lower link to hub	100 Nm **
Lower link to subframe	85 Nm **
Track control arm adjuster	50 Nm
Track control arm to hub	38 Nm
Track control arm to subframe	60 Nm
Trailing arm to hub	60 Nm
Trailing arm compliance bush	100 Nm
Upper arm pivot shaft retaining plate	10 Nm
Upper arm pivot shaft	100 Nm
Upper ball joint nut	54 Nm
Upper ball joint to hub	105 Nm

** Vehicle weight must be on the suspension before tightening.

Front Subframe

Cross brace centre mounting to body	45 Nm
Cross brace to front subframe	45 Nm
Cross brace to rear subframe	45 Nm
Crash can to subframe	45 Nm
Front mounting to body	30 Nm
Front mounting to subframe	100 Nm
Rear mounting to body	45 Nm
Rear mounting to subframe	100 Nm

Rear Subframe

Front subframe mounting to body	30 Nm
Front centre mounting to subframe	100 Nm
Rear subframe mounting to body	45 Nm
Rear mounting to subframe	100 Nm
Splash guard mounting bracket to subframe	30 Nm
Trailing arm compliance bush to subframe	100 Nm

Wheel Nuts

Alloy wheel, nuts	70 Nm *
Spare wheel, nuts	70 Nm *

* Tighten in sequence



BRAKES

General

ABS ECU to modulator	8 Nm
ABS ECU to mounting spigot	15 Nm
ABS harness support bracket	30 Nm
ABS hydraulic modulator to bracket	10 Nm
ABS sensor bolts	10 Nm
Master cylinder to servo	20 Nm
Master cylinder to pipe union	14 Nm
Pedal box mounting bracket to top plate nuts and bolts	22 Nm
Pedal box mounting bracket to bulkhead bolts	22 Nm
Pedal crosstube bracket to bulkhead nut	22 Nm
Pedal pivot shaft to pedal box end bracket nut	22 Nm
Proportioning valve to body	10 Nm
Proportioning valve to pipe union	14 Nm
Servo to bracket	20 Nm
Servo bracket to body	20 Nm
Servo bracket to body bracket	30 Nm

Front Brakes

ABS speed sensor to hub	10 Nm
Bleed nipple	10 Nm
Brake pipe unions	15 Nm
Brake pipes to subframe turrets	25 Nm
Disc to drive flange	7 Nm
Hose to caliper	30 Nm

Rear Brakes

ABS speed sensor to hub	10 Nm
Bleed nipple	10 Nm
Brake pipe unions	15 Nm
Disc to drive flange	7 Nm
Hose to caliper	30 Nm

Handbrake

Handbrake lever bracket to body	25 Nm
Handbrake assembly to bracket	25 Nm
Handbrake abutment bracket to mounting bracket	25 Nm
Handbrake cable to luggage bay bulk head	10 Nm

TORQUE WRENCH SETTINGS

SUPPLEMENTARY RESTRAINT SYSTEM

SRS DCU bracket to body	10 Nm
SRS DCU to bracket	10 Nm
Airbags	
Passenger airbag to fascia bracket	8 Nm
Drivers airbag to steering wheel	8 Nm
Passenger airbag module bracket to fascia	9 Nm
Seat Belts	
Seat belt assembly to body	35 Nm
Seat belt assembly to seat	30 Nm
Seat belt pre-tensioner to seat	45 Nm

BODY

General

'A' post trim	6 Nm
Crossmember to floorpan	22 Nm
Engine compartment cross-bracing centre mounting	25 Nm
Header trim	6 Nm
Headlamp to body	6 Nm
Underbelly panel	22 Nm
Splash guard mounting bracket to front subframe	30 Nm

Bonnet

Bonnet locking platform	10 Nm
Bonnet to hinges	9 Nm
Bonnet lock plate to body	25 Nm
Bonnet release lever to bulkhead	9 Nm

Boot

Boot lid to hinges	9 Nm
Boot lid striker to body	10 Nm
Boot latch to boot lid	10 Nm

TORQUE WRENCH SETTINGS



Bumpers

Crash can to body	25 Nm
Front bumper armature to body	25 Nm
Front bumper valance to bumper armature	25 Nm
Front bumper to crash can	25 Nm
Rear bumper armature to body	22 Nm
Rear bumper valance to armature	25 Nm

Doors

Door finishers	10 Nm
Door glass regulator to door	7 Nm
Door handle to door	2.5 Nm
Door striker screws	18 Nm
Latch assembly to door	5 Nm

Hood

<i>Soft Top</i>	
- Hood frame hinge to body	45 Nm
- Hood catch to header rail	20 Nm
- Hood header strikers	6 Nm
<i>Hard Top</i>	
- Front top catch to hard top	10 Nm

Seats

Seat runners	45 Nm
Squab frame to cushion frame	45 Nm

TORQUE WRENCH SETTINGS

HEATING AND VENTILATION

Fascia rail support bracket	10 Nm
Heater mountings	10 Nm
Intake duct to body	10 Nm

AIR CONDITIONING

Compressor	
Compressor to mounting bracket	45 Nm
Compressor to pipe union	25 Nm
Condenser	
Mounting bracket to striker plate panel	17 Nm
Air conditioning pipe to condenser	5 Nm
Evaporator	
Evaporator to heater - clamp	3 Nm
Evaporator to lower dash panel	9 Nm
Receiver Drier	
Air conditioning pipe to receiver drier	5 Nm
Thermostatic Expansion Valve	
Evaporator pipe clamp to expansion valve	5 Nm
Evaporator pipe, bracket	7 Nm
Trinary switch	10 Nm



WIPERS AND WASHERS

Wiper arm to spindle	20 Nm
Motor and linkage assembly to scuttle	10 Nm
Motor to linkage bracket	12 Nm
Crank to motor spindle	18 Nm

ELECTRICAL

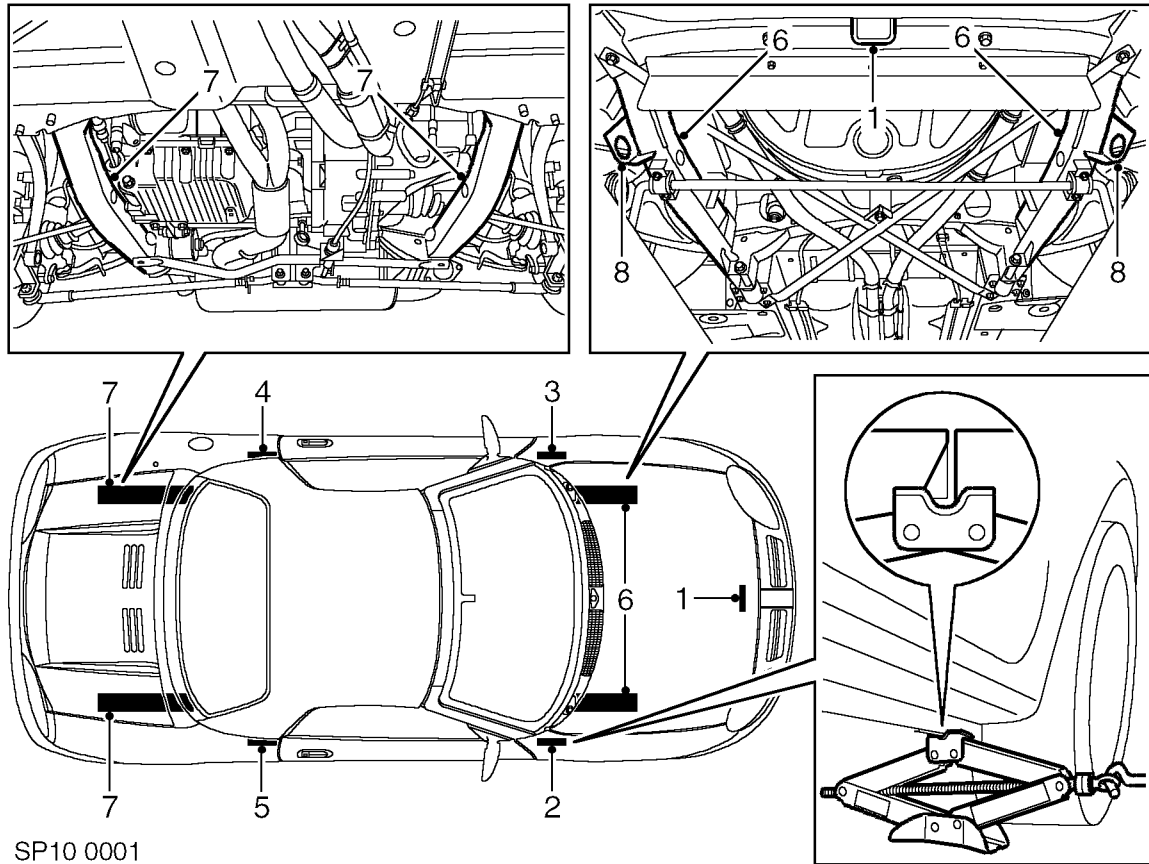
Aerial locking nut	3 Nm
Alarm ECU	4 Nm
Alternator to pulley	25 Nm
Alternator to engine mounting clamp bolts	45 Nm
Alternator adjustment tensioner bracket bolts	25 Nm
Alternator tensioner pulley nut	25 Nm
CD autochanger to vehicle	5 Nm
Central locking motor to door	5 Nm
Fusebox to body	10 Nm
EPAS ECU to mounting	10 Nm
Headlamp to front panel	10 Nm
Horn to valance	8 Nm
Starter motor securing bolts	80 Nm
Tail Lamp to body	2 Nm

TORQUE WRENCH SETTINGS



JACKING, SUPPORTING AND TOWING

Jacking points



SP10 0001

- 1 Central jacking point - front
- 2 RH sill reinforced bracket - front
- 3 LH sill reinforced bracket - front
- 4 LH sill reinforced bracket - rear
- 5 RH sill reinforced bracket - rear
- 6 Subframe longitudinal members - front
- 7 Subframe longitudinal members - rear
- 8 Front towing eyes

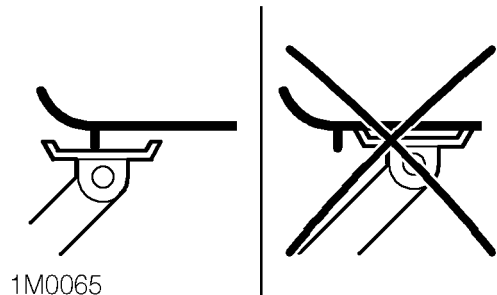
To jack up the rear of the car, use the rear sill jacking points (4 & 5), then place safety support stands under the sill or subframe longitudinals.

WARNING: To avoid potential damage to the rear suspension links, **DO NOT** use a trolley jack from the rear of the car.

WARNING: To avoid the possibility of damage or personal injury, work must not be carried out, on or under a vehicle when it is supported solely on a jack. Place safety supports under the sill reinforced jacking areas (2, 3, 4 or 5).

WARNING: Do not position a jack, jack stand or wheel free support under the suspension attachment points.

WARNING: Do not attempt to jack under suspension attachment points.



CAUTION: When lifting the side of the vehicle with a workshop jack, ensure that the jack head is positioned under the reinforced area of the sill, as shown.

LIFTING AND TOWING

WORKSHOP JACK

Front: Locate the jack head under the central location bracket (1). Position safety supports under both front sill reinforced brackets (2 and 3).

Rear: Locate the jack head under the rear sill jacking points (4 & 5), then place safety support stands under the sill or subframe longitudinals.

Side Front: Locate the jack head under the sill reinforced bracket (2 or 3) and position safety support under front subframe longitudinal member (6).

Side rear: Locate the jack head under the sill reinforced bracket (4 or 5) and position safety support under rear subframe longitudinal member (7).

WHEEL-FREE LIFT

If crossbeams are available, locate the pads under the sill reinforced jacking brackets (2, 3) and (4, 5).

If longitudinal beams are available, locate the beams under the subframe longitudinals with lifting pads at the front and rear positions (6 and 7). Raise the lift a few inches and ensure the vehicle is firmly supported. Raise the lift to full height and inspect the lifting points for security.



RECOVERY

It is recommended that a recovery trailer or two wheel car ambulance be used. In an emergency, the car may be towed on its own wheels using the front lashing/towing eyes (8).

Suspended tow

A suspended tow cannot be carried out without incurring damage. If additional damage is immaterial because of existing crash damage, lifting chains can be attached to the towing eyes.

Before towing commences release the handbrake, place the gear lever in neutral and the ignition switch at 'I'. Do not tow at a greater speed than 30 mph, 50 km/h.

On no account should the vehicle be towed with the rear wheels on the ground if the transmission is faulty, the transmission fluid level is low, or the towing distance exceeds 30 miles or 50 km.

WARNING: MG TF models have a lower ground clearance than most other cars, vehicle recovery should ONLY be carried out by a qualified recovery specialist using a transporter or trailer. Other methods of vehicle recovery, including the use of wheel lift equipment to suspend the front or rear wheels, and towing with rope, bar or chain, will cause damage to the front of the vehicle and are not recommended.

Transporter or trailer lashing

Use the front towing eyes, and specific lashing points for rear of car. DO NOT secure lashing hooks or trailer fixings to other parts of the car.

CAUTION: Some of the information included in the recovery section DOES NOT apply to MG TF models. Please take note of the information below.

Because the MG TF model has a lower ground clearance than most other cars, vehicle recovery should ONLY be carried out by a qualified recovery specialist using a transporter or trailer.

Other methods of vehicle recovery, including the use of wheel lift equipment to suspend the front or rear wheels, and towing with rope, bar or chain, may cause damage to the front of the vehicle and is NOT recommended.

TOWING

General

Use the front lashing/towing eyes (8) for towing the vehicle on all four wheels from the front.

WARNING: To ensure that the steering does not lock when the vehicle is being towed, it is essential that the ignition key is turned to position 'I', and remains there while the vehicle is moving.

Ensure the following precautions are observed:

Do not tow if the gearbox or a drive shaft is faulty.

Do not tow if a wheel or drive shafts are touching the body or frame.

Ensure the gear lever is in neutral and the handbrake is released.

Remember that greater effort than normal will be necessary to apply the brakes if the vehicle is being towed without the engine running.

LIFTING AND TOWING



CAPACITIES

Fuel tank	60 litres
Engine oil refill and filter change:	4.5 litres
Engine oil refill from dry:	5 litres
Manual gearbox:	
Refill	2.2 litres
From dry	2.4 litres
Refill - Gearbox only	4.5 litres
Fluid cooler and lines	1.0 litre
Cooling system from dry:	10.5 litres
Washer reservoir:	2.2 litres

FLUIDS

Brake Fluid

Use DOT 4 brake/clutch fluid. DO NOT use any other type of fluid.

Anti-Freeze Solutions

The overall anti-freeze concentration should not fall, by volume, below 50% to ensure that the anti-corrosion properties of the coolant is maintained. Anti-freeze concentrations greater than 60% are not recommended as cooling efficiency will be impaired.

Use Havoline XLC Anti-freeze and Summer Coolant or any ethylene glycol based anti-freeze (containing no methanol).

In an emergency, if anti-freeze to this specification is not available, top-up the cooling system with clean water only, but be aware of the resultant reduction in frost protection. The correct anti-freeze concentration must be restored as soon as possible.

Replacing coolant

The cooling system should be drained, flushed and refilled with the correct amount of anti-freeze solution at the intervals given on the Service Maintenance Check Sheet.

After filling with anti-freeze solution, attach a warning label to a prominent position on the vehicle stating the type of anti-freeze contained in the cooling system to ensure that the correct type is used for topping-up.

The recommended quantities of anti-freeze for different degrees of frost protection are:

Solution	Amount of anti-freeze	Commences freezing		Frozen solid	
		°C	°F	°C	°F
50%	Litres				
	5.25	-36	-33	-48	-53

CAPACITIES, FLUIDS AND LUBRICANTS

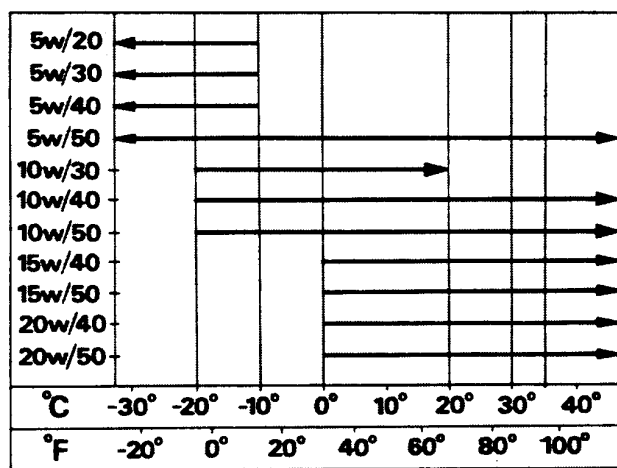
LUBRICATION

The engine and other lubricating systems are filled with high performance lubricants giving prolonged life.

CAUTION: You should always use a high quality oil of the correct viscosity range in the engine and gearbox during maintenance and when topping-up. The use of oil not to the correct specification can lead to high oil and fuel consumption and ultimately to damaged components.

Oil to the correct specification contains additives which disperse the corrosive acids formed by combustion and prevent the formation of sludge which can block the oil ways. Additional oil additives should not be used. Always adhere to the recommended servicing intervals.

Engine oil



1M0060

Use oil meeting specification ACEA A2 or A3 and having a viscosity band recommended for the temperature range of your locality (e.g (10W/40). Where oils to these MG and European specifications are not available, well known brands of oils meeting API SH or SJ quality should be used.

NOTE: Oils meeting specification ACEA A1 can be used if necessary.

Manual gearbox

Use MTF 94 for refill and topping-up.

Gear linkage

Use Multi-purpose Lithium Grease or equivalent.

General greasing

Use Multi-purpose Lithium Grease or equivalent.

Boot hinges

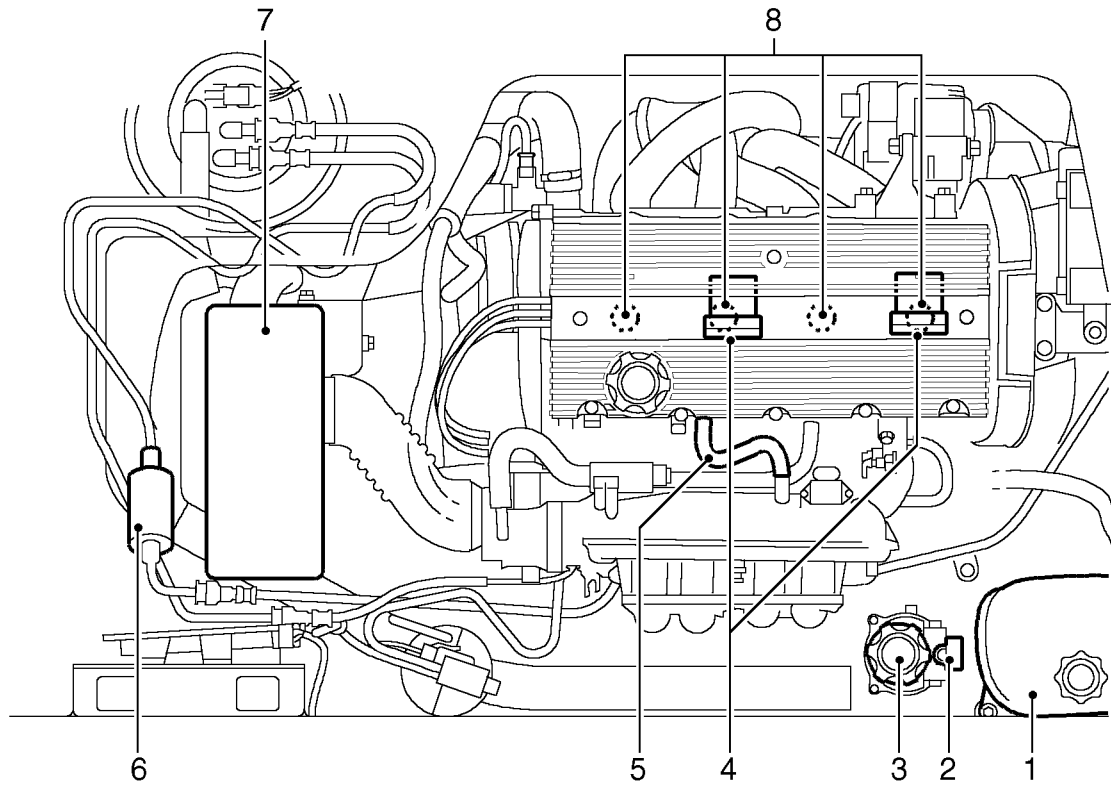
Lubricate with Rocol Ultralube.

Locks, latches and hinges

Use Door Lock and Latch Lubricant.



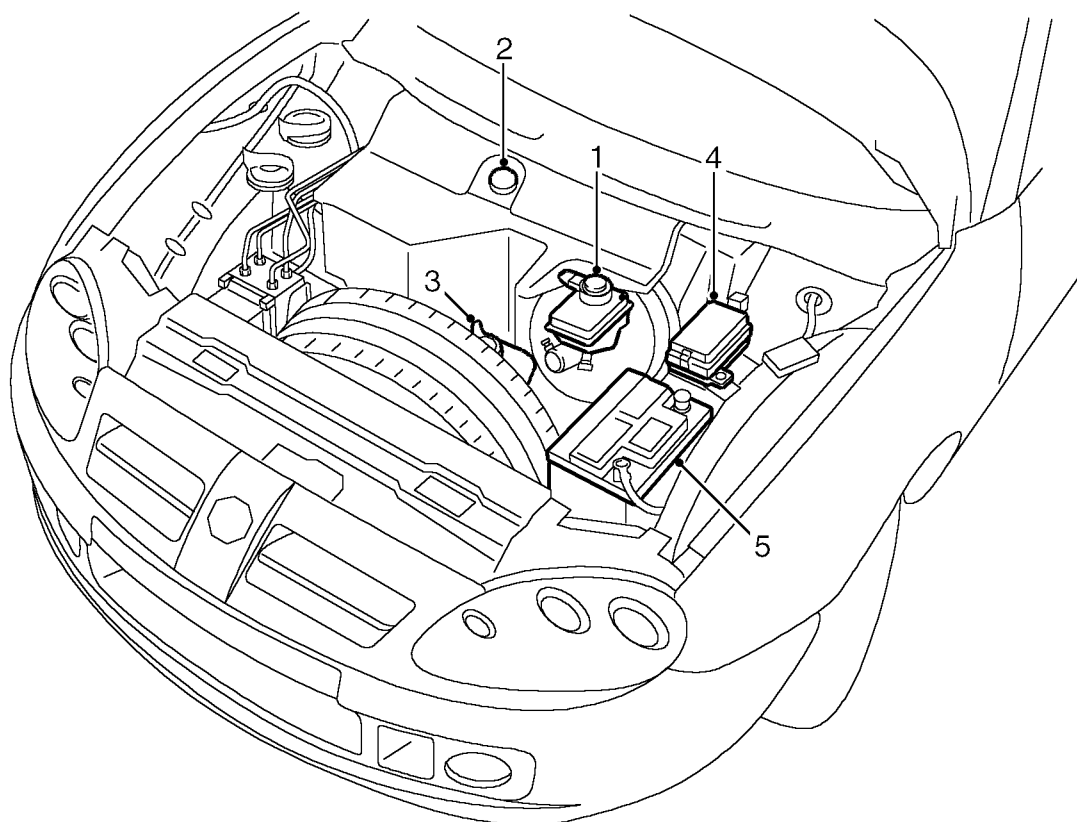
**ENGINE COMPARTMENT
LOCATIONS - MEMS 3**

**M10 0713**

- 1 Coolant expansion tank and cap
- 2 Engine oil dipstick
- 3 Engine oil filler cap
- 4 Ignition coils
- 5 Crankcase ventilation hoses
- 6 Fuel filter
- 7 Air cleaner
- 8 Spark plugs

MAINTENANCE

UNDERBONNET LOCATIONS



SP10 0002

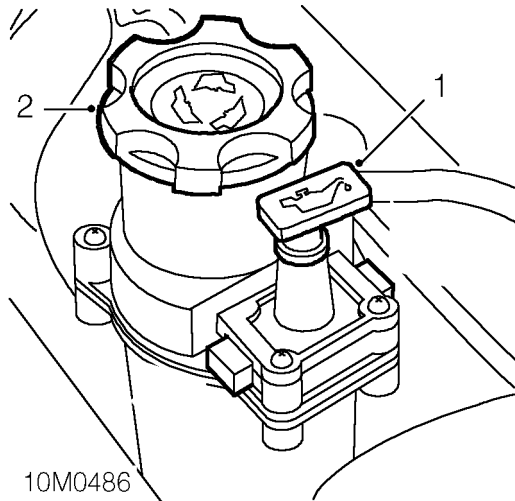
- 1 Brake fluid reservoir
- 2 Clutch fluid reservoir
- 3 Windscreen washer reservoir
- 4 Fusebox
- 5 Battery



ENGINE OIL

Oil level check

Always check oil level and drain oil with vehicle standing on level ground and use engine oil of specification 10W/40 for topping up and refilling.



10M0486

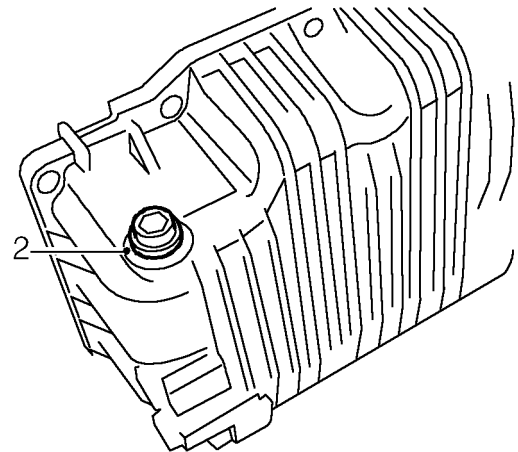
- 1 Pull the dipstick out, wipe clean. Re-insert dipstick fully and withdraw again. Check the oil level which must be maintained between minimum mark '**MIN**' and maximum mark '**MAX**' on dipstick.
- 2 If required, remove filler cap, REMOVE DIPSTICK and top-up with new engine oil to specification 10W/40.

 [FLUIDS, page 09-I.](#)

Oil drain and refill

1. The oil should be drained when engine is warm. The oil filter can be renewed while oil is being drained.

WARNING: Observe due care when draining engine oil as the oil can be very hot. Prolonged and repeated contact with used engine oil may cause serious skin disorders. Wash thoroughly after contact. Keep out of reach of children.



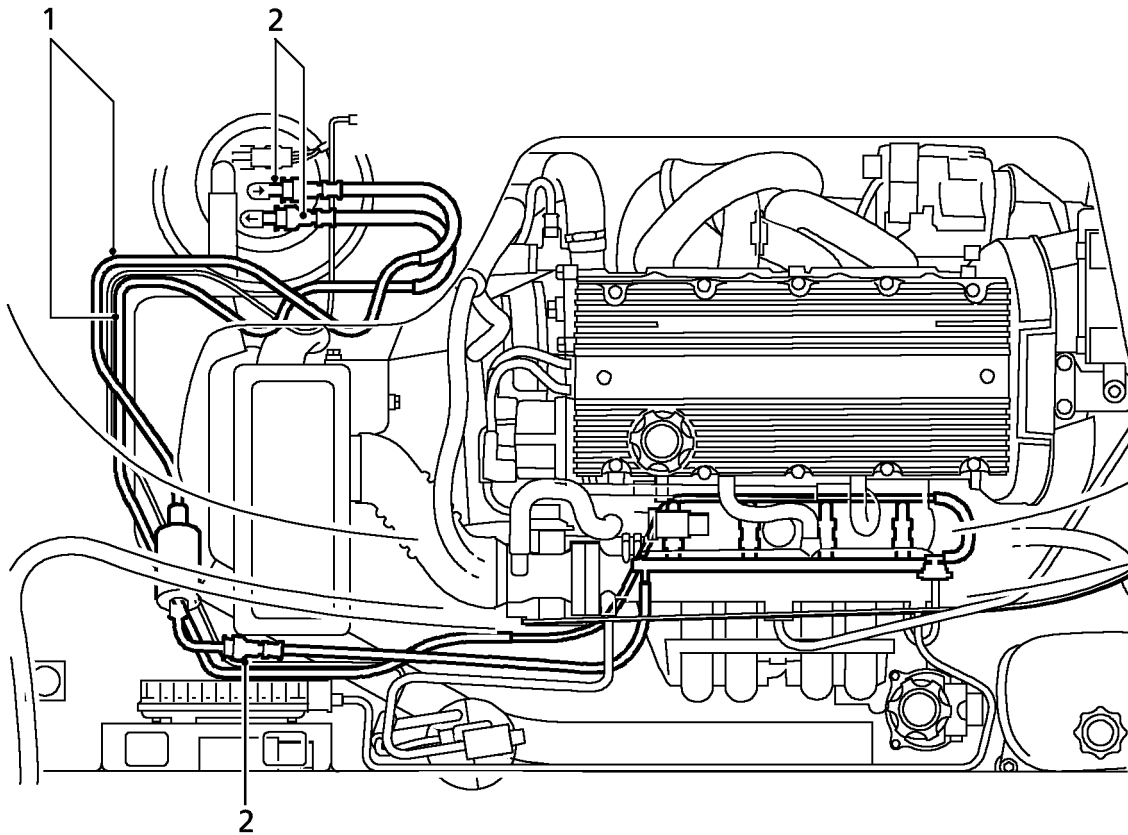
10M0400

2. Place a container under sump.
3. Remove drain plug and sealing washer, allow oil to drain.
4. Clean the drain plug, fit NEW sealing washer and refit drain plug. Tighten to 25 Nm.
5. Remove filler cap, REMOVE DIPSTICK refill with new engine oil to specification 10W/40. Re-check oil level.

MAINTENANCE

FUEL SYSTEM HOSES, PIPES AND UNIONS

Check



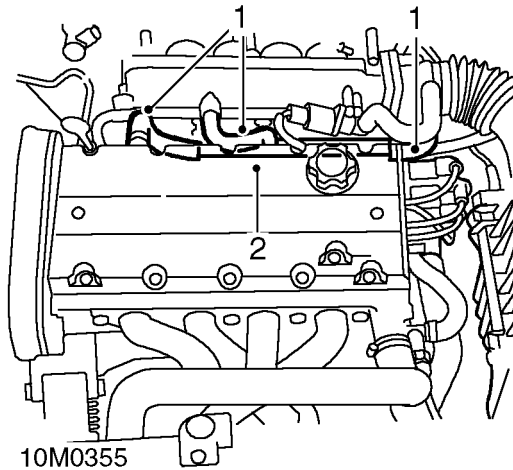
10M0418A

1. Check fuel pipes and connections for chafing and leakage.
2. Check pipes are securely clipped.
3. Check fuel tank is free from leaks.



CRANKCASE VENT HOSES

Check

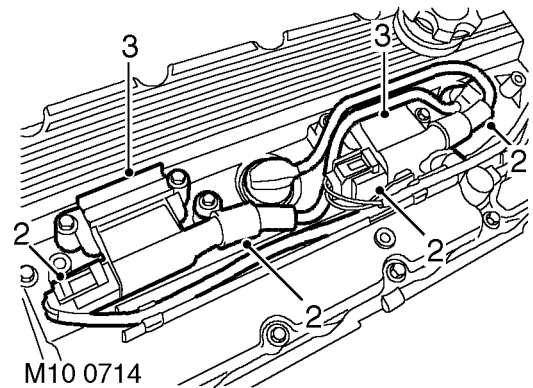


1. Check crankcase ventilation hoses for signs of splitting and general condition.
2. Check hoses are routed correctly, secure and serviceable.

IGNITION COILS

Check

1. Remove coil cover.

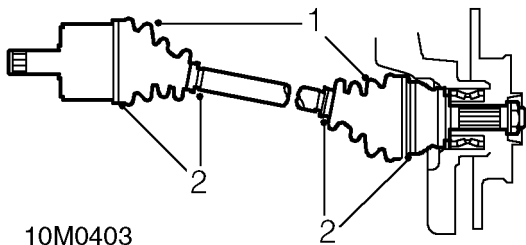


2. Check h.t. cables and multiplugs for security.
3. Clean each coil.

MAINTENANCE

DRIVE SHAFT GAITERS

Check



10M0403

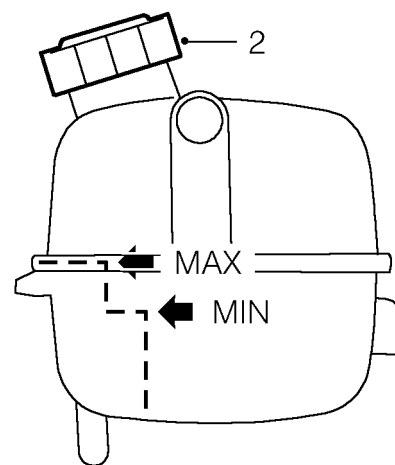
1. Check that drive shaft gaiters are not twisted, split or damaged.
2. Check clips are secure.

COOLING SYSTEM

Check level and top-up

WARNING: To prevent injury such as scalding caused by escaping steam or coolant, do not remove pressure relief cap from expansion tank while system is hot.

CAUTION: The coolant level should only be checked when the system is cold.




10M0485

1. Visually check that coolant level is between the two steps of the level marker inside the expansion tank. If level is appreciably low, suspect leakage or overheating.


CAUTION: If coolant is not visible in expansion tank, the system must be refilled in accordance with Refilling procedure.

2. If required, remove coolant expansion tank cap and top-up with anti-freeze mixture.

 [FLUIDS, page 09-1.](#)

CAUTION: The coolant must not exceed the expansion tank flange.

3. Check specific gravity of coolant. The overall anti-freeze concentration must not be below 50% by volume and must not exceed 60% by volume.
4. Refit expansion tank cap.
5. For cooling system drain and refill.

 [DRAIN AND REFILL, page 26-1.](#)



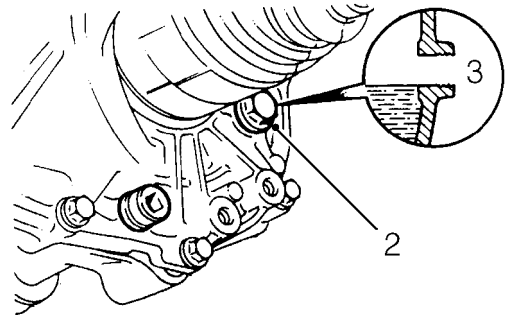
EXHAUST SYSTEM

Check

1. Check for damage and signs of leakage.
2. Check security of system.
3. Check mountings and correct alignment.
4. Check security of heat shields.

GEARBOX FLUID

Fluid level check and top-up



10M0402

1. Ensure vehicle is standing on level surface.
2. Wipe clean area around filler/level plug and remove plug and sealing washer. Discard sealing washer.
3. Check that fluid is level with bottom of level plug hole.

CAUTION: Fluid lodged behind level plug will trickle out when plug is removed and can give impression that level is correct.

4. Top-up, if required, until fluid just runs from hole. Allow sufficient time for fluid to flow and reach a common level within gearbox. Use transmission oil meeting specification MTF 94.

 [FLUIDS, page 09-1.](#)

5. Refit filler/level plug and new sealing washer and tighten to 35 Nm.

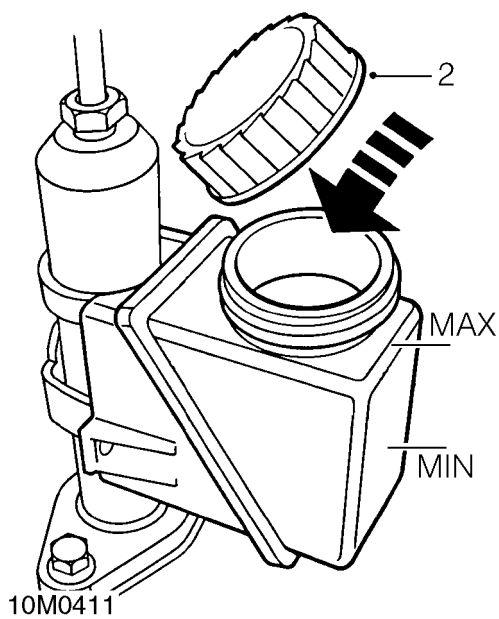
MAINTENANCE

CLUTCH FLUID

Level check

WARNING: Do not allow dirt or foreign liquids to enter reservoir when topping up. Use DOT 4 clutch fluid from airtight containers.

CAUTION: Do not allow clutch fluid to contact paint finished surfaces as paint may be damaged. If spilled, remove fluid and clean area with warm water.

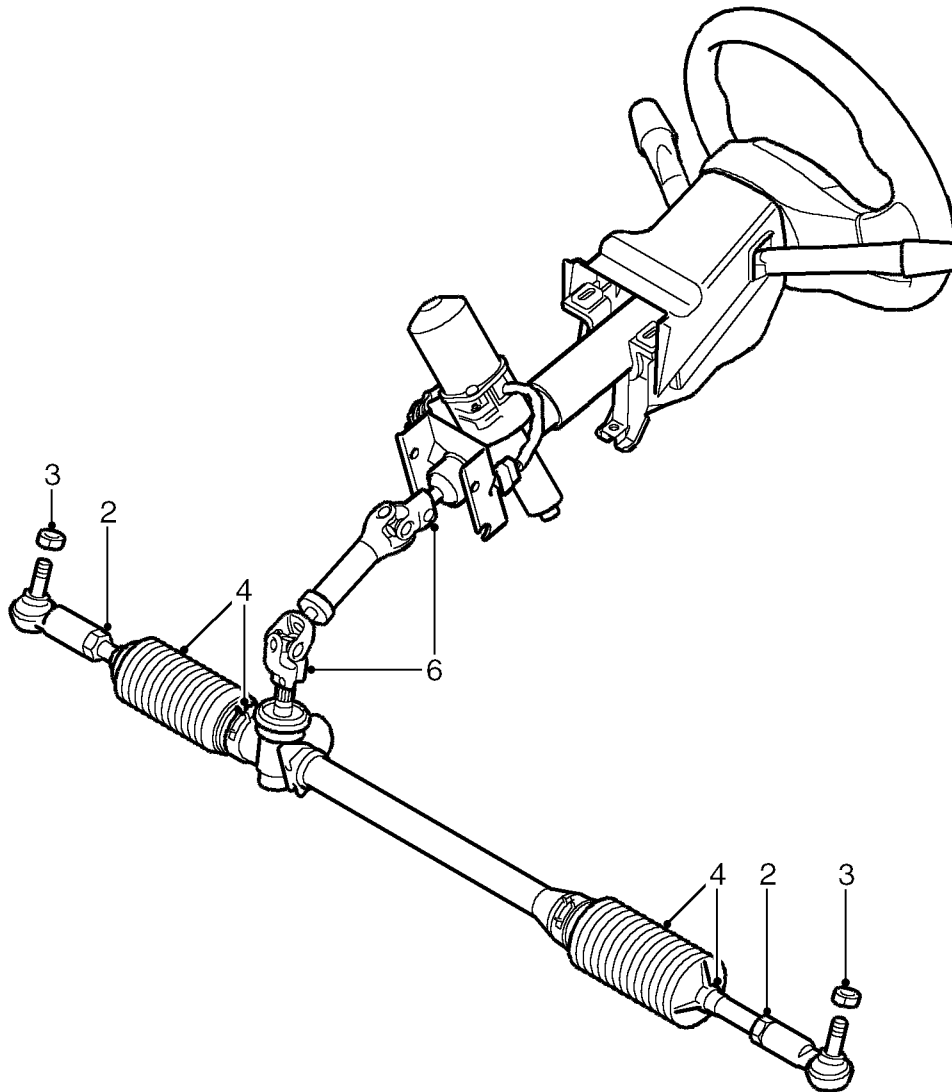


1. Wipe reservoir body and filler cap, and check level visually.
2. Remove filler cap and top-up, until fluid reaches bottom of reservoir filler neck.
3. The baffle plate halfway up the reservoir acts as the the clutch fluid minimum level.



STEERING

Steering column, rack, joints and gaiters



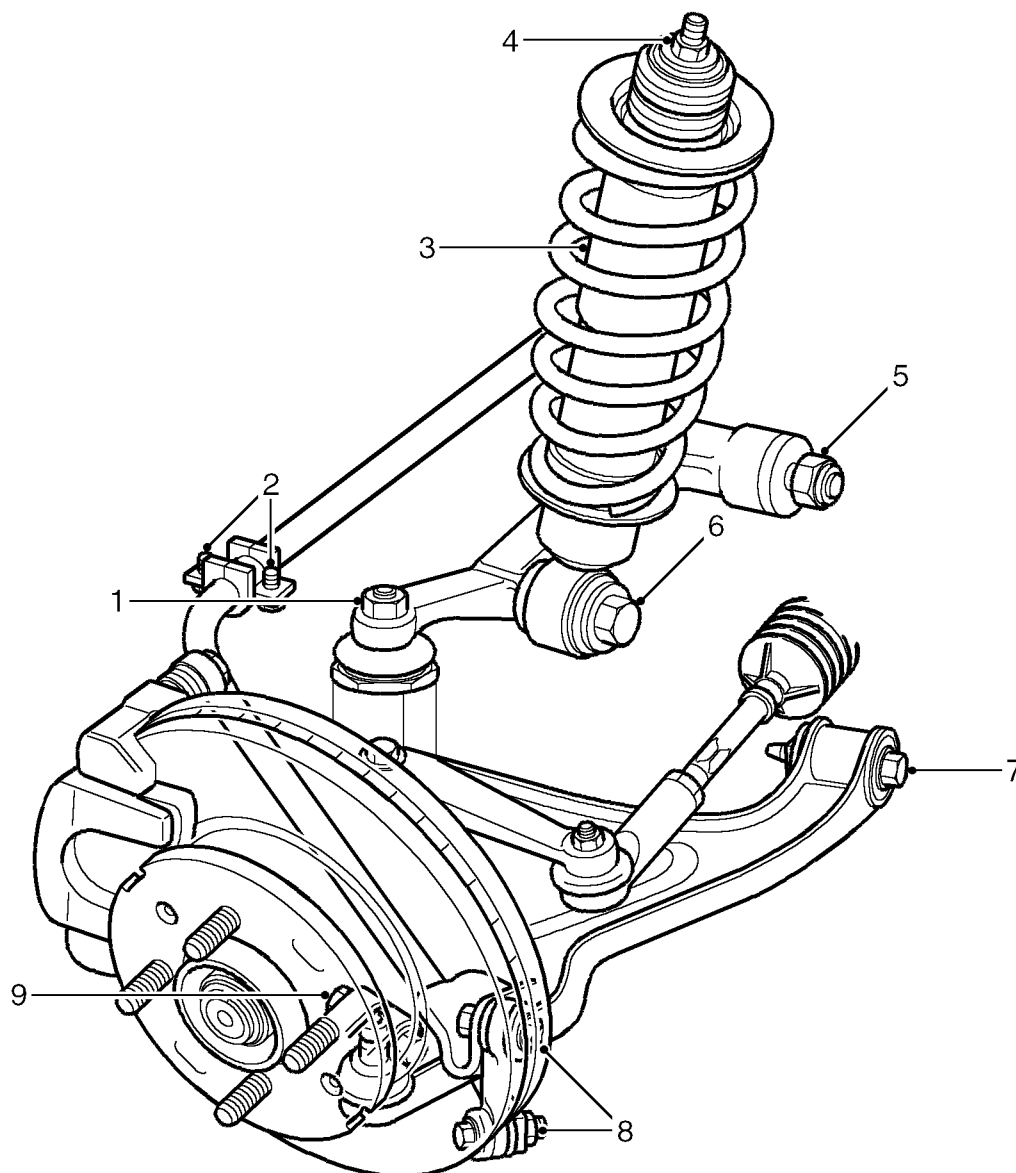
SP10 0004

1. Check security of steering rack, two mounting fixings, tighten nuts to 22 Nm.
2. Restrain ball joint movement and check that steering track rod, locknuts are tightened to 50 Nm.
3. Check security of 2 track rod end nuts, tighten to 30 Nm.
4. Visually check that the rack sealing gaiters are not twisted or damaged and clips are secure.
5. Check for signs of lubricant leakage.
6. Check intermediate shaft bolts are tightened to 22 Nm.

MAINTENANCE

SUSPENSION DAMPERS, BALL JOINTS, FIXINGS AND GAITERS

Front suspension

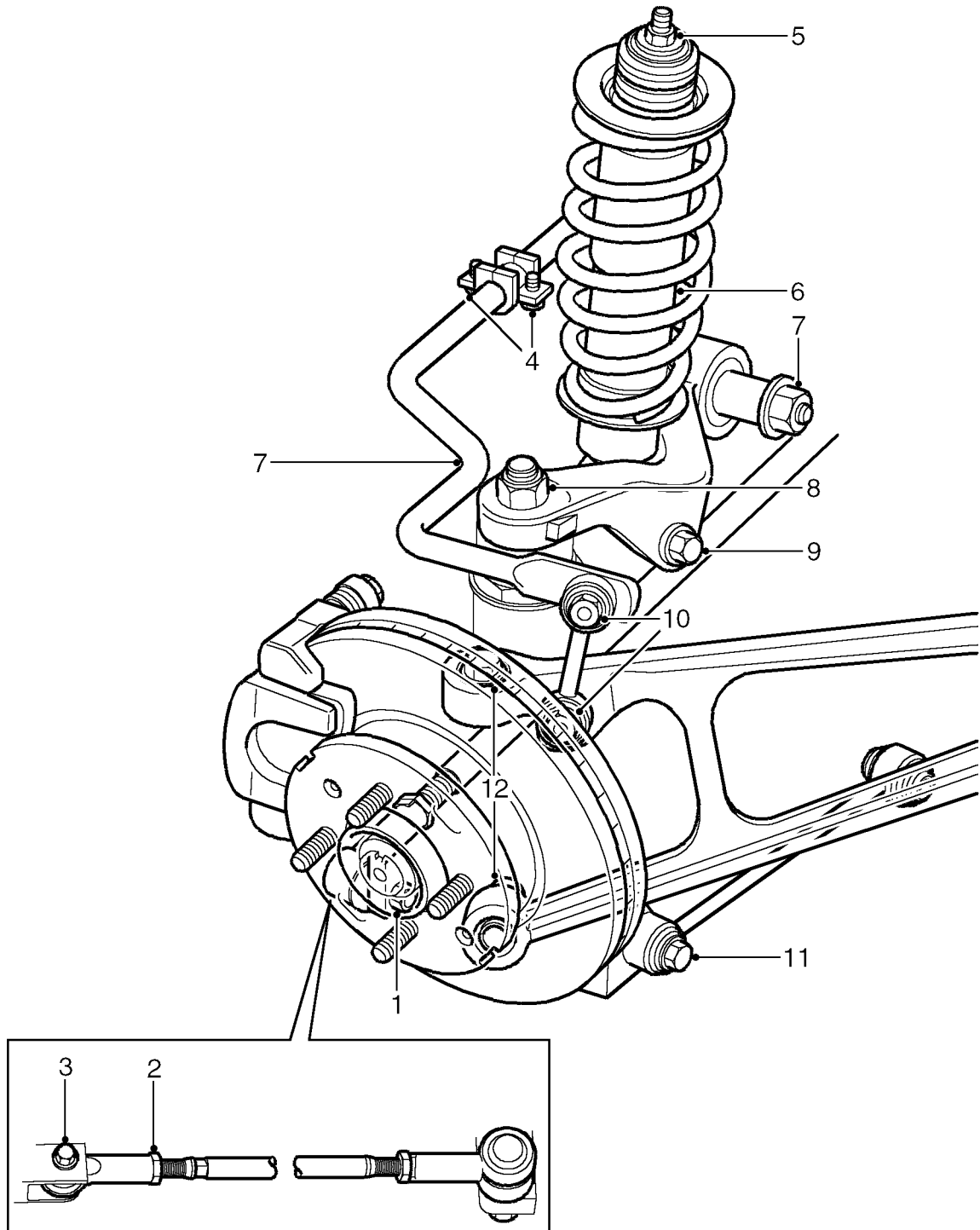


SP10 0005

1. Check upper ball joint nut - 54 Nm.
2. Check anti-roll bar clamp, bushes and bolts - 22 Nm.
3. Check suspension dampers for oil leaks.
4. Check suspension damper top mounting, bushes and nuts - 45 Nm.
5. Check upper arm spindle bolt - 74 Nm.
6. Check suspension damper lower mounting to upper arm bushes and bolts - 100 Nm.
7. Check lower arm to subframe, mounting bushes and bolts - 85 Nm.
8. Check anti-roll bar to lower arm link bushes and bolts - 35 Nm.
9. Check lower ball joint, clamp bolt - 45 Nm.



Rear suspension



SP10 0006

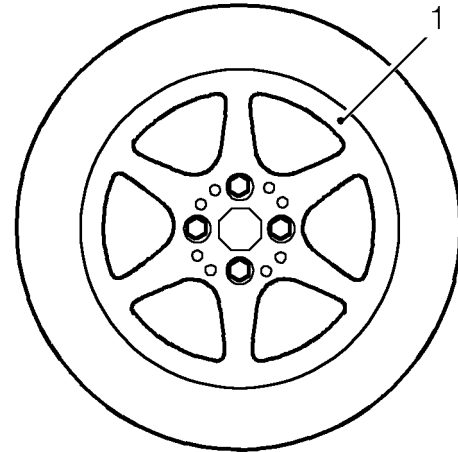
1. Check track control arm to hub nut - 38 Nm.
2. Check track control arm adjuster nuts - 50 Nm.
3. Check track control arm to subframe bushes and bolts - 60 Nm.
4. Check anti-roll bar clamp, bushes and bolts - 22 Nm.
5. Check suspension damper; top mounting bushes and nuts - 45 Nm.
6. Check suspension dampers for oil leaks.
7. Check upper arm to subframe, pivot shaft bushes and bolts - 83 Nm.
8. Check upper arm to hub ball joint nuts - 54 Nm.

MAINTENANCE

9. Check suspension damper lower mounting bushes and bolts - 100 Nm.
10. Check anti-roll bar to trailing arm, link bushes and bolts - 35 Nm.
11. Check lower link to hub, bushes and bolts - 100 Nm.
12. Check trailing arm to hub bolts - 60 Nm.
13. Check trailing arm to compliance bush assembly (not shown) - 100 Nm.

ROAD WHEELS AND FASTENINGS

Check




10M0392

1. Check condition of road wheels including spare (where fitted) for signs of buckling and rim damage.
2. Fit key socket over locking wheel nut, then fit wheel nut spanner over key socket and unscrew.
3. Working in a diagonal sequence slacken each nut $\frac{1}{2}$ turn and then tighten to 70 Nm.



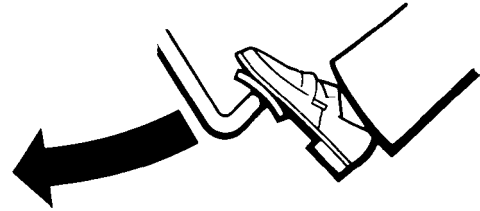
TYRE PRESSURES AND CONDITION

Check

1. Check for signs of tyre wear indicator in tread pattern.
2. Check all tyres including spare (where fitted) for uneven wear, external cuts in fabric, exposure of ply or cord structure, lumps and bulges.
3. Check and adjust tyre pressures.
 [TYRE PRESSURES, page 04-13.](#)

FOOTBRAKE

Check



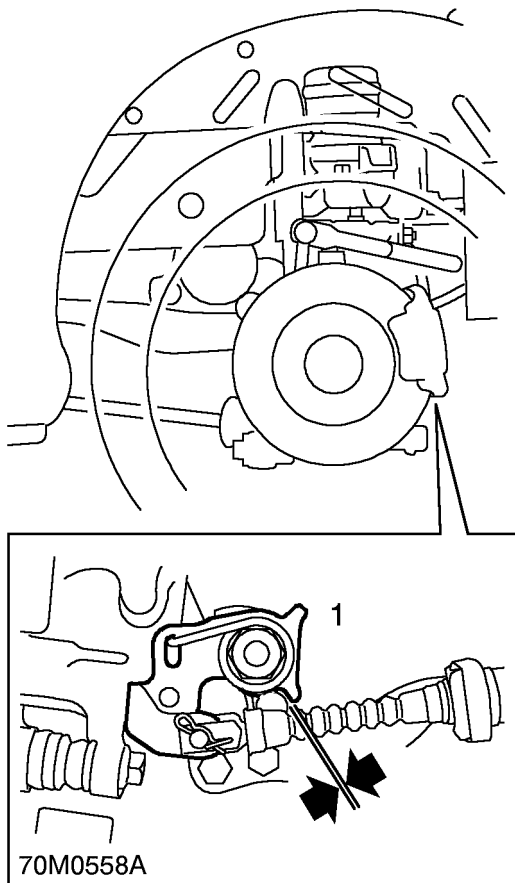
10M0338


1. Press brake pedal and check for firm resistance after short pedal movement.

MAINTENANCE

HANDBRAKE

Check



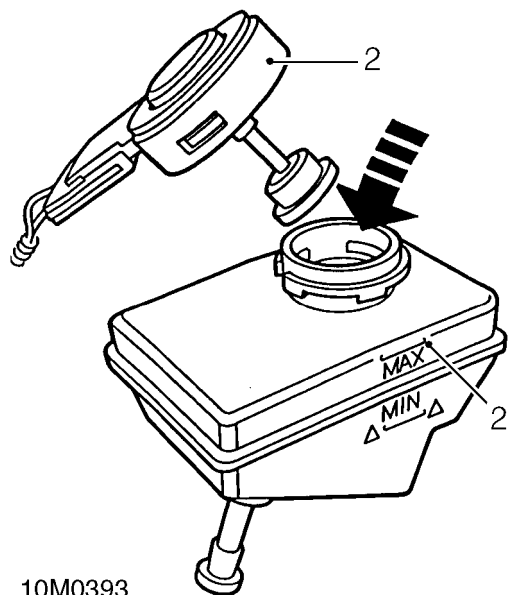
1. Check caliper clearance is between 1 and 2 mm, each side.
2. If the handbrake requires adjustment.
 [HANDBRAKE - ADJUST, page 70-4.](#)

BRAKE FLUID

Level check

WARNING: Do not allow dirt or foreign liquids to enter reservoir when topping-up. Use DOT 4 brake fluid from airtight containers.

CAUTION: Do not allow brake fluid to contact paint finished surfaces as paint may be damaged. If spilled, remove fluid and clean area with clean warm water.



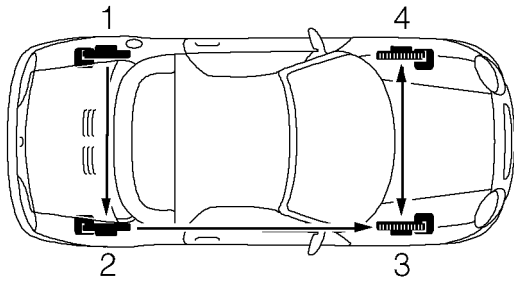
1. Wipe reservoir body and filler cap clean and check level visually.
2. Remove filler cap and top-up to 'MAX' mark, if required.

Renew fluid, ABS and Non-ABS brake systems.

1. Raise vehicle on four post lift.

CAUTION: Ensure that fluid level in reservoir is maintained during the complete operational sequence using new brake fluid.

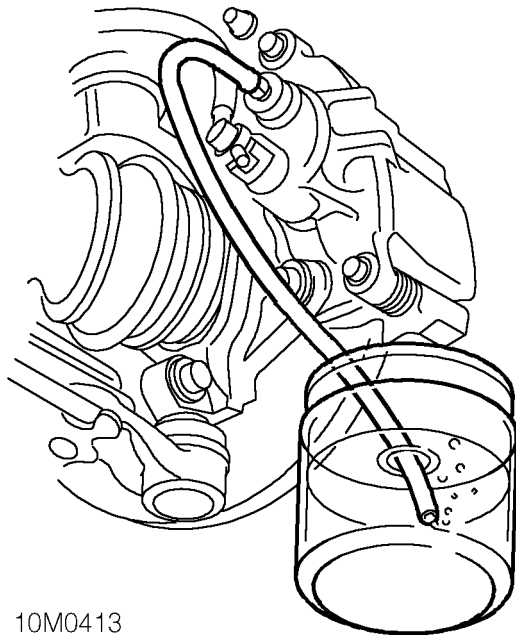
CAUTION: Never re-use fluid that has been bled from system.



10M0414

2. Bleed sequence - non ABS and ABS systems: LH rear to RH rear: RH front to LH front.

CAUTION: Braking efficiency may be seriously impaired if wrong bleed sequence is used.



10M0413

3. Attach a bleed tube to LH rear bleed nipple. Submerge free end of tube into jar containing brake fluid.

WARNING: Ensure vehicle is in neutral before starting engine.

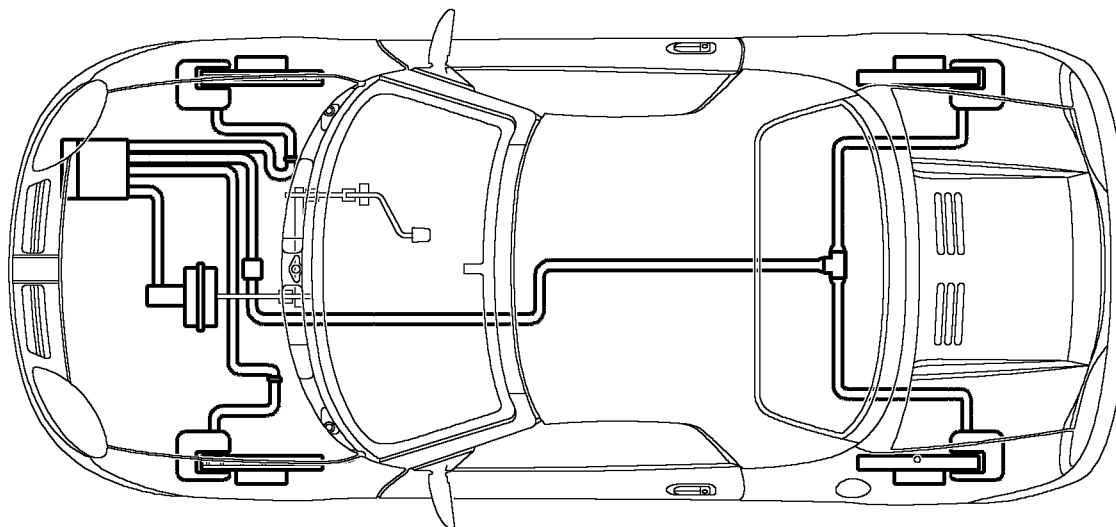
4. Start engine to build up vacuum in the brake servo, keep engine running while carrying out bleeding procedure.
5. Open bleed nipple, use an assistant to press brake pedal to the floor and hold.
6. Close bleed nipple, and then release brake pedal.
7. Repeat procedures 4 and 5 until no more air bubbles can be seen flowing from the bleed hose.
8. Hold pedal to floor and tighten bleed screw to 10 Nm.
9. Release brake pedal.

10. Repeat forgoing procedure at each wheel in sequence illustrated, until clean, bubble free fluid flows from the bleed hose at each sequence stage.
11. Remove bleed tube. Apply brakes and check for leakage.
12. Lower vehicle.
13. Check brake pedal for short firm travel when brakes are applied.
14. Check/top up brake fluid level.

MAINTENANCE

BRAKE HOSES AND PIPES

Check



SP10 0007

1. Visually check all brake fluid pipes, hoses and connections for correct routing and security.
2. Check for signs of chafing, leakage and corrosion.

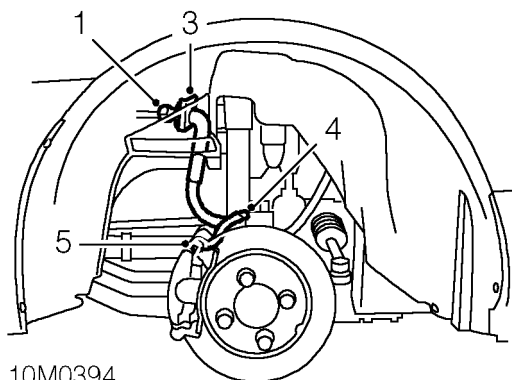
NOTE: Vehicles without ABS have a Brake Proportioning Valve (BPV) included in-line in the brake hydraulic system.

Renew brake hose - front

NOTE: Disconnect hose at end nearest to master cylinder first.

2. Fit plug to pipe end to prevent excessive fluid loss.
3. Withdraw brake hose clip from upper bracket.
4. Remove banjo bolt at caliper end of hose and discard 2 sealing washers.
5. Remove hose and discard.
6. Fit banjo end of hose to caliper with banjo bolt and 2 new sealing washers and tighten to 30 Nm.
7. Fit union end of hose to top bracket and secure with clip.
8. Remove plug from pipe end, connect brake pipe to hose and tighten union to 15 Nm.
9. Bleed brake system.

 [BRAKE SYSTEM - BLEED, page 70-3.](#)



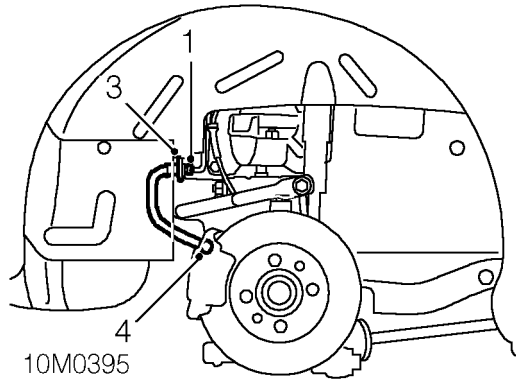
10M0394

1. Release brake pipe union from hose using correct union spanner.



Renew brake hose - rear

NOTE: Disconnect hose at end nearest to master cylinder assembly first.



1. Release brake pipe union from hose using correct union spanner.
2. Fit plug to pipe end to prevent excessive fluid loss.
3. Withdraw brake hose clip from bracket.
4. Remove banjo bolt at caliper end of hose and discard 2 sealing washers.
5. Remove hose and discard.
6. Fit banjo end of hose to caliper with banjo bolt and 2 new sealing washers and tighten to 30 Nm.
7. Fit union end of hose to rear bracket and secure with clip.
8. Remove plug from pipe end, connect brake pipe to hose and tighten union to 15 Nm.
9. Bleed brake system.

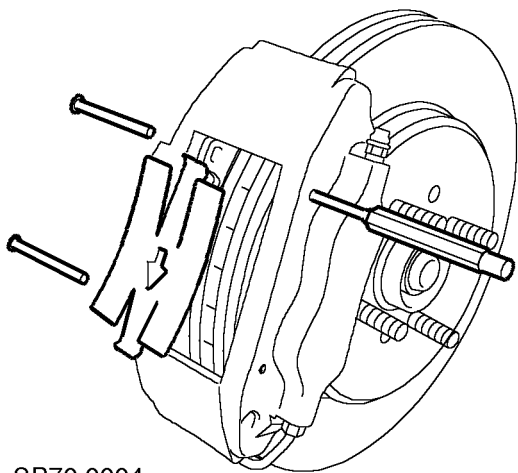
 [BRAKE SYSTEM - BLEED, page 70-3.](#)

MAINTENANCE

FRONT DISC BRAKES

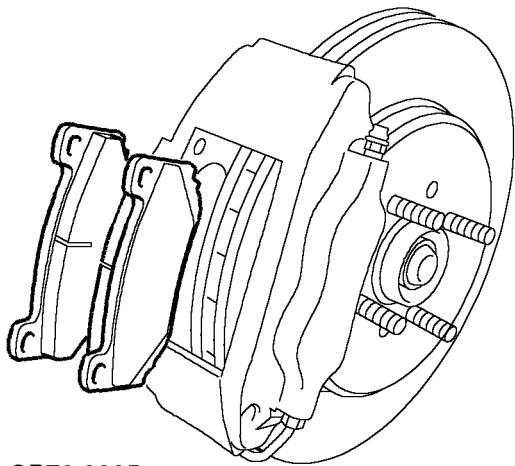
Check

1. Raise front of vehicle.
WARNING: Support on safety stands.
2. Remove both front road wheels.



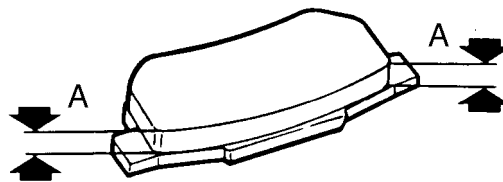
SP70 0004

3. Using a parallel punch, drift out brake pad retaining pins and collect anti-squeal plate.




SP70 0005

4. Remove brake pads from caliper housing.
5. Check brake pads visually and assess lining thickness.



10M0396

Minimum brake pad thickness (Dimension A) = 2.5 mm

6. If the brake pads need to be renewed.
 [BRAKE PADS - FRONT, page 70-17.](#)
NOTE: Measurement does not include pad backing thickness.
7. Using a suitable flat lever, retract caliper pistons into housing.
8. Fit brake pads to caliper housing.
9. Fit brake pad retaining pins and anti-squeal plate.
10. If necessary top up brake fluid reservoir.
11. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
12. Remove stands and lower vehicle.
13. Depress footbrake several times in order to give correct pad to disc clearance before road testing.



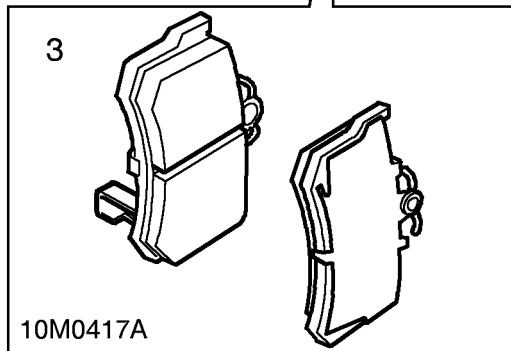
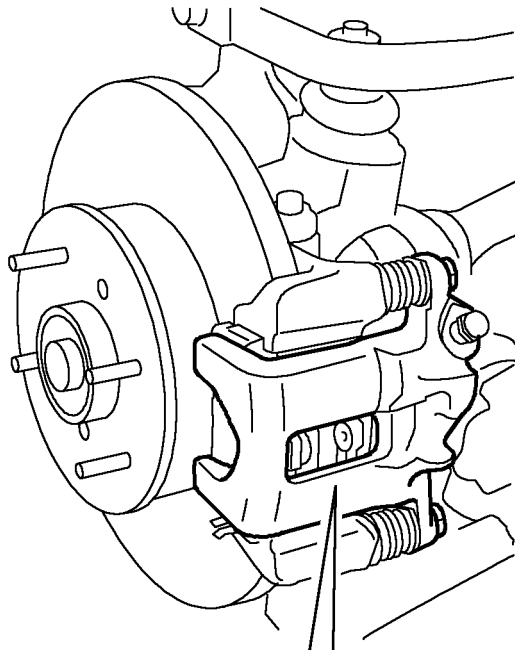
REAR DISC BRAKES

Check

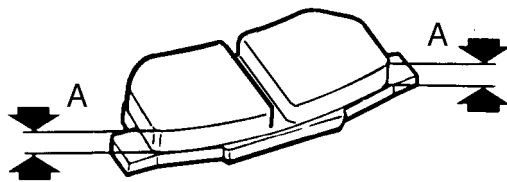
1. Raise rear of vehicle.

WARNING: Support on safety stands.

2. Remove both rear road wheels.



3. Check brake pads visually and assess pad thickness.



10M0397

Minimum brake pad thickness: Dimension A = 3 mm.

4. If the brake pads need to be renewed.

 [BRAKE PADS - REAR, page 70-18.](#)

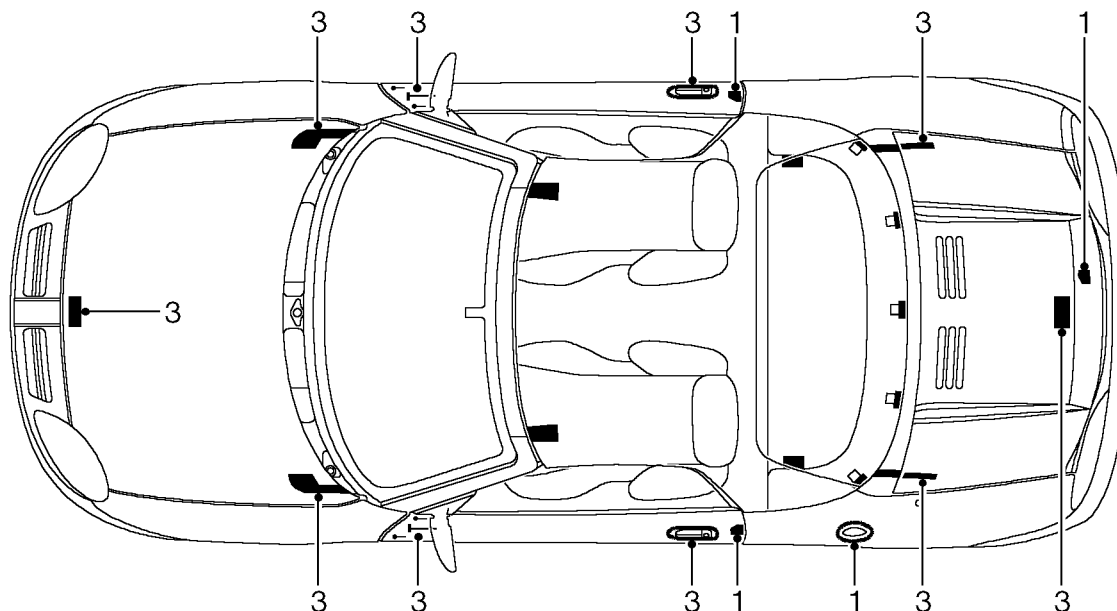
NOTE: Measurement does not include pad backing thickness.

5. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
6. Remove stands and lower vehicle.
7. Depress footbrake several times in order to give correct pad to disc clearance before road testing.

MAINTENANCE

BODY

Locks, hinges and latch mechanism (not steering lock)



SP10 0008

1. Functionally check operation of all locks.
2. Operate driver's door lock and check that electric central door locking operates.
3. Ensure that all locks, hinges and latch mechanisms are lubricated using Door Lock and Latch Lubricant. Inject grease sparingly into lock barrels. Clean off any surplus grease. **DO NOT lubricate the steering lock.**

NOTE: Use Ultralube on the boot hinges.

Exterior paintwork and body panels

1. Visually check paintwork and body panels for damage and corrosion.


Underbody sealer

1. Visually check underbody sealer for damage and continuity.




DRIVER AIR BAG MODULE

Check

1. Visually check for signs of damage.
2. To renew an air bag.
 [DRIVER AIRBAG MODULE, page 75-1.](#)


PASSENGER AIR BAG MODULE

Check

1. Visually check for signs of damage.
2. To renew an air bag.
 [PASSENGER AIRBAG MODULE, page 75-2.](#)

AIR BAG ROTARY COUPLER


Check

1. Rotate steering wheel one half turn in each direction and check for noise from the rotary coupler.
2. To renew the rotary coupler:
 [ROTARY COUPLER, page 75-6.](#)

SEATS AND SEAT BELTS

Check

1. Check seat frames are secured to floor and show no signs of movement.
2. Check operation of seat slide and tilt mechanisms, ensuring there is no excessive play between seat cushion and seat back.
3. Check tightness of all seat belt anchorage points.
4. Fully extract each seat belt and allow it to return under its own recoil mechanism.
5. Connect each seat belt to its respective buckle and check the seat belt buckle and tongue are secure.
6. Check entire length of seat belt webbing for signs of fraying and damage, replace seat belt if fraying or damage is evident.

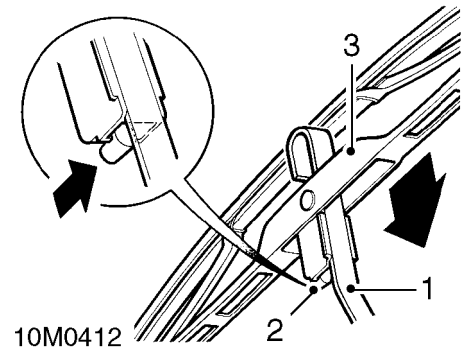
 [SEAT BELT, page 75-4.](#)

SCREEN WIPERS AND BLADES

Check

1. Operate front screen wiper.
2. Check that blades wipe screen without smearing.
3. Check that wipers park correctly.
4. Operate wiper switch in all modes.
5. Check that wipers operate at speeds selected.

Renew blade

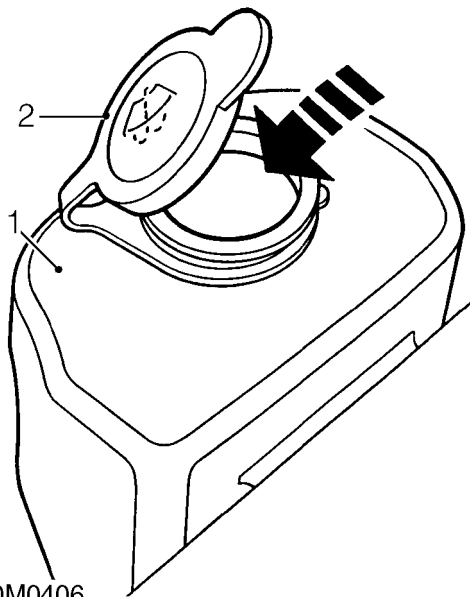


1. Lift wiper arm.
2. Press retaining lever.
3. Slide blade down arm.
4. Withdraw blade assembly from arm.
5. Position new blade to wiper arm.
6. Push blade into engagement with arm.
7. Check that it is retained.

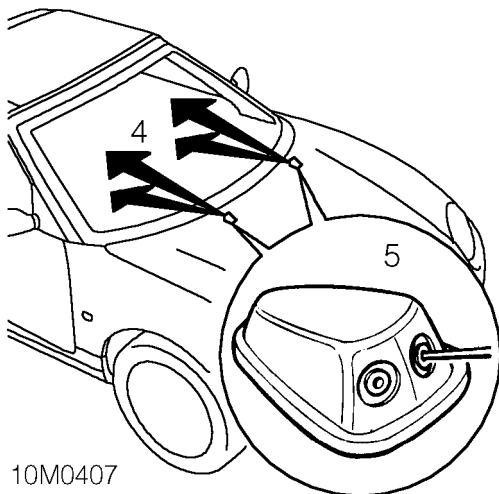
MAINTENANCE

WINDSCREEN WASHERS

Check



1. Visually check mixture level in reservoir.
2. Top-up by removing filler cap and adding required concentration mixture of water and 'Screenwash'.
3. Clean windscreen washer jets using thin wire as a probe.



4. Operate windscreen washer and check that jets strike top and centre of area to be wiped.
5. Adjust jet by inserting a needle into jet hole and repositioning.
6. Check operation of wash/wipe.
7. Observe that washer and wipers operate correctly.
8. Re-check level in reservoir after adjustments.

LAMPS, HORNS AND WARNING INDICATORS

Check

1. Switch on sidelamps, and check that sidelamps, tail lamps, rear number plate lamps, and instrument lights illuminate.
2. Switch on headlamps, operate dip switch and check that headlamps function in both dip and main beam, and panel main beam indicator operates.
3. Operate flash switch and check that headlamps flash.
4. Open doors and check interior lamps illuminate.
5. Open bonnet, and rear luggage compartment and check lights illuminate.
6. Press horn and check that horn operates.
7. Switch on ignition and depress brake pedal, check brake lights illuminate including Centre High Mounted Stop Lamp (CHMSL).
8. Switch on ignition and operate direction indicator switch to right and left and check that the relative warning indicators flash at front and rear.
9. Operate hazard warning switch and check that all warning indicators flash.



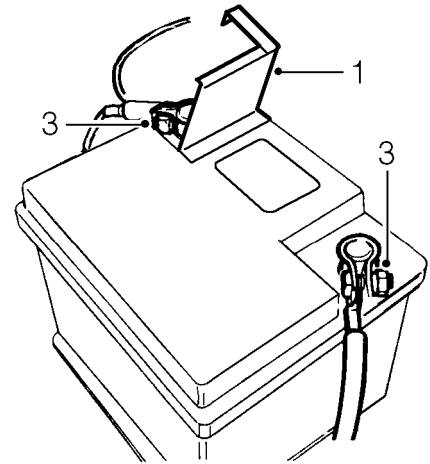
HEATER BLOWER

Check

1. Check operation of heater blower control switch.
2. Open all vents and ensure air is flowing freely when the relative selection is made on the air distribution control panel. Remove any obstruction from vents.

BATTERY CONNECTIONS

Check



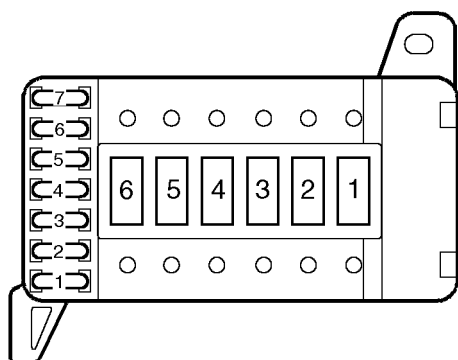
10M0408A

1. Lift flap covering positive terminal.
2. Wipe battery top clean and dry, smear terminal posts with petroleum jelly.
3. Ensure terminals are tight.
4. Replace flap.

MAINTENANCE

FUSEBOX

Underbonnet fuse box



M10 0715

1. Release and lift off cover.
2. Check security of fusible link and power lead connections.
3. Refit cover and secure.

ROAD TEST

Engine start and fast idle speed

1. Start engine from cold and check that fast engine idle speed is maintained until normal engine temperature is reached.

Engine performance and throttle operation

1. Start engine and check that it starts easily.
2. Check that 'oil pressure' and 'no charge' warning lamps extinguish.
3. Check that throttle pedal movement is free and unrestricted.
4. Check that engine is responsive to throttle movement.

Clutch and gear selection - Normal driving conditions

1. Check that clutch engages smoothly without judder, slipping or noise.
2. Check for abnormal transmission noise.
3. Check for smooth, quiet gear change and that gear selected engages easily.

Steering

1. Check for noise, effort required, free play and self-centering.

Suspension

1. Check for noise, irregularity in ride (e.g dampers) and wheel imbalance.

Footbrake

1. Check for pedal effort, travel, braking efficiency, pulling and binding.

Instruments

1. Check that all instruments operate.
2. Check speedometer for steady operation, noise and operation of distance recorder.

Body

1. Check for abnormal body noise.

Seat belts

1. Check for operation of inertia reels and condition of belt webbing.

Handbrake

1. Apply handbrake firmly, check ratchet travel is less than 5 clicks. Check handbrake is not binding when released.

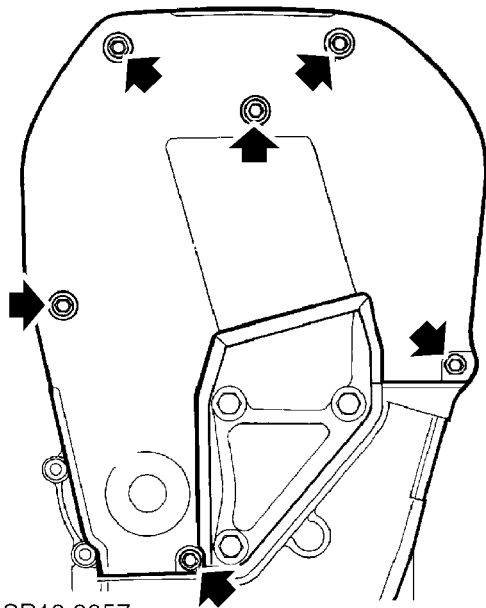


OIL SEAL - FRONT - EXHAUST CAMSHAFT - FRONT/LH

🔑 12.13.07

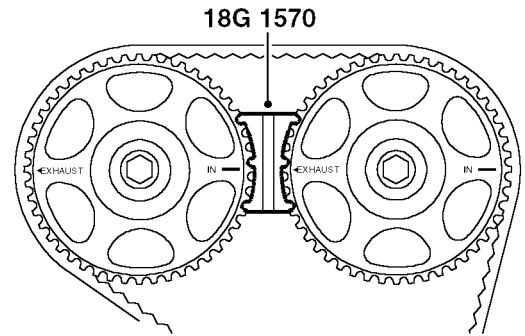
Remove

1. Disconnect battery earth lead.
2. Remove RH engine hydramount.
👉 [MOUNTING BRACKET - RH - ALL MODELS, page 12-29.](#)



SP12 0357

3. Remove 5 bolts securing camshaft timing belt upper cover to rear cover.
4. Loosen lower bolt securing timing belt upper cover; remove cover and collect seal.

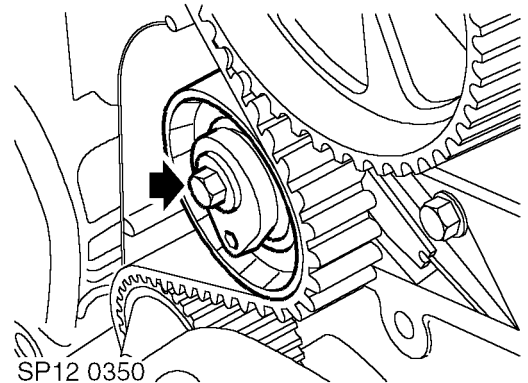


SP12 0349

5. Using a socket and extension bar on crankshaft pulley bolt, rotate crankshaft clockwise to align camshaft gear timing marks - 90° BTDC. Fit camshaft locking tool 18G 1570, between gears.

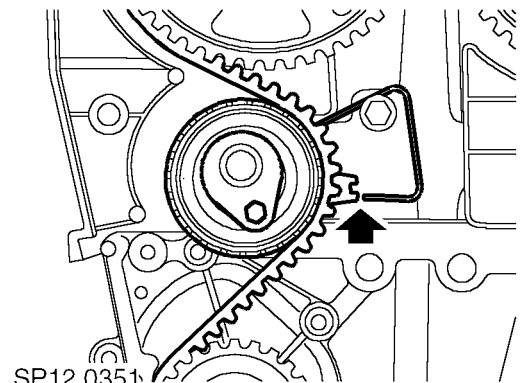
CAUTION: Never use the camshaft gear, the camshaft gear retaining bolts or the timing belt to turn the crankshaft.

6. Check that the timing mark on crankshaft pulley is aligned with mark on timing belt lower cover.



SP12 0350

7. Remove and discard timing belt tensioner bolt.



SP12 0351

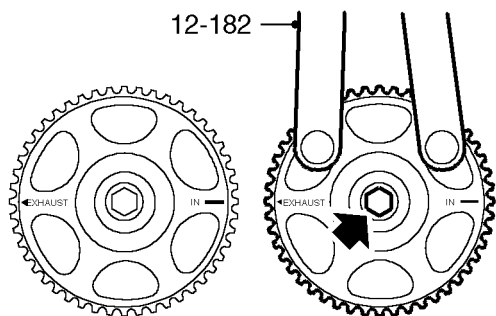
8. Disengage index wire from its fitted position, at the same time removing timing belt tensioner.

ENGINE

- With care, release timing belt from camshaft gears.

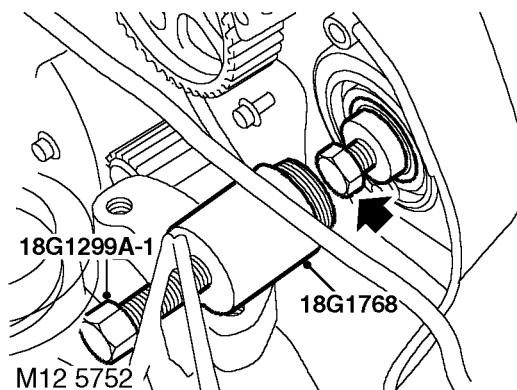
CAUTION: Ease timing belt from gears using fingers only, metal levers may damage timing belt and gears. Do not rotate crankshaft with timing belt removed and cylinder head fitted. Examine timing belt for signs of wear or contamination. Replace a worn or contaminated timing belt.

- Remove camshaft gear locking tool, 18G 1570 from camshaft gears.



M12 5757

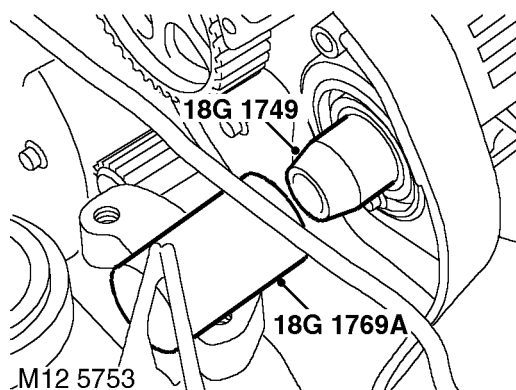
- Using tool 12-182, restrain camshaft gear and remove bolt and plain washer securing camshaft gear to camshaft.
- Release and remove camshaft gear from camshaft.
- Position cloth under camshaft oil seal area to collect any oil spillage.



- Fit camshaft gear retaining bolt to camshaft.
- Remove camshaft oil seal using 18G 1768 and centre bolt 18G 1299A-1.
- Remove and discard oil seal from 18G 1768.
- Remove camshaft gear retaining bolt from camshaft.

Refit

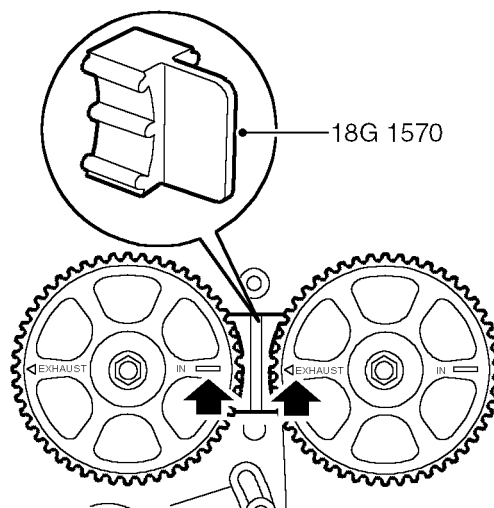
- Clean oil seal recess in camshaft carrier and cylinder head ensuring that all traces of rubber are removed.
CAUTION: To prevent damage to machined surfaces; Do not use a metal scraper.



- Fit oil seal protector, 18G 1749 to end of camshaft. Position new oil seal and carefully drift into position using 18G 1769A.

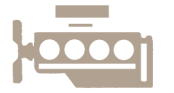
CAUTION: Oil seals are waxed and must not be lubricated prior to fitting.

- Clean camshaft gear and mating face.
CAUTION: If sintered gears have been subjected to prolonged oil contamination, they must be soaked in solvent and then thoroughly washed in clean solvent before refitting. Because of the porous construction of sintered material, oil impregnated in the gear will emerge and contaminate the belt.
- Position camshaft gear to camshaft ensuring that the drive pin is located in correct slot in gear. Fit and lightly tighten retaining bolt and plain washer.

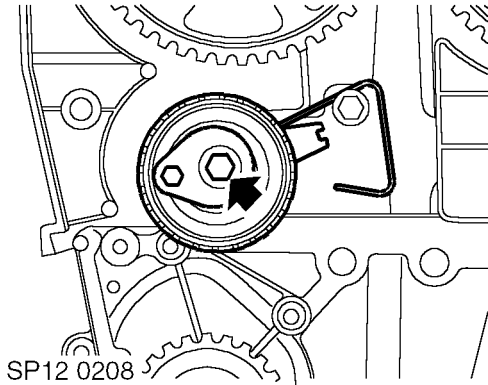


SP12 0358

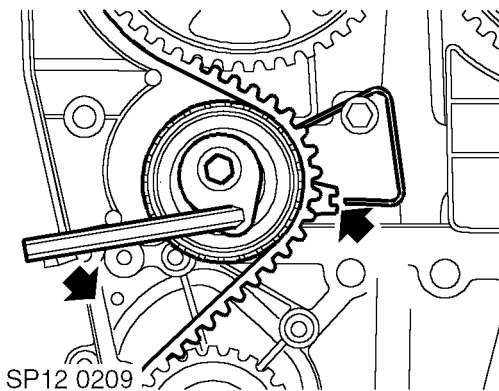
- Using 12-182, align camshaft gear timing marks and fit camshaft gear locking tool, 18G 1570.



6. Restrain camshaft gear using tool I2-I82 and tighten retaining bolt to 65 Nm.
7. Check that the timing mark on crankshaft pulley is aligned with mark on timing belt lower cover.



8. Position timing belt tensioner ensuring that the index wire is located over pillar bolt and that tensioner lever is at 9 o'clock position.
9. Fit new tensioner Patchlok bolt, tighten bolt until it is just possible to move tensioner lever.
10. Using fingers only, position timing belt to camshaft gears, tensioner and coolant pump drive gear, keeping the timing belt taut from crankshaft gear and between camshaft gears.
11. Check that timing belt is positioned centrally around all gears and tensioner pulley.
12. Remove camshaft gear locking tool, I8G I570 from camshaft gears.




13. Using a 6 mm Allen key, rotate tensioner anti-clockwise to align pointer to index wire. If original timing belt is being refitted, align index wire to lower land of pointer.

CAUTION: It is imperative that the pointer approaches the index wire from above. If the pointer passes the index wire, the tension must be fully released and the tensioning procedure must be repeated.

14. Ensuring that the pointer maintains correct position, tighten tensioner bolt to 25 Nm.

15. Fit a suitable socket to crankshaft pulley bolt, rotate crankshaft clockwise 2 complete revolutions and align camshaft gear timing marks.

CAUTION: Never use the camshaft gear, the camshaft gear retaining bolts or the timing belt to turn the crankshaft.


16. Check that pointer is correctly aligned with index wire.
17. Clean timing belt upper cover.
18. Position timing belt upper cover and seal, fit and tighten bolts to 5 Nm.
19. Fit RH engine hydramount.
 **MOUNTING BRACKET - RH - ALL MODELS, page 12-29.**
20. Connect battery earth lead.

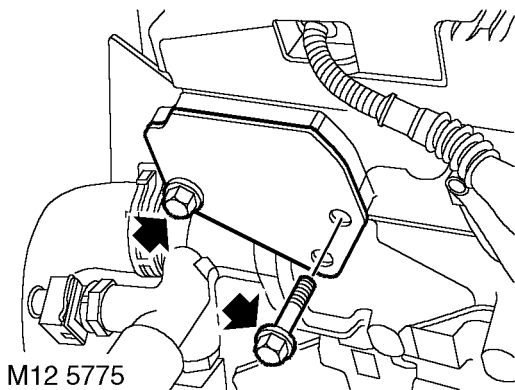
ENGINE

CAMSHAFT REAR OIL SEAL - EXHAUST

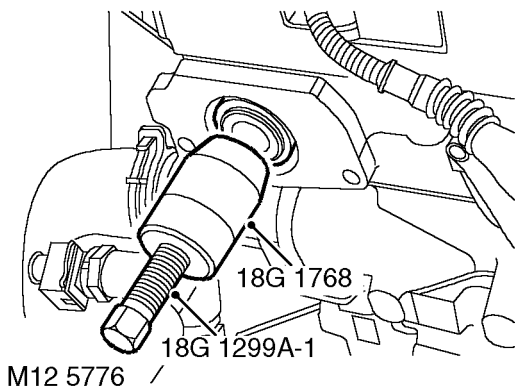
🔑 12.13.08

Remove

1. Disconnect battery earth lead.
2. Remove engine cover.
 [ENGINE COVER, page 12-27.](#)
3. Position absorbent cloth beneath vehicle to catch any oil spillage.



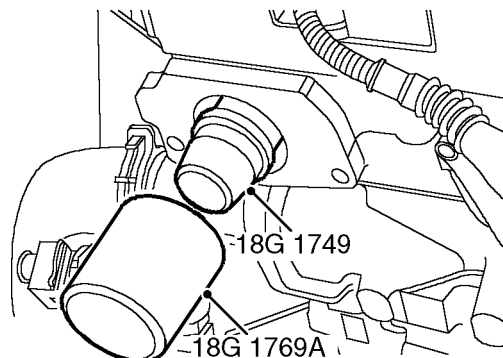
4. Remove 2 bolts securing oil seal cover to cylinder head and remove cover.



5. Remove camshaft oil seal using 18G 1768 and centre bolt 18G 1299A-1.
6. Discard camshaft oil seal.

Refit

1. Clean oil seal recess, ensuring all traces of rubber are removed.
CAUTION: Do not use a metal scraper or the machined surfaces may be damaged.




M12 5784

2. Fit 18G 1749 to end of camshaft to protect seal and fit new camshaft oil seal using 18G 1769A.

CAUTION: Oil seal must be fitted dry. DO NOT USE 18G 1769.

NOTE: Rear oil seals are red.

3. Ensure area around camshaft oil seal is clean and free from oil.
4. Position cover plate, fit bolts and tighten to 12 Nm.
5. Fit engine cover.
 [ENGINE COVER, page 12-27.](#)
6. Connect battery earth lead.

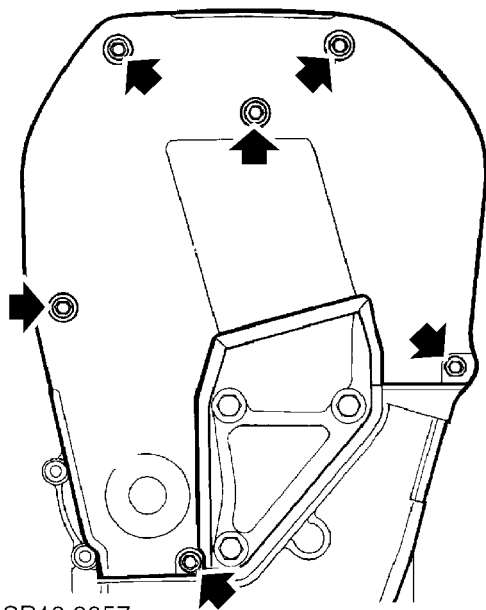


OIL SEAL - FRONT - INLET CAMSHAFT - REAR/RH

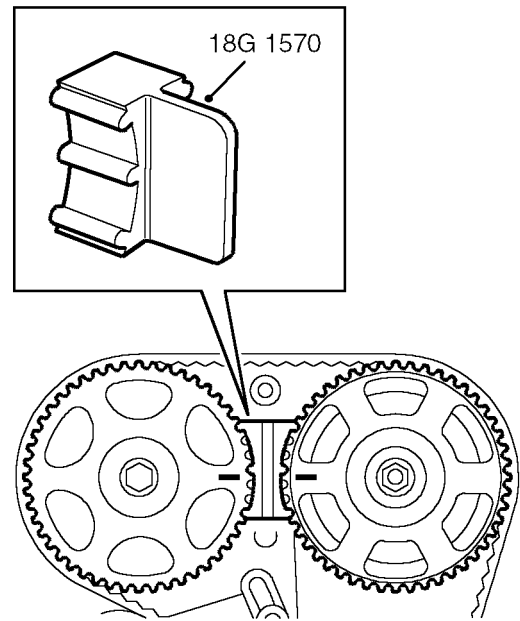
🔑 12.13.09

Remove

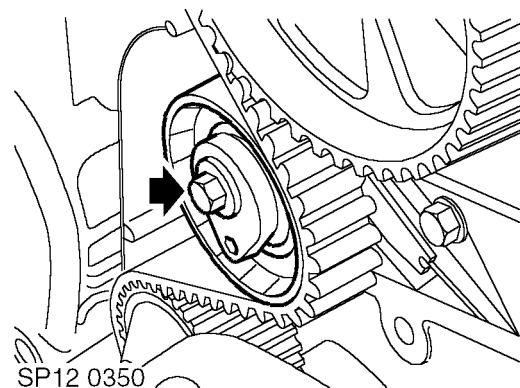
1. Disconnect battery earth lead.
2. Remove RH engine hydramount.
👉 [MOUNTING BRACKET - RH - ALL MODELS, page 12-29.](#)



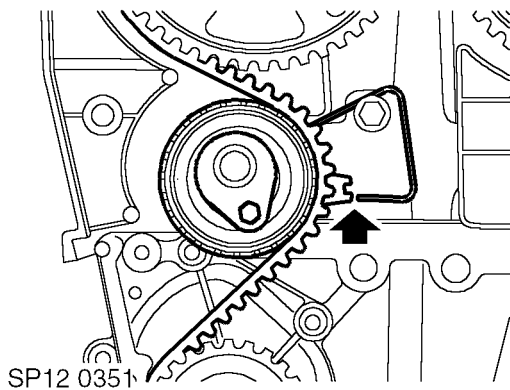
3. Remove 5 bolts securing camshaft timing belt upper cover to rear cover.
4. Loosen lower bolt securing timing belt upper cover; remove cover and collect seal.



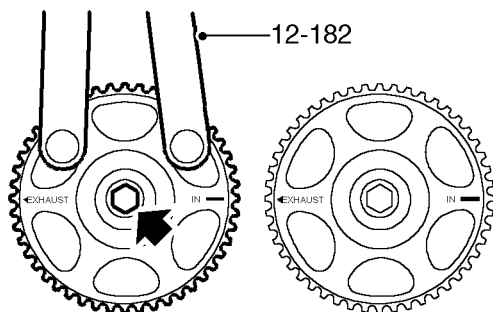
5. Using a socket and extension bar on crankshaft pulley bolt, rotate crankshaft clockwise to align camshaft gear timing marks - 90° BTDC. Fit camshaft locking tool 18G 1570, between gears. Never use the camshaft gear, the camshaft gear retaining bolts or the timing belt to turn the crankshaft.
6. Check that the timing mark on crankshaft pulley is aligned with mark on timing belt lower cover.



7. Remove and discard timing belt tensioner bolt.

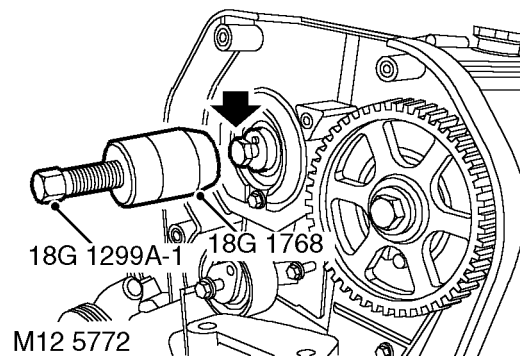


8. Disengage index wire from its fitted position, at the same time removing timing belt tensioner.
9. With care, release timing belt from camshaft gears.
CAUTION: Ease timing belt from gears using fingers only, metal levers may damage timing belt and gears. Do not rotate crankshaft with timing belt removed and cylinder head fitted. Examine timing belt for signs of wear or contamination. Replace a worn or contaminated timing belt.
10. Remove camshaft gear locking tool 18G 1570, from camshaft gears.



M12 5743

11. Using tool 12-182, restrain camshaft gear and remove bolt and plain washer securing camshaft gear to camshaft.
12. Release and remove camshaft gear from camshaft.
13. Position cloth under camshaft oil seal area to collect any oil spillage.

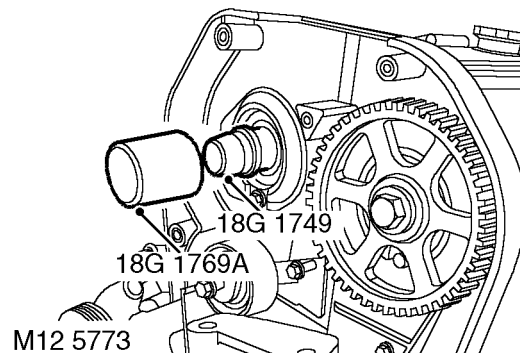


M12 5772

14. Fit camshaft gear retaining bolt to camshaft.
15. Remove camshaft oil seal using 18G 1768 and centre bolt 18G 1299A-1.
16. Remove and discard oil seal from 18G 1768.
17. Remove camshaft gear retaining bolt from camshaft.

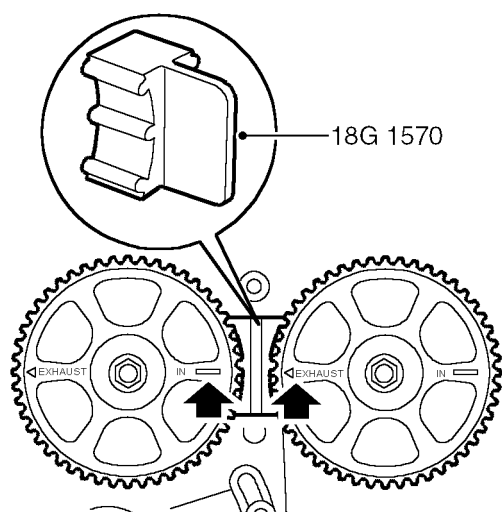
Refit

1. Clean oil seal recess in camshaft carrier and cylinder head ensuring that all traces of rubber are removed.
CAUTION: To prevent damage to machined surfaces; Do Not use a metal scraper.



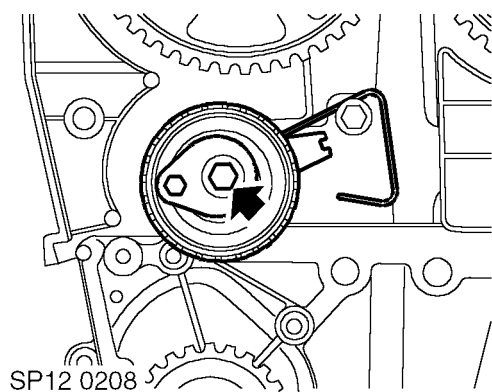
M12 5773

2. Fit oil seal protector, 18G 1749 to end of camshaft. Position new oil seal and carefully drift into position using 18G 1769A.
CAUTION: Oil seals are waxed and must not be lubricated prior to fitting.
3. Clean camshaft gear and mating face.
CAUTION: If sintered gears have been subjected to prolonged oil contamination, they must be soaked in solvent and then thoroughly washed in clean solvent before refitting. Because of the porous construction of sintered material, oil impregnated in the gear will emerge and contaminate the belt.
4. Position camshaft gear to camshaft ensuring that the drive pin is located in correct slot in gear. Fit and lightly tighten retaining bolt and plain washer.



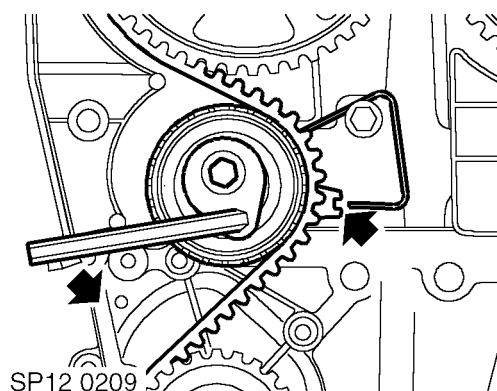
SP12 0358

5. Using 12-182, align camshaft gear timing marks and fit camshaft gear locking tool, 18G 1570.
6. Restrain camshaft gear using tool 12-182 and tighten retaining bolt to 65 Nm.
7. Check that the timing mark on crankshaft pulley is aligned with mark on timing belt lower cover.



SP12 0208

8. Position timing belt tensioner ensuring that the index wire is located over pillar bolt and that tensioner lever is at 9 o'clock position.
9. Fit new tensioner Patchlok bolt, tighten bolt until it is just possible to move tensioner lever.
10. Using fingers only, position timing belt to camshaft gears, tensioner and coolant pump drive gear; keeping the timing belt taut from crankshaft gear and between camshaft gears.
11. Check that timing belt is positioned centrally around all gears and tensioner pulley.
12. Remove camshaft gear locking tool, 18G 1570 from camshaft gears.



SP12 0209


13. Using a 6 mm Allen key, rotate tensioner anti-clockwise to align pointer to index wire. If original timing belt is being refitted, align index wire to lower land of pointer.

CAUTION: It is imperative that the pointer approaches the index wire from above. If the pointer passes the index wire, the tension must be fully released and the tensioning procedure must be repeated.

14. Ensuring that the pointer maintains correct position, tighten tensioner bolt to 25 Nm.
15. Fit a suitable socket to crankshaft pulley bolt, rotate crankshaft clockwise 2 complete revolutions and align camshaft gear timing marks.

CAUTION: Never use the camshaft gear, the camshaft gear retaining bolts or the timing belt to turn the crankshaft.

16. Check that pointer is correctly aligned with index wire.
17. Clean timing belt upper cover.
18. Position timing belt upper cover and seal, fit and tighten bolts to 5 Nm.
19. Fit RH engine hydramount.
20. Connect battery earth lead.

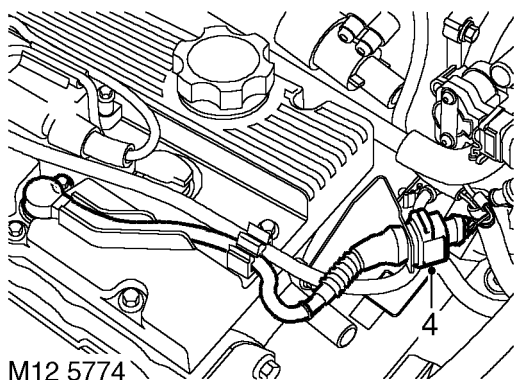
 [MOUNTING BRACKET - RH - ALL MODELS, page 12-29.](#)

CAMSHAFT REAR OIL SEAL - INLET

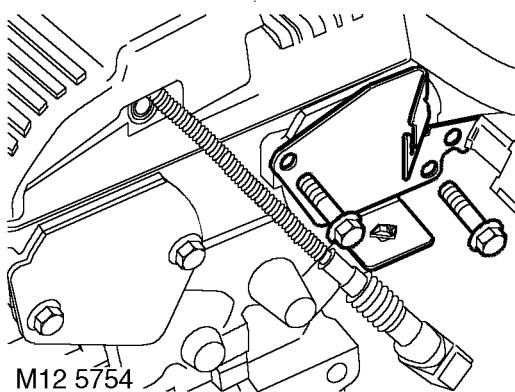
🔑 12.13.10

Remove

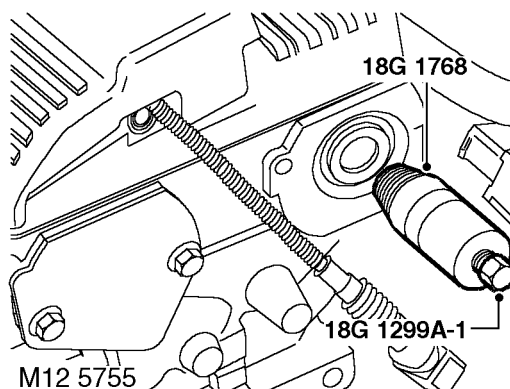
1. Disconnect battery earth lead.
2. Remove engine cover.
👉 [ENGINE COVER, page 12-27.](#)
3. Position absorbent cloth beneath vehicle to catch any oil spillage.



4. Disconnect CMP sensor multiplug and release CMP harness from oil seal cover.



5. Remove 2 bolts securing oil seal cover to cylinder head and position cover aside.

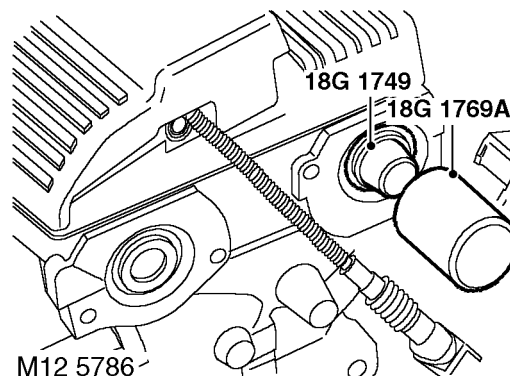


6. Remove camshaft oil seal using 18G 1768 and centre bolt 18G 1299A-1.
7. Discard camshaft oil seal.

Refit

1. Clean oil seal recess, ensuring all traces of rubber are removed.

CAUTION: Do not use a metal scraper or machined surfaces may be damaged.



2. Fit 18G 1749 to end of camshaft to protect seal and fit new camshaft oil seal using 18G 1769A. DO NOT USE 18G 1769.

NOTE: Oil seals are red.

3. Ensure area around camshaft oil seal is clean and free from oil.
4. Position cover plate, fit bolts and tighten to 12 Nm.
5. Secure CMP harness to cover plate and connect CMP multiplug.
6. Fit engine cover.
👉 [ENGINE COVER, page 12-27.](#)
7. Connect battery earth lead.



PULLEY - CRANKSHAFT

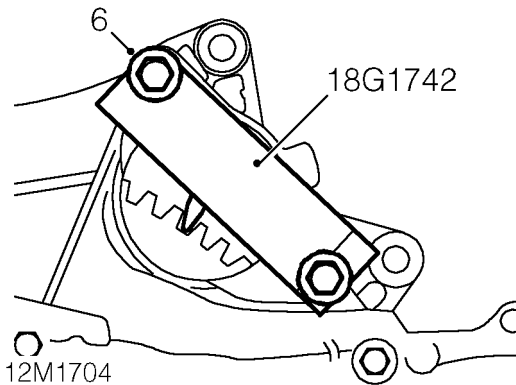
🔑 12.21.01

Remove

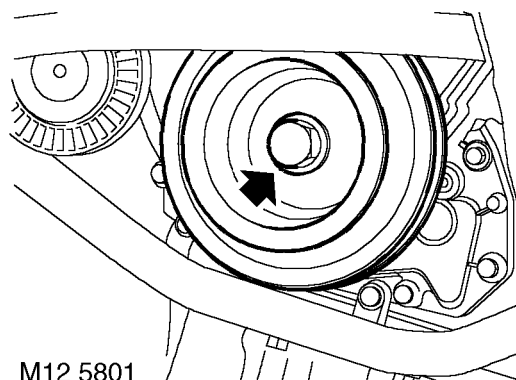
1. Disconnect battery earth lead.
2. Raise rear of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Remove road wheel.
4. Remove auxiliary drive belt.
👉 [ALTERNATOR DRIVE BELT, page 86-4.](#)
5. Remove starter motor.
👉 [STARTER MOTOR, page 86-23.](#)



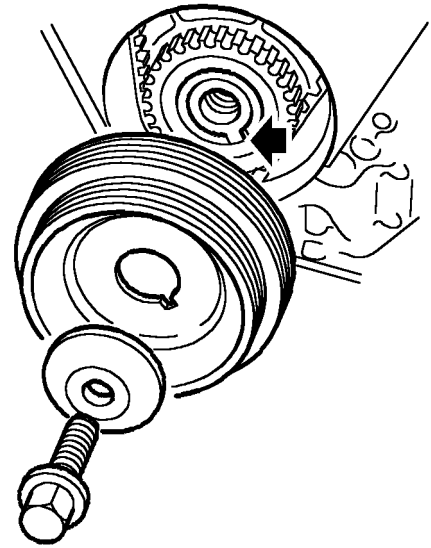
6. Lock crankshaft using tool 18G 1742.



7. Remove bolt securing crankshaft pulley and collect washer.
8. Remove crankshaft pulley.

Refit

1. Clean crankshaft to pulley mating faces.



12M1703A

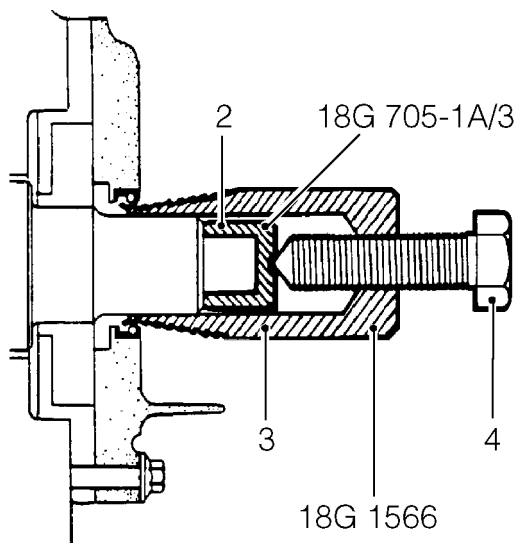
2. Fit crankshaft pulley to crankshaft, ensuring that indent on pulley locates over lug on gear.
3. Fit washer and bolt securing crankshaft pulley to crankshaft and tighten to 205 Nm.
4. Remove crankshaft locking tool 18G 1742.
5. Fit starter motor.
👉 [STARTER MOTOR, page 86-23.](#)
6. Fit auxiliary drive belt.
👉 [ALTERNATOR, page 86-3.](#)
7. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
8. Remove stands and lower vehicle.
9. Connect battery earth lead.

CRANKSHAFT FRONT OIL SEAL

🔑 12.21.14

Remove

1. Remove crankshaft timing belt gear:
👉 [TIMING BELT UPPER FRONT COVER, page 12-44.](#)

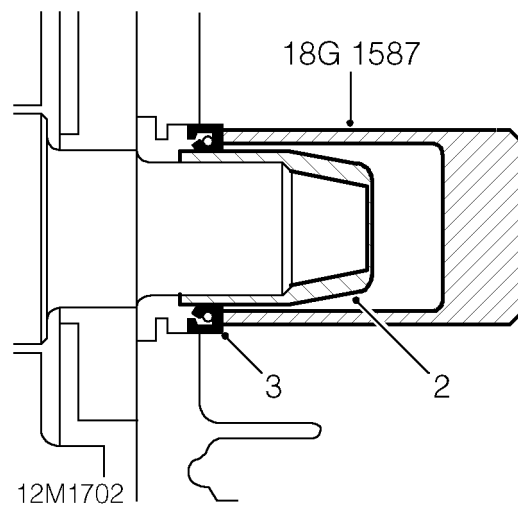


12M1438

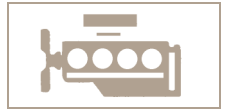
2. Fit thrust button tool 18G 705-1A/3 to crankshaft.
3. Ensure bore of tool is burr free, fit and tighten tool 18G 1566. into crankshaft front oil seal.
4. Tighten centre screw of tool to remove oil seal.
5. Remove thrust button from crankshaft.

Refit

1. Use lint free cloth to thoroughly clean seal recess in oil pump and running surface on crankshaft. Clean crankshaft pulley and gear.




2. Fit protector, from oil seal kit, over crankshaft end.
3. Fit new oil seal to crankshaft using tool 18G 1587. Remove protector.
CAUTION: Oil seal must be fitted dry.
4. Fit crankshaft timing belt gear:
👉 [TIMING BELT UPPER FRONT COVER, page 12-44.](#)

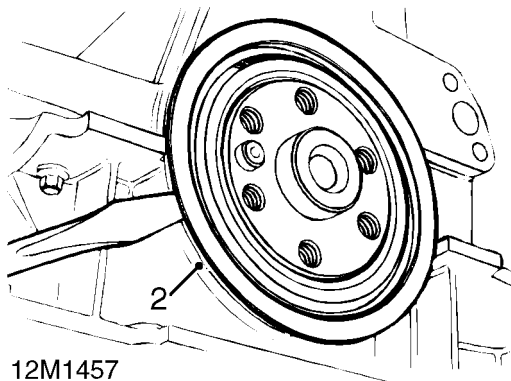


CRANKSHAFT REAR OIL SEAL

🔑 12.21.20

Remove

1. Remove flywheel.
 [FLYWHEEL, page 12-31.](#)



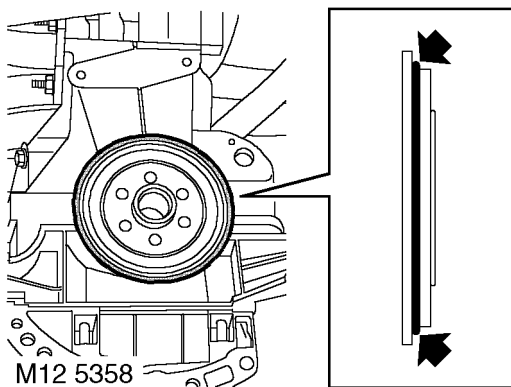
12M1457

2. Using a burr free flat ended screwdriver, ease crankshaft rear oil seal from cylinder block, remove and discard seal.

CAUTION: Do not mark sealing surface on crankshaft.

Refit

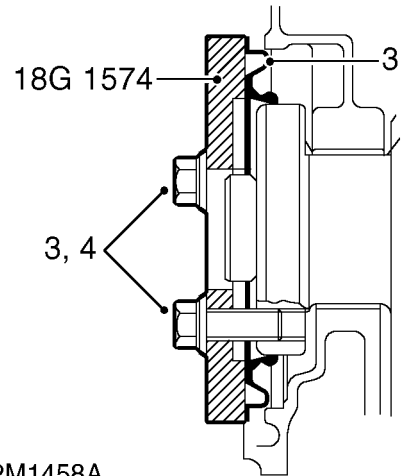
1. Remove all traces of oil and sealant from cylinder block, oil seal recess and running surface of crankshaft.




M12 5358

2. Apply a continuous bead of sealant, Part No. GAC 8000 to replacement oil seal as shown.

CAUTION: Do not apply oil or grease to any part of oil seal or running surface of crankshaft. Seal must be fitted immediately after applying sealant.



12M1458A

3. Position oil seal to cylinder block and fit oil seal replacer tool 18G 1574, retain tool using 3 slave bolts.
4. Evenly tighten oil seal replacer bolts to press oil seal squarely into cylinder block.
5. Leave oil seal replacer tool and oil seal in clamped position for one minute to allow oil seal to relax.
6. Remove oil seal replacer tool.
7. Allow sealant to cure for a minimum of 30 minutes before topping-up oil or rotating crankshaft.
8. Fit flywheel.
 [FLYWHEEL, page 12-31.](#)

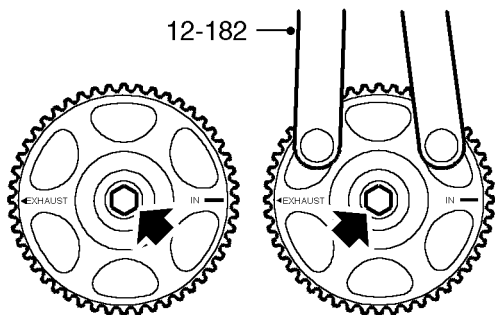
ENGINE

GASKET - CYLINDER HEAD

🔑 12.29.02

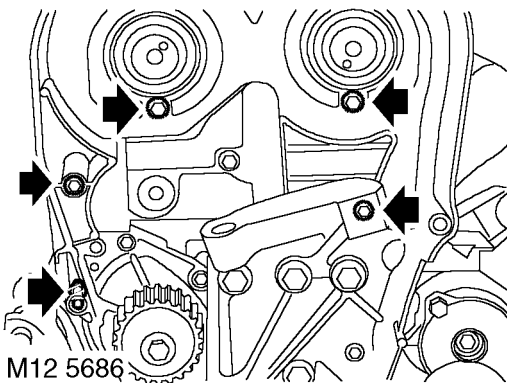
Remove

1. Drain cooling system.
👉 [DRAIN AND REFILL](#), page 26-1.
2. Remove camshaft timing belt.
👉 [TIMING BELT - CAMSHAFT](#), page 12-39.
3. Remove inlet manifold gasket.
👉 [GASKET - INLET MANIFOLD](#), page 30-6.

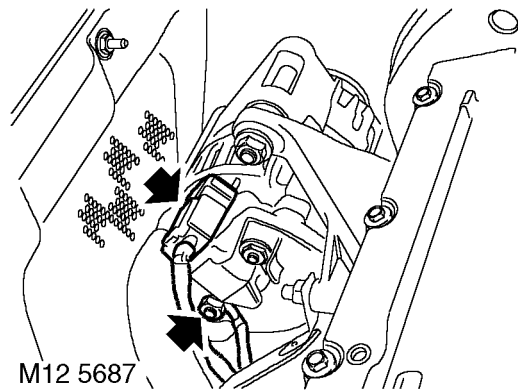


M12 5758

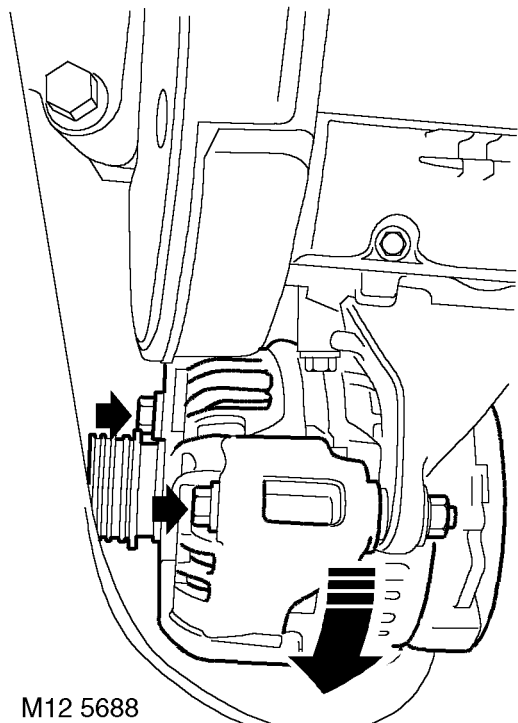
4. Using 12-182 to restrain camshaft gears, remove bolts securing camshaft gears and collect washers.
5. Remove camshaft gears.



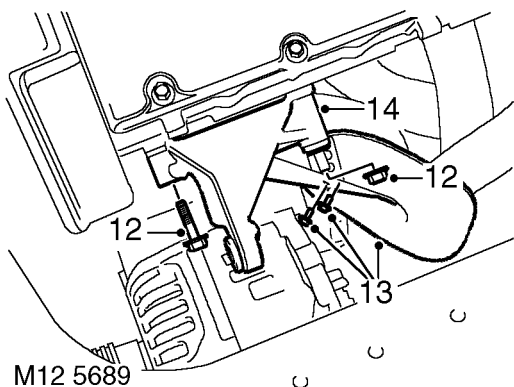
6. Remove 5 bolts from timing belt rear cover.
7. Remove rear cover.
8. Remove camshaft cover gasket.
👉 [GASKET - CAMSHAFT COVER](#), page 12-15.



9. Remove nut securing alternator lead and release lead, disconnect alternator multiplug.

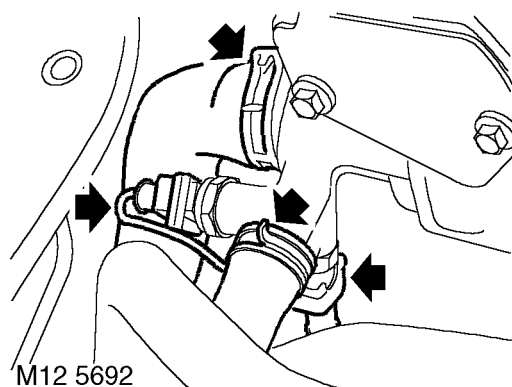


10. Remove alternator top bolt and loosen lower bolt.
11. Position alternator forwards to access alternator bracket.



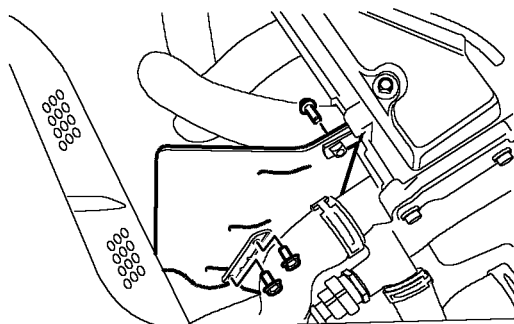
M12 5689

12. Remove nut and bolt securing alternator bracket.
13. Remove 2 bolts securing exhaust heat shield and remove heat shield.
14. Collect alternator bracket.



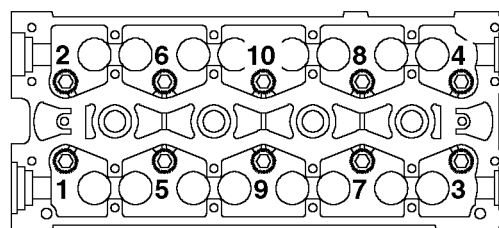
M12 5692

18. Loosen clips and disconnect 2 coolant hoses from cylinder head.
19. Disconnect 2 multiplugs from coolant sensors.



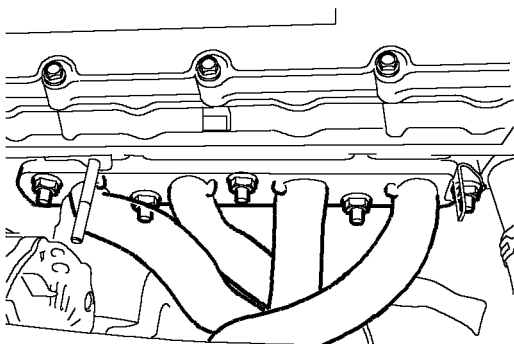
M12 5690

15. Remove 3 bolts securing coolant hose heat shield and remove heat shield.



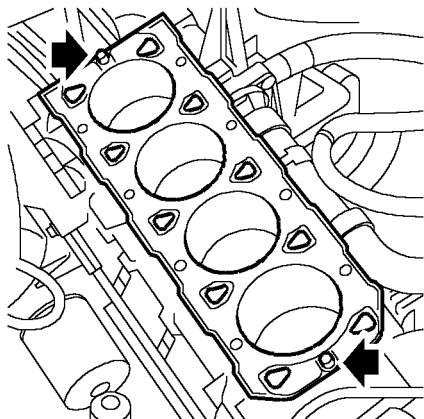
M12 5693

20. Loosen 10 × E12 cylinder head to oil rail bolts in sequence shown. Remove bolts and store in fitted order.
21. Remove cylinder head assembly from cylinder block, use assistance.



M12 5691

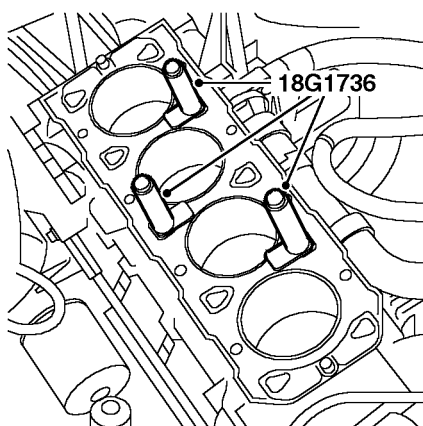
16. Remove 5 flange nuts securing exhaust manifold to cylinder head.
17. Release exhaust manifold from cylinder head. Position manifold aside, remove and discard gasket.



M12 5694

22. Remove cylinder head gasket from cylinder block and discard.


CAUTION: Do not rotate crankshaft with cylinder head removed.



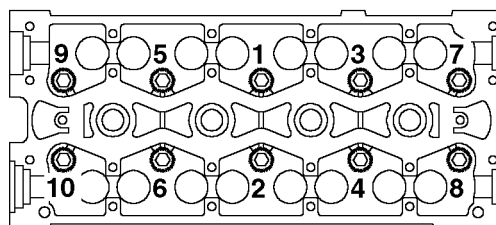
M12 5695

23. Fit tool 18G 1736 to cylinder block and secure using head bolts as shown.

Refit

1. Remove head bolts and tools 18G 1736 from cylinder block.
2. Clean joint surfaces on cylinder head and block, clean oil and coolant passages. Clean exhaust manifold and cylinder head joint surfaces. De-carbonise piston crowns and cylinder head if necessary.
3. Inspect cylinder head bolts,  **GASKET - CYLINDER HEAD - UNIT REMOVED, page 12-51.**
4. Wash cylinder head bolts and wipe dry. Oil threads and under head of bolts.
5. Fit new cylinder head gasket to cylinder block.

6. Fit cylinder head to cylinder block carefully locating dowels, use assistance.
7. Carefully enter cylinder head bolts, **DO NOT DROP.** Screw bolts into place by hand.

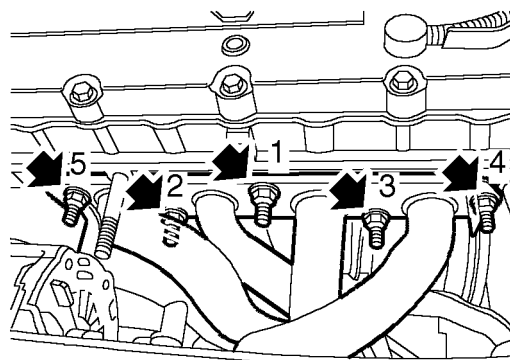


M12 5696

8. Working in the sequence shown, progressively tighten the cylinder head bolts to 20 Nm. Use a suitable angle torque gauge and tighten all bolts in sequence 180°. Then tighten all bolts in sequence a further 180°.

CAUTION: If bolt is over tightened, back off 90° and realign.

9. Connect multiplugs to coolant sensors.
10. Position coolant hoses to cylinder head and tighten clips.
11. Fit new exhaust manifold gasket to cylinder head.




M30 0856

12. Position manifold and working in the sequence shown, tighten nuts to 45 Nm.
13. Position coolant hose heat shield, fit bolts and tighten to 9 Nm.
14. Position alternator bracket.
15. Position exhaust heat shield, fit bolts and tighten to 9 Nm.
16. Tighten alternator bracket nut and bolt to 25 Nm.
17. Align alternator to bracket, fit top bolt, tighten both bolts to 45 Nm.
18. Connect alternator multiplug and lead, secure lead with nut.




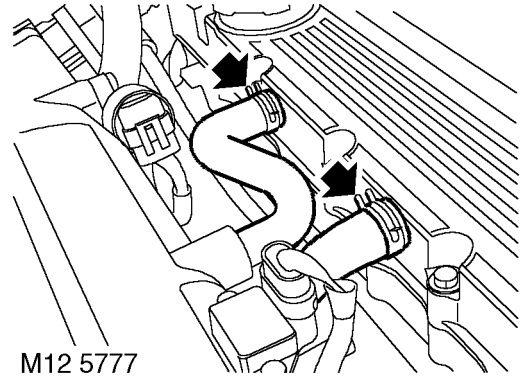
19. Fit timing belt rear cover and secure with bolts.
20. Fit camshaft cover gasket.
 **GASKET - CAMSHAFT COVER, page 12-15.**
21. Clean mating surfaces of camshaft and gears.
22. Fit gears to camshafts.
23. Using tool 12-182 to restrain gears, fit bolts and washers and tighten to 65 Nm.
24. Check timing of gears and adjust if necessary.
25. Fit tool 18G 1570 to gears.
26. Fit inlet manifold gasket.
 **GASKET - INLET MANIFOLD, page 30-6.**
27. Fit camshaft timing belt.
 **TIMING BELT - CAMSHAFT, page 12-39.**
28. Refill cooling system.
 **DRAIN AND REFILL, page 26-1.**

GASKET - CAMSHAFT COVER

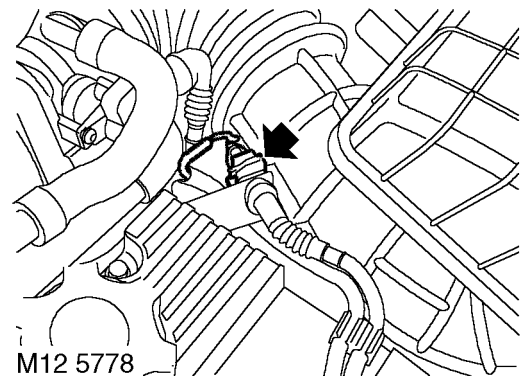
 **12.29.40**

Remove

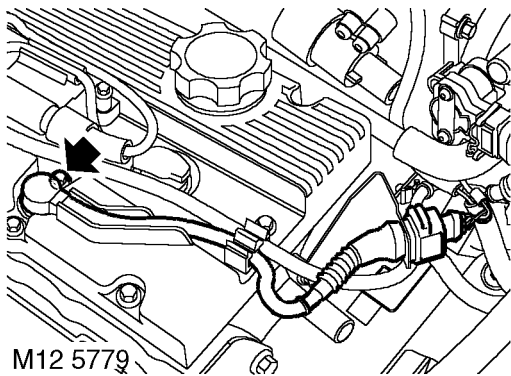
1. Disconnect battery earth lead.
2. Remove coil set.
 **IGNITION COIL, page 18-18.**



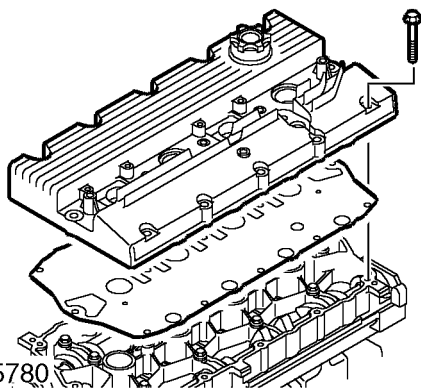
3. Release 2 clips and disconnect 2 breather hoses from camshaft cover.



4. Release coil harness from support bracket and position aside.



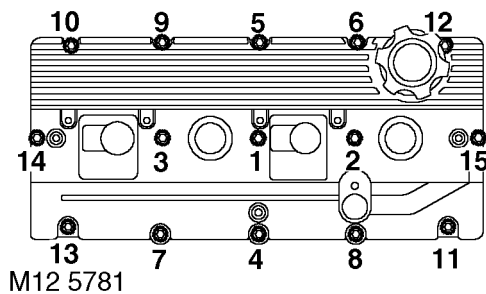
5. Remove bolt securing CMP sensor to cylinder head and position aside.




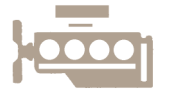
6. Progressively loosen and remove 15 bolts securing camshaft cover.
7. Remove camshaft cover.
8. Remove gasket.

Refit

1. Clean mating surfaces of camshaft cover and carrier.
2. Clean inside of camshaft cover. If necessary, wash oil separator elements in solvent and blow dry.
3. Fit new gasket with '**EXHAUST MAN SIDE**' mark towards exhaust manifold.
4. Fit camshaft cover to camshaft carrier.





5. Fit bolts and working in sequence illustrated, tighten progressively to 9 Nm.
6. Fit CMP sensor, fit bolt and tighten to 9 Nm.
7. Fit coil set.
 [IGNITION COIL, page 18-18.](#)
8. Fit coil harness to support bracket.
9. Connect breather hoses and secure with clips.
10. Connect battery earth lead.

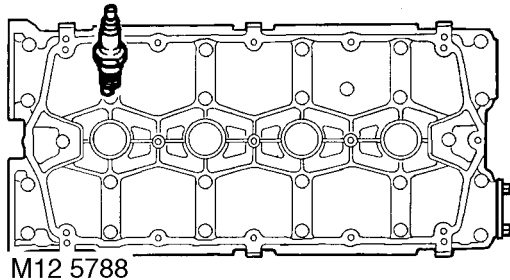


VALVE STEM OIL SEAL

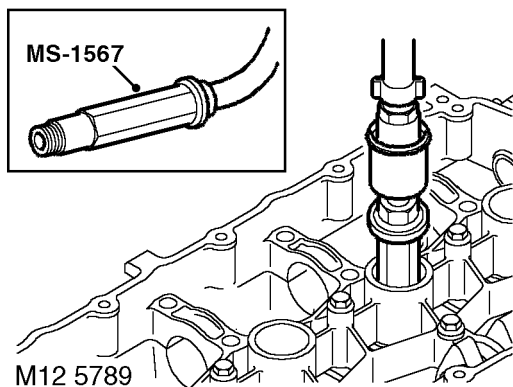
🔑 12.30.26

Remove

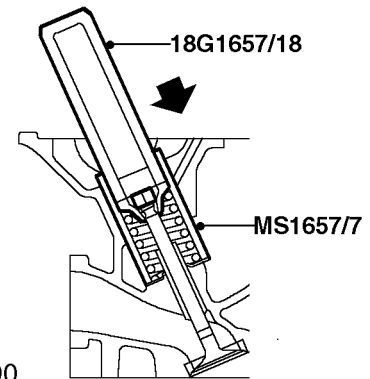
1. Disconnect battery earth lead.
2. Remove inlet and exhaust camshafts.
 [CAMSHAFT REAR OIL SEAL - EXHAUST, page 12-4.](#)
 [CAMSHAFT REAR OIL SEAL - INLET, page 12-8.](#)



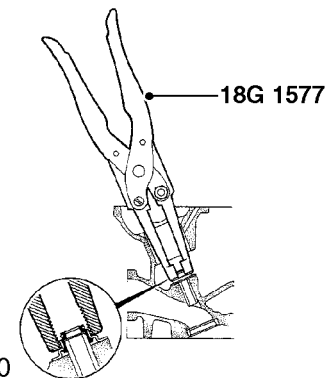
3. Using a 16 mm spark plug socket, remove 4 spark plugs.



4. Fit and tighten air line adaptor tool MS 1567 into spark plug hole.
5. Connect an airline to adaptor and apply air pressure.
6. Remove hydraulic tappet from each exhaust valve.
CAUTION: Retain tappets in fitted order and store inverted to prevent oil loss.



7. Fit tool 18G 1657/18 and tool MS 1657/7 to valve spring cap.
8. Strike head of tool firmly with hammer to release valve spring collets.
9. Remove collets from magnetic end of tool.
10. Remove valve spring cap and spring.



11. Use tool 18G 1577 to remove valve stem oil seal.
12. Repeat operations to remove second exhaust valve oil seal.

Refit

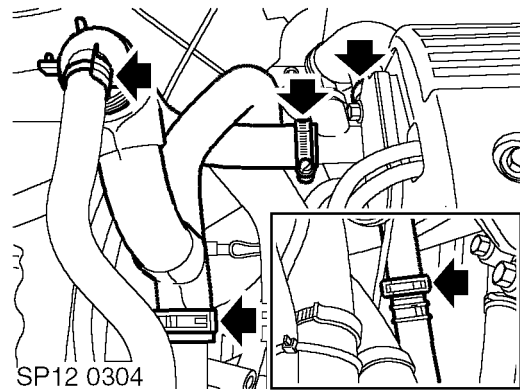
1. Lubricate new valve stem oil seal with engine oil.
2. Use tool 18G 1577 to fit new oil seals.
3. Fit valve spring and spring cap to each valve.

ENGINE & GEARBOX ASSEMBLY - REMOVE FOR ACCESS & REFIT

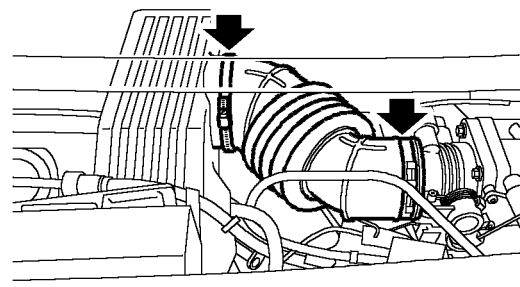
🔑 12.37.01.99

Remove

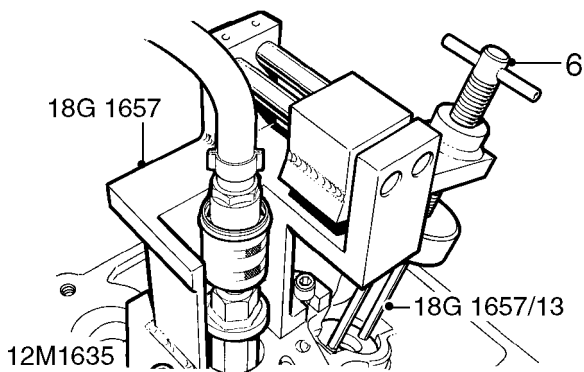
1. Position vehicle on a 2 post ramp.
2. Disconnect battery earth lead.
3. Remove engine compartment access panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
4. Remove engine cover.
👉 [ENGINE COVER, page 12-27.](#)
5. Drain cooling system.
👉 [DRAIN AND REFILL, page 26-1.](#)



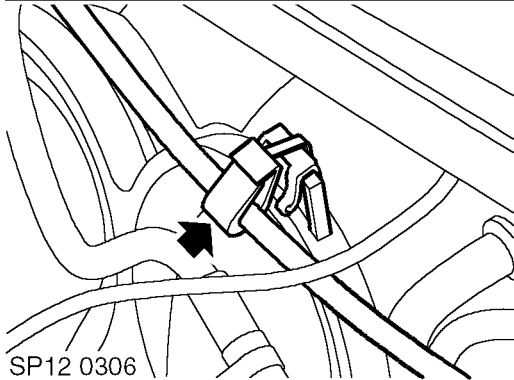
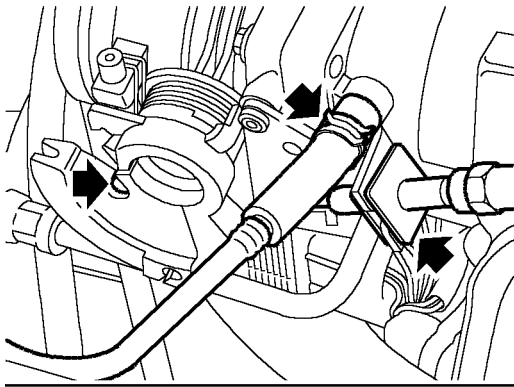
6. Release clip and disconnect hose from coolant outlet elbow on cylinder head.
7. Release 3 clips and disconnect coolant hose assembly between coolant outlet elbow, heater coolant rail and feed hose to expansion tank.
8. Release clip and disconnect hose from coolant rail.



9. Release clips securing air intake hose between air cleaner and throttle body, remove intake hose.

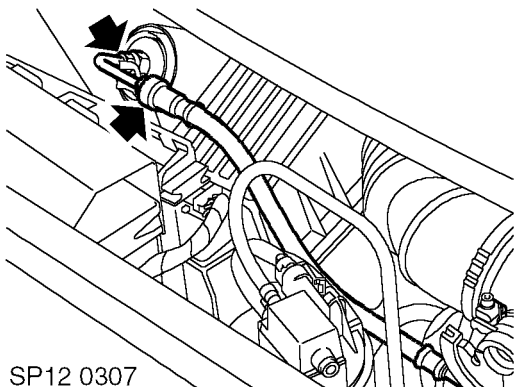


4. Assemble tool 18G 1657 over exhaust valve.
5. Locate valve spring cap with compressor tool 18G 1657/13.
6. Screw down valve spring compressor until valve stem collet groove is level with top face of spring cap.
7. Attach collets to end of a small flat screwdriver with grease and locate collets in valve stem groove.
8. Unscrew valve spring compressor ensuring collets are correctly located in valve spring cap.
9. Slide head of tool 18G 1657 along to second exhaust valve position.
10. Repeat refit operations on second valve.
11. Remove valve spring compressor tool 18G 1657.
12. Lubricate tappets with clean engine oil and refit in original positions.
13. Disconnect air line from adaptor tool MS 1567.
14. Remove air line adaptor tool MS 1567.
15. Clean spark plugs and set gaps to 1.00 mm.
16. Fit inlet and exhaust camshafts.
👉 [CAMSHAFT REAR OIL SEAL - EXHAUST, page 12-4.](#)
👉 [CAMSHAFT REAR OIL SEAL - INLET, page 12-8.](#)
17. Connect battery earth lead.



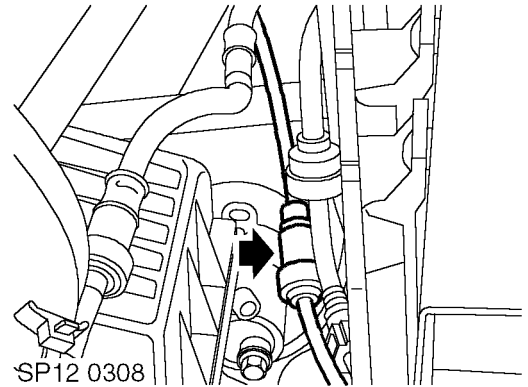
SP12 0306

10. Release clip and evaporative emission hose from throttle body.
11. Disconnect throttle cable from abutment bracket and throttle cam.
12. Release throttle cable from inlet manifold clip and position cable aside.



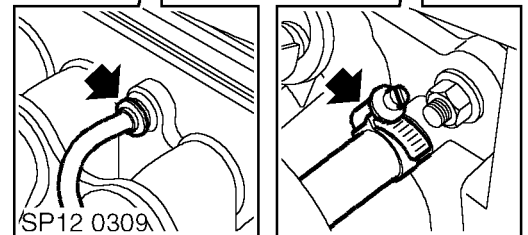
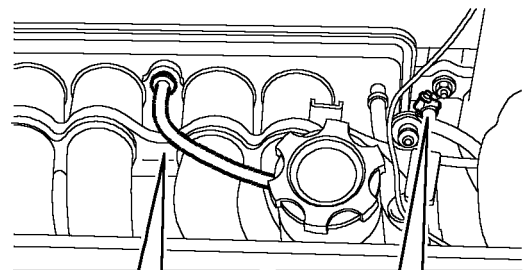
SP12 0307

13. Position absorbent cloth around fuel filter; loosen union to relieve fuel pressure, retighten union to 30 Nm.
14. Release quick release connector securing fuel hose to fuel filter outlet pipe.



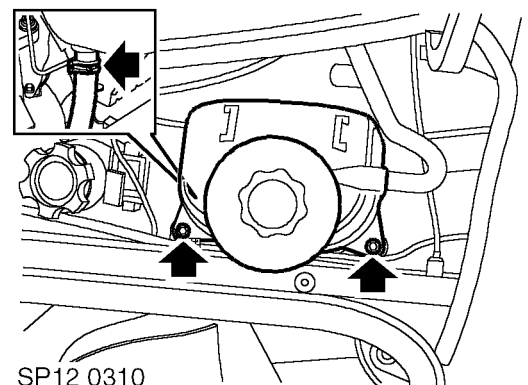
SP12 0308

15. Release quick release connector securing fuel return hose to fuel return pipe.



SP12 0309

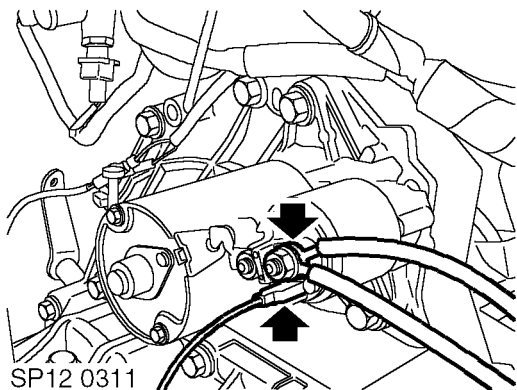
16. Depress locking collar and release brake servo pipe from inlet manifold.
17. Release clip and coolant hose from inlet manifold.



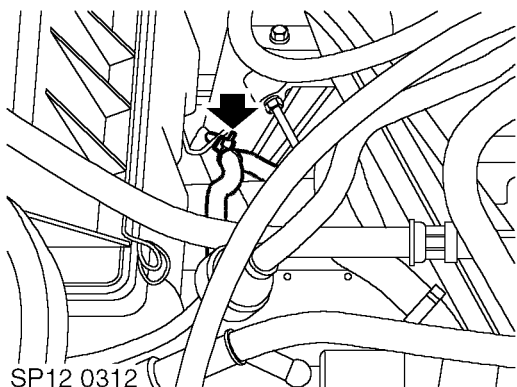
SP12 0310

18. Remove 2 bolts securing expansion tank to body, raise expansion tank, release clip and disconnect hose from expansion tank.

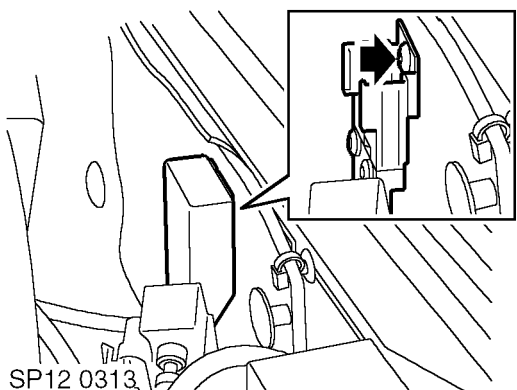
ENGINE



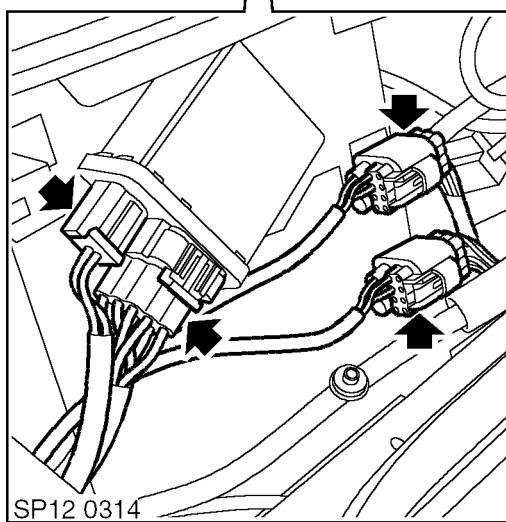
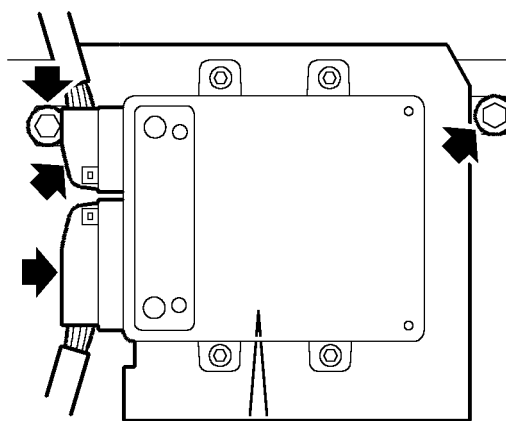
19. Remove nut and disconnect battery lead from starter motor solenoid.
20. Disconnect Lucar connector from starter motor solenoid.



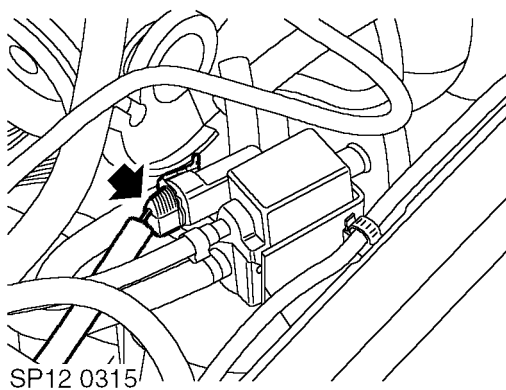
21. Release clip securing battery lead to clutch slave cylinder mounting bracket.



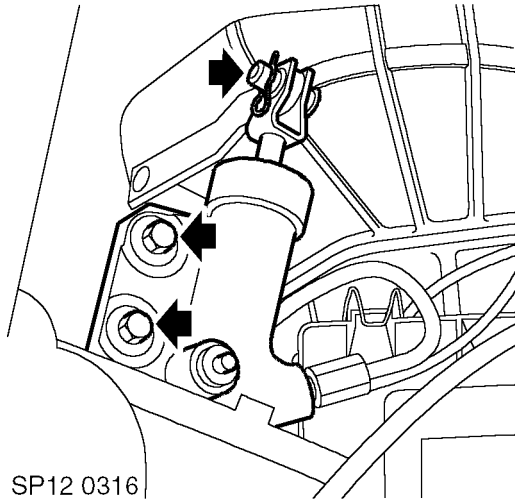
22. Remove cover and main fuse from fuse holder. Remove screw securing fuse holder to body, position fuse holder aside.



23. Remove inner bolt and loosen outer bolt securing ECM mounting bracket.
24. Disconnect multiplugs from ECM.
25. Disconnect engine harness and relay unit multiplug, where fitted.

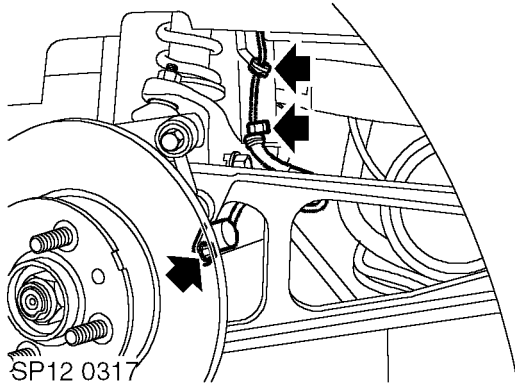


26. Disconnect multiplug from emission canister purge control valve.



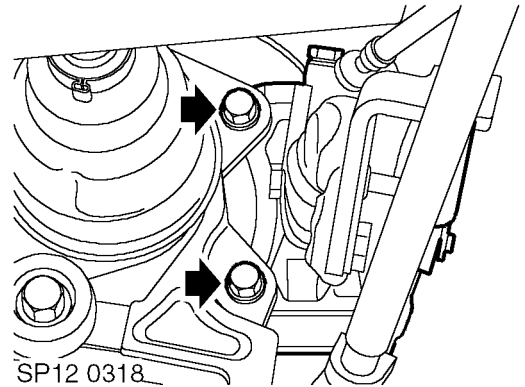
SP12 0316

27. Remove 'R' clip, washer and clevis pin securing clutch slave cylinder push rod to release lever and remove push rod.
28. Remove 2 bolts securing clutch slave cylinder to mounting bracket, position slave cylinder aside.
29. Raise vehicle on ramp.
30. Remove road wheel(s).
31. Drain gearbox oil.



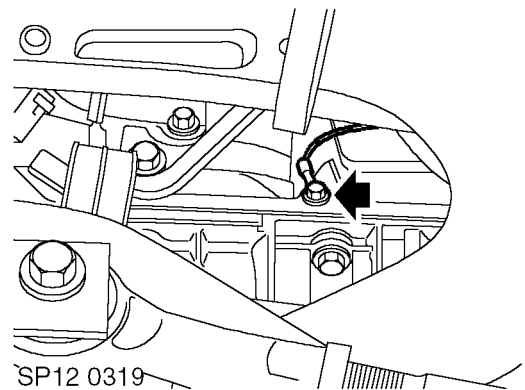
SP12 0317

32. Remove bolts securing LH and RH ABS sensors to hubs, release sensors and collect sensor spacers.
33. Release LH and RH ABS sensor lead grommets and sensor leads into brackets and clips on each subframe turret and upper suspension arms.




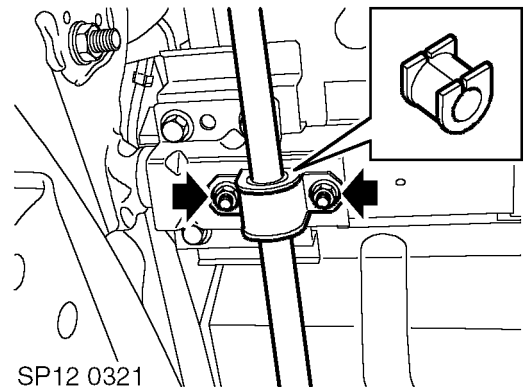
SP12 0318

34. Remove bolts securing LH and RH brake calipers to hubs. Release calipers and tie aside.



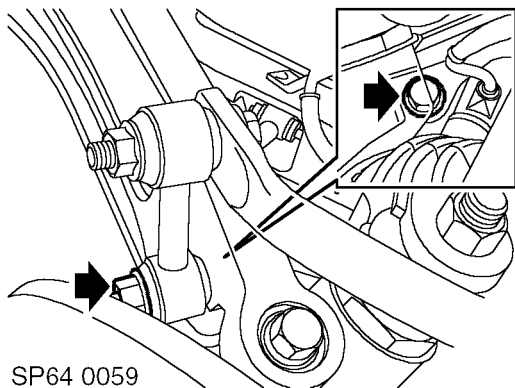
SP12 0319

35. Remove bolt securing engine earth lead to cylinder block, position earth lead aside.
36. Remove heat shield - rear silencer:
 [SILENCER HEAT SHIELD](#), page 30-3.



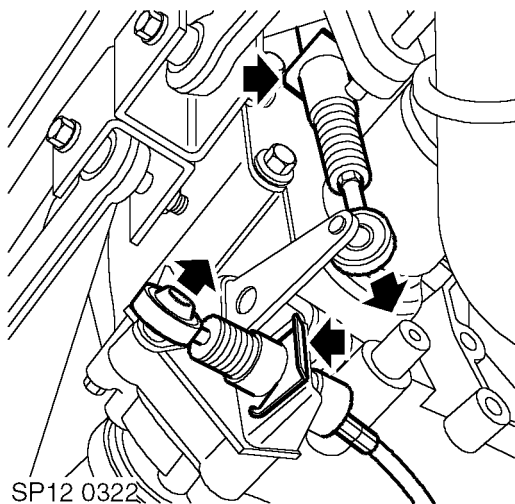
SP12 0321

37. Remove 4 nuts securing anti-roll bar clamps and rubber mountings to subframe. Collect clamps and rubber mountings.



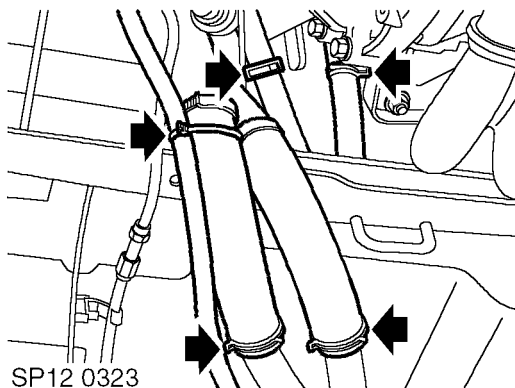
SP64 0059

38. Remove nuts and bolts securing LH and RH anti-roll bar links to trailing arms and remove anti-roll bar.



SP12 0322

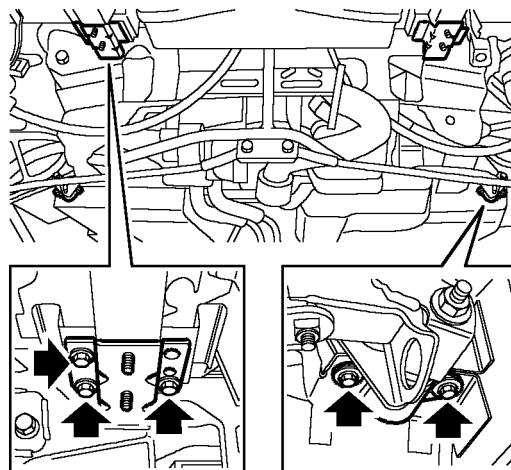
39. Remove and discard clips securing selector cables to gearbox abutment brackets.
40. Release selector cables from selector linkage and position cables aside.



SP12 0323

41. Release clips and disconnect coolant hoses from coolant rail underneath vehicle.

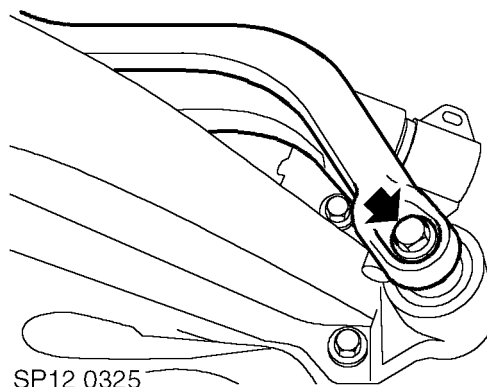
42. Release clips and disconnect heater hoses from underneath vehicle.
43. Remove cable tie securing battery cable to coolant hose, position battery cable aside.
44. Position engine table underneath rear of vehicle, lower ramp sufficiently until engine and subframe are supported by table.



SP12 0324

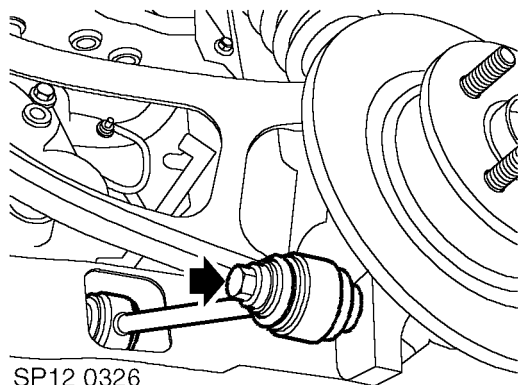
45. Remove 4 front bolts and 6 rear bolts securing subframe mountings to body.
46. Collect anti-roll bar mounting brackets.
47. Carefully raise ramp and guide engine and subframe from body.

CAUTION: Ensure that subframe/engine assembly is positioned securely on engine table.



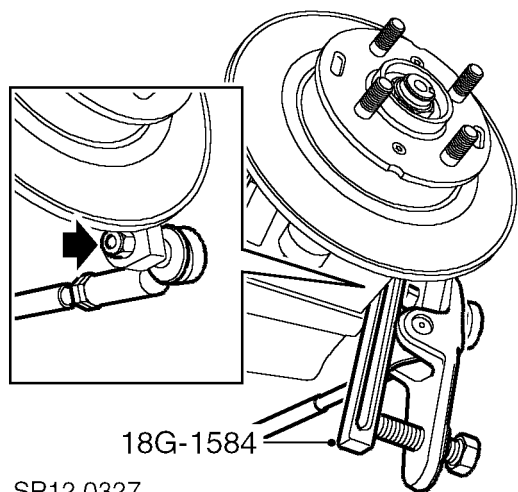
SP12 0325

48. Remove nut and bolt securing trailing arm to trailing arm bush.



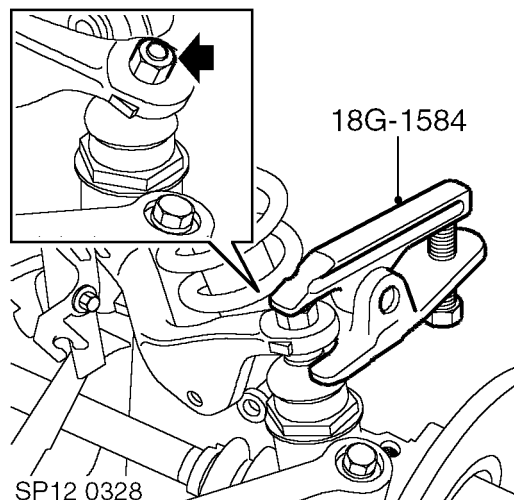
SP12 0326

49. Remove bolt securing lower link to rear hub.



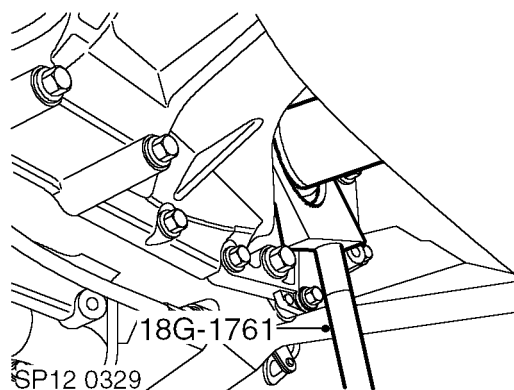
SP12 0327

50. Remove nut securing track control rod to hub.
 51. Release track control rod taper joint from hub using 18G-1584.



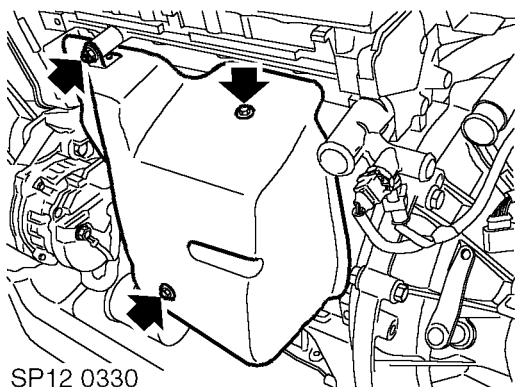
SP12 0328

52. Remove and discard lock nut securing ball joint to upper suspension arm.
 53. Fit slave nut to ball joint threads, position 18G-1584 and release ball joint taper from upper suspension arm. Remove 18G-1584 and slave nut.

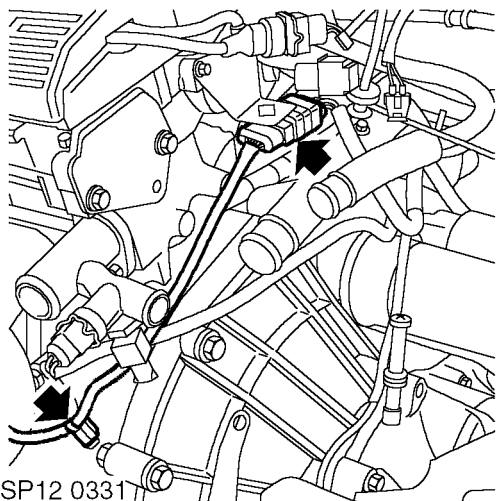


SP12 0329

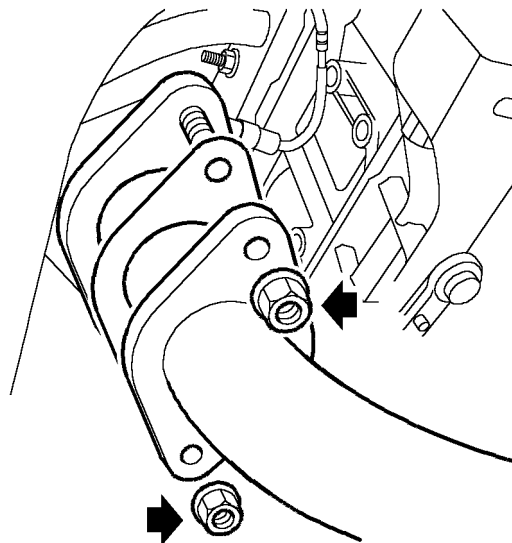
54. Release drive shaft inner joint from gearbox using 18G-1761.
 55. Remove hub assembly and drive shaft.
 56. Remove and discard circlip from drive shaft.
 57. Repeat operations for opposite hub assembly.



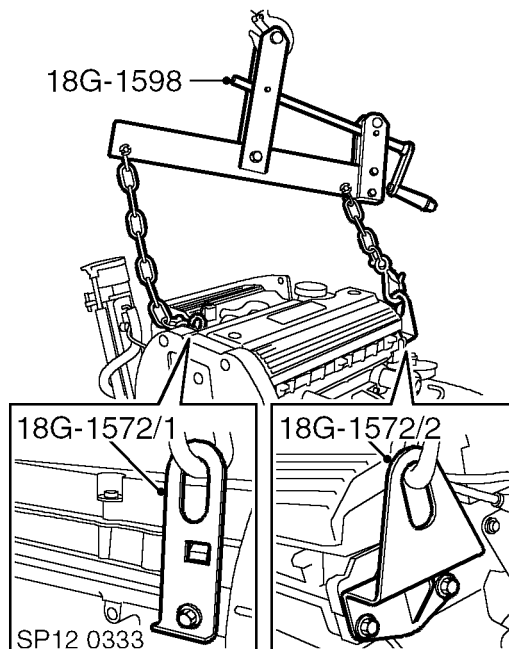
58. Remove nut and 2 speed bolts securing heat shield to cylinder head and exhaust manifold, remove heat shield.



59. Release HO₂S multiplug from bracket at rear of cylinder head and disconnect multiplug.
60. Release HO₂S harness from clip on cylinder block bracket.



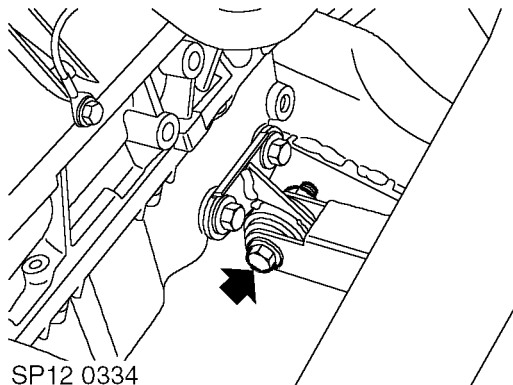
61. Remove 2 nuts securing front pipe to exhaust manifold.
62. Release front pipe from exhaust manifold and support rubber, remove front pipe, remove and discard gasket.



63. Remove 2 bolts securing exhaust camshaft rear oil seal cover plate and remove cover plate.
64. Position lifting brackets 18G-1572/1 and 18G-1572/2 to cylinder head and secure with bolts.
65. Position adjustable lifting equipment, 18G-1598 to lifting brackets.

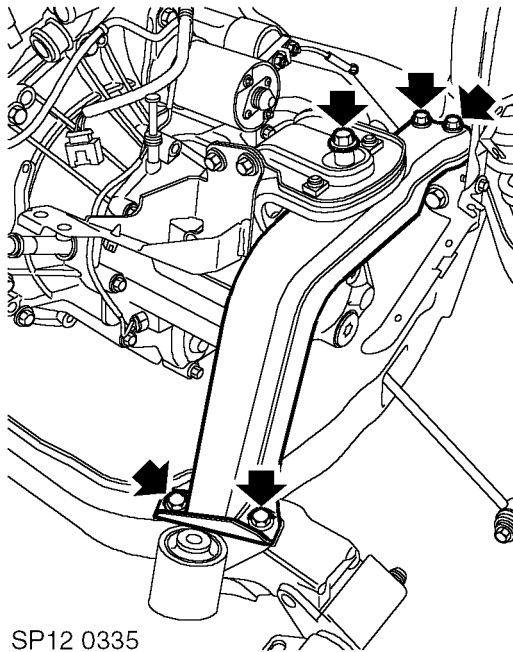


66. Connect hoist to 18G-1598, raise hoist to take weight of engine and gearbox.



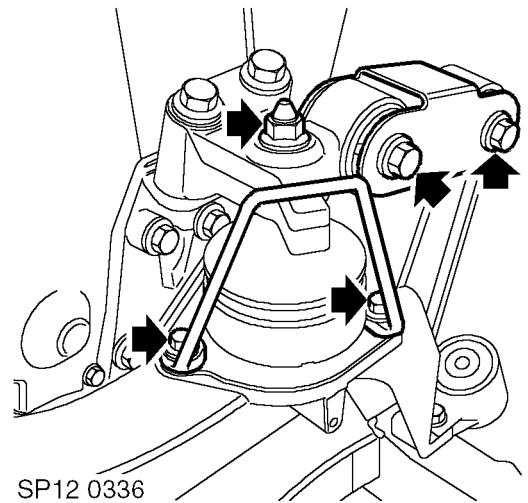
SP12 0334

67. Remove bolt securing rear engine steady to bracket on sump.



SP12 0335

68. Remove nut and bolt securing gearbox mounting to LH buttress.
69. Remove 4 bolts securing LH buttress to subframe and remove buttress.



SP12 0336


70. Remove nut securing RH engine mounting bracket to hydramount.
71. Remove bolt securing RH engine steady to engine mounting bracket. Loosen nut and bolt securing engine steady to RH buttress, pivot engine steady from mounting bracket.
72. Remove bolt, loosen remaining bolt and move engine mounting restraining loop aside.
73. With assistance, raise and remove engine and gearbox from subframe.
74. Lower engine and gearbox assembly, disconnect hoist from 18G-1598.



Refit

1. Connect hoist to 18G-1598, raise engine and gearbox assembly.
2. Position subframe assembly under engine.
3. Lower engine and gearbox assembly onto subframe, correctly position LH buttress and gearbox mounting.
4. Fit and tighten bolts securing LH buttress to subframe to 45 Nm.
5. Fit and tighten nut and bolt securing gearbox mounting to LH buttress to 82 Nm.
6. Position engine mounting restraining loop, fit and tighten bolts to 45 Nm.
7. Fit and tighten nut securing RH engine mounting bracket to hydramount to 82 Nm.
8. Position RH engine steady to engine mounting bracket, fit and tighten bolt to 85 Nm.
9. Tighten nut and bolt securing RH engine steady to buttress to 85 Nm.
10. Position rear engine steady to bracket on sump, fit and tighten bolt to 85 Nm.
11. Lower hoist and remove 18G-1598, remove lifting brackets 18G-1572/1 and 18G-1572/2.
12. Position exhaust camshaft rear oil seal cover plate, fit bolts and tighten to 12 Nm.


13. Fit a new gasket, position front pipe to exhaust manifold. Fit and tighten nuts to 50 Nm. Engage front pipe in support rubber.
14. Position heat shield, fit nut and bolts, tighten nut to 25 Nm and bolts to 10 Nm.
15. Connect HO₂S multiplug, secure multiplug in support bracket.
16. Secure HO₂S harness in clip on cylinder block bracket.
17. Clean ends of both drive shafts.
18. Fit new circlip to groove on drive shaft inner joint.
19. Wipe taper joints of both hub ball joints and upper arms.
20. Fit both hub assemblies to upper arms and engage both drive shafts in differential.

CAUTION: Pull outwards on drive shaft inner joints to check for full engagement in differential.


21. Position ball joint to upper suspension arm, fit and tighten new lock nut to 54 Nm.
22. Position lower link to rear hub, fit, but do not tighten bolt at this stage
23. Wipe tapers and seats of track control arms and hubs.
24. Position track control arms to both rear hubs, fit and tighten nuts to 38 Nm.
25. Fit bolt and nut securing trailing arm to trailing arm bush and tighten to 100 Nm.
26. Position engine table under body, carefully lower ramp over engine and gearbox assembly.
27. Align subframe mountings to body, position anti-roll bar mounting brackets and loosely fit bolts.
28. Carefully lower body remaining distance onto subframe mountings, tighten front mounting bolts to 30 Nm and rear mounting bolts to 45 Nm.
29. Raise vehicle on ramp and remove table.
30. Fit mounting rubbers to anti-roll bar, position anti-roll bar to subframe. Position clamps, fit and tighten nuts to 22 Nm.
31. Position anti-roll bar, align links to LH and RH trailing arms. Fit nuts and bolts but do not tighten at this stage.
32. Clean brake calipers and mating faces.
33. Position LH and RH brake calipers to hubs, fit and tighten bolts to 85 Nm.
34. Clean ABS sensors and mating faces.
35. Position ABS sensors and spacers, fit and tighten bolts to 10 Nm.
36. Secure LH and RH ABS lead grommets and leads into brackets and clips on each subframe turret and upper suspension arms.
37. Position engine earth lead to cylinder block, fit and tighten bolt to 25 Nm.
38. Fit heat shield - rear silencer.
 **SILENCER HEAT SHIELD, page 30-3.**
39. Position selector cables to gearbox abutment brackets and secure with new spring clips. Connect selector cables in gearbox linkages.

40. Connect hoses to coolant rail on underside of vehicle and secure with clips.
41. Connect heater hoses and secure with clips.
42. Secure battery cable to coolant hose with cable tie.
43. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
44. Lower vehicle on ramp.
45. With the weight of the vehicle on the rear suspension, tighten bolts securing lower links to rear hubs to 100 Nm.
46. With the weight of the vehicle on the rear suspension, tighten anti-roll bar link nuts and bolts to 35 Nm.
47. Connect road speed transducer multiplug.
48. Position clutch slave cylinder to mounting bracket, fit and tighten bolts to 25 Nm.
49. Position push rod to slave cylinder, fit clevis pin and washer through push rod and release lever and secure with 'R' clip.
50. Connect multiplug to emission canister purge control valve.
51. Connect engine harness and relay unit multiplugs.
52. Connect ECM multiplugs.
53. Position ECM bracket, fit and tighten bolts to 8 Nm.
54. Position main fuse holder to body and secure with screw. Fit main fuse and cover.
55. Connect battery lead to starter motor solenoid, fit and tighten terminal nut.
56. Connect Lucar to starter motor solenoid.
57. Position battery cable to clutch slave cylinder mounting bracket and secure with clip.
58. Connect coolant hose to expansion tank and secure with clip. Position expansion tank, fit and tighten bolts to 8 Nm.
59. Connect coolant hose to inlet manifold and secure with clip.
60. Connect vacuum pipe to inlet manifold.
61. Connect fuel hose to fuel filter outlet pipe.
62. Connect fuel return hose to fuel return pipe.
63. Connect throttle cable to throttle cam and abutment bracket.
64. Secure throttle cable in clip on inlet manifold.
65. Connect evaporative emission pipe to throttle body and secure with clip.
66. Position air intake hose and secure with clips.
67. Connect hose to coolant rail and secure with clip.
68. Connect hose assembly between coolant outlet elbow, heater coolant rail and expansion tank. Secure hoses with clips.
69. Connect hose to coolant elbow on cylinder head and secure with clip.
70. Fill gearbox with oil.
71. Fill cooling system.
 **DRAIN AND REFILL, page 26-1.**
72. Fit engine cover.
 **ENGINE COVER, page 12-27.**



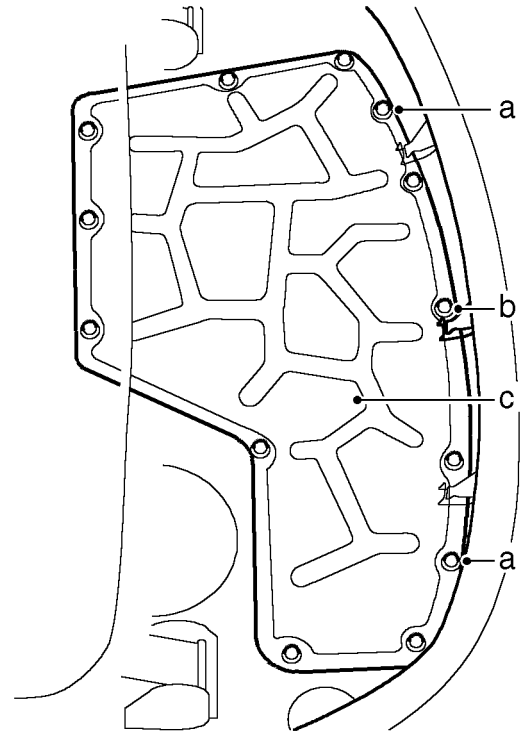
73. Fit engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
74. Connect battery earth lead.

ENGINE COVER

 12.37.04.99

Remove

1. Hoodwell trim.
2. Subwoofer:
 [SUBWOOFER ASSEMBLY, page 86-13.](#)
3. Sound deadener.



SP12 0415

4. Patchlok bolts M8 x 2 (a) - discard - 25 Nm.
5. Bolts M5 x 11 (b) - 9 Nm.
6. Engine cover (c).

ENGINE MOUNTING - REAR

🔑 12.45.17

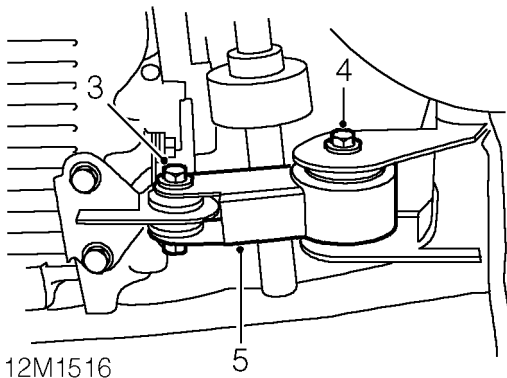
Remove

1. Raise rear of vehicle.

WARNING: Support on safety stands.

2. Support engine on jack.

CAUTION: Place block of wood between sump and jack to avoid damage occurring.



3. Remove nut and bolt securing mounting to sump.
4. Remove bolt securing mounting to subframe.
5. Remove mounting.

Refit

1. Position mounting to subframe, fit bolt but do not tighten.
2. Align mounting to sump bracket, fit bolt and tighten to 85 Nm.
3. Tighten bolt securing mounting to subframe to 85 Nm.
4. Remove jack.
5. Remove stand(s) and lower vehicle.

MOUNTING BRACKET - LH

🔑 12.45.11

Remove

1. Disconnect battery earth lead.

2. Remove air cleaner assembly.

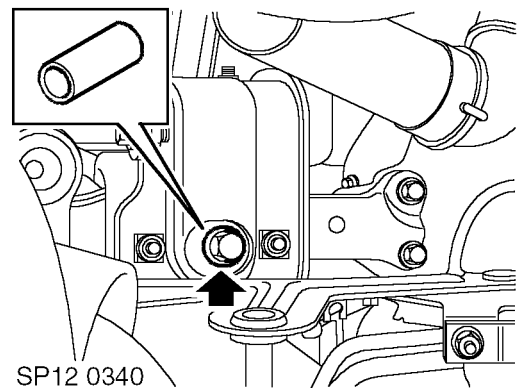
👉 **AIR CLEANER**, page 18-3.

3. Raise rear of vehicle and support on stand(s).

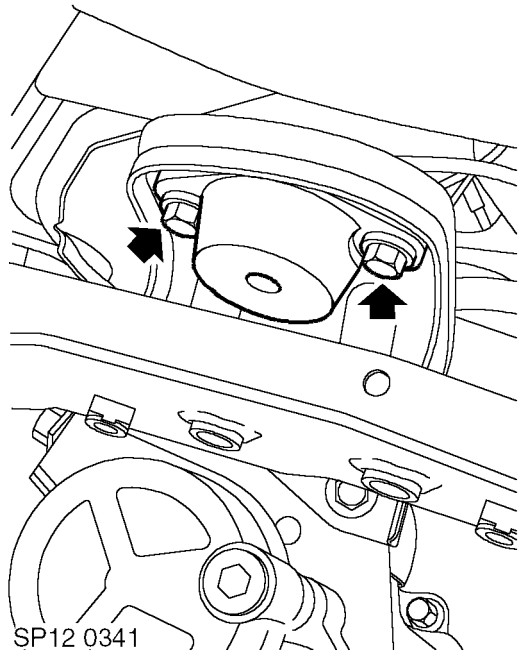
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

4. Remove LH rear road wheel.

5. Fit wooden block to jack and position jack to support gearbox.




6. Remove centre nut and bolt securing mounting to LH buttress.
7. Remove distance piece from centre of mounting.
8. Raise jack sufficiently to gain access to bolts securing mounting to gearbox bracket.




SP12 0341

9. Remove 2 bolts securing mounting to gearbox bracket and remove mounting.



Refit

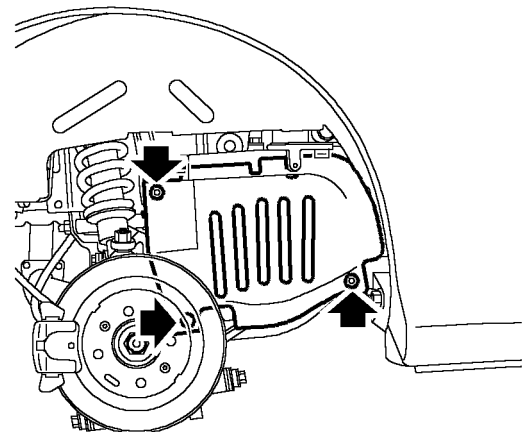
1. Position mounting to gearbox bracket, fit and tighten bolts to 45 Nm.
2. Lower and remove jack from under gearbox.
3. Fit distance piece into centre of mounting.
4. Align mounting to LH buttress, position centre bolt, fit nut, tighten nut and bolt to 82 Nm.
5. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
6. Remove stand(s) and lower vehicle.
7. Fit air cleaner assembly.
 [AIR CLEANER, page 18-3.](#)
8. Connect battery earth lead.

MOUNTING BRACKET - RH - ALL MODELS


 12.45.12

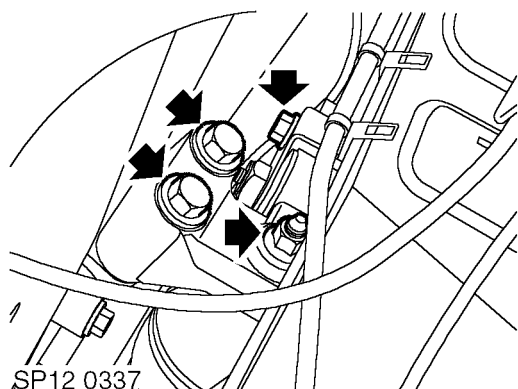
Remove

1. Disconnect battery earth lead.
2. Remove engine compartment access grille.
 [UNDERBONNET CLOSING PANEL, page 76-2-3.](#)
3. Remove engine compartment access cover.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
4. Raise rear of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
5. Remove RH rear road wheel.

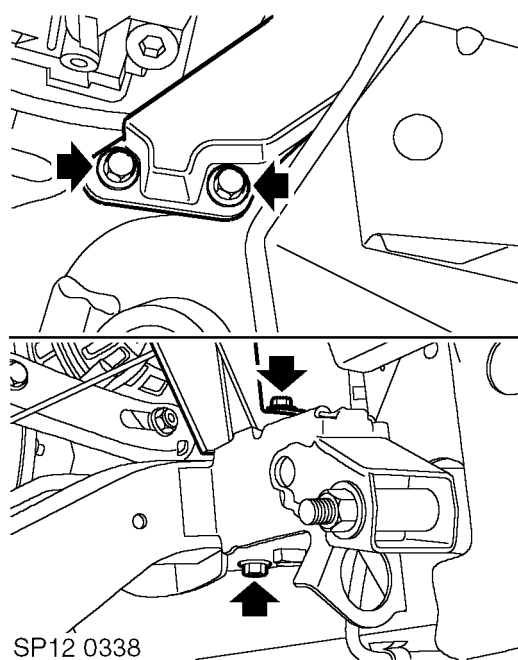


SP12 0348

6. Remove fixings securing closing panel and remove panel.
7. Remove trailing arm.
 [TRAILING ARM, page 64-11.](#)
8. Fit wooden block to jack and position jack to support engine.

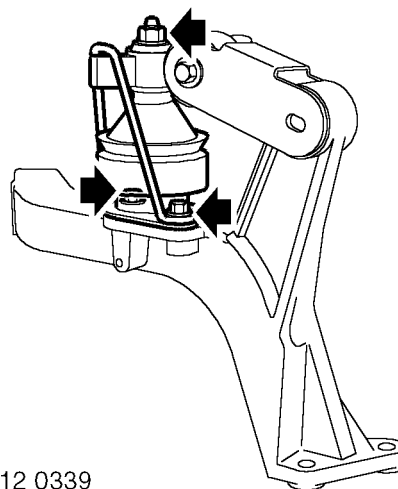


9. Remove nut and bolt securing engine steady to RH buttress.
10. Loosen nut securing engine top arm bracket to RH engine hydramount.
11. Remove 2 bolts securing top arm to engine.





12. Remove 4 bolts securing RH buttress to subframe.
13. Raise engine on jack sufficiently and manoeuvre RH buttress and engine mount assembly from vehicle.

Do not carry out further dismantling if component is removed for access only.




14. Remove 2 bolts securing hydramount to buttress, collect restraining loop and remove hydramount.
15. Remove nut and top arm bracket from hydramount.


Refit

1. Clean hydramount and mating face on buttress.
2. Position top arm bracket to hydramount, fit nut but do not tighten at this stage.
3. Position hydramount and restraining loop to buttress. fit and tighten bolts to 45 Nm.
4. Position engine steady to buttress, fit nut and bolt but do not tighten at this stage.
5. Position buttress assembly to subframe and manoeuvre into position.
6. With assistance, manoeuvre engine and align top arm to engine, fit bolts but do not tighten at this stage.
7. Lower engine on jack, align buttress to bolt holes. Fit and tighten bolts securing buttress to subframe to 45 Nm.
8. Tighten bolts securing top arm to engine to 100 Nm.
9. Tighten nut securing top arm to hydramount to 82 Nm.
10. Tighten nut and bolt securing engine steady to buttress to 85 Nm.
11. Remove jack from underneath engine.
12. Fit trailing arm.
 -  [TRAILING ARM, page 64-11.](#)
13. Position closing panel and secure with fixings.
14. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
15. Remove stand(s) and lower vehicle.
16. Fit engine compartment access cover.
 -  [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)




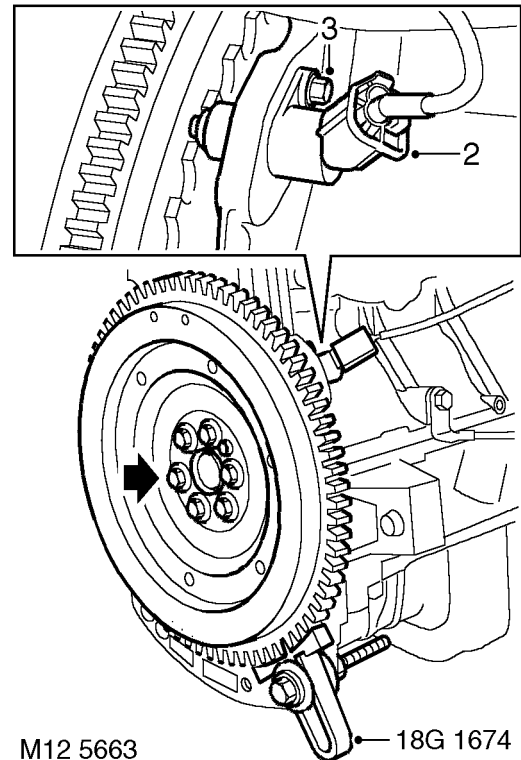
17. Fit engine compartment access grille.
 [UNDERBONNET CLOSING PANEL](#), page 76-2-3.
18. Connect battery earth lead.

FLYWHEEL

 12.53.07

Remove


1. Remove clutch assembly.
 [CLUTCH ASSEMBLY/DRIVE PLATE & RELEASE BEARING](#), page 33-3.



2. Disconnect multiplug from CKP sensor.
3. Remove bolt securing CKP sensor, release and remove sensor.
4. Fit flywheel locking tool 18G 1674, to cylinder block and secure with bolt.
5. Remove and discard 6 bolts securing flywheel to crankshaft.
6. Remove bolt and flywheel locking tool, 18G 1674, from cylinder block.
7. Remove flywheel from crankshaft.

Refit

1. Clean adhesive from threads of flywheel bolt holes in crankshaft using an old flywheel bolt, with 2 saw cuts at an angle of 45° to the bolt shank.
2. Clean flywheel and mating face of crankshaft.
3. Fit flywheel to crankshaft.
4. Fit new bolts securing flywheel to crankshaft but do not tighten at this stage.
5. Fit flywheel locking tool 18G 1674 to cylinder block and secure with bolt.

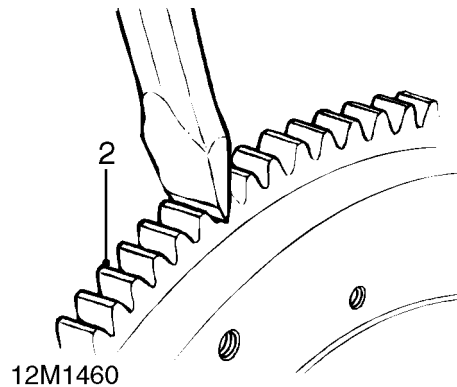
6. Working in a diagonal sequence, tighten flywheel bolts to 85 Nm.
7. Clean CKP sensor and mating face.
8. Fit CKP sensor to cylinder block, fit bolt and tighten to 6 Nm.
9. Connect multiplug to CKP sensor.
10. Fit clutch assembly.
 [CLUTCH ASSEMBLY/DRIVE PLATE & RELEASE BEARING, page 33-3.](#)

FLYWHEEL STARTER RING GEAR

 **12.53.19**


Remove

1. Remove flywheel.
 [FLYWHEEL, page 12-31.](#)



2. Apply a cold chisel in root of one of ring gear teeth, strike chisel with hammer to break ring gear.
3. Remove starter ring gear.

Refit

1. Clean flywheel and new starter ring gear.
2. Heat new starter ring gear evenly to approximately 350°C, indicated when the ring is a light blue colour.
3. Locate ring gear on flywheel and press ring gear hard against flange on flywheel.
4. Ensure ring gear is correctly seated around the complete circumference of flywheel and allow to cool.
5. Fit flywheel.
 [FLYWHEEL, page 12-31.](#)



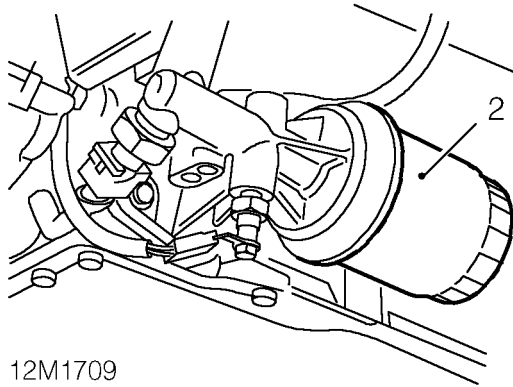
OIL FILTER

🔑 12.60.04

Remove

1. Raise rear of vehicle.

WARNING: Support on safety stands.



12M1709

2. Clean area around filter head and place a container beneath engine.
3. Using a strap wrench, unscrew and discard filter.

Refit

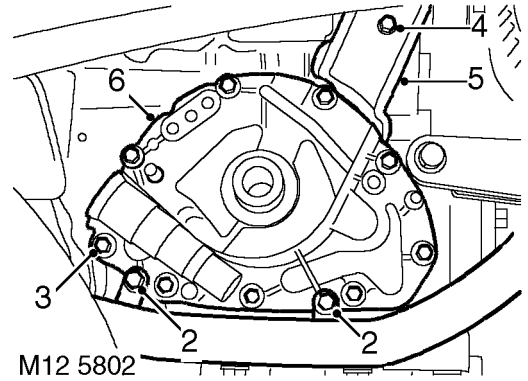
1. Clean mating face of filter head.
2. Lubricate sealing ring of new filter with clean engine oil.
3. Fit new filter and tighten by hand until it seats then tighten a further half turn.
4. Remove stand(s) and lower vehicle.
5. Top up engine with oil to specification 10w/40 until level is correct.
6. Start and run engine and check for oil leaks.
7. Stop engine, wait a few minutes, then check oil level. Top up if necessary.

GASKET - OIL PUMP

🔑 12.60.25

Remove

1. Remove camshaft timing belt.
👉 **TIMING BELT - CAMSHAFT**, page 12-39.

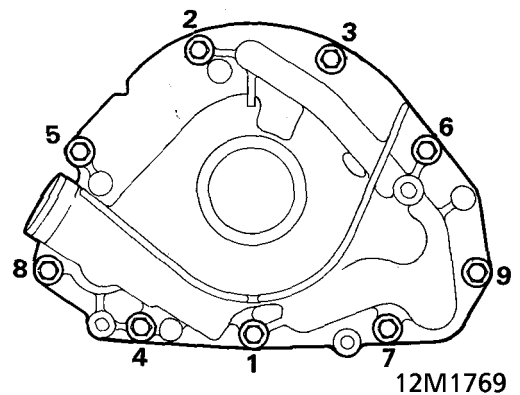


2. Remove 2 bolts securing engine harness to oil pump and move harness clear of pump.
3. Remove 9 bolts securing oil pump to cylinder block.
4. Remove lower bolt from timing belt rear cover.
5. Release rear cover to facilitate pump removal.
6. Remove pump and discard gasket.

Refit


1. Clean oil pump bolt holes in cylinder block.
2. Clean oil seal running surface on crankshaft.
3. Fit new oil pump gasket to cylinder block, align and fit oil pump.

CAUTION: Do not lubricate crankshaft front oil seal or running surface of crankshaft.



4. Fit new Patchlok bolts and tighten in sequence shown to 10 Nm.
5. Fit and tighten bolt securing timing belt rear cover to 9 Nm.



ENGINE

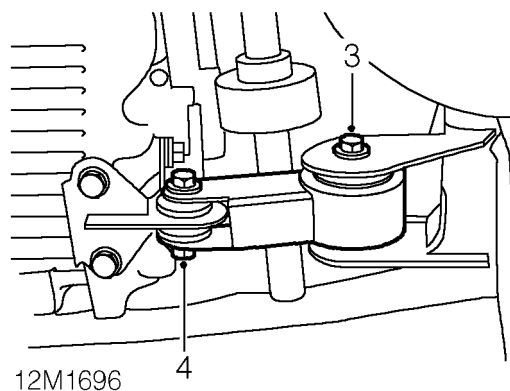
6. Align engine harness to oil pump, fit bolts and tighten to 10 Nm.
7. Fit camshaft timing belt.
 [TIMING BELT - CAMSHAFT, page 12-39.](#)

OIL SUMP

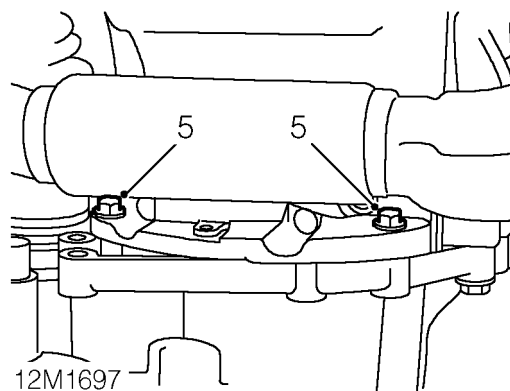
 **12.60.38**

Remove

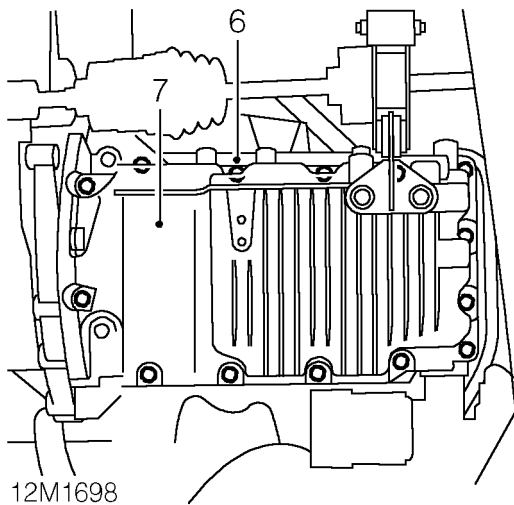
1. Remove exhaust front pipe.
 [FRONT PIPE, page 30-1.](#)
2. Drain engine oil.
 [ENGINE OIL, page 10-3.](#)



3. Loosen bolt securing engine rear mount to subframe.
4. Remove nut and bolt securing engine rear mount to engine.



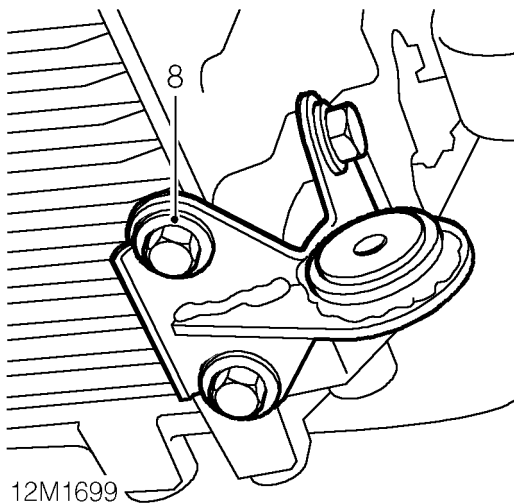
5. Remove 2 bolts securing oil sump to gearbox.



6. Remove 14 bolts securing oil sump to bearing ladder noting the fitted positions of 2 longest bolts.
7. Using a mallet, gently tap sump to release; remove sump.

CAUTION: Do not lever between sump flange and bearing ladder.

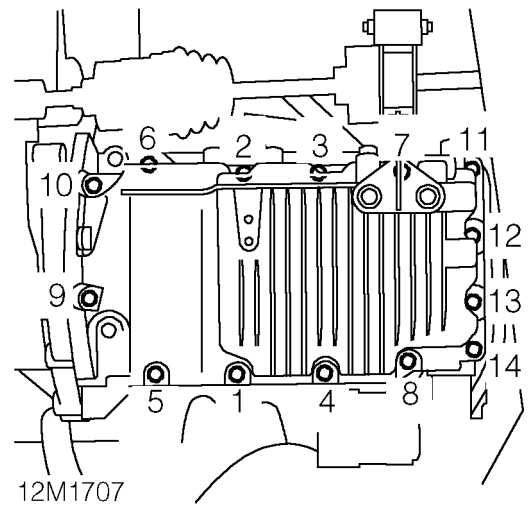
Do not carry out further dismantling if component is removed for access only.



8. Remove 4 bolts securing engine rear mount to sump, remove mount.

Refit

1. Clean inside of sump.
2. Fit mount to sump, fit bolts and tighten to 80 Nm.
3. Fit new gasket.



4. Position sump, fit 2 bolts at positions 5 and 6, tighten bolts to 4 Nm.
5. Fit 12 bolts into remaining holes ensuring that 2 longest bolts are in original fitted positions, finger tighten bolts.
6. Progressively tighten sump bolts in sequence shown to 25 Nm. Tighten sump to gearbox bolts to 45 Nm.
7. Position engine rear mount to subframe, fit bolt and tighten to 85 Nm.
8. Tighten engine rear mount to oil sump bolt to 85 Nm.
9. Fit exhaust front pipe.
[FRONT PIPE, page 30-1.](#)
10. Fill engine with oil.
[ENGINE OIL, page 10-3.](#)

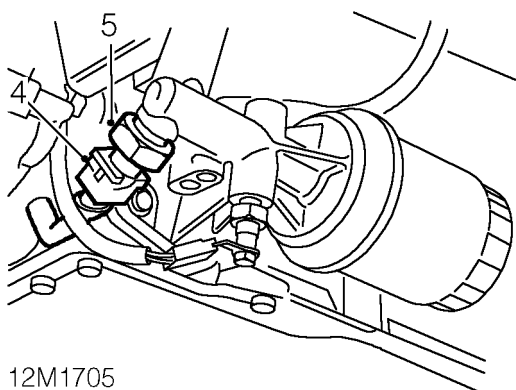
ENGINE

SWITCH - OIL PRESSURE

🔑 12.60.50


Remove

1. Disconnect battery earth lead.
2. Raise rear of vehicle.
WARNING: Support on safety stands.
3. Position container below engine oil filter to collect spillage.



4. Disconnect multiplug from oil pressure switch.
5. Remove oil pressure switch.

Refit

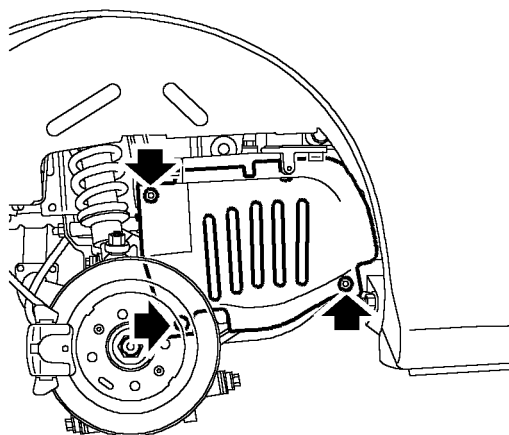
1. Clean oil pressure switch threads.
2. Fit oil pressure switch and tighten to 12 Nm.
3. Connect multiplug to oil pressure switch.
4. Remove stand(s) and lower vehicle.
5. Top-up engine oil.
 **ENGINE OIL**, page 10-3.
6. Connect battery earth lead.

OIL PRESSURE RELIEF VALVE

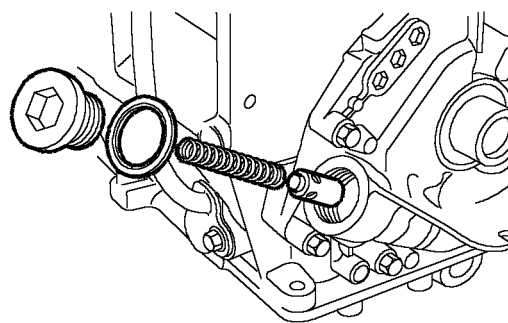
🔑 12.60.56

Remove

1. Raise rear of vehicle.
WARNING: Support on safety stands.
2. Remove road wheel(s).



3. Remove fixings securing closing panel and remove panel.




4. Remove relief valve sealing plug and sealing washer.
5. Remove spring and relief valve.


Refit

1. Clean oil pump housing.
2. Clean valve spring, valve and sealing washer.
3. Lubricate relief valve. Fit valve and spring.
4. Fit new sealing washer, fit and tighten sealing plug to 25 Nm.
5. Fit closing panel and secure with fixings.
6. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.



7. Remove stand(s) and lower vehicle.
8. Check and top up oil level.
 ENGINE OIL, page 10-3.

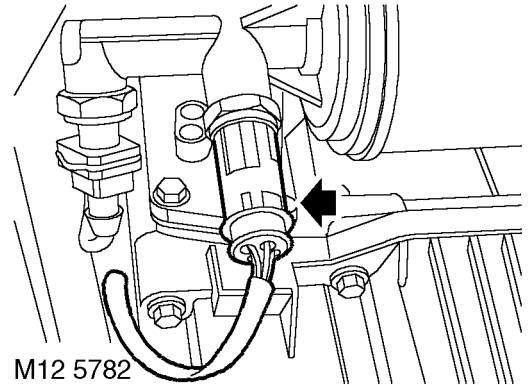
SENSOR - OIL TEMPERATURE

 12.60.65

Remove


1. Disconnect battery earth lead.
2. Raise rear of vehicle.

WARNING: Support on safety stands.



3. Disconnect multiplug from oil temperature sensor.
4. Position drain tin below switch to catch oil spillage.
5. Remove oil temperature sensor.

Refit

1. Clean oil temperature sensor threads.
2. Fit oil temperature sensor and tighten to 15 Nm.
3. Connect multiplug to oil temperature sensor.
4. Remove stand(s) and lower vehicle.
5. Connect battery earth lead.
6. Check and if necessary top up engine oil.
 ENGINE OIL, page 10-3.

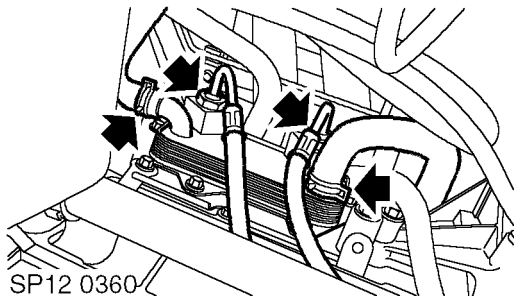
ENGINE

COOLER - ENGINE OIL

🔑 12.60.68

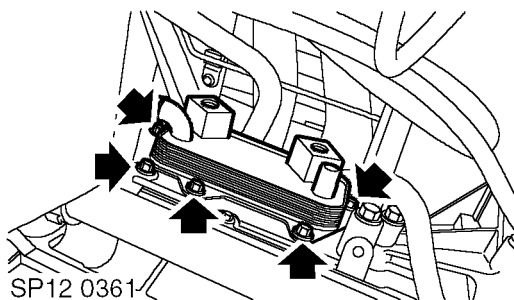
Remove

1. Disconnect battery earth lead.
2. Drain cooling system.
👉 [DRAIN AND REFILL, page 26-1.](#)
3. Raise the vehicle on a ramp.
4. Position drain tray under engine oil cooler to collect spillage.



5. Release clips and disconnect coolant hoses from engine oil cooler.
6. Loosen and remove engine oil cooler pipe unions from oil cooler; remove and discard 'O' rings.

CAUTION: Always fit plugs to open connections to prevent contamination.

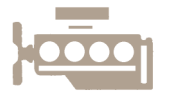


7. Remove 5 bolts securing engine oil cooler to cylinder block and remove oil cooler.

Refit

1. Clean engine oil cooler and mating face on cylinder block.
2. Position engine oil cooler to cylinder block, fit and tighten bolts to 25 Nm.
3. Remove plugs from engine oil cooler and pipe unions.
4. Use a lint free cloth and wipe oil cooler and pipe unions.
5. Lubricate new 'O' rings with clean engine oil and fit to pipe unions.

6. Correctly position pipes to oil cooler and tighten unions to 18 Nm.
7. Connect coolant hoses to oil cooler and secure with clips.
8. Lower vehicle on ramp.
9. Fill cooling system.
👉 [DRAIN AND REFILL, page 26-1.](#)
10. Connect battery earth lead.



TIMING BELT - CAMSHAFT

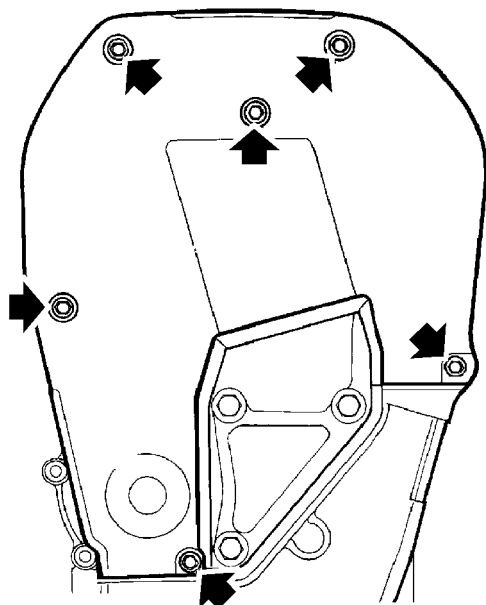
🔑 12.65.18

Remove

CAUTION: Timing belts must be replaced if cylinder head is to be removed or new timing gears are to be fitted. Timing belts must be stored and handled with care. Always store a timing belt on its edge with a bend radius greater than 50 mm. Do not use a timing belt that has been twisted or bent double as this can damage the reinforcing fibres. Do not use a timing belt if debris other than belt dust is found in the timing cover. Do not use a timing belt if partial engine seizure has occurred. Do not use a timing belt if belt mileage exceeds 45,000 (72,000 km). Do not use an oil contaminated timing belt. The cause of contamination **MUST** be rectified.

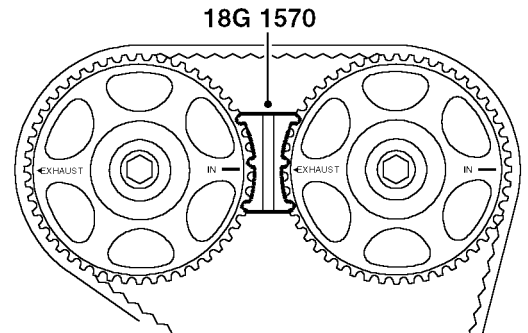
1. Disconnect battery earth lead.
 2. Raise rear of vehicle and support on stand(s).
- WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.**

3. Remove RH rear road wheel.
4. Remove RH engine hydramount assembly.
👉 [MOUNTING BRACKET - RH - ALL MODELS, page 12-29.](#)



SP12 0357

5. Remove 5 bolts securing camshaft timing belt upper cover to rear cover.
6. Loosen lower bolt securing timing belt upper cover, remove cover and collect seal.

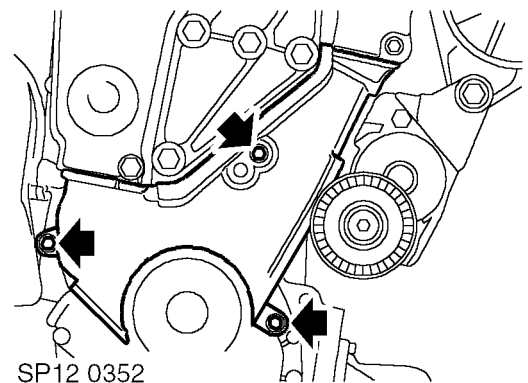


SP12 0349

7. Using a socket and extension bar on crankshaft pulley bolt, rotate crankshaft clockwise to align camshaft gear timing marks - 90° BTDC. Fit camshaft locking tool, 18G 1570 between gears.

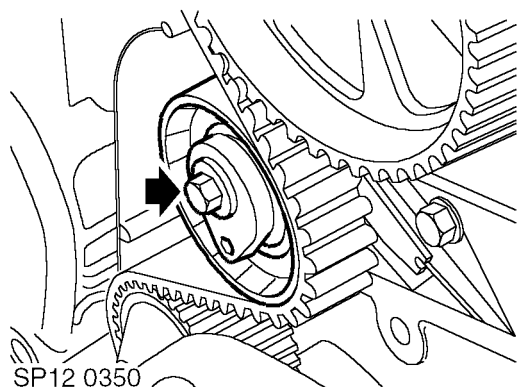
CAUTION: Never use the camshaft gear, the camshaft gear retaining bolts or the timing belt to turn the crankshaft.

8. Check that the timing mark on the crankshaft pulley is aligned with mark on timing belt lower cover.
9. If camshaft timing belt is to be refitted, mark direction of rotation on timing belt.
10. Remove crankshaft pulley.
👉 [CRANKSHAFT TIMING BELT GEAR, page 12-43.](#)

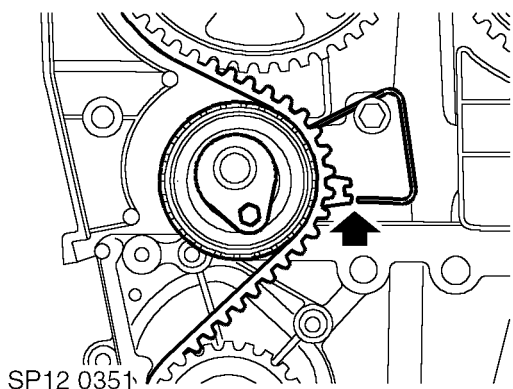


SP12 0352

11. Remove 3 bolts securing timing belt lower cover to cylinder block, remove cover and rubber seal.

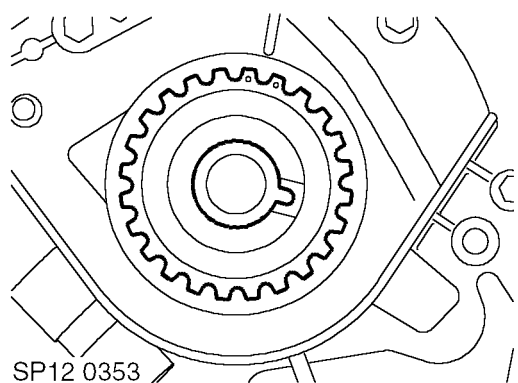


12. Remove and discard timing belt tensioner bolt.



13. Disengage index wire from its fitted position, at the same time removing timing belt tensioner.
 14. With care, release camshaft timing belt from gears and remove camshaft timing belt.

CAUTION: Ease the belt off gears using fingers only. Metal levers may damage the belt and gears. Do not rotate crankshaft with timing belt removed and cylinder head fitted.

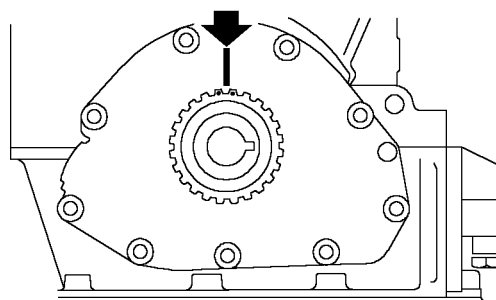


15. Remove timing belt drive gear from crankshaft.

Refit

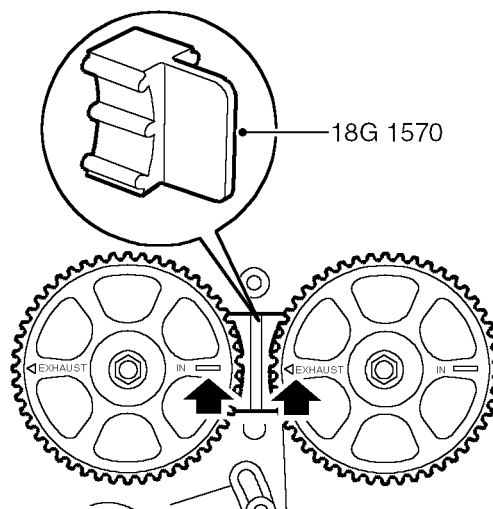
1. Clean crankshaft timing gear, camshaft timing gears, coolant pump drive gear and tensioner pulley.

CAUTION: If sintered gears have been subjected to prolonged oil contamination, they must be soaked in solvent and then thoroughly washed in clean solvent before refitting. Because of the porous construction of sintered material, oil impregnated in the gear will emerge and contaminate the belt.



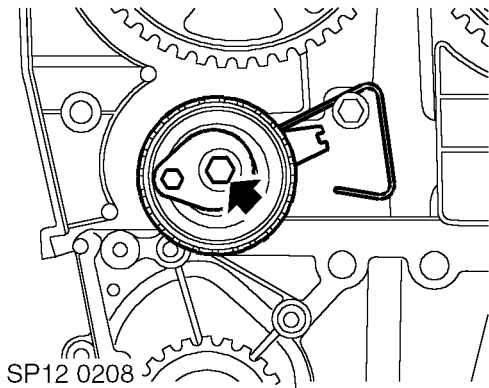
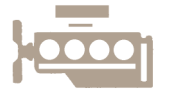
SP12 0345

2. Fit timing gear to crankshaft, ensure dots on timing gear are aligned to flange on oil pump housing.

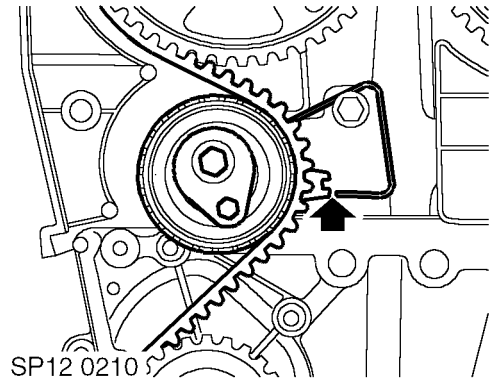


SP12 0358

3. Check that the timing marks on the camshaft gears are correctly aligned and that 18G-1570, is locking camshaft gears.



SP12 0208



SP12 0210

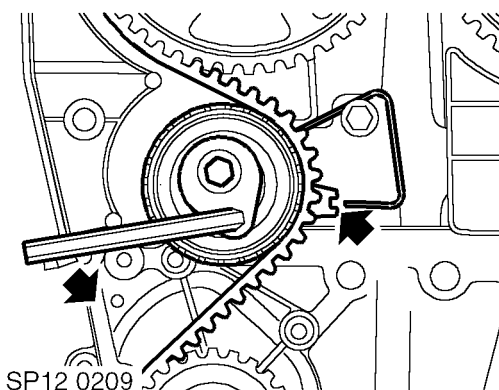
4. Position timing belt tensioner ensuring that the index wire is located over pillar bolt and that tensioner lever is at 9 o'clock position.
5. Fit new tensioner Patchlok bolt, tighten bolt until it is just possible to move tensioner lever.
6. Using fingers only, fit timing belt. Ensure belt run between the crankshaft gear and the exhaust camshaft gear is kept taut during the fitting procedure.

CAUTION: If the original timing belt is being refitted, ensure the direction of rotation mark is facing the correct way.

7. Check that timing belt is positioned centrally around all gears and tensioner pulley.
8. Fit rubber seal to timing belt lower cover, position cover to cylinder block, fit and tighten bolts to 9 Nm.
9. Fit crankshaft pulley.

 [CRANKSHAFT TIMING BELT GEAR, page 12-43.](#)

10. Remove camshaft gear alignment tool.



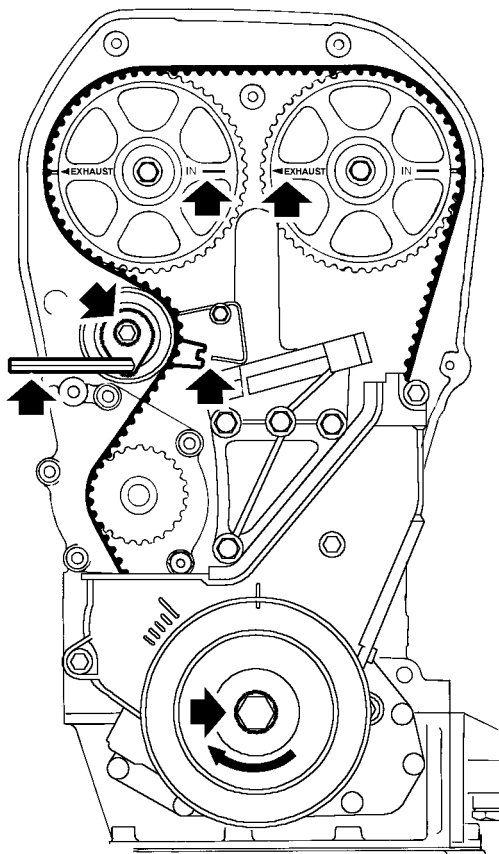
SP12 0209

11. Use a 6mm Allen key to rotate tensioning lever in an anti-clockwise direction and align pointer to index wire as shown.

12. If original belt is to be refitted then the pointer must be aligned so that the index wire is adjacent to lower land of pointer.

CAUTION: It is imperative that the pointer approaches the index wire from above. If the pointer passes the index wire, the tension must be fully released and the tensioning procedure must be repeated.

13. Ensuring that the pointer maintains correct position, tighten tensioner bolt to 25 Nm.




SP12 0359

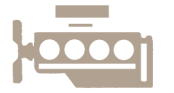
14. Fit a suitable socket to crankshaft pulley bolt, rotate crankshaft clockwise 2 complete revolutions and align camshaft gear timing marks.

CAUTION: *Never use the camshaft gear, the camshaft gear retaining bolts or the timing belt to turn the crankshaft.*

15. Check alignment of pointer to index wire.
CAUTION: *Ensure that the pointer approaches the index wire from above. Should the pointer go past index wire, release tension completely and repeat tensioning procedure.*
16. If pointer is not correctly aligned, loosen bolt until it is just possible to move tensioning lever. Rotate tensioning lever clockwise until tension is completely backed off, then rotate tensioning lever anti-clockwise until pointer is aligned correctly to index wire.
17. Ensuring that the pointer maintains correct position, tighten tensioner bolt to 25 Nm.
18. Fit a suitable socket to crankshaft pulley bolt, rotate crankshaft clockwise 2 complete revolutions and align camshaft gear timing marks.

CAUTION: *Never use the camshaft gear, the camshaft gear retaining bolts or the timing belt to turn the crankshaft.*

19. Check that pointer is correctly aligned with index wire.
20. Clean timing belt upper cover.
21. Position timing belt upper cover and seal, fit and tighten bolts to 9 Nm.
22. Fit RH engine hydramount assembly.
 **MOUNTING BRACKET - RH - ALL MODELS, page 12-29.**
23. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
24. Remove stand(s) and lower vehicle.
25. Connect battery earth lead.

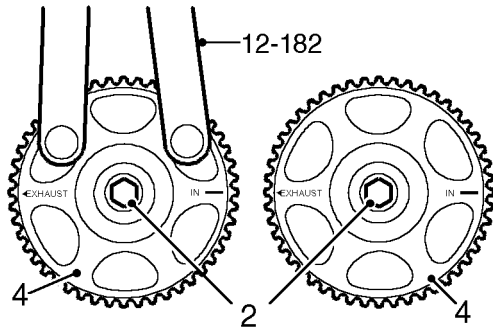


CAMSHAFT TIMING BELT GEAR

🔑 12.65.20

Remove

1. Remove and discard camshaft timing belt.
👉 [TIMING BELT - CAMSHAFT, page 12-39.](#)



M12 5012A

MPI timing gears illustrated.

2. Restrain camshaft gear using tool 12-182, remove bolt and plain washer from camshaft gear.
3. Remove tool 18G 1570.
4. Remove camshaft gear.

Refit

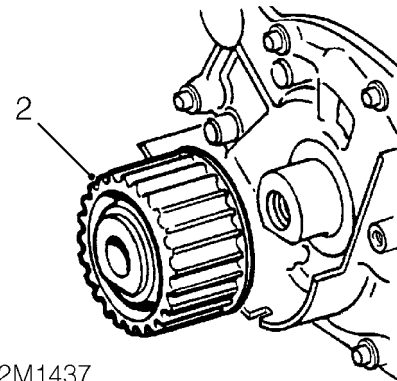
1. Clean gear to camshaft mating faces.
2. Fit camshaft gear and align timing marks using 12-182.
3. Fit plain washer and bolt to camshaft gear, restrain gear using tool 12-182 and tighten bolt to: - M8 bolt - 33 Nm - M10 bolt - 65 Nm
4. Fit camshaft locking tool 18G 1570.
5. Fit new camshaft timing belt.
👉 [TIMING BELT - CAMSHAFT, page 12-39.](#)

CRANKSHAFT TIMING BELT GEAR

🔑 12.65.25

Remove

1. Remove and discard camshaft timing belt.
👉 [TIMING BELT - CAMSHAFT, page 12-39.](#)



12M1437

2. Remove crankshaft timing belt gear.

Refit

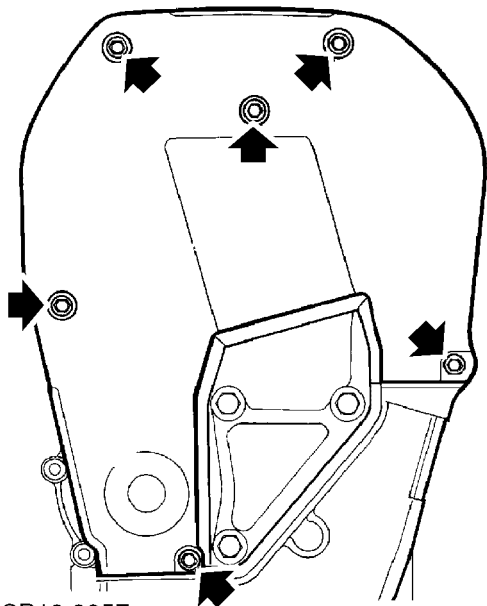
1. Clean timing gear mating faces.
2. Fit crankshaft timing belt gear.
3. Fit new camshaft timing belt.
👉 [TIMING BELT - CAMSHAFT, page 12-39.](#)

TIMING BELT UPPER FRONT COVER

🔑 12.65.41

Remove

1. Remove engine cover:
👉 [ENGINE COVER, page 12-27.](#)



SP12 0357

2. Loosen lower fixing bolt securing timing belt upper front cover.
3. Remove 5 bolts from timing belt upper front cover.
4. Remove timing belt upper front cover and seal.

Refit

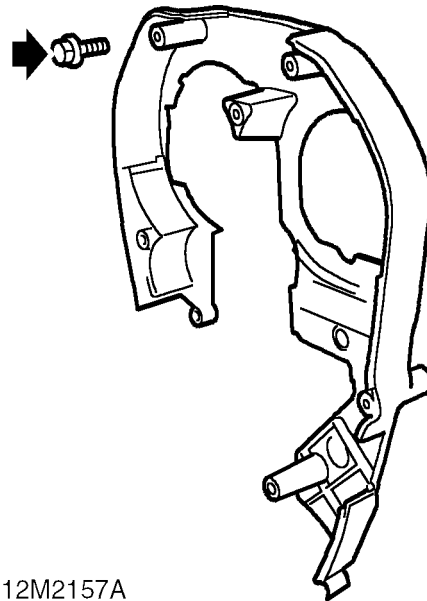
1. Fit timing belt upper front cover, ensuring seal is located correctly.
2. Fit bolts and tighten to 9 Nm.
3. Fit engine cover:
👉 [ENGINE COVER, page 12-27.](#)

CAMSHAFT TIMING BELT REAR COVER

🔑 12.65.42

Remove

1. Remove camshaft timing belt gear:
👉 [CAMSHAFT TIMING BELT GEAR, page 12-43.](#)
2. Remove bolt securing second cam gear to camshaft and remove gear.

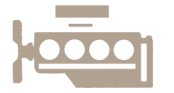


12M2157A

3. Remove 3 bolts securing rear cover to engine.
4. Remove timing belt rear cover.

Refit



1. Fit timing belt rear cover.
2. Fit bolts and tighten to 9 Nm.
3. Fit camshaft gear and tighten bolt to 33 Nm (8mm) or 65 Nm. (10mm)
4. Fit camshaft timing belt gear:
👉 [CAMSHAFT TIMING BELT GEAR, page 12-43.](#)
5. Connect battery earth lead.

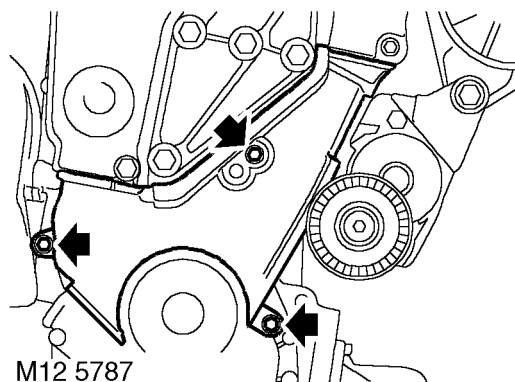


COVER - TIMING BELT LOWER FRONT

🔑 12.65.43



Remove

1. Disconnect battery earth lead.
2. Remove timing belt upper front cover:
 [TIMING BELT UPPER FRONT COVER](#), page 12-44.
3. Remove crankshaft pulley:
 [CRANKSHAFT TIMING BELT GEAR](#), page 12-43.



4. Remove 3 bolts securing lower front cover.
5. Remove lower cover.

Refit

1. Fit lower cover and tighten bolts to 9 Nm.
2. Fit crankshaft pulley:
 [CRANKSHAFT TIMING BELT GEAR](#), page 12-43.
3. Fit timing belt upper front cover:
 [TIMING BELT UPPER FRONT COVER](#), page 12-44.
4. Connect battery earth lead.



ENGINE

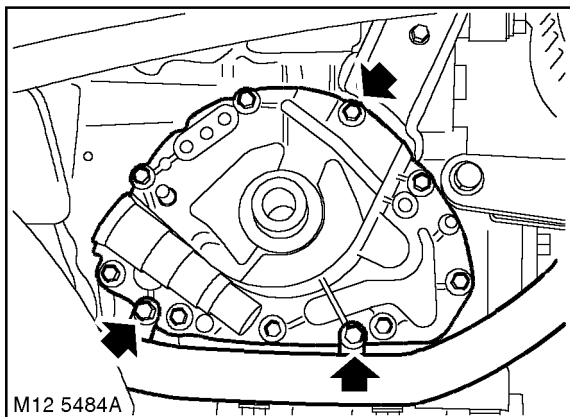


CRANKSHAFT - UNIT REMOVED

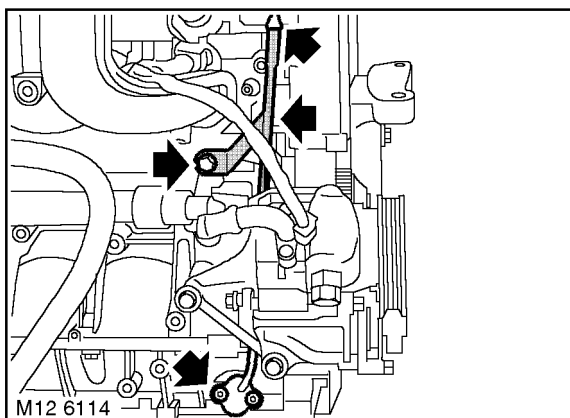
🔑 12.21.33.01

Remove


1. Remove crankshaft rear oil seal.
 [CRANKSHAFT REAR OIL SEAL](#), page 12-11.
2. Remove cylinder head.
 [GASKET - CYLINDER HEAD - UNIT REMOVED](#), page 12-51.
3. Remove crankshaft timing gear.

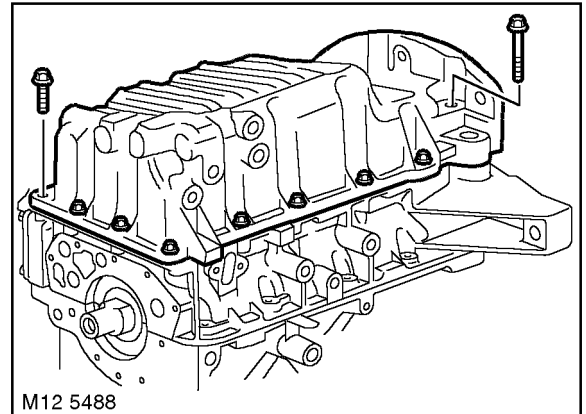


4. Remove 2 bolts securing engine harness to oil pump.
5. Noting fitted position of M6 x 20 bolt, remove and discard 9 bolts securing oil pump to cylinder block.
6. Release oil pump from locating dowels, remove oil pump, remove and discard gasket.
7. Remove and discard crankshaft front oil seal from oil pump body.

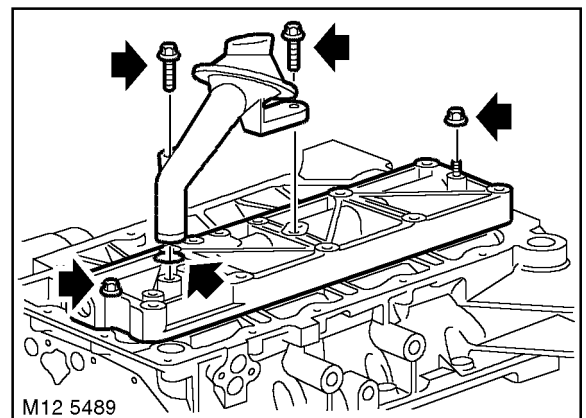


8. Remove dipstick.
9. Remove bolt securing thermostat housing and dipstick tube to cylinder block.
10. Remove 2 bolts securing dipstick tube to cylinder block.

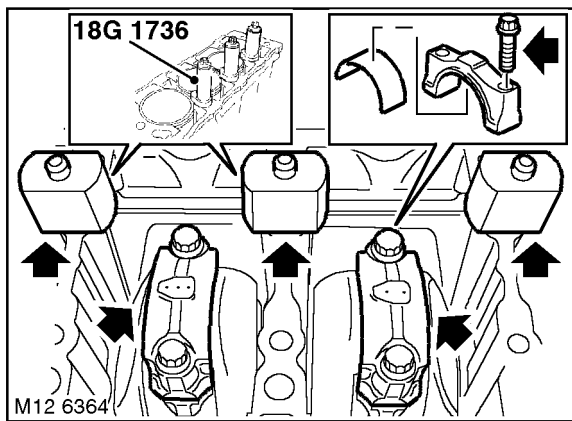
11. Remove dipstick tube and collect gasket.
12. Remove and discard oil filter element.
 [ENGINE OIL](#), page 10-3.
13. Support engine with sump upwards on suitable blocks.



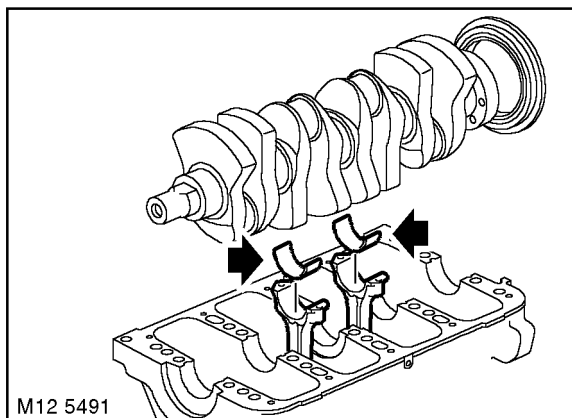
14. Noting fitted positions of 2 longest bolts, remove 14 bolts securing sump to engine bearing ladder.
15. Using a mallet, tap sump sideways to release sealant bond, remove sump.
16. Temporarily remove cylinder liner retainer clamps 18G 1736. Do not rotate crankshaft with clamps removed.



17. Remove 2 bolts securing oil pick-up strainer to oil rail.
18. Remove oil pick-up strainer.
19. Remove and discard 'O' ring from strainer.
20. Remove 2 nuts securing oil rail to bearing ladder.
21. Remove oil rail.

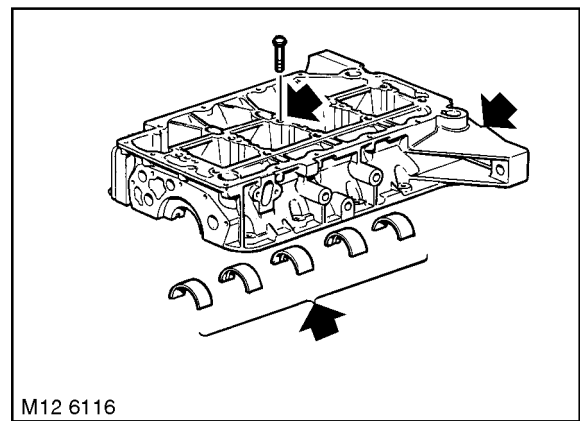


22. Fit cylinder liner retainer clamps 18G 1736 using nylon nuts supplied to retain the clamps. Ensure feet of clamps do not protrude over cylinder bores.
23. Temporarily fit crankshaft timing gear and pulley ensuring that indent on pulley locates over lug on timing gear.
24. Fit pulley bolt and washer; lightly tighten bolt.
25. Mark connecting rod bearing caps for refitment.
CAUTION: Keep bearing caps, bearings and bolts in their fitted order.
26. Using crankshaft pulley bolt, rotate crankshaft for access to connecting rod bearing cap bolts.

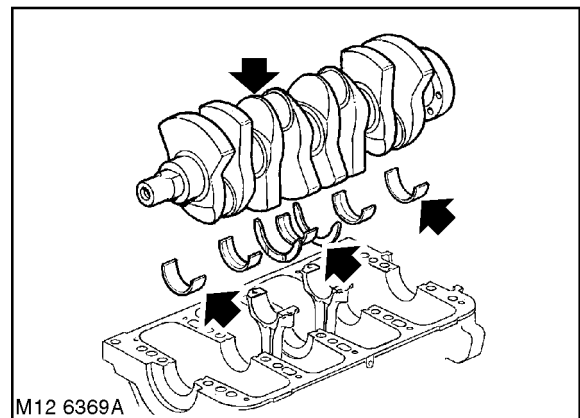


Crankshaft removed for clarity

27. Remove bolts securing bearing caps to connecting rods and remove bearing caps.
28. Remove bearing shells from caps.
29. Push connecting rods clear of crankshaft.
30. Using assistance, position cylinder block on its side.
31. Remove cylinder liner clamps 18G 1736. Do not move pistons up or down cylinder bores with clamps removed.
32. Remove crankshaft pulley bolt, washer and pulley.



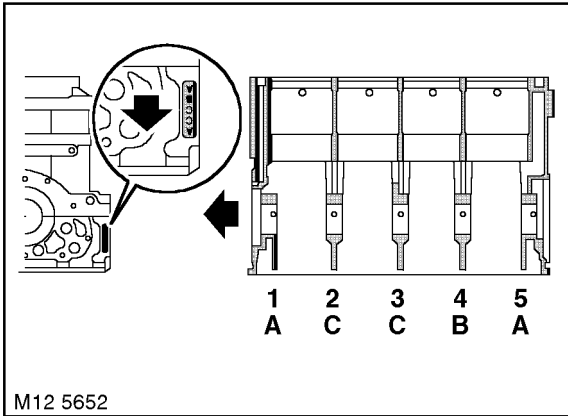
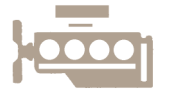
33. Remove 10 bolts securing bearing ladder to cylinder block and remove ladder.



34. Remove crankshaft.
35. Remove 2 thrust washers from No. 3 bearing position.
36. Remove main bearing shells from cylinder block and bearing ladder.

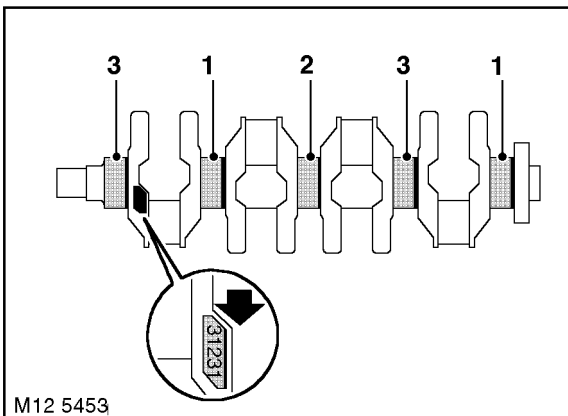
Refit

1. Clean mating faces of cylinder block and bearing ladder.
2. Clean dowels and dowel holes.
3. Clean bearing and thrust washer locations in cylinder block.
4. Clean bearing locations in bearing ladder.
5. Clean bearing locations on connecting rods and caps.
6. Clean crankshaft and inspect for damage.



M12 5652

- Record main bearing code letters from bearing ladder.

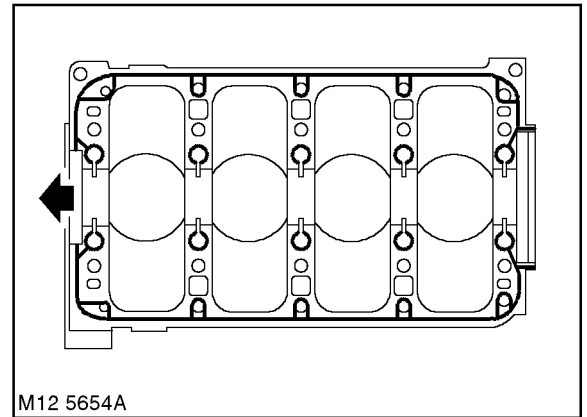


M12 5453

- Record main bearing code numbers from crankshaft front web.
- Check crankshaft main journal diameters.
 [ENGINE - N SERIES, page 04-1.](#)
- Determine appropriate main bearing shells to be fitted from size selection and type.
- Colour code on edge of bearing denotes bearing thickness as follows:
 - GREEN = thin
 - BLUE = intermediate
 - RED = thick.

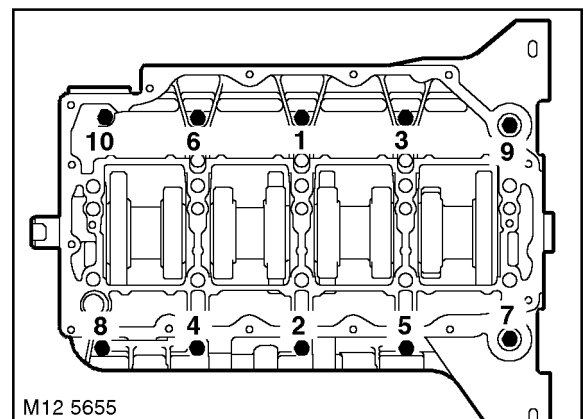
NOTE: If two bearing colours are to be used on the same journal, the thicker bearing must be fitted to the bearing ladder. When original crankshaft is to be refitted, bearing shells must be as selected from table.
- Use a lint free cloth and suitable solvent to clean sealing surfaces on cylinder block and bearing ladder.
- Fit selected crankshaft main bearings and fit to cylinder block and bearing ladder.
- Clean and fit new thrust washers into block, each side of No. 3 main bearing with oil grooves facing outwards.

- Lubricate crankshaft main journals with engine oil.
- Hold crankshaft with big end journals horizontal, lower crankshaft onto main bearings.



M12 5654A

- Apply a continuous bead of sealant to paths shown on cylinder block then spread to an even film with roller.
CAUTION: To avoid contamination, assembly should be completed immediately after application of sealant.

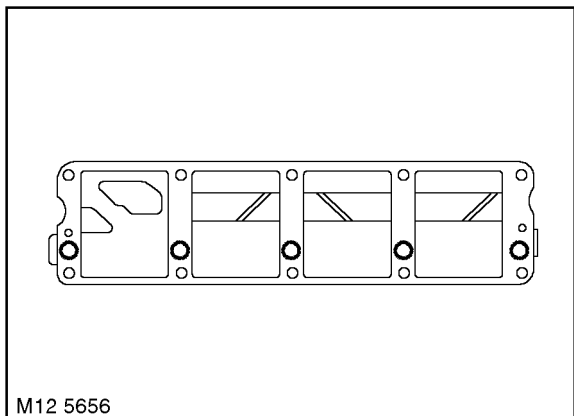


M12 5655

- Lubricate main bearing journals with engine oil. Fit bearing ladder to block, fit bolts ensuring that flanged head bolt is fitted at position 10.
- Tighten bolts in sequence shown to 5 Nm. Then in the same sequence tighten to 30 Nm.
- Fit cylinder liner retainer clamps, 18G 1736, using nylon nuts supplied to retain the clamps.
- Connecting rod bearing selection is required at this stage. Refer to connecting rod bearing selection tables for bearings required.
- Fit selected connecting rod bearing shells to connecting rods and bearing caps.
- Lubricate connecting rod bearings.
- Position connecting rod to crankshaft.
- Lubricate connecting rod bearing cap.
- Fit bearing cap to connecting rod.

ENGINE

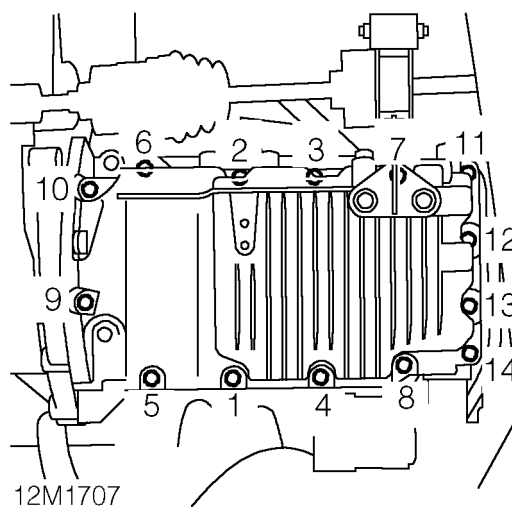
27. Fit bolts securing bearing cap to connecting rod and tighten to 20 Nm and then a further 45°.
28. Using a lint free cloth and suitable solvent, wipe clean sealing surfaces on bearing ladder and oil rail.



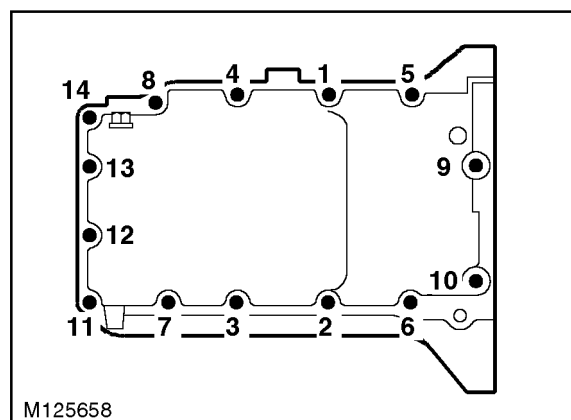
29. Apply continuous beads of sealant to oilways on oil rail as shown, then spread to an even film using a roller.
CAUTION: To avoid contamination, assembly should be completed immediately after application of sealant.


30. Temporarily remove cylinder liner clamps.
31. Take care not to disturb cylinder liners when the clamps are removed, do not rotate crankshaft.
32. Fit oil rail to bearing ladder; fit nuts and tighten to 9 Nm.
CAUTION: A new oil rail must be fitted if a thread is damaged. Thread inserts (Helicoil) are not acceptable.

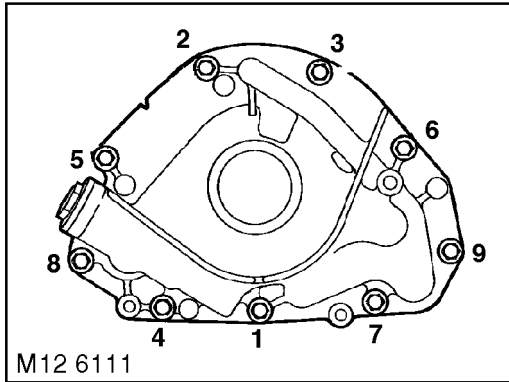
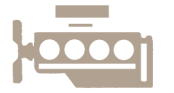
33. Refit cylinder liner clamps 18G 1736 and tighten bolts sufficiently to secure cylinder liners.
34. Clean oil pick up and strainer.
35. Clean 'O' ring recesses.
36. Lubricate new 'O' ring with oil and fit to pick-up.
37. Fit strainer to engine, fit bolts and tighten to 9 Nm.
38. Clean inside of sump. Use a lint-free cloth and solvent to clean mating faces of sump and bearing ladder.
39. Fit new gasket.



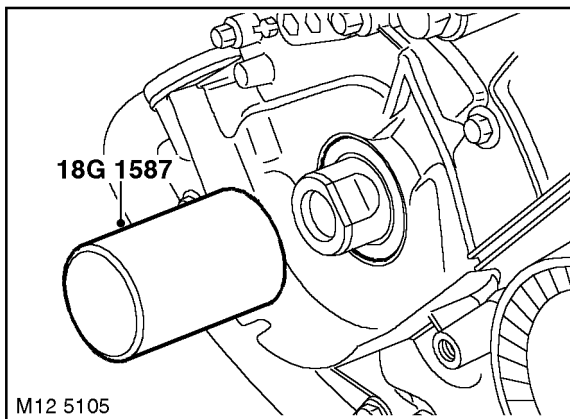
40. Position sump, fit 2 bolts at positions 5 and 6, tighten bolts to 4 Nm.
41. Fit 12 bolts into remaining holes ensuring that 2 longest bolts are in original fitted positions, finger tighten bolts.



42. Working in the sequence shown, progressively tighten engine sump bolts to 25 Nm.
43. Fit new oil filter element.
 **ENGINE OIL, page 10-3.**
44. Fit new gasket and dipstick tube to cylinder block.
45. Fit bolts securing dipstick tube to cylinder block and tighten to 10 Nm.
46. Fit bolt securing dipstick tube and thermostat housing to cylinder block, tighten to 10 Nm.
47. Fit dipstick.
48. Clean mating surfaces of oil pump and cylinder block and crankshaft front oil seal recess in pump body.
49. Clean oil seal running surface on crankshaft.
50. Turn oil pump rotor to align drive with crankshaft.
51. Fit new oil pump gasket to cylinder block and position oil pump.



52. Fit new Patchlock bolts and tighten progressively in sequence shown to 9 Nm.
53. Align engine harness to oil pump, fit bolts and tighten to 9 Nm.
54. Fit oil seal guide from seal kit to crankshaft.



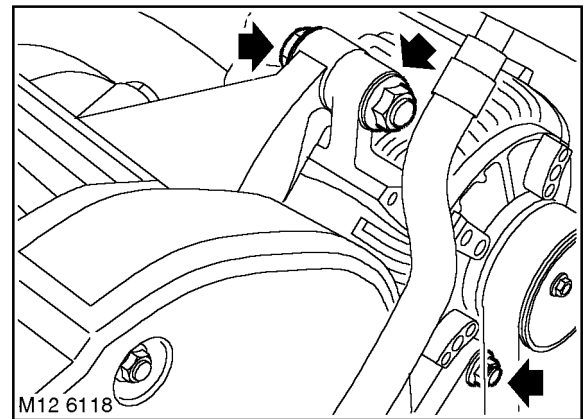
55. Using tool 18G 1587, fit new crankshaft front oil seal.
CAUTION: Oil seal is waxed on outer diameter and must not be lubricated before fitting.
56. Remove oil seal guide.
57. Fit crankshaft timing gear.
58. Fit crankshaft rear oil seal.
 [CRANKSHAFT REAR OIL SEAL, page 12-11.](#)
59. Fit cylinder head.
 [GASKET - CYLINDER HEAD, page 12-12.](#)

GASKET - CYLINDER HEAD - UNIT REMOVED

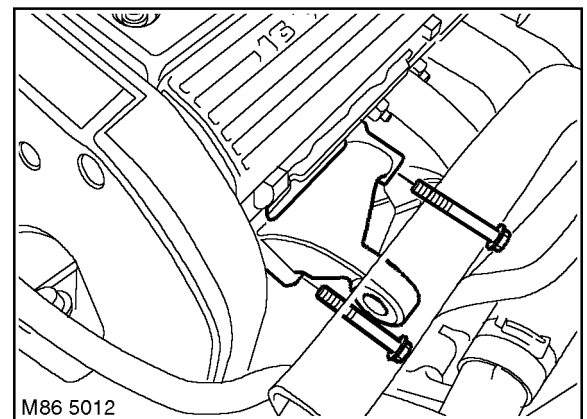
12.29.02.01

Remove

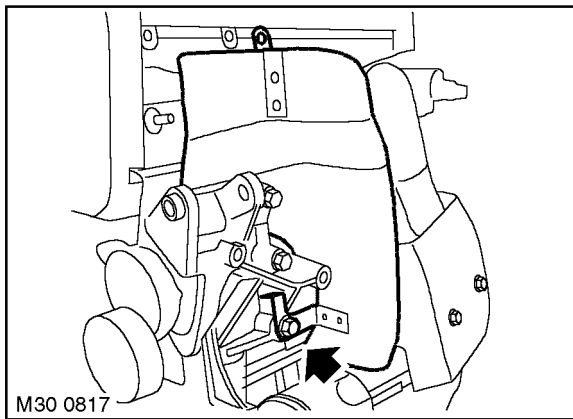
1. Remove and discard camshaft timing belt.
 [TIMING BELT - CAMSHAFT, page 12-39.](#)
2. Remove camshaft cover.
 [GASKET - CAMSHAFT COVER, page 12-15.](#)



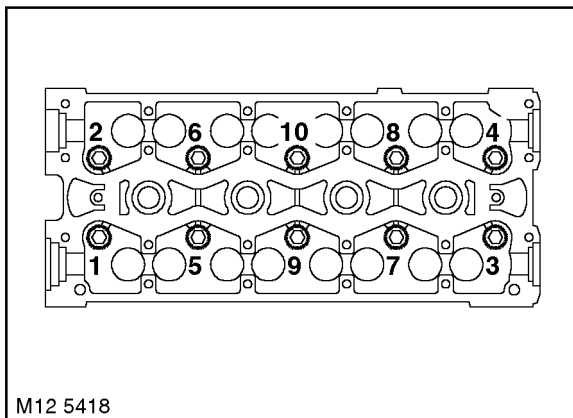
3. Remove upper and lower alternator fixings and remove alternator.



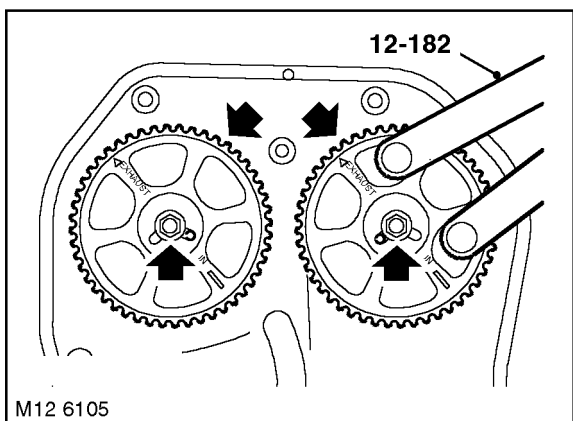
4. Remove 2 bolts securing alternator top support bracket to cylinder head and remove bracket.



- Remove bolt securing alternator heat shield to cylinder block and remove heat shield.

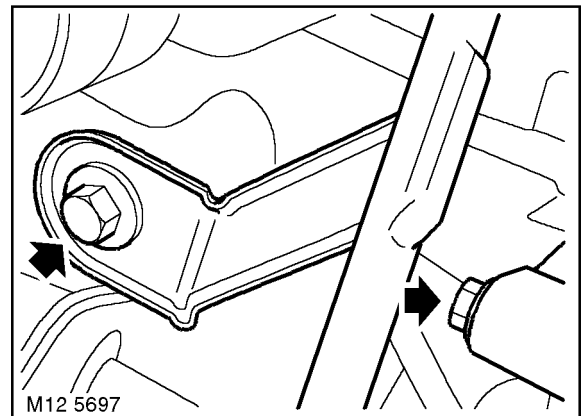


- Using sequence shown, progressively loosen cylinder head bolts 1 to 6; remove bolts and store in fitted order.

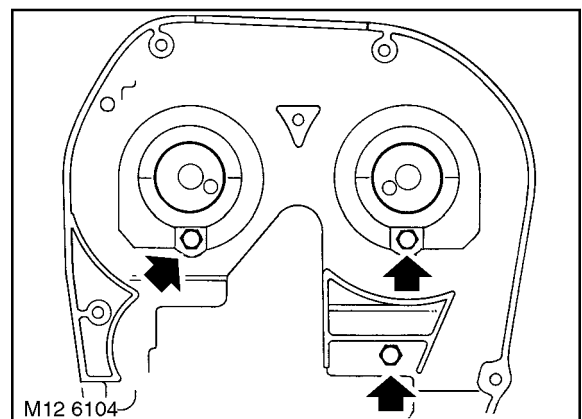


- Remove locking tool 18G 1570 from timing gears.
- Using tool 12-182, rotate both camshafts clockwise to gain access to bolts 7 and 8.

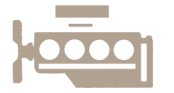
- Using sequence shown, progressively loosen bolts 7 to 10; remove bolts and store in fitted order. Do not rotate crankshaft until cylinder head is removed and cylinder liner retainer clamps are fitted.
- Suitably identify each timing gear to its respective camshaft.
- Restrain timing gears using 12-182 and remove bolts and washers securing timing gears to camshafts.
- Remove timing gears.



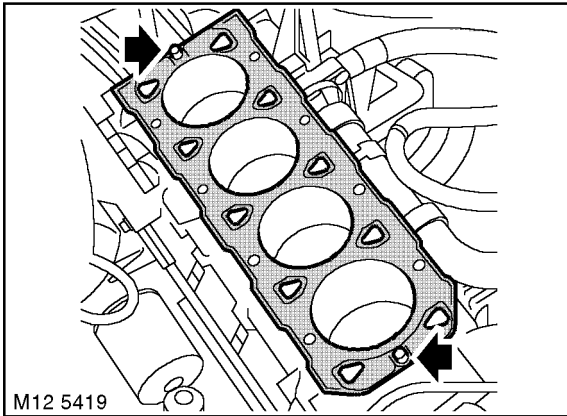
- Remove bolt securing dipstick support bracket and screw rear cover to water pump.



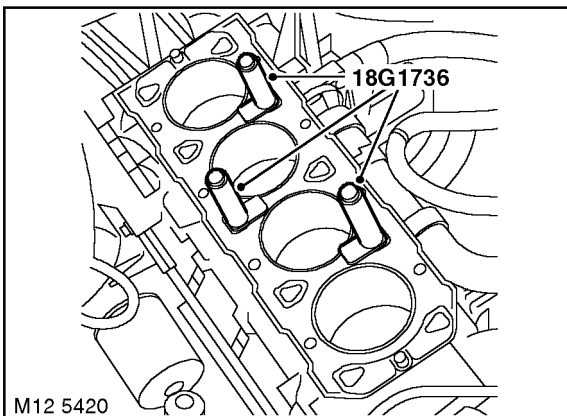
- Remove bolts securing timing belt rear cover to engine.
- Remove timing belt rear cover.
- Using assistance, remove cylinder head assembly from cylinder block.



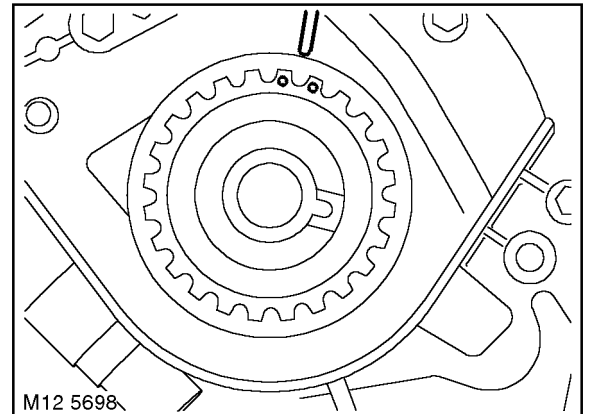
Refit



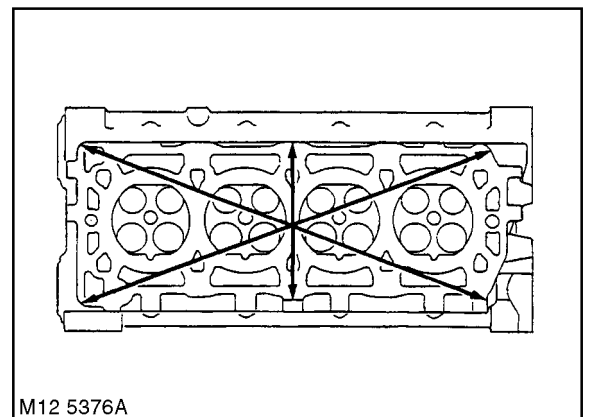
17. Remove and discard cylinder head gasket from cylinder block.



18. Fit cylinder liner retainer clamps 18G 1736 to cylinder block and secure with cylinder head bolts; ensure feet of clamps do not protrude over cylinder bores.

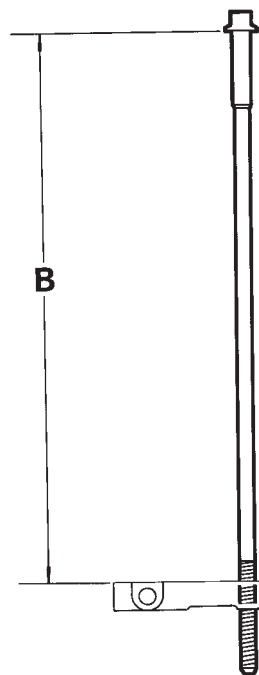
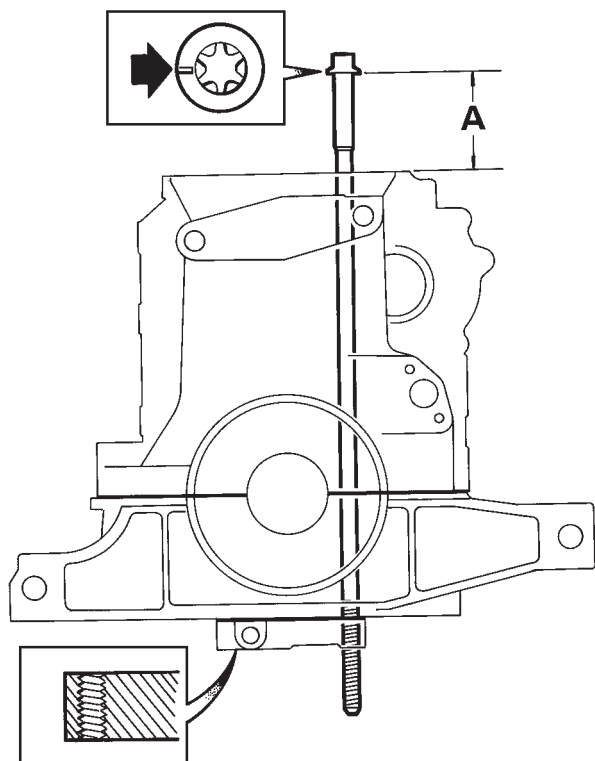


1. If crankshaft has been rotated, ensure that timing marks on crankshaft timing gear and oil pump flange are aligned.
2. Remove bolts securing cylinder liner clamps 18G 1736 and remove clamps. Do not rotate crankshaft with clamps removed.
3. Clean joint surfaces of cylinder head and cylinder block.
4. Check cylinder head for damage, pay particular attention to gasket face of cylinder head.



5. Check cylinder head face for warping, across centre and from corner to corner as shown.
 - [ENGINE - N SERIES, page 04-1.](#)
6. Check cylinder head height.
 - [ENGINE - N SERIES, page 04-1.](#)
7. Clean oil and coolant passages.
8. Clean cylinder head bolts, inspect bolts for signs of damage.
9. Wash cylinder head bolts and wipe dry.
10. Cylinder head bolts may be re-used provided they pass one of the following tests

Cylinder head bolt test - with head removed



SP100029

11. Carefully enter cylinder head bolts in their original fitted location, Screw each bolt by hand into rail.

CAUTION: It will be necessary to temporarily remove cylinder liner retainer clamps 18G 1736 in order to test the bolt used with the retainer clamp. Retainer clamps should only be removed one at a time and replaced immediately bolt test is completed. Take great care not to rotate crankshaft or disturb cylinder liners whilst clamps are removed.

12. Measure distance from cylinder block face to under bolt head 'A' in illustration: 97 mm or less, bolt may be re-used. Over 97 mm, new bolt must be used.

Cylinder head bolt test - with oil rail removed

13. Ensuring cylinder head bolts are in their original fitted location, screw each bolt by hand into oil rail.

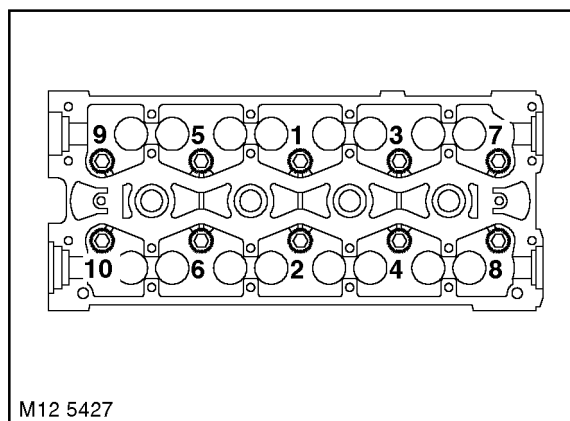
14. If full length of thread is engaged, bolt may be re-used.

15. If full length of thread is not engaged, measure distance from top face of oil rail to under bolt head 'B' in illustration: 378 mm or less, bolt may be re-used. Over 378 mm, new bolt must be used.

CAUTION: A new oil rail must be fitted if a thread is damaged. Thread inserts (Helicoil) are not acceptable.

16. Remove bolts and apply a light film of oil to bolt threads and underside of bolt heads.
17. Fit new cylinder head gasket, dry, to cylinder block.
18. Using assistance, fit cylinder head onto cylinder block carefully locating on dowels.


19. Carefully enter cylinder head bolts, DO NOT DROP. Screw bolts into place by hand.
20. Temporarily fit timing gears to their respective camshafts, fit but do not tighten retaining bolts and washers.

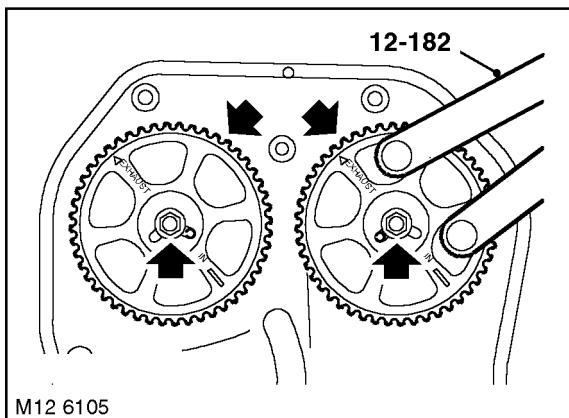


M12 5427

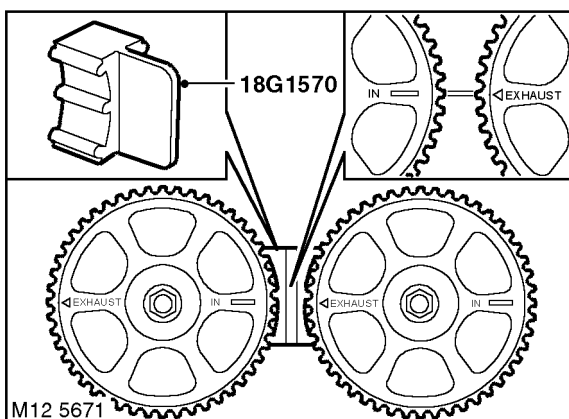
21. Working in the sequence shown, progressively tighten the cylinder head bolts to 20 Nm; use timing gears to rotate camshafts to gain access to cylinder head bolts. Use a felt tip pen and mark position of radial mark on each bolt head on the cylinder head. Use a suitable angle torque gauge and tighten all bolts in sequence 180°. Then tighten all bolts in sequence a further 180°, ensure radial marks are aligned.
22. If any bolt is over tightened, back off 90° and realign.




23. Remove timing gears.
24. Fit camshaft cover.
 **GASKET - CAMSHAFT COVER**, page 12-15.
25. Fit heat shield to engine and tighten lower bolt to 45 Nm. DO NOT fit upper heat shield bolt at this stage.
26. Fit alternator upper support bracket and tighten bolts to 45 Nm.
27. Fit alternator, fit lower and upper bolts and tighten to 45 Nm.
28. Fit camshaft timing belt rear cover.
29. Fit screws securing camshaft timing belt rear cover and tighten to 9 Nm.
30. Fit and tighten dipstick support bracket bolt to 9 Nm.



31. Fit timing gears to their respective camshafts, ensure that drive pins are located in correct slot in gears.
32. Fit bolts and washers securing timing gears to camshafts. Using tool 12-182, restrain each gear in turn and tighten bolts to 65 Nm.



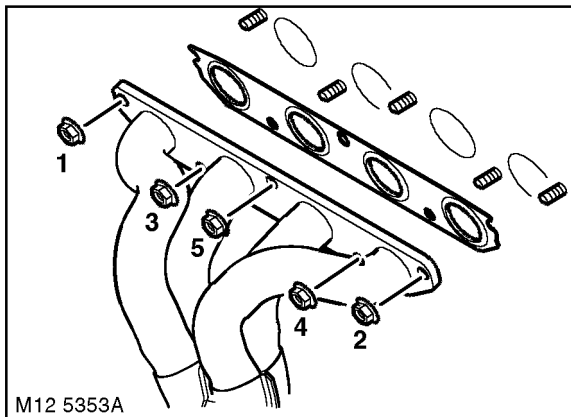
33. Using tool 12-182, align timing marks and fit timing gear locking tool 18G 1570.
34. Fit new camshaft timing belt.
 **TIMING BELT - CAMSHAFT**, page 12-39.

ENGINE

CYLINDER HEAD OVERHAUL - WITH CYLINDER HEAD REMOVED

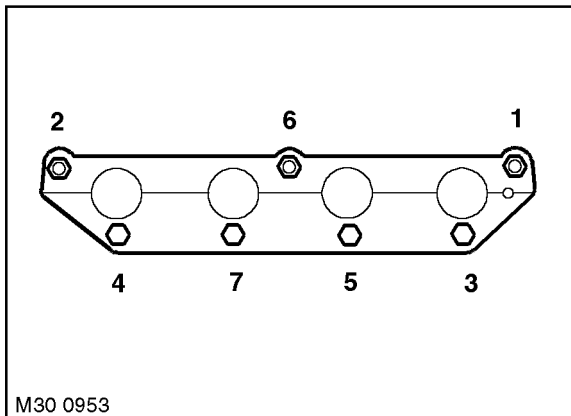
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Disassembly



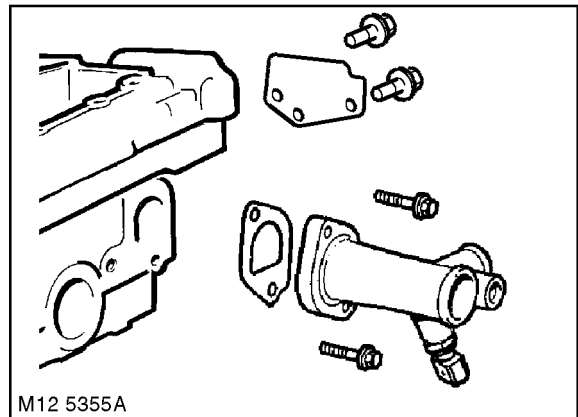
M12 5353A

1. Using sequence shown, remove 5 nuts securing exhaust manifold to cylinder head and remove manifold.
2. Remove and discard gasket.



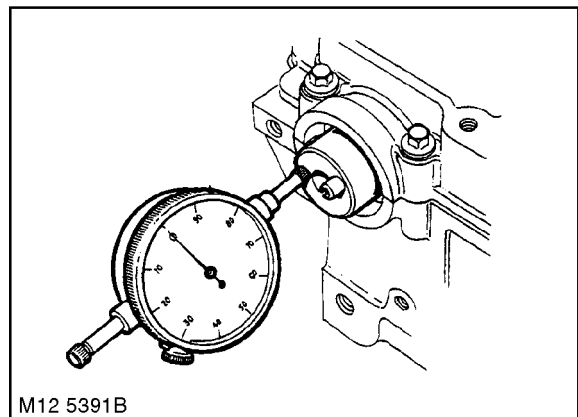
M30 0953

3. Using sequence shown, progressively loosen then remove 3 nuts and 4 bolts or 7 flanged nuts, securing inlet manifold to cylinder head.




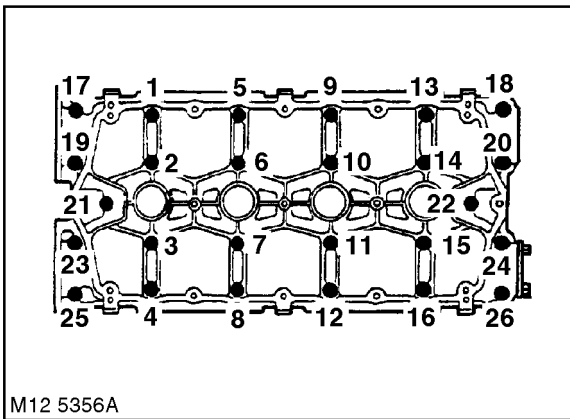
M12 5355A

4. Remove 2 bolts securing coolant outlet elbow to cylinder head. Remove elbow and discard gasket.
5. Remove 2 bolts securing oil seal cover plate to cylinder head and remove plate.
6. Remove any debris from spark plug recesses.
7. Remove spark plugs.

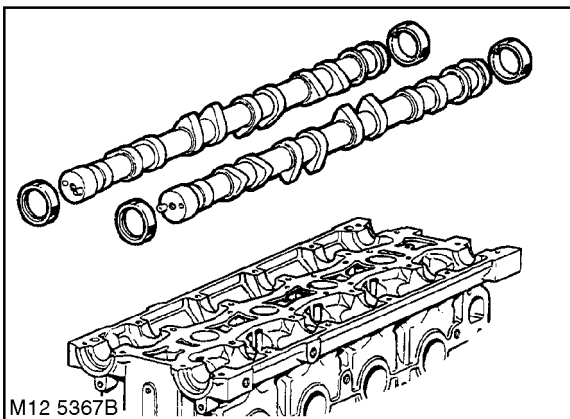


M12 5391B

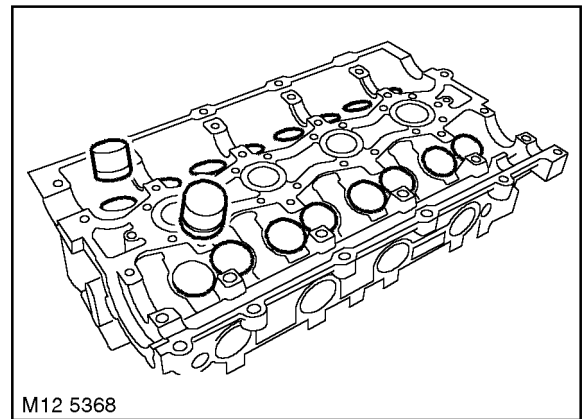
8. Check camshaft end-float using a DTI.
 [ENGINE - N SERIES, page 04-1.](#)
9. If end-float is excessive, fit new camshaft(s) and repeat check. If end-float is still excessive, replace cylinder head and camshaft carrier assembly.



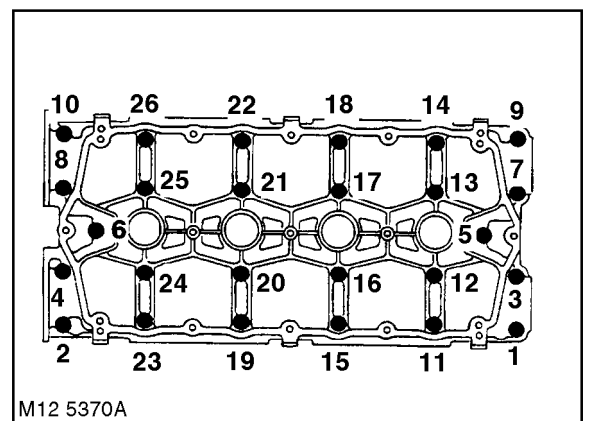
10. Working in the sequence shown, progressively loosen 26 bolts securing camshaft carrier to cylinder head until valve spring pressure is released.
11. Release camshaft carrier from locating dowels, remove camshaft carrier and support on wooden blocks.



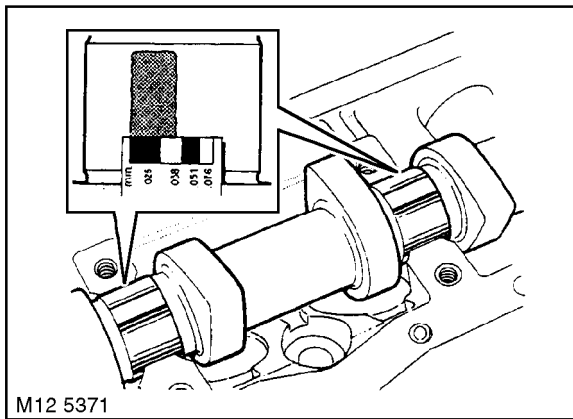
12. Suitably identify each camshaft to its fitted position, remove camshafts.
13. Remove and discard oil seals from camshafts.




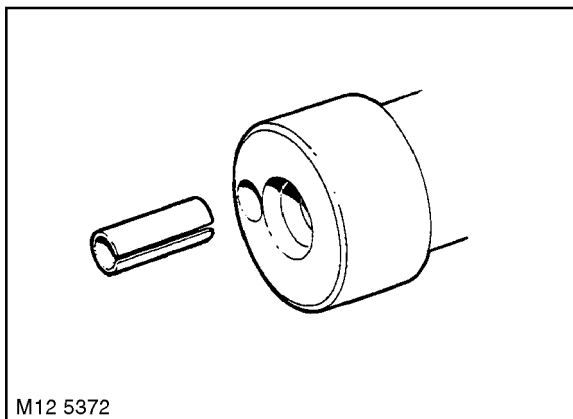
14. Remove 16 tappets from cylinder head and store in fitted order. Invert tappets to prevent oil loss.
15. Measure the outside diameter of each tappet. Measurement must be taken half way along tappet body.
 - Tappet outside diameter = 32.959 to 32.975 mm.
16. Ensure that oil hole in each tappet is clear.
17. Clean camshafts and cylinder head bearing surfaces.
18. Inspect camshaft and replace if scored, pitted or excessively worn.
19. Position camshafts in cylinder head and place Plastigauge across each journal.



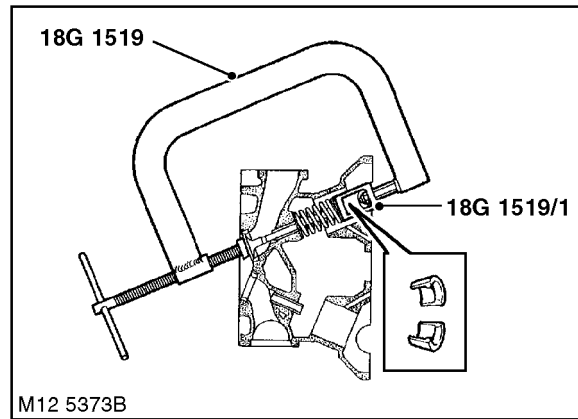
20. Refit camshaft carrier and tighten bolts in sequence to 10 Nm. DO NOT rotate camshafts.
21. Progressively loosen bolts, remove camshaft carrier.



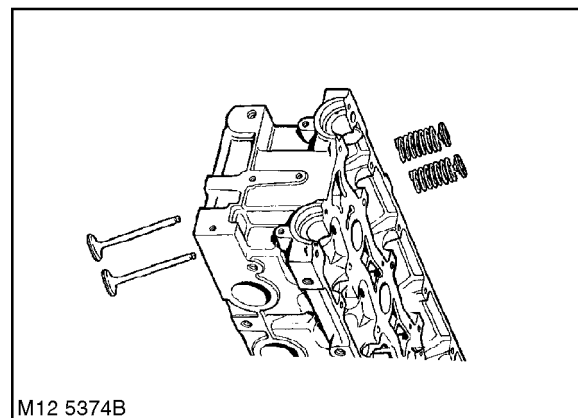
22. Measure widest portion of Plastigauge on each journal:
 **ENGINE - N SERIES, page 04-1.**
23. If clearance is excessive, fit new camshafts and repeat check. If clearance is still excessive renew cylinder head.



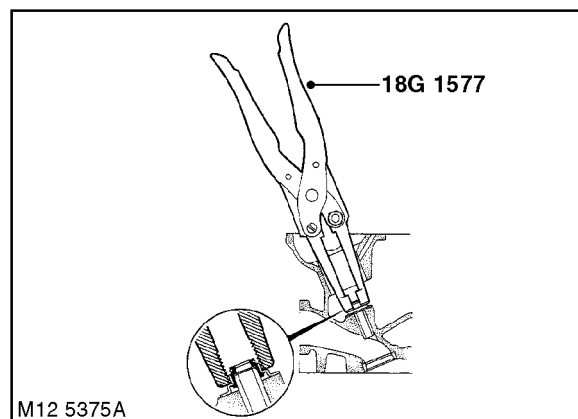
24. Remove drive pin from old camshaft and fit to new with split towards centre of camshaft.
25. Position cylinder head on its exhaust manifold face and support on wooden blocks. Remove inlet valves with cylinder head in this position.



26. Using tool 18G 1519 and adaptor 18G 1519/1, compress valve spring.
27. Remove 2 collets from valve.
28. Release valve spring.
29. Remove tool 18G 1519.



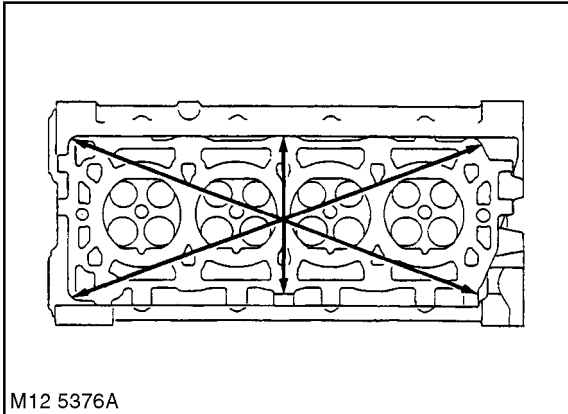
30. Remove remaining valve springs, cups and valves. Keep valves and springs in fitted order.



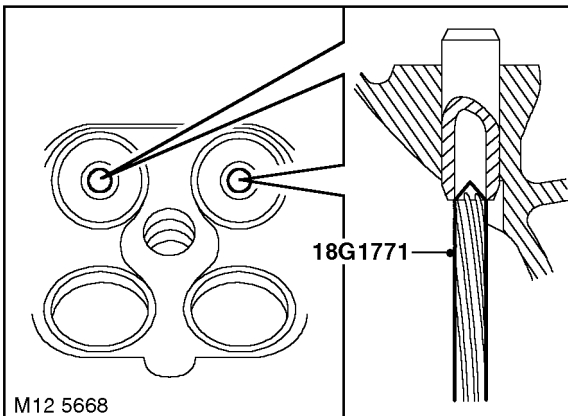
31. Remove valve guide seal using tool 18G 1577.
32. Clean mating face of cylinder head.



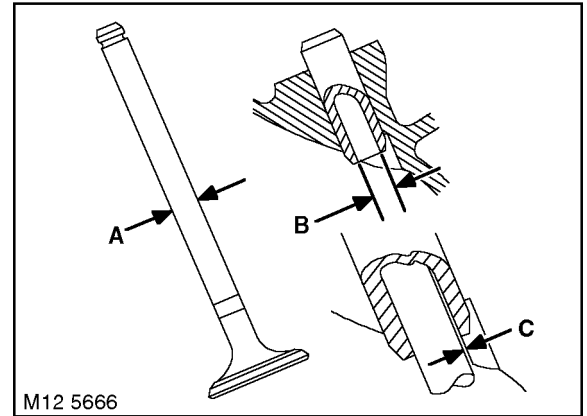
33. Check cylinder head for damage. Pay particular attention to gasket face of cylinder head.



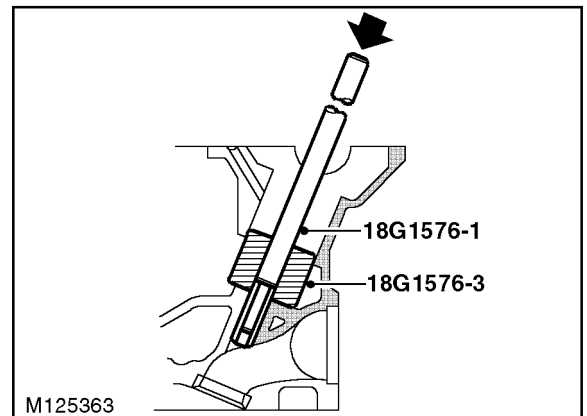
34. Check cylinder head face for warpage across centre and from corner to corner as shown.
[ENGINE - N SERIES, page 04-1.](#)
35. Cylinder head height.
[ENGINE - N SERIES, page 04-1.](#)
36. Cylinder head may be refaced up to a maximum of 0.20 mm.



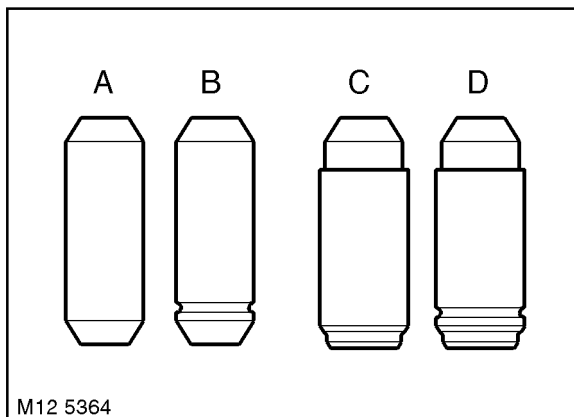
37. Remove deposits from valve guides using reamer 18G 1771.
CAUTION: Tool must be inserted into valve guide from combustion face side of cylinder head.
38. Remove carbon from valve guide, valve, valve seat insert and combustion area. Remove all loose particles of carbon on completion.



39. Check existing valve stem diameter. Check valve guide clearance using new valve.
[ENGINE - N SERIES, page 04-1.](#)
40. Renew valves and guides as necessary.
41. If valve guide removal is necessary, support cylinder head face down on wooden blocks.



42. Position tool guide 18G 1576-3 in tappet bore and drift out valve guide using drift tool 18G 1576-1.

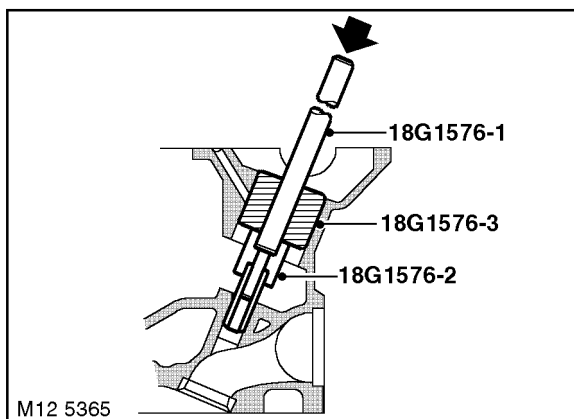


M12 5364

43. Identify the type of valve guide fitted:

- A - Standard production
- C - Production oversize

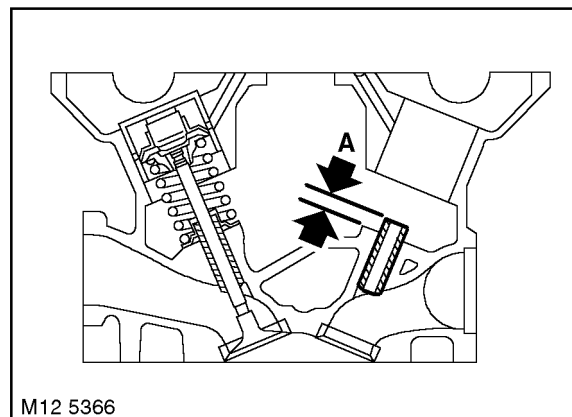
NOTE: Two sizes of replacement valve guides are available, sizes B and D, replace guide A with B and guide C with D.



M12 5365

44. Locate valve guide in valve guide bore with identification groove(s) towards valve seat. Position depth gauge 18G 1576-2. Position nylon guide 18G 1576-3 in cylinder head and press valve guide into bore using driver 18G 1576-1 until depth gauge contacts top of valve guide bore.

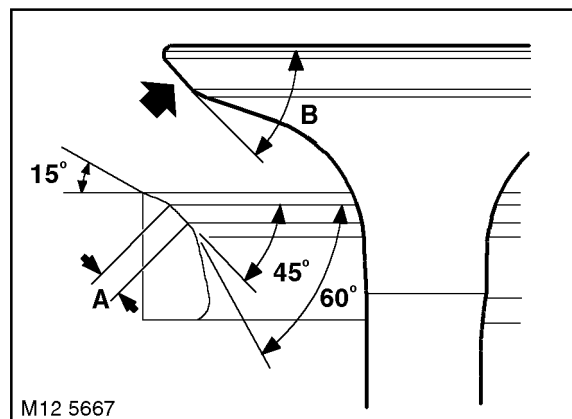
CAUTION: Cylinder head and valve guides must be at room temperature when fitting valve guides.



M12 5366

45. Check that fitted height 'A' is 6.00 mm.

46. Check condition of valve seat and valve, if to be reused.



M12 5667

47. Re-cut valve seat using pilot MS120-6 and the following cutters:

- 15° MS76-120 - To cut first angle
- 45° MS76-122 - Make final cut and remove any burrs
- 60° MS76-111 - To narrow seat and obtain seat widths

48. Cut valve face angle and valve seat to the following:

- Valve seat:

Angle = 45°

Width A – Inlet = 1.2 mm

Exhaust = 1.6 mm

- Valve face angle B:

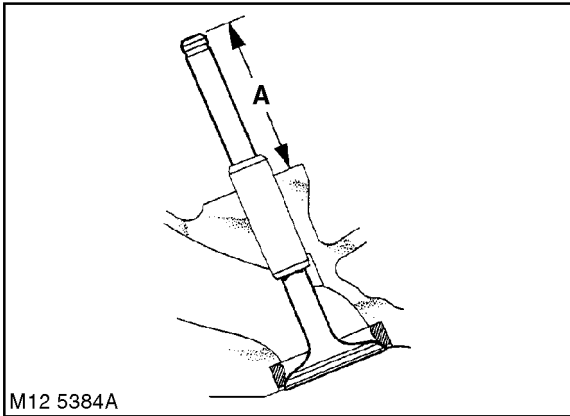
Inlet = 45°

Exhaust = 45°.

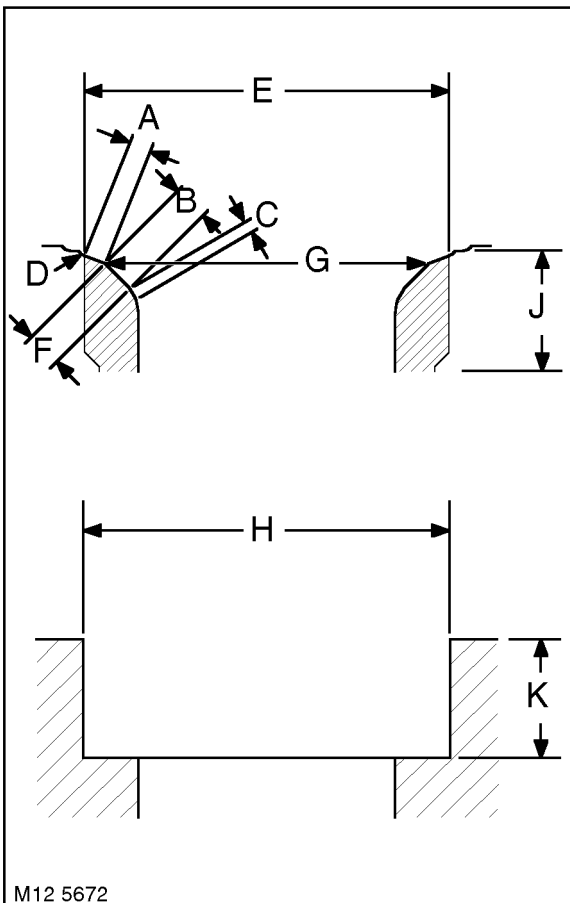
49. Lap valve to seat using fine grinding paste.

50. Apply Prussian Blue to valve seat, insert valve and press into position without rotating. Remove and check for even and central seating. Seating position shown by blue should be in centre of valve face.

51. Lap and re-check valve seating.



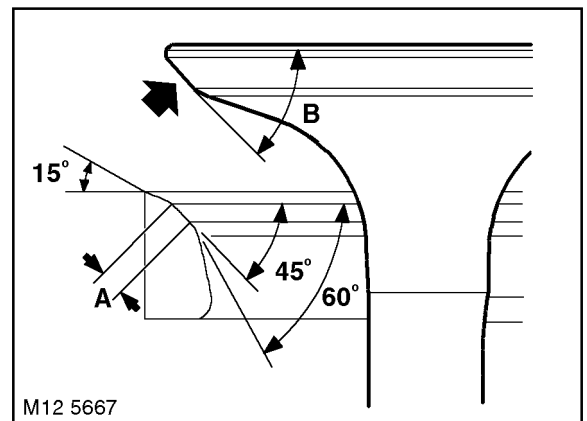
52. Check valve stem fitted height.
ENGINE - N SERIES, page 04-1.
53. If still over limit renew valve seat insert as necessary.
CAUTION: Take care not to damage the counterbore in the cylinder head when removing valve seats.



54. Cool replacement valve seat insert using liquid nitrogen and press into cylinder head in one continuous operation.
CAUTION: Do not heat cylinder head.

Inlet and exhaust valve seat insert dimensions

Inlet	Exhaust
A = 15°	A = 15°
B = 45°	B = 45°
C = 60°	C = 60°
D = 0.4 mm radius	D = 0.4 mm radius
E = 29.560 to 29.573 mm	E = 25.960 to 25.973 mm
F = 1.2 mm	F = 1.6 mm
G = 26.43 mm	G = 22.83 mm
H = 29.475 to 29.500 mm	H = 25.913 to 25.888 mm
J = 5.95 to 6.00 mm	J = 5.45 to 5.80 mm
K = 6.16 to 6.32 mm	K = 5.70 to 5.86 mm

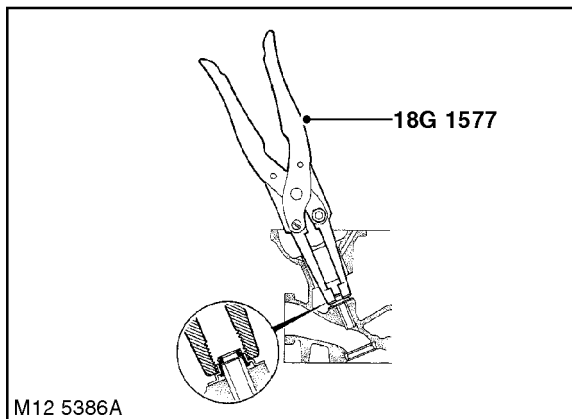


55. Cut new valve seat using pilot MS120-6 and the following cutters:
 - 15° MS76-120 - To cut first angle
 - 45° MS76-122 - Make final cut and remove any burrs
 - 60° MS76-111 - To narrow seat and obtain seat widths
56. Cut valve face angle and valve seat to the following:
 - Valve seat:
 - Angle = 45°
 - Width A – Inlet = 1.2 mm
 - Exhaust = 1.6 mm
 - Valve face angle B:
 - Inlet = 45°
 - Exhaust = 45°.
57. Lap valve to seat using fine grinding paste.
58. Apply Prussian Blue to valve seat, insert valve and press into position without rotating. Remove and check for even and central seating. Seating position shown by blue should be in centre of valve face.
59. Lap and re-check valve seating.
60. Check condition of valve spring:
 - Free length = 50.0 mm
 - Fitted length = 37.0 mm
 - Load - valve closed = 250 ± 12 N
 - Load - valve open = 450 ± 18 N.

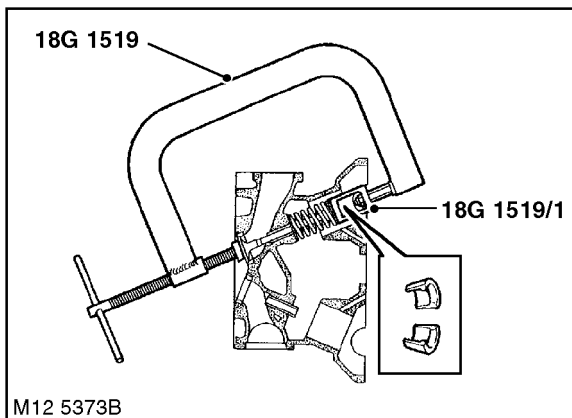
ENGINE

Reassembly

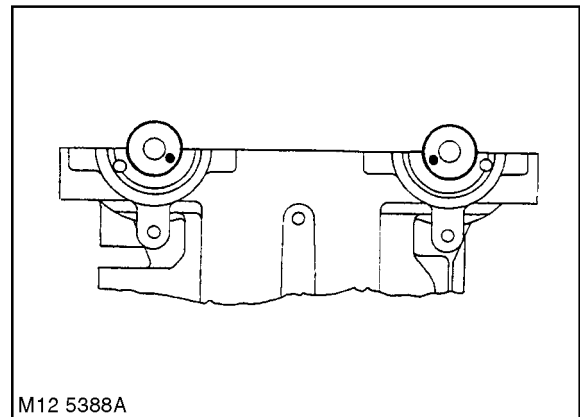
1. Clean sealing surfaces on cylinder head and camshaft carrier. Use foam action gasket remover and a plastic scraper - **DO NOT USE A METAL SCRAPER ON SEALING SURFACES**. Clean inlet and exhaust manifold joint faces.
2. Blow out oilways and waterways. Ensure oil feed to camshaft carrier is clear.



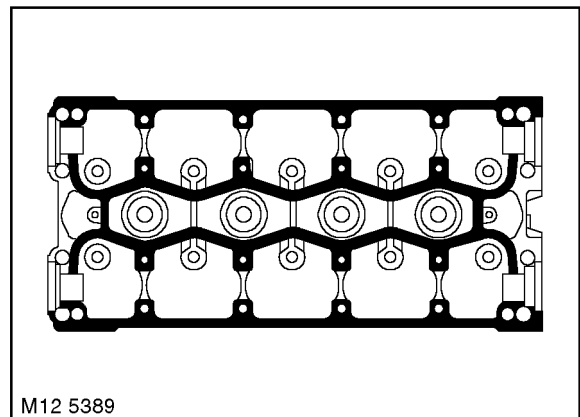
3. Using 18G 1577, fit new valve stem oil seals.



4. Lubricate valve stems and assemble valves, using tool 18G 1519 and adaptor 18G 1519/1, to compress valve spring. Fit cup.
5. Lubricate outside of tappets and fit tappets in original bores.



6. Lubricate bearings, fit camshafts and position inlet drive pin at 4 o'clock and exhaust drive pin at 8 o'clock.

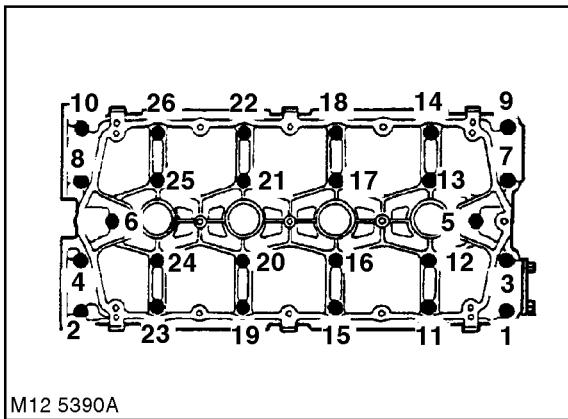


7. Apply continuous thin beads of sealant to paths on camshaft carrier; then spread to an even film using a roller.

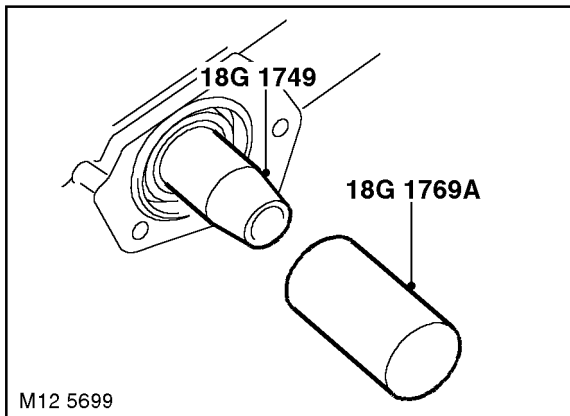
CAUTION: Ensure sealant does not block oilways.

CAUTION: To avoid contamination, assembly should be completed immediately after application of sealant.

8. Lubricate camshaft cams and journals.

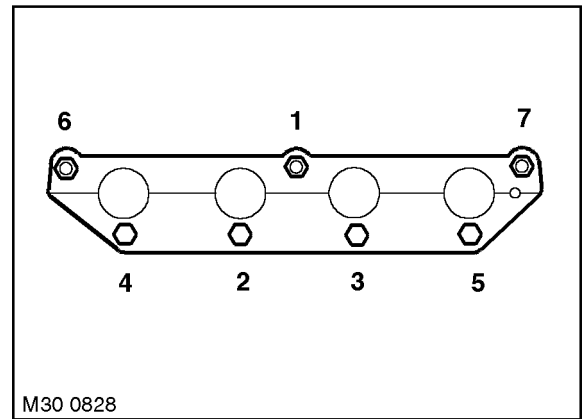


9. Fit camshaft carrier and progressively tighten bolts, in sequence shown to 10 Nm.

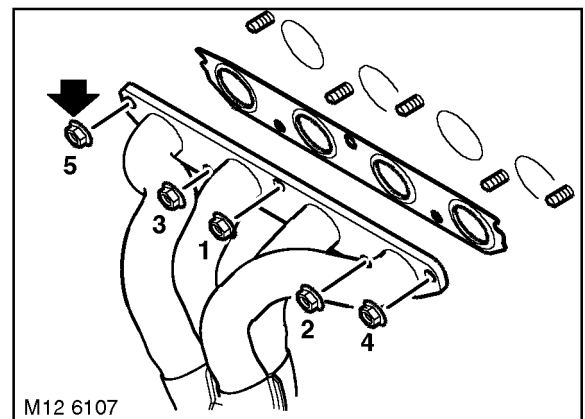


Exhaust rear camshaft seal shown, other seals similar

10. Fit tool 18G 1749 to end of camshafts to protect seals.
11. Noting that front oil seals are coloured black and rear oil seals are coloured red, fit new camshaft oil seals using tool 18G 1769A.
CAUTION: Oil seals are waxed and must not be lubricated prior to fitting.
12. Position exhaust camshaft rear oil seal cover plate, fit and tighten bolts to 25 Nm.
13. Set gaps on new spark plugs to 1.0 ± 0.05 mm, fit plugs and tighten to 27 Nm.
14. Fit a new coolant outlet elbow gasket to cylinder head, fit elbow and tighten bolts to 9 Nm.
15. Clean mating faces of inlet manifold and cylinder head.
16. Fit new inlet manifold gasket to cylinder head.



17. Fit inlet manifold to cylinder head, fit and tighten nuts and bolts or 7 nuts in sequence shown to 17 Nm.
18. Clean mating faces of exhaust manifold and cylinder head.



19. Fit new exhaust manifold gasket to cylinder head, fit manifold and fit and tighten nuts in sequence shown to 45 Nm.

PISTONS, RINGS, & CYLINDER LINERS

🔑 12.17.00.01

The procedure for pistons, rings and cylinder liners is with the engine on a bench, and cylinder head and sump removed from the unit.

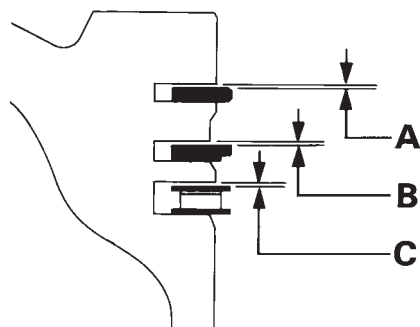
Pistons and connecting rods - remove

1. Suitably identify each piston assembly with its respective cylinder liner.
2. Remove big-end bearings.
3. Using assistance, position cylinder block on its side.
CAUTION: Ensure that feet of cylinder liner retainer clamps 18G 1736 do not protrude over cylinder bores.
4. Remove ridge of carbon from top of each cylinder liner bore.
5. Push pistons to top of their bores.
6. Carefully push out each piston assembly taking care that big-ends do not contact surface of cylinder liners.
7. Refit caps on to connecting rods, lightly tighten dowel bolts.

Removal of pistons will necessitate removal and re-sealing of cylinder liners.

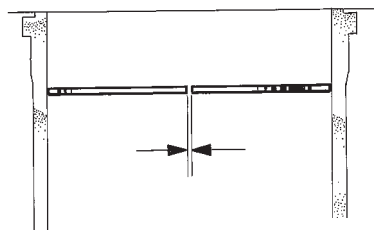
Pistons rings - checking

8. Using an expander, remove and discard old piston rings.
9. Use squared off end of broken piston ring and clean ring grooves.



SP100030

10. Check new ring to groove clearance:
 - Top compression ring A = 0.040 to 0.072 mm
 - 2nd compression ring - B = 0.030 to 0.062 mm
 - Oil control rings - C = 0.010 to 0.180 mm



SP100031

11. Check new ring fitted gap 20 mm from top of cylinder liner bore:
 - Top compression ring = 0.20 to 0.35 mm
 - 2nd compression ring = 0.28 to 0.48 mm
 - Oil control rings = 0.15 to 0.40 mm

CAUTION: Ensure rings are kept square to liner bore and that they are suitably identified to the bore in which they are checked and fitted to the piston for that bore.

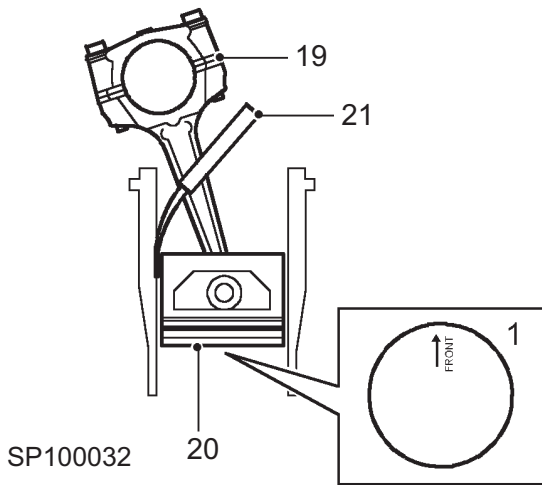
Pistons - Inspection

12. Check pistons for distortion and cracks.
 13. Measure and record piston diameter at right angle to gudgeon pin and 8 mm from bottom of skirt.
 14. Check piston diameter with figures given.
 15. Measure and record piston diameter in line with gudgeon pin hole and 8 mm from bottom of skirt.
 16. Check piston ovality with figures given.
 17. Repeat above procedures for remaining pistons.
 - Grade A = 79.975 to 79.990 mm
 - Grade B = 79.991 to 80.005 mm
 - Maximum ovality = 0.3 mm
 - Service pistons are grade A and B
- Piston grades A or B are stamped on crown of piston.
18. Ensure that oil hole in each tappet is clear.

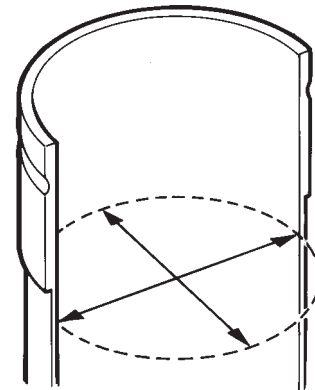


Piston to cylinder liner bore clearance - Checking

Cylinder liner - Inspection

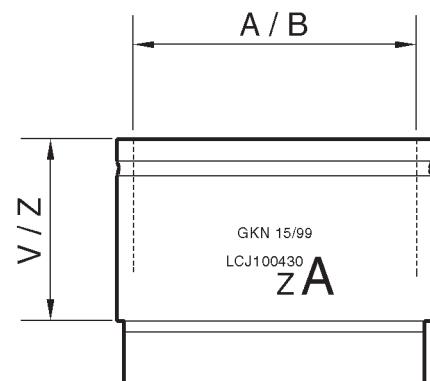


19. Starting with number 1 piston, invert piston and connecting rod and with word FRONT or arrow on piston crown facing towards REAR of cylinder block, insert piston in cylinder liner.
20. Position piston with bottom of skirt 30 mm from top of cylinder block.
21. Using feeler gauges, measure and record clearance between piston and left hand side of cylinder liner - viewed from front of cylinder block.
 - Clearance = 0.01 to 0.04 mm
22. Repeat above procedure for remaining pistons. Pistons and connecting rods are only supplied as an assembly.



23. Measure wear and taper in two axes 65 mm from top of cylinder liner bore.
 - RED grade A = 80.000 to 80.015 mm
 - BLUE grade B = 80.016 to 80.030 mm
 - Service liners are grade A and B.

CAUTION: Cylinder liners with excessively glazed, worn, scratched or scored bores must be replaced, do not attempt to hone or remove glazing from bore.



- A/B - Cylinder liner bore/grade
- V/Z - Cylinder liner step height

Cylinder liners have their step heights graded on production. The step heights, V or Z together with the liner part number and colour codes are marked on the outside of the liner: if cylinder liners are to be replaced, the replacement liners must have the same step height as the originals. Both step heights are available in red and blue grades of liner.

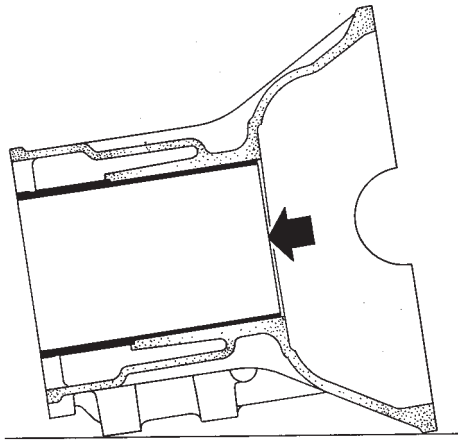
24. Check liner step height.

ENGINE

Cylinder liners - Remove

25. Remove pistons.
26. Remove cylinder liner clamps 18G 1736.
27. Using assistance, position cylinder block on its side.

CAUTION: If original cylinder liners are to be refitted, use a felt tipped pen to make suitable alignment marks between liner and cylinder block. Do not etch or stamp liners.



SP100036

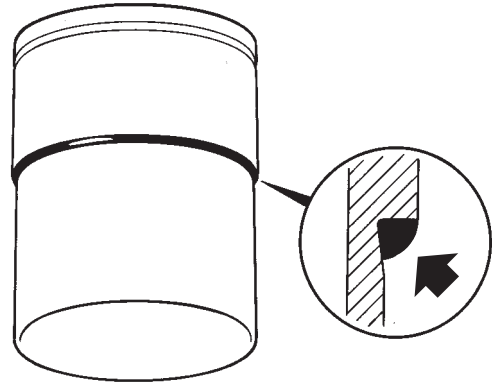
28. Using hand pressure, push cylinder liners out towards cylinder head face of cylinder block; remove liners.

CAUTION: Keep cylinder liners in their fitted order.

Cylinder liners - refit

1. Fit crankshaft and bearing ladder.
NOTE: To enable cylinder liner retainer clamps to be fitted when liners are inserted in cylinder block, crankshaft and bearing ladder must be fitted.
2. Using assistance, support cylinder block on 2 wooden blocks.
3. Remove sealant from cylinder block and if original cylinder liners are to be refitted, from shoulder of liners.
4. Clean cylinder liners and wipe dry.

CAUTION: Ensure that if original cylinder liners are to be refitted, reference marks made during dismantling are not erased.



SP100037

5. Apply a 2.0 mm thick continuous bead of sealant from kit, Part Number GGC 102 around shoulder of cylinder liner.

CAUTION: Do not use any other type of sealant.

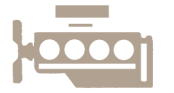
6. Keeping cylinder liner 'square' to cylinder block, push liner fully down until shoulder of liner seats against cylinder block. Do not drop liners into position.

CAUTION: If original cylinder liners are to be refitted, align reference marks made during dismantling before liner is pushed fully down.

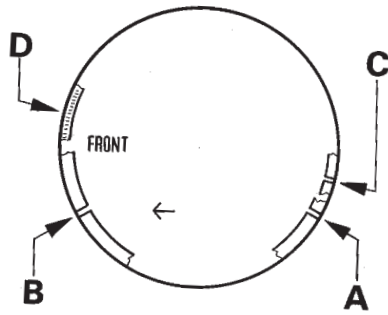
7. Fit cylinder liner retainer clamps 18G 1736.

Piston rings - refit

8. Fit oil control spring.
Ensure that piston rings are fitted to piston for the cylinder bore in which they were checked.
9. With 'TOP' or identification markings to top of piston, use an expander to fit piston rings in sequence; oil control, 2nd and top compression.



16. Fit big-end bearings.

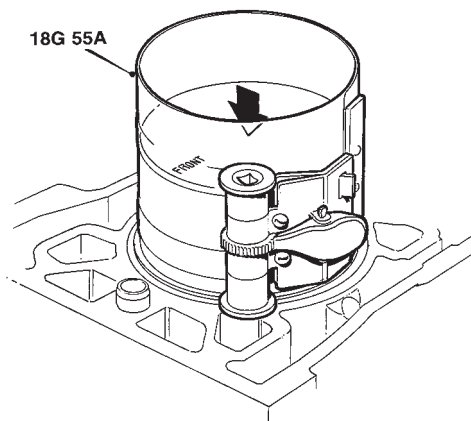


SP100033

10. Ensure rings are free to rotate, position compression ring gaps A and B at 120° to each other and away from thrust side - left hand side of piston when viewed from front. Position oil control ring gap C and spring gap D at 30° on opposite side of gudgeon pin axis

Pistons and connecting rods - refit

11. Using assistance, support base of cylinder block on 2 wooden blocks.
12. Ensure that cylinder liner retainer clamps 18G 1736 are fitted and that feet of clamps do not protrude over cylinder liner bores.
13. Lubricate cylinder bores, pistons and rings with engine oil, ensure ring gaps are correctly spaced.
14. Fit selected bearing shells into big-end bearing caps and connecting rods.



SP100038

15. Fit ring clamp 18G 55A to each piston in turn and with 'FRONT' mark on piston to engine front, push piston into bore until flush with top face of cylinder liner. Remove ring clamp.

CAUTION: If original pistons are to be fitted, ensure that each piston is inserted in its correct cylinder liner. Do not push pistons below top face of cylinder liner until big-end bearings and caps are to be fitted.

ENGINE



THROTTLE CABLE

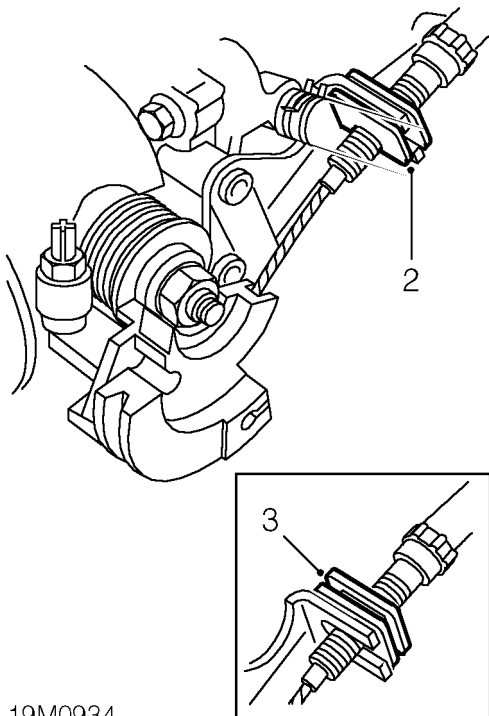
🔑 19.20.05

NOTE: Before adjustment, ensure the cable is correctly routed and located. Do not attempt to adjust the throttle cable or engine idle speed by means of the throttle stop screw.

Adjust

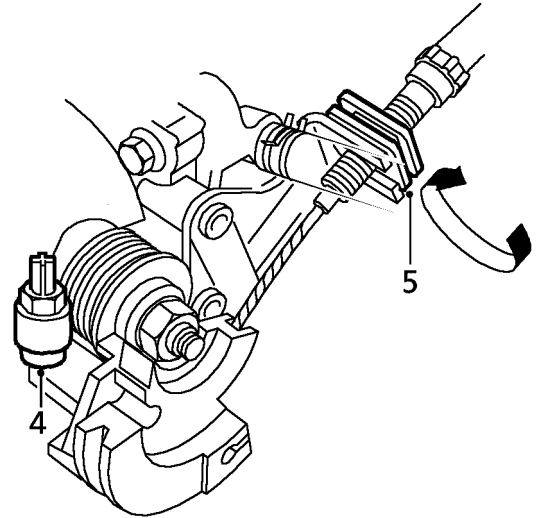
1. Remove the engine compartment access panel.

👉 [ENGINE COMPARTMENT ACCESS PANEL](#), page 76-2-4.



19M0934

2. Release cable adjusting nut from abutment bracket.
3. Position outer cable to abutment bracket so that adjusting nut is in contact with top of abutment bracket.



19M0933A

4. Hold throttle cam in fully closed position, ensure throttle cam contacts throttle stop screw.
5. Rotate cable adjusting nut until all slack is taken out of inner cable. Ensure throttle does not open.
6. Locate throttle cable adjusting nut in abutment bracket.
7. Operate throttle pedal and ensure that full throttle pedal movement is available.
8. Fit engine compartment access panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL](#), page 76-2-4.

ENGINE MANAGEMENT SYSTEM - MEMS

FUEL TANK DRAINING

🔑 19.55.02

Drain

WARNING: The fuel tank must be drained before removing it from the vehicle. Ensure that both sides of the fuel tank are completely drained.

1. Disconnect battery earth lead.
2. Depressurise fuel system.
👉 FUEL SYSTEM DEPRESSURISE, page 18-2.

WARNING: Petrol/gasoline vapour is highly flammable, and in contained spaces is also explosive and toxic. Always have a fire extinguisher containing FOAM, CO₂ GAS OR POWDER close at hand when handling or draining fuel.

3. Remove fuel pump.
👉 FUEL PUMP, page 18-11.
4. Using a fuel recovery appliance, drain fuel from the tank into a sealed container. Follow the manufacturers instructions for the connection and safe use of the appliance.
5. Due to the construction of the fuel tank, it will be necessary to drain fuel from each side of the tank separately.

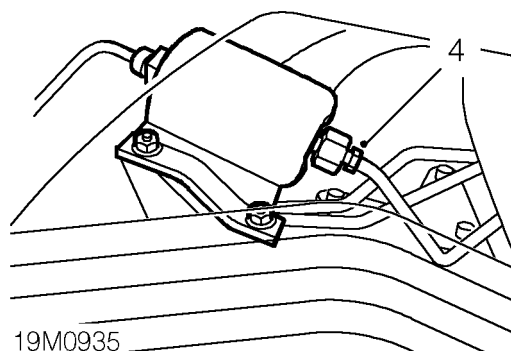
NOTE: Fuel vapour causes the fuel tank to swell, before attempting fuel tank removal, ensure fuel is completely drained and the tank is left in the drained condition for at least 2 hours. See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.

FUEL SYSTEM DEPRESSURISE

🔑 19.50.02

Adjust

1. Disconnect battery earth lead.
2. Remove engine compartment access panel.
👉 ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.
3. Position absorbent cloth around fuel filter outlet union.




4. Loosen fuel filter outlet union to relieve fuel pressure.
CAUTION: To prevent damage to the fuel system pipes and components, use two spanners when loosening or tightening unions.
5. Tighten fuel filter outlet union to 30 Nm.
6. Remove absorbent cloth.
7. Fit engine compartment access panel.
👉 ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.
8. Connect battery earth lead.

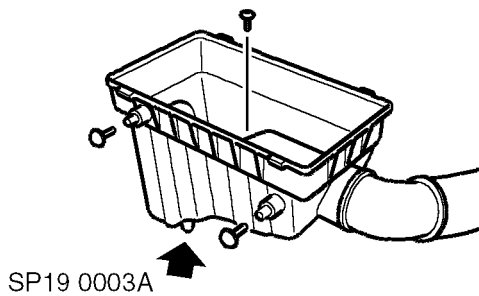


AIR CLEANER

🔑 19.10.01


Remove

1. Remove air cleaner element.
 [ELEMENT - AIR CLEANER, page 18-3.](#)



2. Remove 2 retaining studs securing air cleaner to support bracket.
3. Release air cleaner from lower grommet.
4. Release front air intake hose.
5. Remove screw securing rear air intake hose.
6. Release rear air intake hose and manoeuvre air cleaner from engine bay.



Refit

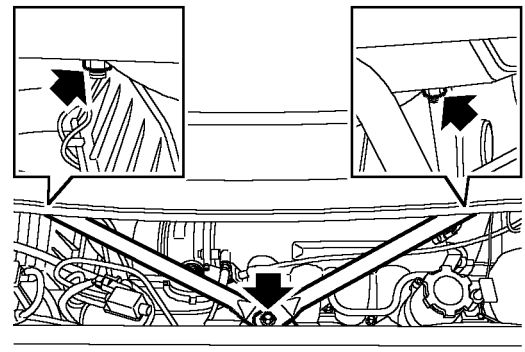
1. Position air cleaner and align rear air intake hose.
2. Fit and tighten screw securing rear air intake hose.
3. Align and connect front air intake hose.
4. Secure air cleaner in lower grommet.
5. Align air cleaner to support bracket and fit retaining studs.
6. Fit air cleaner element.
 [ELEMENT - AIR CLEANER, page 18-3.](#)

ELEMENT - AIR CLEANER

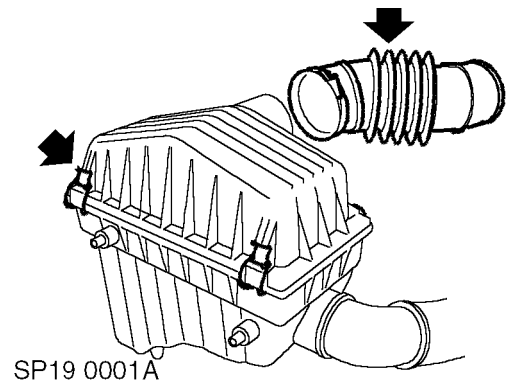
🔑 19.10.10

Remove

1. Disconnect battery earth lead.
2. Remove engine cover.
 [ENGINE COVER, page 12-27.](#)
3. Remove engine compartment access cover.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)

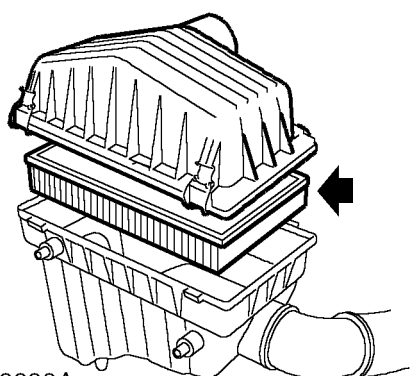


4. Remove nut securing LH cross bracing and remove and discard bolt securing cross bracing.
5. Remove LH cross bracing.



6. Release clip and disconnect air intake hose from throttle body.
7. Loosen clip securing air intake hose to air cleaner and remove hose.
8. Release 4 clips securing air cleaner cover.

ENGINE MANAGEMENT SYSTEM - MEMS



9. Remove air cleaner cover and remove element.

Refit

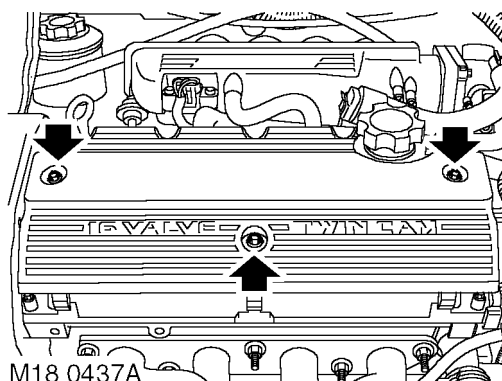
1. Clean inside of air cleaner.
2. Fit air cleaner element.
3. Fit air cleaner cover and secure clips.
4. Fit air intake hose to air cleaner and secure with clip.
5. Fit air intake hose to throttle body and secure with clip.
6. Position cross bracing, fit nut and new bolt and tighten to 25 Nm.
7. Fit engine compartment access cover:
[ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
8. Fit engine cover:
[ENGINE COVER, page 12-27.](#)
9. Connect battery earth lead.

SENSOR - CAMSHAFT POSITION (CMP)

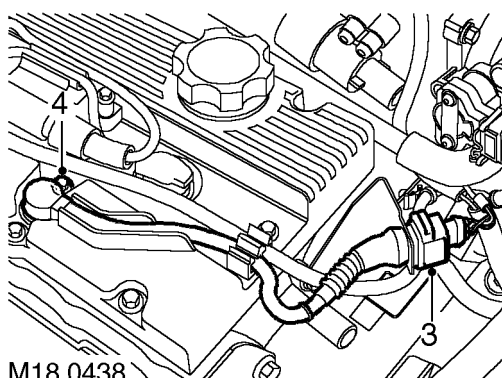
18.30.24

Remove

1. Remove engine cover:
[ENGINE COVER, page 12-27.](#)



2. Remove three bolts securing coil cover to engine and remove coil cover.



3. Release CMP multiplug from bracket and disconnect multiplug.
4. Release sensor cable from clip.
5. Remove bolt securing camshaft sensor and remove sensor.

Refit

1. Clean camshaft sensor and mating face.
2. Fit camshaft sensor; fit bolt and tighten to 9 Nm.
3. Connect CMP multiplug and secure in bracket.
4. Fit coil cover; fit bolts and tighten to 8 Nm.
5. Fit engine cover:
[ENGINE COVER, page 12-27.](#)

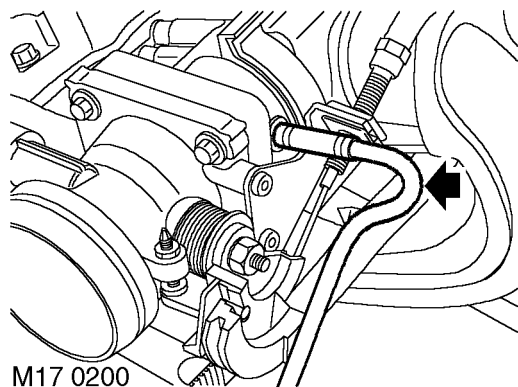


EVAPORATIVE EMISSION CANISTER

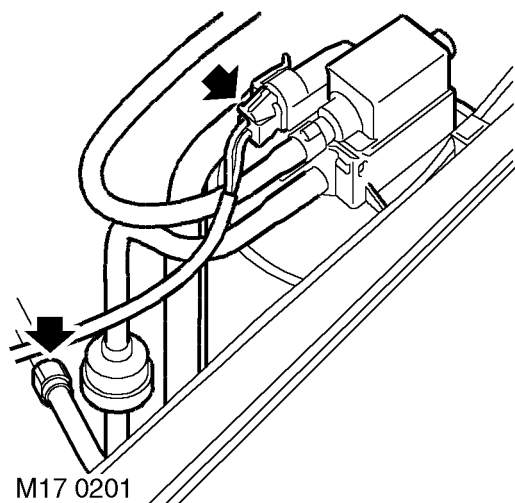
🔑 17.15.13

Remove

1. Disconnect battery earth lead.
2. Remove engine compartment access panel.
👉 ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.



3. Release clip and disconnect hose from inlet manifold.



4. Release and disconnect feed hose.
5. Disconnect multiplug from purge valve.
6. Release EVAP canister from support bracket and remove EVAP canister.

Refit

1. Position EVAP canister and secure in support bracket.
2. Connect hose to inlet manifold and secure with clip.
3. Connect feed hose.
4. Connect multiplug to purge valve.

5. Fit engine compartment access panel.
👉 ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.
6. Connect battery earth lead.

ENGINE MANAGEMENT SYSTEM - MEMS

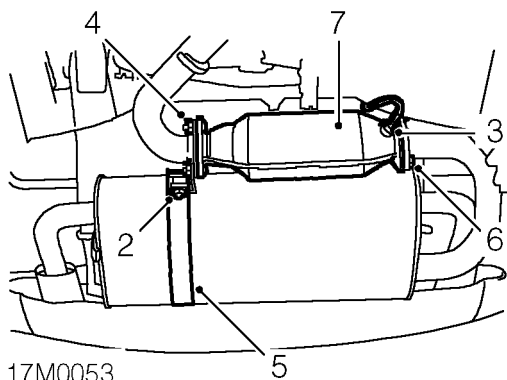
CATALYTIC CONVERTER

🔑 17.50.01

Remove

1. Raise rear of vehicle.

WARNING: Support on safety stands.



2. Remove nut and special washer securing rear silencer clamp.
3. Remove catalyst overheat sensor from catalyst (if fitted)
4. Remove 3 flange nuts securing catalytic converter to front pipe.
5. Remove rear silencer clamp.
6. Remove 3 flange nuts securing catalytic converter to silencer.
7. Remove catalytic converter.
8. Remove and discard gaskets.

Refit

1. Clean flange mating faces of front pipe, silencer and catalytic converter.
2. Fit new gaskets to catalytic converter studs.
3. Fit catalytic converter to silencer; fit nuts and tighten to 50 Nm.
4. Clean catalyst overheat sensor and mating faces (if fitted)
5. Fit and tighten catalyst overheat sensor to 30 Nm (if fitted)
6. Position catalytic converter to front pipe.
7. Fit rear silencer clamp.
8. Fit nuts and tighten to 50 Nm.
9. Align rear silencer clamp strap, fit special washer; fit nut and tighten to 30 Nm.
10. Remove stand(s) and lower vehicle.

CAUTION: Ensure all joints are free from leaks.

Exhaust gas leaks upstream of the catalyst could lead to internal failure of the catalyst converter pipe.

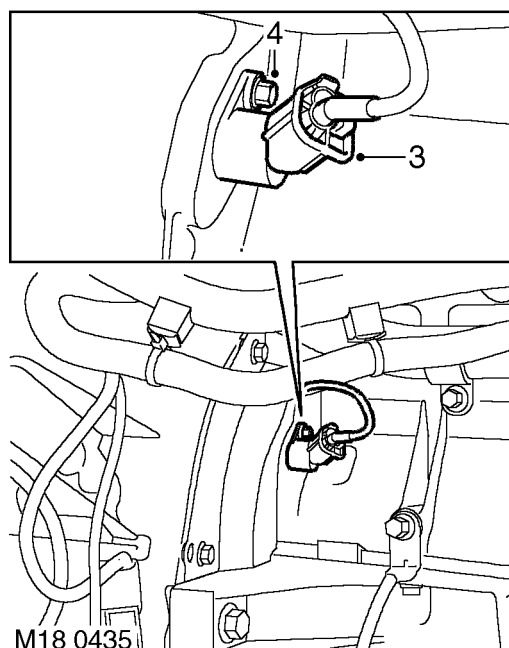
SENSOR - CRANKSHAFT POSITION (CKP)

🔑 18.30.12

Remove

1. Disconnect battery earth lead.
2. Raise rear of vehicle.

WARNING: Support on safety stands.



3. Disconnect multiplug from CKP sensor.
4. Remove bolt securing CKP sensor to flywheel housing.
5. Remove CKP sensor.

Refit


1. Clean CKP sensor and mating face of flywheel housing.
2. Position CKP sensor; fit bolt and tighten to 9 Nm.
3. Connect multiplug to CKP sensor.
4. Remove stand(s) and lower vehicle.
5. Connect battery earth lead.

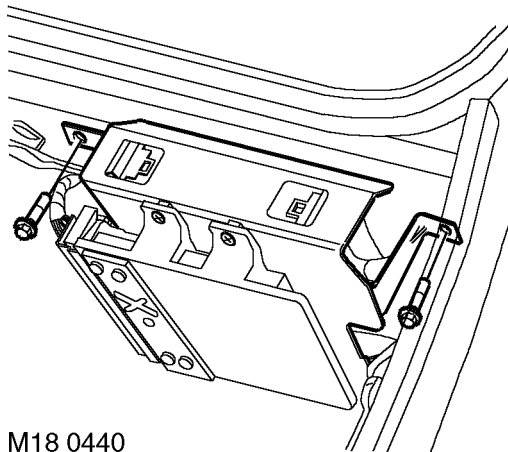


ENGINE CONTROL MODULE (ECM)

🔑 18.30.01

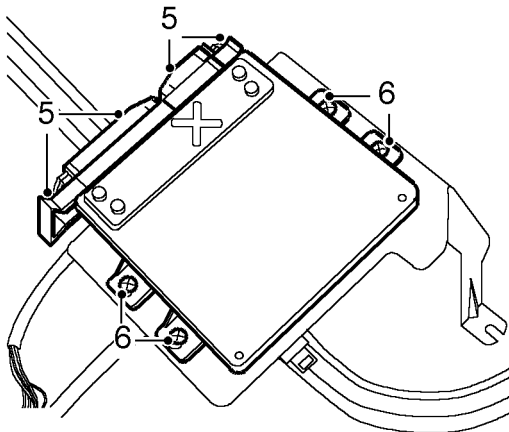
Remove

1. Disconnect battery earth lead.
2. Remove engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)



M18 0440


3. Remove 2 bolts securing ECM mounting bracket.
4. Release mounting bracket from support bracket and position to access ECM screws.



M18 0441

5. Release ECM multiplug catches and disconnect ECM multiplugs.
6. Remove 4 screws securing ECM to mounting bracket.
7. Remove ECM.

Refit

1. Locate ECM to mounting bracket, fit and tighten screws.
2. Connect multiplugs and secure multiplug catches.
3. Position mounting bracket in support bracket, fit bolts and tighten to 8 Nm.
4. Fit engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
5. Connect battery earth lead.
6. Initiate ECM using MG GDS.

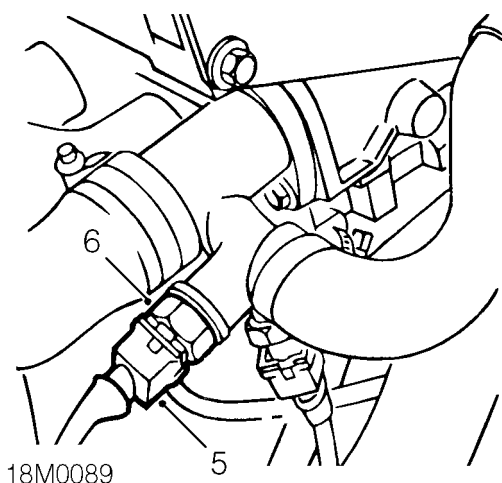
ENGINE MANAGEMENT SYSTEM - MEMS

SENSOR - ENGINE COOLANT TEMPERATURE (ECT)

🔑 18.30.10

Remove

1. Disconnect battery earth lead.
2. Remove engine cover:
👉 [ENGINE COVER, page 12-27.](#)
3. Raise vehicle on ramp.
4. Position container below sensor:



5. Disconnect sensor multiplug.
6. Remove sensor from top coolant hose adapter:

Refit

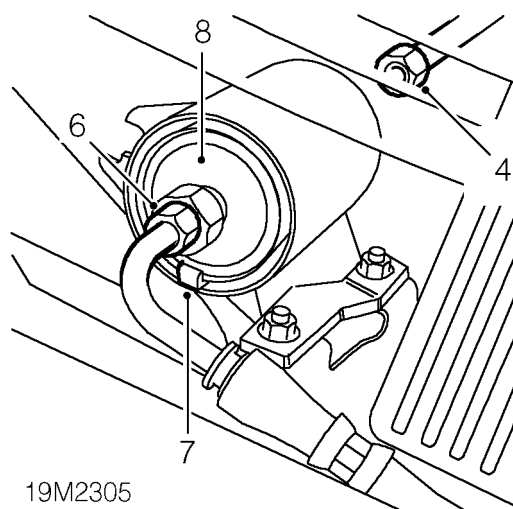
1. Clean sensor threads and mating faces.
2. Fit sensor and tighten to 6 Nm.
3. Connect multiplug to sensor:
4. Remove container; and lower vehicle.
5. Top-up cooling system.
👉 [COOLING SYSTEM, page 10-6.](#)
6. Fit engine cover:
👉 [ENGINE COVER, page 12-27.](#)
7. Connect battery earth lead.

FUEL FILTER

🔑 19.25.02

Remove

1. Disconnect battery earth lead.
2. Remove engine compartment access panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
3. Position cloth around fuel outlet union.



4. Loosen union to relieve fuel pressure and disconnect pipe.

CAUTION: Use two spanners when loosening or tightening unions.

5. Position cloth around fuel filter union.
6. Loosen union and disconnect fuel inlet pipe from fuel filter:
7. Release clip and remove filter from housing.
8. Discard fuel filter.

Refit

1. Clean fuel pipe unions.
2. With arrow on the fuel filter pointing rearwards position new filter into housing.
3. Tighten fuel inlet pipe to 30 Nm.
4. Connect fuel outlet pipe to fuel filter and tighten to 30 Nm.
5. Fit engine compartment access panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
6. Connect battery earth lead.

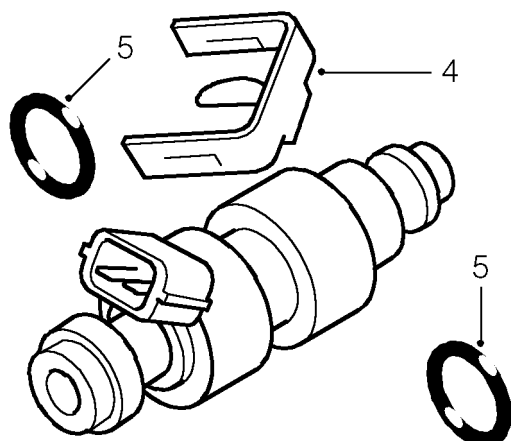


FUEL INJECTORS

🔑 19.60.12

Remove

1. Disconnect battery earth lead.
2. Remove fuel rail.
👉 [FUEL RAIL AND INJECTORS, page 18-9.](#)
3. Release multiplugs from injectors.



19M0907

4. Release spring clips securing injectors to fuel rail.
5. Remove injectors and discard 2 'O' rings from each injector.
6. Fit protective caps to each injector.

Refit

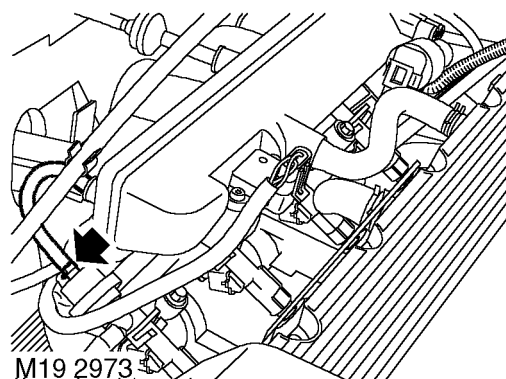
1. Clean injectors and injector recesses in fuel rail and inlet manifold.
2. Lubricate 8 new 'O' rings with castor oil and fit to injectors.
3. Fit fuel rail to injectors.
4. Fit spring clips to secure injectors to fuel rail.
5. Fit multiplugs to injectors.
6. Fit fuel rail.
👉 [FUEL RAIL AND INJECTORS, page 18-9.](#)
7. Connect battery earth lead.

FUEL RAIL AND INJECTORS

🔑 19.60.04

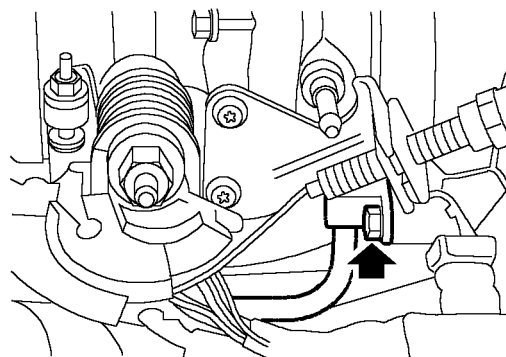
Remove

1. Disconnect battery earth lead.
2. Remove engine cover.
👉 [ENGINE COVER, page 12-27.](#)



M19 2973

3. Release clip and disconnect vacuum pipe from fuel pressure regulator.
4. Position absorbent cloth beneath fuel rail.

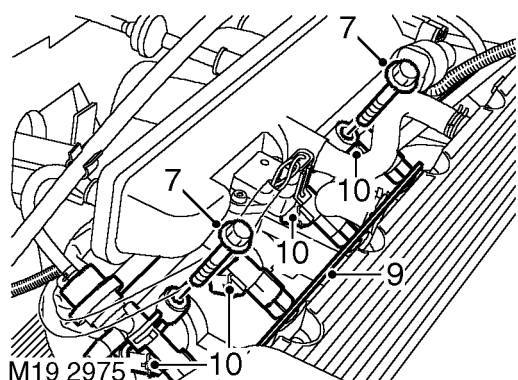



M19 2974

5. Remove 2 bolts securing fuel pipe to fuel rail.
6. Release fuel pipe from fuel rail, remove and discard 'O' ring.

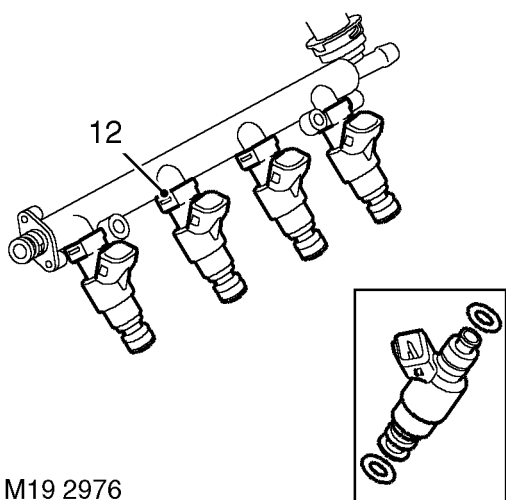
CAUTION: Always fit plugs to open connections to prevent contamination.

ENGINE MANAGEMENT SYSTEM - MEMS



10. Using a new 'O' ring, connect fuel feed to fuel rail, fit bolts and tighten to 8 Nm.
11. Connect vacuum pipe to fuel pressure regulator and secure with clip.
12. Fit engine cover.
 [ENGINE COVER, page 12-27.](#)
13. Connect battery earth lead.

7. Remove 2 bolts securing fuel rail to inlet manifold.
8. Release fuel rail and injectors from inlet manifold.
9. Release and remove injector spacer.
10. Disconnect multiplugs from injectors.
11. Remove the fuel rail complete with injectors.



12. Release spring clips securing injectors to fuel rail and remove fuel injectors.
13. Remove and discard 2 'O' rings from each injector.
14. Fit protective caps to each end of injectors.

Refit

1. Remove protective caps from each injector.
2. Clean injectors and recesses in fuel rail and inlet manifold.
3. Lubricate new 'O' rings with castor oil and fit to each end of injectors.
4. Fit injectors to fuel rail.
5. Secure injectors to fuel rail with spring clips.
6. Position fuel rail assembly and connect injector multiplugs.
7. Fit injector spacer.
8. Push each injector into inlet manifold.
9. Fit bolts securing fuel rail to inlet manifold and tighten to 10 Nm.



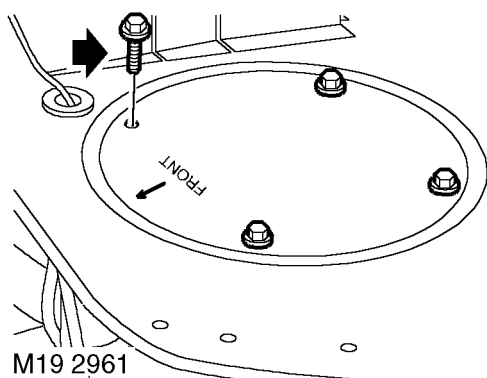
FUEL PUMP

🔑 19.45.08

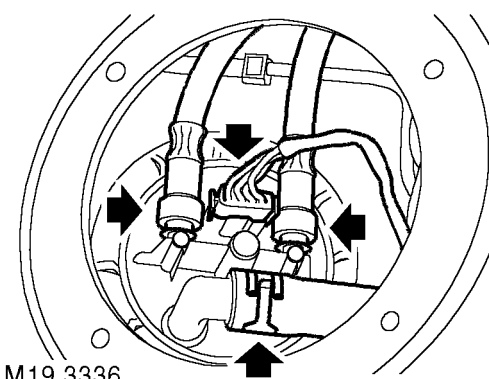
Remove

1. Disconnect battery earth lead.
2. Depressurise fuel system.
👉 [FUEL SYSTEM DEPRESSURISE](#), page 18-2.
3. Remove subwoofer assembly.
👉 [SUBWOOFER ASSEMBLY](#), page 86-13.
4. Remove engine cover.
👉 [ENGINE COVER](#), page 12-27.

WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.



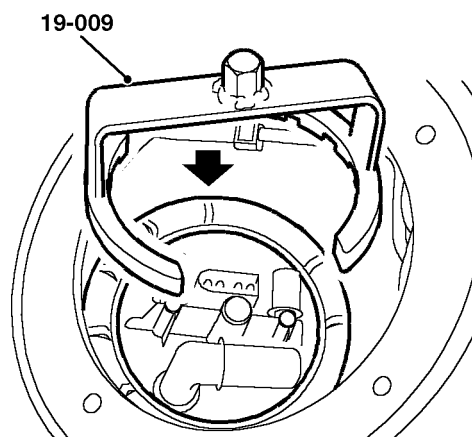
5. Remove 4 bolts securing fuel pump access cover to body and remove cover.



6. Release clip and disconnect hose securing fuel pump breather hose to fuel pump.

WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO₂, gas or powder close at hand when handling or draining fuel.

7. Disconnect fuel pump multiplug.
8. Position absorbent cloth around fuel hoses to collect any fuel spillage.
9. Noting fitted position, release fuel feed and return hoses from pump.



M19 3338

10. Using tool 19-009, loosen and remove fuel pump locking ring from tank.
11. Remove fuel pump retaining ring, release fuel pump and remove from tank. Discard fuel tank sealing ring.

Refit

1. Clean fuel pump and mating face.
2. Fit new fuel pump seal to pump body, locate pump assembly through tank opening. Fit seal to tank, push pump fully home taking care not to dislodge the seal.
3. Fit fuel pump locking ring and using tool 19-009, tighten to 35 Nm.
4. Connect fuel feed and return hoses to pump.
5. Connect multiplug to fuel pump.
6. Connect fuel pump breather hose and secure with clip.
7. Fit fuel pump access cover, fit and tighten bolts to 10 Nm.
8. Fit subwoofer assembly.
👉 [SUBWOOFER ASSEMBLY](#), page 86-13.
9. Fit engine cover.
👉 [ENGINE COVER](#), page 12-27.
10. Connect battery earth lead.

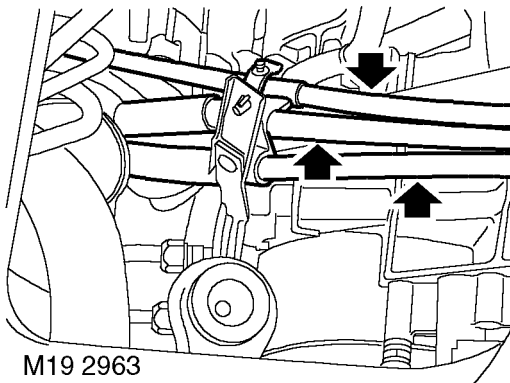
ENGINE MANAGEMENT SYSTEM - MEMS

FILLER NECK

🔑 19.55.07

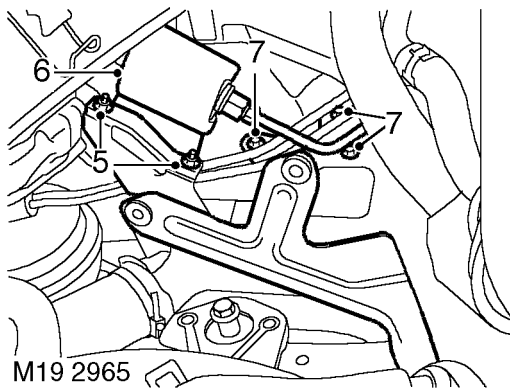
Remove

1. Disconnect battery earth lead.
2. Remove air cleaner:
👉 [AIR CLEANER, page 18-3.](#)
3. Drain fuel tank.
👉 [FUEL TANK DRAINING, page 18-2.](#)



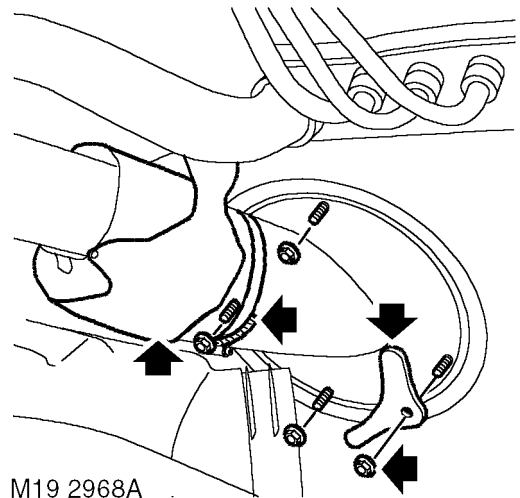
M19 2963

4. Release 3 cables from air cleaner support bracket.



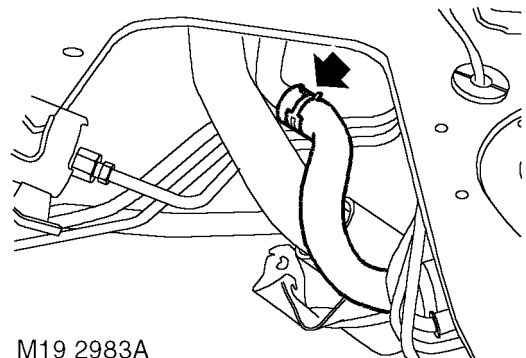
M19 2965

5. Remove 2 nuts securing fuel filter to air cleaner support bracket.
6. Release fuel filter from support bracket and position aside.
7. Remove 3 bolts securing air cleaner support bracket to body and remove bracket.



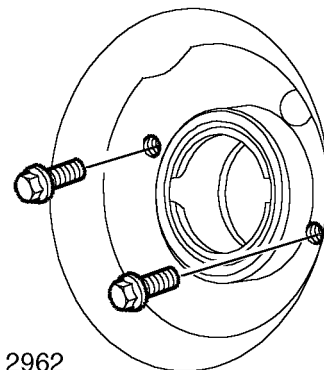
M19 2968A

8. Remove 4 nuts securing filler neck gaiter and collect gaiter clamp.
9. Slide gaiter up filler neck, loosen clip and release hose from filler neck.



M19 2983A

10. Release clip securing breather hose to filler neck and disconnect hose.
11. Remove fuel filler cap.





M19 2962

12. Remove 2 bolts securing filler neck to body and remove filler neck.






Refit

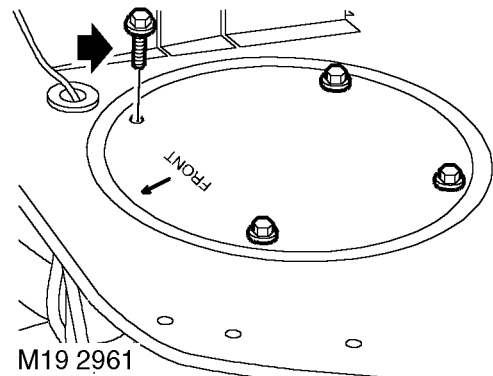
1. Position filler neck, fit and tighten 2 bolts securing neck to body.
2. Connect tank hose to filler neck and secure with clip.
3. Connect breather hose to filler neck and secure with clip.
4. Manoeuvre gaiter into position, fit clamping plate and secure with nuts.
5. Position air cleaner support bracket, fit and tighten bolts.
6. Connect cables to clips.
7. Fit fuel filter to support bracket and secure with nuts.
8. Refill fuel tank.
 [FUEL TANK DRAINING, page 18-2.](#)
9. Fit fuel cap.
10. Fit air cleaner:
 [AIR CLEANER, page 18-3.](#)
11. Connect battery earth lead.

HOSE - BREATHER - TANK TO FILLER NECK

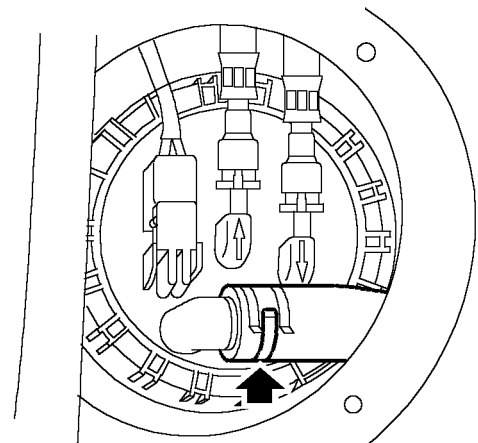
 19.55.14

Remove

1. Disconnect battery earth lead.
2. If fitted, remove subwoofer assembly.
 [SUBWOOFER ASSEMBLY, page 86-13.](#)
3. Remove hoodwell trim.
 [HOODWELL TRIM, page 76-4-11.](#)
4. Remove engine cover:
 [ENGINE COVER, page 12-27.](#)

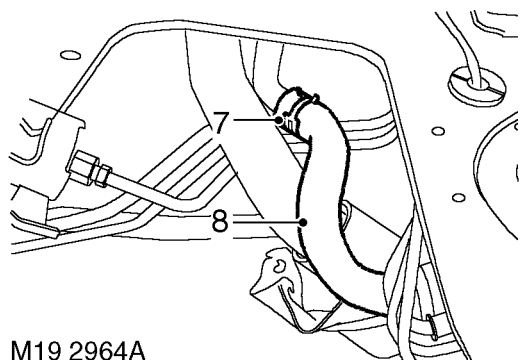


5. Remove 4 bolts securing fuel pump cover and remove cover.



6. Release clip and disconnect breather hose from fuel pump.




ENGINE MANAGEMENT SYSTEM - MEMS



M19 2964A

7. Release clip and disconnect breather hose from filler neck.
8. Remove breather hose.

Refit




1. Position hose and fit to filler neck and fuel pump.
2. Secure hose with clips.
3. Fit fuel pump cover and secure with bolts.
4. If fitted, fit subwoofer assembly.
 [SUBWOOFER ASSEMBLY, page 86-13.](#)
5. Fit engine cover.
 [ENGINE COVER, page 12-27.](#)
6. Fit hoodwell trim.
 [HOODWELL TRIM, page 76-4-11.](#)
7. Connect battery earth lead.

FUEL TANK

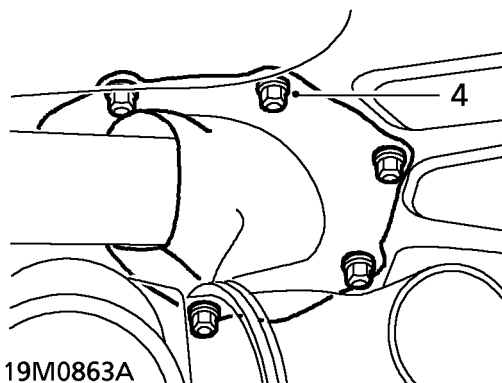
 19.55.01

WARNING: See RESTRAINT SYSTEMS, Precautions.

Remove

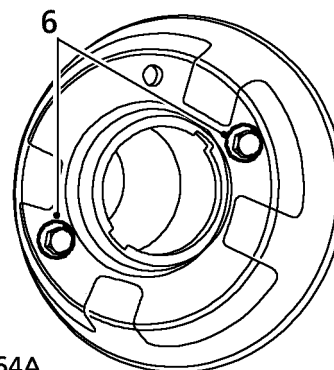
1. Make the SRS system safe.
 [SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.](#)
2. Remove air cleaner.
 [AIR CLEANER, page 18-3.](#)
3. Drain fuel tank.
 [FUEL TANK DRAINING, page 18-2.](#)

NOTE: Fuel vapour causes the fuel tank to swell, before attempting fuel tank removal ensure fuel is completely drained and the tank is left in the drained condition for at least 2 hours.



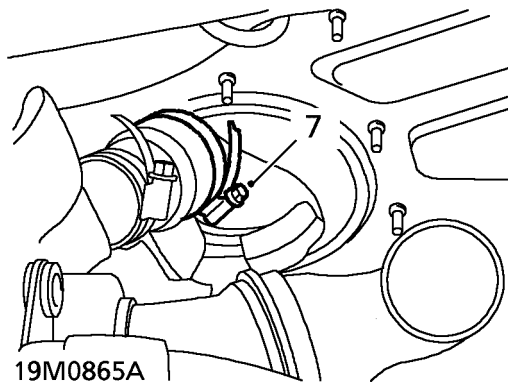
19M0863A


4. Remove 5 nuts securing fuel filler pipe gaiter to bulkhead.
5. Remove fuel filler cap.

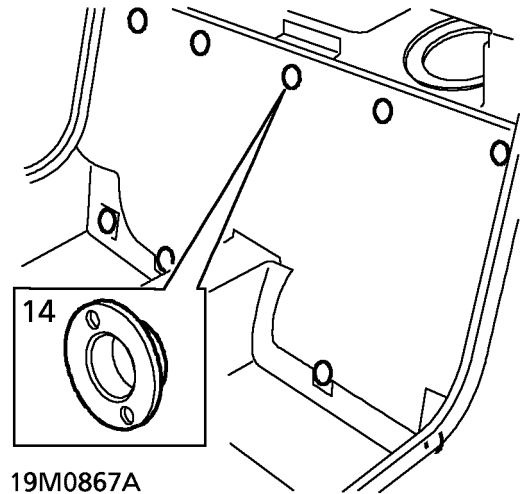


19M0864A

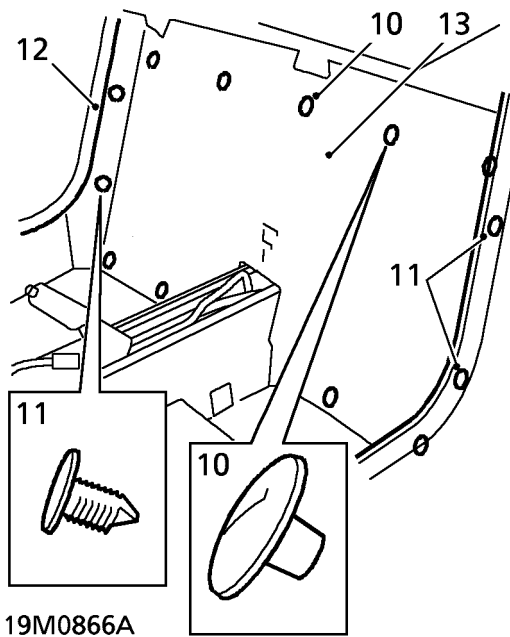
6. Loosen 2 bolts securing filler neck to rear wing.



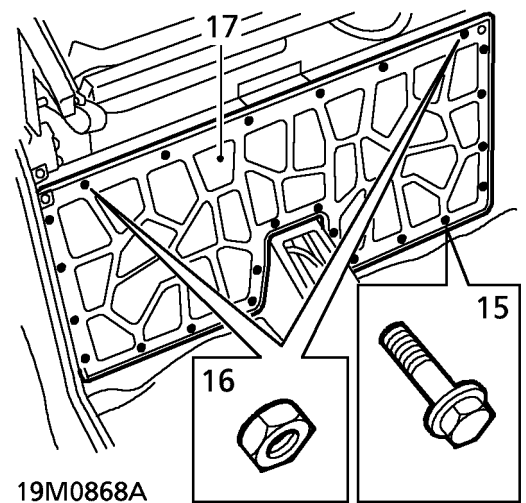
7. Release clip securing filler hose to fuel tank and position hose aside.
8. Remove front console.
-  [FRONT CONSOLE](#), page 76-4-4.
9. Lower hood.



14. Remove 9 retaining studs securing felt pad to rear bulkhead and remove pad.

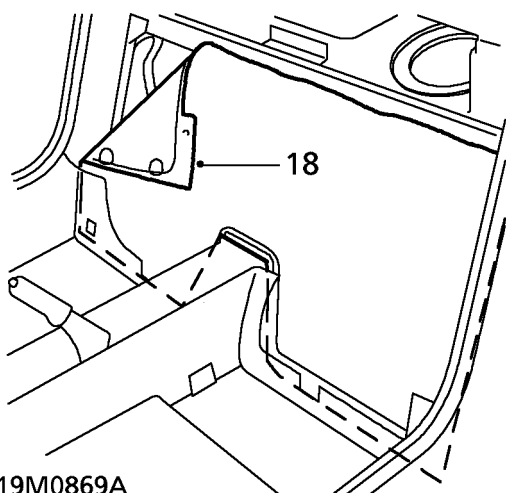


10. Remove 9 retaining studs securing carpet to rear bulkhead.
11. Remove 4 clips securing carpet to 'B' post.
12. Release carpet from door seals and velcro strips.
13. Remove carpet.

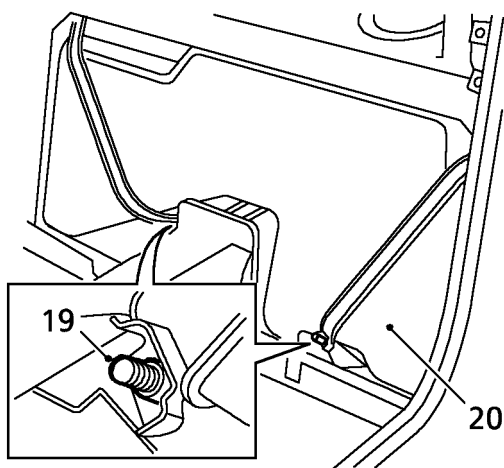


15. Remove 22 bolts securing closing panel to rear bulkhead.
16. Remove 2 nuts securing closing panel to rear bulkhead.
17. Remove closing panel.

ENGINE MANAGEMENT SYSTEM - MEMS




18. Remove and discard plastic fuel tank sealing sheet.



19. Remove 2 nuts securing tank retaining straps to body and position aside.
20. Remove fuel tank.

Refit

1. Position fuel tank to body.
2. Align retaining straps to body and tighten nuts to 10 Nm.
3. Align new plastic sheet to bulkhead and press seal into place.
4. Fit bulkhead closing panel and tighten nuts and bolts to 9 Nm.
5. Fit felt pad and secure with studs.
6. Fit carpet and secure with studs.
7. Position carpet to velcro and behind door seal.
8. Fit front console.
 [FRONT CONSOLE, page 76-4-4.](#)
9. Raise rear of hood.

CAUTION: Do not use any lubricants on flexible filler hose to ease assembly.

10. Position filler hose to tank and tighten clip to 3 Nm.
11. Fit bolts securing filler neck to wing and tighten to 3 Nm.
12. Fit filler cap.
13. Position filler gaiter to body studs and secure with nuts.
14. Fit air cleaner. See **ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**
15. Fit fuel pump. See **ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**

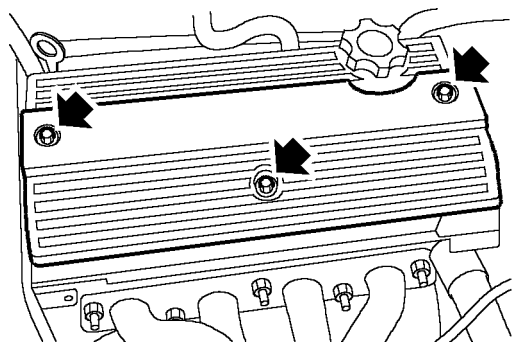


HT LEAD - SET

🔑 18.20.11

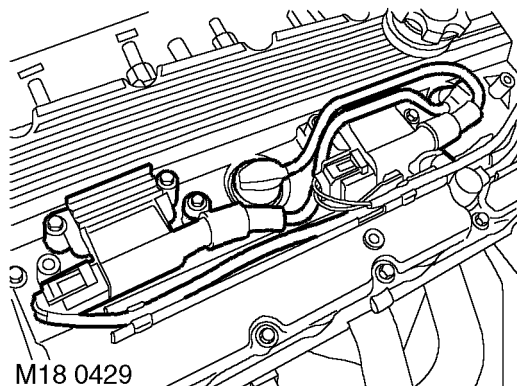
Remove

1. Remove engine cover:
 ENGINE COVER, page 12-27.



M18 0430

2. Remove screws securing coil cover and remove cover.



M18 0429

3. Disconnect ht leads from coils, release ht leads from retainers.
4. Disconnect ht leads from plugs and remove ht leads.

Refit

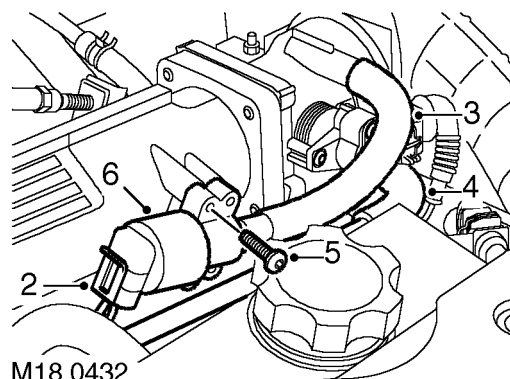
1. Connect ht leads to plugs.
2. Connect ht leads to coils and secure in retainers.
3. Fit coil cover and tighten screws to 8 Nm.
4. Fit engine cover:
 ENGINE COVER, page 12-27.

VALVE - IDLE AIR CONTROL (IAC)

🔑 18.30.05

Remove

1. Remove engine cover:
 ENGINE COVER, page 12-27.



M18 0432

2. Disconnect multiplug from IAC valve.
3. Release bypass hose from IAC valve and remove from throttle body.
4. Release breather hose from throttle body and position aside.
5. Remove 4 Torx screws securing IAC valve to inlet manifold.
6. Remove IAC valve.
7. Remove and discard 'O' ring.

Refit

1. Clean mating faces of IAC valve and inlet manifold.
2. Lubricate new 'O' ring with silicone grease and fit to IAC valve.
3. Fit IAC valve to inlet manifold.
4. Tighten Torx screws to 1.5 Nm.
5. Connect breather hose to throttle body.
6. Connect air bypass hose to IAC valve and throttle body.
7. Connect multiplug to IAC valve.
8. Fit engine cover:
 ENGINE COVER, page 12-27.

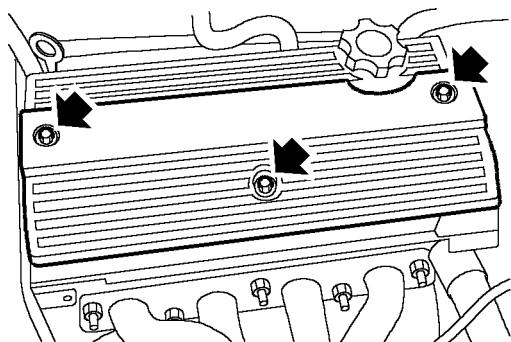
ENGINE MANAGEMENT SYSTEM - MEMS

IGNITION COIL

🔑 18.20.44

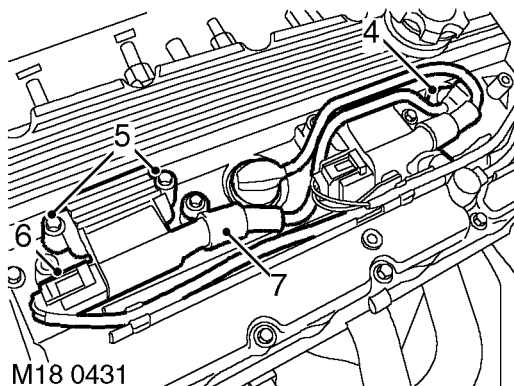
Remove

1. Remove engine cover.
👉 [ENGINE COVER, page 12-27.](#)



M18 0430

2. Remove 3 screws securing coil cover.
3. Remove cover.



M18 0431

4. Release ht lead from spark plug.
5. Remove 2 bolts securing coil and release coil from spark plug.
6. Disconnect multiplug from coil and remove coil.
7. Remove ht lead from coil.

Refit

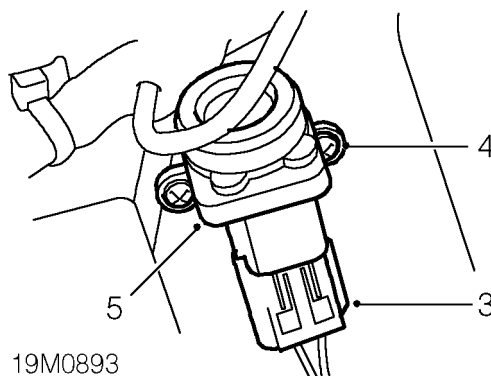
1. Fit ht lead to coil.
2. Fit coil and connect multiplug.
3. Fit and tighten bolts securing coil to 8 Nm.
4. Connect ht lead to spark plug and secure lead in clip.
5. Fit coil cover and tighten bolts to 8 Nm.
6. Fit engine cover.
👉 [ENGINE COVER, page 12-27.](#)

SWITCH - INERTIA FUEL SHUT-OFF

🔑 19.22.09

Remove

1. Disconnect battery earth lead.
2. Remove engine compartment access panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)



19M0893

3. Disconnect multiplug from switch.
4. Remove 2 Torx screws securing switch to body.
5. Remove switch.

Refit


1. Fit switch and tighten screws.
2. Connect multiplug to switch.
3. To ensure switch is set in correct position, press down on top.
4. Fit engine compartment access panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
5. Connect battery earth lead.

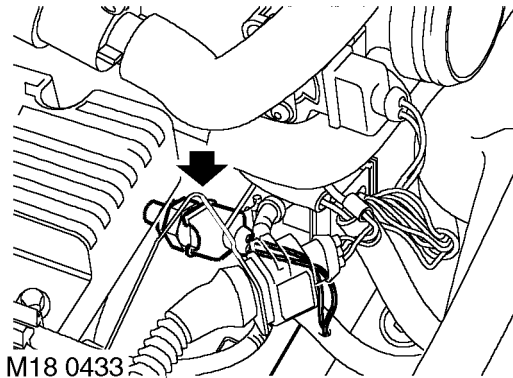


SENSOR - INTAKE AIR TEMPERATURE (IAT)

🔑 18.30.09


Remove

1. Remove engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)



2. Disconnect IAT sensor multiplug.
3. Loosen and remove IAT sensor.


Refit

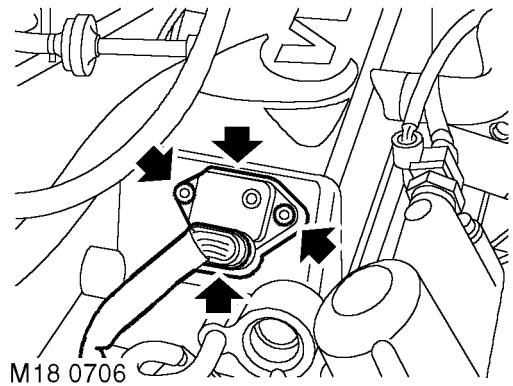
1. Fit and tighten IAT sensor.
2. Connect IAT sensor multiplug.
3. Fit engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)

SENSOR - MANIFOLD ABSOLUTE PRESSURE (MAP)

🔑 18.30.56

Remove

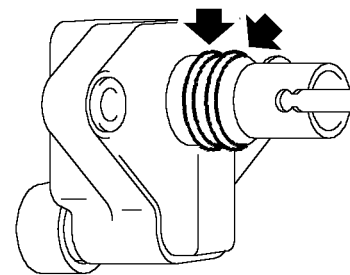
1. Disconnect battery earth lead.
2. Remove engine compartment access cover.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)




3. Disconnect MAP sensor multiplug.
4. Remove 2 Torx screws securing MAP sensor to inlet manifold.
5. Remove MAP sensor from manifold.

Refit

1. Clean MAP sensor and manifold mating faces.



2. Ensure 2 'O' rings are fitted to sensor.
3. Fit sensor to manifold and tighten Torx screws to 3 Nm.
4. Connect multiplug to MAP sensor.
5. Fit engine compartment access cover.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
6. Connect battery earth lead.

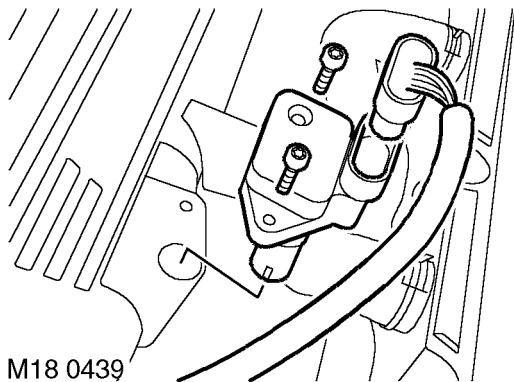
ENGINE MANAGEMENT SYSTEM - MEMS

SENSOR - MANIFOLD ABSOLUTE PRESSURE (MAP)

🔑 18.30.56

Remove

1. Remove engine cover.
👉 ENGINE COVER, page 12-27.



2. Disconnect MAP sensor multiplug.
3. Remove 2 Torx screws securing MAP sensor to inlet manifold.
4. Remove MAP sensor from manifold.

Refit

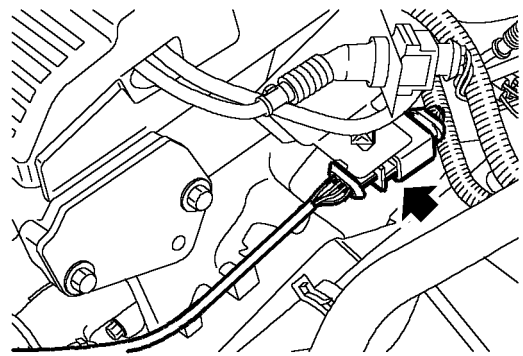
1. Clean MAP sensor and manifold mating faces.
2. Fit MAP sensor to inlet manifold, fit and tighten Torx screws.
3. Connect MAP sensor multiplug.
4. Fit engine cover.
👉 ENGINE COVER, page 12-27.

SENSOR - HEATED OXYGEN (HO2S) - PRE CAT

🔑 19.22.16

Remove

1. Disconnect battery earth lead.
2. Remove engine cover.
👉 ENGINE COVER, page 12-27.



3. Rotate HO2S sensor multiplug through 90° to release from mounting.
4. Disconnect HO₂S sensor multiplug from harness.
5. Raise rear of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

6. Remove HO₂S sensor lead from clip.
7. Using a 22 mm crows foot spanner, remove HO₂S sensor.

Refit

1. Fit HO₂S sensor and tighten to 55 Nm.
2. Fit HO₂S sensor lead to clip.
3. Connect multiplug and secure to mounting.
4. Fit engine cover.
👉 ENGINE COVER, page 12-27.
5. Remove stands and lower vehicle.
6. Connect battery earth lead.

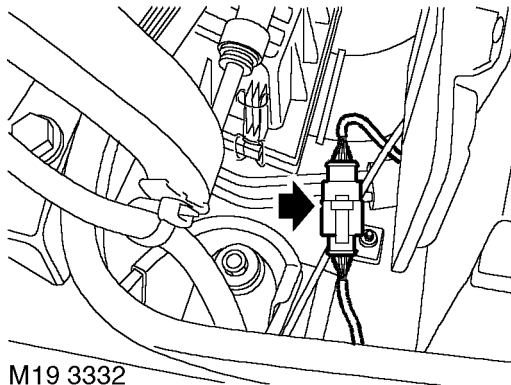


SENSOR - HEATED OXYGEN (HO2S) - POST CAT

🔑 19.22.71

Remove

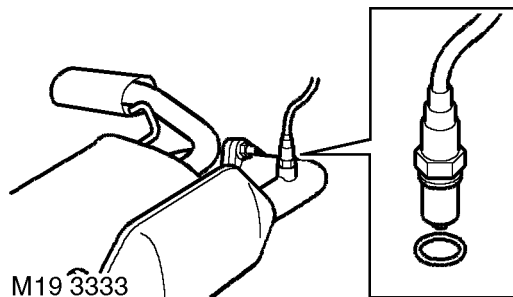
1. Disconnect battery earth lead.
2. Remove engine compartment access cover.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)



M19 3332

3. Release HO2S sensor multiplug from bracket and disconnect from harness.
4. Raise rear of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



M19 3333

5. Remove HO2S sensor.

Refit

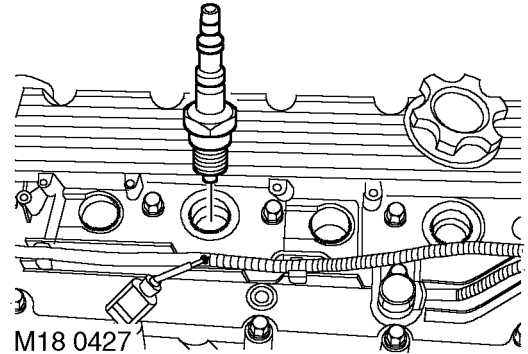
1. Fit HO2S sensor and tighten to 55 Nm.
2. Connect and secure HO2S sensor multiplug.
3. Fit engine compartment access cover.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
4. Remove stands and lower vehicle.
5. Connect battery earth lead.

SPARK PLUGS

🔑 18.20.02

Remove

1. Remove coils.
👉 [IGNITION COIL, page 18-18.](#)
2. Clean area around spark plugs.



3. Using a 16 mm spark plug socket remove 4 spark plugs.

Refit

1. Fit terminals to new spark plugs.
2. Set gap of each new spark plug to 1.00 ± 0.05 mm.
3. Fit spark plugs and tighten to 27 Nm.
4. Refit coils.
👉 [IGNITION COIL, page 18-18.](#)

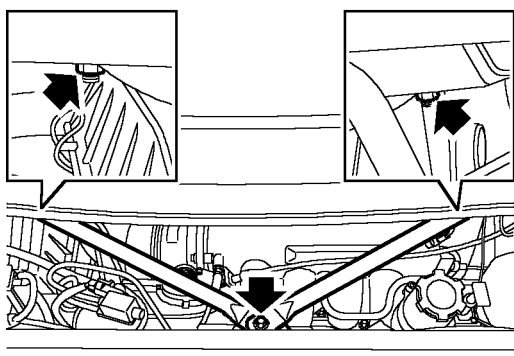
ENGINE MANAGEMENT SYSTEM - MEMS

THROTTLE HOUSING - (INCLUDES TUNING)

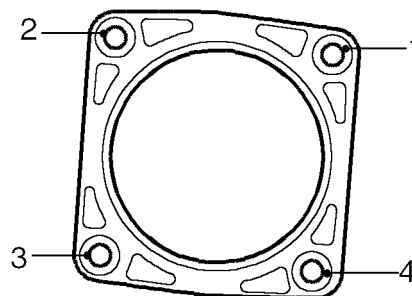
🔑 19.22.45

Remove

1. Disconnect battery earth lead.
2. Remove engine compartment access panel.
[👉 ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)



SP12 0363



M19 3083

3. Remove nuts securing cross bracing, remove and discard bolt securing cross bracing and remove cross bracing.
4. Release clips securing air intake hose and disconnect air intake hose from throttle housing and air cleaner; remove air intake hose.
5. Disconnect Idle Air Control valve hose from throttle housing.
6. Disconnect multiplug from throttle position sensor.
7. Release clip and disconnect breather hose from throttle housing.
8. Release throttle cable adjusting nut from abutment bracket.
9. Release throttle cable from cam.
10. Remove 4 bolts securing throttle housing to inlet manifold.
11. Remove throttle housing and position harness mounting bracket aside.
12. Remove and discard throttle housing 'O' ring.

Refit

1. Clean throttle housing and inlet manifold mating faces.
2. Lubricate new 'O' ring with silicone grease and fit to throttle housing.
3. Position throttle housing to inlet manifold, align harness bracket and fit bolts finger tight.



4. Tighten bolts in the sequence shown using the following procedure. 1. Tighten to 4 Nm. 2. Back off 1 flat. 3. Tighten to 9 Nm.
5. Connect throttle cable to throttle cam and abutment bracket.
6. Connect breather hose to throttle housing and secure clip.
7. Connect multiplug to throttle position sensor.
8. Connect Idle Air Control valve hose to throttle housing.
9. Adjust throttle cable.
10. Connect air intake hose to throttle housing and air cleaner and secure clips.
11. Position cross bracing, fit nuts and new bolt and tighten to 25 Nm.
12. Connect battery earth lead.
13. Re-tune using MG GDS.
14. Fit engine compartment access panel.
[👉 ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)

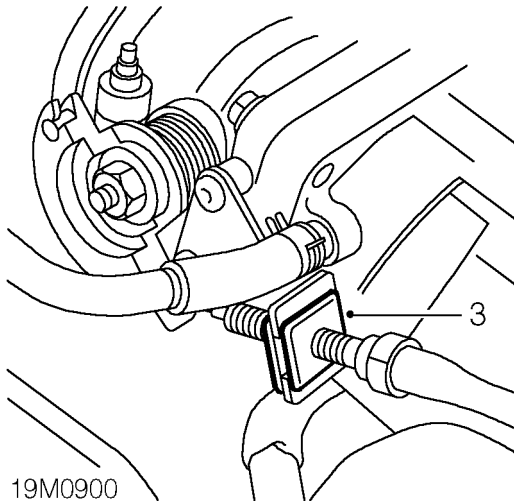


THROTTLE CABLE

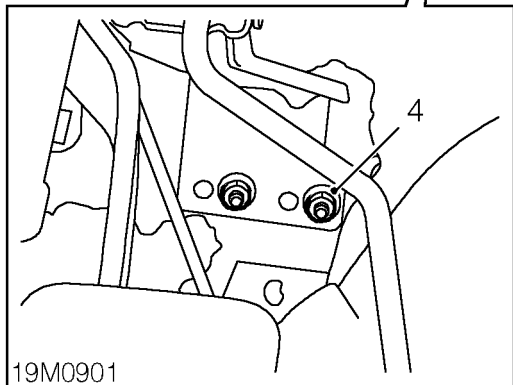
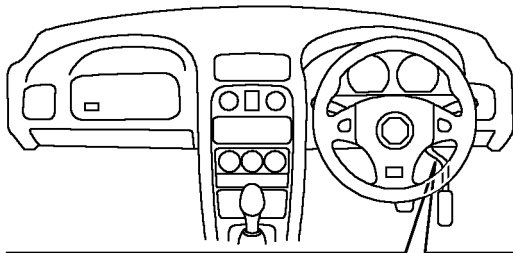
🔑 19.20.06

Remove

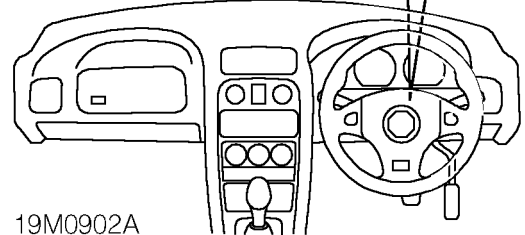
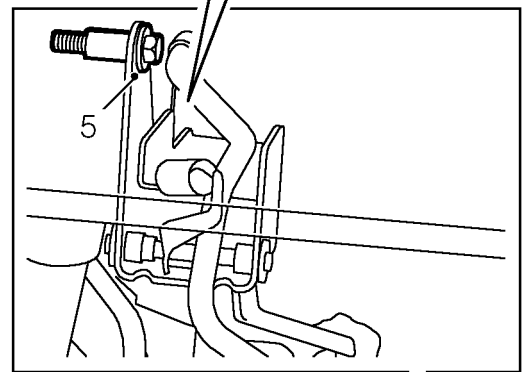
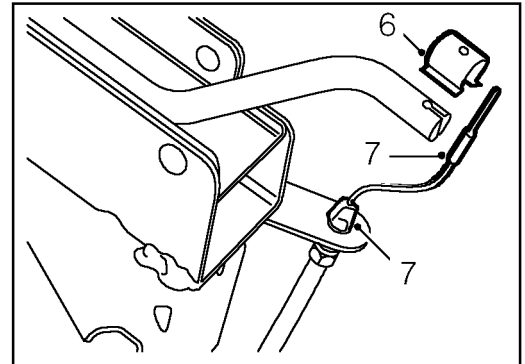
1. Remove engine cover:
 [ENGINE COVER](#), page 12-27.
2. Remove engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL](#), page 76-2-4.



3. Disconnect throttle cable abutment from throttle bracket.



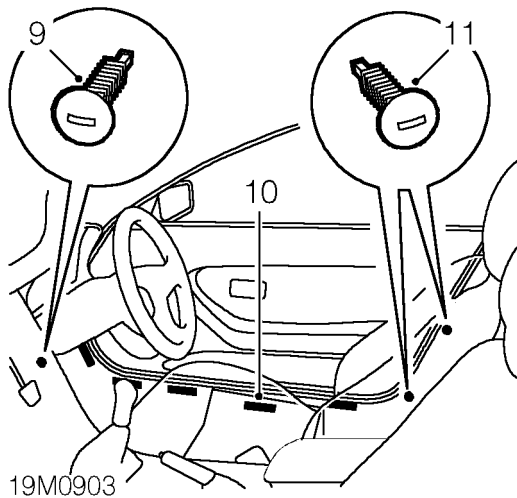
4. Remove 2 nuts securing throttle pedal bracket to bulkhead.



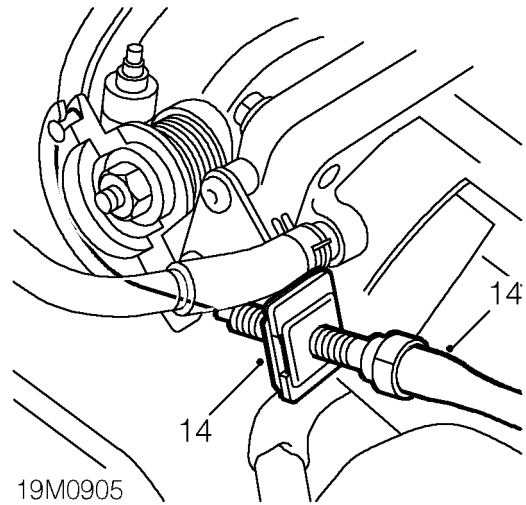
19M0902A

5. Remove bolt securing throttle pedal bracket to pedal box and collect spacer.
6. Position throttle pedal assembly and remove cable retaining clip.
7. Release cable nipple and abutment from throttle pedal.
8. Collect rubber washer.

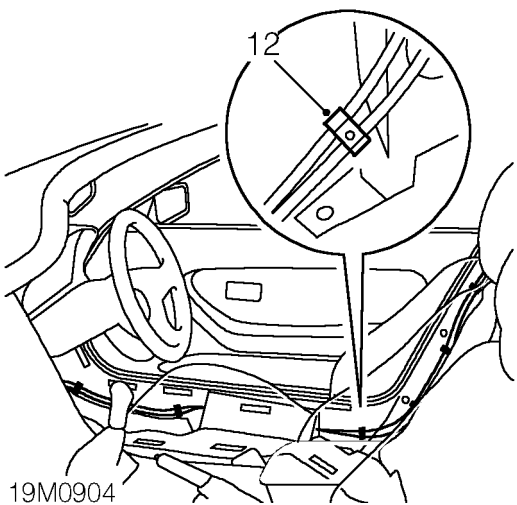
ENGINE MANAGEMENT SYSTEM - MEMS



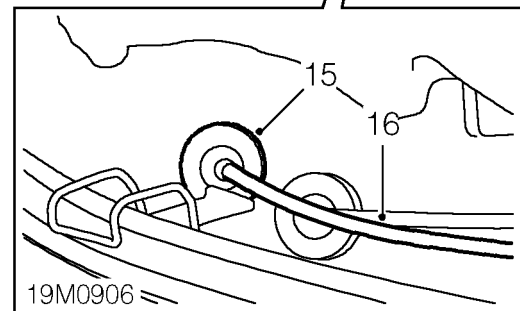
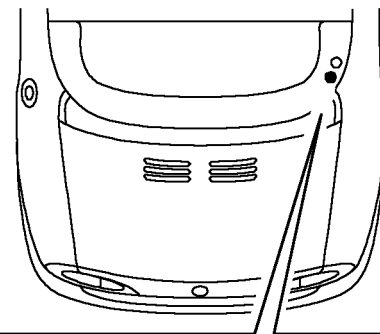
9. Remove stud securing carpet to inner wheel arch.
10. Release carpet from door seal and 5 velcro strips.
11. Remove 2 studs securing carpet to 'B' post and release carpet from door seal and velcro to reveal cables.



14. Release throttle cable from throttle body abutment and cam and position aside.



12. Release cable from 3 sill clips and 3 'B' post clips.
13. Release cable from floorpan crossmember.





15. Position hoodwell insulation aside and release cable grommet from hoodwell.
16. Remove throttle cable.


Refit

1. Feed cable through hoodwell panel and secure throttle cable to throttle body cam.
2. Engage grommet to hoodwell.
3. Position cable to 'B' post and sill and engage clips.
4. Position cable under insulation.
5. Fit rubber washer to cable abutment.
6. Fit cable abutment to throttle pedal bracket and engage cable nipple to pedal.
7. Fit cable retaining clip to pedal.



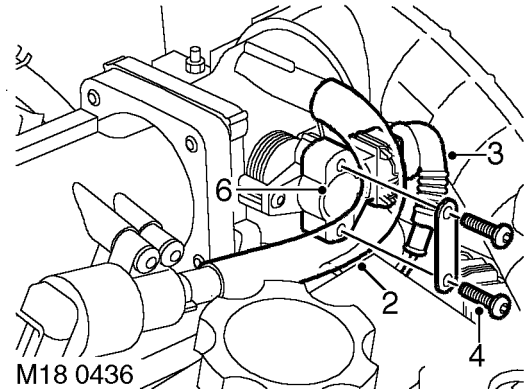
8. Align throttle pedal to bulkhead fixings and tighten nuts to 6 Nm.
9. Position harness clip to stud and secure with nut.
10. Fit bolt and spacer and tighten to 22 Nm.
11. Position carpets and secure with studs and velcro.
12. Position carpet beneath door seal.
13. Adjust cable length and fit cable abutment to throttle body.
14. Fit engine compartment access panel.
 **ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.**
15. Fit engine cover.
 **ENGINE COVER, page 12-27.**

SENSOR - THROTTLE POSITION (TP)

 **18.30.17**

Remove

1. Remove engine cover.
 **ENGINE COVER, page 12-27.**



2. Release air bypass hose from IAC valve and remove from throttle body.
3. Disconnect multiplug from TP sensor.
4. Remove and discard 2 Torx screws and wave washers securing TP sensor to inlet manifold.
5. Remove TP sensor specification plate.
6. Pull TP sensor from throttle spindle.

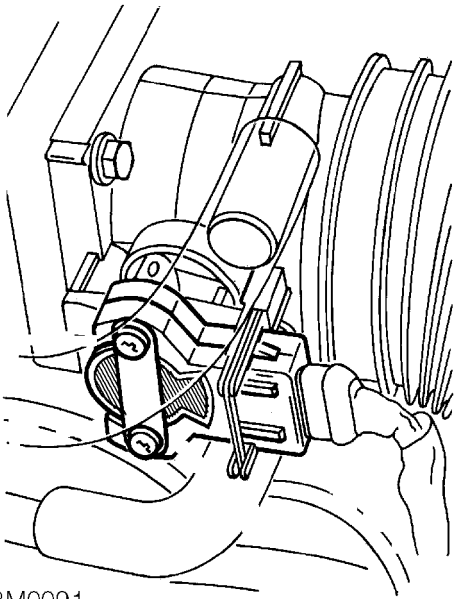
CAUTION: DO NOT twist or apply leverage to TP sensor.

Refit

1. Clean mating faces of throttle housing and TP sensor.
2. Fit TP sensor to throttle spindle. Ensure that during fitting the machined flat on the throttle spindle is aligned with the mating portion of the TP sensor.

CAUTION: The TP sensor can easily be damaged during fitting. When pressing the sensor onto throttle spindle, use fingers only and apply pressure only to the area shown shaded in the illustration.

ENGINE MANAGEMENT SYSTEM - MEMS



18M0091

3. Rotate TP sensor in an anti-clockwise direction to align fixing holes.

CAUTION: Do not rotate TP sensor in a clockwise direction and ensure that it is not rotated beyond its internal stops.

4. Fit TP sensor specification plate.
5. Fit new Torx screws and wave washers, tighten Torx screws to 1.5 Nm.

CAUTION: Do not exceed specified torque figure.

6. Connect multiplug to TP sensor.
7. Operate throttle cable cam 2 or 3 times and ensure that full travel to the throttle open and the throttle closed positions is available.
8. Fit air bypass hose to IAC valve and connect to throttle body.
9. Fit engine cover:

 [ENGINE COVER, page 12-27.](#)

NOTE: A 'throttle initialisation' procedure MUST be carried out using MG GDS whenever the TP sensor is removed or renewed.



DRAIN AND REFILL

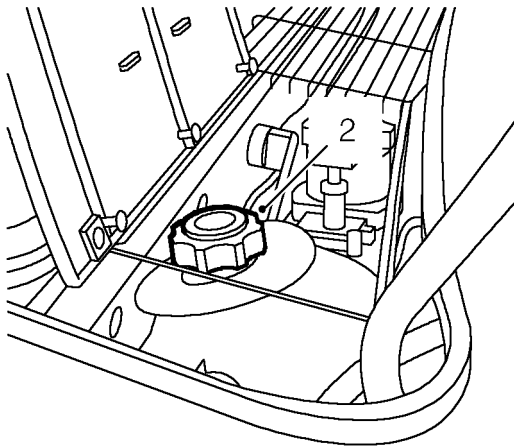
🔑 26.10.01

Drain

WARNING: Do not remove expansion tank filler cap when the engine is hot. The cooling system is pressurised, accidental scalding could result.

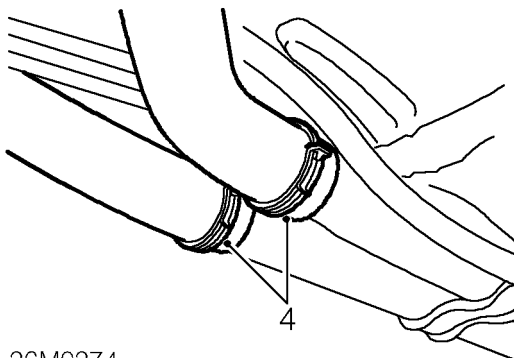
CAUTION: Any coolant spilt on the vehicle's body must be washed off immediately to prevent damage to the paint work.

1. Position heater temperature control to maximum heat position.



26M0273


2. Remove expansion tank filler cap.
3. Position container to collect coolant.

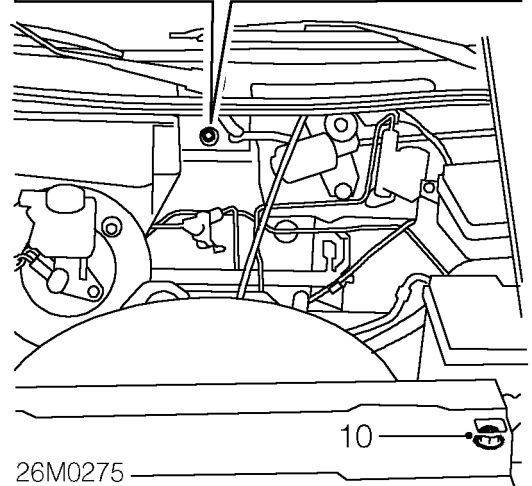
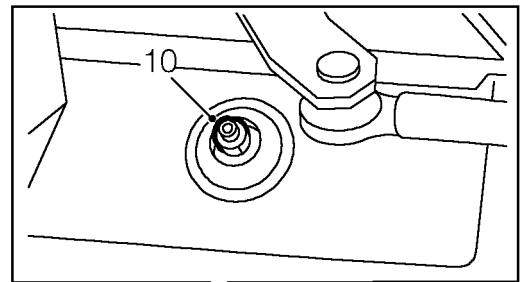


26M0274

4. Release clip and disconnect coolant hoses at rear of under floor coolant rail.
5. Allow cooling system to drain.

Refill

1. Flush system with water under low pressure.
CAUTION: High pressure water could damage the radiator.
2. Connect coolant hoses at the rear of the underfloor coolant rail, secure with clips.
3. Prepare coolant to the required concentration.
 **CAPACITIES, page 09-1.**
4. Turn heater temperature control to maximum heat position.




26M0275

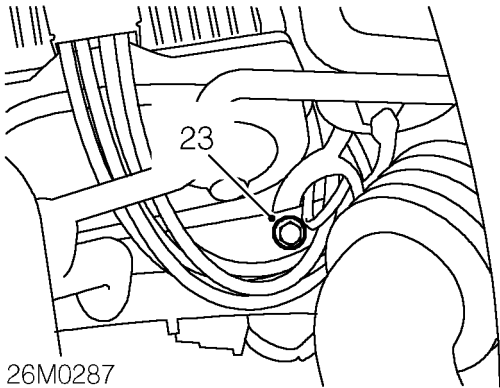
5. Remove bleed screw from radiator; and open heater bleed nipple.
6. Fill the system with coolant.
NOTE: To prevent introducing air into the system, keep the expansion tank filled.
7. When a constant flow of coolant is being emitted from both bleed points, close bleed points and tighten to: Radiator bleed screw 5 Nm, Heater bleed screw 7 Nm.
8. Fill expansion tank to the brim.
9. Fit expansion tank filler cap and start the engine.
10. Run the engine until the radiator cooling fan operates.
NOTE: DO NOT operate the air conditioning (if fitted).
11. Check the cooling system for leaks, and that the heater is emitting heat. If the heater is **NOT** emitting heat, see **Additional bleed.**
12. Switch off engine and allow to cool.


COOLING SYSTEM

13. Check level of coolant, top-up to 'MAX' mark on expansion tank if necessary.


Additional bleed

14. Allow engine to cool.
15. Remove engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
16. Release clip and remove inlet air hose from throttle housing.
17. Top-up the expansion tank with coolant.




18. Remove bleed screw from radiator return rail.
19. When a constant flow of coolant is being emitted from bleed point, fit bleed screw and tighten to 9 Nm.
20. Fit inlet hose to throttle housing and secure with clip.
21. Fit engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
22. Check level of coolant, top-up to 'MAX' mark on expansion tank if necessary.


COOLANT - VACUUM REFILL SYSTEM

 26.10.04.01

Drain

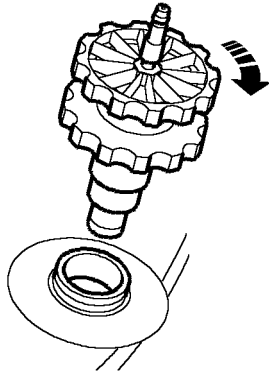
1. Remove engine compartment access grille.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
2. Visually check engine and cooling system for signs of coolant leaks.
3. Examine hoses for signs of cracking, distortion and security of connections.
4. Position heater temperature control to maximum heat position.
5. Remove expansion tank filler cap.
WARNING: Since injury such as scalding could be caused by escaping steam or coolant, do not remove the filler cap from the coolant expansion tank while the system is hot.
6. Position vehicle on 4 post ramp.
7. Position drain tray to collect coolant.
8. Release clips and disconnect coolant hoses from coolant rail underneath vehicle.
9. Allow cooling system to drain.

Check

1. Flush system with water under low pressure. **Do not use water under high pressure as it could damage the radiator.**
2. Connect hoses to coolant rail on underside of vehicle and secure with clips.
3. Prepare sufficient amount of coolant to required concentration and transfer to coolant container.
 [FLUIDS, page 09-1.](#)
4. Ensure heater temperature control is set to maximum.

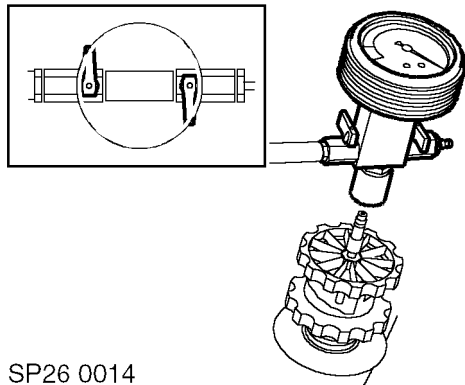


Refill



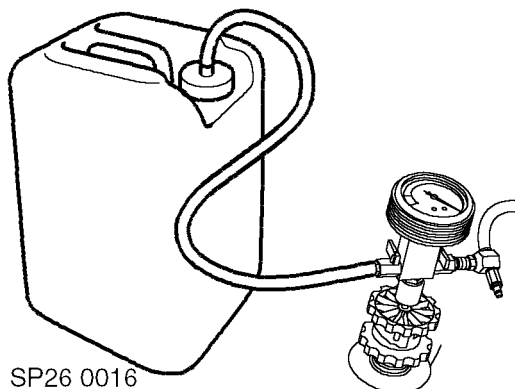
SP26 0013

1. Position vacuum adaptor to expansion tank and tighten hand wheels. Ensure seal is positioned midway in expansion tank neck.



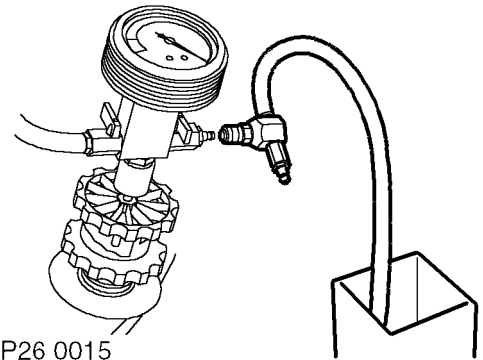
SP26 0014

2. Assemble both parts of vacuum adaptor; ensure both valves on vacuum adaptor are closed.



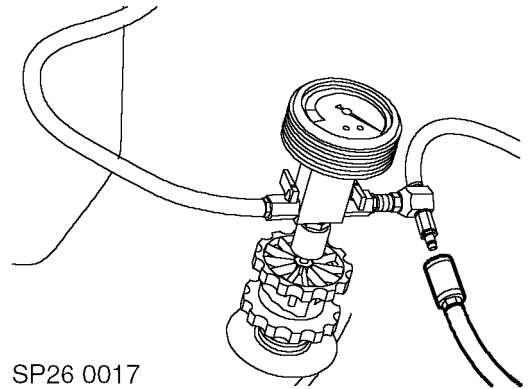
SP26 0016

3. Position fresh coolant container so that the lower level is above the expansion tank neck.
4. Connect fresh coolant hose to container; ensuring no air can enter hose.



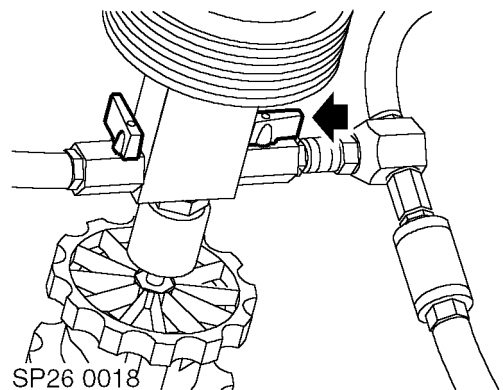
SP26 0015

5. Position evacuated air hose in a container:



SP26 0017

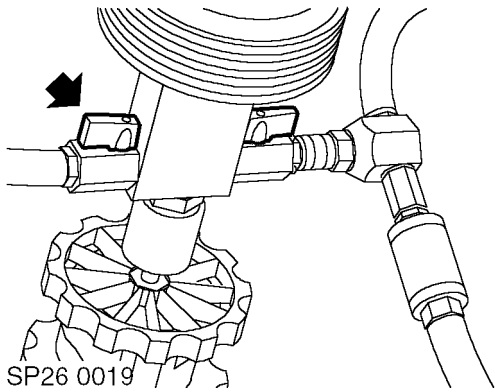
6. Connect a regulated compressed air supply to vacuum adaptor:



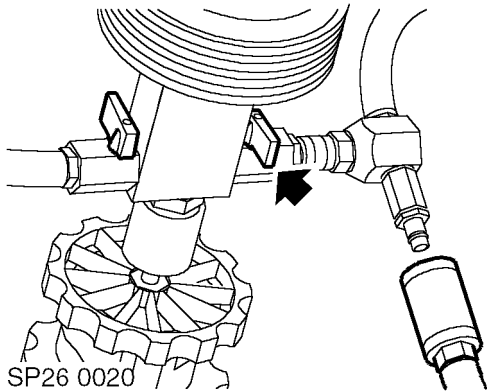
SP26 0018

7. Open air supply valve (arrowed).
8. Apply air pressure progressively from 0 to 10 bar max. Maintain air pressure until gauge reads between -0.85 and -0.95 bar and is stable.

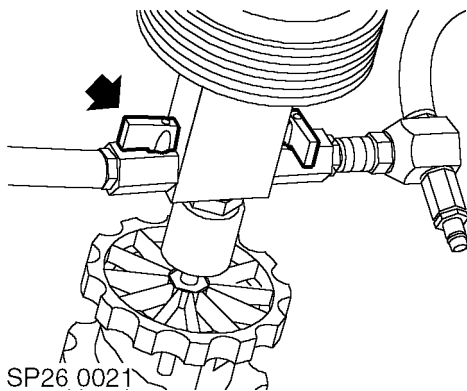
COOLING SYSTEM



9. Briefly open coolant supply valve (arrowed), to prime coolant supply hose. Close valve. Coolant will exhaust from evacuated air hose.
10. Check that vacuum is holding and gauge is steady.



11. Close air supply valve and disconnect air supply.



12. Open vacuum valve and allow coolant to be drawn into system. Wait until 0 bar is indicated on gauge.
13. When expansion tank is full and coolant movement has ceased close vacuum valve.
14. Disconnect vacuum hose from container and remove container.
15. Remove vacuum adaptor from expansion tank.

16. Syphon excess coolant from expansion tank to correct level.
17. Fit expansion tank filler cap.
18. Fit engine compartment access grille.
[ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
19. Start and run engine until radiator cooling fan operates.
20. Monitor temperature gauge during warm up to prevent over heating.
21. Switch off engine and allow to cool.
22. Check for leaks and top-up coolant to 'MAX' mark on expansion tank

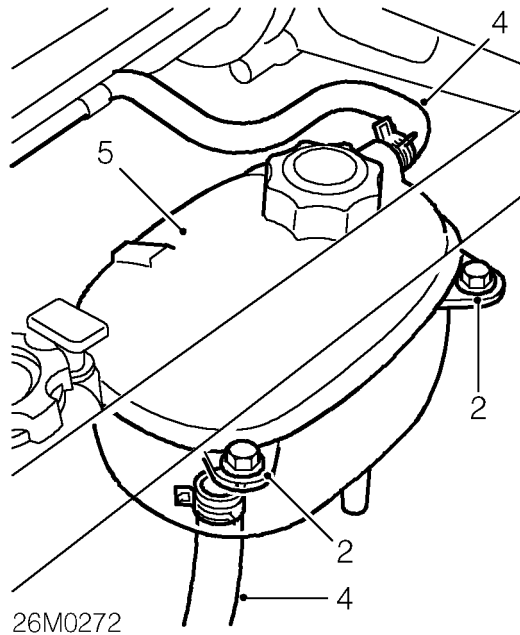


EXPANSION TANK

🔑 26.15.01

Remove

1. Remove engine compartment access panel.
[ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)



2. Remove 2 bolts securing tank to body.
3. Position container to catch spillage.
4. Release 2 hoses from tank and allow to drain.
5. Remove expansion tank.

Refit

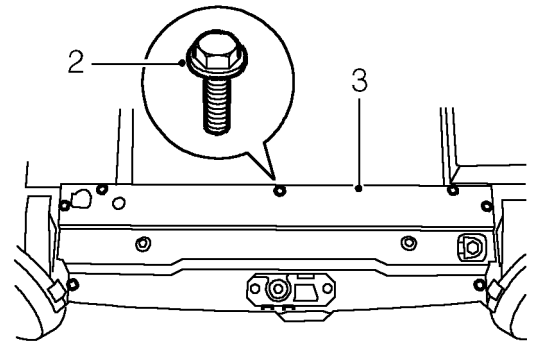
1. Fit tank.
2. Connect coolant hoses to tank and secure clips.
3. Position tank to body, fit and tighten bolts to 5 Nm.
4. Top-up cooling system.
[COOLING SYSTEM, page 10-6.](#)
5. Fit engine compartment access panel.
[ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)

RADIATOR FAN AND MOTOR

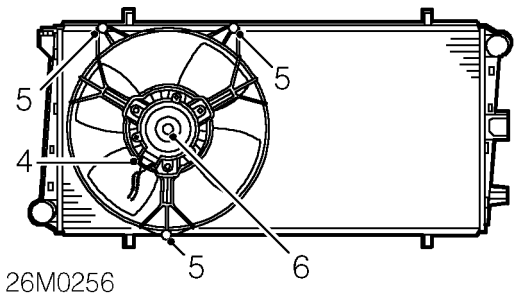
🔑 26.25.23

Remove

1. Remove front bumper valance.
[BUMPER VALANCE - FRONT, page 76-2-9.](#)



2. Remove 9 bolts securing bonnet locking panel.
3. Position panel aside.



4. Disconnect multiplug from fan.
5. Remove 3 nuts securing fan cowl to radiator.
6. Remove fan assembly.

Refit

1. Fit fan assembly and tighten nuts to 3 Nm.
2. Connect multiplug.
3. Position bonnet locking panel and tighten bolts to 10 Nm.
4. Fit front bumper valance.
[BUMPER VALANCE - FRONT, page 76-2-9.](#)

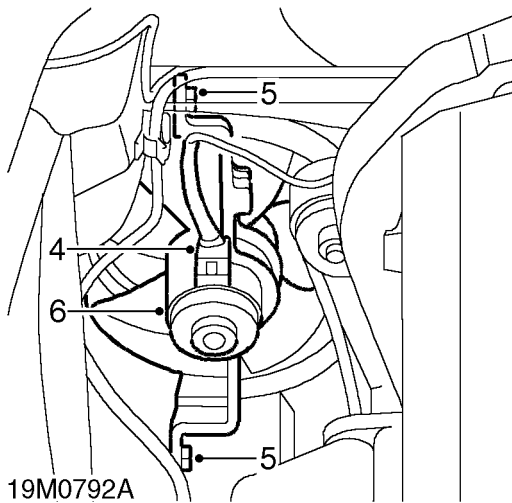
COOLING SYSTEM

ENGINE COMPARTMENT COOLING FAN

🔑 26.25.39

Remove

1. Disconnect battery earth lead.
2. Remove engine cover:
👉 [ENGINE COVER, page 12-27.](#)
3. Remove alternator:
👉 [ALTERNATOR, page 86-3.](#)



4. Disconnect multiplug from motor.
5. Remove 2 nuts securing fan assembly to body.
6. Remove fan assembly.

Refit

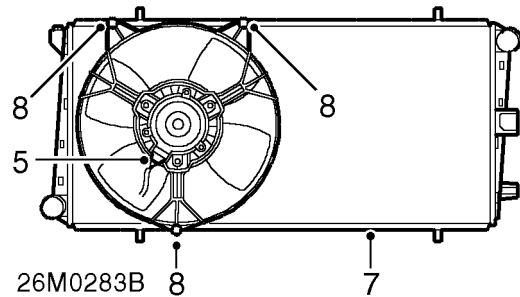
1. Fit fan assembly and tighten nuts to 9 Nm.
2. Connect multiplug.
3. Fit alternator:
👉 [ALTERNATOR, page 86-3.](#)
4. Fit engine cover:
👉 [ENGINE COVER, page 12-27.](#)
5. Connect battery earth lead.

RADIATOR

🔑 26.40.01

Remove

1. Raise front of vehicle.
WARNING: Support on safety stands.
2. Remove bonnet locking platform.
👉 [BONNET LOCKING PLATFORM - R/R ACCESS, page 76-2-5.](#)
3. Drain cooling system.
👉 [DRAIN AND REFILL, page 26-1.](#)
4. Release clips securing top and bottom hoses to radiator and remove hoses.



5. Disconnect multiplug from fan.
6. Disconnect multiplugs from fans.
7. Remove radiator assembly.
8. Remove 3 nuts securing fan to radiator and remove fan.
9. Remove 6 nuts securing fans to radiator and remove fans.

Refit

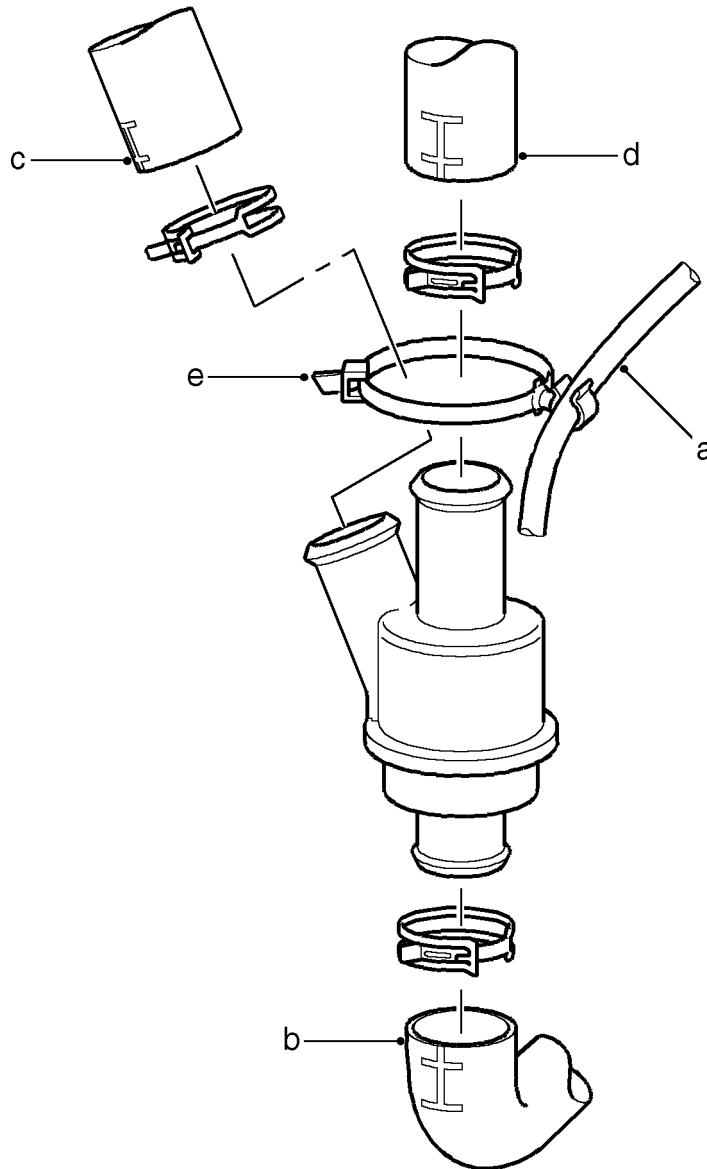
1. Fit fan/s to radiator and tighten nuts to 3 Nm.
2. Fit radiator to lower grommets.
3. Fit coolant hoses to radiator and secure with clips.
4. Connect multiplug.
5. Connect multiplugs to fans.
6. Refill cooling system.
👉 [DRAIN AND REFILL, page 26-1.](#)
7. Fit bonnet locking platform.
👉 [BONNET LOCKING PLATFORM - R/R ACCESS, page 76-2-5.](#)
8. Remove stand(s) and lower vehicle.



PRESSURE RELIEF THERMOSTAT (PRT)

🔑 26.45.02


Remove



SP26 0048

- a Gear selector cable
- b Coolant hose
- c Return hose
- d Inlet hose
- e Gear selector cable clip

I. Drain/vacuum refill cooling system.

 [COOLANT - VACUUM REFILL SYSTEM, page 26-2.](#)

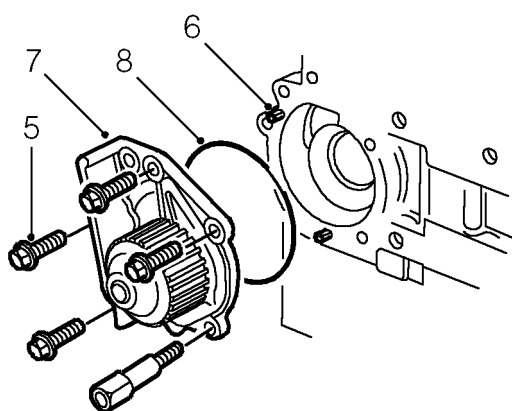
COOLING SYSTEM

ENGINE COOLANT PUMP

🔑 26.50.01

Remove

1. Disconnect battery earth lead.
2. Remove camshaft timing belt.
👉 [TIMING BELT - CAMSHAFT, page 12-39.](#)
3. Drain cooling system.
👉 [DRAIN AND REFILL, page 26-1.](#)
4. Remove bolt securing timing belt rear cover to coolant pump.



26M0281A

5. Remove 5 bolts securing engine coolant pump to cylinder block.
6. Release pump from 2 dowels.
7. Remove engine coolant pump.
8. Remove 'O' ring seal from pump body and discard.

Refit

1. Clean pump and cylinder block mating faces.
2. Fit new 'O' ring seal to pump body and fit pump to cylinder block.
3. Fit bolts securing engine coolant pump to cylinder block and tighten to 10 Nm.
4. Fit bolt securing timing belt rear cover to engine coolant pump and tighten to 10 Nm.
5. Fit camshaft timing belt.
👉 [TIMING BELT - CAMSHAFT, page 12-39.](#)
6. Refill coolant system.
👉 [DRAIN AND REFILL, page 26-1.](#)

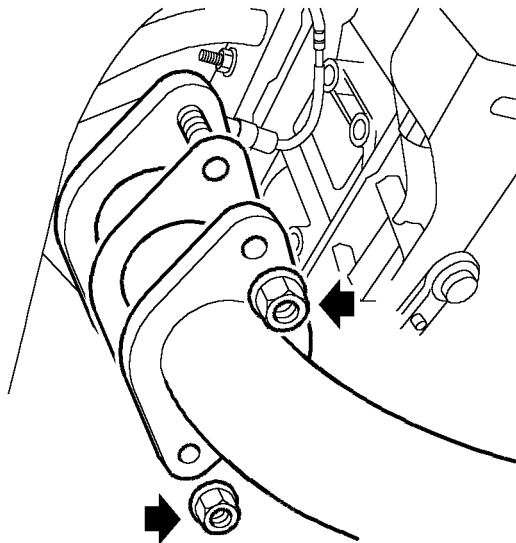


FRONT PIPE

🔑 30.10.09

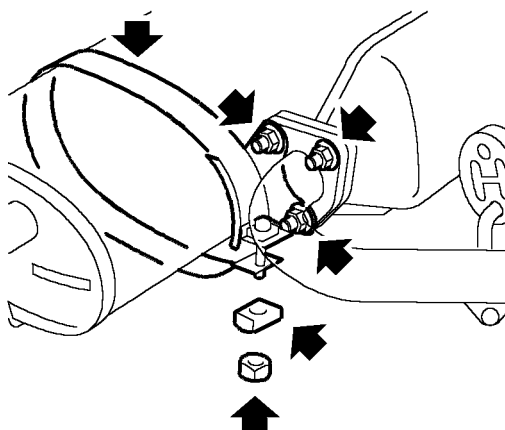
Remove

1. Disconnect battery earth lead.
2. Remove pre catalyst HO₂S.
👉 **SENSOR - HEATED OXYGEN (HO2S) - PRE CAT, page 18-20.**



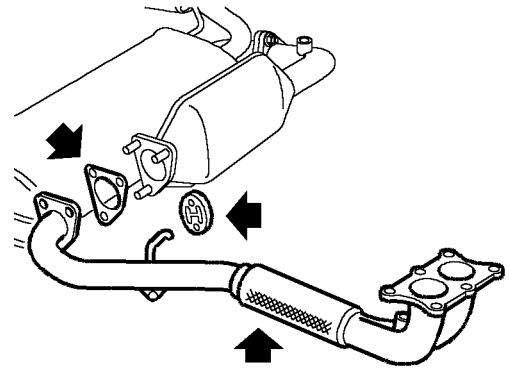
M30 0881

3. Remove 2 nuts, release front pipe from exhaust manifold and discard gasket.



M30 1068

4. Remove nut and washer from silencer clamp.
5. Remove 3 nuts securing front pipe to catalyst.
6. Remove clamp from silencer.



M30 1069

7. Release rubber mounting, remove front pipe and discard gasket.

Refit

1. Clean front pipe and mating faces.
2. Fit new gasket and tighten nuts securing front pipe to manifold to 50 Nm.
3. Fit silencer clamp and tighten nuts securing clamp to front pipe to 50 Nm.
4. Connect mounting to front pipe.
5. Fit washer and tighten silencer clamp nut to 30 Nm.
6. Fit pre catalyst HO₂S.
👉 **SENSOR - HEATED OXYGEN (HO2S) - PRE CAT, page 18-20.**
7. Connect battery earth lead.

MANIFOLD & EXHAUST SYSTEMS

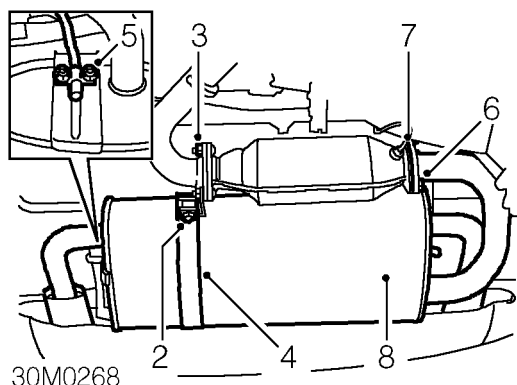
SILENCER

🔑 30.10.22

Remove

1. Raise rear of vehicle.

WARNING: Support on safety stands.



2. Remove nut and special washer securing silencer strap clamp.
3. Remove 2 flange nuts securing silencer strap clamp.
4. Remove strap clamp.
5. Remove 2 flange nuts securing silencer RH mounting bracket, remove mounting bracket.
6. Remove 3 flange nuts securing silencer to catalyst.
7. Release catalyst from silencer, remove and discard gasket.
8. Release silencer from LH mounting bracket, remove silencer.

Refit


1. Clean mating faces of silencer and catalytic converter.
2. Fit silencer to LH mounting bracket.
3. Fit silencer RH mounting bracket to mounting, fit nuts and tighten to 15 Nm.
4. Fit new gasket to catalyst.
5. Position catalyst to silencer, fit nuts and tighten to 50 Nm.
6. Fit rear silencer clamp to flange studs, fit nuts and tighten to 50 Nm.
7. Align rear silencer clamp strap, fit special washer, fit nut and tighten to 30 Nm.
8. Remove stand(s) and lower vehicle.

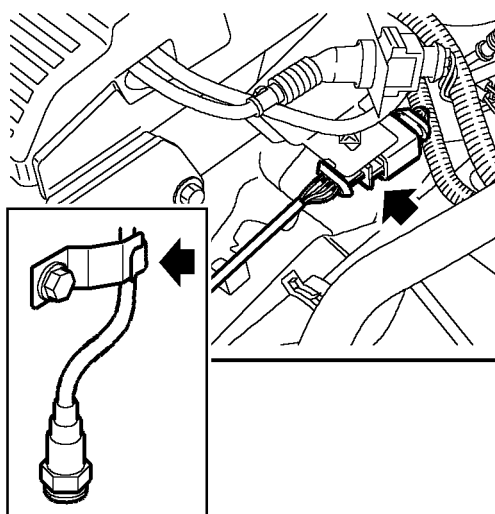
CAUTION: Ensure exhaust system is free from leaks. Exhaust gas leaks upstream of the catalyst could cause internal damage to the catalyst.

GASKET - EXHAUST MANIFOLD TO FRONT PIPE

🔑 30.10.26

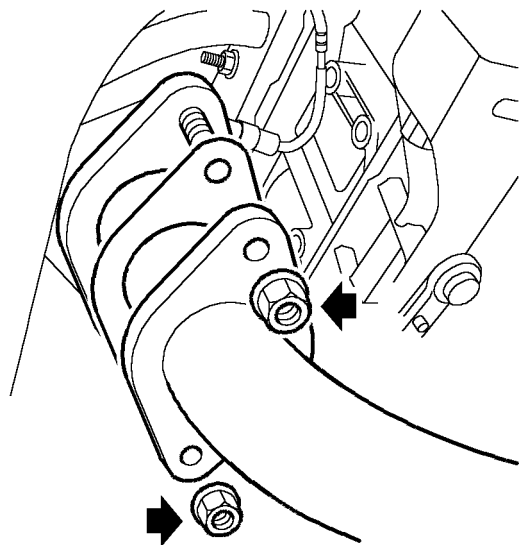
Remove

1. Disconnect battery earth lead.
2. Remove engine compartment access cover:
 [ENGINE COMPARTMENT ACCESS PANEL](#), page 76-2-4.



M301070


3. Rotate HO₂S multiplug through 90° to release from mounting.
 4. Raise rear of vehicle.
- WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.**
5. Release HO₂S lead from clip.



M30 0881

- Remove 2 nuts, release front pipe from exhaust manifold and discard gasket.

Refit

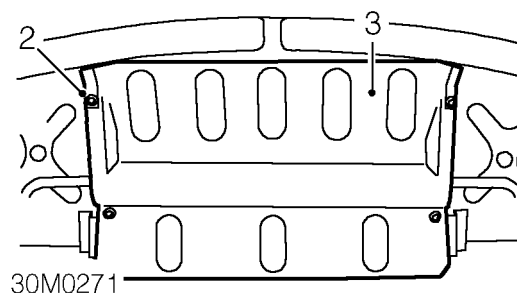
- Clean front pipe and manifold mating faces.
- Fit new gasket and tighten nuts securing front pipe to manifold to 50 Nm.
- Fit HO₂S lead to clip.
- Secure HO₂S multiplug to mounting.
- Remove stand and lower vehicle.
- Fit engine compartment access cover:
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
- Connect battery earth lead.

SILENCER HEAT SHIELD

 30.10.44


Remove

- Remove silencer:
 [SILENCER, page 30-2.](#)



- Remove 4 bolts securing silencer heat shield.
- Remove heat shield.

Refit

- Fit heat shield to underside of vehicle, fit bolts and tighten to 10 Nm.
- Fit silencer:
 [SILENCER, page 30-2.](#)

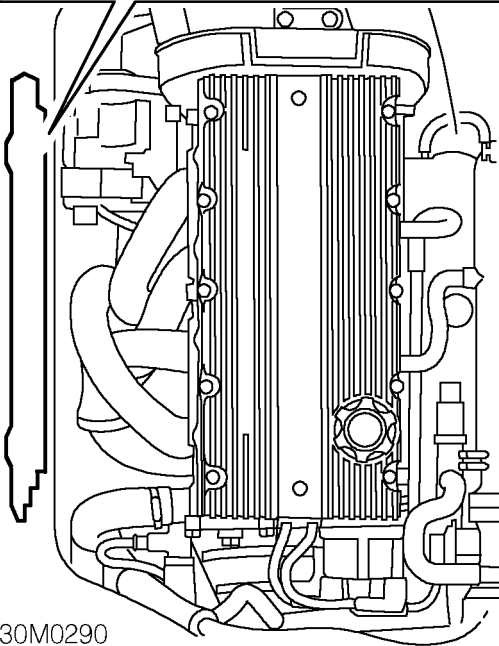
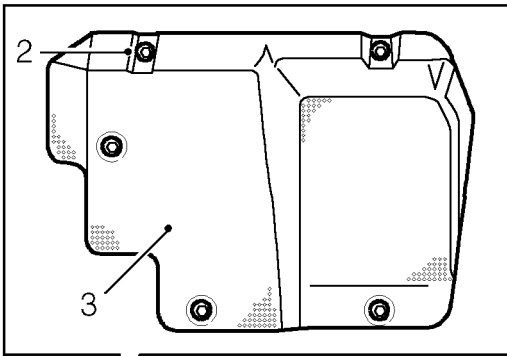
MANIFOLD & EXHAUST SYSTEMS

FUEL TANK HEAT SHIELD

🔑 30.10.64

Remove

1. Remove engine cover.
👉 [ENGINE COVER, page 12-27.](#)



2. Remove 5 nuts securing heat shield to bulkhead.
3. Remove heat shield.

Refit

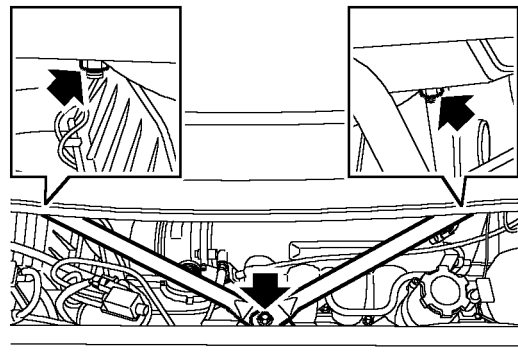
1. Fit heat shield and secure with nuts.
2. Fit engine cover.
👉 [ENGINE COVER, page 12-27.](#)

GASKET - MANIFOLD CHAMBER

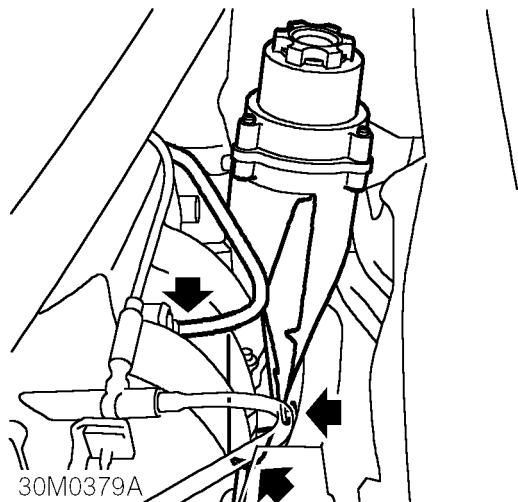
🔑 30.15.37

Remove

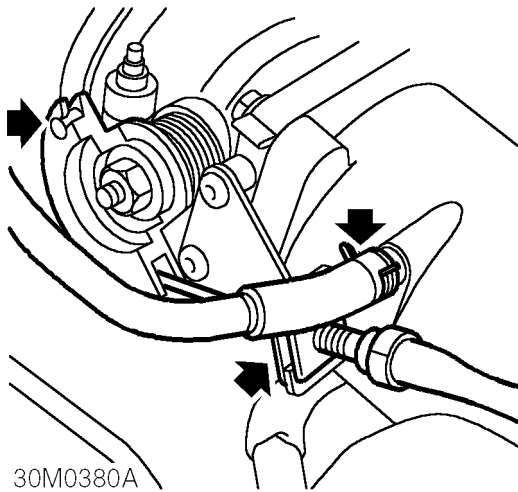
1. Disconnect battery earth lead.
2. Remove engine compartment access panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
3. Remove engine compartment access cover.
👉 [ENGINE COVER, page 12-27.](#)



4. Remove nuts securing cross bracing, remove and discard bolt securing cross bracing and remove cross bracing.
5. Release brake servo vacuum hose from clip on dipstick/oil filler tube.

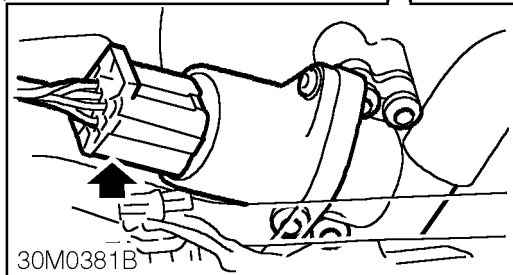
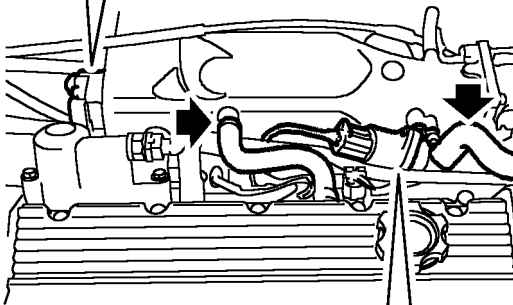
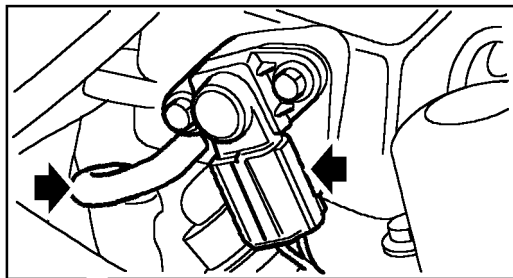


6. Remove bolt securing engine oil level dipstick/filler tube bracket to inlet manifold.
7. Depress locking collar and remove dipstick/oil filler from tube.
8. Depress locking collar and disconnect brake servo hose from inlet manifold chamber.



30M0380A

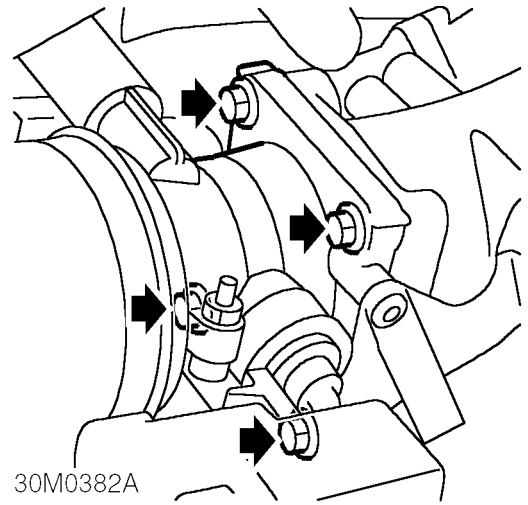
9. Release cable adjusting nut from abutment bracket.
10. Release inner cable from throttle cam.
11. Release clip and disconnected hose, EVAP canister to inlet manifold chamber.



30M0381B

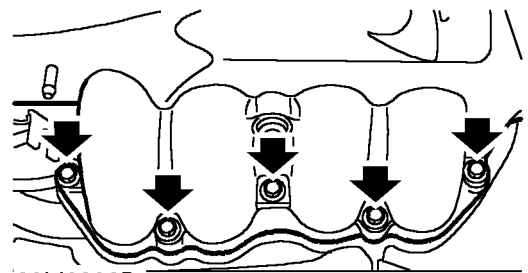
12. Release clip and disconnect engine breather hose from camshaft cover.
13. Disconnect hose from IACV.
14. Disconnect multiplug from IACV.

15. Disconnect vacuum hose connecting fuel pressure regulator to inlet manifold chamber.
16. Disconnect MAP sensor multiplug.



30M0382A

17. Remove 4 bolts securing throttle housing to inlet manifold chamber. Position multiplug bracket aside and remove throttle housing.

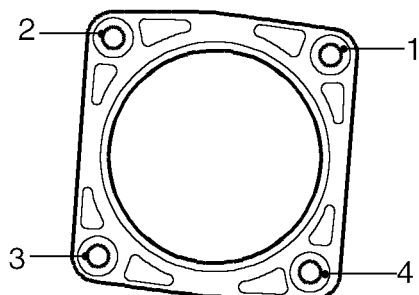


30M0383B

18. Remove 5 bolts securing inlet manifold chamber to inlet manifold and remove inlet manifold chamber.
19. Remove and discard gasket from inlet manifold chamber.
20. Remove and discard 'O' ring seal from throttle housing.

Refit

1. Clean inlet manifold chamber and inlet manifold mating faces.
2. Fit new 'O' ring seal to throttle housing.
3. Position new gasket seal to inlet manifold and fit inlet manifold chamber.
4. Fit and tighten bolts securing inlet manifold chamber to inlet manifold to 25 Nm.
5. Position throttle housing to inlet manifold chamber, align multiplug bracket, fit and lightly tighten bolts.



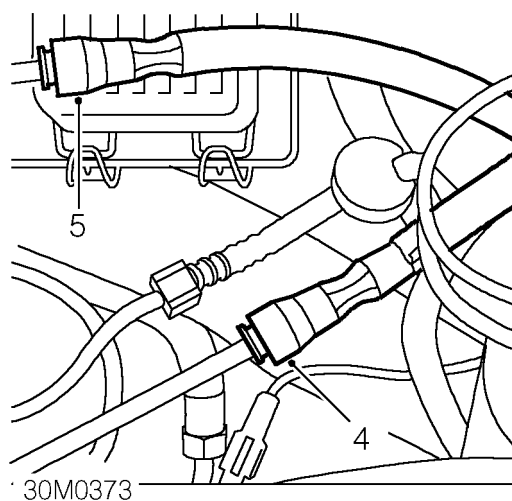
M19 3083

GASKET - INLET MANIFOLD

🔑 30.15.08

Remove

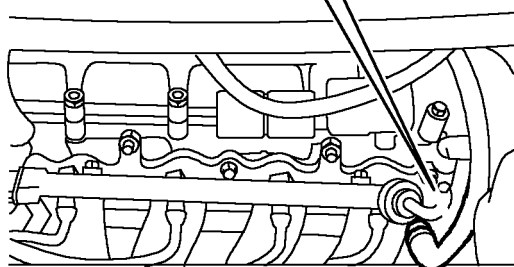
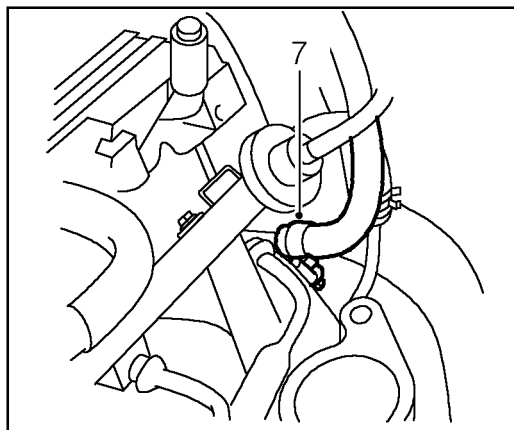
1. Remove manifold chamber gasket.
👉 [GASKET - MANIFOLD CHAMBER, page 30-4.](#)
2. Drain cooling system.
👉 [DRAIN AND REFILL, page 26-1.](#)
3. Position cloth to catch spillage



30M0373

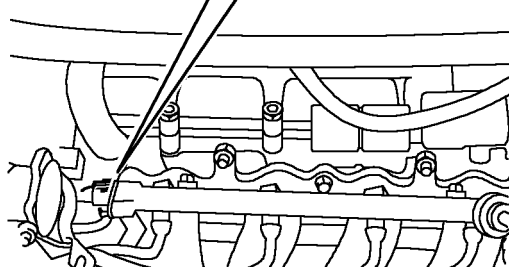
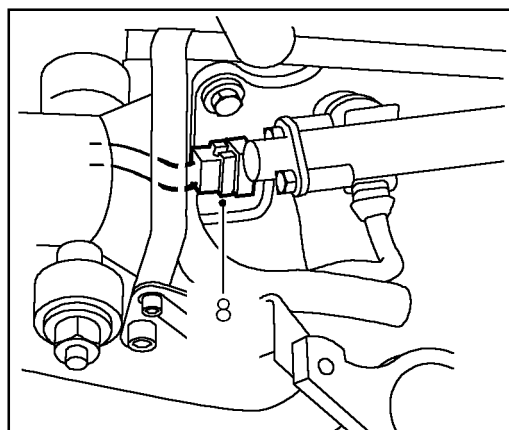
4. Release fuel return hose from fuel return pipe.
👉 [FUEL SYSTEM DEPRESSURISE, page 18-2.](#)
CAUTION: Depressurise fuel pressure before disconnecting fuel pipes.
5. Release fuel feed hose from fuel filter pipe.
6. Position drainage tray to collect coolant spillage.

6. Tighten bolts in sequence shown, using the following procedure. **i.** Tighten to 4 Nm. **ii.** Back off one flat. **iii.** Tighten to 9 Nm.
7. Connect MAP sensor multiplug.
8. Connect multiplug to IACV.
9. Connect hose to IACV.
10. Connect engine breather hose to camshaft cover and secure with clip.
11. Connect throttle cable to cam, abutment bracket and clips on inlet manifold chamber.
12. Connect EVAP canister hose to inlet manifold chamber and secure with clip.
13. Connect brake servo vacuum hose to inlet manifold chamber.
14. Position dipstick/filler tube, align support bracket to inlet manifold, fit and tighten bolt to 10 Nm.
15. Secure brake servo vacuum hose in clip on dipstick/oil filler tube.
16. Position cross bracing, fit nuts and new bolt and tighten to 25 Nm.
17. Fit engine compartment access cover.
👉 [ENGINE COVER, page 12-27.](#)
18. Fit engine compartment access panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
19. Connect battery earth lead.



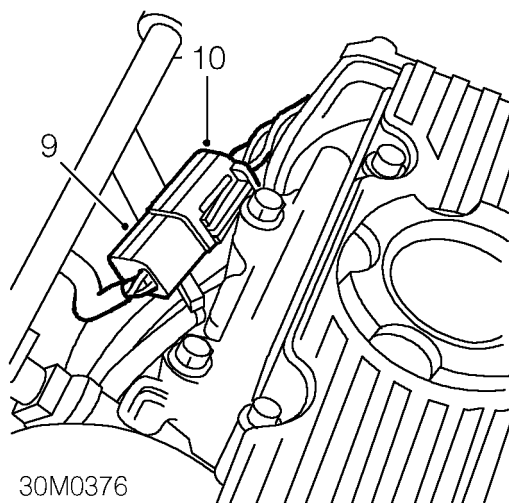
30M0374

7. Loosen clip and disconnect coolant hose from inlet manifold.



30M0375

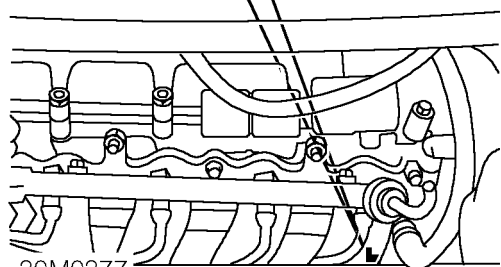
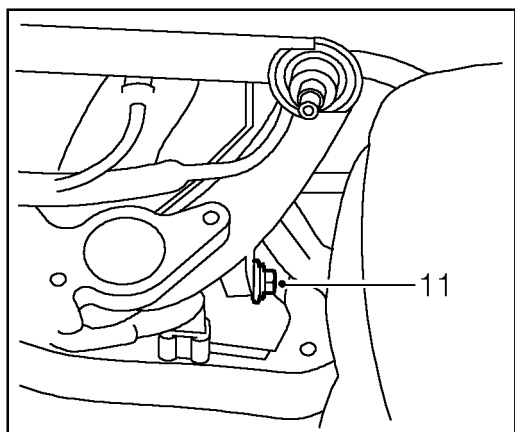
8. Disconnect air intake temperature sensor multiplug from manifold.



30M0376

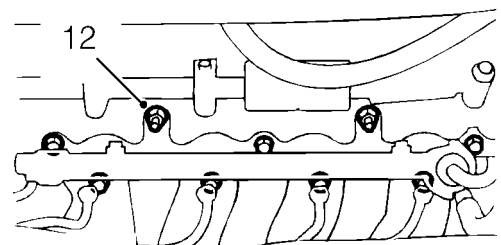
9. Disconnect injector harness multiplug.
10. Release injector multiplug from bracket.

MANIFOLD & EXHAUST SYSTEMS



30M0377

11. Remove bolt securing inlet manifold to support bracket.

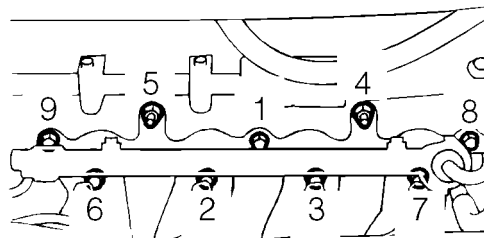


30M0378



12. Remove 2 nuts and 7 bolts securing inlet manifold to cylinder head.
13. Remove inlet manifold from cylinder head studs.
14. Remove and discard gasket seal from inlet manifold.

Refit

1. Clean manifold to cylinder head mating faces.
2. Fit new gasket to cylinder head.
3. Fit inlet manifold to studs.



30M0444

4. Fit nuts and bolts securing inlet manifold to cylinder head and tighten in sequence shown to 25 Nm.
5. Align support bracket and tighten bolt to 25 Nm.
6. Secure fuel feed hose to fuel filter pipe.
7. Secure fuel return hose to return pipe.
8. Connect air intake temperature sensor multiplug.
9. Connect injector harness multiplug.
10. Connect coolant hose to inlet manifold and secure clip.
11. Fit manifold chamber gasket.
 [GASKET - MANIFOLD CHAMBER, page 30-4.](#)
12. Refill cooling system.
 [DRAIN AND REFILL, page 26-1.](#)

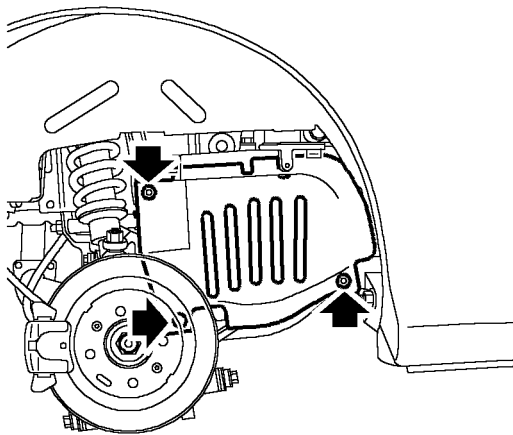


GASKET - EXHAUST MANIFOLD

🔑 30.15.12

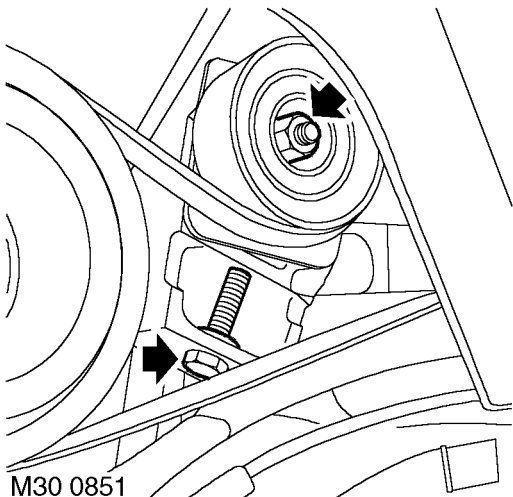
Remove

1. Disconnect battery earth lead.
2. Remove engine cover.
👉 [ENGINE COVER](#), page 12-27.
3. Raise rear of vehicle.
WARNING: Support on safety stands.
4. Remove LH road wheel.



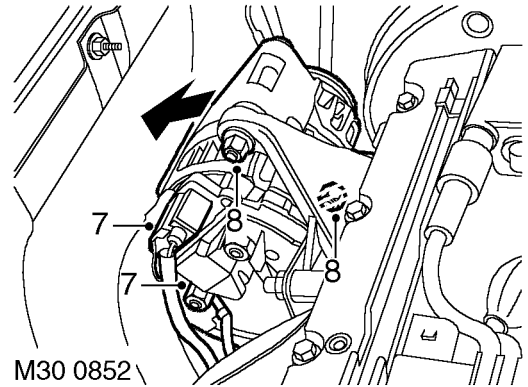
SP12 0348

5. Remove 2 scrivenets and 1 Torx screw closing splash panel and remove panel.



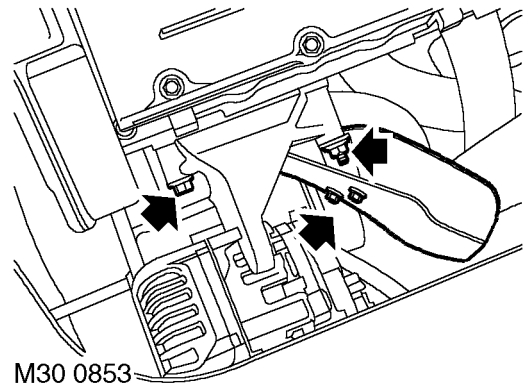
M30 0851

6. Release tension on alternator drive belt tensioner and remove drive belt.



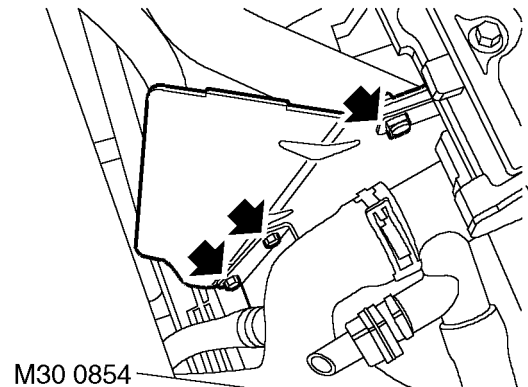
M30 0852

7. Remove nut securing alternator lead and release lead, disconnect alternator multiplug.
8. Remove alternator top bolt and loosen lower bolt.
9. Position alternator forwards to access alternator bracket.



M30 0853

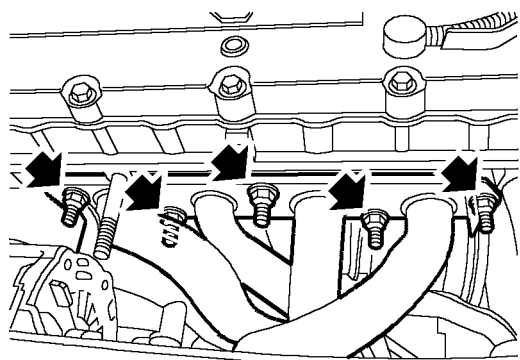
10. Remove nut and bolt securing alternator bracket.
11. Remove 2 bolts securing alternator heat shield and remove heat shield.
12. Remove alternator bracket.



M30 0854

13. Remove 3 bolts securing coolant hose heat shield and remove heat shield.

MANIFOLD & EXHAUST SYSTEMS

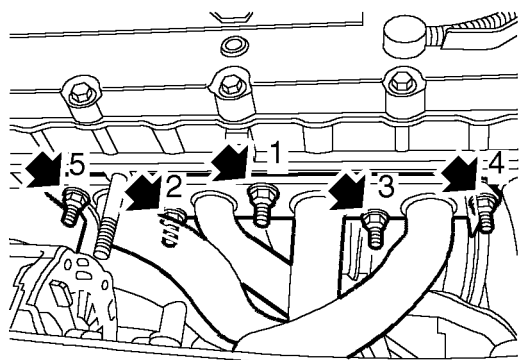


M30 0855


14. Remove 5 flange nuts securing exhaust manifold to cylinder head.
15. Position manifold aside, remove and discard gasket.


Refit

1. Clean exhaust manifold and cylinder head mating faces.
2. Fit new exhaust manifold gasket to cylinder head.



M30 0856

3. Position manifold and working in the sequence shown, tighten nuts to 45 Nm.
4. Position coolant hose heat shield, fit bolts and tighten to 9 Nm.
5. Position alternator bracket.
6. Position alternator heat shield, fit bolts and tighten to 9 Nm.
7. Tighten alternator bracket nut and bolt to 25 Nm.
8. Align alternator to bracket, fit top bolt, tighten both bolts to 45 Nm.
9. Connect alternator multiplug and lead, secure lead with nut.
10. Fit alternator drive belt and engage to tensioner. Ensure drive belt is located correctly on pulleys.
11. Adjust alternator drive belt tension.
 [ALTERNATOR DRIVE BELT - ADJUST, page 86-1.](#)
12. Position closing panel and secure with scrivenets and Torx screw.


13. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
14. Fit engine cover.
 [ENGINE COVER, page 12-27.](#)
15. Remove stand(s) and lower vehicle.
16. Connect battery earth lead.

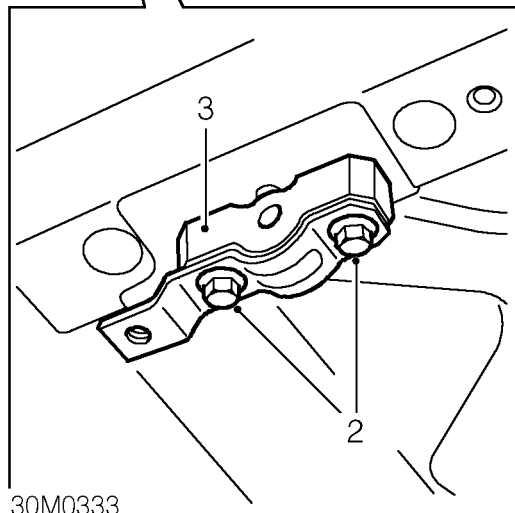
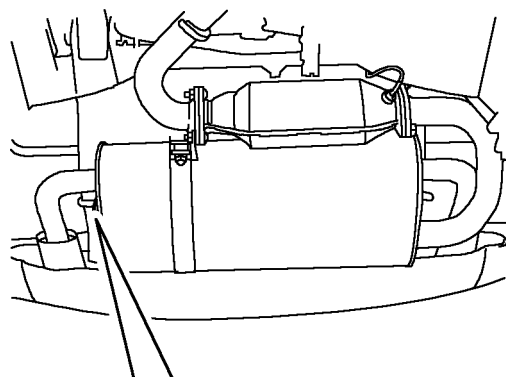


EXHAUST MOUNTINGS

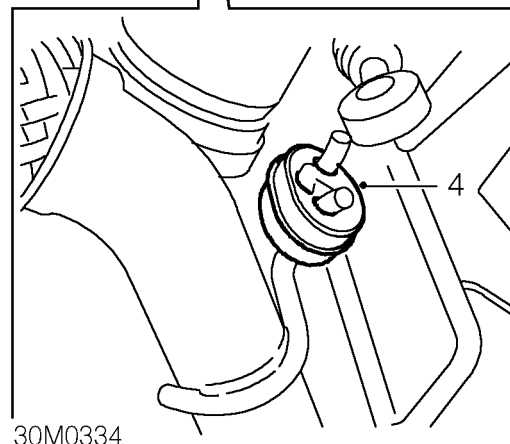
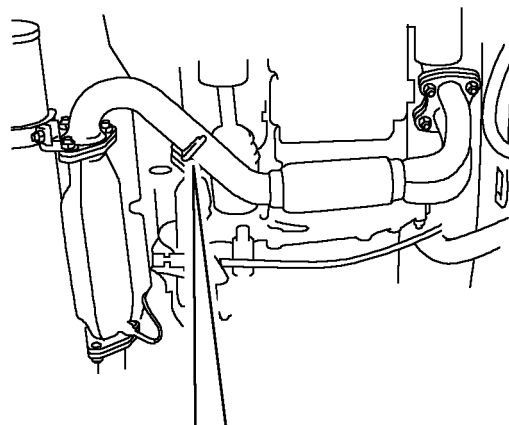
🔑 30.20.06

Remove

1. Remove silencer heat shield.
 [SILENCER HEAT SHIELD, page 30-3.](#)




2. Remove 4 bolts securing LH and RH exhaust mountings.
3. Remove brackets and rubbers.



4. Remove mounting rubber securing front pipe to subframe.

Refit

1. Fit mounting rubber securing front pipe to subframe.
2. Fit LH and RH mounting rubbers and brackets, fit bolts and tighten to 25 Nm.
3. Fit silencer heat shield.
 [SILENCER HEAT SHIELD, page 30-3.](#)

MANIFOLD & EXHAUST SYSTEMS



CLUTCH - BLEED

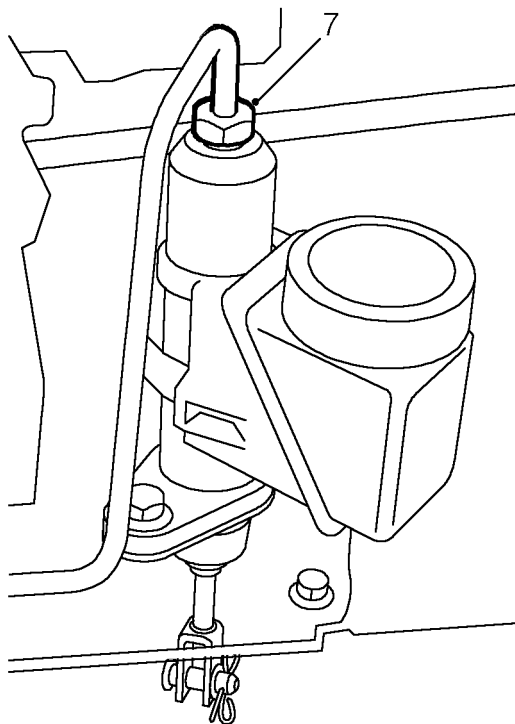
🔑 33.15.01

Bleed

CAUTION: Do not allow brake fluid to contact paint finished surfaces as paint may be damaged. If spilled, remove fluid and clean area with clean warm water.

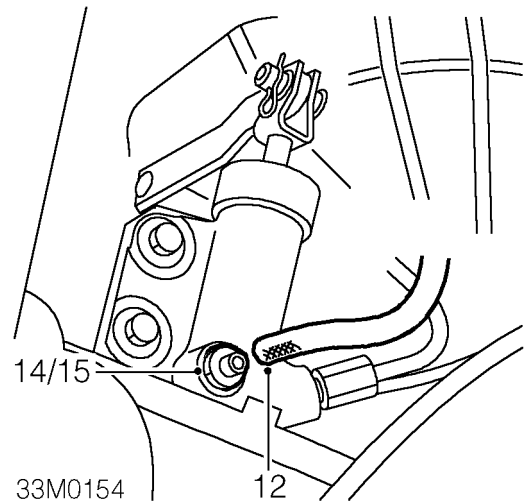
CAUTION: Ensure master cylinder is topped up at frequent intervals. Use only NEW fluid.

1. Open bonnet.
2. Open luggage compartment.
3. Remove engine compartment access panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
4. Position cloth around master cylinder to catch spillage.
5. Clean area around master cylinder pipe union.
6. Depress clutch pedal to floor and hold.



33M0153

7. Loosen master cylinder pipe union and allow air and fluid to escape.
8. Tighten pipe union.
9. Return clutch pedal to released position.
10. Repeat process until bubble free fluid emerges and tighten union to 18 Nm.



33M0154

11. Clean area around slave cylinder bleed nipple.
12. Position bleed bottle and connect hose to bleed nipple.
13. Depress clutch pedal to floor and hold.
14. Loosen bleed nipple and allow air and fluid to escape.
15. Tighten nipple.
16. Return clutch pedal to released position.
17. Repeat process until bubble free fluid emerges.
18. Depress clutch pedal to floor and hold.
19. Open bleed nipple and by hand, pull clutch lever to fully released position.
20. Tighten nipple to 7 Nm.
21. Return clutch pedal to released position.
22. Remove bleed bottle.
23. Top up master cylinder.
24. Fit engine compartment access cover.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)


CLUTCH

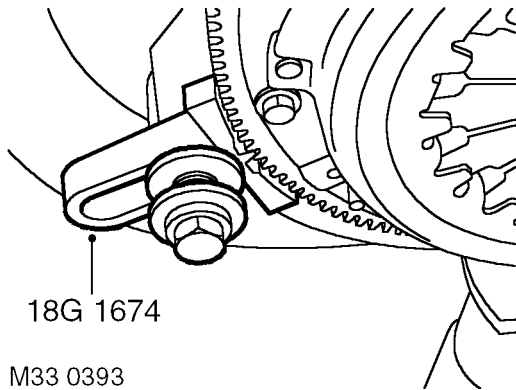


CLUTCH ASSEMBLY/DRIVE PLATE & RELEASE BEARING

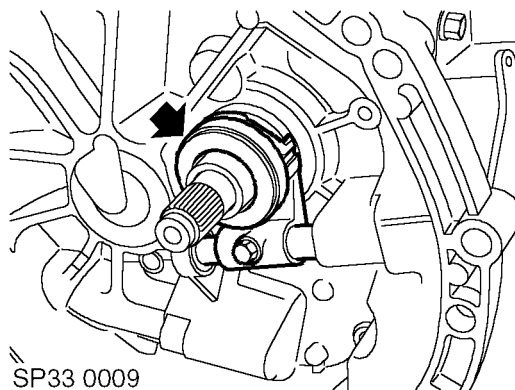
🔑 33.10.07

Remove

1. Disconnect battery earth lead.
2. Remove gearbox assembly.
 [GEARBOX - MANUAL - REMOVE FOR ACCESS & REFIT, page 37-4.](#)

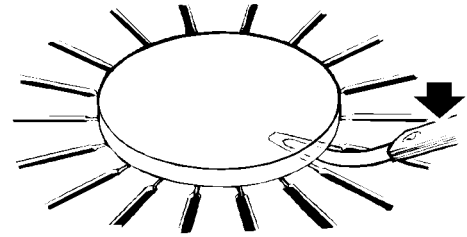


3. Fit flywheel locking tool 18G 1674 to cylinder block and secure with bolt.

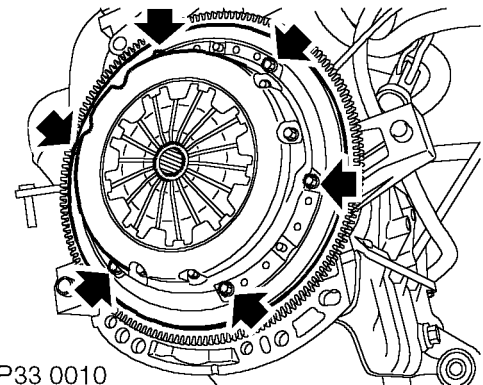


4. Remove clutch release bearing from guide sleeve and release fork.
5. Examine release bearing for signs of wear or damage, renew if necessary.

CAUTION: Bearing is packed with grease. Do not wash in solvent.

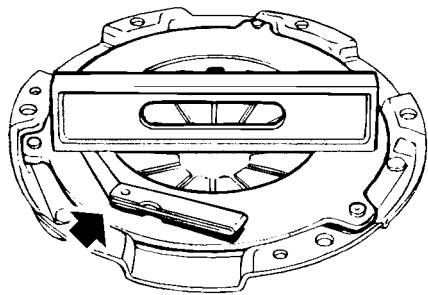


6. Place a circular piece of flat plate across diaphragm fingers, insert feeler gauges between plate and each diaphragm finger, measure finger clearance which has a service limit of 1.0 mm. A single finger exceeding the service limit should be ignored.
7. Measure diaphragm finger height above bolted surface of pressure plate. Diaphragm finger height on a new pressure plate is 29.1 - 32.0 mm with a service limit of 36.5 mm. Renew pressure plate if clearances are outside service limit.



8. Progressively loosen and remove 6 Torx bolts securing clutch pressure plate to flywheel.
9. Remove clutch pressure plate and collect drive plate.
10. Inspect clutch drive plate for signs of wear or oil contamination. Renew drive plate if necessary.
11. Check pressure plate for signs of wear or damage. Check for signs of overheating on drive straps (deep yellow to blue colour), renew pressure plate if necessary.

CLUTCH

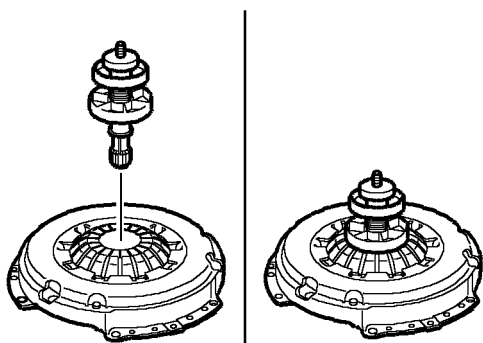


SP33 0008

12. Using a straight edge and feeler gauges, check the surface of the pressure plate for flatness at 4 separate points. Renew pressure plate if warping exceeds the service limit of 0.18 mm.

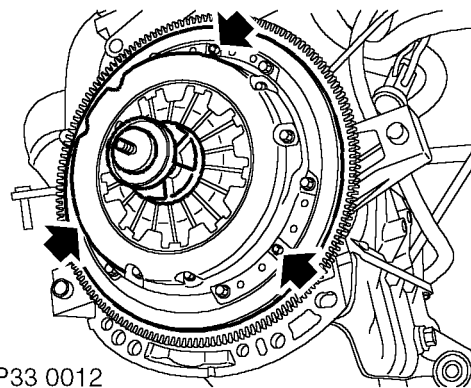
Refit

1. Clean pressure plate, flywheel dowels and dowel holes in flywheel.
2. Inspect flywheel for signs of scoring or other damage. Renew if worn or damaged.
3. Smear clutch drive plate splines with Molybdenum disulphide grease.
4. Position drive plate to pressure plate with 'GEARBOX SIDE' facing towards gearbox.



SP33 0011

5. Use 12-162 to align drive plate and pressure plate.
6. Ensure drive plate is aligned to centre of pressure plate.



SP33 0012

7. Fit clutch assembly to flywheel and locate on dowels.
8. Fit 6 bolts securing pressure plate to flywheel and tighten finger tight.
9. Progressively tighten clutch pressure plate bolts in a diagonal sequence to 25 Nm.
10. Remove drive plate alignment tool 12-162.
11. Clean clutch release fork and release bearing guide sleeve.
12. Smear release fork shaft and bore of release bearing with Molybdenum disulphide grease.
13. Fit release bearing to release fork and slide onto guide sleeve.
14. Operate clutch release lever to ensure that release bearing is correctly located on release fork and slides smoothly on guide sleeve.
15. Remove bolt and flywheel locking tool, 18G 1674, from cylinder block.
16. Fit gearbox assembly.
[👉 GEARBOX - MANUAL - REMOVE FOR ACCESS & REFIT, page 37-4.](#)
17. Connect battery earth lead.



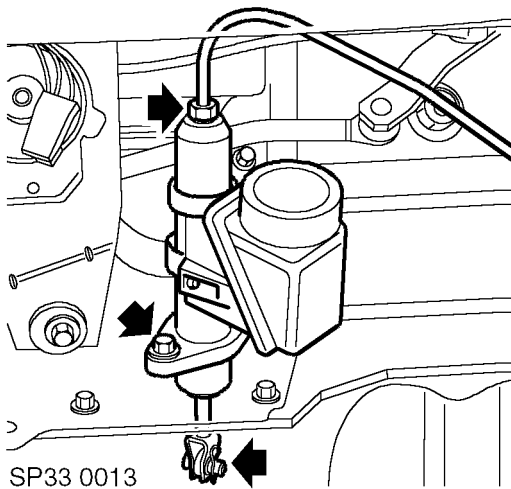
CLUTCH MASTER CYLINDER

🔑 33.20.01

Remove

CAUTION: Do not allow brake fluid to contact paint finished surfaces as paint may be damaged. If spilled, remove fluid and clean area with clean warm water.

1. Remove underbonnet closing panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL](#), page 76-2-4.



2. Remove clevis pin from clutch pedal.
3. Position cloth to catch spillage.
4. Loosen and release union securing fluid pipe to master cylinder, position fluid pipe aside.
CAUTION: Always fit plugs to open connections to prevent contamination.
5. Remove 2 bolts securing master cylinder to pedal box.
6. Remove master cylinder.
7. Remove and discard gasket.

Refit

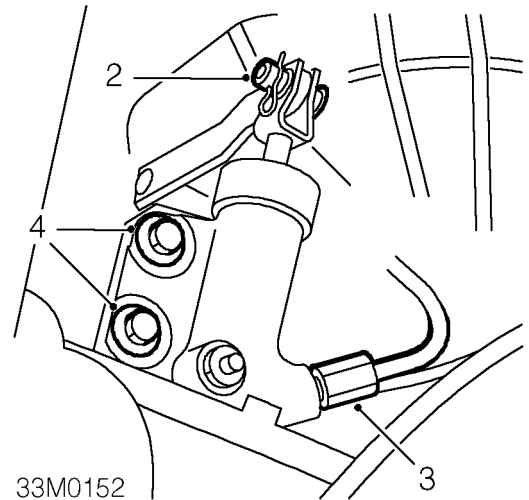
1. Using new gasket, fit master cylinder and tighten bolts to 25 Nm.
2. Position pipe and tighten union to 18 Nm.
3. Position clutch pedal to push rod, fit clevis pin.
4. Fit washer and clip.
5. Bleed clutch.
👉 [CLUTCH - BLEED](#), page 33-1.
6. Fit underbonnet closing panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL](#), page 76-2-4.

CLUTCH SLAVE CYLINDER

🔑 33.35.01

Remove

1. Remove engine cover.
👉 [ENGINE COVER](#), page 12-27.



2. Remove clevis pin from slave cylinder.
CAUTION: Do not allow brake fluid to contact paint finished surfaces as paint may be damaged. If spilled, remove fluid and clean area with clean warm water.
3. Release pipe union from slave cylinder and position aside.
CAUTION: Always fit plugs to open connections to prevent contamination.
4. Remove 2 bolts securing slave cylinder to bracket and remove slave cylinder.

Refit

1. Fit slave cylinder and tighten bolts to 25 Nm.
2. Position pipe and tighten union to 18 Nm.
3. Position cylinder rod to lever and secure with clevis pin.
4. Bleed clutch.
👉 [CLUTCH - BLEED](#), page 33-1.
5. Fit engine cover.
👉 [ENGINE COVER](#), page 12-27.

CLUTCH




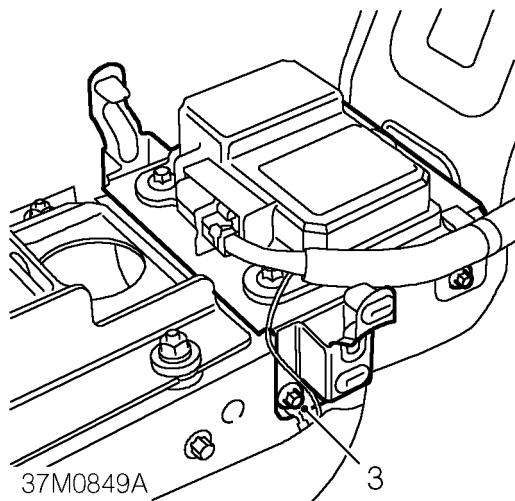
GEAR LEVER

🔑 37.16.04

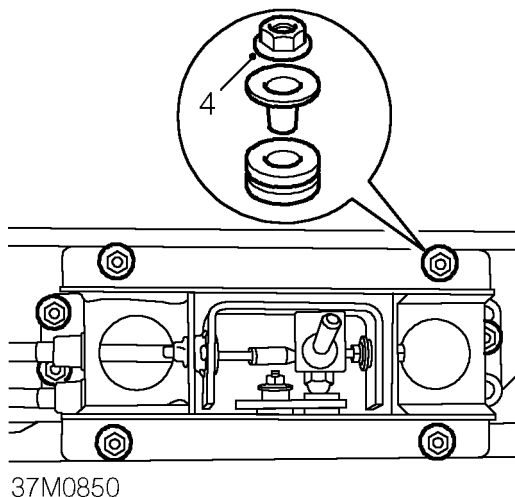
WARNING: See **RESTRAINT SYSTEMS, Precautions.**

Remove

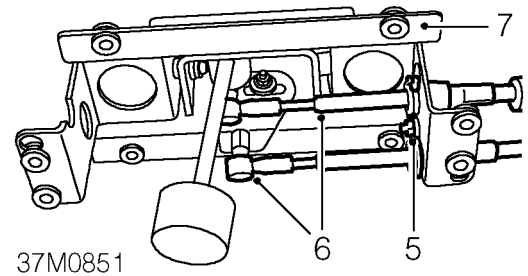
1. Disconnect battery earth lead.
2. Remove front console.
 [FRONT CONSOLE, page 76-4-4.](#)



3. Remove 4 T x 30 Torx bolts securing SRS DCU bracket to tunnel, position bracket aside.




4. Remove 4 nuts and 3 bolts securing lever assembly to tunnel.



5. Remove bolt securing cable abutment clip to lever assembly and release clip.
6. Release 2 cables from ball joints and lever assembly.
7. Remove lever assembly.

Refit

1. Connect cables to lever assembly.
2. Position outer cables and secure with clip.
3. Secure retaining clip with bolt.
4. Position gear lever assembly to body.
5. Fit and tighten nuts and bolts to 9 Nm.
6. Position SRS bracket to body, fit harness earth lead and tighten Torx bolts to 10 Nm.
7. Fit front console.
 [FRONT CONSOLE, page 76-4-4.](#)
8. Connect battery earth lead.

MANUAL GEARBOX

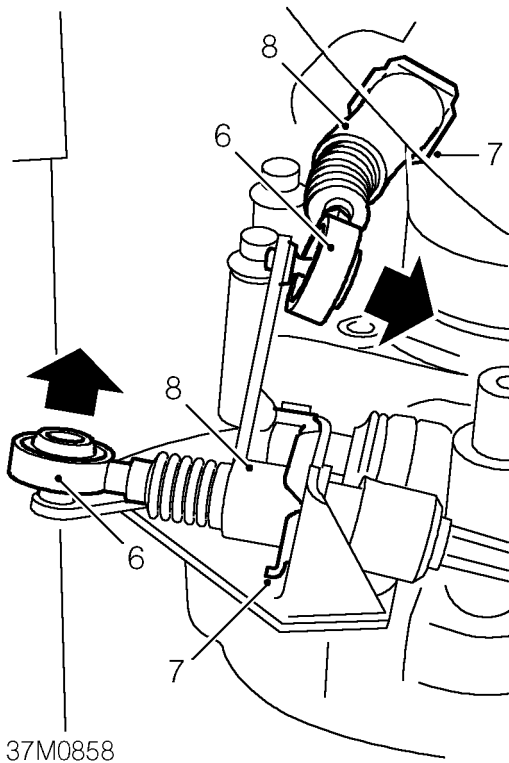
GEAR CHANGE CABLE

🔑 37.16.16

WARNING: See **RESTRAINT SYSTEMS, Precautions.**

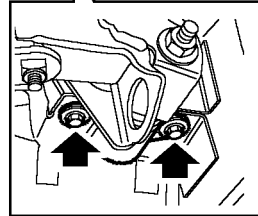
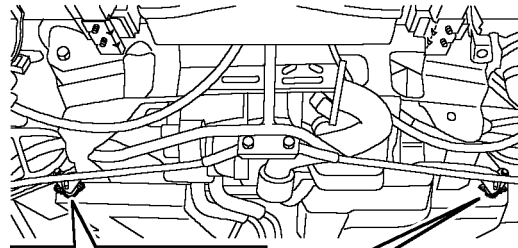
Remove

1. Position vehicle on a 2 post ramp.
2. Make the SRS system safe.
👉 **SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.**
3. Remove engine cover:
👉 **ENGINE COVER, page 12-27.**
4. Drain engine coolant.
👉 **DRAIN AND REFILL, page 26-1.**
5. Release handbrake to OFF position.



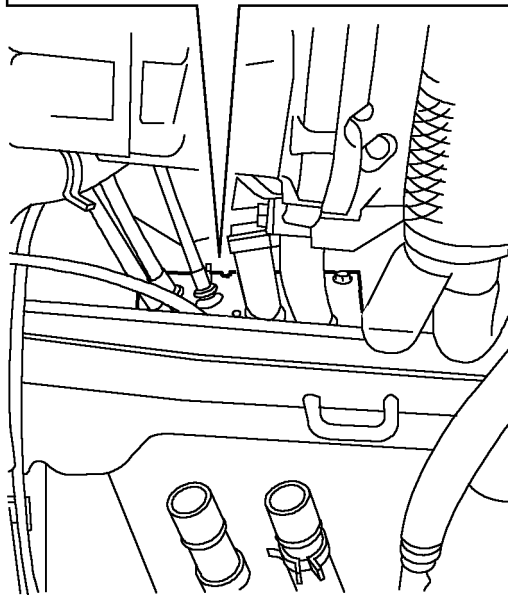
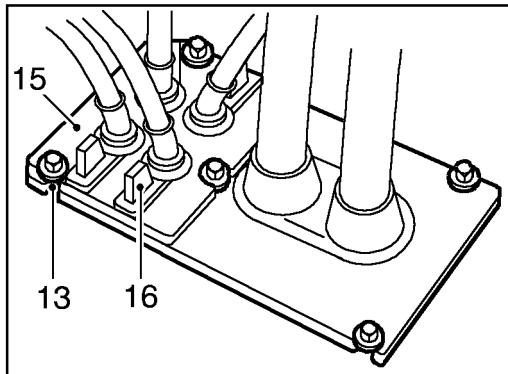
6. Release gear change cable from gearbox linkage.
7. Remove and discard clip securing cable to abutment bracket.
8. Release cable from abutment bracket.
9. Place support jack underneath engine sump and support engine weight.

CAUTION: To prevent damage to sump place a piece of wood between jack and sump.



SP37 0010

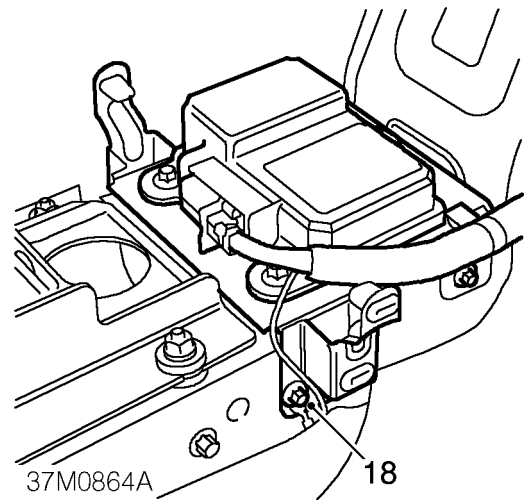
10. Remove 2 bolts securing each front subframe mounting to body brackets.
11. Lower jack carefully, to allow access to closing plate bolts.
CAUTION: Care must be taken that no cables or pipes are stretched when lowering front of subframe.
12. Tie coolant hoses aside to allow access to closing plate.



37M0863A

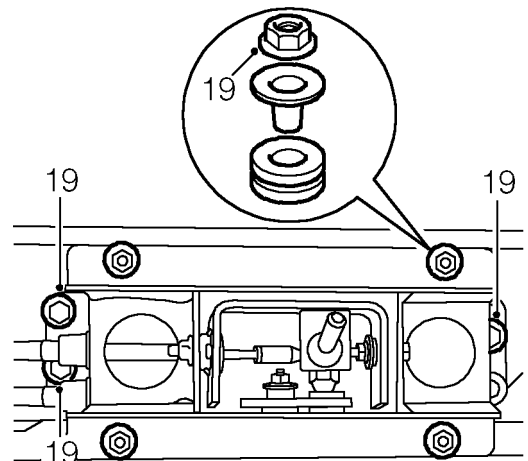
13. Release 2 upper bolts and remove 3 remaining bolts securing closing plate to bulkhead.
14. Apply soft soap to all four closing plate cables, to ease movement of closing plate.
15. Release closing plate from bulkhead and slide along cables.
16. Release gear change cable grommet from closing plate.
17. Remove front console.

 [FRONT CONSOLE, page 76-4-4.](#)



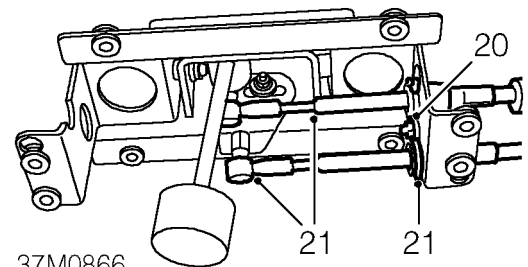
37M0864A

18. Remove 4 Torx bolts securing SRS DCU bracket to tunnel, position bracket aside.



37M0865

19. Remove 4 nuts and 3 bolts securing gear selector assembly to tunnel.



37M0866

20. Position gear selector assembly and remove bolt securing cable abutment clip to assembly.
21. Remove cable abutment clip and release cable from assembly.




MANUAL GEARBOX

22. Remove gear change cable from tunnel and engine compartment.


Refit

1. Position gear change cable to tunnel and feed through rear bulkhead.
2. Position cable in engine compartment.
3. Lubricate all four cables with soft soap to ease grommet movement on cables.
4. Position cable into closing plate slot and secure with grommet.
5. Align closing plate to bulkhead and secure with bolts.
6. Raise subframe on jack, fit subframe mounting bolts and tighten to 30 Nm.
7. Position cable to gear selector abutment bracket.
8. Engage cable to selector ball joint.
9. Fit new abutment bracket clip.
10. Fit cable to gear lever selector assembly.
11. Position cable to abutment, fit retaining clip and secure with bolt.
12. Position gear lever assembly to tunnel, fit and tighten nuts and bolts to 9 Nm.
13. Position SRS DCU bracket to tunnel, fit harness earth connector, tighten Torx bolts to 10 Nm.


WARNING: The crash sensor is incorporated inside the DCU, therefore it is imperative that the DCU bolts are tightened to their correct torque.

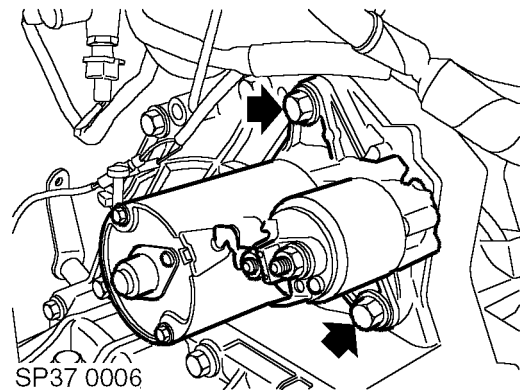
14. Fit front console.
 [FRONT CONSOLE, page 76-4-4.](#)
15. Untie and position coolant hoses.
16. Fill engine coolant system.
 [DRAIN AND REFILL, page 26-1.](#)
17. Fit engine cover.
 [ENGINE COVER, page 12-27.](#)

GEARBOX - MANUAL - REMOVE FOR ACCESS & REFIT

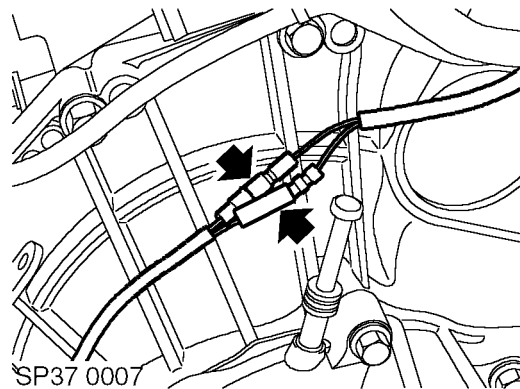
 **37.20.02.99**

Remove

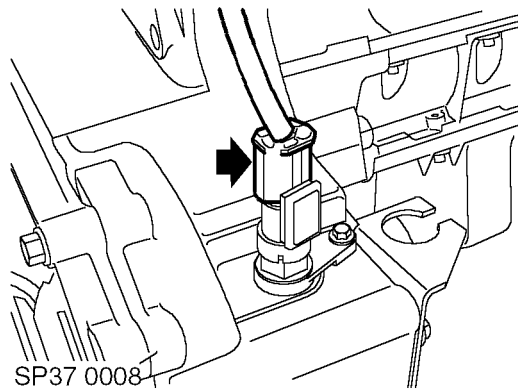
1. Disconnect battery earth lead.
2. Remove engine and gearbox assembly.
 [ENGINE & GEARBOX ASSEMBLY - REMOVE FOR ACCESS & REFIT, page 12-18.](#)
3. Drain gearbox oil.



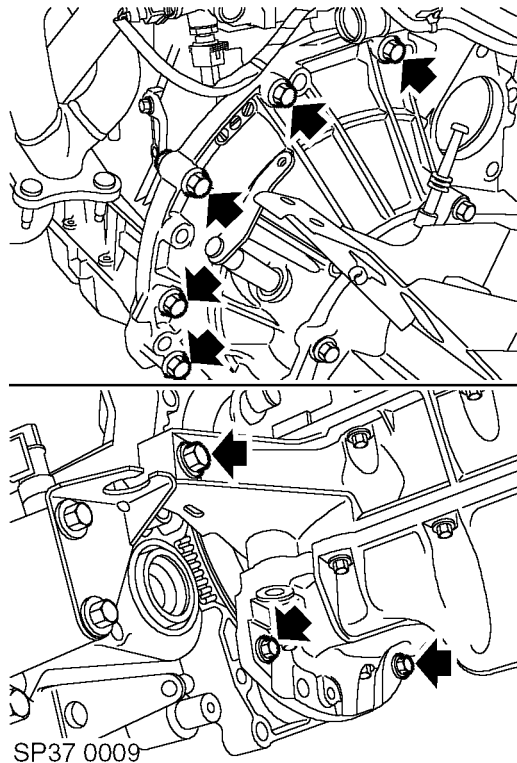
4. Remove 2 nuts and bolts securing starter motor, remove starter motor and collect rear closing plate.



5. Disconnect reverse light switch connectors.




6. Disconnect multiplug from road speed transducer.



7. Remove 5 bolts and 3 nuts and bolts securing gearbox to engine.
8. Collect front closing plate.
9. With assistance remove gearbox from engine.

Refit

1. Clean mating faces of gearbox and engine, ensure locating dowels are fitted.
2. With assistance, fit gearbox, locate on dowels and secure to engine.
3. Position front closing plate.
4. Fit nuts and bolts securing gearbox to engine. Tighten gearbox to engine bolts to 80 Nm. Gearbox to sump bolts to 45 Nm.
5. Connect multiplug to transducer.

6. Connect reverse lamp switch wires.
7. Clean starter motor and mating face on gearbox housing.
8. Position rear closing plate.
9. Position starter motor to gearbox, fit and tighten nuts and bolts to 80 Nm.
10. Fill gearbox with oil.
11. Fit engine and gearbox assembly.
 -  **ENGINE & GEARBOX ASSEMBLY - REMOVE FOR ACCESS & REFIT, page 12-18.**
12. Connect battery earth lead.

MANUAL GEARBOX

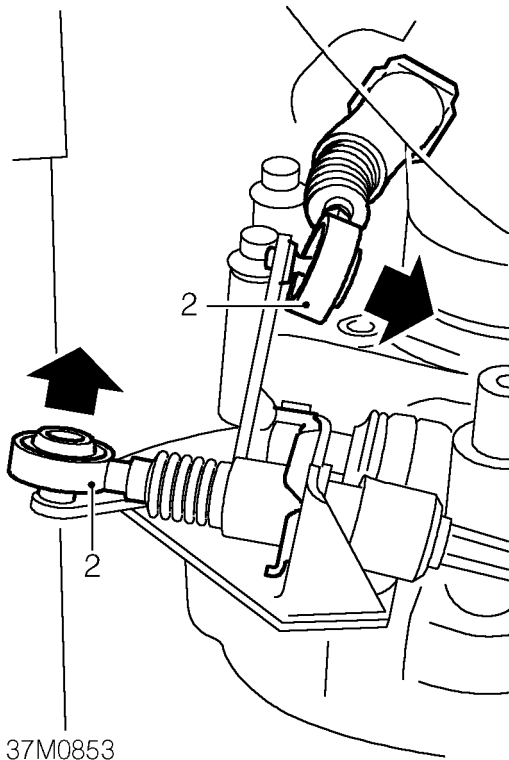
SELECTOR SHAFT OIL SEAL

🔑 37.23.10

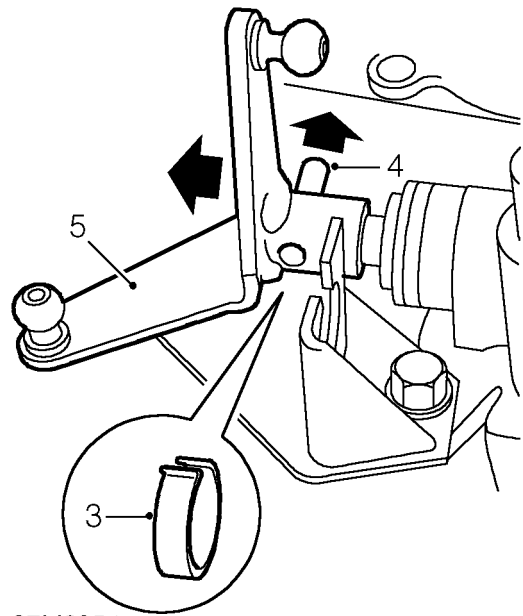
Remove

1. Raise rear of vehicle.

WARNING: Support on safety stands.



2. Release 2 gear change cables from selector linkage.




3. Remove clip securing selector linkage roll pin.
4. Using a suitable punch, drive out roll pin from selector linkage and discard roll pin.
5. Remove selector linkage from shaft.

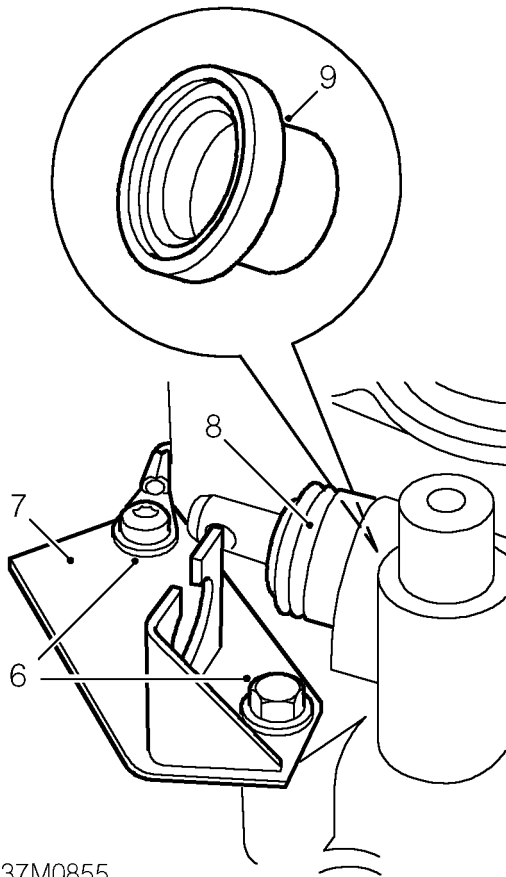


REVERSE LAMP SWITCH

🔑 37.27.01

Remove

1. Raise rear of vehicle.
WARNING: Support on safety stands.
2. Remove engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL](#), page 76-2-4.

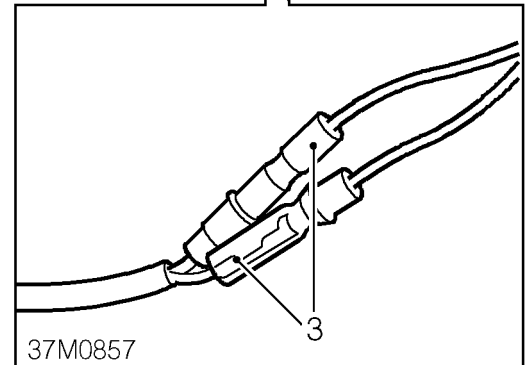
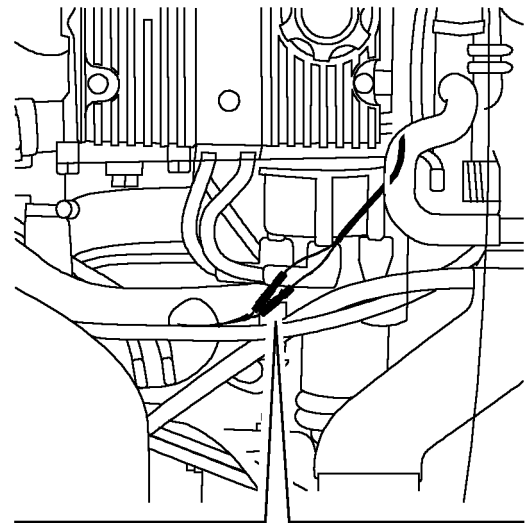


37M0855

6. Remove bolt and Torx screw securing lower gear change cable abutment bracket to gearbox.
7. Remove gear change cable abutment bracket.
8. Remove oil seal cover from selector shaft.
9. Using a flat screwdriver remove oil seal from gearbox and discard oil seal.

Refit

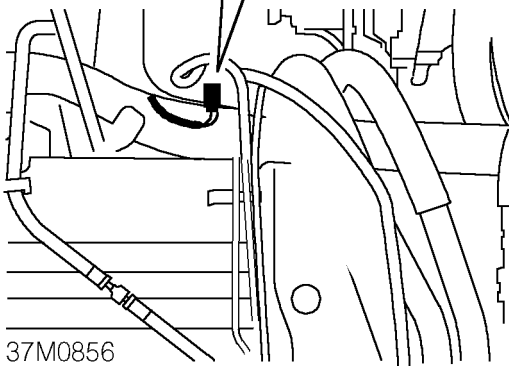
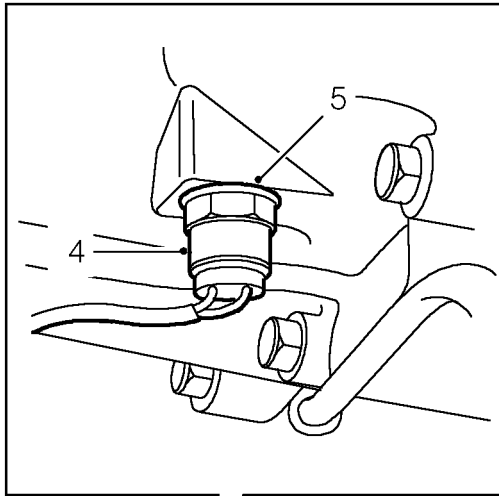
1. Clean oil seal housing and selector shaft.
2. Lubricate new seal using clean unused engine oil.
3. Fit oil seal to selector shaft.
4. Secure seal to gearbox using a deep socket.
5. Fit oil seal cover and secure to seal flange.
6. Fit gear change cable abutment bracket, fit bolts and tighten to 45 Nm.
NOTE: Position earth lead to abutment bracket retaining bolt.
7. Fit selector linkage to shaft, align holes, fit new roll pin and secure clip.
8. Secure gear change cables to selector linkage.
9. Remove stand(s) and lower vehicle.



37M0857

3. Disconnect reverse lamp switch connectors.


MANUAL GEARBOX



37M0856

4. Remove reverse lamp switch.
5. Collect sealing washer and discard.

Refit

1. Clean threads and mating faces of reverse lamp switch.
2. Fit NEW sealing washer to reverse lamp switch.
3. Fit and tighten reverse lamp switch to gearbox.
4. Connect reverse lamp switch connectors.
5. Fit engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
6. Remove stand(s) and lower vehicle.



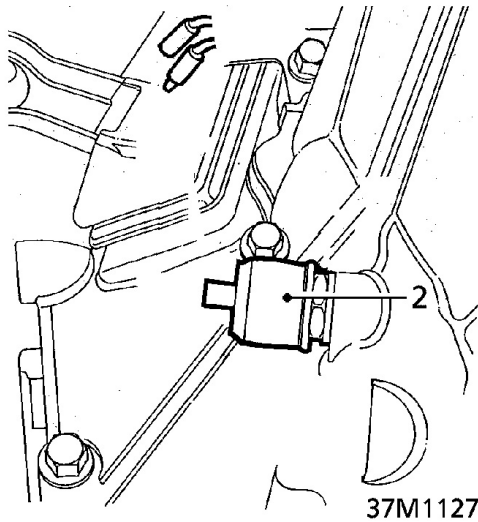
GEARBOX DISMANTLING

🔑 37.20.04

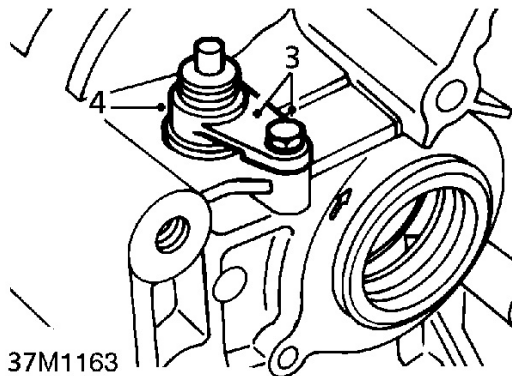
DISASSEMBLE

Gearbox

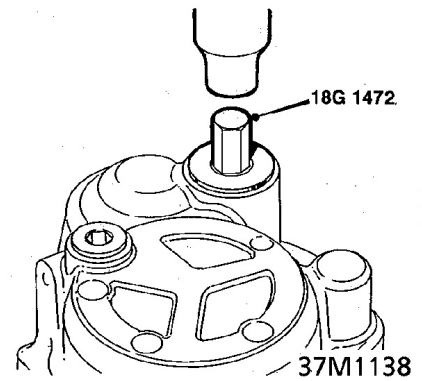
1. Thoroughly clean exterior of gearbox.



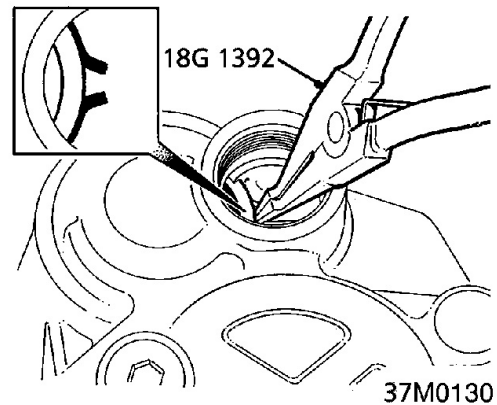
2. Remove reverse light switch; discard sealing washer.



3. Remove bolt and locating plate securing speedometer drive pinion and housing.
4. Remove speedometer drive pinion and housing, discard 'O' ring.

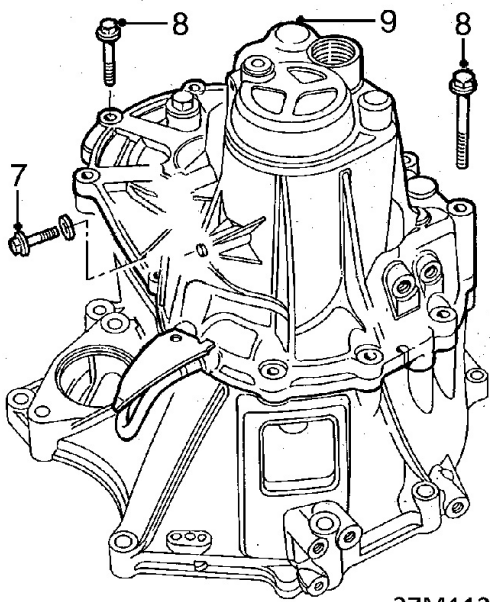


5. Remove access plug using tool 18G1472.



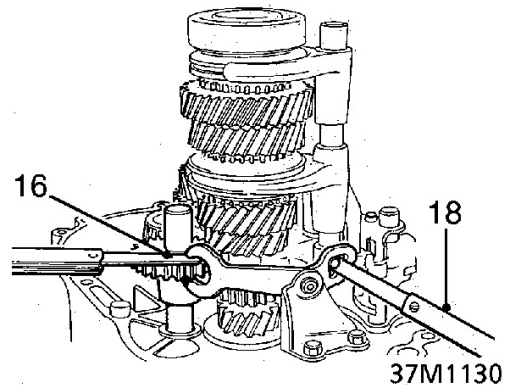
6. Using tool 18G1392, release circlip retaining output shaft bearing.

MANUAL GEARBOX



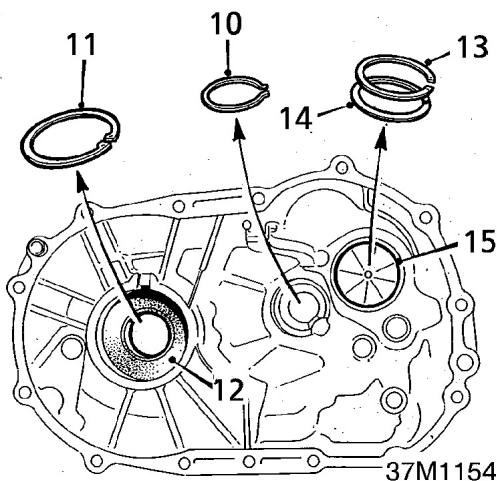
37M1128

7. Remove bolt retaining reverse idler shaft, discard washer.
8. Noting their fitted position, remove 14 bolts securing gear case to differential housing; release breather pipe bracket.
9. Using a soft face mallet, release gear case from differential housing; remove gear case.



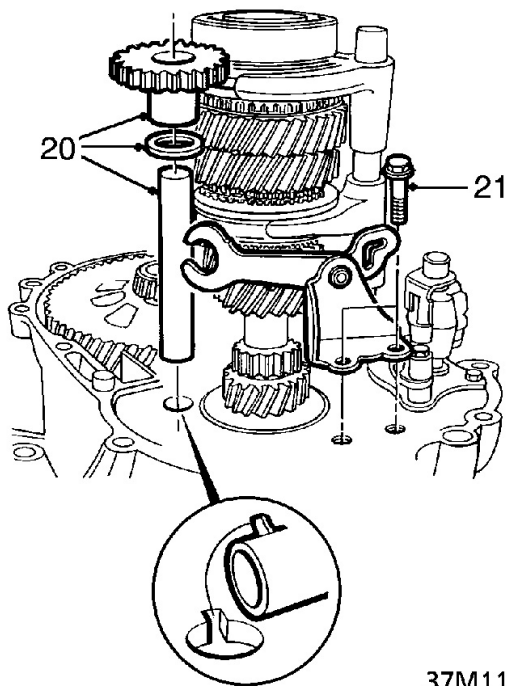
16. Using feeler gauges, measure clearance between reverse idler gear and selector fork.
Clearance = 0.5 to 1.1 mm.
17. If clearance obtained exceeds above figure, measure width across prongs of selector fork.
Prong width = 13.0 to 13.3 mm.
18. Using feeler gauges, measure clearance between pin and selector fork groove.
Standard = 0.05 to 0.35 mm
Service limit = 0.5 mm
19. If clearance obtained exceeds service limit, measure width of selector fork groove.
Groove width = 7.05 to 7.25 mm

CAUTION: If dimensions obtained exceed figures given, selector fork must be replaced.



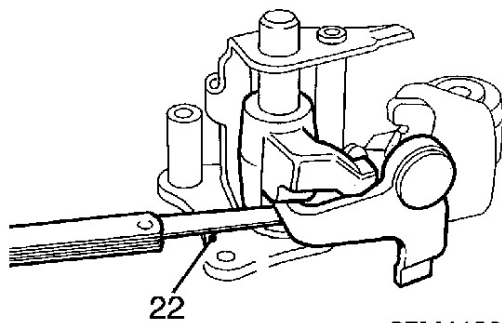
37M1154

10. Remove and discard output shaft bearing circlip from gear case.
11. Remove selective circlip from differential bearing recess in gear case; retain circlip.
12. Remove differential oil seal.
13. Remove selective circlip(s).
14. Remove and discard Belleville washer.
15. Remove input shaft oil guide plate.



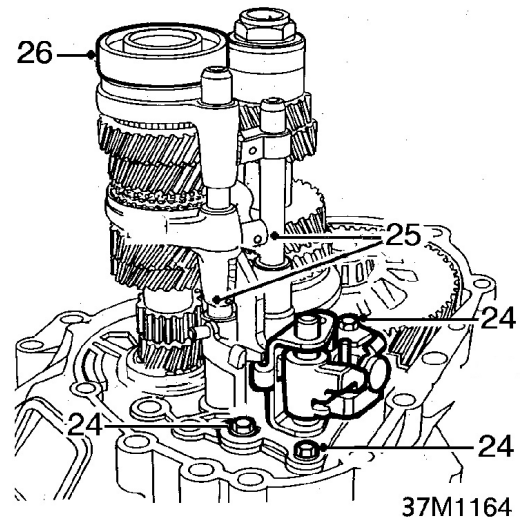
37M1131

20. Remove reverse idler gear, thrust washer and idler shaft.
21. Remove 2 bolts securing reverse selector fork bracket; remove bracket and fork.



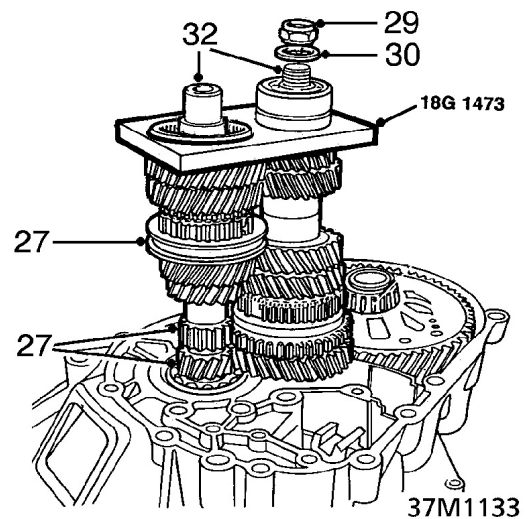
37M1132

22. Using feeler gauges, measure clearance between gearshift arm and guide.
Standard = 0.2 to 0.3 mm
Service limit = 0.55 mm
23. If clearance obtained exceeds service limit, measure width of groove in guide.
Groove width = 8.1 to 8.2 mm
CAUTION: If dimensions obtained exceed figures given, interlock assembly must be replaced.



37M1164

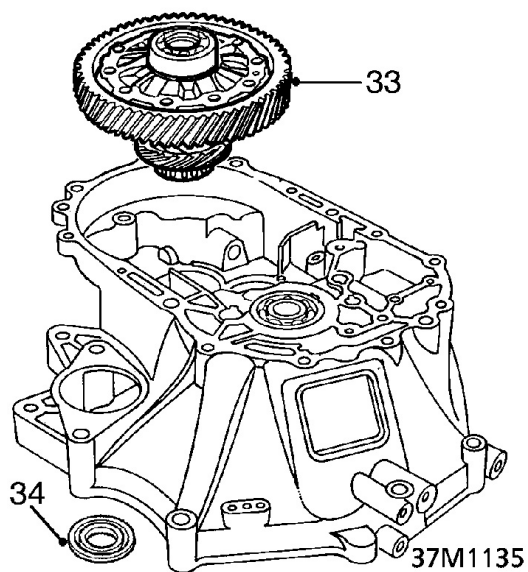
24. Noting their fitted position, remove 3 bolts retaining interlock assembly; remove assembly.
25. Raise both input and output shafts slightly, remove selector forks and rails.
26. Using 2 suitable levers, remove input shaft bearing.



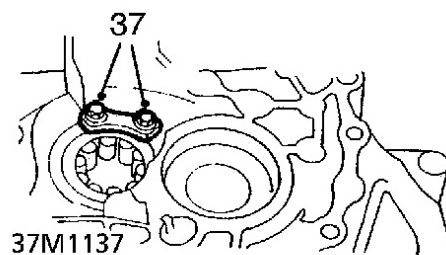
37M1133

27. Move synchro sleeve to engage 1st and 4th gears.
CAUTION: Damage to components will result if gears other than 1st and 4th are engaged.
28. Position tool 18G1473 on input shaft and around output shaft bearing.
29. Release staking, remove and discard nut from output shaft.
NOTE: Nut has a LH thread.
30. Remove and discard tongued washer.
31. Remove tool 18G1473.
32. Remove input and output shafts from differential housing.

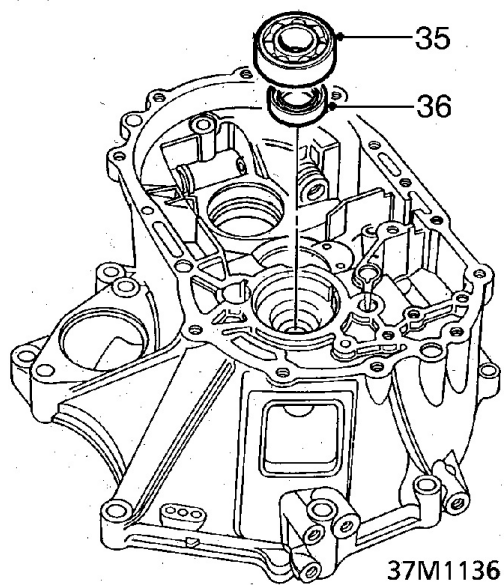
MANUAL GEARBOX



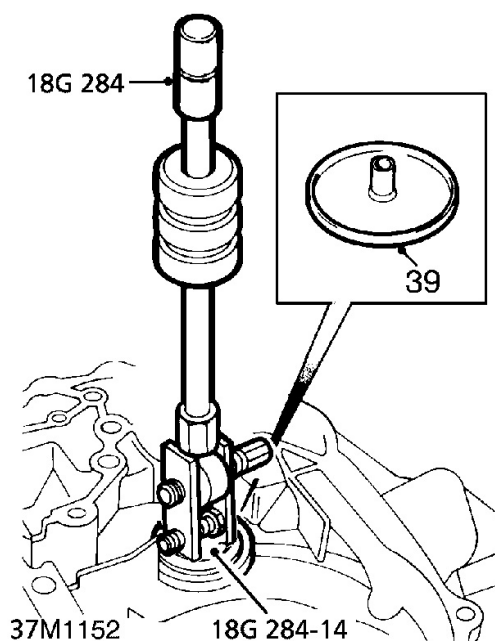
- 33. Lift differential assembly out of housing.
- 34. Remove differential oil seal.



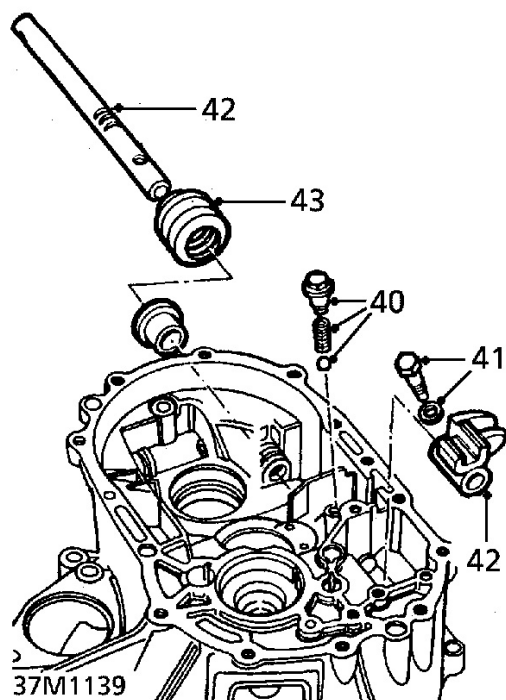
- 37. Remove and discard 2 patchlok bolts securing output shaft bearing retaining plate - if fitted; remove plate.



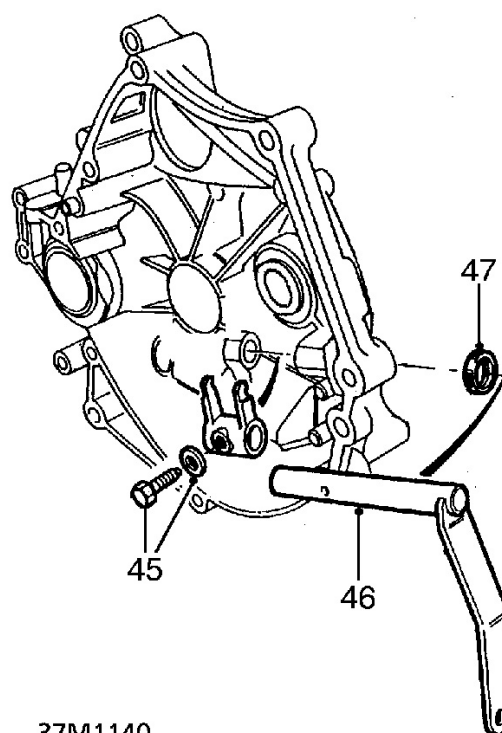
- 35. Using a soft metal drift, remove input shaft bearing from differential housing; discard bearing.
- 36. Remove and discard input shaft oil seal.



- 38. Remove output shaft bearing using tools 18G284 and 18G284-14, discard bearing.
- 39. Remove output shaft oil guide plate.



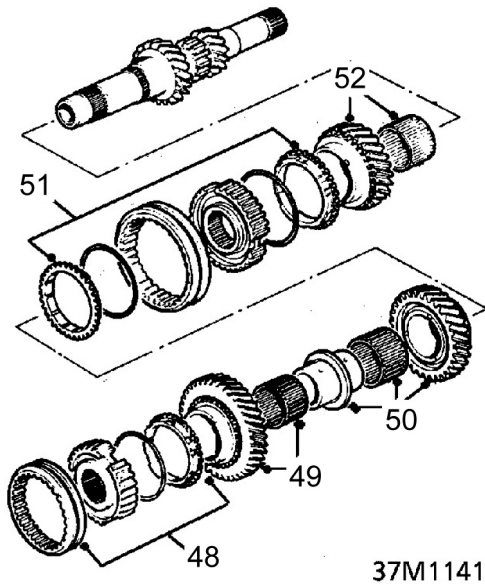
40. Remove detent cap bolt and washer; recover detent spring and ball.
NOTE: Use a stick magnet to recover ball.
41. Remove bolt and washer securing selector shaft guide to shaft.
42. Withdraw selector shaft; remove selector shaft guide.
43. Remove gaiter from shaft.
44. Remove and discard oil seal.



45. Remove bolt and washer securing clutch release fork to release shaft.
46. Withdraw release shaft.
47. Remove and discard release shaft oil seal.

MANUAL GEARBOX

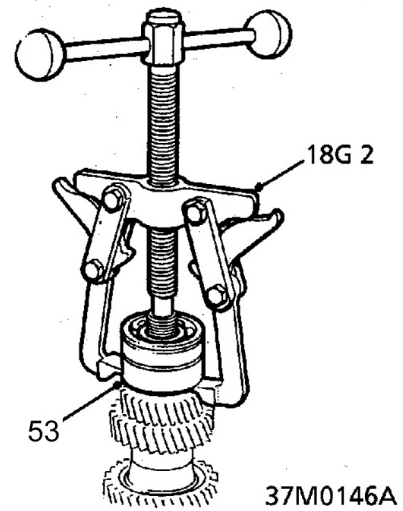
Input Shaft



37M1141

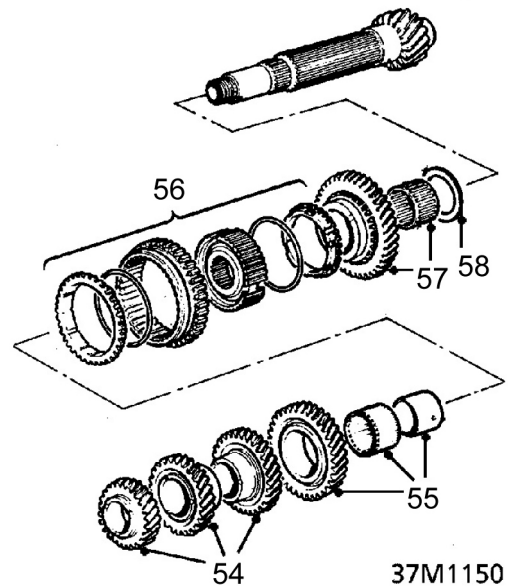
48. Remove 5th gear synchro assembly.
CAUTION: Keep component parts of each synchro assembly together.
49. Remove 5th gear and needle bearing.
50. Remove 4th gear together with collar and needle bearing.
51. Remove 3rd/4th synchro assembly.
52. Remove 3rd gear and needle bearing.

Output Shaft



37M0146A

53. Remove bearings using tool 18G2, note type of bearing fitted; discard bearings.

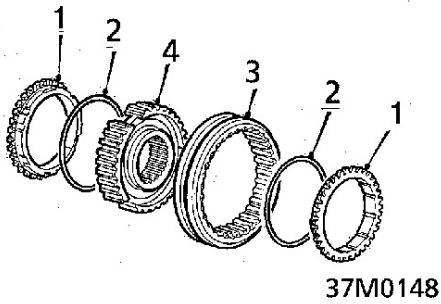


37M1150

54. Remove 5th, 4th and 3rd gears.
55. Remove 2nd gear, needle bearing and collar
56. Remove 1st/2nd synchro assembly.
CAUTION: Keep component parts of synchro assembly together.
57. Remove 1st gear and needle bearing.
58. Remove and retain selective thrust washer.



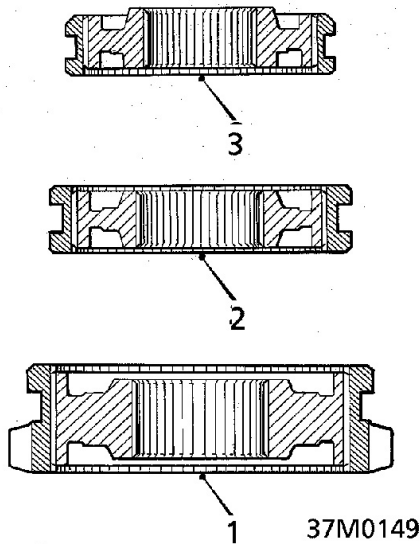
Synchro Assemblies



Synchro Assembly Components

- 1 Synchro ring
- 2 Spring ring
- 3 Synchro sleeve
- 4 Synchro hub

NOTE: Only one synchro ring and spring ring are fitted to 5th speed synchro.

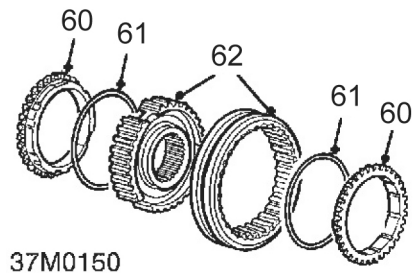


Synchro Assembly Identification

- 1 1st/2nd synchro
- 2 3rd/4th synchro
- 3 5th synchro

CAUTION: Keep component parts of each synchro assembly together.

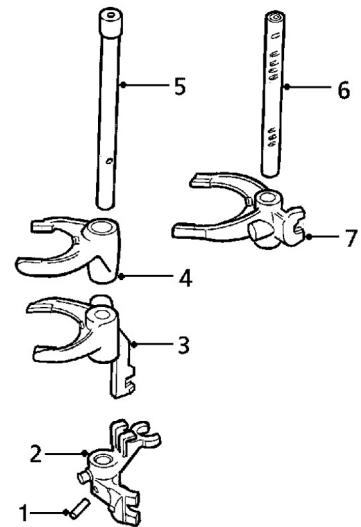
- 59. Suitably mark relative position of each synchro hub to its respective sleeve.



37M0150

- 60. Remove 2 synchro rings.
- 61. Remove 2 spring rings.
NOTE: Only one synchro ring and spring ring are fitted to 5th synchro.
- 62. Remove synchro hub from sleeve.

Selector Shafts



37M1147

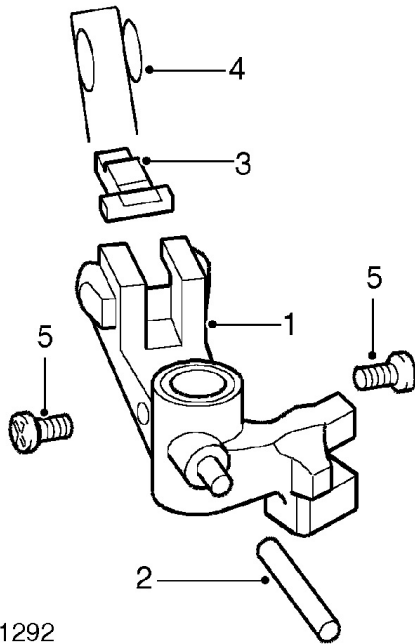
Selector Shaft Components

- 1 Roll pin
 - 2 5th/reverse gear selector
 - 3 3rd/4th gear selector fork
 - 4 5th gear selector fork
 - 5 5th/reverse selector shaft
 - 6 1st/2nd gear selector fork
 - 7 1st/2nd selector shaft
- 63. Identify each selector fork and its fitted position to the relevant selector shaft. Slide 1st/2nd gear selector fork off 1st/2nd selector shaft.

MANUAL GEARBOX

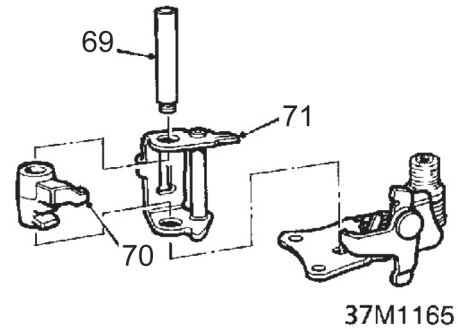
64. Slide 1st/2nd selector shaft out of 5th gear selector fork and 5th/reverse gear selector.
65. Using a suitable punch, remove roll pin securing 5th/reverse gear selector; discard roll pin.
66. Slide 5th/reverse gear selector off 5th/reverse selector shaft.
67. Slide 3rd/4th and 5th selector forks off 5th/reverse selector shaft.

5th/Reverse Selector - With Reverse Brake



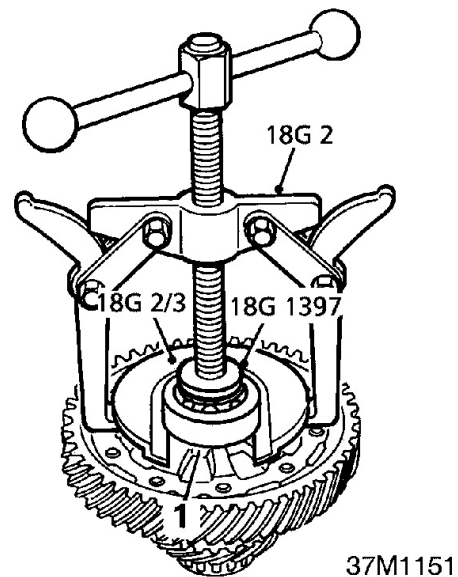
68. The 5th/reverse selector (1) is secured to the selector shaft by a roll pin (2). The selector incorporates the components for the reverse brake operation. This comprises of a lock plate (3) a retaining spring (4). The spring retains the lock plate in position, with the two ends of the spring located under two 'Taptite' screws (5) which are positioned either side of the 5th/reverse selector.

Interlock Assembly

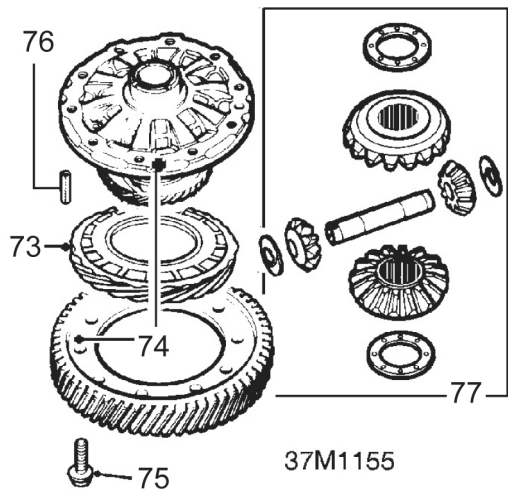


69. Withdraw shift shaft from gearshift holder and arm guide.
70. Release lug on arm guide from slot in interlock.
71. Slide gearshift holder off arm guide.

Differential Assembly



72. Remove bearings using tools 18G2, 18G2/3 and 18G1397; discard bearings.



73. Remove speedometer drive gear from carrier.
74. Suitably mark fitted position of final drive gear to carrier.
75. Progressively slacken, then remove 10 bolts securing final drive gear to carrier; remove gear.
76. Using a suitable punch, remove roll pin securing pinion shaft; discard pin.
77. Remove pinion shaft, sun gears, planet gears and thrust washers; retain thrust washers - if fitted.
NOTE: Selective thrust washers are fitted to planet gears, non-selective washers are fitted to sun gears.

INSPECTION

1. Clean all components ensuring all traces of RTV sealant are removed from gear case, differential housing and access plug. Ensure oil drillings in input and output shafts and oil guide plates are clear. Ensure gearbox breather is unobstructed.
CAUTION: Do not clean plastic components with chlorinated solvent e.g. trichloroethane.
2. Check speedometer pinion for wear and pinion housing threads for damage.

Input and Output Shaft Assemblies

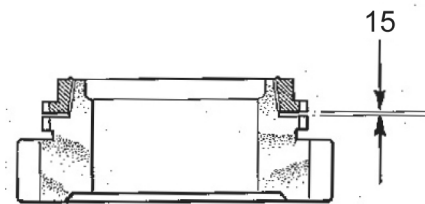
3. Check gears for worn or chipped teeth, cracks or uneven wear.
4. Check coning surfaces of gears for wear.
5. Check needle bearings for wear and overheating (blueing).
Where any of the above are evident, all bearings on the shaft must be replaced.
6. Check shaft splines for wear and threads of output shaft for damage.
7. Check bearing collars for wear and damage.

Reverse Idler Shaft and Gear

8. Check idler shaft for wear.
9. Check gear for wear, chipping or cracking of teeth.
10. Check needle bearings for wear, replace gear and bearings as an assembly if wear is evident.

Synchro Assemblies

11. Check component parts of each synchro assembly for wear or damage, ensure teeth on hubs and sleeves are not chipped or rounded off.
12. Ensure teeth on synchro rings are not chipped or damaged, check inner surfaces of rings for wear.
13. Ensure each hub moves freely in its respective sleeve.
14. Place a synchro ring on its respective gear cone and rotate it until it stops (approximately 10 to 20°).



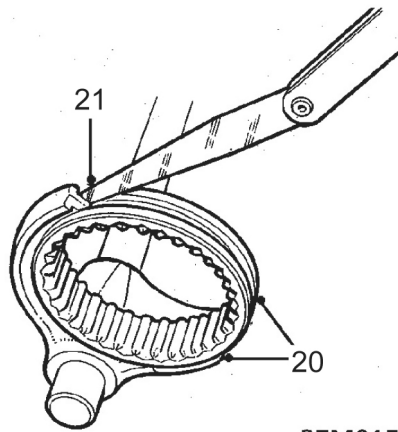
37M0155

15. Measure clearance between synchro ring and gear.
Ring to gear clearance:
Standard = 0.85 to 1.1 mm
Service limit = 0.4 mm (minimum clearance)
16. Repeat for remaining rings and gears.
CAUTION: If any ring to gear clearance is less than above service limit, synchro assembly must be replaced.

Selector Shafts and Forks

17. Check shafts for wear and alignment.
18. Check selector forks for wear, cracks or damage.
19. Check the retained detent balls and springs, there must be no visible 'flats' on the balls, and springs must keep balls in contact with the staked position of the selector fork.
CAUTION: It is not possible to replace balls or springs, selector fork must be replaced.

MANUAL GEARBOX



37M0156

20. Assemble each selector fork to its respective synchro sleeve.

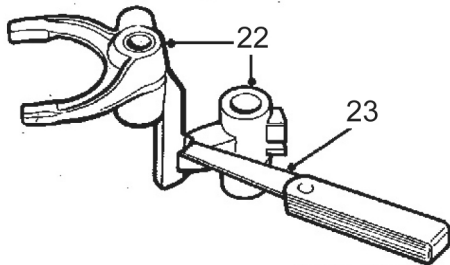
21. Check clearance of selector fork in synchro sleeve groove.

Selector fork to groove clearance:

Standard = 0.45 to 0.65 mm

Service limit = 1.0 mm

CAUTION: If clearance is found to exceed service limit, selector fork must be replaced.



37M1156

22. Assemble gearshift arm guide to 3rd/4th selector fork.

23. Using feeler gauges, measure clearance between gearshift arm guide and fork:

Standard = 0.2 to 0.5 mm

Service limit = 0.8 mm

24. If clearance obtained exceeds service limit, measure width of tongue on gearshift arm guide:

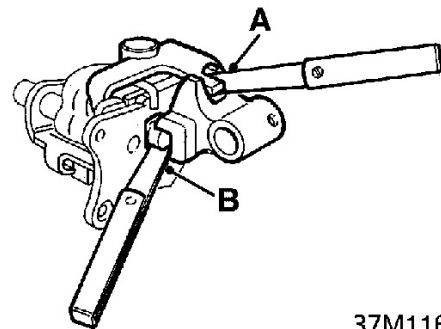
Standard = 11.9 to 12.0 mm

CAUTION: If width of tongue is within limits, 3rd/4th selector fork must be replaced, if width of tongue is less than quoted, gearshift arm guide must be replaced.

25. Repeat above procedures for 1st/2nd selector fork.

Interlock Assembly

26. Check components for wear or damage, replace assembly if necessary.



37M1166

27. Assemble gearshift arm guide to interlock assembly.

28. Using feeler gauges, measure clearance A.

Clearance A:

Standard = 0.02 to 0.3 mm

Service limit = 0.55 mm

29. If clearance exceeds service limit, check width of groove in gearshift arm guide.

Groove width = 13.05 to 13.25 mm

CAUTION: If width of groove exceeds above dimension, gearshift arm guide must be replaced. If width of groove is within service limit, replace interlock assembly.

30. Using feeler gauges, measure clearance B between interlock ball and gearshift arm guide.

Clearance B:

Standard - 0.05 to 0.25 mm

Service limit = 0.5 mm

31. If clearance exceeds service limit, measure outside diameter of interlock ball.

Interlock ball outside diameter = 12.05 to 12.15 mm

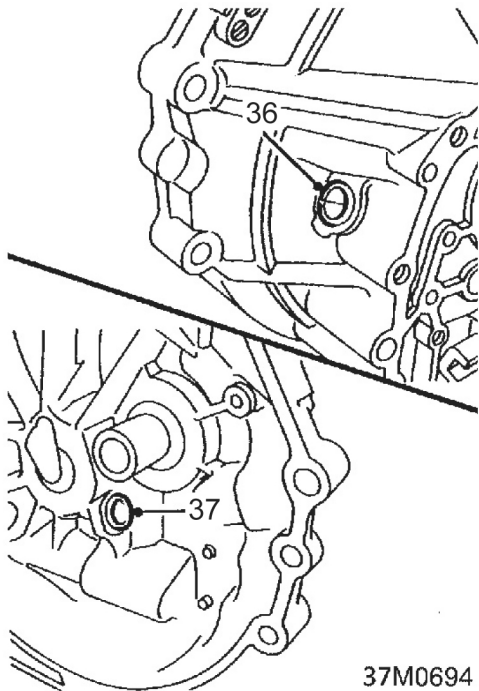
CAUTION: If diameter of ball is within limits, replace gearshift arm guide, if diameter of ball is less than 12.05 mm, replace interlock assembly.



Differential Assembly

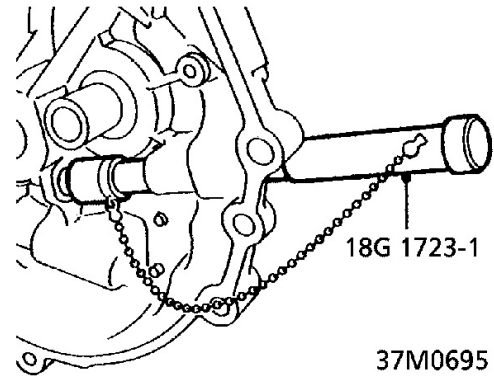
32. Check gear teeth for wear, chipping and signs of overheating
33. Check pinion shaft for wear.
34. Check speedometer drive gear teeth for wear or damage, replace as necessary.
35. Check housing for damage, check that locating dowels are fitted; check clutch release shaft bushes for damage or wear and that shaft is free to turn, replace if necessary using following procedure.

Remove

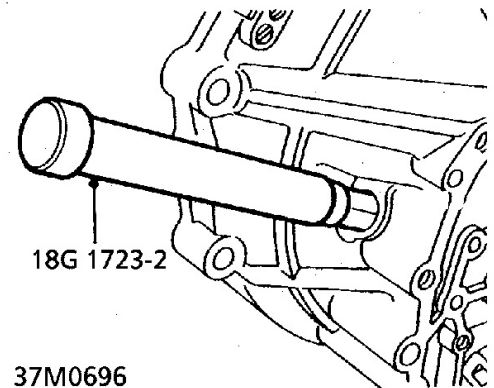


36. *Outer bush:* Using a hacksaw blade, carefully cut a longitudinal slot opposite the split in the bush; prise bush out of differential housing.
37. *Inner bush:* Carefully prise inner bush out of differential housing.

Refit



38. *Inner bush:* Using tool 18G1723-1, drift inner bush into differential housing.



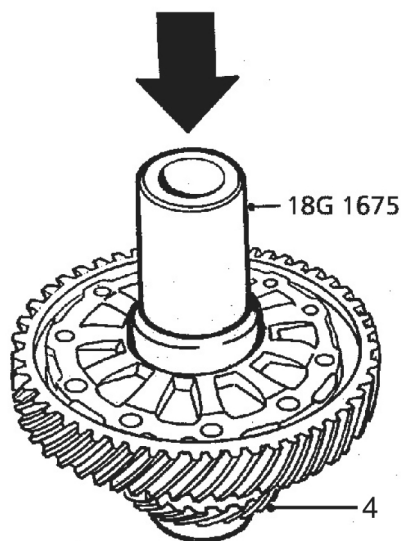
39. *Outer bush:* Using tool 18G1723-2, drift outer bush into differential housing.
CAUTION: Ensure end of tool 18G1723-2 is located in inner bush.
40. *Gearboxes fitted with output shaft bearing retainer plate:* Remove all traces of patchlok compound from output shaft bearing retainer plate bolt holes using an M6 tap.
CAUTION: Ensure bolt holes are thoroughly cleaned.

REASSEMBLY

Differential

1. Assemble planet gears and original thrust washers.
2. Fit sun gears and original thrust washers - if fitted.
3. Rotate gears and thrust washers to align drilling in carrier.
CAUTION: Do not fit roll pin or final drive gear at this stage.

MANUAL GEARBOX



4. Position speedometer drive gear on carrier.
5. Fit new ball bearings to carrier using tool 18G1675.
NOTE: Larger of the two bearings is fitted on speedometer drive gear side.

Synchro Assemblies

6. Assemble each synchro sleeve to its respective hub ensuring that raised teeth on the sleeve are aligned with the deeper grooves in hub.
7. Fit spring rings to retain hub.
NOTE: Only one spring ring is fitted on 5th speed synchro.
8. Assemble synchro rings to their respective sleeves.
CAUTION: When assembling the 5th gear synchro sleeve to hub, it is possible to position the raised teeth on the synchro sleeve in the machined cut-aways for the synchro ring. Although the gearbox can be assembled, it will not be possible to select 5th gear.

Selector Shafts

9. Slide 5th and 3rd/4th selector forks on to 5th/reverse selector shaft.
CAUTION: Ensure that longest portion of selector fork lugs face away from shoulder of shaft.
10. Slide 5th/reverse selector on to 5th/reverse selector shaft; secure selector with a new roll pin.
NOTE: Make sure the lock plate and retaining spring are correctly located on 5th/reverse selector fitted with reverse brake.
11. Slide 1st/2nd gear selector fork on to 1st/2nd selector shaft.
12. Locate 1st/2nd selector shaft in 5th/reverse gear selector and 5th gear selector fork.
13. Locate lug on shift arm guide in gearshift holder.

14. Position gearshift holder to interlock; fit shaft.

Reverse Idler Gear and Shaft

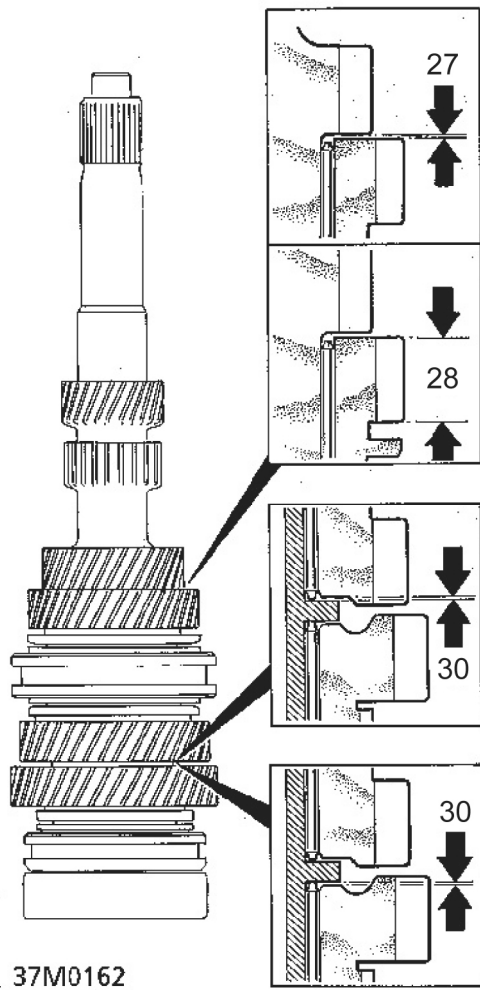
15. Fit a new thrust washer.
16. Smear needle bearing rollers with petroleum jelly and fit in idler gear.
17. Fit reverse idler gear to shaft.
NOTE: Boss on gear must face towards thrust washer.

Input Shaft

18. Fit needle bearing rollers in third gear.
NOTE: Smear needle bearing rollers with petroleum jelly prior to assembly.
19. Fit 3rd gear on shaft.
20. Fit 3rd/4th synchro assembly.
21. Fit needle bearing rollers in 4th gear; position gear on collar and fit assembly on shaft.
22. Fit needle bearing rollers in 5th gear; position gear on collar.
NOTE: Boss on 5th gear must face away from 4th gear.
23. Fit 5th synchro assembly.
NOTE: Machined groove in synchro hub must face towards 5th gear and large chamfer on synchro sleeve must face away from 5th gear.
24. Fit a new input shaft bearing.

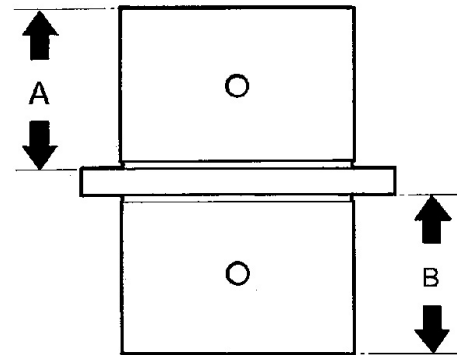
Input Shaft Gear End-Float - Check

25. Position input shaft on bed of a hand press with bearing located on a suitable socket.
26. Apply downward pressure to input shaft.
NOTE: Maintain pressure whilst checks are carried out.



37M0162

27. Using feeler gauges, measure clearance between 2nd and 3rd gears.
3rd gear clearance:
Standard = 0.06 to 0.21 mm
Service limit = 0.3 mm
28. If clearance exceeds service limit, measure thickness of 3rd gear.
3rd gear thickness:
Standard = 35.42 to 35.47 mm
Service limit = 35.30 mm
29. If 3rd gear thickness is greater than service limit, replace 3rd gear synchro assembly; if thickness is less than service limit, replace 3rd gear.
30. Using feeler gauges, measure clearance between the spacer collar and 4th gear and spacer collar and 5th gear.
4th and 5th gear clearance:
Standard = 0.06 to 0.21 mm
Service limit = 0.3 mm



37M0163

31. If clearance of either gear exceeds service limit, measure length of appropriate side of spacer collar A or B.
Length A = 4th gear side
Length B = 5th gear side
Spacer collar length A or B:
Standard = 26.03 to 26.08 mm
Service limit = 26.01 mm
32. If length A exceeds service limit, measure thickness of 4th gear.
4th gear thickness:
Standard = 30.92 to 30.97 mm
Service limit = 30.80 mm
33. If thickness of 4th gear exceeds service limit, replace 3rd/4th synchro assembly; if thickness of gear is less than service limit, replace gear.
34. If length B exceeds service limit, measure thickness of 5th gear.
5th gear thickness:
Standard = 30.42 to 30.47 mm
Service limit = 30.30 mm
35. If thickness of 5th gear exceeds service limit, replace 5th synchro assembly; if thickness of gear is less than service limit, replace gear.

Output Shaft

36. Measure and record thickness of original thrust washer.
37. Fit original thrust washer on shaft.
38. Fit needle bearing rollers in 1st gear.
NOTE: Smear needle bearing rollers with petroleum jelly prior to assembly.
39. Fit 1st gear on shaft.
40. Fit 1st/2nd synchro assembly.
CAUTION: Ensure reverse gear on synchro sleeve is adjacent to 1st gear.
41. Measure and record length of 2nd gear collar.
42. Fit 2nd gear collar on shaft ensuring lubrication groove is towards 1st/2nd synchro assembly.

MANUAL GEARBOX

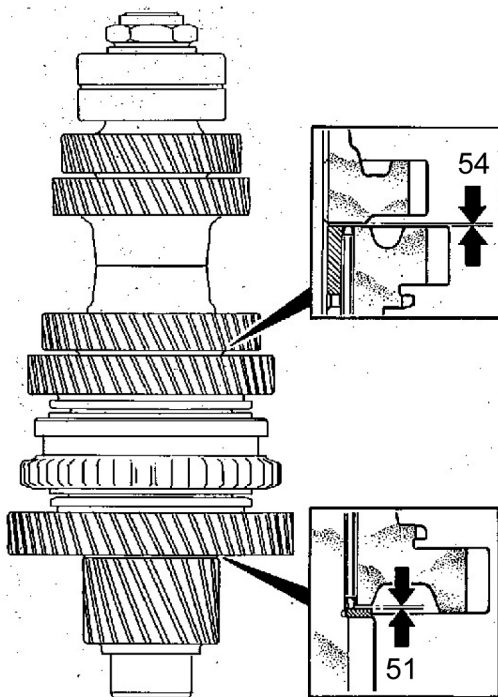
43. Fit needle bearing rollers in 2nd gear.
44. Fit 2nd gear on shaft.
45. Fit 3rd and 4th gears ensuring that bosses on gears are adjacent to each other.
46. Fit 5th gear ensuring that large boss on gear is towards threaded portion of shaft.
47. Fit new output shaft bearings ensuring that snap ring groove in ball race is towards threaded portion of shaft.

CAUTION: Ensure that replacement bearings are the same as originally fitted. Where a roller bearing and single ball race is to be fitted, the single ball race must be adjacent to threaded portion of shaft.

48. Fit a new tongued washer with dished side of washer towards bearing.
49. Secure final drive pinion of shaft in a soft-jawed vice.
50. Fit a new nut and tighten to 110 Nm.

NOTE: Nut has a LH thread; do not stake nut at this stage.

Output Shaft Gear End-Float - Check

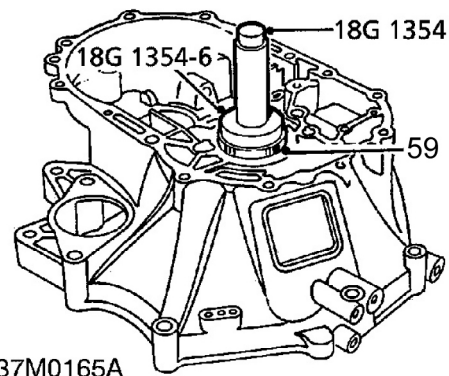


37M0164

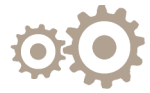
51. Using feeler gauges measure clearance between 1st gear and thrust washer.
Standard = 0.03 mm to 0.08 mm
Service limit = 0.18 mm

52. From clearance obtained, calculate thickness of thrust washer required to give correct clearance. If clearance obtained exceeds service limit, fit a thicker thrust washer; if it is less than 0.03 mm, fit a thinner thrust washer.
NOTE: Thrust washers are available as follows: 1.96 to 2.08 mm thick in increments of 0.03 mm.
53. Select a thrust washer of the required thickness to bring end-float within limits.
54. Using feeler gauges, measure clearance between 2nd and 3rd gears.
2nd/3rd gear clearance = 0.03 to 0.10 mm
55. If clearance exceeds figure given, it will be necessary to fit a shorter 2nd gear collar; if clearance is less than figure given, it will be necessary to fit a longer collar.
56. Compare length of original collar and select a collar which will provide specified clearance.
Collars are available in the following lengths: 28.99 mm and 29.04 mm
57. Having determined thickness of selective thrust washer and length of 2nd gear collar required, fit thrust washer and collar.
58. Secure output shaft nut by staking.

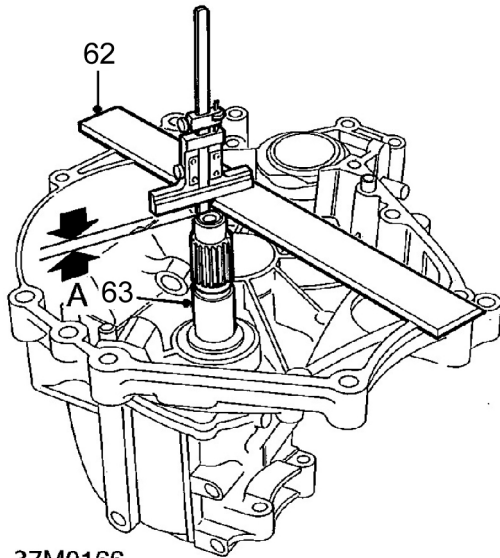
Input Shaft End Thrust - Check and Adjust



59. Fit a new input shaft bearing in differential housing using tools 18G1354 and 18G1354-6.
CAUTION: Do not fit oil seal at this stage.
60. Position input shaft assembly in differential housing ensuring it is fully inserted in bearing.
NOTE: Position housing so that the end of shaft is clear of bench.
61. Fit gear case, fit and tighten bolts to 45 Nm.

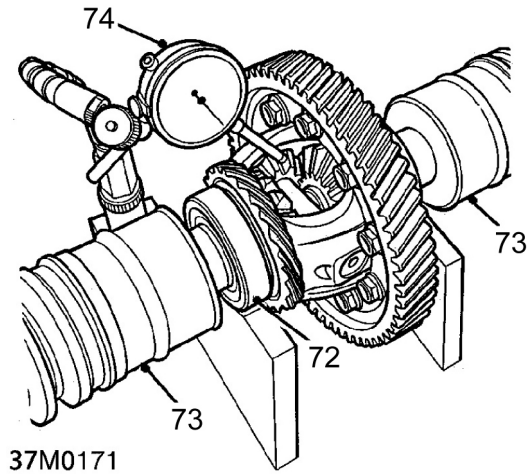


Differential Pinion Gear Backlash - Check and Adjust



37M0166

62. Position a straight edge and depth gauge across face of differential housing.
63. Pull input shaft into differential housing and position end of depth gauge on end of shaft; record measurement shown on gauge.
64. Push input shaft towards gearcase, record measurement shown on gauge.
65. Subtract thickness of straight edge from above readings.
66. Subtract first measurement from second measurement; record figures obtained. Call resultant measurement A.
67. Calculate thickness of circlip(s) required by subtracting 0.97 mm from dimension A.
Input shaft end thrust = 0.14 to 0.21 mm
68. Select circlip(s) from sizes available which equal thickness required. Fourteen circlips are available ranging from 0.5 mm to 1.15 mm thick in increments of 0.05 mm.
CAUTION: No more than two circlips may be fitted. It is not always possible to select the exact thickness of circlips required; when this occurs, always fit a slightly thinner pack to avoid pre-loading bearings.
69. Remove bolts securing gear case; remove gear case.
70. Remove input shaft assembly.
71. Remove input shaft bearing from differential housing using a soft metal drift.



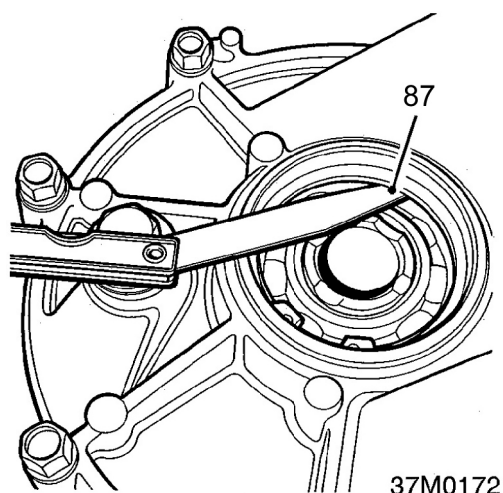
37M0171

72. Position differential assembly with bearings located in V blocks.
73. Fit both inboard drive shaft joints to align gears.
74. Assemble a DTI gauge with stylus of gauge contacting one of the planet gears; zero the gauge.
75. Measure and record planet gear backlash.
76. Repeat procedure for other planet gear.
77. Compare backlash figures obtained with the following:
Planet gear backlash = 0.05 to 0.15 mm
78. If backlash is not as specified, remove planet gears, measure thickness of original thrust washers and from figures obtained, calculate thickness of thrust washers required to give correct backlash.
CAUTION: Thrust washers selected must be of equal thickness, and are available from 0.70 to 0.90 mm thick in increments of 0.20 mm.
79. Fit selected thrust washers, secure pinion shaft with a new pin.
80. Fit final drive gear to carrier ensuring reference marks are aligned.
81. Fit 10 bolts and tighten progressively to 110 Nm.

Differential Bearing Pre-load - Check and Adjust

82. Position original selective circlip in gear case.
83. Position differential assembly in differential housing.
84. Fit gear case, fit and tighten bolts to 45 Nm.
85. Lightly drive differential assembly into gear case to seat circlip.
86. Lightly drive differential into differential housing to settle bearing.

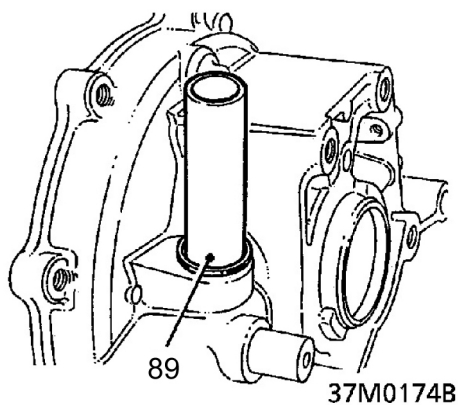
MANUAL GEARBOX



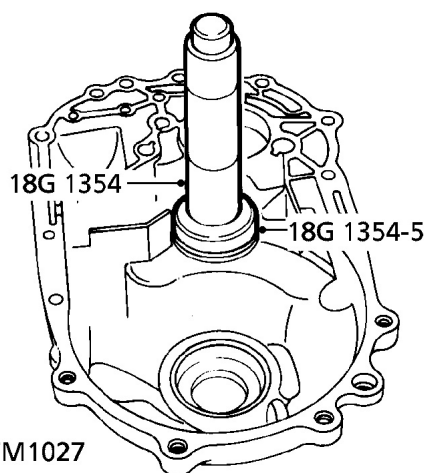
87. Using feeler gauges measure and record clearance between circlip and bearing outer face.
Correct clearance = 0.15 mm maximum

Gearbox

88. Lightly lubricate all components with gearbox oil.

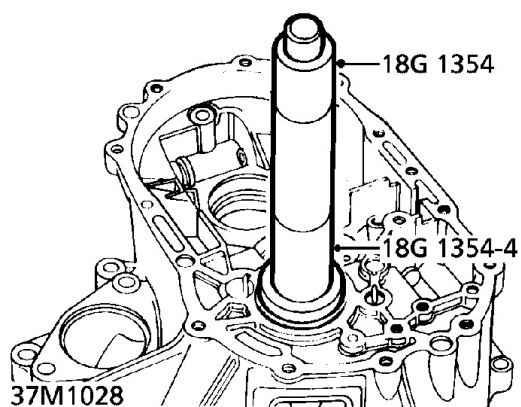


89. Using a suitable piece of tubing, fit a new selector shaft oil seal.
90. Fit output shaft oil guide plate in differential housing.

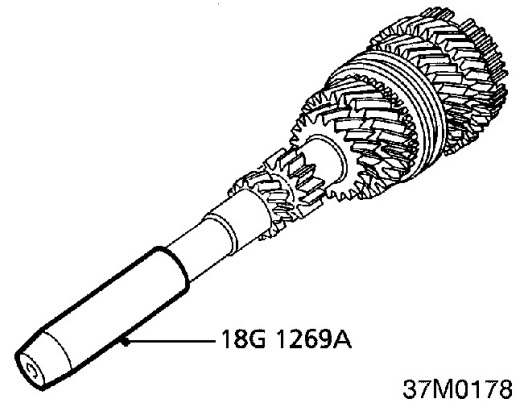
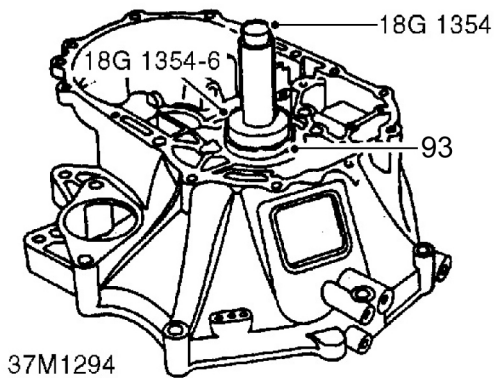


91. Fit a new output shaft bearing in differential housing using tools 18G1354 and 18G1354-5.

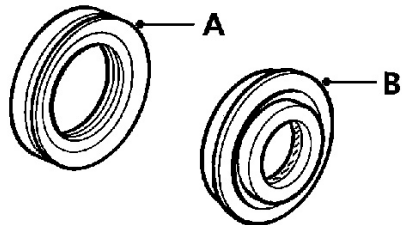
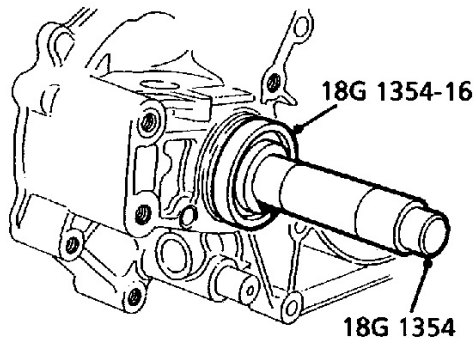
NOTE: Depending on application, output shaft bearing may have oil holes drilled in bearing cage; these holes must face towards output shaft when fitting bearing. Bearings without the oil hole may be fitted either way round.



92. Fit a new input shaft oil seal in differential housing using tools 18G1354 and 18G1354-4.



93. Fit input shaft bearing into differential housing using tools 18G1354 and 18G1354-6.

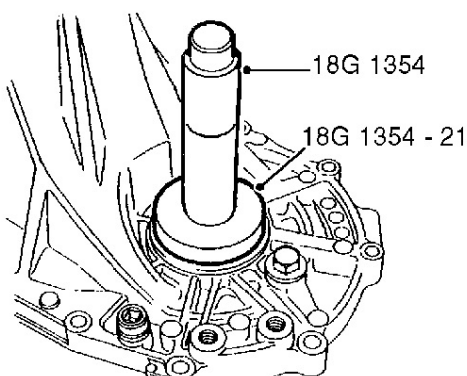
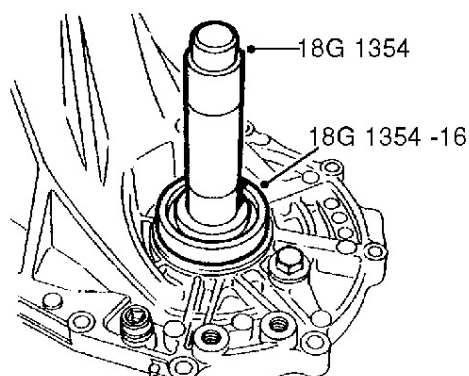


37M1145

94. Fit new oil seal to housing using tools 18G1354 and 18G1354-16.
95. Fit output shaft bearing retaining plate - if fitted.
CAUTION: Ensure side marked **TOP** is facing towards output shaft.
96. Fit 2 new patchlock bolts to secure bearing retaining plate; tighten bolts to 8 Nm.
97. Fit selector shaft and selector shaft guide.
98. Fit and tighten dowel bolt to 28 Nm.
99. Fit detent ball, spring and cap bolt, tighten bolt to 22 Nm.
100. Position differential assembly into housing.

101. Fit seal protector, tool 18G1269A to input shaft, or apply masking tape to splines to protect oil seal.
102. Place input and output shafts together and fit assembly in differential housing.
NOTE: Position housing so that when fitted, end of input shaft is clear of bench.
103. Remove tool 18G1269A.
104. Ensure output shaft nut is staked.
105. Position gears in neutral.
106. Raise both shafts slightly and fit selector forks assembly ensuring forks are located in grooves in synchro sleeves.
107. Fit reverse idler gear, thrust washer and shaft.
NOTE: Large boss on idler gear must be towards differential housing.
108. Fit reverse selector fork and bracket.
109. Fit and tighten retaining bolts.
110. Fit interlock assembly ensuring base of interlock locates in slot at lower end of 1st/2nd selector shaft.
111. Fit and tighten interlock retaining bolts.

MANUAL GEARBOX



37M1146A

127. Fit speedometer drive pinion and housing, use a new 'O' ring; fit retaining plate, fit and tighten bolt to 5 Nm.
128. Fit new clutch release shaft oil seal.
129. Fit clutch release shaft and fork.
130. Fit and tighten bolt to 29 Nm.

112. Fit new differential oil seals in gear case.
113. Fit input shaft oil guide plate in gear case.
114. Fit a new Belleville washer and select circlip(s).
115. Fit selected circlip(s).
116. Fit new output shaft circlip in gear case.
117. Fit selected circlip in differential bearing recess in gear case.
118. Apply a bead of RTV silicone sealant to mating face of gear case.
119. Position gear case over differential housing keeping gear case square to housing.
120. Lower gear case into position and at the same time, expand output shaft bearing circlip using tool 18G1392.
121. Push gear case fully down on to differential housing.
122. Ensure circlip is fully seated in groove in output shaft bearing, raise output shaft and a click will be heard as circlip enters groove.
123. Fit and progressively tighten gear case bolts to 45 Nm.
124. Fit reverse idler shaft bolt and tighten to 67 Nm. Use a new washer.
125. Apply thread sealant to access plug, fit and tighten plug using tool 18G1472.
126. Fit reverse light switch and new washer; tighten to 25 Nm.



SHAFT WITH BOTH JOINTS

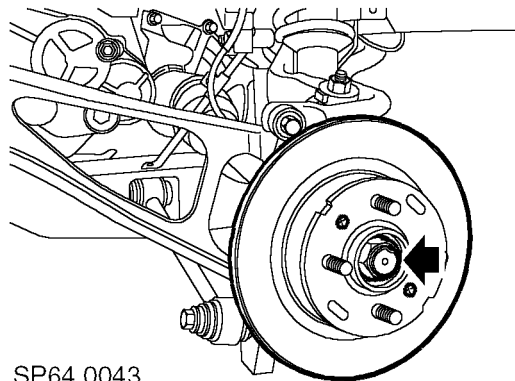
🔑 47.10.01

Remove

1. Raise rear of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

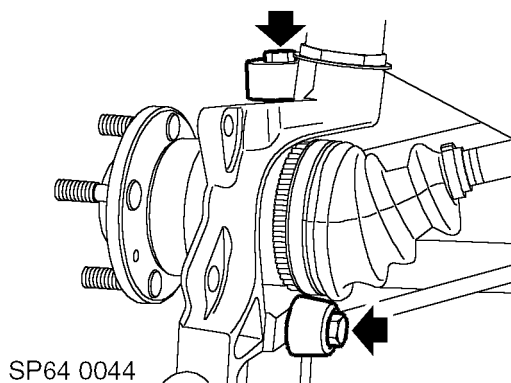
2. Remove road wheel.



SP64 0043

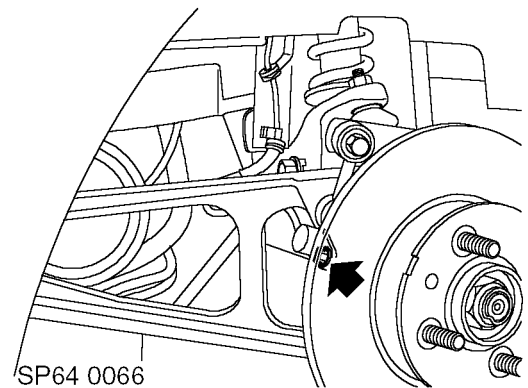
3. Knock back drive shaft nut stake.
4. With assistance, depress brake pedal, remove and discard drive shaft nut.
5. Remove brake disc.

[REAR BRAKE DISC](#), page 70-8.



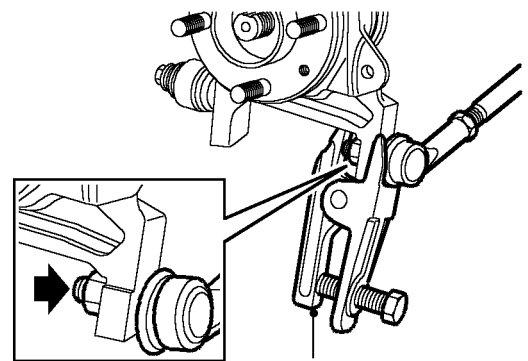
SP64 0044

6. Remove 2 bolts securing trailing arm to rear hub.



SP64 0066

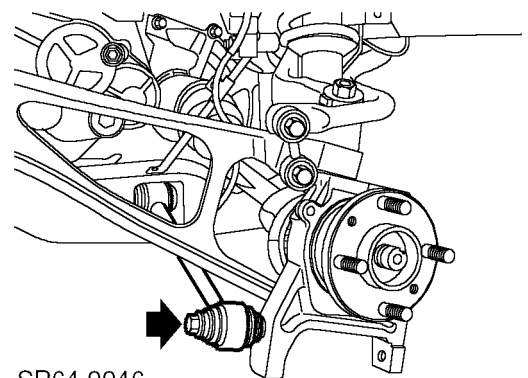
7. Remove bolt securing ABS sensor to hub, release sensor and position aside.



SP64 0045

18G-1584

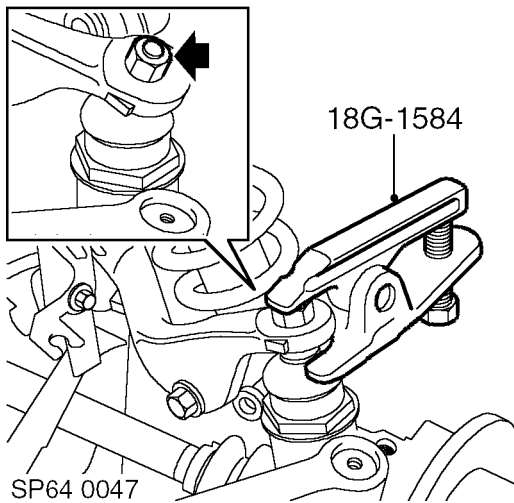
8. Remove nut securing track control arm to rear hub.
9. Using tool 18G-1584, release track control arm ball joint from rear hub.



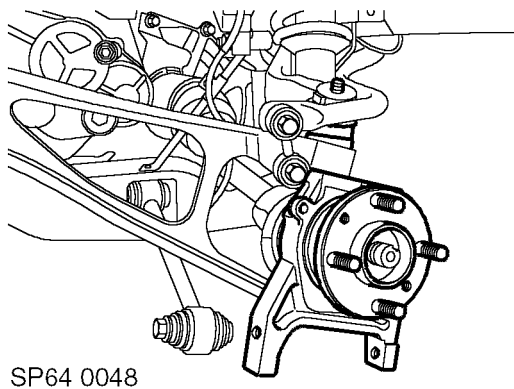
SP64 0046

10. Remove bolt securing lower link to rear hub.

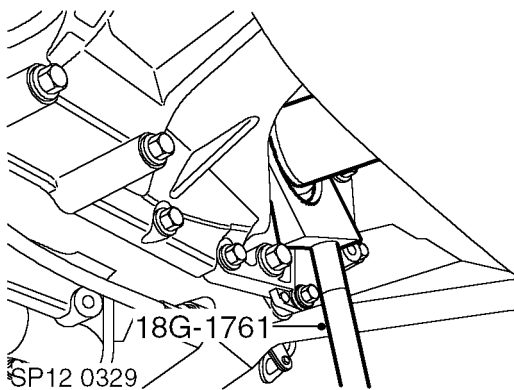
DRIVE SHAFTS



11. Remove lock nut from upper arm ball joint and discard lock nut.
12. Fit slave nut to ball joint threads, position 18G-1584 and release ball joint taper from upper suspension arm. Remove 18G-1584 and slave nut.



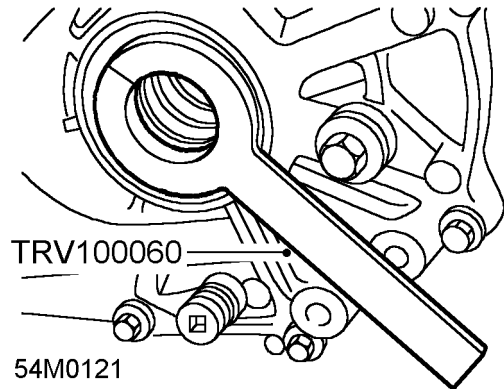
13. Remove rear hub assembly from drive shaft.




14. Using 18G 1761, release drive shaft inboard joint from differential and remove drive shaft assembly.
15. Remove and discard circlip from drive shaft.

Refit

1. Clean drive shaft ends and locations in front hub and differential.
2. Fit new circlip to groove on drive shaft inner joint.



3. Fully insert oil seal protector tool TRV 100060, into differential oil seal so that oil seal lip is protected and that the split end of tool is butted correctly.
4. Keeping the drive shaft horizontal, insert drive shaft through seal protector until drive shaft engages with the differential splines.
5. Pull drive shaft outwards to ensure full engagement.
6. Clean drive shaft end and hub mating faces.
7. Fit hub to drive shaft.
8. Clean upper arm ball joint and mating face.
9. Engage ball joint pin to upper arm.
10. Fit new lock nut and tighten to 54 Nm.
11. Align lower link to rear hub, fit bolt but do not tighten at this stage.
12. Clean track control arm ball joint and mating face.
13. Engage track control arm ball joint to hub, fit nut and tighten to 38 Nm.
14. Clean and thoroughly dry bolts securing trailing arm to rear hub.
15. Apply Loctite 242 to the first 3 threads of bolts securing trailing arm to rear hub.
16. Fit bolts securing trailing arm to rear hub, do not tighten at this stage.
17. Position ABS sensor lead to hub, fit new bolt and tighten to 10 Nm.
18. Fit rear brake disc.
 -  [REAR BRAKE DISC, page 70-8.](#)
19. With assistance tighten new drive shaft nut to 210 Nm.
20. Stake drive shaft nut to shaft.
21. With the weight of the vehicle on the rear suspension, tighten bolt securing lower link to rear hub to 100 Nm.
22. Tighten trailing arm to hub bolts to 60 Nm.
23. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
24. Remove stands and lower vehicle.

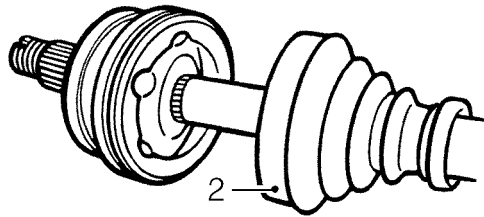


DRIVE SHAFT OUTER GAITER

🔑 47.10.03

Remove

1. Remove drive shaft outer joint.
[DRIVE SHAFT OUTER JOINT, page 47-3.](#)



47M0159

2. Slide gaiter from shaft.
3. Inspect gaiter for signs of damage and renew if necessary.

Refit

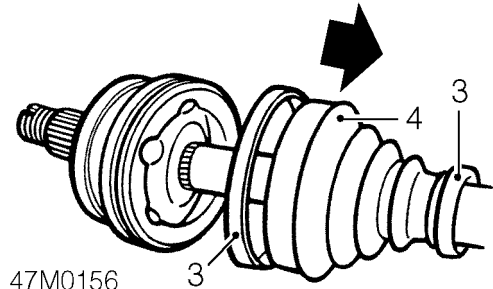
1. Fit gaiter to shaft.
2. Fit drive shaft outer joint.
[DRIVE SHAFT OUTER JOINT, page 47-3.](#)

DRIVE SHAFT OUTER JOINT

🔑 47.10.04

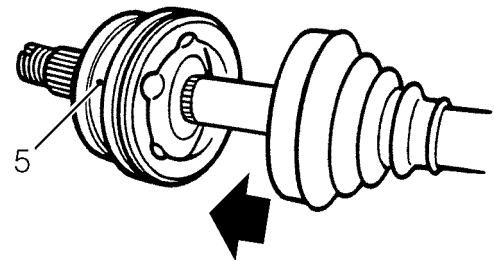
Remove

1. Remove drive shaft.
[SHAFT WITH BOTH JOINTS, page 47-1.](#)
2. Place drive shaft in a vice.



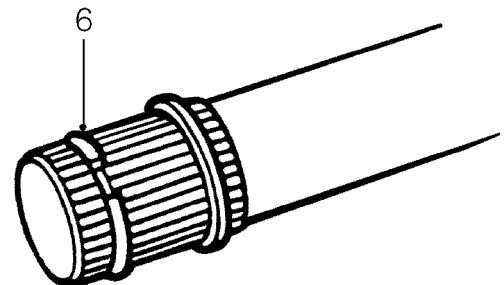
47M0156

3. Release both gaiter clips and discard.
4. Slide gaiter along shaft to gain access to outer joint.



47M0157

5. Bend the joint, and using a suitable drift against the inner part of the joint, remove from shaft.




47M0158


6. Remove circlip from shaft and discard.

DRIVE SHAFTS


Refit

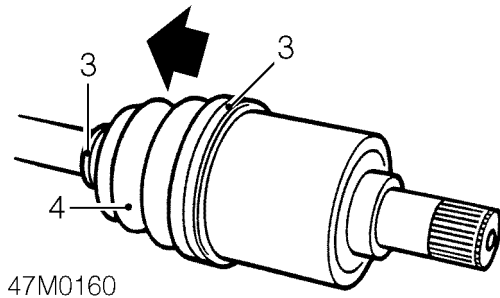
1. Fit new circlip to shaft.
2. Position outer joint to shaft, use a screwdriver to press circlip into its groove and push joint fully onto shaft.
3. Smear grease around joint.
4. Position gaiter to joint and use a band-it thriftool to secure the 2 new clips.
5. Fit drive shaft.
 [SHAFT WITH BOTH JOINTS, page 47-1.](#)

DRIVE SHAFT INNER GAITER

 **47.10.16**


Remove

1. Remove drive shaft outer joint.
 [DRIVE SHAFT OUTER JOINT, page 47-3.](#)
2. Slide outer gaiter off shaft.



3. Release both inner gaiter clips and discard.
4. Slide inner gaiter off shaft.
5. Inspect gaiter for signs of damage and renew if necessary.
6. Clean shaft and joint.

Refit

1. Smear grease around joint.
2. Position gaiter to inner joint and use a band-it thriftool to secure 2 new clips.
3. Fit outer gaiter to shaft.
4. Fit outer joint.
 [DRIVE SHAFT OUTER JOINT, page 47-3.](#)



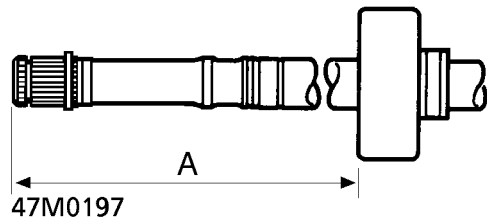
DYNAMIC DAMPER - DRIVE SHAFT - RH

🔑 47.10.33

Remove

1. Remove drive shaft outer gaiter.
👉 [DRIVE SHAFT OUTER GAITER, page 47-3.](#)
2. Clean shaft with emery cloth to remove rust.
3. Lubricate shaft with liquid soap to aid damper removal.
4. Slide damper from shaft.

Refit



1. Measure along shaft for fitted position of damper.
2. Mark shaft for fitting position.
Dimension 'A' = 398.5 mm.± 3 mm.
3. Lubricate shaft for fitting of damper.
4. Position damper to mark.
5. Clean lubricant from shaft.
6. Fit drive shaft outer gaiter.
👉 [DRIVE SHAFT OUTER GAITER, page 47-3.](#)

OIL SEAL - DIFFERENTIAL HOUSING - LH

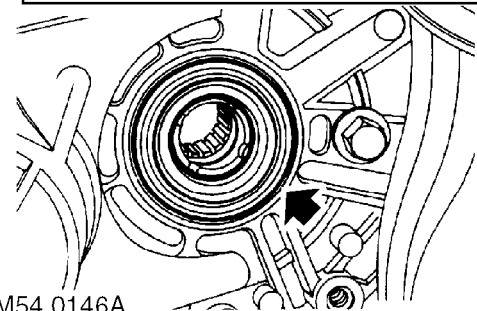
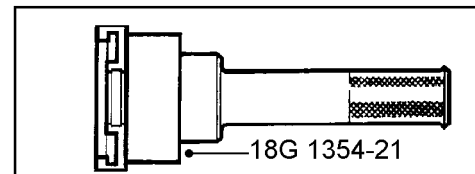
🔑 54.10.18

Remove

1. Remove LH drive shaft.
👉 [SHAFT WITH BOTH JOINTS, page 47-1.](#)
2. Carefully remove oil seal from differential housing, discard oil seal.

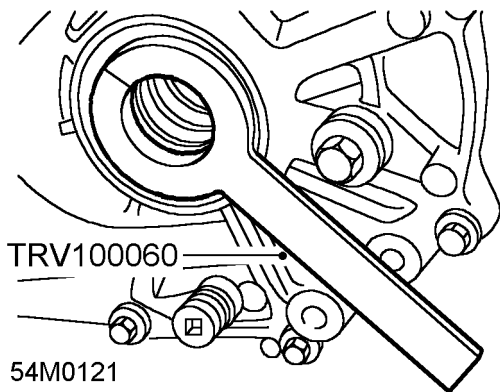
Refit


1. Thoroughly clean oil seal recess in differential housing, splines and oil seal running surface on drive shaft.



2. Locate new oil seal on 18G-1354/21 with sealing lip facing towards differential housing.
3. Carefully drift oil seal into differential housing until it is fully seated in recess.
4. Remove 18G-1354/21.

DRIVE SHAFTS




5. Fully insert oil seal protector tool TRV 100060 into differential oil seal to protect oil seal lip. Ensure that the split end of tool is butted correctly.
6. Fit LH drive shaft.
 [SHAFT WITH BOTH JOINTS, page 47-1.](#)
7. Check, and if necessary, top-up gearbox oil.

OIL SEAL - DIFFERENTIAL HOUSING - RH

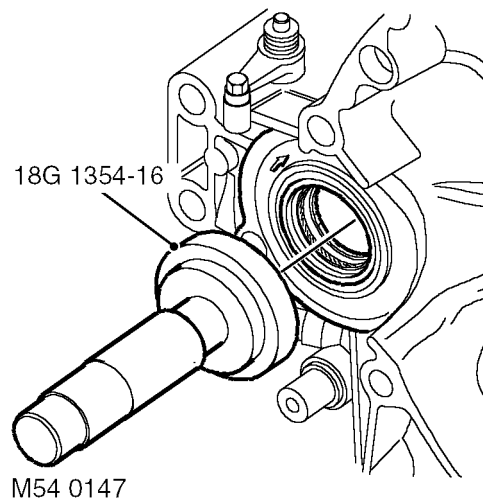
 54.10.21


Remove

1. Remove RH drive shaft.
 [SHAFT WITH BOTH JOINTS, page 47-1.](#)
2. Carefully remove oil seal from differential housing, discard oil seal.

Refit

1. Thoroughly clean oil seal recess in differential housing, splines and oil seal running surface on drive shaft.



2. Fit 18G-1354/16 onto 18G-1354.
3. Position new oil seal onto 18G-1354/16 with the sealing lip facing towards the differential.
4. Carefully drift oil seal into differential housing until it is fully seated in recess.
5. Remove 18G-1354/16 and 18G-1354.
6. Fully insert oil seal protector tool TRV100060 into differential oil seal to protect oil seal lip. Ensure that the split end of tool is butted correctly.
7. Fit RH drive shaft.
 [SHAFT WITH BOTH JOINTS, page 47-1.](#)
8. Check, and if necessary, top-up gearbox oil.



FRONT WHEEL ALIGNMENT

🔑 57.65.01

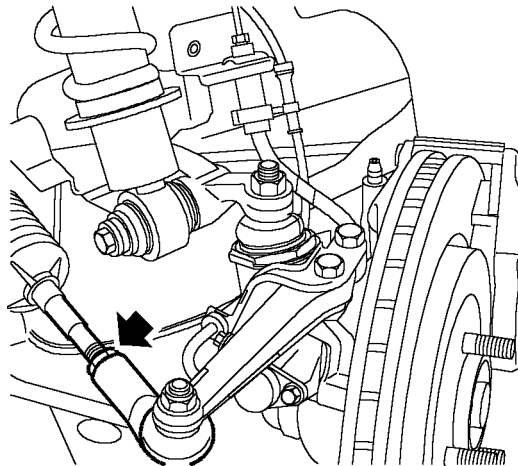
Check

1. Ensure tyre pressures are correct.
2. Ensure that equipment is properly calibrated.
NOTE: Only use equipment recommended in the STEP (Service Tools and Equipment Programme) Manual.
3. Check front wheel alignment is within tolerance.

DATA

Front wheel alignment - total toe = $-0^{\circ} 05' \pm 0^{\circ} 5'$

Adjust




SP57 0009

1. Mark track-rods for reference.
2. Loosen track-rod lock nut.
3. Release clip securing gaiter.
4. Adjust track-rod to obtain correct alignment.
CAUTION: Both track-rods must be rotated an equal amount.
5. Tighten track-rod lock nut to 50 Nm and secure gaiter clip.

REAR WHEEL ALIGNMENT

🔑 57.65.06

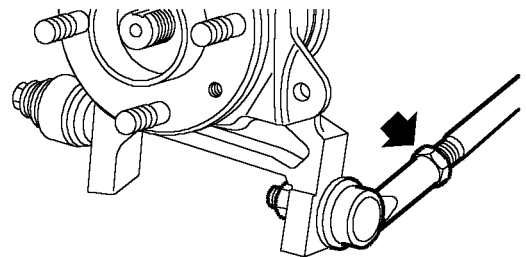
Check

1. Ensure tyre pressures are correct.
2. Ensure that equipment is properly calibrated.
NOTE: When adjusting rear wheel alignment 4 turntables must be used, one for each wheel. Only use equipment recommended in the STEP (Service Tools and Equipment Programme) Manual.
3. Ensure front wheel alignment is correct.
 [FRONT WHEEL ALIGNMENT, page 57-1.](#)
4. Check rear wheel alignment is within tolerance.

DATA

Rear wheel alignment - total toe = $0^{\circ} 30' \pm 0^{\circ} 5'$

Adjust



SP57 0008

1. Loosen 2 lock nuts securing track control arm adjuster.
2. Turn adjuster to obtain correct alignment.
3. Tighten lock nuts.
4. Settle suspension.
5. Re-check alignment, when correct tighten lock nuts to 50 Nm.
6. Repeat check and adjust operation on other side of vehicle.

CAUTION: After adjusting the rear wheel alignment, ensure that the track control arm has rotational movement. This can be checked by grasping the track control arm and rotating it backwards and forwards on the ball joints.

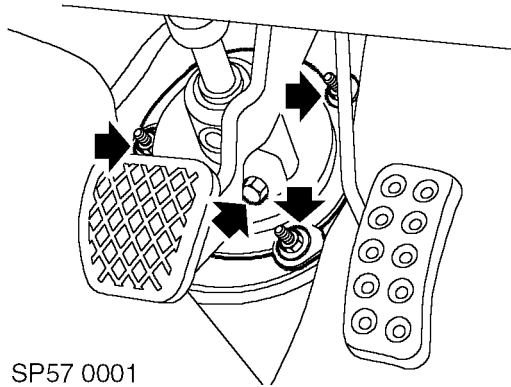
STEERING



RACK & PINION ASSEMBLY

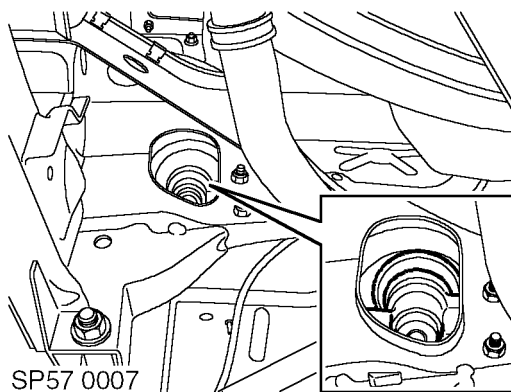
🔑 57.25.01

Remove



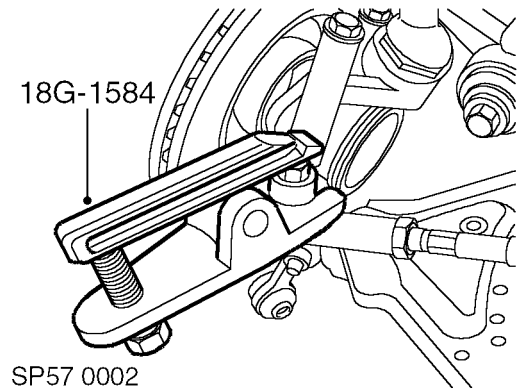
SP57 0001

1. Remove bolt securing steering column universal joint to rack pinion.
2. Release steering column universal joint from rack pinion.
3. Remove 3 nuts securing steering rack pinion cover to body.
4. Raise front of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
5. Remove road wheel(s).



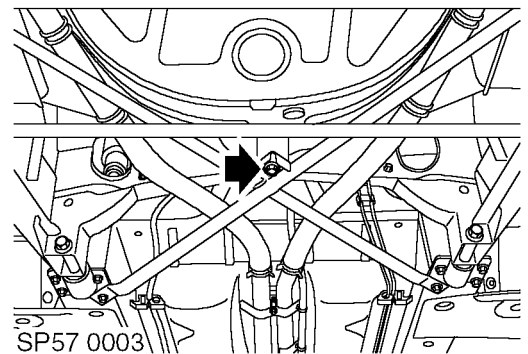
SP57 0007

6. Release pinion cover from steering rack pinion housing and retaining studs.



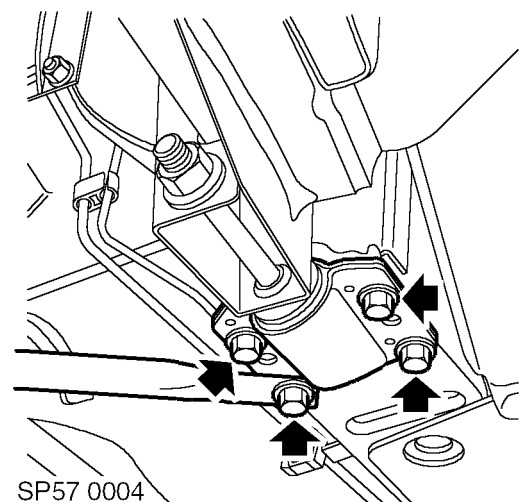
SP57 0002

7. Remove nuts securing RH and LH track rod end ball joints.
8. Using 18G 1584, break taper joints and release ball joints.



SP57 0003

9. Remove bolt securing cross brace to centre mounting.
10. Support rear of front subframe on a jack.

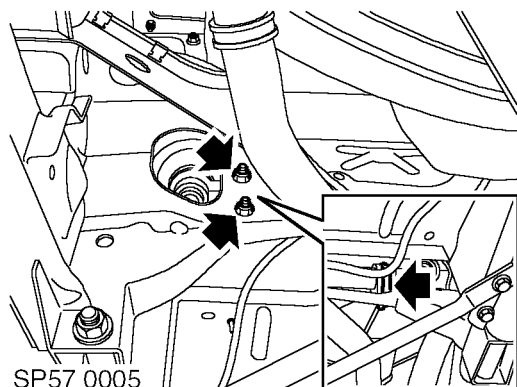


SP57 0004

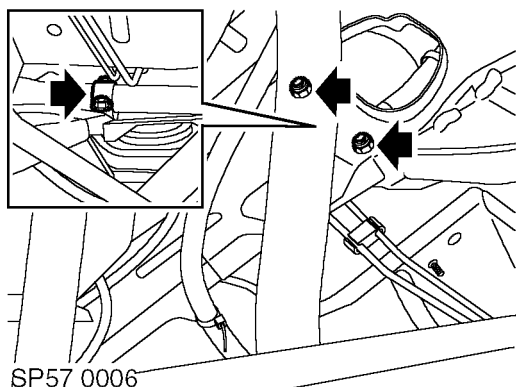
11. Remove 8 bolts securing cross brace and front subframe rear mountings to body.

STEERING

12. Lower subframe on jack sufficiently to remove steering rack.



13. Remove nuts securing steering rack 'U' bolt to subframe and remove 'U' bolt.



14. Remove bolts securing steering rack clamp to subframe and remove clamp.
15. Withdraw steering rack out through drivers side wheel arch.

Refit

1. Clean steering rack and subframe mating faces, 'U' bolt and clamp.
2. Position steering rack to subframe.
3. Fit 'U' bolt securing steering rack to subframe, fit nuts but do not tighten at this stage.
4. Fit steering rack clamp, fit nuts and tighten to 22 Nm.
5. Tighten 'U' bolt nuts to 22 Nm, ensure that thread protrusion behind each nut is equal.
6. Raise subframe on jack.
7. Align subframe to body mountings, fit bolts securing rear mountings and cross brace, and tighten to 45 Nm.
8. Fit and tighten bolt securing cross brace to centre mounting to 45 Nm.
9. Clean steering rack ball joint tapers and mating faces on hubs.

10. Position LH and RH track rod ends, fit and tighten nuts to 30 Nm.
11. Locate pinion cover on studs and secure to steering rack pinion housing, fit and tighten nuts to 8 Nm.
12. Align and connect steering column intermediate shaft joint to rack pinion.
13. Fit bolt and tighten to 22 Nm.
14. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
15. Remove stand(s) and lower vehicle.
16. Check front wheel alignment.

 [FRONT WHEEL ALIGNMENT, page 57-I.](#)



STEERING RACK GAITER

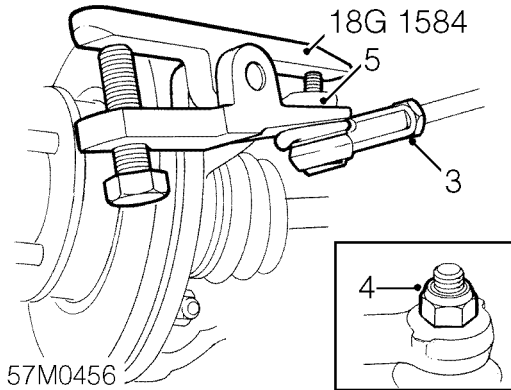
🔑 57.25.03

Remove

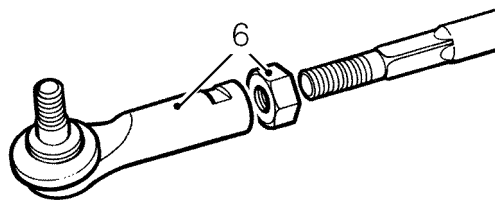
1. Raise front of vehicle.

WARNING: Support on safety stands.

2. Remove road wheel(s).

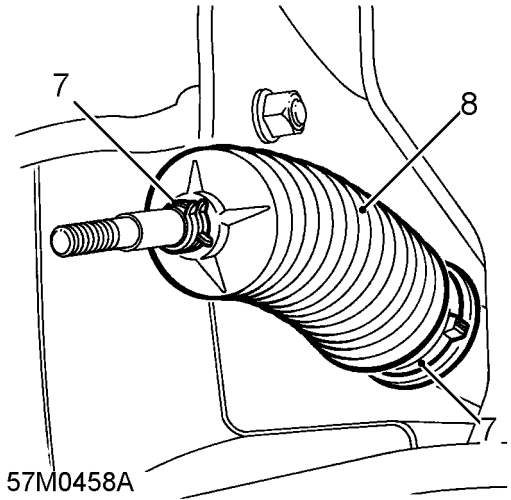


3. Loosen track-rod end lock nut.
4. Remove nut securing track-rod end to steering arm.
5. Using tool 18G 1584, break track-rod end taper joint.



57M0457

6. Noting the number of complete turns remove track-rod end, and lock nut.



7. Remove 2 gaiter clips.
8. Remove gaiter from rack.

Refit

1. Apply grease to gaiter:
👉 **LUBRICATION, page 09-2.**
2. Position inner gaiter clip to gaiter.
3. Fit gaiter and secure with clips.
4. Fit lock nut and track-rod end to rack.
NOTE: Rotate the track-rod end the same amount of turns noted on the removal.
5. Clean taper and position track-rod end to steering arm.
6. Fit nut and tighten to 30 Nm.
7. Tighten track-rod end lock nut to 50 Nm.
8. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
9. Remove stand(s) and lower vehicle.
10. Check and adjust wheel alignment.
👉 **FRONT WHEEL ALIGNMENT, page 57-1.**

STEERING

STEERING COLUMN

🔑 57.40.01

WARNING: See **RESTRAINT SYSTEMS, Precautions.**

Remove

1. Make the SRS system safe

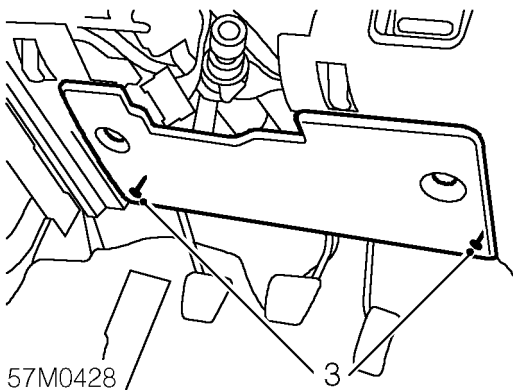
👉 **SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.**

CAUTION: The steering column upper mountings have breakout capsules which are critical to crash performance. Do not clamp the capsules in a vice or otherwise mishandle them.

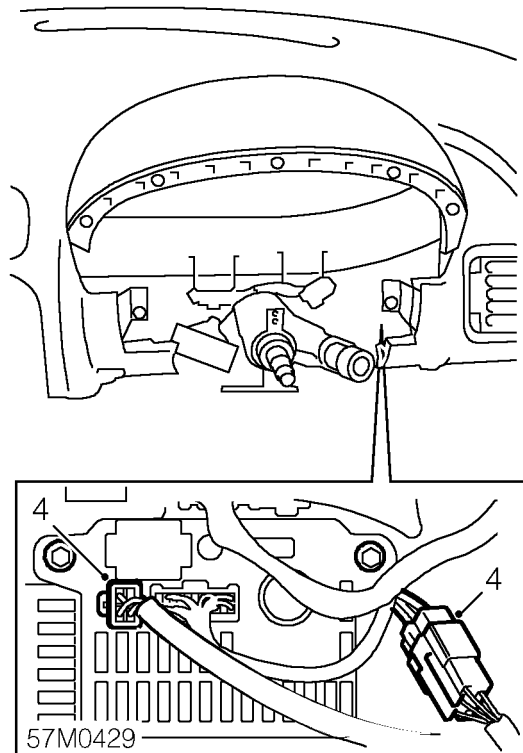
WARNING: If the breakout capsules on the upper mountings are damaged the steering column must be replaced.

2. Remove steering column switch pack.

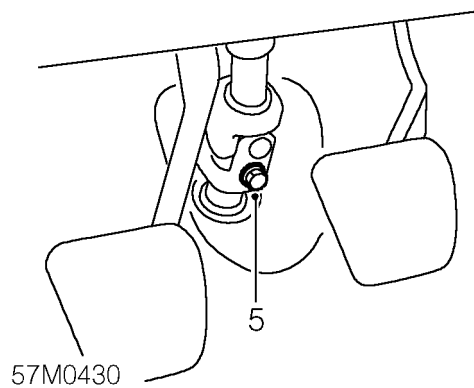
👉 **STEERING COLUMN SWITCH PACK, page 86-25.**



3. Loosen 2 screws securing fuse box cover to fascia and remove fuse box cover.

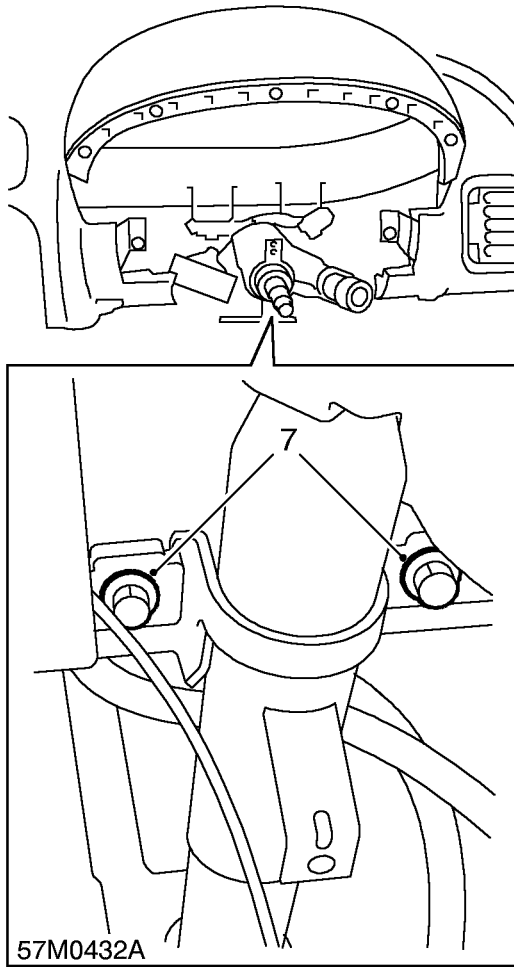


4. Disconnect 2 ignition switch multiplugs from fusebox and harness.

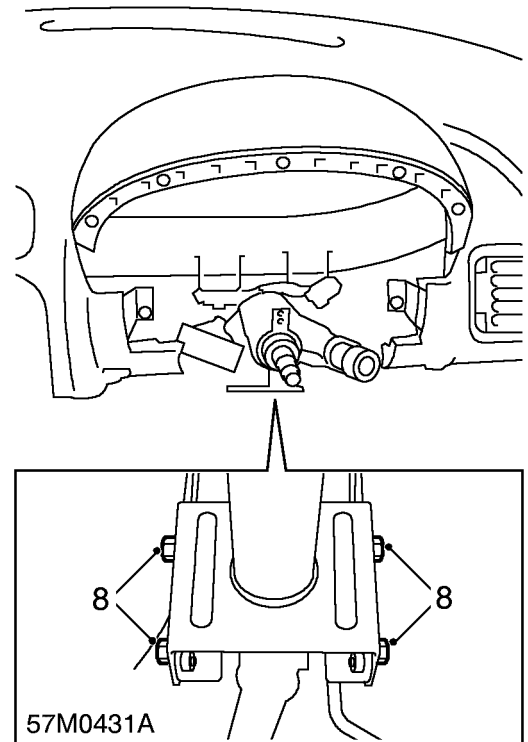


5. Remove bolt securing intermediate shaft to steering rack pinion.
6. Remove 2 nuts securing passenger fusebox to body and position fusebox aside.

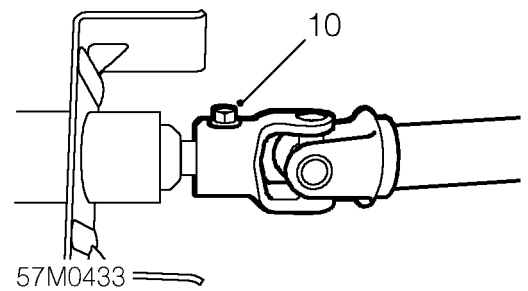
CAUTION: The steering column, upper mounting bolts must be removed before the lower mounting bolts. This is to prevent the weight of the steering column damaging the upper mounting breakout capsules.



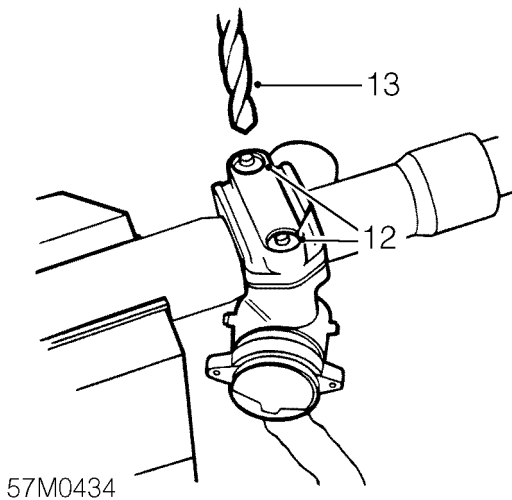
7. Remove 2 bolts securing upper steering column to fascia rail.



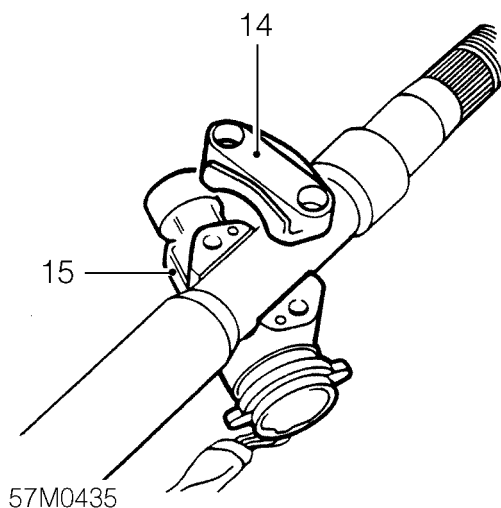
8. Remove 4 bolts securing lower steering column to bracket.
9. Release column assembly and remove from steering rack pinion, remove steering column from vehicle.



10. Remove clamping bolt securing steering column to intermediate shaft. Remove intermediate shaft.
11. Position steering column assembly in vice.



12. Mark ignition lock shear bolt heads with centre punch.
13. Drill out shear bolt heads.




14. Remove lock 'saddle' from column.
15. Remove lock assembly from column.
16. Remove shear bolts from lock assembly.

Refit

1. Remove key from ignition barrel to ensure steering lock pin is protruding.
2. Fit ignition switch to column, locating steering lock pin in groove on inner column.
3. Fit lock saddle.
4. Fit and nip up shear bolts.
5. Test operation of lock and switch prior to tightening shear bolts.
6. Tighten both shear bolts progressively to ensure lock and saddle sit level on column.
7. Tighten bolts until heads shear.
8. Remove column assembly from vice.

9. Fit intermediate shaft to steering column and tighten clamping bolt to 22 Nm.

WARNING: Intermediate shafts are supplied in LH and RH drive variants. The two shafts have different phase angles, and cars fitted with the incorrect shafts will have defective steering. It is essential that all RH drive cars are fitted with shafts with blue marks, and all LH drive cars are fitted with unmarked shafts.

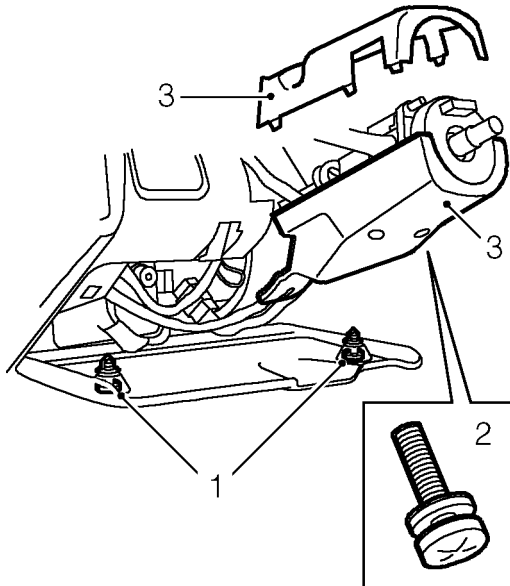
10. Fit column assembly to steering rack pinion.
11. Align column to lower mounting and loosely fit bolts.
12. Align column to upper mounting and loosely fit bolts.
13. Tighten lower mounting bolts to 22 Nm.
14. Tighten upper mounting bolts to 22 Nm.
15. Fit and tighten clamping bolt securing intermediate shaft to steering rack pinion to 22 Nm.
16. Fit fuse box to body and tighten nuts to 10 Nm.
17. Connect ignition switch multiplugs to fusebox and harness.
18. Fit fuse box cover and secure with screws.
19. Fit steering column switch pack.
 -  [STEERING COLUMN SWITCH PACK, page 86-25.](#)
20. Connect battery earth lead.



STEERING COLUMN NACELLE

🔑 57.40.29

Remove



57M0362

1. Release 2 clips securing fascia fusebox cover.
2. Remove 3 screws securing nacelle to column.
3. Release upper nacelle from lower nacelle and remove from column.
4. Remove ignition switch grommet from lower nacelle.

Refit

1. Fit ignition switch grommet to lower nacelle.
2. Fit lower and upper steering column nacelle and clip together.
3. Align nacelle to fixings and tighten screws.
4. Position fascia fusebox cover and secure fasteners.

IGNITION SWITCH AND STEERING LOCK

🔑 57.40.31

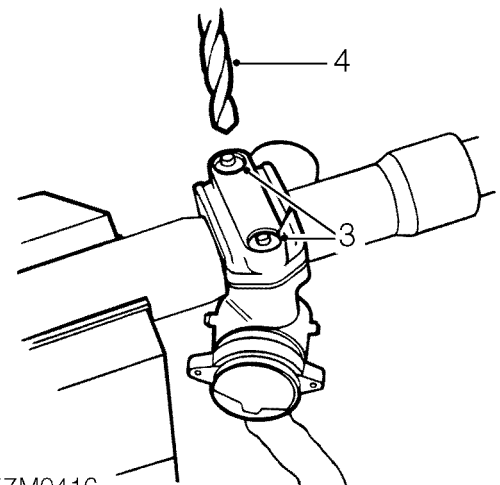
WARNING: See RESTRAINT SYSTEMS, Precautions.

Remove

CAUTION: The steering column upper mountings have breakout capsules which are critical to crash performance. Do not clamp the capsules in a vice or otherwise mishandle them.

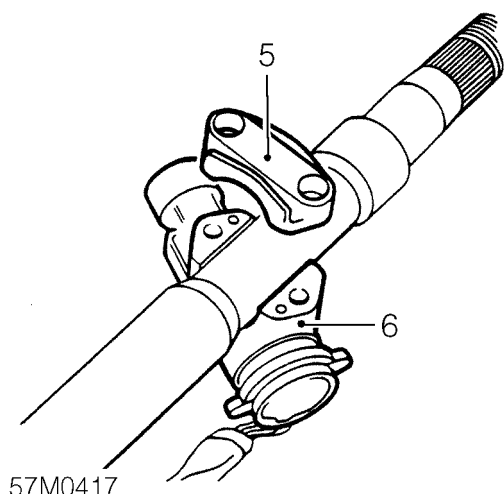
WARNING: If the breakout capsules on the upper mountings are damaged the steering column must be replaced.

1. Remove steering column assembly.
🔗 [STEERING COLUMN](#), page 57-6.
2. Position steering column assembly in vice.



57M0416

3. Mark ignition switch shear bolt heads with centre punch.
4. Drill out shear bolt heads.



5. Remove lock 'saddle' from column.
6. Remove lock assembly from column.

Refit

1. Remove key from ignition barrel to ensure steering lock pin is protruding.
2. Fit ignition switch to column, locating steering lock pin in groove on inner column.
3. Fit lock saddle.
4. Fit and nip up shear bolts.
5. Test operation of lock and switch prior to tightening shear bolts.
6. Tighten both shear bolts progressively to ensure lock and saddle sit level on column.
7. Tighten bolts until heads shear.
8. Remove column assembly from vice.
9. Fit column assembly to vehicle.

[STEERING COLUMN, page 57-6.](#)

STEERING COLUMN

57.43.01

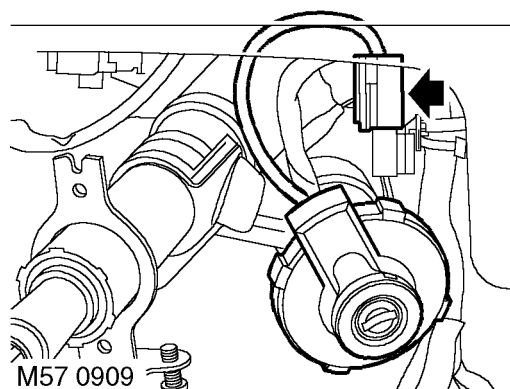
Remove

1. Make the SRS system safe.
[SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.](#)

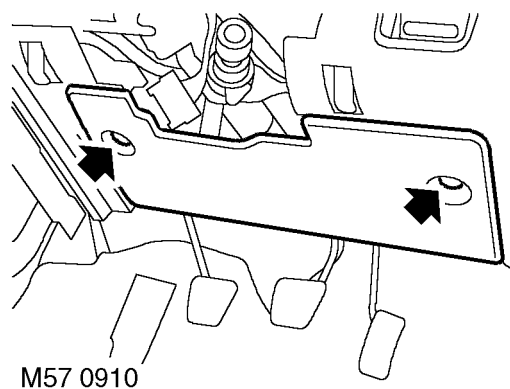
CAUTION: The steering column upper mountings have breakout capsules which are critical to crash performance. Do not clamp the capsules in a vice or otherwise mishandle them.

WARNING: If the breakout capsules on the upper mountings are damaged the steering column must be replaced.

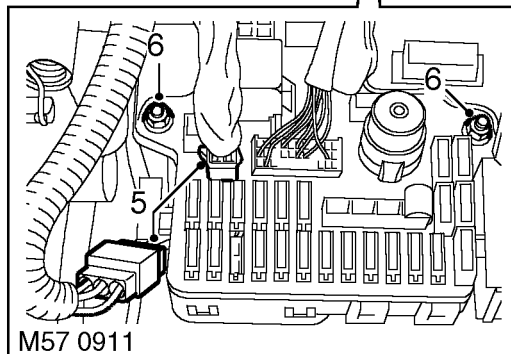
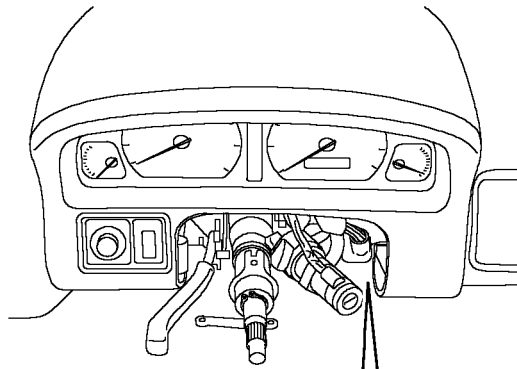
2. Remove steering column switch pack.
[STEERING COLUMN SWITCH PACK, page 86-25.](#)



3. Release transponder coil from ignition switch, disconnect multiplug and remove transponder coil.

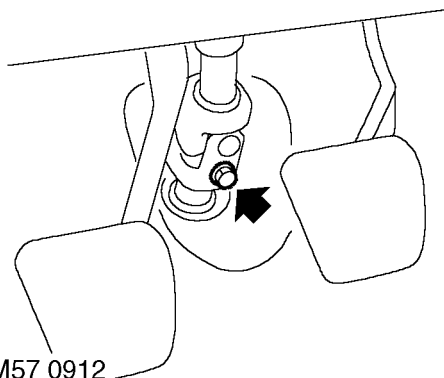


4. Loosen 2 screws and scrivenets securing fuse box cover to fascia and remove fusebox cover.



M57 0911

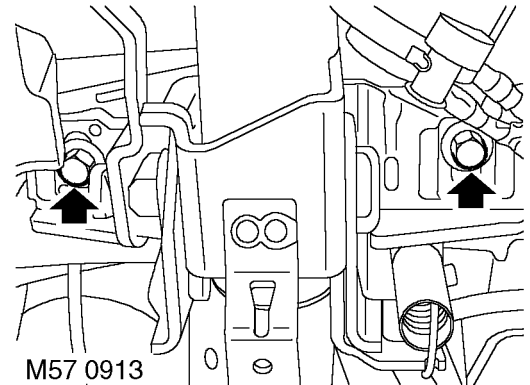
5. Disconnect ignition switch multiplugs from fusebox and main harness.
6. Remove 2 nuts securing passenger compartment fusebox to body and position aside.



M57 0912

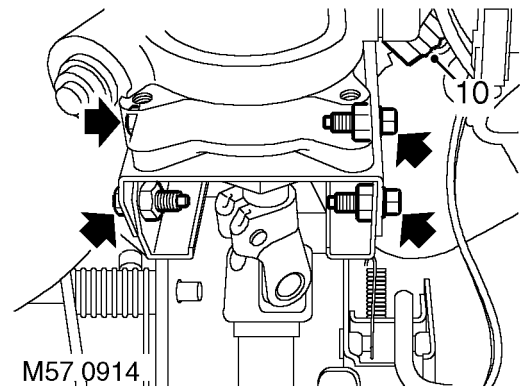
7. Remove bolt securing universal joint to steering rack pinion.

CAUTION: The steering column upper mounting bolts must be removed before the lower mounting bolts. This is to prevent the weight of the steering column damaging the upper mounting breakout capsules.



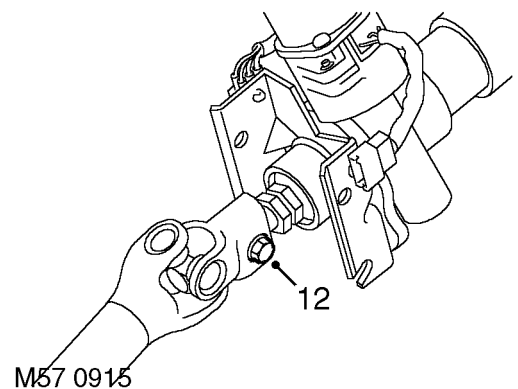
M57 0913

8. Remove 2 bolts securing upper steering column to fascia rail.



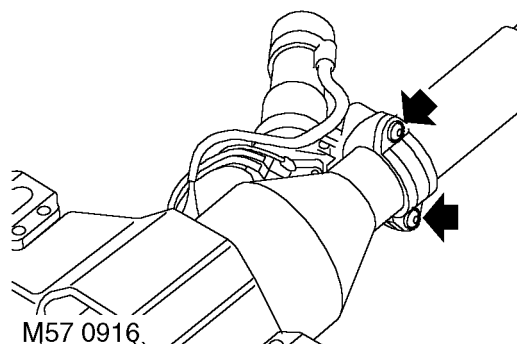
M57,0914

9. Remove 4 bolts securing lower steering column to bracket.
10. Lower steering column and disconnect 2 multiplugs.
11. Release column assembly from steering rack pinion and remove from vehicle.

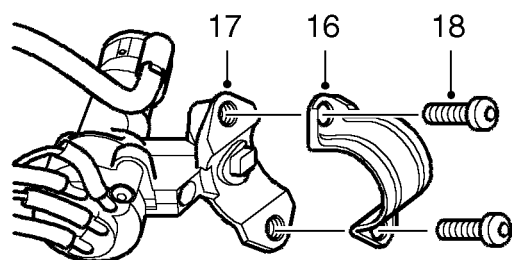


M57 0915

12. Remove clamping bolt securing steering column to universal joint and remove joint.
13. Position steering column assembly in vice.



14. Mark shear bolt heads with centre punch.
15. Drill out shear bolt heads.




16. Remove lock 'saddle' from column.
17. Remove lock assembly from column.
18. Remove shear bolts from lock assembly.
19. Remove column from vice.

Refit

1. Remove key from ignition barrel to ensure steering lock pin is protruding.
2. Fit ignition switch to column, locating steering lock pin in groove on inner column.
3. Fit lock saddle and loosely fit shear bolts.
4. Test operation of lock and switch prior to tightening shear bolts.
5. Tighten both shear bolts progressively to ensure lock and saddle sit level on column.
6. Tighten bolts until heads shear.

7. Fit universal joint to steering column and tighten clamping bolt to 22 Nm.

WARNING: Intermediate shafts are supplied in LH and RH drive variants. The two shafts have different phase angles, and cars fitted with the incorrect shafts will have defective steering. It is essential that all RH drive cars are fitted with shafts with blue marks, and all LH drive cars are fitted with unmarked shafts.

8. Fit column assembly to steering rack pinion.
9. Connect column multiplugs.
10. Align lower column mounting bracket and locate 2 bolts in slots.
11. Fit remaining 2 bolts into column lower mounting bracket and tighten all bolts to 22 Nm.
12. Align column to upper mounting bracket and fit bolts. Tighten bolts to 22 Nm.
13. Fit and tighten clamping bolt securing universal joint to steering rack pinion to 20 Nm.
14. Fit passenger compartment fuse box to body and tighten nuts to 10 Nm.
15. Connect ignition switch multiplugs to passenger compartment fusebox and harness.
16. Fit passenger compartment fuse box cover and secure with screws and scrivenets.
17. Position transponder coil, connect multiplug and secure transponder coil to ignition switch.
18. Fit steering column switch pack.
 -  [STEERING COLUMN SWITCH PACK, page 86-25.](#)
19. Connect battery earth lead.

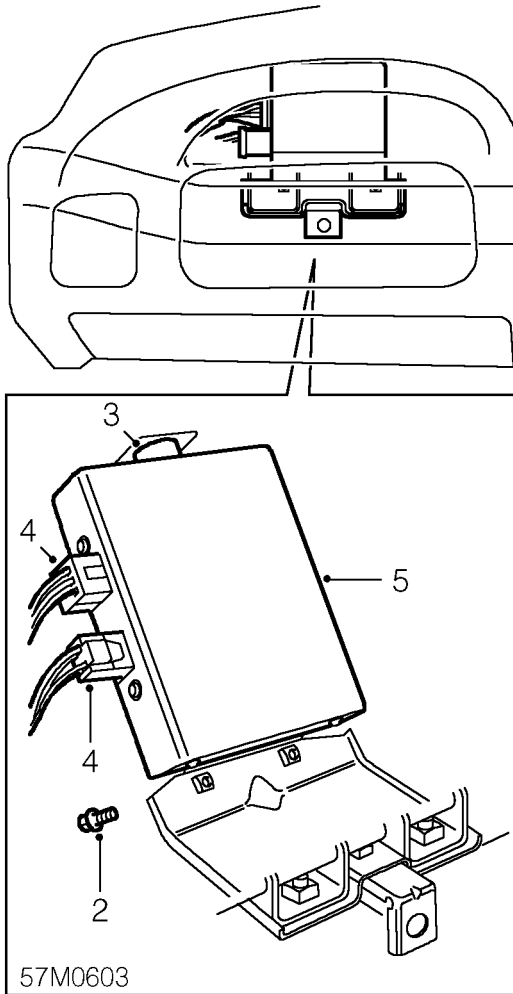


EPAS ECU

🔑 57.43.05

Remove

1. Remove glovebox.
 [GLOVEBOX, page 76-4-10.](#)




2. Remove 2 bolts securing ECU to fascia rail bracket.

WARNING: Do not remove EPAS ECU bracket from fascia rail on vehicles fitted with a passenger airbag.

3. Release ECU from rubber mounting.
4. Disconnect 2 multiplugs from ECU.
5. Remove ECU.

Refit

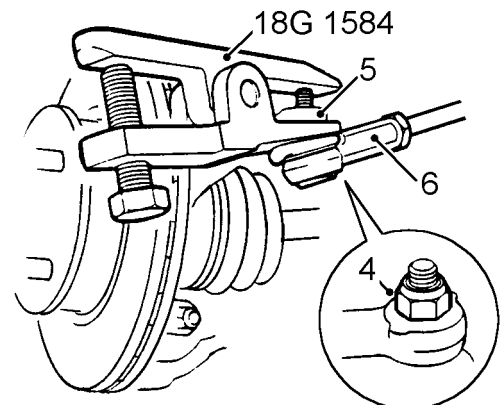
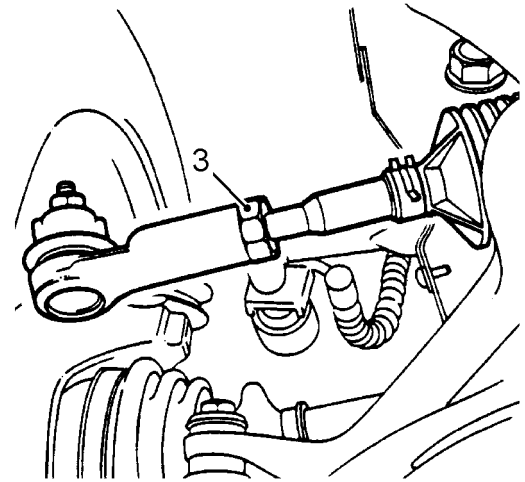
1. Position ECU and connect multiplugs.
2. Fit ECU to mounting and tighten bolts to 10 Nm.
3. Connect multiplugs.
4. Fit glovebox.
 [GLOVEBOX, page 76-4-10.](#)

TRACK-ROD END

🔑 57.55.02

Remove

1. Raise front of vehicle.
WARNING: Support on safety stands.
2. Remove road wheel(s).




57M0462A

3. Loosen track-rod end lock nut.
4. Remove nut securing track-rod end to steering arm.
5. Using tool 18G 1584, break taper joint.
6. Noting the number of complete turns, remove track-rod end.

Refit

1. Fit new track-rod end and position taper to steering arm.
 NOTE: Rotate the track-rod end the same amount of turns noted on the removal.
2. Tighten nut to 30 Nm.

STEERING

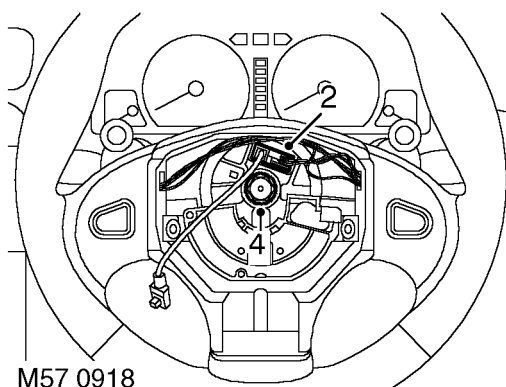
3. Tighten lock nut to 50 Nm.
4. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
5. Remove stand(s) and lower vehicle.
6. Check and adjust front wheel alignment.
 [FRONT WHEEL ALIGNMENT, page 57-I.](#)

STEERING WHEEL

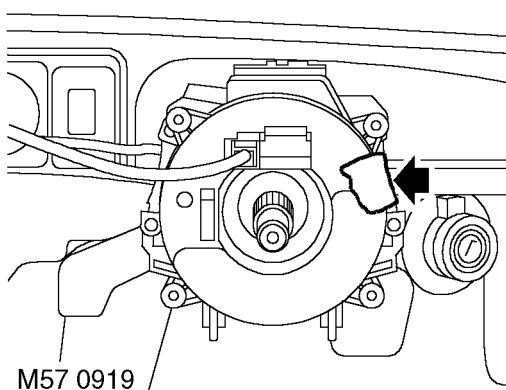
 **57.60.01**

Remove

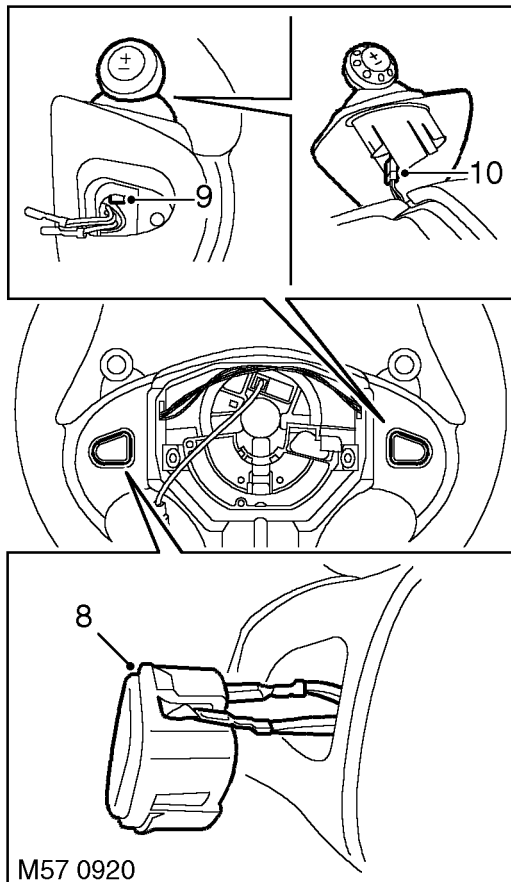
1. Remove driver's airbag.
 [DRIVER AIRBAG MODULE, page 75-I.](#)



2. Disconnect horn/sequential gear change switch multiplug.
3. Centralise steering wheel with road wheels in straight ahead position.
4. Restrain steering wheel and loosen nut securing steering wheel to column.
5. Release steering wheel from column.
6. Remove steering wheel.



7. Attach tape across edge of rotary coupler to retain correct setting and to prevent rotational damage to rotary coupler:



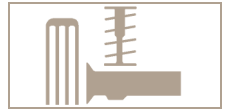
8. Release horn switches, disconnect Lucar connections and remove horn switches.
9. Release clips securing switches from steering wheel.
10. Disconnect gear change switch multiplugs and remove switches from steering wheel.
11. Remove steering wheel harness.

Refit

1. Position harness to steering wheel and locate to switch recesses.
2. Position gear change switches, connect multiplugs and secure switches to steering wheel.
3. Position horn switches, connect Lucar connections and secure horn switches to steering wheel.
4. Remove tape from rotary coupler.
5. Ensure road wheels are in straight ahead position and indicator cancelling cam is aligned horizontally.
6. Fit steering wheel to column.
7. Connect horn switch multiplug.
8. Fit and tighten nut securing steering wheel to column to 63 Nm.
9. Fit driver's airbag.

[DRIVER AIRBAG MODULE, page 75-I.](#)

STEERING

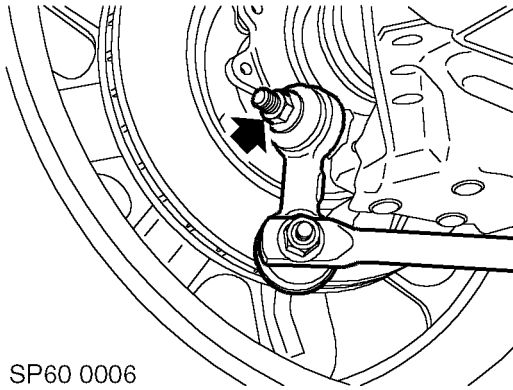


ANTI-ROLL BAR

🔑 60.10.01

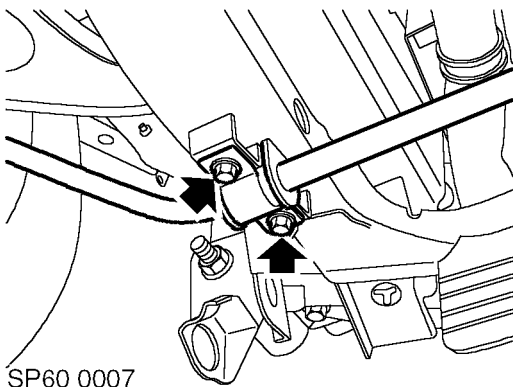
Remove

1. Position vehicle on 4 post ramp.



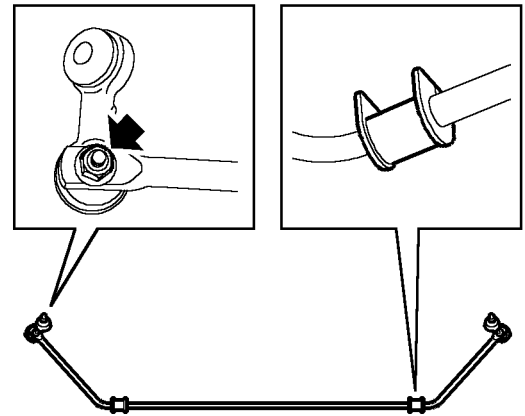
SP60 0006

2. Remove nuts and bolts securing anti-roll bar links to each lower suspension arm.



SP60 0007

3. Remove 2 bolts securing each anti-roll bar mounting rubber clamps to subframe.
4. Remove clamps and anti-roll bar.



SP60 0008

5. Remove 2 mounting rubbers from anti-roll bar.
6. Remove nut and bolt securing each link to anti-roll bar and remove links.
7. Check link bushes for wear.

Refit

1. Clean anti-roll bar and links.
2. Position links to anti-roll bar; fit nuts and bolts but do not tighten at this stage.
3. Fit mounting rubbers to anti-roll bar.
4. Position anti-roll bar; align links to lower suspension arms, fit nuts and bolts but do not tighten at this stage.

CAUTION: The head of the bolt securing the anti-roll bar links to the lower suspension arms must face forward. This is to allow clearance between bolt head and front hub.

5. Position mounting rubbers, align clamps to bolt holes in subframe, fit and tighten bolts to 22 Nm.
6. With the weight of the vehicle on the front suspension, tighten anti-roll bar link nuts and bolts to 35 Nm.
7. Lower vehicle on ramp.

FRONT SUSPENSION

LINK - ANTI-ROLL BAR

🔑 60.10.02

Remove

1. Position vehicle on 4 post ramp.



SP60 0009

2. Remove nut and bolt securing anti-roll bar link to anti-roll bar.
3. Remove nut and bolt securing anti-roll bar link to lower suspension arm and remove anti-roll bar link.

Refit

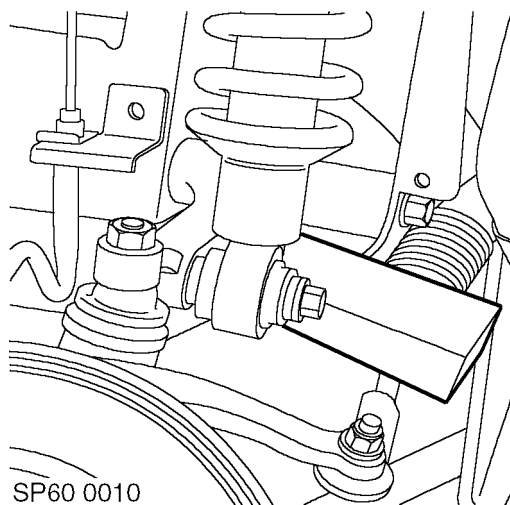
1. Clean anti-roll bar link.
2. Position anti-roll bar link to lower arm, fit nut and bolt but do not tighten at this stage.
CAUTION: The head of the bolt securing the anti-roll bar links to the lower suspension arms must face forward. This is to allow clearance between bolt head and front hub.
3. Align anti-roll bar link to anti-roll bar; fit nut and bolt but do not tighten at this stage.
4. With the weight of the vehicle on the front suspension, tighten anti-roll bar link nuts and bolts to 35 Nm.
5. Lower vehicle on ramp.

BALL JOINT - UPPER

🔑 60.15.02

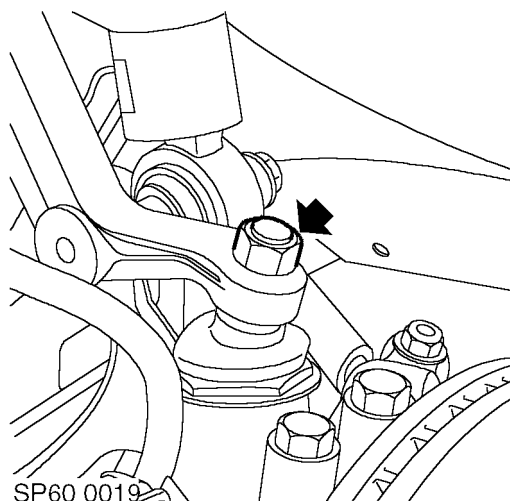
Remove

1. Raise front of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel(s).



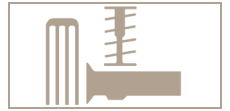
SP60 0010

3. Position jack under lower suspension arm, raise jack sufficiently and fit a suitable block between upper suspension arm and subframe. Lower jack.

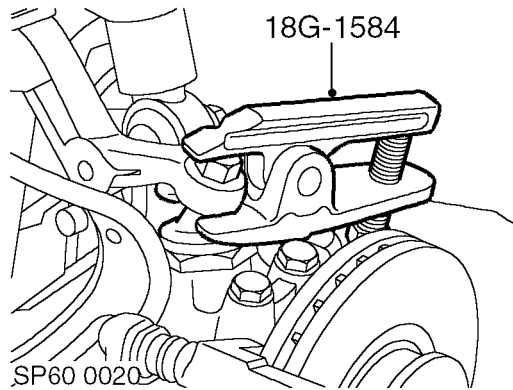


SP60 0019

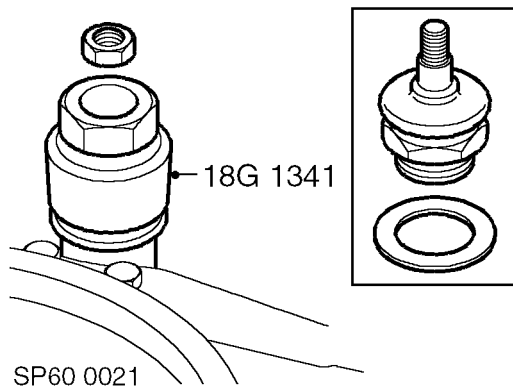
4. Remove and discard lock nut securing ball joint to upper suspension arm.



10. Remove stand(s) and lower vehicle.



5. Fit slave nut to ball joint threads, position 18G-1584 and release ball joint taper from upper suspension arm. Remove 18G-1584 and slave nut.
6. Release ball joint from upper suspension arm.



7. Knock back lock washer securing ball joint to front hub.
8. Using ball joint retaining nut, secure 18G-1341 to ball joint. Attach a suitable socket and socket bar to 18G-1341 and remove ball joint from front hub.
9. Remove and discard lock washer.

Refit

1. Clean ball joint threads and mating threads in front hub. Ensure threads are clean and dry.
2. Apply Loctite 242 to ball joint threads.
3. Fit new lock washer on hub.
4. Fit ball joint to front hub, and using 18G-1341, tighten ball joint to 105 Nm.
5. Knock over lock washer to front hub and ball joint nut.
6. Raise jack and position ball joint to upper suspension arm, fit and tighten new lock nut to 54 Nm.
7. Raise jack and remove support block from upper suspension arm.
8. Lower and remove jack from lower suspension arm.
9. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.

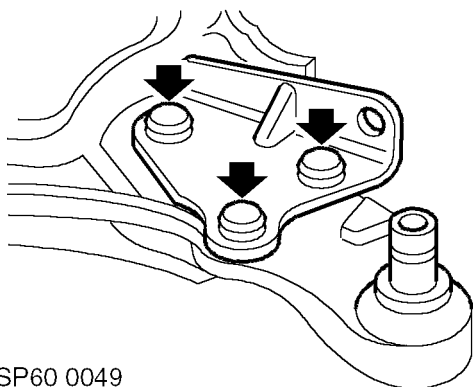
FRONT SUSPENSION

BALL JOINT - LOWER

🔑 60.15.03

Remove

1. Remove front lower arm.
[👉 SUSPENSION ARM - LOWER FRONT, page 60-11.](#)

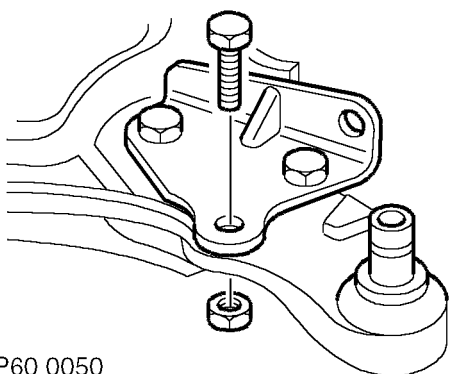


SP60 0049

2. Centre punch centres of rivet heads.
3. Drill pilot hole in rivet heads.
NOTE: Use pedestal drill for accuracy.
4. Enlarge pilot hole to remove rivets.
CAUTION: Do not enlarge holes in lower arm.
5. Press out rivet studs.
6. Remove ball joint assembly.

Refit

1. Clean ball joint and lower arm mating faces.



SP60 0050

2. Fit ball joint to lower arm.
3. Fit 3 nuts and bolts and tighten to 40 Nm.
NOTE: Ensure bolt heads are fitted above the lower arm.

4. Fit front lower arm.
[👉 SUSPENSION ARM - LOWER FRONT, page 60-11.](#)



BEARINGS - HUB

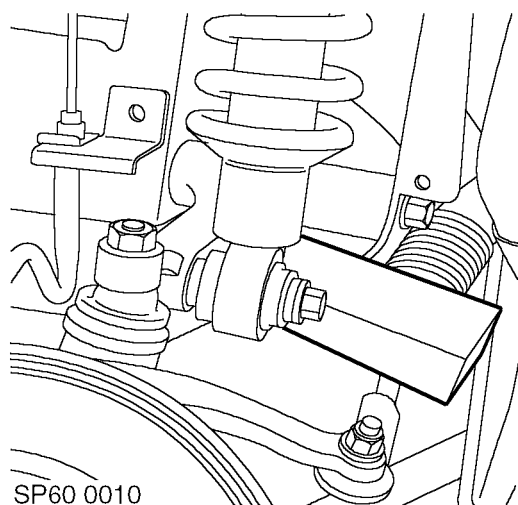
🔑 60.25.14

Remove

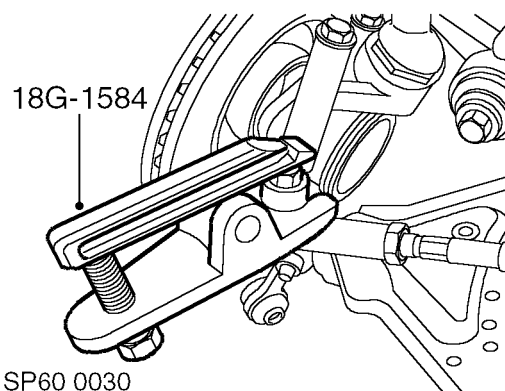
1. Raise front of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel(s).
3. Knock back hub nut stake and remove hub nut.
4. Remove front brake disc.

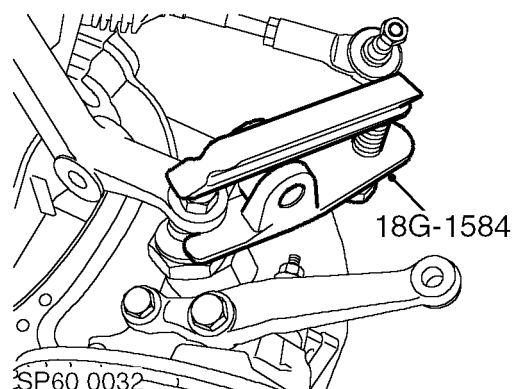
 [FRONT BRAKE DISC, page 70-7.](#)



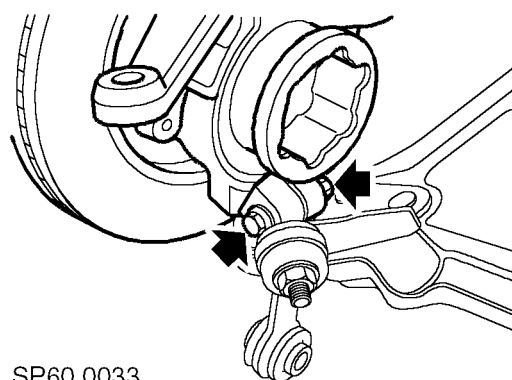
5. Position jack under lower suspension arm, raise jack sufficiently and fit a suitable block between upper suspension arm and subframe. Lower jack.



6. Remove nut securing steering rack ball joint to steering arm.
7. Release ball joint taper from steering arm using 18G-1584.

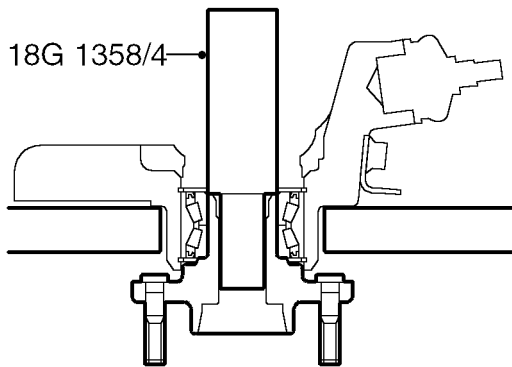


8. Remove and discard lock nut securing ball joint to upper suspension arm.
9. Fit slave nut to ball joint threads, position 18G-1584 and release ball joint taper from upper suspension arm. Remove 18G-1584 and slave nut.



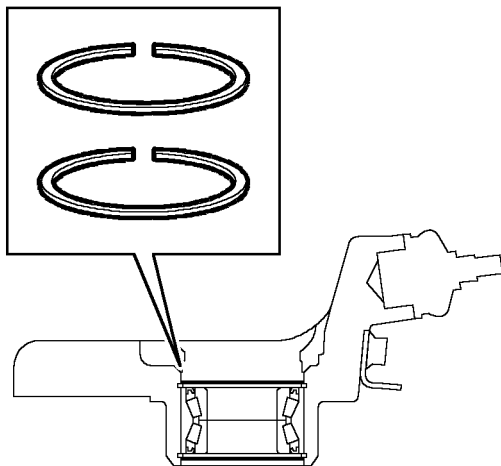
10. Remove nut and bolt securing hub to lower suspension arm ball joint.
11. Release hub from lower ball joint and remove hub assembly.

FRONT SUSPENSION



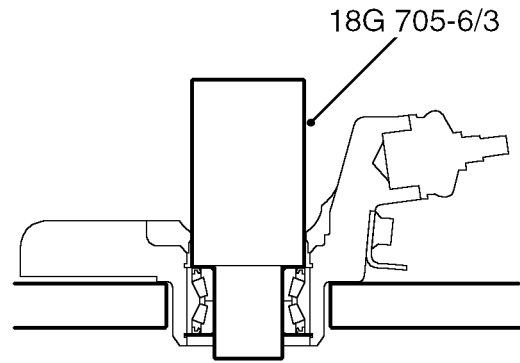
SP60 0051

12. Position hub to press.
13. Press out drive flange using 18G 1358/4.
14. Collect drive flange and remove hub from press.



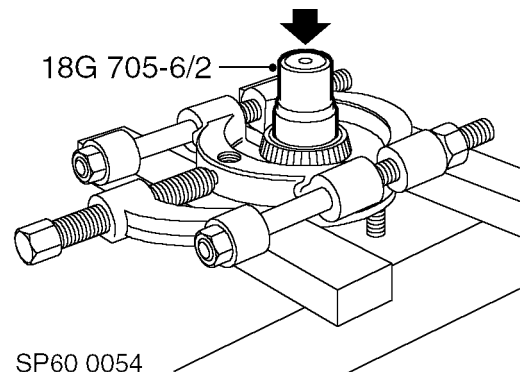
SP60 0052

15. Remove bearing inner and outer circlips.



SP60 0053

16. Position hub to press.
17. Position 18G 705-6/3 to bearing, press out bearing and remove hub from press.

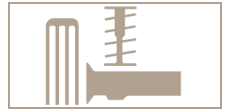



SP60 0054

18. Position drive flange to press, fit universal bearing splitter around bearing as shown.
19. Position thrust button, 18G-705-6/2 to drive flange, press out drive flange from inner bearing track.
20. Collect drive flange and remove bearing inner track.


Refit

1. Clean hub, drive flange and bearing mating faces.
2. Fit new bearing outer circlip to hub.
3. Position hub to press.
4. Position new bearing to hub, press bearing into hub using 18G-705-6/3.
5. Fit new bearing inner circlip to hub.
6. Using 18G-134BD and 18G-705-6/3, press drive flange into hub bearing.
7. Remove hub from press.
8. Clean drive shaft end and hub mating faces.
9. Clean lower ball joint to hub mating faces.
10. Clean ball joint to upper suspension arm mating faces.



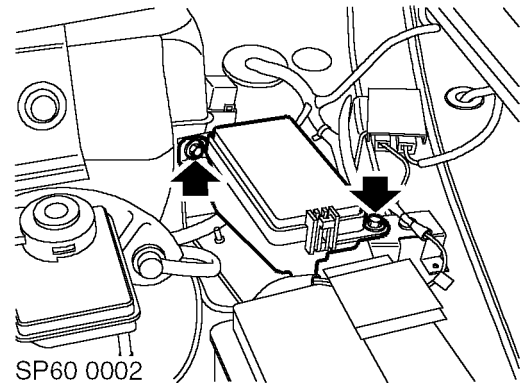
11. Position hub to lower ball joint, fit and tighten nut and bolt to 45 Nm.
12. Position hub assembly to upper suspension arm, fit and tighten new ball joint lock nut to 54 Nm.
13. Raise jack and remove support block from upper suspension arm.
14. Clean steering rack ball joint to steering arm mating faces.
15. Align steering rack ball joint to steering arm, fit and tighten nut to 30 Nm.
16. Fit front brake disc.
 **FRONT BRAKE DISC, page 70-7.**
17. Fit and tighten new hub nut to 210 Nm.
18. Stake hub nut to shaft.
19. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
20. Remove stand(s) and lower vehicle.

DAMPER - LH

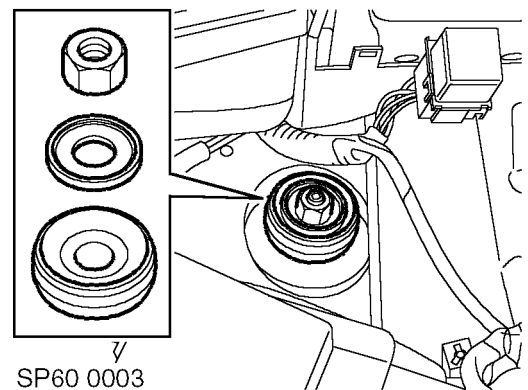
 **60.30.02**

Remove

1. Raise front of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel(s).

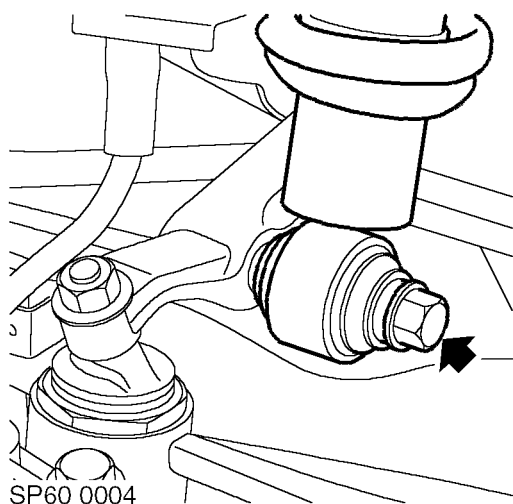


3. Remove 2 bolts securing fuse box in luggage compartment, move fuse box aside.

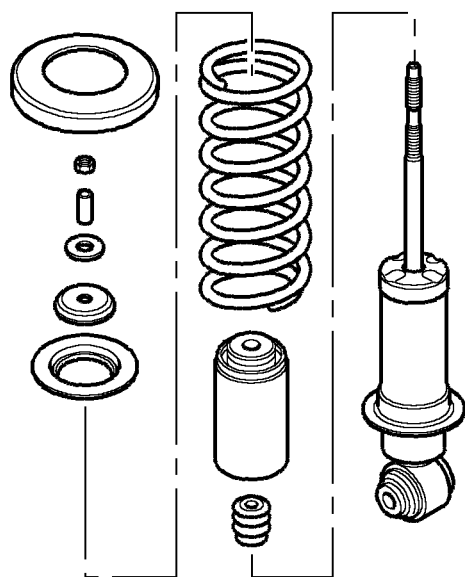


4. Position 5 mm Allen key in top of damper shaft, remove nut securing damper to front wing valance.
5. Remove retaining washer and rubber bush.

FRONT SUSPENSION



6. Remove bolt securing damper to upper suspension arm, remove damper/spring assembly and collect spring isolator.
7. Position damper/spring assembly in vice.

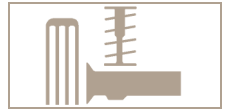


8. Progressively loosen and remove spring retainer nut, remove distance piece, flat washer, steel cup washer and spring retainer. Note fitted position of steel cup washer.
9. Remove spring, dust shield and rebound rubber bush from damper.
10. Remove damper from vice.

Refit

1. Inspect dust shield and rebound rubber bush for deterioration and damage.
2. Clean damper and spring mating faces.

3. Prime new damper by operating it at least 3 full strokes.
4. Position new damper in vice.
5. Position rebound rubber bush on damper shaft.
6. Correctly position spring and dust shield onto damper.
7. Correctly position spring retainer; steel cup washer, flat washer and distance piece. Fit and tighten nut securing spring retainer to damper to 25 Nm.
8. Position isolator on spring retaining plate.
9. Position damper assembly in subframe turret, fit top bush, washer and nut. Do not tighten nut at this stage.
10. Position damper assembly to upper suspension arm, fit and tighten bolt to 100 Nm.
11. Position 5 mm Allen key in top of damper shaft, tighten nut to 45 Nm
12. Position fuse box, fit and tighten bolts to 10 Nm.
13. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
14. Remove stand(s) and lower vehicle.



SUSPENSION ARM ASSEMBLY - UPPER

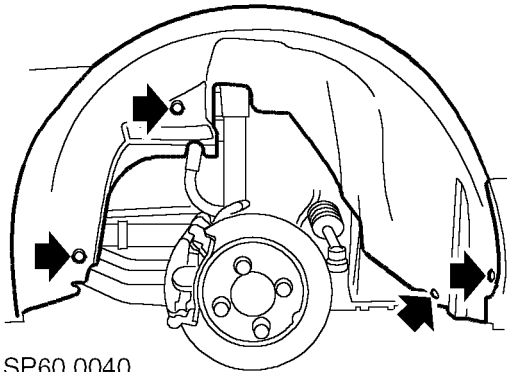
🔑 60.35.01

Remove

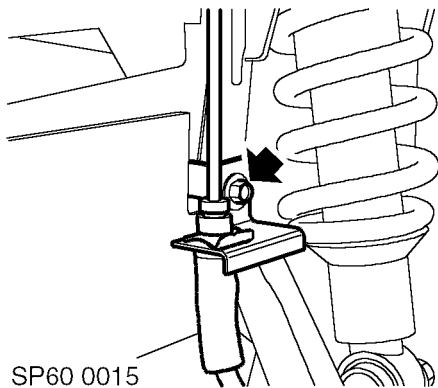
1. Raise front of vehicle and support on stand(s).

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

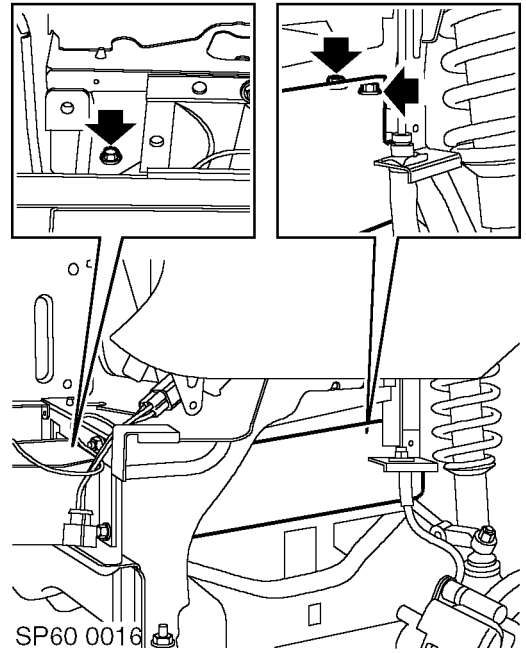
2. Remove road wheel(s).
3. Remove front bumper armature.
👉 [FRONT BUMPER ARMATURE](#), page 76-2-8.



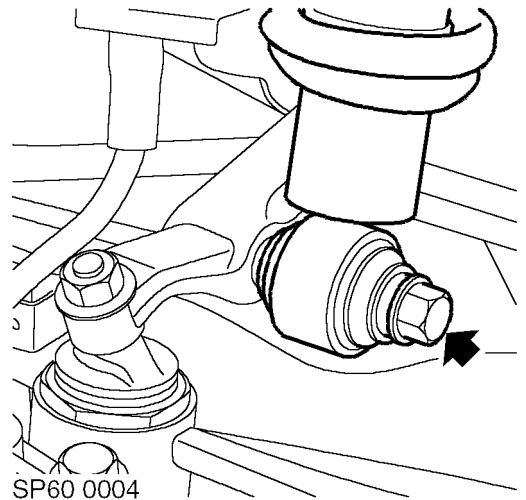
4. Remove screw and 3 scrivenets securing wheel arch liner and remove wheel arch liner.



5. Remove bolt securing brake pipe bracket to subframe turret, move brake pipe aside.

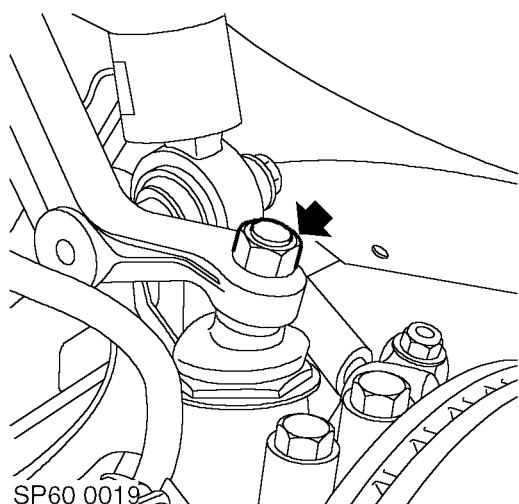


6. Remove 3 bolts securing crash can to subframe and remove crash can.



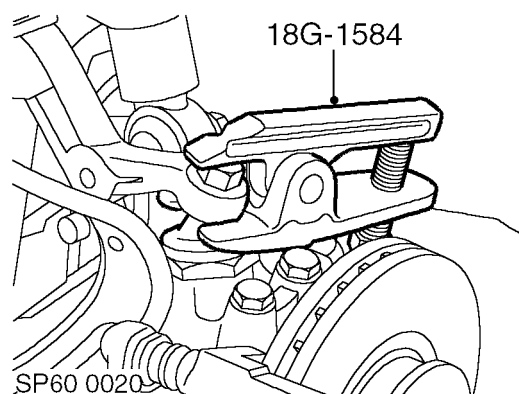
7. Remove bolt securing damper assembly to upper suspension arm, move damper aside.

FRONT SUSPENSION



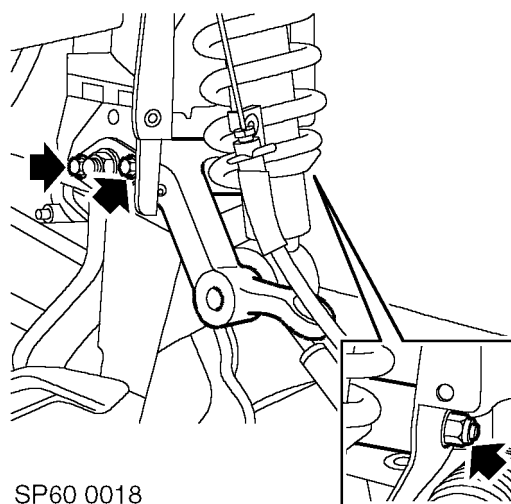
SP60 0019

- Remove and discard nut securing upper ball joint and remove nut.



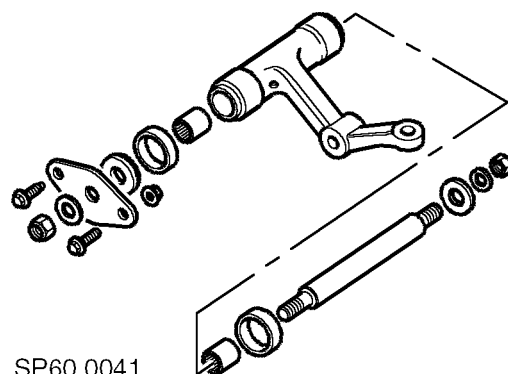
SP60 0020

- Fit slave nut to ball joint threads, position 18G-1584 and release ball joint taper from upper suspension arm. Remove 18G-1584 and slave nut.



SP60 0018

- Remove nut securing rear most end of upper suspension arm pivot shaft.
- Remove bolt and nut and bolt securing pivot shaft retaining plate to subframe.
- Remove pivot shaft from subframe.

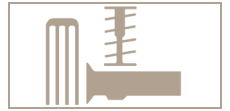



SP60 0041

- Remove upper suspension arm from subframe, noting fitted position of rear thrust washer and rubber seals at each end of suspension arm.
- Secure pivot shaft in soft jawed vice, remove front nut, plain washer, retaining plate and thrust washer.


Refit

- Clean upper suspension arm, pivot shaft, thrust washers and mating faces in subframe.
- Lubricate pivot shaft and thrust washers with Dextragrease Super GP.
- Fit rear thrust washer and rubber seals to upper suspension arm, position suspension arm in subframe.
- Align upper suspension arm and fit pivot shaft.
- Fit front thrust washer, retaining plate, plain washer and nut, fit and tighten retaining plate bolt and nut and bolt to 10 Nm.
- Tighten front and rear pivot shaft nuts to 74 Nm.

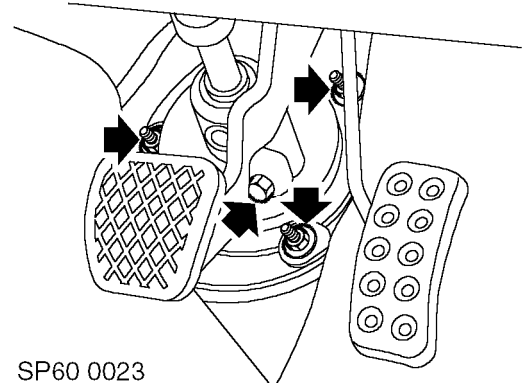


7. Position hub to upper suspension arm, fit new lock nut, and tighten ball joint nut to 54 Nm.
 8. Position crash can in subframe, fit and tighten bolts to 45 Nm.
 9. Position damper assembly to upper suspension arm, fit and tighten bolt to 100 Nm.
 10. Position brake pipe bracket to subframe turret, fit and tighten bolt to 25 Nm.
 11. Position wheel arch liner, fit screw and scrivenets securing wheel arch liner.
 12. Fit front bumper armature.
-  **FRONT BUMPER ARMATURE**, page 76-2-8.
13. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
 14. Remove stand(s) and lower vehicle.

SUSPENSION ARM - LOWER FRONT

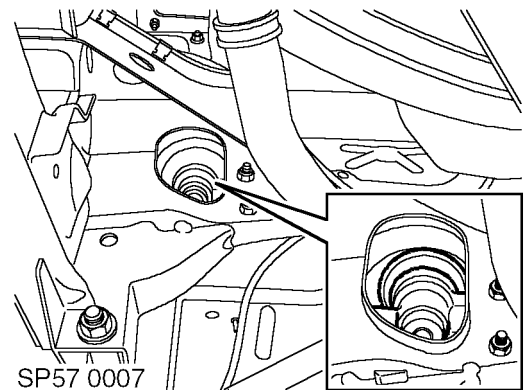
 **60.35.03**

Remove



SP60 0023

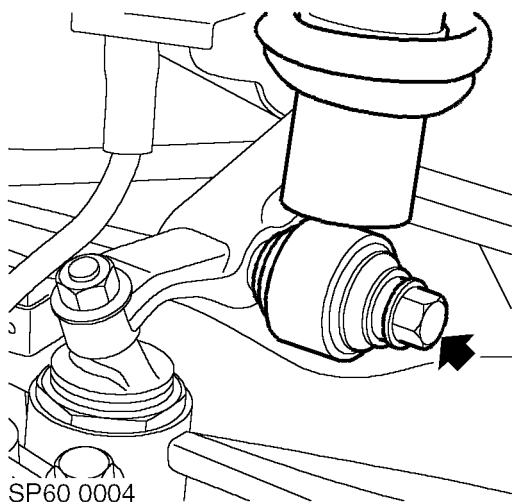
1. Remove bolt securing steering column universal joint to rack pinion.
2. Release steering column universal joint from rack pinion.
3. Remove 3 nuts securing steering rack pinion cover to body.
4. Raise front of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
5. Remove road wheel(s).



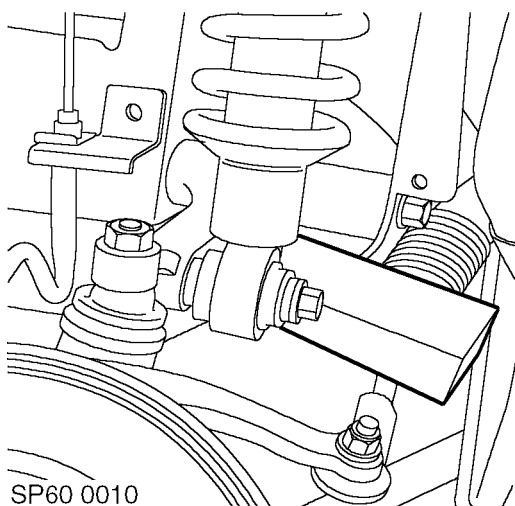
SP57 0007

6. Release pinion cover from steering rack pinion housing and retaining studs.

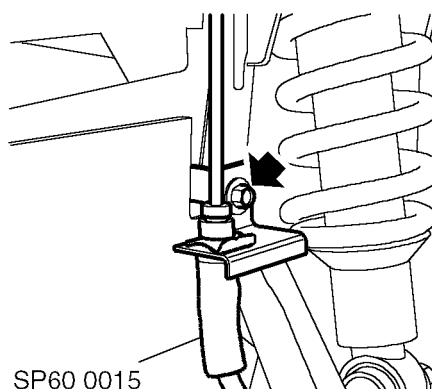
FRONT SUSPENSION



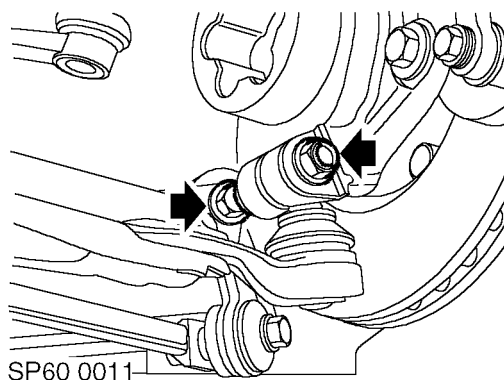
7. Remove bolts securing damper assemblies to upper suspension arms, move dampers aside.



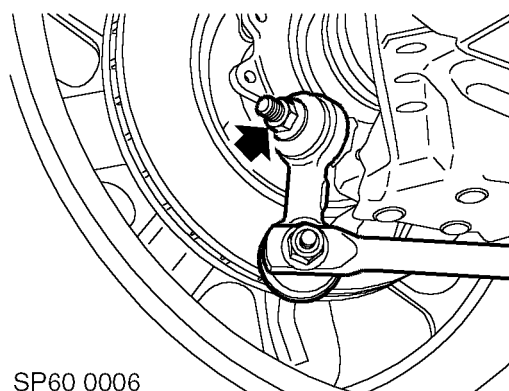
8. Raise suspension and fit a suitable block between upper arm and subframe.



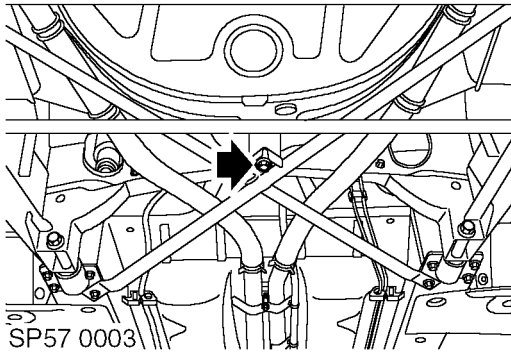
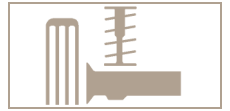
9. Remove 2 bolts securing LH and RH brake pipe support brackets to subframe turret.



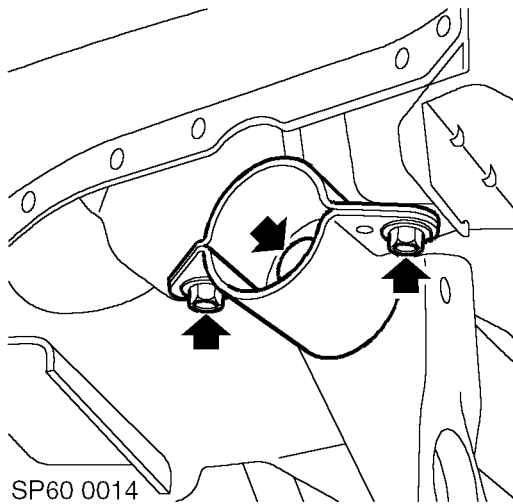
10. Remove nut and bolt securing lower arm ball-joint to hub.
11. Release ball-joint from lower arm.



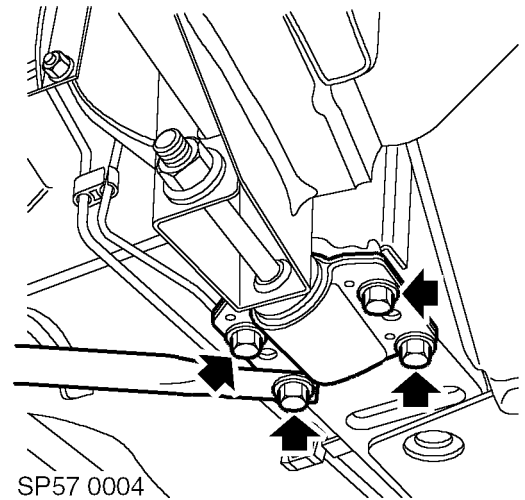
12. Remove nut and bolt securing anti-roll bar link to lower arm.



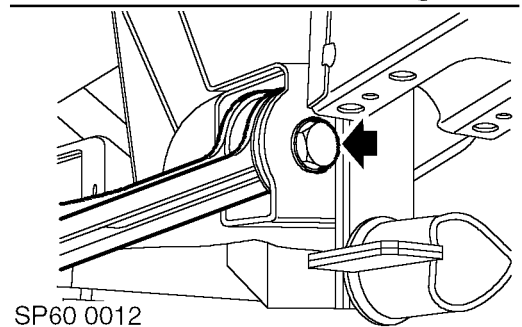
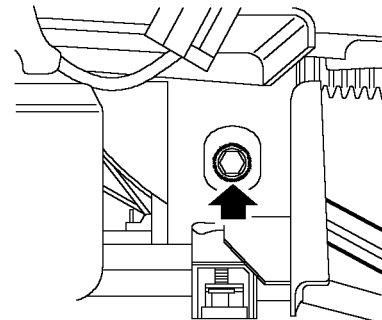
13. Remove bolt securing cross brace to centre mounting.
14. Support rear of front subframe on a jack.



15. Loosen 2 bolts and 2 nuts and bolts securing front subframe mountings to body.



16. Remove 8 bolts securing front subframe rear mountings to body.
17. Remove lower arm bolt access grommet from subframe.
18. Lower subframe on jack to gain access to lower suspension arm rear retaining bolts.



19. Remove front bolt securing lower arm to subframe.
20. Remove rear bolt securing lower arm to subframe.
21. Remove lower arm.

Refit

1. Clean lower arm bushes, bush recesses and pivot bolts.
2. Fit lower arm to subframe.
3. Fit bolts securing lower arm to subframe, do not tighten at this stage.

FRONT SUSPENSION

4. Raise subframe on jack.
5. Align subframe mountings and cross brace to body. Fit and tighten bolts securing subframe mountings and cross brace to 45 Nm.
6. Tighten nuts and bolts securing front subframe mountings to body to 30 Nm.
7. Fit and tighten bolt securing cross brace to centre mounting to 45 Nm.
8. Clean lower ball joint and seat.
9. Position hub to lower ball joint, fit and tighten nut and bolt to 45 Nm.
10. Raise suspension and remove support blocks, align dampers, fit bolts and tighten to 100 Nm.
11. Align anti-roll bar link to lower arm.
12. Fit nut and bolt securing anti-roll bar link to lower arm, do not tighten at this stage.
13. Position brake pipe brackets to subframe turret, fit and tighten bolts to 25 Nm.
14. Locate pinion cover on studs and secure to steering rack pinion housing, fit and tighten nuts to 8 Nm.
15. Align and connect steering column intermediate shaft joint to rack pinion.
16. Fit bolt and tighten to 22 Nm.
17. Tighten lower arm to subframe bolts to 85 Nm. - Tighten anti-roll bar link to lower arm nuts and bolts to 35 Nm.

CAUTION: Nuts and bolts must be tightened with the vehicle weight on the suspension.

18. Fit bolt access grommet to subframe.
19. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
20. Remove stand(s) and lower vehicle.


BEARINGS - SUSPENSION ARM ASSEMBLY - UPPER

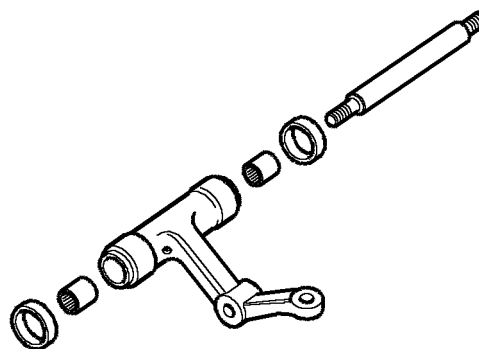
🔑 60.35.05

Remove

1. Raise front of vehicle and support one side on stand.

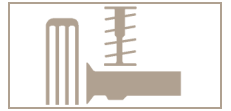
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel(s).
3. Remove upper suspension arm.
 [SUSPENSION ARM ASSEMBLY - UPPER, page 60-9.](#)

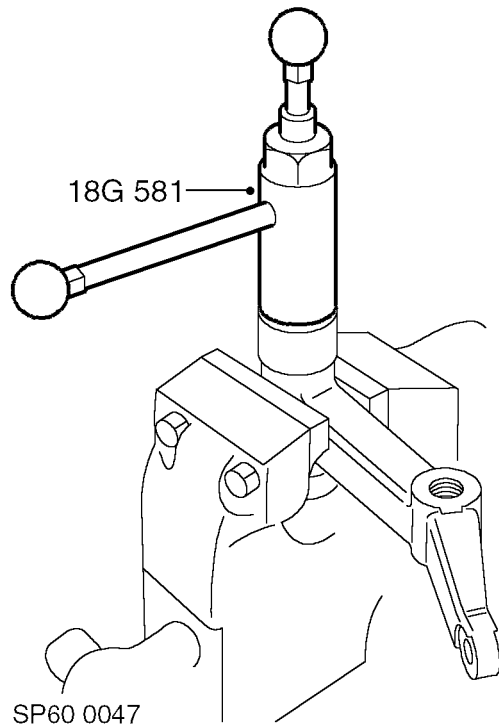


SP60 0042

4. With the pivot shaft and rubber seals removed, note fitted position of bearings in upper suspension arm.

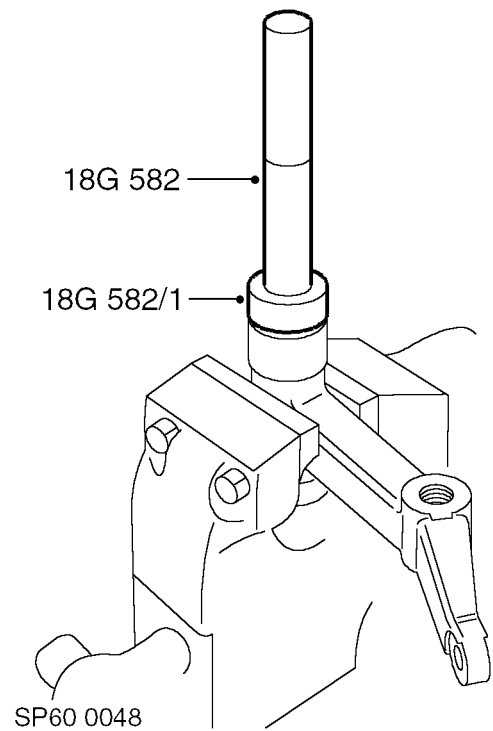


Refit



5. Position upper suspension arm in vice.
6. Remove needle roller bearings from upper suspension arm using 18G-581.

CAUTION: Clean and inspect bearing housings prior to reassembly. If any wear or damage is present due to worn bearings, the suspension arm must be replaced.



1. Align and carefully drift new needle roller bearings into upper suspension arm using 18G 582 and 18G 582/1.
2. Fit upper suspension arm.
[👉 SUSPENSION ARM ASSEMBLY - UPPER, page 60-9.](#)
3. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
4. Remove stand(s) and lower vehicle.

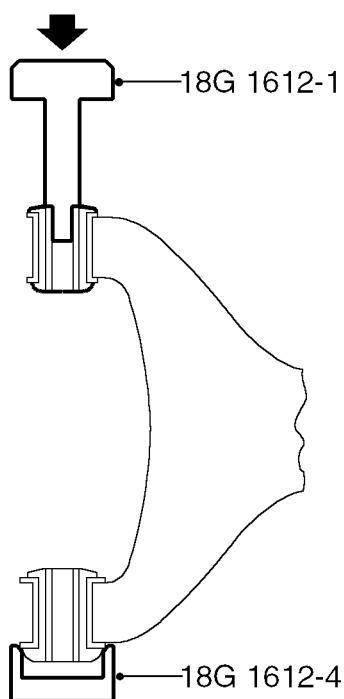
FRONT SUSPENSION

BUSH - SUSPENSION LOWER ARM - FRONT

🔑 60.35.24

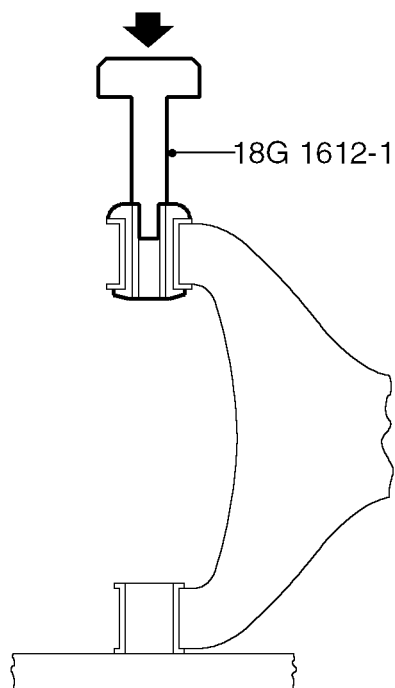
Remove

1. Remove front lower arm.
[👉 SUSPENSION ARM - LOWER FRONT, page 60-11.](#)



SP60 0043

2. Remove front bush using press, position lower arm with front bush uppermost and support with tool 18G 1612-4 under rear bush.
3. Fit tool 18G 1612-1 to front bush and press bush from lower arm.
4. Reposition arm under press with rear bush uppermost.

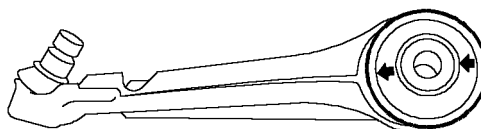


SP60 0044

5. Fit tool 18G 1612-1 to rear bush and press bush from arm.

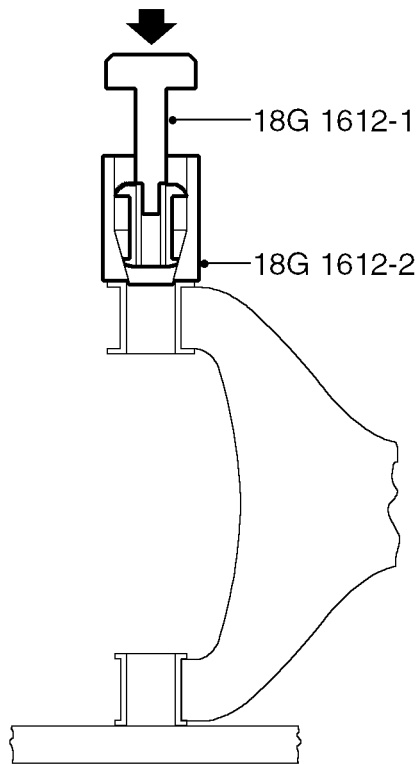
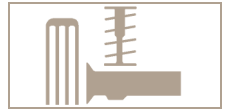
Refit

1. Clean lower arm and bush locations.
2. Position lower arm in press with rear bush located uppermost.
3. Lubricate rear bush with Marlene 148 rubber lubricant.
4. Fit tool 18G 1612-2 to rear bush location.



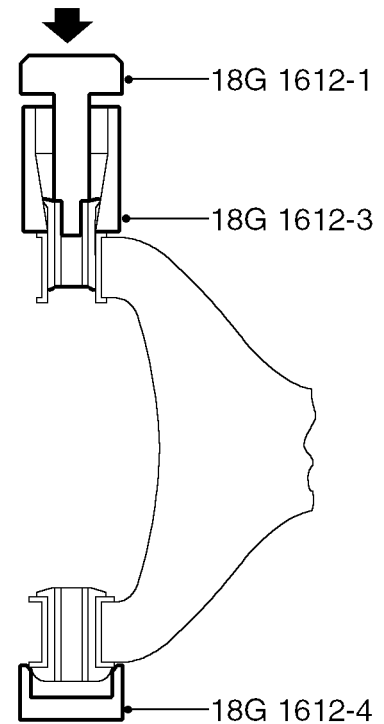
SP60 0100

5. Fit rear bush into tool, 18G 1612-2, with the rounded flange uppermost and the arrows on the bush pointing towards the ball joint as shown.




SP60 0045

6. Fit tool 18G 1612-1 to the rear bush and press into lower arm.



SP60 0046

7. Position lower arm with tool 18G 1612-4.
 8. Fit tool 18G 1612-3 to front bush location.
 9. Lubricate front bush with Marlene 148 rubber lubricant.
 10. Fit bush into tool 18G 1612-3 with flat flange uppermost
 11. Press bush into lower arm using tool 18G 1612-1.
 12. Remove arm from press.
 13. Fit front lower arm.
-  [SUSPENSION ARM - LOWER FRONT, page 60-11.](#)

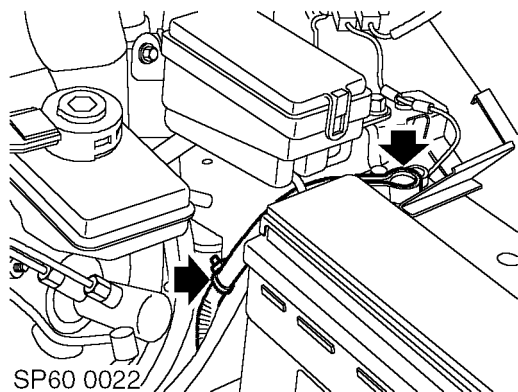
FRONT SUSPENSION

SUB FRAME - FRONT SUSPENSION

🔑 60.35.78

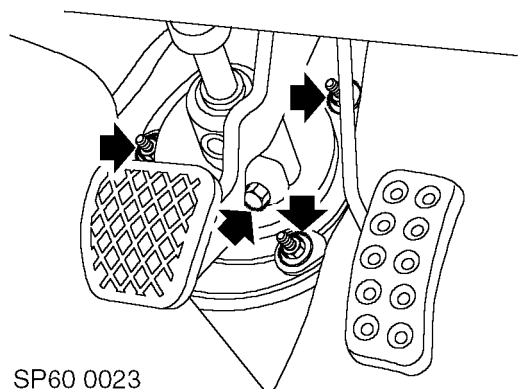
Remove

1. Position vehicle on a 2 post ramp.
2. Disconnect battery earth lead.
3. Disconnect battery positive lead,



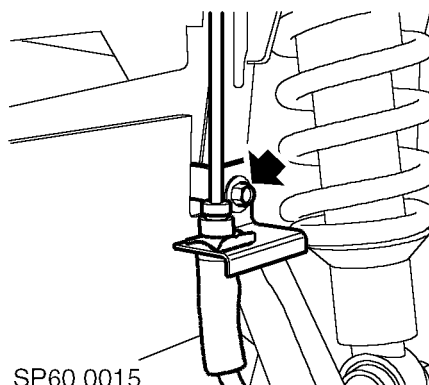
SP60 0022

4. Release main fuse and fuse box connections, release from clips and position aside.



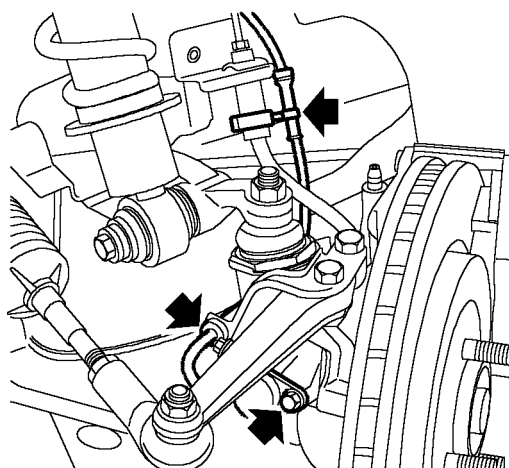
SP60 0023

5. Remove bolt securing steering column universal joint to steering rack.
6. Release steering column from steering rack.
7. Remove 3 nuts securing steering rack pinion cover to body.
8. Remove front road wheels.



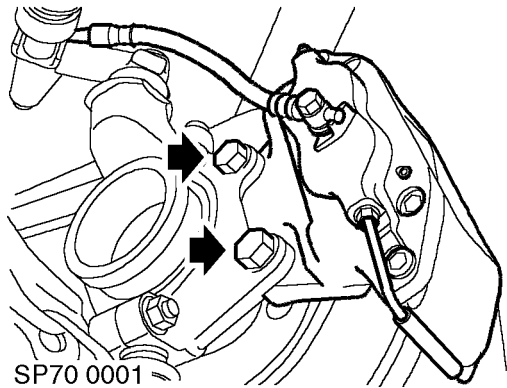
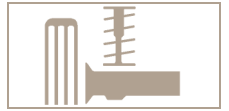
SP60 0015

9. Remove 2 bolts securing LH and RH brake pipe support brackets to subframe turret.



SP12 0362

10. Remove bolts securing LH and RH ABS sensors to calipers. Release sensors and collect spacers.
11. Release LH and RH ABS sensor lead grommets from each bracket on front hubs, clips and grommet brackets on subframe turret.

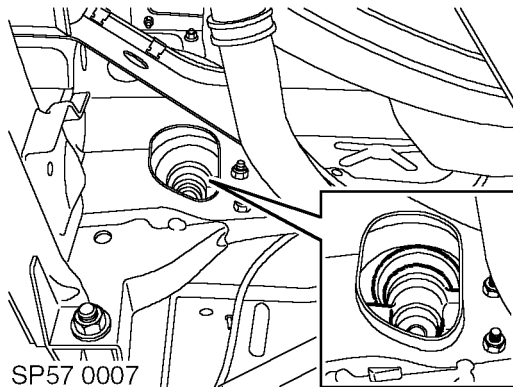


SP70 0001

12. Remove bolts securing LH and RH brake calipers to front hubs. Release calipers from hubs and tie calipers aside.

CAUTION: Do not allow caliper to hang on brake hose.

13. Raise vehicle on ramp.

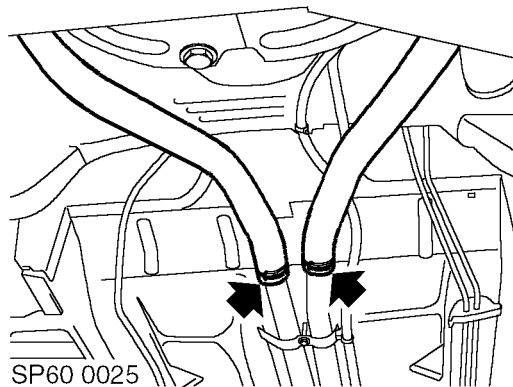


SP57 0007

14. Release pinion cover from steering rack pinion housing and retaining studs.

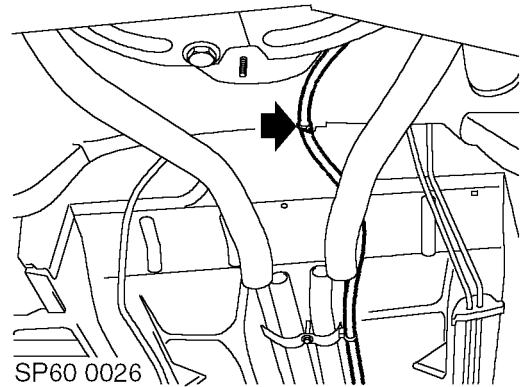
15. Drain cooling system.

 **DRAIN AND REFILL**, page 26-1.



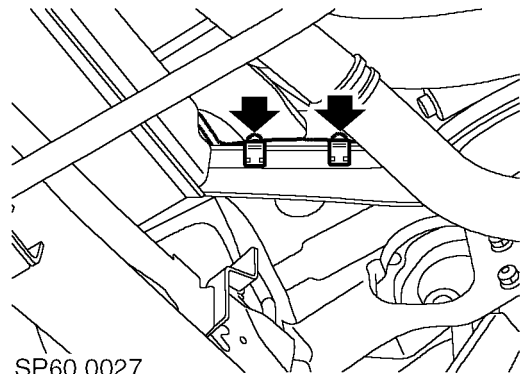
SP60 0025

16. Release clips and disconnect coolant hoses under floor.



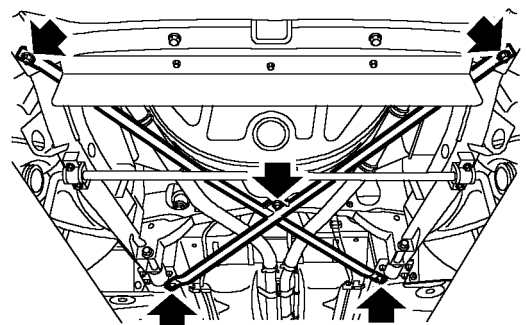
SP60 0026

17. Remove and discard cable tie securing battery lead to subframe, position battery lead aside.



SP60 0027

18. Release screen washer tube from 2 clips on subframe.

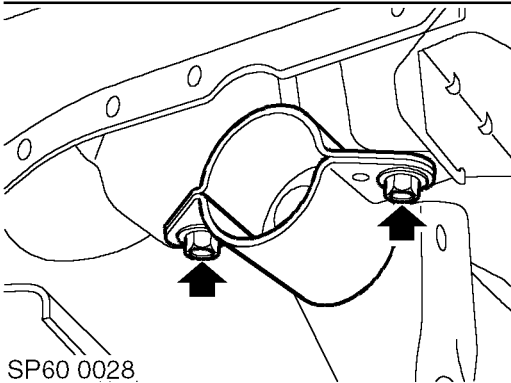
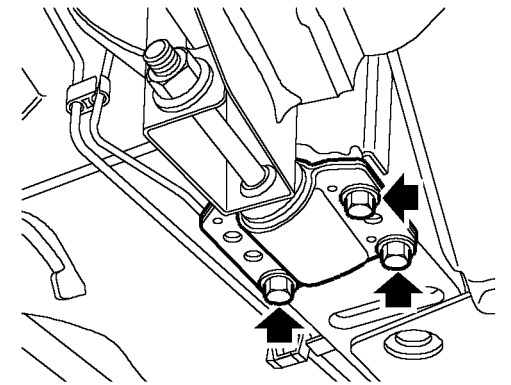


SP12 0364

19. Remove 2 bolts securing cross brace to front of subframe.
20. Remove LH and RH bolts securing cross brace and rear subframe mountings to body.
21. Remove bolt securing cross brace to centre mounting and remove cross brace.
22. Position suitable table beneath front subframe.

FRONT SUSPENSION

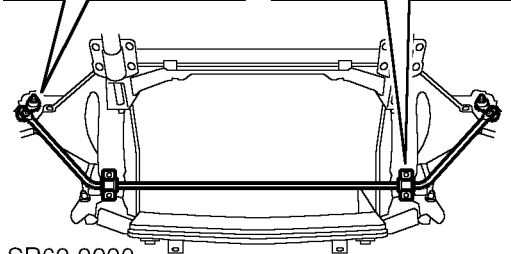
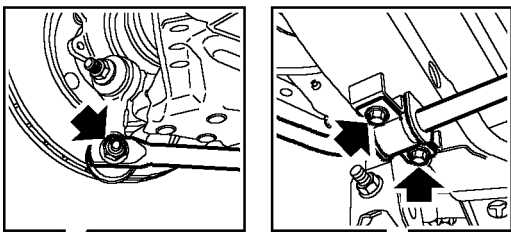
23. Lower vehicle on ramp until subframe makes contact with table.



SP60 0028

24. Remove 6 bolts and 2 nuts and bolts securing LH and RH subframe mountings to body.
25. Slowly raise vehicle away from subframe.

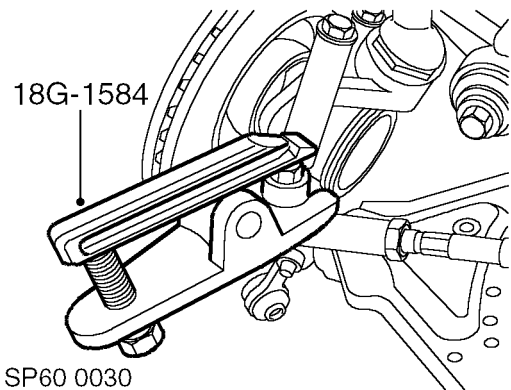
Do not carry out further dismantling if component is removed for access only.



SP60 0029

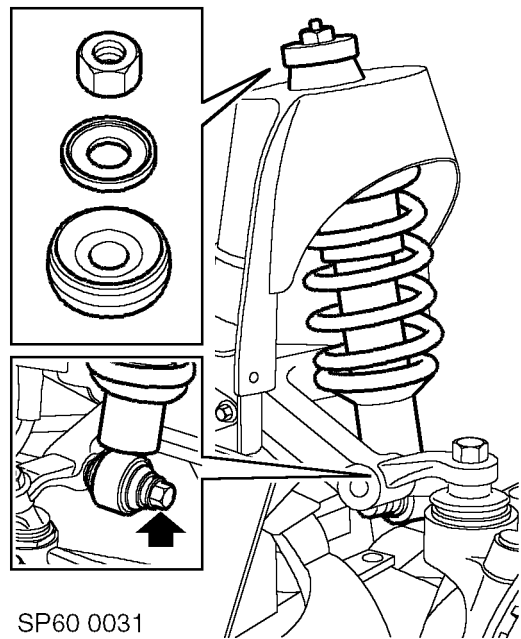
26. Remove nuts and bolts securing anti-roll bar links to anti-roll bar.

27. Remove 4 bolts securing anti-roll bar to subframe, remove anti-roll bar. Collect anti-roll bar clamps and mounting rubbers.



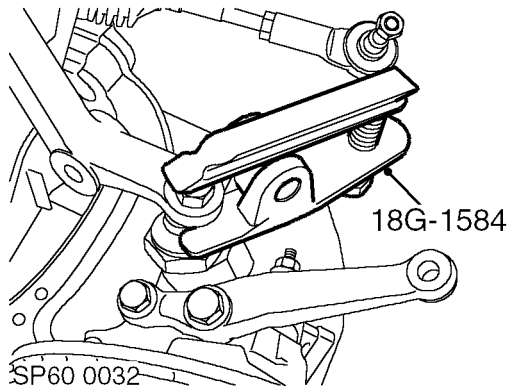
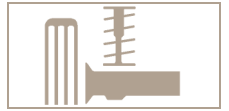
SP60 0030

28. Remove nuts securing steering rack ball joints to front hubs. Using 18G-1584, release ball joint tapers from hubs.

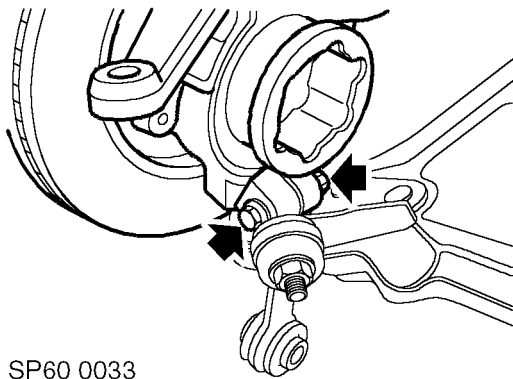


SP60 0031

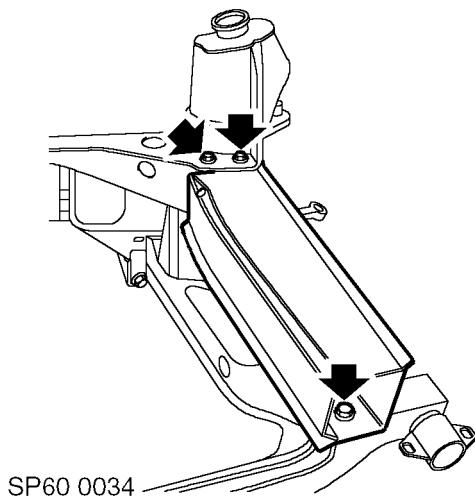
29. Position 5 mm Allen key in top of damper shaft, remove nut securing damper to subframe turret.
30. Remove retaining washer and rubber bush.
31. Remove bolt securing damper to upper suspension arm, remove damper/spring assembly and collect spring isolator.



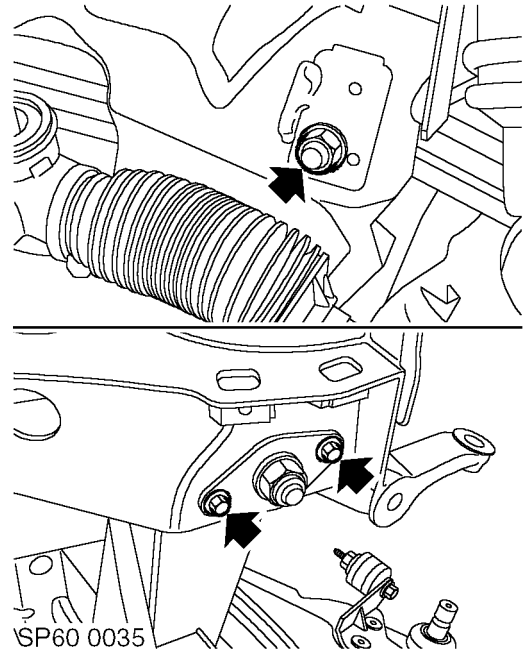
32. Remove and discard lock nut securing ball joint to upper suspension arm.
33. Fit slave nut to ball joint threads, position tool 18G-1584, release ball joint taper from upper suspension arm. Remove slave nut.



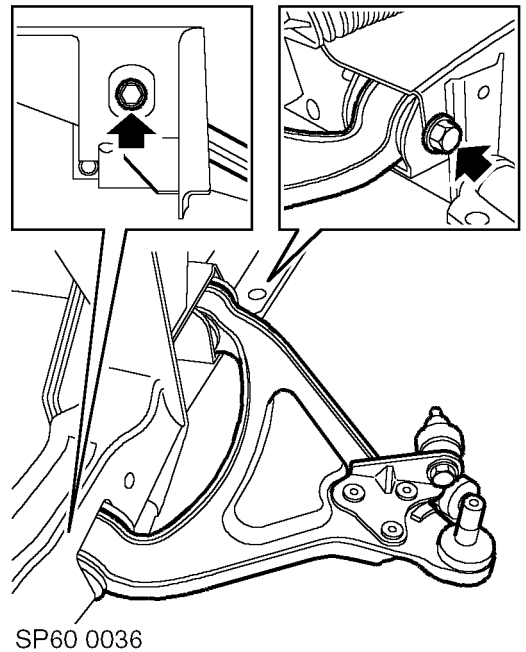
34. Remove nut and bolt securing ball joint to lower arm, release ball joint and remove hub assembly.



35. Remove 3 bolts securing LH crash can to subframe and remove crash can.

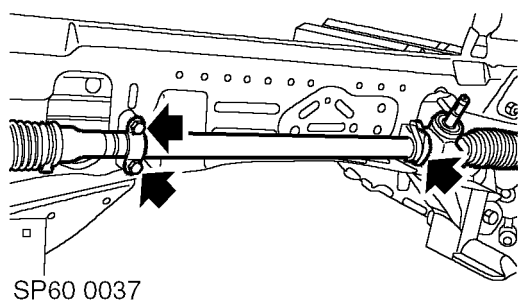


36. Remove rear nut and plain washer securing upper suspension arm pivot shaft to subframe.
37. Remove bolt and nut and bolt securing pivot shaft retaining plate to subframe.
38. Remove pivot shaft from subframe.
39. Remove upper suspension arm from subframe, noting fitted position of rear thrust washer and rubber seals at each end of suspension arm.

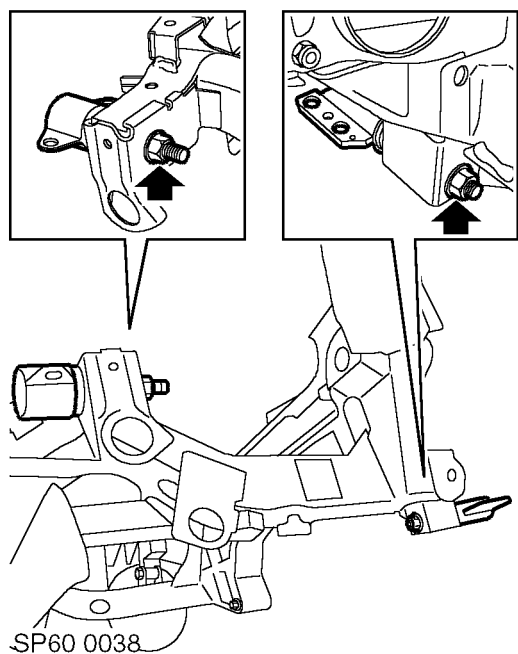


40. Remove front and rear bolts securing lower arm to subframe and remove lower arm.
41. Repeat operations for opposite side of suspension.

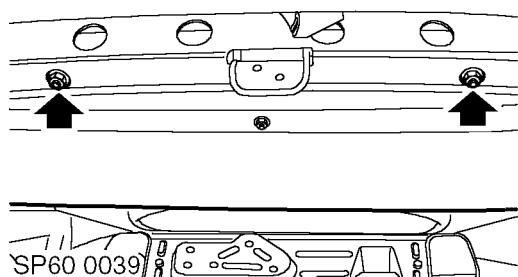
FRONT SUSPENSION



42. Remove 2 nuts and bolts and 'U' bolt securing steering rack to subframe, remove steering rack and collect 'U' bolt and clamp.



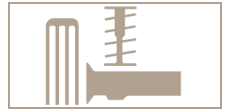
43. Remove nuts and bolts securing LH and RH front mountings to subframe and collect mountings.
44. Remove nuts and bolts securing LH and RH rear mountings to subframe and collect mountings.



45. Remove 2 nuts securing splash guard mounting bracket to subframe, remove splash guard mounting bracket.

Refit

1. Position splash guard mounting bracket to subframe, fit and tighten nuts to 30 Nm.
2. Position LH and RH front mountings to subframe, fit and tighten nuts and bolts to 100 Nm.
3. Position LH and RH rear mountings to subframe, fit and tighten nuts and bolts to 100 Nm.
4. Position steering rack to subframe, fit 'U' bolt and clamp. Fit and tighten nuts and bolts to 22 Nm.
5. Position lower arm in subframe, fit and tighten bolts to 85 Nm.
6. Ensure that thrust washer and rubber seals are correctly positioned on upper suspension arm.
7. Position upper suspension arm in subframe and fit pivot shaft.
8. Align pivot shaft retaining plate to holes in subframe, fit bolt, nut and bolt and tighten to 10 Nm.
9. Position plain washer, fit and tighten rear nut securing pivot shaft to subframe to 74 Nm.
10. Repeat operations for opposite side of suspension.
11. Position crash can in subframe, fit and tighten bolts to 45 Nm.
12. Clean hub assembly and ball joint locations in suspension arms.
13. Position hub assembly to upper suspension arm, fit and tighten new ball joint lock nut to 54 Nm.
14. Ensure bottom ball joint pin is fully engaged in hub.
15. Fit and tighten nut and bolt securing bottom ball joint to hub to 45 Nm.
16. Position isolator on spring retaining plate.
17. Position damper assembly in subframe turret, fit top bush, washer and nut. Do not tighten nut at this stage.
18. Position damper assembly to upper suspension arm, fit and tighten bolt to 100 Nm.
19. Position 5 mm Allen key in top of damper shaft, tighten nut to 45 Nm
20. Repeat operations for opposite side of suspension.
21. Clean steering rack ball joint tapers and mating faces on hubs.
22. Position steering rack ball joints to hubs, fit and tighten nuts to 30 Nm.
23. Clean anti-roll bar.
24. Fit mounting rubbers to anti-roll bar.
25. Position anti-roll bar to subframe, position clamps and align to bolt holes. Fit and tighten bolts to 22 Nm.
26. Align anti-roll bar links to anti-roll bar, fit nuts and bolts but do not tighten at this stage.
27. Correctly position subframe underneath vehicle. Slowly lower vehicle onto subframe.
28. Align subframe mountings to body.
29. Fit nuts and bolts securing subframe mountings to body. Tighten rear mounting bolts to 45 Nm and front mounting bolts to 30 Nm.
30. Raise vehicle on ramp and remove table.



31. Position cross brace to subframe, fit and tighten bolts securing cross brace to rear mountings, front of subframe and centre mounting to 45 Nm.
32. Connect coolant hoses and secure with clips.
33. Position battery lead to subframe and secure with new cable tie.
34. Secure screen washer tube in clips on subframe.
35. Release LH and RH front brake calipers, position to hubs, fit and tighten bolts to 85 Nm.
36. Position LH and RH brake pipes to subframe turrets, fit and tighten bolts to 25 Nm.
37. Fit LH and RH ABS sensors and spacers, fit and tighten bolts to 10 Nm.
38. Secure LH and RH ABS sensor lead grommets in brackets on front hubs, clips and grommet brackets on subframe turret.
39. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
40. Lower vehicle on ramp.
41. With the weight of the vehicle on the front suspension, tighten anti-roll bar link nuts and bolts to 35 Nm.
42. Locate pinion cover on studs and secure to steering rack pinion housing, fit and tighten nuts to 8 Nm.
43. Position steering column universal joint, fit and tighten clamp bolt to 22 Nm.
44. Connect battery positive lead, fuse box and main fuse leads, secure leads in clips.
45. Fill cooling system.
46. Connect battery earth lead.
47. Check front wheel alignment.

 **DRAIN AND REFILL**, page 26-I.

 **FRONT WHEEL ALIGNMENT**, page 57-I.

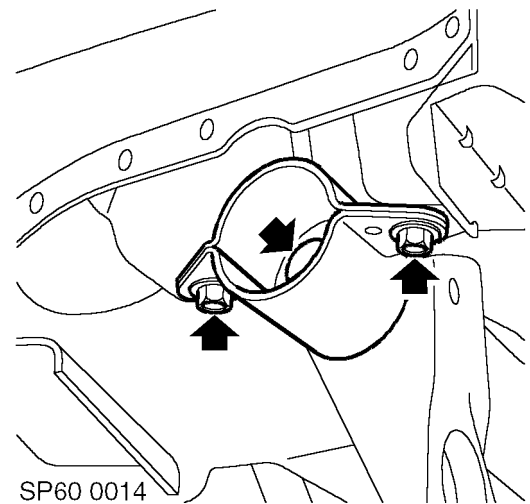
MOUNTING - FRONT SUB FRAME - FRONT

 **60.35.80**

Remove

1. Raise front of vehicle and support on stand(s).

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



2. Remove bolt and nut and bolt securing front mounting to body.
3. Remove nut and bolt securing mounting to subframe and remove mounting.

Refit

1. Position mounting to subframe, fit bolt and nut but do not fully tighten at this stage.
2. Fit and tighten bolts securing subframe mounting to body to 30 Nm.
3. Tighten nut and bolt securing mounting to subframe to 100 Nm.
4. Remove stand(s) and lower vehicle.

FRONT SUSPENSION

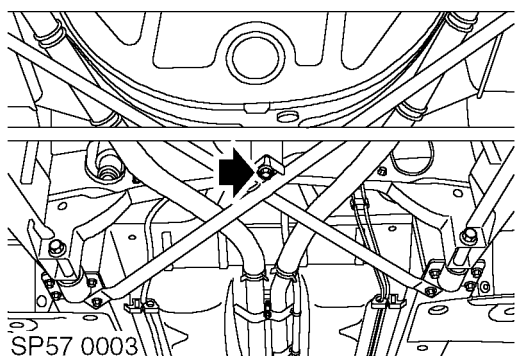
MOUNTING - FRONT SUB FRAME - REAR

🔑 60.35.82

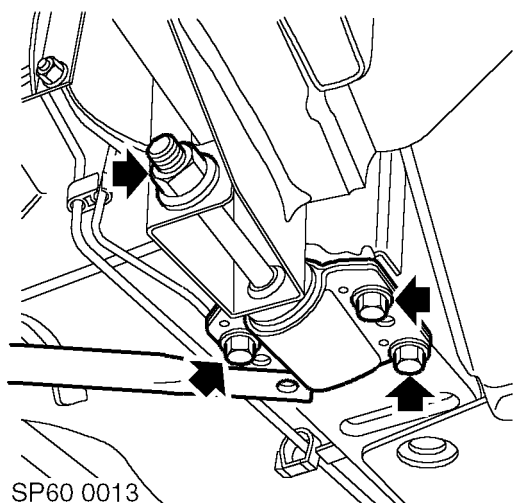
Remove

1. Raise front of vehicle and support on stand(s).

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



2. Remove bolt securing cross brace to centre mounting.

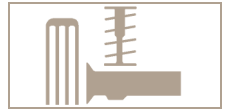


3. Remove 4 bolts securing cross brace and rear subframe mounting to body.
4. Remove nut and bolt securing mounting to subframe and remove mounting.

Refit

1. Position mounting to subframe, fit bolt through subframe and mounting.
2. Fit and tighten bolts securing rear subframe mounting and cross brace to body to 45 Nm.

3. Fit nut securing mounting to subframe, tighten nut and bolt to 100 Nm.
4. Fit and tighten bolt securing cross brace to centre mounting to 45 Nm.
5. Remove stand(s) and lower vehicle.

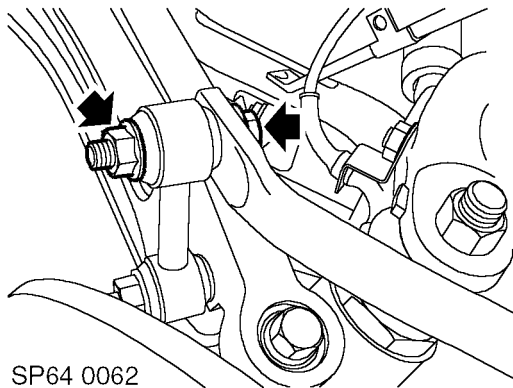


BALL JOINT - UPPER

🔑 64.15.02

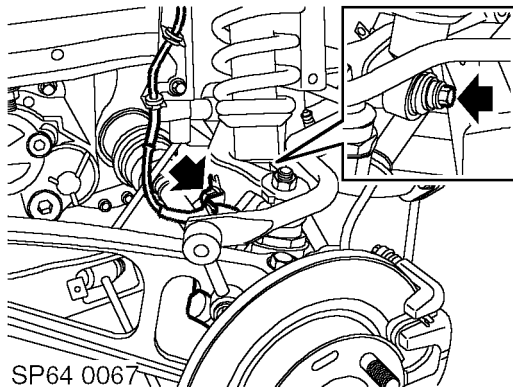
Remove

1. Raise rear of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel(s).



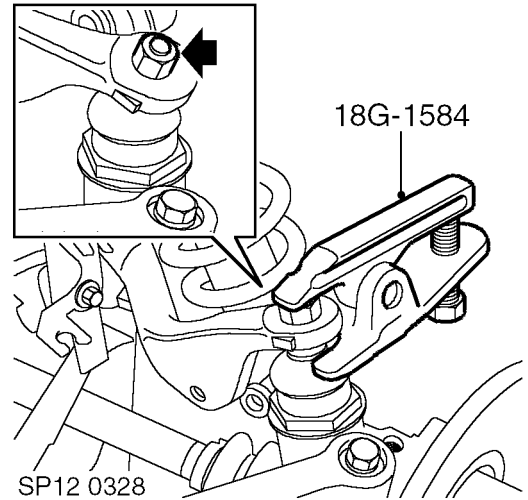
SP64 0062

3. Remove nuts and bolts securing LH and RH anti-roll bar links to anti-roll bar.



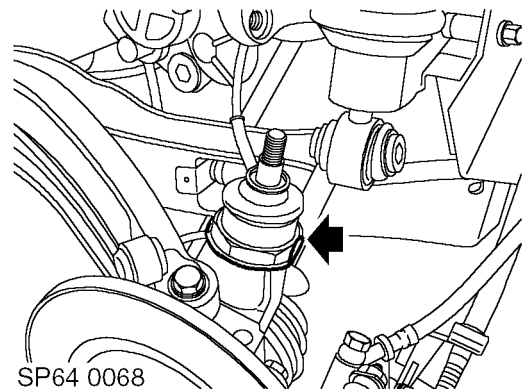
SP64 0067

4. Remove nut and bolt securing damper to upper suspension arm.
5. Release ABS sensor harness bracket.
6. Raise anti-roll bar and upper arm to access ball joint.



SP12 0328

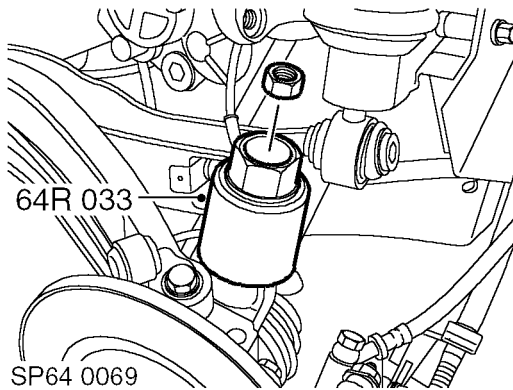
7. Remove and discard lock nut securing ball joint to upper suspension arm.
8. Fit slave nut to ball joint threads, position 18G-1584 and release ball joint taper from upper suspension arm. Remove 18G-1584 and slave nut.



SP64 0068

9. Knock back lock washer securing ball joint to rear hub.

REAR SUSPENSION



10. Using ball joint retaining nut, secure 64R033 to ball joint. Attach a suitable socket and socket bar to 64R033, remove ball joint from rear hub.
11. Remove and discard lock washer.

Refit

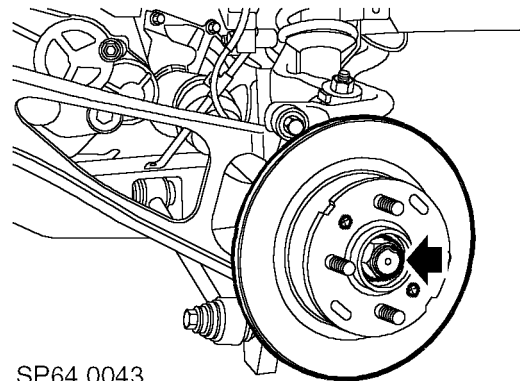
1. Clean ball joint and mating face on rear hub.
2. Apply Loctite 242 to ball joint threads.
3. Fit new ball joint lock washer.
4. Fit ball joint to rear hub, and using 64R003, tighten ball joint to 105 Nm.
5. Knock over lock washer to rear hub and ball joint nut.
6. Position ball joint to upper suspension arm, fit new lock nut and tighten nut to 54 Nm.
7. Align damper to upper arm, fit bolt and tighten to 100 Nm.
8. Align ABS harness bracket fit nut and tighten to 30 Nm.
9. Align anti-roll bar links to anti-roll bar fit nuts and bolts and tighten to 35 Nm.
10. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
11. Remove stand(s) and lower vehicle.


BEARING(S) - HUB - ONE SIDE

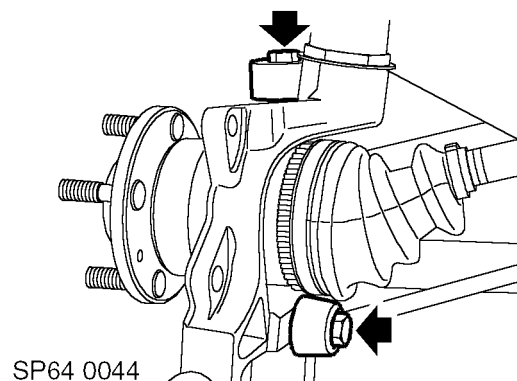
🔑 64.15.14

Remove

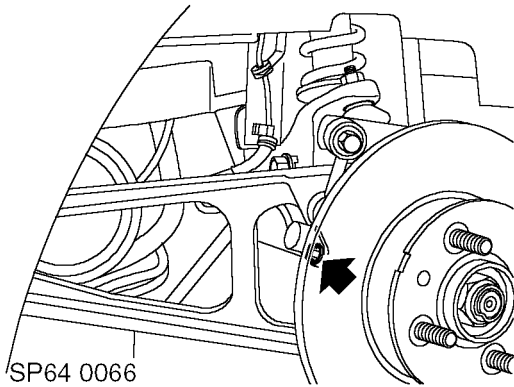
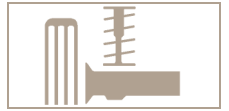
1. Raise rear of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel.



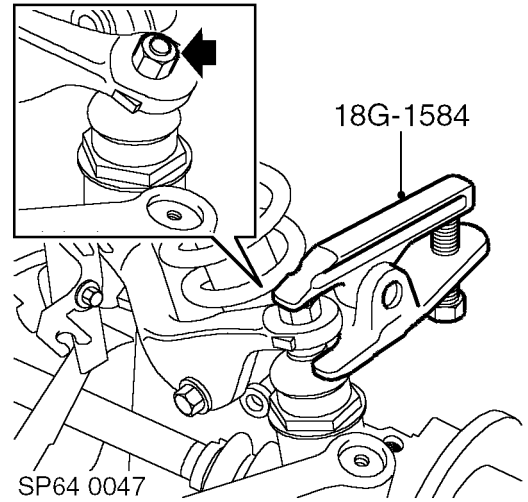
3. Knock back drive shaft nut stake.
4. With assistance, depress brake pedal, remove and discard drive shaft nut.
5. Remove brake disc.
 [REAR BRAKE DISC, page 70-8.](#)



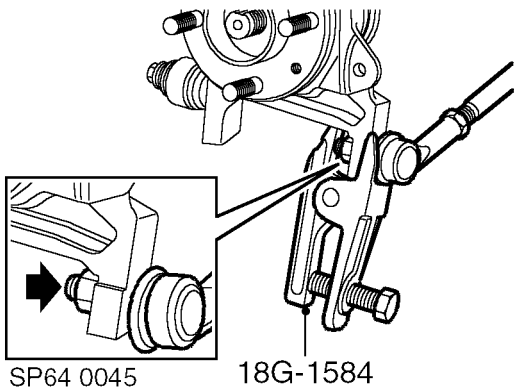
6. Remove 2 bolts securing trailing arm to rear hub.



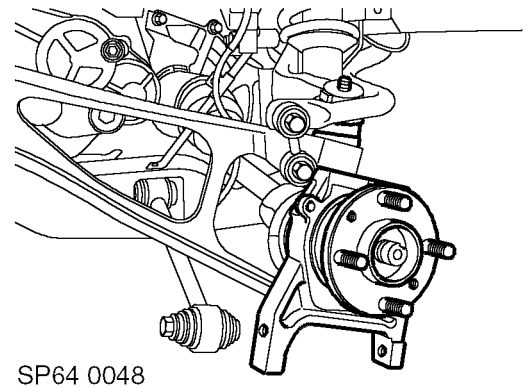
7. Remove bolt securing ABS sensor to hub, release sensor and position aside.



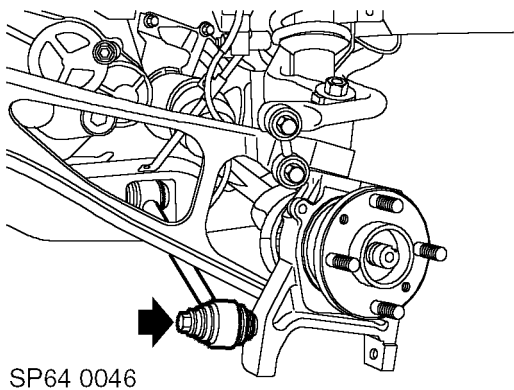
11. Remove and discard lock nut from upper arm ball joint.
12. Fit slave nut to ball joint threads, position 18G-1584 and release ball joint taper from upper suspension arm. Remove 18G-1584 and slave nut.



8. Remove nut securing track control arm to rear hub.
9. Using tool 18G-1584, release track control arm ball joint from rear hub.

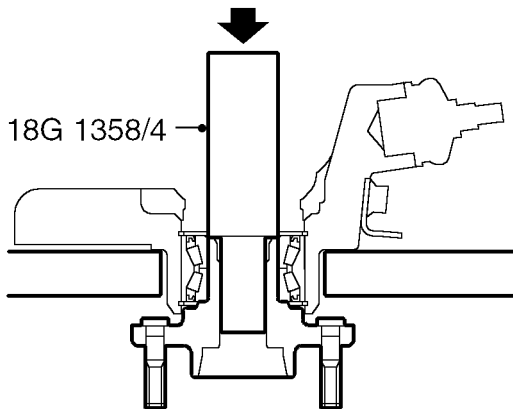


13. Remove rear hub assembly from drive shaft.
14. Position hub to press.



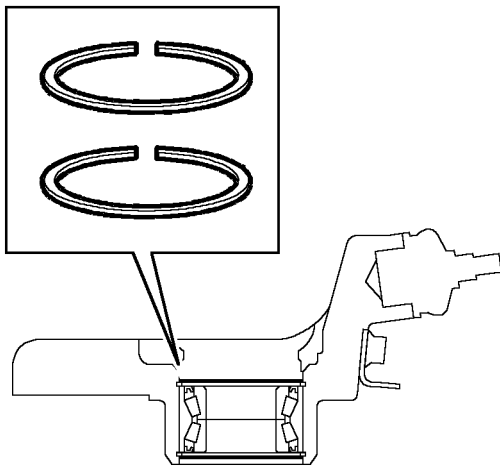
10. Remove bolt securing lower link to rear hub.

REAR SUSPENSION



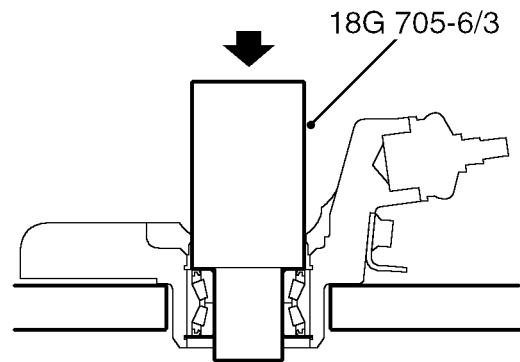
SP64 0026

15. Press out drive flange using tool 18G 1358/4.
16. Collect drive flange.
17. Remove hub from press.



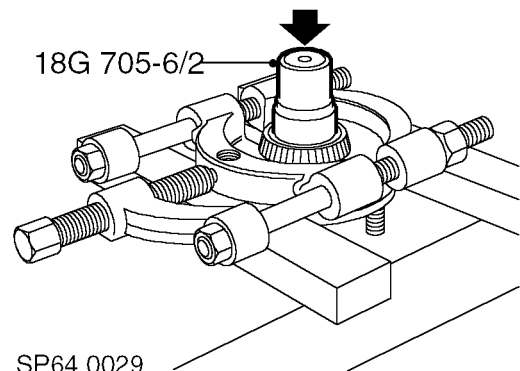
SP64 0027

18. Remove bearing outer circlip.
19. Remove bearing inner circlip.
20. Position hub to press.



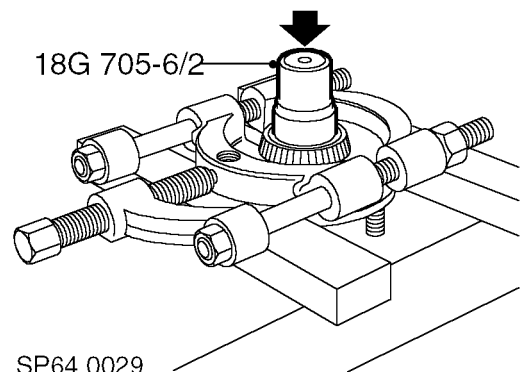
SP64 0028

21. Fit tool 18G 705-6/3 to bearing and press out bearing.
22. Remove hub from press.
23. Position drive flange to press.



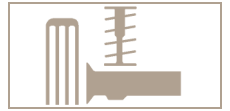
SP64 0029

24. Fit a universal bearing splitter to bearing as shown.




SP64 0029


25. Fit thrust button, tool 18G 705-6/2 to drive flange and press out drive flange from inner track.
26. Collect drive flange and remove bearing inner track.




Refit

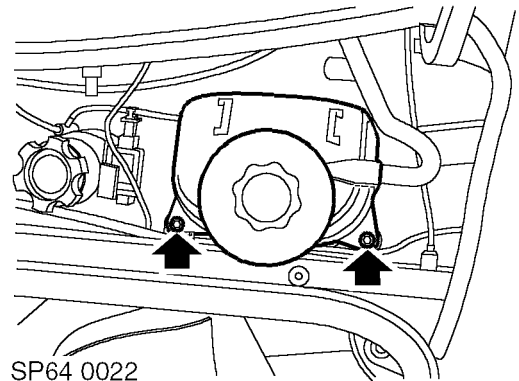
1. Clean hub and bearing mating faces.
2. Fit new bearing outer circlip to hub.
3. Position hub to press.
4. Position new bearing to hub, press bearing into hub using 18G-705-6/3.
5. Fit new bearing inner circlip to hub.
6. Clean drive flange to bearing mating faces.
7. Using tools 18G 134BD and 18G-705-6/3 press drive flange into hub.
8. Remove hub from press.
9. Clean drive shaft end and hub mating faces.
10. Fit hub to drive shaft.
11. Clean upper arm ball joint and mating face.
12. Position ball joint to upper suspension arm, fit new lock nut and tighten to 54Nm.
13. Align lower link to rear hub, fit bolt but do not tighten at this stage.
14. Clean track control arm ball joint and mating face.
15. Clean and thoroughly dry bolts securing trailing arm to rear hub.
16. Engage track control arm ball joint to hub, fit nut and tighten to 38 Nm.
17. Apply Loctite 242 to the first 3 threads of bolts securing trailing arm to rear hub.
18. Fit bolts securing trailing arm to rear hub, do not tighten at this stage.
19. Position ABS sensor lead to hub, fit new bolt and tighten to 10 Nm.
20. Fit rear brake disc.
 [REAR BRAKE DISC, page 70-8.](#)
21. With assistance tighten new drive shaft nut to 210 Nm.
22. Stake drive shaft nut to shaft.
23. Tighten trailing arm to hub bolts to 60 Nm.
24. With the weight of the vehicle on the rear suspension, tighten bolt securing lower link to rear hub to 100 Nm.
25. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
26. Remove stand(s) and lower vehicle.

DAMPER - RH

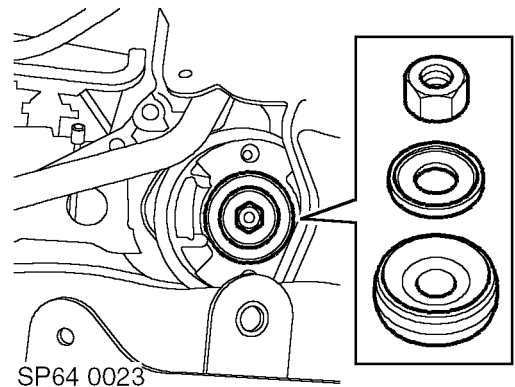
 64.30.02

Remove

1. Remove engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)

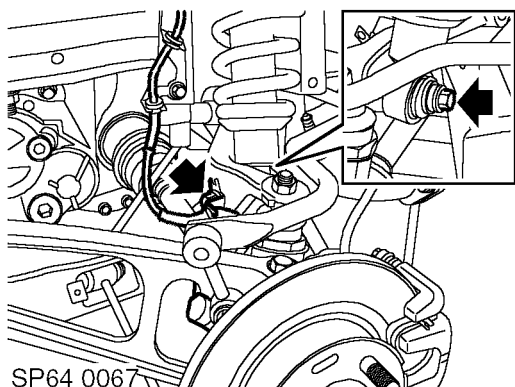


2. Remove 2 bolts securing expansion tank to body, position expansion tank aside.
3. Raise rear of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
4. Remove road wheel(s).

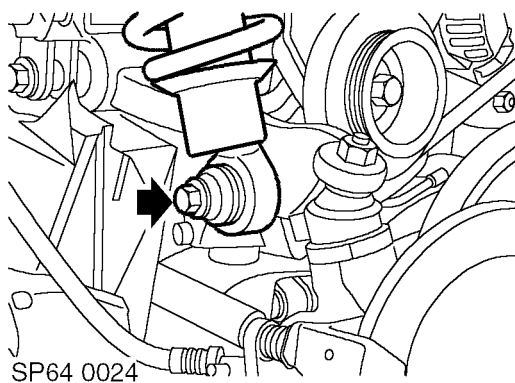


5. Position 5 mm Allen key in top of damper shaft, remove nut securing damper to subframe turret.
6. Remove retaining washer and rubber bush.

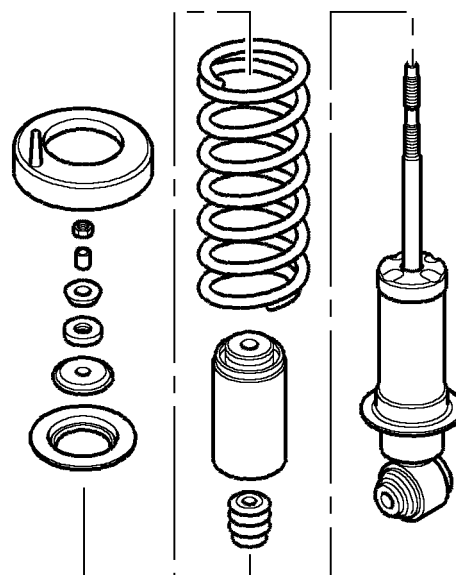
REAR SUSPENSION



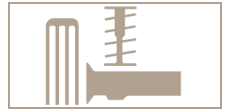
7. Remove nut from RH damper retaining bolt securing ABS lead support bracket and release bracket.



8. Remove bolt securing damper to upper suspension arm, remove damper/spring assembly and collect spring isolator.
9. Position damper/spring assembly in vice.



10. Progressively loosen and remove spring retainer nut, remove distance piece, flat washer, steel cup washer and spring retainer. Note fitted position of steel cup washer.
11. Remove spring, dust shield and rebound rubber bush from damper.
12. Remove damper from vice.




Refit


1. Prime new damper by operating it at least 3 full strokes.
2. Position new damper in vice.
3. Position rebound rubber bush on damper shaft.
4. Correctly position spring and dust shield onto damper.
5. Correctly position spring retainer, steel cup washer, flat washer and distance piece. Fit and tighten nut securing spring retainer to damper to 25 Nm.
6. Correctly position spring isolator, ensure locating tag is located through front hole in subframe turret.
7. Position damper assembly in subframe turret, fit top bush, washer and nut. Do not tighten nut at this stage.
8. Position damper assembly to upper suspension arm, fit and tighten bolt to 100 Nm.
9. Position 5 mm Allen key in top of damper shaft, tighten nut to 45 Nm
10. Position ABS harness support bracket, fit and tighten nut to 30 Nm.
11. Position expansion tank, fit and tighten bolts to 8 Nm.
12. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
13. Remove stand(s) and lower vehicle.
14. Fit engine compartment access panel.

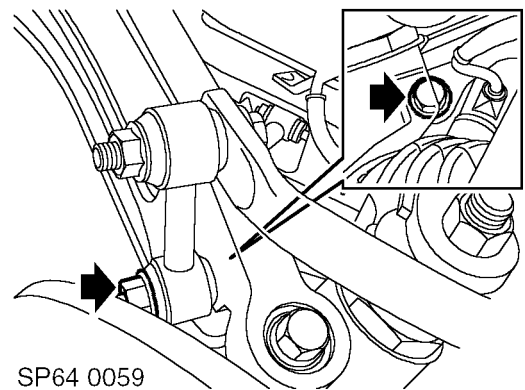
 **ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.**

ANTI-ROLL BAR - REAR

 **64.35.08**

Remove

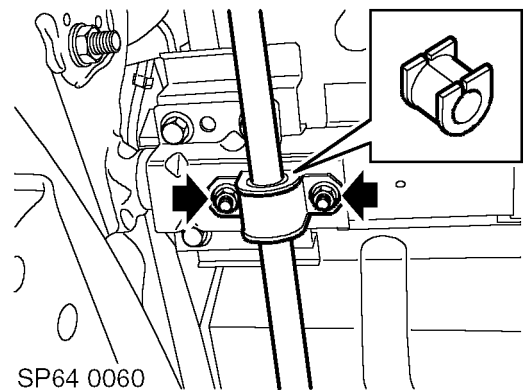
1. Raise rear of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove heat shield - rear silencer.
 **SILENCER HEAT SHIELD, page 30-3.**
3. Remove road wheel(s).



SP64 0059

4. Remove nuts and bolts securing anti-roll bar links to LH and RH trailing arms.

NOTE: Fitted position of link retaining nuts and bolts and anti-roll bar to link.



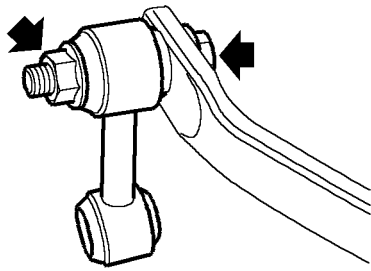
SP64 0060

5. Remove 2 nuts securing each anti-roll bar mounting rubber clamp to subframe, remove clamps and anti-roll bar:

CAUTION: The rear anti-roll bar is handed, the letter 'R' denotes RH side of suspension.

6. Remove 2 mounting rubbers from anti-roll bar.


REAR SUSPENSION



SP64 0061

7. Remove nuts and bolts securing anti-roll bar links to anti-roll bar.
8. Check anti-roll bar link bushes for wear.

Refit

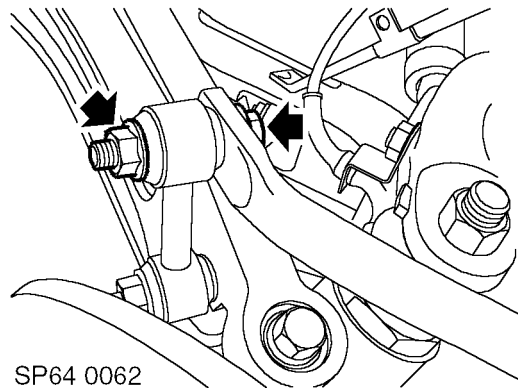
1. Clean anti-roll bar and anti-roll bar links.
2. Correctly position links to anti-roll bar, fit bolts and nuts but do not tighten at this stage.
3. Fit mounting rubbers to anti-roll bar.
4. Correctly position anti-roll bar, align anti-roll bar links to LH and RH trailing arms. Fit bolts and nuts but do not tighten at this stage.
5. Position mounting rubbers, fit clamps, fit and tighten nuts to 22 Nm.
6. Fit heat shield - rear silencer.
 [SILENCER HEAT SHIELD, page 30-3.](#)
7. With the weight of the vehicle on the rear suspension, tighten anti-roll bar link nuts and bolts to 35 Nm.
8. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
9. Remove stand(s) and lower vehicle.

LINK - ANTI-ROLL BAR

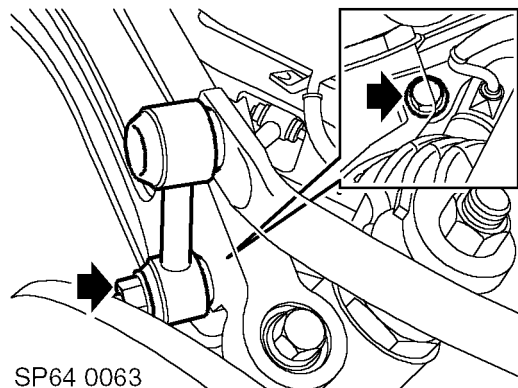
 64.35.24

Remove

1. Raise rear of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel(s).



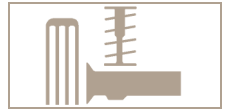
3. Remove nut and bolt securing anti-roll bar link to anti-roll bar.
NOTE: Note fitted position of link retaining nuts and bolts and anti-roll bar to link.



4. Remove nut and bolt securing anti-roll bar link to trailing arm and remove link.

Refit

1. Clean anti-roll bar link.
2. Correctly position anti-roll bar link to trailing arm, fit bolt and nut but do not tighten at this stage.
3. Correctly position anti-roll bar to anti-roll bar link, fit bolt and nut but do not tighten at this stage.



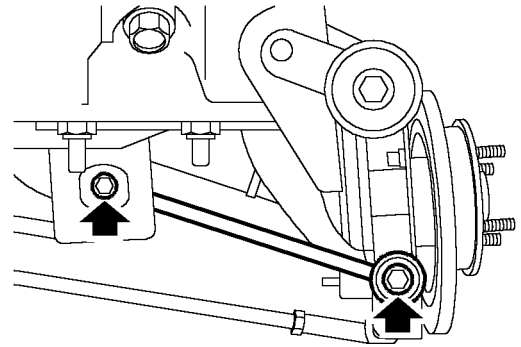
4. With the weight of the vehicle on the rear suspension, tighten anti-roll bar link nuts and bolts to 35 Nm.
5. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
6. Remove stand(s) and lower vehicle.

LOWER LINK - REAR

🔑 64.35.13

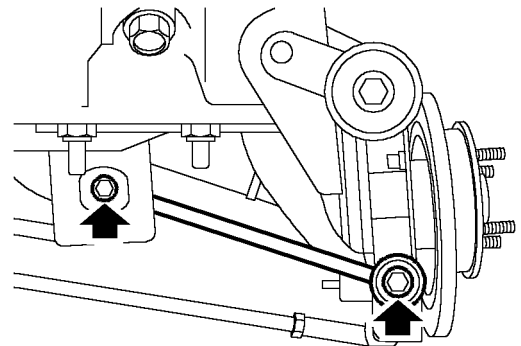
Remove

1. Raise rear of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel.



SP64 0036

3. Remove lower link access grommet from subframe.



SP64 0036

4. Remove 2 bolts securing lower link to subframe and rear hub.
5. Remove lower link assembly.
6. Collect lower link bush spacer.

Refit

1. Position lower link to subframe and rear hub.
2. Fit lower link bush spacer.
3. With the weight of the vehicle on the suspension, tighten lower link to subframe bolt to 85 Nm and lower link to rear hub bolt to 100 Nm.
4. Fit bolt access grommet to subframe.
5. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
6. Remove stands and lower vehicle.

REAR SUSPENSION

TRACK CONTROL ARM

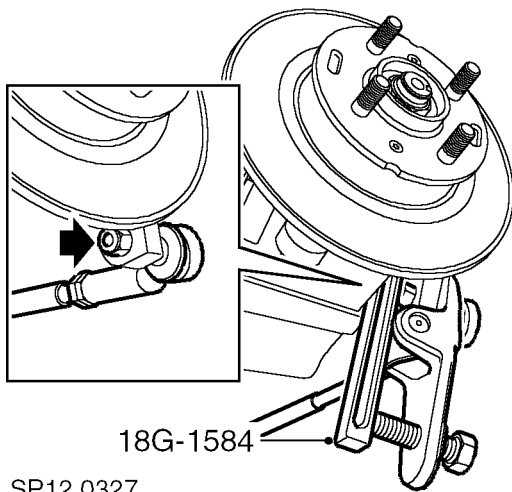
🔑 64.35.14

Remove

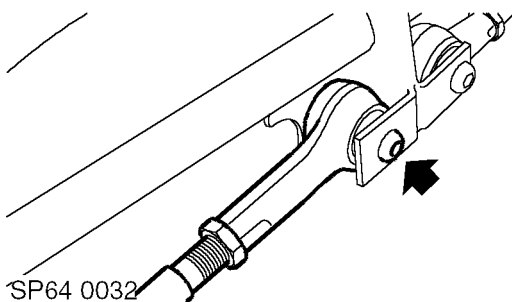
1. Raise rear of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.



3. Remove nut securing track control arm ball joint to rear hub.
4. Fit slave nut to ball joint threads, position tool 18G 1584, release ball joint taper from rear hub. Remove slave nut.



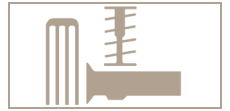
5. Remove torx bolt securing track control arm to subframe and remove track control arm.

Refit

1. Clean ball joint taper, track control arm and subframe mating faces.
2. Position track control arm to subframe and rear hub.
3. Fit and tighten torx bolt securing track control arm to rear subframe to 60 Nm.

4. Fit and tighten nut securing track control arm to rear hub to 38 Nm.
5. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
6. Remove stands and lower vehicle.
7. Check rear wheel alignment.

 [REAR WHEEL ALIGNMENT, page 57-I.](#)

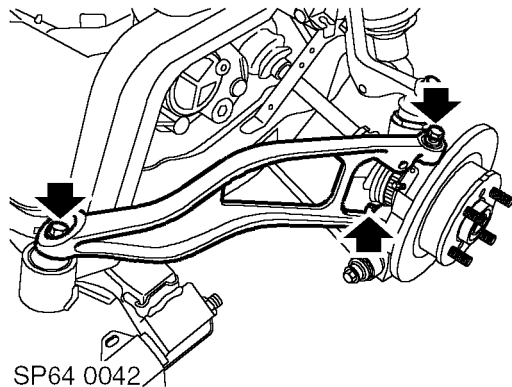


TRAILING ARM

🔑 64.35.46

Remove

1. Raise rear of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel.
3. Remove wheel arch access panel (RH side only).



4. Remove nut and bolt securing trailing arm to trailing arm compliance bush.
5. Remove 2 bolts securing trailing arm to rear hub.
6. Manoeuvre trailing arm from vehicle.

Refit

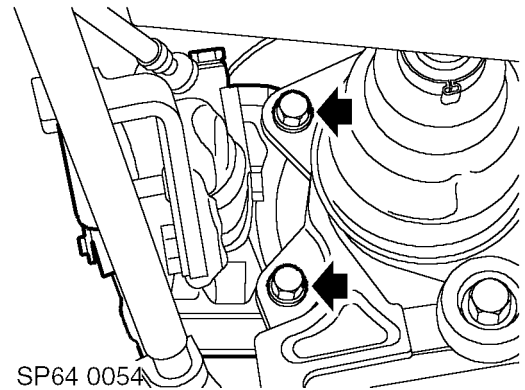
1. Clean mating faces of trailing arm and trailing arm bushes.
2. Clean and thoroughly dry bolts securing trailing arm to rear hub.
3. Manoeuvre trailing arm into position.
4. Apply Loctite 242 to the first 3 threads of bolts securing trailing arm to rear hub.
5. Fit bolts securing trailing arm to rear hub, do not tighten at this stage.
6. Fit nut and bolt securing trailing arm to trailing arm compliance bush and tighten to 100 Nm.
7. Tighten trailing arm to hub bolts to 60 Nm.
8. Fit wheel arch access panel and secure with screws (RH side only).
9. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
10. Remove stands and lower vehicle.

BUSH - TRAILING ARM

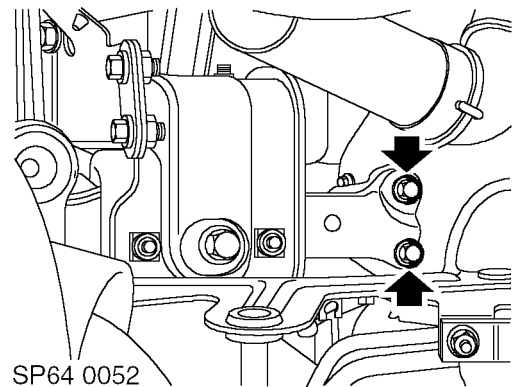
🔑 64.35.48

Remove

1. Disconnect battery earth lead.
2. Raise vehicle on a 2 post ramp.
3. Remove road wheel(s).
4. Remove rear silencer heat shield.
 [SILENCER HEAT SHIELD, page 30-3.](#)
5. Remove trailing arm.
 [TRAILING ARM, page 64-11.](#)

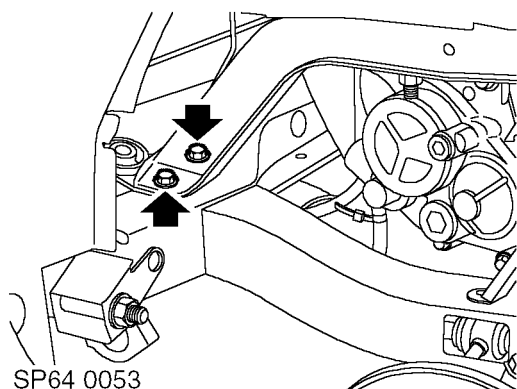


6. Remove 2 bolts securing brake caliper to hub. Release caliper from hub and tie aside.
CAUTION: Do not allow caliper to hang on brake hose.

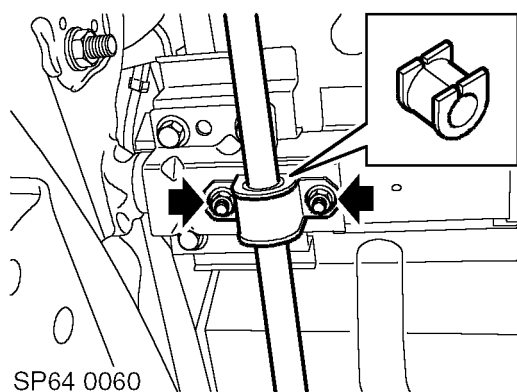


7. Loosen 2 bolts securing rear of butress to subframe.

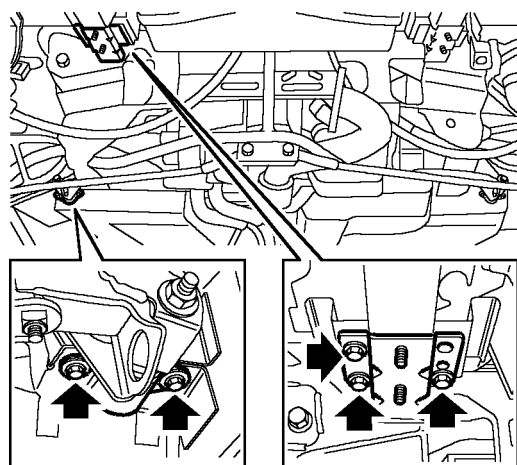
REAR SUSPENSION



- Remove 2 bolts securing front of buttress to subframe.



- Remove 4 nuts securing anti-roll bar mounting clamps to both rear subframe mountings and collect clamps.
- Support subframe with trolley jack.



- Remove 2 bolts securing front subframe mounting to body.

- Remove 3 bolts securing rear subframe mounting to body.
- Carefully lower subframe on trolley jack until sufficient room is gained to remove the trailing arm bush.
- Support the weight of the gearbox and raise sufficiently to release trailing arm bush from the buttress.

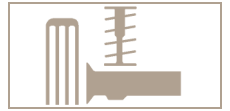
CAUTION: To prevent damage to components, cushion the jack pad with a block of wood or hard rubber.

- Release trailing arm bush from subframe and remove trailing arm bush.

NOTE: If trailing arm bush mounting includes a separate snubber plate this must be retained and refitted in the same orientation as originally fitted.

Refit

- Position trailing arm bush to subframe and align to buttress, fit bolts securing buttress, but do not tighten at this stage.
- Remove gearbox support.
- Raise subframe on trolley jack, fit and tighten bolts securing rear subframe mounting to body to 45 Nm.
- Position anti-roll bar, fit clamps, fit and tighten nuts to 22 Nm.
- Fit and tighten bolts securing front subframe mounting to body to 30 Nm.
- Tighten buttress bolts to 45 Nm.
- Fit trailing arm.
 - [TRAILING ARM, page 64-11.](#)
- Clean mating faces of caliper and hub.
- Position caliper to hub, fit and tighten bolts to 85 Nm.
- Fit heat shield - rear silencer.
 - [SILENCER HEAT SHIELD, page 30-3.](#)
- Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
- Lower vehicle on ramp.
- Connect battery earth lead.



BUSH - TRAILING ARM TO HUB

🔑 64.35.49

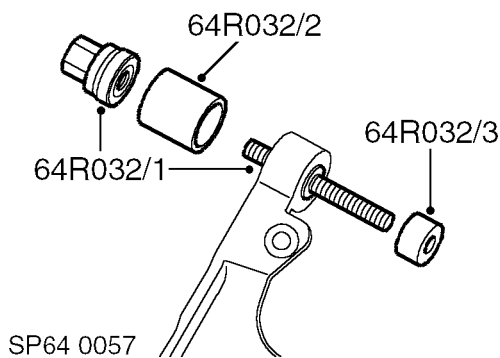
Remove

1. Raise rear of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.
3. Remove trailing arm.

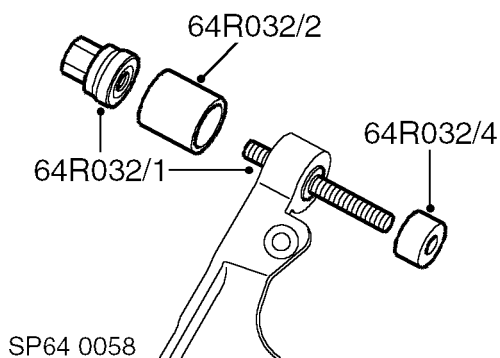
👉 [TRAILING ARM, page 64-11.](#)



4. Note the fitted position of trailing arm bushes.
5. Using tool 64R032 with adaptor 64R032/3 remove trailing arm bushes.

Refit

1. Clean trailing arm bushes and bush recesses.



2. Ensure correct orientation of trailing arm bushes.
 3. Using tool 64R032 with adaptor 64R032/4 fit trailing arm bushes.
 4. Fit trailing arm.
- 👉 [TRAILING ARM, page 64-11.](#)
5. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
 6. Remove stands and lower vehicle.

BUSH - ARM ASSEMBLY - UPPER

🔑 64.35.56

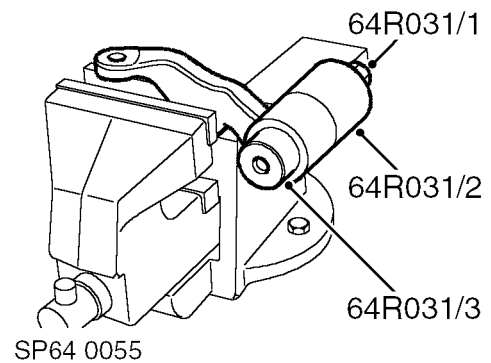
Remove

1. Raise rear of vehicle and support on stand(s).

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.
3. Remove upper suspension arm.

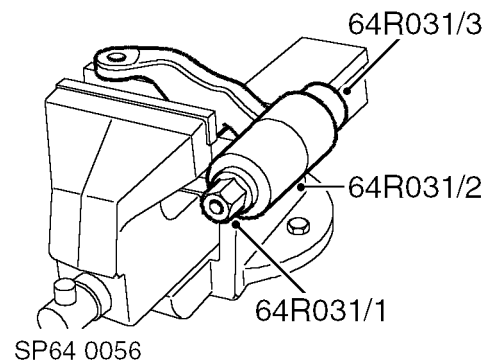
👉 [ARM ASSEMBLY - UPPER, page 64-14.](#)



4. Position upper suspension arm in vice.
5. Note the fitted position of upper arm bush.
6. Using 64R031 remove upper arm bush.

Refit

1. Clean upper arm bush and bush mating face.



2. Ensure correct orientation of upper arm bush.
 3. Using 64R031 fit upper arm bush.
 4. Remove upper arm assembly from vice.
 5. Fit upper suspension arm.
- 👉 [ARM ASSEMBLY - UPPER, page 64-14.](#)
6. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
 7. Remove stands and lower vehicle.

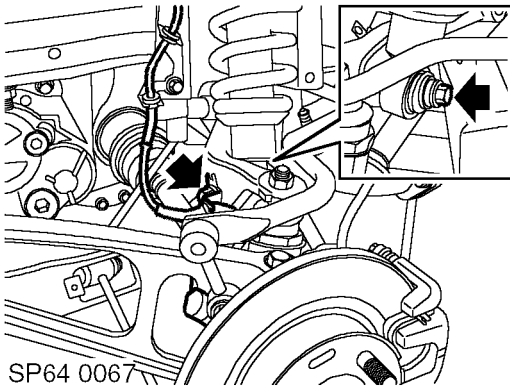
REAR SUSPENSION

ARM ASSEMBLY - UPPER

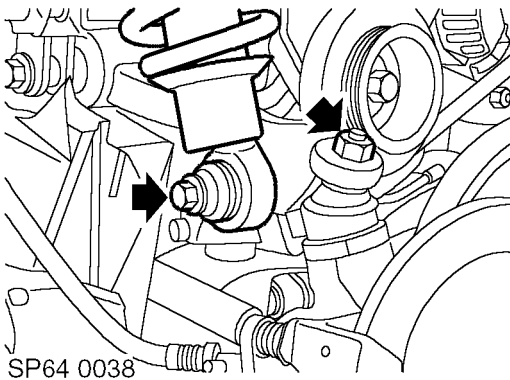
🔑 64.35.60

Remove

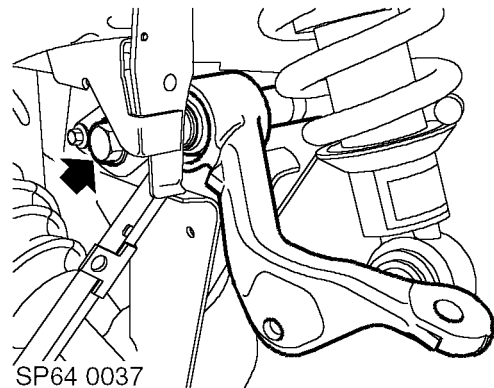
1. Raise rear of vehicle and support on stand(s).
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel.



3. Remove nut and bolt securing damper to upper suspension arm.
4. Release ABS sensor harness bracket.



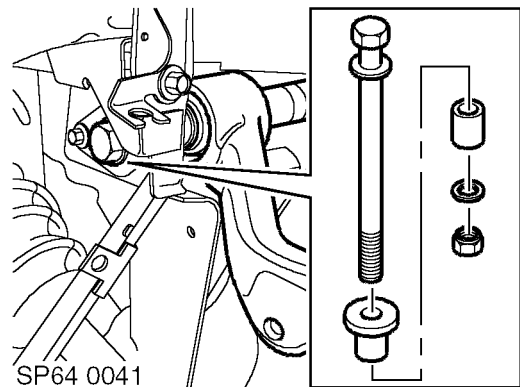
5. Remove and discard lock nut securing ball joint to upper suspension arm.
6. Fit slave nut to ball joint threads, position tool 18G-1584, release ball joint taper from upper suspension arm. Remove slave nut.



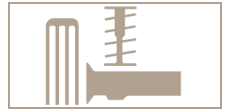
7. Remove nut and bolt securing upper arm to subframe.
8. Noting the position of spacers, remove upper arm and spacers.

Refit

1. Clean upper arm bolt, spacers and upper arm and subframe mating faces,




2. Position upper arm and spacers. Ensure top hat spacer is fitted correctly.
3. Fit nut and bolt securing upper arm, do not tighten at this stage.
4. Position ball joint to upper suspension arm, fit new lock nut and tighten nut to 54 Nm.
5. Align damper to upper arm, fit bolt and tighten to 100 Nm.
6. Align ABS harness bracket fit nut and tighten to 30 Nm.
7. With the weight of the vehicle on the suspension, tighten upper arm bolt to 100 Nm.
8. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
9. Remove stand(s) and lower vehicle.

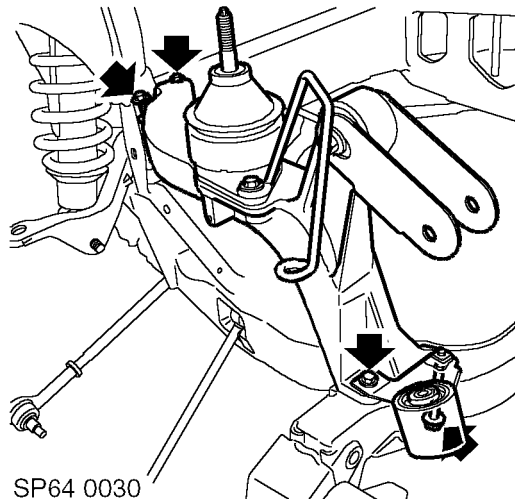


SUB FRAME - REAR SUSPENSION

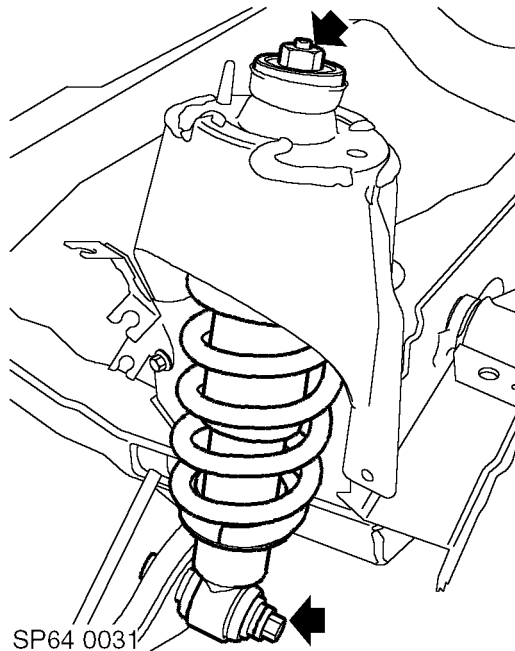
🔑 64.35.78

Remove

1. Remove engine and gearbox assembly.
 **ENGINE & GEARBOX ASSEMBLY - REMOVE FOR ACCESS & REFIT, page 12-18.**
2. Collect LH trailing arm bush.

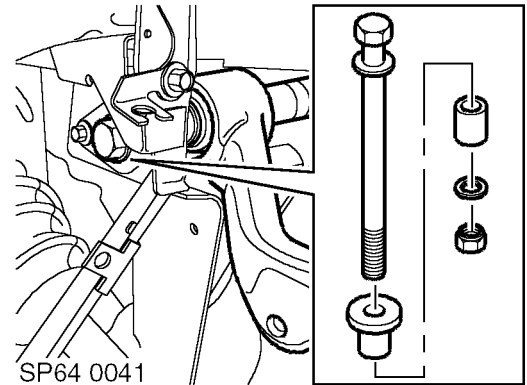


3. Remove 4 bolts securing RH buttress to subframe, remove buttress and trailing arm bush.

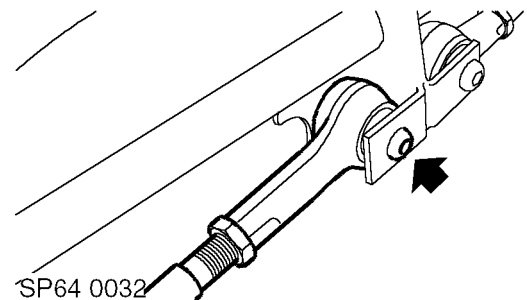


4. Position 5 mm Allen key in top of damper shaft, remove nut securing damper to subframe turret.
5. Remove retaining washer and rubber bush.

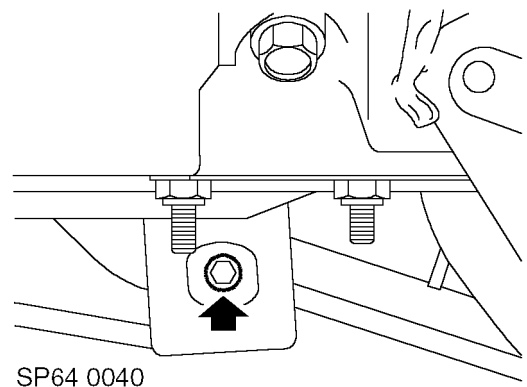
6. Remove bolt securing damper to upper suspension arm, remove damper/spring assembly and collect spring isolator.



7. Remove nut and bolt securing upper arm to subframe.
8. Noting the position of spacers, remove upper arm and spacers.

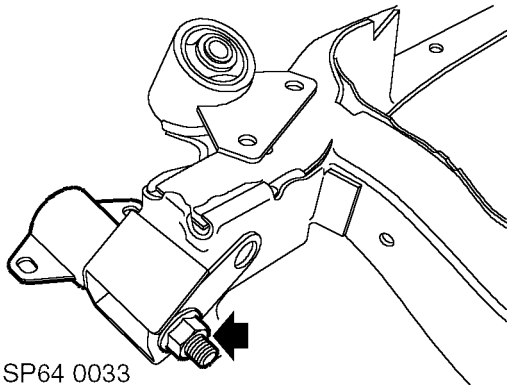


9. Remove torx bolt securing track control arm to subframe and remove track control arm.



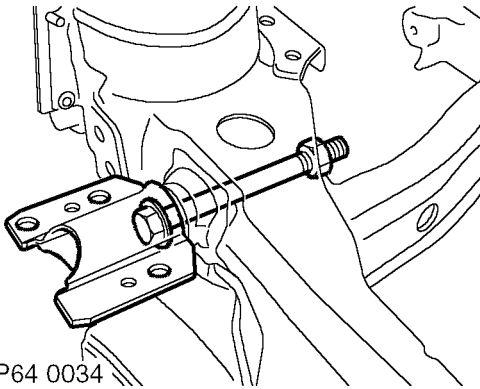
10. Remove access grommet and remove bolt securing lower link to subframe.
11. Noting the fitted position remove lower link.
12. Collect lower link bush spacer.
13. Repeat operations for opposite side of suspension.

REAR SUSPENSION



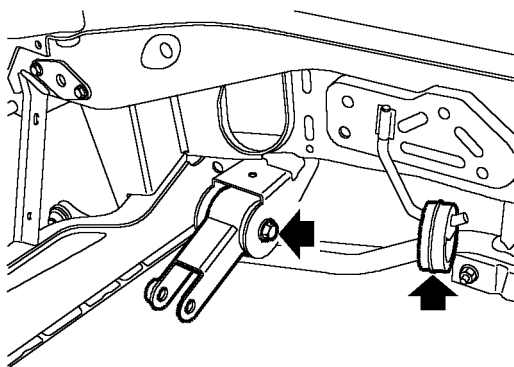
SP64 0033

14. Remove nut and bolt securing front mounting to subframe and collect mounting.



SP64 0034

15. Remove nut and bolt securing rear mounting to subframe and collect mounting.
16. Repeat operations for opposite side of suspension.





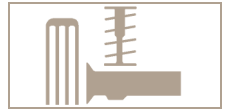
SP64 0035

17. Remove bolt securing rear engine mounting tie-rod to subframe and collect tie-rod.
18. Remove exhaust mounting rubber from subframe.

Refit

1. Fit exhaust mounting rubber to subframe.

2. Position LH and RH front mountings to subframe, fit and tighten nuts and bolts to 100 Nm.
3. Position LH and RH rear mountings to subframe, fit and tighten nuts and bolts to 100 Nm.
4. Position rear engine mounting tie-rod to subframe, fit and tighten bolt to 85 Nm.
5. Position RH buttress and trailing arm bush to subframe, fit and tighten bolts to 45 Nm.
6. Ensuring correct orientation, position lower link and lower link bush spacer, fit bolt but do not tighten at this stage.
7. Position upper arm and spacers. Ensure top hat spacer is fitted correctly.
8. Fit nut and bolt securing upper arm, do not tighten at this stage.
9. Correctly position spring isolator; ensure locating tag is located through front hole in subframe turret.
10. Position damper assembly in subframe turret, fit top bush, washer and nut. Do not tighten nut at this stage.
11. Position damper assembly to upper suspension arm, fit and tighten bolt to 100 Nm.
12. Position 5 mm Allen key in top of damper shaft, tighten nut to 45 Nm
13. Position RH track control arm to subframe, fit and tighten torx bolt to 60 Nm.
14. Repeat operations for opposite side of suspension.
15. Position LH trailing arm bush.
16. Fit engine and gearbox assembly.
 -  **ENGINE & GEARBOX ASSEMBLY - REMOVE FOR ACCESS & REFIT, page 12-18.**
17. With the weight of the vehicle on the suspension tighten lower link to subframe bolt to 85 Nm.
18. With the weight of the vehicle on the suspension tighten upper arm bolt to 100 Nm.
19. Fit bolt access grommet to subframe.
20. Check rear wheel alignment.
 -  **REAR WHEEL ALIGNMENT, page 57-1.**

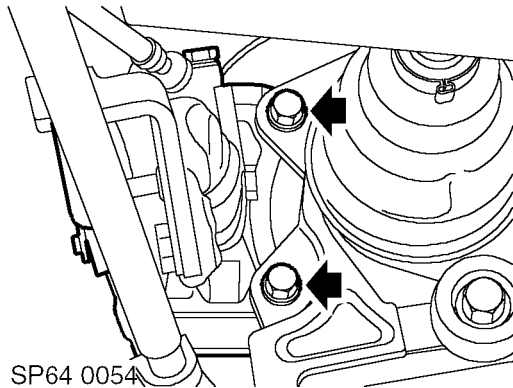


REAR SUB FRAME - LH - FRONT MOUNTING

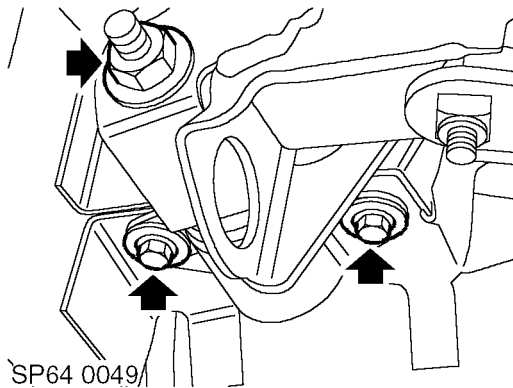
🔑 64.35.90

Remove

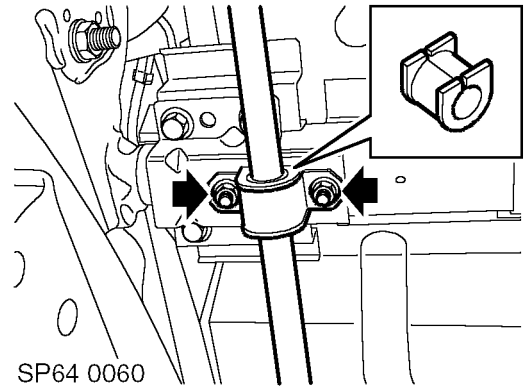
1. Raise vehicle on a 2 post ramp.
2. Remove road wheel(s).
3. Remove rear silencer heat shield.
👉 [SILENCER HEAT SHIELD, page 30-3.](#)



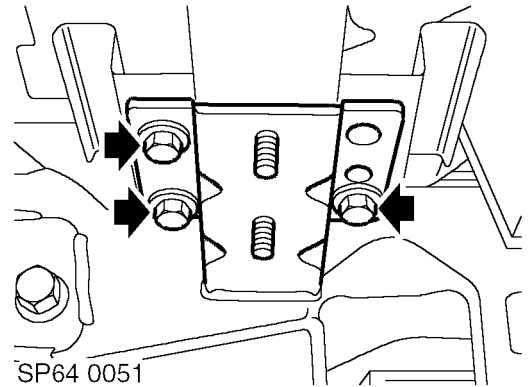
4. Remove 2 bolts securing brake caliper to hub. Release caliper from hub and tie aside.
CAUTION: Do not allow caliper to hang on brake hose.
5. Support subframe with trolley jack.



6. Remove nut from front subframe mounting centre bolt.
7. Remove 2 bolts securing front subframe mounting to body.



8. Remove 4 nuts securing anti-roll bar mounting clamps to both rear subframe mountings and collect clamps.



9. Remove 3 bolts securing rear subframe mounting to body.
10. Carefully lower subframe on trolley jack until sufficient room is gained to remove centre bolt and front subframe mounting.

Refit

1. Position mounting and centre bolt to subframe, fit nut but do not tighten at this stage.
2. Raise subframe on trolley jack, fit and tighten bolts securing rear subframe mounting to body to 45 Nm.
3. Position anti-roll bar; fit clamps, fit and tighten nuts to 22 Nm.
4. Fit and tighten bolts securing front subframe mounting to body to 30 Nm.
5. Tighten front subframe mounting centre nut and bolt to 100 Nm.
6. Clean mating faces of caliper and hub.
7. Position caliper to hub, fit and tighten bolts to 85 Nm.
8. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
9. Fit heat shield - rear silencer.
👉 [SILENCER HEAT SHIELD, page 30-3.](#)
10. Lower vehicle on ramp.

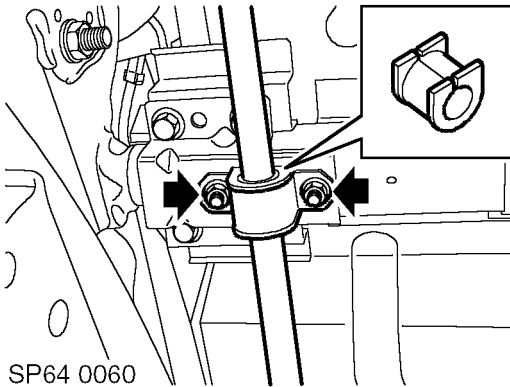
REAR SUSPENSION

REAR SUB FRAME - LH - REAR MOUNTING

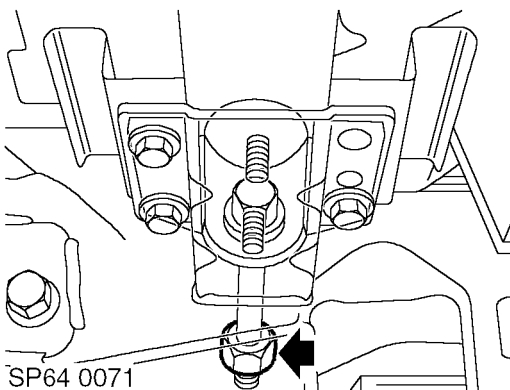
🔑 64.35.91

Remove

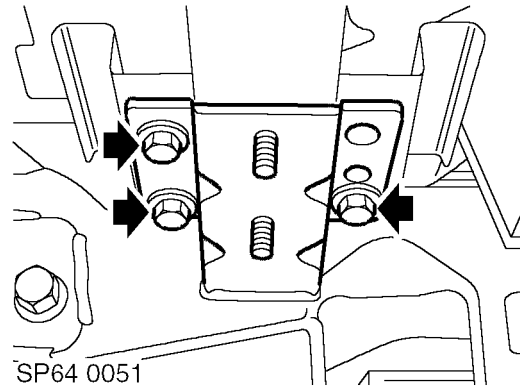
1. Raise vehicle on a 2 post ramp.
2. Remove heat shield - rear silencer:
👉 [SILENCER HEAT SHIELD](#), page 30-3.



3. Remove 2 nuts securing anti-roll bar clamp to subframe, remove clamp and rubber mounting.
4. Support subframe with trolley jack.



5. Remove centre nut securing rear subframe mounting to subframe.



6. Remove 3 bolts securing rear subframe mounting to body.
7. Carefully lower subframe on trolley jack, remove centre bolt and rear subframe mounting.

Refit

1. Position mounting to subframe, fit centre bolt, fit nut but do not tighten at this stage.
2. Raise subframe on jack.
3. Fit and loosely tighten one bolt each side of rear subframe mounting to hold mounting in position. DO NOT fit anti-roll bar bracket at this stage.
4. Tighten centre bolt and nut to 100 Nm.
5. Remove bolts holding rear subframe mounting in position.
6. Position anti-roll bar bracket to subframe, fit and tighten rear suspension mounting to body bolts to 45 Nm.
7. Position mounting rubber and clamp to anti-roll bar, fit and tighten nuts to 22 Nm.
8. Fit heat shield - rear silencer:
👉 [SILENCER HEAT SHIELD](#), page 30-3.
9. Lower vehicle on ramp.



FRONT BRAKE DISC - CHECK THICKNESS AND RUN-OUT

🔑 70.10.14

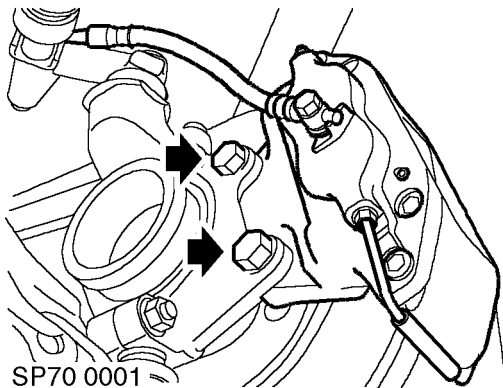
Check

1. Raise front of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Check brake disc run-out.

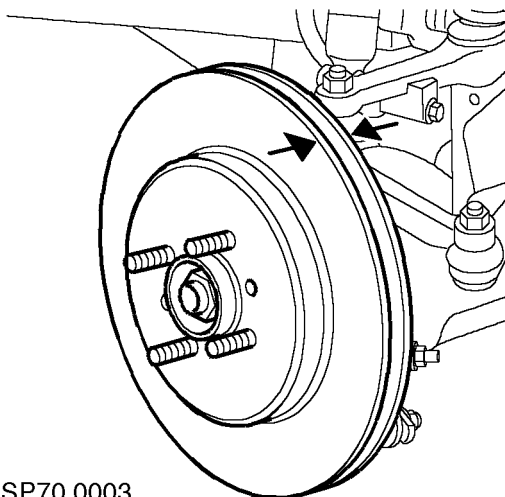
👉 **FRONT BRAKE DISC - CHECK THICKNESS AND RUN-OUT, page 70-1.**



SP70 0001

3. Remove 2 bolts securing brake caliper to hub. Release caliper from hub and tie aside.

CAUTION: Do not allow caliper to hang on brake hose.

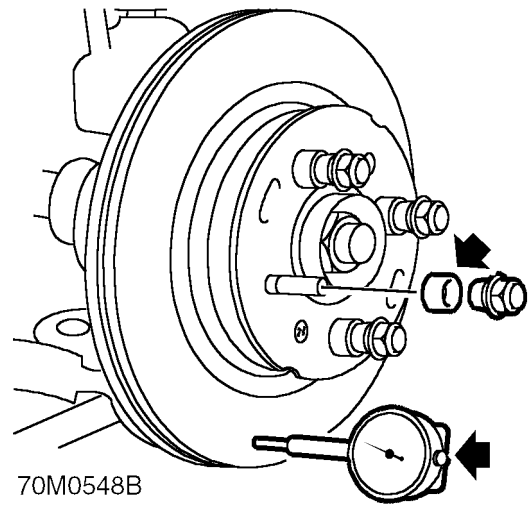


SP70 0003

4. At 4 points around disc, measure disc thickness using a micrometer; renew disc if less than service limit:

Disc thickness, new = 24.00 mm.

Service limit = 22.00 mm.



70M0548B

5. Position a suitable spacer to each wheel stud and secure brake disc using wheel nuts. Tighten wheel nuts in a diagonal sequence to 70 Nm.
6. Secure and position dial test indicator probe 6 mm from outer edge of brake disc. Zero dial test indicator; rotate brake disc one complete turn to measure disc run-out.

Disc run-out limit = 0.05 mm.

7. If run-out exceeds limit, mark disc to drive flange location; remove wheel nuts, spacers and disc retaining screws. Remove disc, rotate 180°; refit disc to drive flange. Fit and tighten disc retaining screws to 7 Nm, fit spacers and wheel nuts and tighten wheel nuts in a diagonal sequence to 70 Nm.
8. Renew disc if run-out exceeds limit even after re-positioning of disc on drive flange.

CAUTION: Brake discs must be renewed in pairs, unless one disc requires changing before 1000 miles (1500 kilometres) from new.

9. Untie caliper; position caliper to hub, fit and tighten bolts to 85 Nm.
10. Remove wheel nuts and spacers.
11. Apply foot brake several times to enable brake pads to position correctly.
12. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
13. Remove stand(s) and lower vehicle.

BRAKES

REAR BRAKE DISC - CHECK

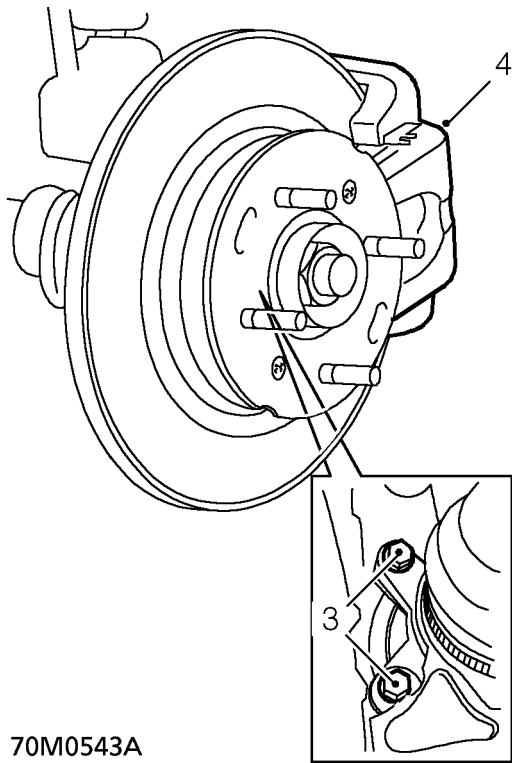
🔑 70.10.35

Check

1. Raise rear of vehicle.

WARNING: Support on safety stands.

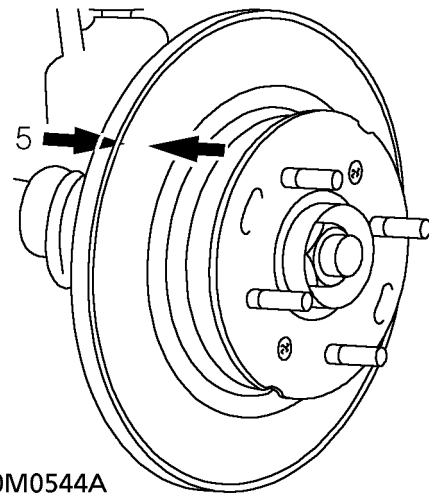
2. Remove road wheel(s).



70M0543A

3. Remove 2 bolts securing brake caliper to hub.
4. Release caliper from disc. Tie caliper clear of brake disc, ensuring that weight of caliper is supported.

CAUTION: Do not allow caliper to hang on brake hose as weight of caliper may damage hose.



70M0544A

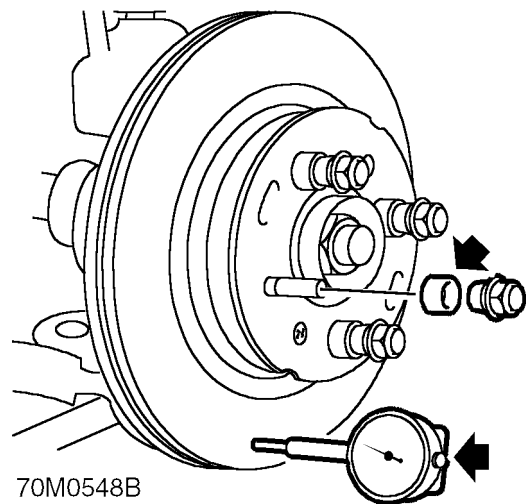
5. At 4 points around disc, measure disc thickness using a micrometer; renew disc if less than service limit or if maximum variation is exceeded:

Disc thickness, new = 10.00 mm.

Service limit = 8.00 mm.

Thickness variation, maximum = 0.015 mm.

NOTE: Maximum variation limit: Both brake discs must be renewed at the same time, unless one disc requires changing at 1000 mile service. Only in this situation is renewal of one disc permissible.



70M0548B

6. Position a suitable spacer to each wheel stud and secure brake disc using wheel nuts. Tighten wheel nuts in a diagonal sequence to 70 Nm.
7. Secure and position dial test indicator probe 6 mm from outer edge of brake disc. Zero dial test indicator; rotate brake disc one complete turn to measure disc run-out.

Disc run-out limit = 0.05 mm.



8. If run-out exceeds limit, mark disc to show position on drive flange; remove 2 screws retaining disc, remove disc and refit after rotating 180°. Tighten disc securing screws to 7 Nm and re-check disc run-out.
9. Renew disc if run-out exceeds limit even after re-positioning of disc on drive flange.
10. Untie caliper and support caliper weight.
11. Align caliper carrier to hub ensuring correct positioning of brake pads. Fit and tighten bolts to 85 Nm.
12. Apply foot brake several times to enable brake pads to position correctly.
13. Remove wheel nuts and spacers.
14. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
15. Remove stand(s) and lower vehicle.

BRAKE SYSTEM - BLEED

70.25.02

The following procedure covers bleeding the complete system but where only the primary or secondary circuit have been disturbed in isolation, it should only be necessary to bleed that system. Partial bleeding of the hydraulic system is only permissible if a brake pipe or hose has been disconnected with only minor loss of fluid.

CAUTION: Never re-use fluid that has been bled from the system.

Bleed

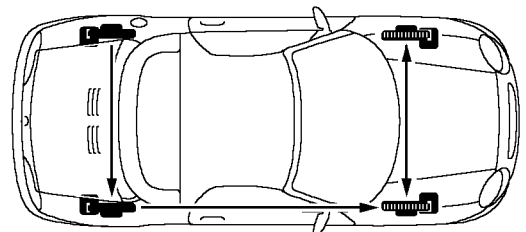
1. Raise front and rear of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Check all pipe and hose connections are tight and there are no signs of leakage.
3. Top-up brake fluid level to 'MAX' mark.

CAUTION: Only use new brake fluid of the recommended grade. See *INFORMATION, Capacities, Fluids and Lubricants*.

Bleed sequence - ABS systems with "Sports" front brake calipers fitted:



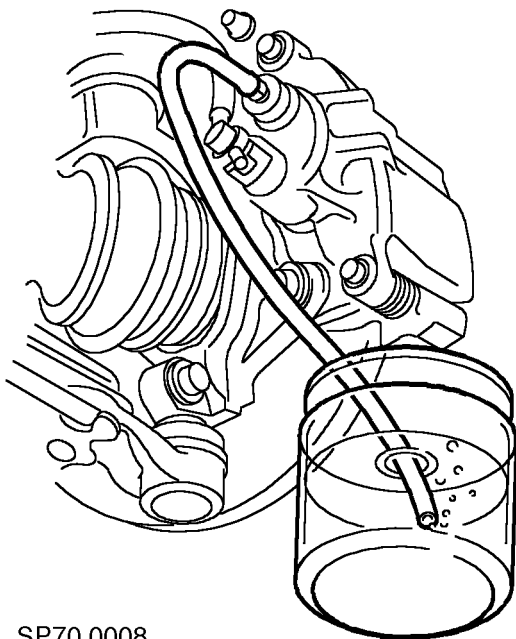
SP70 0007

4. LH rear to RH rear RH front to LH front

NOTE: Two bleed screws are fitted on each brake caliper. When bleeding the brake system, bleed the outer bleed screw followed by the inner bleed screw in the same sequence as shown above.

CAUTION: Braking efficiency may be seriously impaired if the wrong bleed sequence is used.

5. Clean area around bleed screws and remove dust seals.



SP70 0008

6. Attach bleed tube to LH rear brake caliper bleed screw, submerge free end of tube in brake fluid in a clear container.
7. Apply pressure to brake pedal several times, then apply steady pressure.
8. Loosen bleed screw to release brake fluid and air. Allow pedal to return unassisted.
9. Depress brake pedal steadily through its full stroke and allow to return unassisted. Repeat procedure until a flow of clean air-free fluid is purged into container then, whilst holding brake pedal at end of downward stroke, tighten bleed screw to 10 Nm.
CAUTION: Maintain brake fluid level above 'MIN' mark during this procedure.

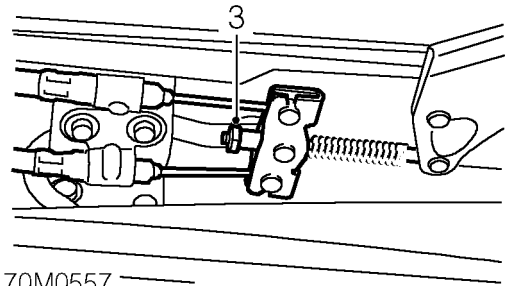
10. Top-up brake fluid level.
11. Repeat procedure at each wheel in the sequence shown.
CAUTION: Braking efficiency may be seriously impaired if wrong bleed sequence is used.
12. Remove bleed tube from bleed screw and fit bleed screw dust cap.
13. Apply brakes and check for leakage.
14. Road test vehicle. Check brake pedal for short firm travel when brakes are applied.

HANDBRAKE - ADJUST

🔑 70.35.10

Adjust

1. Raise rear of vehicle.
WARNING: Support on safety stands.
2. Remove front console storage bin.



70M0557

3. Tighten adjuster nut $\frac{1}{2}$ turn and check caliper lever clearance.

NOTE: Depress brake pedal several times to ensure that automatic adjustment clearance is taken up.

CAUTION: Do not depress brake pedal until caliper adjustment clearance is correct.

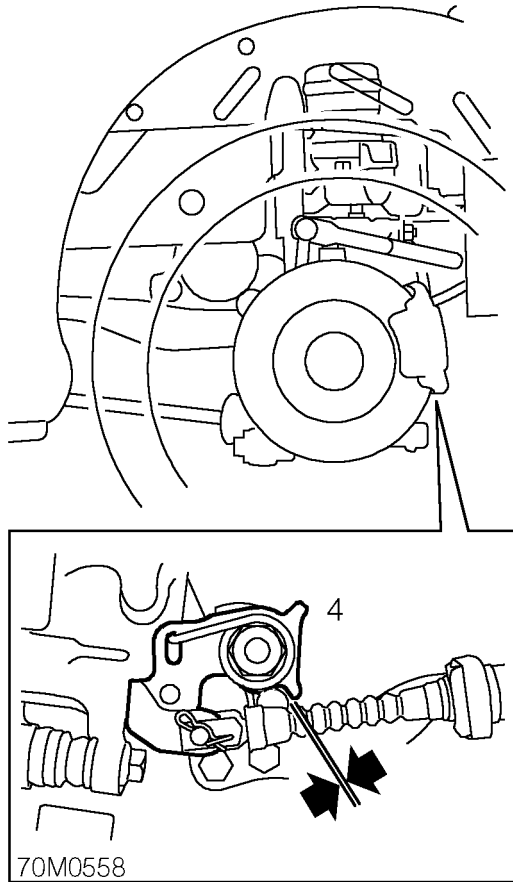


BRAKE LIGHT SWITCH - ADJUST

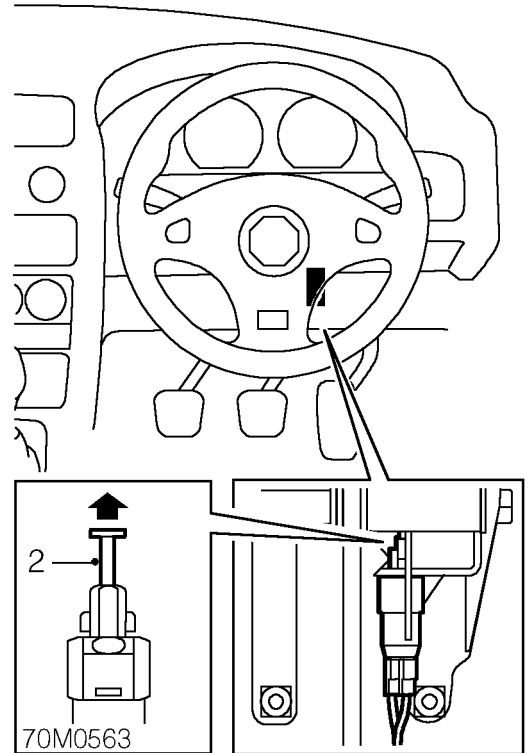
🔑 70.35.41

Adjust

1. Depress and hold brake pedal.



4. Repeat adjustment until caliper lever clearances are between 1 & 2 mm each side.
5. Fit storage bin.
6. Remove stand(s) and lower vehicle.



2. Reset switch by pulling plunger.
3. Release brake pedal to set switch adjustment.

BRAKES



FRONT BRAKE DISC

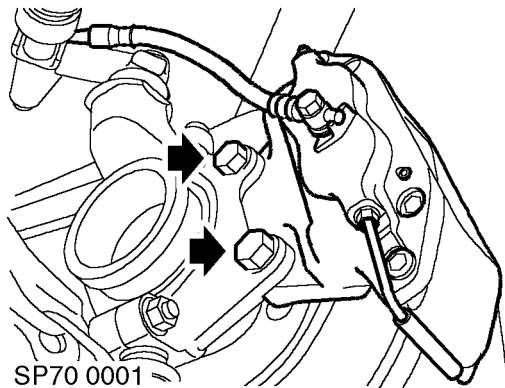
🔑 70.10.10

Remove

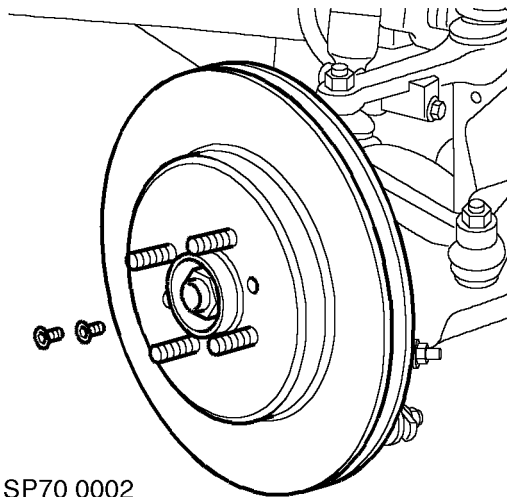
1. Raise front of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel(s).



3. Remove 2 bolts securing brake caliper assembly to hub.
4. Remove caliper assembly from hub and tie aside.
CAUTION: Do not allow caliper to hang on brake hose.



5. Remove 2 screws securing brake disc to drive flange.
6. Remove brake disc.

CAUTION: Brake discs must be renewed in pairs, unless one disc requires changing before 1000 miles (1500 kilometres) from new.

Refit

1. Wire brush drive flange to remove all corrosion deposits. Clean new brake disc.
2. Fit brake disc to drive flange, fit screws and tighten to 7 Nm.
3. Examine brake pads and renew if necessary.
4. Check brake disc run-out.
[🔧 FRONT BRAKE DISC - CHECK THICKNESS AND RUN-OUT, page 70-1.](#)
5. Position brake caliper to hub, fit and tighten bolts to 85 Nm.
6. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
7. Remove stand(s) and lower vehicle.

BRAKES

REAR BRAKE DISC

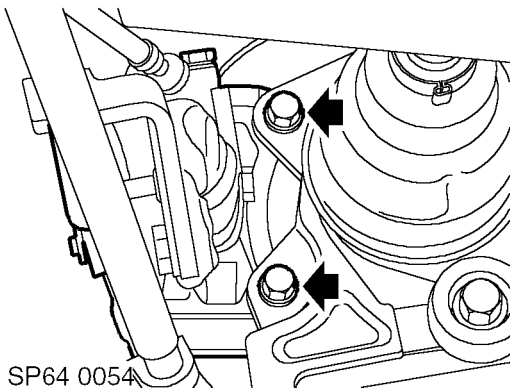
🔑 70.10.33

Remove

1. Raise rear of vehicle.

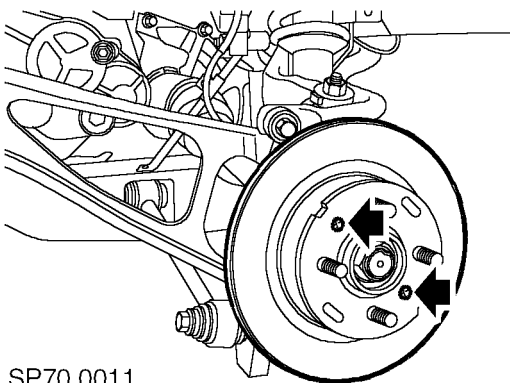
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.



3. Remove 2 bolts securing caliper assembly to hub.
4. Release caliper from disc. Tie caliper clear of brake disc, ensuring the weight of the caliper is supported.

CAUTION: Do not allow caliper to hang on brake hose.




5. Remove 2 screws securing brake disc to drive flange.
6. Remove brake disc.

Refit

1. Wire brush drive flange to remove all corrosion deposits. Clean new brake disc.

CAUTION: Brake discs must be renewed in pairs, unless one disc requires changing before 1000 miles (1500 kilometres) from new.

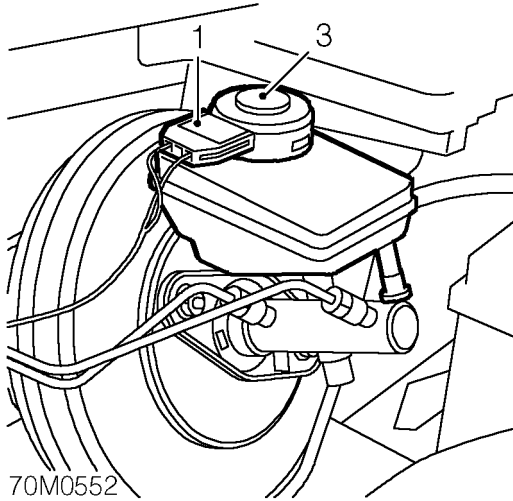
2. Fit brake disc to drive flange. Tighten screws to 7 Nm.
3. Check brake disc runout.
 **REAR BRAKE DISC - CHECK, page 70-2.**
4. Examine brake pads and renew if necessary.
5. Untie caliper, position caliper to hub, fit and tighten bolts to 85 Nm.
6. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
7. Remove stands and lower vehicle.



FLUID LEVEL SWITCH

🔑 70.25.08

Remove



1. Disconnect switch multiplug.
2. Clean area around reservoir cap.
3. Remove cap/switch assembly.

CAUTION: Do not allow brake fluid to contact paint finished surfaces as paint may be damaged. If spilled, remove fluid and clean area with clean warm water.

Refit

1. Check and top-up fluid level.
2. Fit cap/switch assembly.
3. Connect switch multiplug.

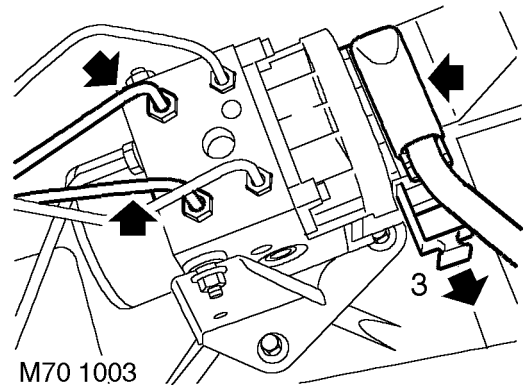
ABS HYDRAULIC MODULATOR

🔑 70.25.12

Remove

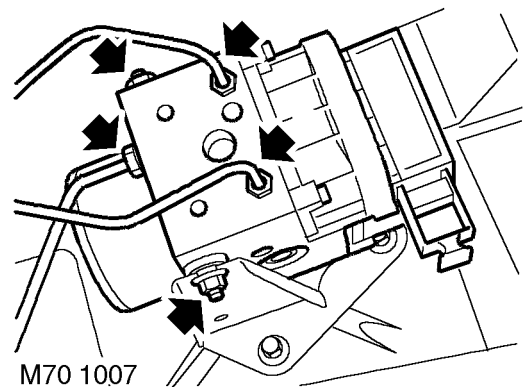
1. Disconnect battery earth lead.
2. Position cloth under modulator to absorb brake fluid.

CAUTION: Do not allow brake fluid to contact paint finished surfaces as paint may be damaged. If spilled, remove fluid and clean area with clean warm water.



3. Release clip securing ABS modulator multiplug and disconnect multiplug.
4. Disconnect 2 inlet brake pipe unions from top of modulator.


CAUTION: Plug the connections.




5. Disconnect 3 outlet brake pipe unions from modulator.
6. Loosen 2 nuts securing modulator to mounting bracket.
7. Release modulator from mounting bracket and remove modulator.

CAUTION: Plug the connections.

Refit

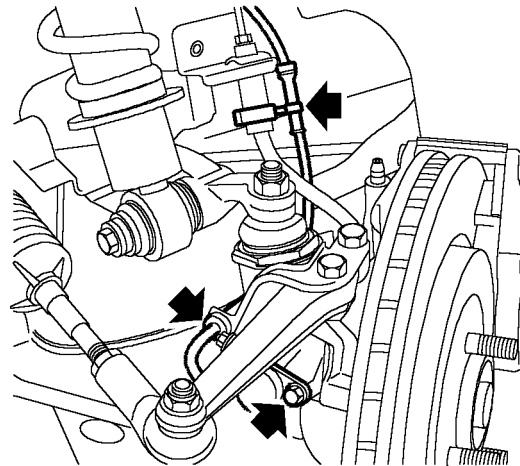
1. Remove 2 mounting rubbers and studs from modulator.
2. Fit mounting rubbers and studs to new modulator.
3. Fit modulator to mounting bracket and tighten mounting nuts to 10 Nm.
4. Connect brake pipe unions to modulator, ensuring pipes are connected to their correct ports as follows:
MC 1 = Master cylinder primary
MC 2 = Master cylinder secondary
RF = Right hand front
LF = Left hand front
R = Right & Left hand rear
5. Connect multiplug to modulator and secure clip.
6. Bleed brakes.
 **BRAKE SYSTEM - BLEED**, page 70-3.
7. Connect battery earth lead.

ABS SENSOR - FRONT WHEEL

 **70.25.32**

Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.
WARNING: Support on safety stands.
3. Remove road wheel(s).



SP12 0362

4. Disconnect ABS sensor lead from main harness.
5. Release ABS sensor lead from clips on subframe turret.
6. Remove bolt securing ABS sensor to hub.
7. Remove ABS sensor and spacer from hub.

Refit

1. Fit ABS sensor and spacer to hub and tighten bolt to 10 Nm.
2. Fit ABS sensor lead to clips on subframe turret.
3. Connect ABS sensor lead to main harness.
4. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
5. Remove stand(s) and lower vehicle.

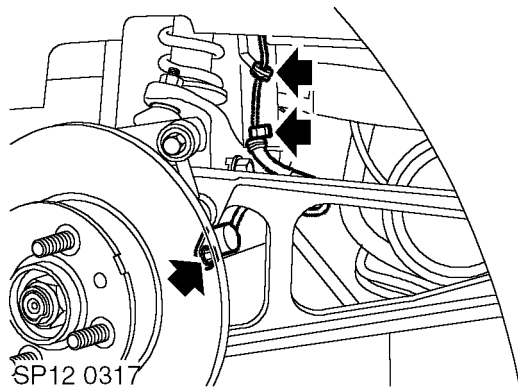


ABS SENSOR - REAR WHEEL

🔑 70.25.33

Remove

1. Disconnect battery earth lead.
2. Remove engine compartment access panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
3. Raise rear of vehicle.
WARNING: Support on safety stands.
4. Remove road wheel(s).



5. Disconnect ABS sensor lead from main harness.
6. Release ABS sensor lead from clips on subframe turret.
7. Remove bolt securing ABS sensor to hub.
8. Remove ABS sensor and spacer from hub.

Refit

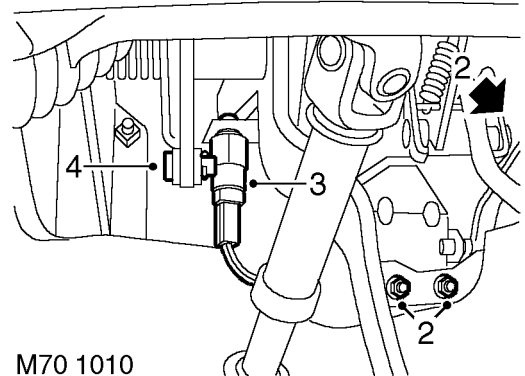
1. Fit ABS sensor and spacer to hub and tighten bolt to 10 Nm.
2. Fit ABS sensor lead to clips on suspension turret.
3. Connect ABS sensor lead to main harness.
4. Connect battery earth lead. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
5. Remove stand(s) and lower vehicle.
6. Fit engine compartment access panel.
👉 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)

PEDAL BOX ASSEMBLY

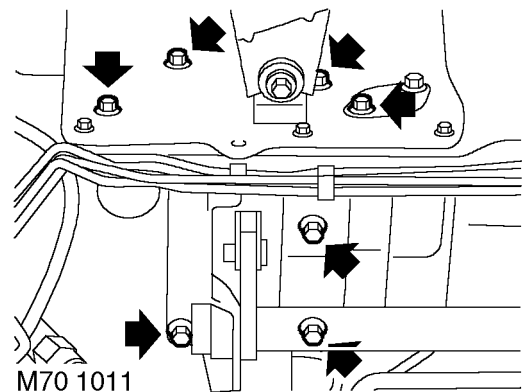
🔑 70.35.03

Remove

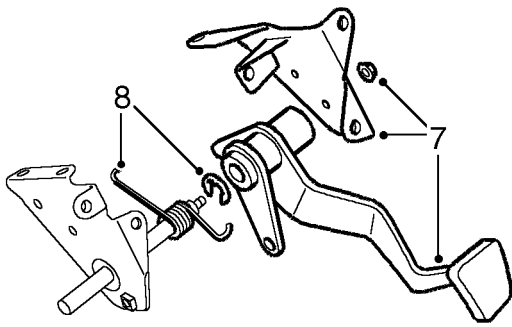
1. Remove bulkhead closing panel.
👉 [REAR BULKHEAD FINISHER, page 76-4-3.](#)



2. Remove 2 nuts and 1 bolt securing throttle pedal. Release pedal and position aside.
3. Release brake light switch and position aside.
4. Remove clip securing brake pedal push rod clevis pin and remove clevis pin.




5. With assistance, remove 3 nuts and bolts and 4 bolts securing pedal box assembly.
6. Manoeuvre pedal box assembly over steering column and remove assembly.




M70 1012

7. Remove nut securing end bracket and remove end bracket and pedal.
8. Remove return spring circlip and return spring from pivot shaft.


Refit

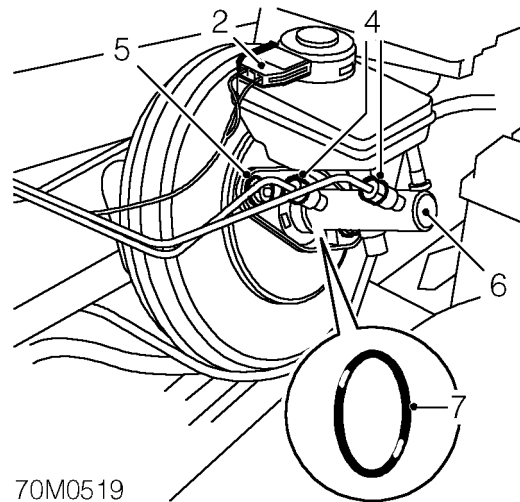
1. Position return spring on pivot shaft and secure with circlip.
2. Examine pedal bushes for wear or damage and replace as required.
3. Position pedal and end bracket, fit nut and tighten to 22 Nm.
4. Position pedal box assembly, manoeuvre over steering column and align to bulkhead.
5. Fit and tighten nuts and bolts securing pedal box assembly to 22 Nm.
6. Align brake pedal push rod, fit clevis pin and secure with clip.
7. Position brake light switch and secure in end bracket.
8. Position throttle pedal, fit nuts and tighten to 6 Nm.
9. Fit bulkhead closing panel.
 [REAR BULKHEAD FINISHER, page 76-4-3.](#)

BRAKE MASTER CYLINDER

 70.30.08

Remove

1. Remove underbonnet closing panel.
 [UNDERBONNET CLOSING PANEL, page 76-2-3.](#)



70M0519



2. Disconnect fluid level switch.
3. Position cloth under master cylinder to absorb spilled fluid.

CAUTION: Do not allow brake fluid to contact paint finished surfaces as paint may be damaged. If spilled, remove fluid and clean area with clean warm water.

4. Disconnect pipe unions at master cylinder.
CAUTION: Plug the connections.

5. Remove 2 nuts and plain washers securing master cylinder to brake servo.
6. Remove master cylinder.
7. Collect and discard 'O' ring.

Refit

1. Clean master cylinder and servo mating surfaces.
2. Fit new 'O' ring to master cylinder.
3. Align servo push rod and fit master cylinder to servo.
4. Secure master cylinder with nuts and plain washers. Tighten to 20 Nm.
5. Connect primary and secondary brake pipes, tighten unions to 15 Nm.
6. Connect fluid level switch.
7. Bleed brake system.
 [BRAKE SYSTEM - BLEED, page 70-3.](#)
8. Fit underbonnet closing panel.
 [UNDERBONNET CLOSING PANEL, page 76-2-3.](#)

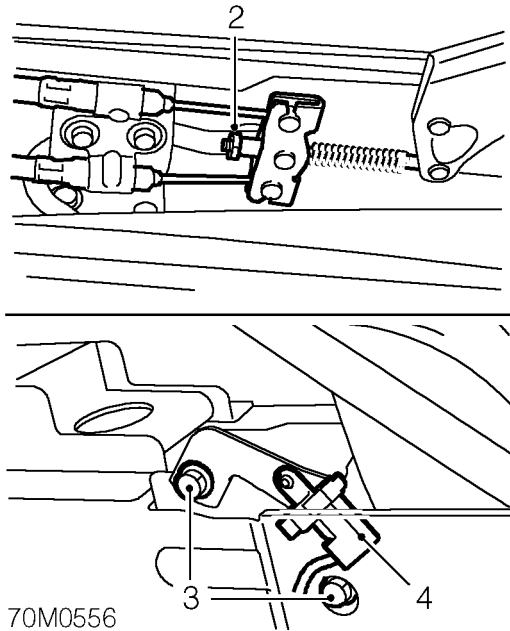


HANDBRAKE LEVER

🔑 70.35.08

Remove



1. Remove front console.
 [FRONT CONSOLE](#), page 76-4-4.



70M0556

2. Loosen cable adjuster nut and disconnect 2 cables from compensator.
3. Remove 2 bolts securing lever to body.
4. Disconnect Lucar from switch and remove handbrake lever.

Refit

1. Connect Lucar to switch.
2. Position handbrake lever to body, fit and tighten bolts to 25 Nm.
3. Connect cables to compensator.
4. Adjust handbrake cables.
 [HANDBRAKE - ADJUST](#), page 70-4.
5. Fit front console.
 [FRONT CONSOLE](#), page 76-4-4.




HANDBRAKE CABLES

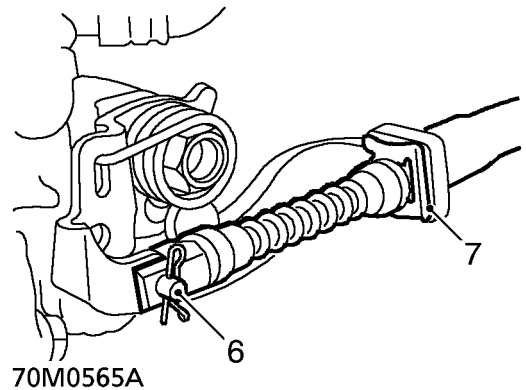
🔑 70.35.28

NOTE: Handbrake cables have colour coded identification bands: Purple - RH, Orange - LH.

WARNING: See GENERAL INFORMATION, SRS Precautions.

Remove

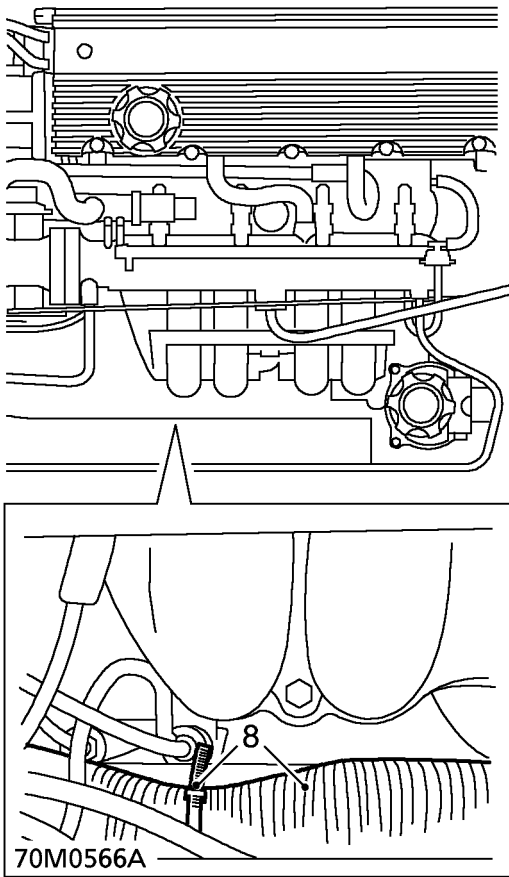
1. Position vehicle on a 2 post ramp.
2. Make the SRS system safe.
 [SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS](#), page 03-19.
3. Remove engine cover.
 [ENGINE COVER](#), page 12-27.
4. Remove engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL](#), page 76-2-4.
5. Release handbrake to off position.



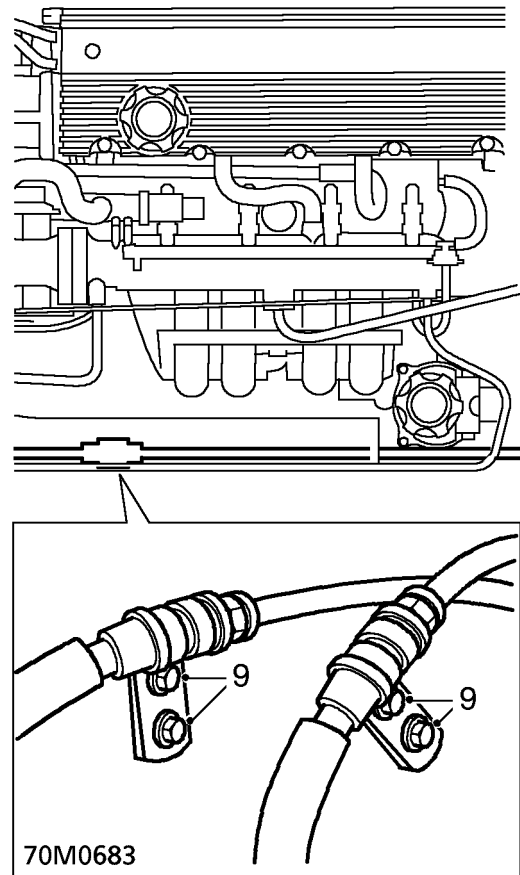
70M0565A


6. Remove and discard 2 'R' clips, and remove 2 clevis pins securing handbrake cables to rear calipers.
7. Remove and discard 2 clips securing handbrake cable abutments to caliper brackets and release cables.

BRAKES

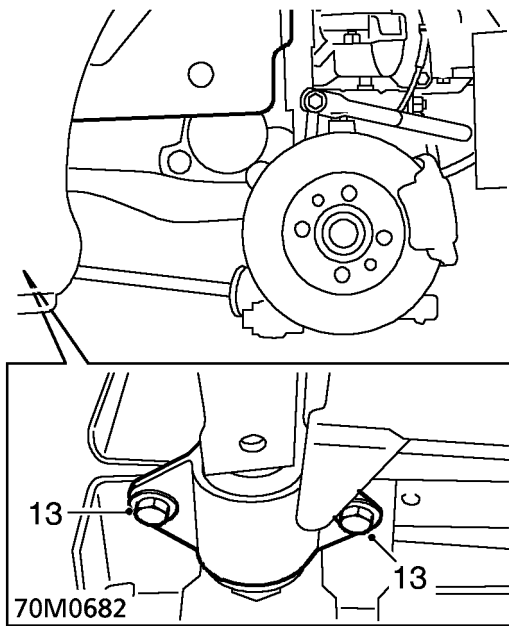


8. Release air intake duct from subframe clip and position duct aside.

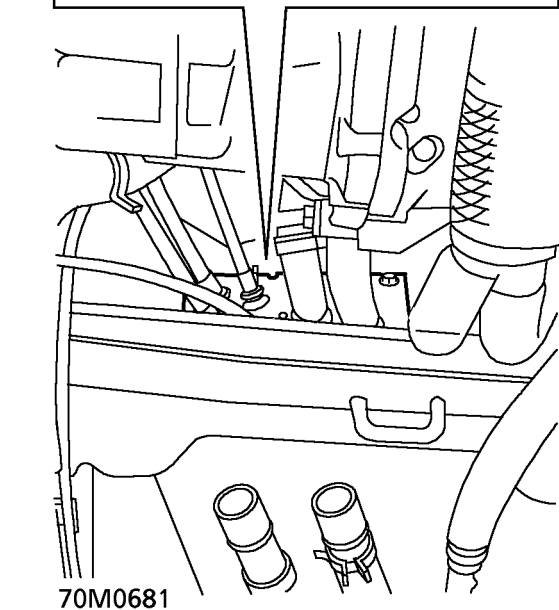
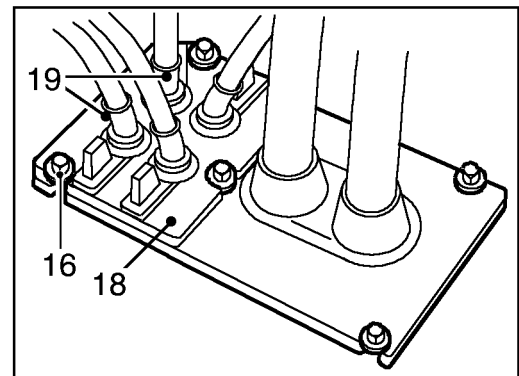


9. Remove 2 bolts securing each handbrake cable to luggage compartment bulkhead.
10. Release handbrake cables from air cleaner mounting bracket.
11. Drain engine coolant.
 [DRAIN AND REFILL, page 26-1.](#)
12. Place support jack underneath engine sump and support engine weight.

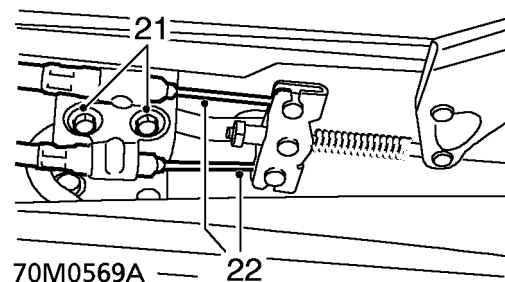
CAUTION: To prevent damage to sump place a piece of wood between jack and sump.



13. Remove 2 bolts securing both front subframe mountings to body brackets.
14. Lower jack carefully, to allow access to closing plate bolts.
CAUTION: Care must be taken that no cables or pipes are stretched when lowering front of subframe.
15. Tie coolant pipes aside to allow access to closing plate.



16. Release 2 upper and remove 3 remaining bolts securing closing plate to bulkhead.
17. Apply soft soap to all four closing plate cables, to ease movement of closing plate.
18. Release closing plate from bulkhead and slide along cables.
19. Noting their fitted positions release 2 handbrake cable grommets from closing plate.
20. Remove front console.
[🔗 FRONT CONSOLE, page 76-4-4.](#)








21. Remove 2 bolts securing handbrake abutment clamp to tunnel and remove clamp.


BRAKES

22. Release handbrake cables from compensator.
23. Remove handbrake cables from tunnel and engine compartment.


Refit

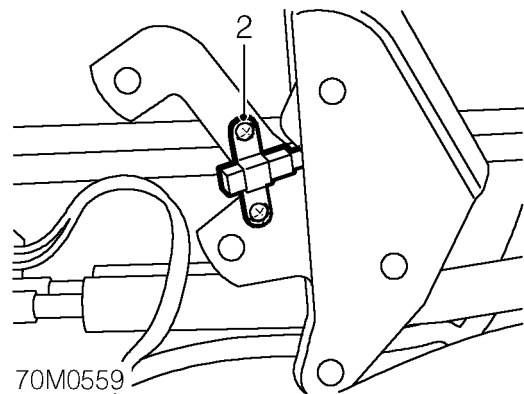
1. Position handbrake cables to tunnel and feed through rear bulkhead.
2. Feed handbrake cables into position in engine compartment.
3. Lubricate all four cables with soft soap to ease grommet movement on cables.
4. Position handbrake cables into closing plate slots and secure with grommets.
5. Align closing plate to bulkhead and secure with bolts.
6. Lift subframe on jack, fit subframe front mounting bolts and tighten to 30 Nm.
7. Position handbrake cable abutments to caliper brackets and secure with new clips.
8. Align handbrake cables to calipers, fit clevis pins and secure with new 'R' clips.
9. Position handbrake cables to luggage compartment bulkhead and secure clips with bolts.
10. Position air intake duct to subframe and secure with clip.
11. Fit handbrake cables to air cleaner mounting bracket.
12. Fit cables to handbrake compensator.
13. Position cables and secure with handbrake abutment clamp.
14. Fit front console.
 [FRONT CONSOLE, page 76-4-4.](#)
15. Untie and position coolant hoses.
16. Fill engine coolant.
 [DRAIN AND REFILL, page 26-1.](#)
17. Fit engine cover.
 [ENGINE COVER, page 12-27.](#)
18. Fit engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
19. Adjust handbrake cable.
 [HANDBRAKE - ADJUST, page 70-4.](#)

HANDBRAKE WARNING SWITCH

 70.35.40


Remove

1. Remove handbrake lever:
 [HANDBRAKE LEVER, page 70-13.](#)



2. Remove 2 screws securing switch to lever and collect switch.

Refit

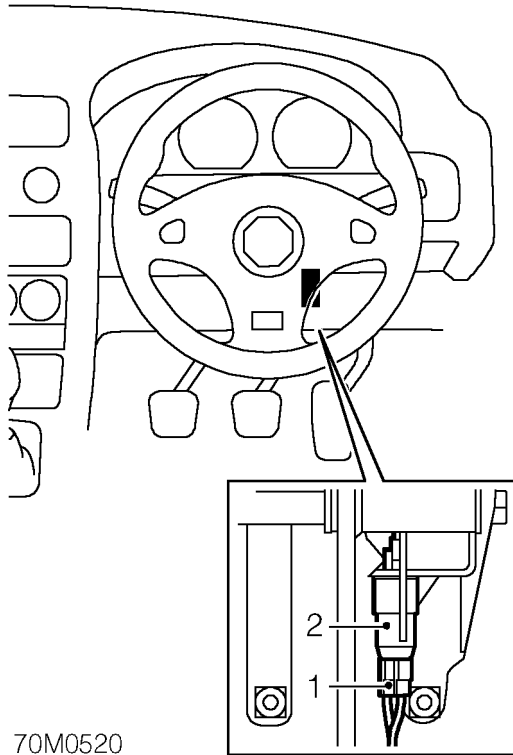
1. Fit switch and secure with screws.
2. Fit handbrake lever:
 [HANDBRAKE LEVER, page 70-13.](#)



BRAKE LIGHT SWITCH

🔑 70.35.42

Remove



70M0520

1. Release 2 Lucar connectors from switch.
2. Release bayonet fixing and remove switch.

Refit

1. Fit switch to pedal box.
2. Connect Lucar connectors.
3. Adjust switch.

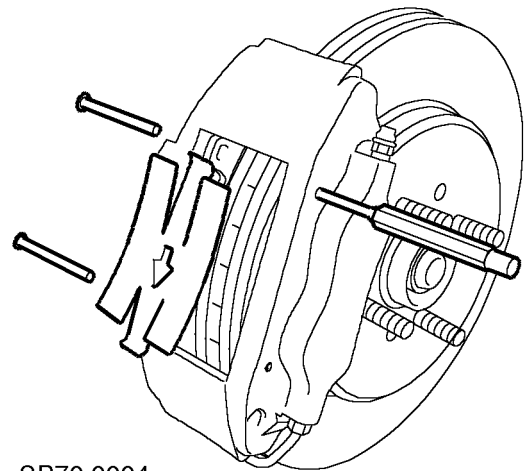
 [BRAKE LIGHT SWITCH - ADJUST](#), page 70-5.

BRAKE PADS - FRONT

🔑 70.40.02

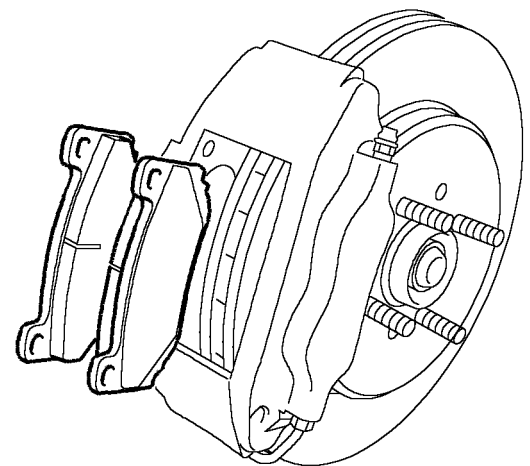
Remove

1. Raise front of vehicle.
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel(s).



SP70 0004

3. Using a parallel punch, drift out brake pad retaining pins and collect anti-squeal plate.



SP70 0005

4. Remove brake pads from caliper housing.

Refit

1. Clean brake pad abutment areas in caliper's retaining pins and anti-squeal plates.
2. Clean area around brake fluid reservoir cap.

BRAKES

3. Disconnect multiplug from brake fluid level indicator, remove reservoir cap and position a piece of cloth over reservoir to collect any brake fluid spillage.

CAUTION: Brake fluid will damage paint finished surfaces. If spilled, immediately remove fluid and clean area with water.

4. Using a suitable flat lever, retract caliper pistons into housing.

5. Remove backings from brake pad shims.

CAUTION: Always fit correct grade and specification of brake pads, and renew in axle set. Braking efficiency may otherwise be impaired.

6. Fit brake pads to caliper housing.

7. Fit brake pad retaining pins and anti-squeal plate.

8. If necessary, top-up brake fluid reservoir.

9. Remove cloth, fit fluid reservoir cap and connect multiplug to fluid level indicator.

10. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.

11. Depress brake pedal several times to seat pads.

12. Remove stand(s) and lower vehicle.

BRAKE PADS - REAR

70.40.03

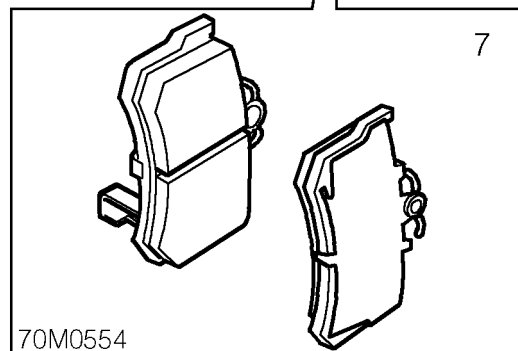
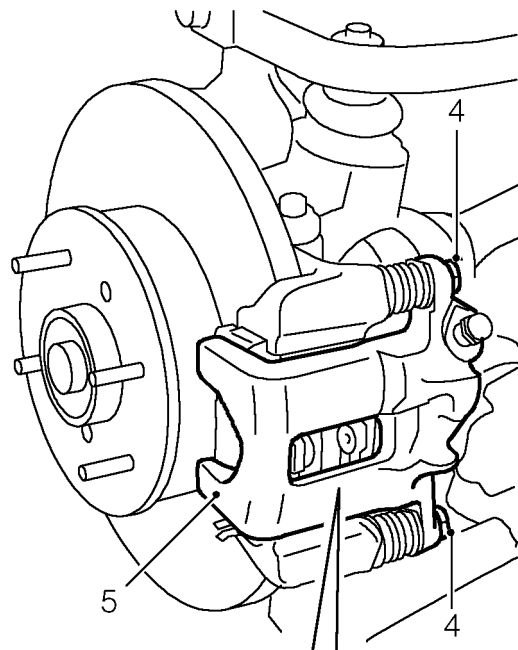
Remove

1. Raise rear of vehicle.

WARNING: Support on safety stands.

2. Release handbrake lever.

3. Remove road wheel(s).



4. Remove guide pin bolts from caliper.

5. Release caliper body from carrier.

6. Tie caliper aside.

CAUTION: Do not allow weight of caliper to hang on hose, as damage may occur to hose.

7. Remove brake pads from carrier.

CAUTION: Do not operate handbrake with brake pads removed.




Refit


WARNING: Always fit the correct grade and specification of brake pads, and renew in axle set. Braking efficiency may otherwise be impaired.

1. Remove old shims from caliper.
2. Fit new shims to replacement pads.
3. Clean area around fluid reservoir cap.
4. Remove cap from brake reservoir and position cloth to catch spillage.


CAUTION: Do not allow brake fluid to contact paint finished surfaces as paint may be damaged. If spilled, remove fluid and clean area with warm water.

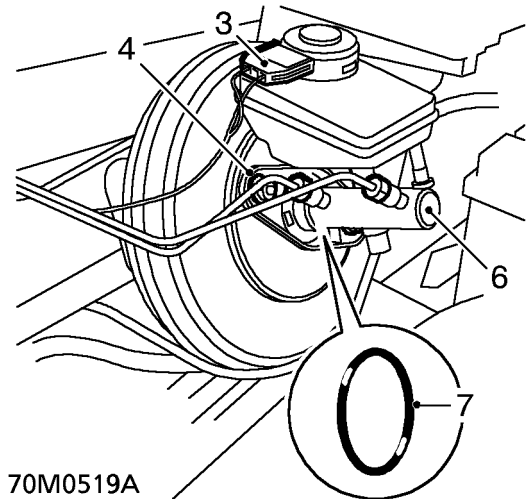
5. Screw piston into caliper using 18G 1596 ensuring piston is fully retracted.
6. Clean components using methylated spirit or denatured alcohol. Do not use any petroleum based fluids.
7. Fit new pads to caliper carrier.
8. Untie caliper body and position to carrier.
9. Fit guide pin bolts and tighten to 45 Nm.
10. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
11. Top-up brake fluid to 'MAX' mark.
 **BRAKE FLUID**, page 10-14.
12. Operate brake pedal several times to adjust brake pads and the handbrake linkage.
CAUTION: Do not apply the handbrake before the brake pads have been adjusted or incorrect brake operation will result.
13. Remove stand(s) and lower vehicle.

BRAKE SERVO

 70.50.01

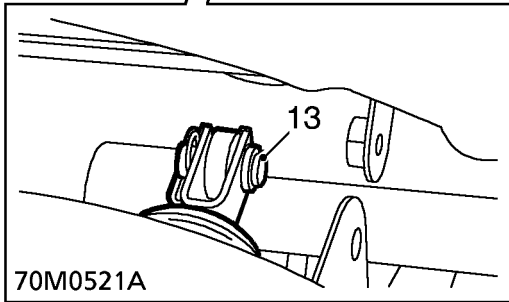
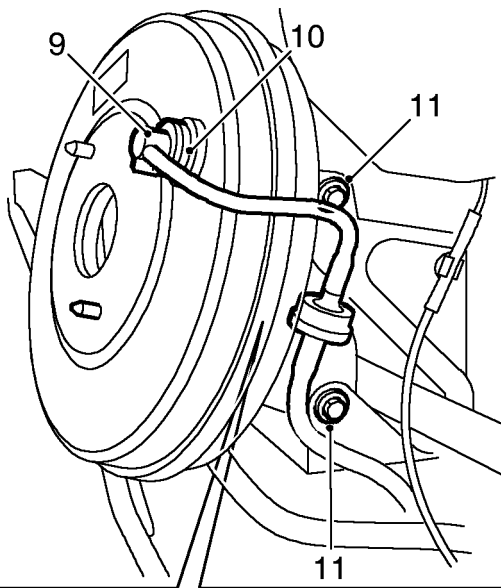
Remove

1. Remove underbonnet closing panel.
 **UNDERBONNET CLOSING PANEL**, page 76-2-3.
2. Remove spare wheel.



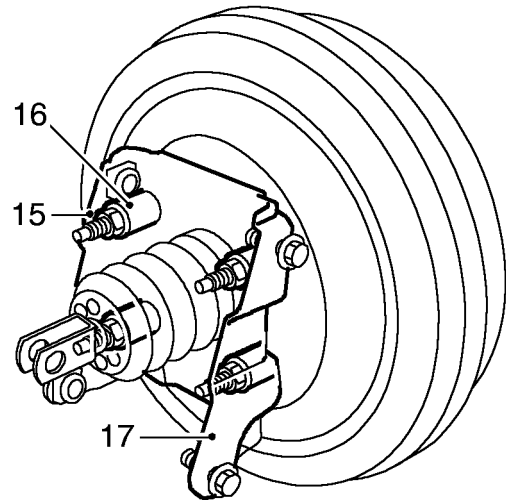
70M0519A

3. Disconnect fluid level switch.
4. Remove 2 nuts and washers securing master cylinder to brake servo.
5. Release brake pipes from bulk head clips.
CAUTION: Do not bend brake pipes when removing master cylinder.
6. Remove master cylinder from brake servo.
7. Remove 'O' ring from master cylinder and discard.
8. Tie master cylinder aside so that weight of master cylinder is supported.



70M0521A

9. Carefully prise vacuum hose connection from brake servo.
10. Remove and discard sealing rubber.
11. Remove 2 inboard bolts and loosen 2 outboard bolts securing servo bracket.
12. Release servo from bracket for access to clevis pin.
13. Remove split pin and withdraw clevis pin securing crank to servo push rod.
14. Remove servo assembly.



70M0522A

15. Remove 4 nuts securing bracket to servo.
16. Collect spacers.
17. Remove bracket.

Refit

1. Position bracket to servo, fit spacers and secure with nuts, tighten nuts to 20 Nm.
2. Position servo assembly and align servo push rod.
3. Fit clevis pin and secure with new split pin.
4. Align servo and engage outboard bolts to slots in bracket.
5. Fit inboard bolts. Tighten all bolts to 20 Nm.
6. Engage harness clip to bracket.
7. Fit new sealing rubber to vacuum hose.
8. Connect vacuum hose to servo.
9. Untie master cylinder.
10. Clean master cylinder and servo mating surfaces.
11. Fit new 'O' ring to master cylinder.
12. Align servo push rod and fit master cylinder to servo.
13. Fit nuts and washers securing master cylinder to servo, tighten nuts to 20 Nm.
14. Fit brake pipes to clips.
15. Connect fluid level switch.
16. Fit spare wheel.
17. Fit underbonnet closing panel.

 [UNDERBONNET CLOSING PANEL, page 76-2-3.](#)



BRAKE CALIPER HOUSING - FRONT

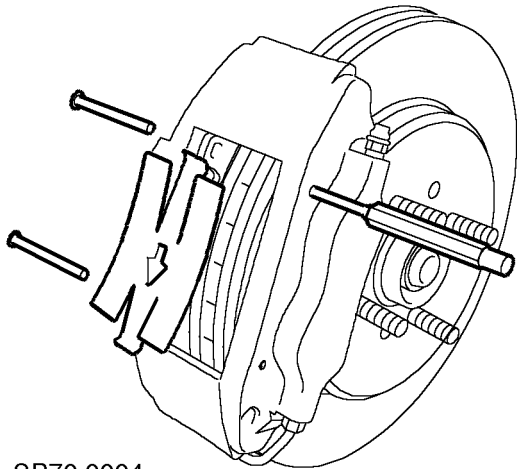
🔑 70.55.02

Remove

1. Raise front of vehicle, one side.

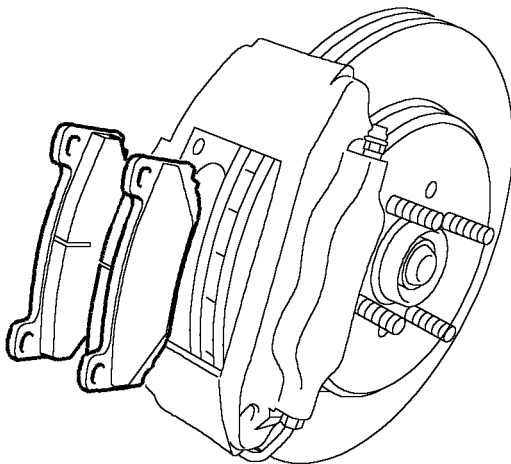
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel(s).



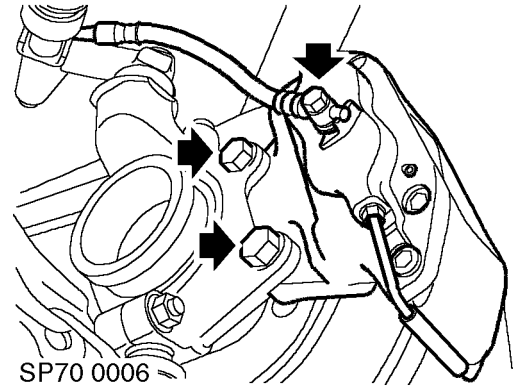
SP70 0004

3. Using a parallel punch, drift out brake pad retaining pins and collect anti-squeal plate.



SP70 0005

4. Remove brake pads from caliper housing, mark their fitted position if they are to be refitted.
5. Use a recommended brake hose clamp to clamp brake hose.



SP70 0006

6. Remove banjo bolt securing brake hose to caliper; remove and discard sealing washers.

CAUTION: Always fit plugs to open connections to prevent contamination.

7. Remove 2 bolts securing caliper assembly to hub and remove caliper.

Refit

1. Rotate disc by hand and scrape all scale and rust from around edge of disc.
2. Clean mating faces of caliper and hub.
3. Position caliper to hub, fit and tighten bolts to 85 Nm.
4. Remove plug from brake hose banjo.
5. Clean brake hose banjo connection, fit NEW sealing washers and tighten banjo bolt to 35 Nm.
6. Remove clamp from brake hose.
7. Using a suitable flat lever; retract caliper pistons into housing.
8. Fit brake pads to caliper housing.
9. Fit brake pad retaining pins and anti-squeal plate.
10. Bleed brake caliper.
11. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
12. Depress brake pedal several times to seat pads.
13. Remove stand(s) and lower vehicle.

BRAKES

HOSE - FRONT - PRIMARY - LH

🔑 70.15.02

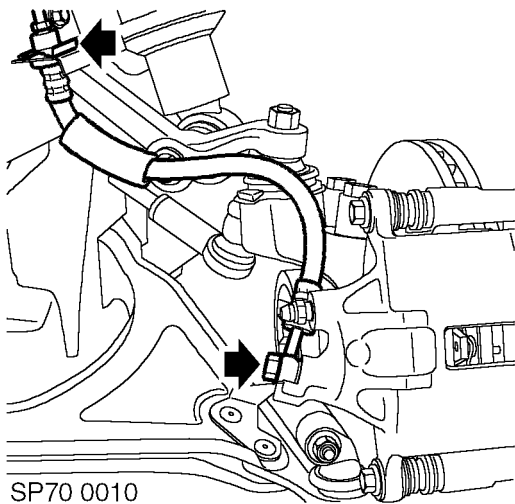
Remove

1. Raise front of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.

CAUTION: Brake fluid will damage paint finished surfaces. If spilled, immediately remove fluid and clean area with water.



3. Remove banjo bolt securing brake hose to caliper; remove and discard sealing washers.

CAUTION: Always fit plugs to open connections to prevent contamination.


4. Loosen and release union securing brake hose to brake pipe.

CAUTION: Always fit plugs to open connections to prevent contamination.

5. Remove clip securing brake hose to support bracket.
6. Release brake hose from support bracket and remove brake hose.

Refit

1. Clean brake fluid spillage.
2. Clean brake pipe union, banjo bolt and caliper mating face.
3. Position brake hose to support bracket, ensure flat on brake hose is engaged in support bracket recess and secure with clip.
4. Align brake pipe union to brake hose and tighten union to 15 Nm.

5. Ensure brake hose is not kinked or twisted, align to brake caliper. Using new sealing washers fit banjo bolt and tighten to 30 Nm.
6. Bleed brakes.
 [BRAKE SYSTEM - BLEED, page 70-3.](#)
7. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
8. Remove stands and lower vehicle.



HOSE - REAR

🔑 70.15.17

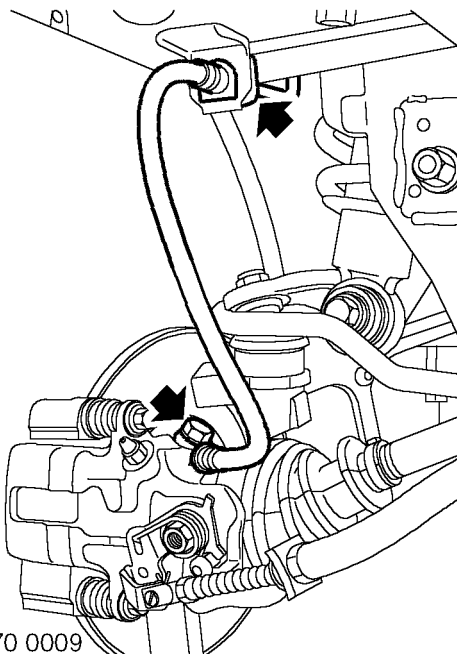
Remove

1. Raise rear of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.

CAUTION: Brake fluid will damage paint finished surfaces. If spilled, immediately remove fluid and clean area with water.



3. Remove banjo bolt securing brake hose to caliper; remove and discard sealing washers.

CAUTION: Always fit plugs to open connections to prevent contamination.

4. Loosen and release union securing brake hose to brake pipe.

CAUTION: Always fit plugs to open connections to prevent contamination.

5. Remove clip securing brake hose to support bracket.
6. Release brake hose from support bracket and remove brake hose.

Refit

1. Clean brake fluid spillage.
2. Clean brake pipe union, banjo bolt and caliper mating face.

3. Position brake hose to support bracket, ensure flat on brake hose is engaged in support bracket recess and secure with clip.
4. Align brake pipe union to brake hose and tighten union to 15 Nm.
5. Ensure brake hose is not kinked or twisted, align to brake caliper. Using new sealing washers fit banjo bolt and tighten to 30 Nm.
6. Bleed brakes.
 - [BRAKE SYSTEM - BLEED](#), page 70-3.
7. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
8. Remove stands and lower vehicle.



BRAKES

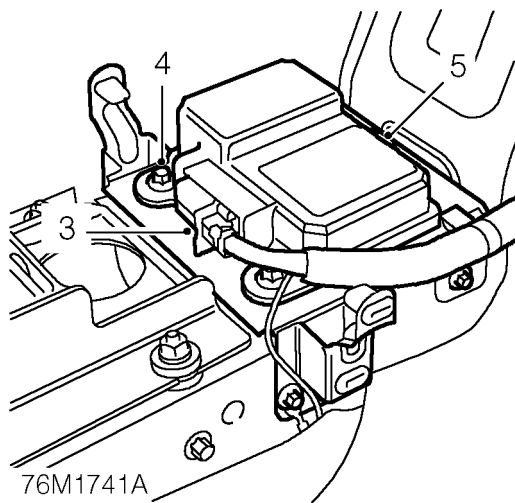
DIAGNOSTIC CONTROL UNIT (DCU)

🔑 76.73.72

WARNING: See **GENERAL INFORMATION, SRS Precautions.**

Remove


1. Make the SRS system safe.
 **SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.**
2. Remove centre console panel.
 **FRONT CONSOLE, page 76-4-4.**



3. Disconnect multiplug from DCU.
4. Remove 3 Torx bolts securing DCU to bracket.
5. Remove DCU.

Refit

WARNING: Because the crash sensor is incorporated inside the DCU, it is imperative that bolts securing the DCU are tightened to their correct torque.


1. Position DCU to support bracket, fit and tighten Torx bolts to 10 Nm.
2. Connect multiplug.
CAUTION: Before connecting multiplug ensure that clip is in the open position, pointing away from the harness. Lock the connector into position by pushing clip towards harness.
3. Fit centre console panel.
 **FRONT CONSOLE, page 76-4-4.**
4. Carry out system check using MG GDS.

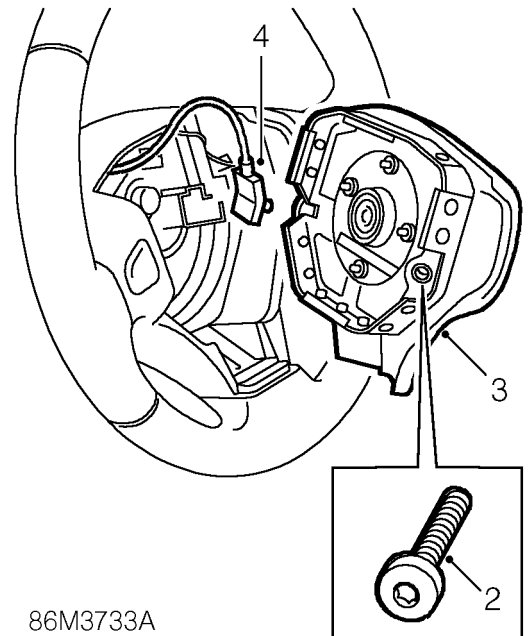
DRIVER AIRBAG MODULE

🔑 76.74.71

WARNING: See **GENERAL INFORMATION, SRS Precautions.**

Remove

1. Make the SRS system safe.
 **SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.**



2. Remove 2 T×30 Torx screws securing module to steering wheel.
3. Release air bag module from steering wheel.
CAUTION: Do not allow the air bag module to hang by the air bag harness.
4. Disconnect multiplug from air bag module.
5. Remove air bag module.
CAUTION: Store the air bag module in accordance with the storage procedures outlined in the precautions part of this manual. See **GENERAL INFORMATION, SRS Precautions.**

NOTE: If the air bag module is to be replaced, the bar code must be recorded.

Refit

1. Position module to steering wheel and connect harness multiplug.
2. Align module to steering wheel, fit Torx screws and tighten to 8 Nm
3. Carry out system check using MG GDS.

RESTRAINT SYSTEMS

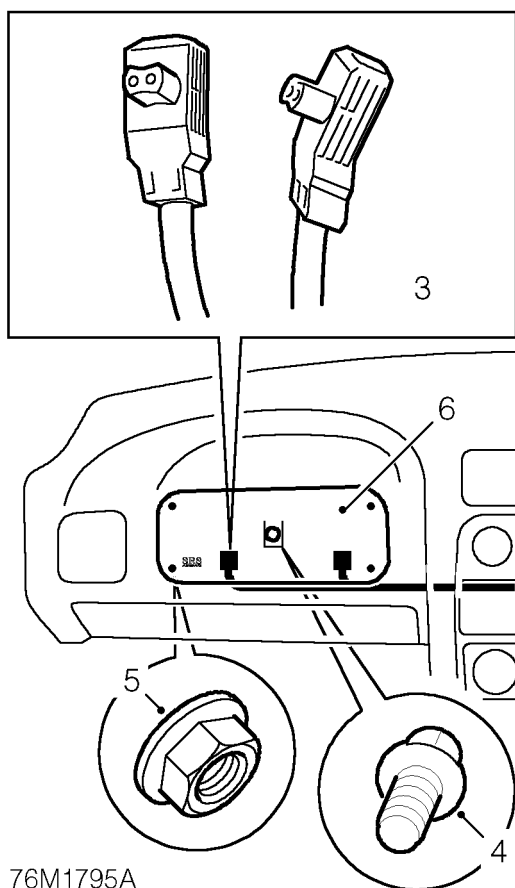
PASSENGER AIRBAG MODULE

🔑 76.74.69

WARNING: See **GENERAL INFORMATION, SRS Precautions.**

Remove

1. Make the SRS system safe.
👉 **SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.**
2. Remove glovebox.
👉 **GLOVEBOX, page 76-4-10.**



3. Disconnect 2 multiplugs from airbag.
4. Remove bolt securing bracket to fascia cross rail.
5. Remove 4 nuts securing airbag to bracket.
6. Remove airbag module.

CAUTION: Store the airbag module in accordance with the storage procedures outlined in the precautions part of this manual. See **GENERAL INFORMATION, SRS Precautions.**

NOTE: If the airbag module is to be replaced, the bar code must be recorded.

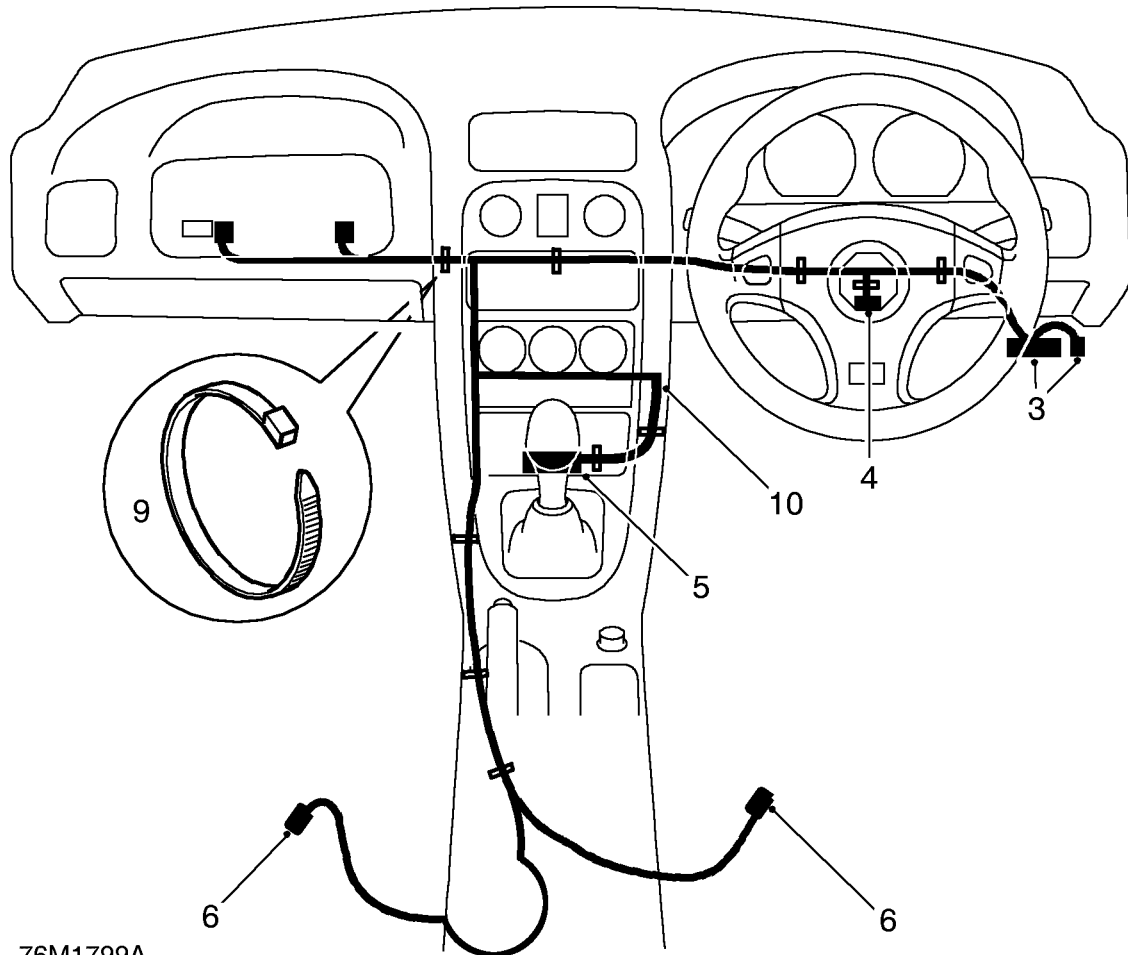
Refit

1. Position module to fascia bracket and tighten nuts to 8 Nm.
2. Tighten bolt securing bracket to fascia rail to 9 Nm.
3. Connect multiplugs.
4. Fit glovebox.
👉 **GLOVEBOX, page 76-4-10.**
5. Carry out system check using MG GDS.



SRS HARNESS



🔑 76.73.73



76M1799A

WARNING: See **GENERAL INFORMATION, SRS Precautions.**

Remove

1. Make the SRS system safe.
 **SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS**, page 03-19.
2. Remove fascia.
 **FASCIA PANEL**, page 76-4-9.
3. Disconnect SRS multiplug and SRS fuse satellite from fusebox.
4. Disconnect multiplug from steering column.
5. Disconnect multiplug from DCU and release harness from bracket clip.
6. Disconnect 2 multiplugs from seatbelt pre-tensioners.
7. Remove 4 Torx bolts securing DCU bracket to tunnel, release harness earth and position DCU aside.

8. Remove 4 nuts and 3 bolts securing gear lever assembly to tunnel and position assembly aside.
9. Release 11 cable clips securing SRS harness to main harness.
10. Remove SRS harness.

Refit

1. Position harness to body.
2. Connect fuse satellite and multiplug to fusebox.
3. Connect multiplugs to seatbelt pre-tensioners.
4. Secure harness with clips.

CAUTION: Ensure that pre-tensioner leads pass through grommets in centre console area.


RESTRAINT SYSTEMS

5. Position gear lever assembly to tunnel and tighten fixings to 9 Nm.

WARNING: Because the crash sensor is incorporated inside the DCU, it is imperative that all bolts securing the DCU are tightened to their correct torque.

6. Position DCU bracket to tunnel, fit harness earth lead and tighten fixings to 10 Nm.
7. Connect multiplug to steering column.



CAUTION: Before connecting DCU multiplug ensure that clip is in the open position, pointing away from the harness. Lock the connector into position by pushing clip towards the harness.

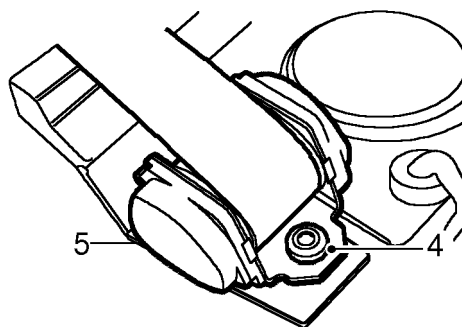
8. Connect multiplug to DCU and fit harness to clip.
9. Fit fascia.
 [FASCIA PANEL, page 76-4-9.](#)
10. Carry out system check using MG GDS.

SEAT BELT

 76.73.13

Remove



1. Remove seat.
 [SEAT, page 76-4-12.](#)
2. Remove Torx bolt securing seat belt strap to seat frame.
3. Remove hoodwell trim.
 [HOODWELL TRIM, page 76-4-11.](#)



M76 4195

4. Remove Torx screw securing seat belt reel to body.
5. Remove seat belt.

Refit

1. Position seat belt reel to body, fit and tighten Torx screw to 35 Nm.
2. Fit hoodwell trim.
 [HOODWELL TRIM, page 76-4-11.](#)
3. Position seat belt strap to seat, fit bolt and tighten to 30 Nm.
4. Fit seat.
 [SEAT, page 76-4-12.](#)





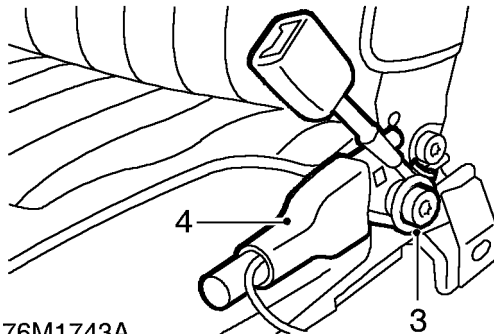
SEAT BELT PRE-TENSIONER

76.73.75

WARNING: See **GENERAL INFORMATION, SRS Precautions.**

Remove

1. Make the SRS system safe.
 [SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.](#)
CAUTION: Ensure pre-tensioner multiplug is disconnected before seat is removed.
2. Remove seat.
 [SEAT, page 76-4-12.](#)

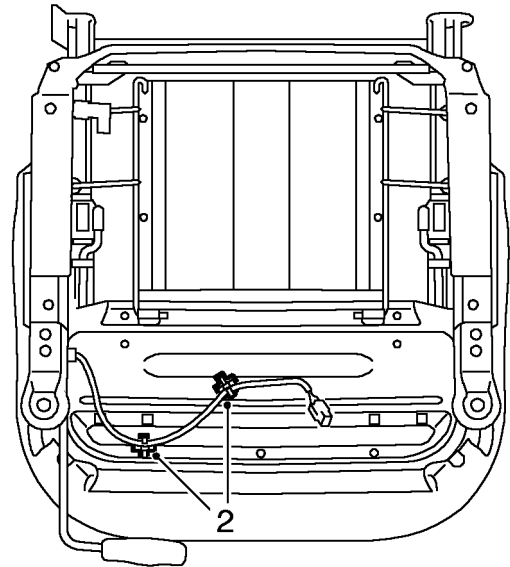


76M1743A


3. Remove bolt securing pre-tensioner to seat.
4. Remove pre-tensioner.

Refit

1. Position pre-tensioner to seat and tighten bolt to 45 Nm.



76M2318

2. Ensure that pre-tensioner lead is correctly clipped to seat base.
3. Fit seat.
 [SEAT, page 76-4-12.](#)
4. Carry out system check using MG GDS.

RESTRAINT SYSTEMS

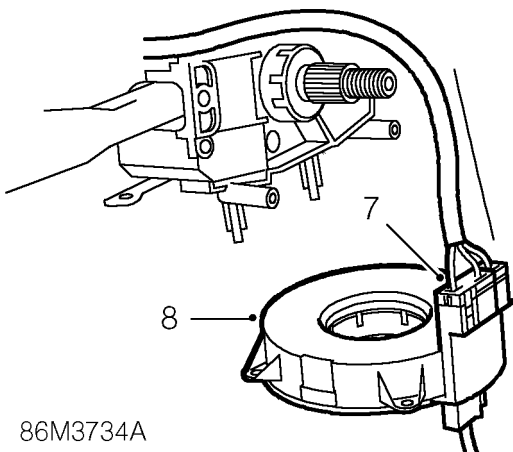
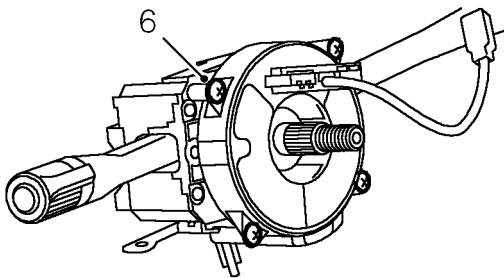
ROTARY COUPLER

🔑 86.65.85

WARNING: See **GENERAL INFORMATION, SRS Precautions.**

Remove

1. Make the SRS system safe.
👉 **SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.**
2. Ensure wheels are in the straight ahead position.
3. Remove steering wheel.
👉 **STEERING WHEEL, page 57-14.**
4. Remove steering column nacelle.
👉 **STEERING COLUMN NACELLE, page 57-9.**
5. If the rotary coupler is being re-used, place adhesive tape around moulding to prevent rotation.



6. Remove 4 screws securing rotary coupler to steering column switch pack.
7. Release rotary coupler from column and disconnect 2 multiplugs.
8. Remove rotary coupler.

CAUTION: Do not dismantle the rotary coupler. It has **NO** serviceable parts and must be replaced as a complete assembly.

Refit

1. Position rotary coupler to switch pack.
2. Connect multiplugs.
3. Fit and tighten screws.
4. Remove adhesive tape.
5. Fit steering column nacelle.
👉 **STEERING COLUMN NACELLE, page 57-9.**
6. Fit steering wheel.
👉 **STEERING WHEEL, page 57-14.**
7. Carry out system check using MG GDS.



AIRBAG AND PRE-TENSIONER MANUAL DEPLOYMENT

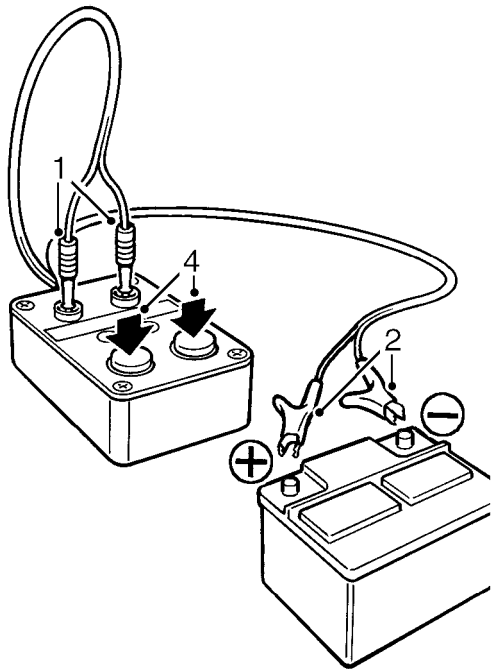
🔑 7674

NOTE: Pre-tensioner deployment is done in car only.

If a vehicle is to be scrapped and contains an undeployed airbag module, or pre-tensioner; the components must be manually deployed. This operation should only be carried out using the following recommended manual deployment procedure.

Before deployment is started the deployment tool self test procedure should be carried out.

Deployment tool SMD 4082/I self test procedure



M76 3660

1. Insert BLUE and YELLOW connectors of the deployment tool lead into the corresponding sockets on the face of the deployment tool.
2. Connect crocodile clips of the second deployment tool lead to the battery, red to positive and black to negative.
3. Press and hold both operating buttons.
4. Press and hold both operating buttons.
5. GREEN "DEFECTIVE" light should illuminate.
6. Release both operating buttons.
7. RED "READY" light should illuminate.
8. Disconnect the deployment tool from the battery.

9. Disconnect the BLUE and YELLOW connectors from the deployment tool face sockets.
10. Deployment tool self-test is now complete.

RESTRAINT SYSTEMS

DEPLOYMENT OF SEAT BELT PRE-TENSIONER

🔑 7674

These guidelines are written to aid authorised personnel to carry out the safe manual deployment and disposal of the seat belt pre-tensioners.

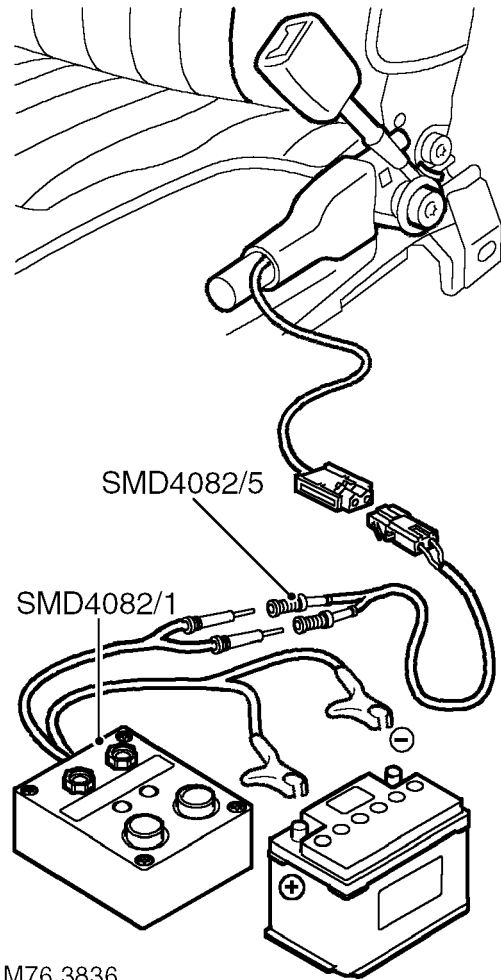
WARNING: Always read and adhere to the SRS deployment precautions outlined in this workshop manual. See GENERAL INFORMATION, SRS Precautions.

- Always remove the key from the ignition switch and disconnect the vehicle battery (negative lead first) before starting the deployment procedures.
- Always observe the system safe time of 10 minutes (to allow the energy reserve capacitors to discharge) before disconnecting or removing any SRS components.
- Only use the MG approved deployment equipment.
- Deploy the seat belt pre-tensioners in a well ventilated, specially designated area.
- Ensure the seat belt pre-tensioner is not damaged or ruptured before deploying.
- Notify the relevant authorities.

Deploy

1. Carry out deployment tool SMD 4082/1 self test.
2. Slide the front seat fully forward to access the pre-tensioner harness connector.
3. Disconnect pre-tensioner harness connector.

WARNING: Ensure deployment tool SMD 4082/1 is not connected to the battery.



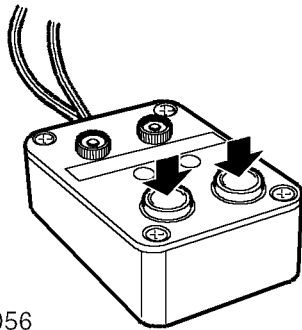
M76 3836

4. Connect deployment tool flylead SMD 4082/5 to the pre-tensioner connector.
5. Connect deployment tool flylead SMD 4082/5 to deployment tool SMD 4082/1.

WARNING: Ensure the pre-tensioner is secured tightly to the seat.

WARNING: Ensure all personnel are standing at least 15 metres (50 ft.) away from the pre-tensioner module.

6. Connect deployment tool SMD 4082/1 to the battery.




M76 3056

- Press both operating buttons of deployment tool SMD 4082/1 to deploy the pre-tensioner.

WARNING: A deployed pre-tensioner gas generator will be very hot, DO NOT return to the pre-tensioner for 30 minutes.

CAUTION: Wear a face shield and gloves when handling a deployed pre-tensioner unit. Wash hands and rinse well after handling a deployed pre-tensioner unit.

- Remove the front seat belt pre-tensioner assembly from the vehicle.
 **SEAT BELT PRE-TENSIONER, page 75-5.**
- Wipe down the deployment tools with a damp cloth.
- Place the pre-tensioner in a strong plastic bag and seal the bag.
- Transport the deployed pre-tensioner to the designated area for incineration.
 NOTE: DO NOT transport the deployed pre-tensioner unit in the vehicle passenger compartment.
- Scrap all remaining parts of the seat belt and pre-tensioner assembly. **DO NOT** re-use or salvage any parts of the seat belt and pre-tensioner assembly.

DEPLOYMENT OF DRIVER AIRBAG MODULE


 7674

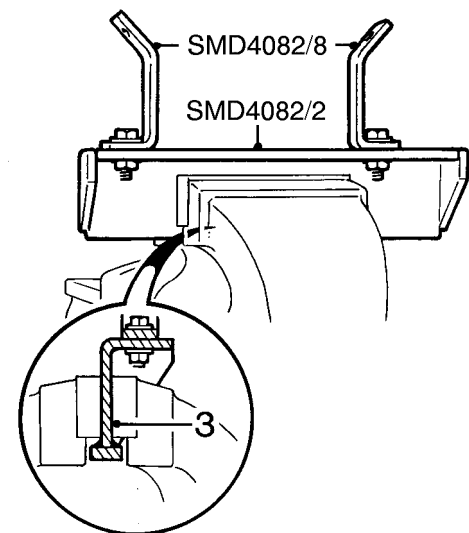
These guidelines are written to aid authorised personnel to carry out the safe manual deployment and disposal of the seat belt pre-tensioners.

WARNING: Always read and adhere to the SRS deployment precautions outlined in this workshop manual. See GENERAL INFORMATION, SRS Precautions.

- Always remove the key from the ignition switch and disconnect the vehicle battery (negative lead first) before starting the deployment procedures.
- Always observe the system safe time of 10 minutes (to allow the energy reserve capacitors to discharge) before disconnecting or removing any SRS components.
- Only use the MG approved deployment equipment.
- Deploy the airbag modules in a well ventilated, specially designated area.
- Ensure the airbag module is not damaged or ruptured before deploying.
- Notify the relevant authorities.

Deploy

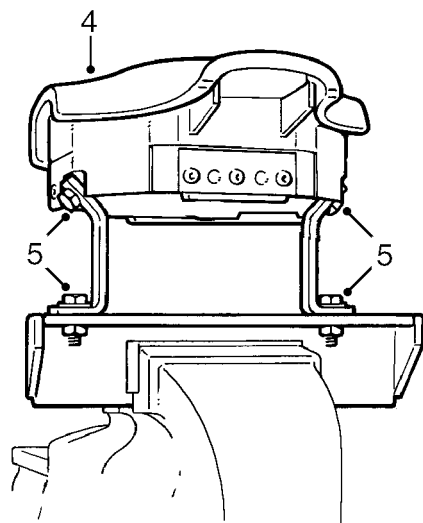
- Carry out deployment tool SMD 4082/1 self test.
- Remove the airbag module from the steering wheel.
 **DRIVER AIRBAG MODULE, page 75-1.**



76M1349

- Position tool SMD 4082/2 in a vice, ensuring that the vice jaws grip the tool above the bottom flange to prevent the possibility of the tool being forced upwards from the vice. Tighten the vice.

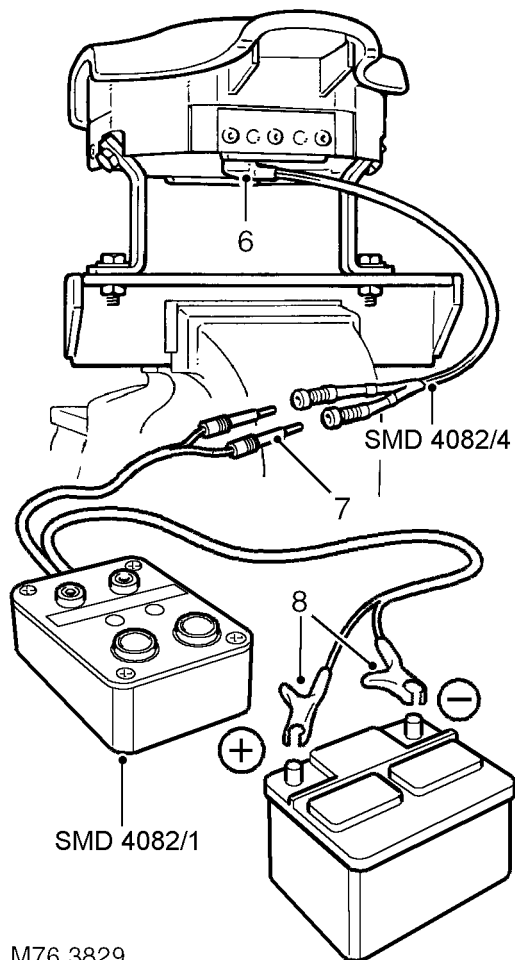
RESTRAINT SYSTEMS



M76 3828

4. Secure the airbag module to tool SMD 4082/2 using the appropriate mounting brackets (e.g.SMD 4082/8).
5. Ensure the airbag module mounting brackets are secure.

WARNING: Ensure deployment tool SMD 4082/1 is not connected to the battery.



M76 3829

6. Connect deployment tool flylead SMD 4082/4 to the driver airbag module.
7. Connect deployment tool flylead SMD 4082/4 to deployment tool SMD 4082/1.

WARNING: Do not lean over the airbag module whilst connecting.

WARNING: Ensure all personnel are standing at least 15 metres (50 ft.) away from the airbag module.

8. Connect deployment tool SMD 4082/1 to the battery.



DEPLOYMENT OF PASSENGER AIRBAG MODULE

🔑 7674

These guidelines are written to aid authorised personnel to carry out the safe manual deployment and disposal of the seat belt pre-tensioners.

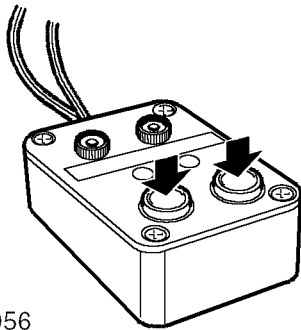
WARNING: Always read and adhere to the SRS deployment precautions outlined in this workshop manual. See GENERAL INFORMATION, SRS Precautions.

- Always remove the key from the ignition switch and disconnect the vehicle battery (negative lead first) before starting the deployment procedures.
- Always observe the system safe time of 10 minutes (to allow the energy reserve capacitors to discharge) before disconnecting or removing any SRS components.
- Only use the MG approved deployment equipment.
- Deploy the airbag modules in a well ventilated, specially designated area.
- Ensure the airbag module is not damaged or ruptured before deploying.
- Notify the relevant authorities.

Deploy

1. Carry out deployment tool SMD 4082/I self test.
2. Remove the passenger airbag module.

 [PASSENGER AIRBAG MODULE, page 75-2.](#)

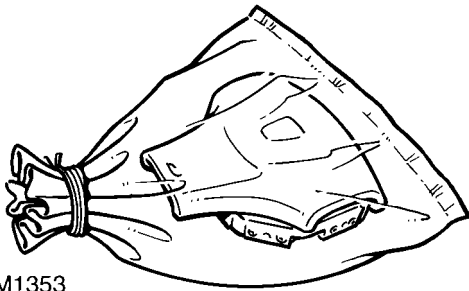


M76 3056

9. Press both operating buttons of deployment tool SMD 4082/I to deploy the airbag module.

WARNING: A deployed airbag module will be very hot. DO NOT return to the airbag module for 30 minutes.

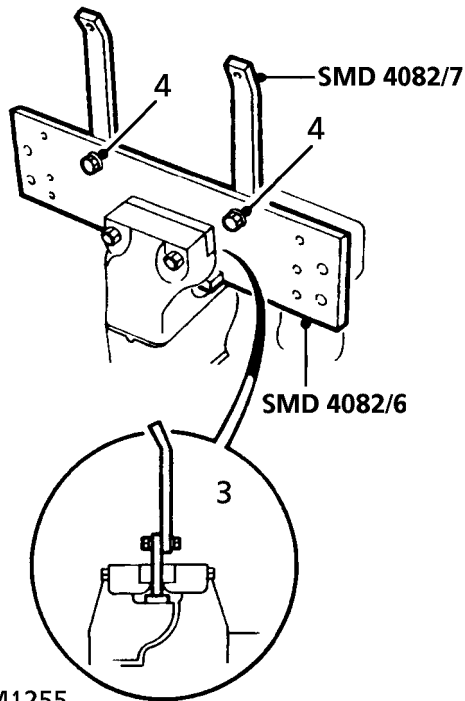
CAUTION: Wear a face shield and gloves when handling a deployed airbag module. Wash hands and rinse well after handling a deployed airbag module.



76M1353

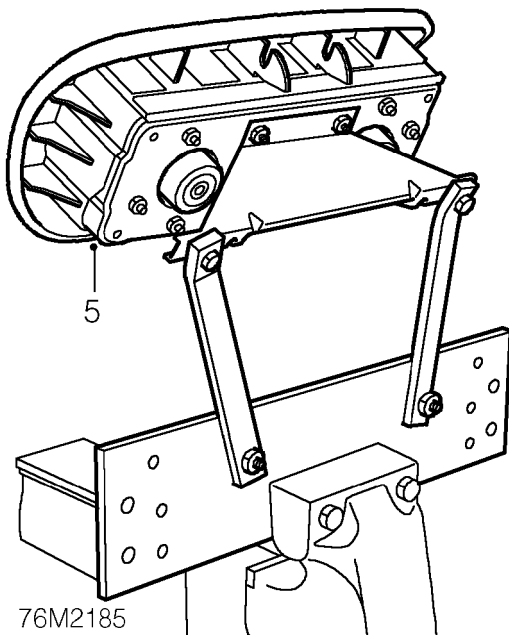
10. Remove the driver airbag module from the deployment tools and place the deployed airbag module in a strong plastic bag, and seal bag.
11. Wipe down the deployment tools with a damp cloth.
12. Transport the deployed driver airbag module to the designated area for incineration.
NOTE: DO NOT transport the airbag module in the vehicle passenger compartment.
13. Scrap all remaining parts of airbag system. **DO NOT** re-use or salvage any parts of the airbag system.

RESTRAINT SYSTEMS



76M1255

3. Position tool SMD 4082/6 in a vice, ensuring that the vice jaws grip the tool above the bottom flange to prevent the possibility of the tool being forced upwards from the vice. Tighten the vice
4. Position brackets SMD 4082/7 to tool SMD 4082/6, lightly tighten the bolts.

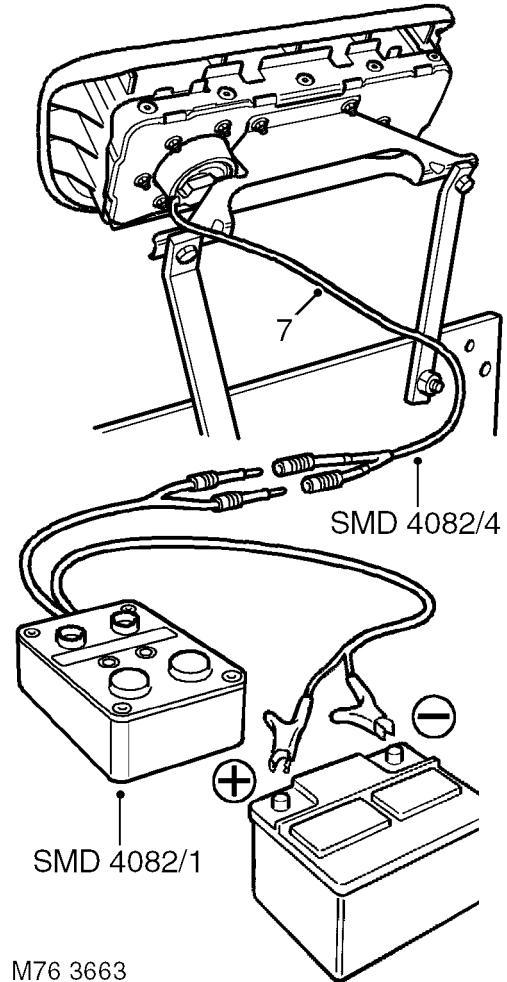


76M2185

5. Position the airbag module to tool SMD 4082/6.

6. Ensure all the airbag module and mounting bracket fixings are secure.

WARNING: Ensure tool SMD 4082/1 is not connected to the battery.



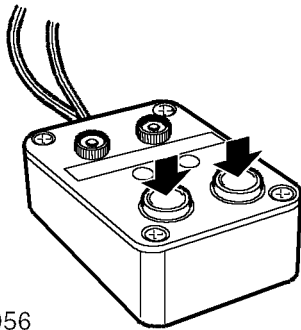
M76 3663

7. Connect deployment tool flylead SMD 4082/4 to the passenger airbag mo
8. Connect deployment tool flylead SMD 4082/4 to the deployment tool SMD 4082/1.

WARNING: Do not lean over the airbag module whilst connecting.

WARNING: Ensure all personnel are standing at least 15 metres (50 ft.) away from the airbag module.

9. Connect deployment tool SMD 4082/1 to the battery.



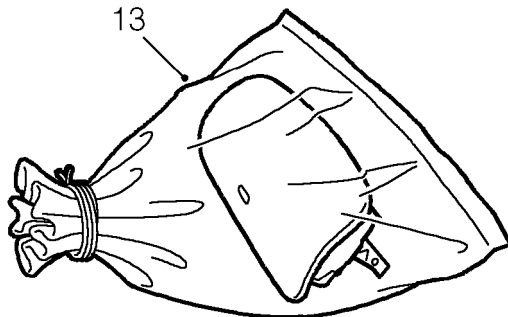
M76 3056

10. Press both operating buttons of deployment tool SMD 4082/1 to deploy the airbag module

WARNING: A deployed airbag module will be very hot. DO NOT return to the airbag module for 30 minutes.

CAUTION: Wear a face shield and gloves when handling a deployed airbag module. Wash hands and rinse well after handling a deployed airbag module.

11. Disconnect the passenger airbag module from deployment tool SMD 4082/1 and remove the airbag module from the mounting brackets.
12. Wipe down the deployment tools with a damp cloth.



76M2187

13. Place the deployed passenger airbag module in a strong plastic bag and seal the bag.
14. Transport the deployed airbag module to the designated area for incineration.
NOTE: DO NOT transport the airbag module in the vehicle passenger compartment.
15. Scrap all remaining parts of the airbag system. **DO NOT** re-use or salvage any parts of the airbag system

RESTRAINT SYSTEMS



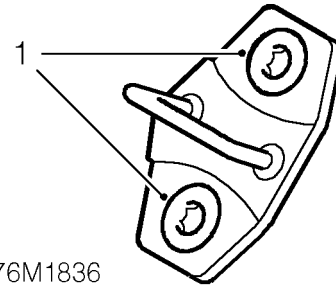
DOOR - ALIGN ON HINGES

🔑 76.28.07

- 1 Turn wheel in lock for access to wheel arch liner screws.
- 2 Remove 3 screws and 3 scrivenets securing wheel arch liner.
- 3 Remove wheel arch liner to gain access to hinge bolts.
- 4 Open door.
- 5 Remove screws securing door striker to 'B' post collect striker.
- 6 Loosen bolts securing hinges to 'A' post.
- 7 Align door to meet the profile of adjacent panels, and ensure all surrounding door gaps are parallel.
- 8 Tighten door hinge bolts.
- 9 Re-check door alignment.
- 10 Position door striker and fit screws.
- 11 Adjust door striker so that the door closes without the need for slamming it.
- 12 Tighten door striker screws to 18 Nm.
- 13 Fit wheel arch liner and secure with screws and scrivenets.

DOOR STRIKER - ADJUST

🔑 76.28.05



76M1836

- 1 Using a Torx bit loosen 2 striker screws and close door.
- 2 Check door for flush fit to adjacent panels and edges for equal gap.
- 3 Open door and tighten striker screws to 18 Nm.

DOORS

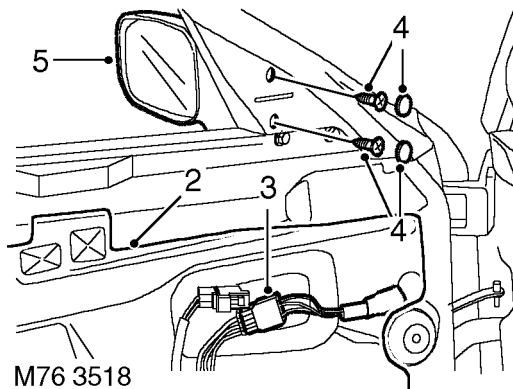


MIRROR - EXTERIOR - ELECTRIC

🔑 76.10.57


Remove

1. Remove front door casing.
 TRIM CASING, page 76-I-6.



2. Release plastic sheet to access mirror multiplug.
3. Disconnect mirror multiplug and attach draw string to mirror harness.
4. Remove 2 screw caps and screws securing mirror.
5. Remove exterior mirror.
6. Remove draw string from mirror harness.

Refit

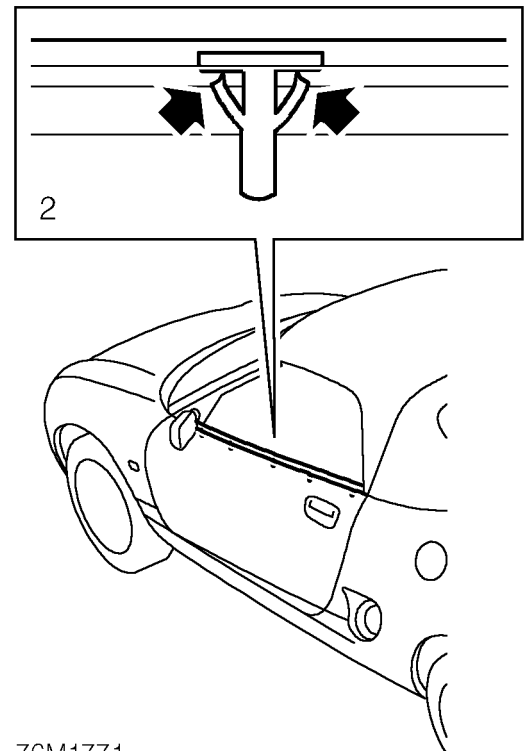
1. Attach draw string to mirror harness and feed harness into door. Remove draw string from mirror harness.
2. Position exterior mirror to door and secure with screws.
3. Fit screw caps.
4. Connect mirror multiplug.
5. Secure plastic sheet in correct position.
6. Fit front door casing.
 TRIM CASING, page 76-I-6.

GLASS

🔑 76.31.01

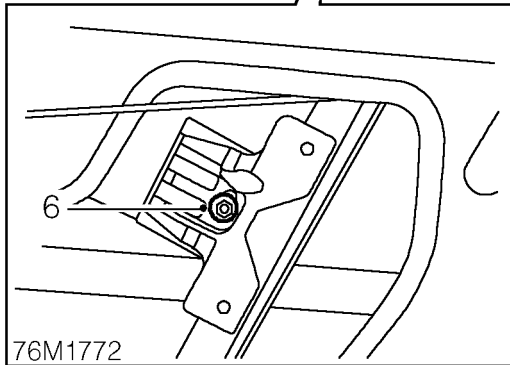
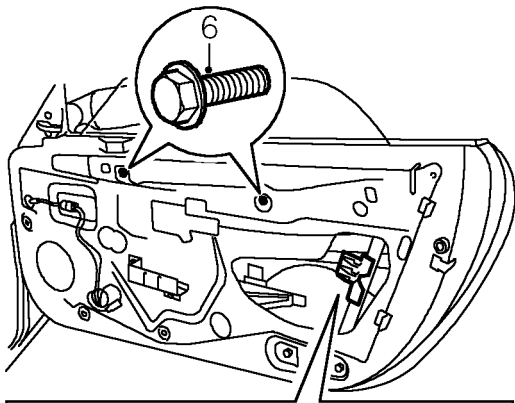
Remove

1. Remove trim casing.
 TRIM CASING, page 76-I-6.





76M1771

2. Release 5 clips securing outer waist seal to door and remove seal.
3. Peel back plastic sheet to allow access to inner door.
4. Switch ignition ON and lower window to allow access to bolts.
5. Switch ignition OFF.



6. Remove 3 bolts securing glass to regulator.
7. Remove glass.



Refit

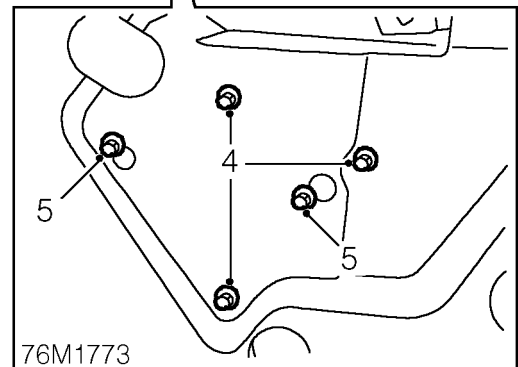
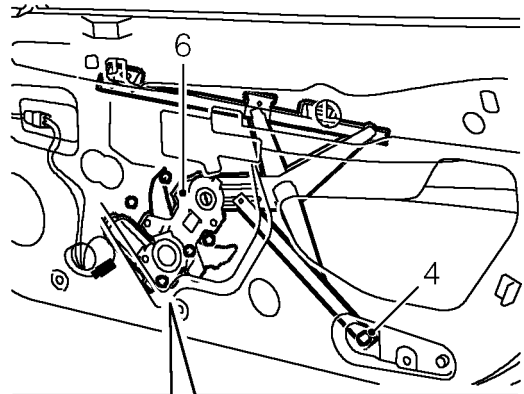
1. Position glass to regulator and align rear guide to glass.
2. Fit bolts securing glass to regulator but do not tighten.
3. Adjust door glass.
 [GLASS, page 76-1-3.](#)
4. Position plastic sheet and secure in place.
5. Fit outer waist seal and secure with clips.
6. Fit trim casing.
 [TRIM CASING, page 76-1-6.](#)

DOOR GLASS REGULATOR

 **76.31.45**



Remove

1. Remove glass.
 [GLASS, page 76-1-3.](#)
2. Remove plastic sheet.
 [PLASTIC SHEET, page 76-1-6.](#)
3. Disconnect multiplug from motor.



4. Remove 4 bolts securing regulator to door.
5. Loosen 2 bolts securing regulator to door.
6. Remove regulator.

Refit

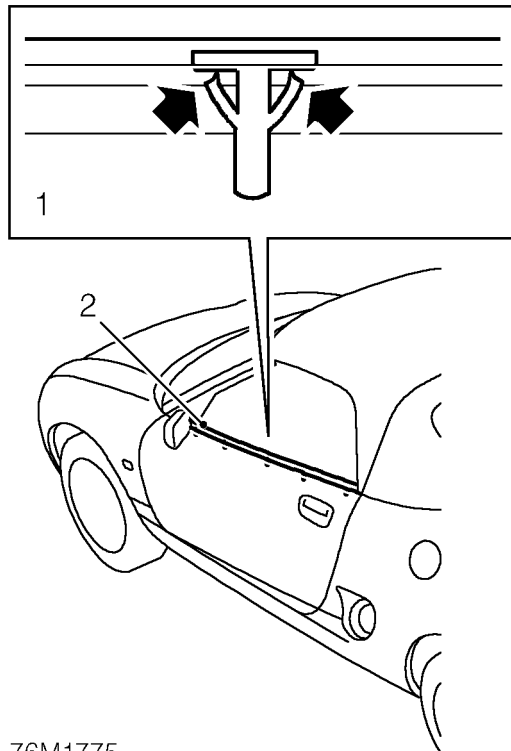
1. Position regulator to door and feed multiplug through aperture.
2. Align bolts to slotted holes and tighten to 7 Nm.
3. Fit and tighten bolts to 7 Nm.
4. Fit glass.
 [GLASS, page 76-1-3.](#)
5. Fit plastic sheet.
 [PLASTIC SHEET, page 76-1-6.](#)



OUTER WAIST SEAL

🔑 76.31.53

Remove



76M1775

1. Starting from the rear of the door, release 5 clips securing seal to door.
2. Remove seal.

Refit

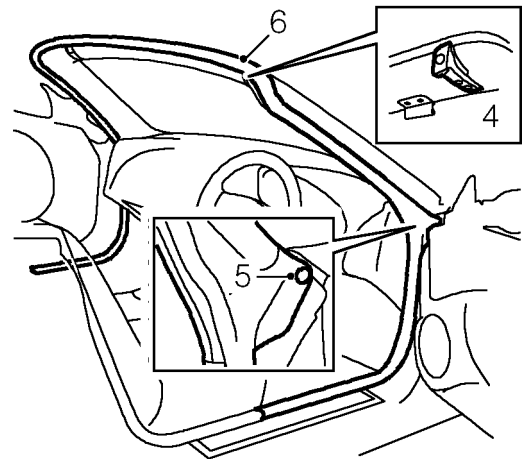
1. Position seal to door and align clips.
2. Fit seal and engage clips.

DOOR AND HEADER SEAL

🔑 76.31.85

Remove

1. Open both doors.
2. Lower both sun visors.
3. Release catches and lower hood.



76M1552

4. Remove 2 Tx30 Torx screws securing each hood striker and remove both strikers.
5. Remove 2 studs securing seal to 'A' posts.
6. Remove seal.

Refit

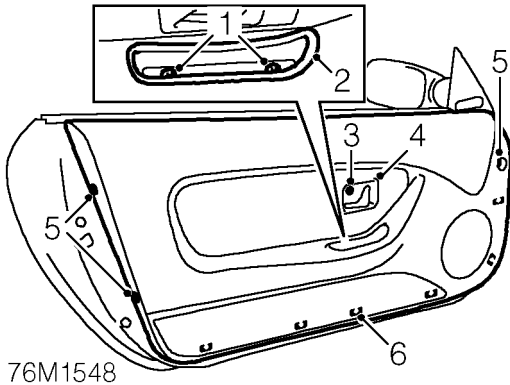
1. Position and centralise seal to header rail.
2. Secure seal to 'A' posts with studs.
3. Engage seal to flanges of header, 'A' posts and sills.
4. Fit hood strikers and tighten screws to 6 Nm.
5. Reposition sun visors.
6. Raise hood and secure catches.
7. Close doors.

DOORS

TRIM CASING

🔑 76.34.01/99

Remove



1. Remove 2 screws securing door pull.
2. Remove door pull from trim casing.
3. Remove screw securing remote door handle escutcheon.
4. Remove remote door handle escutcheon.
5. Remove 3 screws securing trim casing.
6. Release 6 lower trim casing retaining clips, remove trim casing.

Refit

1. Fit trim casing to door and secure with clips.
2. Fit screws securing trim casing to door.
3. Fit remote door handle escutcheon and secure with screw.
4. Fit door pull to trim casing and secure with screws.

PLASTIC SHEET

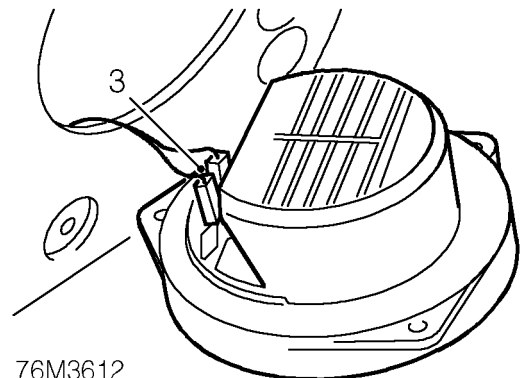
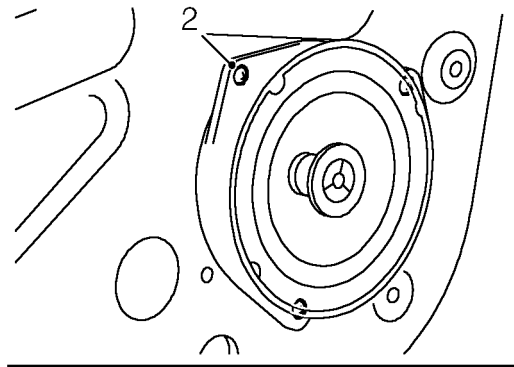
🔑 76.34.26

NOTE: A new plastic sheet must always be fitted, do not attempt to repair an existing plastic sheet.

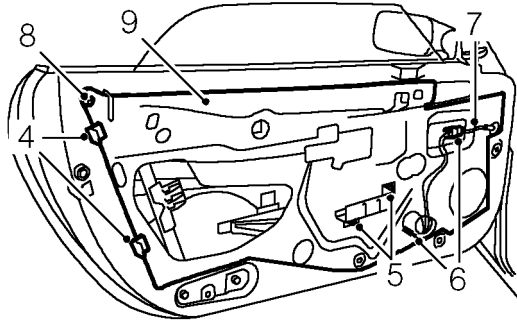
NOTE: To obtain an effective seal when fitting a new plastic sheet, ensure that the plastic sheet and door contact surface are at room temperature: between 18 ° C to 30 ° C.

Remove

1. Remove the remote door handle.
 [REMOTE DOOR HANDLE, page 76-I-7.](#)



2. Remove 3 screws securing door speaker.
3. Release speaker, disconnect 2 Lucars and remove speaker.



76M1551

4. Remove 2 trim rear fixing clips from door.
5. Remove 2 screws securing door pull fixing bracket to door; remove bracket.
6. Release 2 door harness retaining clips from door.
7. Disconnect heated door mirror multiplug.
8. Remove trim casing rear upper fixing clip from door.
9. Release plastic sheet from door. Feed harness connectors through sheet and remove plastic sheet.

Refit

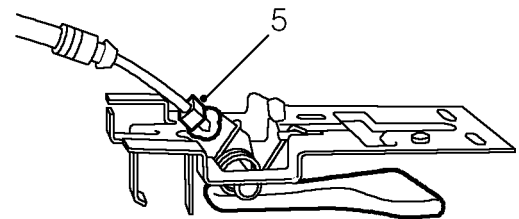
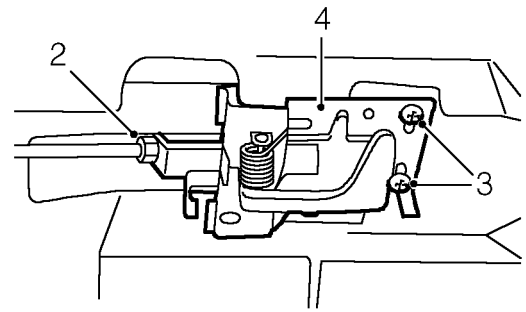
1. Ensure door is clean and dry where it comes in contact with the adhesive strip on the plastic sheet.
2. Fit plastic sheet, by fitting the adhesive strip to the bottom centre of the door first.
3. Starting from the bottom centre of the adhesive strip apply even pressure along the strip in both directions simultaneously, until the top centre of seal is reached.
4. Feed harness connectors through sheet and secure to door.
5. Fit fixing clips to door.
6. Connect heated door mirror multiplug.
7. Secure harness retaining clips to door.
8. Fit door pull fixing bracket to door and tighten screws.
9. Fit trim casing rear fixing brackets to door.
10. Position door speaker; connect Lucars and tighten screws.
11. Fit the remote door handle.
 - [REMOTE DOOR HANDLE, page 76-1-7.](#)

REMOTE DOOR HANDLE

76.37.31

Remove

1. Remove trim casing.
 - [TRIM CASING, page 76-1-6.](#)



76M1549

2. Release latch operating cable from remote door handle abutment bracket.
3. Remove 2 screws securing remote door handle.
4. Release remote door handle from door by sliding in a forward direction.
5. Release clip securing latch operating cable to remote door handle, remove remote door handle.

Refit

1. Fit latch operating cable to remote door handle and secure with clip.
2. Position remote door handle to door and secure with screws.
3. Secure latch operating cable to remote door handle abutment bracket.
4. Fit trim casing.
 - [TRIM CASING, page 76-1-6.](#)

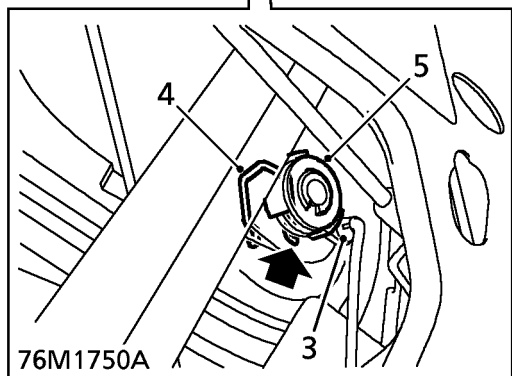
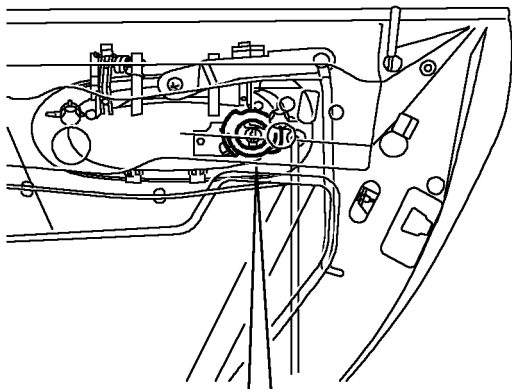
DOORS

PRIVATE LOCK

🔑 76.37.39

Remove

1. Remove trim casing.
👉 TRIM CASING, page 76-I-6.
2. Carefully peel back plastic sheet to allow access to inner door.



3. Unclip link rod from lock.
4. Release spring clip from lock.
5. Remove private lock.

Refit

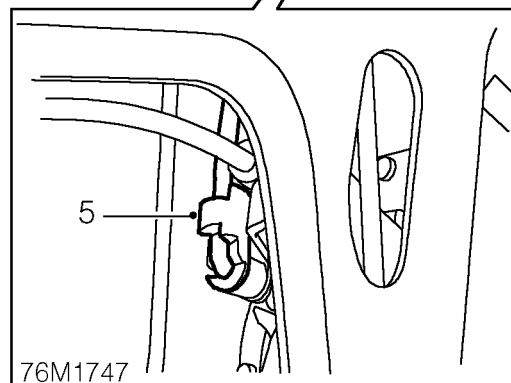
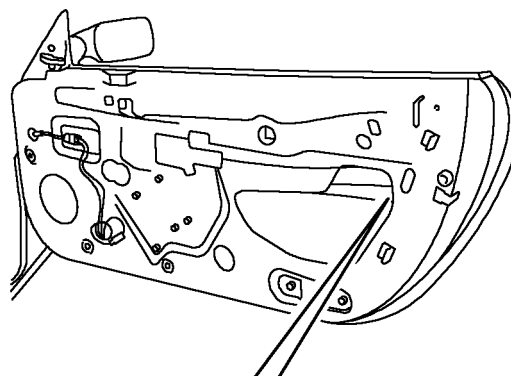
1. Fit lock to handle and secure with spring clip.
2. Engage link rod to lock.
3. Position plastic sheet and press into place.
4. Fit trim casing.
👉 TRIM CASING, page 76-I-6.

OUTSIDE HANDLE

🔑 76.58.07

Remove

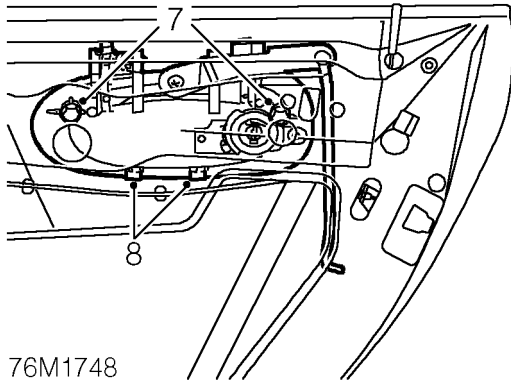
1. Remove trim casing.
👉 TRIM CASING, page 76-I-6.
2. Switch the ignition ON and fully lower door glass.
3. Switch ignition OFF.
4. Carefully peel back corner of plastic sheet to allow access to door latch.



5. Release clip securing door handle link rod to latch assembly and position aside.

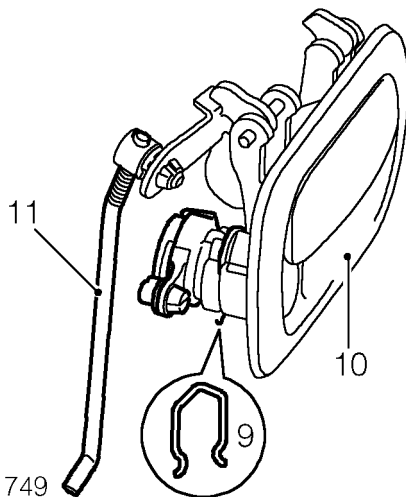
Driver's side:

6. Release lock link rod from lock.

**All models:**

76M1748

7. Remove 2 bolts securing handle to door.
8. Release 2 clips retaining handle to door and position handle.

Drivers side:

76M1749

9. Release clip securing lock to handle and remove lock.

All models:

10. Remove handle.
11. Remove rod from handle.


Refit

1. Fit rod to handle and position handle to door.
2. Engage handle to door and tighten bolts to 2.5 Nm.
3. Adjust rod length to align rod to latch.
4. Position rod and secure with clip.

Drivers side:

5. Engage lock connecting rod.
6. Fully raise door window.
7. Position lock to handle and secure with clip.

All models:

8. Secure plastic sheet.
 9. Fit trim casing.
-  [TRIM CASING](#), page 76-I-6.

DOORS

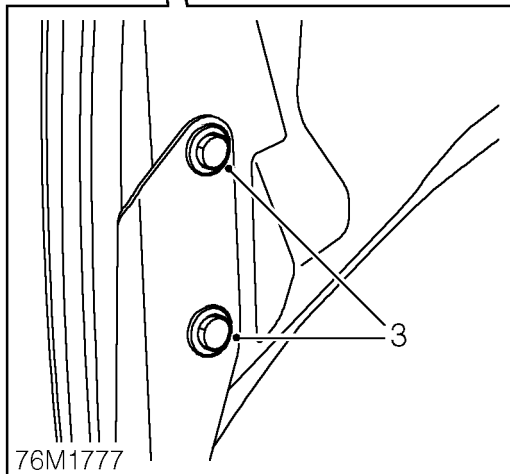
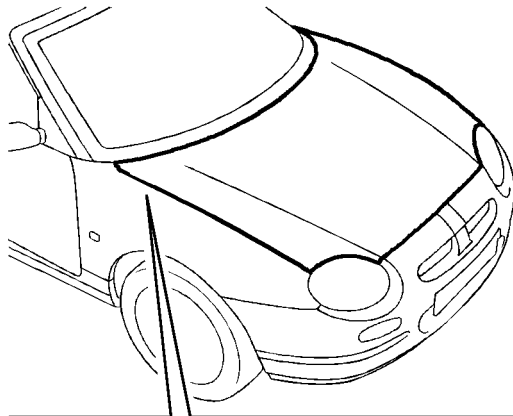


BONNET - ADJUST

🔑 76.16.02/01

Adjust

1. Check alignment of bonnet.
2. Open bonnet.



3. Loosen 4 bolts securing bonnet to hinges and adjust bonnet.
4. Lightly tighten bolts and close bonnet.
5. Check gaps are equal and bonnet is aligned with adjacent panels.
6. Open bonnet, adjust hinges if necessary and tighten bolts to 9 Nm.
7. If necessary, adjust bonnet locking plate.

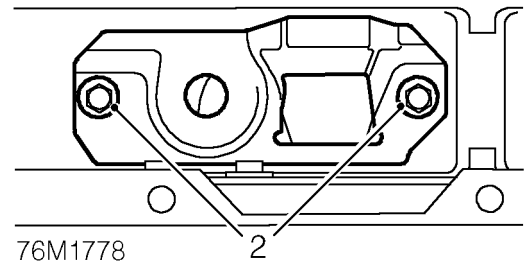
👉 [BONNET LOCK PLATE - ADJUST, page 76-2-1.](#)

BONNET LOCK PLATE - ADJUST

🔑 76.16.20

Adjust

1. Open bonnet.



2. Loosen 2 bolts securing lock plate to body.
3. Position lock plate fully forward.
4. Gently lower bonnet. Align striker pin with lock and ensure safety catch engages in lock plate.
5. Tighten bolts to 25 Nm.
6. Check correct operation of bonnet latch and alignment of bonnet.
7. If necessary adjust bonnet.

👉 [BONNET - ADJUST, page 76-2-1.](#)

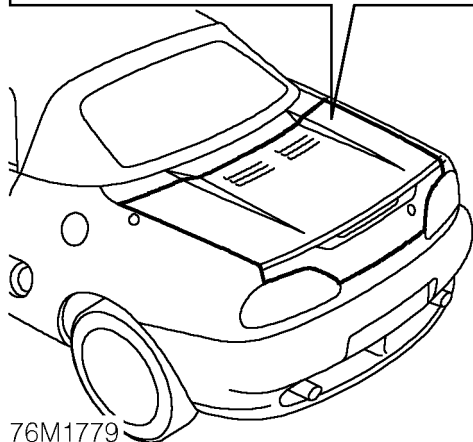
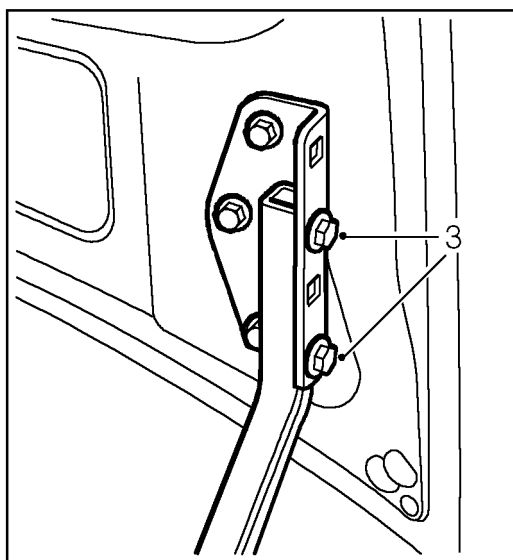
EXTERIOR FITTINGS

BOOT LID - ADJUST

🔑 76.19.03


Adjust

1. Check for equal gaps around boot and alignment with adjacent panels.
2. Open boot lid.



76M1779

3. Loosen 4 bolts securing boot lid to hinges and adjust boot lid.
4. Lightly tighten bolts and close boot.
5. Check alignment of boot lid.
6. Open boot lid.
7. Adjust boot lid if necessary and tighten bolts to 9 Nm.
8. If necessary, adjust boot striker:

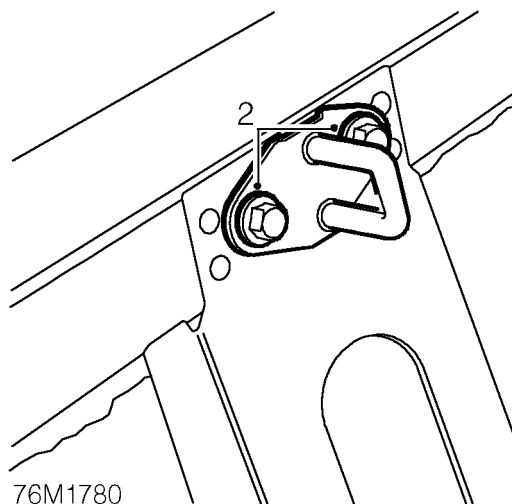
 [BOOT LID STRIKER - ADJUST, page 76-2-2.](#)

BOOT LID STRIKER - ADJUST

🔑 76.19.04

Adjust

1. Open boot lid.



76M1780

2. Loosen 2 bolts securing striker to body and approximately position striker.
3. Lightly tighten bolts and close boot lid. Check for equal gaps and alignment with adjacent panels.
4. Open boot lid, re-position latch as necessary, tighten latch and striker bolts to 10 Nm.

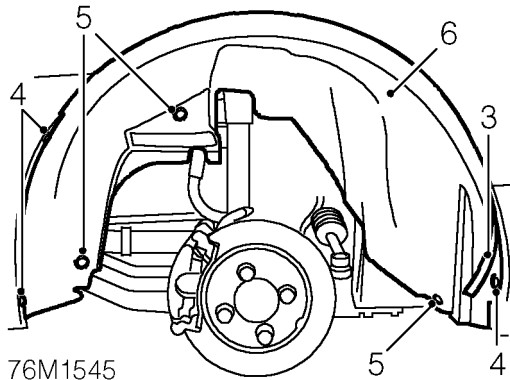


FRONT WHEEL ARCH LINER

🔑 76.10.48

Remove

1. Raise front of vehicle.
WARNING: Support on safety stands.
2. Remove road wheel(s).



3. Release wheel arch flange seal from rear lower edge of wing panel.
4. Remove 3 screws securing wheel arch liner.
5. Remove 3 scrivet screws securing wheel arch liner; remove scrivets.
6. Remove wheel arch liner.

Refit

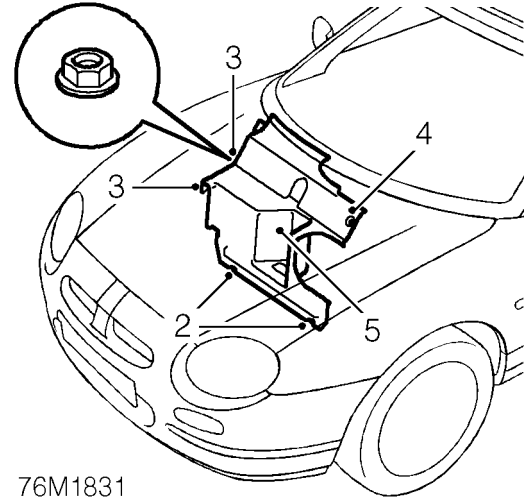
1. Fit and align wheel arch liner.
2. Fit scrivet fasteners securing wheel arch liner.
3. Fit and tighten screws securing wheel arch liner.
4. Secure wheel arch flange seal.
5. Fit road wheel(s) and tighten wheel nuts to 70 Nm.
6. Remove stand(s) and lower vehicle.

UNDERBONNET CLOSING PANEL

🔑 76.10.94

Remove

1. Open bonnet.



2. Remove 2 fixings securing closing panel to spare wheel well.
3. Remove 2 fixings securing closing panel to scuttle.
4. Remove fixing securing closing panel to air intake plenum.
5. Remove closing panel.

Refit

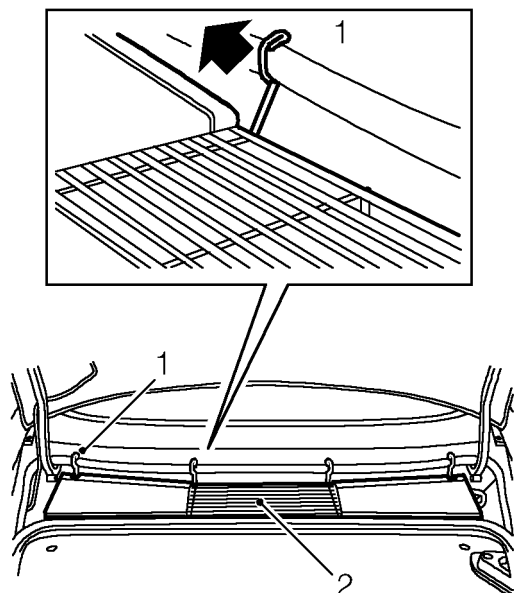
1. Fit closing panel to body studs and secure fixings.
2. Close bonnet.

EXTERIOR FITTINGS

ENGINE COMPARTMENT ACCESS PANEL

🔑 76.11.05/99

Remove



76M1745

1. Release 4 retaining clips along front edge of closing panel by pulling each clip away from the seal and lifting upwards.
2. Remove panel.

Do not carry out further dismantling if component is removed for access only.

3. Remove 6 screws securing LH plate to panel, remove plate.
4. Remove 3 screws securing RH plate to panel, remove plate.

Rebuild

5. Fit RH plate to panel and secure with screws.
6. Fit LH plate to panel and secure with screws.

Refit

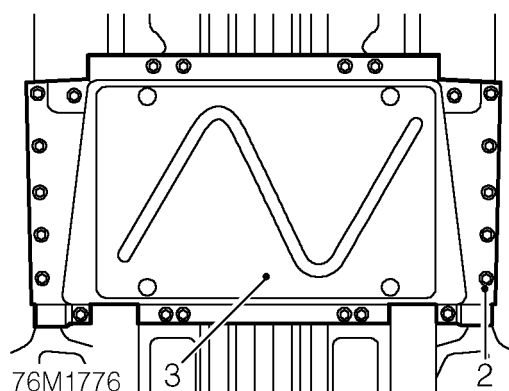
1. Fit closing panel and secure.

PANEL - FRONT UNDERBELLY - CENTRE

🔑 76.10.50

Remove

1. Raise vehicle on a 2 post ramp.



2. Remove 22 bolts securing underbelly panel to floorpan.
3. Remove underbelly panel.

Refit

1. Position underbelly panel to floorpan and tighten bolts to 22 Nm.
2. Lower vehicle.

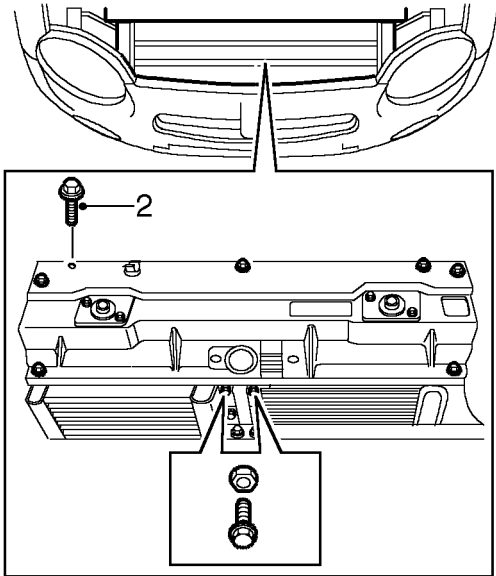


BONNET LOCKING PLATFORM - R/R ACCESS

76.16.22/99

Remove

1. Remove front bumper valance.
[BUMPER VALANCE - FRONT, page 76-2-9.](#)



M76 3522

2. Remove 7 bolts and 2 nuts and bolts securing bonnet locking platform. Release bonnet locking platform from 4 location pegs.
3. Disconnect bonnet cable from bonnet catch and remove bonnet locking platform.

Refit

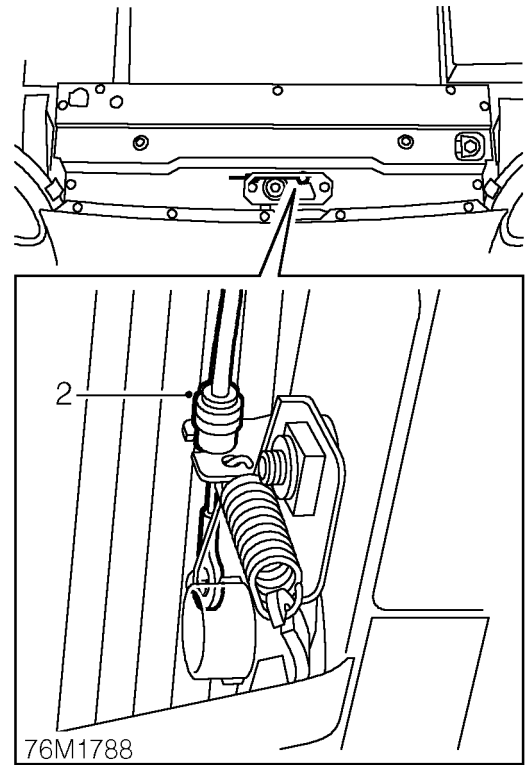
1. Position bonnet locking platform and connect bonnet cable to bonnet catch.
2. Fit bonnet locking platform and engage platform in location pegs. Fit nuts and bolts and tighten to 10 Nm.
3. Fit front bumper valance.
[BUMPER VALANCE - FRONT, page 76-2-9.](#)

BONNET RELEASE CABLE

76.16.29

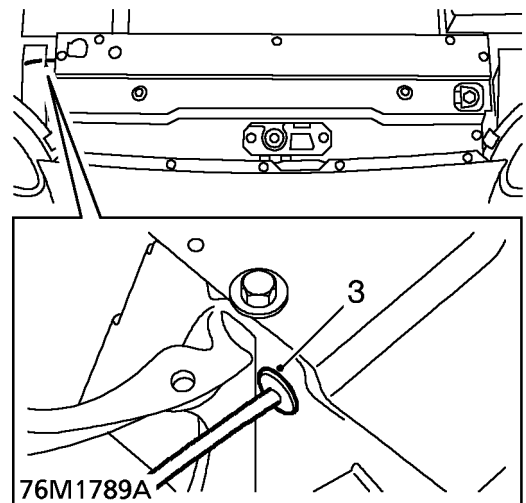
Remove

1. Remove headlamp assembly.
[HEADLAMP ASSEMBLY, page 86-8.](#)



76M1788

2. Release cable from bonnet lock plate.

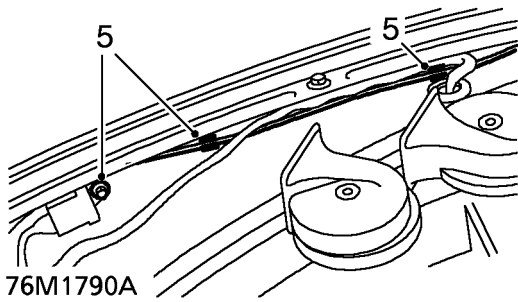


76M1789A

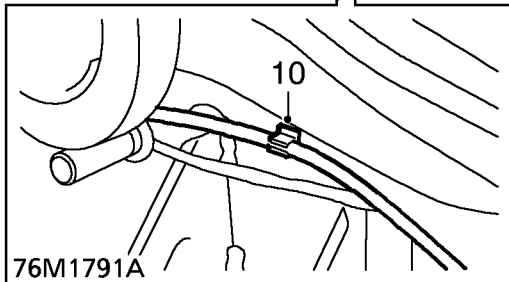
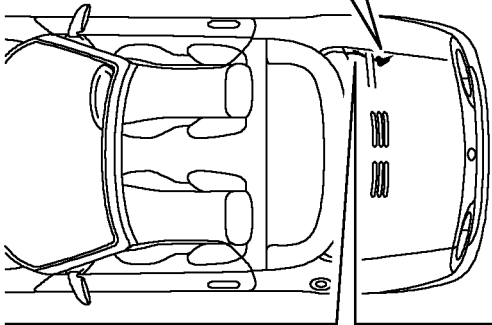
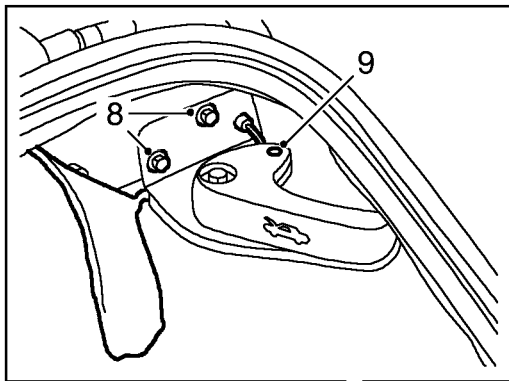
3. Release grommet from body

EXTERIOR FITTINGS

4. Feed bonnet release cable through hole.

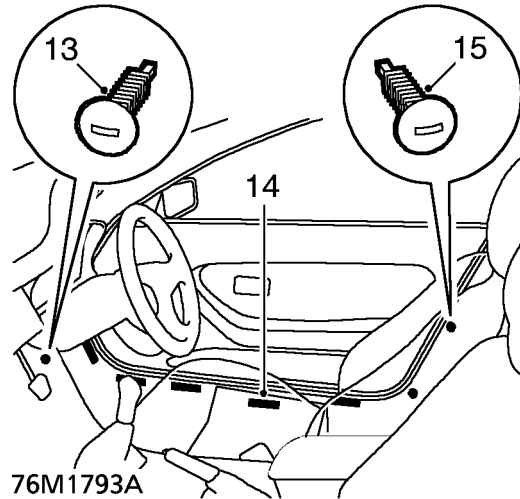


5. Loosen bolt securing earth header to inner wing and release cable from 2 inner wing clips.
6. Remove engine compartment access panel.
[👉 ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
7. Remove hoodwell trim.
[👉 HOODWELL TRIM, page 76-4-11.](#)

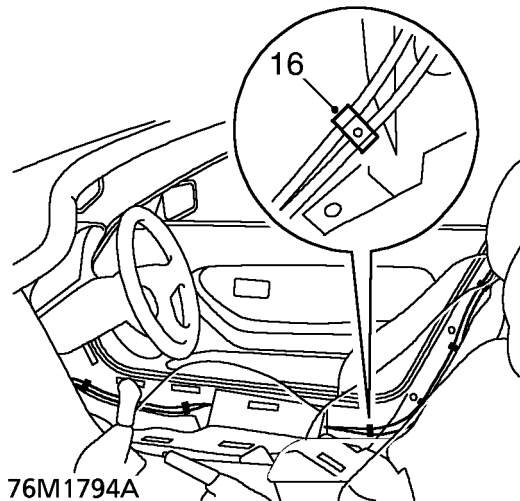


8. Position carpet aside and remove 2 bolts securing bonnet release lever to luggage compartment bulkhead.

9. Release cable abutment and cable from lever assembly.
10. Release cable from rear, inner wing clip.
11. Position felt pad aside and release grommet from hoodwell panel.
12. Feed cable through body holes and remove grommet from cable.



13. Remove stud securing carpet to inner wheel arch.
14. Release carpet from door seal and 5 velcro strips.
15. Remove 2 studs securing carpet to 'B' post, and release carpet from door seal and velcro to reveal cables.



16. Release cable from 3 sill clips and 3 'B' post clips.
17. Release cable from floorpan crossmember.
18. Release grommet from scuttle and remove cable.

Refit

1. Feed cable through scuttle and under carpet insulation.
2. Position grommet to cable timing mark and engage grommet to scuttle.



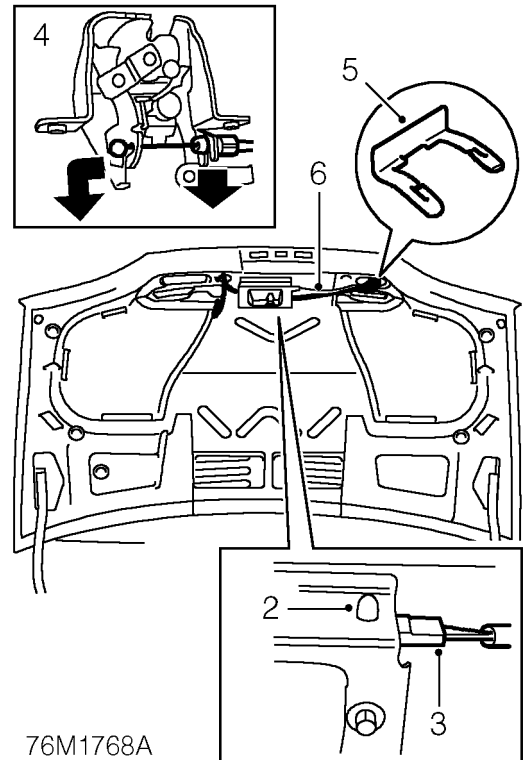
3. Position cable to front inner wing and through hole in body.
4. Engage cable and abutment to bonnet lock plate.
5. Engage grommet to body.
6. Fit headlamp assembly.
- [HEADLAMP ASSEMBLY, page 86-8.](#)
7. Engage cable to inner wing clip and tighten earth header bolt to 9 Nm.
8. Feed cable through floorpan crossmember and engage to clips.
9. Position carpet and secure with studs and velcro.
10. Position carpet beneath door flip seal.
11. Fit grommet to cable and position to timing mark.
12. Position cable through hole in hoodwell panel and luggage compartment bulkhead.
13. Engage cable and abutment to bonnet release lever.
14. Position lever to bulkhead and tighten bolts to 9 Nm.
15. Position carpet beneath luggage compartment flip seal.
16. Engage grommet and cable clip.
17. Fit hoodwell trim.
- [HOODWELL TRIM, page 76-4-11.](#)
18. Fit engine compartment access panel.
- [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)

PRIVATE LOCK - BOOT LID

76.19.10

Remove

1. Open boot lid.



76M1768A

2. Release multiplug from boot lid latch, bracket.
3. Disconnect multiplug.
4. Disconnect release cable from boot lid latch.
5. Remove clip securing lock to boot lid.
6. Remove lock assembly from boot lid.

Refit

1. Position lock to boot lid and secure with clip.
2. Connect release cable to boot lid latch.
3. Connect multiplug.
4. Secure multiplug to boot lid latch, bracket.

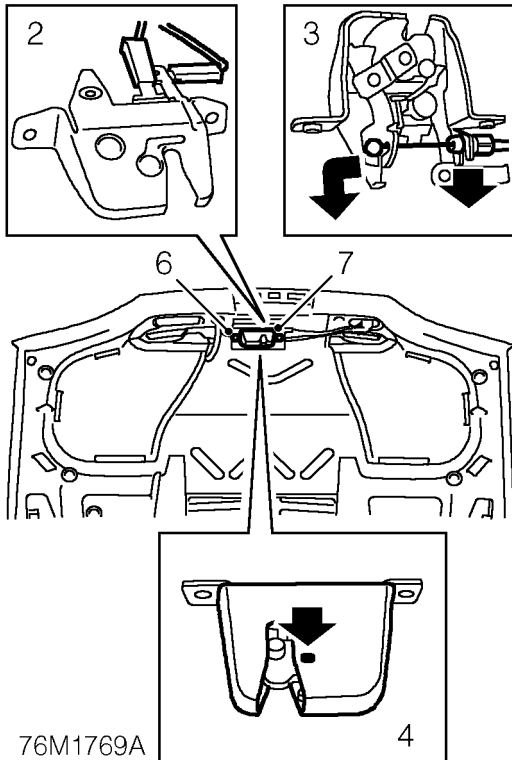
EXTERIOR FITTINGS

BOOT LID LATCH

🔑 76.19.11

Remove

1. Open boot lid.



2. Disconnect 2 Lucars and multiplug from latch assembly.
3. Release cable from latch.
4. Release clip and remove cover from latch.
5. Mark position of latch to boot for reference.
6. Remove 2 bolts securing latch to boot lid.
7. Remove latch assembly.

Refit

1. Position latch to boot lid using reference marks and tighten bolts to 10 Nm.
2. Connect cable and secure to latch.
3. Connect Lucars and multiplug, and fit latch cover.
4. Check latch operation and if necessary, adjust boot lid striker.

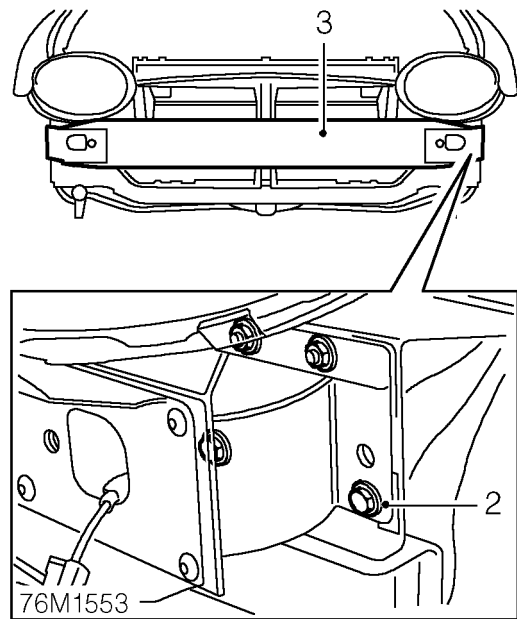
[BOOT LID STRIKER - ADJUST, page 76-2-2.](#)

FRONT BUMPER ARMATURE

🔑 76.22.49

Remove

1. Remove front bumper valance.
 [BUMPER VALANCE - FRONT, page 76-2-9.](#)



2. Remove 2 bolts and 2 nuts securing each end of armature to front panel.
3. Remove armature.

Refit

1. Fit armature to fixing studs.
2. Fit nuts and bolts and tighten to 25 Nm.
3. Fit front bumper valance.

[BUMPER VALANCE - FRONT, page 76-2-9.](#)

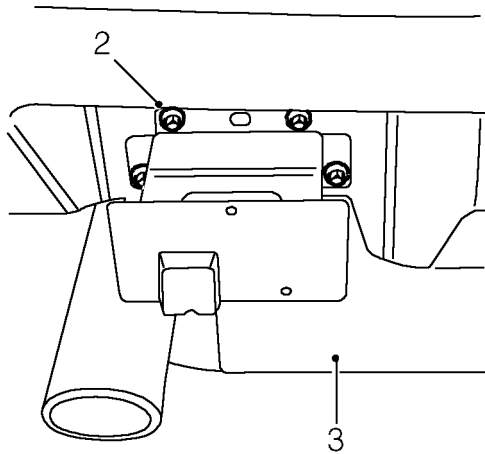


REAR BUMPER ARMATURE

🔑 76.22.52

Remove


1. Remove rear bumper valance.
 [REAR BUMPER VALANCE, page 76-2-11.](#)



76M1798

2. Position luggage compartment carpet aside and remove 4 bolts securing bumper armature to body.
3. Remove bumper armature.

Refit

1. Align armature to body and tighten bolts to 22 Nm.
2. Fit rear bumper valance.
 [REAR BUMPER VALANCE, page 76-2-11.](#)

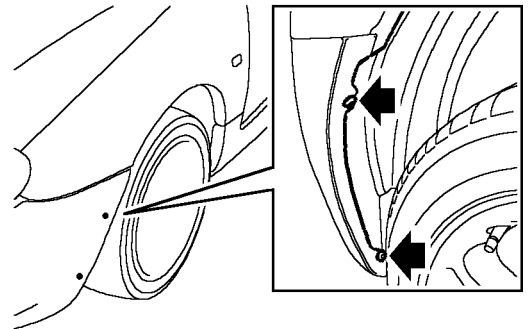
BUMPER VALANCE - FRONT

🔑 76.22.72

Remove

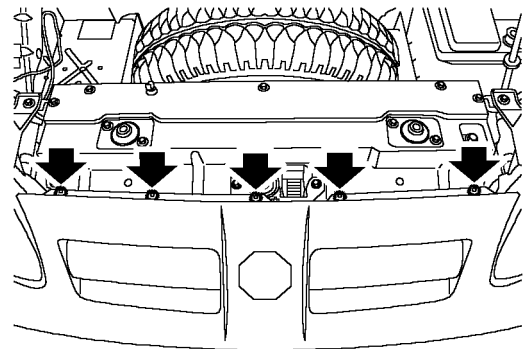
1. Raise front of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



SP76 0149

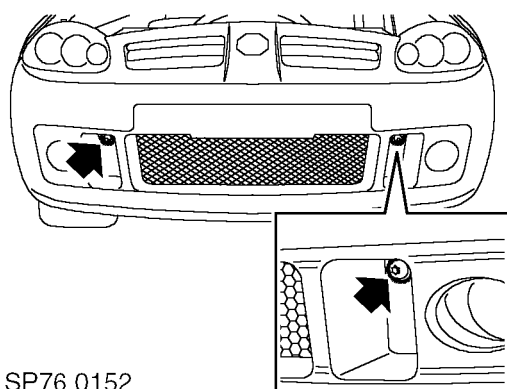
2. Remove 2 screws securing each end of bumper valance to wheel arch liners.
3. Remove 2 screws securing each end of bumper valance to front wing.



SP76 0151

4. Remove 5 screws securing bumper valance to bonnet locking panel.

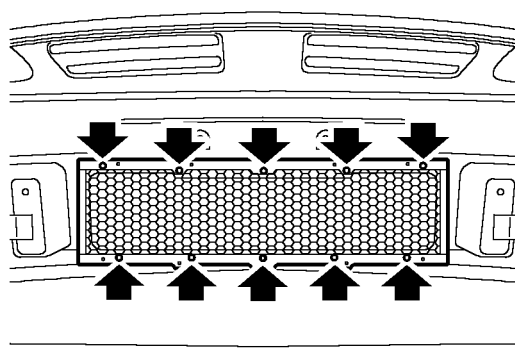
EXTERIOR FITTINGS



SP76 0152

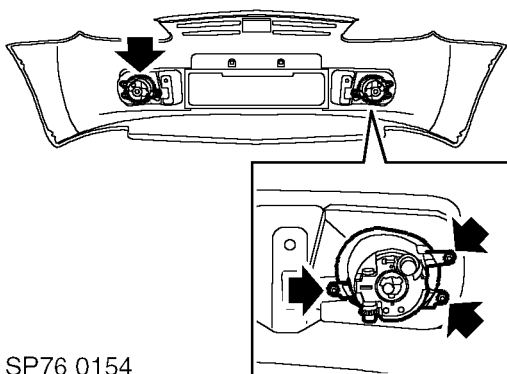
5. Remove 2 Torx bolts securing bumper valance to bumper armature.
6. Disconnect fog/driving lamp multiplugs and remove front bumper valance.

Do not carry out further dismantling if component is removed for access only.



SP76 0153

7. Remove 10 screws securing bumper valance grille and remove grille.
8. Remove bumper valance badge.



SP76 0154

9. Remove 3 screws securing each fog lamp and remove fog lamps.

10. Remove front number plate.

Refit

1. Clean number plate and mating face.
2. Fit number plate.
3. Clean bumper badge and mating face, fit badge.
4. Position bumper grille, fit and tighten screws.
5. Position fog/driving lamps, fit and tighten screws.
6. Fit front bumper valance and connect fog/driving lamp multiplugs.
7. Fit Torx bolts securing bumper valance to bumper armature and tighten to 25 Nm.
8. Fit and tighten screws securing bumper valance to bonnet locking panel.
9. Fit and tighten screws securing bumper valance to front wings.
10. Fit and tighten screws securing front bumper to both wheel arch liners.
11. Remove stands and lower vehicle.



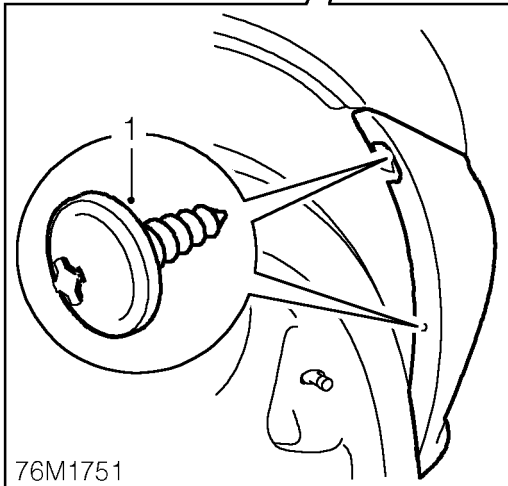
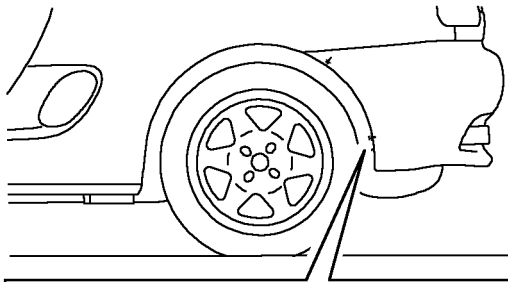
REAR BUMPER VALANCE

76.22.74

Remove

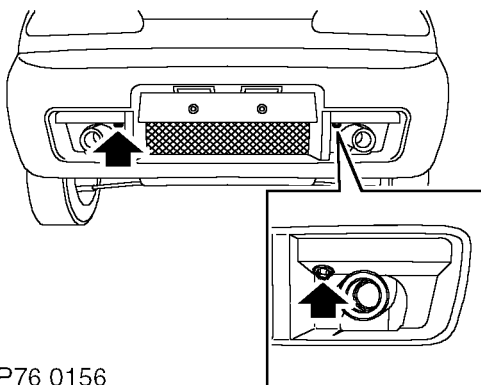
1. Raise rear of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



76M1751

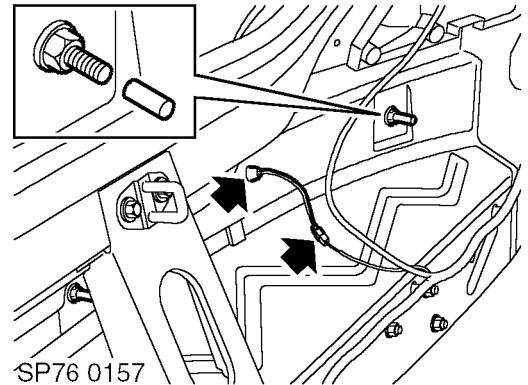
2. Remove 2 screws securing bumper valance to rear of both wheel arches.



SP76 0156

3. Remove 2 Torx bolts securing bumper valance to bumper armature.

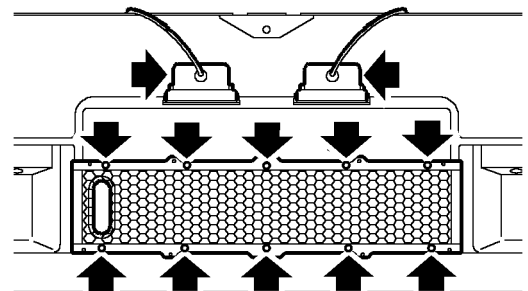
4. Open boot lid and position luggage compartment carpet aside to access multiplugs and bumper valance retaining nuts.



SP76 0157

5. Disconnect both number plate illuminating lamp multiplugs.
6. Release both number plate illuminating lamp harness grommets from rear panel.
7. Remove 3 thread covers and 3 nuts securing bumper valance to rear panel.
8. Release bumper valance from body, taking care to withdraw number plate illuminating lamp harnesses through rear panel. Remove bumper valance.

Do not carry out further dismantling if component is removed for access only.



SP76 0158

9. Release and remove both number plate illuminating lamps.
10. Remove 10 screws securing bumper valance grille and remove grille.

Refit

1. Position bumper grille, fit and tighten screws.
2. Position number plate illuminating lamps and secure to bumper valance.
3. Position bumper valance to body, feed number plate illuminating lamp harnesses through rear panel and align bumper valance to body.

EXTERIOR FITTINGS

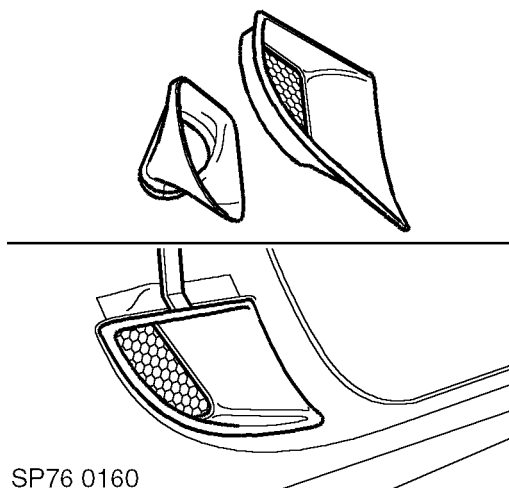
4. Fit bolts securing bumper valance to bumper armatures and tighten to 25 Nm.
5. Fit nuts securing bumper valance to rear panel and tighten to 25 Nm.
6. Fit thread covers.
7. Connect number plate illuminating lamp multiplugs and secure harness grommets.
8. Fit and tighten screws securing bumper valance to rear of both wheel arches.
9. Remove stands and lower vehicle.

AIR VENT - SIDE

🔑 76.55.19

Remove

1. Apply protective tape to paintwork around side air vent.



SP76 0160

2. Using a thin flat blade in the position shown release side air vent from body.
3. Release side air vent from adhesive tape and remove side air vent.
4. Release and remove air intake duct.

Refit

1. Clean side air vent and mating face of body.
2. Position air intake duct and secure to body.
3. Remove adhesive backing from side air vent retaining tape.
4. Position side air vent to air intake duct, align retaining pegs and secure side air vent to body.
5. Remove protective tape, clean and inspect paintwork.



HOOD SEALS AND DOOR GLASS - CANTRAIL SEAL

🔑 76.31.04

Check

1. Check door alignment.
👉 DOOR - ALIGN ON HINGES, page 76-1-1.

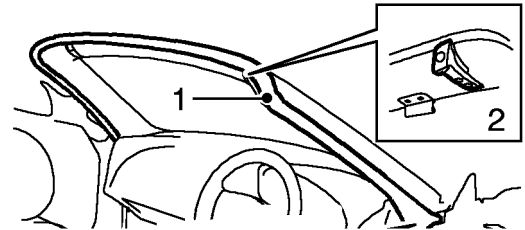
Adjust

1. Check that cantrail seal butts up to 'A' post seal correctly, the cantrail seal must not be distorted when the hood is closed.
2. To adjust cantrail seal release hood and carefully slide seal either backwards or forwards in its channel.
3. Ensure seals are located correctly in their channels.

HOOD SEALS AND DOOR GLASS - 'A' POST SEAL

🔑 76.31.04

Check



76M2334

1. Check that 'A' post seal is positioned square at the corner of the 'A' post and header.

Adjust

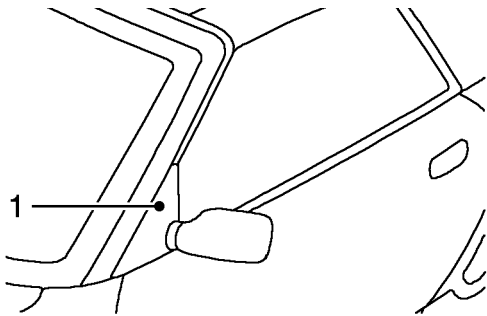
1. To adjust 'A' post seal remove 2 Torx screws securing header striker and remove striker.
2. Manoeuvre 'A' post seal to its correct position.
3. Close hood and secure with opposite side hood catch, apply downward pressure on hood and check that 'A' post seal is aligning correctly.
4. Release hood and fit header striker and secure with Torx screws, tighten to 6 Nm.

HOOD

HOOD SEALS AND DOOR GLASS - CHEATER

🔑 76.31.04

Check

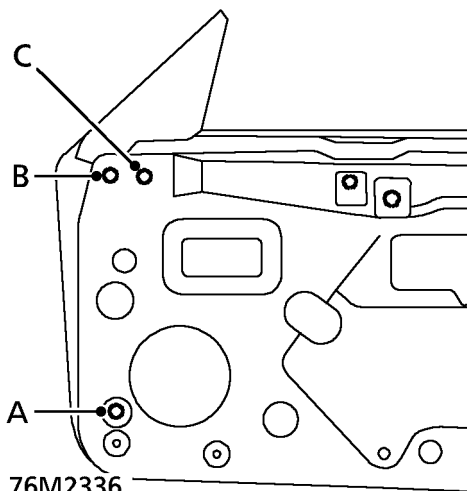


76M2335

1. Check position of cheater; the cheater must be parallel with 'A' post when viewed from the side and front of vehicle.

Adjust

1. If cheater is protruding out at the top when viewed from the front it will hold the door glass away from the seal.
2. To access cheater adjusters remove door speaker:
👉 [FRONT SPEAKER, page 86-12.](#)



76M2336

3. Lower window and loosen screws **B** and **C**.
4. Loosen lock-nut on adjuster **A**, position adjuster screw so that it is level with the back of the nut it screws in to.
5. Push cheater down and pull inboard as far as possible.
6. Hold cheater in this position and tighten screws **B** and **C**, and the adjuster lock nut **A**.

7. Ensure window can be raised and lowered smoothly.
8. Close door and check cheater is positioned correctly, this can be judged by the bulge made by the glass on the 'A' post seal which should be uniform along the seal.
9. Fit speaker:
👉 [FRONT SPEAKER, page 86-12.](#)
10. Fit door trim casing
👉 [TRIM CASING, page 76-1-6.](#)

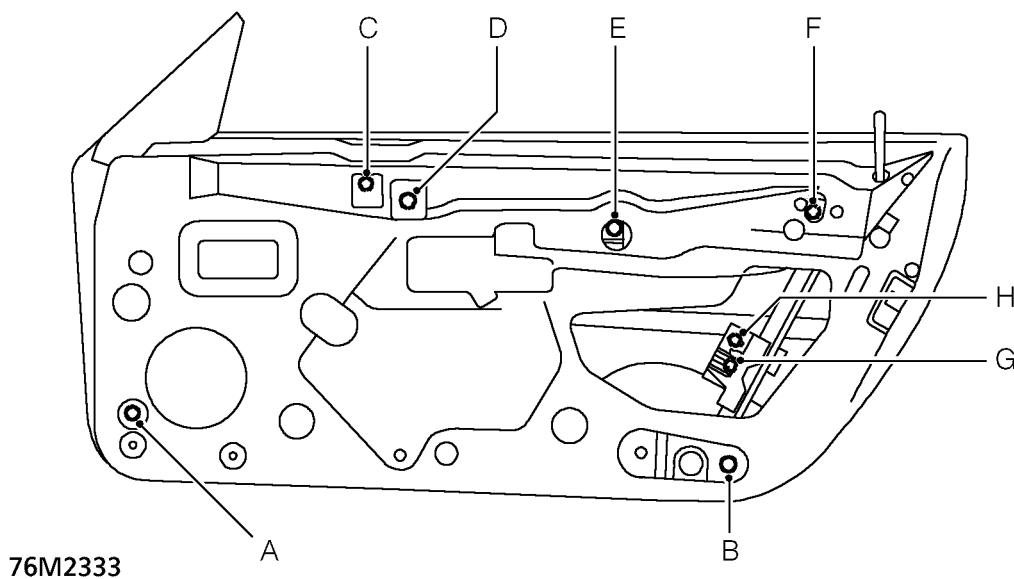


HOOD SEALS AND DOOR GLASS - DOOR GLASS

🔑 76.31.04

Adjust

NOTE: All glass adjustments must be done before the upstroke of the glass.



- a Glass deflection adjustment (pivoting at waist rail).
- b Glass deflection adjustment (pivoting at waist rail).
- c Glass height adjustment (this is also the glass stop).
- d Glass lateral and vertical adjustment.
- e Glass lateral and vertical adjustment.
- f Glass height adjustment (this is also the glass stop).
- g Used at beginning of adjustment to position the door glass centrally in waist rail slot. Tighten bolt to 7 Nm.
- h Positioned at rear glass rail at final stage of adjustment and tightened to 7 Nm.

1. Remove door speaker.

[FRONT SPEAKER](#), page 86-12.

2. Peel back water shedder to access adjusters.

Height

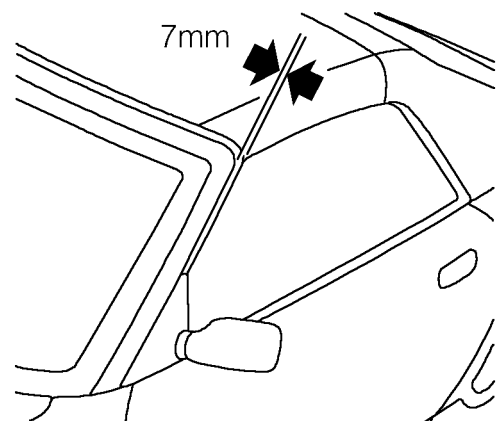
3. Lower glass slightly and loosen adjusters **C** and **F** these also act as glass stops.

NOTE: Glass height is correct when pressure is being applied to the soft part of the cantrail seal.

4. Raise glass to height required, pull adjusters down in slots and tighten adjusters.

5. Lower glass and then raise fully to ensure required height has been obtained.

Parallelism



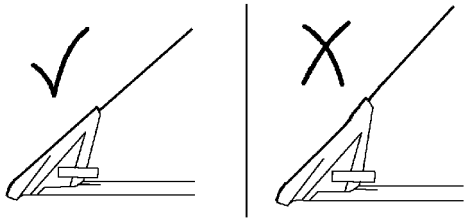
76M1797

6. Loosen two height adjusters **C** and **F**.



NOTE: The glass is parallel when it is in the fully raised position and there is a constant clearance of 7 mm between the glass and the rear face of the 'A' post.

HOOD

- Lower glass sufficiently to gain access to adjusters **D** and **E**, loosen adjusters.
- Lower glass further to gain access to rear sash rail bracket.
- Loosen adjuster bolt **H**.
- Raise glass until adjusters **D** and **E** can be accessed, then close the door.
- Adjust the position of the glass until it is parallel with the 'A' post, tighten adjusters **D** and **E**.



76M2332

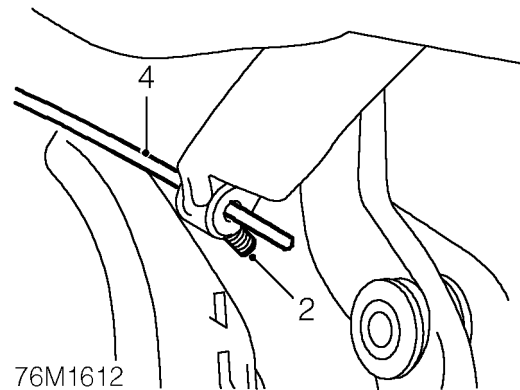
- Open door and lower glass then raise fully, check that front edge of glass and cheater are in line.
- Close door by pushing on glass, check glass height.
- If glass height is correct, pull adjusters down in slots and tighten adjusters **C** and **F**.
NOTE: If glass height is incorrect refer to height adjustment above.
- Lower glass to access rear sash bracket, tighten adjuster **H**.
- Raise glass and ensure it pre-loads all surrounding seals.
- If pre-load is not sufficient loosen lock-nut on adjuster **B**.
- Position adjuster so that it is level with the back of nut it is screwed in to, this will tilt the top edge of the glass inwards.
- Tighten lock-nut and check pre-load of glass on seal.
- If pre-load is still not sufficient loosen bolt **G** and slide the bolt down one notch, tighten bolt.
- Repeat previous instruction until pre-load is correct.
- Secure water shedder.
- Fit speaker.
 [FRONT SPEAKER, page 86-12.](#)
- Fit door trim casing
 [TRIM CASING, page 76-1-6.](#)

CANTRAIL TENSIONING CABLES - ADJUST

 76.61.25

Adjust

- Partially lower hood.



76M1612

- Loosen cable locking screws.
- Raise hood fully, but do not secure catches.
- Using pliers, pull cables taught and tighten locking screws.
- Secure hood catches and check cable tension.
- If necessary, release hood catches, loosen cable locking screws and adjust cable tension. Tighten locking screws.
- Secure catches.



HARDTOP - ADJUST

🔑 76.61.02

NOTE: Check that soft top hood fit is correct before making any adjustments to the hardtop fit. See BODY, Hood.

Adjust

1. Fit hardtop.

 [HARD TOP, page 76-3-7.](#)

NOTE: If necessary, only make adjustments to the cantrail seal and glass height. It should not be necessary to disturb any other settings.

Cantrail seal

2. Check that cantrail seal butts up to 'A' post seal correctly, the cantrail seal must not be distorted when the hardtop is secured.
3. To adjust cantrail seal release hardtop and carefully slide seal either backwards or forwards in its channel.
4. Ensure seals are located correctly in their channels.

Glass height

5. Adjust glass height.

 [HOOD SEALS AND DOOR GLASS - DOOR GLASS, page 76-3-3.](#)

NOTE: If glass height is incorrect adjust the height to the minimum requirement, to prevent too much disturbance to the soft top hood settings.

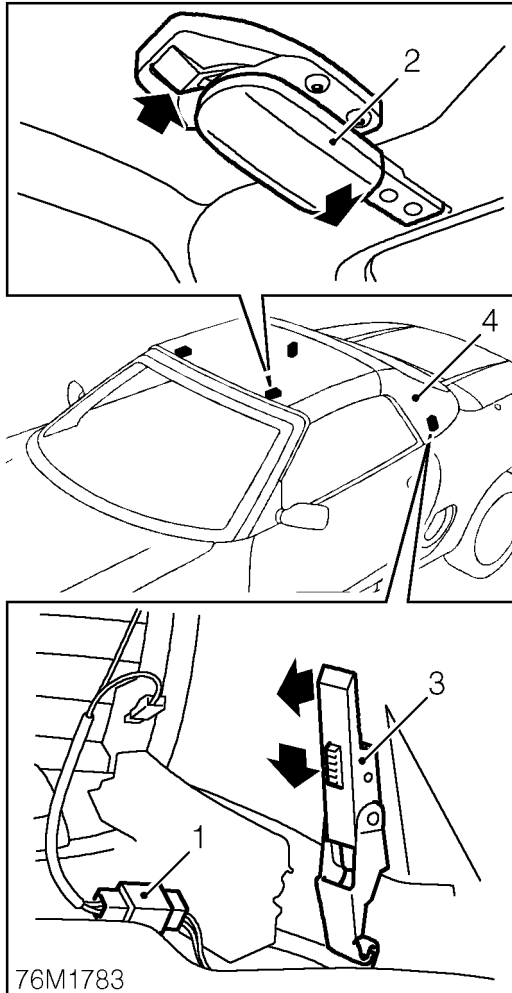
HOOD



HARD TOP

76.61.01

Remove



1. Disconnect multiplug from heated rear window.
2. Release 2 catches securing hard top to header rail.
3. Release 2 catches securing hard top to hood mounting brackets.
4. With assistance, remove hard top from vehicle.

Refit

NOTE: Ensure side catches are in the raised position before fitting the hard top to the vehicle.

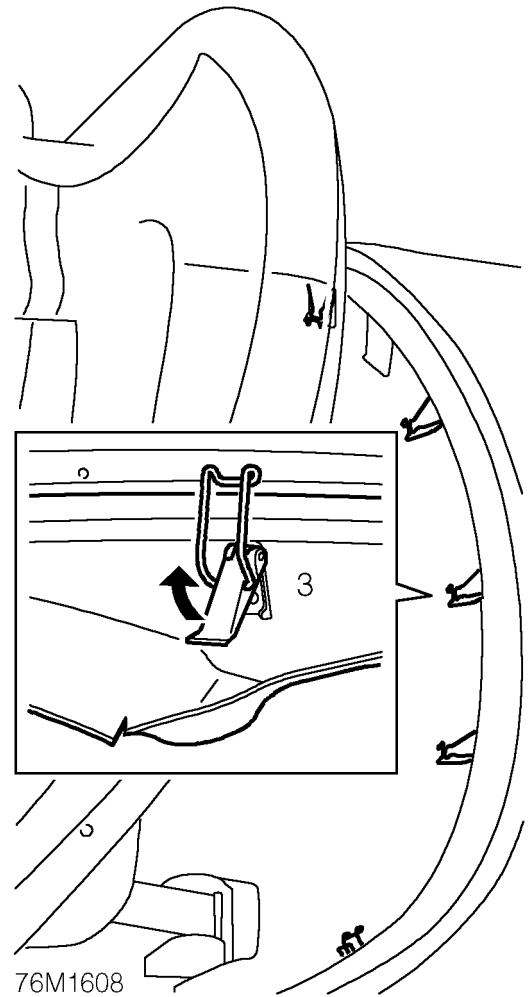
1. With assistance, position hard top to vehicle.
2. Secure hard top to header rail with catches.
3. If necessary, release clips and adjust catches.
4. Secure hard top to hood mounting brackets.
5. Adjust catches if required.
6. Connect screen heater multiplug.

HOOD ASSEMBLY

76.61.10/99

Remove

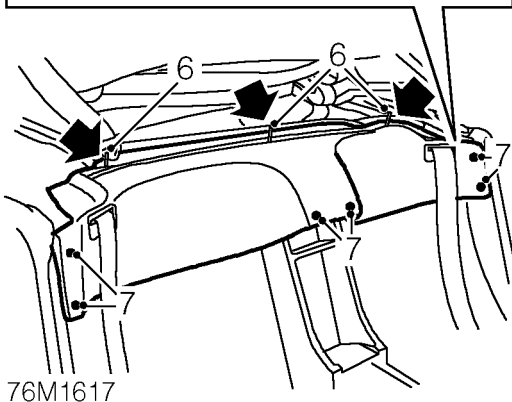
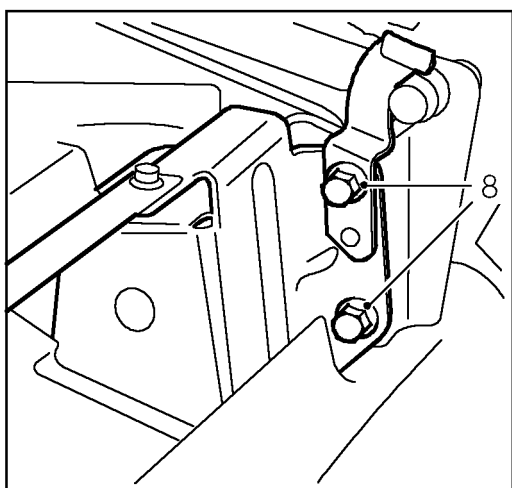
1. Lower both windows.
2. Release both hood catches, but do not lower hood.



3. Release rear edge of hoodwell carpet and release 5 clips securing hood to body.
4. Fold rear of hood, up to release from body.

CAUTION: Clips must be fully released to ensure that backlight is not damaged when hood is lowered.

5. Tilt both seat squabs forward.



6. Remove 3 screws securing bulkhead finisher. Collect press studs.
7. Release 6 clips and position bulkhead finisher aside.
8. Remove 4 bolts securing hood to body.
9. Collect 2 hard top strikers.
10. With assistance, remove hood assembly.

CAUTION: Support assembly beneath backlight and hinges during removal.

11. Position hood on a soft covered work surface.

Refit

1. With assistance, position hood to body.
2. Position hard top strikers.
3. With assistance, align hinge brackets to body and fit bolts but do not tighten at this stage.
4. Raise hood but do not secure catches.
5. Tighten hinge bracket bolts to 45 Nm.
6. Position bulkhead finisher and engage clips.
7. Position press studs and secure bulkhead finisher with screws.
8. Return seat squabs to original positions.
9. Engage clips to secure rear of hood to body.
10. Engage hoodwell carpet beneath flip seal.
11. Secure catches to secure front of hood.
12. Raise windows.

HOOD OUTER COVER

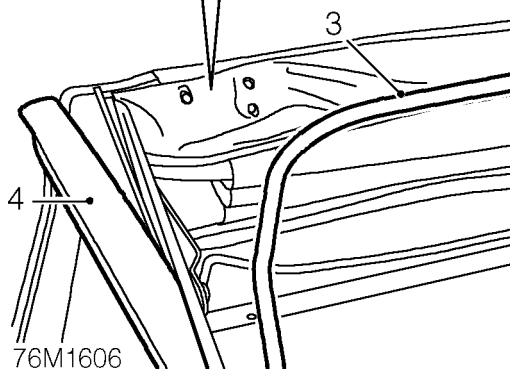
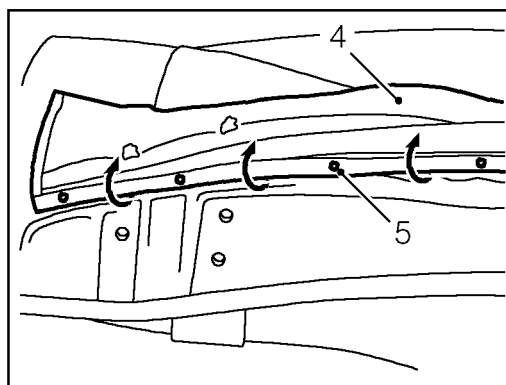
76.61.11

The following operation involves the bonding of fabric backed vinyl to various steel components of the hood frame. If adhesive is to be applied to the fabric backing, a thin coating of adhesive should be applied to both surfaces.

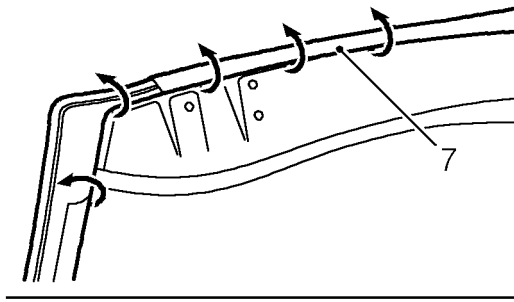
Allow the adhesive to cure, until just touch dry, for between 5 and 10 minutes, before the bond is made.

Remove

1. Remove both hood catches.
 - HOOD CATCH, page 76-3-14.
2. Remove both 'B' post seals.
 - 'B' POST SEAL, page 76-3-18.

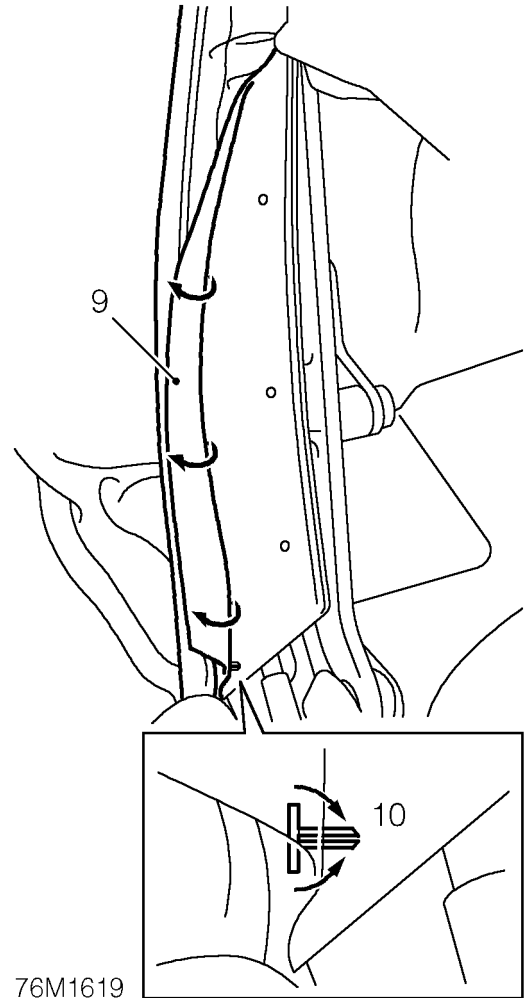


3. With hood in the lowered position, remove edge protector from rear of header rail.
4. Release forward 150 mm of cantrail seals from retainers. release covering from rear of header rail and fold cover forward to reveal retaining strip.
5. Locally release foam from retaining strip to reveal 11 rivets, drill out rivets.
6. Collect header cover assembly.



76M1618

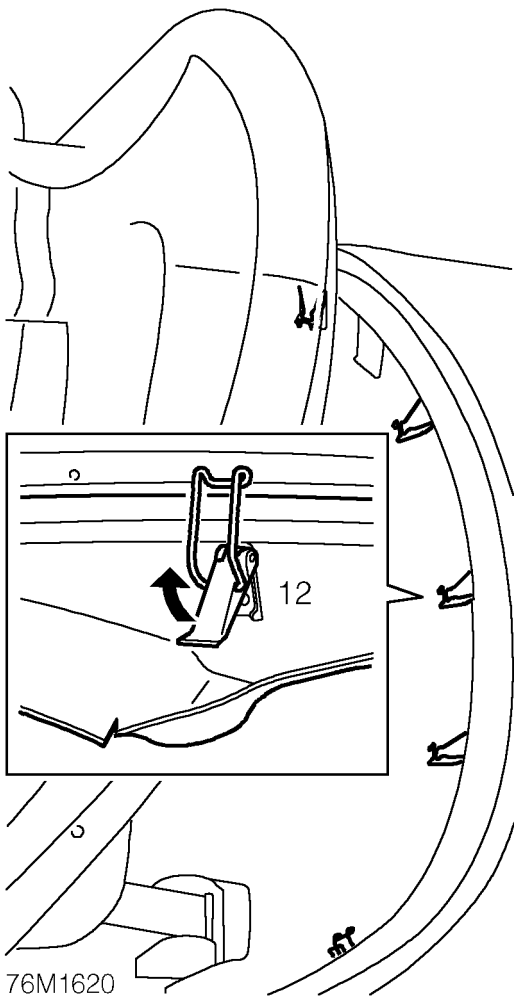
7. Release outer cover from adhesive on underside of header rail.
8. Drill out 5 pop rivets securing each 'B' post seal retainer. Collect retainers.



76M1619

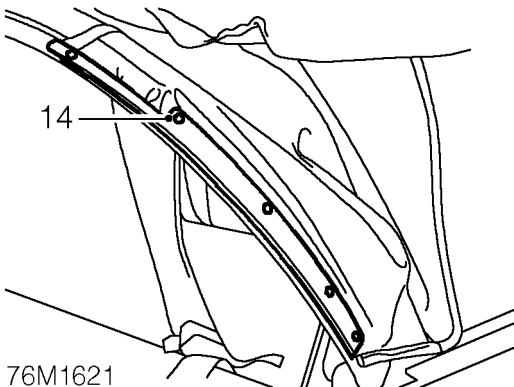
9. Release outer cover from adhesive on 'B' post brackets.
10. Bend up tabs and release 'rivet' plates securing outer cover to base of 'B' post brackets.
11. Raise hood frame.

HOOD



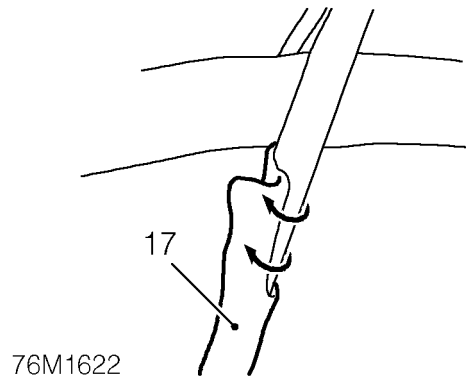
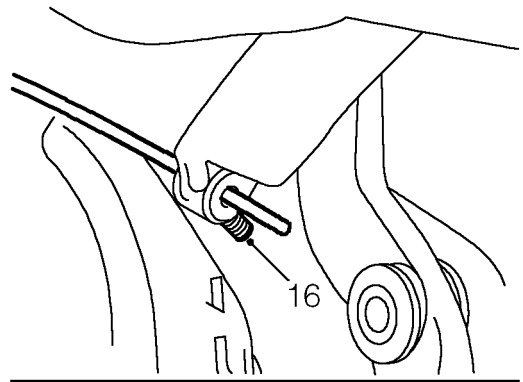
76M1620

12. Release rear edge of hoodwell carpet and release 5 clips.
13. Fold rear of hood, up to release from body.



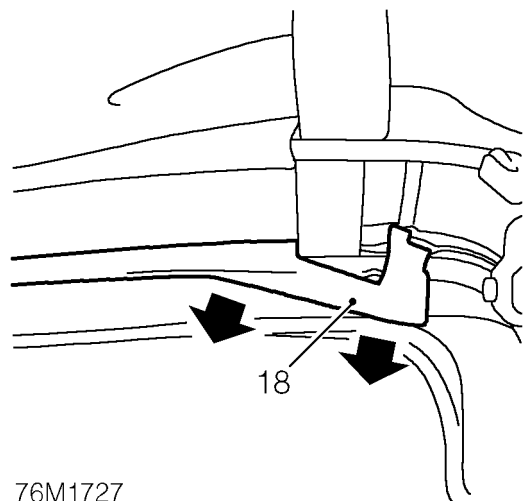
76M1621

14. Drill out 5 pop rivets securing each retaining strip and collect retaining strips.
15. Drill out any rivet heads still captive in hood frame.



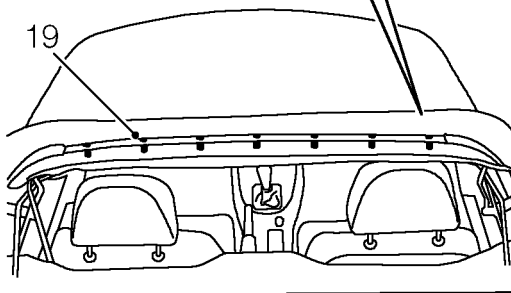
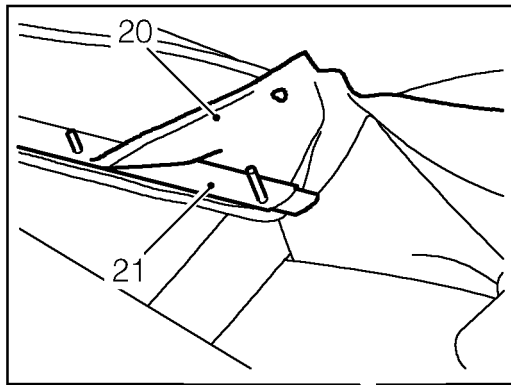
76M1622

16. Loosen cable locking screws and release cables from outer cover.
NOTE: Leave cables attached at header rail.
17. Release outer cover flaps from adhesive on 1st and 2nd hood bows.



76M1727

18. Release felt covering from 3rd hood bow.

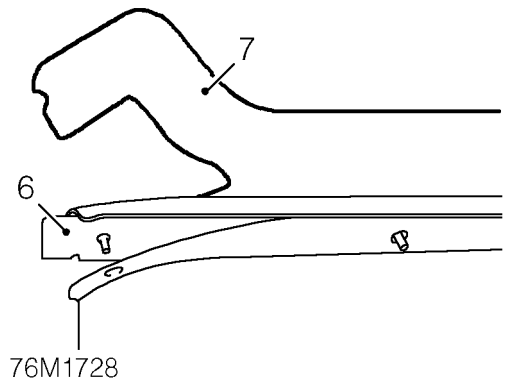


76M1623

19. Remove 7 nuts securing outer cover clamp rail to 3rd hood bow.
20. Release clamp rail studs from bow and remove outer cover assembly.
21. Remove clamp rail from outer cover.
22. Remove 4 bolts securing hood frame and with assistance remove hood frame.
23. Invert frame and shake vigorously to remove rivets and swarf from frame.

Refit

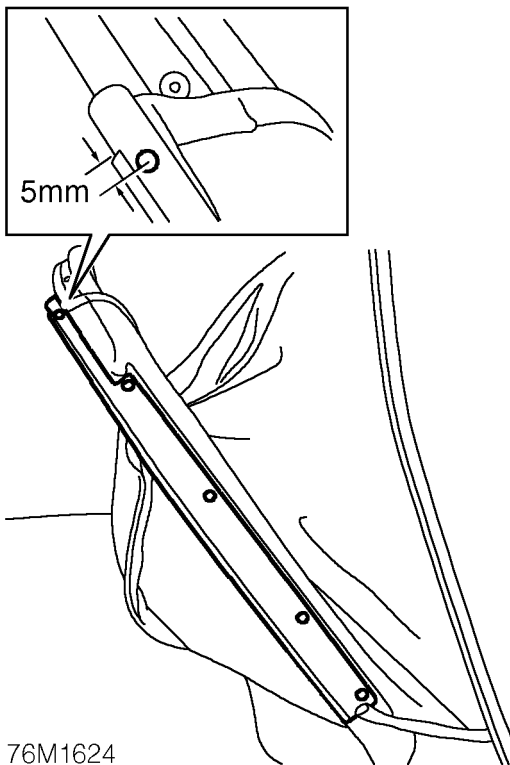
1. Position hood frame, fit and tighten bolts.
2. Remove any uneven deposits of adhesive from 'B' post brackets, clamp rail and header rail using a suitable solvent.
3. Position new outer cover to a soft covered work surface.
4. Fold outer cover in half and chalk centre line to aid alignment.
5. Measure and mark centre line on underside of hood header rail.
6. Apply adhesive to clamp rail and outer cover.



7. Bond clamp rail to outer cover with larger flange towards edge of material.
8. If necessary, apply adhesive to clamp rail and felt covering. Bond covering centrally to clamp rail, ensuring that slotted ends remain free.
9. Position outer cover over raised hood frame and engage clamp rail studs to bow.
10. Secure clamp rail with nuts.
11. Apply adhesive to 3rd hood bow and mating surface of felt covering.

CAUTION: Ensure underside of outer cover does not become contaminated with adhesive.




12. Bond felt covering to 3rd bow, ensuring that slots are correctly positioned around frame straps.



13. Align hood rear quarters to lower rail, ensuring that: Lower edge of rail and cover reinforcement strip are aligned. Centre of rivet hole in lower rail is 5 mm from end of reinforcement strip as shown.
14. Transfer holes from lower rail into outer cover, using a bradawl or similar tool.
15. With careful use of a drill, open out holes to 3.5 mm.
16. Position retaining strips and secure hood rear quarters to lower rail with pop rivets.
17. Raise backlight into position and secure with zip.
18. Engage clips to secure rear of hood to body.
19. Engage hoodwell carpet beneath flip seal.
20. Partially lower hood frame.
21. Apply adhesive to underside of header rail and mating surface of outer cover.
22. Temporarily fit hood catches.
23. Position outer cover to header; then make adhesive joint in three small areas.
CAUTION: Do not make a permanent joint at this stage as adjustment may be necessary.
24. Raise hood and secure catches.
25. Check outer cover tension.
26. Lower hood partially.
27. Adjust position of outer cover and re-check tension if necessary.
28. Remove hood catches.
29. Bond outer cover securely to header rail, ensuring cover does not crease.
30. Trim off excess material using a sharp knife.
31. Lower hood fully.

32. Position header cover assembly.
33. Transfer holes in header cover retainer through outer cover into header rail.
34. Secure header cover retainer with pop rivets.
35. Apply adhesive to header rail and mating surface of header cover.

CAUTION: Ensure underside of outer cover does not become contaminated with adhesive.


36. Bond header cover.
37. Fit edge protector to rear of header rail.
38. Secure forward ends of cantrail seals in retainers.
39. Fit hood catches.
 **HOOD CATCH, page 76-3-14.**
40. Raise hood partially.
41. Engage outer cover rivet plates to 'B' post brackets and bend over tabs to secure.
42. Apply adhesive to 'B' post brackets and mating surfaces of outer cover.
43. Raise hood, but do not secure catches.
44. Thread cantrail cables through pockets in outer cover and engage in frame locations.
45. Bond outer cover to 'B' post brackets, ensuring that even tension is applied as bond is made.
46. Position 'B' post seal retainers.
47. Transfer holes in retainers through outer cover into brackets.
48. Secure retainers with pop rivets.
49. Fit 'B' post seals.
 **'B' POST SEAL, page 76-3-18.**
50. Apply adhesive to outer cover flaps and mating surfaces of 1st and 2nd hood bows.
CAUTION: Ensure that underside of outer cover does not become contaminated with adhesive.
51. Check cosmetic appearance of hood.
52. Adjust cantrail cables.
 **CANTRAIL TENSIONING CABLES - ADJUST, page 76-3-4.**
53. Remove protection.
54. Secure hood catches.
55. Close windows.

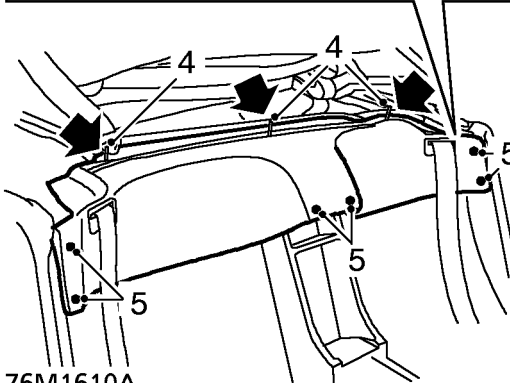
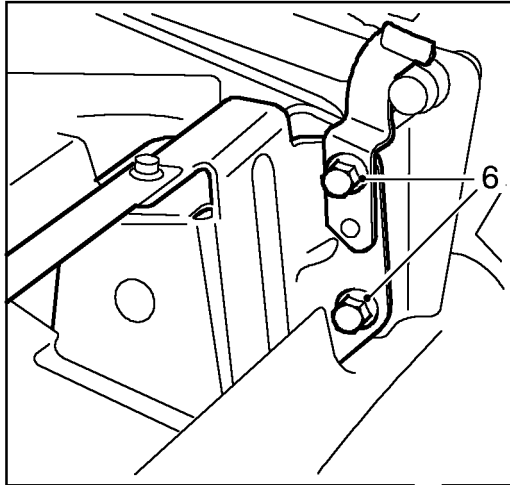


HOOD FRAME


🔑 76.61.12

Remove


1. Remove outer cover:
 [HOOD OUTER COVER, page 76-3-8.](#)
2. Tilt both seat squabs forward.




76M1610A

3. Remove 3 screws securing bulkhead finisher; collect press studs.
4. Release 6 clips and position bulkhead finisher aside.
5. Remove 4 bolts securing hood frame to body.
6. Collect hard top strikers.
7. With assistance, remove hood frame.
8. Remove cantrail seals.
 [CANTRAIL SEAL, page 76-3-17.](#)
9. Bend up tabs securing cantrail tensioning cables to header rail.
10. Remove tensioning cables.

Refit

1. Position cantrail tensioning cables to header rail.
2. Secure cables top header rail by bending tabs.
3. Fit cantrail seals, leaving forward ends disengaged from retainer:
 [CANTRAIL SEAL, page 76-3-17.](#)

4. With assistance, position frame.
5. Position hard top strikers.
6. With assistance, align hinge brackets to body and secure with bolts. Tighten bolts to 45 Nm.
7. Raise hood frame.
8. Position bulkhead finisher and engage clips.
9. Position press studs and secure bulkhead finisher with screws.
10. Return seat squabs to original positions.
11. Fit outer cover:
 [HOOD OUTER COVER, page 76-3-8.](#)

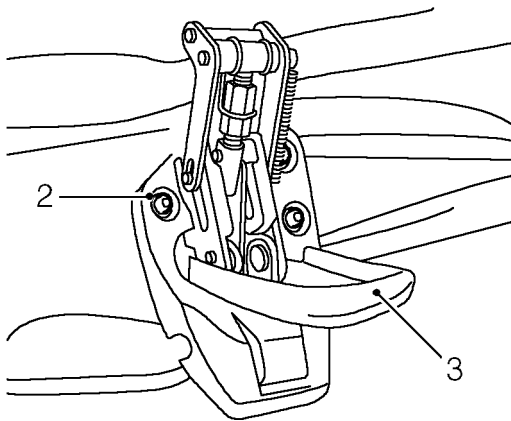
HOOD

HOOD CATCH

🔑 76.61.17

Remove

1. Lower hood.



76M1611

2. Remove 3 Allen screws securing catch to hood header rail.
3. Remove hood catch.

Refit

1. Position catch and fit screws, finger tight.
2. Raise hood, but do not secure catches.
3. Align catch to striker and tighten screws to 20 Nm.
4. Check operation of hood catches. If necessary, release locking wire and turn hexagonal adjuster to give correct action.
5. Secure locking wire.
6. Secure hood catches.

CANTRAIL TENSIONING CABLE

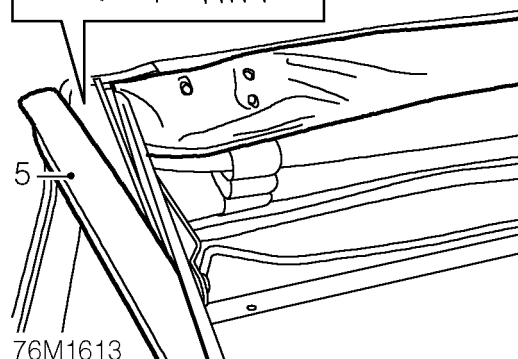
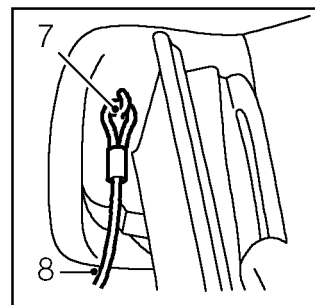
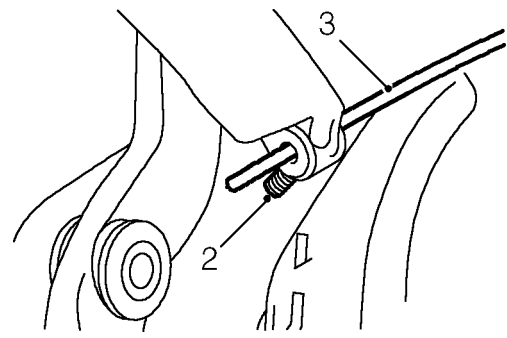
🔑 76.61.26

The following operation involves the bonding of fabric backed vinyl to various steel components of the hood frame. If adhesive is to be applied to the fabric backing, Dunlop 758 adhesive or equivalent should be used. For direct application on vinyl surfaces, use Dunlop S1588 adhesive or equivalent.

A thin coating of adhesive should be applied to both surfaces and then allowed to cure, until just touch dry, for between 5 and 10 minutes, before the bond is made.

Remove

1. Partially lower hood.



76M1613

2. Loosen cable locking screw.
3. Release cable from location.
4. Lower hood fully.
5. Release forward 100 mm of cantrail seal from retainer.



6. Peel outer cover away from header in immediate area of cable location.
7. Bend location tag up by minimum amount necessary and release cantrail tensioning cable from header rail.
8. Remove cantrail tensioning cable.

Refit

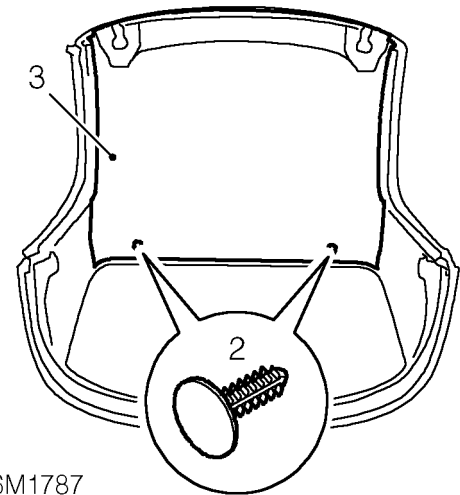
1. Locate cable loop over location tag in header rail and bend tag over to retain cable.
2. Apply adhesive to outer cover and header rail.
3. Bond outer cover to header rail, ensuring that beading at side of header is correctly positioned.
4. Fit forward end of cantrail seal to retainer.
5. Partially raise hood.
6. Insert new cable into pocket of outer cover.
7. Thread cable through location in 2nd hood bow.
8. Raise hood fully, but do not secure catches.
9. Using pliers, pull cable taught and tighten locking screw.
10. Secure hood catches and check cable tension.
11. If necessary, release hood catches, loosen cable locking screw and adjust cable tension. Tighten locking screw.
12. Secure catches.

HARD TOP HEADLINING

🔑 76.61.31

Remove


1. Remove front catches.
 [HOOD CATCH, page 76-3-14.](#)



76M1787

2. Remove 2 trim studs securing rear of headlining to hard top.
3. Remove headlining.

Refit

1. Position headlining and secure with trim studs.
2. Fit front catches.
 [HOOD CATCH, page 76-3-14.](#)

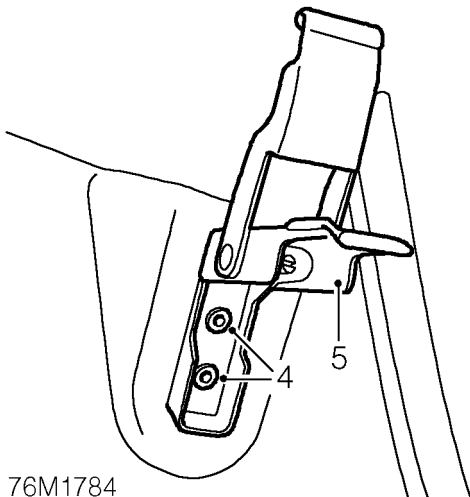
HOOD

HARD TOP CATCH - REAR

🔑 76.61.32

Remove

1. Remove hard top.
👉 [HARD TOP, page 76-3-7.](#)
2. Invert hard top on a soft covered work surface.
3. Position protection over headlining and backlight.



4. Drill out 2 pop rivets securing catch to hard top.
5. Remove catch.

Refit

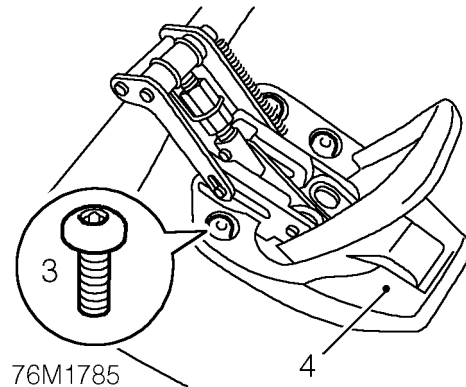
1. Position catch and secure with rivets.
2. Fit hard top.
👉 [HARD TOP, page 76-3-7.](#)
3. Check operation of catch. If necessary, turn adjuster to give correct action.
4. Secure catch.

HARD TOP CATCH - FRONT

🔑 76.61.33

Remove

1. Remove hard top.
👉 [HARD TOP, page 76-3-7.](#)
2. Invert hard top on a soft covered work surface.



3. Remove 3 Allen screws securing catch to hard top.
4. Remove catch.

Refit

1. Position catch and tighten screws to 10 Nm.
2. Fit hard top.
👉 [HARD TOP, page 76-3-7.](#)
3. Check operation of catch. If necessary, release locking wire and turn hexagonal adjuster to give correct action.
4. Secure locking wire.
5. Secure catch.

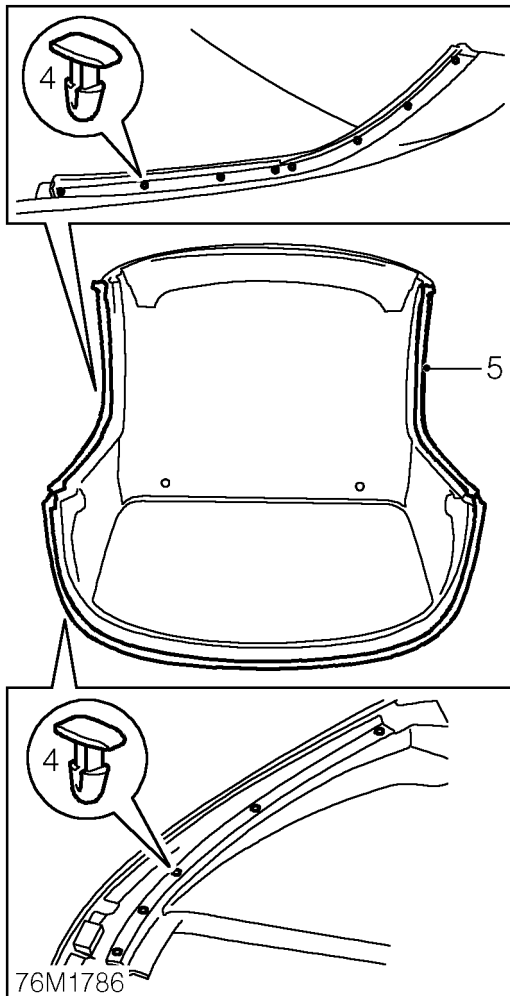


HARD TOP SEAL

🔑 76.61.34

Remove

1. Remove hard top.
👉 [HARD TOP, page 76-3-7.](#)
2. Invert hard top on a soft covered work surface.
3. Release seal from adhesive at header and below backlight.



4. Release 26 studs securing seal to hard top.
5. Remove seal.

Refit

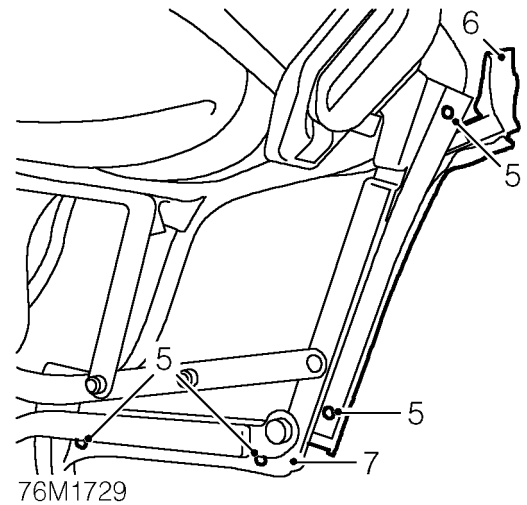
1. Remove all traces of dirt and grease from surfaces to be bonded using a suitable mild solvent.
2. Apply Loctite 401 to hard top using old deposits as a guide.
3. Position seal, centralise and carefully bond to hard top.
4. Engage studs securing seal to hard top.
5. Fit hard top.
👉 [HARD TOP, page 76-3-7.](#)

CANTRAIL SEAL

🔑 76.61.35

Remove

1. Lower both windows.
2. Depress locking buttons and release both hood catches.
3. Partially lower hood.
4. Position protective covering beneath frame.



5. Drill out pop rivets securing seal to frame channels.
6. Release seal from 2 retainers.
7. Remove seal.

Refit

1. Apply liquid soap to seal retainers.
2. Position seal and engage to retainers.
3. Raise hood and check seal fit.
4. If necessary, partially lower hood, reposition seal in retainers and re-check.
5. Carefully transfer rivet holes into seal using a 3 mm drill bit.
CAUTION: Care must be taken not to drill through the outer surface of the seal.
6. Secure seal with pop rivets.
7. Raise hood and secure catches.
8. Raise windows.

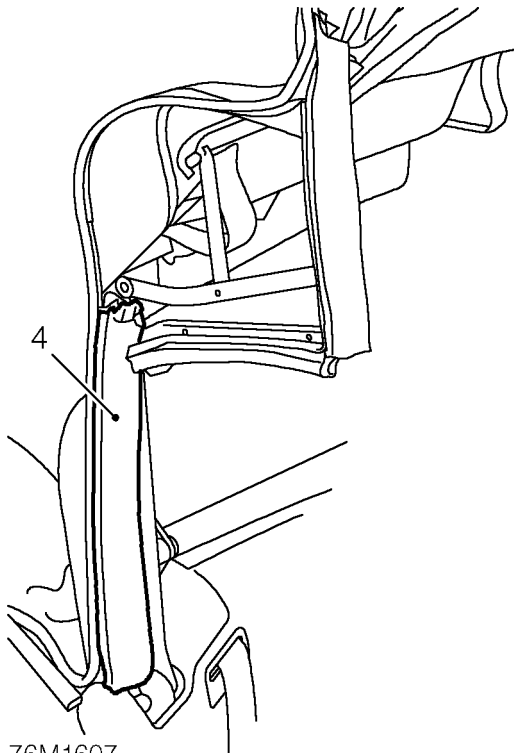
HOOD

'B' POST SEAL

🔑 76.61.38

Remove

1. Lower both windows.
2. Depress locking buttons and release both hood catches.
3. Partially lower hood.



4. Remove seal from retainer.


Refit

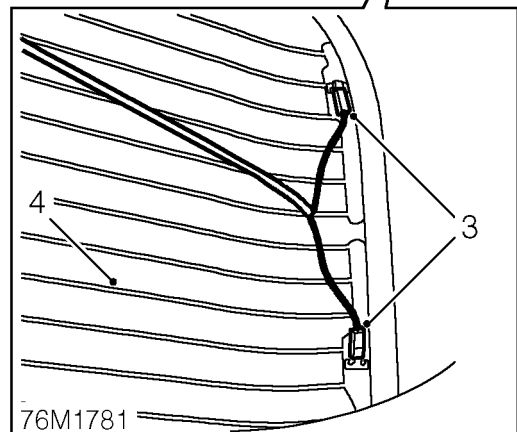
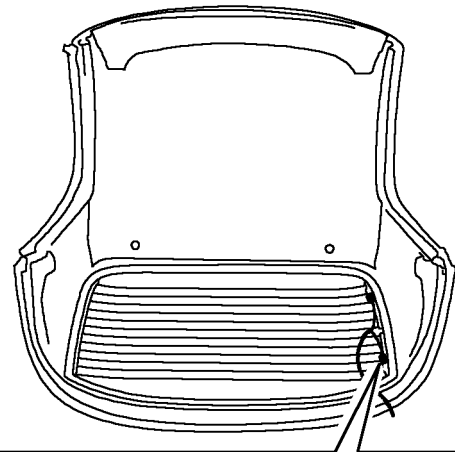
1. Apply liquid soap to seal retainer.
2. Fit seal to retainer.
3. Raise hood and check seal fit.
4. If necessary, partially lower hood, reposition seal in retainer and re-check.
5. Raise hood and secure catches.
6. Raise windows.

HARD TOP - BACKLIGHT

🔑 76.61.40

Remove

1. Remove hard top.
 [HARD TOP, page 76-3-7.](#)
2. Invert hard top on a soft covered work surface.



3. Disconnect 2 Lucar terminals and remove heated screen harness.

WARNING: Gloves and suitable eye protection must be worn when removing glass.

4. Working from inside hard top and commencing from lower LH corner; release sealing rubber. Remove glass and seal.

CAUTION: Use assistance to support glass as it is removed.

5. Remove and discard rubber seal.

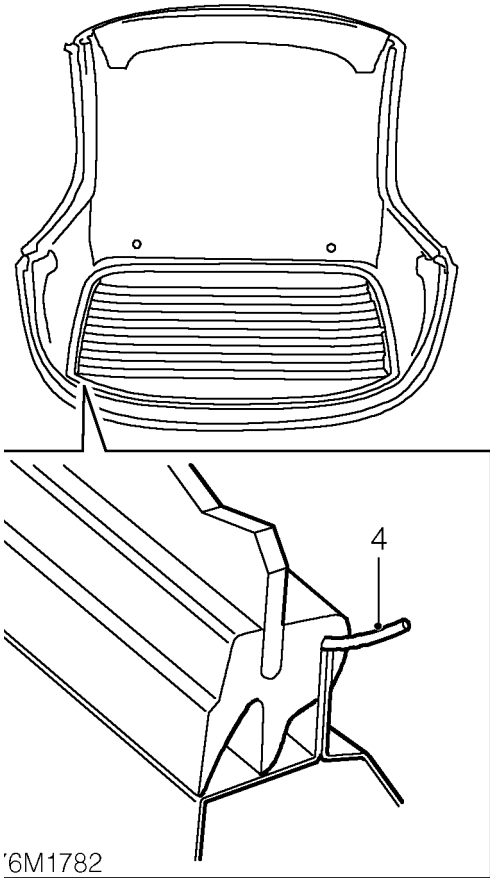
Refit

1. Clean hard top aperture and edge of glass.
2. Apply rubber lubricant to seal channels.




3. Fit sealing rubber to glass.

WARNING: Gloves and suitable eye protection must be worn when fitting glass.



6M1782

4. Insert a suitable length of cord in hard top aperture channel of sealing rubber.
5. Using assistance, push glass against hard top aperture whilst using cord to pull lip of seal over aperture flange.
6. Clean all traces of rubber lubricant from glass and hard top using white spirit.
7. Fit heated screen harness and connect Lucar terminals.
8. Fit hard top.
 [HARD TOP, page 76-3-7.](#)
9. Press firmly around outside edges of glass to ensure that seal is fully seated.

HOOD

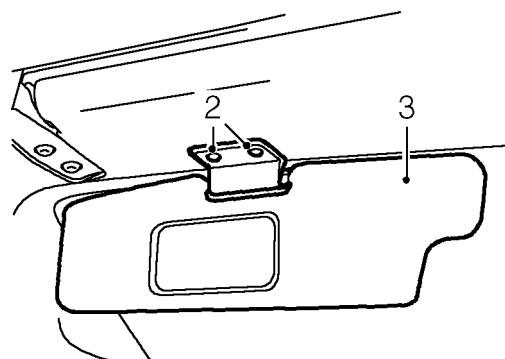


SUN VISOR

🔑 76.10.47

Remove

1. Lower sun visor.



76M1556

2. Remove 2 screws securing visor to header rail.
3. Remove visor.

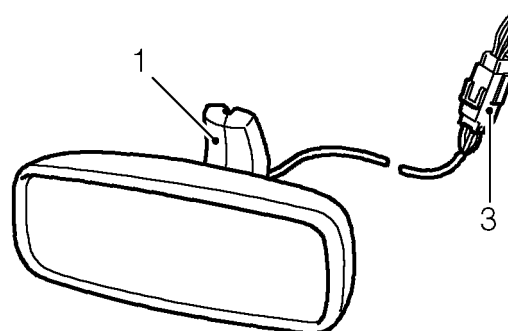
Refit

1. Position visor and secure with screws.

INTERIOR MIRROR

🔑 76.10.51

Remove



76M1766

1. Release mirror from screen mounted clip.
2. Release cable and multiplug from header finisher.
3. Disconnect multiplug and remove mirror.

Refit

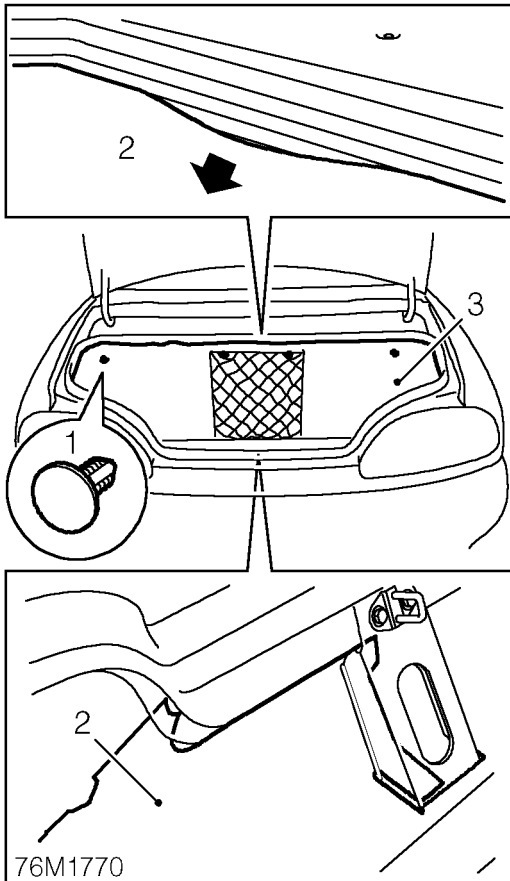
1. Connect multiplug and position cable to recess in mirror mounting.
2. Fit mirror to windscreen.
3. Position excess cable and multiplug behind header finisher.

INTERIOR TRIM COMPONENTS

LUGGAGE COMPARTMENT TRIM

🔑 76.13.17

Remove



1. Remove 4 clips securing trim to engine compartment bulkhead.
2. Release trim from flip seal, bonnet release lever and boot lid striker.
3. Remove trim.

Refit

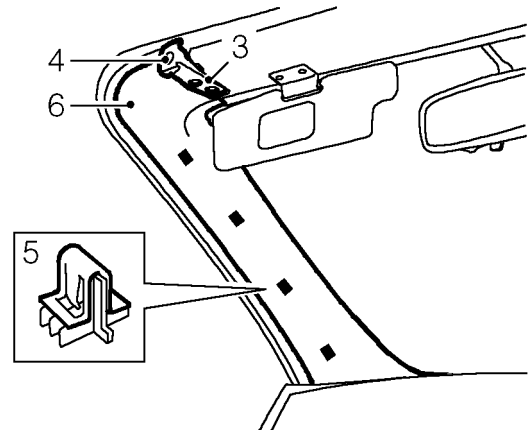
1. Fit trim and secure with clips.
2. Position trim behind flip seal.
3. Position trim to bonnet release lever and boot lid striker.

'A' POST TRIM

🔑 76.13.26

Remove

1. Lower sun visor.
2. Release catches and lower hood.



76M1554

3. Remove 2 Tx30 Torx screws securing hood striker.
4. Remove striker.
5. Release 4 sprag clips securing trim to 'A' post.
6. Remove 'A' post trim.

Refit

1. Position trim and engage sprag clips.
2. Fit hood striker and tighten screws to 6 Nm.
3. Reposition sun visor.
4. Raise hood and secure catches.

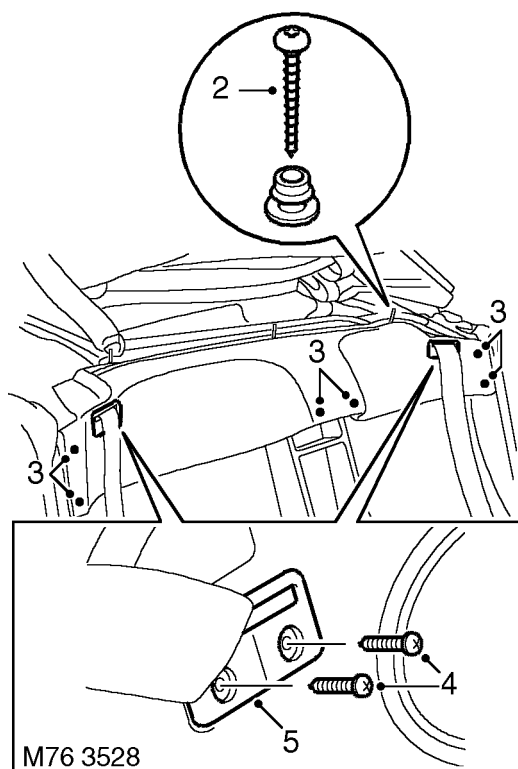


REAR BULKHEAD FINISHER

🔑 76.13.49

Remove

1. Remove front seats.
👉 SEAT, page 76-4-12.



2. Remove 3 screws securing finisher and collect press studs.
3. Release finisher from fixings.
4. Remove 4 screws securing belt guides to finisher.
5. Release belt guides from finisher and remove from belt.
6. Slide seat belts through finisher and remove finisher from vehicle.

Refit

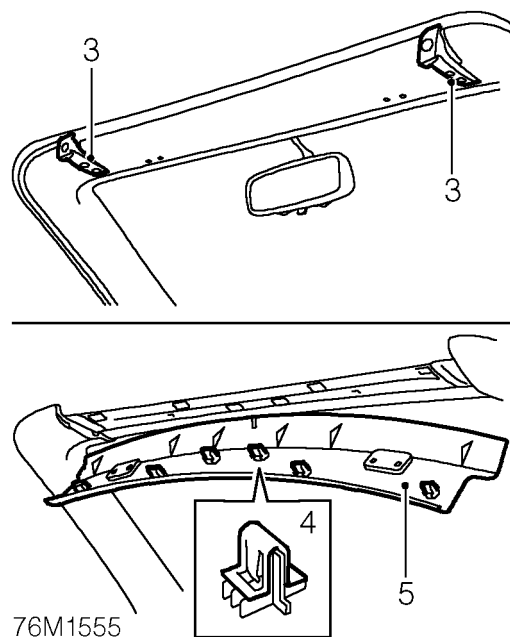
1. Position finisher and thread seat belts into position.
2. Fit seat belt guides and locate guides into position.
3. Secure guides with screws.
4. Align finisher to studs and secure into position.
5. Position press studs and secure with screws.
6. Fit front seats.
👉 SEAT, page 76-4-12.

HEADER TRIM

🔑 76.13.69

Remove

1. Remove both sun visors.
👉 SUN VISOR, page 76-4-1.
2. Release catches and lower hood.



3. Remove 2 Tx30 Torx screws securing each hood striker and remove strikers.
4. Release 6 sprag clips securing trim to header rail.
5. Remove trim.

Refit

1. Position trim and engage sprag clips.
2. Fit hood strikers and tighten screws to 6 Nm.
3. Fit sun visors.
👉 SUN VISOR, page 76-4-1.
4. Raise hood and secure catches.

INTERIOR TRIM COMPONENTS

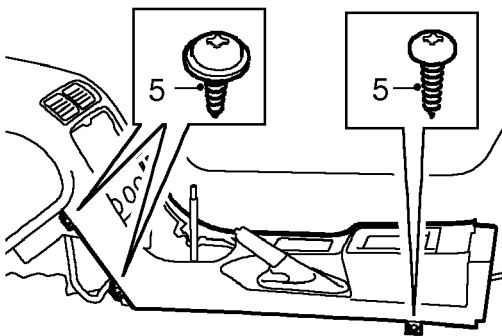
FRONT CONSOLE

🔑 76.25.01

WARNING: See **GENERAL INFORMATION, SRS Precautions.**

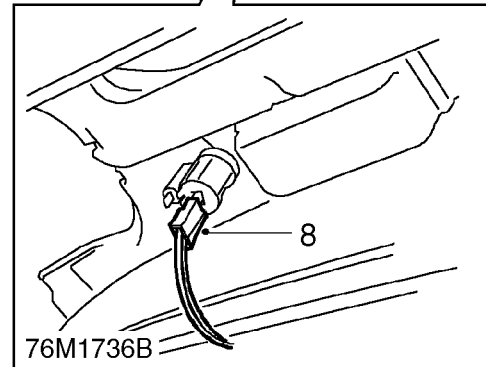
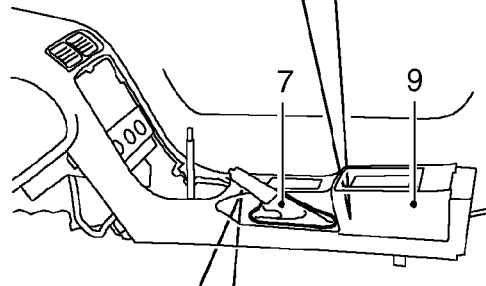
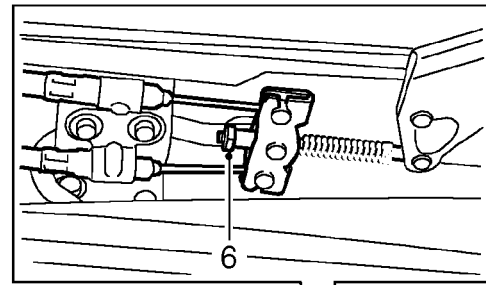
Remove

1. Make SRS system safe.
👉 **SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS**, page 03-19.
2. Remove centre console panel.
👉 **FRONT CONSOLE**, page 76-4-4.
CAUTION: Ensure pre-tensioner multiplug is disconnected before seat is removed.
3. Remove rear console.
👉 **REAR CONSOLE**, page 76-4-5.
4. Remove both console closing panels.
👉 **CONSOLE CLOSING PANEL**, page 76-4-8.



76M1735B




5. Remove 6 screws securing console to tunnel.




6. Loosen handbrake adjustment and position hand brake lever in ON position.
7. Release handbrake gaiter from console and remove gaiter from handbrake.
8. Release console and disconnect multiplug from cigar lighter.
9. Release volumetric sensor cable and remove console.



Refit

1. Position front console, connect cigar lighter multiplug and position volumetric sensor cable.
2. Position console and secure with screws.
3. Fit handbrake gaiter and secure with band.
4. Engage gaiter to console.
5. Adjust handbrake.
6. Fit console closing panels.
 **HANDBRAKE - ADJUST**, page 70-4.
7. Fit rear console.
 **CENTRE CONSOLE PANEL**, page 76-4-7.
8. Fit rear console.
 **REAR CONSOLE**, page 76-4-5.


CAUTION: Ensure that pre-tensioner flylead is correctly clipped to seat base before fitting seat, as shown in seat refit. See *INTERIOR TRIM COMPONENTS, Repairs*.

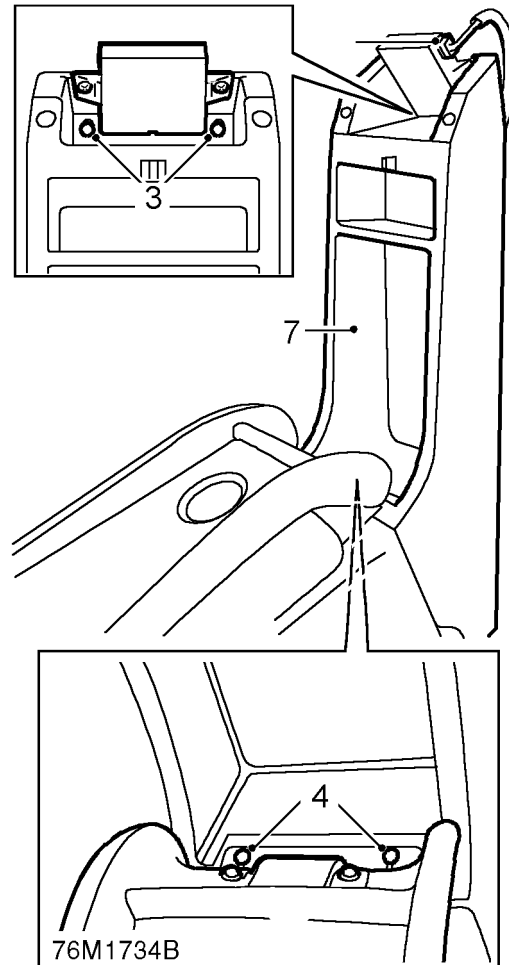
9. Fit centre console panel.
 **FRONT CONSOLE**, page 76-4-4.
10. Connect both battery terminals, earth lead last.

REAR CONSOLE

 **76.25.04**

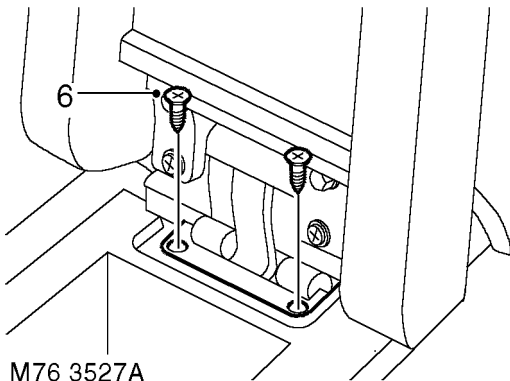
Remove

1. Remove rear bulkhead finisher.
 **REAR BULKHEAD FINISHER**, page 76-4-3.




2. Disconnect multiplug from volumetric sensor.
3. Remove 2 screws securing rear console to rear bulkhead.
4. Open rear console lid and remove 2 screws securing console lid bracket to rear console.
5. Open front console lid and remove storage bin from front console.

INTERIOR TRIM COMPONENTS



6. Remove 2 screws securing console lid bracket to front console and remove console lid assembly.
7. Remove rear console.
8. Remove 2 screws securing volumetric sensor to rear console and remove sensor.

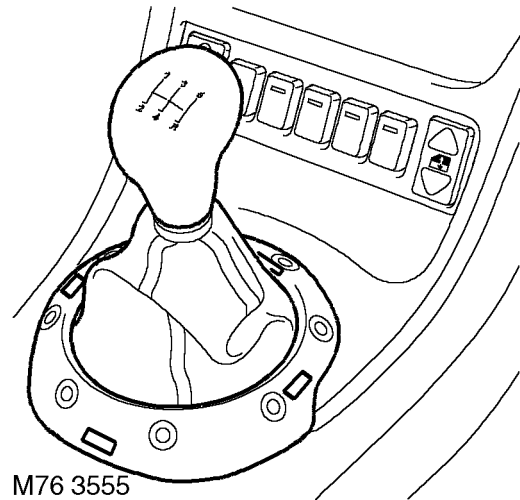
Refit

1. Fit sensor to console and secure with screws.
2. Fit rear console to bulkhead and secure with 2 upper screws. Ensure correct position of cable.
3. Fit console lid assembly and secure with screws.
4. Fit front console storage bin.
5. Connect multiplug to sensor.
6. Fit rear bulkhead finisher.
 [REAR BULKHEAD FINISHER, page 76-4-3.](#)

GEAR LEVER GAITER

 76.25.06

Remove



1. Unscrew and remove gear knob.
2. Release gaiter from centre console.
3. Remove gaiter.

Refit

1. Position gaiter.
2. Secure gaiter to centre console.
3. Fit gear change selector knob.

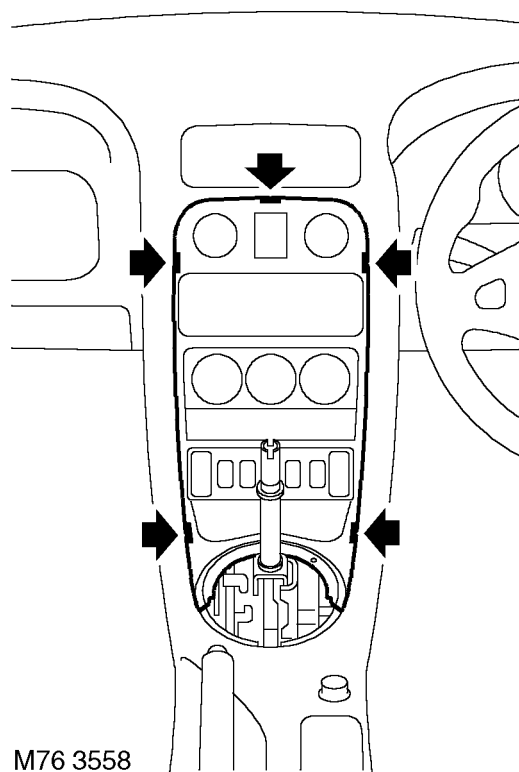


CENTRE CONSOLE PANEL

🔑 76.25.23

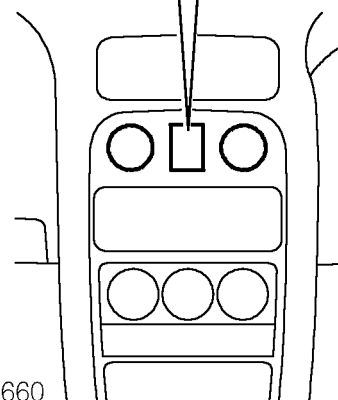
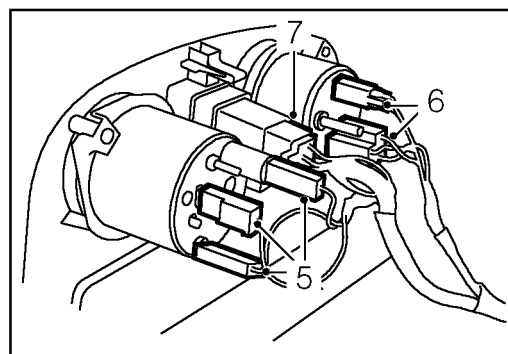
Remove

1. Disconnect battery earth lead.
2. Remove radio.
👉 [HEAD UNIT - AUDIO SYSTEMS, page 86-15.](#)
3. Remove gear lever gaiter.
👉 [GEAR LEVER GAITER, page 76-4-6.](#)



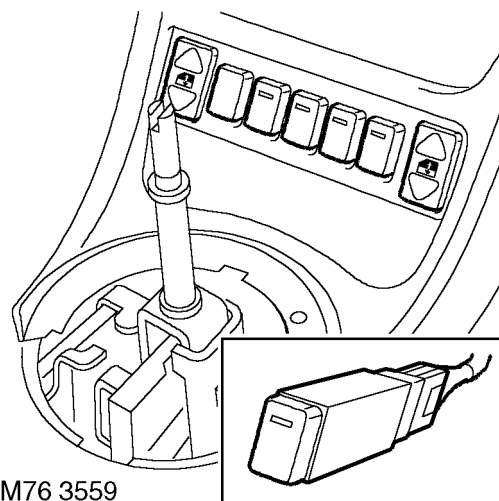
M76 3558

4. Release 5 clips securing console to fascia.



76M1660

5. Release 3 Lucars from clock.
6. Release multiplug and bulb holder from oil temperature gauge.
7. Release hazard switch multiplug.





M76 3559

8. Release multiplugs from switches.
9. Remove centre console panel.

Refit

1. Position console and connect multiplugs, Lucars and bulb holder.

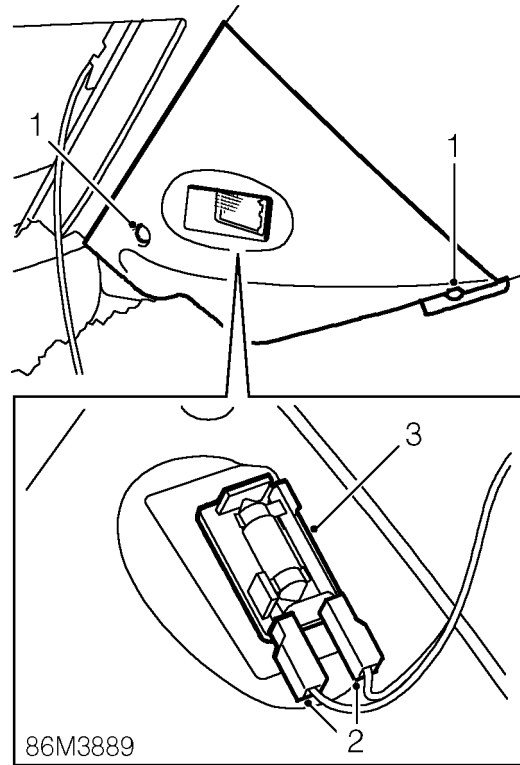
INTERIOR TRIM COMPONENTS

2. Secure console clips to fascia.
3. Fit gear lever gaiter.
 [GEAR LEVER GAITER, page 76-4-6.](#)
4. Fit radio.
 [HEAD UNIT - AUDIO SYSTEMS, page 86-15.](#)
5. Connect battery earth lead.

CONSOLE CLOSING PANEL

 76.25.31

Remove



1. Remove 2 screws securing panel to console.
2. Release panel and disconnect 2 Lucars from lamp.
3. Remove lamp from panel.

Refit

1. Fit lamp to panel and connect Lucars.
2. Position panel and secure with screws.



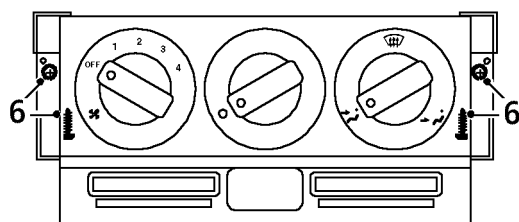
FASCIA PANEL

🔑 76.46.23

WARNING: See **GENERAL INFORMATION, SRS Precautions.**

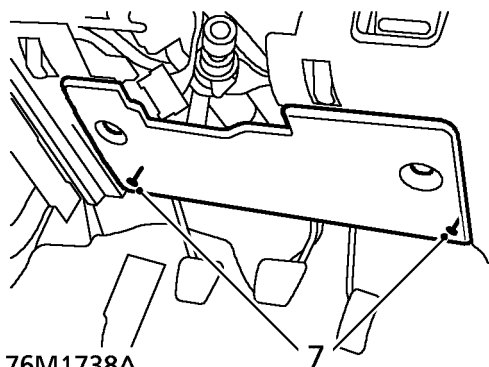
Remove

1. Make SRS system safe.
[SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.](#)
2. Remove front console.
[FRONT CONSOLE, page 76-4-4.](#)
3. Remove steering column switch pack.
[STEERING COLUMN SWITCH PACK, page 86-25.](#)
4. Remove instrument pack.
[INSTRUMENT PACK, page 88-1.](#)
5. Remove glovebox.
[GLOVEBOX, page 76-4-10.](#)



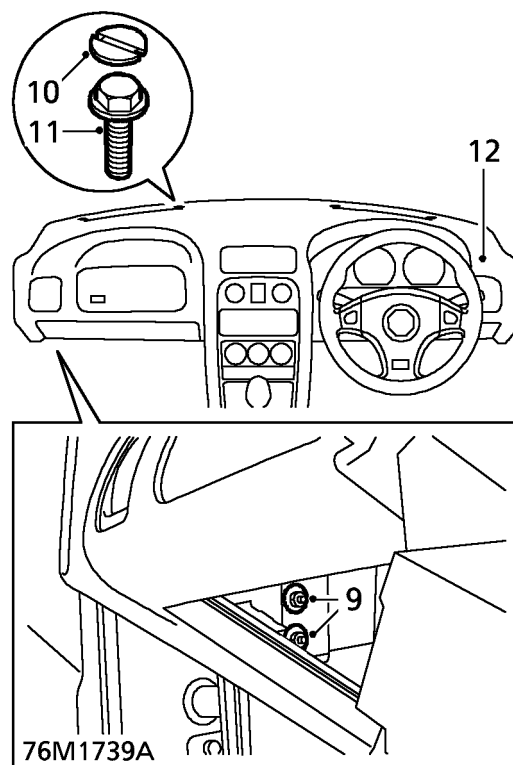
76M1737A

6. Remove 4 screws securing heater controls to fascia and position aside.



76M1738A

7. Loosen 2 screws securing fuse box cover to fascia and remove cover.
8. Release both screen heater ducts from fascia and position aside.



9. Loosen 4 nuts securing fascia to lower 'A' post.
10. Release 4 retaining bolt caps from fascia and collect caps.
11. Remove 4 bolts securing fascia to scuttle.
12. Remove fascia panel.

Refit

1. Position fascia to scuttle.
2. Align fascia and secure with nuts and bolts.
3. Fit retaining bolt caps.
4. Engage heater ducts to fascia.
5. Position fuse box cover to fascia and secure with screws.
6. Align heater controls to fascia and secure with screws.
7. Fit glovebox.
[GLOVEBOX, page 76-4-10.](#)
8. Fit instrument pack.
[INSTRUMENT PACK, page 88-1.](#)
9. Fit steering column switch pack.
[STEERING COLUMN SWITCH PACK, page 86-25.](#)
10. Fit front console.
[FRONT CONSOLE, page 76-4-4.](#)

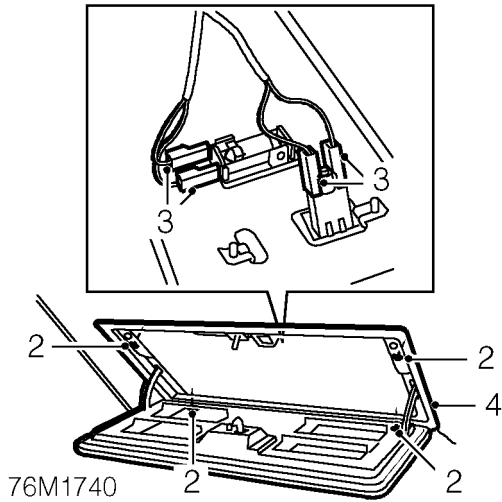
INTERIOR TRIM COMPONENTS

GLOVEBOX

🔑 76.52.03

Remove

1. Open glovebox lid.



2. Remove 4 screws securing glovebox to fascia.
3. Release glovebox and disconnect 4 Lucars.
4. Remove glovebox.

Refit

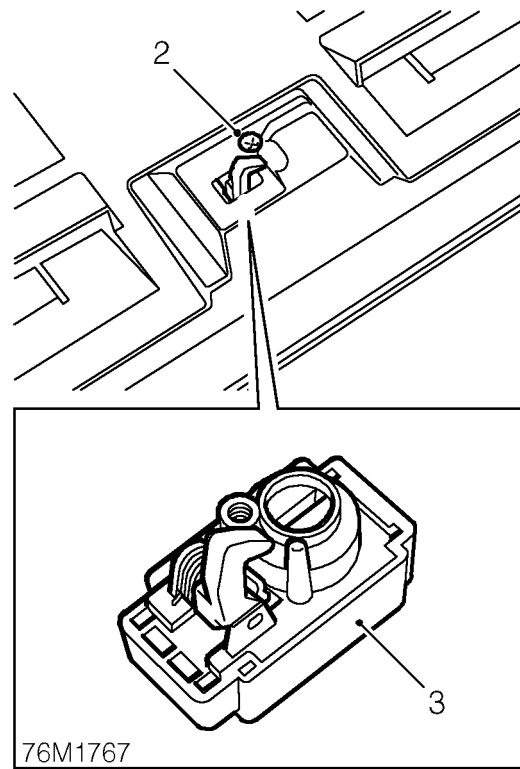
1. Position glovebox and connect Lucars.
2. Engage glovebox to fascia and secure with screws.
3. Close glovebox lid.

GLOVEBOX LATCH

🔑 76.52.08

Remove

1. Open glovebox lid.



2. Remove screw securing latch to glovebox lid.
3. Remove latch.

Refit

1. Position latch to glovebox lid and secure with screw.
2. Close glovebox lid.

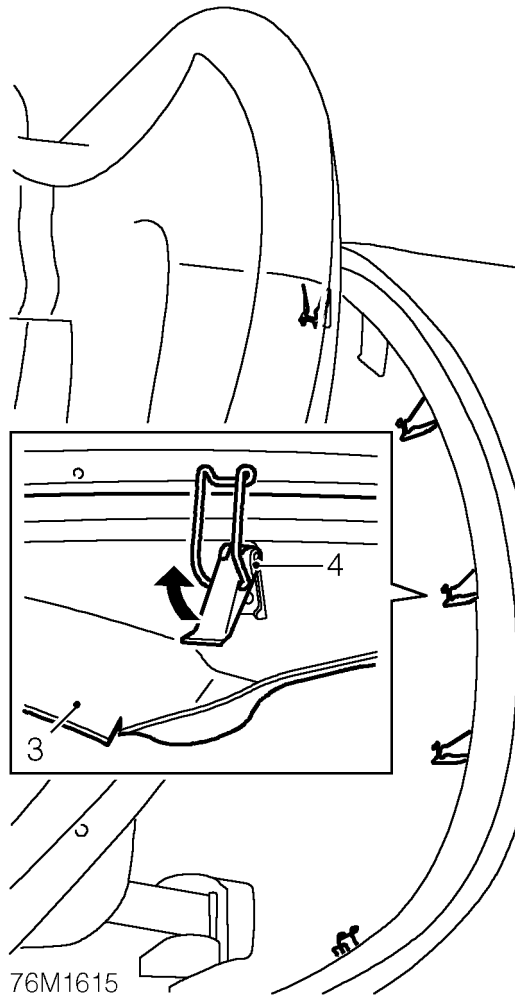


HOODWELL TRIM

🔑 76.67.06

Remove

1. Lower both windows.
2. Release hood catches, do not lower hood.



3. Release rear edge of hoodwell trim to reveal 5 clips.
4. Release clips securing rear of hood to body.
5. Raise rear edge of hood.
6. Remove hoodwell trim.

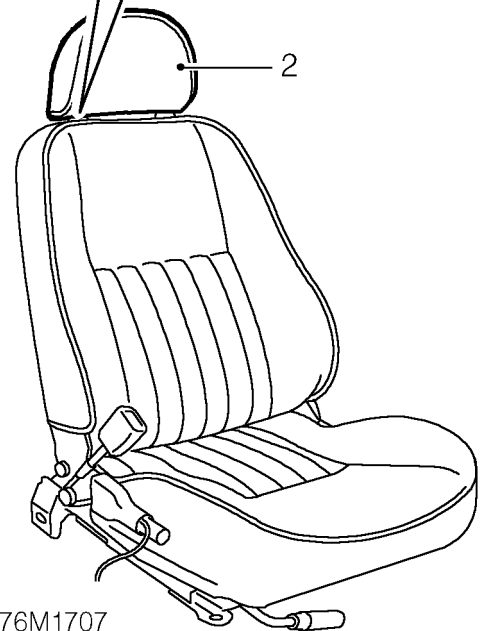
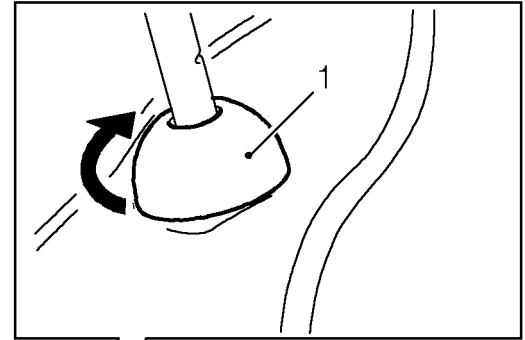
Refit

1. Fit trim and engage beneath lip of bulkhead finisher.
2. Reposition rear edge of hood.
3. Engage clips to secure rear of hood to body.
4. Engage hoodwell trim beneath flip seal.
5. Secure hood catches.
6. Raise windows.

HEAD RESTRAINT

🔑 78.10.36/99

Remove



1. Rotate inboard head restraint, guide cap 90°.
2. Remove head restraint.

Refit

1. Fit head restraint.
2. Rotate inboard head restraint, guide cap back 90° to lock head restraint.

INTERIOR TRIM COMPONENTS

SEAT

🔑 78.10.44/99

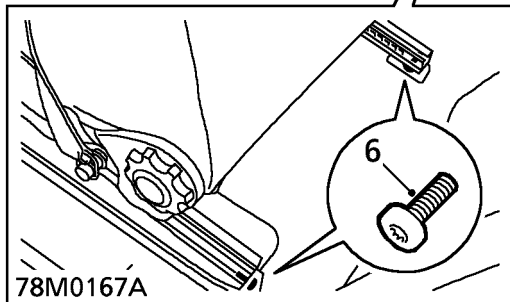
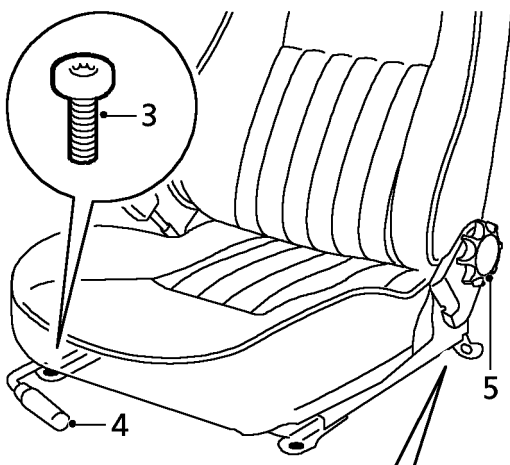
Remove

1. Make the SRS system safe.

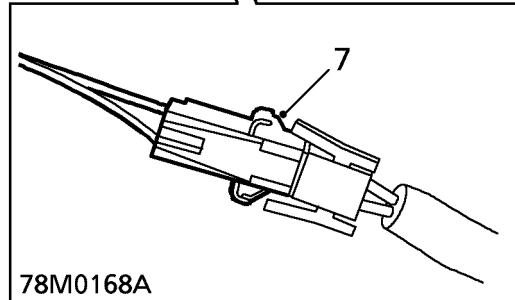
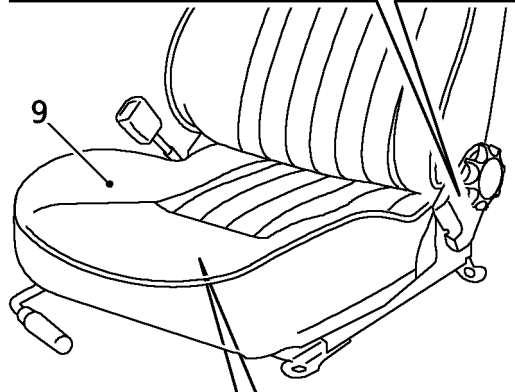
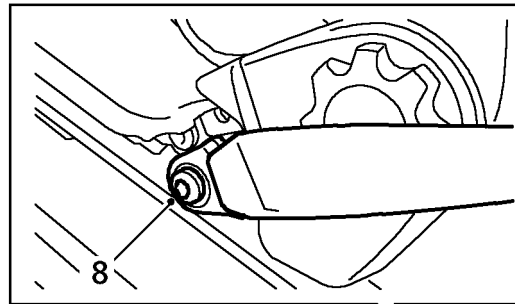
👉 **SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS**, page 03-19.

WARNING: Always remove the ignition key from the ignition switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.

2. Lift seat adjuster, move seat rearwards.



3. Remove Torx screw from front of each seat runner.
4. Lift seat adjuster, move seat forwards.
5. Rotate recline handle to tilt squab fully forward.
6. Remove Torx screw from rear of each seat runner.



7. Disconnect seat belt pre-tensioner multiplug.
8. Position seat and remove Torx screw securing seat belt strap to seat frame.
9. Remove seat.

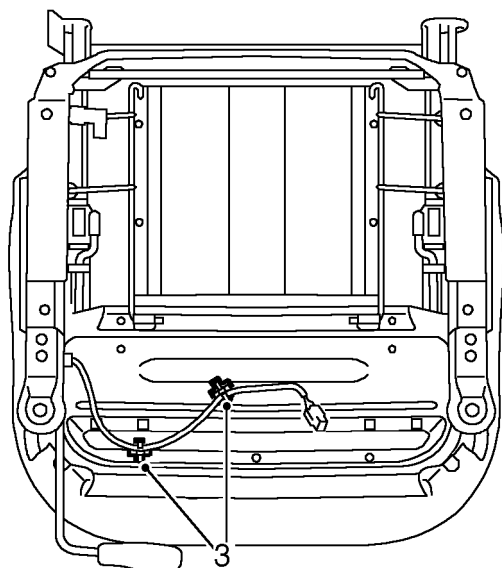
Refit

1. Ensure harness lead does not become trapped under seat runner when fitting seat.
2. Position seat belt strap to seat frame and tighten Torx screw to 30 Nm.



SEAT SQUAB ASSEMBLY



🔑 78.10.50/99

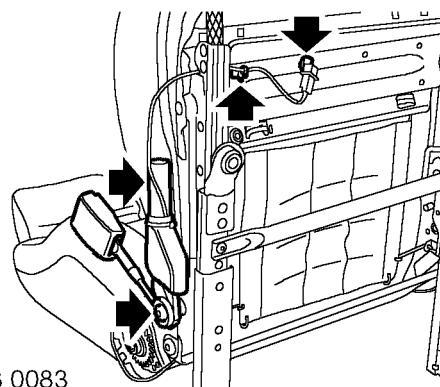


M76 4196

3. Ensure that pre-tensioner lead is correctly clipped to seat base.
4. Position seat and align runners to floor bolt holes.
5. Connect pre-tensioner multiplug.
6. Fit but do not tighten Torx screw securing rear of each seat runner.
7. Lift seat adjuster; move seat rearwards.
8. Fit Torx screw securing front of each seat runner and tighten to 45 Nm.
9. Lift seat adjuster; move seat forwards.
10. Tighten Torx screw securing rear of each seat runner to 45 Nm.
11. Connect both battery leads, earth lead last.
12. Carry out system check using MG GDS.

Remove

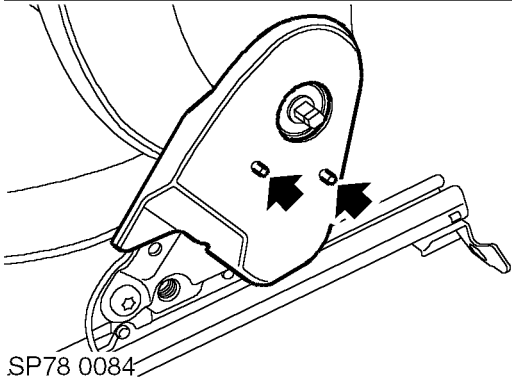
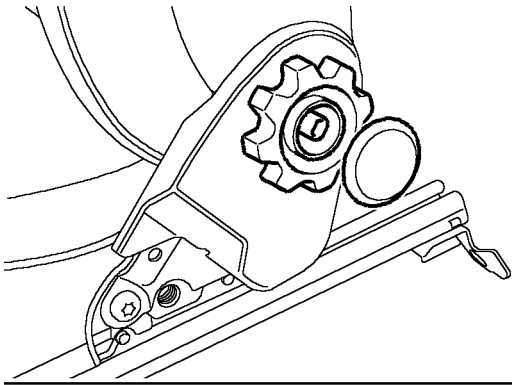
1. Make SRS system safe.
 [SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS](#), page 03-19.
WARNING: Always remove the ignition key from the ignition switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.
2. Remove front seat.
 [SEAT](#), page 76-4-12.



SP78 0083

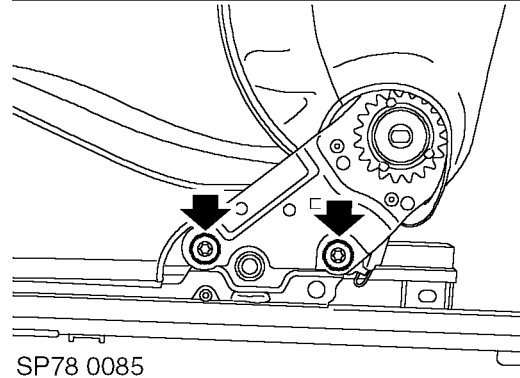
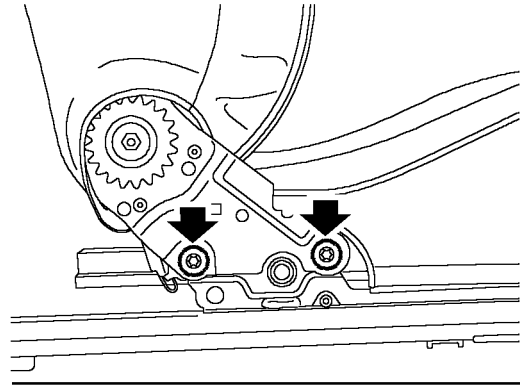
3. Release 2 clips securing pre-tensioner harness to underside of seat.
4. Remove Torx bolt securing pre-tensioner to seat and remove pre-tensioner.

INTERIOR TRIM COMPONENTS



SP78 0084


5. Remove outer half of squab recline control handle.
6. Remove inner half of recline control handle.
7. Using a suitable punch, drive out 2 retaining pins securing the side valance.
8. Remove side valance.



SP78 0085

9. Remove 4 Torx bolts securing squab frame to cushion frame.
10. Remove seat squab assembly.

Refit

1. Position squab frame to cushion frame, fit Torx bolts and tighten to 45 Nm.
 2. Fit side valance and secure with retaining pins.
 3. Fit inner half of squab recline handle.
 4. Fit outer half of squab recline handle.
 5. Fit pre-tensioner to squab frame, fit Torx bolt and tighten to 45 Nm.
 6. Secure pre-tensioner harness clips to underside of seat.
 7. Fit front seat.
-  [SEAT, page 76-4-12.](#)

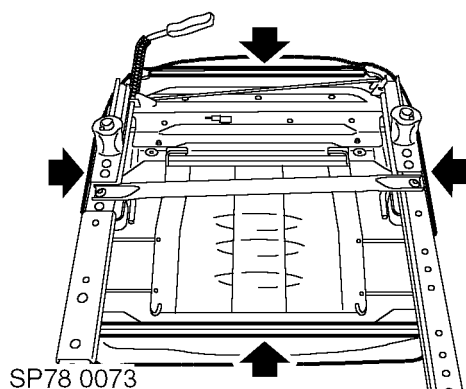


COVER - ONE PIECE - FRONT SEAT CUSHION

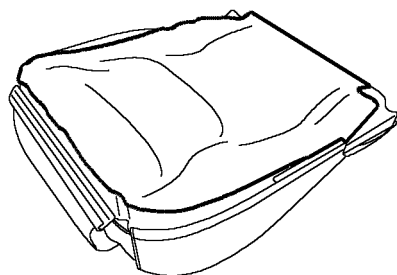
🔑 78.30.01

Remove

1. Make SRS system safe.
👉 [SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.](#)
WARNING: Always remove the ignition key from the ignition switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.
2. Remove seat squab assembly.
👉 [SEAT SQUAB ASSEMBLY, page 76-4-13.](#)

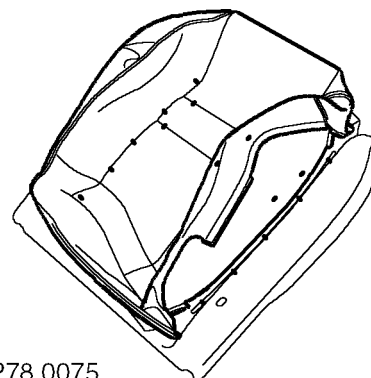


3. Release 2 retainers securing sides of cushion cover to seat frame.
4. Release retainer securing rear of cushion cover to seat frame.
5. Release retainer securing front of cushion cover to seat frame.
6. Release cushion cover from seat frame and remove cushion assembly.



7. Remove seat membrane.

Do not carry out further dismantling if component is removed for access only.



8. Noting the fitted position, remove and discard 16 hog rings securing cushion cover to cushion pad.
9. Remove cushion cover from cushion pad.

Refit

1. Position cushion cover to cushion pad and secure with new hog rings using 78 R002.
2. Position seat membrane.
3. Position cushion cover assembly to cushion frame.
4. Secure front, rear and side cushion retainers to cushion frame.
5. Fit seat squab assembly.
👉 [SEAT SQUAB ASSEMBLY, page 76-4-13.](#)
6. Carry out system check by turning the ignition on and checking the SRS warning light illuminates for 4 seconds and then extinguishes.

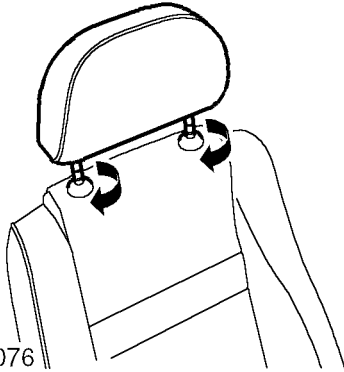
INTERIOR TRIM COMPONENTS

COVER - SQUAB - FRONT SEAT

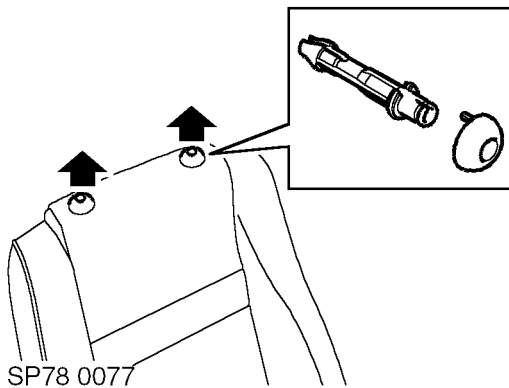
🔑 78.90.08

Remove

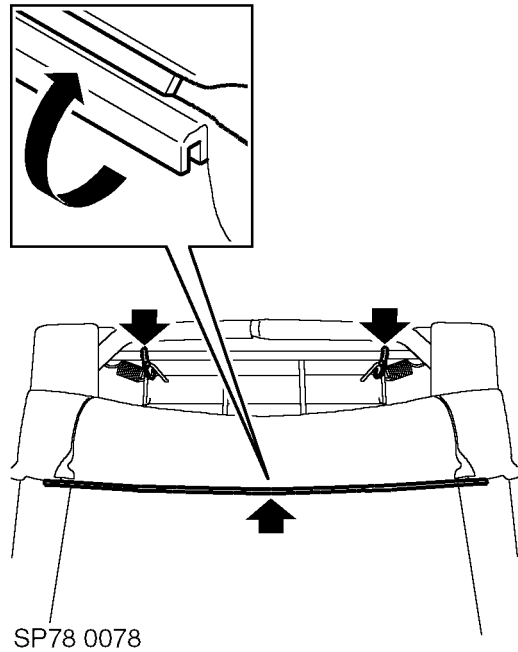
1. Make SRS system safe.
👉 **SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS**, page 03-19.
WARNING: Always remove the ignition key from the ignition switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.
2. Remove seat squab assembly.
👉 **SEAT SQUAB ASSEMBLY**, page 76-4-13.



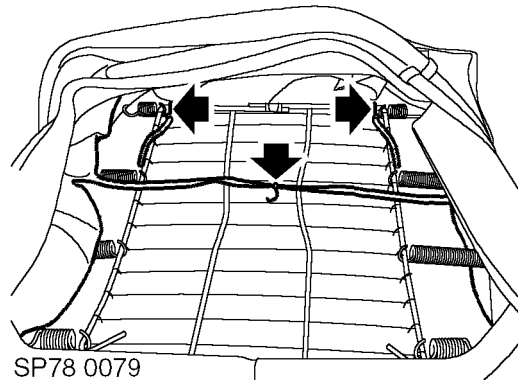
3. Rotate inboard head restraint guide cap 90° and remove head restraint.



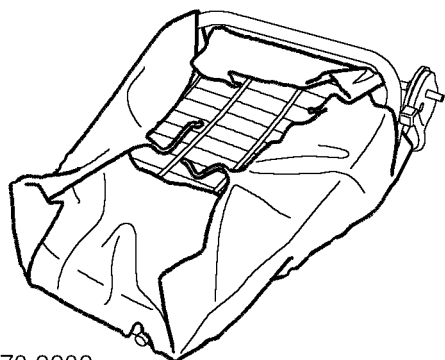
4. Remove head restraint guide tube caps.



5. Release squab cover lower retainer.
6. Release seat membrane from bottom of seat frame.
7. Noting the fitted position, release shock cords from pullmaflex and seat frame.



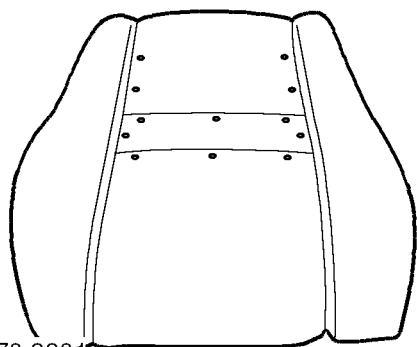
8. Raise squab cover to access other end of shock cords.
9. Noting the fitted position, release shock cords from pullmaflex.



SP78 0080

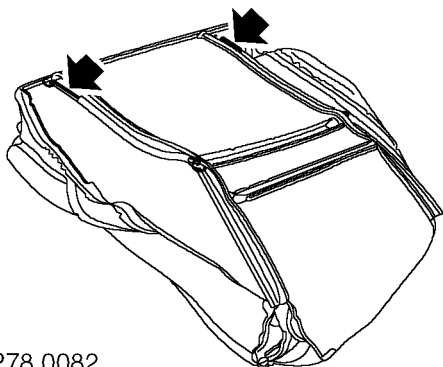
10. Untie and release seat membrane.
11. Remove squab frame from squab pad.
12. Remove seat membrane.

Do not carry out further dismantling if component is removed for access only.



SP78 0081


13. Release squab cover from squab pad to access hog rings.
14. Noting the fitted position, remove and discard 12 hog rings.
15. Remove squab cover from squab pad.



SP78 0082

16. Remove shock cords from squab cover.

Refit

1. Position shock cords to squab cover.
2. Position squab cover to squab pad and secure with new hog rings using 78 R002.
3. Align squab cover to squab pad.
4. Position seat membrane.
5. Fit squab cover and pad to frame.
6. Secure seat membrane to squab frame.
7. Align shock cords and secure to pullmaxflex frame.
8. Align squab cover to seat frame.
9. Align shock cords and secure to pullmaxflex frame.
10. Align seat membrane to bottom of squab frame.
11. Secure squab cover lower retainer.
12. Fit head restraint guide tube caps.
13. Fit head restraint.
14. Fit seat squab assembly.
 -  [SEAT SQUAB ASSEMBLY, page 76-4-13.](#)
15. Carry out system check by turning the ignition on and checking the SRS warning light illuminates for 4 seconds and then extinguishes.

INTERIOR TRIM COMPONENTS



WINDSCREEN

76.81.01

NOTE: The following equipment is required:

Cutting wire and handles

Windscreen repair kit




Sealer applicator gun

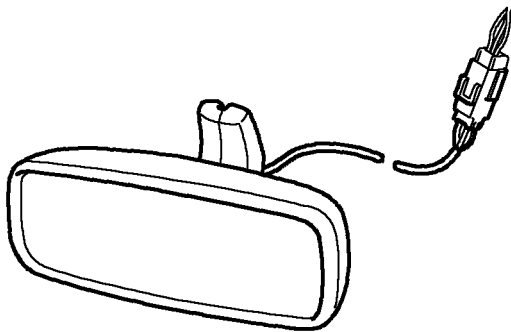
Suction cups

WARNING: Wear protective gloves when handling glass, solvents and primers.


WARNING: Wear suitable eye protection when removing and refitting glass.

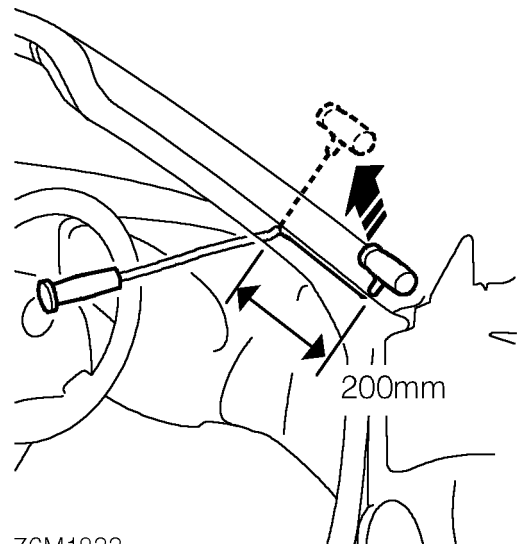
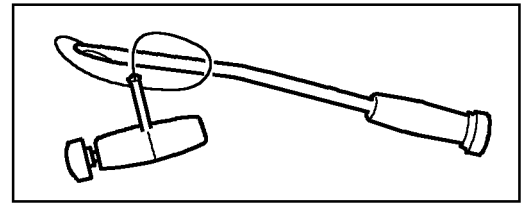
Remove

1. Remove air intake panel.
 **AIR INTAKE PANEL**, page 80-8.
2. Remove header trim.
 **HEADER TRIM**, page 76-4-3.
3. Remove 'A' post trim,
 **'A' POST TRIM**, page 76-4-2.



76M1832

4. Remove interior mirror.
 **INTERIOR MIRROR**, page 76-4-1.
5. Fit protection to bonnet and areas around screen.
6. Cover heater ducts with masking tape.
7. Cover interior of vehicle with protective sheet.
8. Make knife cut in sealant at bottom of 'A' post.



76M1833

9. Insert cutting wire through previously made knife cut and fit handles as shown, with approximately 200 mm of wire between handles.
10. With assistance, wedge tube of handle **A** between glass and body, ahead of cutting position, and carefully cut sealer using a continuous pull on handle **B** from the outside. Ensure that glass is retained as last sealant is cut.

NOTE: If multi-strand cutting wire is used, a sawing action can be used to cut through heavy sealant deposits around corners.

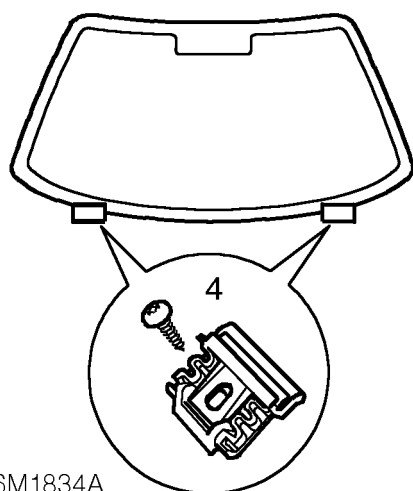
CAUTION: Use of a sawing action may overheat and break single strand wire.

11. Attach suction cups and use assistance to remove glass from body.
CAUTION: Lay glass on felt covered supports. Do not stand on edge. Any chipping of glass edge may develop into cracks.

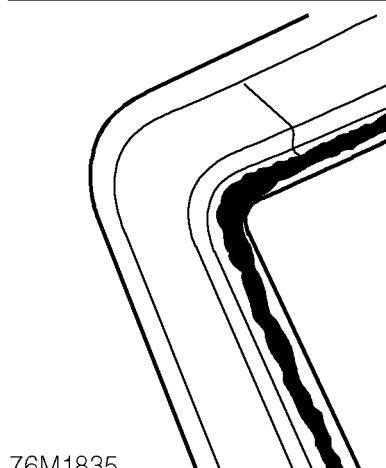
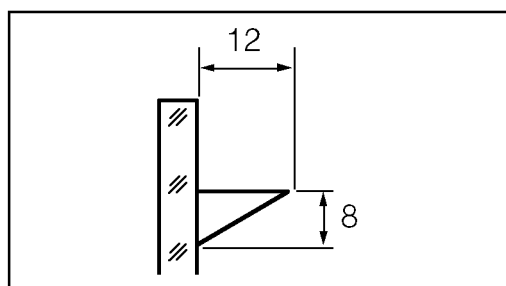
Refit

1. Carefully remove excess sealer from body leaving a smooth surface.
2. Use a vacuum cleaner to clear away any waste.
3. Original glass: Carefully cut back old sealer to obtain a smooth surface without damaging obscuration band on glass.

SCREENS



76M1834A







76M1835

4. Fit 2 brackets and tighten screws.
5. With assistance, locate screen upright on brackets and then lay in position in body frame.
6. Carefully centre screen in body frame and apply masking tape reference marks from screen to body, on each side of lower screen.
7. Cut tape at edge of screen, and with assistance remove screen and place aside.
8. Clean frame and edge of screen with solvent.

CAUTION: Do not touch cleaned or primed surfaces with fingers.

9. Apply etch primer to any bare metal on frame.
10. Apply bonding agent to screen and allow to cure.
11. Apply primer over etch primer on frame.
12. Apply activator over old sealer on frame.
13. Allow activator to cure.
14. Fit pre-cut nozzle to sealer cartridge, remove lid and shake out crystals, and install in applicator gun.

NOTE: Nozzle will need modification to achieve required bead section.

15. Apply a continuous bead of sealer around edge of frame as shown. Make bead slightly thicker at each corner.
16. Check for breaks and air bubbles in sealer.
17. With assistance, lift screen into place and align to brackets and tape. Lightly press glass to seat sealer.
18. Remove protective covers and tape.
19. Test sealer for leaks, apply additional sealer if necessary. If water is used, allow sealer to dry before testing. Spray water around glass and check for leaks. Mark any area that leaks. Dry glass and sealer then apply additional sealer.
20. Fit 'A' post trim.
 **'A' POST TRIM**, page 76-4-2.
21. Fit header trim.
 **HEADER TRIM**, page 76-4-3.
22. Fit interior mirror.
 **INTERIOR MIRROR**, page 76-4-1.
23. Fit air intake panel.
 **AIR INTAKE PANEL**, page 80-8.

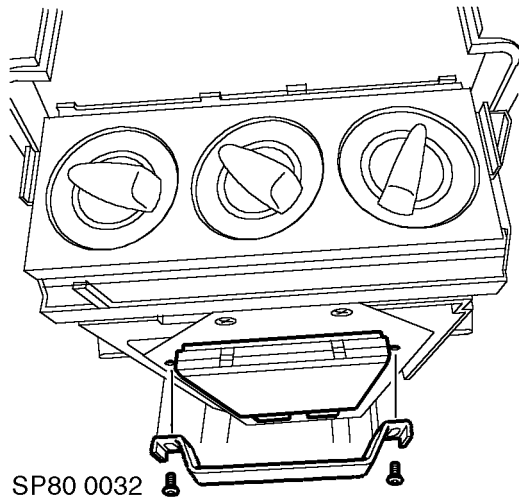
CAUTION: A curing time of 6 hours is desirable, during this time leave a window open and do not slam the doors. If the car must be used, drive slowly.

CONTROL - HEATER

🔑 80.10.02

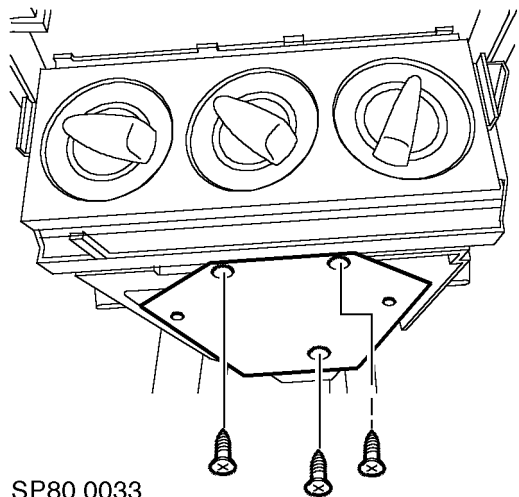
Remove

1. Remove centre console.
 [FRONT CONSOLE](#), page 76-4-4.



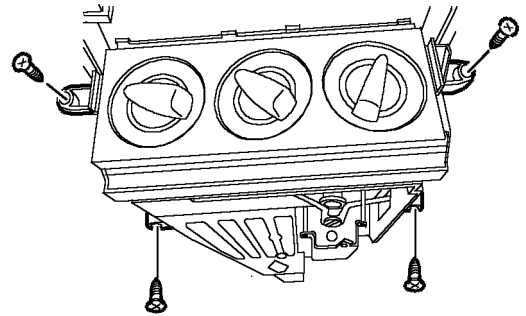
SP80 0032

2. Using 99R-027, remove 2 security screws securing SCU retaining strap, position SCU aside.



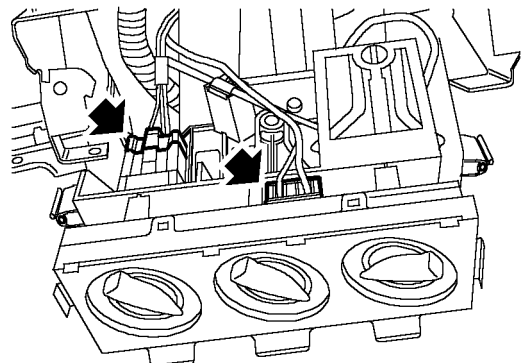
SP80 0033

3. Remove 3 screws securing SCU support plate, remove plate.



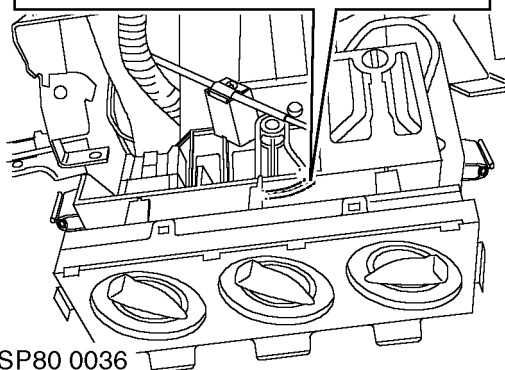
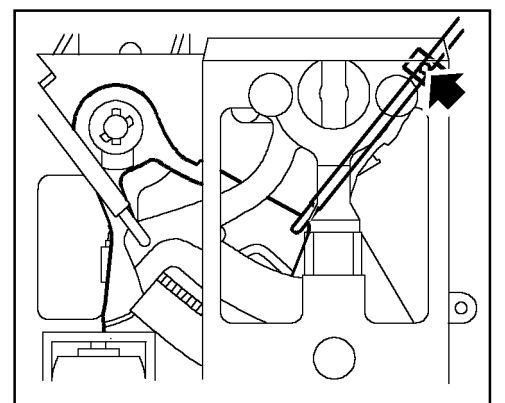
SP80 0034

4. Remove 4 screws securing heater controls and release controls from support bracket.



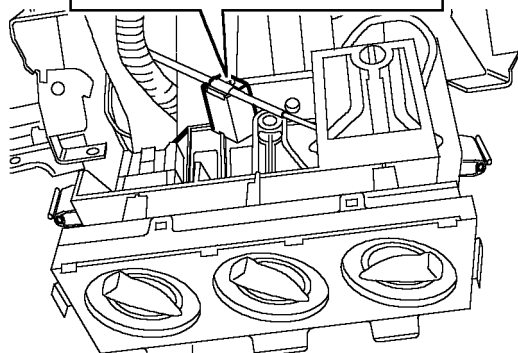
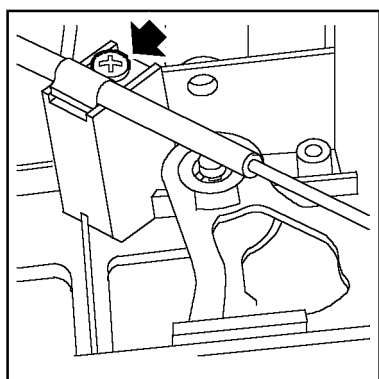
SP80 0035

5. Disconnect heater control multiplugs.



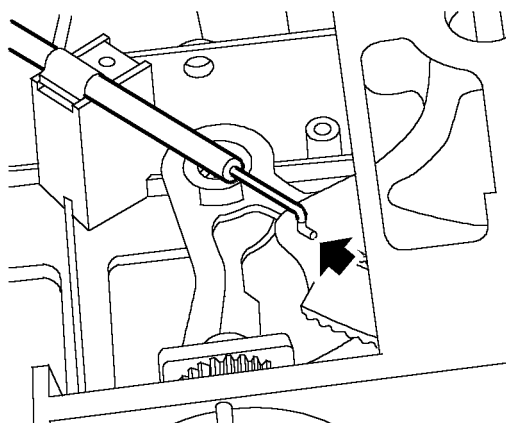
SP80 0036

6. Loosen screw securing temperature control outer cable and release inner cable from control lever.



SP80 0037

7. Loosen screw securing distribution cable control outer cable.



M80 0426

8. Release inner cable from control lever.
9. Remove control assembly.

Refit

1. Position control assembly and connect inner cables.
2. Secure outer cables in clips, do not tighten clamp screws at this stage.
3. Connect control multiplugs.
4. Align controls to support bracket. Fit and tighten screws.
5. Turn distribution control fully anti-clockwise to face vent position.
6. Position air distribution lever fully forward.
7. Align outer cable to abutment and secure clamp screw.
8. Turn heater control to 'cold' and heater valve lever fully clockwise.
9. Secure outer cable clamp screw.
10. Position SCU support plate, fit and tighten screws.
11. Position SCU and retaining strap to support plate, fit and tighten security screws using 99R-027
12. Fit centre console.

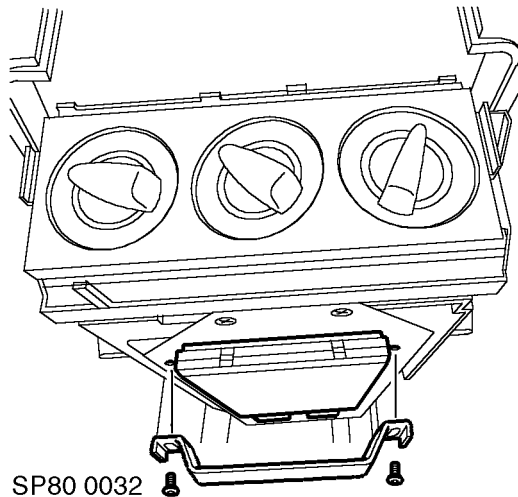
 [FRONT CONSOLE, page 76-4-4.](#)

CABLE - WATER VALVE CONTROL

80.10.07

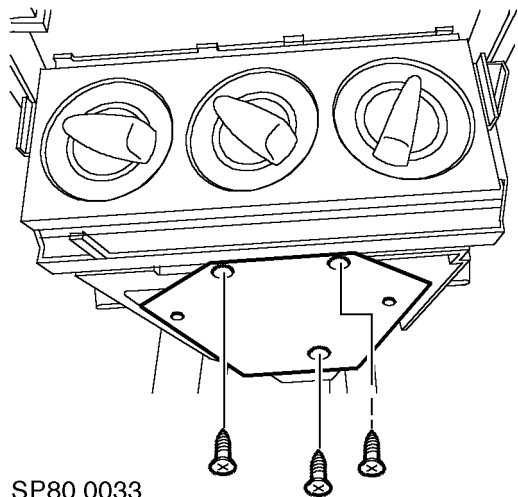
Remove

1. Remove front console.
 FRONT CONSOLE, page 76-4-4.



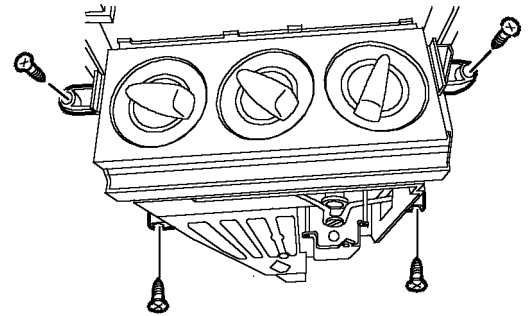
SP80 0032

2. Using 99R-027, remove 2 security screws securing SCU retaining strap, position SCU aside.



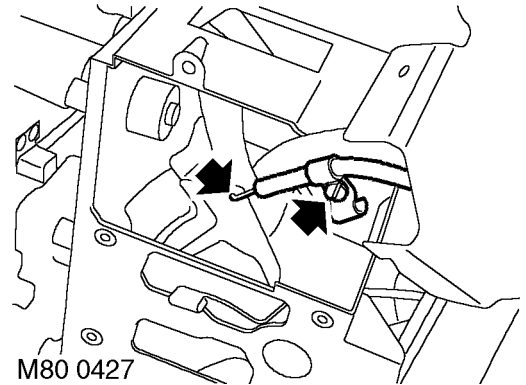
SP80 0033

3. Remove 3 screws securing SCU support plate, remove plate.



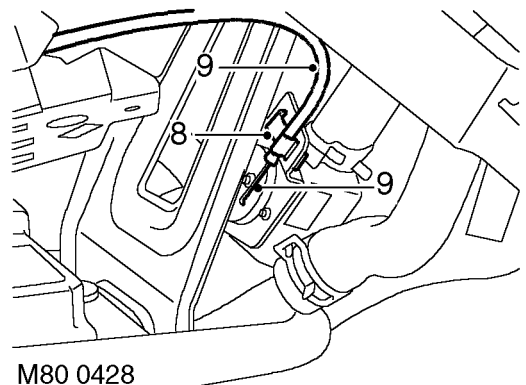
SP80 0034

4. Remove 4 screws securing controls to fascia.
5. Release controls from fascia.



M80 0427

6. Remove screw securing cable clamp to controls and collect clamp.
7. Release cable from controls.




M80 0428

8. Remove clip securing cable outer to heater.
9. Release cable from valve and remove cable.


Refit

1. Engage cable to heater valve.
2. Engage cable to heater controls and secure cable clamp.

HEATING & VENTILATION

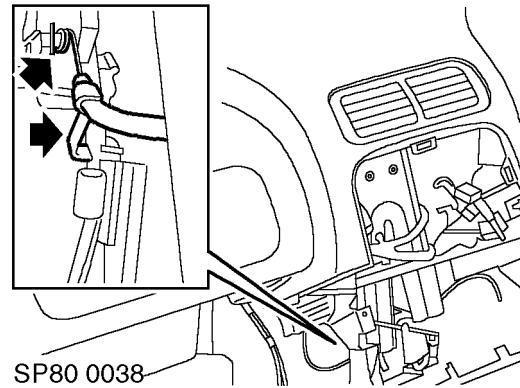
3. Turn heater control to 'cold' and heater valve lever fully clockwise.
4. Secure outer cable to valve with clip.
5. Position controls to fascia and secure with screws.
6. Position alarm ECU support plate and secure with screws.
7. Position SCU and retaining strap to support plate, fit and tighten security screws using 99R-027
8. Fit front console.
 [FRONT CONSOLE, page 76-4-4.](#)

CABLE - AIR DISTRIBUTION CONTROL

 **80.10.12**


Remove

1. Remove heater controls.
 [CONTROL - HEATER, page 80-1.](#)



2. Remove clip securing cable outer to heater.
3. Remove star washer securing cable to air distribution control lever.
4. Remove cable from heater.

Refit

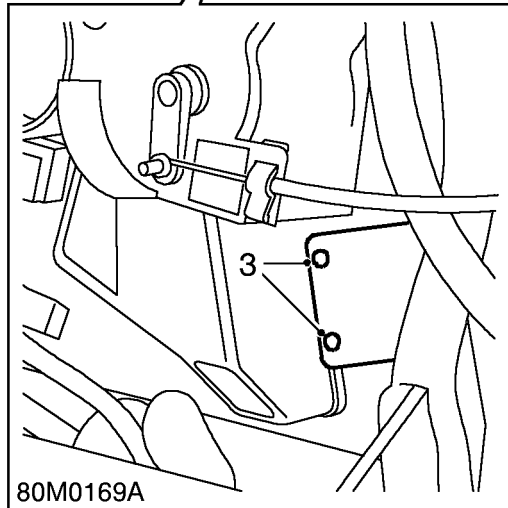
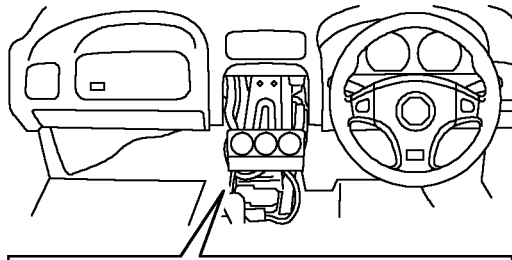
1. Fit cable to control lever and secure with star washer.
2. Position cable to heater and secure with clip.
3. Fit heater controls.
 [CONTROL - HEATER, page 80-1.](#)

HEATER VALVE

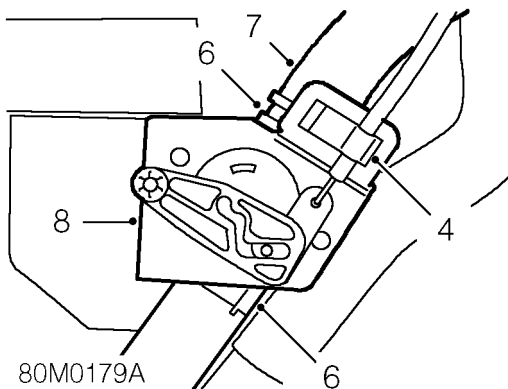
🔑 80.10.16

Remove

1. Drain coolant system.
[DRAIN AND REFILL, page 26-1.](#)
2. Remove both console closing panels.
[CONSOLE CLOSING PANEL, page 76-4-8.](#)



3. Remove 2 screws securing valve to heater assembly.

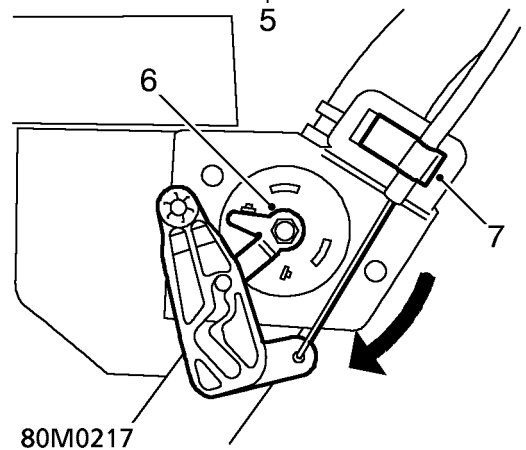
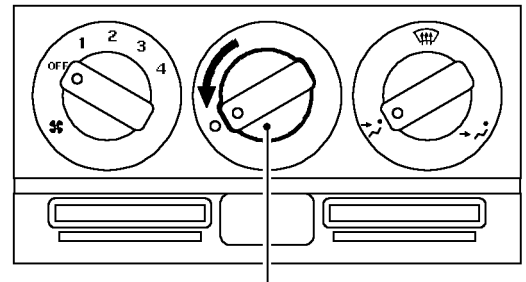


4. Remove clip securing cable outer to valve and release cable from valve lever.
5. Position cloth and container to catch spillage.
6. Release 2 clips securing hoses to valve.

7. Release top hose.
8. Remove valve from bottom hose.

Refit

1. Fit valve to lower hose and secure with clip.
2. Position upper hose to valve and secure with clip.
3. Engage cable to valve lever.
4. Position valve to heater assembly and secure with screws.



5. Turn heater control fully to 'COLD'.
6. Turn valve lever fully clockwise.
7. Position cable outer and secure with clip.
8. Fit console closing panels.
[CONSOLE CLOSING PANEL, page 76-4-8.](#)
9. Refill coolant system.
[DRAIN AND REFILL, page 26-1.](#)

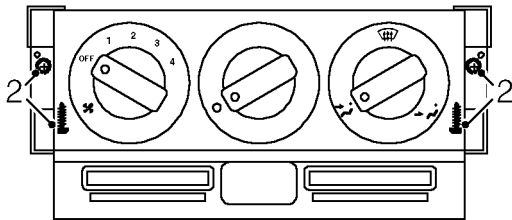
HEATING & VENTILATION

HEATER FAN SWITCH

🔑 80.10.22

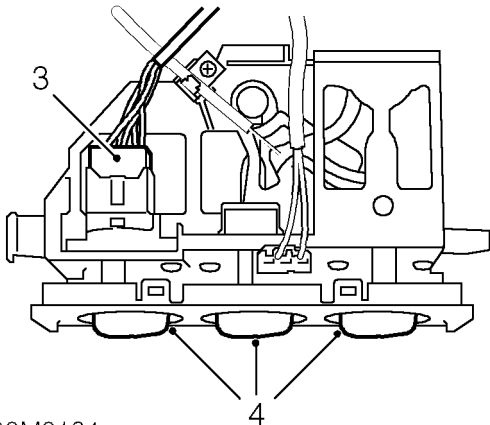
Remove

1. Remove front console.
👉 [FRONT CONSOLE](#), page 76-4-4.



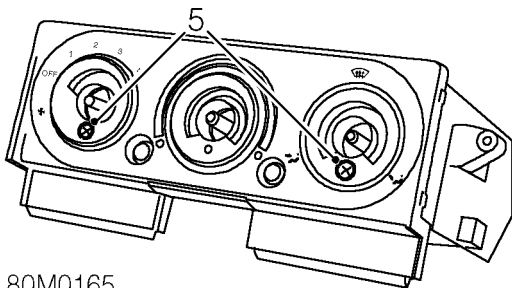
80M0163

2. Remove 4 screws securing heater control unit to fascia and position control unit aside.



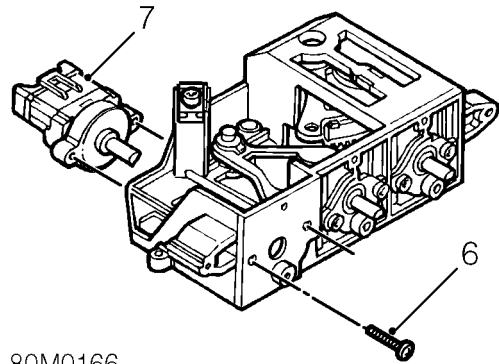
80M0164

3. Disconnect multiplug from control unit.
4. Remove 3 knobs from control assembly.



80M0165

5. Remove 2 screws securing illumination housing to assembly and remove housing.



80M0166

6. Remove 2 screws securing fan switch to assembly.
7. Remove switch.

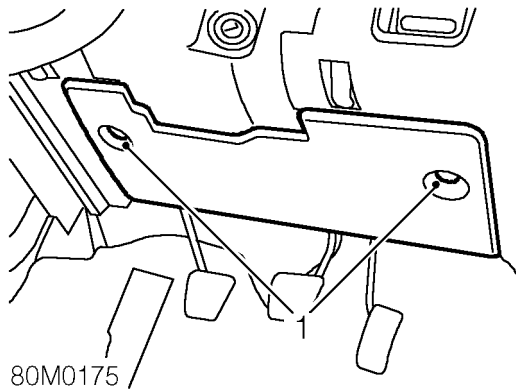
Refit

1. Position switch to assembly and secure with screws.
2. Position illumination housing to assembly and secure with screws.
3. Fit control knobs.
4. Connect multiplug.
5. Position control unit to fascia and secure with screws.
6. Fit front console.
👉 [FRONT CONSOLE](#), page 76-4-4.

FACE LEVEL VENT - RH

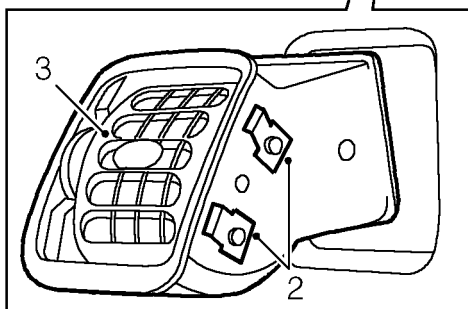
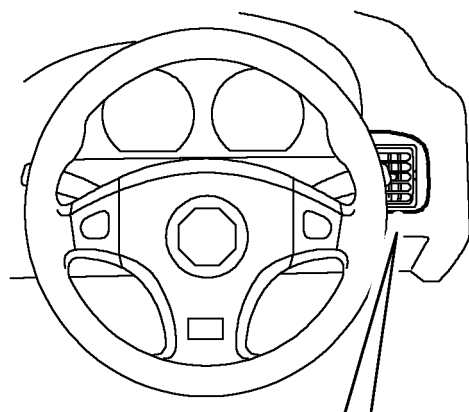
🔑 80.15.04

Remove



80M0175

1. Turn clips securing fuse box cover $\frac{1}{4}$ turn and open cover.



80M0176

2. Release 4 clips securing vent to fascia.
3. Remove vent.

Refit

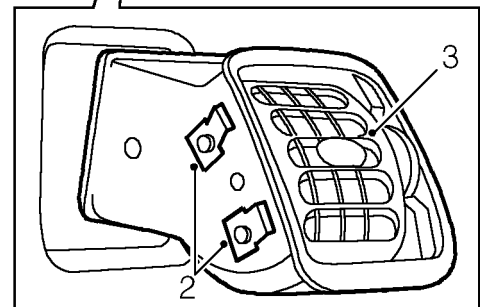
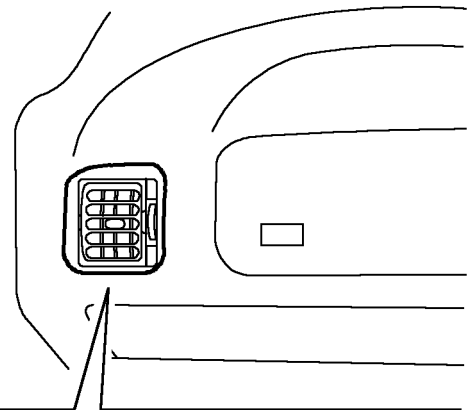
1. Fit vent to fascia and engage clips.
2. Close fuse box cover and secure with clips.

FACE LEVEL VENT - LH

🔑 80.15.05

Remove

1. Remove glovebox.
[GLOVEBOX, page 76-4-10.](#)



80M0178

2. Release 4 clips securing vent to fascia.
3. Remove vent.

Refit

1. Fit vent to fascia and engage clips.
2. Fit glovebox.
[GLOVEBOX, page 76-4-10.](#)

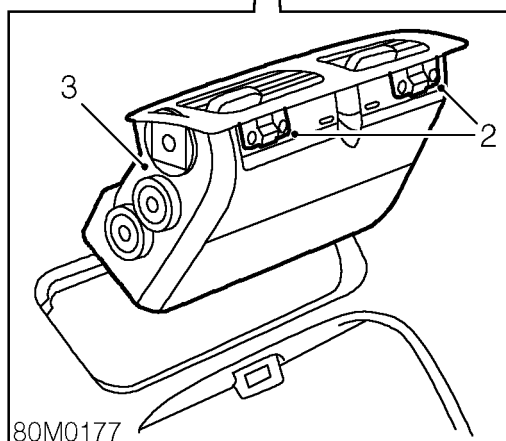
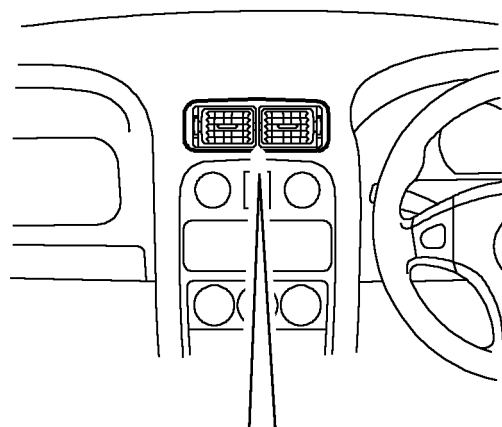
HEATING & VENTILATION

FACE LEVEL VENT - CENTRE

🔑 80.15.63

Remove

1. Remove centre console panel.
👉 CENTRE CONSOLE PANEL, page 76-4-7.



2. Release 4 clips securing vent to fascia.
3. Remove vent.

Refit

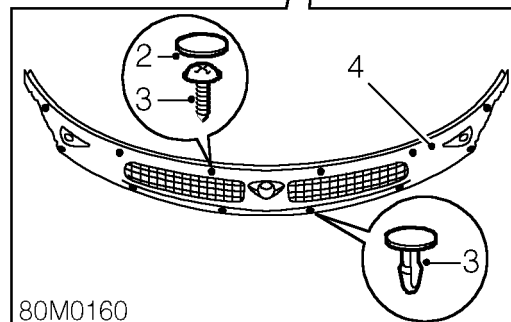
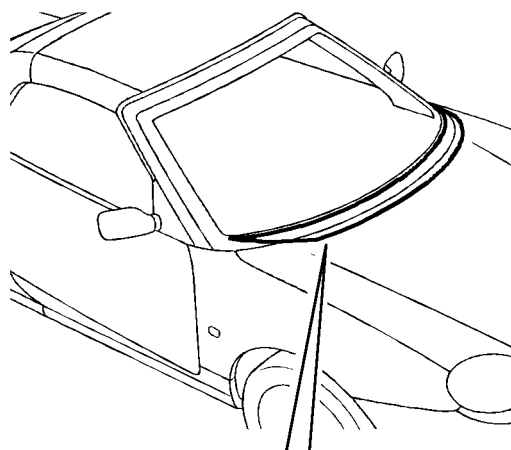
1. Fit vent to fascia and engage clips.
2. Fit centre console panel.
👉 CENTRE CONSOLE PANEL, page 76-4-7.

AIR INTAKE PANEL

🔑 80.15.62

Remove

1. Remove wiper arms.
👉 WIPER ARM, page 84-3.



2. Remove 6 retaining screw caps from intake moulding.
3. Remove 6 screws and 6 clips securing panel to scuttle.
4. Release intake panel from clips and remove panel.

Refit

1. Position panel to scuttle and secure with clips and screws.
2. Fit screw caps.
3. Fit wiper arms.
👉 WIPER ARM, page 84-3.

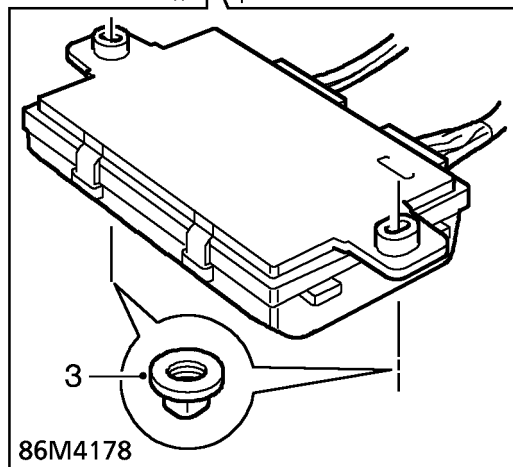
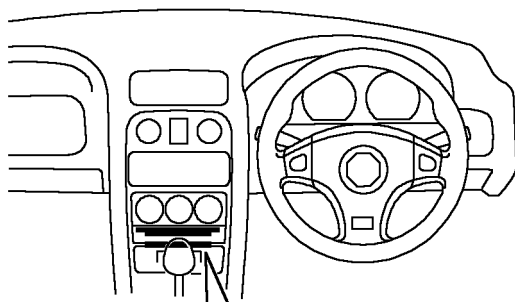
HEATER

80.20.01

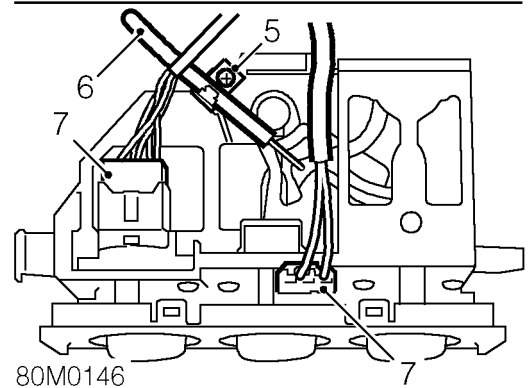
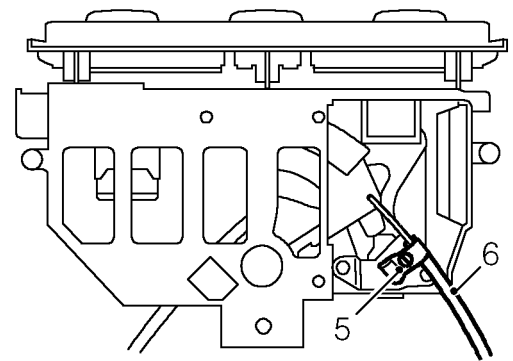
WARNING: See **GENERAL INFORMATION, SRS Precautions.**

Remove

1. Make the SRS system safe
SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.
2. Remove fascia.
FASCIA PANEL, page 76-4-9.

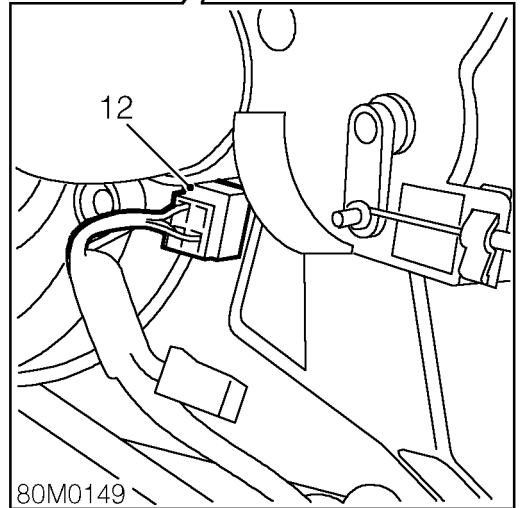
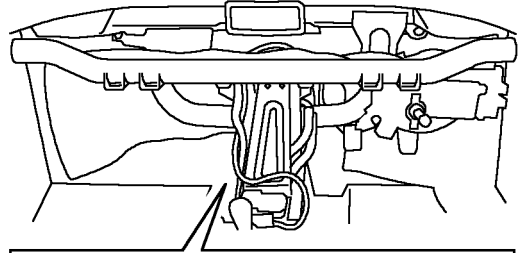
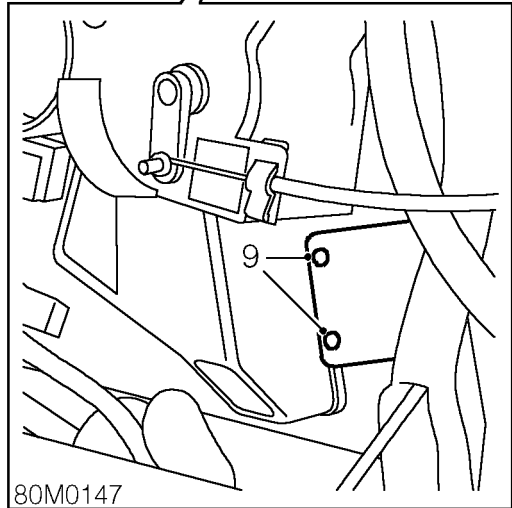
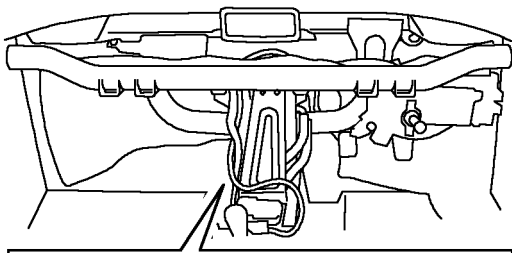


3. Remove 2 nuts securing anti-theft alarm ECU to heater control unit, position ECU aside.
4. Drain cooling system.
DRAIN AND REFILL, page 26-1.



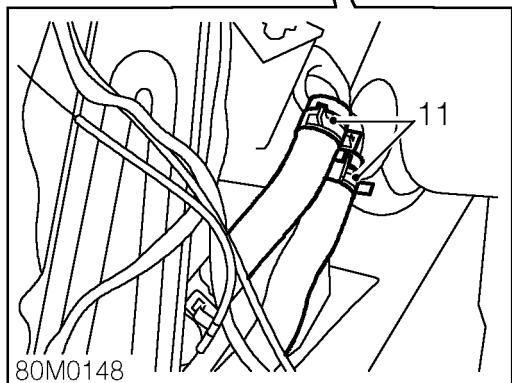
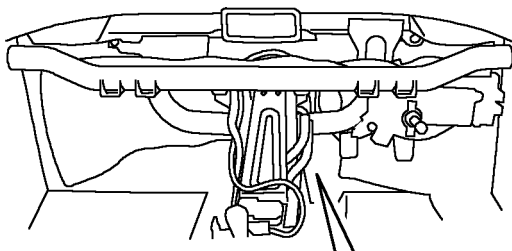
5. Remove 2 screws retaining outer cables to control unit.
6. Release cables from control unit.
7. Disconnect 2 multiplugs and remove control unit.
8. Remove 2 screen ducts from heater.

HEATING & VENTILATION

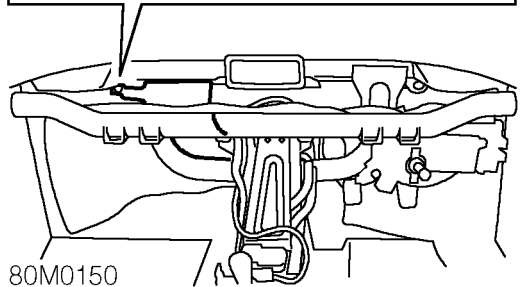
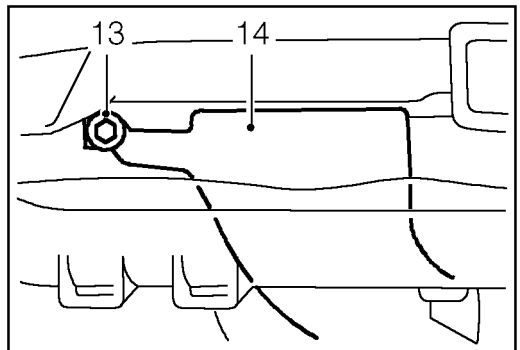


- 9. Remove 2 screws securing valve to heater casing.
- 10. Position container beneath heater to catch spillage.

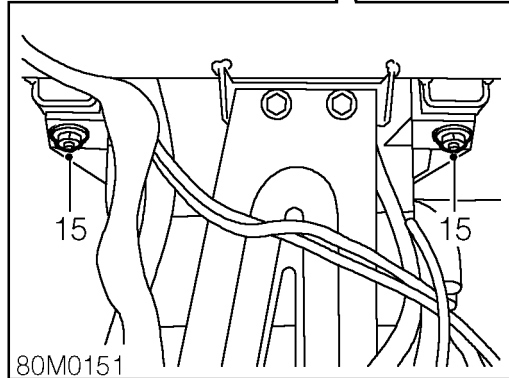
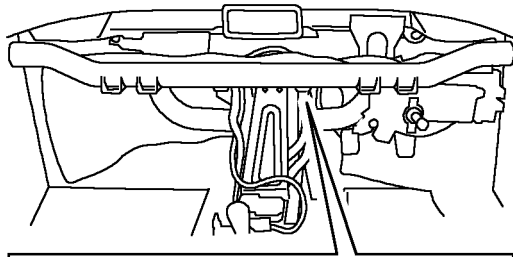
- 12. Disconnect multiplug from heater blower.



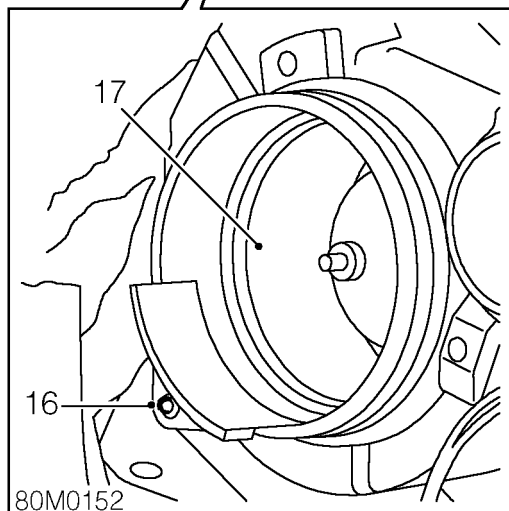
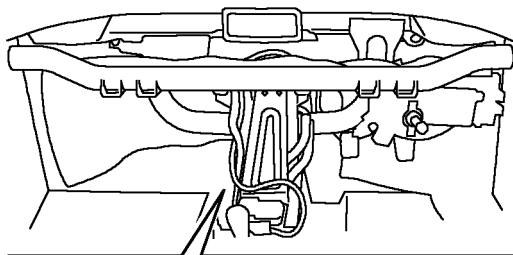
- 11. Release clips and disconnect both hoses from heater matrix. Allow matrix to drain.



- 13. Remove nut securing intake duct to body.
- 14. Remove intake duct.



15. Remove 2 nuts securing heater unit to crossmember.

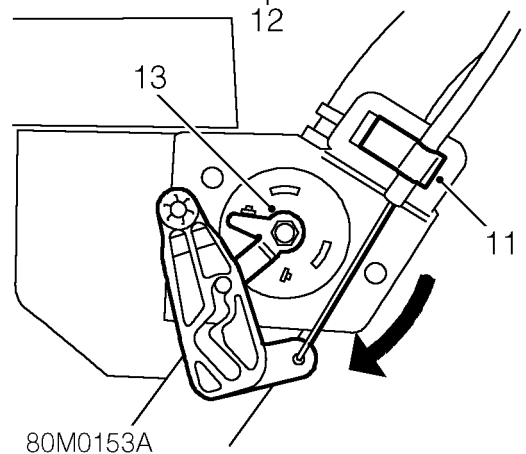
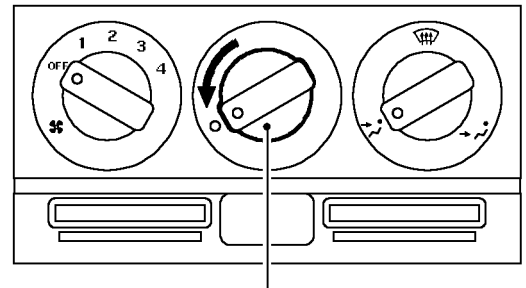


16. Remove bolt securing heater unit to bulkhead.
17. Remove heater unit.

Refit

1. Position heater to mountings.
2. Tighten all fixings to 10 Nm.
3. Position intake duct and tighten nut to 10 Nm.

4. Connect multiplug to heater blower.
5. Connect hoses to heater matrix and secure with clips.
6. Position valve and secure with screws.
7. Fit screen ducts.
8. Connect multiplugs to control unit.
9. Position control cables and connect to control unit.
10. Align cable outers to control unit and tighten clamp screws.



11. Release clip securing cable outer to heater valve.
12. Turn temperature control to COLD.
13. Push heater control valve to the cold position and secure cable clip.
14. Position alarm ECU to control unit, fit and tighten nuts to 4 Nm.
15. Refill cooling system.
 [DRAIN AND REFILL, page 26-1.](#)
16. Fit fascia.
 [FASCIA PANEL, page 76-4-9.](#)

HEATING & VENTILATION

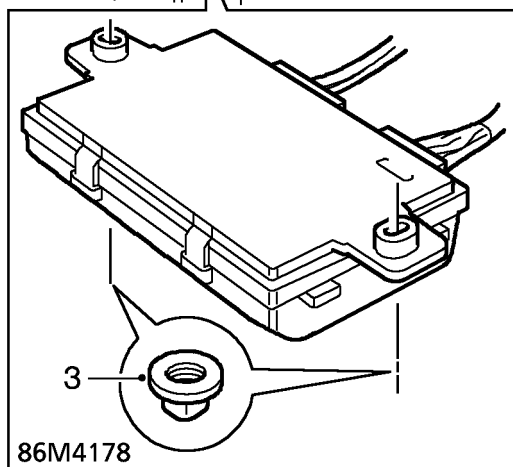
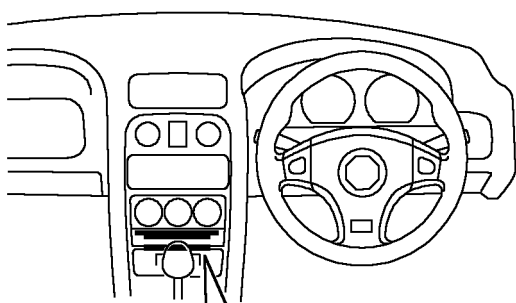
HEATER - WITH AIR CONDITIONING

🔑 80.20.01/20

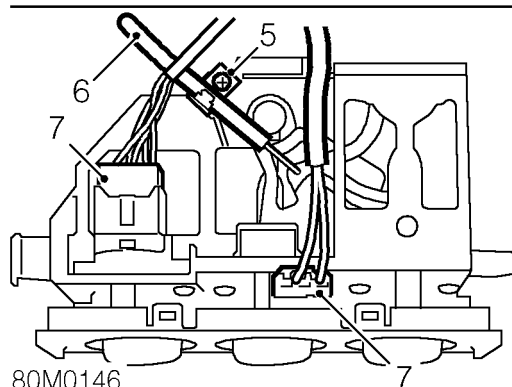
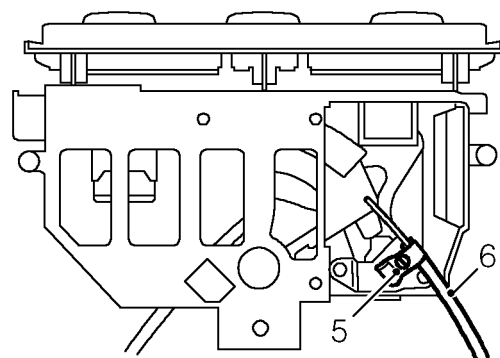
WARNING: See **GENERAL INFORMATION, SRS Precautions.**

Remove

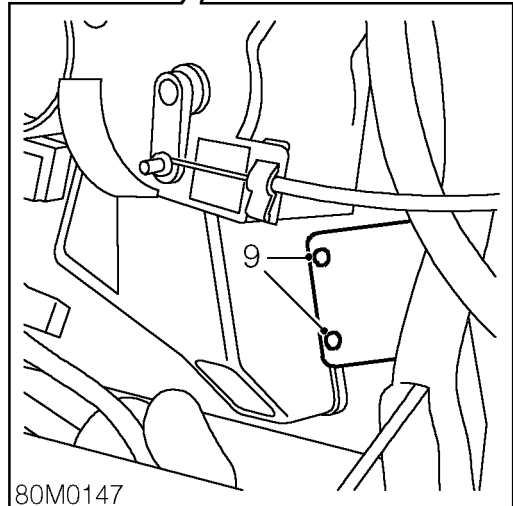
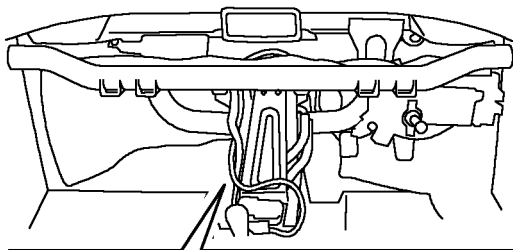
1. Make the SRS system safe
👉 **SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS**, page 03-19.
2. Remove evaporator.
👉 **EVAPORATOR**, page 82-8.



3. Remove 2 nuts securing anti-theft alarm ECU to heater control, position ECU aside.
4. Drain cooling system.
👉 **DRAIN AND REFILL**, page 26-1.

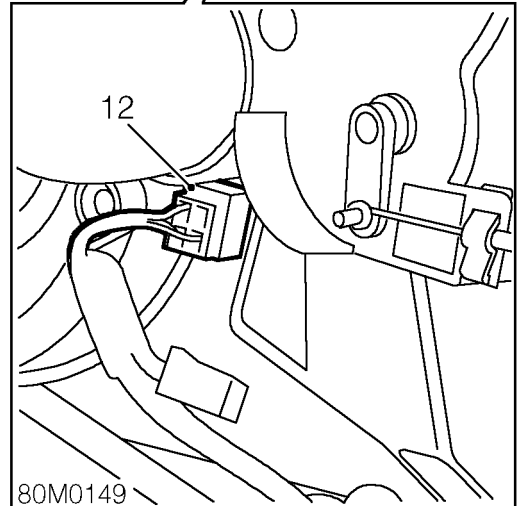
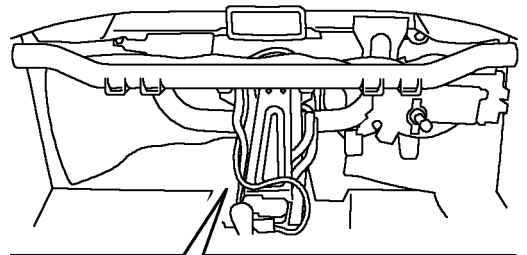


5. Remove 2 screws retaining outer cables to control unit.
6. Release cables from control unit.
7. Disconnect 2 multiplugs and remove control unit.
8. Remove screen duct from heater.



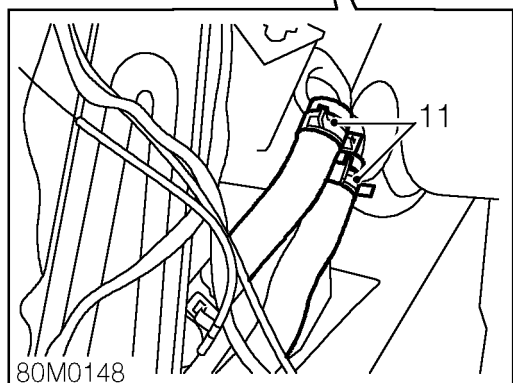
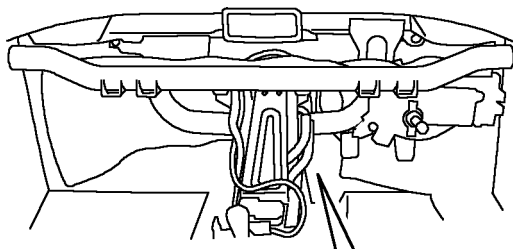
80M0147

- 9. Remove 2 screws securing valve to heater casing.
- 10. Position container beneath heater to catch spillage.



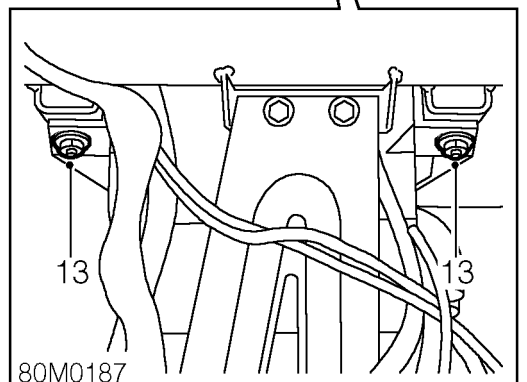
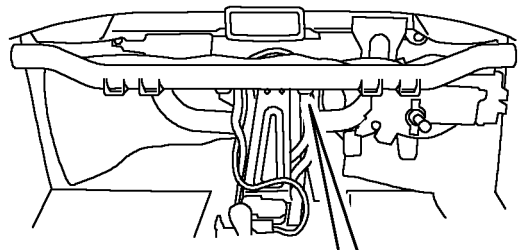
80M0149

- 12. Disconnect multiplug from heater blower.



80M0148

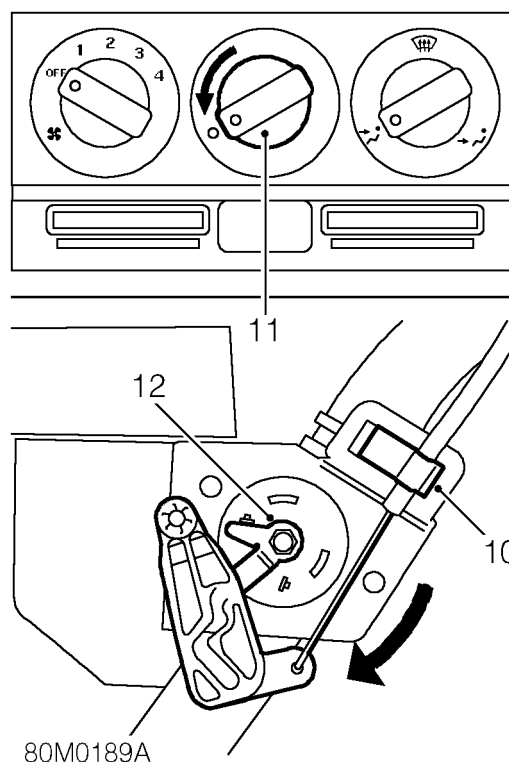
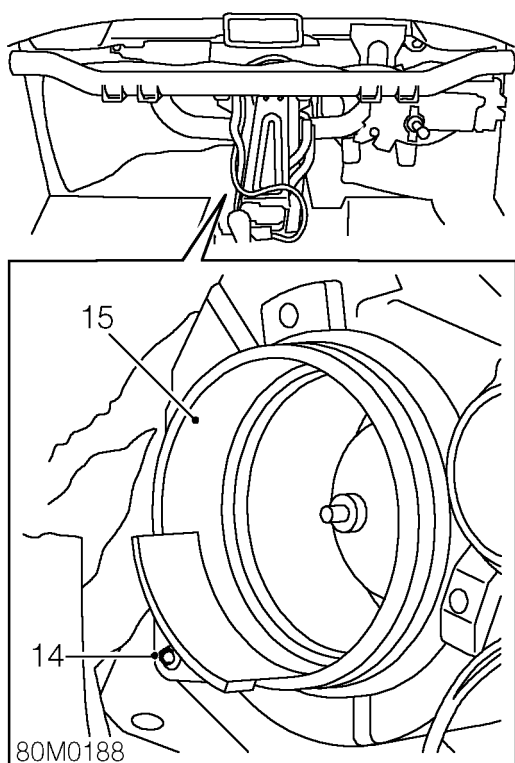
- 11. Release clips and disconnect both hoses from heater matrix. Allow matrix to drain.



80M0187

- 13. Remove 2 nuts securing heater unit to crossmember.



HEATING & VENTILATION



14. Remove nut securing heater unit to bulkhead.
15. Remove heater unit.

Refit

1. Position heater to mountings.
2. Tighten all fixings to 10 Nm.
3. Connect multiplug to heater blower.
4. Connect hoses to heater matrix and secure with clips.
5. Position valve and secure with screws.
6. Fit screen duct.
7. Connect multiplugs to control unit.
8. Position control cables and connect to control unit.
9. Align cable outers to control unit and tighten clamp screws.

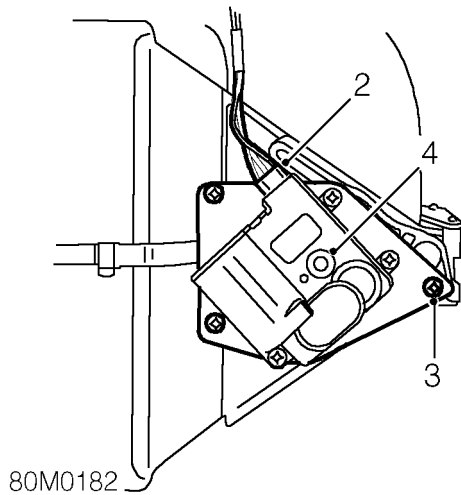
10. Release clip securing cable outer to heater valve.
11. Turn temperature control to COLD.
12. Push heater control valve to the COLD position and secure cable clip.
13. Refill cooling system.
 [DRAIN AND REFILL, page 26-1.](#)
14. Position alarm ECU to heater control, fit and tighten nuts to 4 Nm.
15. Fit evaporator:
 [EVAPORATOR, page 82-8.](#)

RECIRCULATION SERVO MOTOR

🔑 80.20.10

Remove

1. Remove glovebox.
[GLOVEBOX, page 76-4-10.](#)



2. Disconnect multiplug from servo motor.
3. Remove 3 screws securing servo motor to evaporator casing.
4. Remove servo motor.

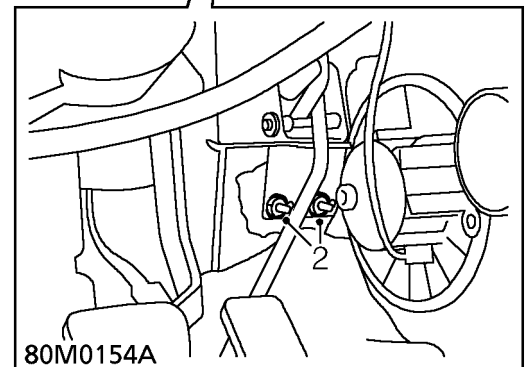
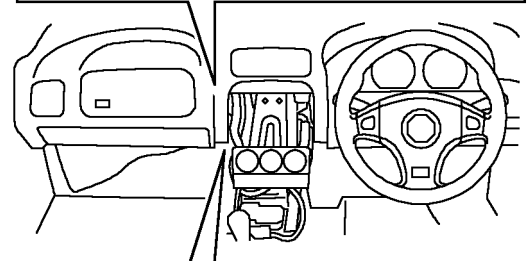
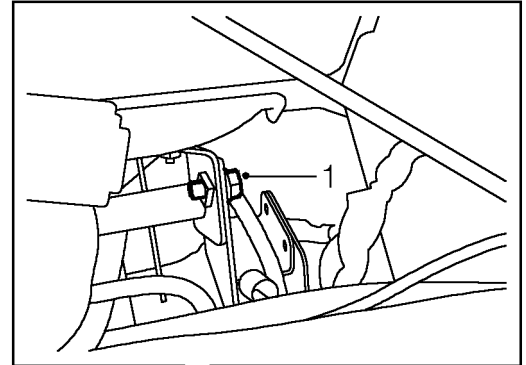
Refit

1. Position servo motor and engage output crank to re-circulation flap lever.
2. Secure servo motor with screws.
3. Connect multiplug.
4. Fit glovebox.
[GLOVEBOX, page 76-4-10.](#)

HEATER BLOWER

🔑 80.20.12

Remove



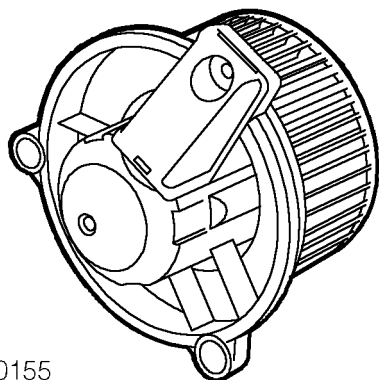
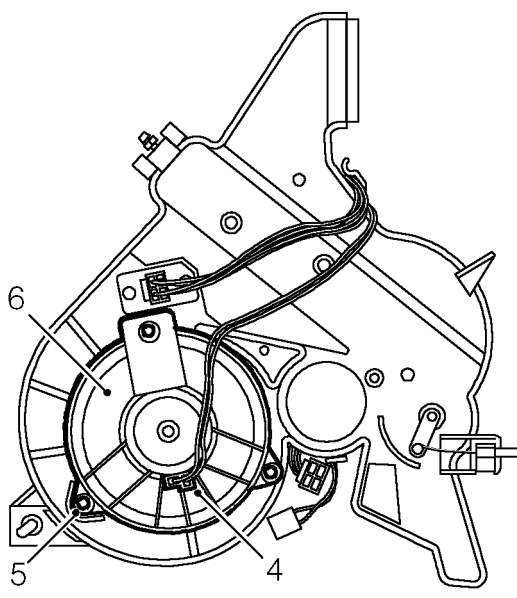
1. Remove bolt securing throttle pedal bracket to pedal box.
2. Remove 2 nuts securing throttle pedal bracket to bulkhead and position throttle pedal assembly aside.
3. Remove heater duct.

HEATING & VENTILATION

HEATER RESISTOR

🔑 80.20.17

Remove

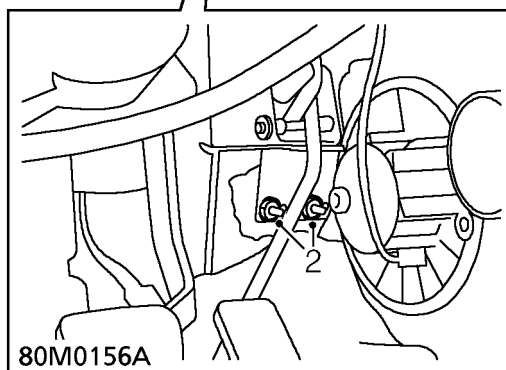
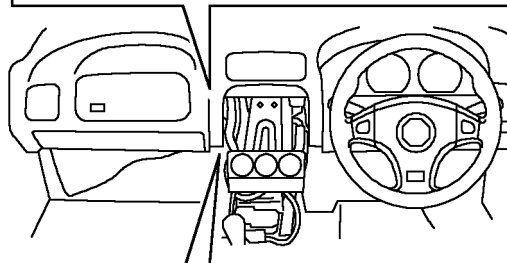
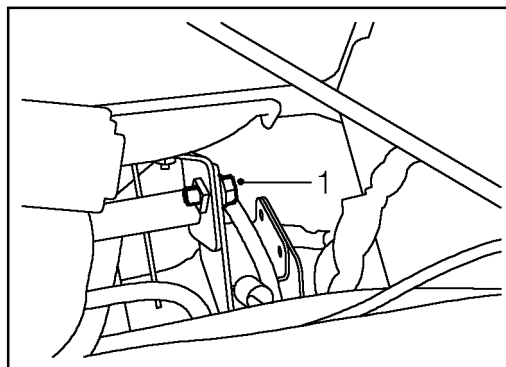


80M0155

4. Disconnect multiplug from heater blower.
5. Remove 3 screws securing blower to heater.
6. Remove heater blower.
7. Release armature cover and collect sleeve.

Refit

1. Position screw and sleeve to top location of heater blower.
2. Position blower to heater and secure with screws.
CAUTION: Ensure screw sleeve does not fall into blower motor.
3. Connect multiplug to blower.
4. Fit heater duct.
5. Position throttle pedal assembly, fit and tighten nuts to 6 Nm.
6. Fit and tighten bolt to 22 Nm.



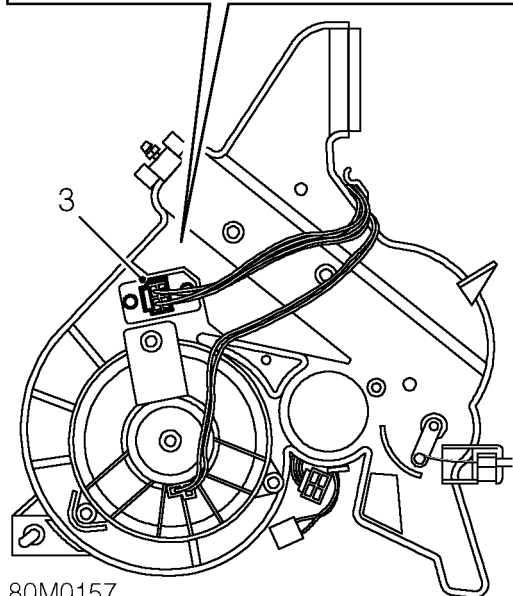
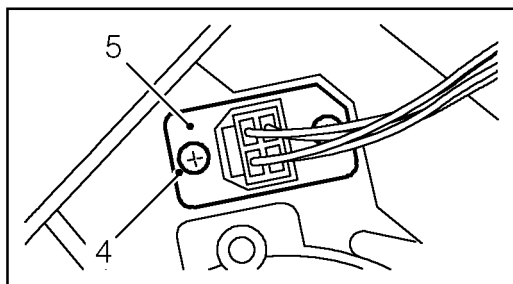
1. Remove bolt securing throttle pedal bracket to pedal box.
2. Remove 2 nuts securing throttle pedal bracket to bulkhead and position throttle pedal assembly aside.

HEATER MATRIX

🔑 80.20.29

Remove

1. Remove heater.
👉 [HEATER, page 80-9.](#)

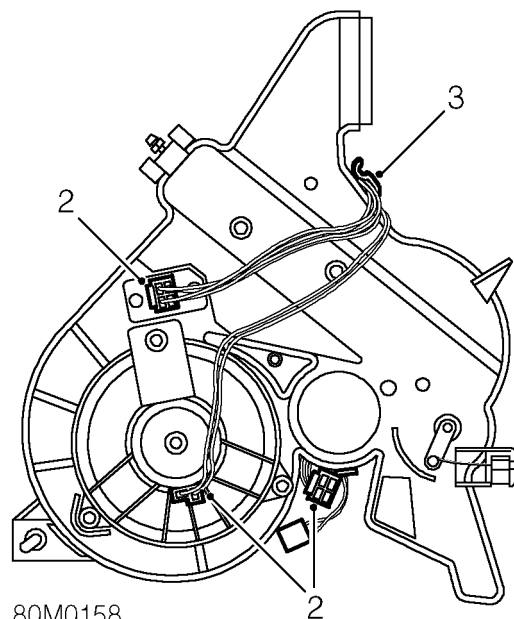


80M0157

3. Disconnect multiplug from resistor.
4. Remove 2 screws securing resistor.
5. Remove heater resistor.

Refit

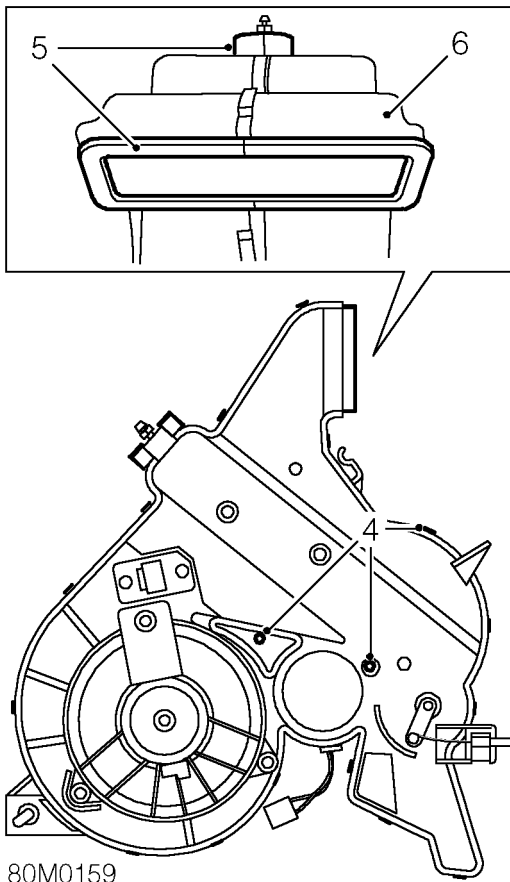
1. Position resistor to heater and secure with screws.
2. Connect resistor multiplug.
3. Position throttle pedal assembly, fit and tighten nuts to 6 Nm.
4. Fit and tighten bolt to 22 Nm.



80M0158

2. Disconnect multiplugs from blower and resistor.
3. Release harness from 2 clips and position aside.

HEATING & VENTILATION



4. Remove 15 clips and 2 screws securing two halves of casing.
5. Remove foam seal from outlet vent and matrix bleed nipple.
6. Separate two halves of casing.
7. Remove heater matrix.

Refit

1. Position matrix to heater.
2. Position two halves of casing, ensuring correct location of flow direction flap.
3. Secure casing halves with clips and screws.
4. Clean sealing faces.
5. Fit foam seals to outlet vent and bleed nipple.
6. Engage harness clips and connect multiplugs.
7. Fit heater.

 [HEATER, page 80-9.](#)



REFRIGERANT RECOVERY, RECYCLING AND RECHARGING

🔑 82.30.02

WARNING: Servicing must only be carried out by personnel familiar with both the vehicle system and the charging and testing equipment. All operations must be carried out in a well ventilated area away from open flame and heat sources.

Recovery

1. Remove dust caps from high and low pressure connectors.
2. Connect high and low pressure hoses to appropriate connections.
3. Open valves on connectors.
4. Turn valves on refrigerant station to correct positions.
5. Turn Process switch to correct position.
6. Turn Main switch to 'ON'.
7. Allow station to recover refrigerant from system.

WARNING: Refrigerant must always be recycled before re-use to ensure that the purity of the refrigerant is high enough for safe use in the air conditioning system.

Recycling should always be carried out with equipment which is design certified by Underwriter Laboratory Inc. for compliance with SAE J1991. Other equipment may not recycle refrigerant to the required level of purity.

A R134a Refrigerant Recovery Recycling Recharging Station must not be used with any other type of refrigerant.

Refrigerant R134a from domestic and commercial sources must not be used in motor vehicle air conditioning systems.

8. Close valves on refrigerant station.
9. Turn Main switch to 'OFF'.
10. Close valves on connectors.
11. Disconnect connectors high and low pressure hoses from connectors.
12. Fit dust caps to connectors.
13. Open tap at rear of station to drain refrigerant oil.
14. Measure and record quantity of refrigerant oil recovered from system.
15. Close tap at rear of station.

Evacuation

1. Remove dust caps from high and low pressure connectors.
2. Connect high and low pressure hoses to appropriate connections.

3. Open valves on connectors.
4. Turn valves on refrigerant station to correct positions.
5. Turn Process switch to correct position.
6. Turn Main switch to 'ON'.
7. Allow station to evacuate system.

Recharging

CAUTION: The system must be evacuated immediately before recharging commences. Delay between evacuation and recharging is not permitted.

1. Close valves on refrigerant station.
2. Close valve on oil charger.
3. Disconnect yellow hose from refrigerant station.
4. Remove lid from oil charger.
5. Pour same quantity of refrigerant oil into oil charger as collected during recovery. If the following components have been renewed, add the following additional quantity of lubricating oil:
 - Condenser = 30 cm³
 - Evaporator = 30 cm³
 - Pipe or hose = 10 cm³/metre
6. Fit lid to oil charger.
7. Connect yellow hose to refrigerant station.
8. Open valve on oil charger.
9. Move pointer on refrigerant gauge to mark position of refrigerant charge quantity. System charge weight is 450 ± 50 grammes.



NOTE: When recharging the A/C system, always allow additional weight of refrigerant to fill the charging line between refrigerant station and vehicle. Calculate the additional refrigerant weight required at 30 grammes per metre of charging line.
10. Slowly open correct valve on refrigerant station and allow vacuum to pull refrigerant into system.
11. Close valve on refrigerant station when correct amount of refrigerant has been drawn into air conditioning system.
12. Turn Main switch to 'OFF'.
13. Close valves on connectors.
14. Disconnect high and low pressure hoses from connectors.
15. Fit dust caps to connectors.

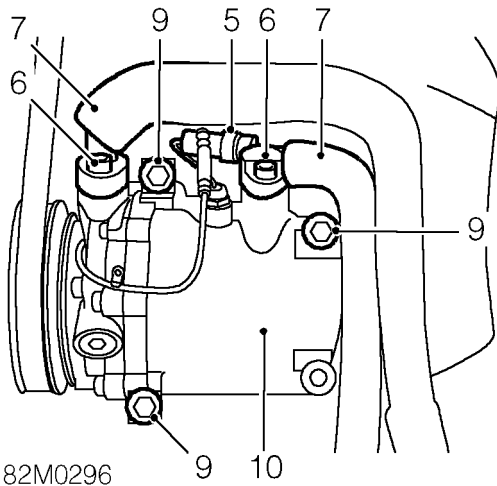
AIR CONDITIONING

COMPRESSOR

🔑 82.10.20

Remove

1. Recover refrigerant from air conditioning system.
 **REFRIGERANT RECOVERY, RECYCLING AND RECHARGING**, page 82-1.
2. Disconnect battery earth lead.
3. Raise rear of vehicle.
WARNING: Support on safety stands.
4. Remove alternator:
 **ALTERNATOR**, page 86-3.



82M0296

5. Disconnect multiplug from air conditioning compressor.
6. Remove 2 Allen screws securing air conditioning pipe unions to compressor.
7. Release air conditioning pipe unions from compressor.
8. Remove and discard 2 'O' ring seals from pipe unions.
CAUTION: Immediately cap all air conditioning pipes to prevent ingress of dirt and moisture into the system.
9. Remove 3 bolts securing compressor to mounting bracket and collect 2 washers from each bolt.
10. Remove compressor.

Refit

Fitting a new compressor

1. A new compressor is sealed and pressurised with Nitrogen gas, slowly release the sealing cap, gas pressure should be heard to escape as the seal is broken.

NOTE: A NEW compressor should always have its sealing cap in place and must not be removed until immediately prior to fitting.

A NEW compressor is supplied with an oil fill quantity ($X \text{ cm}^3$) of 170 cm^3 . A calculated quantity of oil must be drained from a new compressor before fitting.

To calculate the quantity to be drained:

- Remove the drain plug from the old compressor.
- Invert compressor and gravity drain the oil into a calibrated measuring cylinder. Rotating the compressor clutch plate will assist complete draining.
- Note the quantity of oil drained ($Y \text{ cm}^3$).
- Calculate the quantity of oil to be drained from the NEW compressor using the following formula: $X \text{ cm}^3 - (Y \text{ cm}^3 + 20 \text{ cm}^3) = Q \text{ cm}^3$

2. Remove drain plug from NEW compressor and drain $Q \text{ cm}^3$ of oil. Fit and tighten compressor drain plug.

Fitting an existing compressor

3. When refitting an existing compressor, a quantity of refrigerant oil equivalent to the amount obtained when the system was discharged must be added to the compressor.

NOTE: Use only an approved refrigerant lubricating oil SK-20.



CAUTION: Do not use any other type of refrigerant oil. Refrigerant oil easily absorbs water and must not be stored for long periods. Do not pour unused oil back into the container.

All compressors

4. Fit bolts to compressor.
5. Position compressor to engine, fit washers to bolts and tighten to 45 Nm.
6. Clean compressor and pipe connections.
7. Remove caps from compressor and pipe connections.
8. Lubricate 2 new 'O' rings with refrigerant oil and fit to pipes.
9. Position air conditioning pipe unions to compressor, fit securing bolts and tighten to 25 Nm.
10. Connect multiplug to compressor.
11. Fit alternator.

 **ALTERNATOR**, page 86-3.



AIR CONDITIONING

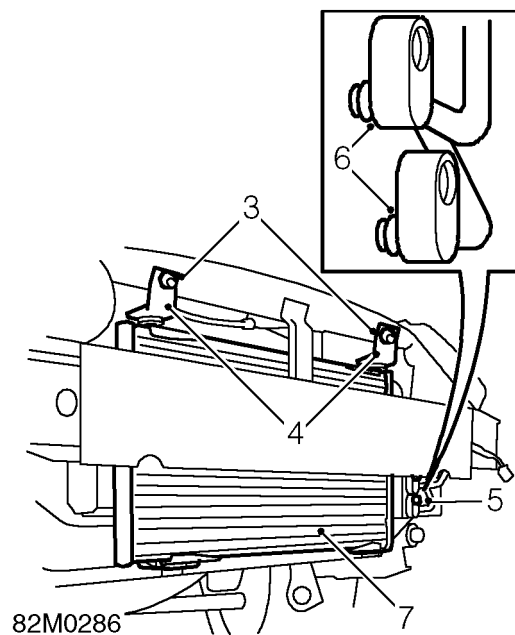
12. Replace receiver drier.
 [RECEIVER DRIER, page 82-5.](#)
13. Remove stand(s) and lower vehicle.
14. Connect battery earth lead.
15. Recharge air conditioning system.
 [REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, page 82-1.](#)

CONDENSER

 **82.15.07**

Remove

1. Recover refrigerant from air conditioning system.
 [REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, page 82-1.](#)
2. Remove front bumper valance.
 [BUMPER VALANCE - FRONT, page 76-2-9.](#)






3. Remove 2 bolts securing top condenser mounting brackets to striker plate panel.
4. Remove brackets from condenser.
5. Remove 2 bolts securing air conditioning pipe connections to condenser and release pipes.
6. Remove and discard 2 'O' rings from air conditioning pipes.

CAUTION: *Immediately cap all air conditioning pipes to prevent ingress of dirt and moisture into the system.*


7. Release condenser from lower mountings and remove condenser.

Refit


1. Clean air conditioning pipe connections.
2. Lubricate new 'O' rings with refrigerant oil and fit to air conditioning pipes.
3. Remove caps from new condenser and fit to old condenser.
4. Position condenser to lower mountings.
5. Fit mounting brackets to condenser.
6. Align mounting brackets to striker plate panel and tighten bolts to 17 Nm.

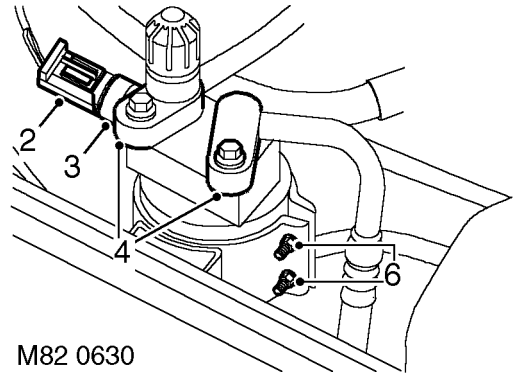
7. Align air conditioning pipes to condenser and tighten bolts to 5 Nm.
8. Renew receiver drier.
 [RECEIVER DRIER, page 82-5.](#)
9. Fit front bumper valance.
 [BUMPER VALANCE - FRONT, page 76-2-9.](#)
10. Recharge air conditioning system.
 [REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, page 82-1.](#)

RECEIVER DRIER

 **82.17.03**

Remove


1. Recover refrigerant from A/C system.
 [REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, page 82-1.](#)



M82 0630

2. Disconnect multiplug from trinary switch.
3. Loosen and remove trinary switch, remove and discard 'O' ring.
4. Remove 2 bolts securing A/C pipes to receiver drier.
5. Remove and discard 2 'O' ring seals from pipes.
CAUTION: Immediately cap all air conditioning pipes to prevent ingress of dirt and moisture into the system.
6. Loosen 2 Allen screws clamping receiver drier bracket.
7. Position pipes aside and remove receiver drier.

Refit

1. Clean A/C pipe connections.
2. Lubricate new 'O' ring seals with clean refrigerant oil and fit to air conditioning pipes.
3. Remove caps from new receiver drier and fit to old unit.
4. Fit receiver drier to bracket and secure bracket clamp screws.
5. Engage A/C pipes to receiver drier and tighten retaining bolts to 5 Nm.
6. Lubricate new trinary switch 'O' ring with clean refrigerant oil and fit 'O' ring to trinary switch.
7. Fit trinary switch and tighten to 10 Nm.
8. Connect multiplug.
9. Recharge A/C system.
 [REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, page 82-1.](#)

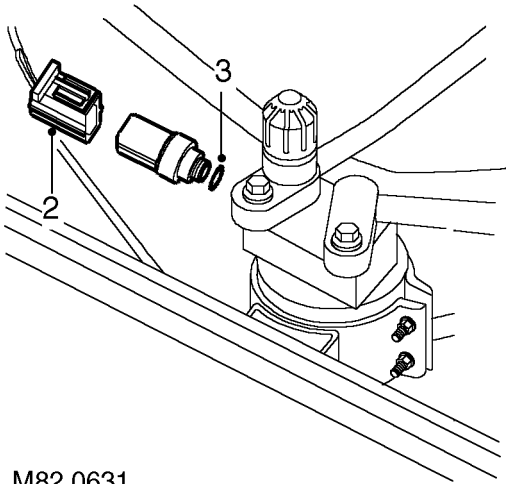
AIR CONDITIONING

SWITCH - TRINARY

🔑 82.20.86

Remove

1. Recover refrigerant from A/C system.
👉 REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, page 82-1.



M82 0631

2. Disconnect trinary switch multiplug.
3. Remove trinary switch and discard 'O' ring.
CAUTION: Immediately cap all air conditioning pipes to prevent ingress of dirt and moisture into the system.

Refit

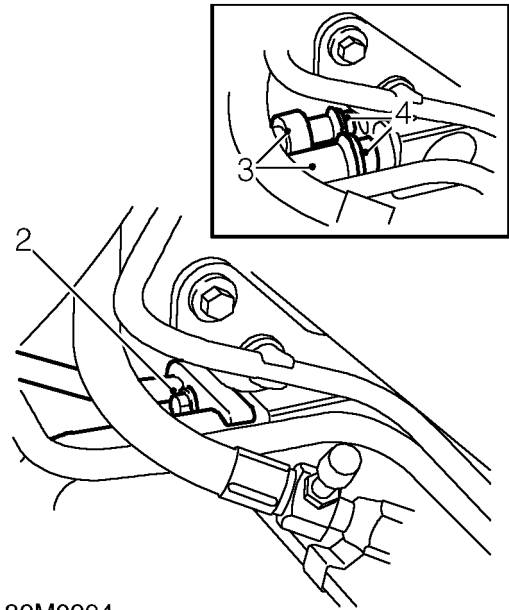
1. Lubricate new 'O' ring with clean refrigerant oil and fit to trinary switch.
2. Fit trinary switch and tighten to 10 Nm.
3. Connect trinary switch multiplug.
4. Recharge A/C system.
👉 REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, page 82-1.

THERMOSTATIC EXPANSION VALVE

🔑 82.25.01

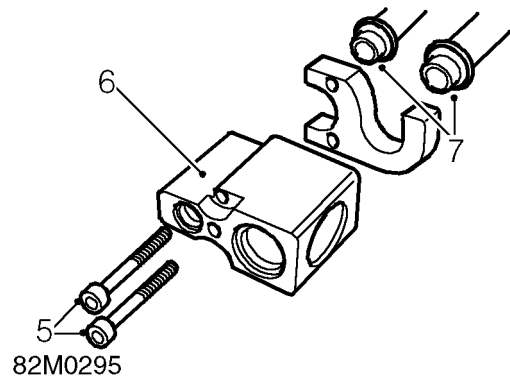
Remove

1. Recover refrigerant from air conditioning system.
👉 REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, page 82-1.



82M0294

2. Remove bolt securing pipe clamp to thermostatic expansion valve.
3. Release 2 air conditioning pipes from valve.
4. Remove and discard 2 'O' rings from air conditioning pipes.
CAUTION: Immediately cap all air conditioning pipes to prevent ingress of dirt and moisture into the system.





82M0295

5. Remove 2 Allen bolts securing evaporator pipe clamp to thermostatic expansion valve.
6. Remove thermostatic expansion valve from evaporator pipes.


- Remove and discard 2 'O' rings from evaporator pipes.

CAUTION: Immediately cap all air conditioning pipes to prevent ingress of dirt and moisture into the system.


Refit

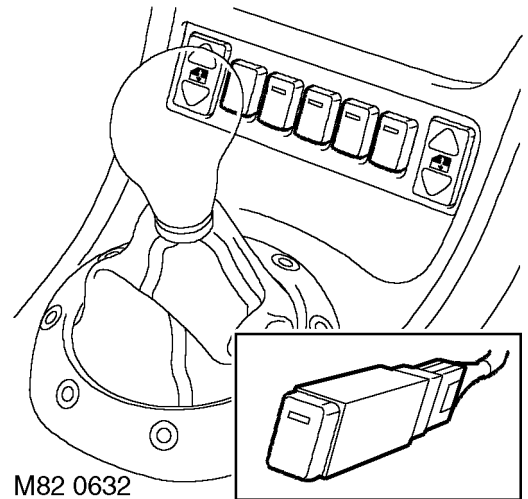
- Clean air conditioning pipe connections.
- Lubricate new 'O' rings with refrigerant oil and fit to air conditioning pipes.
- Remove caps from new thermostatic expansion valve and fit to old unit.
- Engage valve to evaporator pipes.
- Position evaporator pipe bracket, fit and tighten Allen bolts to 7 Nm.
- Engage pipes to valve and position pipe clamp.
- Tighten pipe clamp bolt to 5 Nm.
- Renew receiver drier.
 -  [RECEIVER DRIER, page 82-5.](#)
- Recharge air conditioning system.
 -  [REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, page 82-1.](#)

CONTROL SWITCH

 **82.20.07**


Remove

- Remove console closing panel.
 -  [CONSOLE CLOSING PANEL, page 76-4-8.](#)



- Release switch from centre console.
- Disconnect multiplug from switch.
- Remove switch.

Refit

- Connect multiplug to switch and fit switch to centre console.
- Fit console closing panel.
 -  [CONSOLE CLOSING PANEL, page 76-4-8.](#)

AIR CONDITIONING

EVAPORATOR

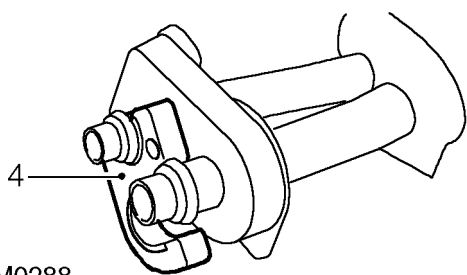
🔑 82.25.20

Remove

1. Raise front of vehicle.

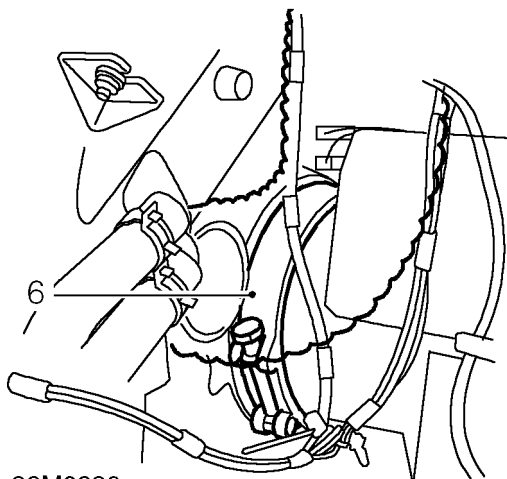
WARNING: Support on safety stands.

2. Remove fascia panel.
🔧 FASCIA PANEL, page 76-4-9.
3. Remove thermostatic expansion valve.
🔧 THERMOSTATIC EXPANSION VALVE, page 82-6.



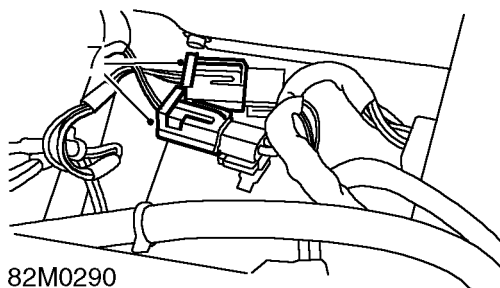
82M0288

4. Remove pipe clamp from evaporator pipes.
5. Remove screen vent duct from heater.



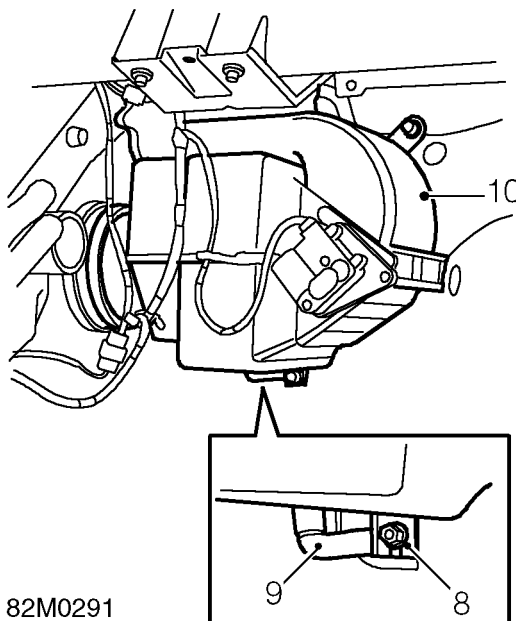
82M0289

6. Remove clamp securing evaporator to heater.



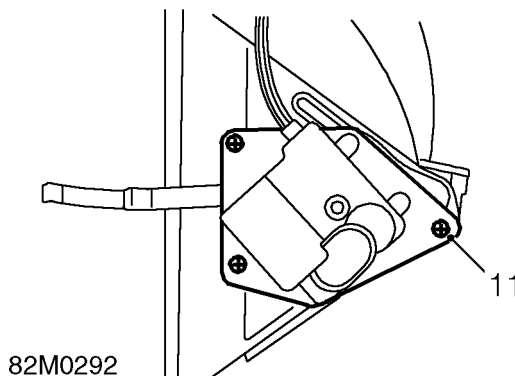
82M0290

7. Disconnect 2 multiplugs from evaporator.



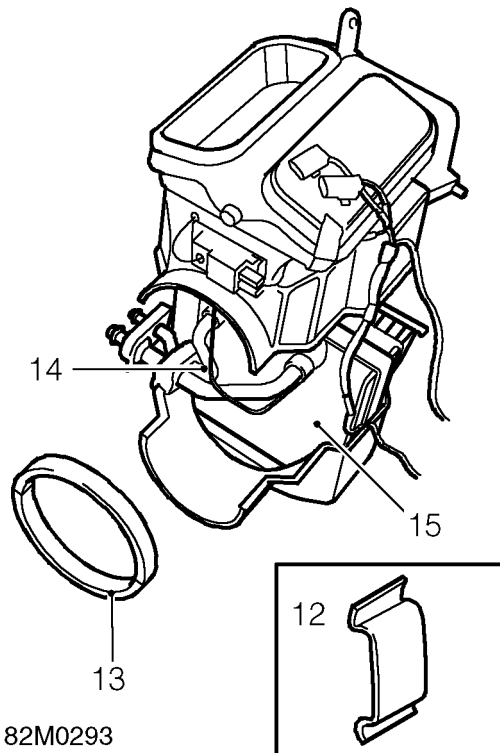
82M0291

8. Remove 2 nuts securing evaporator to lower dash panel.
9. Release evaporator drain hose from evaporator.
10. Remove evaporator assembly.





82M0292

11. Remove 3 screws securing re-circulation servo to casing and position aside.



12. Remove 7 clips securing casing halves.
13. Remove and discard foam seal from output duct.
14. Release thermocouple from evaporator matrix.
15. Separate evaporator casing and remove evaporator matrix.

Refit

1. Position matrix to casing.
2. Align casing halves and secure with clips.
3. Insert tip of thermocouple into centre of matrix fins.
4. Position servo output crank to re-circulation flap lever and secure servo with screws.
5. Fit new foam seal to output duct.
6. Position evaporator, fit nuts but do not tighten.
7. Engage hose to drain pipe.
8. Fit clamp securing evaporator to heater and tighten nut to 3 Nm.
9. Tighten nuts securing evaporator to lower dash panel to 9 Nm.
10. Connect multiplugs.
11. Remove evaporator pipe caps and clean air conditioning pipe connections.
12. Lubricate new 'O' rings with refrigerant oil.
13. Fit pipe bracket to evaporator pipes.
14. Fit thermostatic expansion valve.
 [THERMOSTATIC EXPANSION VALVE, page 82-6.](#)
15. Fit fascia panel.
 [FASCIA PANEL, page 76-4-9.](#)
16. Remove stand(s) and lower vehicle.

AIR CONDITIONING

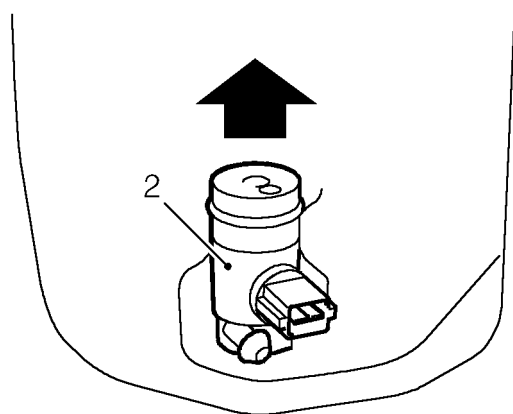


WASHER RESERVOIR

🔑 84.10.01

Remove

1. Remove reservoir and pump assembly.
 RESERVOIR AND PUMP, page 84-1.



84M0114

2. Remove pump from reservoir:

Refit

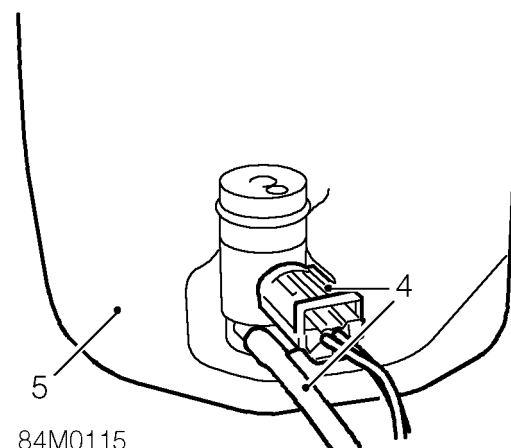
1. Fit pump to reservoir.
2. Fit reservoir and pump assembly.
 RESERVOIR AND PUMP, page 84-1.

RESERVOIR AND PUMP

🔑 84.10.06

Remove

1. Remove underbonnet closing panel.
 UNDERBONNET CLOSING PANEL, page 76-2-3.
2. Position container to catch spillage.
3. Release reservoir from body bracket.



84M0115

4. Disconnect multiplug and washer hose.
5. Remove reservoir assembly.

Refit

1. Position reservoir.
2. Connect multiplug and hose.
3. Engage reservoir to body.
4. Fill reservoir with washer fluid.
5. Fit underbonnet closing panel.
 UNDERBONNET CLOSING PANEL, page 76-2-3.

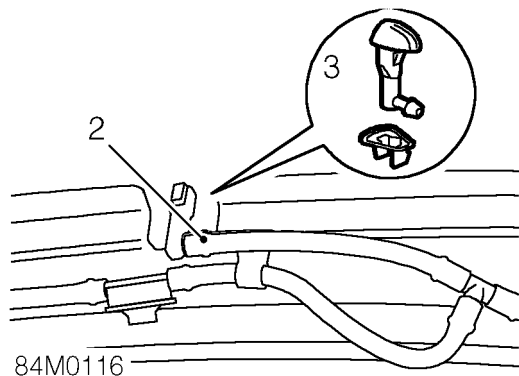
WIPERS & WASHERS

WASHER JET

🔑 84.10.08

Remove

1. Open bonnet.



2. Disconnect hose from washer jet.
3. Remove jet and collect seat.

Refit

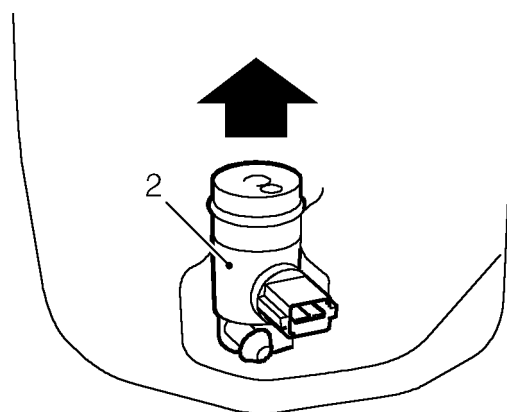
1. Position seat and engage jet to bonnet.
2. Connect hose.
3. Adjust jets.

WASHER PUMP

🔑 84.10.21

Remove

1. Remove reservoir and pump.
👉 [RESERVOIR AND PUMP, page 84-I.](#)



84M0117

2. Remove pump from reservoir.

Refit

1. Fit pump to reservoir.
2. Fit reservoir and pump assembly.
👉 [RESERVOIR AND PUMP, page 84-I.](#)

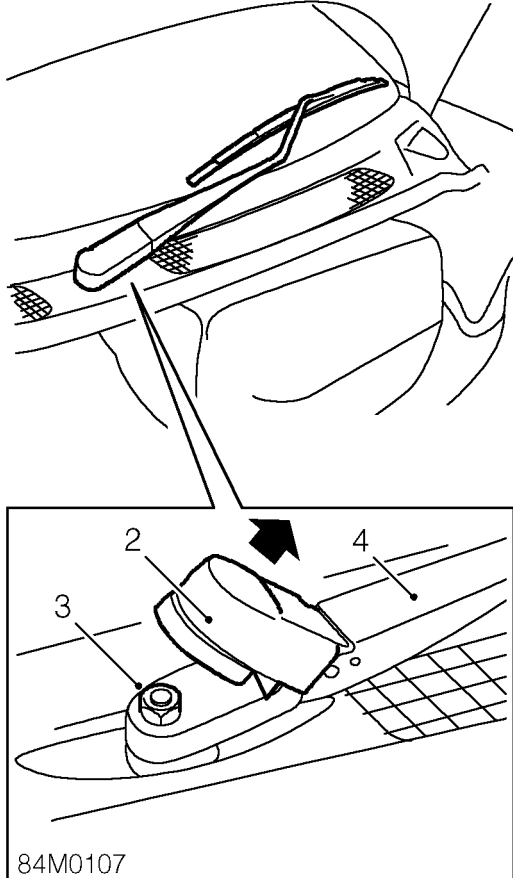


WIPER ARM

🔑 84.15.02

Remove

1. Open bonnet.



2. Remove cover from wiper arm.
3. Remove nut securing wiper arm to spindle.
4. Remove wiper arm.

Refit

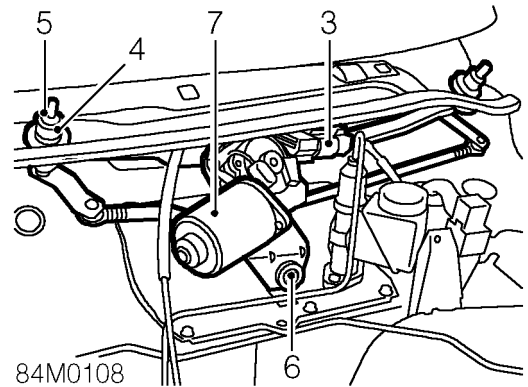
1. Fit wiper arm to spindle and align blade to screen.
2. Fit and tighten nut to 20 Nm.
3. Fit cover.

WIPER MOTOR AND LINKAGE

🔑 84.15.11

Remove

1. Remove air intake panel.
👉 [AIR INTAKE PANEL, page 80-8.](#)
2. Remove underbonnet closing panel.
👉 [UNDERBONNET CLOSING PANEL, page 76-2-3.](#)



3. Disconnect multiplug from motor.
4. Remove cover from spindle.
5. Remove 2 nuts securing spindles to scuttle.
6. Remove bolt securing motor to pedal box.
7. Remove motor and linkage assembly.

Refit

1. Position motor and linkage assembly to scuttle.
NOTE: Ensure spindle seals are correctly positioned to scuttle apertures.
2. Tighten fixings to 10 Nm.
3. Fit spindle cover.
4. Connect multiplug.
5. Fit air intake panel.
👉 [AIR INTAKE PANEL, page 80-8.](#)
6. Fit underbonnet closing panel.
👉 [UNDERBONNET CLOSING PANEL, page 76-2-3.](#)

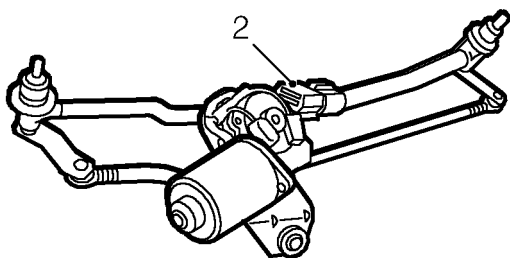
WIPERS & WASHERS

WIPER MOTOR

🔑 84.15.12

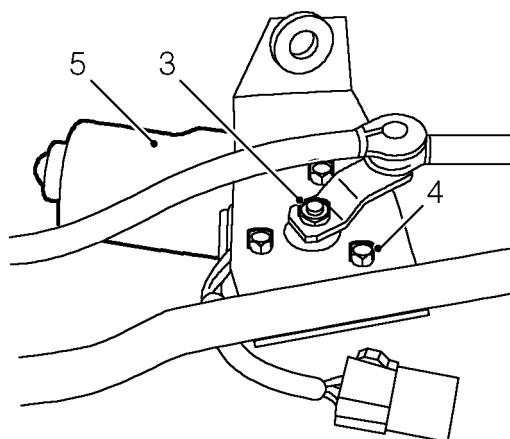
Remove

1. Remove wiper motor and linkage assembly.
👉 [WIPER MOTOR AND LINKAGE, page 84-3.](#)



84M0109

2. Release multiplug clip from linkage.

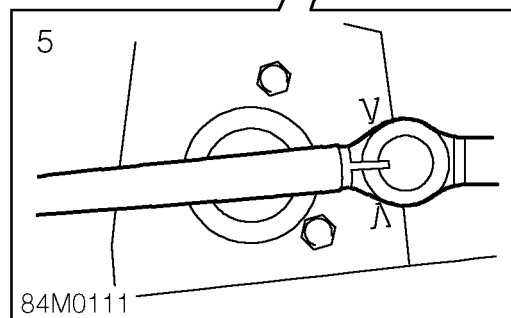
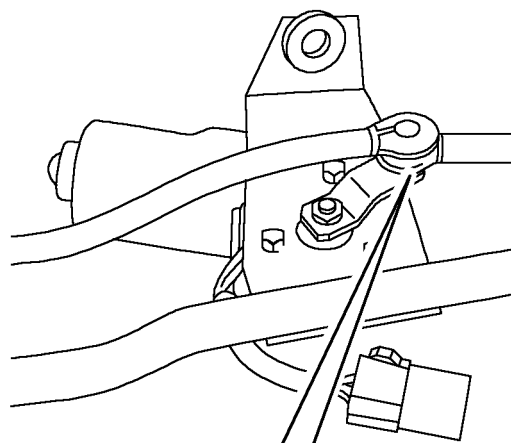


84M0110

3. Remove nut securing crank to motor spindle and release crank.
4. Remove 3 bolts securing motor.
5. Remove motor.

Refit

1. Connect multiplug to harness.
2. Operate wipers to park motor.
3. Disconnect multiplug.
4. Fit motor to linkage bracket and tighten bolts to 12 Nm.



84M0111

5. Align crank between timing marks and fit to motor spindle.
6. Fit and tighten crank nut to 18 Nm.
7. Engage multiplug.
8. Fit wiper motor and linkage.
👉 [WIPER MOTOR AND LINKAGE, page 84-3.](#)



ALTERNATOR DRIVE BELT - ADJUST

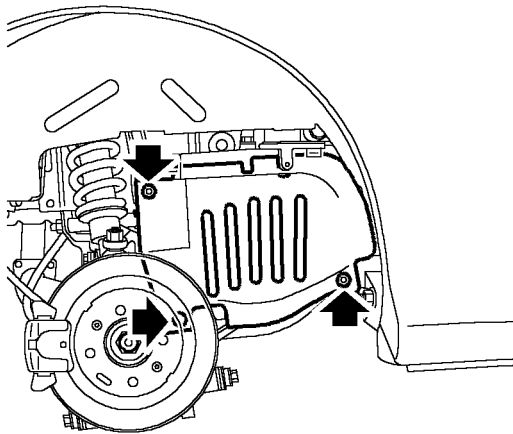
🔑 86.10.05/20

Check

1. Disconnect battery earth lead.
2. Raise rear of vehicle.

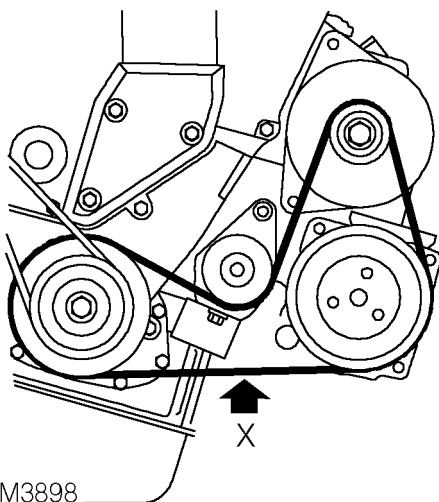
WARNING: Support on safety stands.

3. Remove road wheel(s).



SP12 0348

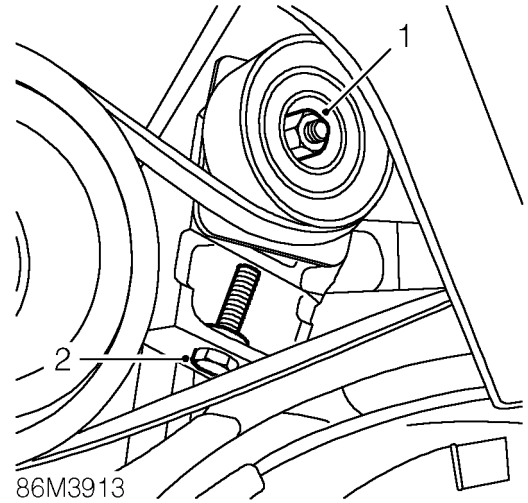
4. Remove 2 scrivenets and Torx screw securing closing panel.
5. Remove closing panel.
6. Check condition of drive belt. Renew a drive belt that shows signs of wear and splitting.



86M3898

7. Apply a force of 10 kg to the drive belt at position 'X' and measure the deflection between the crankshaft pulley and air conditioning compressor pulley. Deflection must be 9 - 10 mm.

Adjust



86M3913

1. Loosen nut securing drive belt, tensioner pulley.
2. Increase drive belt tension by turning the tension adjusting bolt clockwise.
3. Tighten drive belt tensioner pulley securing nut to 25 Nm.
4. Re-check drive belt tension.
5. Fit closing panel and secure with fixings.
6. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
7. Remove stand(s) and lower vehicle.
8. Connect battery earth lead.

ELECTRICAL

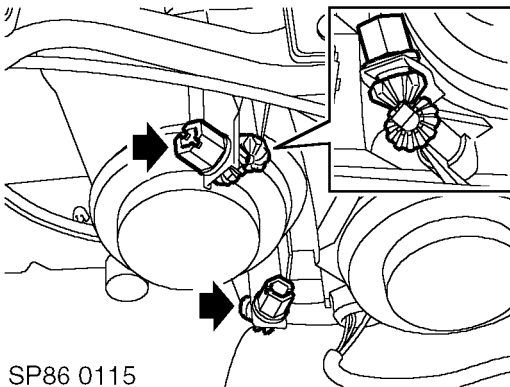
HEADLAMPS - PAIR - ALIGN BEAM

🔑 86.40.17

Check

1. Before adjustment, ensure tyre pressures are at correct settings.
2. Line up suitable beam setting equipment to headlamp.
3. Switch on headlamps and check alignment;
Alignment figures = 1.0% Vertical, 0.0% Horizontal.

Adjust



1. Adjust headlamp accordingly to achieve correct alignment.
2. Turn adjuster for vertical alignment.
3. Turn adjuster for horizontal alignment.
4. Repeat above procedure for 2nd headlamp.
5. Switch off headlamps.

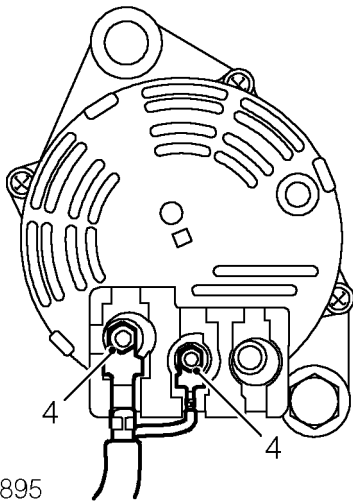


ALTERNATOR

🔑 86.10.02/20

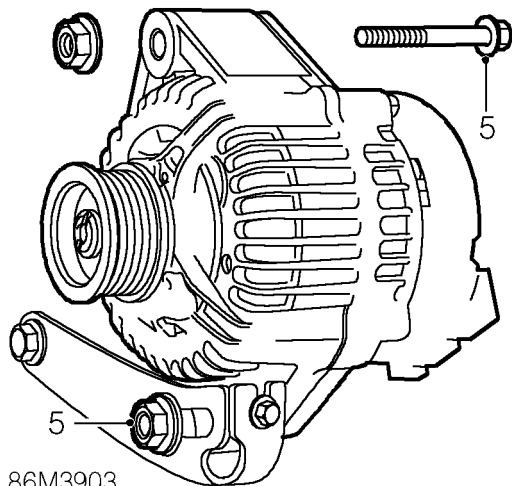
Remove

1. Disconnect battery earth lead.
2. Raise rear of vehicle, and remove engine cover.
👉 [ENGINE COVER, page 12-27.](#)
3. Remove alternator drive belt,
👉 [ALTERNATOR DRIVE BELT, page 86-4.](#)



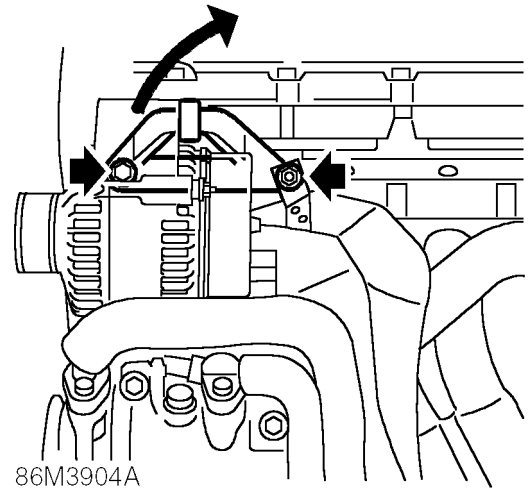
86M3895

4. Remove 2 nuts securing connections to alternator and position aside.



86M3903

5. Remove upper and lower bolts securing alternator to mounting bracket.



86M3904A

6. Remove bolt and loosen nut securing alternator upper mounting bracket to cylinder head.
7. Rotate bracket aside.
8. Remove alternator.

Do not carry out further dismantling if component is removed for access only.

9. Restraining the alternator shaft with an 8 mm Allen key, remove nut securing pulley to alternator shaft using tool 18G 1653.
10. Remove pulley from alternator.
11. Clean pulley and alternator shaft.

Refit

1. Fit pulley to alternator shaft.
2. Fit alternator pulley nut, hold shaft with an 8 mm Allen key and tighten nut to 25 Nm using tool 18G 1653.
3. Fit alternator to engine.
4. Align top bracket and tighten fixings to 25 Nm.
5. Position alternator to top bracket and tighten fixings to 45 Nm.
6. Connect cables and secure nuts.
7. Fit alternator drive belt.
👉 [ALTERNATOR DRIVE BELT, page 86-4.](#)
8. Fit engine cover.
👉 [ENGINE COVER, page 12-27.](#)

ALTERNATOR DRIVE BELT

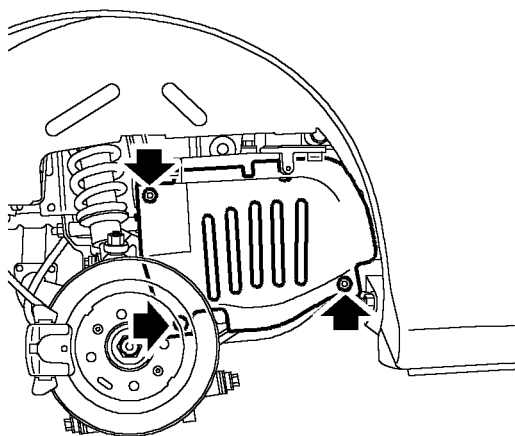
🔑 86.10.03/20

Remove

1. Disconnect battery earth lead.
2. Raise rear of vehicle.

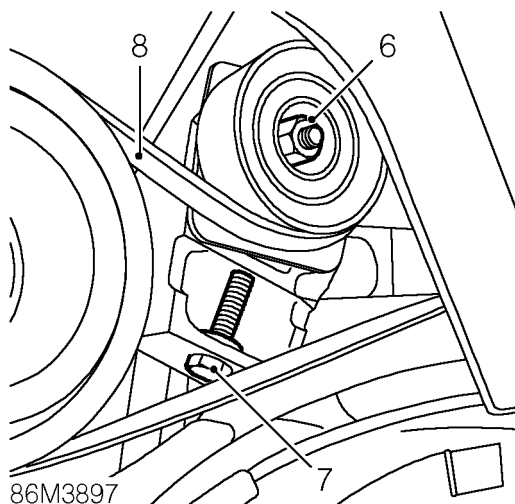
WARNING: Support on safety stands.

3. Remove road wheel(s).



SP12 0348

4. Remove 2 scrivenets and Torx screw securing closing panel.
5. Remove closing panel.

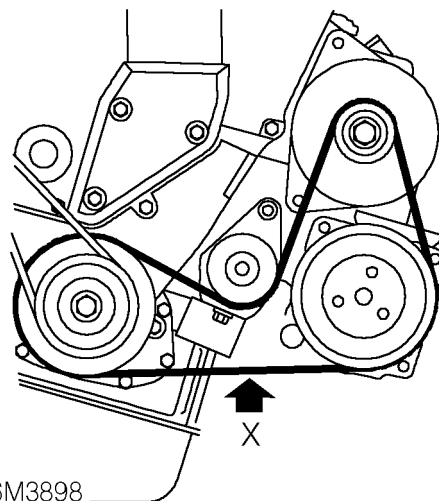


86M3897

6. Loosen drive belt tensioner pulley securing nut.
7. Release drive belt tension by turning the tension adjusting bolt anti-clockwise.
8. Release drive belt from alternator and compressor pulleys.
9. Remove and discard drive belt.

Refit

1. Clean pulley 'V's.
2. Fit new drive belt to crankshaft pulley and engage to alternator and compressor pulleys. Ensure grooves on drive belt and pulleys are correctly located.
3. Increase drive belt tension by turning the tension adjusting bolt clockwise.
4. Tighten drive belt tensioner pulley securing nut to 25 Nm.



86M3898


5. Apply a force of 10 kg to the drive belt at position 'X' and measure the deflection between the crankshaft pulley and air conditioning compressor pulley. Deflection must be 9 - 10 mm.
6. Fit closing panel and secure with fixings.
7. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
8. Remove stand(s) and lower vehicle.
9. Connect battery earth lead.

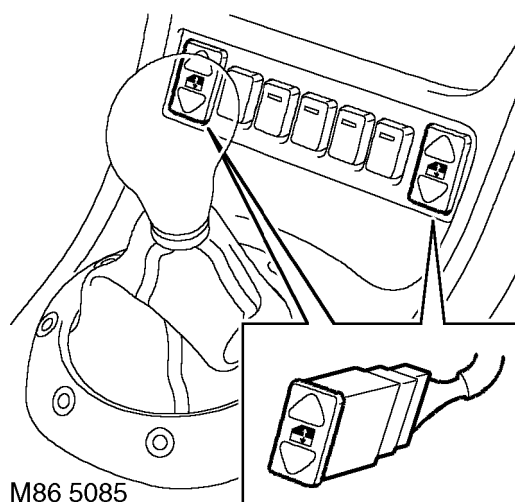


ELECTRIC WINDOW SWITCH

🔑 86.25.19


Remove

1. Remove console closing panel.
 [CONSOLE CLOSING PANEL, page 76-4-8.](#)



2. Release switch from centre console.
3. Disconnect multiplug from switch.
4. Remove switch.


Refit

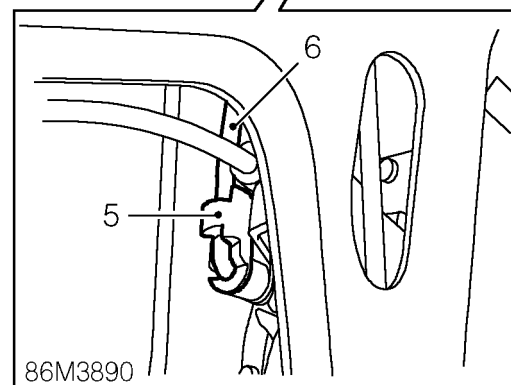
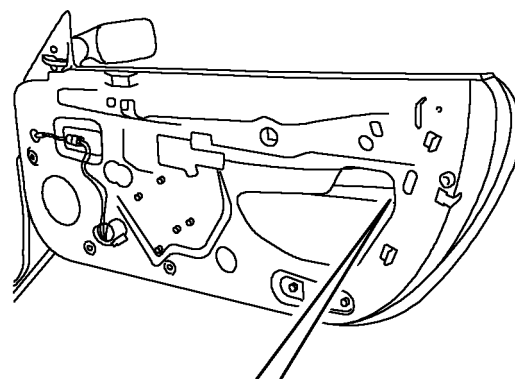
1. Connect multiplug to switch and fit switch to centre console.
2. Fit console closing panel
 [CONSOLE CLOSING PANEL, page 76-4-8.](#)

CENTRAL DOOR LOCKING MOTOR AND LATCH

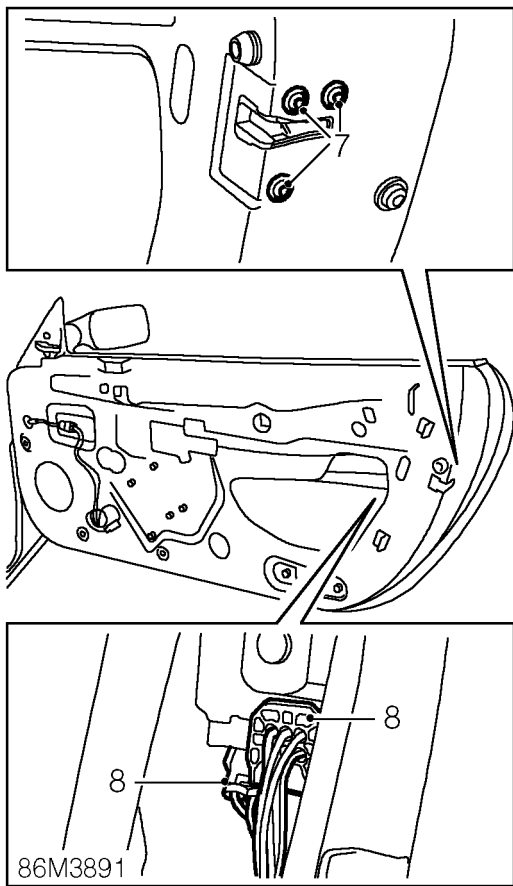
🔑 86.26.08

Remove

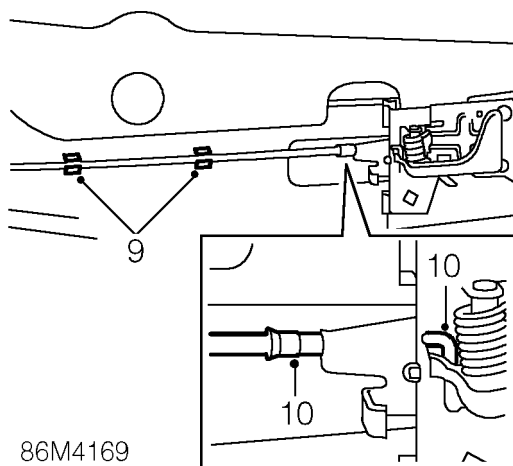
1. Remove door trim casing.
 [TRIM CASING, page 76-1-6.](#)
2. Switch the ignition ON and fully lower door glass.
3. Switch ignition OFF.
4. Carefully peel back corner of plastic sheet to allow access to door latch.



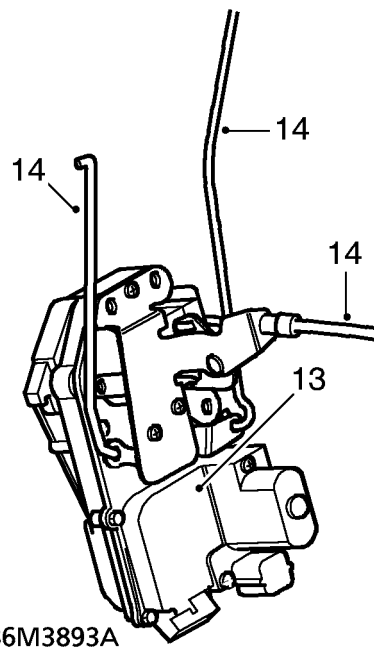
5. Release clip securing door handle link rod to latch assembly and position aside.
6. Release lock link rod from lock.



7. Remove 3 Tx25 Torx screws securing latch assembly to door.
8. Position latch assembly and disconnect 2 multiplugs.



9. Release cable from 2 inner door panel clips.
10. Disconnect cable from remote door handle.
11. Switch ignition ON and fully raise door glass.
12. Switch ignition OFF.



13. Remove latch assembly from door.
14. Remove sill button, lock link rod and cable from latch assembly.

Refit

1. Fit sill button, lock link rod and cable to latch assembly.
2. Position latch assembly to door and guide sill button through door aperture.
3. Switch ignition ON and fully lower door glass.
4. Switch ignition OFF.
5. Connect multiplugs to latch assembly.
6. Connect door release cable to remote door handle and secure to inner door panel clips.
7. Align exterior handle, link rod to latch assembly and secure with clip.

NOTE: A small amount of free-play should be evident between the exterior handle and latch. If necessary adjust the exterior handle, link rod trunnion.

8. Engage lock link rod to lock.
9. Fit Torx screws securing latch assembly to door and tighten to 5 Nm.
10. Secure plastic sheet to door.
11. Fit door trim casing.

 [TRIM CASING, page 76-I-6.](#)

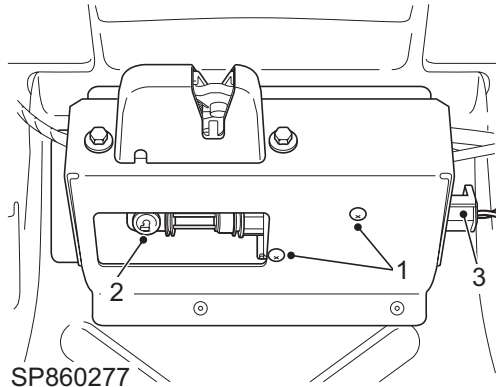


MOTOR ASSEMBLY - BOOT LATCH

🔑 86.26.02

Remove

1. Open boot lid.



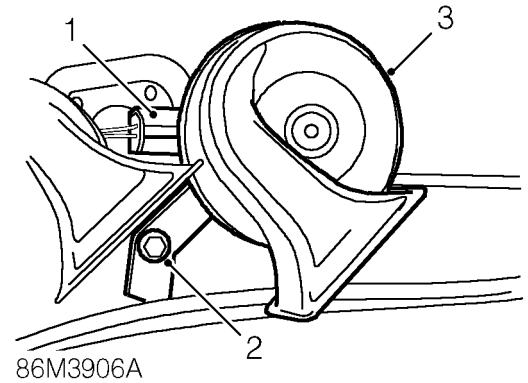
2. Remove 2 screws securing lock motor to bracket.
3. Disconnect lock motor link.
4. Release motor from bracket, disconnect multiplug and remove motor.

Refit

1. Position motor and connect multiplug.
2. Connect motor link.
3. Position motor to bracket and secure with screws.

HORN

🔑 86.30.10

Remove

1. Disconnect horn multiplug.
2. Remove bolt securing horn to valance.
3. Remove horn.

Refit

1. Position horn to valance fit bolt and tighten to 8 Nm.
2. Connect multiplug.

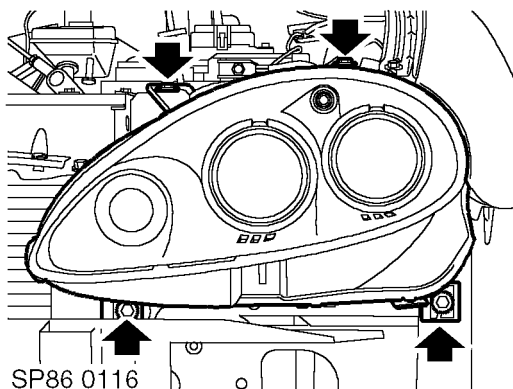
ELECTRICAL

HEADLAMP ASSEMBLY

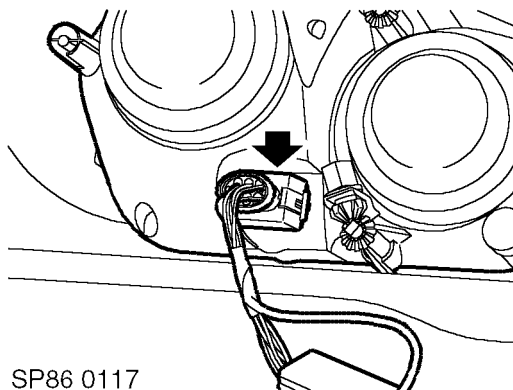
86.40.49

Remove

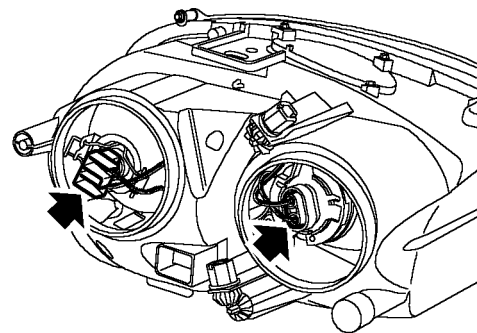
1. Remove front bumper valance.
 [BUMPER VALANCE - FRONT, page 76-2-9.](#)



2. Remove 4 bolts securing headlamp assembly to front panel and release headlamp assembly.

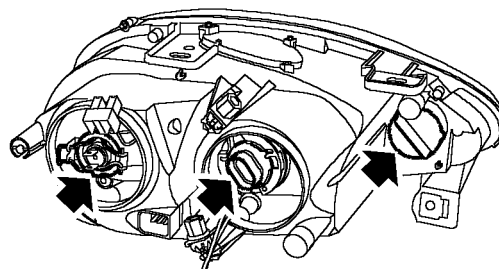


3. Disconnect headlamp multiplug and remove headlamp assembly.
4. Remove both headlamp bulb covers.



SP86 0119



5. Disconnect both headlamp bulb multiplugs.



SP86 0120

6. Release bulb holders and remove both headlamp bulbs.
7. Release and remove indicator bulb holder and bulb.

Refit

1. Fit indicator bulb and bulb holder.
2. Fit headlamp bulbs and secure bulb holders.
3. Connect headlamp bulb multiplugs.
4. Fit headlamp bulb covers.
5. Position headlamp assembly to front panel and connect headlamp multiplug.
6. Fit bolts securing headlamp to front panel and tighten to 10 Nm.
7. Fit front bumper valance.
 [BUMPER VALANCE - FRONT, page 76-2-9.](#)
8. Check/adjust headlamp alignment.
 [HEADLAMPS - PAIR - ALIGN BEAM, page 86-2.](#)



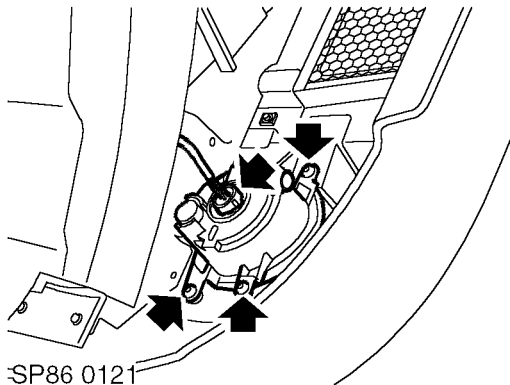
LAMP ASSEMBLY - FOG/DRIVING

🔑 86.40.96

Remove

1. Raise front of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



2. Disconnect fog/driving lamp multiplug.
3. Remove 3 screws securing fog/driving lamp to bumper valance.
4. Remove fog/driving lamp from bumper valance.

Refit

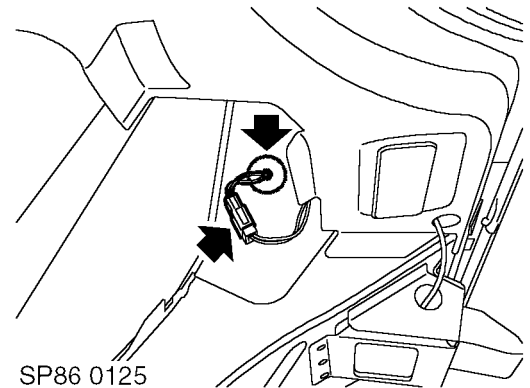
1. Position fog/driving lamp to bumper valance, fit and tighten screws.
2. Connect fog/driving lamp multiplug.
3. Remove stands and lower vehicle.
4. Check operation and alignment of fog lamp.

LAMP ASSEMBLY - CENTRE HIGH MOUNTED STOP (CHMSL)

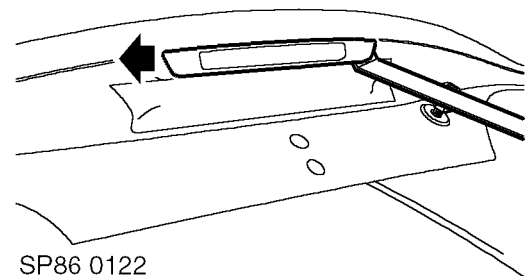
🔑 86.41.32

Remove

1. Apply protective tape to the area around CHMSL.
2. Open boot lid.



3. Disconnect CHMSL multiplug and release harness grommet.



4. Using a thin round edged flat blade bent to 20° at the tip, apply pressure to one side of the CHMSL and release from retaining clip.
5. Slide CHMSL from remaining retaining clip.
6. Withdraw harness and CHMSL from boot lid.
7. Remove CHMSL retaining clips from boot lid.

Refit

1. Fit retaining clips to CHMSL.
2. Position CHMSL and feed harness through boot lid.
3. Secure CHMSL retaining clips to boot lid.
4. Connect CHMSL multiplug and secure harness grommet.
5. Remove protection from boot lid, clean and inspect paintwork.

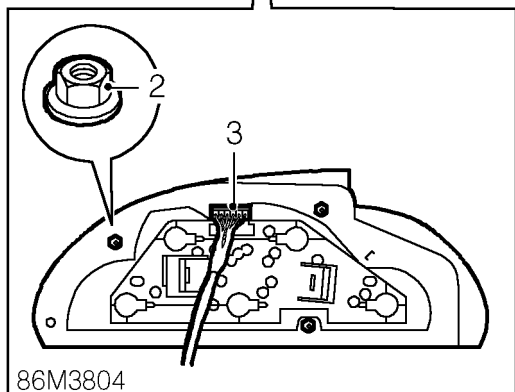
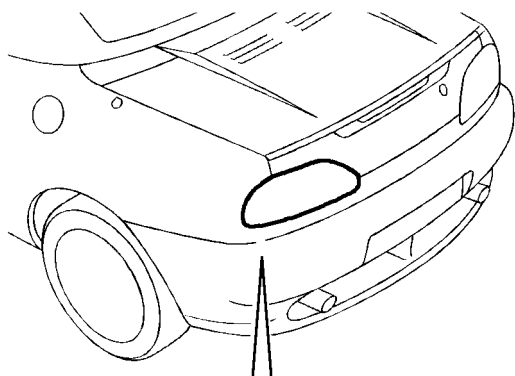
ELECTRICAL

TAIL LAMP ASSEMBLY

🔑 86.40.70

Remove

1. Disconnect battery earth lead.



2. Remove 3 nuts securing tail lamp.
3. Release tail lamp and disconnect multiplug.

Refit

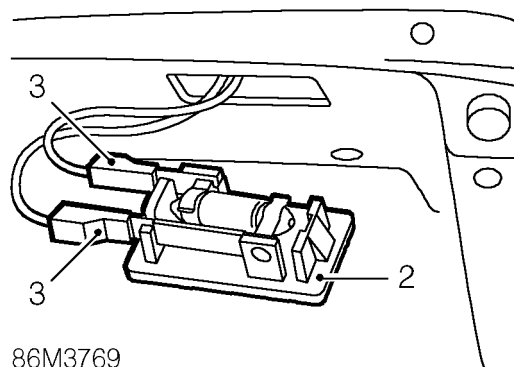
1. Connect multiplug to tail lamp.
2. Fit tail lamp and tighten nuts to 2 Nm.
3. Connect battery earth lead.

GLOVEBOX LAMP

🔑 86.45.08

Remove

1. Open glove box.



2. Release lamp from glovebox.
3. Disconnect 2 Lucars from lamp.
4. Remove lamp.

Refit

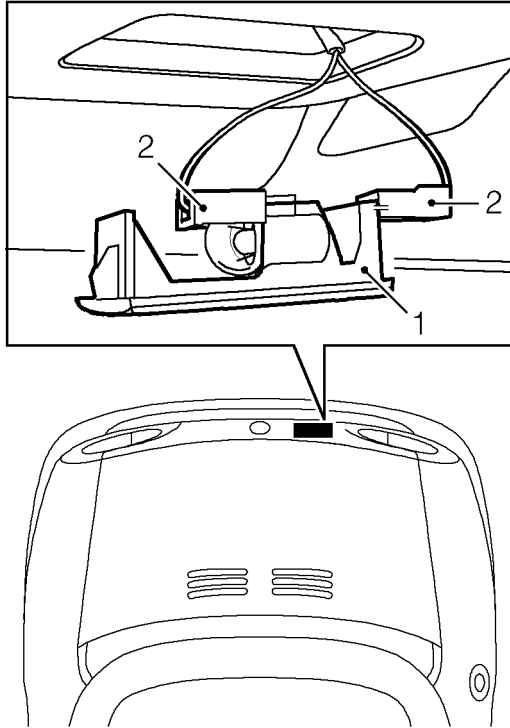
1. Position lamp and connect Lucars.
2. Secure lamp in glovebox.



BOOT LID LAMP

🔑 86.45.16

Remove



86M3767A

1. Release lamp from boot lid.
2. Disconnect 2 Lucars.
3. Remove lamp.

Refit

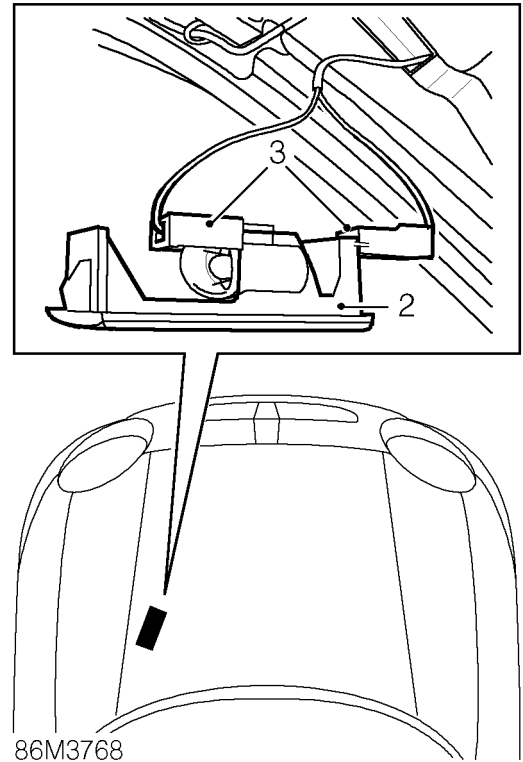
1. Position lamp and connect Lucars.
2. Secure lamp in boot lid.

BONNET LAMP

🔑 86.45.24

Remove

1. Open bonnet.



86M3768

2. Release lamp from bonnet.
3. Disconnect 2 Lucars.
4. Remove lamp.

Refit

1. Position lamp and connect Lucars.

CAUTION: Ensure black wire is connected to terminal closest to the bulb.

2. Secure lamp in bonnet.

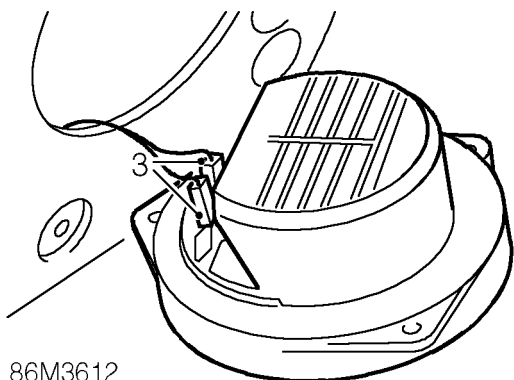
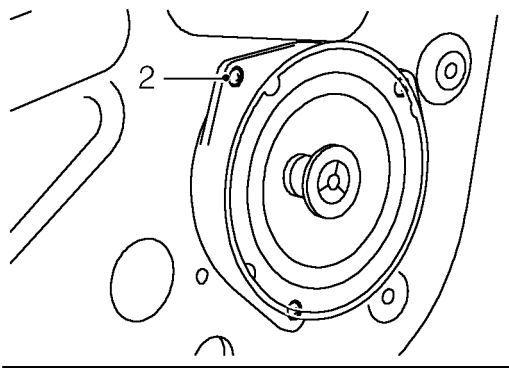
ELECTRICAL

FRONT SPEAKER

🔑 86.50.15

Remove

1. Remove front door trim casing.
👉 TRIM CASING, page 76-1-6.



86M3612

2. Remove 3 screws securing speaker to door.
3. Release speaker from door, disconnect 2 Lucars.
4. Remove speaker.

Refit

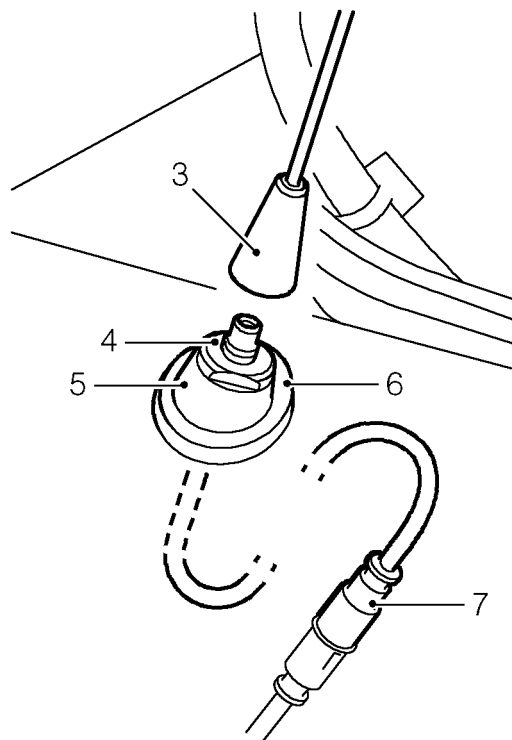
1. Position speaker to door and connect Lucars.
2. Align speaker to door and secure with screws.
3. Fit front door trim casing.
👉 TRIM CASING, page 76-1-6.

AERIAL

🔑 86.50.18

Remove

1. Remove engine compartment access grille.
👉 ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.



86M3803

2. Unscrew aerial from base.
3. Using a 17 mm open ended spanner, remove aerial base locking nut.
4. Collect locking nut and outer sleeve.
5. Remove aerial base from body.
6. Disconnect aerial coaxial lead from harness.

Refit


1. Position aerial base in body.
2. Fit sleeve and tighten locking nut to 3 Nm.
NOTE: If the vehicle is fitted with a rear spoiler ensure the aerial mast does not contact the rear spoiler before tightening the locking nut.
3. Connect aerial coaxial lead to harness.
4. Screw aerial into base.
5. Fit engine compartment access grille.
👉 ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.

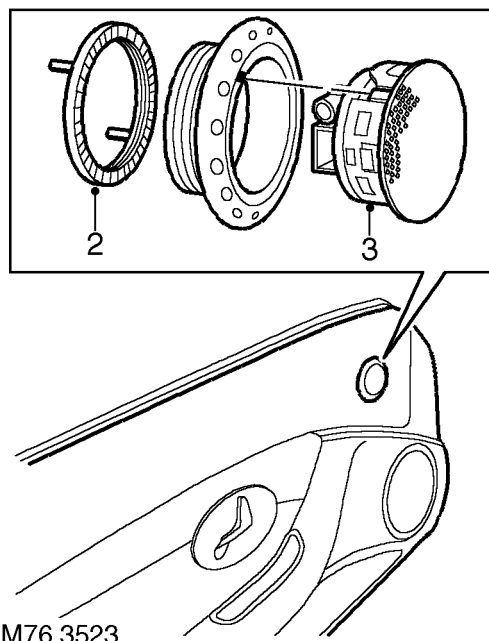


SPEAKER - TWEETER

🔑 86.50.34


Remove

1. Remove door casing.
 [TRIM CASING, page 76-I-6.](#)



2. Remove backing nut from tweeter assembly and remove tweeter assembly from door casing.
3. Release tweeter from finisher.

Refit

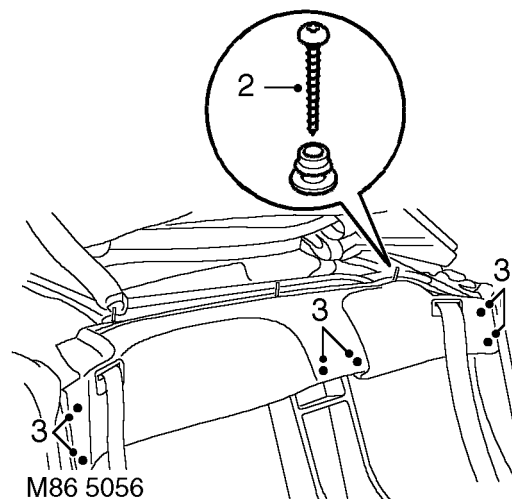
1. Fit tweeter to finisher ensuring correct alignment of key and keyway in finisher.
2. Fit tweeter assembly to door casing and fit backing nut.
3. Fit door casing.
 [TRIM CASING, page 76-I-6.](#)

SUBWOOFER ASSEMBLY

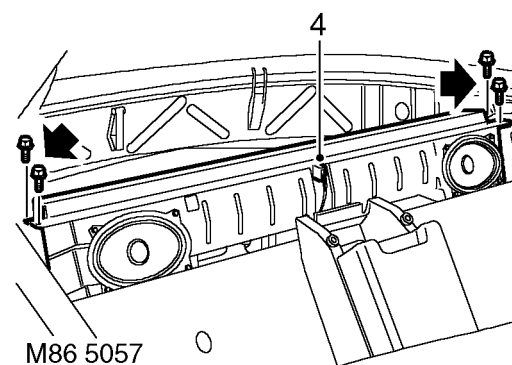
🔑 86.50.51

Remove

1. Move both seats fully forwards.



2. Remove 3 screws securing finisher and collect press studs.
3. Release finisher from fixings and slide downwards for access to subwoofer assembly.



4. Disconnect multiplug from subwoofer.
5. Remove 4 bolts securing subwoofer to body fixings and remove subwoofer assembly.

Refit

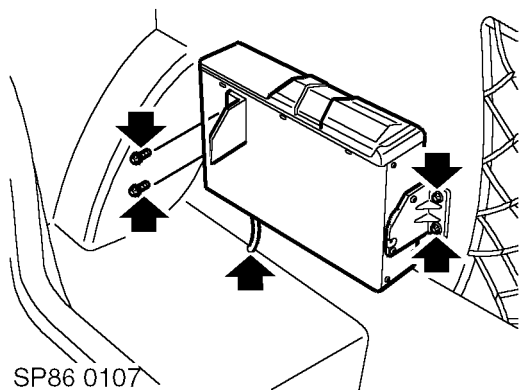
1. Position subwoofer assembly and connect multiplug.
2. Fit and tighten 4 bolts securing subwoofer to body.
3. Align finisher to fixings and secure into position.
4. Position press studs and secure with screws.
5. Return seats to original position.

ELECTRICAL

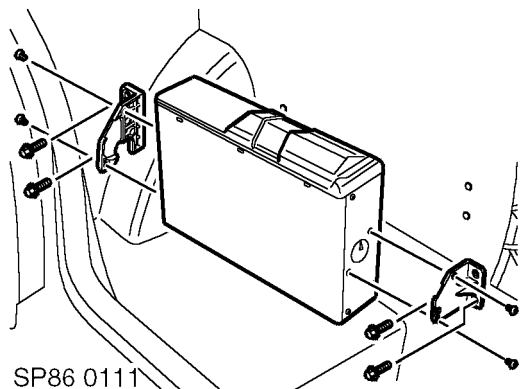
AUTO CHANGER - AUDIO SYSTEMS

🔑 86.50.60

Remove

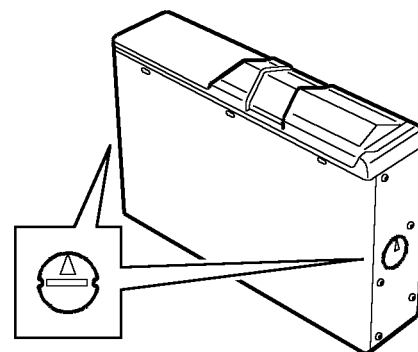


1. Release multiplug from auto changer. Remove 4 bolts securing auto changer to vehicle and remove autochanger.



2. Remove 4 screws securing support brackets to auto changer and remove brackets.

Refit



SP86 0110

1. Set the angle adjustment switches on the auto changer to 90°.
2. Attach brackets to auto changer with 4 screws and secure to vehicle with 4 bolts. Tighten bolts to 5 Nm.
3. Connect auto changer multiplug to auto changer.
4. Check head unit and auto changer for correct operation.

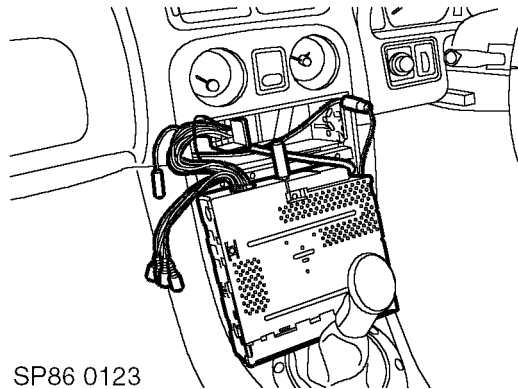


HEAD UNIT - AUDIO SYSTEMS

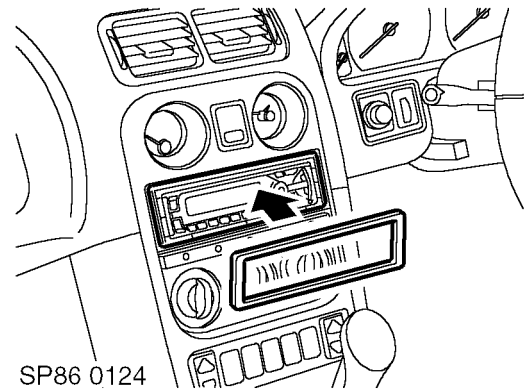
🔑 86.50.81

Remove

1. Disconnect battery earth lead.
2. Remove audio unit escutcheon.
3. Insert removal tools into slots either side of head unit. Push removal tools upwards and pull head unit out of aperture.



SP86 0123



SP86 0124

4. Disconnect multiplugs, aerial cable and auto changer data cable (if fitted). Remove head unit.
5. Release retaining tags and remove cage from centre console.

Refit

1. Position audio unit cage to centre console and secure with retaining tags.
2. Position audio unit, fit threaded rubber bung, connect aerial cable, CD auto changer data cable (if fitted) and multiplugs.
3. Slide audio unit into cage until retaining clips engage. Ensure that rubber support stud locates in rear support plate.

4. Fit audio unit escutcheon, ensuring that the felt strip is located on the bottom inner edge. Locate the top edge lugs and then push the bottom edge in until the retaining tags click into position.
5. Connect battery earth lead.
6. Check audio unit including CD auto changer for correct operation and program suitable radio stations on all pre-sets.

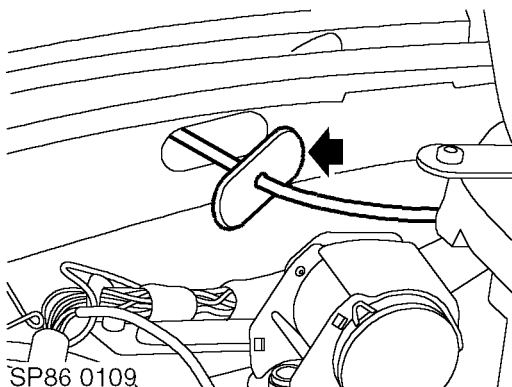
ELECTRICAL

HEAD UNIT AND AUTO CHANGER - AUDIO SYSTEMS - RENEW

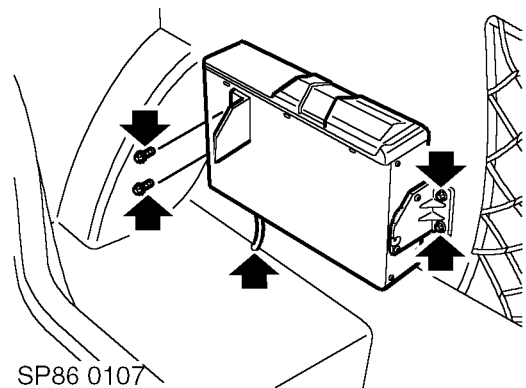
🔑 86.50.93

Remove

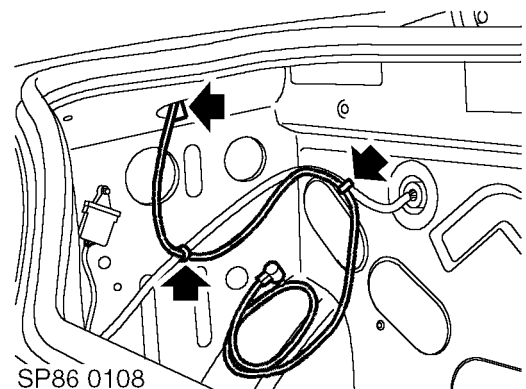
1. Lower both windows and release both hood catches but do not lower hood.
2. Release rear edge of hoodwell carpet and release 5 clips.
3. Unzip top edge or rear window and lay window in hoodwell.
4. Fold rear of hood up to release from body.
5. Disconnect battery earth lead.
6. Remove head unit.
[👉 HEAD UNIT - AUDIO SYSTEMS, page 86-15.](#)
7. Remove centre console closing panel.
8. Release lower section of LH door seal to release carpet.
9. Remove 5 trim clips securing carpet to LH side of vehicle.
10. Pull back carpet from sill to access harness.
11. Fold back carpet and sound deadening in LH footwell.
12. Release cable ties securing auto changer data cable to harness.



13. Release grommet from body. Remove grommet from auto changer data cable.



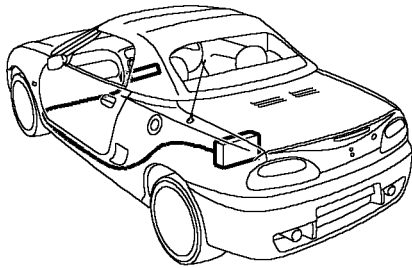
14. Disconnect auto changer data cable from auto changer; remove 4 bolts securing auto changer brackets to vehicle and remove auto changer.
15. Remove luggage compartment trim.
[👉 LUGGAGE COMPARTMENT TRIM, page 76-4-2.](#)



16. Remove cable ties securing auto changer data cable to harness.
17. Remove auto changer data cable.



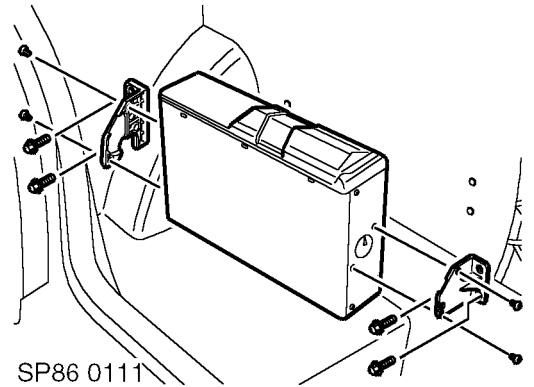
Refit




SP86 0114

1. Route auto changer cable behind console closing panel and into audio unit aperture.
2. Route auto changer data cable under sound deadening and carpet in LH footwell and along harness. Secure with cable ties.
3. Route auto changer data cable under roof hinge and into hood compartment. Secure with cable ties.
4. Replace sound deadening and secure carpet with trim clips.
5. Position centre console closing panel, connect Lucar connectors and secure closing panel with screws.
6. Fit lower section of LH door seal to secure carpet.
7. Fit new grommet to auto changer data cable. Feed data cable through aperture and fit new grommet to body.
8. Feed auto changer data cable along cavity and into luggage compartment. Secure with supplied cable tie clip and attach to body to prevent damage to cable.
9. Secure auto changer data cable to harness with cable ties and feed through luggage compartment trim.
10. Position luggage compartment trim.
11. Feed auto changer data cable through slit in luggage compartment trim.
12. Refit luggage compartment trim.

 [LUGGAGE COMPARTMENT TRIM, page 76-4-2.](#)



SP86 0111

13. Attach brackets to auto changer with 4 screws and secure to vehicle with 4 bolts. Tighten bolts to 5 Nm.
14. Connect auto changer multiplug to auto changer.
15. Lower rear of hood and engage clips to secure rear of hood to body.
16. Engage hoodwell carpet beneath flip seal.
17. Position rear window and zip up top edge.
18. Secure catches to secure front of hood.
19. Fit head unit.
 [HEAD UNIT - AUDIO SYSTEMS, page 86-15.](#)
20. Connect battery earth lead.
21. Raise windows.
22. Check audio unit including CD auto changer for correct operation and program suitable radio stations on all pre-sets.

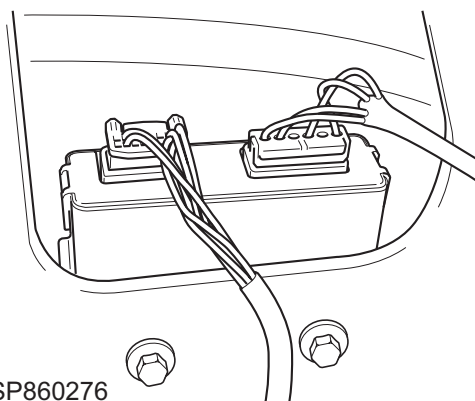
ELECTRICAL

PDC MODULE

🔑 86.54.10

Remove

1. Position RH side carpet aside.



2. Remove 2 bolts and release PDC module.
3. Disconnect 2 multiplugs and remove module.

Refit

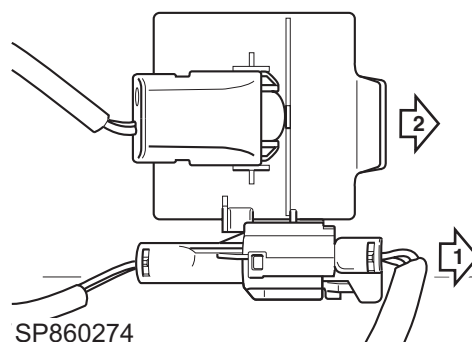
1. Fit PDC module and secure with bolts.
2. Connect multiplugs.
3. Fit carpet.

PDC SENSOR - CENTRE

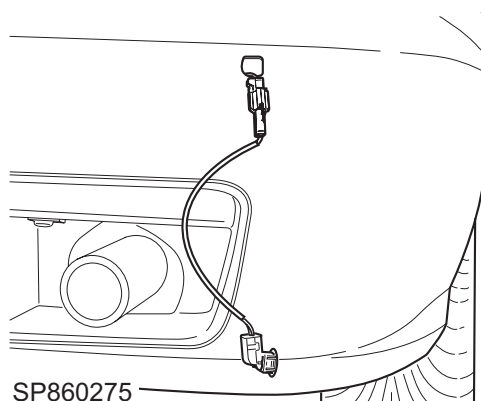
🔑 86.54.21

Remove

1. Remove rear bumper valance.
 [REAR BUMPER VALANCE](#), page 76-2-11.




2. Release multiplug connector from 'U' clip.
3. Remove 'U' clip.



4. Disconnect multiplug and remove PDC sensor.

Refit

1. Position PDC sensor and connect multiplug.
2. Fit PDC sensor and secure with 'U' clip.
3. Fit connector block to clip.
4. Fit rear bumper valance.
 [REAR BUMPER VALANCE](#), page 76-2-11.

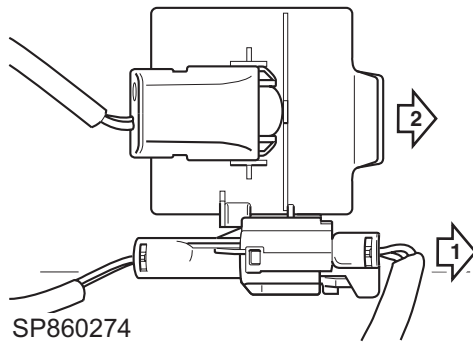


PDC SENSOR - SIDE

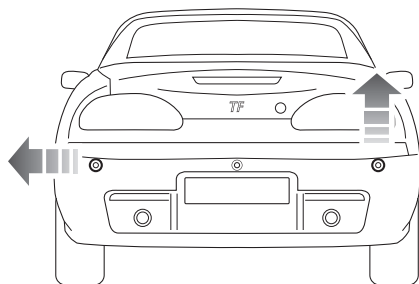
🔑 86.54.14

Remove

1. Position vehicle on 2 post ramp.

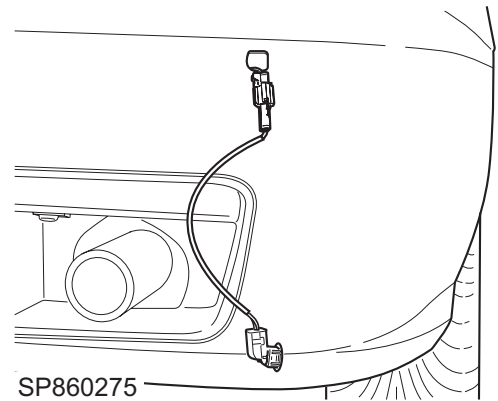


2. Working from behind rear bumper cover, release the multiplug connector block from 'U' clip.



SP860269

3. Carefully remove 'U' clip from sensor.
Note: RH vertical, LH horizontal.
4. Push the PDC sensor rearwards and withdraw from bumper valance.



5. Disconnect multiplug and remove PDC sensor.

Refit

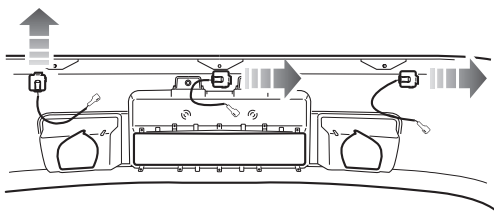
1. Connect PDC multiplug.
2. Fit PDC sensor to bumper valance.
3. Secure PDC sensor with 'U' clip.
4. Secure PDC connector block to 'U' bracket.

PDC SENSOR - SET

🔑 86.54.15

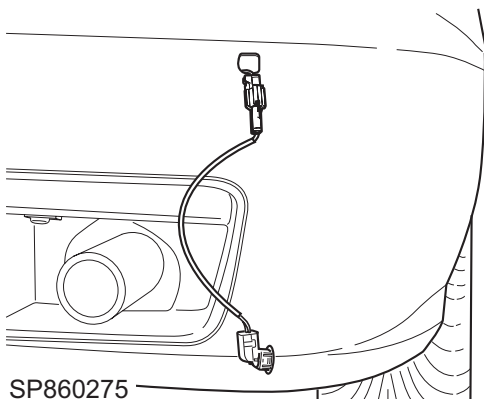
Remove

1. Remove rear bumper valance.
👉 [REAR BUMPER VALANCE, page 76-2-11.](#)
2. Release multiplug connector block from 'U' clip.



SP860268

3. Remove 'U' clips.
4. Disconnect multiplugs.



SP860275

5. Remove PDC sensors.

Refit

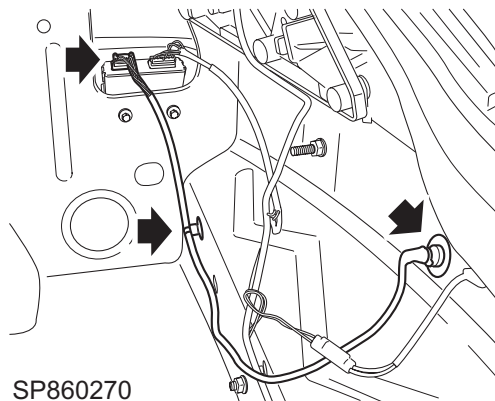
1. Fit PDC sensors and secure with 'U' clips.
2. Connect multiplugs.
3. Secure connector blocks to clips.
4. Fit rear bumper valance.
👉 [REAR BUMPER VALANCE, page 76-2-11.](#)

LINK HARNESS - PDC SENSOR - REAR

🔑 86.54.16

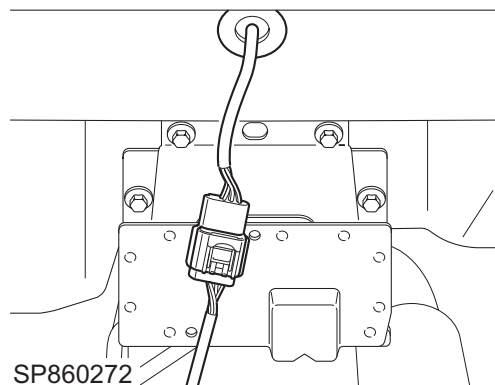
Remove

1. Remove rear bumper valance.
👉 [REAR BUMPER VALANCE, page 76-2-11.](#)
2. Position RH side boot carpet aside and disconnect multiplug from PDC module.
3. Release clip securing link harness to body.



SP860270

4. Release link harness body grommet.



SP860272

5. Disconnect link harness lead multiplug from PDC harness.
6. Remove link harness.

Refit

1. Position link harness to body.
2. Secure harness clip and grommet to body.
3. Connect multiplugs
4. Align carpet.
5. Fit rear bumper valance.
👉 [REAR BUMPER VALANCE, page 76-2-11.](#)

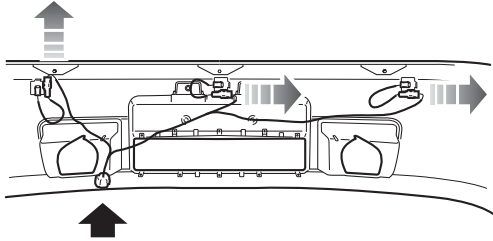


PDC HARNESS - REAR

🔑 86.54.17

Remove

1. Remove rear bumper valance.
👉 REAR BUMPER VALANCE, page 76-2-1 I.
2. Disconnect multiplug from PDC link lead.



SP860273

3. Disconnect 3 PDC multiplugs
4. Remove PDC harness.

Refit

1. Position harness.
2. Connect PDC sensor multiplugs.
3. Connect multiplug to link harness.
4. Fit rear bumper valance.
👉 REAR BUMPER VALANCE, page 76-2-1 I.

SPEAKER - PDC

🔑 86.54.18

Remove

1. Remove PDC speaker:
👉 INTERIOR MIRROR, page 76-4-1.

Refit

1. Fit PDC speaker:
👉 INTERIOR MIRROR, page 76-4-1.

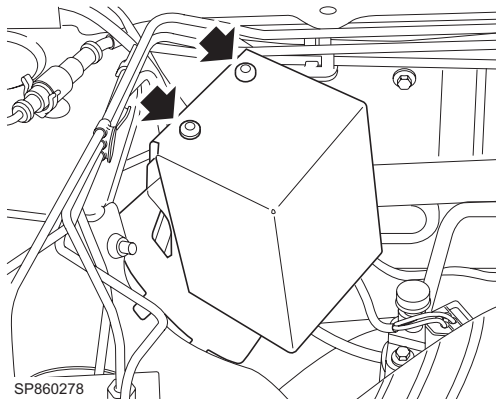
ELECTRICAL

BBUS SOUNDER

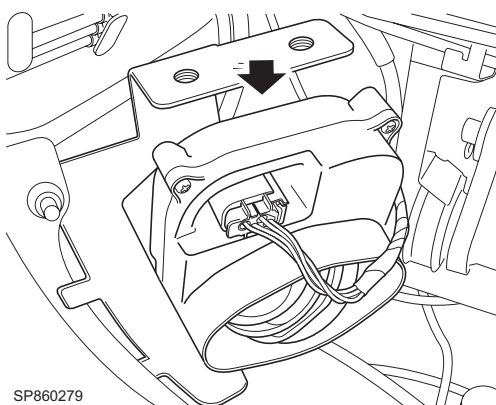
🔑 86.77.13

Remove

1. Open front luggage compartment.



2. Remove 2 security shear bolts from BBUS cover.
3. Remove cover.



4. Disconnect BBUS multiplug.
5. Remove nut securing BBUS to bracket and remove BBUS.

Refit

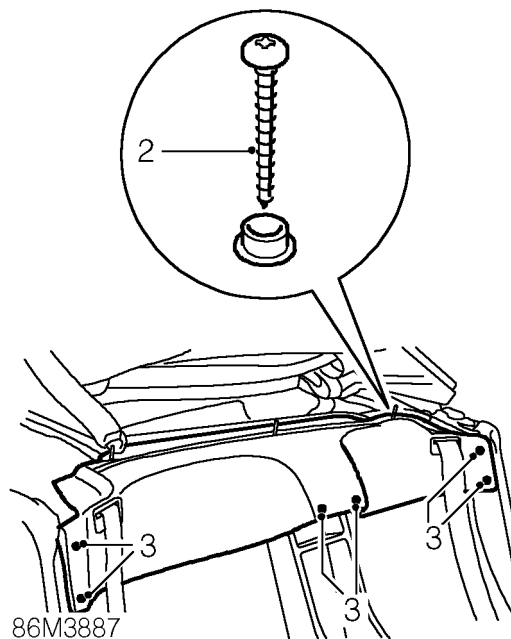
1. Position BBUS to bracket and secure with nut.
2. Connect multiplug.
3. Fit BBUS cover and secure with new shear bolts.
4. Close luggage compartment.

VOLUMETRIC SENSOR

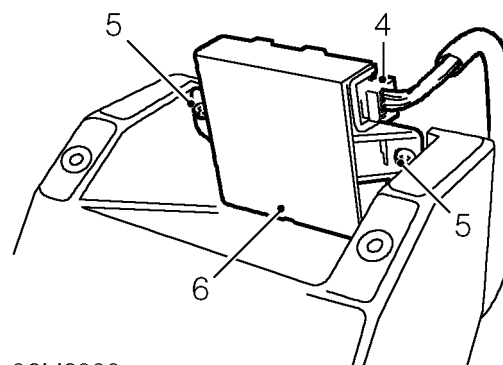
🔑 86.77.29

Remove

1. Position both seats fully forward and position seat squab forward.



2. Remove 3 screws securing rear bulkhead finisher to rear bulkhead and collect 3 studs.
3. Release finisher from 6 clips and position aside.



4. Disconnect multiplug from sensor.
5. Remove 2 screws securing sensor to rear console.
6. Remove sensor.

Refit


1. Fit sensor to console and secure with screws.
2. Connect multiplug.
3. Locate bulkhead finisher and engage clips.
4. Fit studs and secure with screws.
5. Return seats to original position.

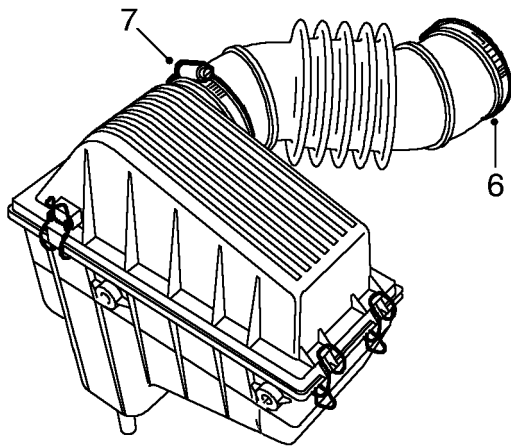


STARTER MOTOR

🔑 86.60.01

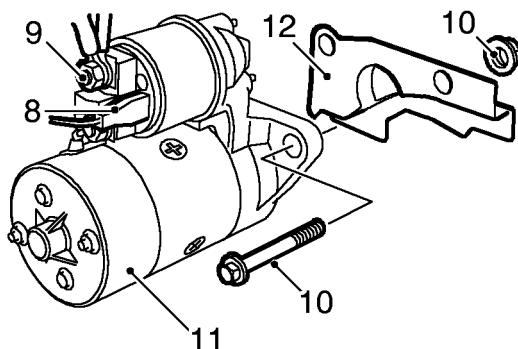
Remove

1. Disconnect battery earth lead.
2. Remove engine compartment access panel
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
3. Raise rear of vehicle.
WARNING: Support on safety stands.
4. Remove LH rear wheel.
5. Release EVAP canister from bracket and position canister aside.



86M4177

6. Remove clip and disconnect air intake hose from throttle body.
7. Loosen clip and remove air intake hose from air filter:




86M3760A

8. Disconnect Lucar and release cable tie from starter motor solenoid.
9. Remove nut from solenoid and release 2 leads.
10. Remove 2 nuts and bolts securing starter motor.
11. Remove starter motor.

12. Remove flywheel closing plate.

Refit

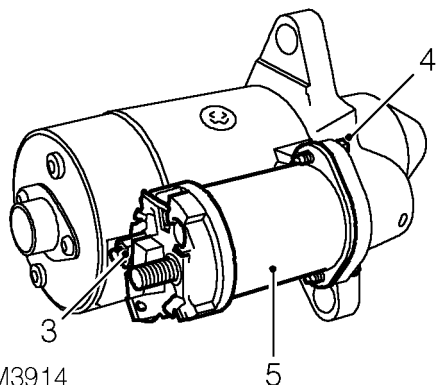
1. Clean mating faces of starter motor and gearbox.
2. Fit starter motor.
3. Fit closing plate.
4. Fit nuts and bolts and tighten nuts to 80 Nm.
5. Fit leads to starter solenoid and tighten terminal nut.
6. Connect Lucar to starter solenoid.
7. Secure cables to starter solenoid with cable tie.
8. Fit air intake hose to air filter and to throttle body.
9. Tighten clip securing air intake hose to air filter; fit clip securing air intake hose to throttle body.
10. Fit EVAP canister.
11. Fit road wheel(s), fit wheel nuts and tighten in a diagonal sequence to 70 Nm.
12. Remove stand(s) and lower vehicle.
13. Fit engine compartment access panel.
 [ENGINE COMPARTMENT ACCESS PANEL, page 76-2-4.](#)
14. Connect battery earth lead.

STARTER SOLENOID

🔑 86.60.08

Remove

1. Disconnect battery earth lead.
2. Remove starter motor:
👉 [STARTER MOTOR, page 86-23.](#)



3. Remove nut from solenoid and disconnect lead.
4. Remove 2 bolts securing solenoid to starter motor housing.
5. Remove solenoid from starter motor housing.
6. Remove plunger from starter.

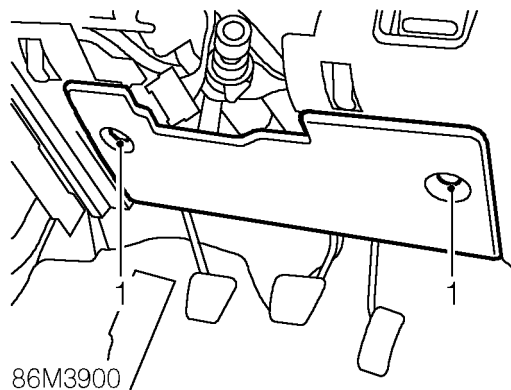
Refit

1. Apply grease to lever end of plunger.
2. Fit starter solenoid to starter motor housing and tighten bolts.
3. Fit lead to rear of solenoid and tighten nut.
4. Fit starter motor:
👉 [STARTER MOTOR, page 86-23.](#)
5. Connect battery earth lead.

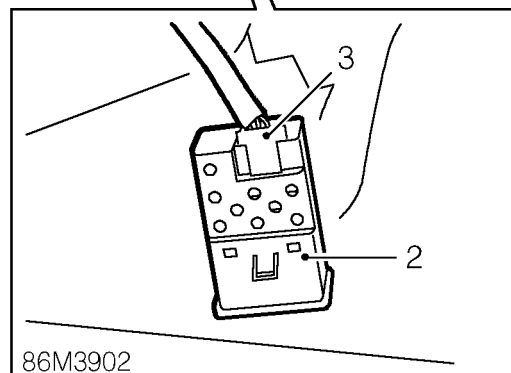
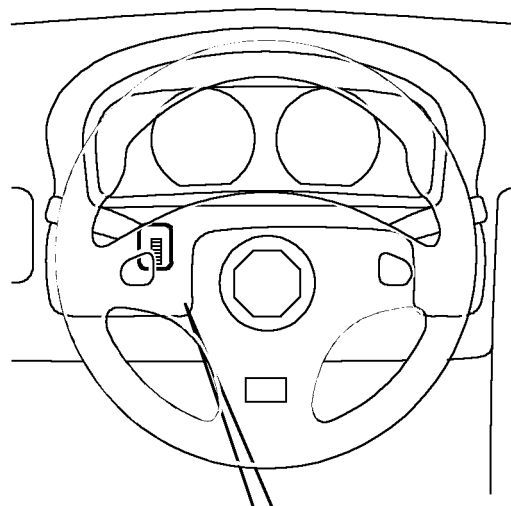
PANEL DIMMER RESISTOR

🔑 86.65.37

Remove



1. Release 2 clips and open fuse box cover.



2. Release dimmer resistor from instrument cowl.
3. Disconnect multiplug from dimmer.

Refit

1. Connect multiplug and engage dimmer to cowl.
2. Position fuse box cover and secure with clips.

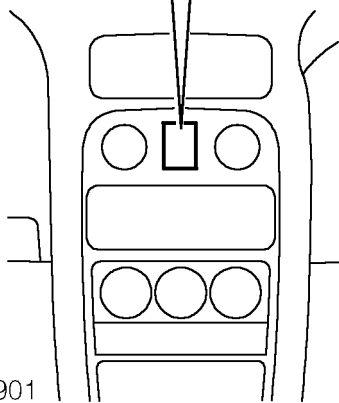
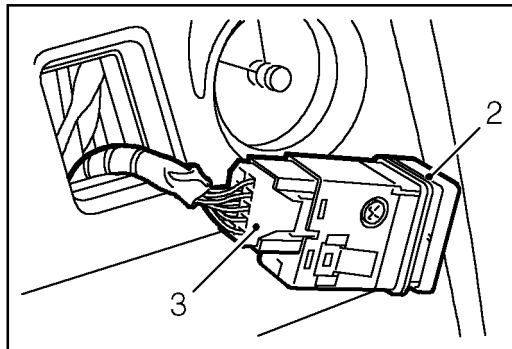


HAZARD WARNING LAMP SWITCH

🔑 86.65.50

Remove

1. Release radio from console.
[HEAD UNIT - AUDIO SYSTEMS, page 86-15.](#)



86M3901

2. Release hazard warning lamp switch from console.
3. Disconnect multiplug from switch.

Refit

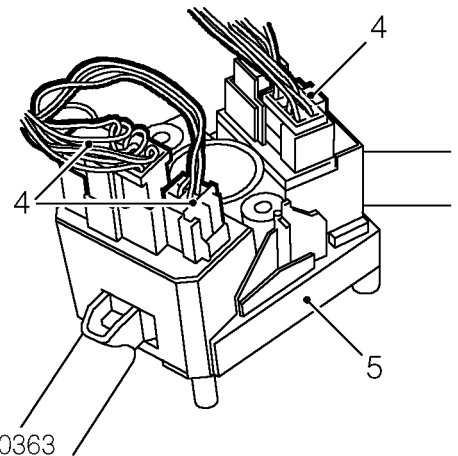
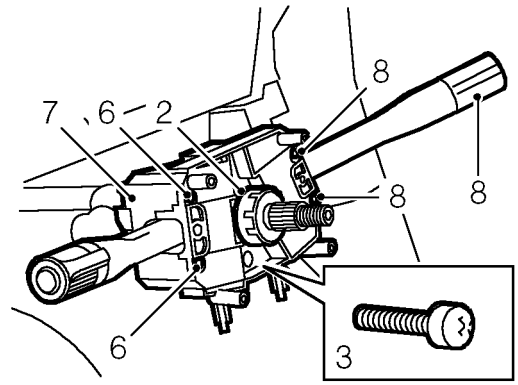
1. Connect multiplug and engage switch to console.
2. Secure radio to console.
[HEAD UNIT - AUDIO SYSTEMS, page 86-15.](#)

STEERING COLUMN SWITCH PACK

🔑 86.65.55

Remove

1. Remove rotary coupler:
[ROTARY COUPLER, page 75-6.](#)




57M0363

2. Remove direction indicator cancellation cam from column.
3. Remove 2 screws securing switch pack to steering column.
4. Release switch pack from column and disconnect 3 multiplugs.
5. Remove switch pack.
6. Remove 2 screws securing direction/ headlamp stalk to switch pack.
7. Remove direction/headlamp stalk from switch pack.
8. Remove 2 screws securing wash wipe stalk to switch pack.
9. Remove wash wipe stalk from switch pack.

Refit

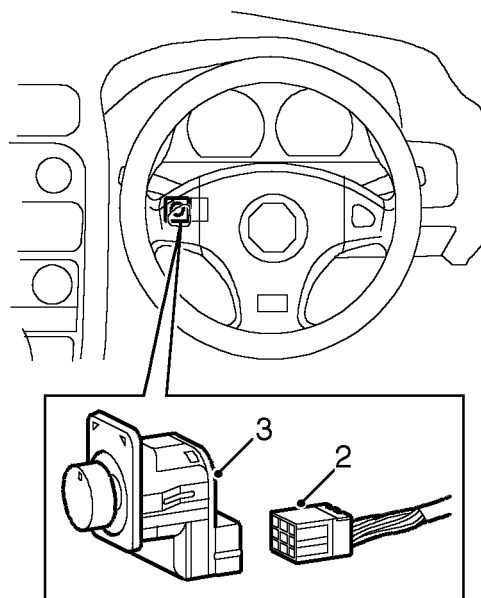
1. Fit wash wipe stalk to switch pack and secure with screws.
2. Fit indicator/headlamp stalk to switch pack and tighten screws.

3. Position switch pack to steering column, connect 3 multiplugs and tighten screws.
4. Fit direction indicator cancellation cam to steering column.
5. Fit rotary coupler:
 [ROTARY COUPLER, page 75-6.](#)

SWITCH - EXTERIOR MIRROR

🔑 86.65.75

Remove



M86 5066

1. Carefully remove switch from fascia.
2. Disconnect multiplug from switch.
3. Remove switch.

Refit

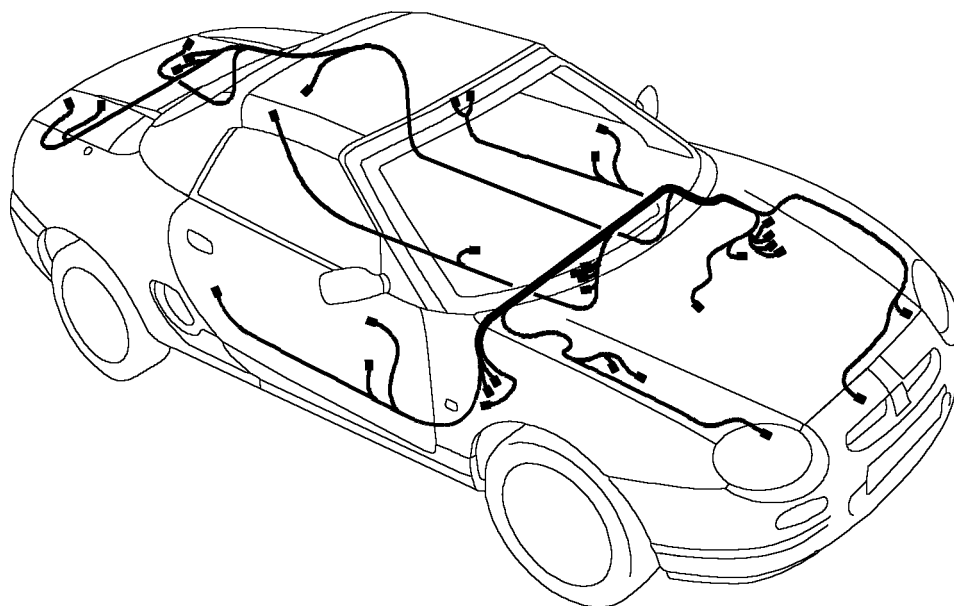
1. Position switch and connect multiplug.
2. Carefully push switch back into position.



MAIN HARNESS


🔑 86.70.07

Remove





SP86 0251

Harness connections - Under Bonnet


1. Battery - negative/positive leads.
2. Grille - engine compartment.
3. Cover - engine compartment.
4. Raise front of vehicle and support on stand(s).
5. Headlamp
 [HEADLAMP ASSEMBLY, page 86-8.](#)
6. Headlamp - opposite.
7. Multiplugs × 2 - cooling fans.
8. Clips × 3 - harness.
9. Bolts × 2 - earth headers.
10. Scrivets × 6 - Screws × 6 - front wheel arch liners.
11. Side indicators - lenses from bulb holders.
12. Grommets - side indicator harness.
13. Cover - front bulkhead.
14. Clips × 7 - harness inner wings.
15. Clip - bonnet cable.
16. Bolts × 2 - under bonnet fuse box.
17. Clips × 3 - bottom cover fuse box.
18. Multiplugs × 5 - fuse box.

19. Multiplugs × 8
 - ABS modulator
 - ABS sensor connectors
 - Horns
 - Wiper motor
 - Brake fluid reservoir
 - Washer pump
 - Trinary switch
20. Lucar connector × 3 - bonnet lamp, switch.
21. Clips × 3 - harness - bonnet.
22. Clip - cable tie - harness - trinary switch.
23. Grommets × 2 - bulkhead.

Harness Connections - Vehicle Interior.

24. Fascia.
 [FASCIA PANEL, page 76-4-9.](#)
25. Seats × 2.
26. Multiplugs × 2 - seat belt pre-tensioners.
27. Carpet studs × 4 - front lower bulkhead.
28. Trim studs × 7 - rear bulkhead.
29. Bolts × 3 - foot rest.
30. Carpet.
31. Remove RH upper 'A' post trim finisher.
 ['A' POST TRIM, page 76-4-2.](#)
32. Multiplug - interior mirror.

ELECTRICAL

33. Clips x 2 - harness - lower 'A' post.
34. Bolt - earth leads - lower 'A' post.
35. Cable tie x 2 - harness to fascia rail.
36. Remove front door trim casing.
 **TRIM CASING, page 76-I-6.**
37. Trim casing - opposite door.
38. Screws x 6 - door speakers.
39. Multiplugs x 6
 - Speakers
 - Window lift motors
 - Door mirrors
40. Plastic sheets - doors - peel back. Multiplugs x 2 - door latches.
41. Clips x 10 - release harness from doors.
42. Multiplug - heater motor.
43. Multiplugs x 2 - EPAS ECU.
44. Torx screw x 2 - 99-026 - SCU - strap.
45. Multiplugs x 4 - SCU.
46. Multiplug - SRS ECU.
47. Torx screws x 4 - SRS ECU - 10 Nm.
48. Clip - harness - fascia support bracket.
49. Bolts x 4 - fascia support bracket - 25 Nm.
50. Nuts x 4 - Bolts x 3 - gear change - 9 Nm.
51. Clips x 4 - harness - tunnel.
52. Bolts x 2 - handbrake - 25 Nm - Lucar connector.
53. Multiplugs x 2 - EPAS steering motor.
54. Multiplugs x 5
 - Ignition switch
 - Column switches
 - Passive transponder
 - SRS
55. Nuts x 2 - Fuse box.
56. Multiplugs x 2 - instrument pack - connector block.
57. Relay - A/C - multiplug - fuse box.
58. Diagnostic connector - fuse box.
59. Multiplug - brake light switch.
60. Multiplugs x 2 - heater controls.
61. Clips x 9 - sill - 'B' post.
62. Multiplug - volumetric sensor.
63. Bolts x 4 - fuel pump cover - 9 Nm.
64. Multiplug - fuel sender.
65. Studs x 2 - harness - hoodwell.
66. Grommets x 2 - harness - hoodwell.
78. Multiplugs x 2 - main harness to engine harness.
79. Studs x 4 - luggage compartment trim.
80. Rear studs x 2. luggage compartment trim.
81. Multiplugs x 4
 - Rear lamps
 - Number plate illumination
82. Clips x 5 - harness - luggage compartment.
83. Bolt - earth leads - LH rear inner wing - 10 Nm.
84. Connector block - relays x 3 - LH rear inner wing.
85. Grommet - manoeuvre harness to engine compartment.
86. Multiplugs x 3
 - Engine compartment temperature sensor
 - Engine compartment cooling fan
 - Purge control valve
87. Clips x 9 - harness - engine compartment.
88. Harness - manoeuvre and remove.

Harness Connections - Engine/Luggage compartment.

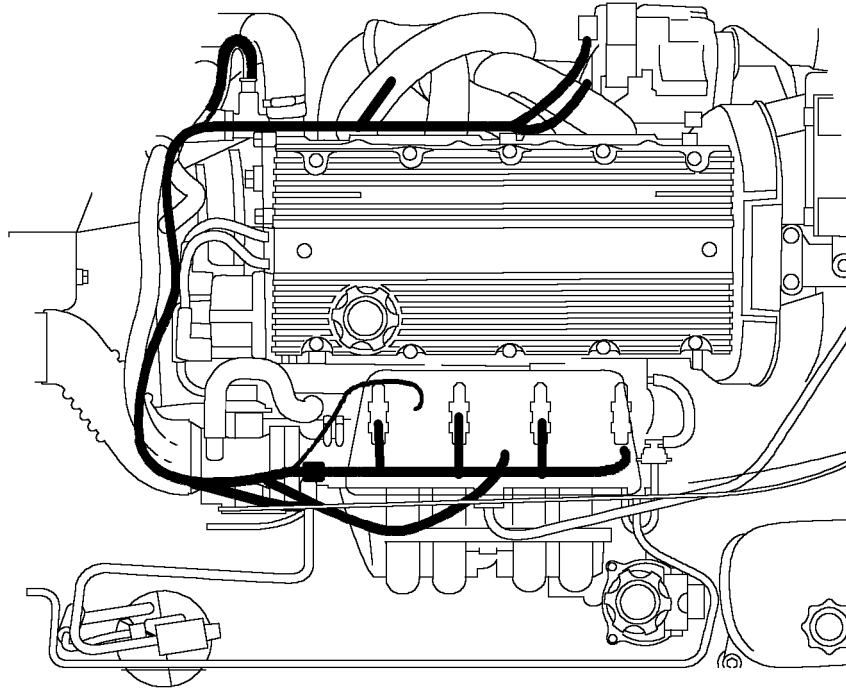
67. Bolt - earth leads - LH rear inner wing - 10 Nm.
68. Multiplug - inertia switch.
69. Aerial connector.
70. Clips x 2 - harness rear inner wing.
71. Release 2 harness clips from boot hinge.
72. Grommet - boot lid.
73. Boot lamp - Lucar connectors x 2.
74. Boot latch - multiplug - Lucar connectors x 2.
75. Clip - harness - boot latch.
76. Harness - manoeuvre from boot lid.
77. Bolts x 2 - ECM bracket - 8 Nm - multiplugs x 2 - harness clip.




ENGINE HARNESS

🔑 86.70.17

Remove



SP86 0252

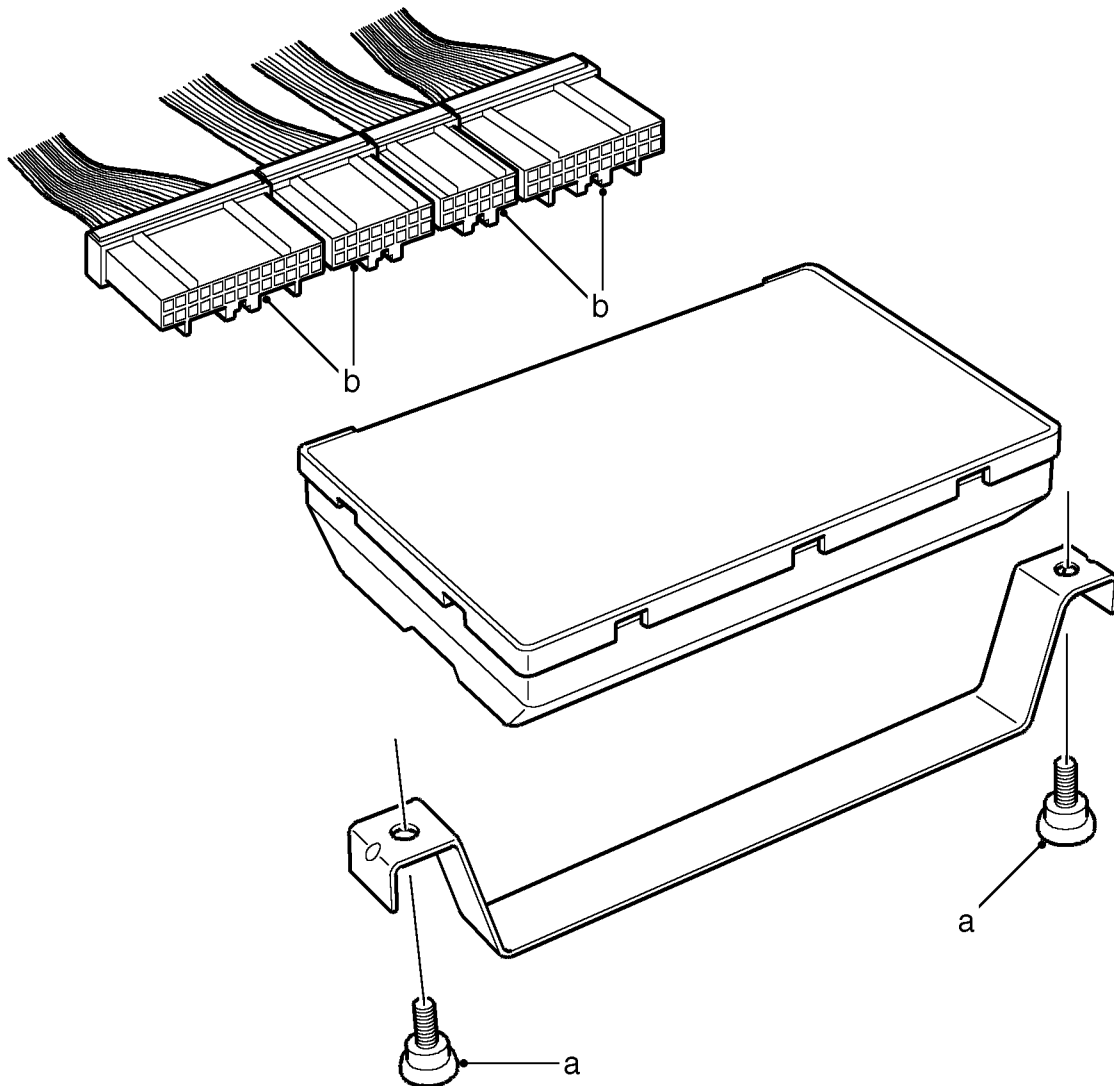
1. Battery - negative/positive leads.
2. Cover - engine compartment.
 [ENGINE COVER, page 12-27.](#)
3. Grille - engine compartment.
4. Bolts x 2 - ECM bracket - 8 Nm - multiplugs x 2 - harness clip.
5. Multiplugs x 2 - main harness to engine harness.
6. ECM assembly.
7. Bolt - earth leads to body.
8. Lucar connector - starter motor solenoid.
9. Terminal nut - starter motor solenoid - 13 Nm.
10. Connectors x 2 - reverse lamp switch.
11. Multiplugs x 2 - HO2S - post and pre-catalyst.
12. Multiplugs x 2 - ECT and temperature gauge sensors.
13. Bolts x 3 - coil cover 8 Nm.
14. Multiplugs x 4
 - Ignition coils
 - CMP sensor
 - MAP sensor
15. Multiplugs x 3 - (VVC)
 - HCU solenoids
 - Oil temperature sensor
16. Multiplug - CKP sensor.
17. Multiplug - injector harness.
18. Raise front of vehicle one side and support on stand.
19. Remove RH rear road wheel.
20. Scrivets x 2 - Torx screw - RH closing panel.
21. Clips x 3 - armour to harness.
22. Multiplug - Nut - alternator connections.
23. Multiplugs x 3
 - A/C compressor
 - Oil temperature sensor
 - Oil pressure sensor
24. Harness - release - engine front.
25. Clips x 4 - harness to coolant rail and throttle body.
26. Harness - manoeuvre and remove.
27. Clips x 3 - armour to new harness.
28. Armour - remove from new harness.
29. Align armour to engine harness - clips x 3.

ELECTRICAL

SECURITY CONTROL UNIT (SCU)

🔑 86.77.06

Remove



SP86 0248

1. Battery earth lead.
2. Front console closing panel
3. SCU strap (a)
 - Special tool 99R027
4. SCU multiplugs (b)

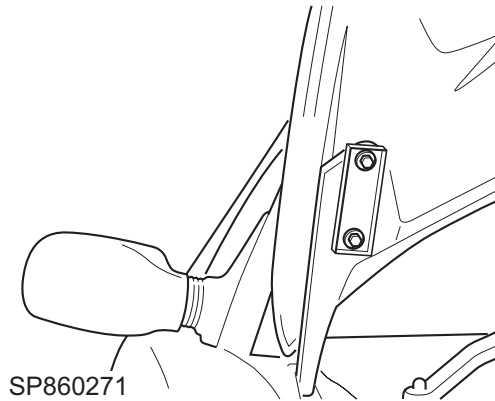


COVER - BONNET SWITCH

🔑 86.77.25

Remove

1. Open and support bonnet.



2. Remove 2 bolts securing switch cover to bonnet hinge.
3. Remove switch cover.

Refit

1. Align switch cover and secure with bolts.
2. Close bonnet.

ELECTRICAL

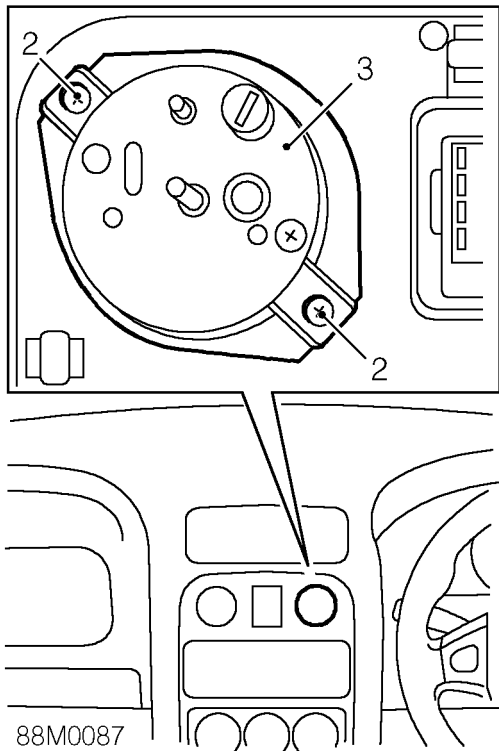


CLOCK

🔑 88.15.07

Remove

1. Remove centre console panel.
👉 CENTRE CONSOLE PANEL, page 76-4-7.



2. Remove 2 screws securing clock to console.
3. Remove retaining bracket, clock and 'O' ring.

Refit

1. Position 'O' ring and clock to console.
2. Fit retaining bracket and secure with screws.
NOTE: Ensure correct orientation of clock in console.
3. Fit centre console panel.
👉 CENTRE CONSOLE PANEL, page 76-4-7.

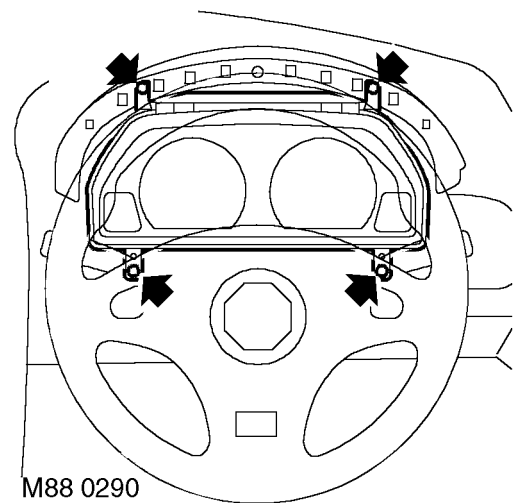
INSTRUMENT PACK

🔑 88.20.01/99

WARNING: See GENERAL INFORMATION, SRS Precautions.

Remove

1. Make the system safe.
👉 SUPPLEMENTARY RESTRAINT SYSTEM PRECAUTIONS, page 03-19.
2. Remove instrument cowl.
👉 INSTRUMENT COWL, page 88-2.



3. Remove 4 screws securing instrument pack to fascia.
4. Release instrument pack from fascia.
5. Release 2 multiplugs from pack and remove instrument pack.

Refit

1. Position instrument pack to fascia and connect multiplugs.
2. Position instrument pack and secure with screws.
3. Fit instrument cowl.
👉 INSTRUMENT COWL, page 88-2.

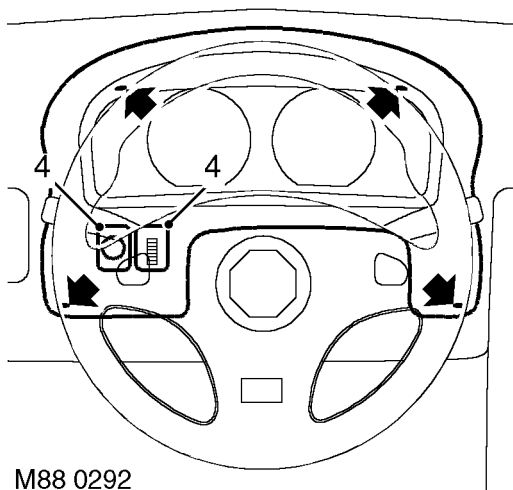
INSTRUMENTS

INSTRUMENT COWL

🔑 88.20.02

Remove

1. Remove steering column nacelle.
👉 [STEERING COLUMN NACELLE, page 57-9.](#)



2. Remove 4 screws securing instrument cowl to fascia.
3. Release cowl from fascia.
4. Disconnect multiplugs from dimmer resistor and door mirror selector switch.
5. Remove cowl.
6. Remove dimmer and mirror switch from cowl.

Refit

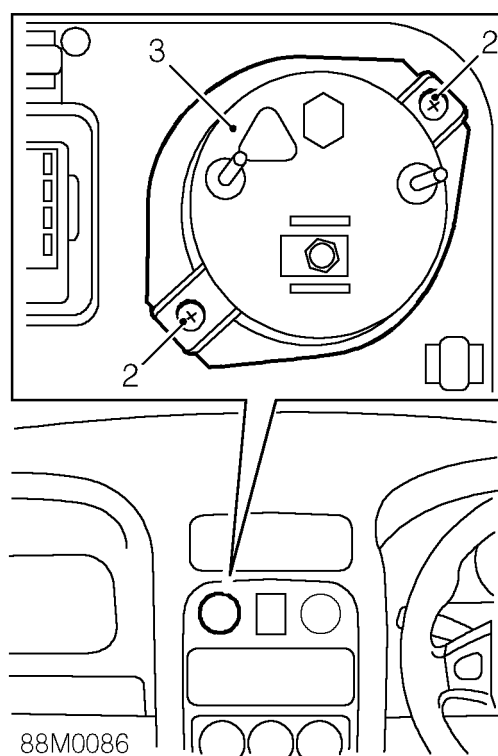
1. Fit dimmer and mirror switch to cowl.
2. Position cowl and connect multiplugs.
3. Position cowl to fascia and secure with screws.
4. Fit steering column nacelle.
👉 [STEERING COLUMN NACELLE, page 57-9.](#)

OIL TEMPERATURE GAUGE

🔑 88.25.02

Remove

1. Remove centre console panel.
👉 [CENTRE CONSOLE PANEL, page 76-4-7.](#)



2. Remove 2 screws securing gauge to console.
3. Remove retaining bracket, gauge and 'O' ring.

Refit

1. Position 'O' ring and gauge to console.
2. Fit retaining bracket and secure with screws.
NOTE: Ensure correct orientation of gauge in console.
3. Fit centre console panel.
👉 [CENTRE CONSOLE PANEL, page 76-4-7.](#)

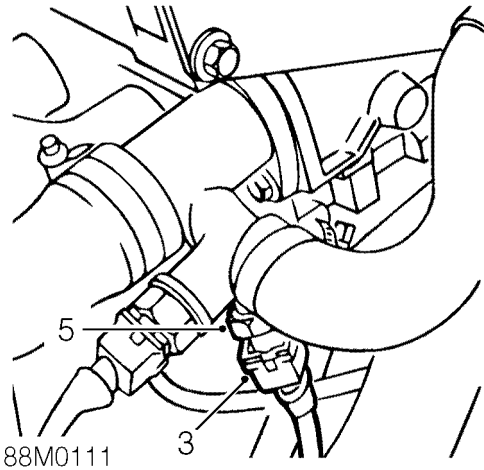


ENGINE COOLANT TEMPERATURE GAUGE SENSOR

88.25.20



Remove

1. Disconnect battery earth lead.
2. Remove engine cover:
 [ENGINE COVER, page 12-27.](#)



3. Disconnect multiplug from sensor.
4. Position a container below sensor to collect coolant spillage
5. Remove sensor.

Refit

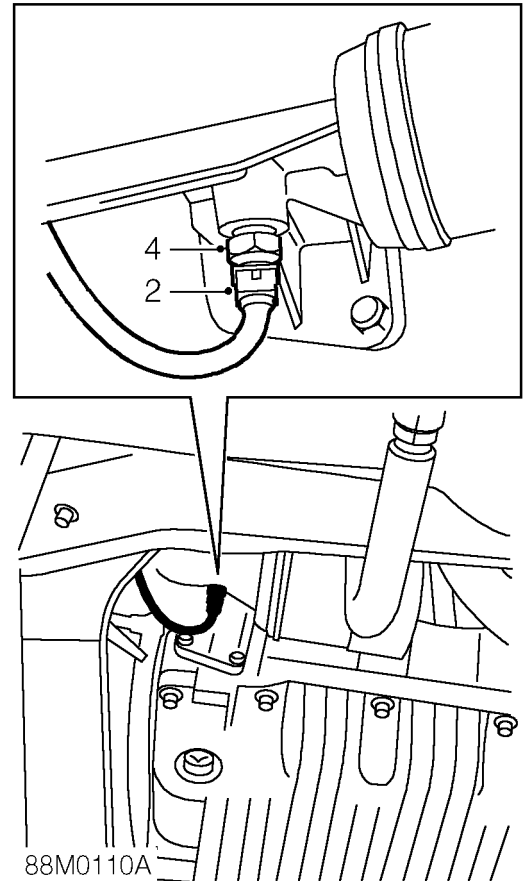
1. Clean threads of sensor.
2. Apply Loctite 577 to threads of sensor.
3. Fit sensor and tighten to 6 Nm.
4. Connect multiplug to sensor.
5. Fit engine cover:
 [ENGINE COVER, page 12-27.](#)
6. Connect battery earth lead.
7. Top-up coolant.
 [DRAIN AND REFILL, page 26-1.](#)

ENGINE OIL TEMPERATURE GAUGE SENSOR

88.25.21


Remove

1. Raise rear of vehicle.
WARNING: Support on safety stands.



2. Disconnect multiplug from sensor.
3. Position spillage tray.
4. Remove sensor from oil filter housing.

Refit

1. Fit oil temperature sensor to oil filter housing and tighten to 15 Nm.
2. Remove spillage tray.
3. Connect multiplug to sensor.
4. Remove stand(s) and lower vehicle.
5. Check and top up engine oil level.
 [ENGINE OIL, page 10-3.](#)