



Workshop Manual

Werkplaatshandboek

Manuel D'Atelier

Werkstatthandbuch

Manuale D'Officina

Manual De Taller

Manual de Oficina



AMENDMENT INSTRUCTION SHEET



MINI WORKSHOP MANUAL

Publication Number RCL 0193ENG - 2nd Edition

Amendment Number: **XN-001/97ENG**

Date: **12/96**

To ensure that this manual is kept up to date and that a record of amendments to this manual is available, an Amendment Instruction Sheet will be issued with each set of revised pages.

- The Title page of the Manual is re-issued, and the Part No. has been raised to the next edition. Except for the Contents pages, all revised and new pages have the issue date at the foot of each page, together with an indication of whether the pages are revised or new.
- This Amendment Instruction Sheet must be inserted at the front of the manual to indicate that the amendment has been incorporated. Do not discard previous Amendment Instruction sheets.
- Your manual is only complete to this issue providing all prior Amendments are included.
- The filing instructions give section and page numbers affected. Additional pages or complete new sections may be issued, insert the pages as instructed.

FILING INSTRUCTIONS

Section	Discard Existing Pages	Insert New Pages	Reason for Amendment
Introduction	Title Page	Title Page	Introduction of new sections. Part number raised to next edition.
Information	Contents Page General data, 1 Torque wrench settings, 1&3	Contents Page General data, 1 Torque wrench settings, 1-5	Corrections to existing information and addition of new torque figures.
Engine	Contents Page Repairs, 33-37	Contents Page Repairs, 33-41	Corrections to existing information and addition of new repair procedures.
Emission Control	Description and operation, 1 Repairs, 1	Description and operation, 1 Repairs, 1	Corrections to existing information.
Engine Management System - MEMS	Contents Page Description and operation, 1-11	Contents Page Description and operation, 1-11	Corrections to existing information.
Fuel Delivery System	Contents Page - Repairs, 1	Contents Page Adjustments Repairs, 1	Corrections to existing information and introduction of Adjustments section.
Cooling System	Repairs, 3	Repairs, 3	Corrections to existing information.
Manifold & Exhaust Systems	Description and operation, 3	Description and operation, 3	Corrections to existing information.
Clutch	Contents page Adjustments, 1 Repairs, 1-7	Contents Page Adjustments, 1 Repairs, 1-11	Corrections to existing information and addition of new repair procedures.

Continued.....

Section	Discard Existing Pages	Insert New Pages	Reason for Amendment
Manual Gearbox	Contents page Adjustments, 1 -	Contents Page Adjustments, 1 Repairs, 1-5	Corrections to existing information and addition of new repair procedures.
Drive shafts	- -	Contents Page Repairs, 1-5	New Section
Steering	Contents page - Repairs, 1	Contents Page Adjustments, 1 Repairs, 1-11	Corrections to existing information and addition of new repair procedures.
Suspension	- - -	Contents Page Adjustments, 1 Repairs, 1&3	New Section.
Brakes	Contents Page Adjustments, 1 Repairs, 1&3	Contents Page Adjustments, 1 Repairs, 1-17	Corrections to existing information and addition of new repair procedures.
Restraint Systems	Description and operation, 3 Repairs, 3&5	Description and operation, 3 Repairs, 3&5	Corrections to existing information.
Body	Contents Page Exterior fittings, 1&3 Interior trim components, 1 Screens, 1 -	Contents Page Exterior fittings, 1-7 Interior trim components, 1-7 Screens, 1 Seats and seat belts, 1&3	Corrections to existing information and addition of new repair procedures.
Heating & Ventilation	- -	Contents Page Repairs, 1-7	New Section.
Wipers & Washers	Contents Page Repairs, 1	Contents page Repairs, 1-7	Addition of new repair procedures
Electrical	Contents Page Description and operation, 1 Adjustments, 1 Repairs, 1-19	Contents Page Description and operation, 1 Adjustments, 1 Repairs, 1-27	Corrections to existing information and addition of new repair procedures.
Instruments	Repairs, 7	Repairs, 7	Corrections to existing information.

AMENDMENT INSTRUCTION SHEET



MINI WORKSHOP MANUAL

Publication Number RCL0193ENG (3rd Edition)

Amendment Number: **XN003.98ENG**

Date: **11/98**

To ensure that this manual is kept up to date and that a record of amendments to this manual is available, an Amendment Instruction Sheet will be issued with each set of revised pages.

- The Title page of the Manual is re-issued, and the Part No. has been raised to the next edition. Except for the Contents pages, all revised and new pages have the issue date at the foot of each page, together with an indication of whether the pages are revised or new.
- This Amendment Instruction Sheet must be inserted at the front of the manual to indicate that the amendment has been incorporated. Do not discard previous Amendment Instruction sheets.
- Your manual is only complete to this issue providing all prior Amendments are included.
- The filing instructions give section and page numbers affected. Additional pages or complete new sections may be issued, insert the pages as instructed.

FILING INSTRUCTIONS

Section	Discard Existing Pages	Insert New Pages	Reason for Amendment
TITLE PAGE	Title page	Title page	Part number raised to 4th Edition and year of copyright amended.
INSTRUMENTS	Contents page	Contents page	Additional jobs added
INSTRUMENTS	Page 9	Pages 9 and 11	Speedometer cable upper and lower added

AMENDMENT INSTRUCTION SHEET



MINI WORKSHOP MANUAL

Publication Number RCL0193ENG (4th Edition)

Amendment Number: **XN002.99ENG**

Date: **06/99**

To ensure that this manual is kept up to date and that a record of amendments to this manual is available, an Amendment Instruction Sheet will be issued with each set of revised pages.

- The Title page of the Manual is re-issued, and the Part No. has been raised to the next edition. Except for the Contents pages, all revised and new pages have the issue date at the foot of each page, together with an indication of whether the pages are revised or new.
- This Amendment Instruction Sheet must be inserted at the front of the manual to indicate that the amendment has been incorporated. Do not discard previous Amendment Instruction sheets.
- Your manual is only complete to this issue providing all prior Amendments are included.
- The filing instructions give section and page numbers affected. Additional pages or complete new sections may be issued, insert the pages as instructed.

FILING INSTRUCTIONS

Section	Discard Existing Pages	Insert New Pages	Reason for Amendment
TITLE PAGE	Title Page	Title Page	Part number raised to 5th Edition.
ELECTRICAL	Contents page Adjustments pages 1 & 2 Repairs pages 1 & 2 Repairs page 27	Contents page Adjustments pages 1 & 2 Repairs pages 1 & 2 Repairs pages 27 & 28	Contents changed. Auxiliary Drive Belt - Check and Adjust - Caution regarding drive belt adjusting bolt added. Auxiliary Drive Belt - Remove and Refit - Cautions regarding drive belt adjusting bolt added. CD Player - Remove and Refit - New operation issued herewith.



WORKSHOP MANUAL

This manual covers changes to Mini models manufactured from VIN **SAXXNNAZEBD 134455** and should be used in conjunction with the following manuals.

AKM 7169 Mini Repair Manual
RCL 0194 Mini Electrical Circuit Diagrams

Publication Part No. RCL 0193ENG (5th Edition)
Published by Rover Technical Communication
© 1998 Rover Group Limited

INTRODUCTION
GENERAL INFORMATION
INFORMATION



ENGINE



EMISSION CONTROL
ENGINE MANAGEMENT SYSTEM
FUEL DELIVERY SYSTEM



COOLING SYSTEM



MANIFOLD & EXHAUST SYSTEMS



CLUTCH



MANUAL GEARBOX



DRIVE SHAFTS



STEERING



SUSPENSION



BRAKES



RESTRAINT SYSTEMS
BODY



HEATING & VENTILATION



WIPERS & WASHERS
ELECTRICAL
INSTRUMENTS



CONTENTS

Page



INTRODUCTION

INTRODUCTION 1
REPAIRS AND REPLACEMENTS 2
SPECIFICATION 2
ABBREVIATIONS AND SYMBOLS 3



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.

Each major section starts with a contents page, listing the information contained in the relevant sub-sections. To assist filing of revised information each sub-section is numbered from page 1.

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

Adjustment and repair 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 its Repair Operation Time number. 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.

INTRODUCTION

REPAIRS AND REPLACEMENTS

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

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

Rover Dealers are obliged to supply only Rover recommended parts.

SPECIFICATION

Rover 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. Rover Dealers are not agents of Rover and have no authority to bind the manufacturer by any expressed or implied undertaking or representation.



ABBREVIATIONS AND SYMBOLS

After Bottom Dead Centre	ABDC	Manifold absolute pressure	MAP
After Top Dead Centre	ATDC	Mass air flow	MAF
Air conditioning	A/C	Maximum	max.
Air fuel ratio	AFR	Mercury	Hg
Alternating current	ac	Metre	m
Amperes	A	Metric unit of horse power	PS
Anti-lock brake system	ABS	Miles per hour	mph
Automatic temperature control	ATC	Millimetre	mm
Before Bottom Dead Centre	BBDC	Minimum	min
Before Top Dead Centre	BTDC	Minus (of tolerance)	-
Bottom Dead Centre	BDC	Minute (angle)	'
British Standards	BS	Model Year	MY
Camshaft Position	CMP	Multi-point injection	MPi
Carbon monoxide	CO	Negative (electrical)	(-)
Celcius (Centigrade)	C	Newton metre	Nm
Centimetre	cm	Number	No.
Chlorofluorocarbons	CFC's	Outside diameter	o.dia.
Cubic centimetres	cm ³	Percentage	%
Crankshaft position	CKP	Plus or minus	±
Degree (angle)	deg. or °	Plus (tolerance)	+
Degree (temperature)	deg. or °	Positive (electrical)	+
Dial test indicator	DTI	Positive crankcase ventilation	PCV
Diameter	dia.	Radius	r
Direct current	dc	Ratio	:
Electronic Control Unit	ECU	Reference	ref
Exhaust gas recirculation	EGR	Revolutions per minute	rev/min
Engine Control Module	ECM	Right-hand	RH
Engine coolant temperature	ECT	Right-hand drive	RHD
Fuel Injection Pump	FIP	Rover Engineering Standards	RES
Gramme (mass)	g	Second (angle)	"
High compression	hc	Single overhead camshaft	SOHC
High Tension	h.t.	Specific gravity	sp.gr
Hour	h	Square centimetres	cm ²
Idle Air Control Valve	IACV	Standard	std.
Inertia Fuel Shut-off	IFS	Supplementary Restraint System	SRS
Intake air temperature	IAT	Synchronizer/synchromesh	synchro
Internal diameter	i.dia.	Thousand	k
International Organisation for Standardization	ISO	Top dead centre	TDC
Kilometre	km	Throttle position	TP
Kilogramme	kg	United Kingdom	UK
Left-hand	LH	United States	US
Left-hand drive	LHD	Variable induction system	VIS
Light emitting diode	LED	Vehicle identification number	VIN
Litre	l	Volt	V
Low Compression	lc	Watt	W

CONTENTS

Page



VEHICLE IDENTIFICATION NUMBER

VEHICLE IDENTIFICATION NUMBER	1
IDENTIFICATION NUMBER LOCATIONS	1

GENERAL PRECAUTIONS AND FITTING INSTRUCTIONS

GENERAL PRECAUTIONS AND FITTING INSTRUCTIONS	1
Dangerous substances	1
Engine oils	1
Health Protection Precautions	1
Environmental Protection Precautions	1
SAFETY INSTRUCTIONS	2

FUEL HANDLING PRECAUTIONS

FUEL HANDLING PRECAUTIONS	1
---------------------------------	---

ELECTRICAL PRECAUTIONS

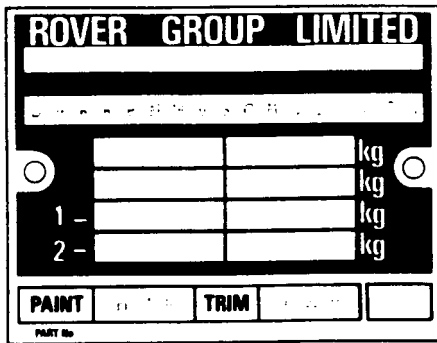
ELECTRICAL PRECAUTIONS	1
------------------------------	---



VEHICLE IDENTIFICATION NUMBER

Location

The Vehicle Identification Number (VIN) plate is attached to the RH inner wing valance. The VIN is also etched into the lower LH corners of the windscreen and rear window.



1M0061

Vehicle identification number

Example: S A X X N N A Z E B D 134455

S= Geographic area

A= Country

X= Manufacturer

XN= Marque/Model

N= Class

A= Body

Z= Engine

E= Transmission and Steering

B= Model change

D= Assembly plant

6 figures= Serial number

Paint and Trim colour codes

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

Paint

Example: H A M

H= Basic colour

A= Mark identifier

M= Colour/Shade name

Trim

Example: L P R

L= Basic colour

P= Mark identifier

R= Colour/Shade name

IDENTIFICATION NUMBER LOCATIONS

Engine number

Stamped on the front face of the cylinder block adjacent to the alternator.

Gearbox number

Shown on a label attached to the upper face of the final drive housing.

Body number

The body number is stamped on a plate fixed to the bonnet locking platform.



GENERAL PRECAUTIONS AND FITTING INSTRUCTIONS

Ignition system safety precautions



WARNING: Before commencing work on an ignition system, all high tension terminals, adapters and diagnostic equipment for testing should be inspected to ensure that they are adequately insulated and shielded to prevent accidental personal contacts and minimise the risk of shock. Wearers of surgically implanted pacemaker devices should not be in close proximity to ignition circuits or diagnostic equipment.

Dangerous substances



WARNING: Many liquids and other substances used in motor vehicles are poisonous and should under no circumstances be consumed and should, as far as possible, be kept from contact with the skin. These substances among others include acid, anti-freeze, asbestos, brake fluid, fuel, windscreen washer additives, lubricants, refrigerant and various adhesives. Always read carefully 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. Used engine oils: Prolonged exposure to used engine oils can cause serious skin disorders, avoid excessive skin contact and always adhere to the following recommendations:

Engine oils

Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer. Adequate means of skin protection and washing facilities must be provided.

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 underpants, 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.
- Use barrier creams, applying before each work period, to help the removal of oil from the skin.
- Wash with soap and water to ensure all oil is removed (skin cleansers and nail brushes will help). Preparations containing lanolin replace the natural skin oils which have been removed.
- Do not use petrol, kerosene, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practicable, degrease components prior to handling.
- Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.

Environmental Protection Precautions

It is illegal to pour used oil on to the ground, down sewers or drains, or into water courses.

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 of HMIP for small burners of less than 0.4 MW. If in doubt check with the appropriate local authority and/or manufacturer of approved appliance.

Dispose of used oil and used filters through authorised waste disposal contractors to licensed waste disposal sites, or to the waste oil reclamation trade. If in doubt, contact the Local Authority for advice on disposal facilities.

GENERAL INFORMATION

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.

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.

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.**

Brake hydraulics

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

Always use two spanners when slackening 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 run cannot contact a potential chafing point.

Containers used for hydraulic fluid must be kept absolutely clean. Do not store hydraulic fluid in an unsealed container, it will absorb water and in this condition would be dangerous to use. Do not allow hydraulic fluid to be contaminated with mineral oil, or use a container which has previously contained mineral oil. Do not re-use fluid from the system. Always use clean brake fluid or a recommended alternative to clean hydraulic components. Fit a blanking cap to an hydraulic union and a plug to its socket after removal to prevent the ingress of dirt. Absolute cleanliness must be observed with hydraulic components.

Engine coolant 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.

Cleaning components

Always use the recommended cleaning agent or equivalent.

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.



Joints and joint faces

Fit joints dry unless otherwise specified in this Manual.

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.

Prior to reassembly, blow through any pipes, channels or crevices with compressed air.

Screw threads

Both UNF and 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.

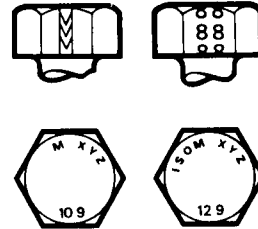
Castellated nuts must not be slackened back to accept a split-pin, except in those recommended cases when this forms part of an adjustment.

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.

Bolt identification



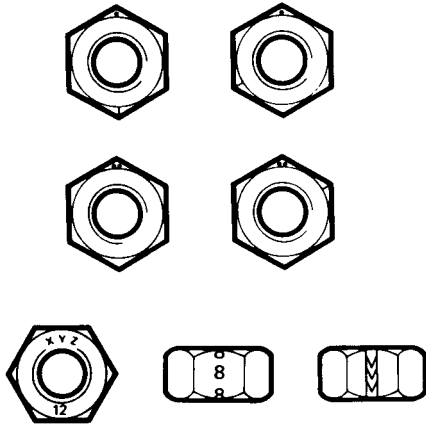
1M0055

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.

GENERAL INFORMATION

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.

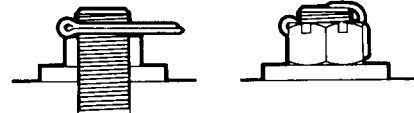
A clock face system is used as an alternative method of indicating the strength grade. The external chambers or a face of the nut is marked in a position relative to the appropriate hour mark on a clock face to indicate the strength grade.

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.

Locking devices

Always release locking tabs and fit new locking washers, do not re-use locking tabs. Always use a backing spanner when slackening or tightening brake and fuel pipe unions.

Fitting a split pin



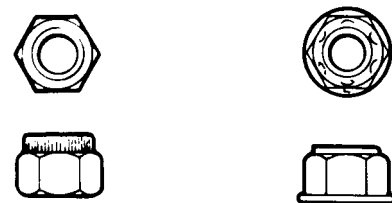
1M0057

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.**

Always fit new roll pins of an interference fit in the hole.

Always fit new circlips of the correct size for the groove.

Self-locking nuts

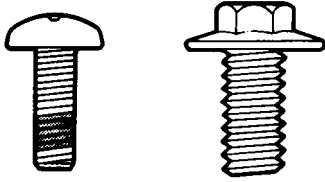


1M0058

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.



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 flywheel. 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.

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 adhesive.

Fit a new encapsulated bolt, or if not available a bolt of equivalent specification treated with an approved adhesive.

GENERAL INFORMATION

Oil seals

Always renew oil seals which have been removed from their working location either as an individual component or as part of an assembly.

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 in initial use. On dual lipped seals, smear the area between the lips with grease.

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 smaller than the outside diameter of the seal.

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.

Service tools and garage equipment

Special service tools have been developed to facilitate removal, dismantling and assembly of mechanical components in a cost effective and practical manner without causing damage. Some operations in this Manual cannot be carried out without the aid of the relevant service tools.

TestBook

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

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 which can cause serious burns on contact with skin. If skin contact does occur:

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

Should the material be in a burnt or over-heated condition handle only with seamless industrial gloves. Decontaminate and dispose of loves immediately after use.



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, and if in doubt appropriate enquiries should be made of your local Fire Officer.

Petrol - Gasoline


Petrol/gasoline vapour is highly flammable and in confined spaces is also explosive and toxic.

When petrol/gasoline evaporates it produces 150 times its own volume in vapour which when diluted with air becomes a readily ignitable mixture. The vapour is heavier than air and will always fall to the lowest level. It can readily be distributed throughout a workshop by air currents; consequently, even a small spillage of petrol/ gasoline 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 and in other areas where fuel containers are stored.

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

Whenever petrol/gasoline 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 petrol/gasoline without first having specialist training.**

Fuel tank drainage



WARNING: Petrol/gasoline must not be extracted or drained from any vehicle whilst it is standing over a pit.

Draining or extraction of petrol/gasoline from a vehicle fuel tank must be carried out in a well ventilated area.

The receptacle used to contain the petrol/gasoline must be more than adequate for the full amount of fuel to be extracted or drained. The receptacle should be clearly marked with its contents, and placed in a safe storage area which meets the requirements of local authority regulations.



CAUTION: When petrol/gasoline 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 petrol fumes in the fuel tank being ignited when the clip is released.

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

GENERAL INFORMATION

Fuel tank repairs

Under no circumstances should a repair to any fuel tank involving heat treatment be carried out without first rendering the tank SAFE, by using one of the following methods:

a. STEAMING: With the filler cap and tank unit removed, empty the tank. Steam the tank for at least two hours with low pressure steam. Position the tank so that condensation can drain away freely, ensuring that any sediment and sludge not volatilized by the steam is washed out during the steaming process.

b. BOILING: With the filler cap and tank unit removed, empty the tank. Immerse the tank completely in boiling water containing an effective alkaline degreasing agent or a detergent, with the water filling and also surrounding the tank for at least two hours.

After steaming or boiling, a signed and dated label to this effect should be attached to the tank.

Body and chassis repairs

When a body or chassis 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.

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

Fuel lines or tanks must not be removed whilst the vehicle is over an inspection pit.



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, this particularly applies to mains lead and plugs.



WARNING: Before commencing work on an ignition system all high tension terminals, adapters and diagnostic equipment for testing should be inspected to ensure that they are adequately insulated and shielded to prevent accidental personal contacts and minimise the risk of shock. Wearers of surgically implanted pacemaker devices should not be in close proximity to ignition circuits or diagnostic equipment.

Polarity - Never reverse connect the vehicle battery and always observe 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 come into contact with other components particularly ECU's. 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 these items are dry and oil free before disconnecting and connecting test equipment. Never force connectors apart either by using tools or by pulling on the wiring harness. Always ensure locking tabs are disengaged before removal and not orientation to enable correct reconnection. Ensure that any protective covers and substances are 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, 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 electrical system. The earth 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

Recharge the battery out of the vehicle and keep the top well ventilated. While being charged or discharged, and for approximately fifteen minutes afterwards, batteries emit hydrogen gas. This gas is inflammable.

Always ensure any battery charging area is well ventilated and that every precautions is taken to avoid naked flames and sparks.

GENERAL INFORMATION

Disciplines

Switch off ignition prior to making any connection or disconnection in the system as electrical surge caused by disconnecting 'live' connections can damage electronic components.

Ensure hands and work surfaces are clean and free of grease, swarf, etc. as grease collects dirt which can cause tracking or high-resistance contacts.

When handling printed circuit boards, treat them as you would a disc - 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 will cause short-circuit and open-circuit conditions.

Prior to commencing test, and periodically during test, touch a good earth, i.e. cigar lighter socket, to discharge body static as some electronic components are vulnerable to static electricity.

Grease for electrical connectors

All under bonnet and under body connectors are protected against corrosion by the application of a special grease on production. Should connectors be disturbed in service or repaired or replaced, a grease of this type, available in 150 gm tubes under Part No. BAU 5811, should again be applied.



NOTE: The use of other greases must be avoided as they can migrate into relays, switches etc. contaminating the contacts and leading to intermittent operation or failure.



CONTENTS

Page

LIFTING AND TOWING

JACKING, SUPPORTING AND TOWING 1
 WORKSHOP JACK 2
 WHEEL-FREE LIFT 2
 TOWING 2

GENERAL DATA

ENGINE 1
 FUEL SYSTEM 1
 COOLING SYSTEM 1
 CLUTCH 2
 MANUAL GEARBOX 2
 AUTOMATIC GEARBOX 2
 FINAL DRIVE 2
 WHEELS 3
 TYRE SIZE 3
 TYRE PRESSURES 3
 ELECTRICAL 3
 DIMENSIONS 4
 WEIGHTS 4

ENGINE TUNING DATA

Model: SPi with manual gearbox 1
 Model: SPi with automatic gearbox 2
 Model: MPi 3

TORQUE WRENCH SETTINGS

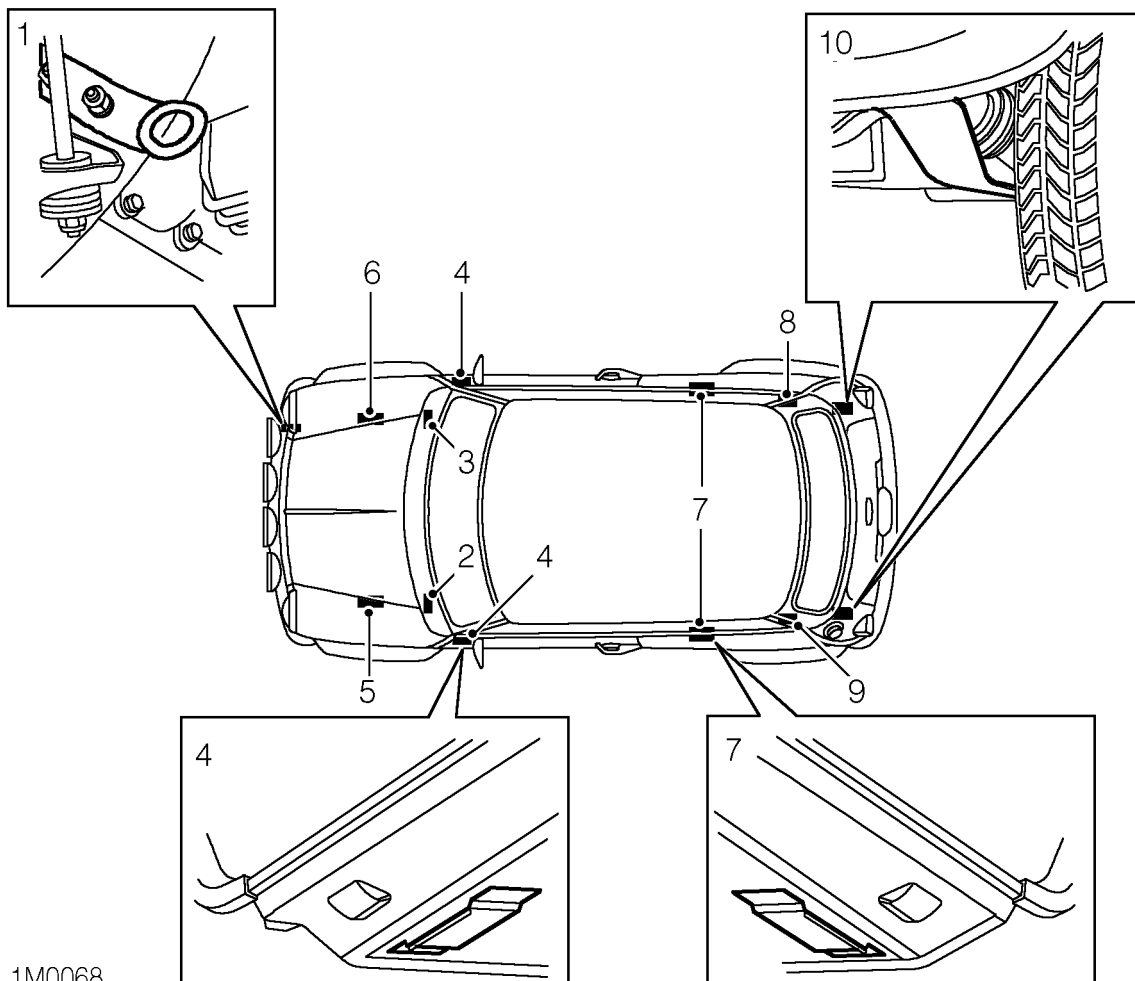
GENERAL 1
 ENGINE 1
 EMISSION CONTROL 2
 ENGINE MANAGEMENT SYSTEM 2
 FUEL SYSTEM 2
 COOLING 2
 MANIFOLD AND EXHAUST 3
 CLUTCH 3
 MANUAL GEARBOX 3
 STEERING 3
 SUSPENSION 4
 BRAKES 4
 RESTRAINT SYSTEMS 4
 BODY 5
 HEATING AND VENTILATION 5
 WIPERS AND WASHERS 5
 ELECTRICAL 5
 INSTRUMENTS 5

CAPACITIES, FLUIDS AND LUBRICANTS

CAPACITIES 1
 FLUIDS 1
 LUBRICATION 2



JACKING, SUPPORTING AND TOWING



1M0068

Jacking and support points

- 1. Lashing/towing eye - front
- 2. LH floor front reinforcement
- 3. RH floor front reinforcement
- 4. Sill reinforced brackets - front
- 5. LH subframe longitudinal - front

- 6. RH subframe longitudinal - front
- 7. Sill reinforced brackets - rear
- 8. RH subframe longitudinal - rear
- 9. LH subframe longitudinal - rear
- 10. Lashing eye - rear

WARNING: In accordance with normal workshop practice and 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 brackets (4 and 7).

WARNING: Do not position a jack, jack stand or wheel free support under the subframe transverse members.

CAUTION: Use suitable hardwood or rubber pads when jacking and supporting the vehicle.

INFORMATION

WORKSHOP JACK

Front

Locate the jack head under the front subframe longitudinal (5 or 6) towards the rear directly below the drive shaft.

Position a safety support under the appropriate floor front reinforcement (2 or 3).

Side

Locate the jack head under the appropriate front sill reinforced bracket (4).

Position a safety support under the nearest floor front reinforcement (2 or 3).



CAUTION: The side jacking points are designed to accommodate the vehicle jack only.

Rear

Locate the jack head under the triangular depression on the appropriate rear subframe longitudinal (8 or 9).

Position a safety support under the adjacent rear sill reinforcement (7).

WHEEL-FREE LIFT

Two-post lift and crossbeams: Locate the pads under the floor front reinforcements (2, 3), and under the rear sill reinforcements (5, 7).

Longitudinal beams: Locate the beams under the front and rear subframe longitudinals (5, 6) and (8, 9). Raise the lift a few inches and ensure the car is firmly supported. Raise the lift to full height and inspect the lifting points for security.

TOWING

It is recommended that a recovery trailer or two wheel car ambulance be used. When a recovery trailer, the car should be secured using the front lashing/towing eye (1) and the rear lashing points on the subframe (10). No other attachment points may be used for this purpose. In an emergency, the car may be towed on its own wheels using the front lashing/towing eye.



CAUTION: Do not use the car for towing another light vehicle, or a trailer, as it not suitable for this purpose.

Suspended tow

A front wheel lift should be used with a cross beam and body protection.

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



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



Manual gearbox models

Use the front lashing/towing eye (1) for towing the car on all four wheels from the front.



WARNING: To ensure that the steering does not lock when the car is being towed, it is essential that the starter key is turned to position 'I', and remains there while the car 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 car is being towed without the engine running.

Automatic gearbox models

When a car with an automatic gearbox is to be towed, a suspended tow must be used because the gearbox is not adequately lubricated without the engine running. The following precautions must be observed:

The selector must be at 'N'.



CAUTION: A rear suspended tow must not be attempted as serious damage will be caused to the automatic transmission.



NOTE: A vehicle fitted with an automatic gearbox cannot be started by towing or pushing.



ENGINE

Type	8 valve OHV
Cylinder arrangement	4 in line - transverse
Bore	70.61 mm
Stroke	81.28 mm
Capacity	1275 cm ³
Firing order	1 - 3 - 4 - 2
Rotation	Clockwise, viewed from front of engine
Compression ratio	10.0 : 1

Valve timing

Inlet:	
Opens	9°BTDC
Closes	41°ABDC
Exhaust:	
Opens	55°BBDC
Closes	17°ATDC

Lubrication

System type	Wet sump, crankshaft driven eccentric rotor pump
Relief valve opening pressure	2.0 bar
Pressure at idle	0.5 bar
Oil pressure warning light switch opens	0.2 to 0.3 bar
Oil filter	Full flow with disposable canister

FUEL SYSTEM

Electronic fuel injection data	See Engine Tuning Data
Fuel Pump:	
Type	Electric immersible
Pump maximum pressure at 16V	2.7 bar
Regulated injection pressure range	1.0 to 3.0 bar ± 0.2 bar

COOLING SYSTEM

Pressure cap opens	0.5 bar
Thermostat starts to open	88°C ± 2°
Thermostat fully open	100°C ± 2°
Cooling fan operation:	
On	105°C
Off	98°C

INFORMATION

CLUTCH

Type	Diaphragm spring, hydraulically operated
Clutch plate diameter	180 mm

MANUAL GEARBOX

Gear ratios:	
Fourth	1.000 : 1
Third	1.425 : 1
Second	2.185 : 1
First	3.647 : 1
Reverse	3.667 : 1

AUTOMATIC GEARBOX

Type	3-speed, torque converter
Gear ratios:	
Drive	1.000 : 1
Third	1.460 : 1
Second	1.845 : 1
First	2.690 : 1
Reverse	2.690 : 1

FINAL DRIVE

Manual gearbox:

Ratio	3.213 : 1	
Road speed at 1000 rev/min:		
Fourth	28.6 km/h	17.8 mph
Third	20.1 km/h	12.5 mph
Second	13.1 km/h	8.2 mph
First	7.9 km/h	4.9 mph

Automatic gearbox:

Ratio	2.690 : 1	
Road speed at 1000 rev/min:		
Drive	29.3 km/h	18.2 mph
Third	20.1 km/h	12.5 mph
Second	15.9 km/h	9.9 mph
First	10.1 km/h	6.8 mph



WHEELS

Wheel size and type:

Steel wheel (spare only) 4«J x 12
 Standard alloy wheel 4«J x 12
 Optional alloy wheel 6J x 13

TYRE SIZE

Steel spare wheel 145/70-SR 12
 Standard alloy wheel 145/70-SR 12
 Optional alloy wheel 175/50-VR 13

TYRE PRESSURES

Pressures (cold):

Loading conditions	bar	lbf/in
All load conditions		
145/70-SR 12		
Front	2.0	28
Rear	2.0	28
175/50-VR 13		
Front	2.0	28
Rear	1.8	26

ELECTRICAL

System 12 volt, negative earth

Battery

Cold crank 265 amps
 Reserve capacity 45 minutes

Alternator

Type A115I - 65
 Maximum output 65 Amps
 Regulator 21TR

Starter motor

Type M79
 Power 0.8 kW

INFORMATION

DIMENSIONS

Overall length	3.05 m
Overall width (including mirrors)	1.58 m
Overall height *	1.34 m
Ground clearance *	163 mm
Wheelbase	2.04 m
Turning circle (kerb to kerb):	
145/70 SR-12 tyres	8.60 m
175/VR-13 tyres	8.80 m

* At unladen weight

WEIGHTS

Unladen (fuel tank full, excluding optional fittings) . . .	715 kg
Maximum gross vehicle weight	1050 kg
Maximum roof rack load (distributed)	50 kg



CAUTION: Do not use the vehicle for towing a trailer, as it is not suitable for this purpose.



Model: SPi with manual gearbox

Engine

Type / Capacity	12A2EK71/1275 cm ³
Firing order	1 - 3 - 4 - 2
Compression ratio	10.0 : 1
Idle speed, controlled by the ECM *	900 ± 50 rev/min
Exhaust gas CO content at idle	less than 0.4% hot
Ignition timing at idle speed ç	15°BTDC (nominal)
Valve rocker clearance (cold)	0.27 to 0.33 mm

Ignition Coil

Type	Quad type dry
Part No.	NEC 1000710
Primary resistance at 20°C	0.41 to 0.61 ohm
Secondary resistance at 20°C	6200 to 6700 ohm
Consumption at engine idle speed	4.7 to 6.7 amps

Spark Plugs

Type	NGK BPR6E
Plug gap	0.80 to 0.90 mm

Engine Management System

Type	Single point throttle body injection
MEMS ECM	MNE 101350
Fuel pump module	WFX 10047
Injector/fuel pressure regulator	JZX 3300
Fuel pressure	1.0 ± 0.2 bar constant
Throttle position (TP) sensor	MJC 10020
Intake air temperature (IAT) sensor	NNK 10001
Crankshaft position (CKP) sensor	ADU 7340
Engine coolant temperature (ECT) sensor	ADU 7161
Heated oxygen sensor (HO2S)	MHK 10004
Lost motion gap at engine idle speed	Equal either side of lever
TP sensor voltage:	
Throttle closed	0 to 1v
Throttle open 90°	4 to 5v
Throttle open 65°	3 to 4v
Fuel grade	95 RON minimum - UNLEADED fuel



CAUTION: Do not use LEADED fuel as it will damage the catalyst. Serious damage to the engine may occur if a lower octane number fuel than that recommended is used.

* No electrical load present

ç Crankshaft degrees and rev/min

INFORMATION

Model: SPi with automatic gearbox

Engine

Type / Capacity	12A2EK72/1275 cm ³
Firing order	1 - 3 - 4 - 2
Compression ratio	9.4 : 1
Idle speed, controlled by the ECM *	900 ± 50 rev/min
Exhaust gas CO content at idle	less than 0.4% hot
Ignition timing at idle speed ç	15°BTDC (nominal)
Valve rocker clearance (cold)	0.27 to 0.33 mm

Ignition Coil

Type	Quad type dry
Part No.	NEC 1000710
Primary resistance at 20°C	0.41 to 0.61 ohm
Secondary resistance at 20°C	6200 to 6700 ohm
Consumption at engine idle speed	4.7 to 6.7 amps

Spark Plugs

Type	NGK BPR6E
Plug gap	0.80 to 0.90 mm

Engine Management System

Type	Single point throttle body injection
MEMS ECM	MNE 101350
Fuel pump module	WFX 10047
Injector/fuel pressure regulator	JZX 3300
Fuel pressure	1.0 ± 0.2 bar constant
Throttle position (TP) sensor	MJC 10020
Intake air temperature (IAT) sensor	NNK 10001
Crankshaft position (CKP) sensor	ADU 7340
Engine coolant temperature (ECT) sensor	ADU 7161
Heated oxygen sensor (HO2S)	MHK 10004
Lost motion gap at engine idle speed	Equal either side of lever
TP sensor voltage:	
Throttle closed	0 to 1v
Throttle open 90°	4 to 5v
Throttle open 65°	3 to 4v
Fuel grade	95 RON minimum - UNLEADED fuel



CAUTION: Do not use LEADED fuel as it will damage the catalyst. Serious damage to the engine may occur if a lower octane number fuel than that recommended is used.

* No electrical load present

ç Crankshaft degrees and rev/min



Model: MPi

Engine

Type / Capacity	12A2LK70/1275 cm ³
Firing order	1 - 3 - 4 - 2
Compression ratio	10.0 : 1
Idle speed, controlled by the ECM *	900 ± 50 rev/min
Exhaust gas CO content at idle	less than 0.4% hot
Ignition timing at idle speed ç	12°BTDC (nominal)
Valve rocker clearance (cold)	0.27 to 0.33 mm

Ignition Coil

Type	Quad type dry
Part No.	NEC 1000710
Primary resistance at 20°C	0.41 to 0.61 ohm
Secondary resistance at 20°C	6200 to 6700 ohm
Consumption at engine idle speed	4.7 to 6.7 amps

Spark Plugs

Type	NGK BPR6E
Plug gap	0.80 to 0.90 mm

Engine Management System

Type	Two point injection
MEMS ECM	MNE 104290
Fuel pump module	WFX 100810
Injector/fuel pressure regulator	MKW 10016
Fuel pressure	3.0 ± 0.2 bar constant
Throttle position (TP) sensor	MJC 10020
Intake air temperature (IAT) sensor	NNK 10001
Crankshaft position (CKP) sensor	ADU 7340
Camshaft position (CMP) sensor	NSC 100390
Engine coolant temperature (ECT) sensor	MEK 100060
Heated oxygen sensor (HO2S)	MHK 10004
TP sensor voltage:	
Throttle closed	0 to 1v
Throttle open 90°	4 to 5v
Throttle open 65°	3 to 4v
Fuel grade	95 RON minimum - UNLEADED fuel



CAUTION: Do not use LEADED fuel as it will damage the catalyst. Serious damage to the engine may occur if a lower octane number fuel than that recommended is used.

* No electrical load present

ç Crankshaft degrees and rev/min



Refer to the appropriate section heading for component torque figures, e.g.

Road wheel nuts - refer to **SUSPENSION**,

Exhaust front pipe to manifold - refer to **MANIFOLD AND EXHAUST**

GENERAL

Bolt M6	10 Nm
Bolt M8	25 Nm
Bolt M10	45 Nm
Bolt M12	80 Nm
1/4 UNC/UNF	9 Nm
5/16 UNC/UNF	25 Nm
3/8 UNC/UNF	40 Nm
7/16 UNC/UNF	75 Nm
1/2 UNC/UNF	90 Nm
5/8 UNC/UNF	135 Nm

ENGINE

Timing gear cover bolts	16 Nm
Timing gear nuts	90 Nm
Timing chain tensioner bolts	22 Nm
Cylinder head nuts	34 Nm then a further 34 Nm
Front cover plate bolts	11 Nm
Rocker shaft nuts	25 Nm
Camshaft thrust plate screws	11 Nm
Rocker cover bolts	5 Nm
Crankshaft pulley bolt	150 Nm
Engine LH mounting:	
Mounting to subframe - nuts	25 Nm
Mounting to engine - bolts	25 Nm
Engine RH mounting:	
Mounting to flywheel housing cover - bolts	18 Nm
Mounting to subframe - nuts	22 Nm
Engine steady bar upper bolts	22 Nm
Engine steady bar lower:	
Bar to subframe bolt	40 Nm
Bar to flywheel housing bolt	40 Nm
Oil pressure gauge sensor	60 Nm
Oil pressure relief valve cap	60 Nm
Oil pressure switch	25 Nm
Oil pump to engine - bolts	11 Nm
Flywheel housing to engine/gearbox - bolts	25 Nm
Earth lead to engine - bolt	10 Nm
Engine to gearbox - nuts and bolts	8 Nm
Flywheel to crankshaft - bolt	150 Nm
Flywheel housing cover - bolts	10 Nm
Engine mounting adaptor plate to engine - bolts	25 Nm

INFORMATION

EMISSION CONTROL

Oil breather/separator to flywheel housing	18 Nm
Catalytic converter to tail pipe nuts	9 Nm
Catalytic converter to front pipe nuts	45 Nm
Emission canister purge valve to body - bolts	9 Nm

ENGINE MANAGEMENT SYSTEM

ECT sensor to thermostat housing	15 Nm
MAP sensor to inlet manifold	6 Nm
IAT sensor to inlet manifold	7 Nm
TP sensor to throttle body screws	1.5 Nm
Throttle housing to inlet manifold - bolts	8 Nm
Throttle pedal nuts	25 Nm
Spark plugs	25 Nm
Ignition coil to bracket - bolts	10 Nm
HO2S to exhaust manifold	55 Nm
Air cleaner to inlet manifold	7 Nm
ECM to mounting bracket	10 Nm
ECM mounting bracket to body	10 Nm
IACV to inlet manifold - bolts	7 Nm
CMP sensor to engine - bolt	10 Nm
CKP sensor to flywheel housing - bolts	6 Nm
CKP sensor multiplug to flywheel housing - bolt	3 Nm

FUEL SYSTEM

Fuel breather valve nut	9 Nm
Fuel pump to fuel tank nuts	9 Nm
IFS to bulkhead - screws	2 Nm
Fuel filter mounting bracket to body	9 Nm
Fuel pipe unions to fuel filter	30 Nm
Fuel feed/return pipes to fuel rail	5 Nm
Fuel rail to inlet manifold - bolts	10 Nm

COOLING

Radiator brackets to bonnet platform	9 Nm
Thermostat housing bolts	11 Nm
Coolant pump bolts	22 Nm
Coolant pump pulley bolts	10 Nm
Expansion tank to mounting bracket	10 Nm
Expansion tank mounting bracket to body	10 Nm



MANIFOLD AND EXHAUST

Front pipe to manifold nuts	22 Nm
Front pipe to differential housing	22 Nm
Inlet and exhaust manifold nuts	22 Nm
Catalytic converter to tail pipe nuts	9 Nm
Catalytic converter to front pipe nuts	45 Nm

CLUTCH

Flywheel centre bolt	150 Nm
Pressure plate to flywheel bolts	25 Nm
Flywheel housing to engine block bolts	25 Nm
Slave cylinder to mounting bracket	37 Nm
Slave cylinder mounting bracket to flywheel housing:	
M8 bolts	37 Nm
M5 bolt	7 Nm
Pipe union to master cylinder	14 Nm
Pipe union to slave cylinder	14 Nm

MANUAL GEARBOX

Gearbox to engine bolts	28 Nm
Third motion shaft bearing retaining bolts	18 Nm
First motion shaft gear nut	200 Nm
Speedometer drive housing to gearbox - bolts	25 Nm
Speedometer drive housing cover - bolts	8 Nm
Speedometer drive pinion clamping plate - bolt	8 Nm

STEERING

Steering wheel nut	49 Nm
Drivers air bag module Torx screws	9 Nm
Steering column upper mounting to fascia rail bolt	25 Nm
Inner column to steering rack pinion clamp bolt	16 Nm
Track rod ball joint to steering arm nut	30 Nm
Steering rack U-bolts	15 Nm
Steering rack pinion cover bolts	15 Nm
Steering arm to front hub bolts	45 Nm
Steering column to pinion - bolt	15 Nm

INFORMATION

SUSPENSION

Wheel nuts:	
Alloy wheels	50 Nm
Steel wheels	60 Nm
Upper arm to front hub	52 Nm
Lower arm to front hub	52 Nm
Front hub to drive shaft - nut	260 Nm
Front subframe turret bolts	67 Nm
Front damper to body bracket - nut	37 Nm
Front damper to upper arm - nut	48 Nm
Front subframe to body - nuts and bolts	25 Nm
Rear damper to body	25 Nm
Rear damper to suspension arm	25 Nm

BRAKES

Bleed screw to caliper	9 Nm
Brake master cylinder nuts	25 Nm
Brake servo banjo bolt	50 Nm
Brake servo to bracket nuts	25 Nm
Brake servo bracket nuts and bolts to body	25 Nm
Brake caliper to swivel hub bolts	52 Nm
Brake disc to drive flange bolts	57 Nm
Brake drum back plate to radius arm bolts	28 Nm
Pressure limiting valve to body bolt	17 Nm
Brake pipe to master cylinder - union	14 Nm
Brake drum to hub - screw	7 Nm
Brake pipe union to pressure reducing valve	14 Nm
Pressure reducing valve to body - bolt	17 Nm
Brake pedal pivot bolt - nut	15 Nm
Brake light switch bracket to pedal box	5 Nm
Brake hose union to caliper	15 Nm
Brake pipe union to wheel cylinder	14 Nm

RESTRAINT SYSTEMS

Rotary coupler bolts	15 Nm
Diagnostic unit	9 Nm
Airbag module screws	7 Nm
Diagnostic harness earth lead bolt	10 Nm
Front seat belt stalk bolt	32 Nm
Front seat belt upper mounting bolt	32 Nm
Front seat belt lower mounting bolt	30 Nm
Front seat belt upper mounting bolt	30 Nm
Seat belt pre-tensioner reel bolt	30 Nm
Seat belt pre-tensioner tube nut	6 Nm
Seat belt pre-tensioner tube screw	1.2 Nm
Rear seat belt buckle to body - bolt	30 Nm
Rear seat belt reel to body - bolt	30 Nm
Rear seat belt lower mounting bolt	30 Nm
Rear seat belt upper mounting bolt	30 Nm



BODY

Bonnet hinge nuts	9 Nm
Front/Rear bumper to body - nuts	10 Nm
Door striker to body - screws	18 Nm
Bonnet latch to body - bolts	9 Nm
Wheel arch extension to body - nuts	9 Nm
Fascia top rail to body - nuts	9 Nm
Front seat to body - nut and bolt	25 Nm

HEATING AND VENTILATION

Heater to bulkhead - nut	9 Nm
------------------------------------	------

WIPERS AND WASHERS

Wiper wheel boxes to body - nut	10 Nm
---	-------

ELECTRICAL

Alternator pulley nut	25 Nm
Auxiliary drive belt tensioner pulley nut	25 Nm
Auxiliary drive belt tensioner to engine	22 Nm
Starter motor to flywheel housing bolts	37 Nm
Starter solenoid terminal nuts	4 Nm
Horn mounting bracket to body	9 Nm
Horn to mounting bracket	10 Nm

INSTRUMENTS

Oil temperature gauge sensor	60 Nm
--	-------



CAPACITIES

Fuel tank	34.0 litres
Engine/gearbox oil refill and filter change	4.8 litres
Automatic gearbox	5.1 litres
Cooling system refill	4.0 litres
Windscreen washer reservoir	2.3 litres

FLUIDS

Fuel

Octane rating: UNLEADED fuel - 95 RON minimum



CAUTION: Catalyst equipped vehicles MUST NOT be run on LEADED fuel as damage to the catalyst will result.

Brake/Clutch Fluid

For topping-up Rover recommend the use of AP New Premium Super DOT 4 brake fluid or Castrol Universal DOT 4 brake/clutch fluid.

Anti-freeze solutions

The overall anti-freeze concentration should not fall, by volume below 30% to ensure that the anti-corrosion properties of the coolant are maintained. Anti-freeze concentrations greater than 60% are not recommended as cooling efficiency will be impaired.

Use **UNIPART SUPERPLUS 3 ANTI-FREEZE AND SUMMER COOLANT** to protect the cooling system.

If this is not available, use an ethylene glycol based anti-freeze, containing no methanol with non-phosphate corrosion inhibitors suitable for use in mixed metal engines to ensure the protection of the cooling system against frost and corrosion.



CAUTION: No other 'universal' anti-freeze should be used with UNIPART SUPERPLUS 3 ANTI-FREEZE AND SUMMER COOLANT.

The cooling system should be drained, flushed and refilled with the correct amount of anti-freeze solution at three years and every two years thereafter.

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				
33¹/₃ 50	1.2	- 19	- 2	- 36	- 33
	1.8	- 36	- 33	- 48	- 53

INFORMATION

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/Gearbox oil

Use oil meeting specification ACEA A2 and having a viscosity of 10W/30.

Gear linkage - Manual

Use a grease Part No. AFU 1500.1509 containing 3% Molybdenum Disulphide.

Steering rack

Use Sterak grease specification 31.815.252 in accordance with specification 31.820.194; a total quantity of 100 cm³ is required to fill a rack from the dry condition.

General Greasing

Use Multipurpose Lithium Base Grease N.L.G.I. consistency No. 2.

Bonnet latch

Lubricate cable and latch with oil.

Locks, latches and hinges

Use Door Lock and Latch Lubricant, Part No. VWN 10075.

CONTENTS

Page

ADJUSTMENTS

CRANKSHAFT PRIMARY GEAR END-FLOAT	1
VALVE ROCKER ADJUSTMENT	2

REPAIRS

CAMSHAFT THRUST PLATE	1
CRANKSHAFT FRONT PULLEY	1
CRANKSHAFT FRONT SEAL	3
MAIN BEARING CAP OIL SEAL	5
FRONT PLATE GASKET	5
CYLINDER HEAD GASKET	6
ROCKER COVER GASKET	11
ROCKER SHAFT ASSEMBLY	11
VALVE	13
ENGINE AND GEARBOX	15
ENGINE LH MOUNTING	24
ENGINE RH MOUNTING	25
ENGINE STEADY BAR - UPPER	25
ENGINE STEADY BAR - LOWER	26
FLYWHEEL HOUSING OIL SEAL	27
FLYWHEEL HOUSING GASKET	29
FLYWHEEL	32
OIL FILTER	33
OIL PUMP	34
ENGINE TO GEARBOX GASKET	34
OIL PRESSURE SWITCH	39
OIL PRESSURE RELIEF VALVE	39
TIMING GEAR COVER AND OIL SEAL	40
TIMING CHAIN AND GEARS	40
TIMING CHAIN TENSIONER	42





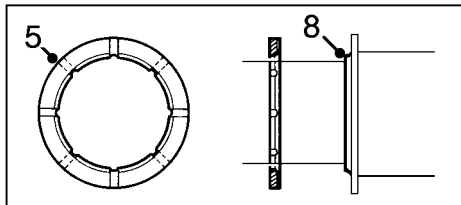
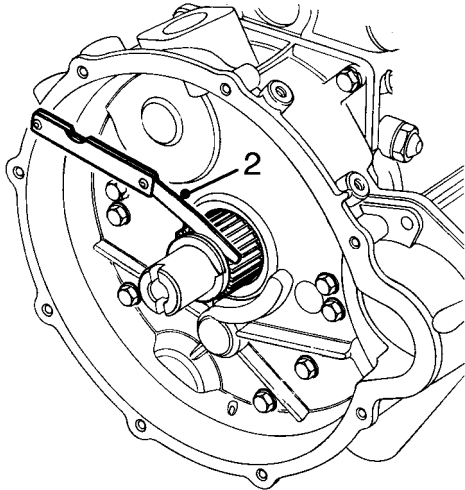
CRANKSHAFT PRIMARY GEAR END-FLOAT

Service repair no - 12.21.28

Check and Adjust

Check

1. Remove clutch assembly. *See CLUTCH, Repairs.*



12M3440

2. Using feeler gauges, check primary gear end-float between backing ring and primary gear.
DATA: End-float = 0.089 to 0.165 mm.
3. Adjust end-float if outside of tolerance.

Adjust

4. Remove flywheel housing oil seal. *See Repairs.*
5. Remove primary gear front thrust washer.
6. Measure thickness of thrust washer.
7. Select a thrust washer which will give the correct end-float figure.



NOTE: Thrust washers are available in sizes from 2.79 mm to 3.04 mm in steps of 0.05 mm.

8. Grease the selected washer and fit with chamfered inner edge against the crankshaft.
9. Fit primary gear (without the oil seal), fit backing ring and 'C' shaped washer.
10. Check that end-float is now within tolerance.
11. Remove 'C' shaped washer, backing ring and primary gear.
12. Fit flywheel housing oil seal. *See Repairs.*
13. Fit clutch assembly. *See CLUTCH, Repairs.*

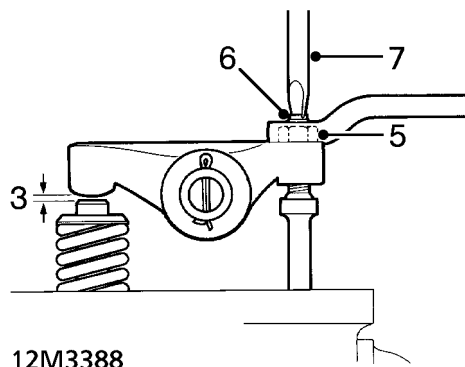
ENGINE

VALVE ROCKER ADJUSTMENT

Service repair no - 12.29.48

Remove

1. Disconnect battery earth lead.
2. Remove rocker cover. **See Repairs.**



3. Check clearance between the valve rocker arms and valve stems with a feeler gauge.
Data: Clearance = 0.30 mm.
4. Check clearance of each valve in the following order:
Check No. 1 valve with No. 8 fully open.
Check No. 3 valve with No. 6 fully open.
Check No. 5 valve with No. 4 fully open.
Check No. 2 valve with No. 7 fully open.
Check No. 8 valve with No. 1 fully open.
Check No. 6 valve with No. 3 fully open.
Check No. 4 valve with No. 5 fully open.
Check No. 7 valve with No. 2 fully open.



NOTE: The gauge should be a sliding fit when the engine is cold.

5. Loosen adjusting screw lock nut.
6. Rotate the adjusting screw, clockwise to decrease or anti-clockwise to increase the clearance.
7. Tighten locknut when clearance is correct, holding the screw against rotation.
8. Fit rocker cover. **See Repairs.**
9. Connect battery earth lead.

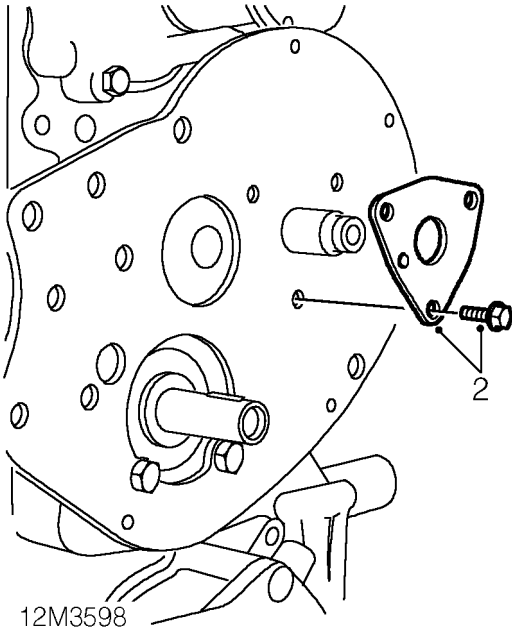


CAMSHAFT THRUST PLATE

Service repair no - 12.13.23.

Remove

1. Remove timing chain and gears. **See this section.**



2. Remove 3 bolts securing camshaft thrust plate and remove camshaft thrust plate.

Refit

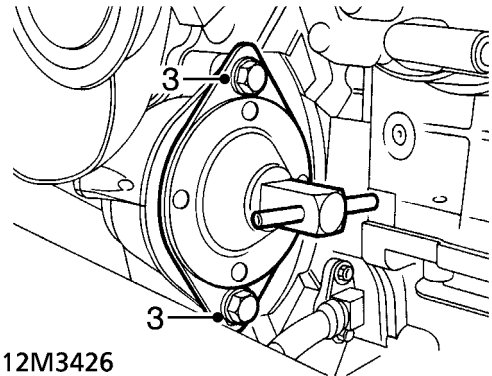
1. Clean camshaft thrust plate and engine front plate.
2. Lubricate face of camshaft thrust plate.
3. Fit camshaft thrust plate and tighten bolts to 11 Nm.
4. Fit timing chain and gears. **See this section.**

CRANKSHAFT FRONT PULLEY

Service repair no - 12.21.01

Remove

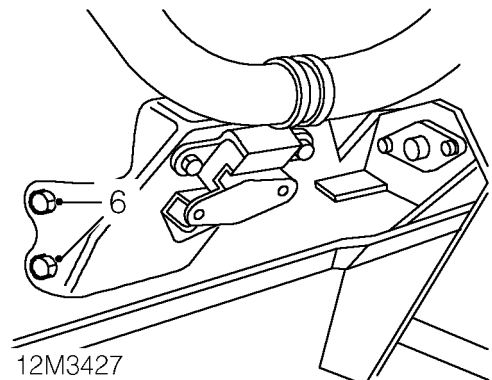
1. Remove coolant pump pulley. **See COOLING SYSTEM, Repairs.**
2. Remove starter motor. **See ELECTRICAL, Repairs.**



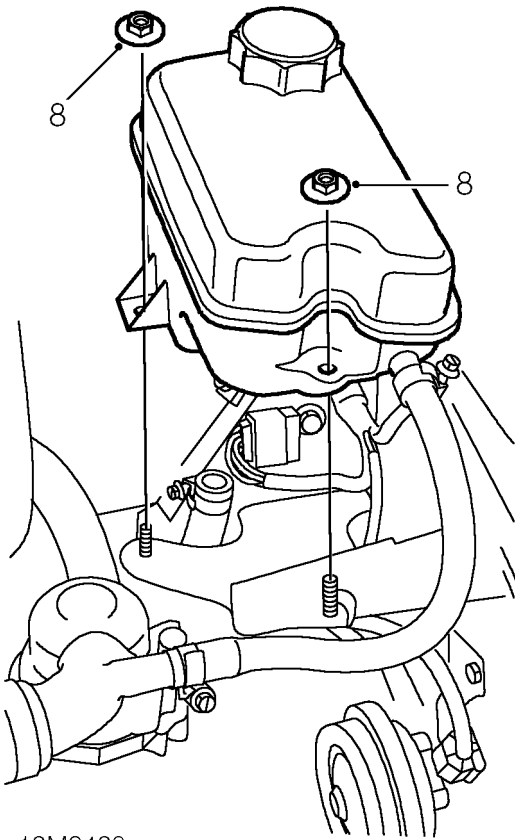
3. Fit flywheel locking tool and secure with 2 bolts.
4. Position jack under engine.

CAUTION: Use a block of wood or hard rubber pad between jack and engine.

5. Take the weight off engine LH mounting.

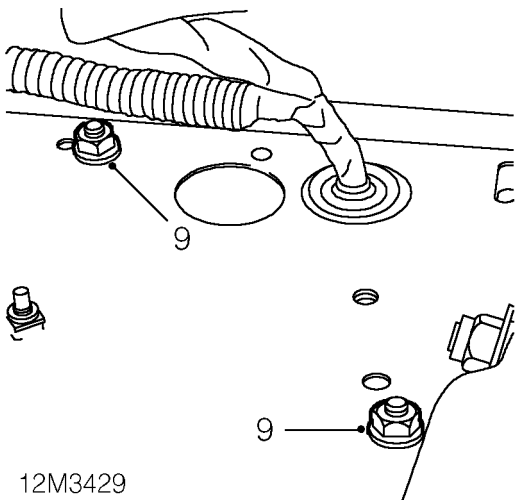


6. Remove bolts securing engine LH mounting bracket to gearbox casing.
7. Raise engine to allow access to crankshaft pulley bolt.



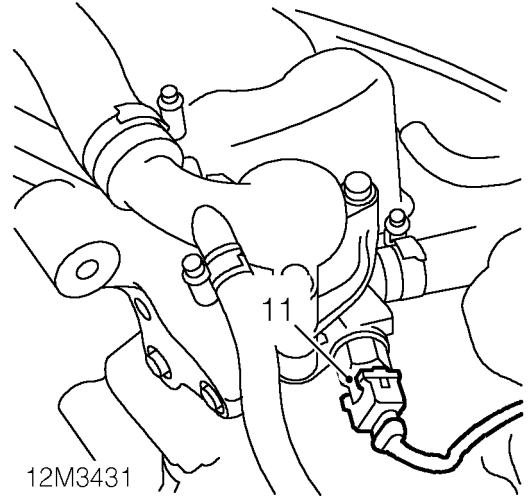
12M3428

8. Remove nuts securing expansion tank to mounting bracket and position tank aside.



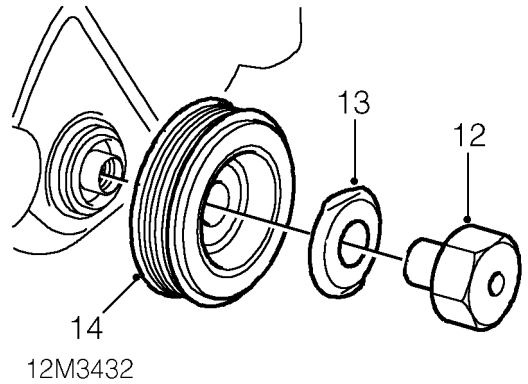
12M3429

9. Remove nuts securing expansion tank mounting bracket to body and remove bracket.
10. Remove bolts securing horn bracket to body and position horn aside.



12M3431

11. Disconnect multiplug from ECT sensor.



12M3432

12. Tap back lock washer from crankshaft pulley bolt and remove bolt.
13. Remove lockwasher from bolt.
14. Remove crankshaft pulley.



Refit

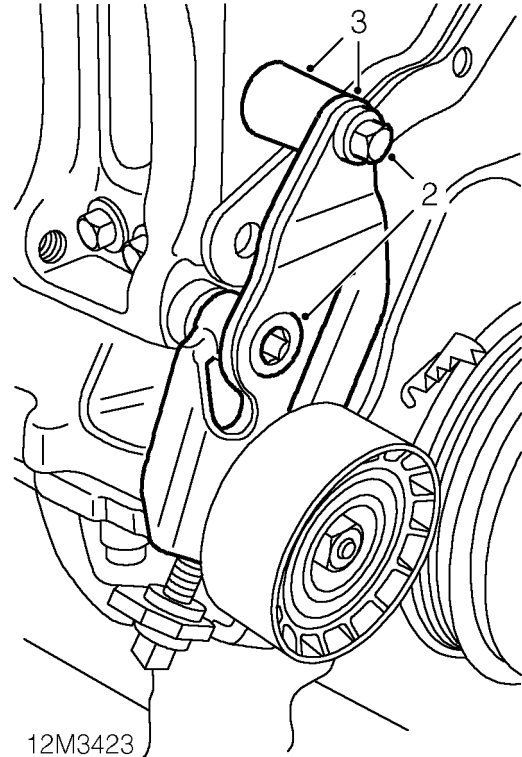
1. Clean crankshaft pulley and ensure Woodruff key is in position in crankshaft.
2. Lubricate oil seal surface on crankshaft pulley and fit pulley to crankshaft.
3. Fit new lock washer to pulley bolt, fit pulley bolt and tighten to 150 Nm.
4. Secure crankshaft pulley bolt with lock washer.
5. Remove bolts securing flywheel locking tool.
6. Fit starter motor. **See *ELECTRICAL, Repairs*.**
7. Connect multiplug to ECT sensor.
8. Position horn mounting bracket to body, fit bolts and tighten to 9 Nm.
9. Position expansion tank mounting bracket to body fit nuts and tighten to 10 Nm.
10. Fit expansion tank to mounting bracket fit and tighten nuts to 10 Nm.
11. Fit coolant pump pulley. **See *COOLING SYSTEM, Repairs*.**
12. Lower jack to align engine LH mounting to engine, fit bolts and tighten to 25 Nm.
13. Remove jack.

CRANKSHAFT FRONT SEAL

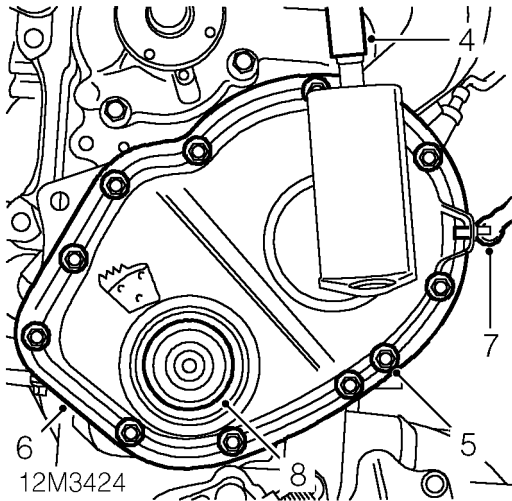
Service repair no - 12.21.14

Remove

1. Remove crankshaft front pulley. **See *this section*.**



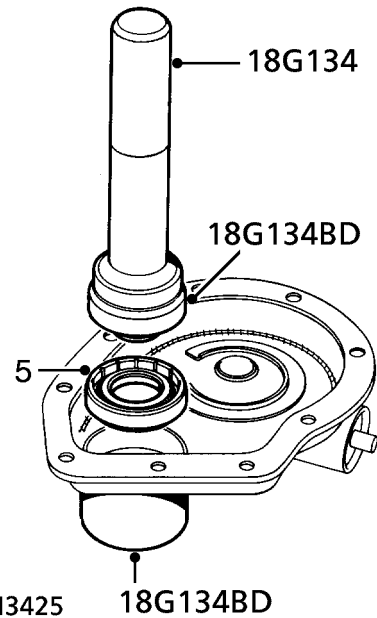
2. Remove bolts securing drive belt tensioner to engine.
3. Remove tensioner and collect spacer.



4. Disconnect breather hose from timing gear cover.
5. Remove 11 bolts securing timing gear cover to engine front plate.
6. Remove timing gear cover and discard gasket.
7. Remove cable tie from timing gear cover and release harness.
8. Remove oil seal from timing gear cover.

Refit

1. Clean mating faces of timing gear cover and engine front plate.
2. Lubricate inner lip of new seal with oil and outer lip with grease.



3. Using tool **18G 134 BD** support timing gear cover.
4. Position seal on tools **18G 134** and **18G 134 BD** with the lips of the seal facing upwards.
5. Drift seal into timing gear cover.
6. Using a new gasket fit the timing gear cover, centralise the seal over the crankshaft using tool **18G 1044**.
7. Fit bolts securing timing gear cover and tighten to 16 Nm.
8. Position harness to cover and secure with cable tie.
9. Connect breather hose to timing gear cover.
10. Locate spacer on tensioner bolt, position drive belt tensioner, and tighten bolts to 22 Nm.
11. Fit crankshaft front pulley. **See this section.**

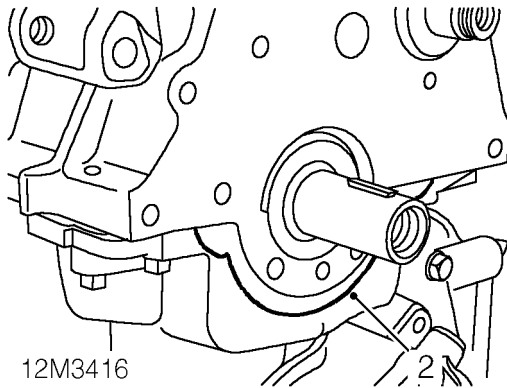


MAIN BEARING CAP OIL SEAL

Service repair no - 12.21.38

Remove

1. Remove front mounting plate gasket. **See this section.**



2. Remove seal from recess under front main bearing cap.

Refit

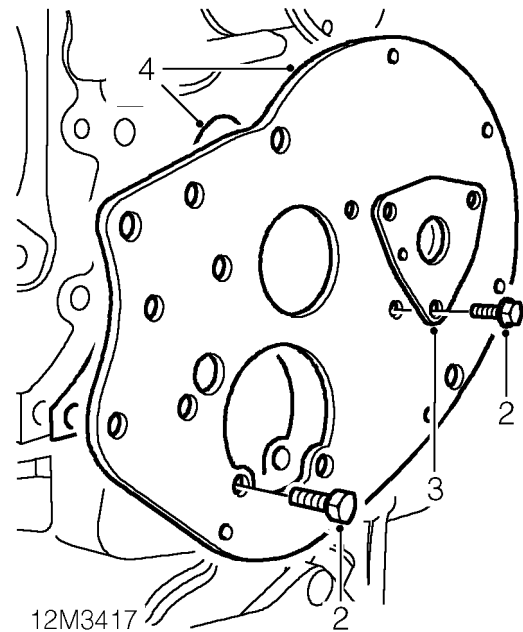
1. Clean seal recess.
2. Apply RTV sealant to ends of new seal and lubricate remainder of seal with clean engine oil.
3. Fit seal into recess by first inserting the ends and then working the seal into position until the seal face is flush with cylinder block face.
4. Fit front mounting plate gasket. **See this section.**
5. Check and if necessary top up engine oil. **See MAINTENANCE Maintenance.**

FRONT PLATE GASKET

Service repair no - 12.25.10.

Remove

1. Remove timing chain and gears. **See this section.**



2. Remove 5 remaining bolts securing front cover plate.
3. Remove camshaft thrust plate.
4. Remove front cover plate and discard gasket.

Refit

1. Clean front cover plate and mating face, dowels and dowel holes.
2. Fit gasket and position front plate to cylinder block.
3. Fit camshaft thrust plate.
4. Fit and tighten bolts to 11 Nm.
5. Fit timing chain and gears. **See this section.**

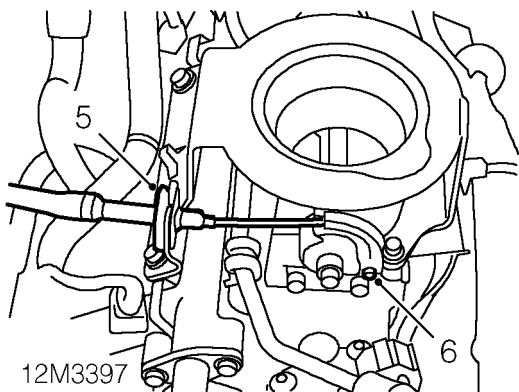
ENGINE

CYLINDER HEAD GASKET

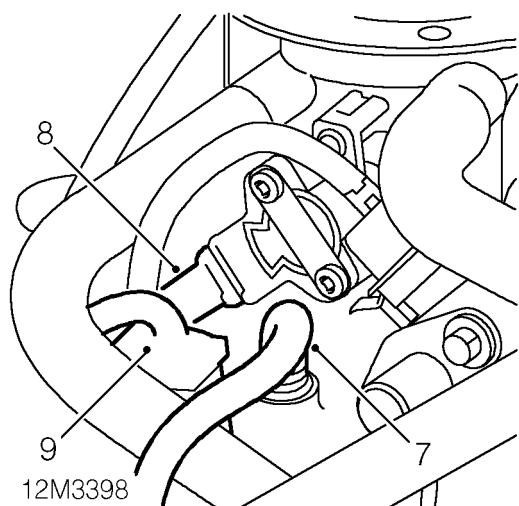
Service repair no - 12.29.02

Remove

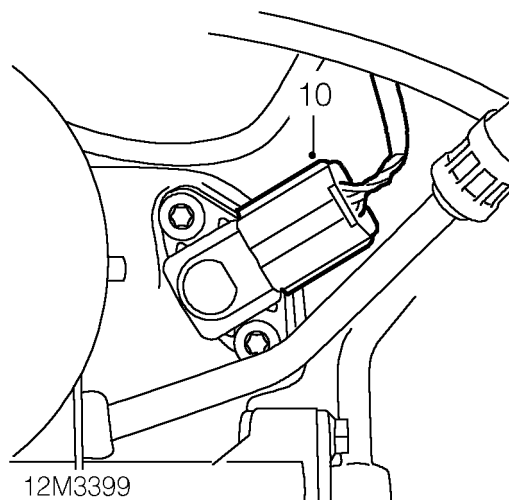
1. Disconnect battery earth lead.
2. Remove bonnet. *See BODY, Exterior fittings.*
3. Remove air cleaner. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*
4. Remove front pipe to manifold gasket. *See MANIFOLD & EXHAUST SYSTEMS, Repairs.*



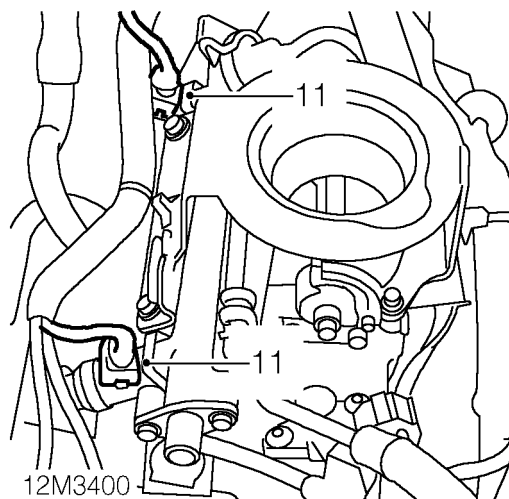
5. Release throttle cable adjustment nut from abutment bracket.
6. Disconnect throttle cable from throttle cam and position aside.



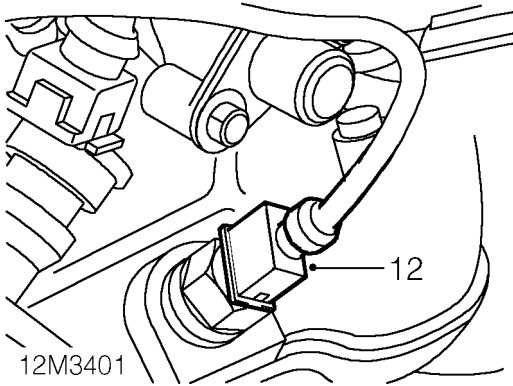
7. Depress plastic collar on quick fit connector and disconnect brake servo vacuum pipe from inlet manifold.
8. Disconnect multiplug from TP sensor.
9. Disconnect multiplug from IACV.



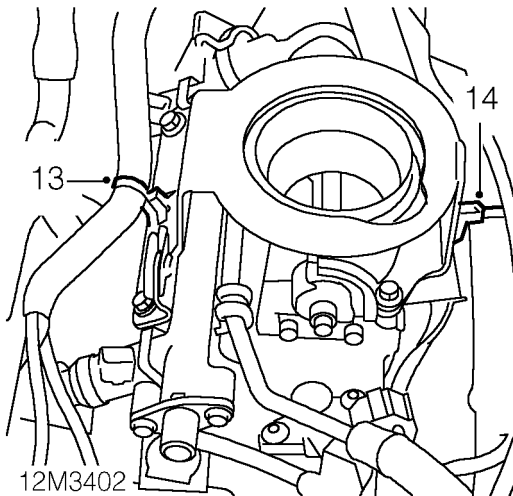
10. Disconnect multiplug from MAP sensor.



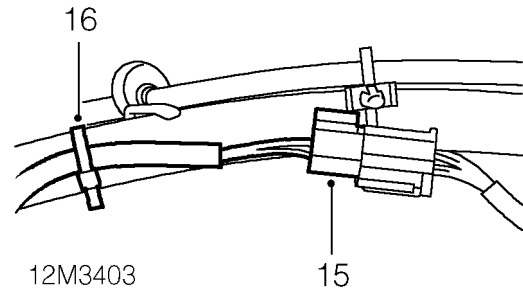
11. Disconnect 2 multiplugs from fuel injectors.



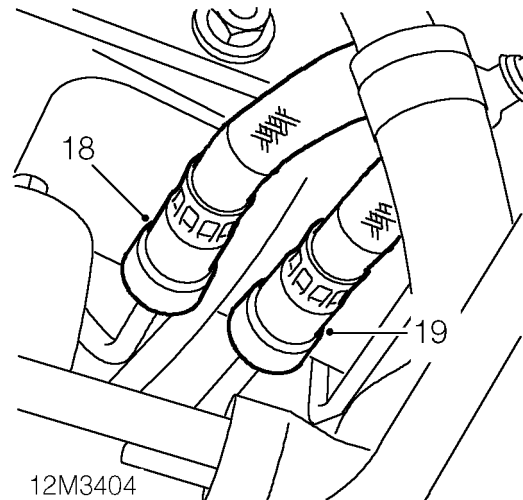
- 12.** Disconnect multiplug from IAT sensor.



- 13.** Release clip securing engine harness to air cleaner bracket and move harness clear.
14. Release harness clip from rear of air cleaner bracket.



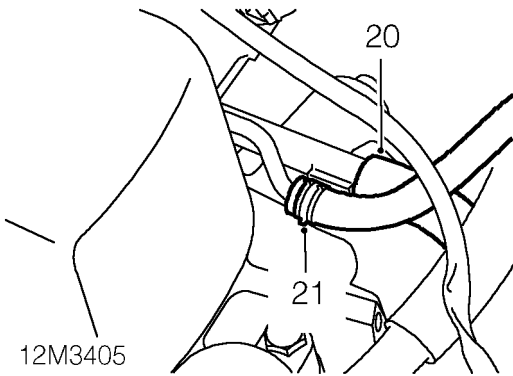
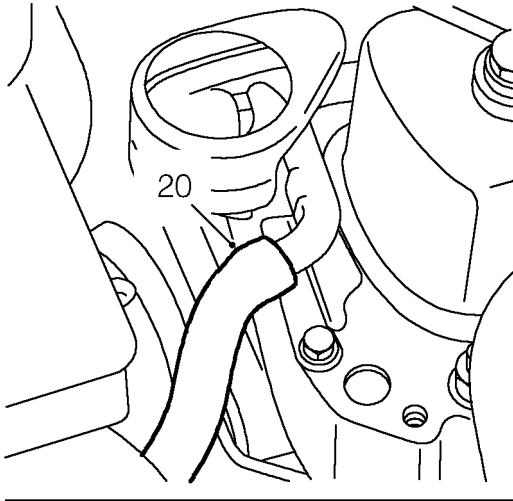
- 15.** Disconnect HO2S multiplug from harness.
16. Remove cable tie securing HO2S cable to harness.
17. Position absorbent cloth around fuel line quick fit connectors.



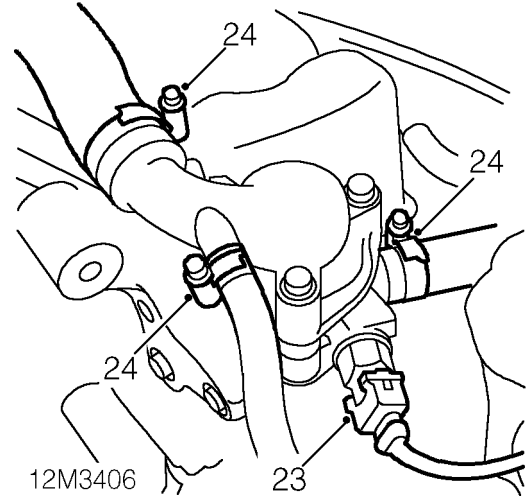
- 18.** Release quick fit connector and disconnect fuel return hose from fuel pipe.
19. Release quick fit connector and disconnect fuel feed hose from fuel pipe.



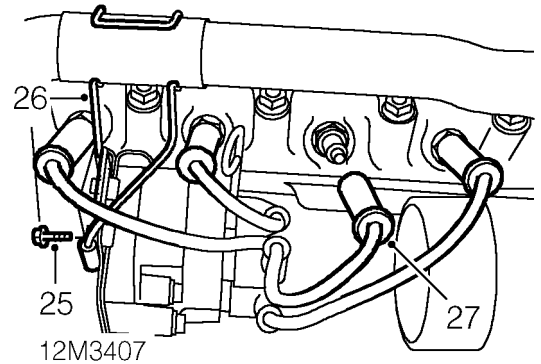
CAUTION: Plug the connections.



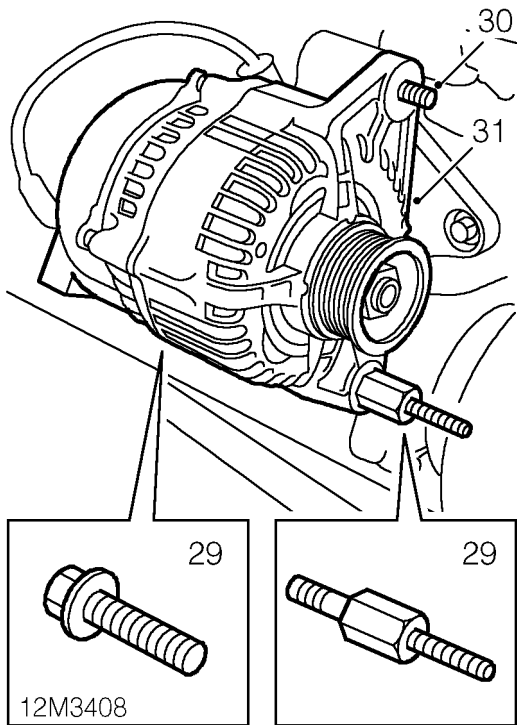
- 20. Disconnect 2 engine breather hoses from connecting pipe.
- 21. Release clip and disconnect evaporative emission canister purge hose from inlet manifold.
- 22. Drain cooling system. **See COOLING SYSTEM, Adjustments.**



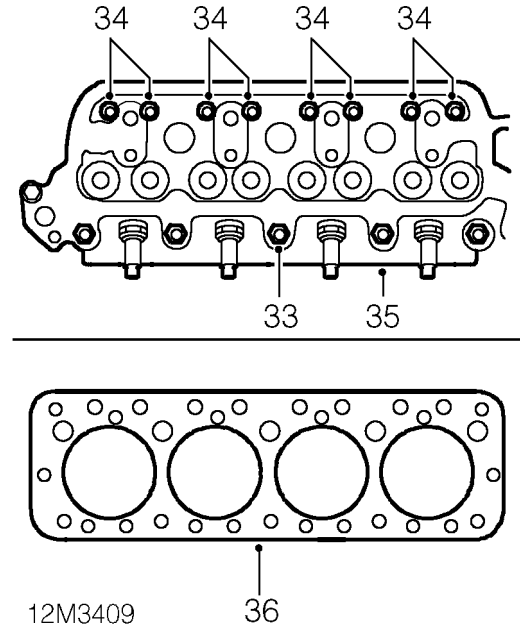
- 23. Disconnect multiplug from coolant temperature sensor.
- 24. Loosen top hose, expansion hose and heater hose clips and disconnect hoses from thermostat housing.



- 25. Remove 2 bolts securing top hose support bracket.
- 26. Remove support bracket.
- 27. Disconnect h.t. leads from spark plugs.
- 28. Remove auxiliary drive belt. **See ELECTRICAL, Repairs.**



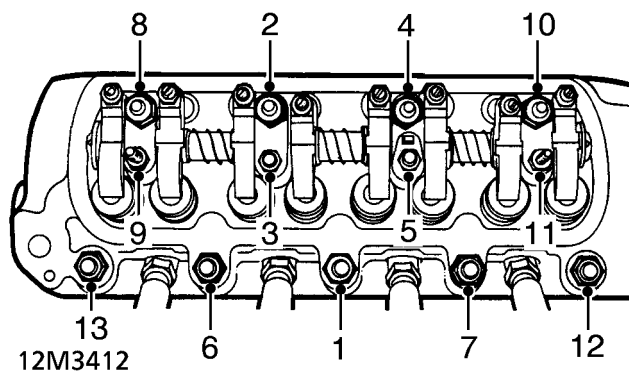
29. Loosen 2 lower bolts securing alternator to engine.
30. Remove upper nut and bolt securing alternator to mounting bracket.
31. Move alternator away from bracket on cylinder head.
32. Remove rocker shaft assembly. **See this section.**



33. Remove 5 remaining cylinder head nuts
34. Remove push rods and retain them in original order.
35. Remove cylinder head assembly.
36. Remove and discard cylinder head gasket.

Refit

1. Clean joint surfaces of cylinder head and cylinder block and ensure rocker shaft oil feed drilling is clear.
2. Clean mating faces exhaust manifold and exhaust front pipe.
3. Fit new cylinder head gasket dry and ensure that marks "TOP" and "FRONT" are correctly positioned.
4. Clean and lubricate push rods, and fit them in original positions.
5. Fit rocker shaft assembly. **See this section.**



6. Fit cylinder head nuts and tighten progressively in order shown to 34 Nm initially. Finally, tighten in order shown to 68 Nm.
7. Tighten rocker shaft bracket nuts to 25 Nm.
8. Align alternator to bracket on cylinder head, fit and tighten upper nut and bolt to 25 Nm.
9. Tighten lower bolts securing alternator to engine to 25 Nm.
10. Fit auxiliary drive belt. **See ELECTRICAL, Repairs.**
11. Connect h.t. leads to spark plugs.
12. Fit top hose support bracket to coil bracket and secure with bolts.
13. Connect top hose, expansion tank hose and heater hoses to thermostat housing and tighten hose clips.
14. Connect evaporative emission canister purge hose to inlet manifold and secure with clip.

15. Connect engine breather hoses to connecting pipe.
16. Clean ends of fuel pipes.
17. Connect fuel feed hose to fuel pipe.
18. Connect fuel return hose to pipe.
19. Connect HO2S multiplug to harness.
20. Secure HO2S lead to harness with cable tie.
21. Secure harness clip to rear of air cleaner bracket.
22. Connect multiplug to coolant temperature sensor.
23. Connect multiplug to IAT sensor.
24. Connect multiplugs to fuel injectors.
25. Connect multiplug to IACV.
26. Connect multiplug to TP sensor.
27. Connect multiplug to MAP sensor.
28. Connect brake servo vacuum pipe to inlet manifold.
29. Fit strap securing engine harness to heater hose.
30. Secure engine harness clip to air cleaner bracket.
31. Connect throttle cable to throttle cam and locate adjusting nut to abutment bracket.
32. Adjust throttle cable. **See ENGINE MANAGEMENT SYSTEM - MEMS, Adjustments.**
33. Fit front pipe to manifold gasket. **See MANIFOLD & EXHAUST SYSTEMS, Repairs.**
34. Fit bonnet **See BODY, Exterior fittings.**
35. Connect battery earth lead.

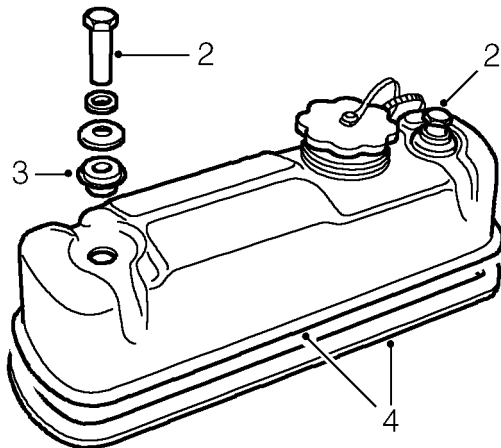


ROCKER COVER GASKET

Service repair no - 12.29.40.

Remove

1. Disconnect battery earth lead.



12M3341

2. Remove 2 bolts securing rocker cover to cylinder head.
3. Collect sealing rubbers and retainers.
4. Remove rocker cover and gasket.

Refit

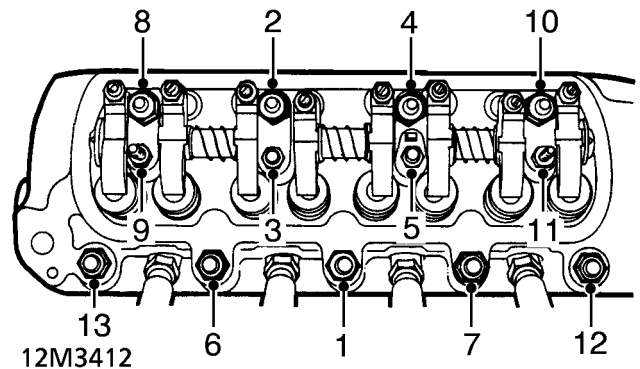
1. Clean mating face of rocker cover and cylinder head.
2. Clean retainers and sealing rubbers.
3. Position gasket and cover. Fit sealing rubbers and retainers.
4. Fit bolts securing rocker cover to cylinder head and tighten to 5 Nm.
5. Connect battery earth lead.

ROCKER SHAFT ASSEMBLY

Service repair no - 12.29.54

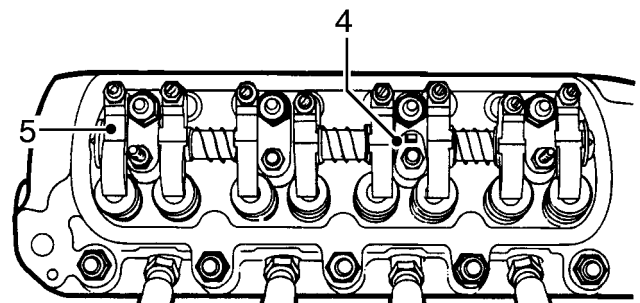
Remove

1. Drain cooling system. *See COOLING SYSTEM, Adjustments.*
2. Remove rocker cover. *See this section.*



12M3412

3. Loosen in the sequence shown the 13 nuts securing rocker shaft brackets and cylinder head then remove the 8 nuts securing the rocker shaft brackets only.



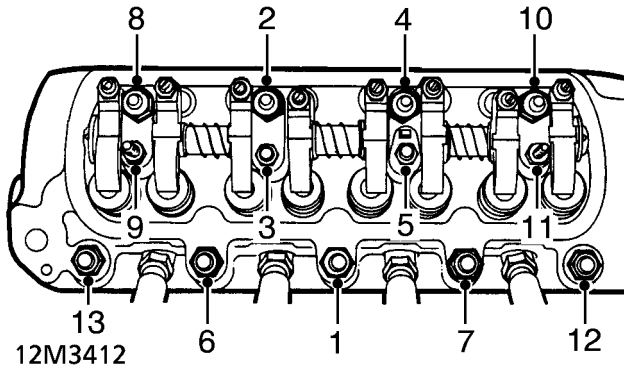
12M0991A

4. Remove rocker shaft lock plate.
5. Remove the rocker shaft assembly.

ENGINE

Refit

1. Ensure rocker shaft is clean and oil passage is clear.
2. Fit rocker shaft assembly locating the rocker screws in the push rods.
3. Fit rocker shaft lock plate.



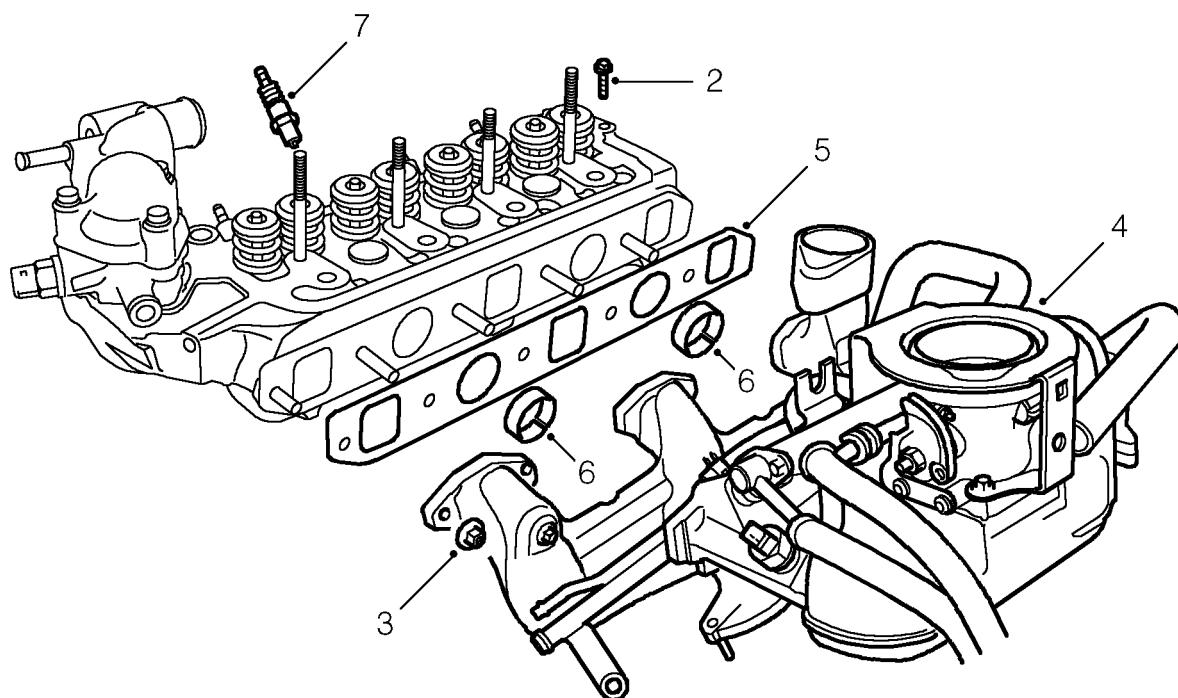
4. Working in sequence shown, tighten the cylinder head nuts to 34 Nm then to 68 Nm.
5. Tighten rocker shaft nuts to 25 Nm.
6. Adjust valve to rocker clearances. **See Adjustments.**
7. Fit rocker cover. **See this section.**
8. Fill cooling system. **See COOLING SYSTEM, Adjustments.**



VALVE

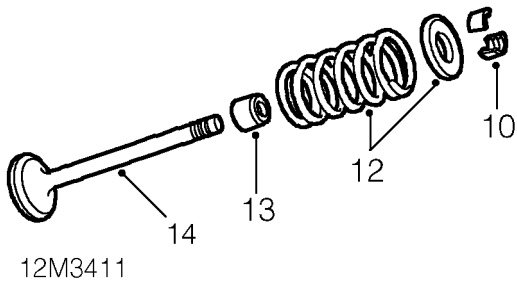
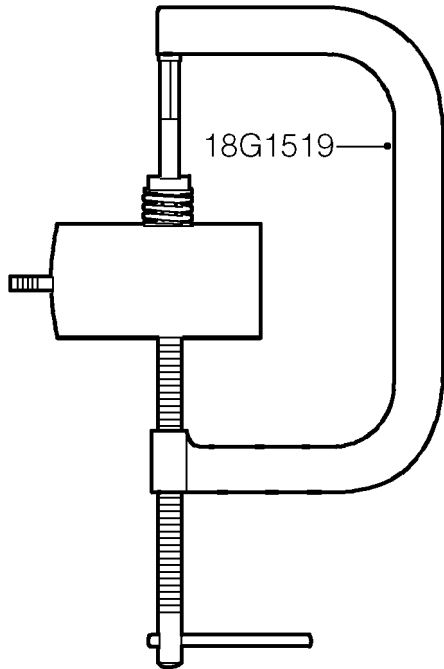
Service repair no - 12.29.59

Remove



12M3410

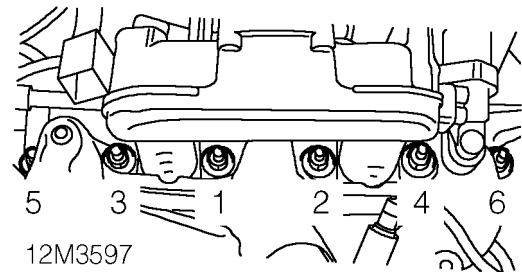
1. Remove cylinder head. **See this section.**
2. Remove bolt securing engine breather pipe to cylinder head.
3. Remove 6 nuts securing inlet and exhaust manifolds to cylinder head.
4. Remove inlet and exhaust manifolds.
5. Remove and discard manifold gasket.
6. Remove inlet manifold locating rings.
7. Remove 4 spark plugs.



8. Position tool **18G 1519** to valve.
9. Compress valve spring with tool.
10. Remove 2 collets securing spring cap to valve.
11. Release valve spring and remove tool **18G 1519**.
12. Remove valve spring and cap.
13. Remove oil seal from valve stem.
14. Remove valve from cylinder head.

Refit

1. Recut valve seat in cylinder head.
2. Grind in valve.
3. Clean combustion space in cylinder head.
4. Use an air line to blow out combustion space and valve guide.
5. Clean valve.
6. Clean valve, spring, cap and collets.
7. Lubricate valve and oil seal.
8. Fit oil seal to valve guide.
9. Fit valve to cylinder head.
10. Position valve spring and cap.
11. Using tool **18G 1519**, compress valve spring.
12. Fit collets securing spring cap to valve.
13. Release valve spring and remove **18G 1519**.
14. Clean mating faces of cylinder head and inlet manifold.
15. Clean inlet manifold locating rings.
16. Fit locating rings to inlet manifold.
17. Fit NEW manifold gasket to cylinder head.
18. Fit inlet and exhaust manifolds.



19. Fit nuts and washers securing manifolds to cylinder head. Working in sequence illustrated, tighten nuts to 22 Nm.
20. Align breather pipe to cylinder, fit and tighten bolt.
21. Set gap of spark plugs to 0.85 mm.
22. Fit spark plugs and tighten to 25 Nm.
23. Fit cylinder head. **See this section.**



ENGINE AND GEARBOX

Service repair no - 12.37.01/99

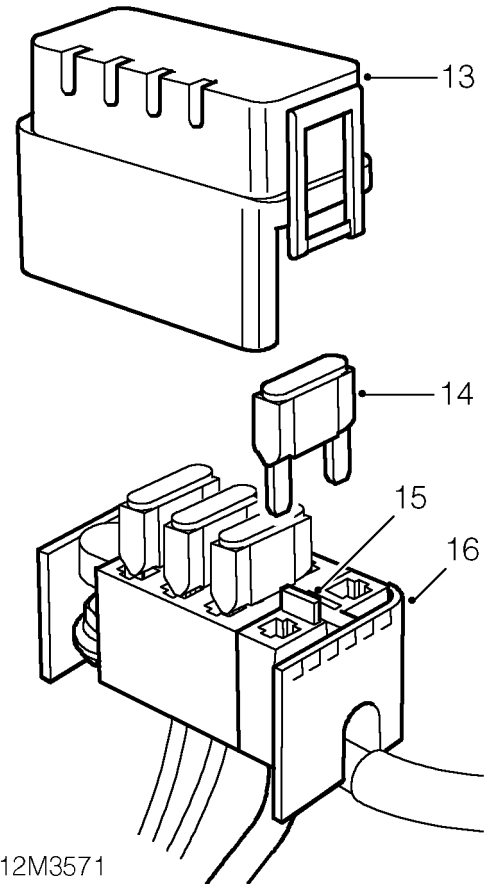
Remove

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

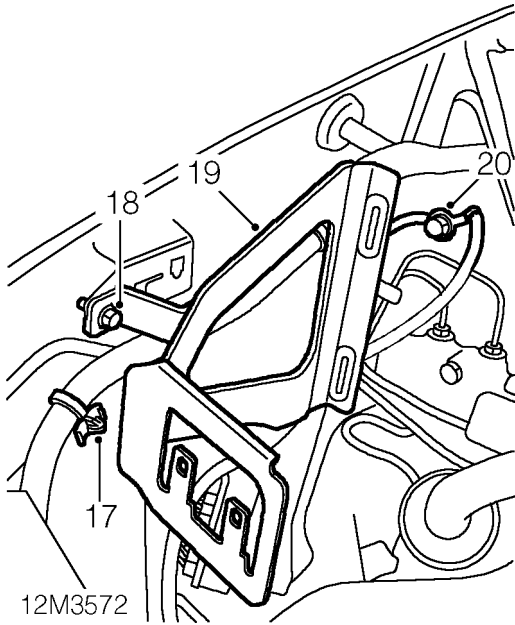


WARNING: Support on safety stands.

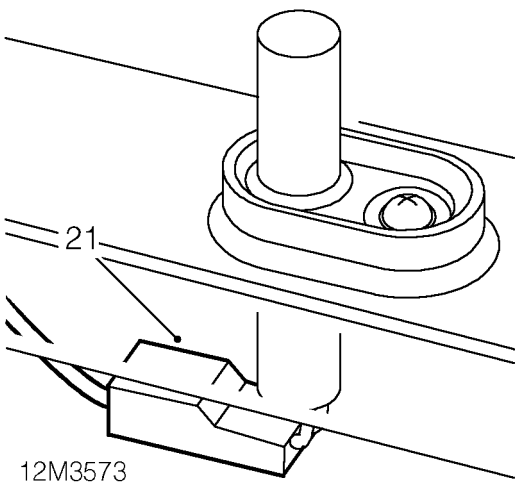
3. Drain engine oil. **See MAINTENANCE Maintenance.**
4. Fit new sealing washer to drain plug.
5. Fit drain plug and tighten to 34 Nm.
6. Remove bonnet. **See BODY, Exterior fittings.**
7. Remove radiator. **See COOLING SYSTEM, Repairs.**
8. Remove engine steady bar - upper. **See this section.**
9. Remove ECM. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**
10. Remove servo and mounting bracket assembly. **See BRAKES, Repairs.**
11. Remove starter motor. **See ELECTRICAL, Repairs.**
12. Remove horn. **See ELECTRICAL, Repairs.**



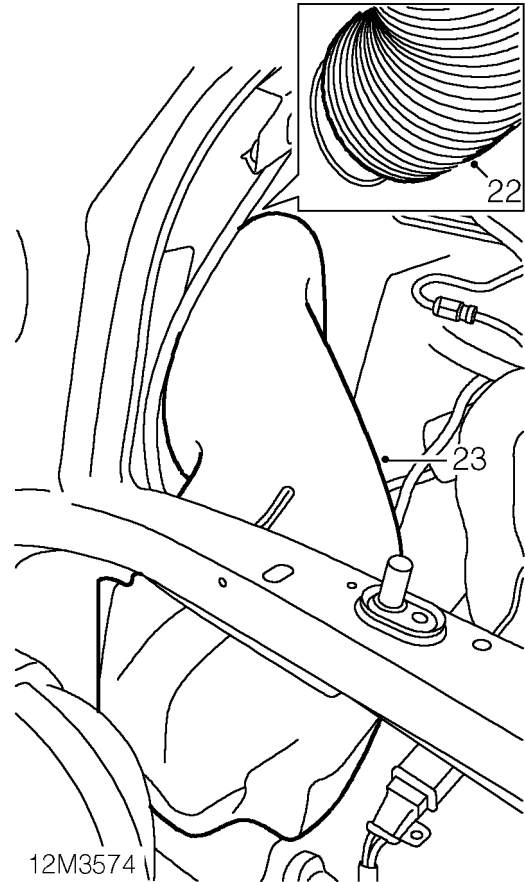
13. Remove cover from engine compartment fuse box.
14. Remove fusible link.
15. Release retaining tag and disconnect engine harness lead from fuse box.
16. Release engine compartment fuse box from ECM mounting bracket.



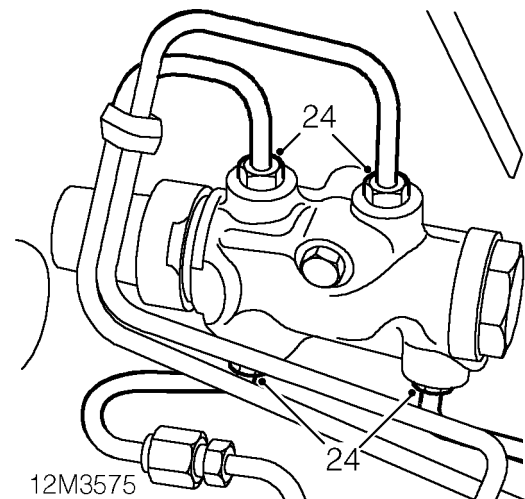
17. Release clip securing main harness to ECM mounting bracket.
18. Remove bolt securing ECM mounting bracket to body.
19. Release ECM mounting bracket from body and remove.
20. Remove bolt securing earth leads to body.



21. Disconnect Lucar from bonnet switch.



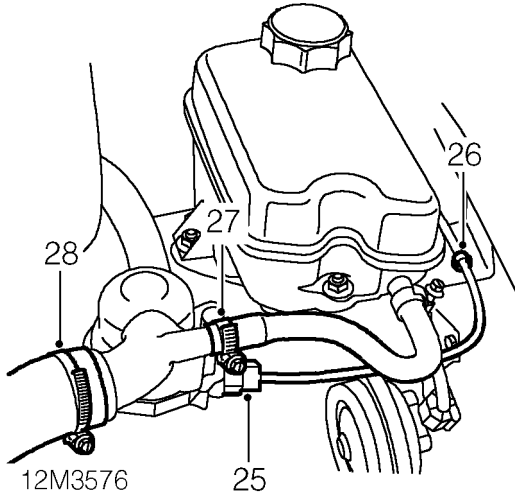
22. Disconnect fresh air intake hose from duct under RH front wing.
23. Release and remove fresh air intake duct from inner wing.



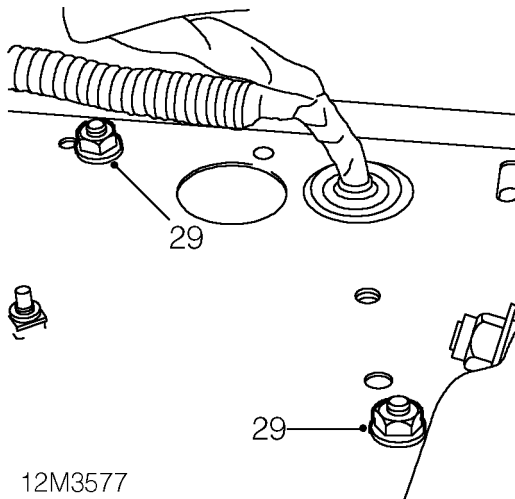
24. Loosen unions and disconnect brake pipes from pressure reducing valve.



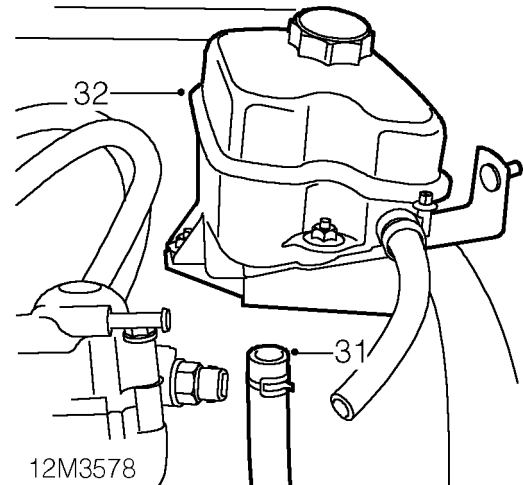
CAUTION: Plug the connections.



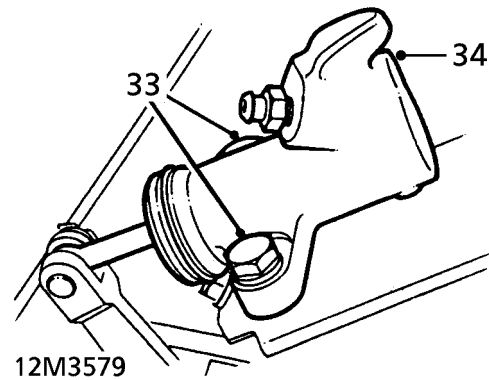
- 25. Disconnect multiplug from ECT sensor.
- 26. Release clip securing ECT sensor harness to mounting bracket.
- 27. Loosen clip and disconnect expansion tank hose from thermostat housing.
- 28. Loosen clip and remove radiator top hose from thermostat housing.



- 29. Remove 2 nuts securing coolant expansion tank mounting bracket to body.
- 30. Release mounting bracket from body.

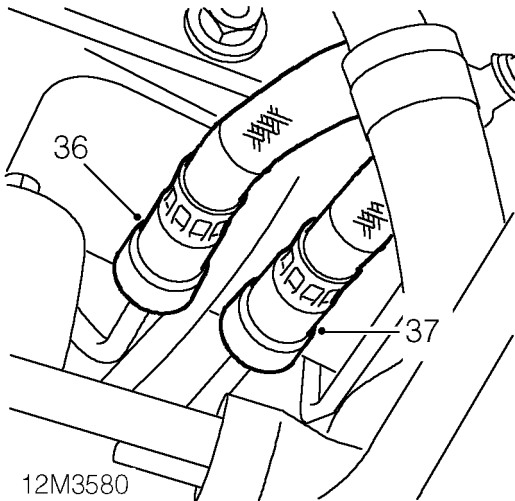


- 31. Release clip and disconnect coolant feed hose from expansion tank.
- 32. Remove coolant expansion tank and mounting bracket.

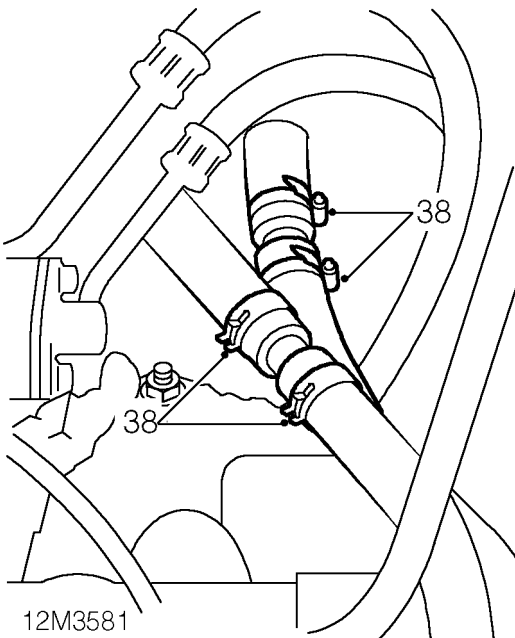


- 33. Remove 2 bolts securing clutch slave cylinder to bracket on flywheel housing.
- 34. Withdraw slave cylinder from push rod and position aside.
- 35. Position absorbent cloth around fuel line quick fit connectors.

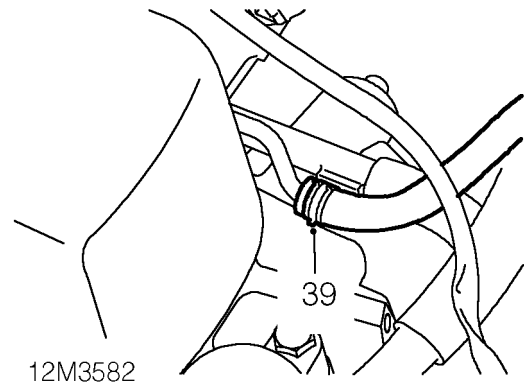
ENGINE



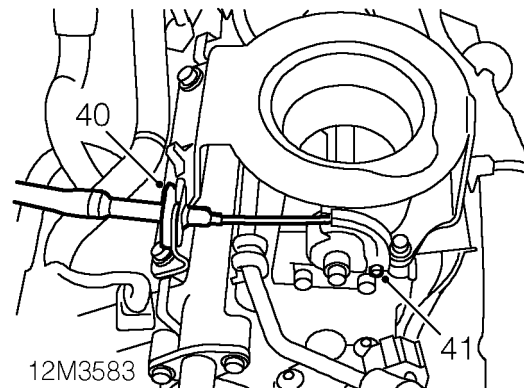
- 36. Release quick fit connector and disconnect fuel return hose from fuel pipe.
- 37. Release quick fit connector and disconnect fuel feed hose from fuel pipe.



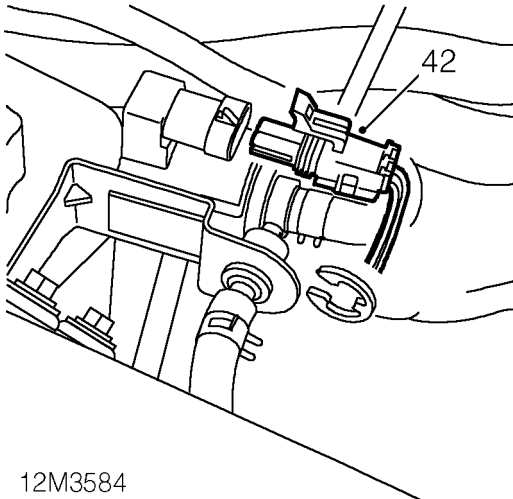
- 38. Release clips and disconnect heater hoses.



- 39. Release clip and disconnect purge hose from pipe.

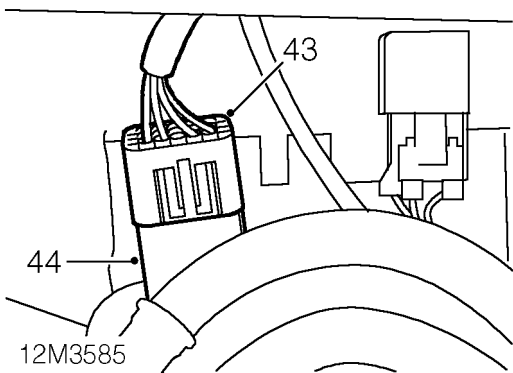


- 40. Release throttle cable adjustment nut from abutment bracket.
- 41. Disconnect inner cable from throttle cam and position aside.



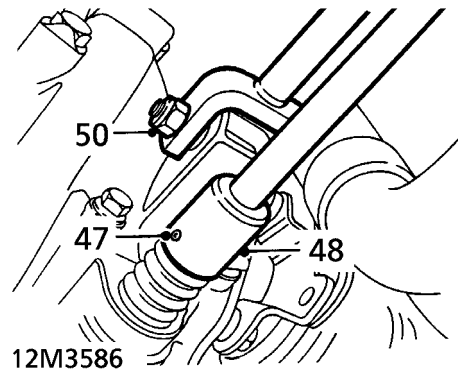
12M3584

42. Disconnect multiplug from evaporative emission canister purge valve.



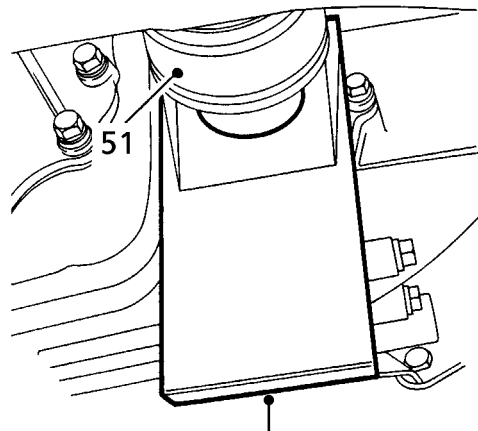
12M3585

43. Disconnect engine harness multiplug from main harness.
 44. Release engine harness multiplug from bracket on body.
 45. Remove exhaust front pipe. **See MANIFOLD & EXHAUST SYSTEMS, Repairs.**
 46. Select reverse gear.



12M3586

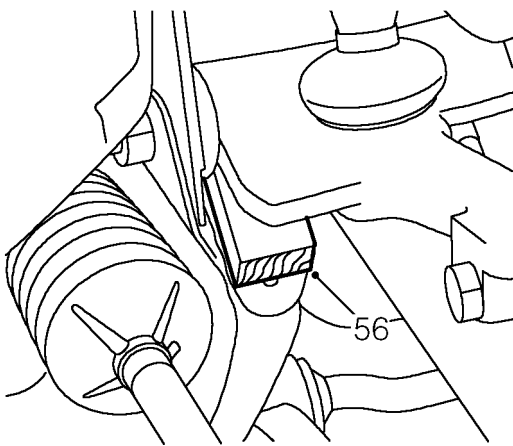
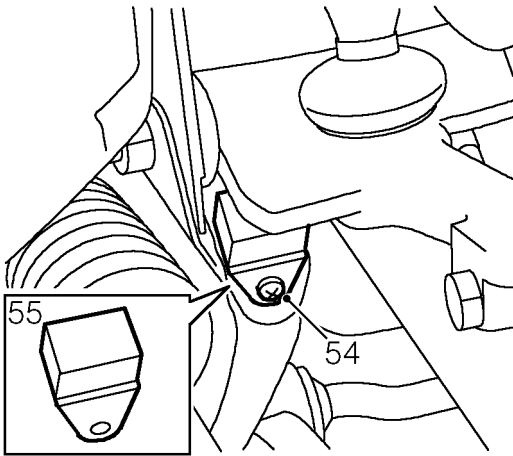
47. Using a suitable punch, drive out roll pin securing selector rod to selector shaft.
 48. Release selector rod from shaft.
 49. Select neutral.
 50. Remove nut and bolt securing gear change steady bar to gearbox.



12M3587

18G1240

51. Using tool **18G 1240** release drive shafts from differential housing.
 52. Remove both front road wheels.
 53. Raise one side of front suspension using a jack positioned beneath lower suspension arm.

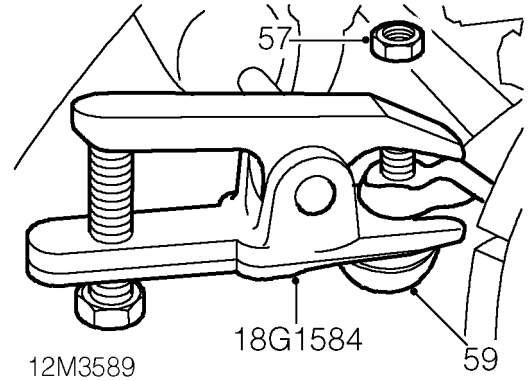


12M3588

- 54. Remove screw securing rebound rubber to subframe.
- 55. Remove rebound rubber.
- 56. Fit a wedge between suspension arm and subframe, lower suspension onto wedge and remove jack.

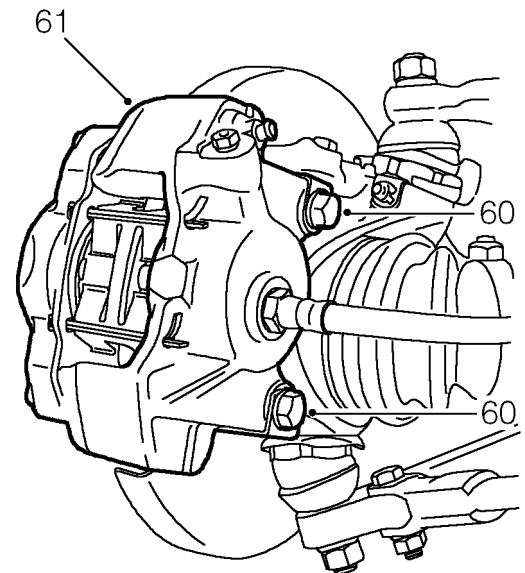


CAUTION: Ensure that an appropriate wedge is used to prevent any damage occurring to the suspension components.



12M3589

- 57. Remove nut securing steering rack track rod end to front hub.
- 58. Break taper joint using tool **18G 1584**.
- 59. Disconnect track rod end from front hub.

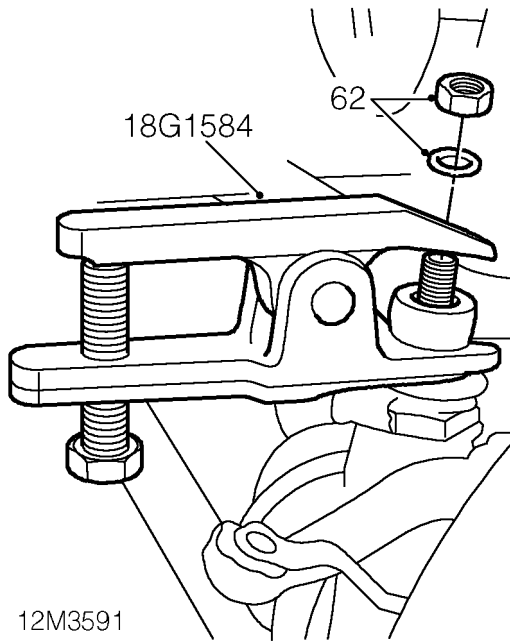


12M3590

- 60. Remove 2 bolts and collect washers securing brake caliper to front hub.
- 61. Release brake caliper from front hub and position aside.



CAUTION: Do not allow caliper to hang on brake hose.



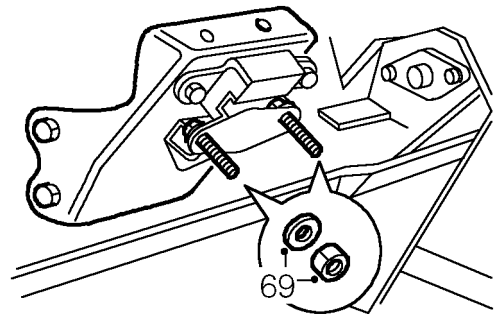
12M3591

- 62. Remove nut and washer securing front hub upper ball joint to suspension arm.
- 63. Break taper joint using tool **18G 1584**.



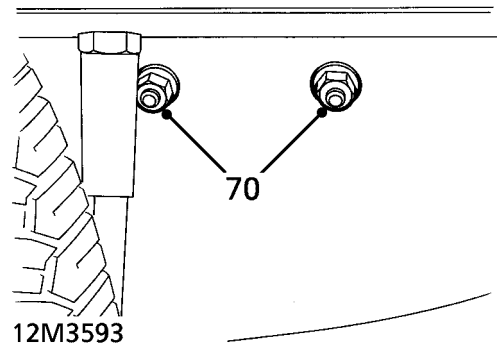
CAUTION: Be careful not to damage the rubber boot on ball joint.

- 64. Support front hub on stand.
- 65. Repeat procedure to release suspension arm from front hub on other side.
- 66. Withdraw drive shafts from differential housing.
- 67. Fit suitable lifting brackets to engine.
- 68. Connect hoist to engine lifting brackets and raise hoist to take weight of engine without exerting load on engine mounting bolts.



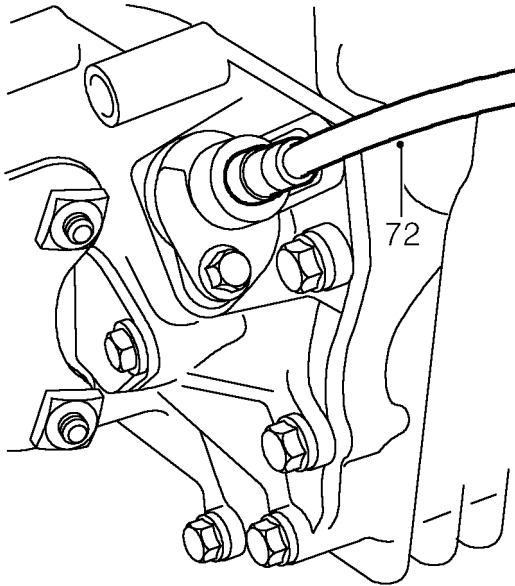
12M3592

- 69. Remove 2 nuts and bolts securing engine LH mounting to subframe, collect washers.



12M3593

- 70. Remove 2 nuts and bolts securing engine RH mounting to subframe, collect washers.
- 71. Raise engine to gain access to speedometer cable union.



12M3594

- 72. Loosen union and disconnect speedometer cable from gearbox.
- 73. Using assistance, raise engine and manoeuvre from vehicle.

Refit


1. Using assistance, raise engine and manoeuvre into position in vehicle.
2. Connect speedometer cable to gearbox and tighten union.
3. Align engine RH mounting to subframe. Fit bolts, washers and nuts securing engine mounting to subframe.
4. Align engine LH mounting to subframe. Fit bolts, washers and nuts securing engine mounting to subframe.
5. Disconnect hoist from engine lifting brackets and remove lifting brackets.
6. Tighten nuts and bolts securing engine mountings to subframe to 22 Nm.
7. Thoroughly clean splines of drive shaft.
8. Fit new circlip to drive shaft.
9. Engage drive shaft in differential and push fully home.



CAUTION: Pull drive shaft to ensure circlip is fully engaged and retains shaft.

10. Clean front hub upper ball joint and suspension arm.
11. Locate suspension arm on front hub upper ball joint.
12. Fit nut and washer securing suspension arm to ball joint and tighten nut to 52 Nm.
13. Clean front brake disc.
14. Fit brake caliper to front hub.
15. Fit 2 bolts and washer securing brake caliper to front hub and tighten to 52 Nm.
16. Connect steering rack track rod end to front hub, fit nut and tighten to 30 Nm.
17. Position jack beneath lower suspension arm and raise front suspension.
18. Remove wedge between suspension arm and subframe.
19. Position rebound rubber and secure with screw.
20. Remove jack from beneath suspension arm.
21. Repeat procedure to connect suspension arm to front hub on other side.
22. Fit both front road wheels.



23. Align gear change steady bar to gearbox and secure with nut and bolt.
 24. Connect selector rod to selector shaft and align holes.
 25. Fit new roll pin securing selector rod to shaft.
 26. Fit exhaust front pipe. **See MANIFOLD & EXHAUST SYSTEMS, Repairs.**
 27. Connect engine harness multiplug to main harness and secure to bracket on body.
 28. Connect multiplug to evaporative emission canister purge valve.
 29. Ensure throttle cable is correctly routed and connect inner cable to throttle cam.
 30. Secure throttle cable adjusting nut to abutment bracket.
 31. Connect purge hose to pipe and secure with clip.
 32. Connect heater hoses and secure with clips.
 33. Clean ends of fuel return and fuel feed pipes.
 34. Identify and connect fuel return hose to fuel pipe.
 35. Identify and connect fuel feed hose to fuel pipe.
-  **CAUTION: Ensure hoses are correctly located on fuel pipes.**
36. Fit clutch slave cylinder onto push rod.
 37. Align clutch slave cylinder to mounting bracket on flywheel housing, fit bolts and tighten to 37 Nm.
 38. Position coolant expansion tank and mounting bracket to body.
 39. Connect coolant feed hose to expansion tank and secure with clip.
 40. Fit 2 nuts securing coolant expansion tank mounting bracket to body and tighten to 10 Nm.
 41. Connect expansion tank hose to thermostat housing and tighten clip.
 42. Connect radiator top hose to thermostat housing and tighten clip.
 43. Secure ECT sensor harness clip to expansion tank mounting bracket.
 44. Connect multiplug to ECT sensor.
 45. Remove plugs from brake pressure reducing valve.
 46. Clean brake pipe unions.
 47. Connect brake pipes to pressure reducing valve and tighten unions to 14 Nm.
 48. Position earth leads to body, fit bolt and tighten to 10 Nm.
 49. Connect Lucar to bonnet switch.
 50. Fit fresh air intake duct to inner wing.
 51. Connect fresh air intake hose to duct beneath wing.
 52. Locate ECM mounting bracket on body, fit bolt and tighten to 10 Nm.
 53. Secure clip on main harness to ECM mounting bracket.
 54. Secure engine compartment fuse box to ECM mounting bracket.
 55. Connect engine harness lead to engine compartment fuse box.
 56. Fit fusible link.
 57. Fit cover to engine compartment fuse box.
 58. Fit horn. **See ELECTRICAL, Repairs.**
 59. Fit starter motor. **See ELECTRICAL, Repairs.**
 60. Fit servo and mounting bracket assembly. **See BRAKES, Repairs.**
 61. Fit ECM. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**
 62. Fit engine steady bar - upper. **See this section.**
 63. Fit radiator. **See COOLING SYSTEM, Repairs.**
 64. Remove stand(s) and lower vehicle.
 65. Connect battery earth lead.
 66. Refill engine with oil. **See MAINTENANCE Maintenance.**
 67. Adjust throttle cable. **See ENGINE MANAGEMENT SYSTEM - MEMS, Adjustments.**
 68. Fit bonnet. **See BODY, Exterior fittings.**

ENGINE

ENGINE LH MOUNTING

Service repair no - 12.45.11.

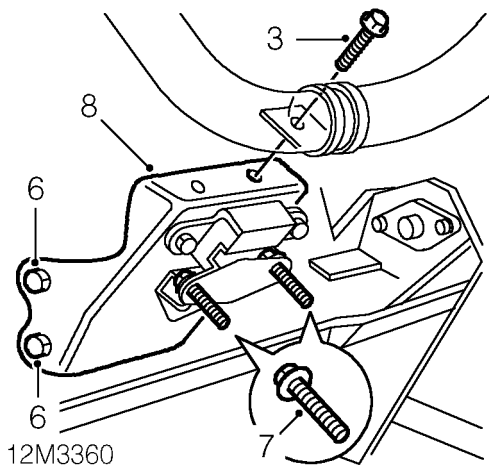
Remove

1. Raise front of vehicle.



WARNING: Support on safety stands.

2. Disconnect battery earth lead.

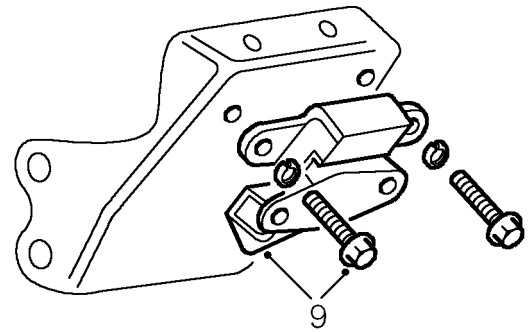


3. Remove bolt securing radiator bottom hose to engine mounting.
4. Position jack to support engine.



CAUTION: Use a block of wood or hard rubber pad between jack and engine.

5. Take weight off engine mounting.
6. Remove 2 bolts securing engine mounting bracket to gearbox.
7. Remove 2 bolts securing engine mounting to subframe.



12M3361

8. Remove engine mounting and bracket.
9. Position bracket in a vice, remove 2 bolts securing mounting to bracket and remove mounting.

Refit

1. Position mounting to bracket, fit bolts and tighten to 22 Nm.
2. Remove bracket from vice, fit mounting to subframe and tighten bolts to 22 Nm.
3. Lower engine and align to mounting bracket fit and tighten bolts to 25 Nm.
4. Remove jack
5. Fit bolt securing radiator bottom hose to engine mounting.
6. Remove stand(s) and lower vehicle.
7. Connect battery earth lead.

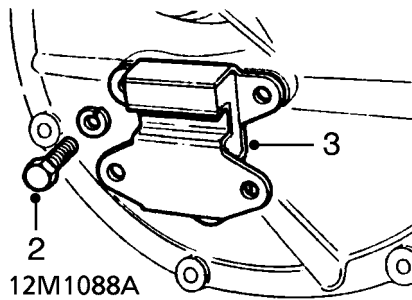


ENGINE RH MOUNTING

Service repair no - 12.45.12

Remove

1. Remove flywheel housing cover. *See CLUTCH, Repairs.*



2. Remove 3 bolts securing engine mounting to flywheel housing cover, collect washers.
3. Remove engine mounting.

Refit

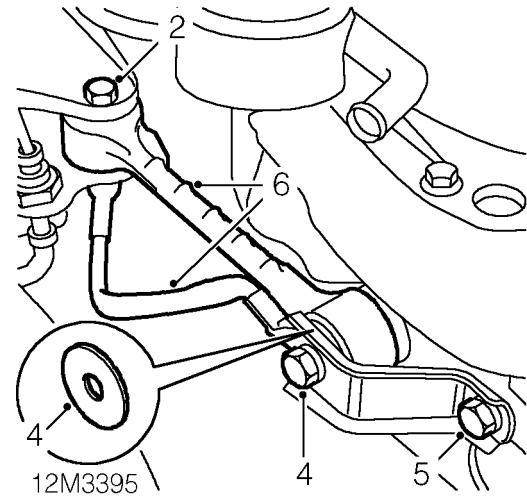
1. Clean mating face of flywheel housing cover and engine mounting.
2. Position engine mounting to cover, fit bolts and washers and tighten to 18 Nm.
3. Fit flywheel housing cover. *See CLUTCH, Repairs.*

ENGINE STEADY BAR - UPPER

Service repair no - 12.45.16

Remove

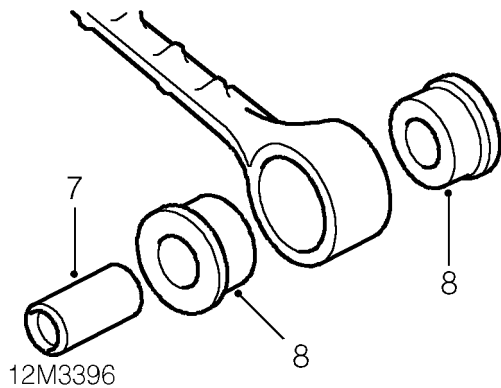
1. Remove air cleaner. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*



2. Remove nut and bolt securing steady bar to body.
3. Release earth strap from body.
4. Remove bolt securing steady bar to engine and collect washers.
5. Remove bolt securing engine steady bar bracket to engine and remove bracket.
6. Remove engine steady bar and earth strap.

ENGINE

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



7. Remove spacers from steady bar bushes.
8. Remove bushes from steady bar.
9. Clean engine steady bar.
10. Fit bushes to steady bar.
11. Fit spacers to steady bar bushes.

Refit

1. Fit steady bar to bracket on body and align to engine.
2. Fit washer between steady bar and engine.
3. Fit steady bar bracket to engine, fit bolt and tighten to 22 Nm.
4. Fit earth strap to bolt, fit bolt securing steady bar to engine and tighten to 22 Nm.
5. Fit bolt securing steady bar to body and connect earth strap.
6. Fit nut and tighten bolt to 22 Nm.
7. Fit air cleaner. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**

ENGINE STEADY BAR - LOWER

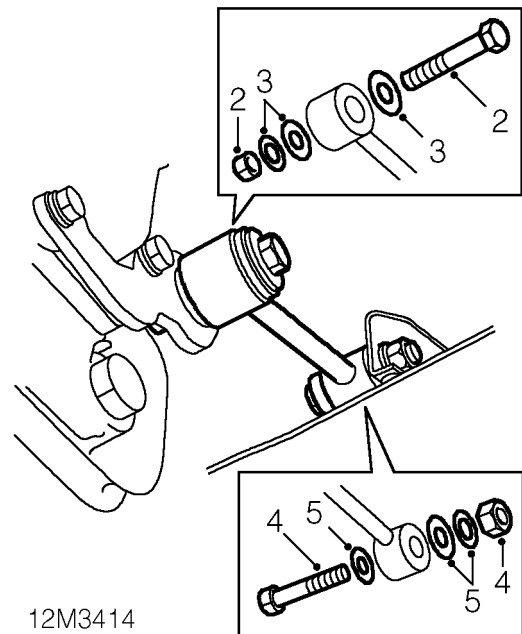
Service repair no - 12.45.17

Remove

1. Raise front of vehicle.



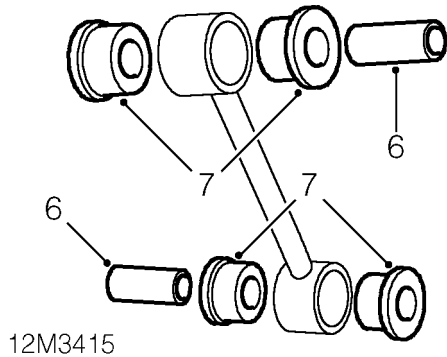
WARNING: Support on safety stands.



2. Remove nut and bolt securing steady bar to bracket on flywheel housing.
3. Collect steady bar washers.
4. Remove nut and bolt securing steady bar to subframe.
5. Remove engine steady bar and collect washers.



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



6. Remove spacers from steady bar bushes.
7. Remove bushes from steady bar.
8. Clean engine steady bar.
9. Fit bushes to steady bar.
10. Fit spacers to steady bar bushes.

Refit

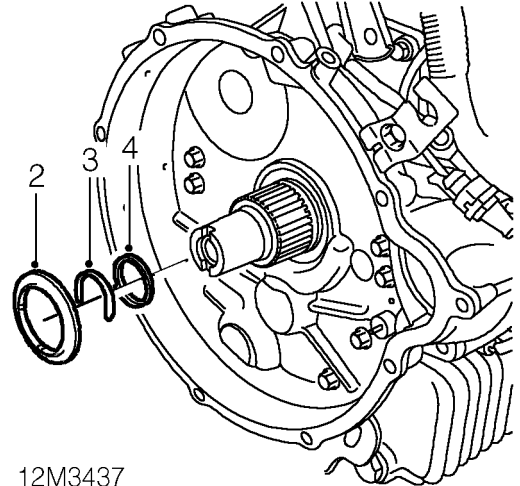
1. Position steady bar to mounting on subframe.
2. Fit washer between steady bar and subframe.
3. Fit nut and bolt securing steady bar to subframe and tighten to 40 Nm.
4. Align steady bar to bracket on flywheel housing and position washers.
5. Fit nut and bolt securing steady bar to flywheel housing bracket and tighten to 40 Nm.
6. Remove stand(s) and lower vehicle.

FLYWHEEL HOUSING OIL SEAL

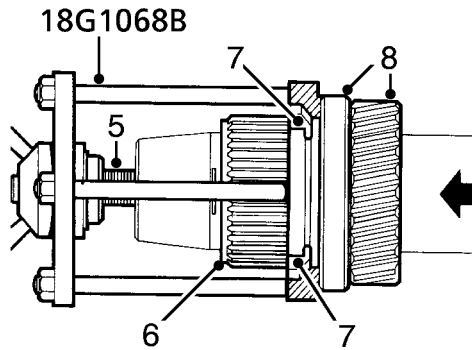
Service repair no - 12.53.02

Remove

1. Remove clutch assembly. *See CLUTCH, Repairs.*



2. Remove dust shield from primary gear.
3. Remove 'C' washer securing primary gear to crankshaft.
4. Remove backing ring from crankshaft.

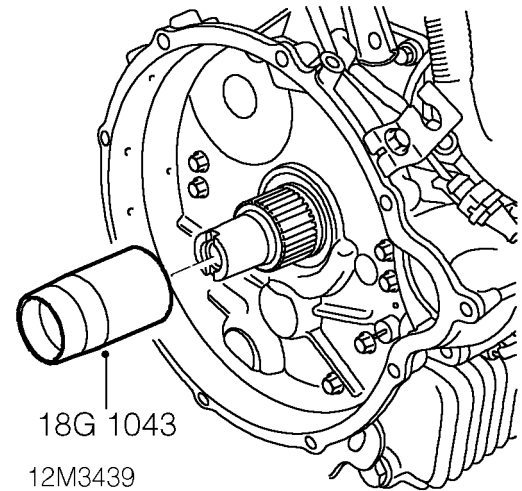


12M3438

5. Position seal removing tool **18G 1068B** and screw centre bolt of tool into end of crankshaft.
6. Pull the primary gear outwards as far as possible by hand.
7. Locate collets of tool **18G 1068B** into the groove on the primary gear.
8. Loosen wing nut on tool to withdraw primary gear and oil seal out of housing.
9. Undo wing nut on tool and remove tool.
10. Collect collets.
11. Remove primary gear and oil seal.
12. Remove and discard oil seal from primary gear.

Refit

1. Clean primary gear, crankshaft bearing surface, backing ring and 'C' washer.
2. Clean oil seal housing and dust shield.
3. Lubricate inner face of new oil seal with oil and apply grease to outer face.



4. Fit protective sleeve **18G 1043** to primary gear.
5. Lubricate protective sleeve with oil.
6. Position new oil seal on primary gear.
7. Remove protective sleeve from primary gear.
8. Locate primary gear onto crankshaft until the gear teeth are just starting to mesh with those of the idler gear.

CAUTION: DO NOT fully engage primary gear with idler gear or the seal will become displaced.

9. Position tool **18G 1068** over crankshaft.
10. Tighten wing nut of tool **18G 1068** to press oil seal into flywheel housing.

NOTE: The seal is correctly fitted when the base of the tool contacts the lip of the housing bore.

11. Loosen wing nut on tool **18G 1068** and remove tool.
12. Position backing ring on crankshaft.
13. Fit 'C' washer to crankshaft.
14. Fit dust shield onto primary gear with its stepped face marked 'FLYWHEEL SIDE' facing away from the engine.
15. Fit clutch assembly. **See CLUTCH, Repairs.**

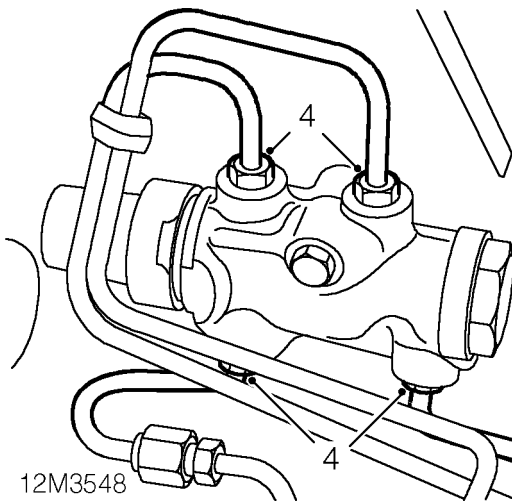


FLYWHEEL HOUSING GASKET

Service repair no - 12.53.04

Remove

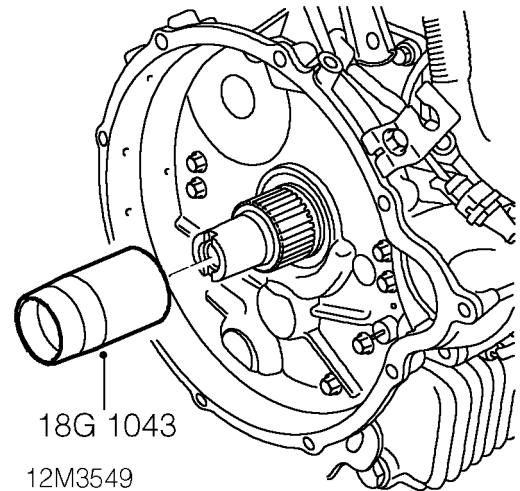
1. Drain engine/gearbox oil. **See MAINTENANCE Maintenance.**
2. Remove brake master cylinder. **See BRAKES, Repairs.**
3. Remove clutch assembly and release bearing. **See CLUTCH, Repairs.**



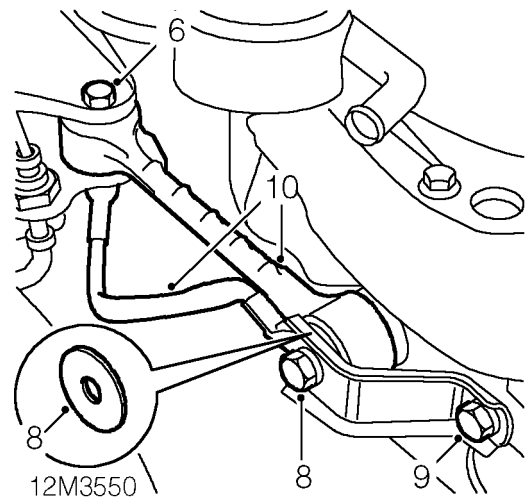
4. Loosen unions and disconnect brake pipes from pressure reducing valve.



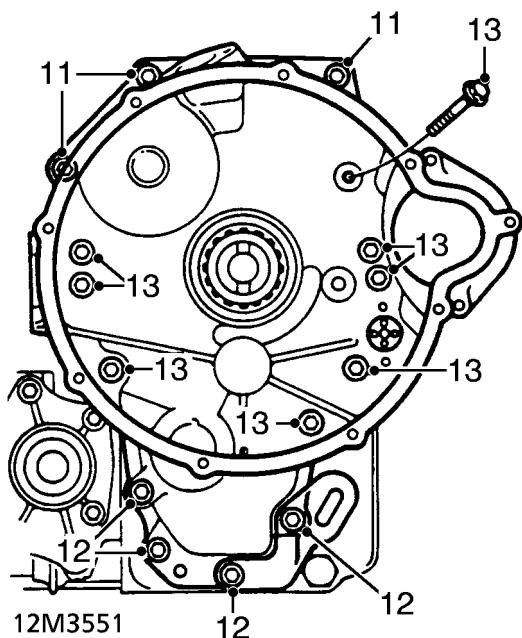
CAUTION: Plug the connections.



5. Fit protective sleeve **18G 1043** to primary gear splines.



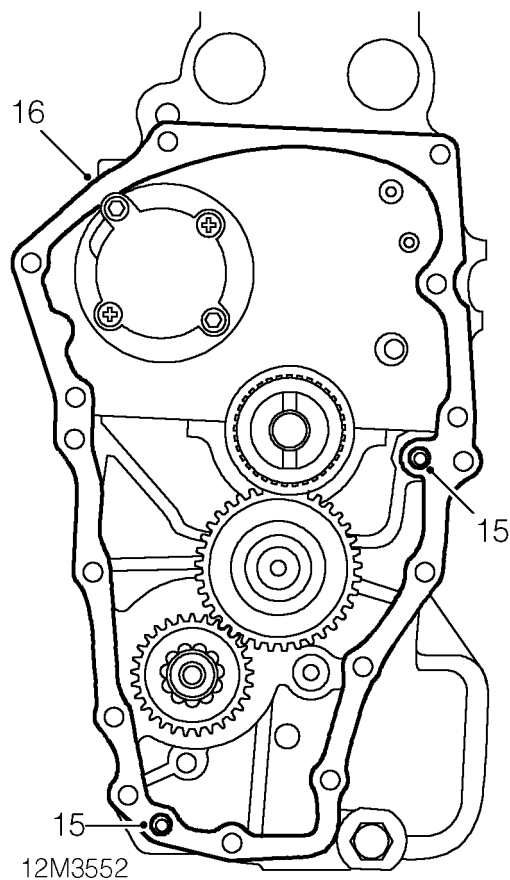
6. Remove nut and bolt securing steady bar to body.
7. Release earth strap from body.
8. Remove bolt securing steady bar to engine and collect washers.
9. Remove bolt securing engine steady bar bracket to engine and remove bracket.
10. Remove engine steady bar and earth strap.



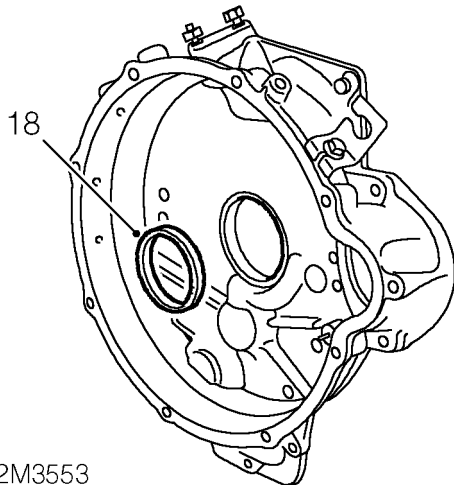
11. Remove 3 bolts securing top of flywheel housing to engine.
12. Remove 4 bolts securing bottom of flywheel housing to gearbox and collect bracket.
13. Remove 8 inner bolts securing flywheel housing to engine and gearbox.

NOTE: The 3 upper bolts securing the centre of the flywheel housing to engine and gearbox have a different thread than the other 5.

14. Raise engine on jack.



15. Release flywheel housing from 2 locating dowels on engine.
16. Manoeuvre flywheel housing from engine compartment and remove.
17. Remove locating dowels from engine and gearbox.



12M3553

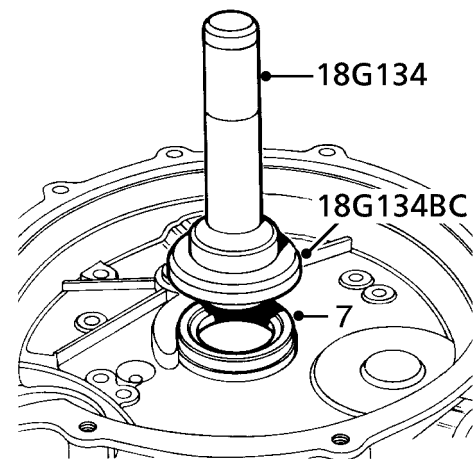
18. Using a suitable drift, remove primary gear oil seal from flywheel housing.



NOTE: The oil seal can be renewed without removing the flywheel housing. Refer to Flywheel housing oil seal. See *this section*.

Refit

1. Remove all traces of gasket material from mating faces of flywheel housing, engine and gearbox.
2. Clean flywheel housing locating dowels.
3. Fit locating dowels to engine and gearbox.
4. Position flywheel housing on a flat surface and support underside of housing with a block.
5. Clean oil seal aperture in flywheel housing.
6. Lubricate NEW flywheel housing oil seal.



12M3554

7. Position oil seal to flywheel housing and using tools **18G 134** and **18G 134BC** drift oil seal into place.
8. Fit NEW gasket to engine and gearbox.
9. Ensure protective sleeve is fitted to primary gear splines, manoeuvre flywheel housing into position and locate on dowels.
10. Clean Loctite from threads of flywheel housing bolts with a wire brush.
11. Apply Loctite 242 to first 3 threads of each bolt.
12. Fit 8 inner bolts securing flywheel housing to engine and gearbox and tighten to 25 Nm.



NOTE: Ensure 3 bolts with the finer thread are fitted at the top.

13. Position bracket to housing, fit lower bolts securing housing to gearbox and tighten to 25 Nm.
14. Fit upper bolts securing housing to engine and tighten to 25 Nm.
15. Fit steady bar to bracket on body and align to engine.
16. Fit washer between steady bar and engine.
17. Fit steady bar bracket to engine, fit bolt and tighten to 22 Nm.
18. Fit earth strap to bolt, fit bolt securing steady bar to engine and tighten to 22 Nm.
19. Fit bolt securing steady bar to body and connect earth strap.
20. Fit nut and tighten bolt to 22 Nm.
21. Remove protective sleeve **18G 1043** from primary gear splines.
22. Remove plugs from brake pressure reducing valve.
23. Clean brake pipe unions.
24. Connect brake pipes to pressure reducing valve and tighten unions to 14 Nm.
25. Fit clutch assembly and release bearing. **See CLUTCH, Repairs.**
26. Fit brake master cylinder. **See BRAKES, Repairs.**
27. Refill engine/gearbox with oil. **See MAINTENANCE Maintenance.**

FLYWHEEL

Service repair no - 12.53.07

Remove

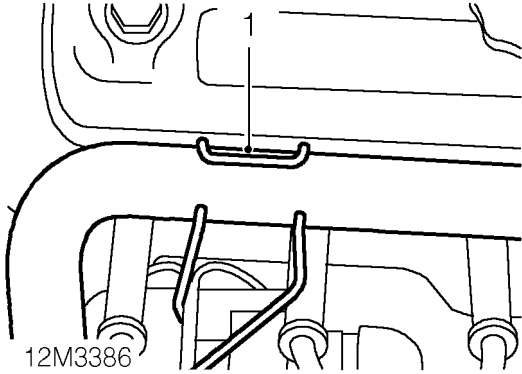
1. Remove clutch assembly and release bearing. **See CLUTCH, Repairs.**



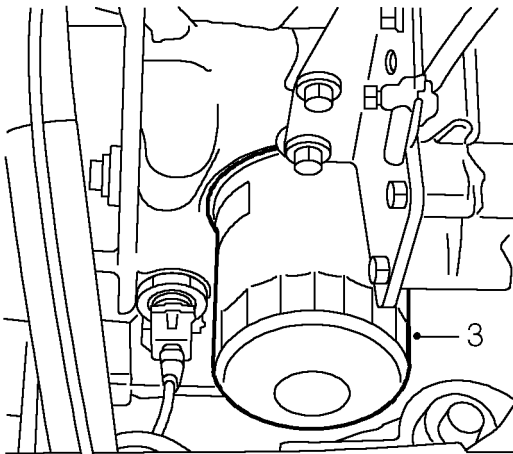
OIL FILTER

Service repair no - 12.60.04

Remove



1. Release radiator top hose from clip on ignition coil mounting bracket.
2. Clean area around filter head and place a container beneath engine.



3. 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. Secure radiator top hose to clip on ignition coil mounting bracket.
5. Top up engine with oil to specification 10w/40 until level is correct.
6. Start and run engine and check for leaks.
7. Stop engine, wait a few minutes, then check oil level. Top up if necessary.

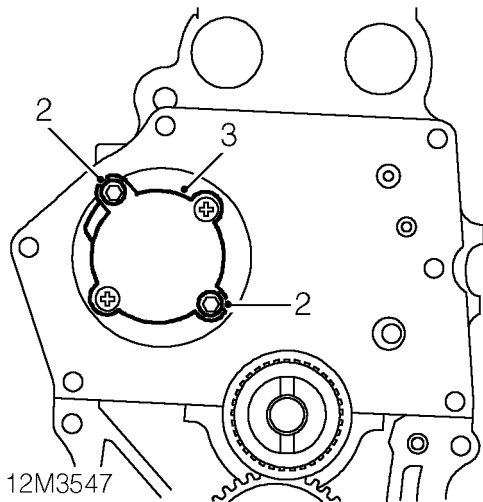
ENGINE

OIL PUMP

Service repair no - 12.60.26

Remove

1. Remove flywheel housing gasket. **See this section.**



2. Remove 2 bolts securing oil pump to engine.
3. Remove pump and discard gasket.

Refit

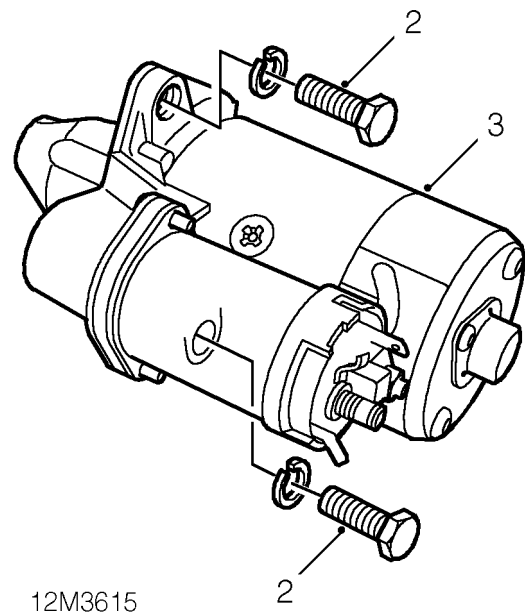
1. Clean mating faces of oil pump and cylinder block.
2. Prime oil pump with clean engine oil
3. Rotate pump to align drive and fit pump with a new gasket.
4. Fit bolts and tighten to 11 Nm.
5. Fit flywheel housing gasket. **See this section.**

ENGINE TO GEARBOX GASKET

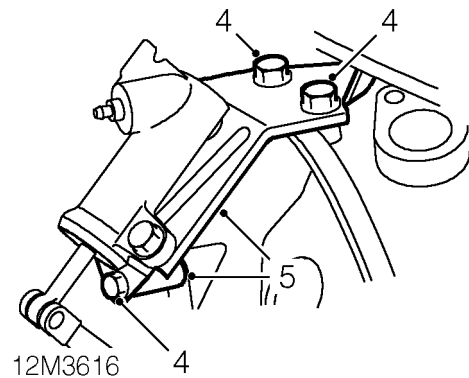
Service repair no - 12.60.38

Remove

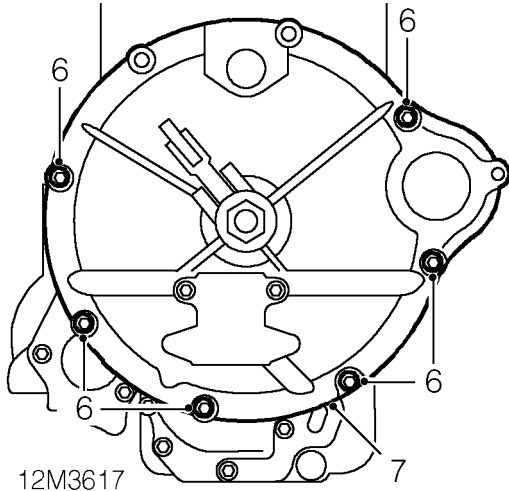
1. Remove engine and gearbox from vehicle. **See this section.**



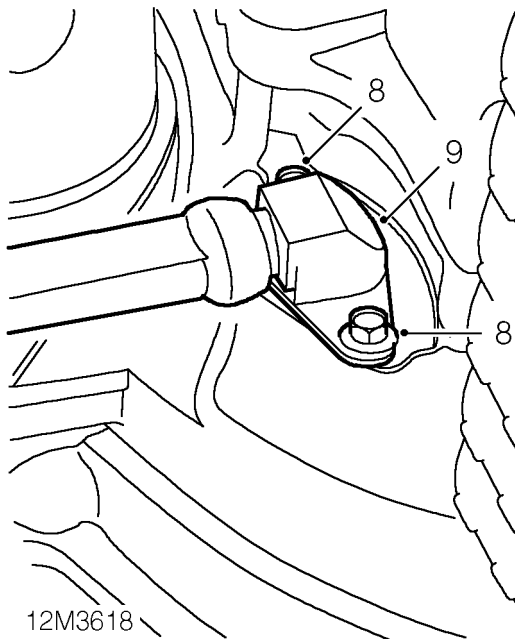
2. Remove 2 bolts securing starter motor to flywheel housing.
3. Remove starter motor.



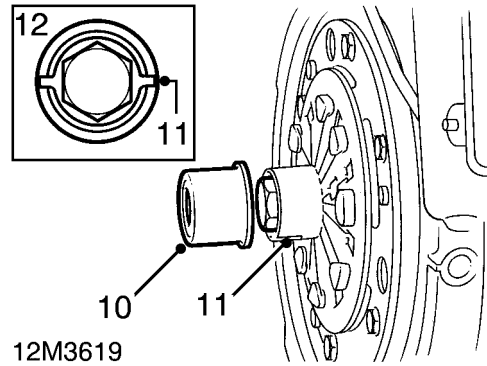
4. Remove 3 bolts securing clutch slave cylinder mounting bracket to flywheel housing.
5. Remove slave cylinder mounting bracket and collect spacer.



- 6. Remove 6 bolts securing cover to flywheel housing.
- 7. Remove flywheel housing cover.

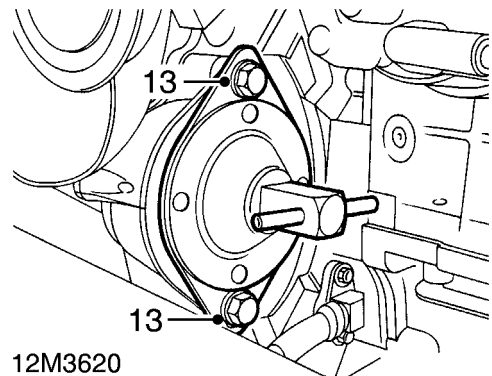


- 8. Remove 2 bolts securing CKP sensor to flywheel housing.
- 9. Remove CKP sensor.

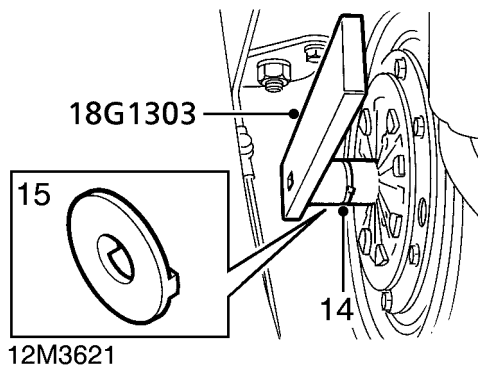


- 10. Remove thrust bearing sleeve from clutch hub.
- 11. Rotate crankshaft and knock back tabs on clutch hub lock washer.
- 12. Rotate crankshaft until clutch hub slots are aligned horizontally.

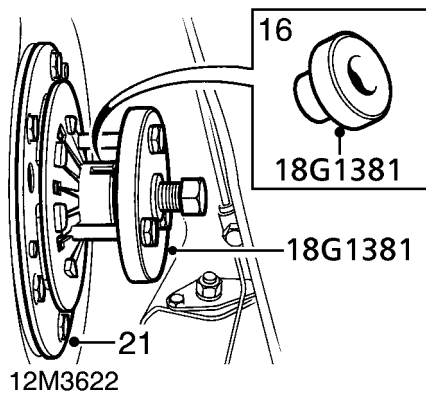
CAUTION: If crankshaft is not positioned correctly, primary drive 'C' shaped washer may become displaced and make it impossible to remove flywheel.



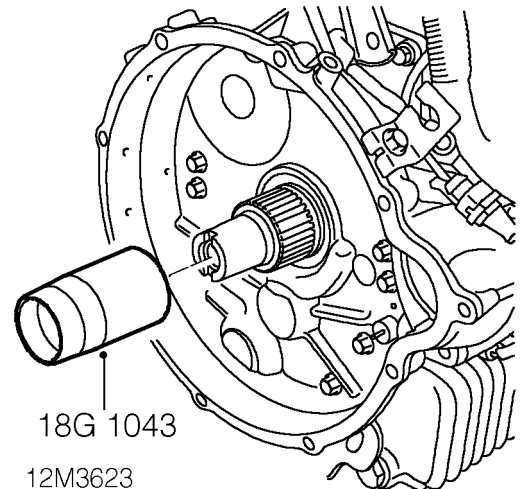
- 13. Fit flywheel locking tool and secure with bolts.



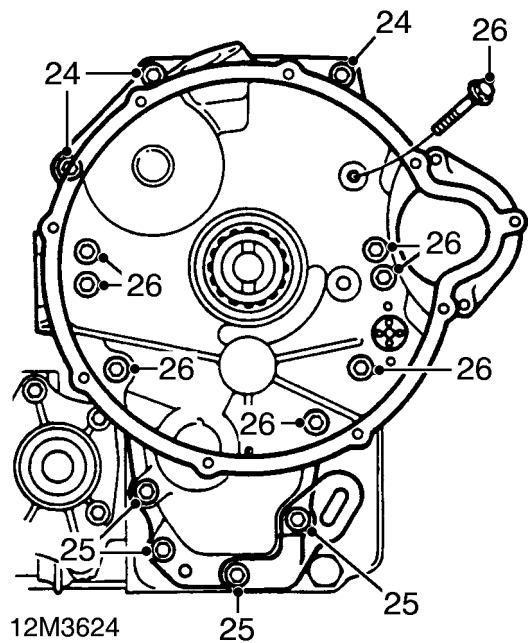
14. Using tool **18G 1303**, remove flywheel retaining bolt.
15. Remove key plate from crankshaft.



16. Fit thrust button of tool **18G 1381** to crankshaft.
17. Loosen centre bolt of tool **18G 1381** and position to flywheel.
18. Fit and tighten bolts securing tool **18G 1381** to flywheel
19. Tighten centre bolt of tool to release flywheel from crankshaft taper.
20. Remove tool **18G 1381** from flywheel.
21. Remove flywheel and clutch assembly.
22. Remove oil seal dust shield from primary gear.



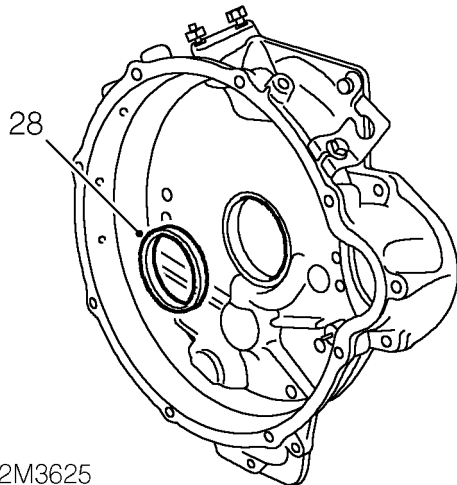
23. Fit protective sleeve **18G 1043** to primary gear splines.



24. Remove 3 bolts securing top of flywheel housing to engine.
25. Remove 4 bolts securing bottom of flywheel housing to gearbox and collect bracket.
26. Remove 8 inner bolts securing flywheel housing to engine and gearbox.

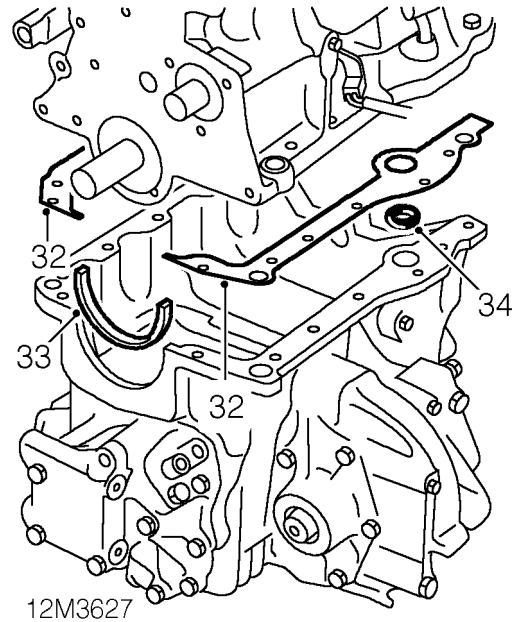
NOTE: The 3 upper bolts securing the centre of the flywheel housing to engine and gearbox have a different thread than the other 5.

27. Release flywheel housing from 2 locating dowels on engine and remove housing.



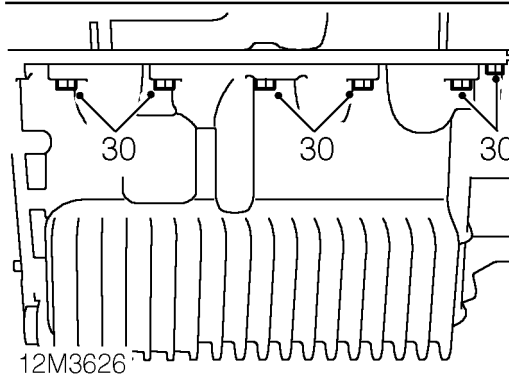
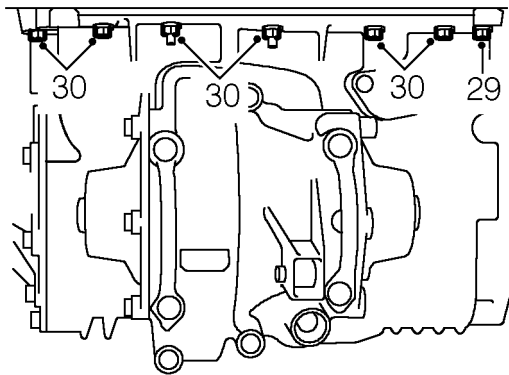
12M3625

- 28.** Using a suitable drift, remove primary gear oil seal from flywheel housing.



12M3627

- 32.** Remove and discard gaskets.
33. Remove and discard main bearing cap oil seal.
34. Remove and discard 'O' ring.

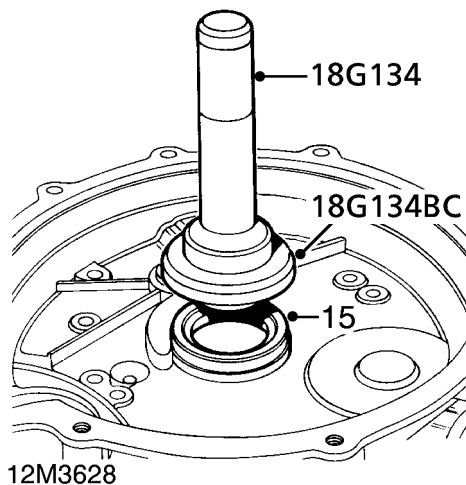


12M3626

- 29.** Remove nut and bolt securing gearbox to engine.
30. Remove 11 bolts and 2 nuts securing gearbox to engine.
31. Take weight of engine on lifting chains and release gearbox from engine.

Refit

1. Clean all traces of gasket and sealing materials from engine and gearbox mating faces.
2. Clean locating dowels.
3. Lubricate with clean engine oil and fit new 'O' ring and main bearing cap oil seal to gearbox.
4. Fit gaskets to face of gearbox.
5. Move primary drive gear to end of crankshaft.
6. Lower engine onto gearbox.
7. Fit nuts and bolts securing gearbox to engine and tighten to 8 Nm.
8. Fit nut and bolt securing engine to gearbox and tighten to 8 Nm.
9. Position primary drive gear into mesh.
10. Remove all traces of gasket material from mating face of flywheel housing, engine and gearbox.
11. Clean flywheel housing locating dowels.
12. Position flywheel housing on a flat surface and support underside adjacent to seal aperture.
13. Clean oil seal aperture in flywheel housing.
14. Lubricate new flywheel housing oil seal.



15. Position oil seal to flywheel housing and using tools **18G 134** and **18G 134BC** drift oil seal into place.
16. Fit new gasket to engine and gearbox.

17. Ensure protective sleeve is fitted to primary gear splines and locate flywheel housing on dowels.
18. Clean Loctite from threads of flywheel housing bolts with a wire brush.
19. Apply Loctite 242 to first 3 threads of each bolt.
20. Fit 8 inner bolts securing flywheel housing to engine and gearbox and tighten to 25 Nm.



NOTE: Ensure 3 bolts with the finer thread are fitted at the top.

21. Position bracket to housing, fit lower bolts securing housing to gearbox and tighten to 25 Nm.
22. Fit upper bolts securing flywheel housing to engine and tighten to 25 Nm.
23. Remove protective sleeve **18G 1043** from primary gear splines.
24. Clean crankshaft taper and flywheel.
25. Fit dust shield on primary gear.
26. Fit flywheel and clutch assembly to crankshaft.
27. Fit key plate and NEW flywheel retaining bolt.
28. Tighten flywheel retaining bolt to 150 Nm.
29. Stake lock washer into slots on clutch hub.
30. Remove bolts securing flywheel locking tool.
31. Remove flywheel locking tool.
32. Clean thrust bearing sleeve.
33. Fit thrust bearing sleeve to clutch hub.
34. Clean CKP sensor and mating face of flywheel housing.
35. Fit CKP sensor to flywheel housing, fit bolts and tighten to 6 Nm.
36. Clean flywheel housing cover and mating face of flywheel housing.
37. Position cover to flywheel housing, fit bolts and tighten to 10 Nm.
38. Fit clutch slave cylinder mounting bracket and spacer to flywheel housing.
39. Fit 3 bolts securing mounting bracket to flywheel housing, tighten bolts:
 - M8 bolts to 37 Nm.
 - M5 bolt to 7 Nm.
40. Clean mating face of starter motor and flywheel housing.
41. Fit starter motor and tighten bolts to 37 Nm.
42. Fit engine and gearbox. **See this section.**

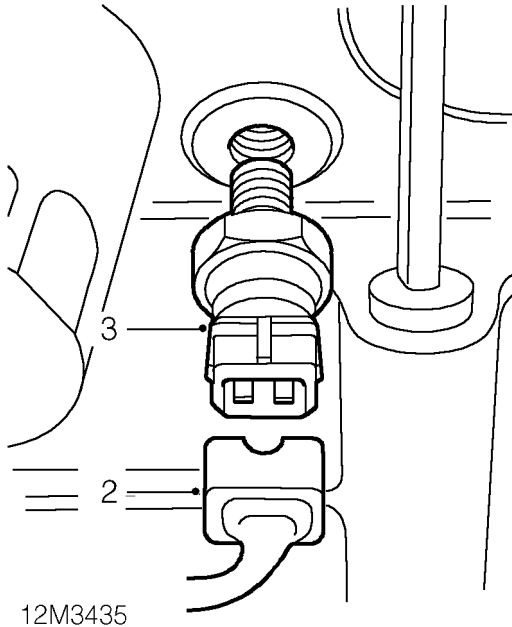


OIL PRESSURE SWITCH

Service repair no - 12.60.50

Remove

1. Remove ignition coil. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*



2. Disconnect multiplug from oil pressure switch.
3. Loosen oil pressure switch and remove.

Refit

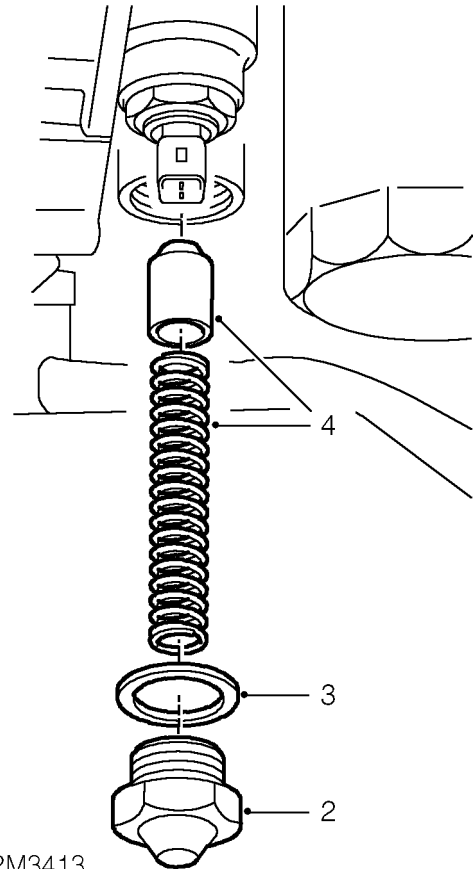
1. Clean threads of oil pressure switch and hole in cylinder block.
2. Apply Loctite 572 to threads of oil pressure switch.
3. Fit oil pressure switch and tighten to 25 Nm.
4. Fit ignition coil. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*

OIL PRESSURE RELIEF VALVE

Service repair no - 12.60.56

Remove

1. Remove starter motor. *See ELECTRICAL, Repairs.*



2. Remove oil pressure relief valve cap.
3. Remove and discard sealing washer from cap.
4. Remove spring and relief valve from cylinder block.

ENGINE

Refit

1. Clean oil pressure relief valve, spring, cap and seating area of cylinder block.
2. Check the face of the relief valve is not pitted or scored, and that the valve seats correctly in cylinder block. Renew if necessary.
3. Measure the length of the spring. If the length of the spring is less than 72.5 mm, renew spring.
4. Fit oil pressure relief valve and spring.
5. Fit new sealing washer to cap.
6. Fit oil pressure relief valve cap and tighten to 60 Nm.
7. Fit starter motor. *See ELECTRICAL, Repairs.*

TIMING GEAR COVER AND OIL SEAL

Service repair no - 12.65.05

Remove

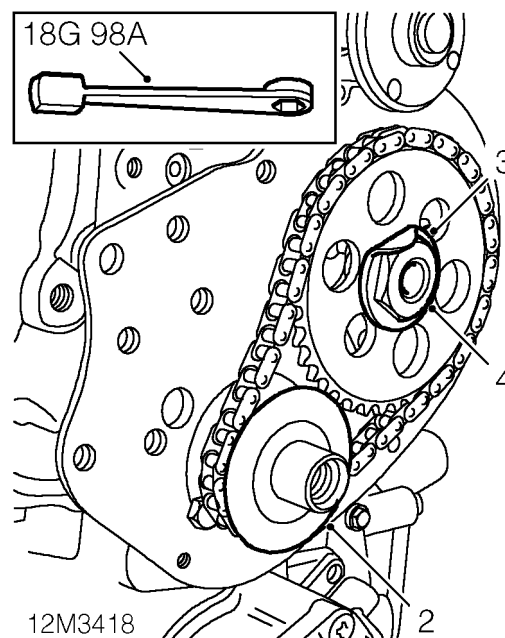
1. Refer to crankshaft front seal for details. *See this section.*

TIMING CHAIN AND GEARS

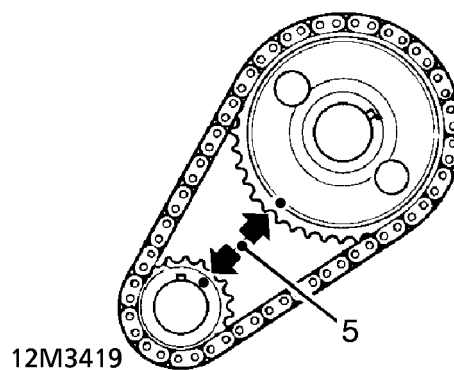
Service repair no - 12.65.12.

Remove

1. Remove timing gear tensioner. *See this section.*



2. Remove oil thrower.
3. Bend back the lock washer tab on the camshaft gear retaining nut.
4. Using tool **18G 98 A**, unscrew the camshaft gear retaining nut and remove the lock washer.

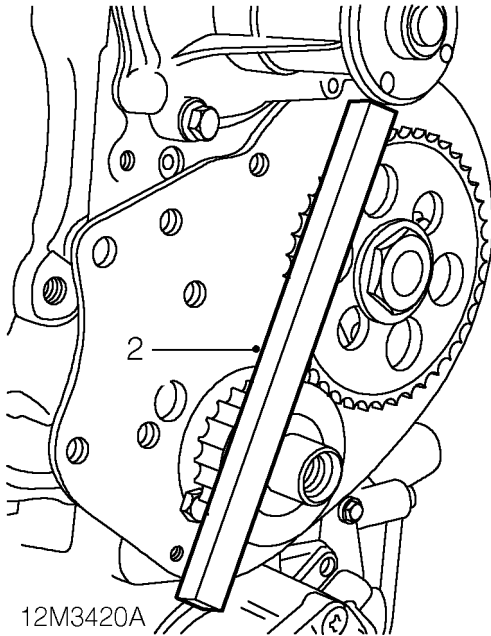


5. Rotate the crankshaft until the two timing marks are aligned.
6. Gently lever off the crankshaft and camshaft gears complete with timing chain.

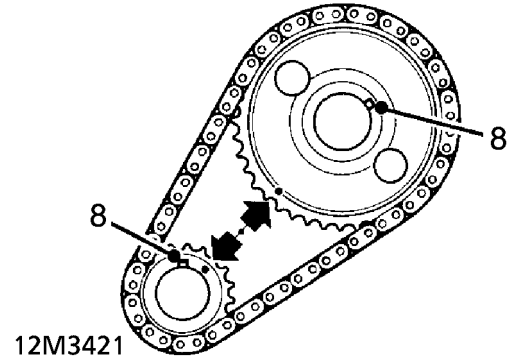


Refit

1. Fit the timing gears without the chain.



2. Check the alignment of the gears with a straight edge.
3. Use feeler gauges to determine the thickness of shim required.
DATA: Shim thickness = 0.152 mm.
4. Remove the crankshaft gear and the crankshaft driving key.
5. Fit the required thickness of shims to obtain the correct alignment.
6. Refit the driving key to the crankshaft.
7. Clean timing gears, timing chain and crankshaft and camshaft ends.



8. Position the crankshaft key at TDC and the camshaft key at 2 o'clock.
9. Fit timing chain and gears and check alignment.
10. Fit camshaft gear retaining nut and new lock washer. Tighten nut to 90 Nm. and tap over lock washer.
11. Fit oil thrower with the 'F' mark facing outwards.
12. Fit timing chain tensioner. **See this section.**

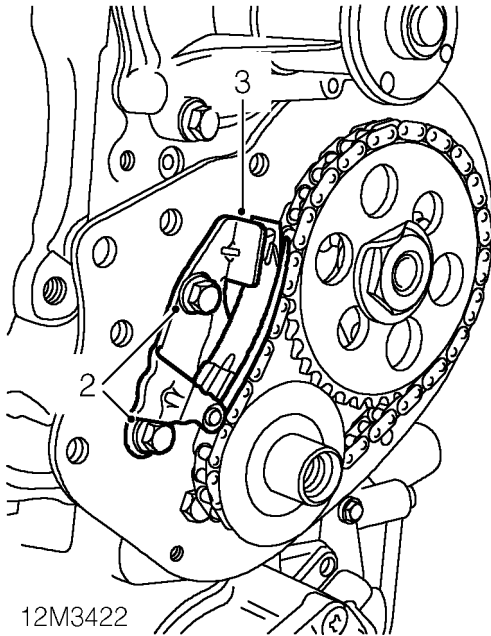
ENGINE

TIMING CHAIN TENSIONER

Service repair no - 12.65.28

Remove

1. Remove timing gear cover. **See this section.**



2. Remove 2 bolts securing timing chain tensioner to engine.
3. Remove tensioner.

Refit

1. Fit tensioner and tension the chain by applying firm pressure on the tensioner.
2. Fit bolts securing tensioner to engine and tighten to 22 Nm.
3. Fit timing gear cover. **See this section.**

CONTENTS

Page

DESCRIPTION AND OPERATION

EMISSION CONTROL SYSTEMS	1
--------------------------------	---

REPAIRS

ENGINE BREATHER/OIL SEPARATOR	1
EVAPORATIVE EMISSION CANISTER	1
EMISSION CANISTER PURGE VALVE	2
CATALYTIC CONVERTER	3
CATALYTIC CONVERTER HEAT SHIELD	4





EMISSION CONTROL SYSTEMS

The vehicle is fitted with various emission and evaporative control components to comply with emission regulation requirements.

The following control systems are used to reduce harmful emissions released into the atmosphere at all times, and under all conditions:

1. Exhaust emission control
2. Fuel vapour evaporative loss control
3. Crankcase emission control

In many countries it is against the law for a vehicle owner or an unauthorised repair shop to modify or tamper with emission control equipment. In this event the vehicle owner and/or the repairer may be liable for prosecution.

The emission control system fitted to the vehicle is designed to keep the emissions within the legal limits, provided that the engine is correctly maintained and is in good mechanical condition.

Exhaust emission control

The engine management system provides accurately metered quantities of fuel to the combustion chambers, to ensure the most efficient air to fuel ratio under all conditions of operation. A further improvement to combustion is made by measuring the oxygen content of the exhaust gases. This enables the quantity of injected fuel to be varied, which allows the ratio needed for efficient gas conversion by the catalytic converter to be maintained.

The catalytic converter is situated between the exhaust front pipe and exhaust tail pipe. The catalytic converter reduces emissions of carbon monoxide, oxides of nitrogen (NO_x) and hydrocarbons. The active constituents of the converter are the precious metals palladium and rhodium.

The correct operation of the catalytic converter is dependent upon close control of the oxygen concentration of the exhaust gas entering the converter. The quantity of oxygen in the exhaust gas is determined by a heated oxygen sensor situated in the exhaust manifold. The heated oxygen sensor provides the engine control module with a signal dependent on the oxygen content. The ECM can then adjust the amount of injected fuel, so that it can implement the necessary changes to achieve the correct exhaust gas content.



CAUTION: Serious damage to catalytic converter will occur if leaded fuel is used. The filler neck is designed to accommodate only unleaded fuel pump nozzles.

Evaporative emission canister

The evaporative emission (EVAP) canister is situated beneath the LH inner wing valance, and contains charcoal which absorbs and stores fuel from the fuel tank when the engine is not running. When the engine is running the vapour is purged from the canister into the engine and burned.

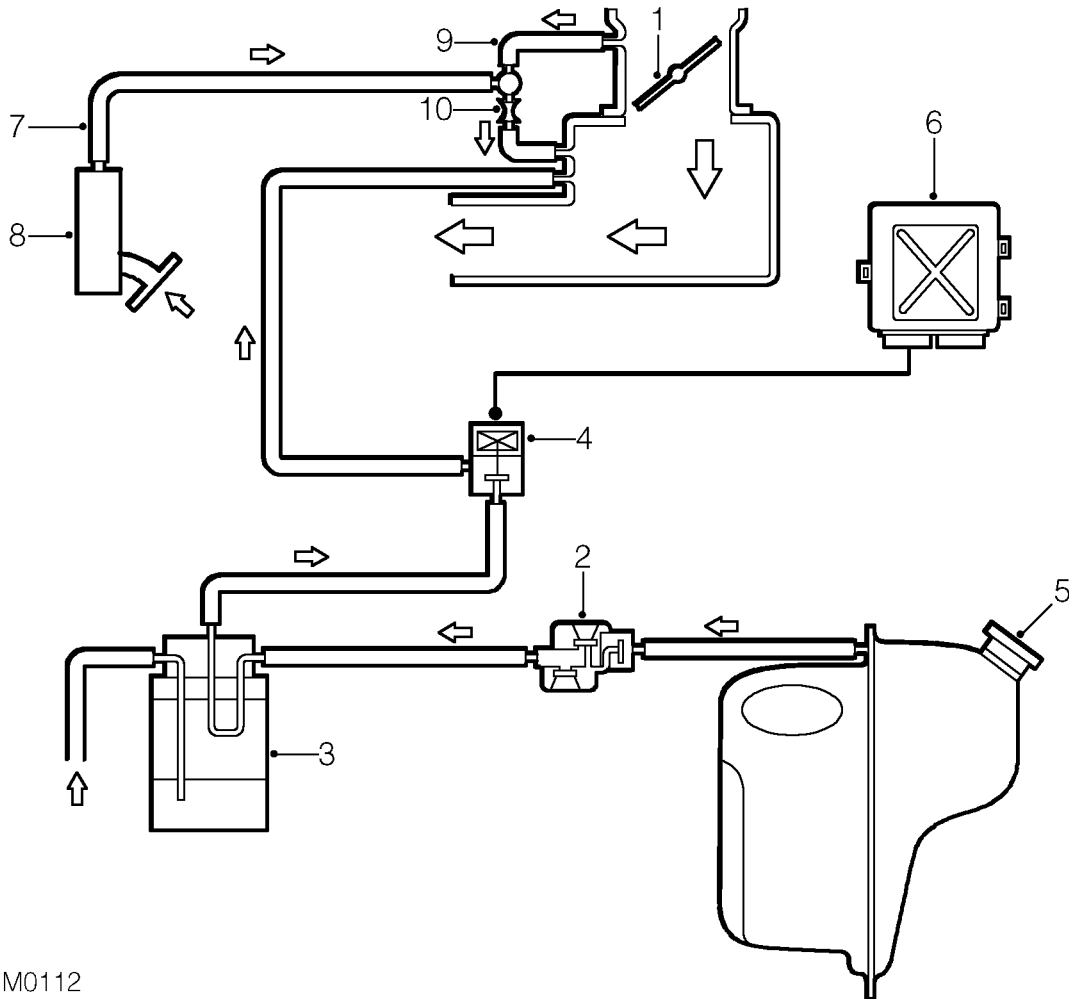
The EVAP canister is purged when the EVAP canister purge valve is opened. Manifold depression draws fresh air into the canister through the charcoal, which releases fuel vapour into the inlet manifold.

Evaporative emission canister purge valve

The EVAP canister purge valve is operated by the ECM. The valve remains closed until engine temperature rises above 70°C. This is to maintain engine tune and catalyst performance. If the valve was to open with the engine cold or at idling speed, the enriched mixture would delay catalyst light off time and cause erratic idling. When the purge valve opens, fuel vapour from the EVAP canister is drawn along a pipe through the valve and into the inlet manifold for combustion.

EMISSION CONTROL

Crankcase emission and evaporative loss control systems



17M0112

1. Throttle disc
2. Fuel cut-off/two way valves
3. Evaporative emission canister
4. Evaporative emission canister purge valve
5. Fuel filler cap

6. MEMS ECM
7. Crankcase breather hose
8. Oil breather/separator
9. Clean air pipe
10. Restrictor

Crankcase emission control system

To ensure crankcase depression is maintained, clean air is drawn into the system through a pipe connected to the air cleaner side of the inlet manifold above the throttle disc. The increase in manifold depression causes air and crankcase gases to pass along pipes through oil breather/separators on the engine front cover and flywheel housing.

The gases are then drawn through a restrictor into the inlet manifold below the throttle disc to be consumed in the combustion chambers. The oil filler cap on the rocker cover also incorporates an internal breather passage and a filter, to reduce crankcase emissions.

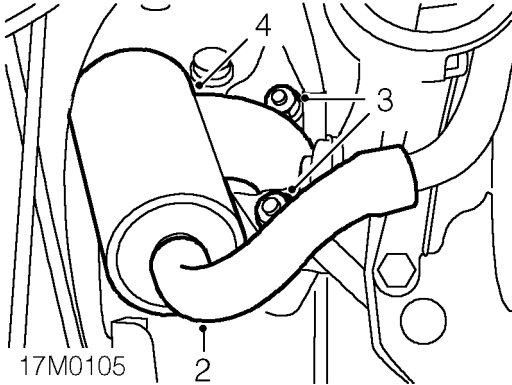


ENGINE BREATHER/OIL SEPARATOR

Service repair no - 17.10.03

Remove

1. Remove air cleaner. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*



2. Disconnect breather hose from oil separator.
3. Remove 2 nuts and washers securing breather/oil separator to flywheel housing.
4. Remove engine breather/oil separator from flywheel housing.
5. Remove and discard gasket.

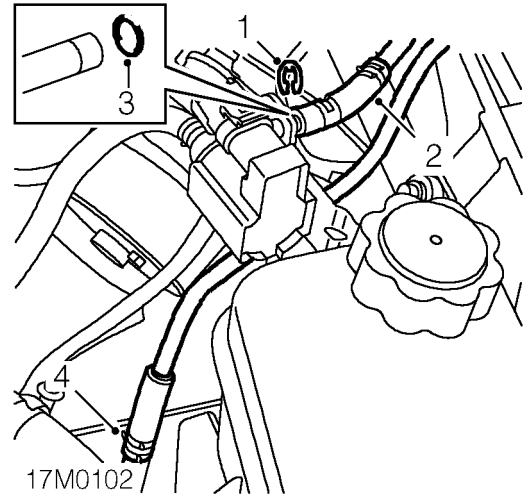
Refit

1. Clean mating face of breather/oil separator and flywheel housing.
2. Wash out breather/oil separator with cleaning fluid.
3. Using an air line, dry breather/oil separator.
4. Fit new gasket to flywheel housing.
5. Fit breather/oil separator to flywheel housing, fit washers and nuts and tighten to 18 Nm.
6. Connect breather hose to breather/oil separator.
7. Fit air cleaner. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*

EVAPORATIVE EMISSION CANISTER

Service repair no - 17.15.13

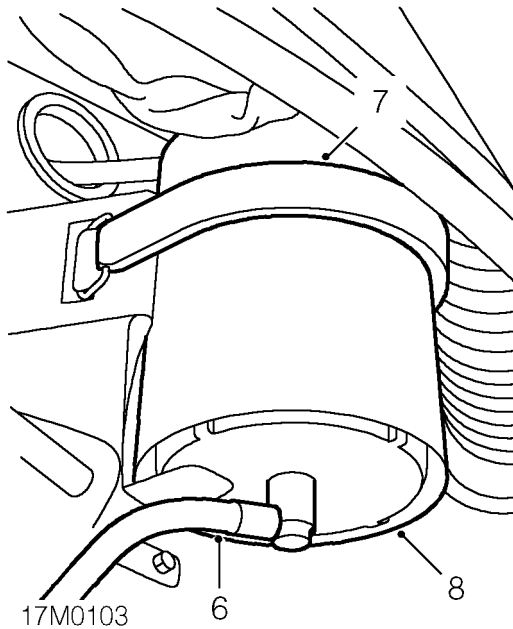
Remove



1. Remove 'E' clip securing emission canister pipe to mounting bracket.
2. Release emission canister pipe from mounting bracket.
3. Remove and discard 'O' ring from valve.
4. Release clip and disconnect hose from fuel tank vent pipe.
5. Raise front of vehicle.



WARNING: Support on safety stands.



6. Disconnect vent pipe from emission canister.
7. Release strap securing emission canister to mounting bracket beneath wing.
8. Release emission canister from mounting bracket and remove.

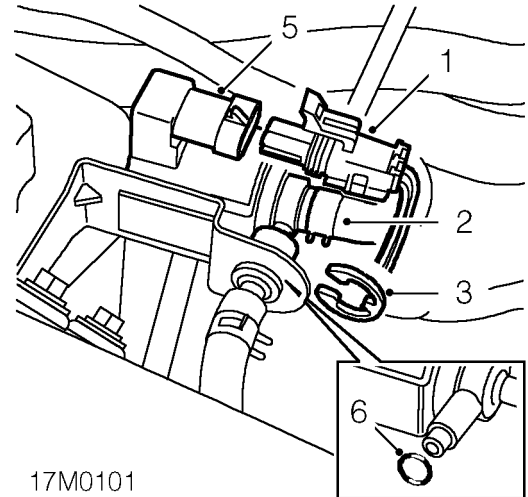
Refit

1. Fit emission canister to mounting bracket and secure with strap.
2. Connect vent hose to emission canister.
3. Lubricate new 'O' ring with silicone grease and fit to purge valve.
4. Connect emission canister pipe to purge valve.
5. Secure emission canister pipe to mounting bracket with 'E' clip.
6. Connect hose to fuel tank vent pipe and secure with clip.
7. Remove stand(s) and lower vehicle.

EMISSION CANISTER PURGE VALVE

Service repair no - 17.15.39

Remove



1. Disconnect multiplug from valve.
2. Release clip and disconnect purge hose from valve.
3. Remove 'E' clip securing emission canister pipe to mounting bracket.
4. Release emission canister pipe from mounting bracket.
5. Slide purge valve from mounting bracket and remove.
6. Remove and discard 'O' ring from valve.

Refit

1. Lubricate new 'O' ring with silicone grease and fit to valve.
2. Fit purge valve to mounting bracket.
3. Connect emission canister pipe to valve.
4. Secure emission canister pipe to mounting bracket with 'E' clip.
5. Connect purge hose to valve and secure with clip.
6. Connect multiplug to purge valve.



CATALYTIC CONVERTER

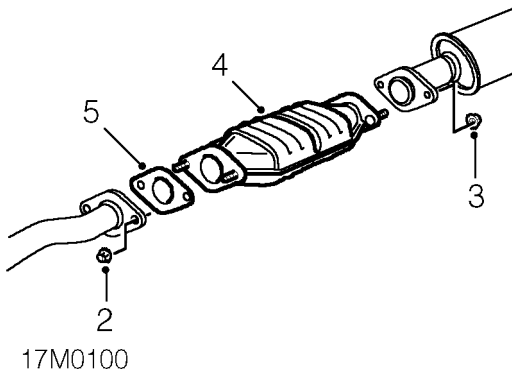
Service repair no - 17.50.01

Remove

1. Raise front of vehicle.



WARNING: Support on safety stands.



2. Remove 2 nuts securing catalytic converter to front pipe.
3. Remove 2 nuts securing catalytic converter to tail pipe.
4. Disconnect catalytic converter from tail pipe and remove from front pipe.
5. Remove and discard gasket from flange on catalytic converter.



CAUTION: Catalytic converters are manufactured from ceramic material which is very fragile, avoid heavy impacts on converter casing.

Refit

1. Clean mating faces of catalytic converter, front pipe and tail pipe.
2. Fit new gasket to catalytic converter flange.
3. Fit catalytic converter to front pipe and connect to tail pipe.
4. Fit nuts securing front pipe to catalytic converter and tighten to 45 Nm.
5. Fit nuts securing tail pipe to catalytic converter and tighten evenly to 9 Nm.
6. Remove stand(s) and lower vehicle.

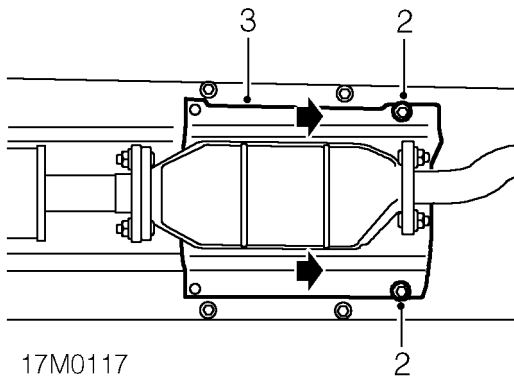
EMISSION CONTROL

CATALYTIC CONVERTER HEAT SHIELD

Service repair no - 17.50.05

Remove

1. Remove intermediate pipe heat shield. **See** *MANIFOLD & EXHAUST SYSTEMS, Repairs.*



2. Remove 2 nuts securing catalytic converter heat shield to body.
3. Release heat shield from studs and slide forward.
4. Manoeuvre heat shield around exhaust pipe and remove.

Refit

1. Manoeuvre heat shield into position and locate on studs.
2. Fit and tighten nuts securing heat shield to body.
3. Fit intermediate pipe heat shield. **See** *MANIFOLD & EXHAUST SYSTEMS, Repairs.*

ENGINE MANAGEMENT SYSTEM - MEMS

CONTENTS

Page

DESCRIPTION AND OPERATION

ENGINE COMPARTMENT COMPONENT LOCATIONS	1
ENGINE MANAGEMENT SYSTEM	2

ADJUSTMENTS

THROTTLE CABLE	1
----------------------	---

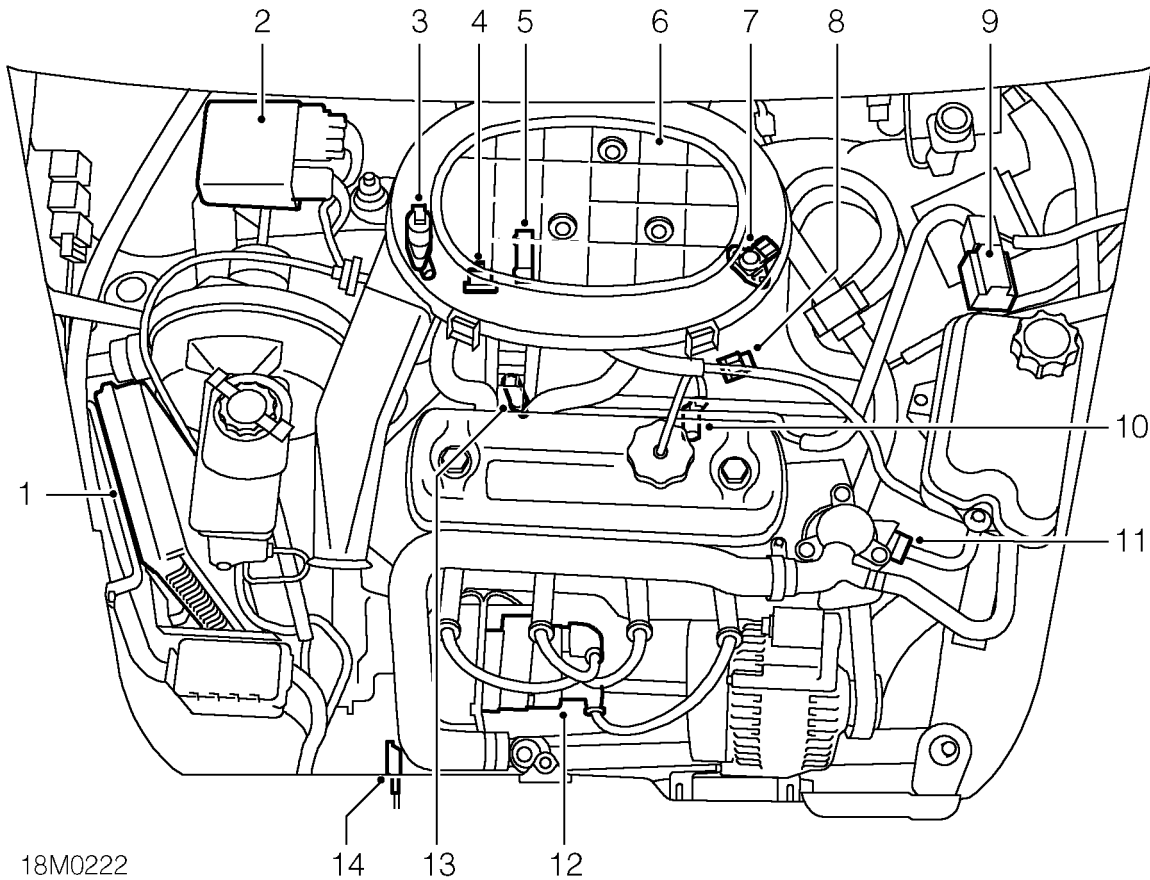
REPAIRS

THROTTLE CABLE	1
THROTTLE PEDAL	2
THROTTLE HOUSING	3
AIR CLEANER	5
AIR CLEANER ELEMENT	5
SPARK PLUGS	6
IGNITION COIL	6
ENGINE CONTROL MODULE (ECM)	7
IDLE AIR CONTROL VALVE (IACV)	8
INTAKE AIR TEMPERATURE (IAT) SENSOR	9
ENGINE COOLANT TEMPERATURE (ECT) SENSOR	9
CRANKSHAFT POSITION (CKP) SENSOR	10
THROTTLE POSITION (TP) SENSOR	11
MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR	12
ENGINE MANAGEMENT RELAY MODULE	13
CAMSHAFT POSITION (CMP) SENSOR	13
HEATED OXYGEN SENSOR (HO2S)	14
FUEL RAIL	14
FUEL INJECTORS	16





ENGINE COMPARTMENT COMPONENT LOCATIONS



- 1. Engine Control Module (ECM)
- 2. Relay module
- 3. Idle Air Control Valve (IACV)
- 4. Fuel pressure regulator
- 5. Throttle Position (TP) sensor
- 6. Air cleaner
- 7. Manifold Absolute Pressure (MAP) sensor

- 8. Intake Air Temperature (IAT) sensor
- 9. Evaporative emission canister purge valve
- 10. Camshaft Position (CMP) sensor
- 11. Engine Coolant Temperature (ECT) sensor
- 12. Ignition coil
- 13. Heated Oxygen Sensor (HO2S)
- 14. Crankshaft Position (CKP) sensor

ENGINE MANAGEMENT SYSTEM - MEMS

ENGINE MANAGEMENT SYSTEM

The Engine Control Module (ECM) monitors the conditions required for optimum combustion of fuel in the cylinder through sensors located at strategic points around the engine. As a result of these sensor inputs, the engine control module can adjust the fuel quantity and timing of the fuel being delivered to the cylinders.

The main features are as follows:

- A single ECM controls the fuel injection system and the ignition system. The ECM incorporates short circuit protection and can store intermittent faults on certain inputs. TestBook can interrogate the ECM for these stored faults.
- The ECM is electronically immobilised which prevents the engine from being started unless it receives a coded signal from the anti-theft control unit.
- In conjunction with the throttle position sensor the ECM uses the speed/density method of air flow measurement to calculate fuel delivery. This method measures the inlet air temperature and inlet manifold pressure and assumes that the engine is a calibrated vacuum pump, with its characteristics stored in the ECM, it can then determine the correct amount of fuel to be injected.
- The vehicle diagnostic connector allows engine tuning or fault diagnosis to be carried out using TestBook without disconnecting the ECM harness multiplug.
- The ECM harness multiplug incorporates specially plated pins to minimise oxidation and give improved reliability.
- The ECM controls the operation of the radiator and air conditioning cooling fans, based on signals received from the engine coolant temperature sensor.
- If certain system inputs fail, the ECM implements a back-up facility to enable the system to continue functioning, although at a reduced level of performance.

IGNITION SYSTEM

The ECM determines the optimum ignition timing based on the signals from the following sensors:

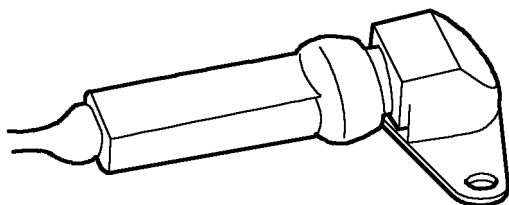
1. Crankshaft position sensor - Engine speed and crankshaft position
2. Manifold absolute pressure sensor - Engine load
3. Engine coolant temperature sensor - Engine temperature
4. Throttle position sensor - Throttle pedal released

The engine management system uses no centrifugal or vacuum advance. Timing is controlled by the ECM which is energised by the main relay, located within the relay module. Spark distribution is achieved by a direct ignition system which consists of a twin-ignition coil driven directly from the ECM.



BASIC IGNITION TIMING

Crankshaft position sensor



18M0212

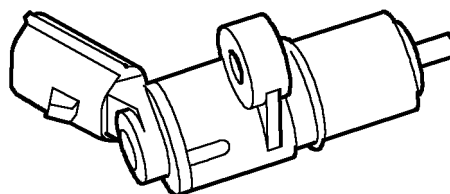
The speed and position of the engine is detected by the crankshaft position (CKP) sensor which is bolted to, and projects through, the engine adaptor plate adjacent to the flywheel.

The CKP sensor is an inductive sensor consisting of a bracket mounted body containing a coil and a permanent magnet which provides a magnetic field. The CKP sensor is situated so that an air gap exists between it and the flywheel. Air gap distance is critical for correct operation.

The flywheel incorporates a reluctor ring which consists of 32 poles spaced at 10° intervals, with 4 missing poles at 30°, 60°, 210° and 250°. The missing poles inform the ECM when to operate the groups of injectors. When the flywheel rotates, as a pole passes the CKP sensor it disturbs the magnetic field inducing a voltage pulse in the coil. This pulse is transmitted to the ECM.

By calculating the number of pulses that occur within a given time, the ECM can determine the engine speed. This is a primary input necessary to make the engine run.

Camshaft position sensor

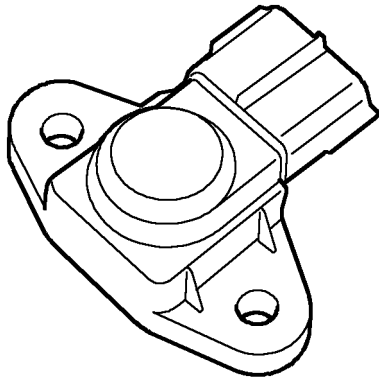


18M0220

The camshaft position sensor has two functions. The first is to enable the ECM to run a sequential fuelling mode. The second is to measure the actual cam period, this measurement is achieved using teeth on the camshaft to indicate when the valve opens and closes.

If the camshaft position sensor fails when the engine is running, the engine will continue to run normally in sequential fuelling mode. If the sensor fails before the engine is started, the engine will start but run at a reduced rev limit in comparison to the normal rev limit of 6500 rpm. Camshaft position sensor failure can be identified using TestBook.

Manifold absolute pressure sensor

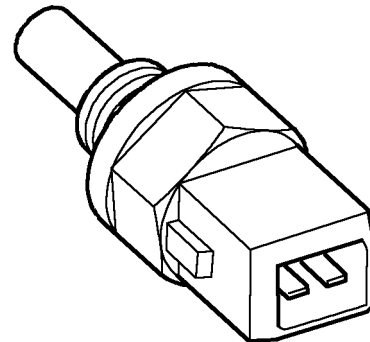


18M0216

The manifold absolute pressure (MAP) sensor is mounted directly on the inlet manifold. The MAP sensor converts pressure variations within the inlet manifold into graduated electrical signals which can be read by the ECM. Increases and decreases in the manifold pressure provide the ECM with an accurate representation of the load being placed on the engine allowing the ECM to adjust the quantity of fuel being injected and the ignition timing to achieve optimum fuelling of the engine.

IGNITION TIMING COMPENSATION

Engine coolant temperature sensor



18M0197

The engine coolant temperature (ECT) sensor is a 'thermistor' (a temperature dependent resistor), i.e. the voltage output varies in proportion to temperature. The ECT sensor is located on top of the coolant outlet elbow. The ECM constantly monitors this signal and uses the information to provide optimum driveability and emissions by advancing or retarding the ignition timing.

Idle speed control

With the throttle pedal released and the engine at idle, the ECM uses the fast response of the engine to ignition timing to maintain idle stabilisation.

When loads are placed on or removed from the engine, the ECM responds to changes in engine speed and in conjunction with adjusting the idle air control valve (IACV), advances or retards the ignition timing to maintain a specified idle speed. When load is removed from the engine the IACV returns to its original position and the ignition timing returns to the idle setting.

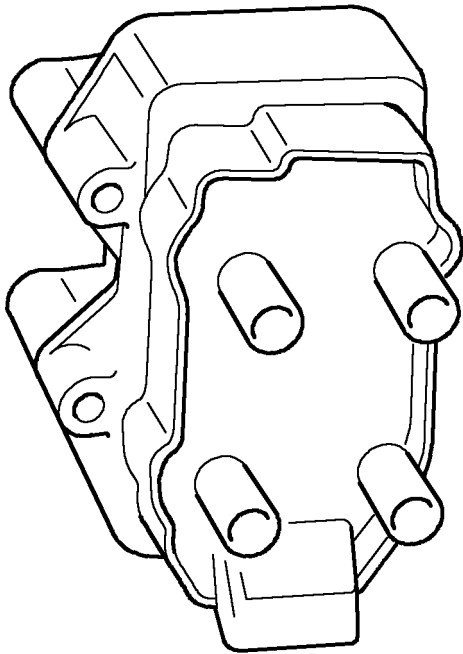


NOTE: Due to the sensitivity of this system the ignition timing will be constantly changing at idle speed.



IGNITION COMPONENTS

Ignition coil



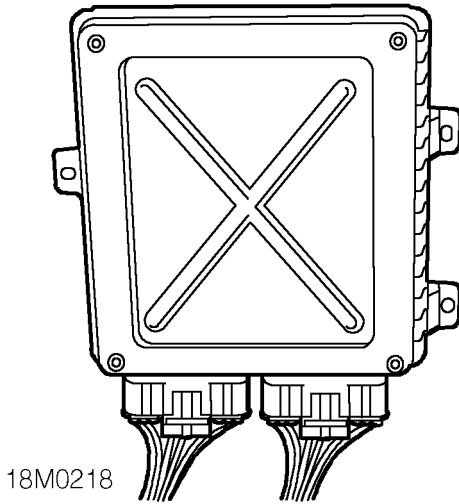
18M0219

The coil for the programmed ignition system is mounted on the front of the engine. The coil has a lower primary winding resistance (0.63 to 0.77 ohms at 20°C) than a coil in a conventional ignition system. This allows the full h.t. output to be reached faster and so makes the coil operation more consistent throughout the engine speed range.

ENGINE MANAGEMENT SYSTEM - MEMS

FUEL SYSTEM

Engine Control Module (ECM)

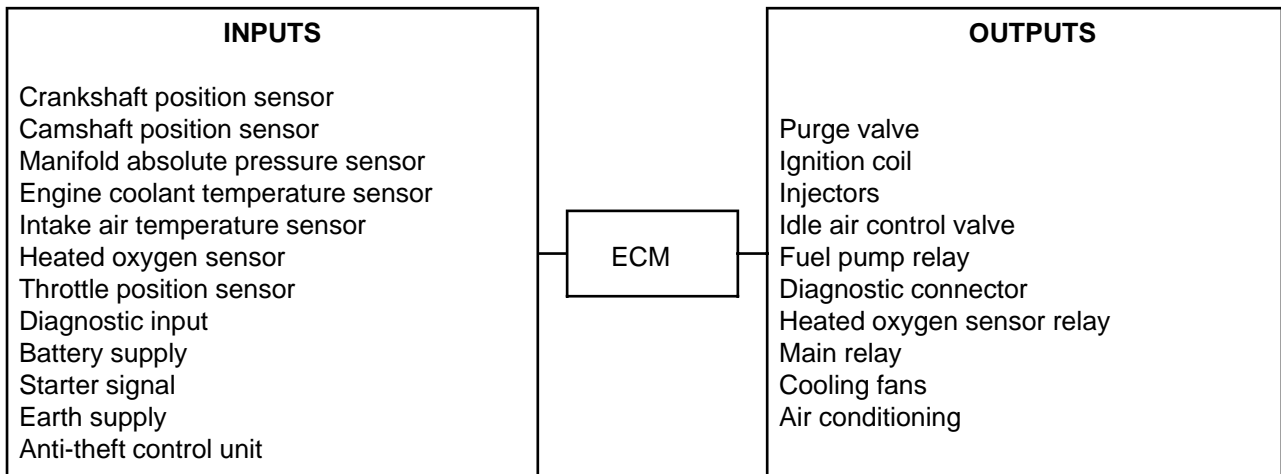


The Modular Engine Management System (MEMS) is controlled by an ECM mounted in the engine compartment. The ECM is an adaptive unit which over a period of time learns the load and wear characteristics of the engine it controls. The ECM remembers and updates two main engine requirements when the engine is running at normal operating temperature:

1. The position of the idle air control (IAC) valve required to achieve a specified idle speed. This is then used as a reference for IAC valve movement to achieve idle speed under all load conditions.
2. The fuelling change or offset required to achieve a set oxygen sensor voltage. This allows the system to provide the correct fuelling without having to apply excessive adjustments to the fuelling which can adversely affect the emissions and driveability.

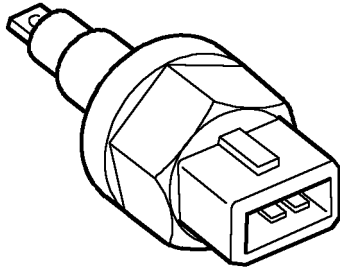
NOTE: After fitting a different ECM, TestBook will be required to reprogramme the ECM with the code from the anti-theft control unit and to perform a full engine tune procedure.

The ECM inputs and outputs are shown in the following table:





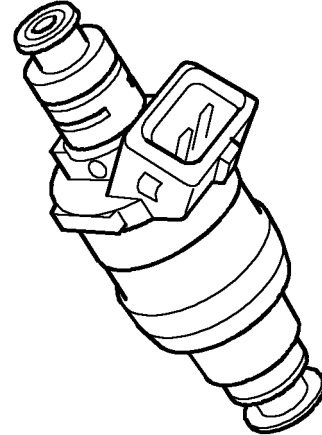
Intake air temperature sensor



18M0200

The intake air temperature (IAT) sensor is located in the side of the inlet manifold. The IAT sensor is of the negative temperature coefficient (NTC) type, designed to reduce its resistance with increasing temperature. The ECM receives a signal proportional to the temperature of the intake air. When used in conjunction with the signal from the manifold absolute pressure sensor the ECM can calculate the volume of oxygen in the air and adjust the quantity of fuel being injected to achieve optimum fuelling of the engine.

Injectors



18M0215

The two fuel injectors are fitted between the pressurised fuel rail and inlet manifold. Each injector comprises a solenoid operated needle valve and a specially designed nozzle to ensure good fuel atomisation.

The ECM determines when to operate the injectors based on the signal it receives from the crankshaft position sensor.

The ECM provides an earth signal for the period the injectors are required to be open, the injector solenoids are energised and fuel is sprayed into the inlet manifold onto the back of the inlet valves. The ECM carefully meters the amount of fuel injected by adjusting the injector opening period (pulse width). During cranking, when the engine speed is below approximately 400 rev/min, the ECM increases the injector pulse width to aid starting. The amount of increase depends upon engine coolant temperature. To prevent flooding, the ECM periodically inhibits the operation of the injectors.

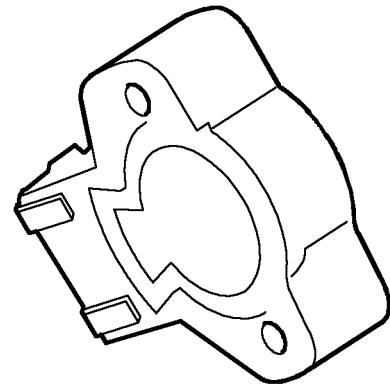
Throttle housing

The throttle housing is located between the inlet manifold and air intake hose and is sealed to the manifold by an 'O' ring. The throttle housing incorporates a throttle disc which is connected to the throttle pedal via the throttle lever and a cable.

There are two breather pipes connected to the throttle housing; one either side of the throttle disc. When the engine is running with the throttle disc open, both pipes are subject to manifold depression and draw crankcase fumes into the manifold. When the throttle disc is closed, only the pipe on the inlet manifold side of the disc is subject to manifold depression. This pipe incorporates a restrictor to prevent engine oil being drawn into the engine by the substantially greater manifold depression.

Mounted on the throttle housing are the throttle position sensor and idle air control valve.

Throttle position sensor



18M0213

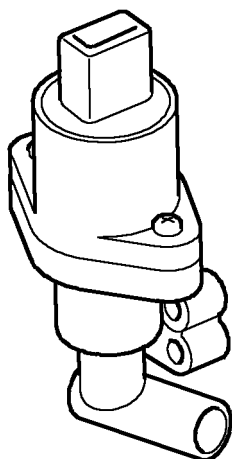
The throttle position (TP) sensor is a potentiometer attached to the throttle housing and is directly coupled to the throttle disc. The TP sensor is non-adjustable. Closed throttle is detected by the TP sensor which initiates idle speed control via the idle air control valve.

The ECM supplies the TP sensor with a 5 volt supply and an earth path. The TP sensor returns a signal proportional to throttle disc position.

Throttle disc movement causes voltage across the TP sensor to vary. The ECM calculates the rate of change of the voltage signal in positive (acceleration) or negative (deceleration) directions. From this the ECM can determine the required engine speed, rate of acceleration or rate of deceleration and apply acceleration enrichment, deceleration fuel metering or over-run fuel cut-off.



Idle air control valve



18M0217

The idle air control valve (IACV) is mounted on the inlet manifold and controlled by the ECM. The IACV opens a pintle valve situated in an air passage in the throttle housing, allowing air to bypass the throttle disc and flow straight into the inlet manifold.

By changing the amount the IACV is open the ECM can control engine idle speed and cold start air flow requirements by adjusting the flow of air in the passage.

During cold starting the ECM indexes the IACV open slightly to provide a level of fast idle, dependent on engine coolant temperature. As the engine warms, fast idle is gradually decreased until normal operating temperature is reached.

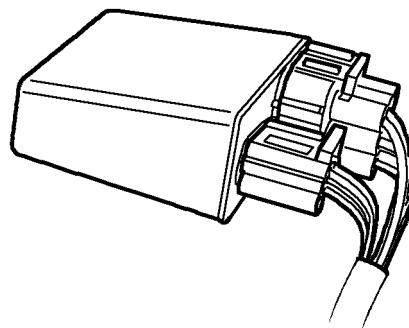
The position of the IACV should be within the range of 20 to 40 steps when the engine is running.

NOTE: Adjustment of the IACV only applies to the 'learnt' position, not the actual position at idle, so adjustment is not recommended.

If the valve is identified as being outside this range it can be adjusted to within range using TestBook. This ensures that the IACV is at the optimum position within its range for providing further movement to compensate for changes in engine load or temperature in accordance with signals from the ECM.

NOTE: The position of the throttle disc is preset during manufacture and the throttle position setting screw MUST NOT be adjusted.

Relay module



18M0202

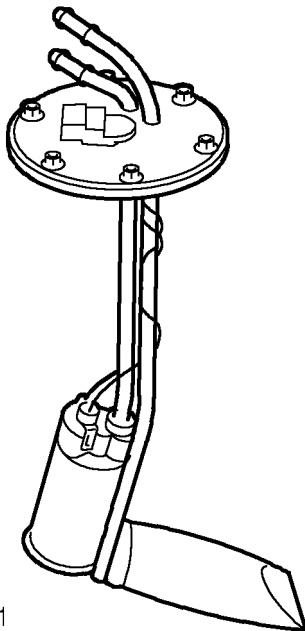
The relay module is located in the engine compartment adjacent to the engine control module. The relay module contains the following relays:

- Main relay - energised when the ignition is switched on and supplies power to the ECM.
- Fuel pump relay - energised by the ECM for a short period when the ignition is switched on, during cranking and while the engine is running.
- Starter relay - energised by the cranking signal from the ignition switch.
- Heated oxygen sensor (HO2S) relay - energised by the ECM and supplies current to the heated oxygen sensor element.

Purge valve

The purge valve is driven directly from by the ECM. When the purge valve is opened it allows the EVAP canister to vent into the engine inlet manifold. The valve is opened by the ECM for varying periods under specific engine conditions to avoid degrading engine performance.

Fuel pump

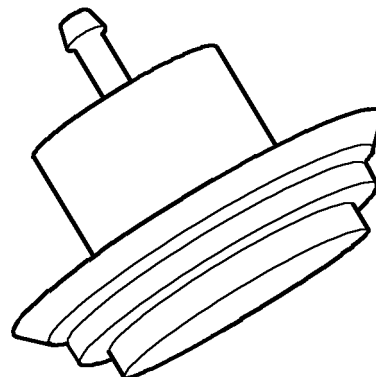


18M0211

The electric fuel pump is located inside the fuel tank and is energised by the ECM via the fuel pump relay in the relay module and the fuel cut-off switch.

The fuel pump delivers more fuel than the maximum load requirement for the engine, pressure is therefore maintained in the fuel system under all conditions.

Fuel pressure regulator



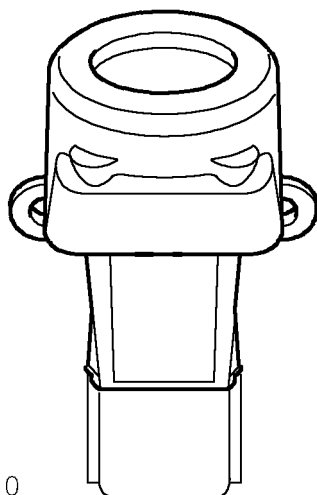
18M0214

The pressure regulator is a mechanical device controlled by manifold depression and is mounted on one end of the fuel rail. The regulator ensures that fuel rail pressure is maintained at a constant pressure difference to that in the inlet manifold, as manifold depression increases the regulated fuel pressure is reduced in direct proportion.

When pressure exceeds the regulator setting, excess fuel is returned to the fuel tank swirl pot which contains the fuel pump pick-up.



Inertia fuel shut-off switch



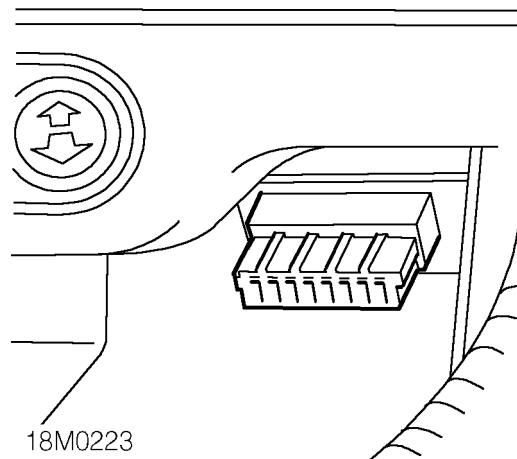
18M0210

The electrical circuit for the fuel pump incorporates an inertia fuel shut-off (IFS) switch which, in the event of a sudden deceleration, breaks the circuit to the fuel pump preventing fuel being delivered to the engine. The IFS switch is situated in the engine compartment, fixed to the bonnet switch bracket which is located on the bulkhead, and must be reset by pressing the rubber top before the engine can be restarted.



WARNING: ALWAYS check for fuel leaks and the integrity of fuel system connections before resetting the switch.

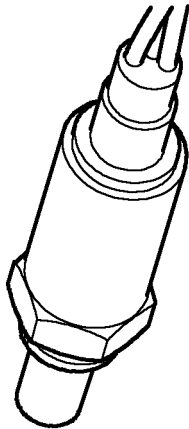
Vehicle diagnostic connector



18M0223

The diagnostic connector, located on a bracket by the foot pedals, allows engine tuning or fault diagnosis to be carried out using TestBook without disconnecting the ECM harness multiplug.

Heated oxygen sensor



18M0221

The modular engine management system operates a closed loop emission system to ensure the most efficient level of exhaust gas conversion.

A heated oxygen sensor (HO2S) fitted in the exhaust manifold monitors the exhaust gases. It supplies a small voltage proportional to exhaust oxygen content to the ECM. As the air/fuel mixture weakens, the exhaust oxygen content increases and the voltage to the ECM decreases. If the mixture becomes richer, the oxygen content decreases and the voltage to the ECM increases.

From this signal the ECM can determine the air/fuel mixture being delivered to the engine and can adjust the duration the injectors are open to maintain the ratio necessary for efficient gas conversion by the catalyst.

The HO2S has an integral heating element to ensure an efficient operating temperature is quickly reached from cold. The electrical supply to the heater element is controlled by the ECM via the HO2S relay in the relay module.

Acceleration enrichment

When the throttle pedal is depressed the ECM receives a rising voltage from the throttle position sensor and detects a rise in manifold pressure from the manifold absolute pressure sensor. The ECM provides additional fuel by increasing the normal injector pulse width and also provides a small number of extra additional pulses on rapid throttle openings.

Over-run fuel cut-off

The ECM implements over-run fuel cut-off when the engine speed is above 1600 rev/min with engine at normal operating temperature and the TP sensor in the closed position, i.e. the vehicle is 'coasting' with the throttle pedal released. The ECM indexes the IACV open slightly to increase the air flow through the engine to maintain a constant manifold depression to keep emissions low.

Fuel is immediately reinstated if the throttle is opened. If the engine speed drops below 1600 rev/min on over-run, fuel is progressively reinstated.

Over-speed fuel cut-off

To prevent damage at high engine speeds the ECM will implement fuel cut-off at engine speeds above approximately 6500 rev/min; fuel being gradually reinstated as speed falls.

Ignition switch off

When the starter switch is turned off, the ECM will keep the main relay energised for approximately 30 seconds while it drives the idle air control valve to its power down position, ready for the next engine start.

The ECM monitors the engine coolant temperature for a minimum of 2 minutes after the starter switch is turned off. If the coolant temperature rises above a certain limit, the ECM switches on the radiator fans. Once the fans are running the ECM will not power down until either the coolant temperature falls below a certain limit or 8 minutes have elapsed since the starter switch was turned off. If the coolant temperature has not risen above the limit after 2 minutes, the ECM will power down.



THROTTLE CABLE

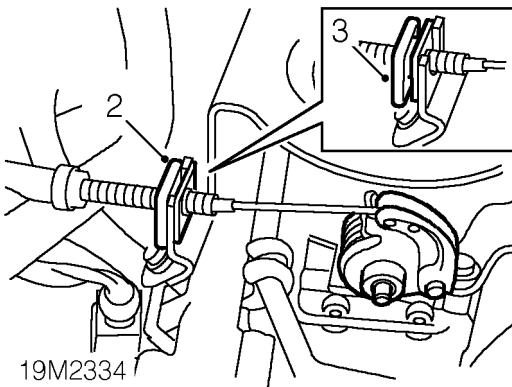
Service repair no - 19.20.05



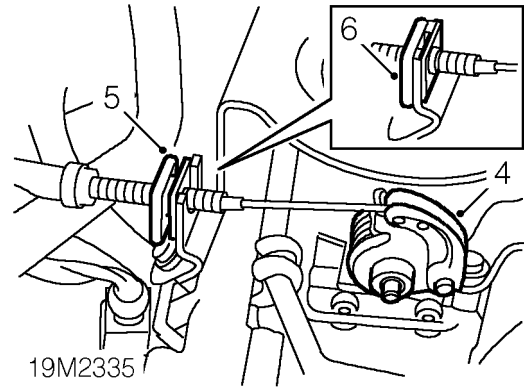
NOTE: Before adjusting cable, ensure that cable is correctly routed and located. Do not attempt to adjust throttle cable or engine idle speed by means of the throttle stop screw.

Adjust

1. Remove air cleaner. *See Repairs.*



2. Release cable adjusting nut from abutment bracket.
3. Position outer cable to abutment bracket so that adjusting nut contacts top of the abutment bracket.



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 air cleaner. *See Repairs.*

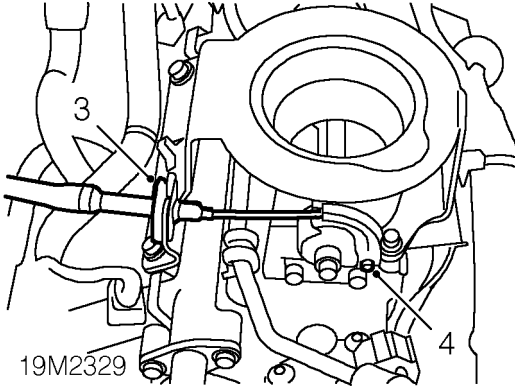


THROTTLE CABLE

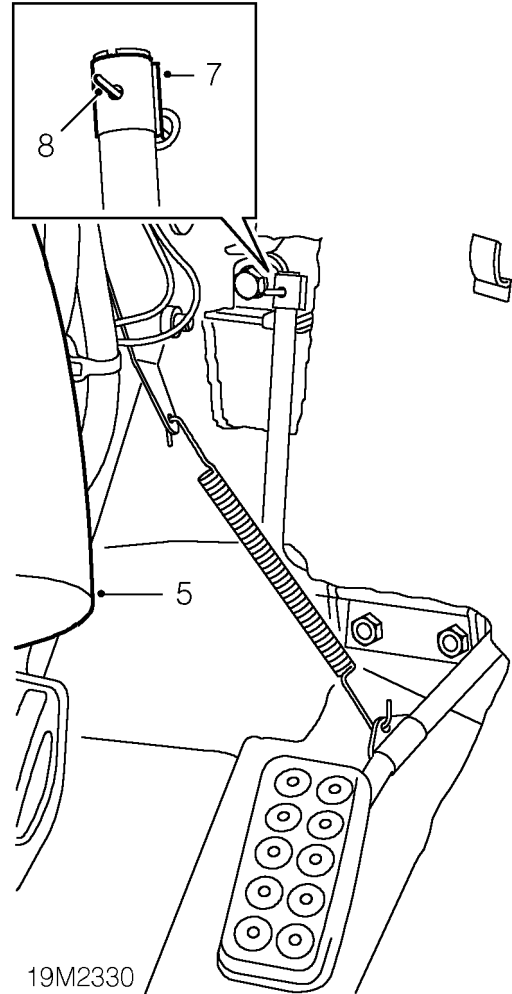
Service repair no - 19.20.06

Remove

1. Remove air cleaner. *See this section.*
2. Remove ECM. *See this section.*



3. Release throttle cable adjustment nut from abutment bracket.
4. Disconnect inner cable from throttle cam.



5. Release heater air intake duct from adaptor inside vehicle.
6. Position air intake duct aside.
7. Remove clip securing inner cable to throttle pedal.
8. Release inner cable from pedal.
9. Remove throttle cable.

Refit

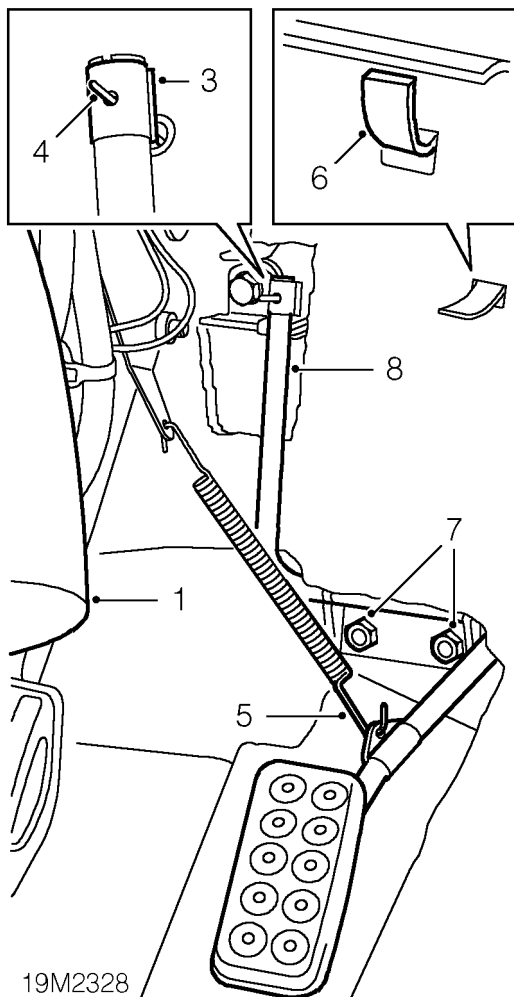
1. Feed throttle cable through bulkhead.
2. Connect inner cable to throttle pedal and secure with clip.
3. Connect heater air intake duct to adaptor on body.
4. Ensure throttle cable is correctly routed and connect inner cable to throttle cam.
5. Locate throttle cable adjusting nut on abutment bracket.
6. Fit ECM. *See this section.*
7. Adjust throttle cable. *See Adjustments.*

ENGINE MANAGEMENT SYSTEM - MEMS

THROTTLE PEDAL

Service repair no - 19.20.01

Remove



19M2328

1. Release heater air intake duct from adaptor inside vehicle.
2. Position air intake duct aside.
3. Remove clip securing inner cable to throttle pedal.
4. Release inner cable from pedal.
5. Disconnect return spring from throttle pedal.
6. Release carpet retainer and fold back carpet.
7. Remove 2 nuts securing throttle pedal to bulkhead.
8. Remove throttle pedal.
9. Remove return spring clip from throttle pedal.

Refit

1. Fit return spring clip to throttle pedal.
2. Fit throttle pedal to studs on bulkhead.
3. Fit nuts securing throttle pedal to bulkhead and tighten to 25 Nm.
4. Connect return spring to pedal.
5. Connect inner cable to throttle pedal and secure with clip.
6. Connect heater air intake duct to adaptor on body.
7. Adjust throttle cable. **See Adjustments.**

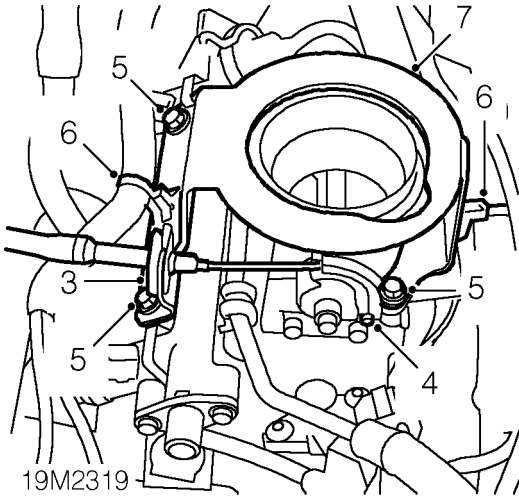


THROTTLE HOUSING

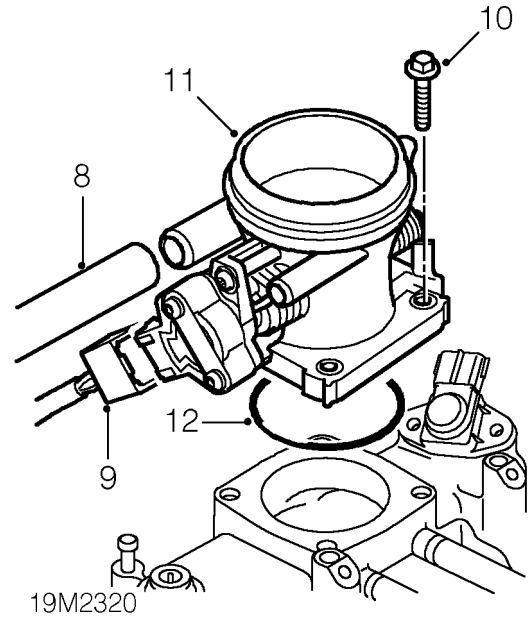
Service repair no - 19.22.45

Remove

1. Disconnect battery earth lead.
2. Remove air cleaner. **See this section.**

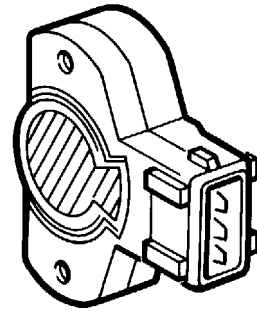
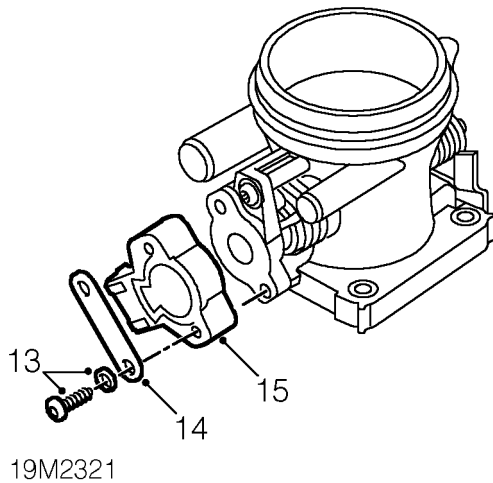


3. Release throttle cable adjusting nut from abutment bracket.
4. Disconnect throttle cable from throttle cam and position aside.
5. Remove 3 bolts securing air cleaner mounting bracket to fuel rail and inlet manifold.
6. Release 2 clips securing harnesses to mounting bracket.
7. Remove air cleaner mounting bracket.



8. Disconnect air bypass hose from throttle body.
9. Disconnect multiplug from TP sensor.
10. Remove 3 bolts securing throttle housing to inlet manifold.
11. Remove throttle housing.
12. Remove and discard 'O' ring from throttle housing.

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




18M0056


13. Remove and discard 2 screws and wave washers securing TP sensor to throttle housing.
14. Remove TP sensor specification plate.
15. Pull TP sensor from throttle spindle.

 **CAUTION: Do not twist or apply leverage to TP sensor.**

16. Clean mating faces of throttle housing and TP sensor.
17. 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 be easily damaged during fitting. When pressing the sensor onto the throttle spindle, use fingers only, and only apply pressure to the area shown shaded in the illustration.**

18. Rotate TP sensor in an anti-clockwise direction to align fixing holes.

 **CAUTION: Do not rotate sensor in a clockwise direction, and ensure that it is not rotated beyond its internal stops.**

19. Fit TP sensor specification plate.
20. Fit NEW screws and wave washers, and tighten to 1.5 Nm.

 **CAUTION: Do not exceed specified torque figure.**

Refit

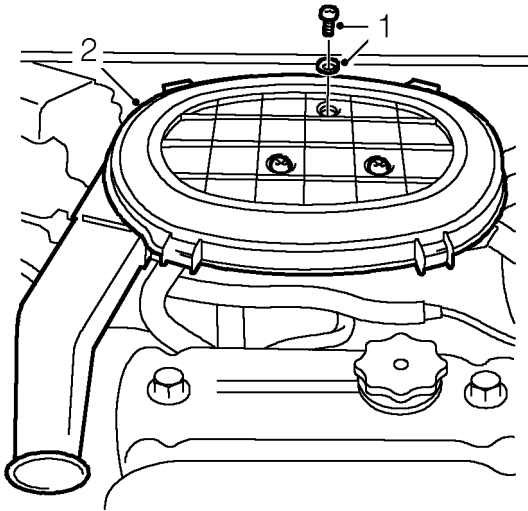
1. Clean mating faces of throttle housing and inlet manifold.
2. Lubricate new 'O' ring with silicone grease and fit to throttle housing.
3. Position throttle housing to inlet manifold, fit bolts and tighten to 8 Nm.
4. Connect multiplug to TP sensor.
5. Connect air bypass hose to throttle body.
6. Position air cleaner mounting bracket to fuel rail and inlet manifold, fit and tighten bolts to 9 Nm.
7. Secure harness clips to air cleaner mounting bracket.
8. Connect throttle cable to throttle cam and locate adjusting nut to abutment bracket.
9. Connect battery earth lead.
10. Adjust throttle cable. **See Adjustments.**



AIR CLEANER

Service repair no - 19.10.01

Remove



19M2310

1. Remove 3 screws securing air cleaner to throttle body. Collect washers.
2. Remove air cleaner.

Refit

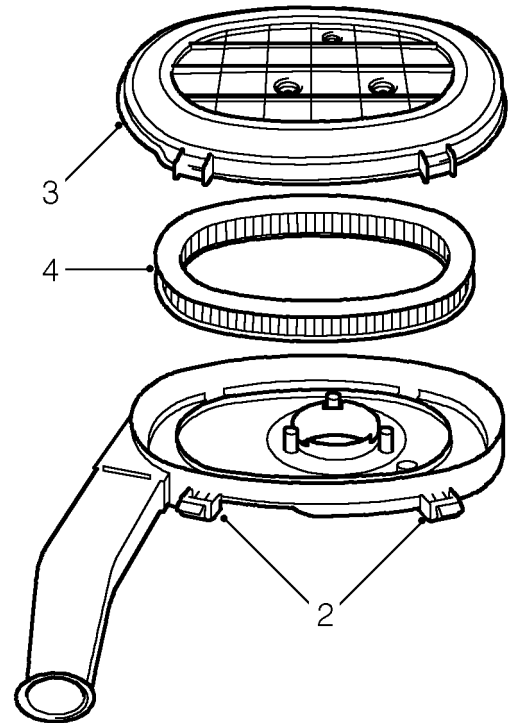
1. Clean mating face of air cleaner and throttle body.
2. Fit air cleaner to throttle body and align.
3. Fit screws securing air cleaner to throttle body and tighten to 7 Nm.

AIR CLEANER ELEMENT

Service repair no - 19.10.10

Remove

1. Remove air cleaner. *See this section.*



19M2311

2. Release 4 clips securing 2 halves of air cleaner.
3. Remove upper half of air cleaner.
4. Remove and discard air cleaner element.

Refit

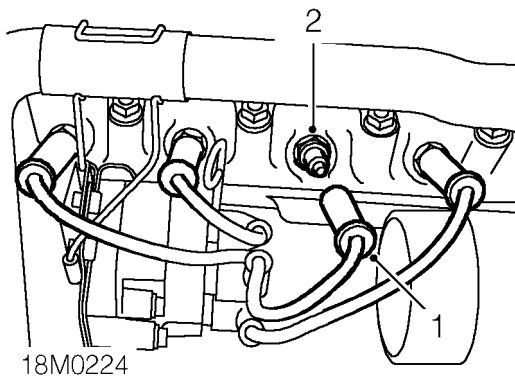
1. Clean inside of air cleaner.
2. fit new air cleaner element.
3. Position upper half of air cleaner and secure with clips.
4. Fit air cleaner. *See this section.*

ENGINE MANAGEMENT SYSTEM - MEMS

SPARK PLUGS

Service repair no - 18.20.02

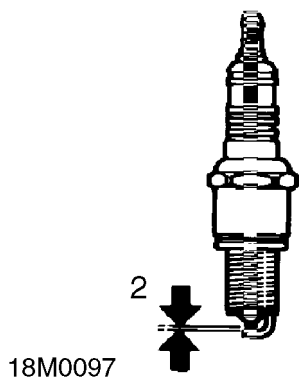
Remove



1. Disconnect h.t. leads from spark plugs.
2. Using a spark plug socket, remove 4 spark plugs.

Refit

1. Fit terminals to new spark plugs.



2. Set gap of each spark plug to 0.85 mm.
3. Fit spark plugs and tighten to 25 Nm.
4. Connect h.t. leads to spark plugs.

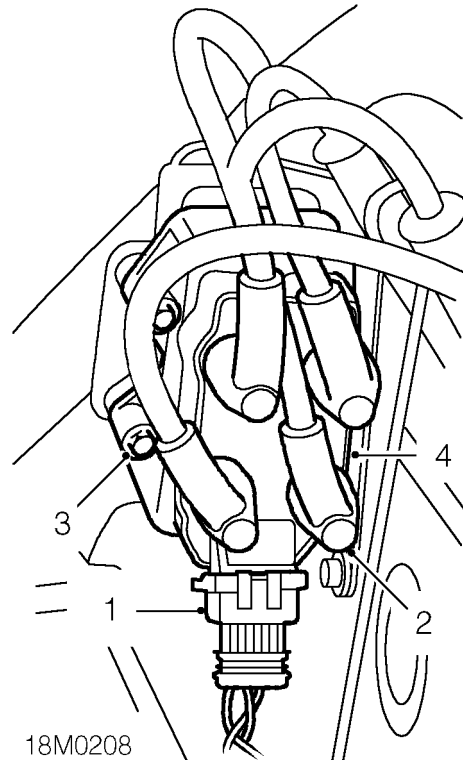


CAUTION: Ensure that h.t. leads connect to spark plug terminals.

IGNITION COIL

Service repair no - 18.20.43

Remove

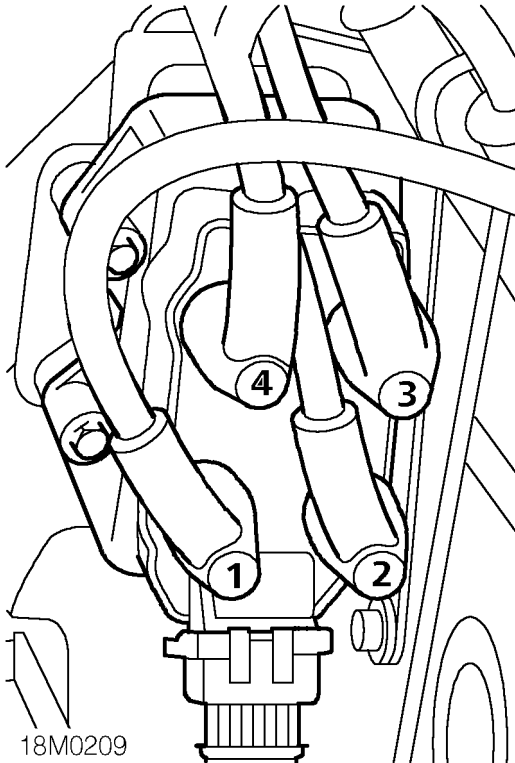


1. Disconnect multiplug from ignition coil.
2. Noting fitted positions, disconnect h.t. leads from ignition coil.
3. Remove 4 bolts securing ignition coil to engine.
4. Remove ignition coil.



Refit

1. Position ignition coil to mounting bracket, fit bolts and tighten to 10 Nm.



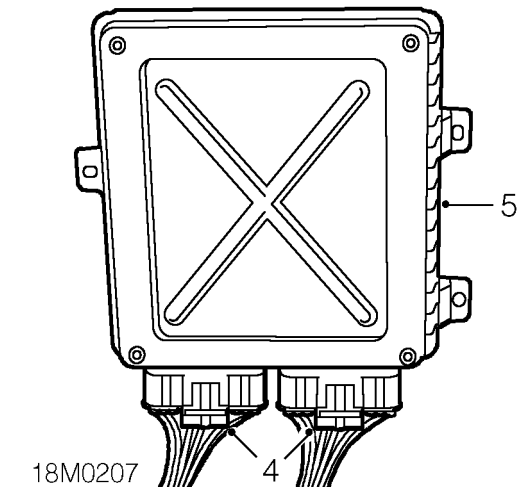
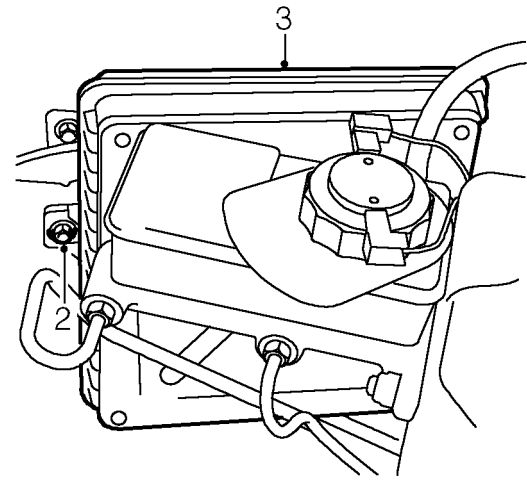
2. Identify and connect h.t. leads to ignition coil.
3. Connect multiplug to ignition coil.

ENGINE CONTROL MODULE (ECM)

Service repair no - 18.30.01

Remove

1. Disconnect battery earth lead.



2. Remove bolt securing ECM to mounting bracket.
3. Release ECM from mounting bracket.
4. Disconnect 2 multiplugs from ECM.
5. Remove ECM.

Refit

1. Position ECM and connect 2 multiplugs.
2. Locate ECM on mounting bracket.



CAUTION: Ensure mounting rubbers are correctly located in mounting bracket.

3. Fit and tighten bolt securing ECM to mounting bracket to 10 Nm.
4. Connect battery earth lead.



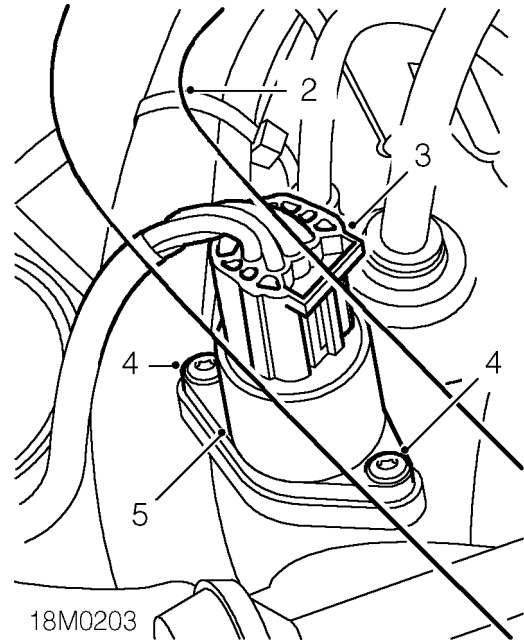
NOTE: If a new ECM has been fitted, the ECM will need to be programmed with the code from the anti-theft security unit using TestBook, before the engine can be started.

IDLE AIR CONTROL VALVE (IACV)

Service repair no - 18.30.05

Remove

1. Remove air cleaner. **See this section.**



2. Disconnect air bypass hose from throttle body and position aside.
3. Disconnect multiplug from IACV.
4. Remove 2 screws securing IACV to inlet manifold.
5. Remove IACV from inlet manifold.
6. Remove and discard 'O' ring from IACV.

Refit

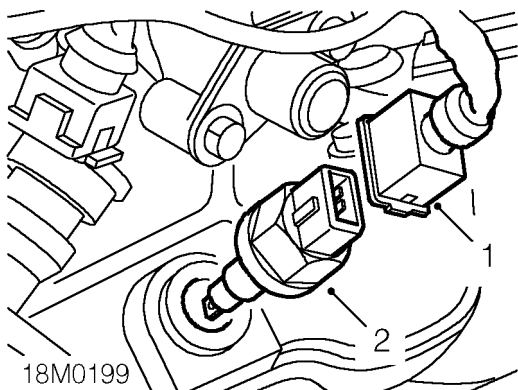
1. Clean mating faces of IACV and inlet manifold.
2. Lubricate new 'O' ring with silicone grease and fit to IACV.
3. Fit IACV to inlet manifold. Fit screws and tighten to 7 Nm.
4. Connect multiplug to IACV.
5. Connect air bypass hose to throttle body.
6. Fit air cleaner. **See this section.**



INTAKE AIR TEMPERATURE (IAT) SENSOR

Service repair no - 18.30.09

Remove



1. Disconnect multiplug from IAT sensor.
2. Remove IAT sensor.

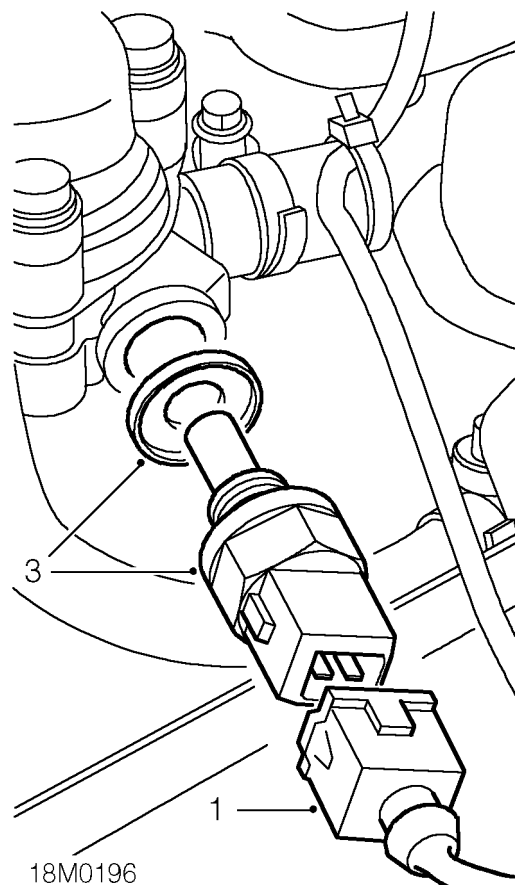
Refit

1. Clean threads of IAT sensor.
2. Clean mating faces of IAT sensor and inlet manifold.
3. Fit IAT sensor to inlet manifold and tighten to 7 Nm.
4. Connect multiplug to IAT sensor.

ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Service repair no - 18.30.10

Remove



1. Disconnect multiplug from ECT sensor.
2. Position container to collect spillage.
3. Remove ECT sensor and discard sealing washer.

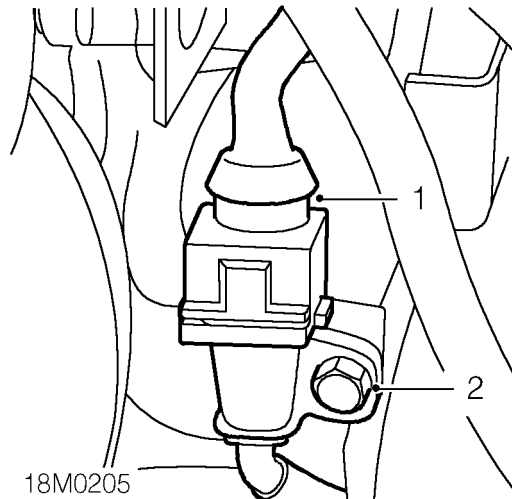
Refit

1. Clean threads of ECT sensor.
2. Clean mating faces of ECT sensor and thermostat housing.
3. Fit new sealing washer to ECT sensor.
4. Fit ECT sensor and tighten to 15 Nm.
5. Connect multiplug to ECT sensor.
6. Top-up coolant. **See**
MAINTENANCE Maintenance.

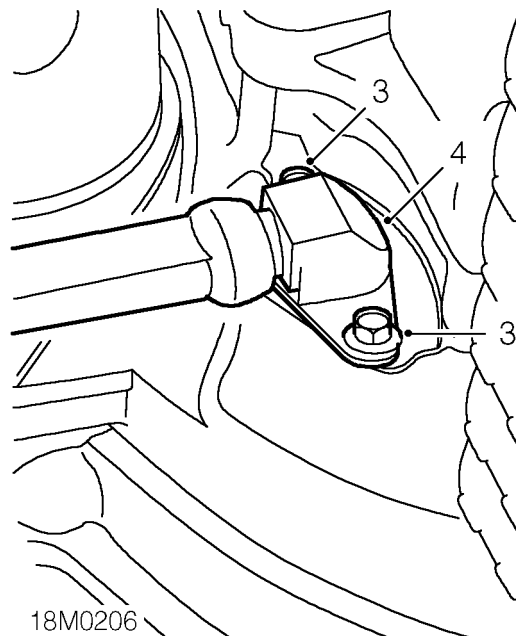
CRANKSHAFT POSITION (CKP) SENSOR

Service repair no - 18.30.12

Remove



1. Disconnect CKP sensor multiplug from harness.
2. Remove bolt securing CKP sensor multiplug to flywheel housing.



3. Remove 2 bolts securing CKP sensor to flywheel housing.
4. Remove CKP sensor.



Refit

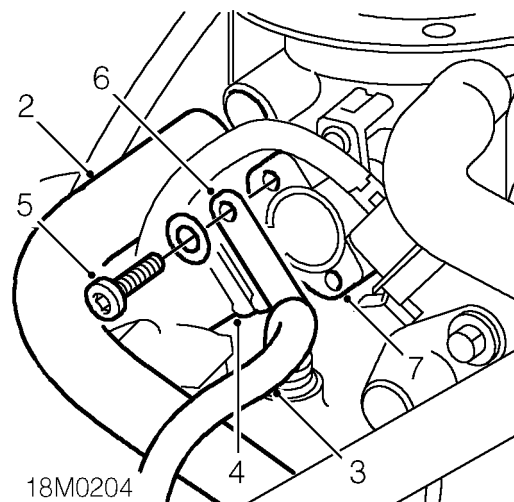
1. Clean CKP sensor and mating face on flywheel housing.
2. Position CKP sensor, fit bolts and tighten to 6 Nm.
3. Position CKP sensor multiplug to flywheel housing, fit bolt and tighten to 3 Nm.
4. Connect harness to CKP sensor multiplug.

THROTTLE POSITION (TP) SENSOR

Service repair no - 18.30.17

Remove

1. Remove air cleaner. **See this section.**



2. Disconnect air bypass hose from throttle body.
3. Depress plastic collar on quick release connector and disconnect brake servo vacuum pipe from inlet manifold.
4. Disconnect multiplug from TP sensor.
5. Remove and discard 2 screws and wave washers securing TP sensor to throttle housing.
6. Remove TP sensor specification plate.
7. Pull TP sensor from throttle spindle.

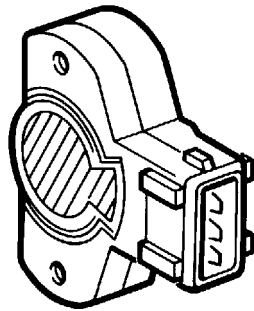


CAUTION: Do not twist or apply leverage to TP sensor.

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.

18M0056



CAUTION: The TP sensor can be easily damaged during fitting. When pressing the sensor onto the throttle spindle, use fingers only, and only apply pressure to the area shown shaded in the illustration.

3. Rotate TP sensor in an anti-clockwise direction to align fixing holes.

CAUTION: Do not rotate 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 screws and wave washers, and tighten to 1.5 Nm.

CAUTION: Do not exceed specified torque figure.

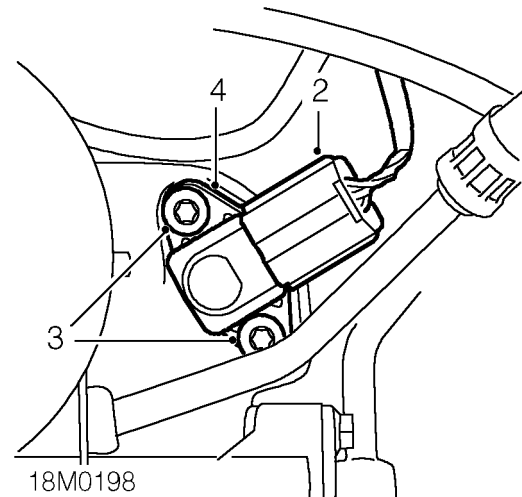
6. Connect multiplug to TP sensor.
7. Connect brake servo vacuum pipe to inlet manifold.
8. Connect air bypass hose to throttle body.
9. Operate throttle cable cam 2 or 3 times and ensure that full travel to the throttle open and the throttle closed positions is available.
10. Fit air cleaner. **See this section.**

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

Service repair no - 18.30.56

Remove

1. Remove air cleaner. **See this section.**



2. Disconnect multiplug from MAP sensor.
3. Remove 2 bolts securing MAP sensor to inlet manifold.
4. Remove MAP sensor.
5. Remove and discard 'O' ring from MAP sensor.

Refit

1. Clean sealing faces of sensor and manifold chamber.
2. Lubricate and fit new 'O' ring to MAP sensor.
3. Fit sensor to inlet manifold and tighten bolts to 6 Nm.
4. Connect multiplug to sensor.
5. Fit air cleaner. **See this section.**



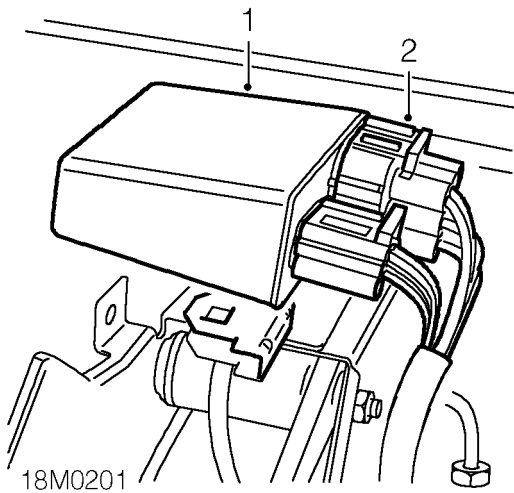
ENGINE MANAGEMENT RELAY MODULE

Service repair no - 18.30.71

The engine management relay module contains the following relays:

- Main relay
- Starter relay
- Fuel pump relay
- HO2S relay

Remove



1. Release relay module from mounting bracket.
2. Disconnect 2 multiplugs from relay module.
3. Remove relay module.

Refit

1. Position relay module and connect 2 multiplugs. Ensure multiplugs are correctly engaged.
2. Secure relay module to mounting bracket.

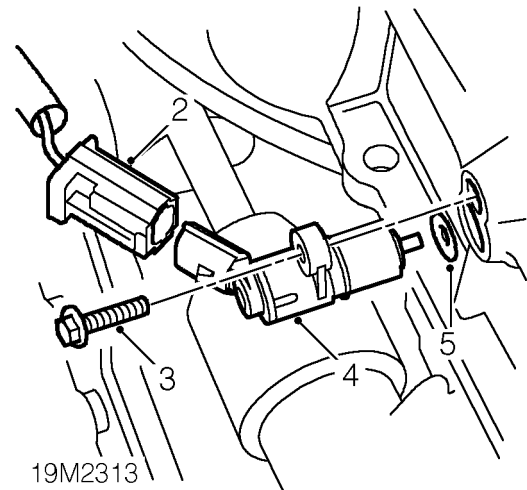
CAMSHAFT POSITION (CMP) SENSOR

Service repair no - 19.22.07

Remove

WARNING: The exhaust manifold reaches very high temperatures when the engine is running and can cause serious burns. Allow engine to cool before commencing work.

1. Remove air cleaner. *See this section.*



2. Disconnect multiplug from CMP sensor.
3. Remove bolt (8 mm) securing CMP sensor to cylinder block.
4. Remove CMP sensor.
5. Remove 'O' ring from CMP sensor.

Refit

1. Clean sealing faces of sensor and cylinder head.
2. Lubricate and fit new 'O' ring to CMP sensor.
3. Fit sensor to cylinder block and tighten bolt to 10 Nm.
4. Connect multiplug to CMP sensor.
5. Fit air cleaner. *See this section.*

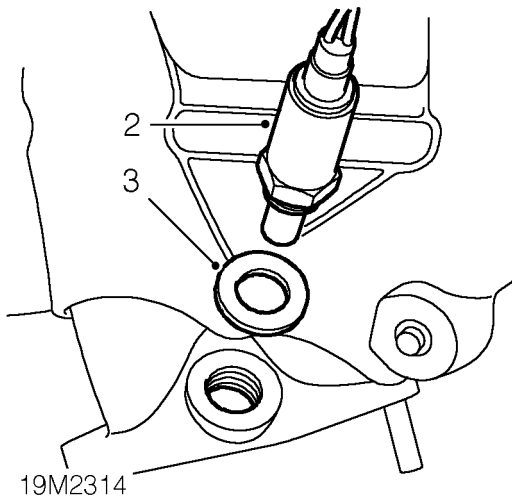
ENGINE MANAGEMENT SYSTEM - MEMS

HEATED OXYGEN SENSOR (HO2S)

Service repair no - 19.22.16

Remove

1. Remove inlet and exhaust manifold gasket. **See MANIFOLD & EXHAUST SYSTEMS, Repairs.**



2. Using a 22mm open ended spanner, remove HO2S.
3. Remove and discard sealing washer.

Refit

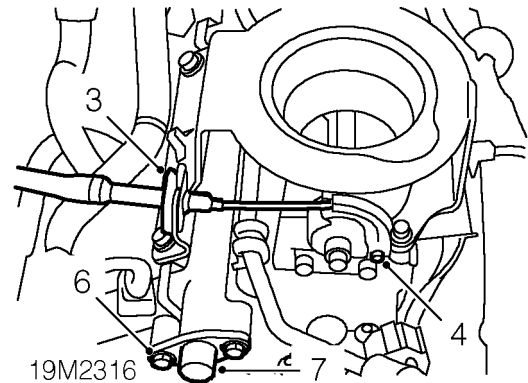
1. Clean mating faces of HO2S and exhaust manifold.
2. Fit new sealing washer to HO2S.
3. Fit HO2S and tighten to 55 Nm.
4. Fit inlet and exhaust manifold gasket. **See MANIFOLD & EXHAUST SYSTEMS, Repairs.**

FUEL RAIL

Service repair no - 19.60.04

Remove

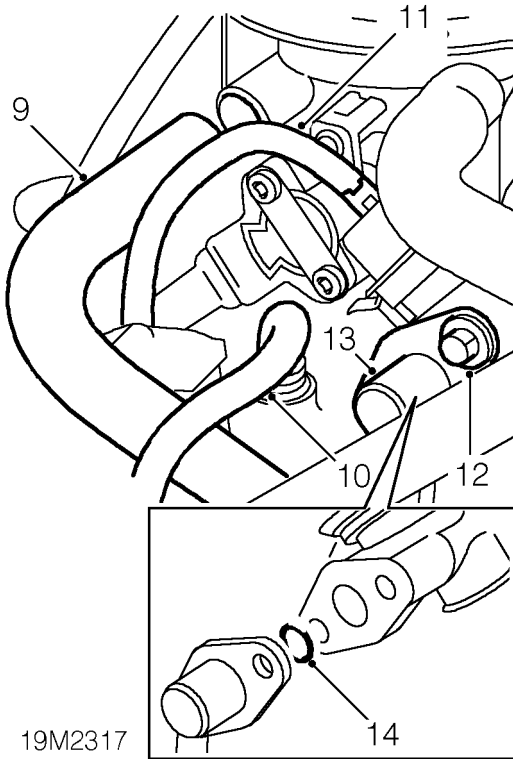
1. Disconnect battery earth lead.
2. Remove air cleaner. **See this section.**



3. Release throttle cable adjusting nut from abutment bracket.
4. Disconnect throttle cable from throttle cam and position aside.
5. Position absorbent cloth around fuel feed pipe to fuel rail connection.
6. Remove 2 bolts securing fuel feed pipe to fuel rail.
7. Release fuel feed pipe from fuel rail.
8. Remove and discard 'O' ring.

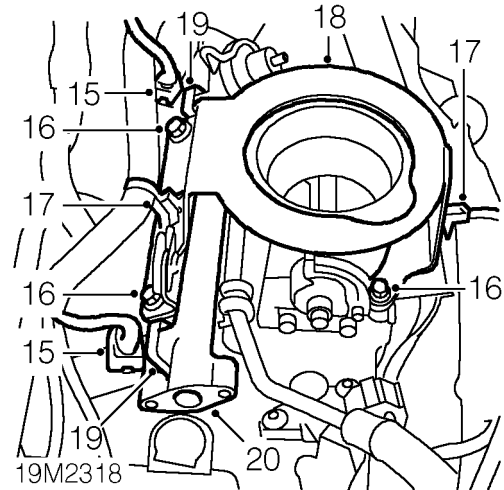


CAUTION: Plug the connections.



19M2317

9. Disconnect breather hose from throttle body and position aside.
10. Depress plastic collar on quick release connector and disconnect brake servo vacuum hose from inlet manifold.
11. Release clip and disconnect vacuum hose from fuel pressure regulator.
12. Remove 2 bolts securing fuel return pipe to fuel rail.
13. Release fuel return pipe from fuel rail.
14. Remove and discard 'O' ring.



19M2318

15. Disconnect 2 multiplugs from injectors.
16. Remove 3 bolts securing air cleaner mounting bracket to fuel rail and inlet manifold.
17. Release 2 clips securing harnesses to mounting bracket.
18. Remove air cleaner mounting bracket.
19. Remove 2 spring clips securing fuel rail to injectors.
20. Release fuel rail from injectors and remove.
21. Remove and discard 'O' rings from injectors.



CAUTION: Plug the connections.

Refit

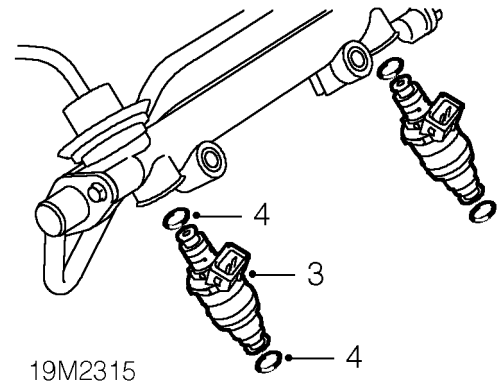
1. Lubricate new 'O' rings with silicone grease and fit to injectors.
2. Position fuel rail and fit to injectors.
3. Fit 2 spring clips securing fuel rail to injectors.
4. Position air cleaner mounting bracket to fuel rail and inlet manifold.
5. Align fuel return pipe 'P' clip to inlet manifold.
6. Fit 3 bolts securing air cleaner mounting bracket to inlet manifold and fuel rail. Tighten bolts to 9 Nm.
7. Secure harness clips to air cleaner mounting bracket.
8. Remove plugs from fuel rail, fuel feed pipe and fuel return pipe.
9. Clean fuel rail and fuel pipe connections.
10. Lubricate new 'O' ring with silicone grease and fit to fuel return pipe connection.
11. Connect fuel return pipe to fuel rail, fit bolts and tighten to 4 Nm.
12. Lubricate new 'O' ring with silicone grease and fit to fuel feed pipe connection.
13. Connect fuel feed pipe to fuel rail, fit bolts and tighten to 4 Nm.
14. Connect vacuum hose to pressure regulator and secure with clip.
15. Connect brake servo vacuum hose to inlet manifold.
16. Connect breather hose to throttle body.
17. Connect throttle cable to throttle cam and locate adjusting nut to abutment bracket.
18. Connect battery earth lead.
19. Adjust throttle cable. **See Adjustments.**

FUEL INJECTORS

Service repair no - 19.60.12

Remove

1. Disconnect battery earth lead.
2. Remove fuel rail. **See this section.**



3. Remove injectors.
4. Remove and discard 'O' rings from injectors.
5. Fit protective caps to each end of injectors.

Refit

1. remove protective caps from injectors.
2. Clean injectors and recesses in inlet manifold.
3. Lubricate new 'O' rings with silicone grease and fit to injectors.
4. Fit injectors to inlet manifold.
5. Fit fuel rail. **See this section.**
6. Connect battery earth lead.

FUEL DELIVERY SYSTEM

CONTENTS

Page

ADJUSTMENTS

FUEL SYSTEM - PRESSURE TEST	1
-----------------------------------	---

REPAIRS

FUEL TANK DRAINING	1
INERTIA FUEL SHUT-OFF (IFS) SWITCH	1
FUEL FILTER	2
FUEL PUMP	3
FUEL TANK	3
FUEL TANK BREATHER VALVE	5



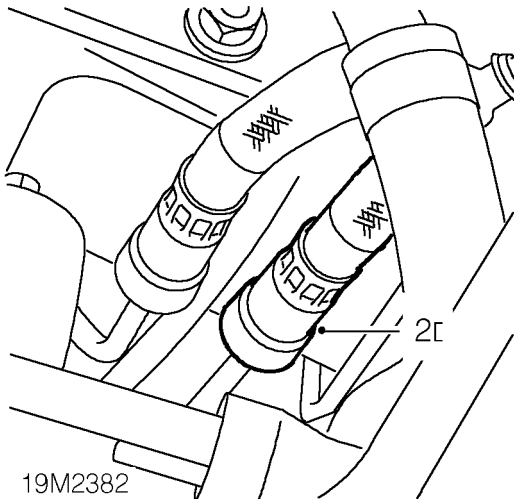


FUEL SYSTEM - PRESSURE TEST

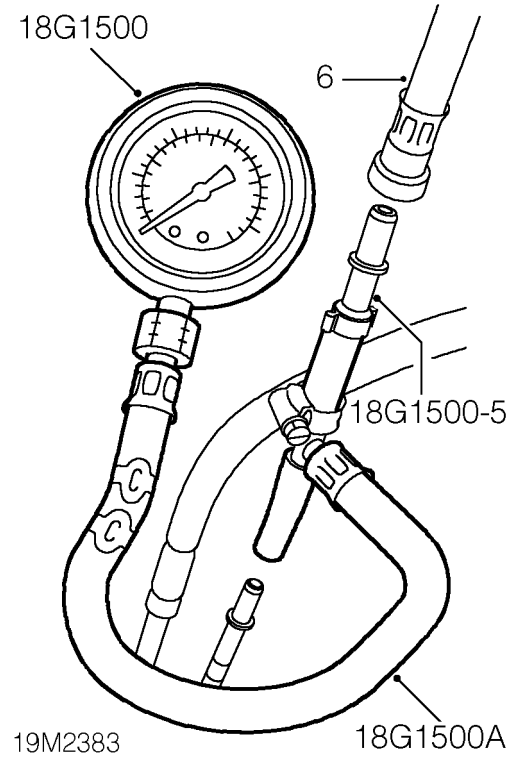
Service repair no - 19.50.13

Remove

1. Position absorbent cloth around fuel line quick fit connector.



2. Release quick fit connector and disconnect fuel feed hose from fuel pipe.



3. Fit adapter hose **18G 1500-A** to fuel pipe.
4. Fit adaptor **18G 1500-5** to **18G 1500-A**.
5. Fit pressure gauge **18G 1500** to **18G 1500-A**.
6. Connect fuel feed hose quick fit connector to **18G 1500-5**.
7. Start engine check reading and pressure drop over one minute and then stop engine.
8. Disconnect quick fit connector from **18G 1500-5**.
9. Remove **18G 1500** from **18G 1500-A**.
10. Remove **18g 1500-5** from **18G 1500-A**.
11. Remove **18G 1500-A** from fuel pipe.
12. Clean end of fuel pipe.
13. Connect fuel feed hose connector to fuel feed pipe.

CAUTION: Ensure quick fit connector is correctly engaged on fuel pipe.

14. Remove cloth positioned to absorb fuel spillage.



FUEL TANK DRAINING

Service repair no - 19.55.02

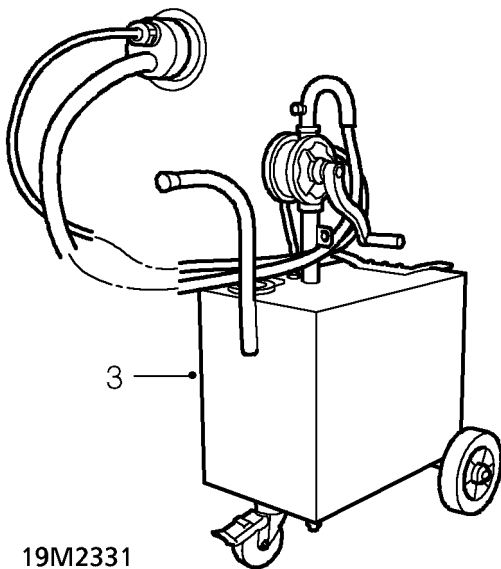


WARNING: Before removing the fuel tank from the vehicle it must be drained.



WARNING: Petrol/gasoline 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. See **GENERAL INFORMATION, Fuel handling precautions.**

Drain



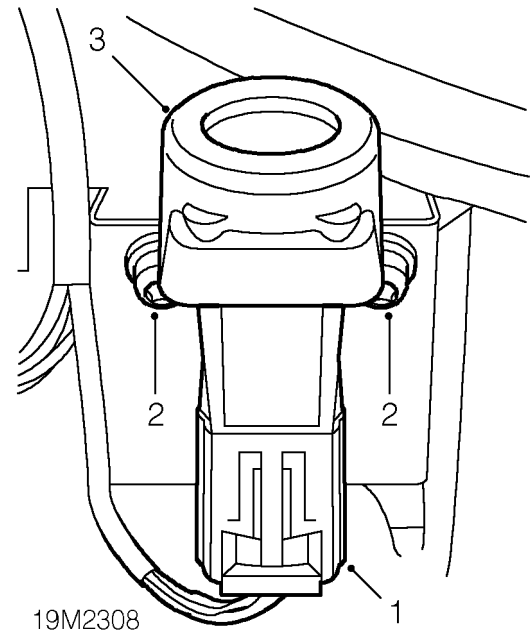
19M2331

1. Remove fuel tank filler cap and allow fuel tank to vent in an open space before commencing work.
2. Disconnect battery earth lead.
3. Using a bowser, drain fuel from the tank into a sealed container. Follow the manufacturers instructions for the connection and safe use of the bowser.
4. Continue draining until air bubbles appear and fuel ceases to flow.
5. Disconnect bowser from fuel tank.
6. Connect battery earth lead.

INERTIA FUEL SHUT-OFF (IFS) SWITCH

Service repair no - 19.22.09

Remove



1. Disconnect multiplug from IFS switch.
2. Remove 2 screws securing IFS switch to mounting bracket.
3. Remove IFS switch.

Refit

1. Align IFS switch to mounting bracket.
2. Fit screws securing IFS switch to mounting bracket and tighten to 2 Nm.
3. Connect multiplug to IFS switch.
4. Press top of IFS switch to reset.

FUEL DELIVERY SYSTEM

FUEL FILTER

Service repair no - 19.25.02

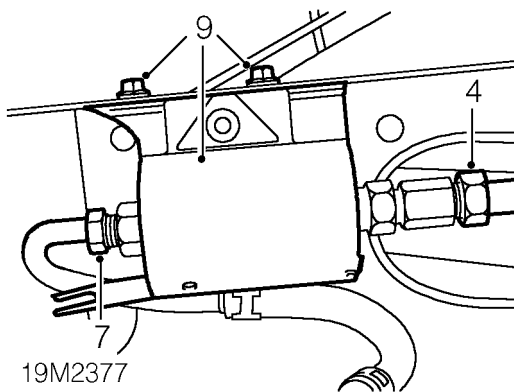
Remove

1. Disconnect battery earth lead.
2. Raise rear of vehicle, one side.



WARNING: Support on safety stands.

3. Position absorbent cloth around fuel pipe union.



4. Loosen union to relieve fuel pressure.



CAUTION: To prevent damage to fuel system pipes and components, use two spanners when loosening or tightening unions.

5. Disconnect fuel outlet pipe from fuel filter.
6. Position absorbent cloth around fuel filter union.
7. Loosen union and allow fuel to seep into cloth.
8. Disconnect fuel inlet pipe from fuel filter.



CAUTION: Plug the connections.

9. Remove 2 bolts securing fuel filter to subframe.

10. Remove fuel filter and bracket.

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

11. Remove bolt securing bracket to fuel filter.
12. Remove bracket from fuel filter.
13. Remove inlet pipe adapter union from fuel filter and discard 'O' ring.
14. Lubricate new 'O' ring with silicone grease and fit to fuel filter.
15. Fit inlet pipe adapter union to fuel filter and tighten to 30 Nm.
16. Fit bracket to fuel filter and secure with bolt.

Refit

1. Clean fuel filter and fuel pipe unions.
2. Position fuel filter and bracket to subframe, fit bolts and tighten to 9 Nm.
3. Remove plugs from fuel pipes.
4. Connect fuel pipes to filter and tighten unions to 30 Nm.
5. Connect battery earth lead.
6. Remove stand(s) and lower vehicle.

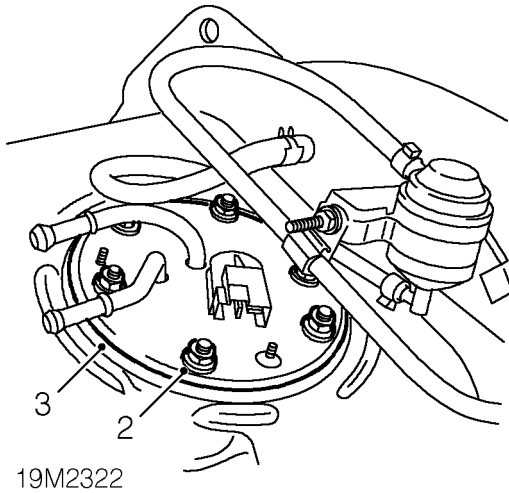


FUEL PUMP

Service repair no - 19.45.08

Remove

1. Remove fuel tank. **See this section.**



2. Remove 6 nuts securing fuel pump.
3. Remove fuel pump and discard seal.

Refit

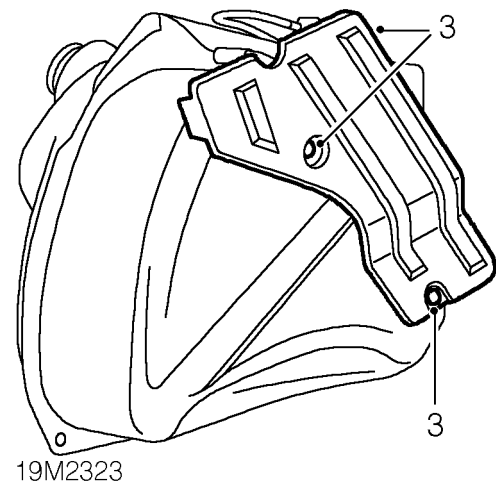
1. Clean mating faces fuel pump and fuel tank.
2. Using a new seal fit the fuel pump.
3. Fit nuts securing fuel pump to fuel tank and tighten to 9 Nm.
4. Fit fuel tank. **See this section.**

FUEL TANK

Service repair no - 19.55.01

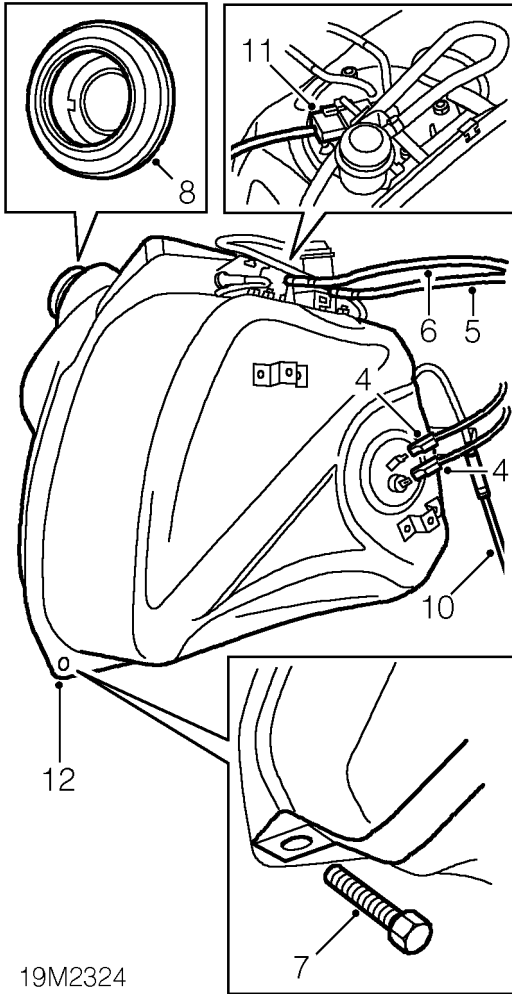
Remove

1. Drain fuel tank. **See Adjustments.**
2. Remove spare wheel.



3. Remove studs securing fuel tank side cover and remove cover.

FUEL DELIVERY SYSTEM



19M2324

4. Disconnect 2 Lucars from fuel tank sender unit.
5. Release clip and disconnect fuel feed hose, identified by orange coloured band.
6. Release clip and disconnect fuel return hose.



CAUTION: Plug the connections.

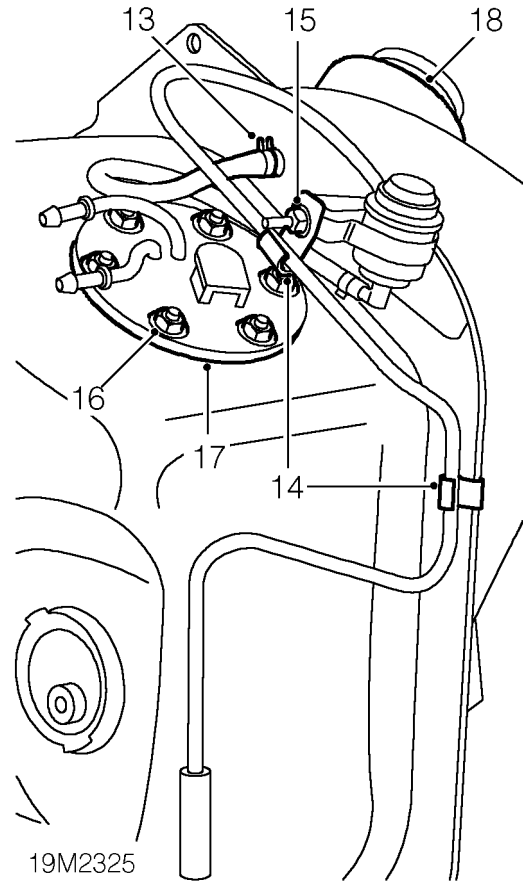
7. Remove bolt securing fuel tank retaining strap and move strap aside.
8. Release tank from filler neck grommet.
9. Manoeuvre fuel tank into boot space.
10. Release clip and disconnect breather hose from pipe.



CAUTION: Plug the connections.

11. Disconnect multiplug from fuel pump.
12. Remove fuel tank.

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



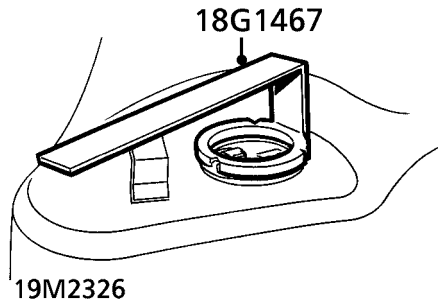
19M2325

13. Release clip and disconnect breather hose from tank.
14. Release breather pipe from clips.
15. Remove nut securing breather valve to fuel tank and remove breather valve.



CAUTION: Plug the connections.

16. Remove 6 nuts securing fuel pump to tank.
17. Remove fuel pump and discard seal.
18. Remove filler neck seal.



19. Using tool **18G 1467** remove fuel gauge sender unit and discard seal.

Refit

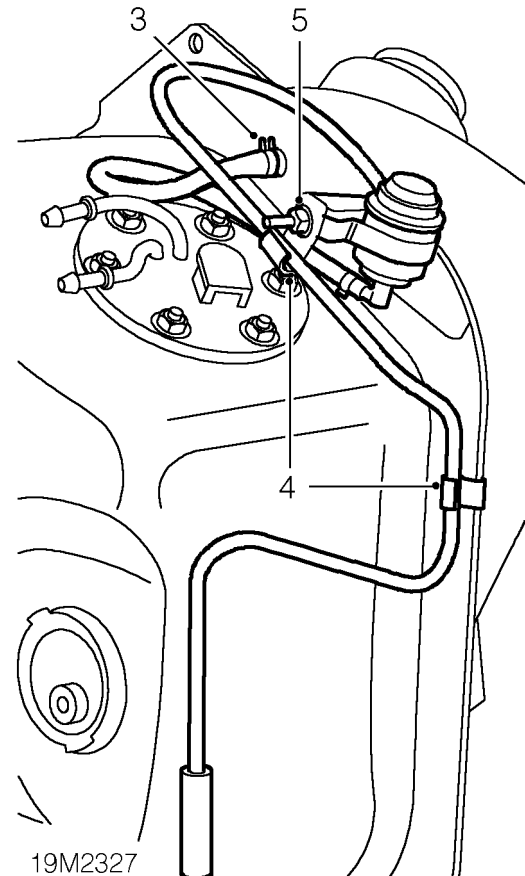
1. Clean mating faces of fuel tank and sender unit.
2. Using a new seal fit sender unit to fuel tank.
3. Clean mating faces of fuel pump and fuel tank.
4. Using a new seal fit the fuel pump to fuel tank.
5. Fit nuts securing fuel pump to fuel tank and tighten to 9 Nm.
6. Fit breather valve to fuel tank, fit nut and tighten to 9 Nm.
7. Connect breather hose to fuel tank and secure with clip.
8. Secure hose to clips on tank.
9. Fit seal to filler neck.
10. Position tank in vehicle.
11. Connect breather hose to pipe and secure with clip.
12. Connect multiplug to fuel pump.
13. Manoeuvre tank into position and position restraining strap.
14. Fit and tighten strap retaining bolt.
15. Connect fuel feed and return hoses and to fuel tank and secure with clips.
16. Connect Lucars to sender unit.
17. Fit fuel tank side cover and secure with studs.
18. Fit spare wheel.
19. Refill fuel tank with fuel.
20. Connect battery earth lead.

FUEL TANK BREATHER VALVE

Service repair no - 19.55.25

Remove

1. Disconnect battery earth lead.
2. Remove fuel tank. **See this section.**



3. Release clip and disconnect breather hose from fuel tank.
4. Release breather pipe from clips.
5. Remove nut securing bracket and remove two way valve assembly.



CAUTION: Plug the connections.

Refit

1. Fit two way valve and bracket to fuel tank. Fit nut and tighten to 9 Nm.
2. Connect two way valve hose to fuel tank and secure with clip.
3. Secure hose in clips.
4. Refit fuel tank. **See this section.**

CONTENTS

Page

DESCRIPTION AND OPERATION

COOLING SYSTEM COMPONENTS	1
COOLING SYSTEM OPERATION	2

ADJUSTMENTS

DRAIN AND REFILL	1
------------------------	---

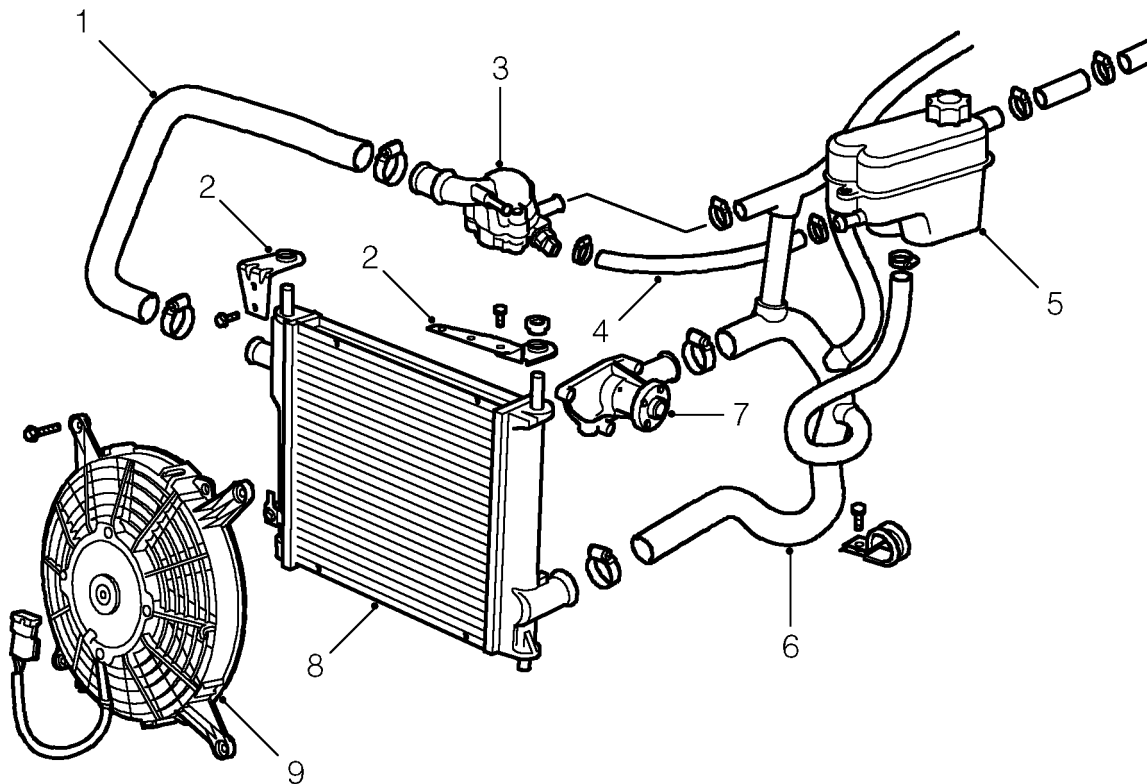
REPAIRS

COOLANT EXPANSION TANK	1
COOLANT PUMP PULLEY	2
RADIATOR COOLING FAN	2
COOLING FAN RELAY	3
RADIATOR	4
THERMOSTAT	5
COOLANT PUMP	6





COOLING SYSTEM COMPONENTS

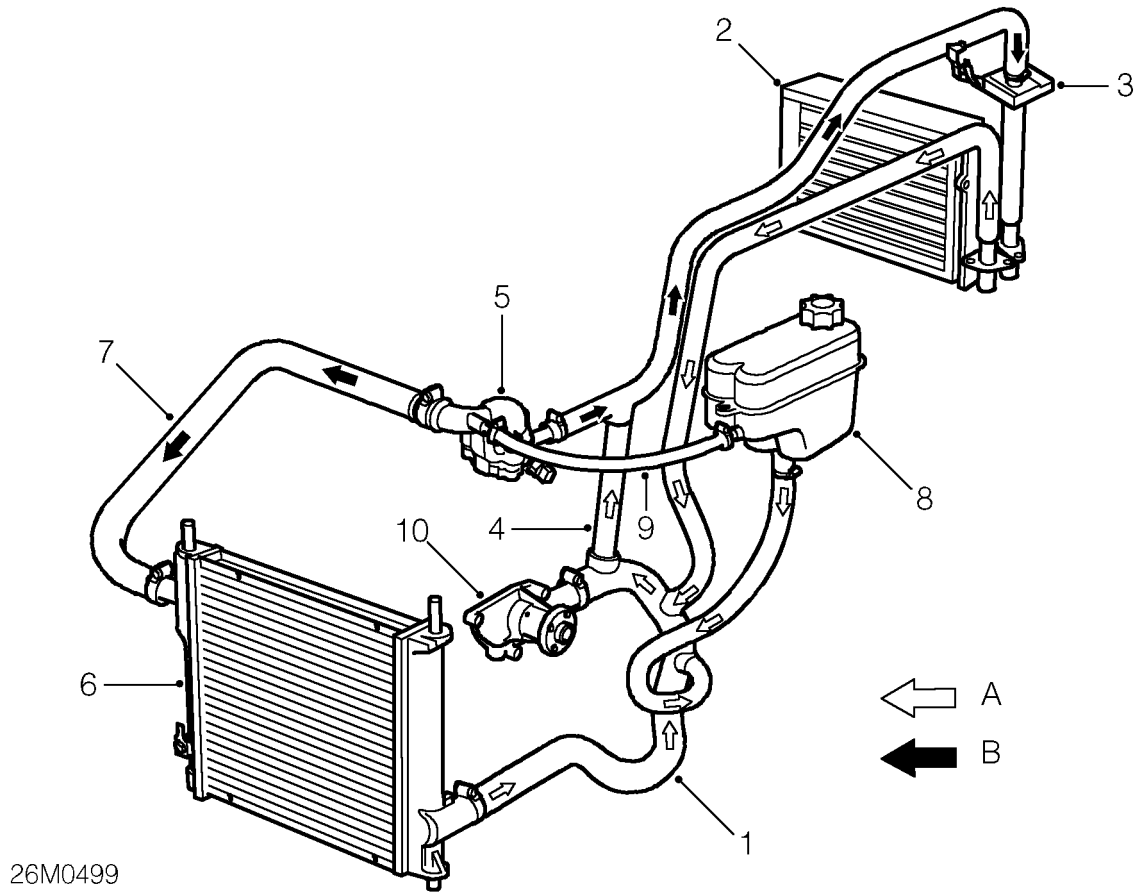


26M0497

- | | |
|--|-------------------------|
| 1. Top hose | 6. Bottom hose |
| 2. Radiator upper mounting | 7. Coolant pump |
| 3. Thermostat housing | 8. Radiator |
| 4. Hose - expansion tank to thermostat | 9. Cooling fan and cowl |
| 5. Expansion tank | |

COOLING SYSTEM

COOLING SYSTEM OPERATION



Flow diagram

A = COLD

B = HOT



Operation

The cooling system employed is the bypass type.

When the engine is cold the thermostat closes off the coolant feed from the radiator bottom hose (1). Coolant in the cylinder head and heater matrix (2) begins to rise in temperature after the engine is started. The heater is regulated by a control valve (3) from the dashboard. Coolant circulates back into the heater circuit through a by-pass hose (4) prior to the thermostat opening.

As temperature increases the thermostat (5) gradually opens, allowing hot coolant to flow to the radiator (6) via the top hose (7). As the thermostat opens further so the full flow of coolant is drawn through the radiator.

Any excess coolant created by heat expansion is returned to the expansion tank (8) via hose (9).

The radiator is an aluminium cross-flow type with integral end tanks and is mounted on rubber bushes directly into the subframe transverse member. The top of the radiator is supported by means of mounting brackets bolted to the radiator and bonnet locking platform.

For additional air flow, at times when the vehicle is stationary, an electric cooling fan is fitted. It is triggered by the Engine Control Module (ECM).

The coolant pump (10) is a rotor type pump which draws coolant directly from the radiator. The pump is driven by a poly-V pulley from the alternator drive belt.

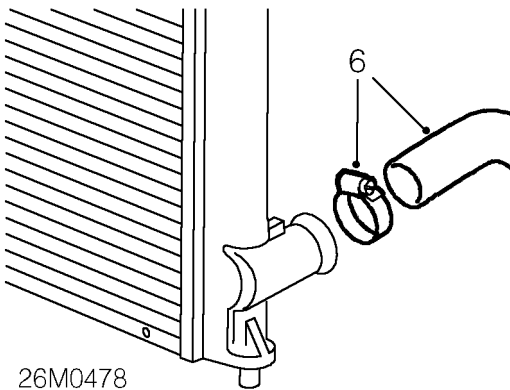
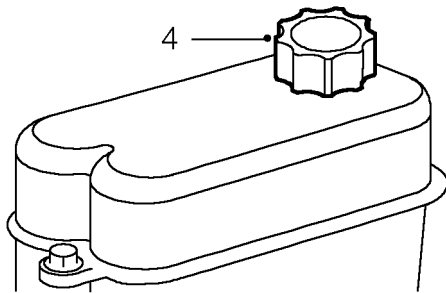


DRAIN AND REFILL

Service repair no - 26.10.01

Drain

1. Visually check engine and cooling system for signs of coolant leaks.
2. Examine hose for signs of cracking, distortion and security of connections.
3. Position heater temperature control to maximum heat position.



26M0478

4. Remove expansion tank filler cap.
5. Position drain tin to collect coolant.
6. Loosen clip and disconnect bottom hose from radiator.
7. Allow cooling system to drain.

Refill

1. Flush system with water under low pressure.



CAUTION: High pressure water could damage the radiator.

2. Connect bottom hose to radiator and tighten clip.
3. Prepare coolant to required concentration. **See INFORMATION, Capacities, fluids and lubricants.**
4. Turn heater temperature control to maximum heat position.
5. Fill system slowly until coolant level reaches 'MAX' mark on expansion tank.
6. Start and run engine until radiator cooling fan operates.
7. Switch off engine and allow to cool.
8. Check for leaks and top-up coolant to 'MAX' mark on expansion tank.

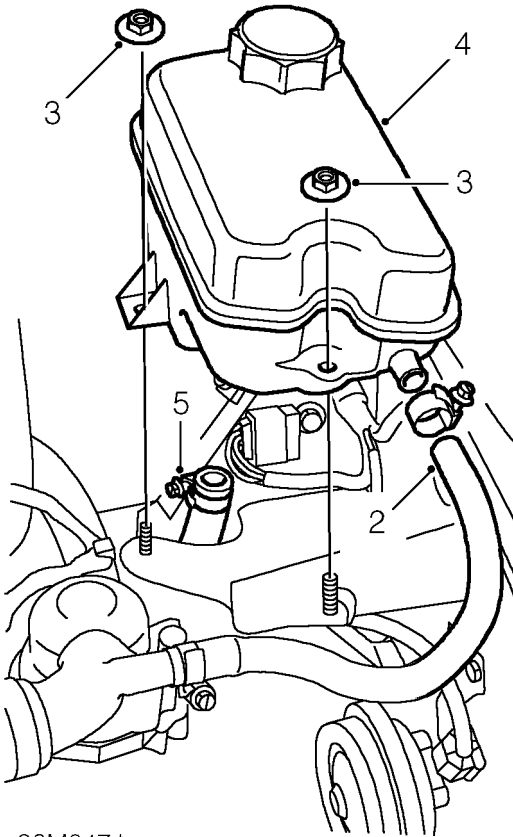


COOLANT EXPANSION TANK

Service repair no - 26.15.01

Remove

1. Drain cooling system. *See Adjustments.*



26M0471

2. Loosen clip and disconnect hose from expansion tank.
3. Remove 2 nuts securing expansion tank to mounting bracket.
4. Release expansion tank from mounting
5. Release clip and disconnect coolant feed hose from expansion tank.
6. Remove coolant expansion tank.

Refit

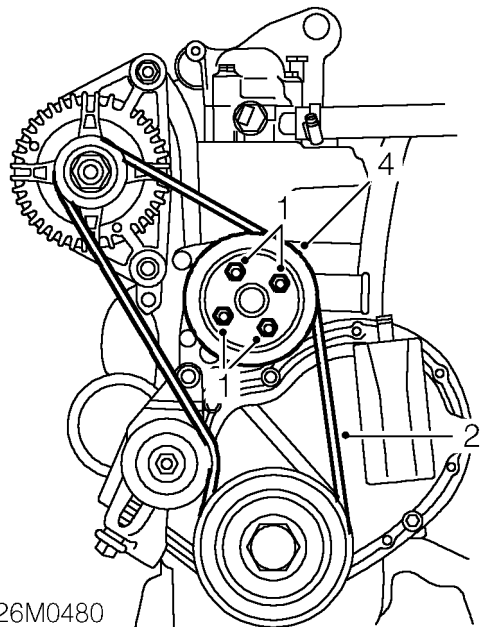
1. Position coolant expansion tank.
2. Connect coolant feed hose to expansion tank and secure with clip.
3. Position expansion tank on mounting bracket, fit nuts and tighten to 10 Nm.
4. Connect hose to expansion tank and tighten clip.
5. Refill cooling system. *See Adjustments.*

COOLING SYSTEM

COOLANT PUMP PULLEY

Service repair no - 26.25.03

Remove



1. Loosen 4 bolts securing coolant pump pulley.
2. Remove auxiliary drive belt. **See ELECTRICAL, Repairs.**
3. Remove 4 bolts securing coolant pump pulley.
4. Remove pulley.

Refit

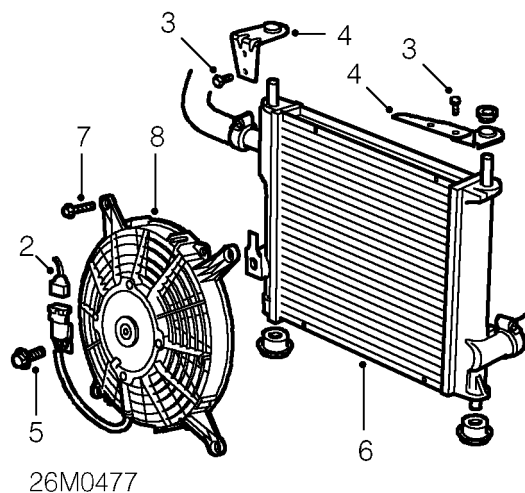
1. Ensure mating faces of pulley and coolant pump flange are clean.
2. Fit pulley to pump and tighten bolts to 10 Nm.
3. Fit auxiliary drive belt. **See ELECTRICAL, Repairs.**

RADIATOR COOLING FAN

Service repair no - 26.25.22

Remove

1. Remove front grille. **See BODY, Exterior fittings.**



2. Disconnect radiator cooling fan multiplug from harness.
3. Remove 4 bolts securing 2 upper radiator mounting bracket to bonnet locking platform.
4. Remove 2 upper radiator mounting brackets.
5. Remove bolt securing cooling fan multiplug to radiator.
6. Release radiator from lower mountings.
7. Manoeuvre radiator to gain access to bolts and remove 4 bolts securing cooling fan to radiator.
8. Remove radiator cooling fan.



Refit

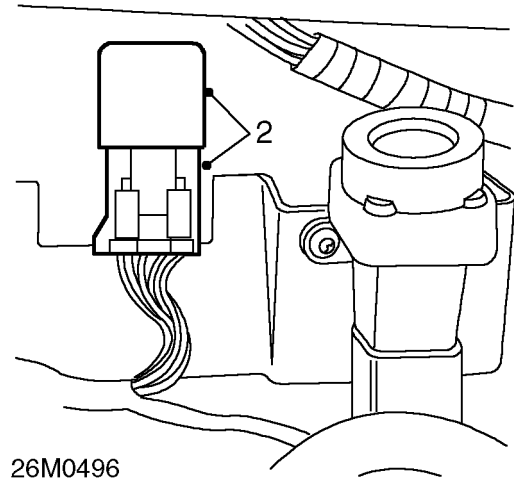
1. Position radiator cooling fan in vehicle.
2. Align cooling fan to radiator, fit bolts and tighten to 7 Nm.
3. Align radiator to lower mountings.
4. Position cooling fan multiplug to radiator, fit bolt and tighten to 7 Nm.
5. Fit upper mounting brackets to radiator and align to bonnet locking platform.
6. Fit bolts securing radiator upper mounting brackets to bonnet locking platform and tighten to 9 Nm.
7. Connect cooling fan multiplug to harness.
8. Fit front grille. **See *BODY, Exterior fittings.***

COOLING FAN RELAY

Service repair no - 26.25.41

Remove

1. Open bonnet.



2. Remove relay from multiplug on bulkhead.

Refit

1. Fit relay to multiplug on bulkhead.
2. Close bonnet.

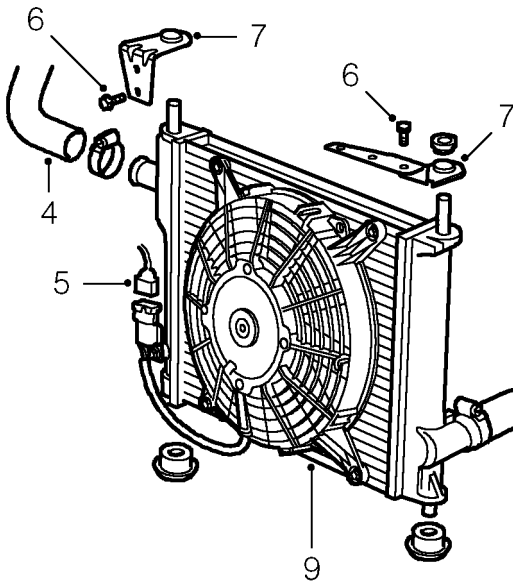
COOLING SYSTEM

RADIATOR

Service repair no - 26.40.01

Remove

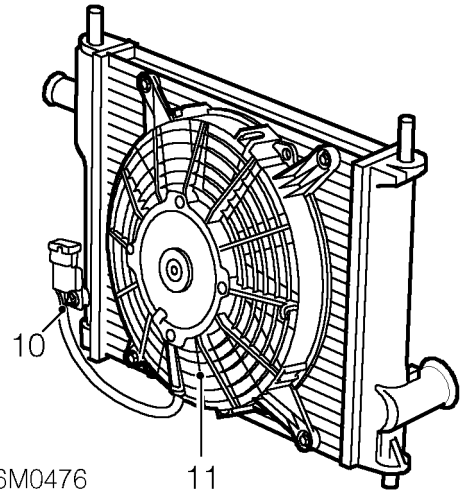
1. Drain cooling system. *See Adjustments.*
2. Remove front grille. *See BODY, Exterior fittings.*
3. Remove alternator. *See ELECTRICAL, Repairs.*



26M0475

4. Loosen clip and disconnect top hose from radiator.
5. Disconnect radiator cooling fan multiplug from harness.
6. Remove 4 bolts securing 2 upper radiator mounting bracket to bonnet locking platform.
7. Remove 2 upper radiator mounting brackets.
8. Release radiator from lower mountings.
9. Remove radiator from vehicle.

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



26M0476

10. Remove bolt securing cooling fan multiplug to radiator.
11. Remove 4 bolts securing cooling fan to radiator and remove cooling fan.
12. Align cooling fan to radiator, fit bolts and tighten to 7 Nm.
13. Position cooling fan multiplug to radiator, fit bolt and tighten to 7 Nm.

Refit

1. Position radiator in vehicle.
2. Align radiator to lower mountings.
3. Fit upper mounting brackets to radiator and align to bonnet locking platform.
4. Fit bolts securing radiator upper mounting brackets to bonnet locking platform and tighten to 9 Nm.
5. Connect cooling fan multiplug to harness.
6. Connect top hose to radiator and tighten clip.
7. Fit alternator. *See ELECTRICAL, Repairs.*
8. Fit front grille. *See BODY, Exterior fittings.*
9. Refill cooling system. *See Adjustments.*

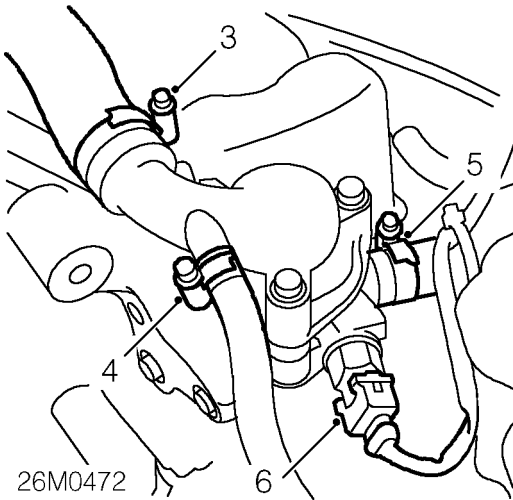


THERMOSTAT

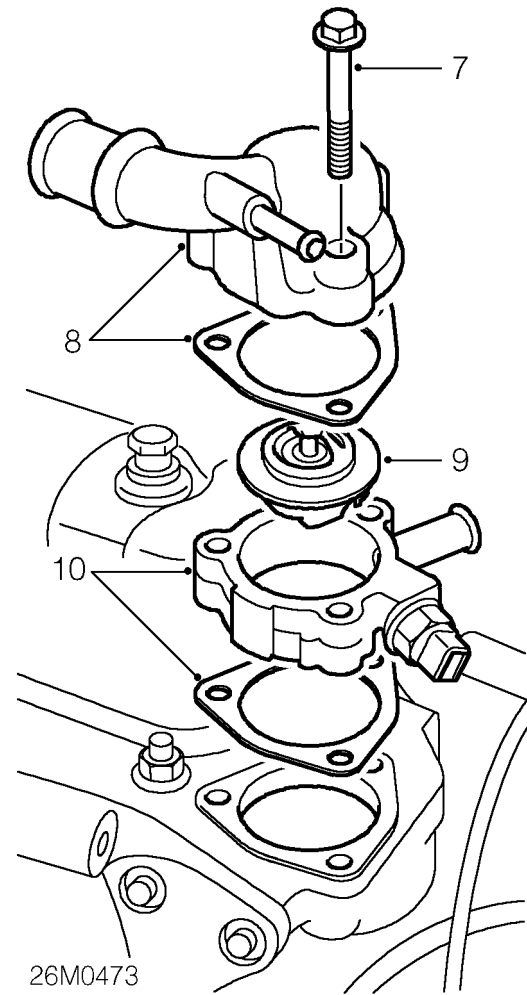
Service repair no - 26.45.09

Remove

1. Disconnect battery earth lead.
2. Drain cooling system. *See Adjustments.*

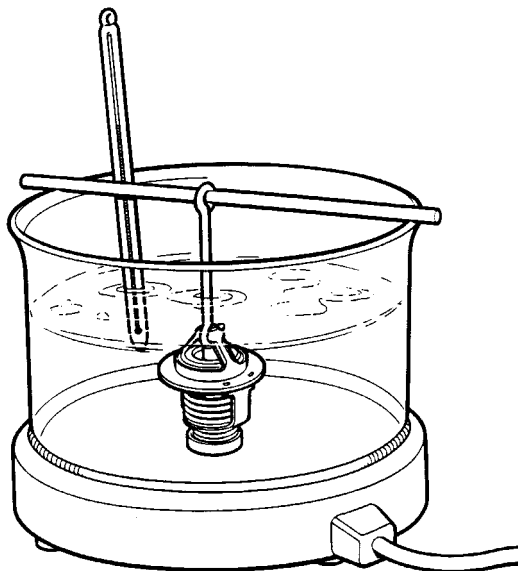


3. Loosen clip and disconnect top hose from thermostat housing.
4. Loosen clip and disconnect expansion tank hose from thermostat housing.
5. Loosen clip and disconnect heater hose from thermostat housing.
6. Disconnect multiplug from ECT sensor.



7. Remove 3 bolts securing thermostat housing.
8. Remove thermostat upper housing and discard gasket.
9. Remove thermostat.
10. Remove thermostat lower housing and discard gasket.

COOLING SYSTEM



26M0474

11. Test thermostat using thermostat test equipment, renew thermostat if necessary. thermostat opening temperature is 88°C.

Refit

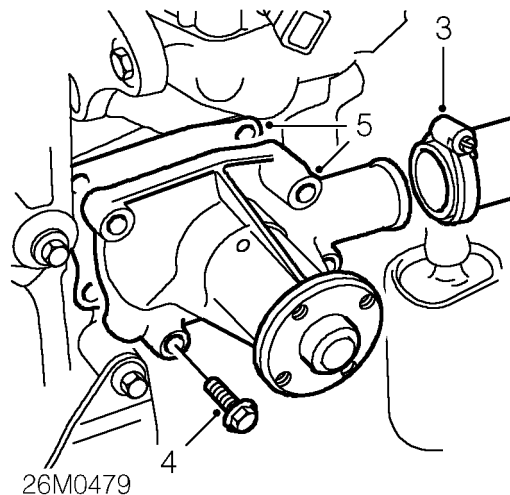
1. Clean thermostat housings and mating faces.
2. Fit gasket and lower housing to cylinder head.
3. Fit thermostat and upper housing gasket.
4. Fit thermostat upper housing and tighten bolts to 11 Nm.
5. Connect top hose, heater hose and expansion tank hose. Tighten hose clips
6. Connect multiplug to ECT sensor.
7. Connect battery earth lead.
8. Fill cooling system. **See Adjustments.**

COOLANT PUMP

Service repair no - 26.50.01

Remove

1. Drain cooling system. **See Adjustments.**
2. Remove coolant pump pulley. **See Adjustments.**



3. Loosen clip and disconnect hose from coolant pump.
4. Remove 4 bolts securing coolant pump to engine.
5. Remove coolant pump and discard gasket.

Refit

1. Clean mating faces of coolant pump and engine.
2. Using a new gasket, fit coolant pump to engine.
3. Fit bolts securing coolant pump to engine and tighten to 22 Nm.
4. Fit coolant hose to coolant pump and tighten clip.
5. Fit coolant pump pulley. **See Adjustments.**
6. Fill cooling system. **See Adjustments.**

CONTENTS

Page

DESCRIPTION AND OPERATION

EXHAUST SYSTEM COMPONENTS	1
EXHAUST MANIFOLD COMPONENTS	2
INLET MANIFOLD COMPONENTS	3
INLET MANIFOLD	4
EXHAUST MANIFOLD	4
EXHAUST SYSTEM	4

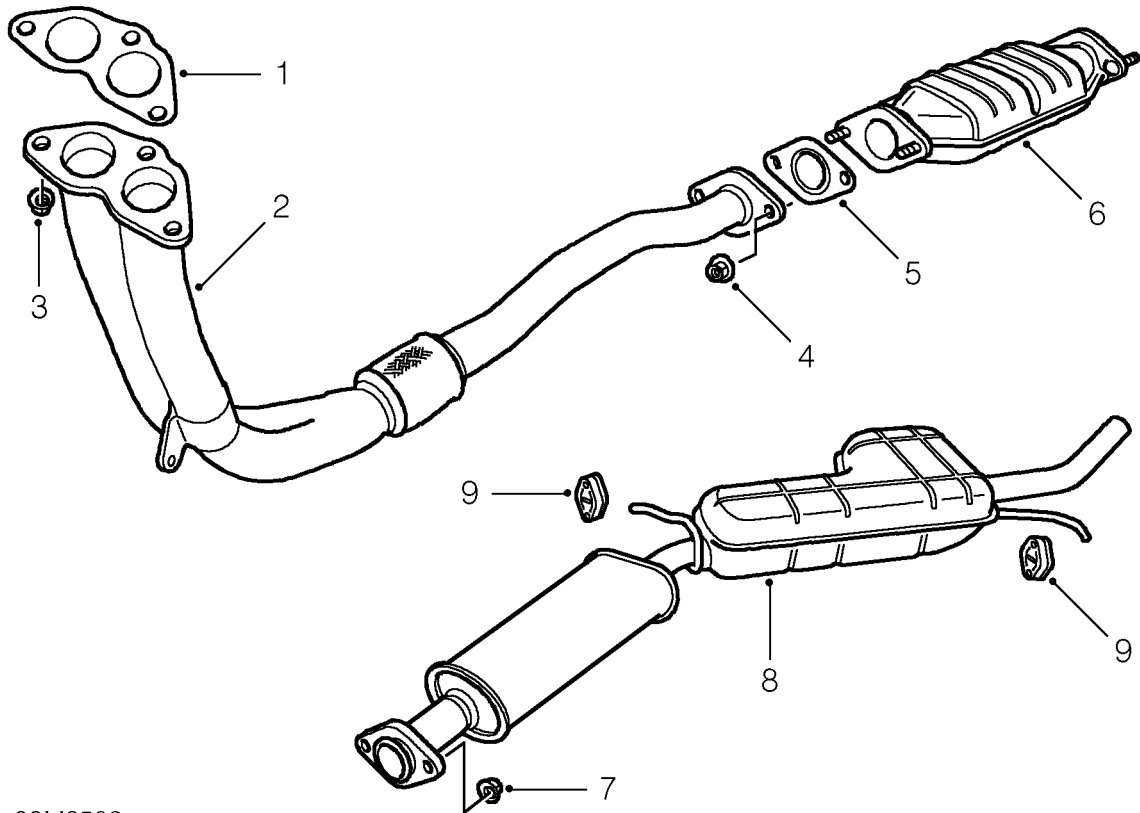
REPAIRS

FRONT PIPE	1
TAIL PIPE	1
FRONT PIPE TO MANIFOLD GASKET	2
INTERMEDIATE PIPE HEAT SHIELD	3
INLET MANIFOLD	4
EXHAUST MANIFOLD	5
INLET AND EXHAUST MANIFOLD GASKET	6





EXHAUST SYSTEM COMPONENTS

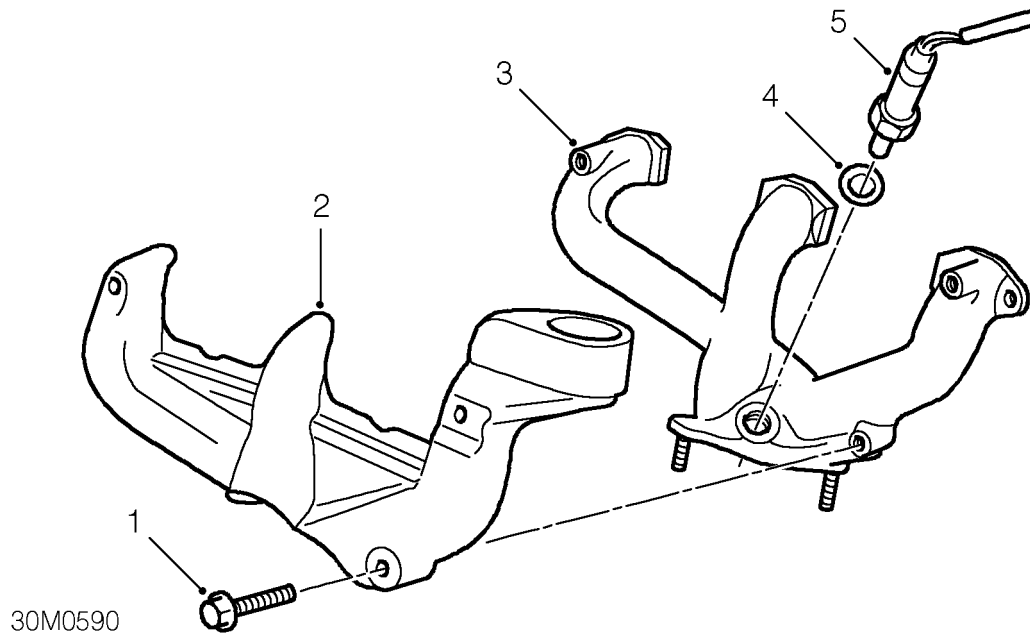


30M0589

- | | |
|---|---|
| 1. Gasket - front pipe to manifold | 6. Catalytic converter |
| 2. Front pipe | 7. Nut - Tail pipe to catalytic converter |
| 3. Nut - Front pipe to manifold | 8. Tail pipe |
| 4. Nut - Front pipe to catalytic converter | 9. Mounting rubbers |
| 5. Gasket - front pipe to catalytic converter | |

MANIFOLD & EXHAUST SYSTEMS

EXHAUST MANIFOLD COMPONENTS

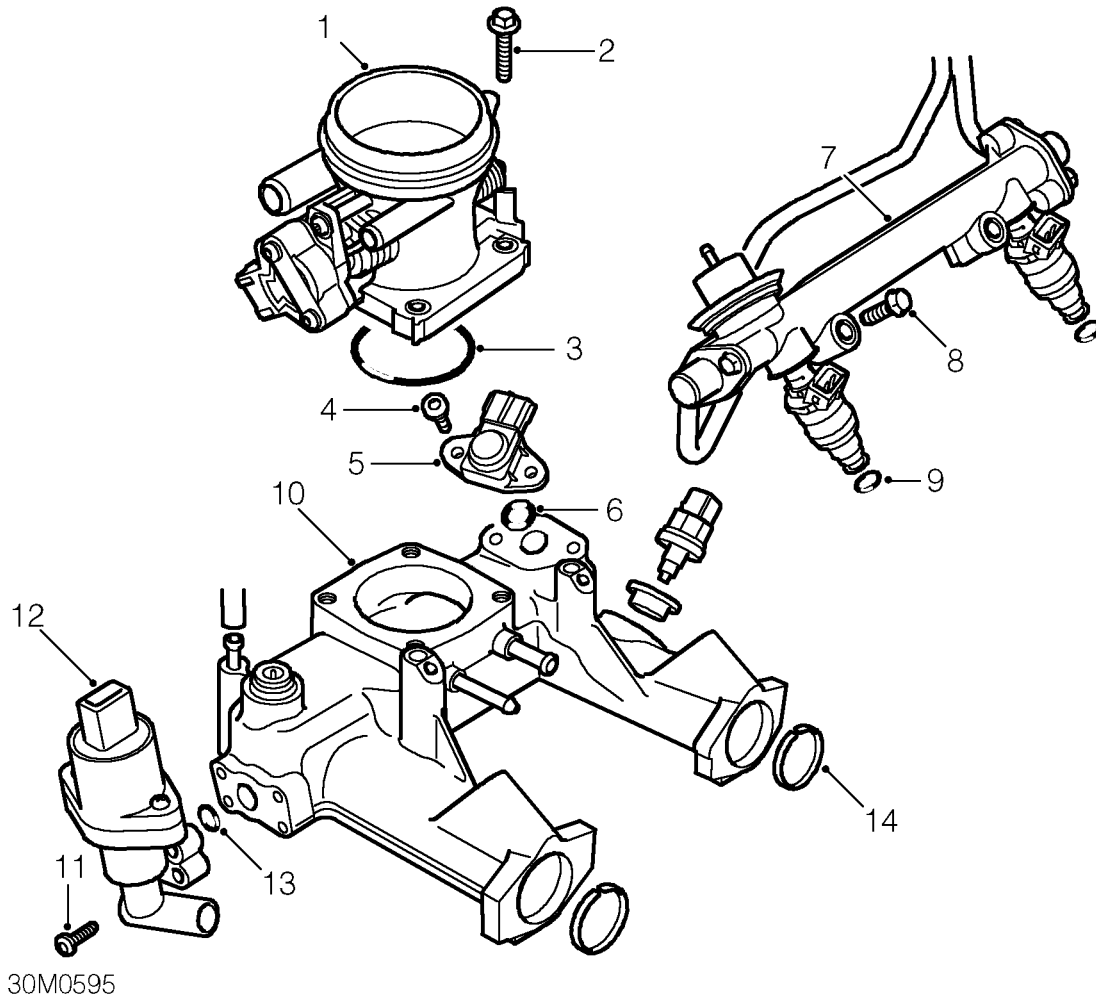


1. Bolt - Heat shield to exhaust manifold
2. Heat shield
3. Exhaust manifold

4. Sealing washer - HO2S
5. Heated Oxygen Sensor - (HO2S)



INLET MANIFOLD COMPONENTS



- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Throttle housing 2. Bolt - Throttle housing to inlet manifold 3. 'O' ring - Throttle housing to inlet manifold 4. Bolt - MAP sensor to inlet manifold 5. MAP sensor 6. 'O' ring - MAP sensor to inlet manifold 7. Fuel rail and injectors | <ul style="list-style-type: none"> 8. Bolt - Fuel rail to inlet manifold 9. 'O' ring - Injector to inlet manifold 10. Inlet manifold 11. Bolt - IACV to inlet manifold 12. Idle Air Control Valve (IACV) 13. 'O' ring - IACV to inlet manifold 14. Inlet manifold locating ring |
|--|--|

MANIFOLD & EXHAUST SYSTEMS

INLET MANIFOLD

The inlet manifold is an aluminium casting, which incorporates a throttle housing, MAP sensor, IACV, IAT sensor, fuel rail and injectors. The inlet manifold is attached to the cylinder head and sealed by two locating rings and a gasket.

EXHAUST MANIFOLD

The cast iron exhaust manifold is fitted with a Heated Oxygen Sensor (HO2S). To assist the extraction of exhaust gases the manifold is divided into two outlets, No.2 and 3 cylinders discharge into one half of the manifold and No.1 and 4 cylinders into the other half.

EXHAUST SYSTEM

The exhaust system consists of a front pipe, catalytic converter and a silencer/tail pipe assembly, which incorporates two silencers. Both silencers contain a series of expansion chambers, resonators and baffles designed to give an improved exhaust system, reduce condensation and increase the life of the system.

The catalytic converter operates in 'closed loop' system. A Heated Oxygen Sensor (HO2S), located in the exhaust manifold is used to monitor the exhaust gases and provide a signal to the Engine Control Module (ECM). The ECM uses this signal to modify the fuelling and maintain emissions acceptable to the catalytic converter. For information on the operation of the catalytic converter. **See EMISSION CONTROL, Description and operation.**

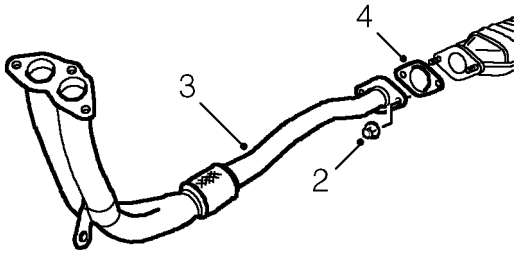


FRONT PIPE

Service repair no - 30.10.09

Remove

1. Remove front pipe to manifold gasket. **See this section.**



30M0588

2. Remove 2 nuts securing front pipe to catalytic converter.
3. Release front pipe from catalytic converter and remove.
4. Remove and discard flange gasket.

Refit

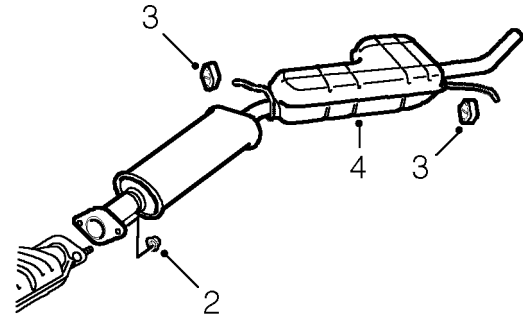
1. Clean mating faces of front pipe and catalytic converter.
2. Fit new flange gasket to catalytic converter.
3. Fit front pipe to catalytic converter.
4. Fit nuts securing front pipe to catalytic converter and tighten to 45 Nm.
5. Fit front pipe to manifold gasket. **See this section.**

TAIL PIPE

Service repair no - 30.10.22

Remove

1. Raise vehicle on a 4 post ramp.



30M0587

2. Remove 2 nuts securing tail pipe to catalytic converter.
3. Release 2 rubber mountings securing tail pipe to body.
4. Remove tail pipe.

Refit

1. Clean mating faces of catalytic converter and tail pipe.
2. Fit tail pipe to catalytic converter and secure to rubber mountings on body.
3. Fit nuts securing tail pipe to catalytic converter and tighten evenly to 9 Nm.
4. Lower vehicle.

MANIFOLD & EXHAUST SYSTEMS

FRONT PIPE TO MANIFOLD GASKET

Service repair no - 30.10.26

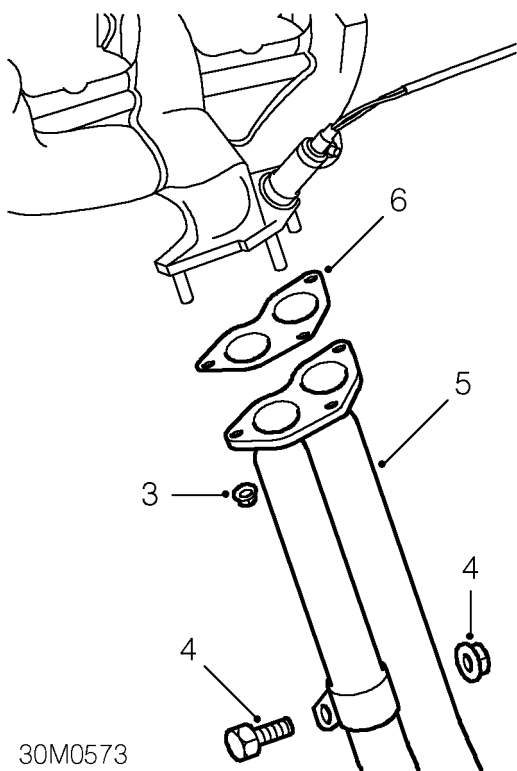
Remove

1. Raise front of vehicle.



WARNING: Support on safety stands.

2. Disconnect battery earth lead.



3. Remove 3 nuts securing front pipe to exhaust manifold.
4. Remove nut and bolt securing front pipe to mounting bracket on differential housing.
5. Release front pipe from exhaust manifold.
6. Remove gasket from manifold flange.

Refit

1. Clean manifold and front pipe flanges.
2. Fit new gasket to exhaust manifold flange.
3. Align front pipe to exhaust manifold.
4. Fit nuts securing front pipe to manifold and tighten to 22 Nm.
5. Align front pipe clamp to bracket on differential housing, fit nut and bolt and tighten to 22 Nm.
6. Remove stand(s) and lower vehicle.
7. Connect battery earth lead.

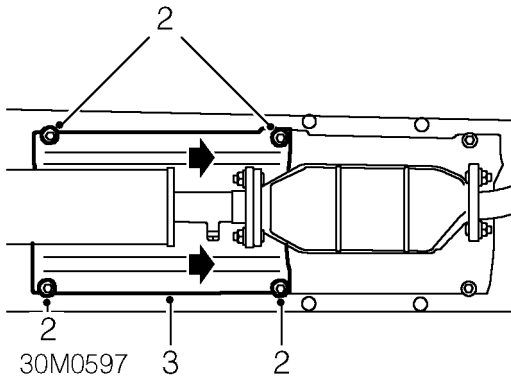


INTERMEDIATE PIPE HEAT SHIELD

Service repair no - 30.10.62

Remove

1. Raise vehicle on a 4 post ramp.



2. Remove 4 nuts securing intermediate pipe heat shield to body.
3. Release heat shield from studs and slide forward.
4. Manoeuvre heat shield around exhaust pipe and remove.

Refit

1. Manoeuvre heat shield into position and locate on studs.
2. Fit and tighten nuts securing heat shield to body.
3. Lower vehicle.

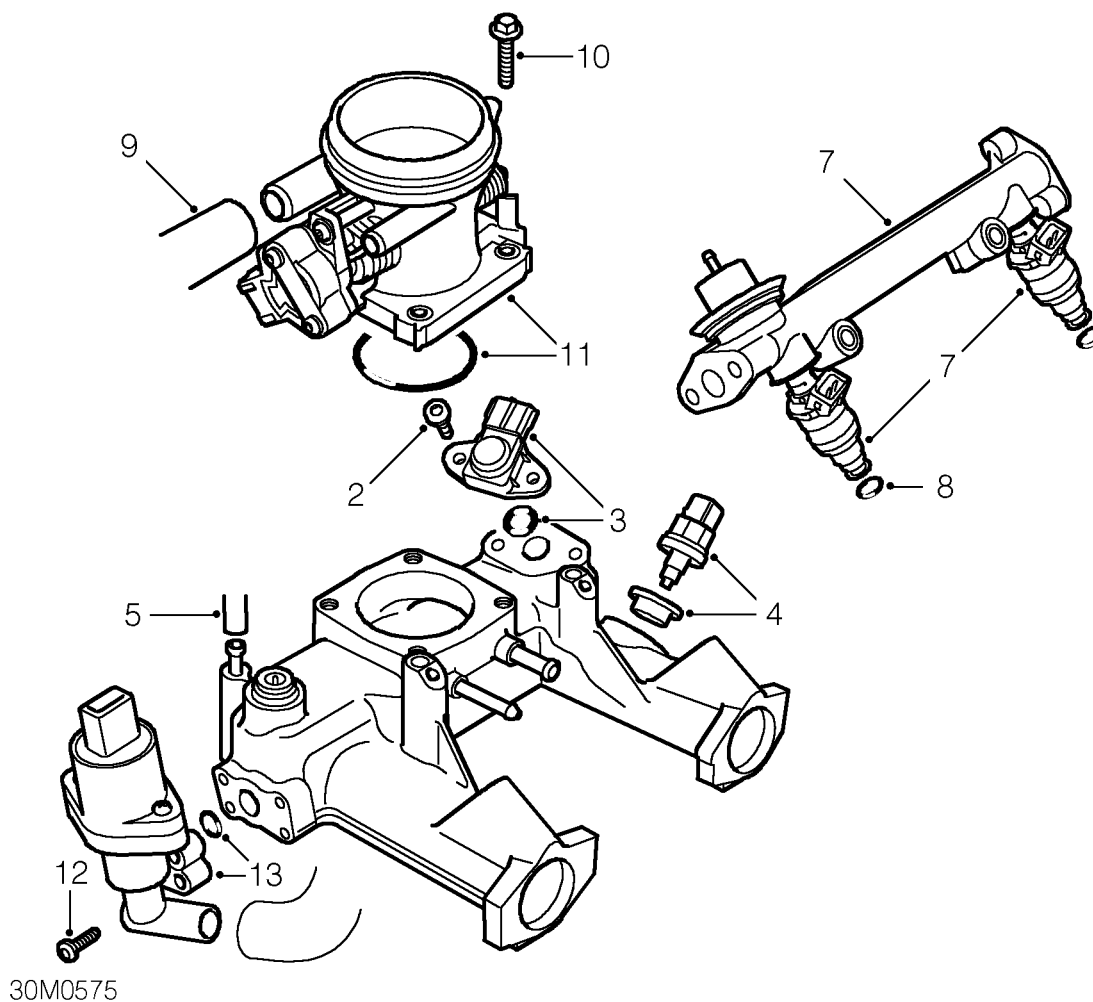
MANIFOLD & EXHAUST SYSTEMS

INLET MANIFOLD

Service repair no - 30.15.02

Remove

1. Remove inlet and exhaust manifold gasket.
See this section.



2. Remove 2 screws securing MAP sensor to inlet manifold.
3. Remove MAP sensor and discard 'O' ring.
4. Remove IAT sensor and adaptor.
5. Disconnect pressure regulator vacuum hose from inlet manifold.
6. Release fuel injectors from inlet manifold.
7. Remove fuel rail and injectors.
8. Remove and discard 'O' rings from injectors.
9. Disconnect air bypass hose from throttle body.
10. Remove 3 bolts securing throttle body to inlet manifold.
11. Remove throttle body and discard 'O' ring.
12. Remove 4 screws securing IACV to inlet manifold.
13. Remove IACV and discard 'O' ring.



Refit

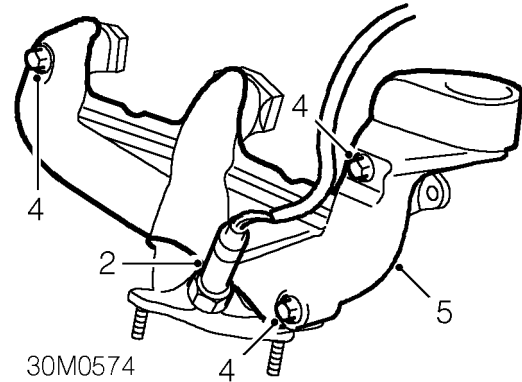
1. Clean mating face of IACV and inlet manifold.
2. Lubricate new 'O' ring with silicone grease and fit to IACV.
3. Fit IACV to inlet manifold, fit screws and tighten to 7 Nm.
4. Clean mating face of inlet manifold and throttle body.
5. Lubricate new 'O' ring with silicone grease and fit to throttle body.
6. Fit throttle body to inlet manifold, fit bolts and tighten to 8 Nm.
7. Connect air bypass hose to throttle body.
8. Clean injectors and recesses in inlet manifold.
9. Lubricate new 'O' rings with silicone grease and fit to fuel injector.
10. Fit fuel rail and injector assembly to inlet manifold.
11. Connect pressure regulator vacuum hose to inlet manifold.
12. Clean mating face of IAT sensor and inlet manifold.
13. Fit IAT sensor and adaptor to inlet manifold, tighten to 7 Nm.
14. Clean mating face of MAP sensor and inlet manifold.
15. Lubricate and fit new 'O' ring to MAP sensor.
16. Fit MAP sensor to inlet manifold, fit screws and tighten to 6 Nm.
17. Fit inlet and exhaust manifold gasket. **See this section.**

EXHAUST MANIFOLD

Service repair no - 30.15.10

Remove

1. Remove inlet and exhaust manifold gasket. **See this section.**



2. Using a 22 mm open ended spanner, remove HO2S.
3. Remove and discard sealing washer.
4. Remove 3 bolts securing heat shield to exhaust manifold.
5. Remove exhaust manifold heat shield.

Refit

1. Position heat shield to exhaust manifold, fit and tighten bolts.
2. Clean mating faces of HO2S and exhaust manifold.
3. Fit new sealing washer to HO2S.
4. Fit HO2S and tighten to 55 Nm.
5. Fit inlet and exhaust manifold gasket. **See this section.**

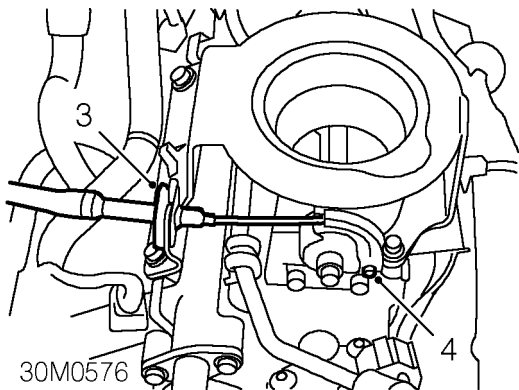
MANIFOLD & EXHAUST SYSTEMS

INLET AND EXHAUST MANIFOLD GASKET

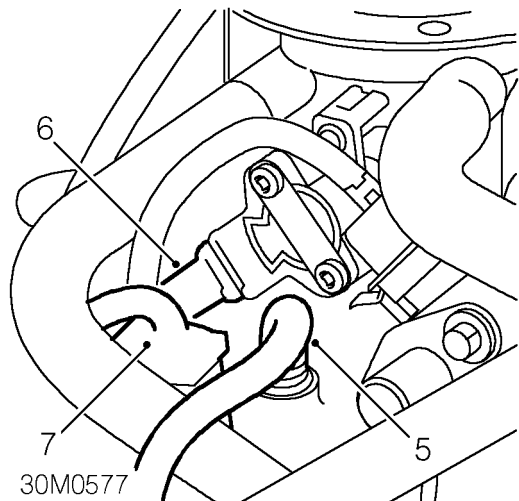
Service repair no - 30.15.15

Remove

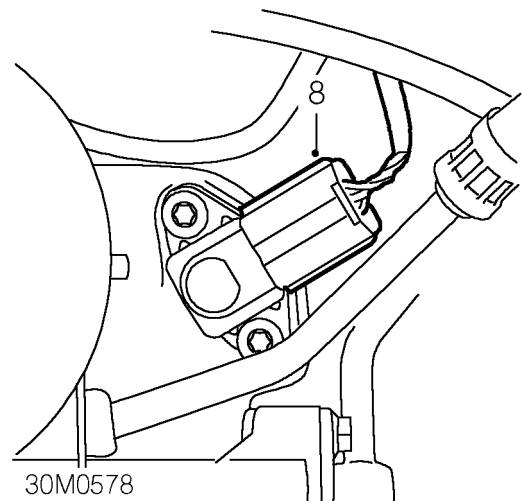
1. Disconnect battery earth lead.
2. Remove air cleaner. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*



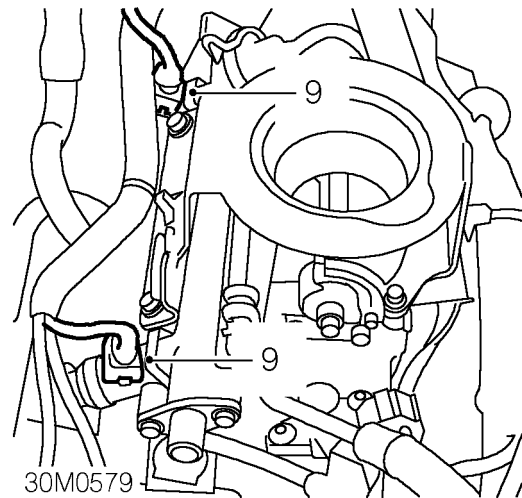
3. Release throttle cable adjustment nut from abutment bracket.
4. Disconnect throttle cable from throttle cam and position aside.



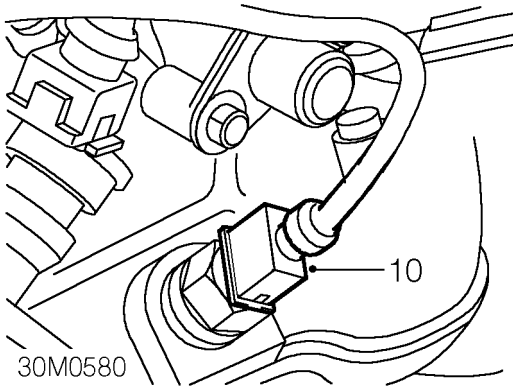
5. Depress plastic collar on quick fit connector and disconnect brake servo vacuum pipe from inlet manifold.
6. Disconnect multiplug from TP sensor.
7. Disconnect multiplug from IACV.



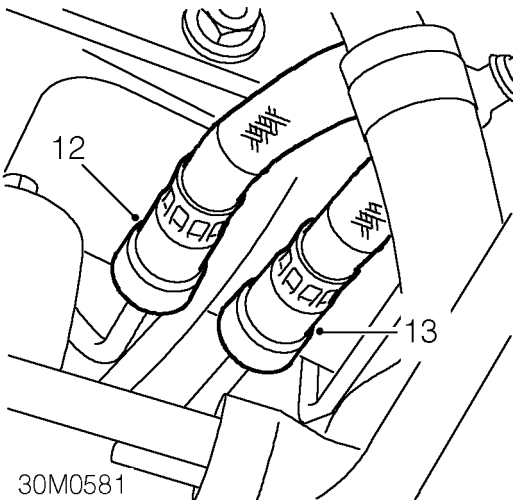
8. Disconnect multiplug from MAP sensor.



9. Disconnect 2 multiplugs from fuel injectors.



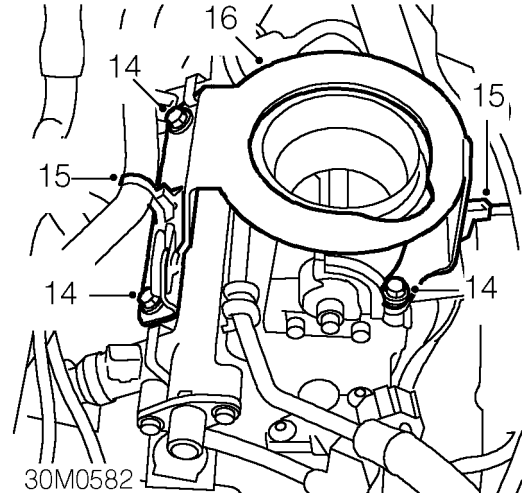
- 10. Disconnect multiplug from IAT sensor.
- 11. Position absorbent cloth around fuel line quick fit connectors.



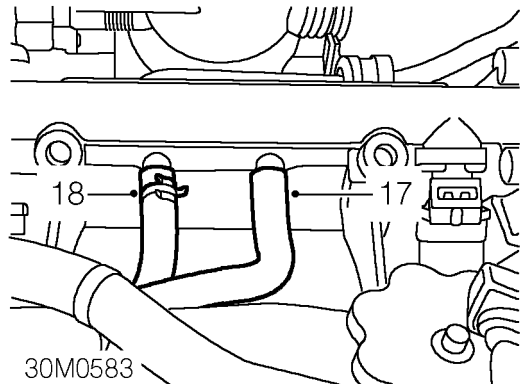
- 12. Release quick fit connector and disconnect fuel return hose from fuel pipe.
- 13. Release quick fit connector and disconnect fuel feed hose from fuel pipe.



CAUTION: Plug the connections.

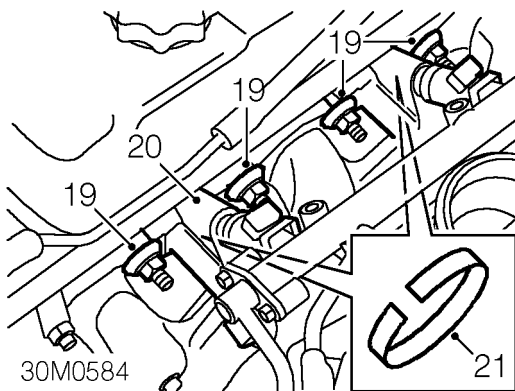


- 14. Remove 3 bolts securing air cleaner mounting bracket to fuel rail and inlet manifold.
- 15. Release 2 clips securing harnesses to mounting bracket.
- 16. Remove air cleaner mounting bracket.

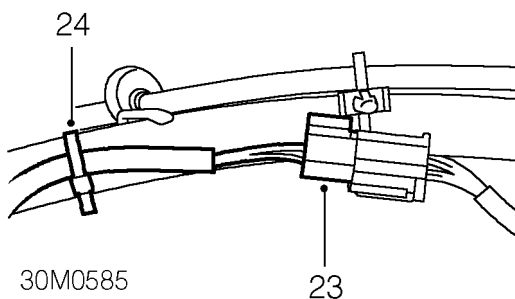


- 17. Disconnect breather hose from inlet manifold.
- 18. Release clip and disconnect evaporative emission canister purge hose from inlet manifold.

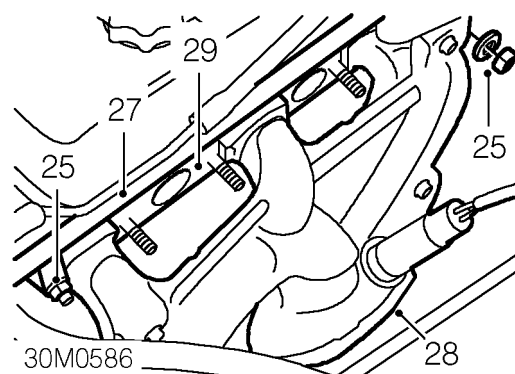
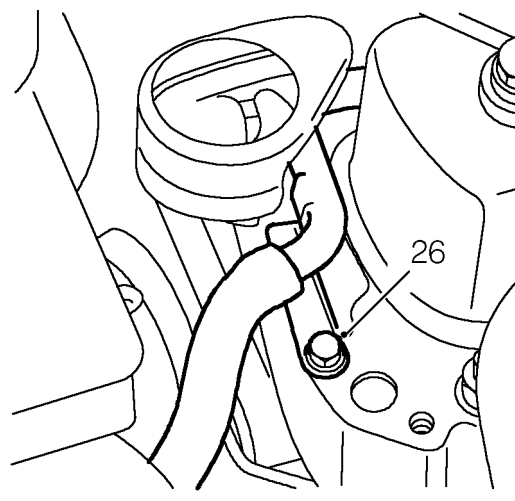
MANIFOLD & EXHAUST SYSTEMS



19. Remove 4 nuts securing inlet manifold to cylinder head.
20. Remove inlet manifold.
21. Collect 2 locating rings.
22. Remove front pipe to manifold gasket. **See this section.**



23. Disconnect HO2S multiplug from harness.
24. Release cable tie securing HO2S lead to harness.

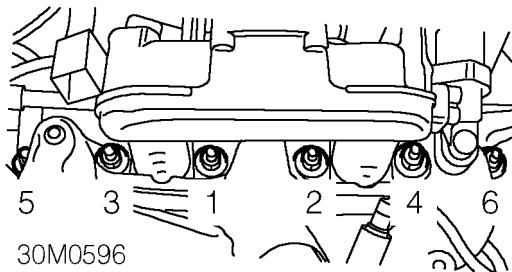


25. Remove 2 nuts and washers securing exhaust manifold to cylinder head.
26. Remove bolt securing breather pipe to cylinder head.
27. Release breather pipe from exhaust manifold stud.
28. Remove exhaust manifold.
29. Remove and discard exhaust manifold gasket.



Refit

1. Clean mating faces of inlet manifold, exhaust manifold and cylinder head.
2. Fit new exhaust manifold gasket to cylinder head.
3. Fit exhaust manifold to cylinder head.
4. Locate breather pipe on exhaust manifold stud.
5. Align breather pipe to cylinder head, fit bolt and tighten to 9 Nm.
6. Connect HO2S multiplug to harness.
7. Secure HO2S lead to harness with cable tie.
8. Clean inlet manifold locating rings.
9. Fit 2 inlet manifold locating rings to cylinder head.
10. Fit inlet manifold to cylinder head.



11. Fit nuts and washers securing manifolds to cylinder head. Working in the sequence illustrated, tighten nuts to 22 Nm.
12. Fit front pipe to manifold gasket. **See this section.**
13. Connect evaporative emission canister purge hose to inlet manifold and secure with clip.

14. Connect breather hose to inlet manifold.
15. Position air cleaner mounting bracket to fuel rail and inlet manifold.
16. Align fuel return pipe 'P' clip to inlet manifold.
17. Fit bolts securing mounting bracket to inlet manifold and fuel rail. Tighten bolts to 9 Nm.
18. Secure harness clips to mounting bracket.
19. Remove plugs from fuel pipes and fuel hose quick fit connectors.
20. Clean ends of fuel pipes.
21. Connect fuel return hose connector to fuel return pipe.
22. Connect fuel feed hose connector to fuel feed pipe.



CAUTION: Ensure quick fit connectors are correctly engaged on fuel pipes.

23. Remove cloth position to absorb fuel spillage.
24. Connect multiplug to IAT sensor.
25. Connect multiplug to IACV.
26. Connect multiplugs to fuel injectors.
27. Connect multiplug to TP sensor.
28. Connect multiplug to MAP sensor.
29. Connect brake servo vacuum pipe to inlet manifold.
30. Connect throttle cable to throttle cam and locate adjusting nut to abutment bracket.
31. Connect battery earth lead.
32. Adjust throttle cable. **See ENGINE MANAGEMENT SYSTEM - MEMS, Adjustments.**

CONTENTS

Page

ADJUSTMENTS

THROW-OUT STOP CLEARANCE	1
CLUTCH BLEED	2

REPAIRS

FLYWHEEL HOUSING COVER	1
CLUTCH ASSEMBLY AND RELEASE BEARING	6
RELEASE BEARING	8
MASTER CYLINDER	8
SLAVE CYLINDER	10



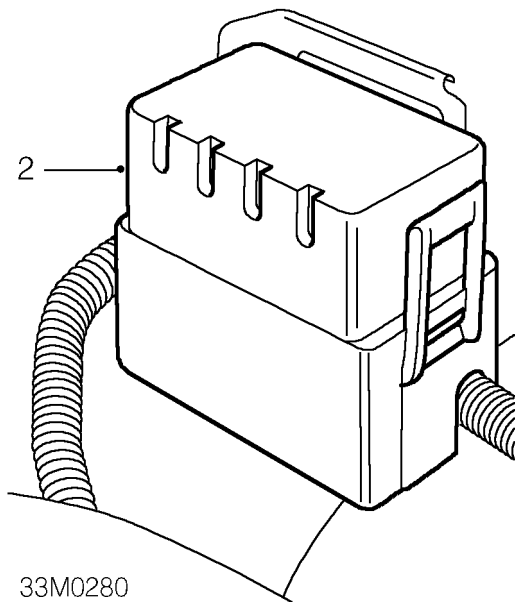


THROW-OUT STOP CLEARANCE

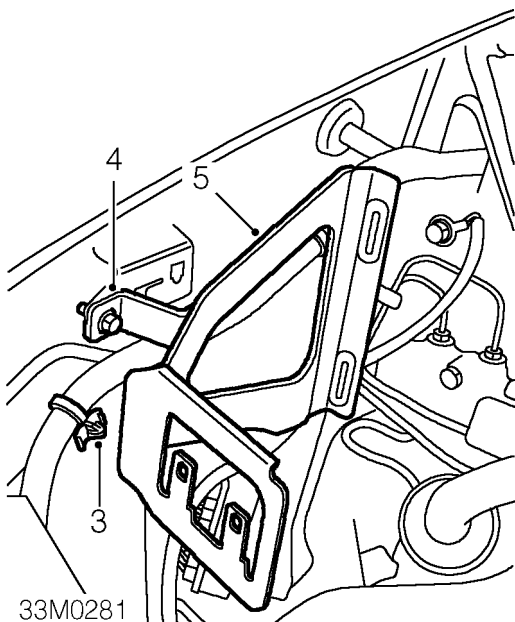
Service repair no - 33.25.03

Check and Adjust

1. Remove ECM. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*

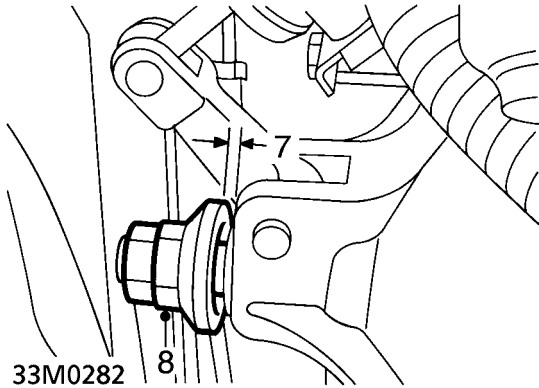


2. Release engine compartment fuse box from ECM mounting bracket.



3. Release clip securing main harness to ECM

4. Remove bolt securing ECM mounting bracket to body.
5. Release ECM mounting bracket from body and remove.
6. Depress clutch pedal to load clutch lever and remove any free play.





7. Measure clearance between throw out stop lock nut and flywheel housing cover.
8. The correct clearance is 6.5 mm. If the clearance is incorrect, loosen lock nut and adjust throw out stop to obtain correct clearance.
9. Tighten lock nut and recheck clearance.
10. Locate ECM mounting bracket on body, fit bolt and tighten to 10 Nm.
11. Secure clip on main harness to ECM mounting bracket.
12. Secure engine compartment fuse box to ECM mounting bracket.
13. Fit ECM. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**

CLUTCH BLEED

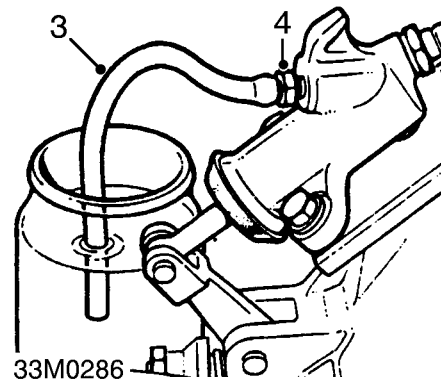
Service repair no - 33.15.01

Bleed

 **CAUTION: Never reuse fluid that has been bled from the system. Do not allow fluid level in master cylinder to fall below half during bleeding.**

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

1. Remove ECM. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**
2. Top up the clutch master cylinder with brake fluid. **See INFORMATION, Capacities, fluids and lubricants.**



3. Attach bleed tube to bleed screw on clutch slave cylinder and submerge free end in a clear container containing fluid.
4. Open the bleed screw three-quarters of a turn, depress the clutch pedal slowly, tighten bleed screw whilst holding pedal at end of downward stroke. Allow pedal to return and repeat procedure until a flow of clean air-free fluid is purged into container.

 **CAUTION: Maintain fluid level above half in reservoir during this procedure.**

5. Tighten bleed screw and remove bleed tube.
6. Top up the clutch master cylinder.
7. Fit ECM. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**

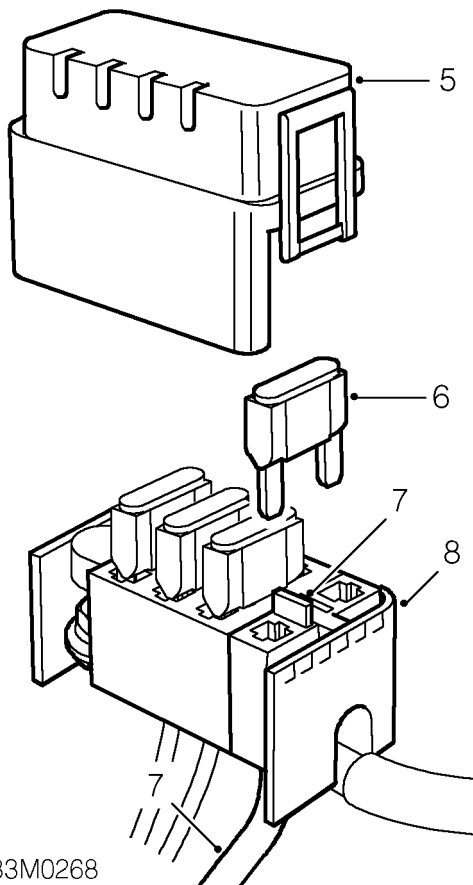


FLYWHEEL HOUSING COVER

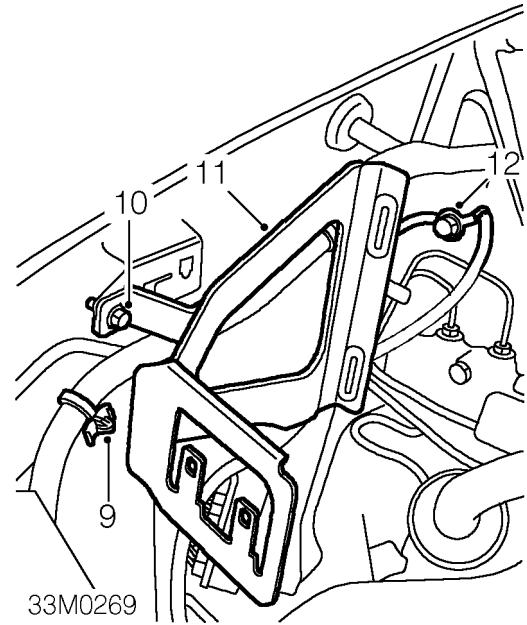
Service repair no - 33.10.04.99

Remove

1. Remove starter motor. *See ELECTRICAL, Repairs.*
2. Remove bonnet. *See BODY, Exterior fittings.*
3. Remove ECM. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*
4. Remove engine breather/oil separator. *See EMISSION CONTROL, Repairs.*

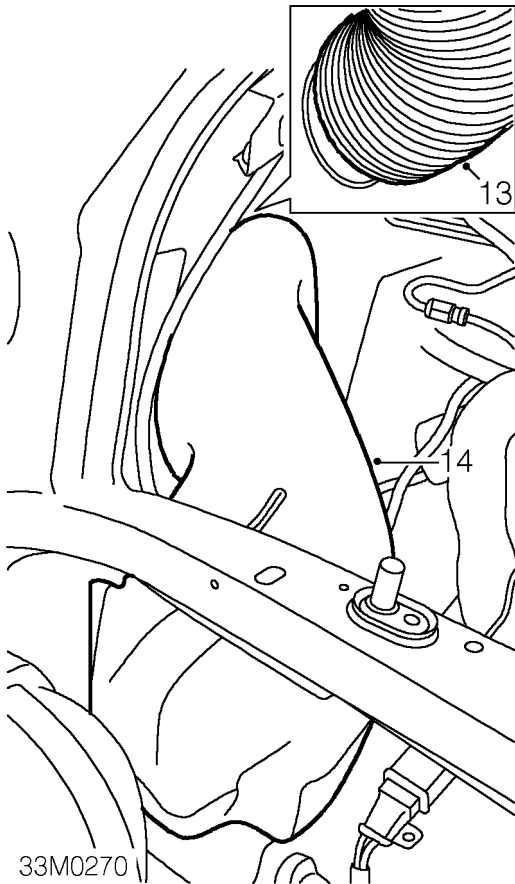


5. Remove cover from engine compartment fuse box.
6. Remove fusible link.
7. Release retaining tag and disconnect engine harness lead from fuse box.
8. Release engine compartment fuse box from ECM mounting bracket.

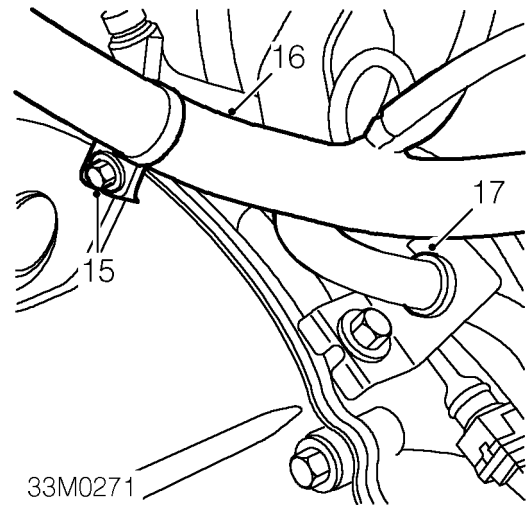


9. Release clip securing main harness to ECM mounting bracket.
10. Remove bolt securing ECM mounting bracket to body.
11. Release ECM mounting bracket from body and remove.
12. Remove bolt securing earth leads to body.

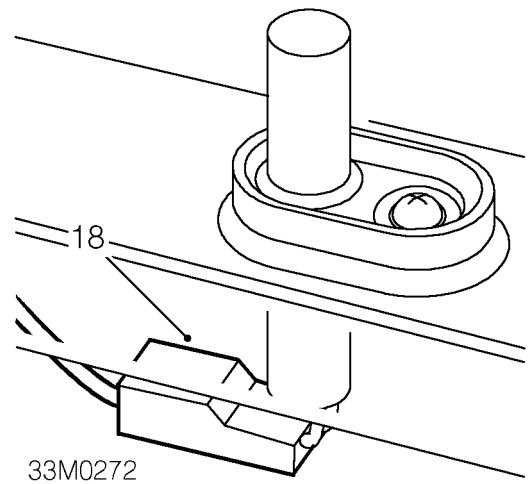
CLUTCH



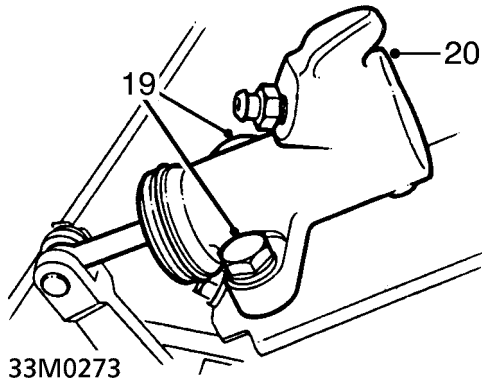
- 13. Disconnect fresh air intake hose from duct under RH front wing.
- 14. Release and remove fresh air intake duct from inner wing.



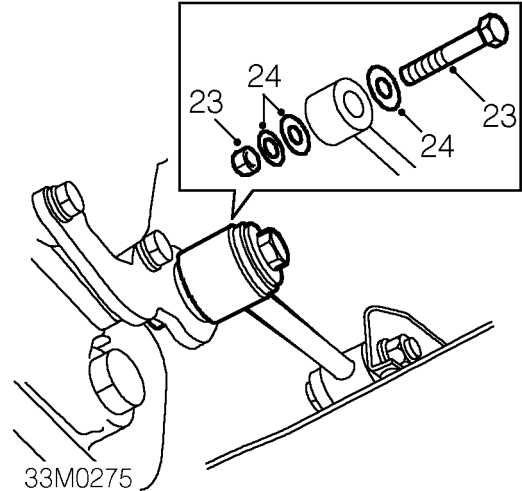
- 15. Remove bolt securing engine harness retaining bracket to flywheel housing.
- 16. Position engine harness aside.
- 17. Release battery feed cable grommet from bracket on flywheel housing.



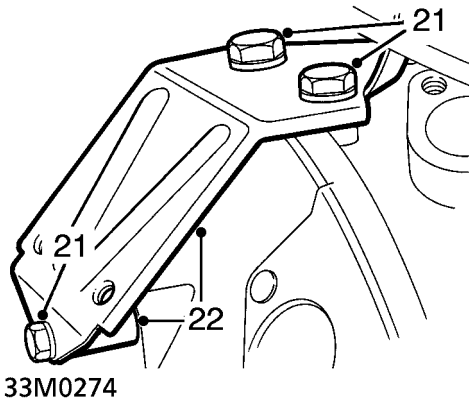
- 18. Disconnect Lucar from bonnet switch.



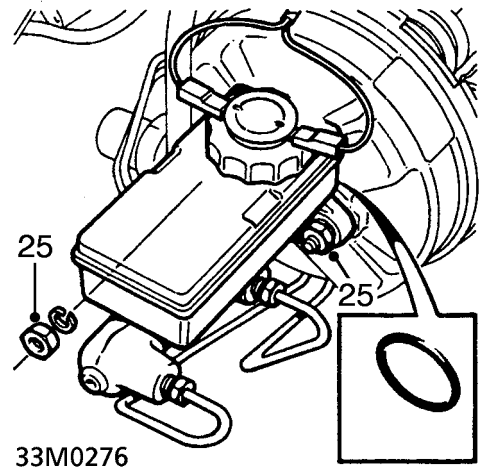
- 19. Remove 2 bolts securing clutch slave cylinder to mounting bracket and collect washers.
- 20. Withdraw slave cylinder from push rod and position aside.



- 23. Remove nut and bolt securing engine lower steady bar to bracket on flywheel housing.
- 24. Collect steady bar washers and position aside.

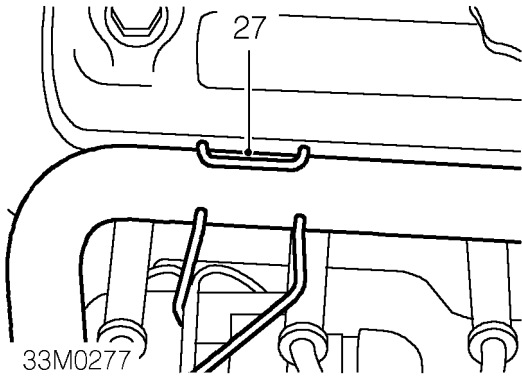


- 21. Remove 3 bolts securing slave cylinder mounting bracket to flywheel housing.
- 22. Remove slave cylinder mounting bracket and collect spacer.

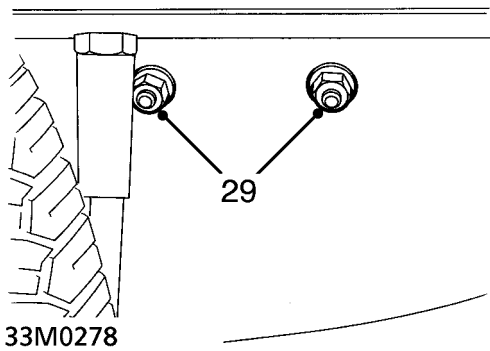


- 25. Remove 2 nuts securing brake master cylinder to servo.
- 26. Release master cylinder from studs on servo.

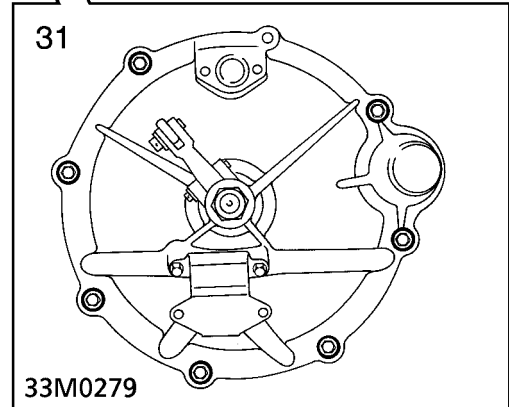
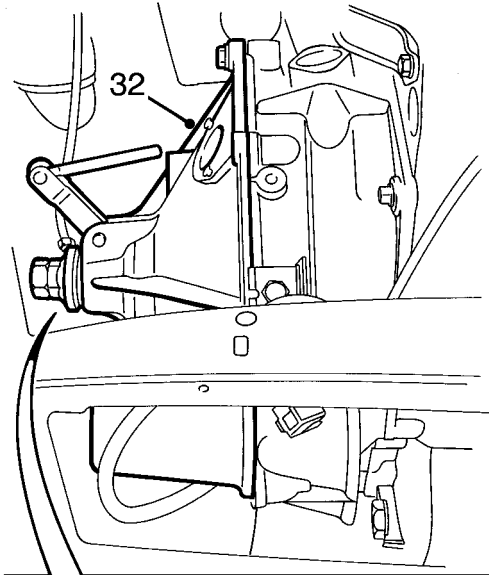
CLUTCH



27. Release radiator top hose from clip on ignition coil mounting bracket.
28. Fit wooden block to jack and position jack to support engine.



29. Remove 2 nuts and bolts securing engine RH mounting to subframe, collect washers.
30. Raise engine on jack.

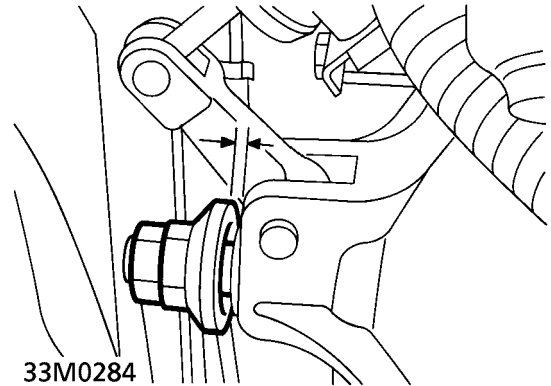


31. Remove 6 bolts securing cover to flywheel housing.
32. Release cover from flywheel housing.
33. Lower engine on jack.
34. Manoeuvre flywheel housing cover through gap between brake master cylinder and engine, remove cover.



Refit

1. Clean flywheel housing cover and mating face of flywheel housing.
2. Manoeuvre cover through gap between brake master cylinder and engine.
3. Position cover to flywheel housing.
4. Raise engine on jack.
5. Fit and tighten bolts securing cover to flywheel housing.
6. Lower engine on jack and align engine RH mounting to subframe.
7. Fit bolts, washers and nuts securing engine mounting to subframe.
8. Remove jack supporting engine.
9. Align engine lower steady bar to bracket on flywheel housing and position washers.
10. Fit bolt and nut securing engine lower steady bar to flywheel housing bracket and tighten to 40 Nm.
11. Fit brake master cylinder to studs on servo, fit nuts and tighten to 25 Nm.
12. Position clutch slave cylinder mounting bracket and spacer to flywheel housing.
13. Fit 3 bolts securing mounting bracket to flywheel housing, tighten bolts:
M8 bolts to 37 Nm.
M5 bolt to 7 Nm.
14. Fit clutch slave cylinder onto push rod.
15. Align slave cylinder to mounting bracket, fit bolts and tighten to 37 Nm.
16. Depress clutch pedal to load clutch lever and remove any free play.



17. Measure clearance between throw out stop lock nut and flywheel housing cover.
18. The correct clearance is 6.5 mm. If the clearance is incorrect, loosen lock nut and adjust throw out stop to obtain correct clearance.
19. Tighten lock nut and recheck clearance.
20. Secure battery feed cable grommet to bracket on flywheel housing.
21. Position engine harness retaining bracket to flywheel housing, fit bolt and tighten to 25 Nm.
22. Connect Lucar to bonnet switch.
23. Position earth leads to body, fit bolt and tighten to 9 Nm.
24. Fit fresh air intake duct to inner wing.
25. Connect fresh air intake hose to duct beneath wing.
26. Locate ECM mounting bracket on body, fit bolt and tighten to 10 Nm.
27. Secure clip on main harness to ECM mounting bracket.
28. Secure engine compartment fuse box to ECM mounting bracket.
29. Connect engine harness lead to engine compartment fuse box.
30. Fit fusible link.
31. Fit cover to engine compartment fuse box.
32. Fit engine breather/oil separator. **See EMISSION CONTROL, Repairs.**
33. Fit ECM. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**
34. Fit bonnet. **See BODY, Exterior fittings.**
35. Fit starter motor. **See ELECTRICAL, Repairs.**

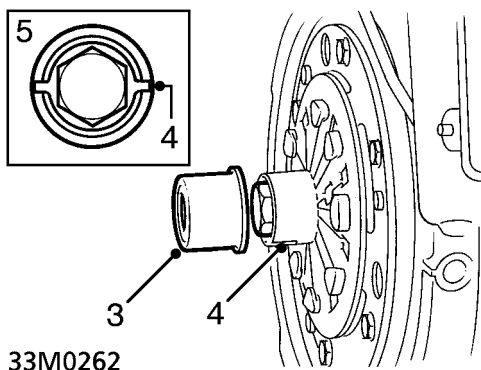
CLUTCH

CLUTCH ASSEMBLY AND RELEASE BEARING

Service repair no - 33.10.07

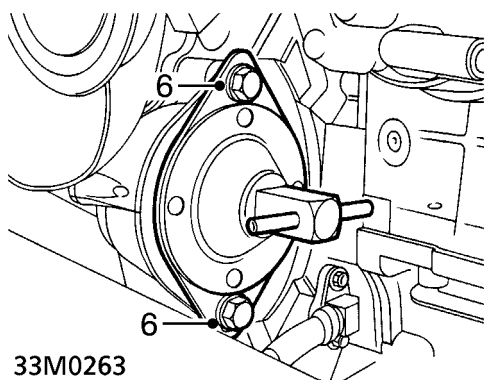
Remove

1. Remove CKP sensor. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*
2. Remove clutch release bearing. *See this section.*

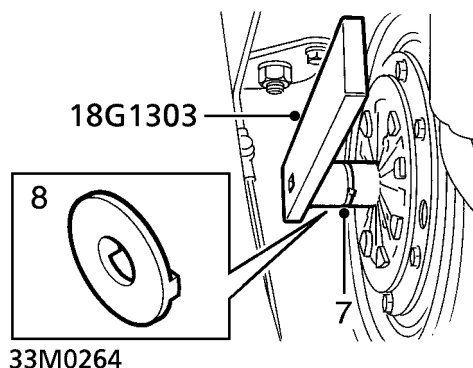


3. Remove thrust bearing sleeve from clutch hub.
4. Rotate crankshaft and knock back tabs on clutch hub lock washer.
5. Rotate crankshaft until clutch hub slots are aligned horizontally.

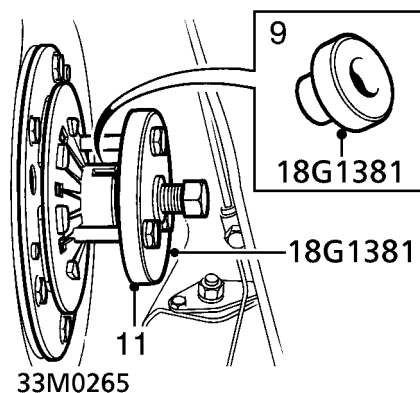
CAUTION: If crankshaft is not positioned correctly, primary drive 'C' shaped washer may become displaced and make it impossible to remove flywheel.



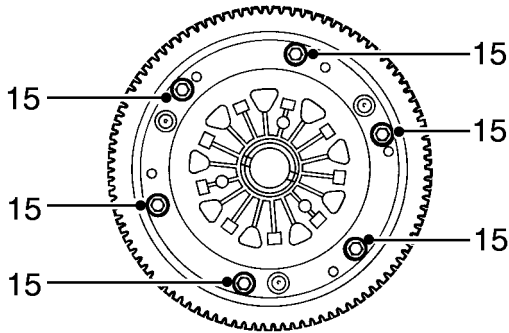
6. Fit flywheel locking tool and secure with bolts.



7. Using tool **18G 1303**, remove flywheel retaining bolt.
8. Remove key plate from crankshaft.



9. Fit thrust button of tool **18G 1381** to crankshaft.
10. Loosen centre bolt of tool **18G 1381** and position to flywheel.
11. Fit and tighten bolts securing tool **18G 1381** to flywheel.
12. Tighten centre bolt of tool to release flywheel from crankshaft taper.
13. Remove tool **18G 1381** from flywheel.
14. Remove flywheel and clutch assembly.

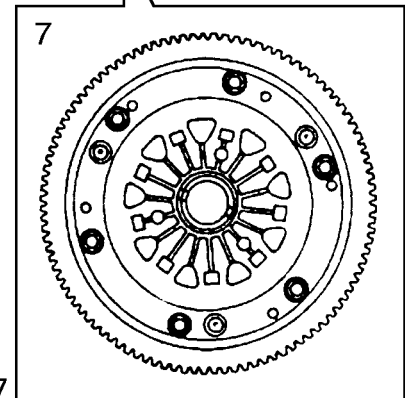
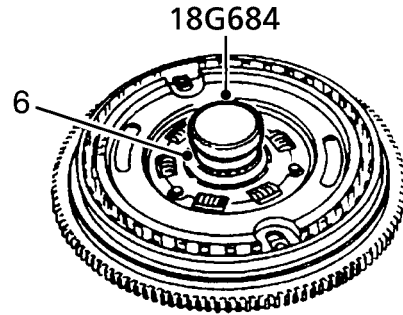


33M0266

- 15. Remove 6 bolts securing pressure plate to flywheel.
- 16. Remove pressure plate assembly.
- 17. Remove drive plate from flywheel.

Refit

- 1. Clean flywheel and pressure plate. Check diaphragm spring for wear and fractures. Renew flywheel and pressure plate as an assembly if either component shows signs of wear or damage.
- 2. Clean crankshaft and pressure plate hub.
- 3. Clean inside of flywheel housing.
- 4. Position drive plate on flywheel.
- 5. Fit pressure plate and align to flywheel, fit bolts but DO NOT tighten.



33M0267

- 6. Fit clutch aligning tool **18G 684**.
- 7. Tighten pressure plate to flywheel bolts to 25 Nm.
- 8. Remove clutch aligning tool.
- 9. Check crankshaft primary gear end-float. **See ENGINE, Adjustments.**
- 10. Grease splines of crankshaft primary gear.
- 11. Fit flywheel and clutch assembly to crankshaft.
- 12. Fit keyplate and NEW flywheel retaining bolt.
- 13. Tighten flywheel retaining bolt to 150 Nm.
- 14. Stake lock washer into slots on clutch hub.
- 15. Remove bolts securing flywheel locking tool to flywheel housing.
- 16. Remove flywheel locking tool.
- 17. Clean thrust bearing sleeve.
- 18. Fit thrust bearing sleeve to clutch hub.
- 19. Fit clutch release bearing. **See this section.**
- 20. Fit CKP sensor. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**

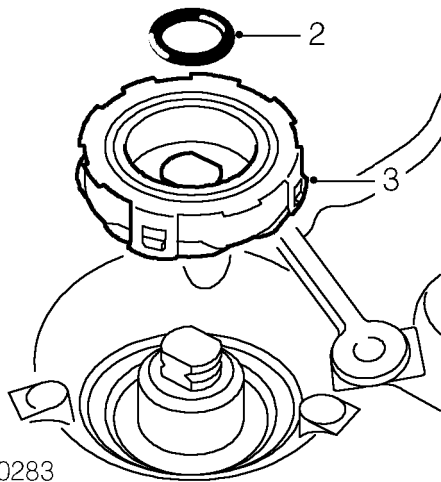
CLUTCH

RELEASE BEARING

Service repair no - 33.25.12

Remove

1. Remove flywheel housing cover. **See this section.**



2. Remove 'O' ring retaining bearing to plunger.
3. Remove bearing assembly from plunger.
4. Remove retainer securing locating plate to bearing.
5. Remove locating plate from bearing.

Refit

1. Clean mating face of locating plate and release bearing.
2. Examine release bearing for signs of wear or damage, renew if necessary.



CAUTION: Bearing is packed with grease, DO NOT wash in solvent.

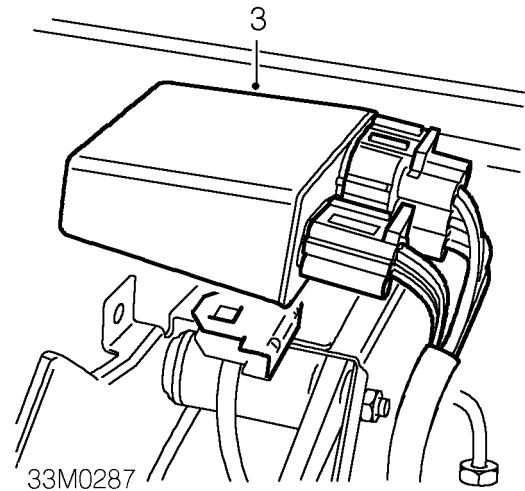
3. Apply grease to plunger shaft.
4. Position locating plate to bearing.
5. Fit location plate retainer.
6. Fit bearing assembly onto plunger.
7. Fit new 'O' ring securing bearing to plunger.
8. Fit flywheel housing cover. **See this section.**

MASTER CYLINDER

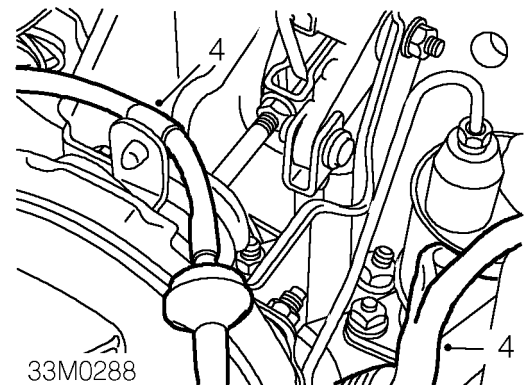
Service repair no - 33.20.01

Remove

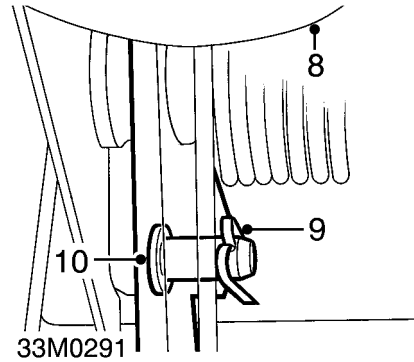
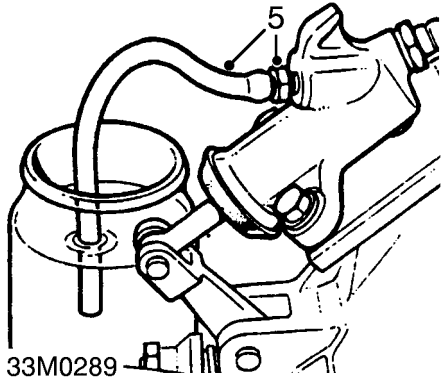
1. Remove ECM. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**
2. Remove air cleaner. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**



3. Release engine management relay module from mounting bracket and position aside.

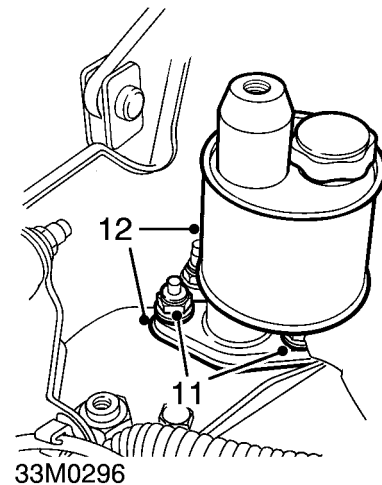
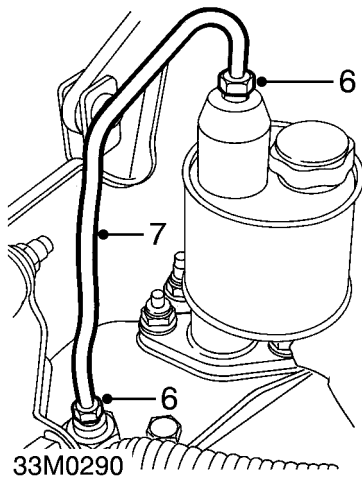


4. Release brake servo vacuum pipe from clip, move vacuum pipe and engine harness aside.



5. Attach bleed tube to bleed screw on slave cylinder. Remove cylinder cap and open bleed screw, pump clutch pedal to drain fluid from cylinder.

8. Release heater air intake duct from adapter inside vehicle and remove duct.
9. Remove split pin from clutch pedal clevis pin.
10. Remove clutch pedal clevis pin.



6. Loosen unions securing pipe to master and slave cylinders.
7. Remove clutch pipe.

11. Remove 2 nuts securing master cylinder to body.
12. Remove master cylinder and discard gasket.



CAUTION: Plug the connections.

CLUTCH

Refit

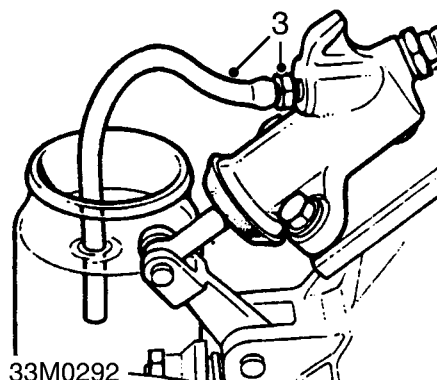
1. Clean mating face of master cylinder and body.
2. Fit master cylinder with new gasket to body.
3. Align push rod to clutch pedal.
4. Fit and tighten nuts securing master cylinder to body.
5. Lubricate and fit clevis pin securing push rod to pedal.
6. Secure clutch pedal clevis pin with a new split pin.
7. Fit fresh air intake duct to heater and connect to adapter on body.
8. Clean unions on clutch pipe, master cylinder and slave cylinder. Fit clutch pipe and tighten unions to 14 Nm.
9. Reposition engine harness and secure brake servo vacuum pipe to clip.
10. Secure engine management relay module to mounting bracket.
11. Bleed clutch. **See Adjustments.**
12. Fit air cleaner. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**

SLAVE CYLINDER

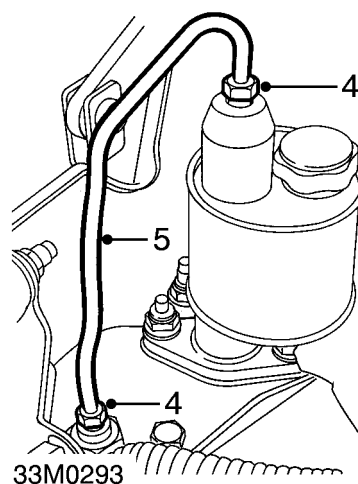
Service repair no - 33.35.01

Remove

1. Remove ECM. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**
2. Remove engine breather/oil separator. **See EMISSION CONTROL, Repairs.**



3. Attach bleed tube to bleed screw on slave cylinder. Remove master cylinder cap and open bleed screw, pump clutch pedal to drain fluid from cylinder.



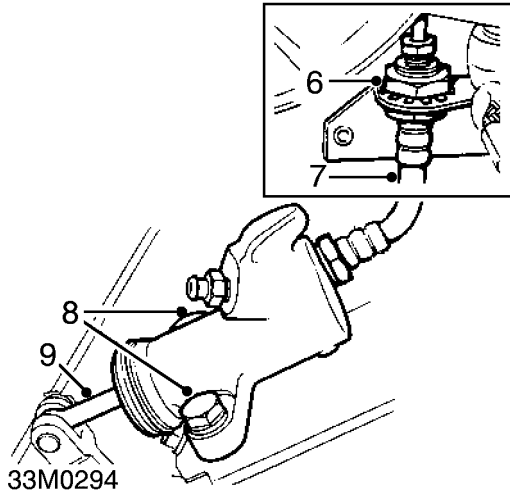
4. Loosen unions securing pipe to master and slave cylinder.
5. Remove clutch pipe.



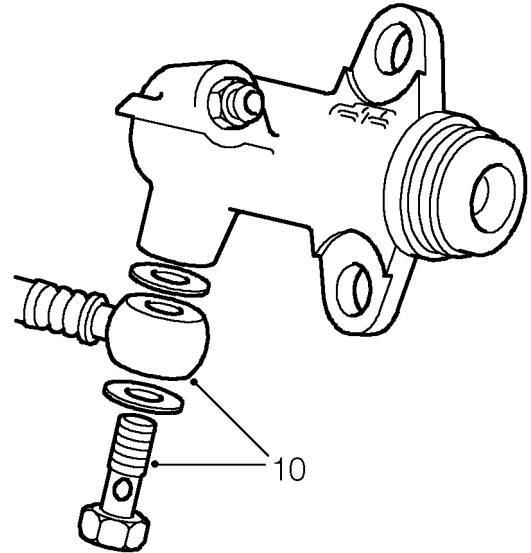
CAUTION: Plug the connections.



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



6. Remove nut securing hose to bracket and remove washer.
7. Release hose from bracket.
8. Remove 2 bolts securing slave cylinder to mounting bracket.
9. Withdraw slave cylinder from push rod and remove.



33M0295

10. Holding slave cylinder in a soft jawed vice, loosen union and remove hose and sealing washers from slave cylinder.
11. Remove old slave cylinder from vice and replace with new.
12. Ensure mating faces of cylinder and hose union are clean.
13. Using new sealing washers, fit hose and tighten union.
14. Remove cylinder from vice.

Refit

1. Position slave cylinder to mounting bracket on flywheel housing, fit bolts and tighten to 37 Nm.
2. Fit hose to bracket and secure with washer and nut.
3. Clean unions on clutch pipe, master cylinder and slave cylinder.
4. Fit pipe to master cylinder and slave cylinder and tighten unions to 14 Nm.
5. Fit engine breather/oil separator. **See EMISSION CONTROL, Repairs.**
6. Bleed clutch. **See Adjustments.**

CONTENTS

Page

ADJUSTMENTS

IDLER GEAR END-FLOAT	1
----------------------------	---

REPAIRS

GEAR SELECTOR MOUNTINGS	1
MANUAL GEARBOX	1
SPEEDOMETER DRIVE GEAR	2
SPEEDOMETER DRIVE PINION	4
REVERSE LIGHT SWITCH	5

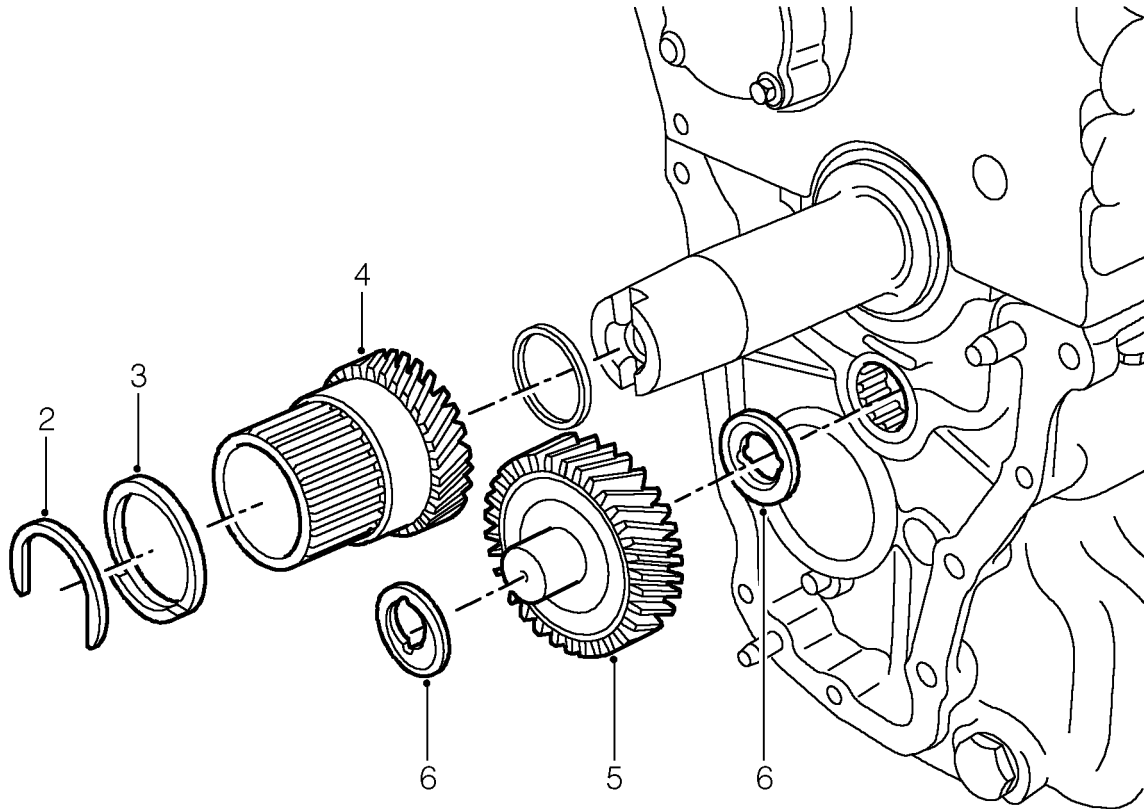




IDLER GEAR END-FLOAT

Service repair no - 37.20.10

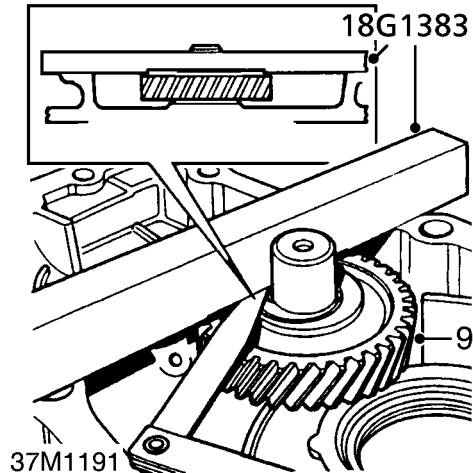
Check and Adjust



37M1190

Check

1. Remove flywheel housing gasket. **See ENGINE, Repairs.**
2. Remove 'C' washer securing primary gear to crankshaft.
3. Remove backing ring from crankshaft.
4. Remove primary gear from crankshaft.
5. Remove idler gear assembly.
6. Remove selective washers from idler gear.
7. Clean selective washers, idler gear and flywheel housing.
8. Fit selective washers to idler gear.



9. Fit idler gear assembly to flywheel housing.
10. Position tool **18G 1383** across flywheel housing and idler gear, centralise tool.
11. Using feeler gauges, measure gap between tool **18G 1383** and selective washer on idler gear.
DATA: End-float = 0.101 to 0.177 mm.

Adjust

12. Remove idler gear assembly from flywheel housing.
13. Remove selective washers from idler gear assembly.
14. Select washers which will give the correct end-float figure.
15. Clean selective washers and fit to idler gear.
16. Fit idler gear assembly to flywheel housing.
17. Position tool **18G 1383** and centralise.
18. Check that end-float is now within tolerance.
18G 1383.
19. Remove idler gear assembly from flywheel housing and fit to engine.
20. Clean primary gear, backing ring and 'C' shaped washer.
21. Fit primary gear to crankshaft.
22. Position backing ring on crankshaft.
23. Fit 'C' washer to crankshaft.
24. Fit flywheel housing gasket. **See ENGINE, Repairs.**



GEAR SELECTOR MOUNTINGS

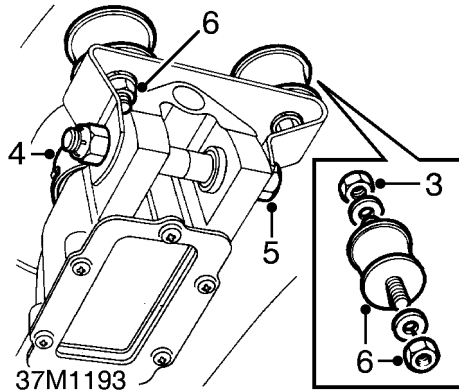
Service repair no - 37.16.25

Remove

1. Remove carpet *See BODY, Interior trim components.*
2. Raise front of vehicle.



WARNING: Support on safety stands.



3. Remove 2 nuts securing selector mountings to floor.
4. Lower gear selector.
5. Remove nut and bolt securing mounting bracket to gear selector and remove.
6. Remove nuts securing mountings to mounting bracket and remove mountings.

Refit

1. Position mountings to mounting bracket and secure with nuts.
2. Position mounting bracket to gear selector, secure with nut and bolt.
3. Raise gear selector and locate mountings to floor, fit and tighten nuts.
4. Fit carpet. *See BODY, Interior trim components.*
5. Remove stand(s) and lower vehicle.

MANUAL GEARBOX

Service repair no - 37.20.02.99

Remove

1. The procedure for removing the gearbox is identical to that for renewing the Engine to gearbox gasket. *See ENGINE, Repairs.*

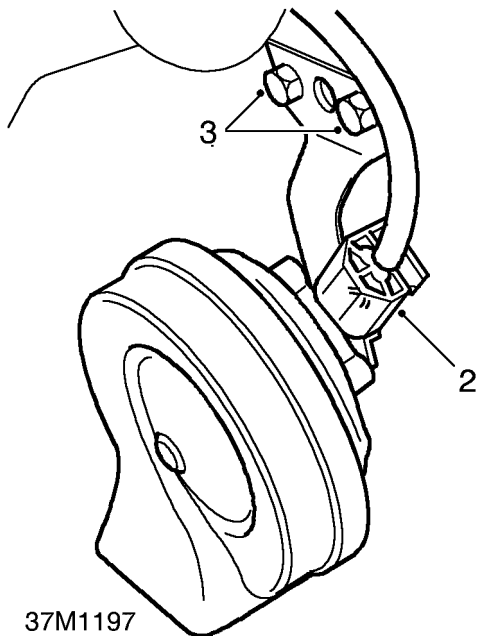
MANUAL GEARBOX

SPEEDOMETER DRIVE GEAR

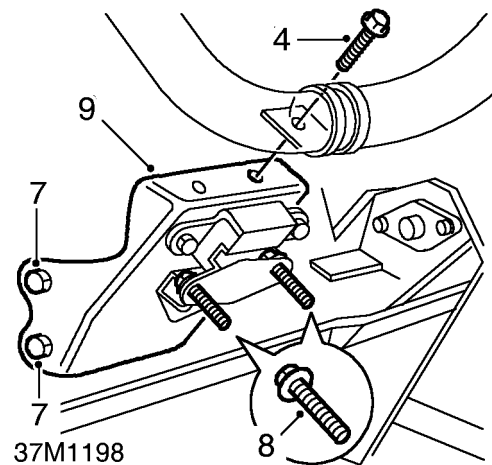
Service repair no - 37.25.01

Remove

1. Remove front pipe to manifold gasket. **See MANIFOLD & EXHAUST SYSTEMS, Repairs.**



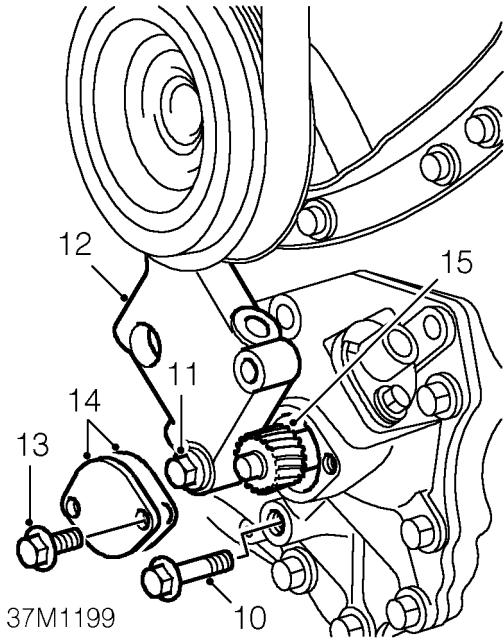
2. Disconnect multiplug from horn.
3. Remove 2 bolts securing horn to body and remove.



4. Remove bolt securing radiator bottom hose to engine mounting.
5. Position jack to support engine.

CAUTION: Use a block of wood or hard rubber pad between jack and engine.

6. Take weight off engine mounting.
7. Remove 2 bolts securing engine mounting bracket to gearbox.
8. Remove 2 bolts securing engine mounting to subframe.
9. Remove engine mounting and bracket.



- 10. Remove 3 bolts securing engine mounting adaptor plate to gearbox. lower front bolt.
- 11. Loosen lower bolt securing adaptor plate to gearbox.
- 12. Release adaptor plate from gearbox and rotate anti-clockwise to gain access to speedometer drive gear cover plate.



NOTE: Engine may have to be raised for adaptor plate to clear crankshaft front pulley.

- 13. Remove 2 bolts securing drive gear cover plate to housing.
- 14. Remove cover plate and discard gasket.
- 15. Remove speedometer drive gear.

Refit

- 1. Position speedometer drive gear in housing ensuring correct engagement with mainshaft and speedometer pinion.
- 2. Clean mating faces of cover plate and housing.
- 3. Position cover plate and new gasket.
- 4. Fit bolts securing cover plate to housing and tighten to 8 Nm.
- 5. Position adaptor plate to gearbox and align bolt holes.
- 6. Fit bolts securing adaptor plate to gearbox and tighten to 25 Nm.
- 7. Tighten bolt securing adaptor plate to gearbox to 25 Nm.
- 8. Position engine mounting and bracket.
- 9. Lower engine to align engine mounting to subframe.
- 10. Fit bolts securing engine mounting to adaptor plate and tighten to 25 Nm.
- 11. Fit bolts securing engine mounting to subframe and tighten to 22 Nm.
- 12. Remove jack.
- 13. Fit bolt securing radiator bottom hose to engine mounting.
- 14. Position horn to body, fit bolts and tighten to 9 Nm.
- 15. Connect multiplug to horn.
- 16. Fit front pipe to manifold gasket. **See** *MANIFOLD & EXHAUST SYSTEMS, Repairs.*

MANUAL GEARBOX

SPEEDOMETER DRIVE PINION

Service repair no - 37.25.05

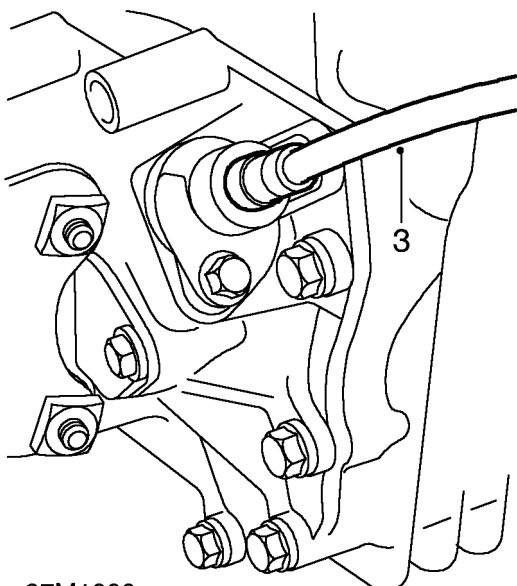
Remove

1. Raise front of vehicle.



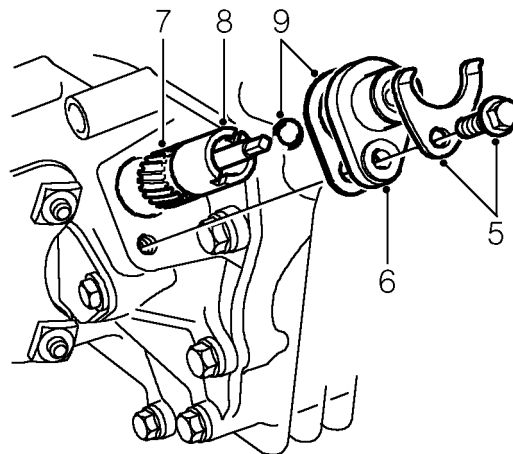
WARNING: Support on safety stands.

2. Disconnect battery earth lead.



37M1200

3. Loosen knurled nut and disconnect speedometer cable from housing.
4. Position speedometer cable aside.



37M1201

5. Remove bolt securing drive pinion housing to gearbox and remove clamping plate.
6. Remove drive pinion housing.
7. Remove drive pinion from housing.
8. Remove bush from drive pinion.
9. Remove and discard gasket and oil seal from housing.

Refit

1. Clean drive pinion, housing and bush.
2. Lubricate inner lip of oil seal with clean engine oil, and grease outer surface.
3. Fit oil seal to housing
4. Fit bush to drive pinion.
5. Fit drive pinion to housing.
6. Clean mating faces of drive pinion housing and gearbox.
7. Using a new gasket, fit drive pinion housing to gearbox.
8. Fit clamping plate.
9. Fit bolt securing clamping plate to gearbox and tighten to 8 Nm.
10. Connect speedometer cable to gearbox and tighten nut.
11. Remove stand(s) and lower vehicle.
12. Connect battery earth lead.



REVERSE LIGHT SWITCH

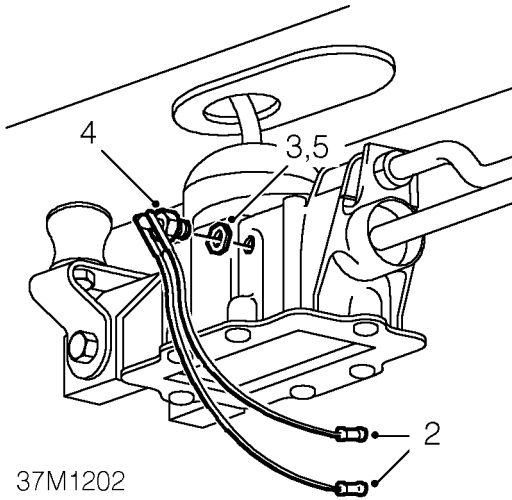
Service repair no - 37.27.01.

Remove

1. Raise front of vehicle.



WARNING: Support on safety stands.



2. Disconnect 2 reverse lamp switch leads from harness.
3. Loosen locknut securing switch to gear selector housing.
4. Remove reverse light switch.
5. Remove locknut from switch.

Refit

1. Fit locknut to new switch.
2. Fit switch to gear selector housing but DO NOT tighten.
3. Connect reverse lamp switch leads to harness.
4. Switch on ignition and select reverse gear.
5. Adjust switch until reverse lights are illuminated, screw switch in a further half turn and tighten lock nut.
6. Select neutral and switch off ignition.
7. Remove stand(s) and lower vehicle.

CONTENTS

Page

REPAIRS

DRIVE SHAFT OUTER JOINT 1
DRIVE SHAFT INNER JOINT 1
DRIVE SHAFT AND OUTER JOINT 2



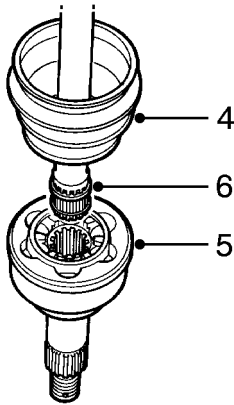


DRIVE SHAFT OUTER JOINT

Service repair no - 47.10.04

Remove

1. Remove drive shaft and outer joint. **See this section.**
2. Place drive shaft in vice.



47M0198

3. Remove clip securing gaiter to outer joint.
4. Fold back gaiter to gain access to outer joint.
5. Using a suitable drift against the inner part of the joint, remove joint from shaft.
6. Remove circlip from shaft and discard.
7. Inspect gaiter for signs of damage and renew if necessary.

Refit

1. Thoroughly clean outer joint and drive shaft.
2. Fit new circlip to drive shaft.
3. Position outer joint to shaft, use a screwdriver to press circlip into groove and push joint fully onto shaft.
4. Apply grease from the sachet supplied to the joint.
5. Fold back gaiter and locate on outer joint.
6. Using a Band-it thrift tool secure gaiter to outer joint with clip.
7. Remove drive shaft from vice.
8. Fit drive shaft and outer joint. **See this section.**

DRIVE SHAFT INNER JOINT

Service repair no - 47.10.14

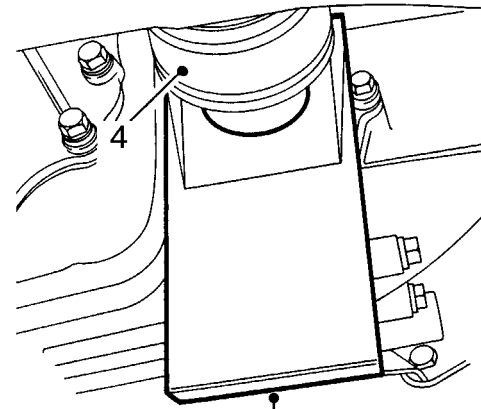
Remove

1. Raise front of vehicle, one side.



WARNING: Support on safety stands.

2. Remove drive shaft and outer joint, but DO NOT remove drive shaft from front hub. **See this section.**
3. Position container beneath differential to collect fluid loss.

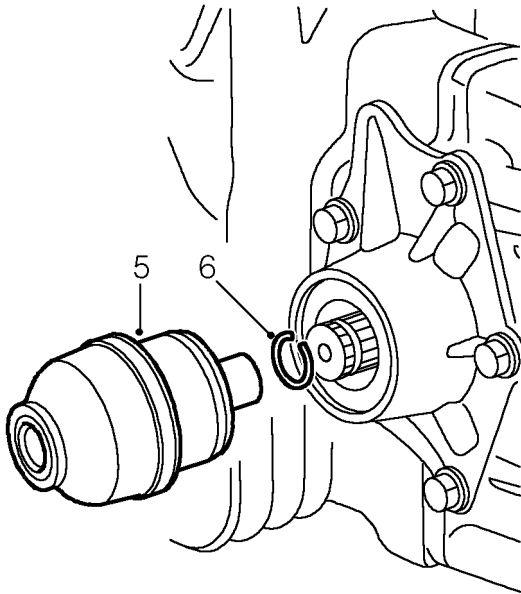


47M0199

18G1240

4. Using tool **18G 1240** release inner joint from differential.

DRIVE SHAFTS



47M0200

5. Remove drive shaft inner joint.
6. Remove and discard circlip from inner joint.

Refit

1. Clean drive shaft inner joint.
2. Inspect differential end cover oil seal for signs of damage and renew if necessary.
3. Fit new circlip to inner joint.
4. Fit inner joint to differential.



CAUTION: Ensure inner is securely retained in differential by circlip.

5. Fit drive shaft and outer joint. **See this section.**
6. Remove stand(s) and lower vehicle.
7. Top-up engine oil. **See MAINTENANCE Maintenance.**

DRIVE SHAFT AND OUTER JOINT

Service repair no - 47.10.28

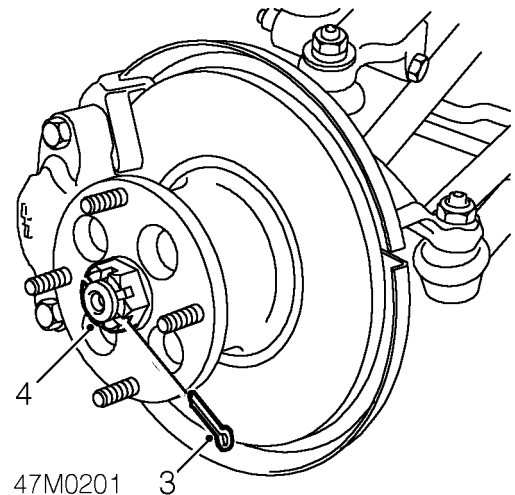
Remove

1. Raise front of vehicle, one side.

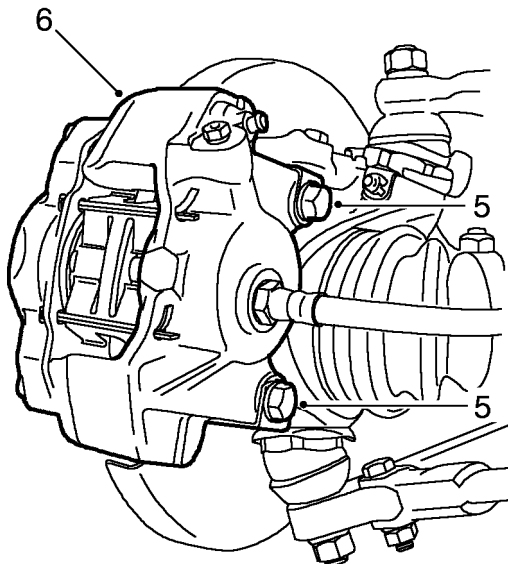


WARNING: Support on safety stands.

2. Remove road wheel(s).



3. Remove split pin retaining drive shaft nut.
4. Loosen nut securing front hub to drive shaft.

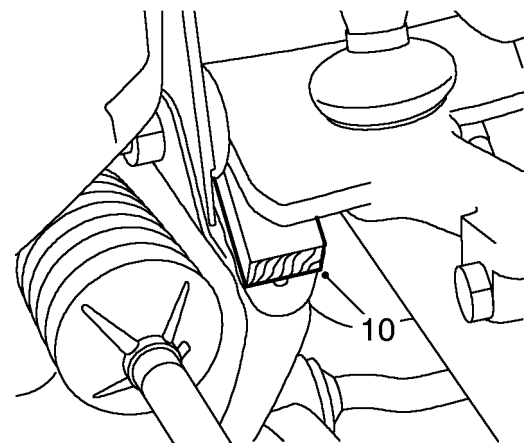
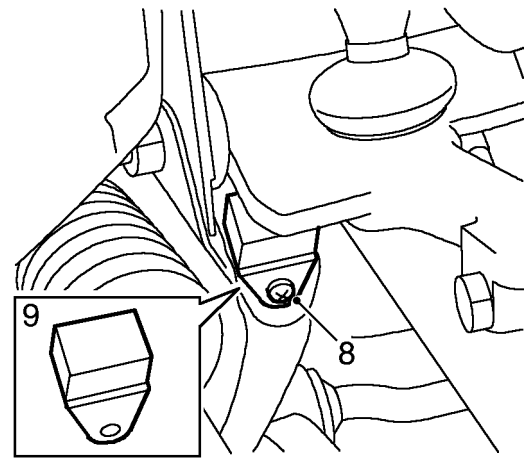


47M0202

5. Remove 2 bolts and collect washers securing brake caliper to front hub.
6. Release brake caliper from front hub and tie aside.

! CAUTION: Do not allow weight of caliper to hang on brake hose.

7. Raise front suspension using a jack positioned beneath lower suspension arm.

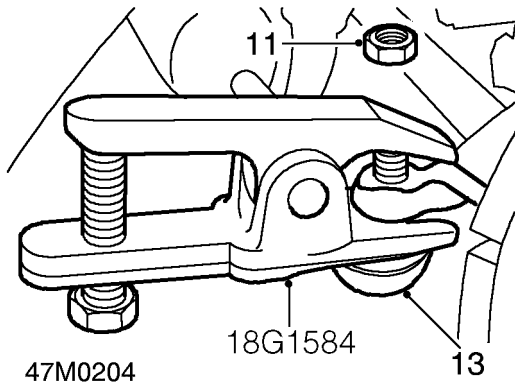


47M0203

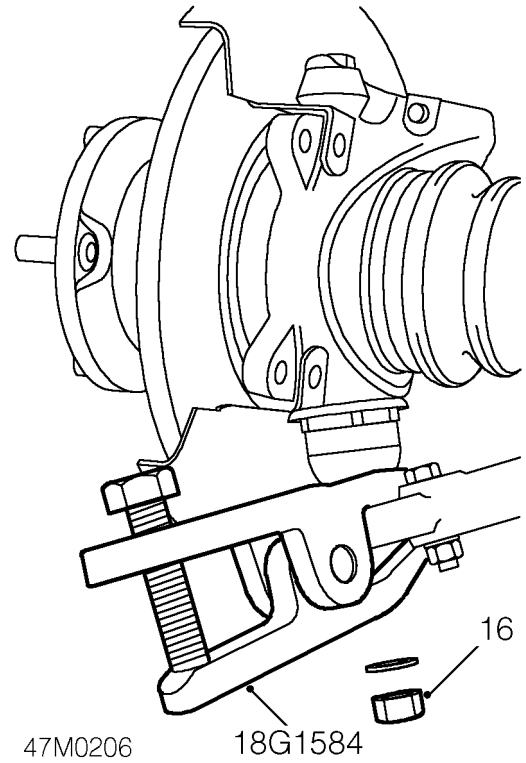
8. Remove screw securing rebound rubber to subframe.
9. Remove rebound rubber.
10. Fit a wedge between suspension arm and subframe, lower suspension onto wedge and remove jack.

! CAUTION: Ensure that an appropriate wedge is used to prevent any damage occurring to the suspension components.

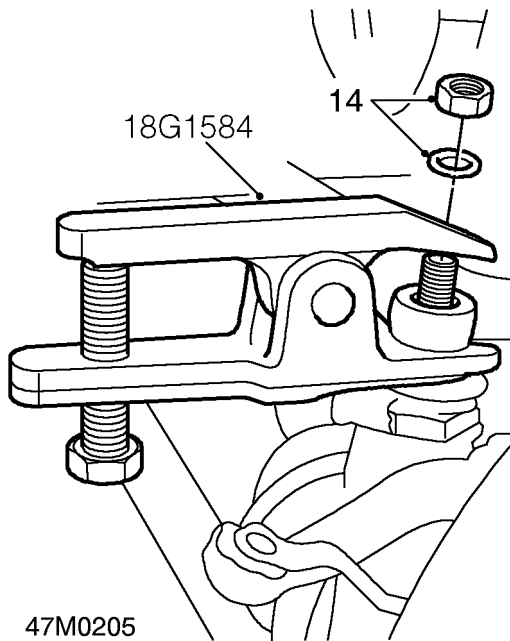
DRIVE SHAFTS



11. Remove nut securing steering rack track end to front hub.
12. Break taper joint using tool **18G 1584**.
13. Disconnect track rod end from front hub.



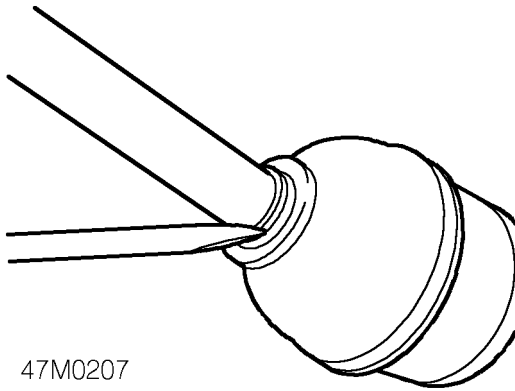
16. Remove nut and washer securing front hub lower ball joint to suspension arm.
17. Break taper joint using tool **18G 1584**.
18. Loosely fit nut securing upper ball joint to suspension arm.



14. Remove nut and washer securing front hub upper ball joint to suspension arm.
15. Break taper joint using tool **18G 1584**.



CAUTION: Be careful not to damage the rubber boot on ball joint.



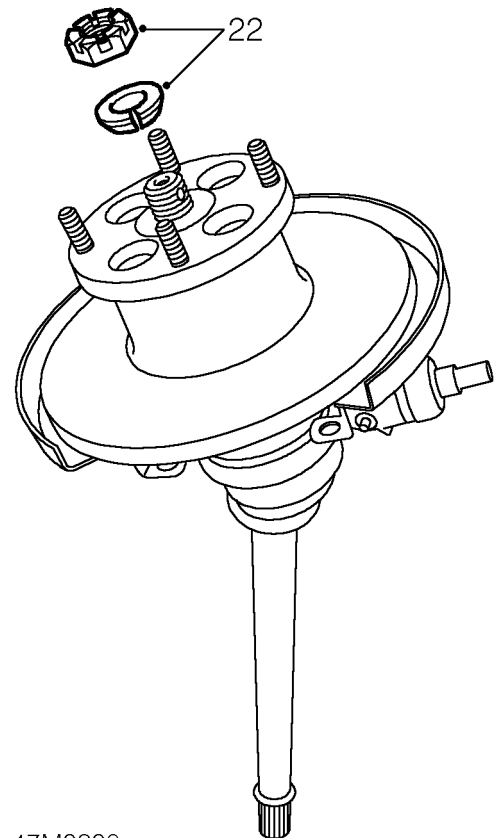
47M0207

19. Using a suitable drift, release drive shaft from inner joint.



CAUTION: Take care not to damage gaiter on drive shaft inner joint.

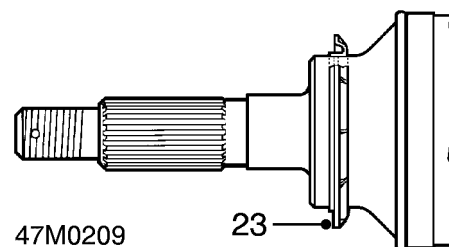
20. Remove nut and disconnect front hub from upper suspension arm.
21. Retain position of inboard joint gaiter and remove drive shaft and hub as an assembly.



47M0208

22. Remove hub nut and split collar securing front hub to drive shaft. Withdraw drive shaft from hub.

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



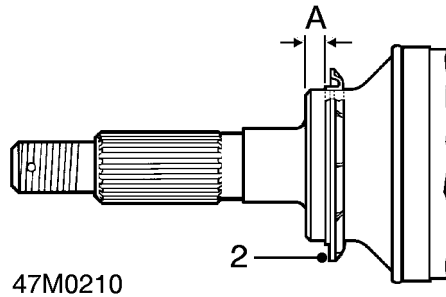
47M0209

23. Remove hub bearing water shield.

DRIVE SHAFTS

Refit

1. Clean both ends of drive shaft.



2. Fit hub bearing water shield onto drive shaft as shown:
'A' = 6 mm approximately.
3. Lubricate end of drive shaft and fit to inboard joint.



NOTE: Ensure shaft is securely retained by joint.

4. Clean front hub ball joints and mating faces of suspension arms.
5. Fit front hub to drive shaft and engage upper and lower ball joints on suspension arms.
6. Fit nuts and washers securing suspension arms to front hub and tighten to 52 Nm.
7. Connect steering rack track rod end to front hub, fit nut and tighten to 30 Nm.
8. Clean front brake disc.
9. Fit brake caliper to front hub.
10. Fit 2 bolts and washers securing brake caliper to front hub and tighten to 52 Nm.
11. Fit road wheel.
12. Position jack beneath lower suspension arm and raise front suspension.
13. Remove wedge between suspension arm and subframe.
14. Position rebound rubber and secure with screw.
15. Remove jack from beneath suspension arm.
16. Remove stand(s) and lower vehicle.
17. Fit split collar and tighten hub nut to 260 Nm.
18. Align nut to next split pin hole and fit new split pin.

CONTENTS

Page

ADJUSTMENTS

FRONT WHEEL ALIGNMENT	1
-----------------------------	---

REPAIRS

STEERING RACK AND PINION	1
STEERING COLUMN NACELLE	5
STEERING COLUMN LOCK	6
STEERING COLUMN ASSEMBLY	8
STEERING WHEEL	11



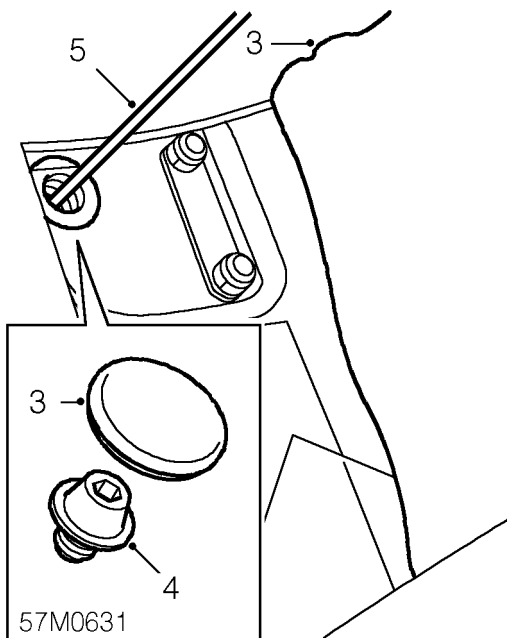


FRONT WHEEL ALIGNMENT

Service repair no - 57.65.01

Check

1. Ensure tyre pressures are correct and vehicle is at kerbside weight.
2. With the wheels in the straight ahead position, roll vehicle backwards and forwards at least a vehicle length to relieve any stresses in the steering and suspension.



3. Release carpet from LH foot well to access grommet, remove grommet from floor.
4. Using an Allen key, remove plug from steering rack.
5. Using assistance, move road wheels until a 6mm diameter rod can be inserted into the centralising hole in the steering rack.
6. Ensure that equipment is properly calibrated and take an average of 3 readings.



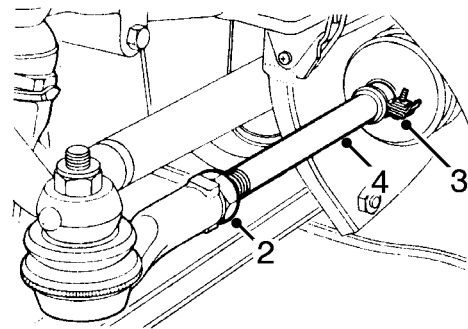
NOTE: Only use equipment recommended in the STEP (Service Tools and Equipment Programme) Manual.

7. Check front wheel alignment is within tolerance.

DATA: Front wheel alignment.
= Toe out 0° 15" ± 7.5" per side

Adjust

1. Mark position of track rod ends for reference.



57M0632

2. Loosen track rod end locknuts.
3. Loosen clip securing gaiter to the track rod.
4. Rotate track rod to obtain correct alignment.



CAUTION: Both track rod ends must be rotated an equal amount.

5. Recheck front wheel alignment and adjust if necessary.
6. Tighten track rod end locknuts to 52 Nm.
7. Ensure gaiters are not strained or twisted then tighten clip.
8. Remove 6mm rod from steering rack, fit and tighten blanking plug.
9. Fit grommet to floor and reposition carpet.



STEERING RACK AND PINION

Service repair no - 57.25.01

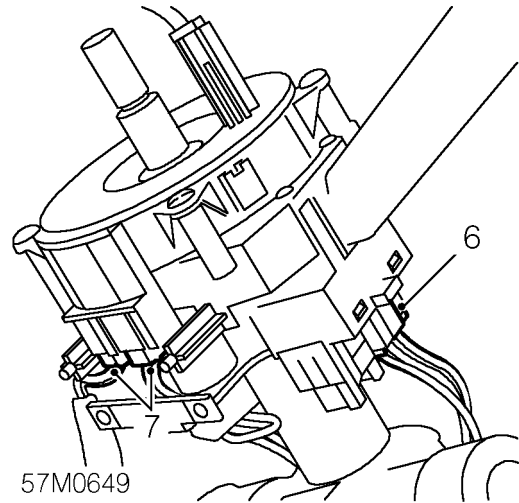
Remove

WARNING: SRS procedures must be followed and all precautions observed. See *RESTRAINT SYSTEMS, Precautions.*

1. Raise front of vehicle.

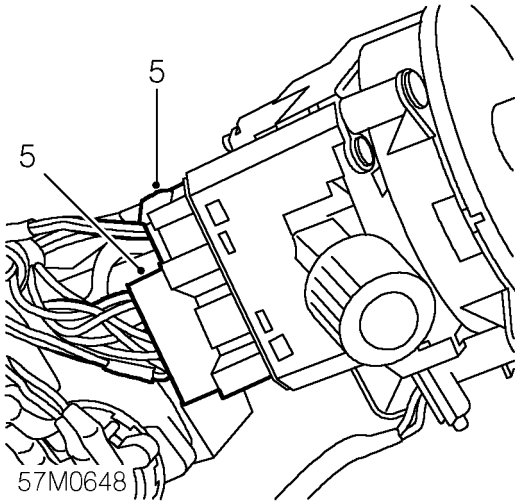
WARNING: Support on safety stands.

2. Remove both front road wheels.
3. Remove air cleaner. See *ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*
4. Remove steering column nacelle. See *this section.*



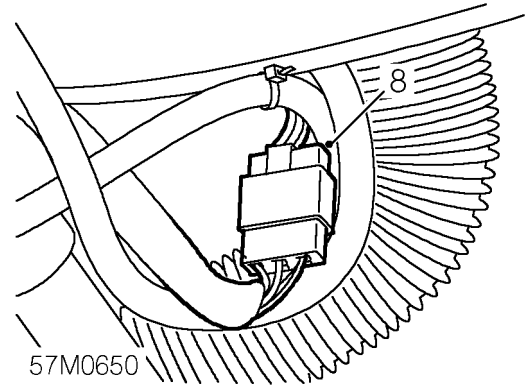
57M0649

6. Disconnect multiplug from windscreen washer and wiper switch.
7. Disconnect multiplug from rotary coupler.



57M0648

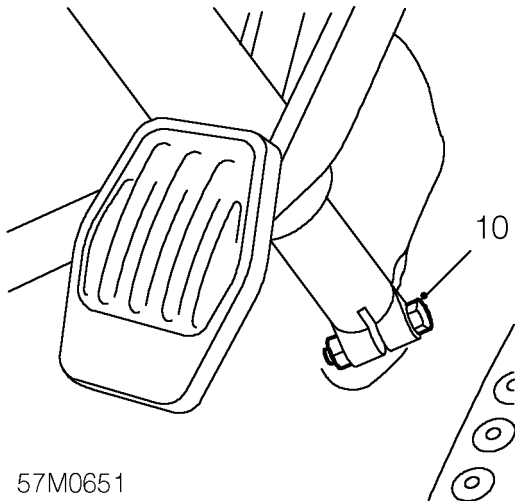
5. Disconnect 2 multiplugs from indicator/headlamp switch.



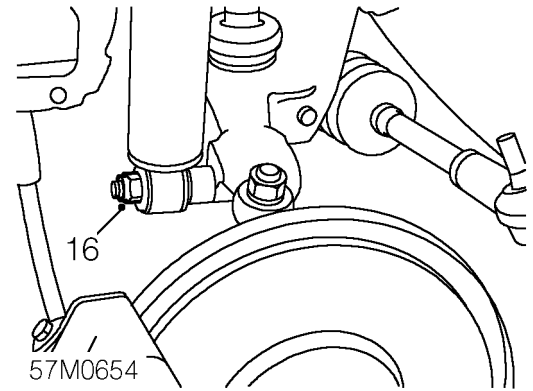
57M0650

8. Disconnect multiplug from ignition/starter switch.
9. Release carpet from around steering column.

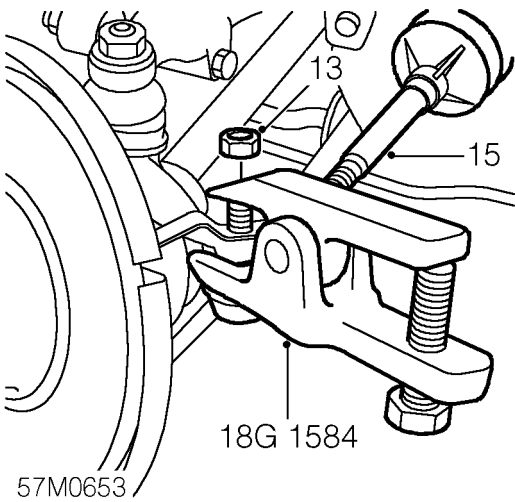
STEERING



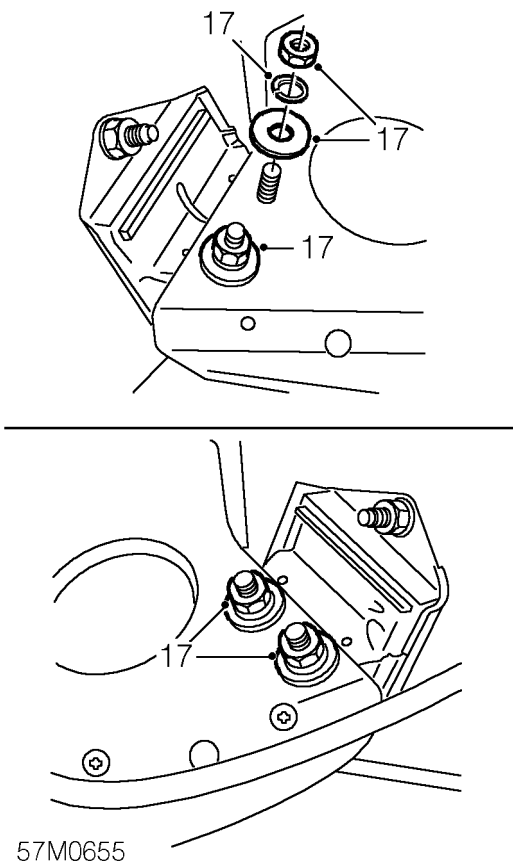
10. Remove bolt securing steering column to steering rack pinion.
11. Remove bolt securing steering column to support bracket.
12. Remove steering column assembly.



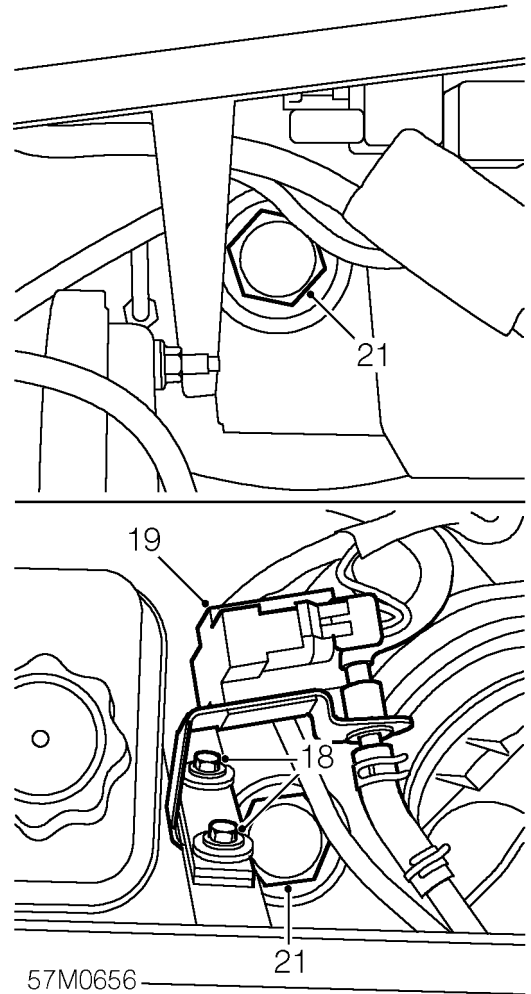
16. Remove nuts and bolts securing front dampers to suspension upper arms, collect spacers and washers.



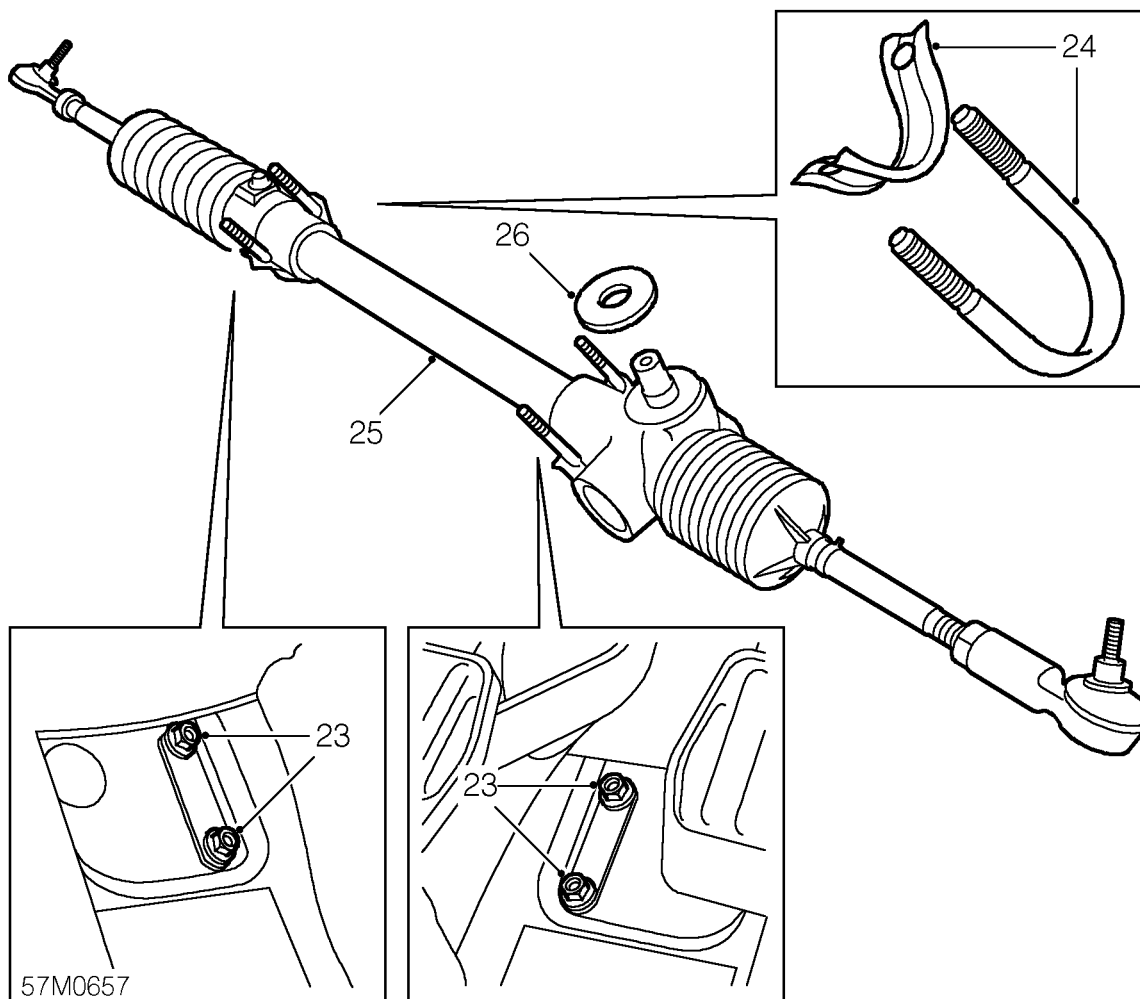
13. Remove nuts securing steering rack track ends to front hubs.
14. Break taper joints using tool **18G 1584**.
15. Disconnect track rod ends from front hubs.



- 17. Remove 4 nuts and bolts securing front subframe to mounting brackets on body, collect washers.



- 18. Remove 2 bolts securing emission canister purge valve to body.
- 19. Position purge valve aside.
- 20. Fit wooden block or hard rubber pad to jack and position jack to support rear of front subframe.
- 21. Remove 2 bolts securing subframe turrets to body.
- 22. Lower subframe to give a clearance of approximately 20 mm between the subframe turrets and body.



23. Remove 4 nuts securing the 2 steering rack 'U' bolts to body.
24. Release steering rack and remove 'U' bolts and anti-friction strips.
25. Manoeuvre steering rack out from the RH side of the vehicle.
26. Remove steering rack pinion seal from vehicle.

Refit

1. Inspect steering rack pinion seal and anti-friction strips for signs of damage and replace if necessary.
2. Fit steering rack pinion seal to body.
3. Manoeuvre steering rack into position in vehicle.
4. Fit anti-friction strips and 'U' bolts securing steering rack to body, but DO NOT tighten 'U' bolt securing nuts.
5. Raise subframe into position.
6. Fit bolts securing subframe turrets to body and tighten to 67 Nm.
7. Position emission canister purge valve to body, fit bolts and tighten to 9 Nm.
8. Position front dampers to suspension upper arms.

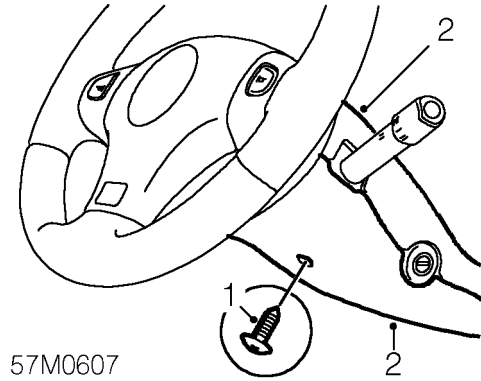


9. Fit spacers, washers, nuts and bolts securing front dampers to suspension upper arms, tighten nuts to 48 Nm.
10. Align subframe to mounting brackets on body.
11. Fit nuts, bolts and washers securing subframe to mounting bracket and tighten nuts to 25 Nm.
12. Connect steering rack track rod ends to front hubs, fit nuts and tighten to 30 Nm.
13. Release carpet from LH foot well to access grommet, remove grommet from floor.
14. Using an Allen key, remove plug from steering rack.
15. Using assistance, move road wheels until a 6mm diameter rod can be inserted into the centralising hole in the steering rack.
16. Fit steering column assembly to steering rack pinion.
17. Fit pinch bolt securing column to pinion and tighten to 15 Nm.
18. Tighten nuts securing steering rack 'U' bolts to body, to 15 Nm.
19. Reposition carpet round steering column.
20. Align steering column to mounting bracket, fit bolt and tighten to 25 Nm.
21. Connect multiplugs to column switches and ignition/starter switch.
22. Connect multiplug from rotary coupler.
23. Fit steering column nacelle. **See this section.**
24. Fit air cleaner. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**
25. Fit road wheels.
26. Remove stand(s) and lower vehicle.
27. Remove 6 mm rod from steering rack, fit and tighten blanking plug.
28. Fit grommet to floor and reposition carpet.

STEERING COLUMN NACELLE

Service repair no - 57.40.29

Remove



1. Remove 3 screws securing steering column nacelle.
2. Separate and remove upper and lower halves of nacelle.



CAUTION: Care must be taken when removing upper half of nacelle to avoid damaging the steering wheel.

Refit


1. Fit upper and lower half of column nacelle and fasten together.
2. Align nacelle to bracket on column and secure with screws.

STEERING

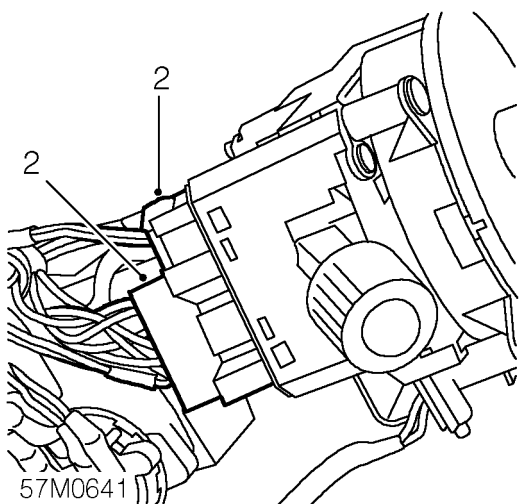
STEERING COLUMN LOCK

Service repair no - 57.40.31

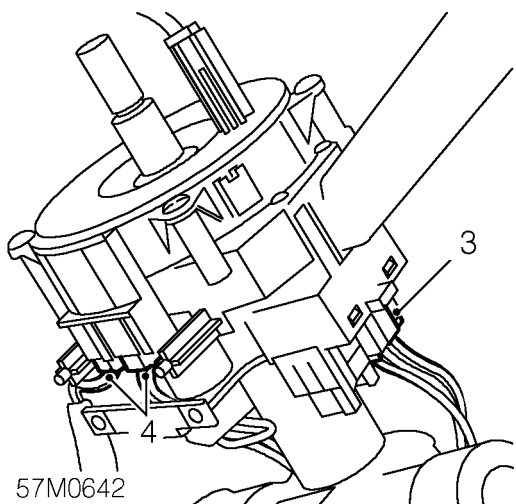
Remove

 **WARNING: SRS procedures must be followed and all precautions observed. See RESTRAINT SYSTEMS, Precautions.**

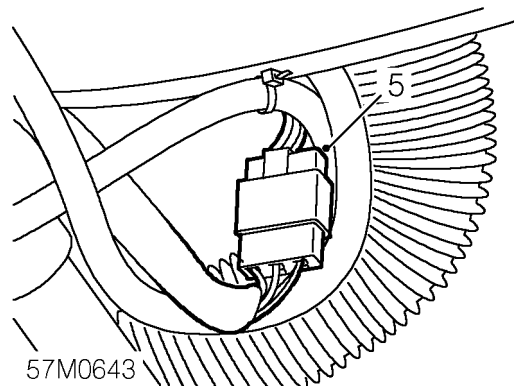
1. Remove steering column nacelle. **See this section.**



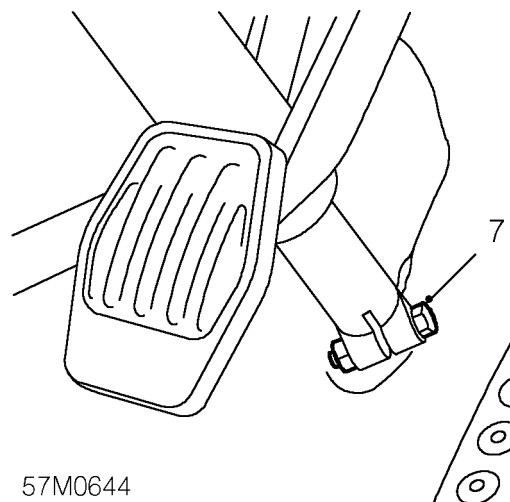
2. Disconnect 2 multiplugs from indicator/headlamp switch.



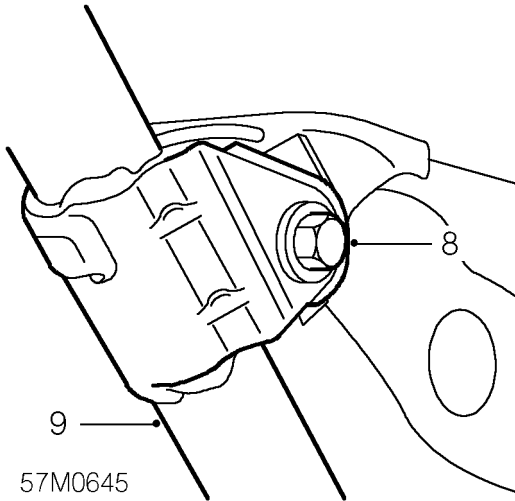
3. Disconnect multiplug from windscreen washer and wiper switch.
4. Disconnect multiplug from ignition/starter switch.



5. Disconnect 2 multiplugs from rotary coupler.
6. Release carpet from around steering column.

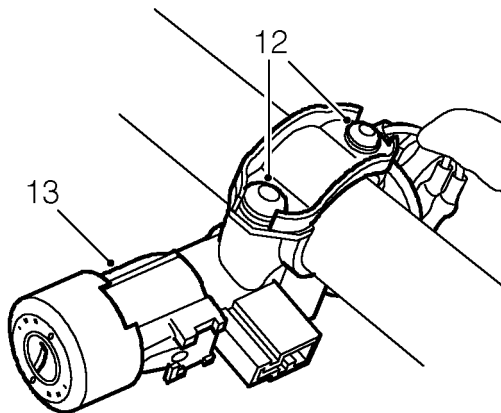


7. Remove bolt securing steering column to steering rack.



57M0645

8. Remove bolt securing steering column to support bracket.
9. Remove steering column assembly.
10. Position steering column in vice.
11. Centre punch shear bolts securing lock to column.



57M0646

12. Using a 5mm drill, drill out 2 shear bolts securing column to lock.

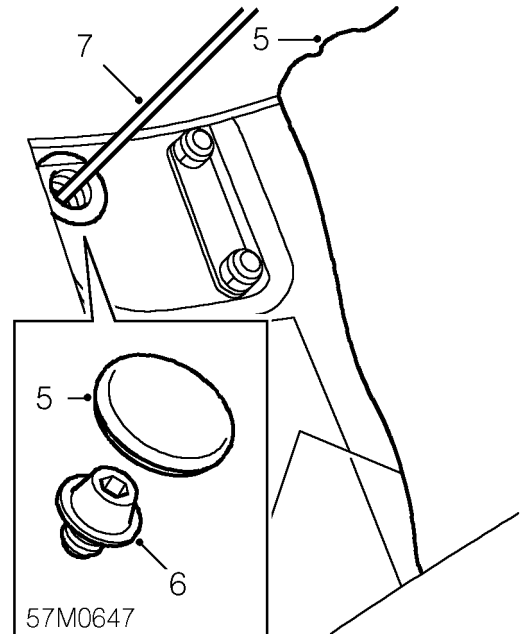


CAUTION: Take care not to damage lock body if lock is to be refitted.

13. Remove steering column lock.

Refit

1. Locate steering column lock in position on steering column, fit but do not tighten shear bolts.
2. Insert key, confirm correct operation of steering lock and that key turns freely.
3. Tighten shear bolts until heads shear off.
4. Remove steering column assembly from vice.



57M0647

5. Release carpet from LH foot well to access grommet, remove grommet from floor.
6. Using an Allen key, remove plug from steering rack.
7. Using assistance, move road wheels until a 6mm diameter rod can be inserted into the centralising hole in the steering rack.
8. Fit steering column assembly to steering rack pinion.
9. Fit pinch bolt securing column to pinion and tighten to 15 Nm.
10. Reposition carpet round steering column.

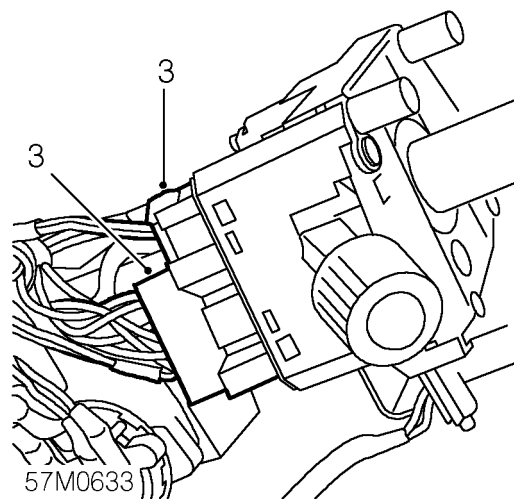
11. Align steering column to mounting bracket, fit bolt and tighten to 25 Nm.
12. Connect multiplugs to column switches and ignition/starter switch.
13. Connect 2 multiplugs to rotary coupler.
14. Fit steering column nacelle. **See this section.**
15. Remove 6mm rod from steering rack, fit and tighten blanking plug.
16. Fit grommet to floor and reposition carpet.
17. Connect battery earth lead.
18. Carry out system check by turning the ignition on and checking that the SRS warning light illuminates then extinguishes after 3 seconds.

STEERING COLUMN ASSEMBLY

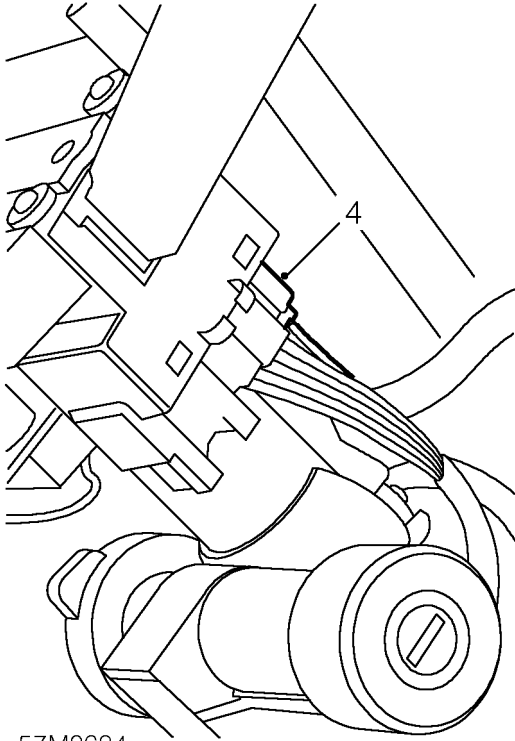
Service repair no - 57.50.01

Remove

1. Disconnect battery earth lead.
2. Remove rotary coupler. **See ELECTRICAL, Repairs.**

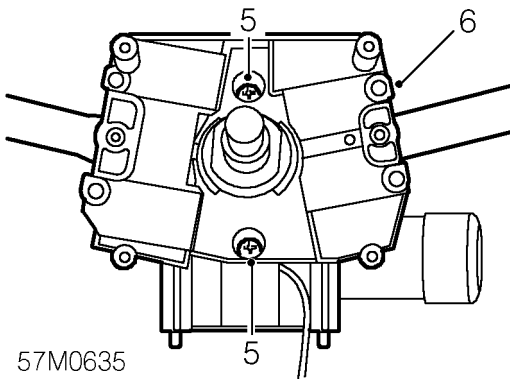


3. Disconnect 2 multiplugs from indicator/headlamp switch.



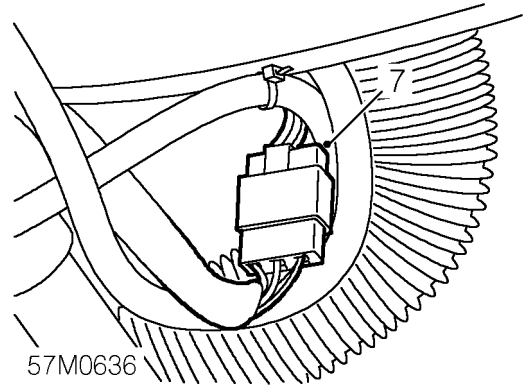
57M0634

- 4. Disconnect multiplug from windscreen washer and wiper switch.



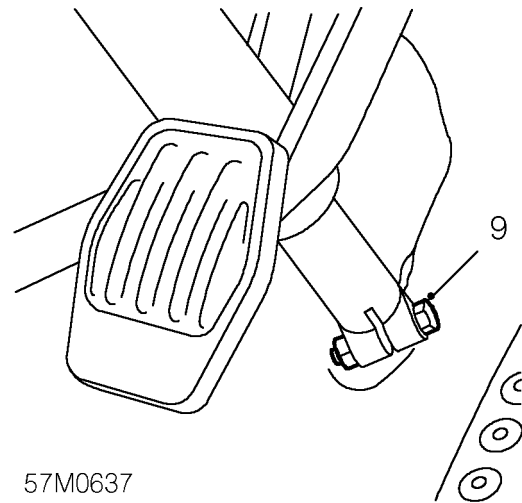
57M0635

- 5. Remove 2 screws securing column switch assembly to steering column.
- 6. Remove steering column switch assembly.



57M0636

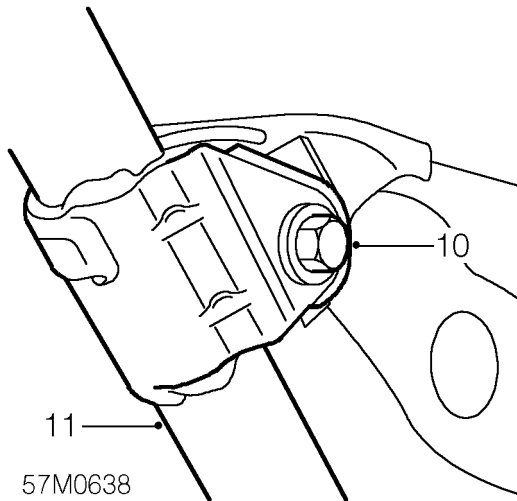
- 7. Disconnect multiplug from ignition/starter switch.
- 8. Release carpet from around steering column.



57M0637

- 9. Remove bolt securing steering column to steering rack pinion.

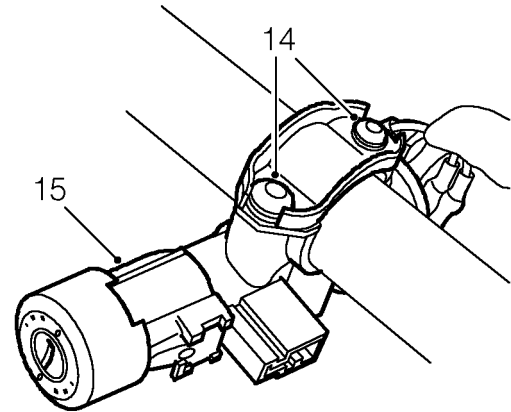
STEERING



10. Remove bolt securing steering column to support bracket.
11. Remove steering column assembly.

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

12. Position steering column in a vice.
13. Centre punch shear bolts securing lock to column.



14. Using a 5mm drill, drill out 2 shear bolts securing lock to column.

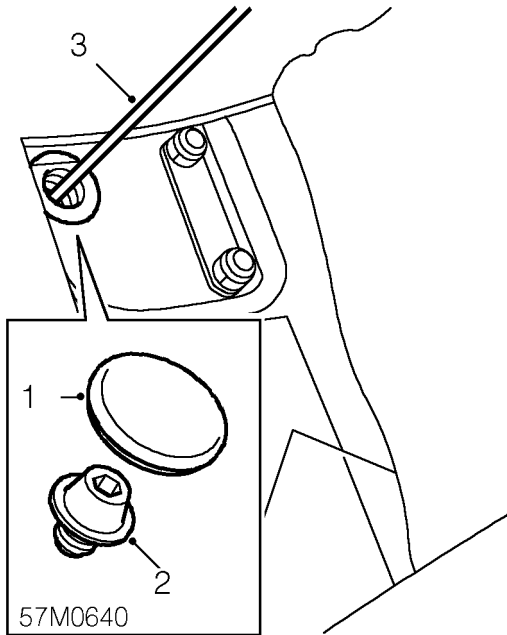


CAUTION: Take care not to damage lock body if lock is to be refitted.

15. Remove steering column lock.
16. Remove steering column assembly from vice.
17. Position new steering column assembly in vice.
18. Locate steering column lock in position on steering column, fit but do not tighten shear bolts.
19. Insert key, confirm correct operation of steering lock and that key turns freely.
20. Tighten shear bolts until heads shear off.
21. Remove steering column assembly from vice.



Refit



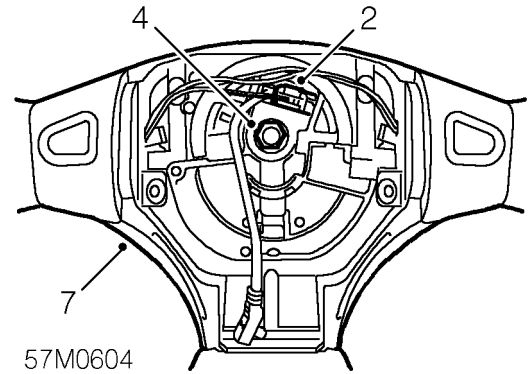
1. Release carpet from LH foot well to access grommet, remove grommet from floor.
2. Using an Allen key, remove plug from steering rack.
3. Using assistance, move road wheels until a 6mm diameter rod can be inserted into the centralising hole in the steering rack.
4. Fit steering column assembly to steering rack pinion.
5. Fit pinch bolt securing column to pinion and tighten to 15 Nm.
6. Reposition carpet round steering column.
7. Align steering column to mounting bracket, fit bolt and tighten to 25 Nm.
8. Fit steering column switch assembly and secure with screws.
9. Connect multiplugs to column switches and ignition/starter switch.
10. Fit rotary coupler. **See ELECTRICAL, Repairs.**
11. Remove 6 mm rod from steering rack, fit and tighten blanking plug.
12. Fit grommet to floor and reposition carpet.

STEERING WHEEL

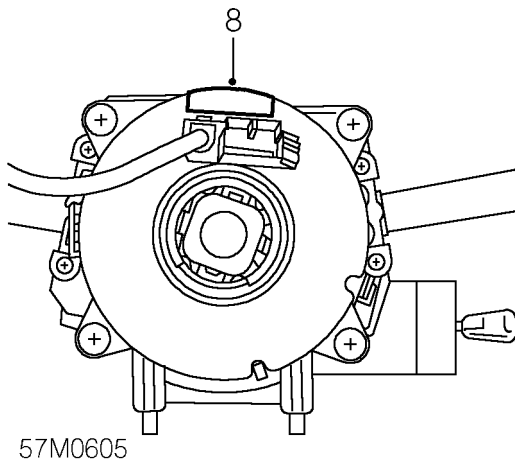
Service repair no - 57.60.01

Remove

1. Remove driver's airbag module. **See RESTRAINT SYSTEMS, Repairs.**

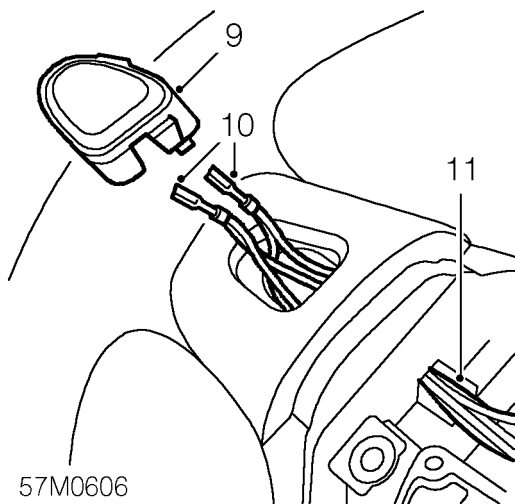


2. Disconnect horn multiplug from rotary coupling.
3. Centralise steering wheel with road wheels in straight ahead position.
4. Restrain steering wheel and loosen self-locking nut securing steering wheel to column. Loosen 2 turns only.
5. Release steering wheel from column splines by rocking steering wheel from side-to-side and pulling with both hands.
6. Remove and discard self-locking nut.
7. Remove steering wheel.



8. Attach tape across edge of rotary coupler to retain in central setting.

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



9. Release horn switches from steering wheel.
10. Disconnect Lucar connections from switches and remove switches.
11. Remove horn harness from steering wheel.

Refit

1. Fit horn harness to steering wheel.
2. Position horn switches to wheel, connect Lucars and fit switches.
3. Remove retaining tape from rotary coupler.
4. Ensure road wheels are in straight ahead position and indicator cancel cam aligned vertical.
5. Engage rotary coupling and fit steering wheel to column, ensure wheel spokes are horizontal.
6. Fit NEW self-locking nut, and tighten to 49 Nm.
7. Connect horn multiplug to rotary coupler.
8. Fit driver's airbag module. **See RESTRAINT SYSTEMS, Repairs.**

CONTENTS

Page

ADJUSTMENTS

DAMPER ADJUSTMENT 1

REPAIRS

FRONT BUMP RUBBER 1

FRONT REBOUND RUBBER 1

FRONT DAMPER 2

REAR DAMPER 3





DAMPER ADJUSTMENT

Service repair no -
 Front - 68.15.16.01
 Rear - 68.15.22.01

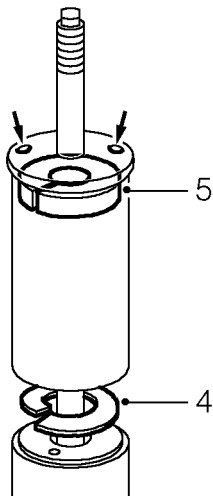
WARNING: Dampers must be adjusted equally, in axle pairs only, otherwise handling characteristics may be impaired.

Adjust

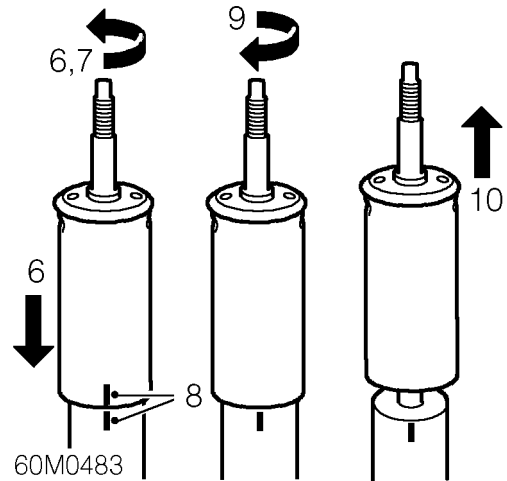
1. Remove damper.
 Front damper. **See Repairs.**
 Rear damper. **See Repairs.**
2. Hold damper vertically with lower eye in vice.

CAUTION: Use soft jaws to prevent damage to damper.

3. Extend damper.



4. Remove plastic collar from damper shaft.
5. Remove rebound rubber from dust cover.



6. Compress damper whilst at the same time turning dust cover anti-clockwise to engage adjusting pins with holes on damper.
7. Keeping damper compressed, turn dust cover fully anti-clockwise until it stops.
8. Using a felt tipped pen, mark relationship between dust cover and damper cylinder.
9. Adjust damper by turning dust cover 1/2 turn clockwise for each 48,000 miles completed.
10. Extend damper to release adjusting pins.
11. Fit rebound rubber to dust cover.
12. Fit plastic collar to damper shaft.
13. Remove damper from vice.
14. Fit damper.
 Front damper. **See Repairs.**
 Rear damper. **See Repairs.**



FRONT BUMP RUBBER

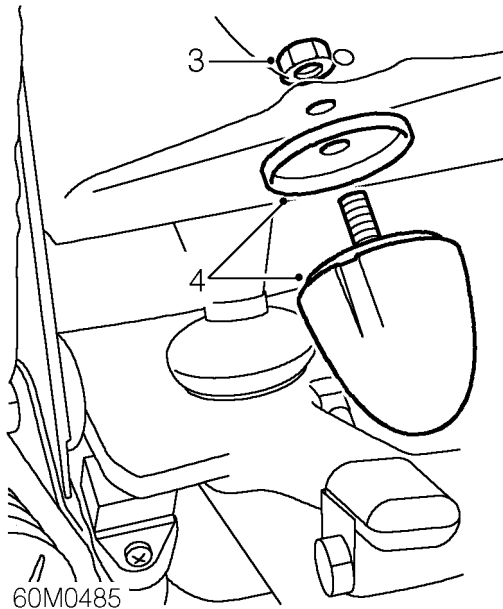
Service repair no - 68.15.01

Remove

1. Raise front of vehicle, one side.



2. Remove road wheel(s).



3. Using an 11mm spanner remove nut securing bump rubber to subframe.
4. Remove bump rubber and collect spacer.

Refit

1. Fit spacer, position bump rubber to subframe.
2. Fit and tighten nut securing bump rubber to subframe.
3. Fit road wheel and tighten nuts.
4. Remove stand(s) and lower vehicle.

FRONT REBOUND RUBBER

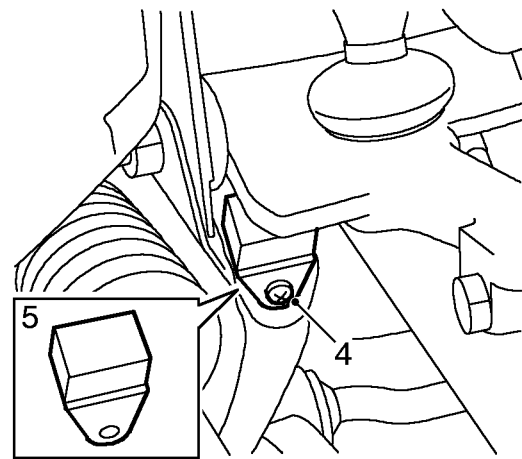
Service repair no - 68.15.08

Remove

1. Raise front of vehicle, one side.



2. Remove road wheel(s).
3. Raise front suspension using a jack positioned beneath lower suspension arm.



60M0487

4. Remove screw securing rebound rubber to subframe.
5. Remove rebound rubber.

Refit

1. Position rebound rubber and secure with screw.
2. Remove jack from beneath suspension arm.
3. Fit road wheel and tighten nuts
4. Remove stand(s) and lower vehicle.

SUSPENSION

FRONT DAMPER

Service repair no - 68.15.16

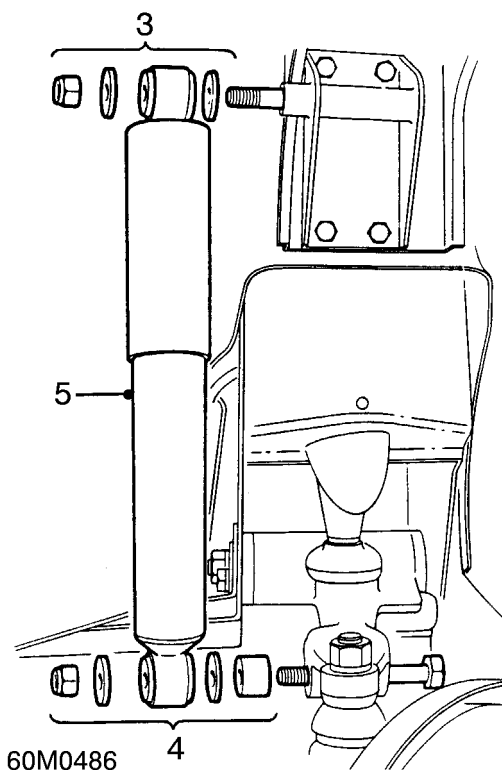
Remove

1. Raise front of vehicle, one side.



WARNING: Support on safety stands.

2. Remove road wheel(s).



3. Remove nut and washers securing damper to bracket on body.
4. Remove nut and washers securing damper to suspension upper arm and remove spacer.
5. Remove front damper.



NOTE: Store damper upright if it is to be refitted.

Refit

1. Hold new damper in vice, compress and extend it through its full stroke until there is no free travel when changing direction of stroke.
2. Fit spacer and washer to suspension upper arm bolt.
3. Fit washer to bolt on body and locate damper on mounting bolts.
4. Fit nut and washer securing damper to bracket on body and tighten to 37 Nm.
5. Fit nut and washer securing damper to suspension upper arm and tighten to 48 Nm.
6. Fit road wheel and tighten nuts.
7. Remove stand(s) and lower vehicle.



REAR DAMPER

Service repair no -
 LH side - 68.15.22
 RH side - 68.15.23

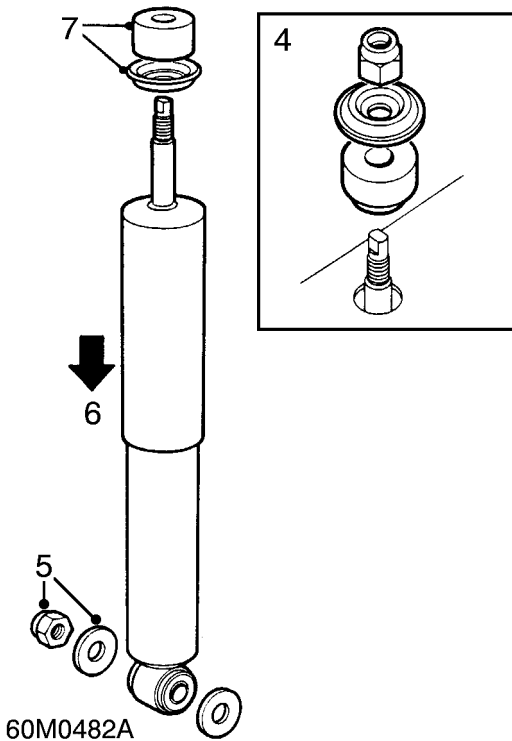
Remove

1. *LH damper only:* Remove fuel tank. **See FUEL DELIVERY SYSTEM, Repairs.**
2. Raise rear of vehicle, one side.



WARNING: Support on safety stands.

3. Remove road wheel(s).



4. From inside luggage compartment, remove nut, washer and bush securing damper to body.
5. Remove nut and washer securing damper to suspension arm.
6. Compress damper and remove from suspension arm.
7. Remove rubber bush and washer from damper.



NOTE: Store damper upright if it is to be refitted.

Refit

1. Hold new damper in vice, compress and extend it through its full stroke until there is no free travel when changing direction of stroke.
2. Fit rubber bush and washer to top of damper.
3. Fit damper to suspension arm.
4. Fit nut and washer securing damper to suspension arm and tighten to 25 Nm.
5. Extend damper and locate shaft in hole on body.
6. Fit bush and washer to damper shaft.
7. Fit nut securing damper to body, hold damper shaft and tighten nut to 25 Nm.
8. *LH damper only:* Fit fuel tank. **See FUEL DELIVERY SYSTEM, Repairs.**
9. Fit road wheel and tighten nuts.
10. Remove stand(s) and lower vehicle.

CONTENTS

Page

ADJUSTMENTS

BRAKE SYSTEM BLEED	1
BRAKE LIGHT SWITCH	2

REPAIRS

REAR BRAKE DRUM	1
BRAKE FAILURE WARNING SWITCH	2
PRESSURE REDUCING VALVE	3
BRAKE LIGHT SWITCH	5
MASTER CYLINDER	5
BRAKE PEDAL	7
FRONT BRAKE PADS	9
REAR BRAKE SHOES	10
SERVO ASSEMBLY	12
FRONT BRAKE CALIPER	14
REAR WHEEL BRAKE CYLINDER	15
HANDBRAKE CABLE - FRONT	15





BRAKE SYSTEM BLEED

Service repair no - 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 reuse fluid that has been bled from the brake system. Do not allow fluid level in master cylinder to fall below 'MIN' mark during bleeding. Do not fill reservoir above 'MAX' mark.

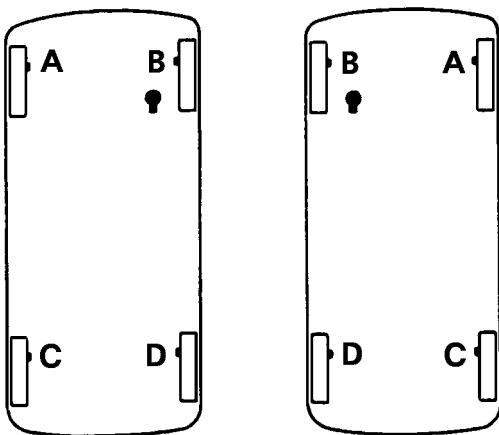
CAUTION: Do not allow brake fluid to contact paint finished surfaces as paint may be damaged. If spilled, remove fluid and clean area with clean warm water.

Bleed

1. Raise front and rear of vehicle.

- WARNING:** Support on safety stands.
2. Check all pipe and hose connections are tight and there are no signs of leakage.
 3. Top-up fluid level in brake reservoir to 'MAX' mark. *See INFORMATION, Capacities, fluids and lubricants.*

CAUTION: Use only new brake fluid of the recommended grade.



70M0688A

4. Attach bleed tube to front brake caliper bleed screw (A), submerge free end in a clear container containing brake fluid.

NOTE: Bleed brakes with handbrake in OFF position.

5. Apply pressure to brake pedal several times, then apply steady pressure.
6. Loosen bleed screw to release brake fluid and air.
7. 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 pedal at end of downward stroke, tighten bleed screw to 9 Nm.

CAUTION: Maintain brake fluid level above 'MIN' mark during this procedure.

8. Top-up brake fluid level.
9. Repeat procedure at each wheel in the sequence shown.

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

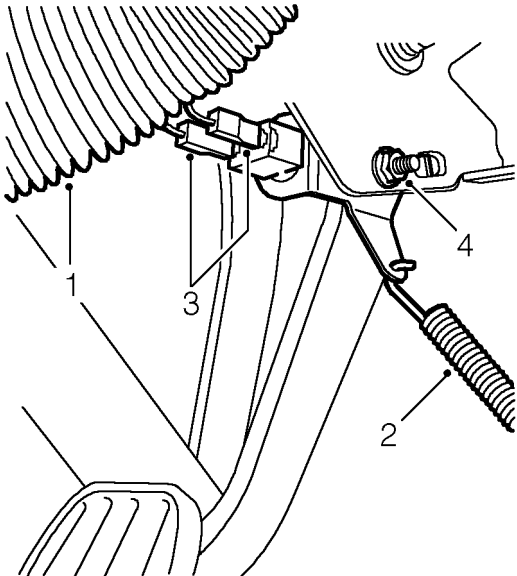
10. Remove bleed tube. Apply brakes and check for leakage.
11. Remove stand(s) and lower vehicle.
12. Road test vehicle. Check brake pedal for short firm travel when brakes are applied.

BRAKES

BRAKE LIGHT SWITCH

Service repair no - 70.35.41

Adjust



70M0694

1. Remove heater air intake hose
2. Disconnect throttle pedal return spring from mounting bracket.
3. Disconnect Lucars from brake light switch.
4. Loosen locknut securing brake light switch bracket to pedal box.
5. Connect an ohmmeter across switch terminals.
6. Adjust position of switch until an open circuit condition exists with the pedal released and a closed circuit condition exists with the pedal depressed.
7. Tighten nut securing brake light switch bracket to pedal box, to 5 Nm.



CAUTION: Ensure the switch does not prevent the brake pedal returning fully.

8. Connect Lucars to brake light switch.
9. Connect throttle pedal return spring to bracket on pedal box.
10. Fit heater air intake hose.



REAR BRAKE DRUM

Service repair no - 70.10.03

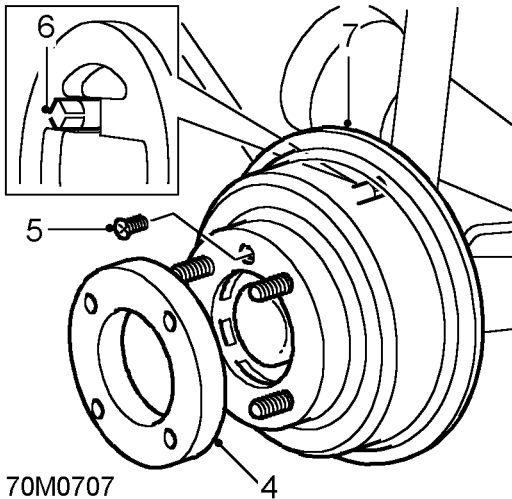
Remove

1. Raise rear of vehicle.



WARNING: Support on safety stands.

2. Remove road wheel(s).
3. Release handbrake.



4. Remove wheel spacer from rear hub.
5. Remove screw securing brake drum to hub.
6. Loosen brake shoe adjuster.
7. Withdraw brake drum from hub.

Inspect

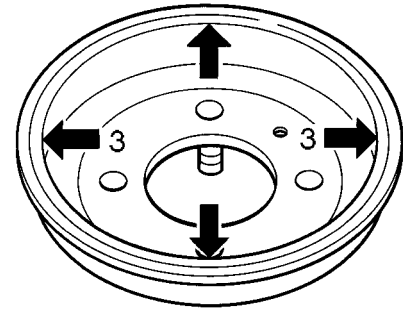
1. Clean backplate and brake drum with brake cleaning fluid.



WARNING: Do not use an air line to blow dust from brake assembly.

Do not use petroleum based fluid as damage will occur to rubber components.

2. Renew brake drum if scored, grooved or cracked.



70M0713

3. Measure inside diameter of drum at 2 points.
Drum internal diameter:
New = 177.75 - 177.85 mm
Service limit = 179 mm
Drum ovality limit = 0.012 mm
Renew drum if outside limits.
4. Examine wheel cylinder dust seals for signs of brake fluid leakage, a certain amount of dampness is usual. However, if free fluid is apparent, lift dust seal and check for excessive leakage.
Renew wheel cylinder if brake linings have become contaminated.
5. Check wheel cylinder pistons for freedom of movement.

Refit

1. Apply Molycote 111 grease to brake shoe and spring contact points.
2. Fit brake drum, tighten screw to 7 Nm.



NOTE: Clean inside of NEW brake drum with brake cleaning fluid.

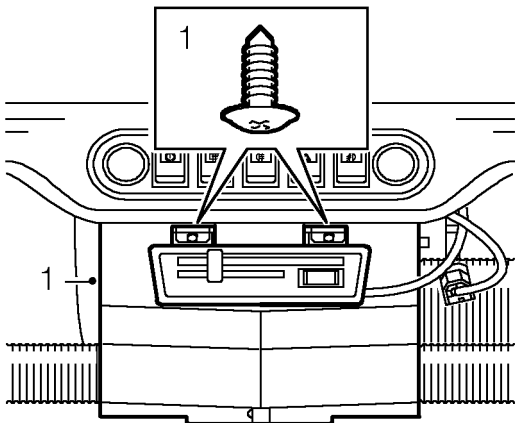
3. Fit wheel spacer to rear hub.
4. Fit road wheel and tighten nuts.
5. Remove stand(s) and lower vehicle.
6. Adjust rear brakes. **See MAINTENANCE**

BRAKES

BRAKE FAILURE WARNING SWITCH

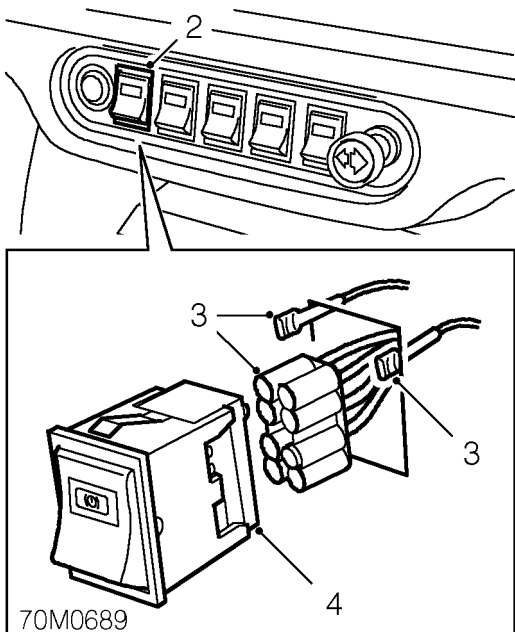
Service repair no - 70.25.09

Remove



86M4241

1. Remove 2 screws securing heater to fascia lower rail and lower heater.



2. Release switch from switch panel.
3. Disconnect multiplug and 2 Lucars from switch.
4. Remove switch.

Refit

1. Position switch to panel.
2. Connect multiplug and Lucars to switch.
3. Fit switch to switch panel.
4. Position heater to fascia rail and secure with screws.

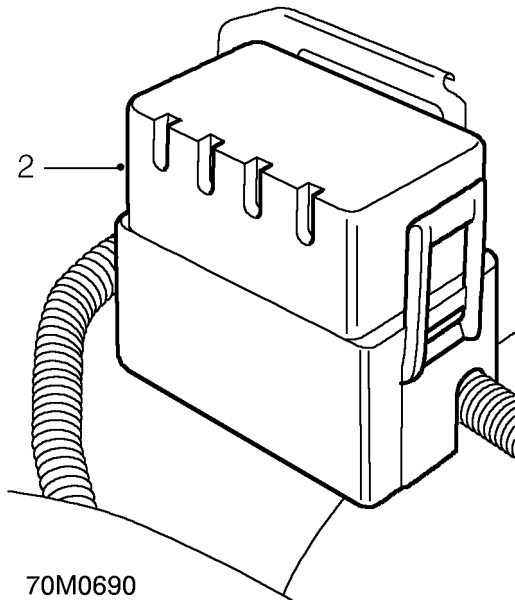


PRESSURE REDUCING VALVE

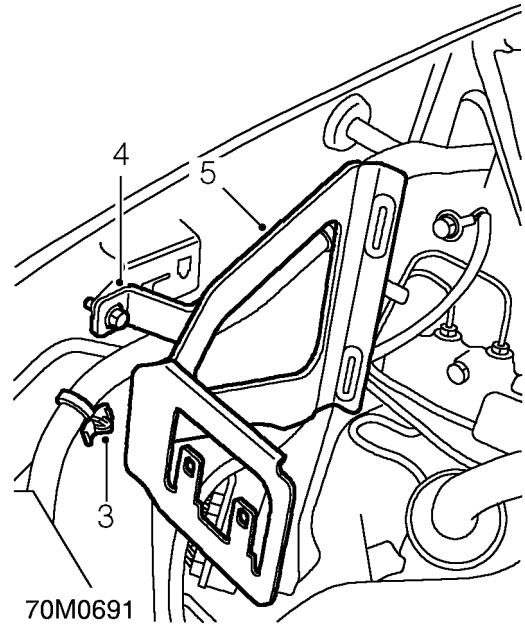
Service repair no - 70.25.21

Remove

1. Remove ECM. See **ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**



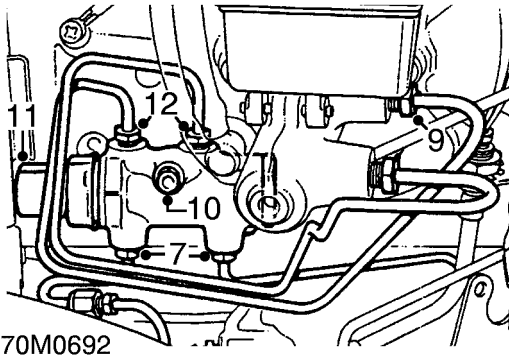
2. Release engine compartment fuse box from ECM mounting bracket.



3. Release clip securing main harness to ECM mounting bracket.
4. Remove bolt securing ECM mounting bracket to body.
5. Release ECM mounting bracket from body and remove.
6. Position cloth beneath valve 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.



7. Loosen unions and disconnect lower brake pipes from valve



CAUTION: Plug the connections.

8. Position cloth under master cylinder to absorb spilled fluid.
9. Loosen unions and disconnect brake pipes from master cylinder.



CAUTION: Plug the connections.

10. Remove bolt securing valve to body.
11. Remove valve and pipes as an assembly.
12. Loosen unions and remove pipes from pressure reducing valve.

Refit

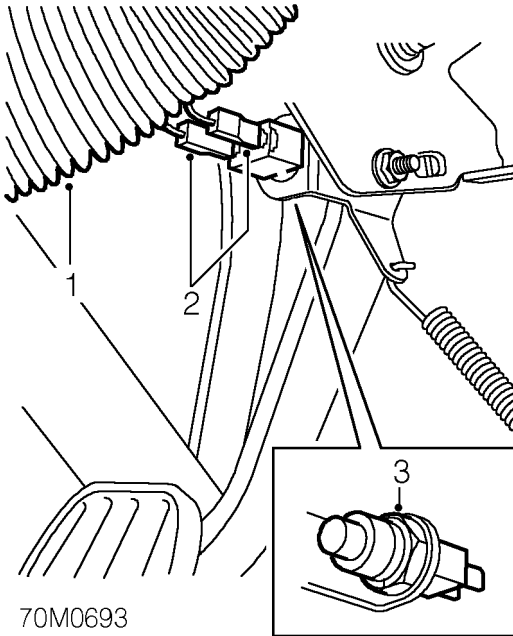
1. Remove blanking plugs from new valve.
2. Clean master cylinder brake pipe and pressure reducing valve unions.
3. Fit pipes to valve and tighten unions. 14 Nm.
4. Position valve and pipe assembly to body, fit bolt and tighten to 17 Nm.
5. Remove plugs from master cylinder.
6. Clean master cylinder and brake pipe unions.
7. Connect pipes to master cylinder and tighten unions to 14 Nm.
8. Connect brake pipes to valve and tighten unions to 14 Nm.
9. Remove cloth positioned to absorb fluid.
10. Locate ECM mounting bracket on body, fit bolt and tighten to 10 Nm.
11. Secure clip on main harness to ECM mounting bracket.
12. Secure engine compartment fuse box to ECM mounting bracket.
13. Fit ECM. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**
14. Bleed brakes. **See Adjustments.**



BRAKE LIGHT SWITCH

Service repair no - 70.35.42

Remove



1. Remove heater air intake hose.
2. Disconnect Lucars from brake light switch.
3. Loosen locknut securing brake light switch to pedal box bracket and remove switch

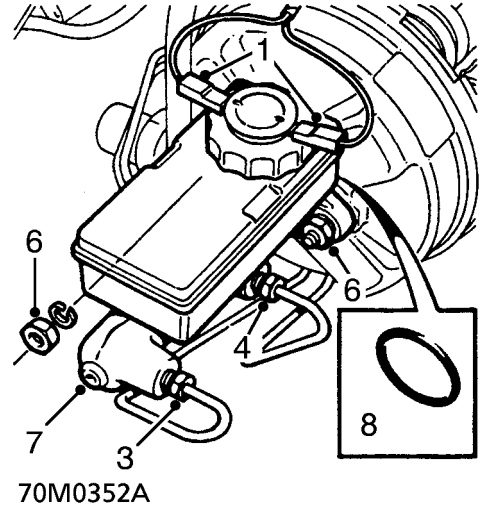
Refit

1. Fit brake light switch and tighten locknut.
2. Adjust brake light switch. **See Adjustments.**

MASTER CYLINDER

Service repair no - 70.30.08

Remove



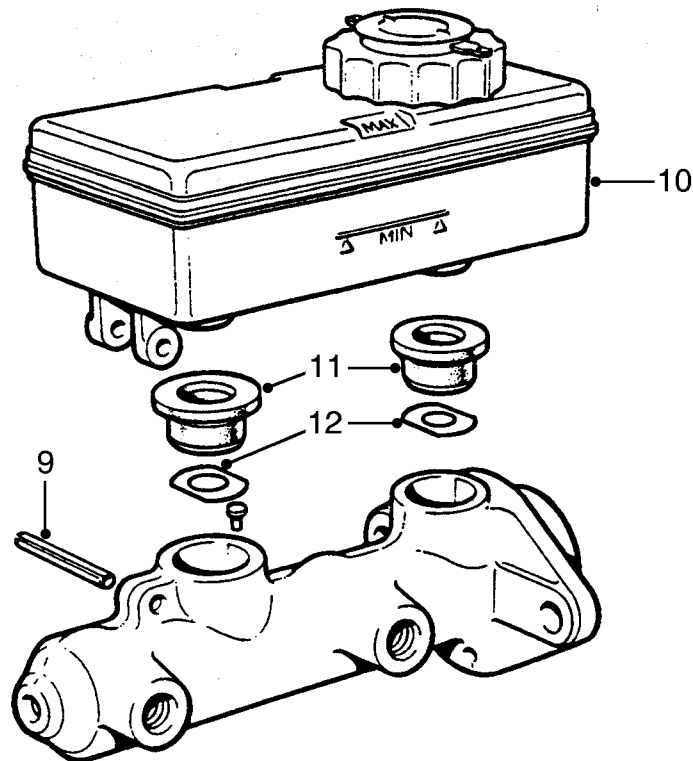
1. Disconnect 2 Lucars from fluid reservoir filler cap.
2. Position cloth under master cylinder to absorb spilled fluid.

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.

3. Loosen union and disconnect secondary system pipe from master cylinder.
4. Loosen union and disconnect primary system pipe from master cylinder.
5. Move brake pipes aside.
6. Remove 2 nuts securing master cylinder to servo.
7. Remove master cylinder.
8. Remove and discard 'O' ring from master cylinder.

BRAKES

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



70M0345A

9. Using a suitably sized, flat ended punch, drive out roll pin securing reservoir to cylinder body.
10. Remove reservoir from master cylinder.
11. Remove 2 sealing washers from reservoir.
12. Extract 2 metal seating washers from master cylinder.
13. Clean 2 metal seating washers and fit to master cylinder.
14. Lubricate 2 new sealing washers with clean brake fluid and fit to reservoir.
15. Fit reservoir to master cylinder and secure with new roll pin.

Refit

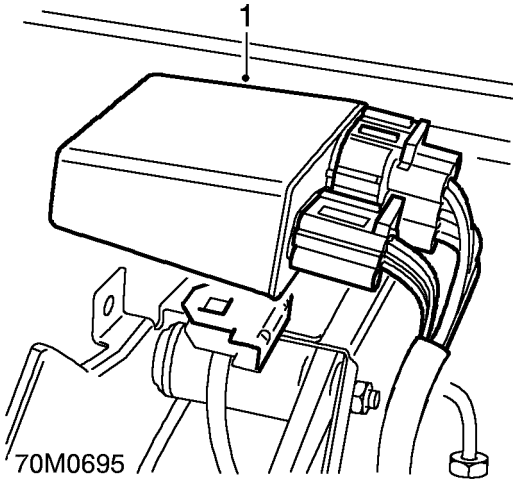
1. Lubricate new 'O' ring with clean brake fluid and fit to master cylinder.
2. Clean mating faces of master cylinder and brake servo.
3. Clean brake servo push rod and lubricate.
4. Locate master cylinder on servo ensuring push rod is correctly seated.
5. Fit nuts securing master cylinder to servo and tighten to 25 Nm.
6. Remove plugs from master cylinder and brake pipes.
7. Clean brake pipe unions.
8. Connect brake pipes to master cylinder and tighten unions to 14 Nm.
9. Connect Lucars to fluid reservoir filler cap.
10. Bleed brake system. **See Adjustments.**



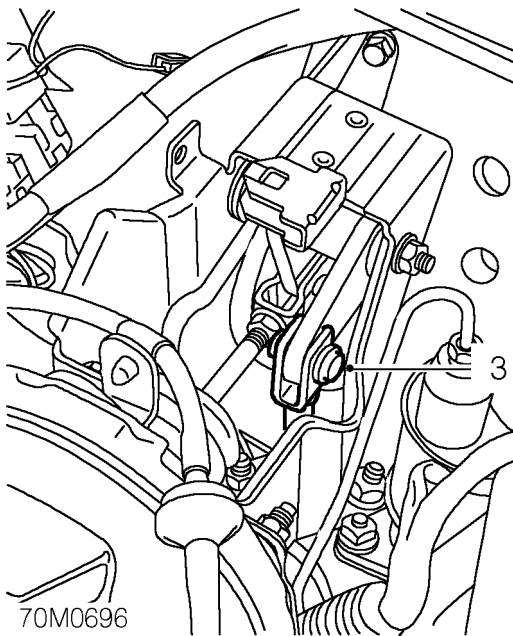
BRAKE PEDAL

Service repair no - 70.35.01

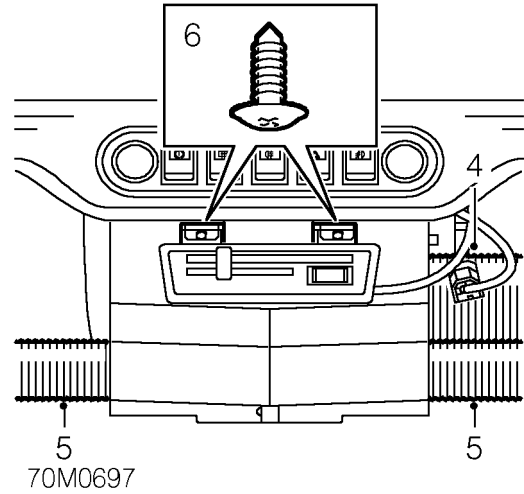
Remove



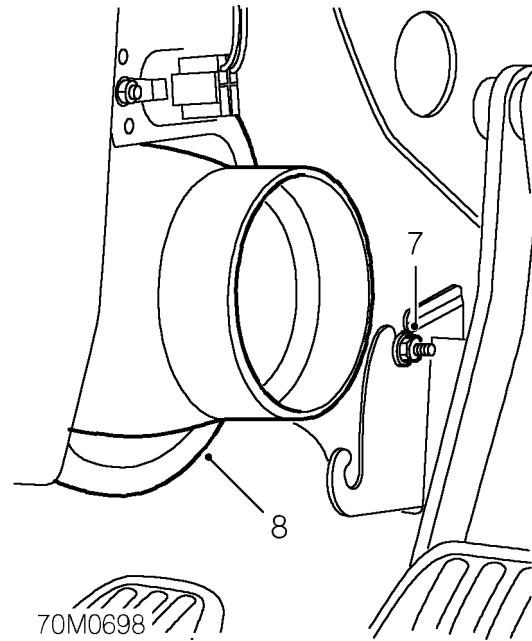
1. Release engine management relay module from mounting bracket.
2. Remove and discard split pin from clevis pin.



3. Remove clevis pin securing brake pedal push rod to fulcrum
4. Remove heater air intake hose.
5. Disconnect demister tubes from heater.

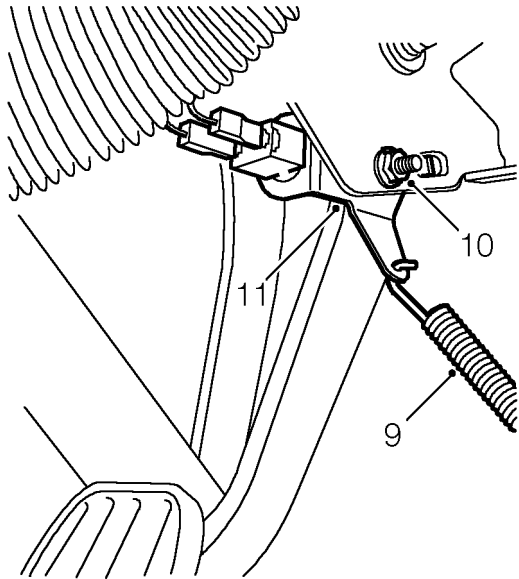


6. Remove 2 screws securing heater to lower fascia rail.



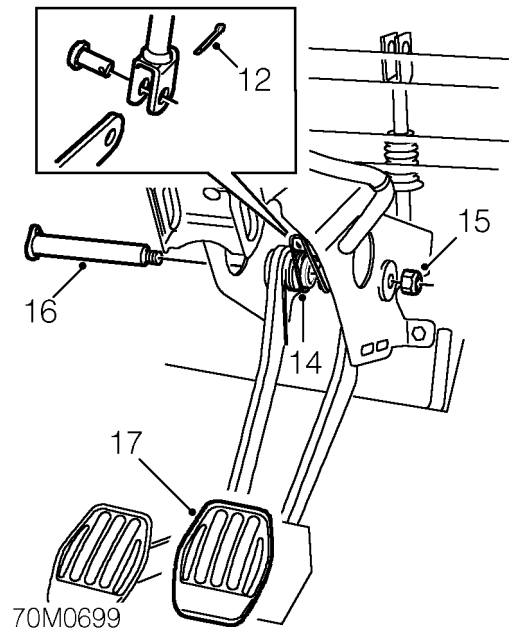
7. Loosen nut securing rear of heater to bulkhead.
8. Release heater and move aside.

BRAKES



70M0700

9. Release throttle pedal return spring from bracket.
10. Remove nut and washer securing brake light switch mounting bracket to pedal box.
11. Release brake light switch mounting bracket from pedal box.



70M0699

12. Remove and discard split pin from clevis pin.
13. Remove clevis pin securing master cylinder push rod to clutch pedal.
14. Release return spring from clutch pedal.
15. Remove nut securing pedal pivot bolt to pedal box.
16. Withdraw pivot bolt from pedal box and remove pedals and return spring.
17. Remove rubber from pedal.



Refit

1. Fit rubber to pedal.
2. Clean pedal bushes and pivot bolt.
3. Lubricate pedal pivot bolt.
4. Position pedals and return spring to pedal box .
5. Align push rods to pedals, fit pedal pivot bolt.



NOTE: Ensure pivot bolt is correctly located.

6. Fit nut securing pivot bolt to pedal box and tighten to 15 Nm.
7. Clean and lubricate clutch master cylinder clevis pin.
8. Align clutch master cylinder push rod to pedal, fit clevis pin and secure with new split pin.
9. Connect return spring to clutch pedal.
10. Position brake light switch mounting bracket to pedal box, fit nut and tighten to 5 Nm.
11. Secure throttle pedal return spring to mounting bracket.
12. Locate heater on bulkhead.
13. Tighten nut securing heater to bulkhead to 9 Nm.
14. Fit and tighten screws securing front of heater to lower fascia rail.
15. Connect demister tubes to heater.
16. Fit heater air intake hose.
17. Align brake pedal push rod to fulcrum, fit clevis pin and secure with NEW split pin.
18. Secure engine management relay module to mounting bracket.
19. Adjust brake light switch. **See Adjustments.**

FRONT BRAKE PADS

Service repair no - 70.40.02

Remove

1. Raise front of vehicle.

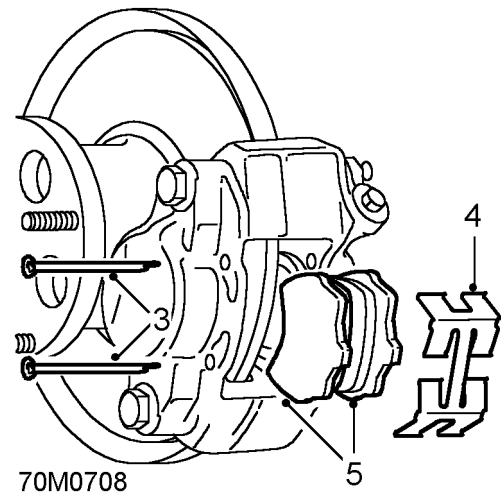


WARNING: Support on safety stands.

2. Remove road wheel(s).



WARNING: Brake pads must be renewed in axle sets only. Braking efficiency may otherwise be impaired.



3. Remove 2 split pins retaining brake pads.
4. Remove brake pad anti-rattle spring.
5. Remove 2 brake pads.

BRAKES

Refit

1. Rotate disc by hand and scrape all scale and rust from around edge of disc.
2. Scrape rust from pad locating surfaces on caliper.
3. Clean dust from calipers using brake cleaning fluid or industrial alcohol.



WARNING: Do not use an air line to blow dust from brake assembly. Do not use petroleum based fluid as damage will occur to rubber components.

4. Position bleed bottle, connect bleed hose to bleed screw and loosen screw.
5. Press piston back into housing.
6. Tighten bleed screw to 9 Nm.
7. Remove bleed bottle.
8. Fit brake pads to caliper.



NOTE: Fit pad with wear indicator on the inside.

9. Position brake pad anti-rattle spring.
10. Fit split pins retaining brake pad anti-rattle spring.
11. Repeat procedure for other side.
12. Fit road wheel and tighten nuts to the correct torque.
13. Remove stand(s) and lower vehicle.
14. Depress brake several times to set pad to disc clearance.
15. Check and top-up brake fluid **See INFORMATION, Capacities, fluids and lubricants.**

REAR BRAKE SHOES

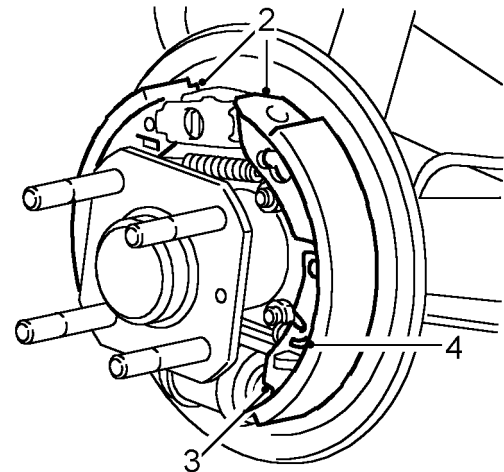
Service repair no - 70.40.03

Remove



WARNING: Brake shoes must be renewed in axle sets only. Braking efficiency may otherwise be impaired.

1. Remove both rear brake drums. **See this section.**



70M0705

2. Release brake shoes from adjuster.
3. Release brake shoes from wheel cylinder and disengage from handbrake lever.

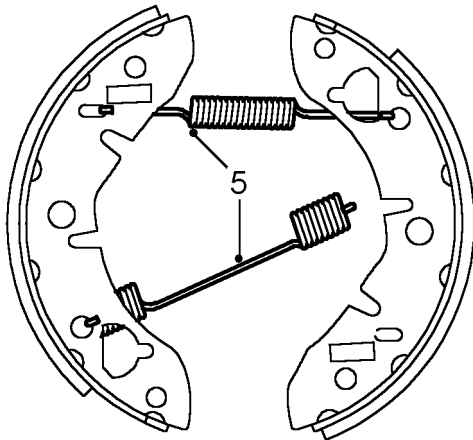


CAUTION: Ensure edges of brake shoes do not damage wheel cylinder dust covers.

4. Release spring from a trailing brake shoe and remove brake shoe assembly



NOTE: The forward shoe is the LEADING shoe, the TRAILING shoe has the handbrake lever attached to it.



70M0706

5. Remove springs from brake shoes.
6. Fit an elastic band around wheel cylinder to retain pistons.

Inspect

1. Clean back plate and drum with brake cleaning fluid.



WARNING: Do not use an air line to blow dust from brake assembly.

Do not use petroleum based fluid as damage will occur to rubber components.

2. Use a wire brush to remove any corrosion taking care not to damage wheel cylinder covers.
3. Inspect all parts for wear or damage.
4. Examine wheel cylinder dust seals for signs of brake fluid leakage, a certain amount of dampness is usual. However, if free fluid is apparent, lift dust shield and check for excessive leakage.
Renew wheel cylinder if brake linings have become contaminated.
5. Check wheel cylinder pistons for freedom of movement.
6. Check condition of springs, renew if necessary.

Refit

1. Lubricate brake shoe contact points with MolyKote 111 grease, ensure grease does not contact linings or dust covers.
2. Fit return springs to leading brake shoe
3. Connect return spring to trailing brake shoe.
4. Position brake shoe assembly to back plate.
5. Remove elastic band from wheel cylinder.
6. Connect return spring to trailing brake shoe.
7. Connect handbrake linkage to trailing brake shoe.
8. Locate brake shoes in slots on wheel cylinder pistons.
9. Locate brakes shoes in slots on adjuster.
10. Fit rear brake drums. **See this section.**

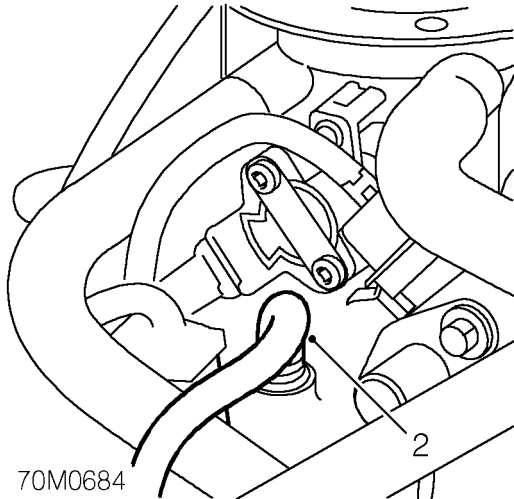
BRAKES

SERVO ASSEMBLY

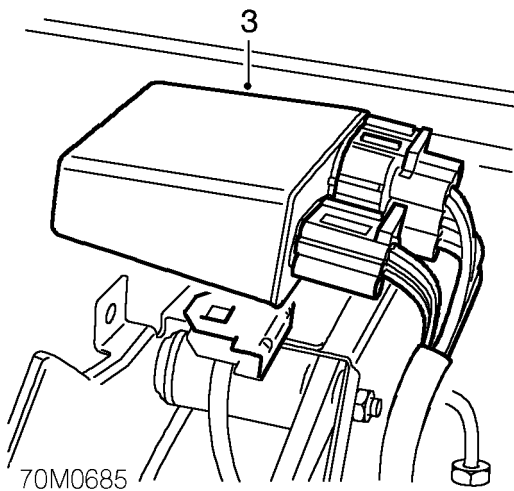
Service repair no - 70.50.01

Remove

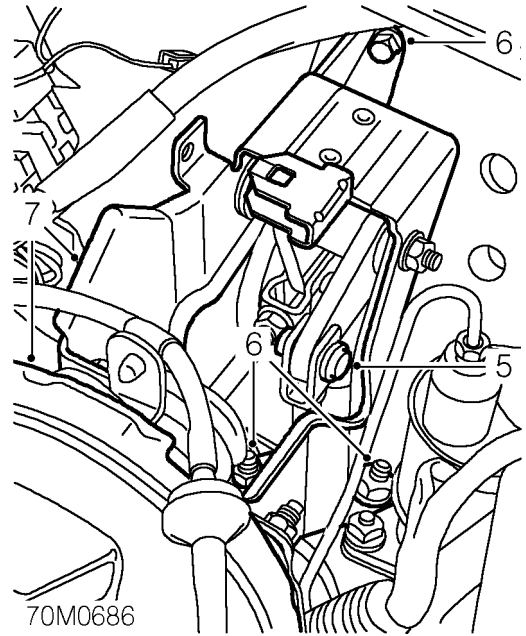
1. Remove master cylinder. **See this section.**



2. Depress plastic collar on quick release connector and disconnect servo vacuum hose from inlet manifold.



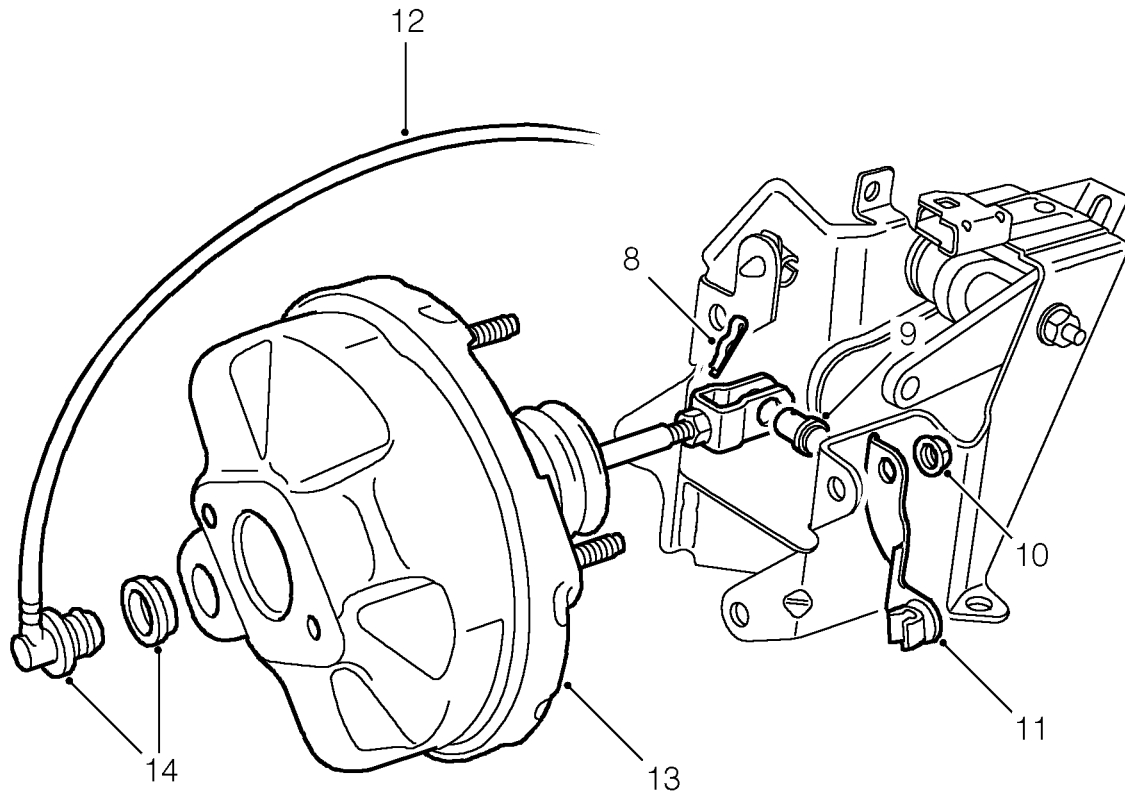
3. Release engine management relay module from mounting bracket.
4. Remove and discard split pin from clevis pin.



5. Remove clevis pin securing brake pedal push rod to fulcrum.
6. Remove bolt and 2 nuts securing servo mounting bracket to body and collect washers.
7. Release and remove servo and mounting bracket assembly.



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



70M0687

8. Remove and discard split pin from clevis pin.
9. Remove clevis pin securing servo push rod to fulcrum.
10. Remove 4 nuts securing servo to mounting bracket.
11. Remove bracket from stud on servo.
12. Release vacuum pipe from clip on mounting bracket.
13. Remove servo from mounting bracket.
14. Remove vacuum pipe from servo and remove sealing rubber.
15. Clean servo.
16. Fit sealing rubber to servo.
17. Fit vacuum pipe to servo.
18. Fit servo to mounting bracket.
19. Fit bracket to stud on servo, fit nuts securing servo to mounting bracket and tighten to 25 Nm.
20. Secure vacuum pipe to clip on mounting bracket.
21. Align servo push rod to fulcrum, fit clevis pin and secure with NEW split pin.

Refit

1. Clean mating faces of servo mounting bracket and bulkhead.
2. Fit servo and mounting bracket assembly to bulkhead.
3. Fit bolt, washers and nuts securing servo mounting bracket to bulkhead and tighten to 25 Nm.
4. Align brake pedal push rod to fulcrum, fit clevis pin and secure with NEW split pin.
5. Secure engine management relay module to mounting bracket.
6. Connect brake servo vacuum pipe to inlet manifold.
7. Fit master cylinder. **See this section.**

BRAKES

FRONT BRAKE CALIPER

Service repair no - 70.55.02

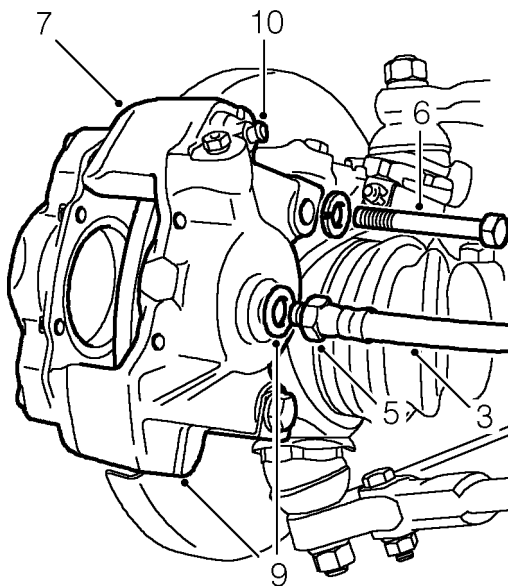
Remove

1. Raise front of vehicle, one side.



WARNING: Support on safety stands.

2. Remove road wheel(s).



70M0709

3. Clamp brake hose to prevent fluid loss.



CAUTION: A brake hose clamp must be used.

4. Remove front brake pads. **See this section.**
5. Loosen union securing brake hose to caliper.
6. Remove 2 bolts securing brake caliper to front hub.
7. Release brake caliper from front hub.
8. Disconnect brake hose from caliper.
9. Remove brake caliper.



CAUTION: Plug the connections.

10. Remove bleed nipple.

Refit

1. Remove plugs from new caliper and fit to old caliper.
2. Ensure bleed nipple is clean and fit to new brake caliper.
3. Remove plug from brake hose and clean union.
4. Fit NEW sealing washer to brake hose union.
5. Position caliper and connect brake hose.
6. Position brake caliper to front hub.
7. Fit bolts securing caliper to hub and tighten to 52 Nm.
8. Tighten brake hose union to 15 Nm.
9. Remove clamp from brake hose.
10. Fit brake pads. **See this section.**
11. Bleed brakes. **See Adjustments.**
12. Fit road wheel.
13. Remove stand(s) and lower vehicle.



REAR WHEEL BRAKE CYLINDER

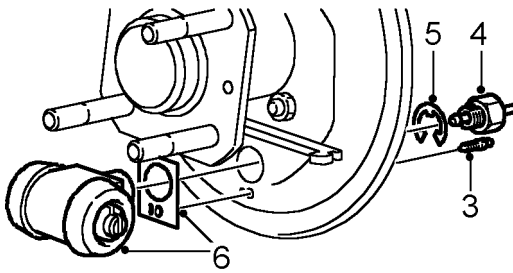
Service repair no - 70.60.19

Remove

1. Remove rear brake shoes. **See this section.**
2. Clamp rear brake hose to prevent fluid loss.



CAUTION: A brake hose clamp must be used.



70M0704

3. Remove bleed nipple.
4. Loosen union and disconnect brake pipe from wheel cylinder.



CAUTION: Plug the connections.

5. Remove 'C' clip securing wheel cylinder to back plate.
6. Remove wheel cylinder and discard gasket.

Refit

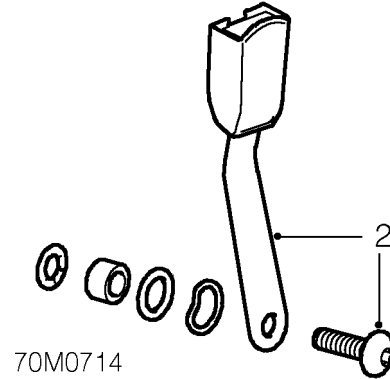
1. Clean mating faces of cylinder and backplate.
2. Remove plugs from new cylinder and fit to old cylinder.
3. Using a new gasket position wheel cylinder to back plate and secure with clip.
4. Remove plug from brake pipe and clean brake pipe union.
5. Connect brake pipe to wheel cylinder and tighten union to 14 Nm.
6. Ensure bleed nipple is clean and hole is clear.
7. Fit bleed nipple and tighten 9 Nm.
8. Remove brake hose clamp.
9. Fit rear brake shoes. **See this section.**
10. Bleed brakes. **See Adjustments.**

HANDBRAKE CABLE - FRONT

Service repair no - 70.35.14.

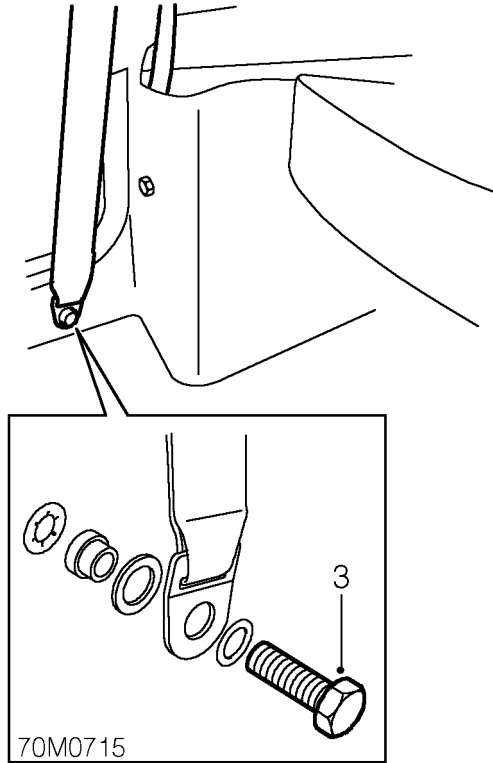
Remove

1. Remove drivers front seat. **See BODY, Seats and seat belts.**

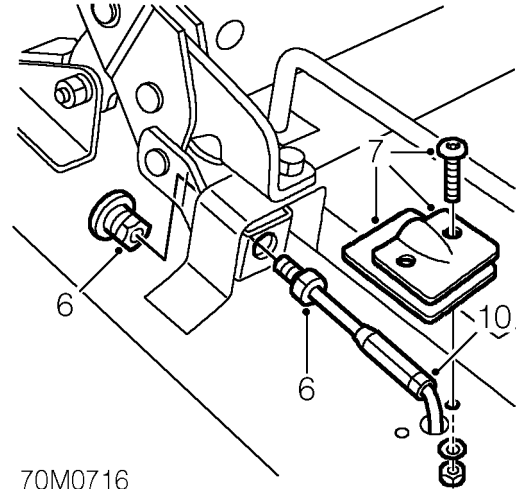


70M0714

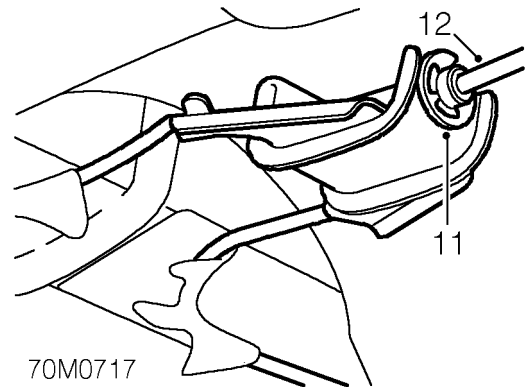
2. Remove Torx screw securing seat belt stalk to body and remove stalk.



3. Remove seat belt lower mounting bolt and collect spacer and washers.
4. Release carpet from door seal and clips on bulkhead.
5. Fold back carpet to access handbrake lever.



6. Loosen locknut, unscrew cable adjusting nut and release cable from handbrake lever.
7. Remove 2 screws securing cable guide plate to body, remove guide plate and seal.
8. Remove locknut from cable.
9. Remove intermediate pipe heat shield. **See MANIFOLD & EXHAUST SYSTEMS, Repairs.**
10. Withdraw cable through floor.



11. Remove clip retaining cable to compensator.
12. Disconnect cable from compensator and remove handbrake cable.



Refit

1. Connect cable to compensator and secure with clip.
2. Feed cable into vehicle.
3. Fit intermediate pipe heat shield. **See** *MANIFOLD & EXHAUST SYSTEMS, Repairs.*
4. Fit locknut to cable.
5. Position cable guide plate and seal, secure with screws.
6. Connect cable to handbrake lever and fit cable adjusting nut.
7. Adjust handbrake. **See** *Adjustments.*
8. Position carpet and secure to door seal and clips on bulkhead.
9. Extend seat belt and align to lower mounting. Fit lower mounting bolt, spacers and washers and tighten to 30 Nm.
10. Position seat belt stalk, spacer and washers, fit Torx bolt and tighten to 32 Nm.
11. Fit drivers front seat. **See** *BODY, Seats and seat belts.*

CONTENTS

Page

DESCRIPTION AND OPERATION

COMPONENT LOCATION	1
DESCRIPTION	2
OPERATION	3

PRECAUTIONS

PRECAUTIONS	1
WARNING LABELS	4
AIRBAG AND PRE-TENSIONER, MANUAL DEPLOYMENT	6

REPAIRS

DRIVERS AIR BAG MODULE	1
FRONT SEAT BELT PRE-TENSIONER	2
SRS AND DIAGNOSTIC CONTROL UNIT	3
SUPPLEMENTARY RESTRAINT SYSTEM HARNESS	4

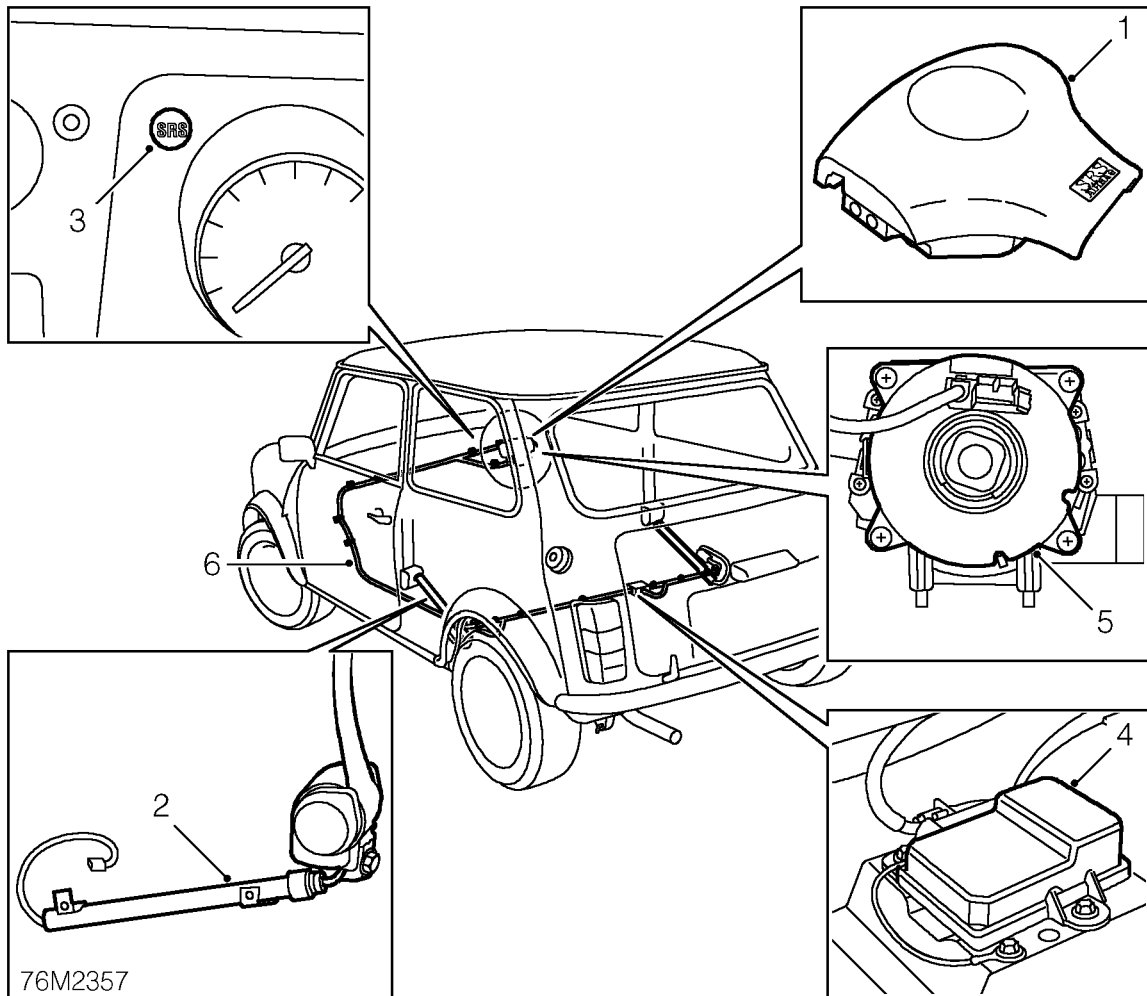




COMPONENT LOCATION



NOTE: LHD type is symmetrical to RHD type.



- 1. Driver's airbag module *
- 2. Seat belt pre-tensioners *
- 3. SRS warning lamp
- 4. Diagnostic control unit *
- 5. Rotary coupler *
- 6. SRS harness (YELLOW) *

* Components to be renewed following system deployment.



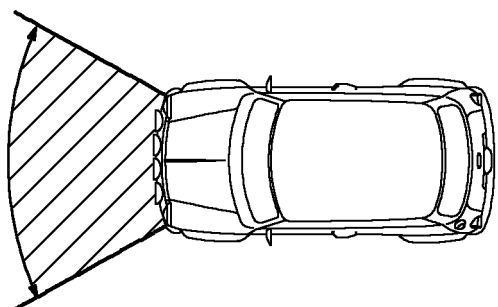
NOTE: Following deployment of the Supplementary Restraint System (SRS) within the vehicle, under any circumstances, all system components including the yellow harnesses MUST be replaced.

RESTRAINT SYSTEMS

DESCRIPTION



76M2358




76M2359

The airbag Supplementary Restraint System (SRS) is a safety device which, when deployed in the event of a severe frontal impact, provides additional protection to the driver's face and upper torso. The airbag is designed to inflate when the vehicle is exceeding a set speed and receives a frontal impact within the area shaded.

The pre-tensioner consists of the seat belt buckle and stalk, a piston and a pyrotechnic device. The pre-tensioners, fitted to both driver and passenger seat belt mechanisms are designed to remove any play in the the lap and diagonal belts in the event of a severe frontal impact.

OPERATION

 **CAUTION: The diagnostic control unit is a non-serviceable component and no attempt should be made to repair or modify the unit.**

The diagnostic control unit (DCU) which is mounted within the passenger compartment performs two functions:

1. It continually monitors the airbag system for faults;
2. It provides a fire signal to the airbag and pre-tensioners in the event of a crash.

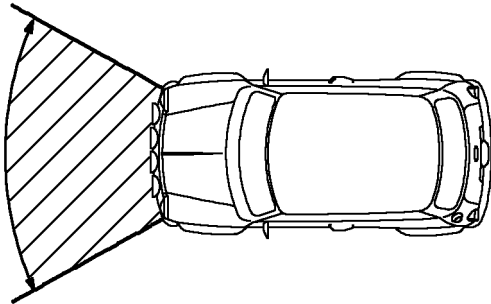
The SRS warning lamp illuminates to inform the driver of any airbag system faults and during a system self test.

The diagnostic control unit comprises of the following circuits which control the airbag system:

1. The crash sensor determines the severity of any impact and can discriminate between rough road conditions and an actual crash.
2. The safing sensor is wired in series with the crash sensor. The fire signal from the crash sensor therefore, passes through the safing sensor which confirms a crash is taking place.
3. The regulator circuit maintains stability of the system in the event of battery voltage drop.
4. The back-up power supply provides power to the system in the event of the battery being damaged or disconnected during the impact.



Airbag

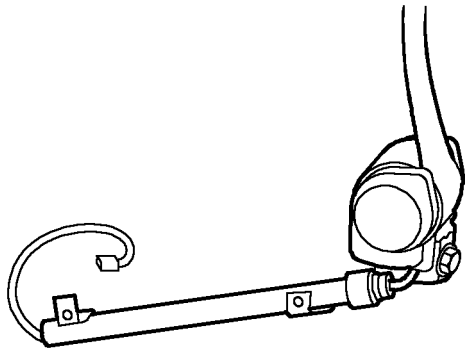


76M2359

When triggered, the fire signal from the diagnostic control unit passes via the airbag harness to the airbag module. Grains of Nitrocellulose and Nitroglycerine inside the airbag module, ignite and combine in a chemical reaction to form a large amount of Nitrogen gas, leading to inflation of the airbag in approximately 30 milli-seconds.

As the driver moves forward into the airbag it rapidly deflates to provide progressive deceleration and reduce the risk of injuries.

Seat belt pre-tensioners



76M2360

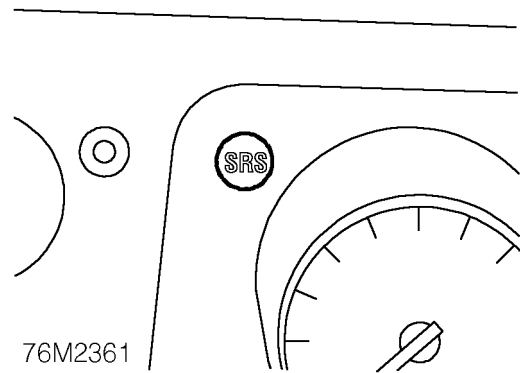
The front seat belt reels are linked by cables to gas generators housed within remote steel tubes. The generators are driven by small quantities of nitrocellulose. On receiving a fire signal from the DCU, the generators deploy to force pistons down the steel tubes, pulling the cables tight. The cables are connected to the seat belt reels which in turn pull the seat belts tight, reducing any slack in the belts.

Sequence of operation:

1. The main sensor and the safing sensor detect crash conditions.
2. The DCU supplies an electrical pulse to the airbag igniter and pre-tensioners.
3. Airbag and pre-tensioners deploy.

It takes about 0.1 seconds from the beginning of the airbag deployment until it is completely deflated.

System check



76M2361

The SRS warning lamp, located on the fascia, illuminates when the electrical circuits are switched on whilst the system performs a self diagnosis test. If the system finds no fault during self diagnosis the light will extinguish after approximately 5 seconds and remain extinguished.

In the event of a fault in the system, the warning light will either:

1. Illuminate continuously;
2. Illuminate for 0.5 second, extinguish, then illuminate continuously;
3. Fail to illuminate during the self diagnosis test.

Fault diagnosis

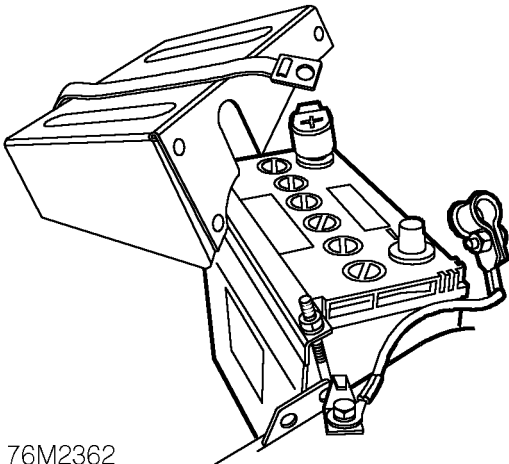
Diagnosis is accomplished using TestBook connected to the vehicle diagnostic connector which is located on a bracket by the foot pedals.



PRECAUTIONS

Making the system safe

- Always disconnect the battery and wait 10 minutes to allow the SRS back-up circuit to fully discharge before commencing work on the airbag system.



76M2362

- Always disconnect both battery leads, earth lead first before commencing work.

Care Points

ALWAYS:

- Carefully inspect any SRS part before installation.
- Use a digital circuit tester to check the system.



WARNING: Using an analogue circuit tester may cause an accidental deployment and possible injury.

- Check SRS harness is correctly routed.
- Check SRS connectors are mated correctly after completion of work.



76M2363

NEVER:

- Drop any component.



NOTE: The airbag diagnostic control unit is a shock sensitive device and must be handled with extreme care.

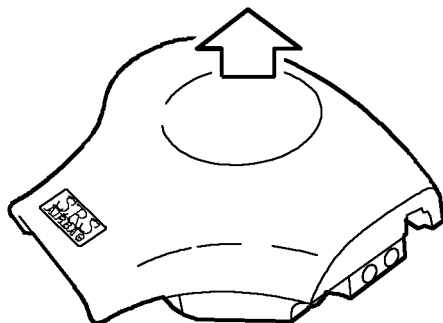
- Wrap arms around an airbag module.
- Attach anything to the airbag cover.
- Attempt to repair any component.
- Apply electrical power to a component except as part of an approved test procedure.
- Transport airbag modules in the passenger compartment of a car.
- Install any SRS component that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.
- Install used SRS parts from another car. When repairing an SRS, use only genuine new parts.

RESTRAINT SYSTEMS

Handling and Storage

- Do not try to disassemble the airbag assembly or pretensioner. They have no serviceable parts. Once an airbag or pre-tensioner has been deployed, it cannot be repaired or reused.
- Do not carry a seat belt pre-tensioner assembly by the electrical lead, or allow the reel or tube to hang on the flexible link.
- Be careful that the airbag assembly receives no strong shocks; it could deploy.
- Special bolts are necessary for installing the airbag assembly. Do not use other bolts.


Airbag storage



76M2364

For temporary storage of the airbag assembly during service, observe the following precautions:

- Always keep components dry.
- Always carry the airbag module with the pad surface face up.
- Store the removed airbag assembly with the pad surface face up.
- Do not allow anything to rest on the airbag module.
- Place the airbag module in a designated storage area.

 **WARNING: If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.**

- Store the removed airbag assembly on a secure flat surface away from any electrical equipment or high heat source (exceeding 85°C/185°F) and free of any oil, grease, detergent or water.



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

Overnight storage

Airbag modules are classed as explosive articles and as such must be stored in an approved secure steel cabinet which has been registered by the local authority.

Seat belt pre-tensioner storage

For temporary storage of the seat belt pre-tensioner during service, observe the following precautions:

- Place the pre-tensioner in designated storage area.
- Store the removed pre-tensioner on a secure, flat surface away from heat, oil, grease, detergent or water.



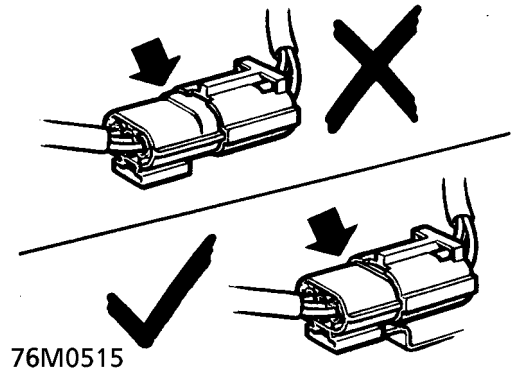
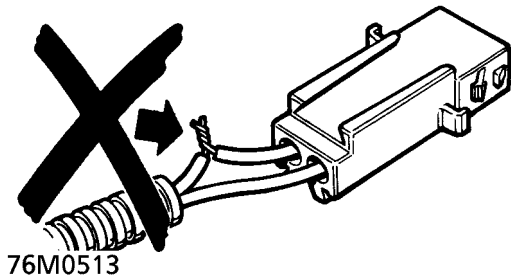
CAUTION: Improper handling or storage can damage the pre-tensioner assembly. If damage is suspected, install a new assembly.

Overnight storage


The seat belt pre-tensioners are classed as explosive articles and as such must be stored in an approved secure steel cabinet which has been registered by the local authority.

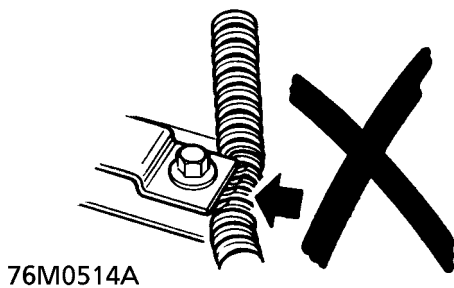


Wiring and connectors



- 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 interferes electrically with the airbag harness.
- Ensure all airbag harness connectors are mated correctly and securely fastened. Do not leave the connectors hanging loose.

 **NOTE: SRS wiring can be identified by special yellow outer protective covering.**



- Always ensure SRS harnesses are routed correctly. Be careful to avoid trapping or pinching the SRS harness. Look out for possible points of chafing.
- Always use specified earth fixings tightened to the correct torque. Poor earthing can cause intermittent problems that are difficult to diagnose.

RESTRAINT SYSTEMS

WARNING LABELS



76M2365

A combination of symbols/icons is displayed (either in a suitable, prominent position or is attached to the component itself) to indicate:

- (a) The need for caution when working in close proximity to SRS components.
- (b) The publication where suitable reference and advice can be found (usually Workshop Manual or Owner's Handbook).

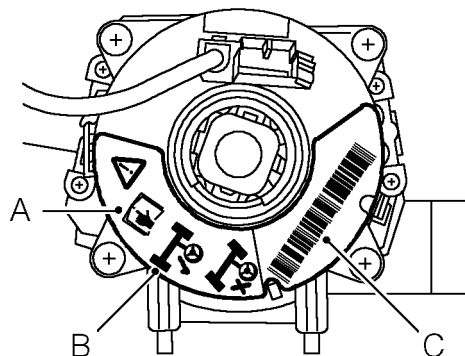


NOTE: It is imperative that before any work is undertaken on the SRS system, the appropriate publication is read thoroughly.

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

1. Front windscreen

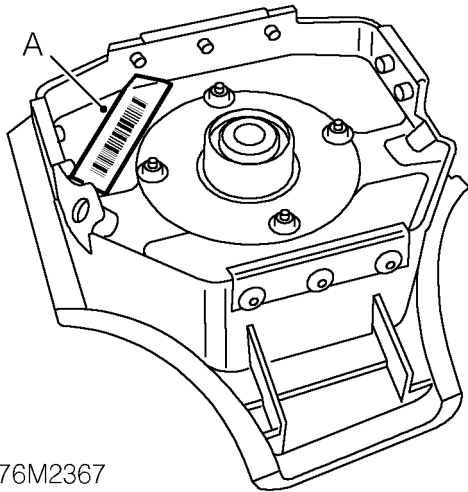
Refer to the Owner's Handbook for information on the airbag system.



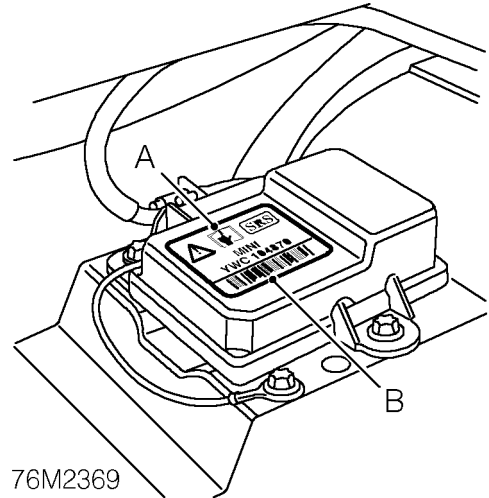
76M2366

2. Rotary coupler

- A** - Refer to the Workshop Manual for detailed instructions.
- B** - Ensure wheels are in the straight ahead position before removal and refitting.
- C** - ROVER Part Number/Bar code - The code must be recorded and quoted for ordering purposes.



76M2367



76M2369

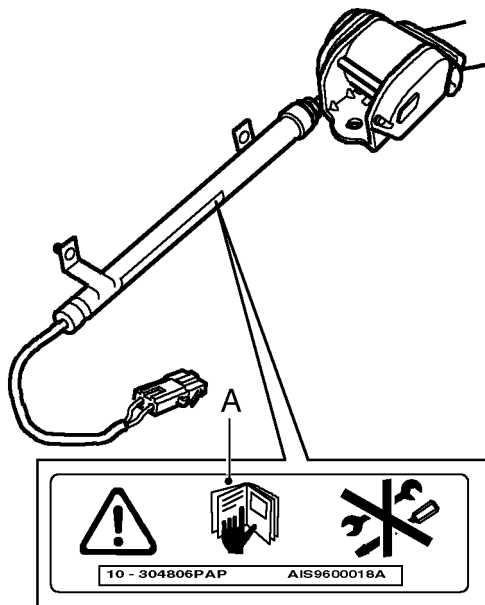
3. Airbag module

A - ROVER Part Number/Bar code - If the airbag module is to be replaced, the code must be recorded and quoted for ordering purposes.

5. Diagnostic control unit.

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

B - ROVER Part Number/Bar Code - If the airbag diagnostic control unit is to be replaced, the code must be recorded and quoted for ordering purposes.



76M2368

4. Seat belt pre-tensioner

A - Refer to the Workshop Manual for detailed instructions. DO NOT attempt to disassemble.

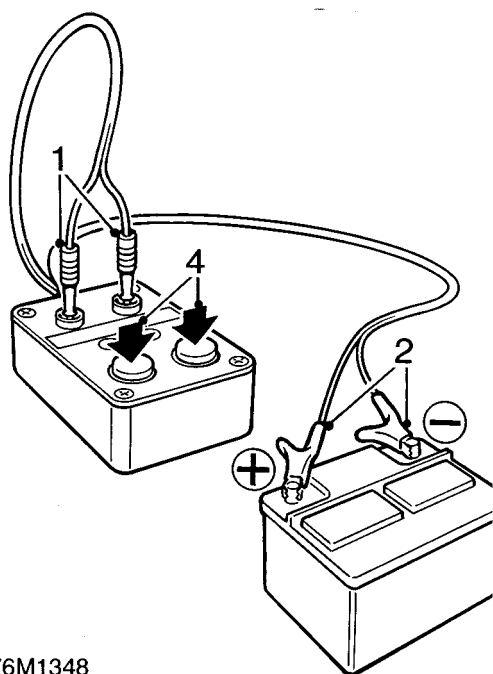
RESTRAINT SYSTEMS

AIRBAG AND PRE-TENSIONER, MANUAL DEPLOYMENT

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 4082/1 self test procedure



76M1348

1. Insert blue and yellow connectors of tool lead into corresponding sockets on face of tool.
2. Connect crocodile clips of second tool lead to battery, red to positive and black to negative.
3. Red "READY" light should illuminate.
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 tool from battery.
9. Disconnect blue and yellow connectors from tool face sockets.
10. Self test now complete.

Deployment of pre-tensioner fitted to vehicle

These guidelines are written to aid authorised personnel to carry out the safe disposal of the pre-tensioner.



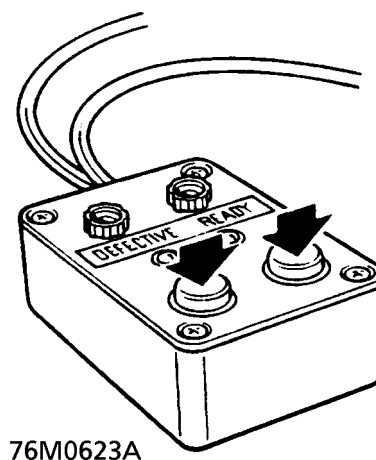
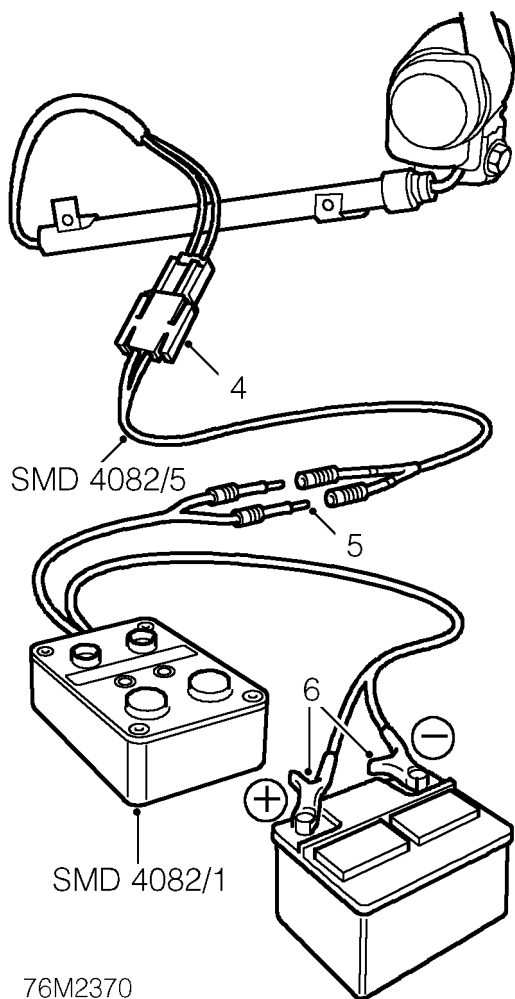
WARNING:

- Only use the Rover approved deployment equipment.
- Deploy pre-tensioner in a designated area.
- Ensure pre-tensioner is not damaged or ruptured before deploying.
- Notify relevant authorities.

1. Carry out deployment tool self test.
2. Remove 3 screws securing rear cubby hole cover to body and remove cover.
3. Disconnect pre-tensioner harness connector.



WARNING: Ensure deployment tool SMD 4082/1 is not connected to battery.



7. Press both operating buttons to deploy pre-tensioner.
8. DO NOT return to the vehicle for 5 minutes.
9. Using gloves, remove pre-tensioner from body, place pre-tensioner in plastic bag, and seal bag.
10. Transport deployed pre-tensioner to designated area for incineration.

NOTE: DO NOT transport pre-tensioner in the vehicle passenger compartment.

4. Connect flylead **SMD 4082/5** to pre-tensioner connector.
5. Connect flylead **SMD 4082/5** to tool **SMD 4082/1**.
6. Connect tool **SMD 4082/1** to battery.

WARNING: Ensure all personnel are standing at least 15 metres away from vehicle.

RESTRAINT SYSTEMS

Deployment of pre-tensioner removed from vehicle

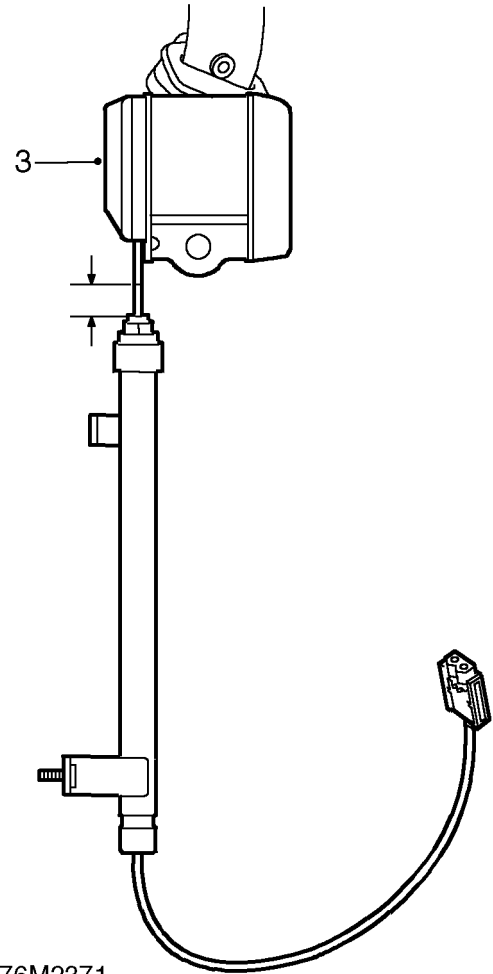
These guidelines are written to aid authorised personnel to carry out the safe disposal of the pre-tensioner.



WARNING:

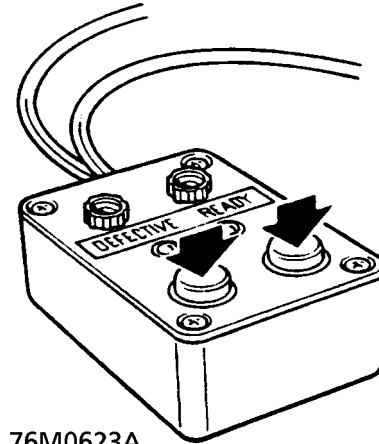
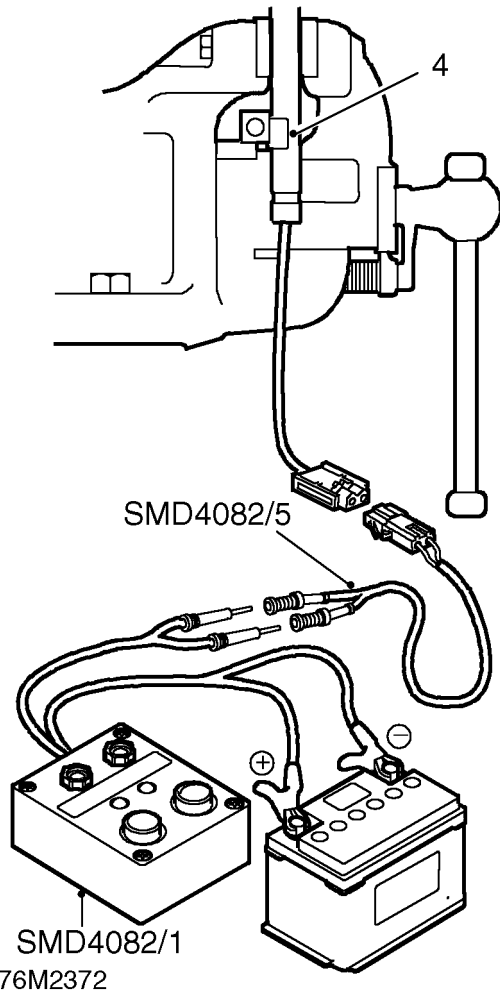
- Only use the Rover approved deployment equipment.
- Deploy pre-tensioner in a designated area.
- Ensure pre-tensioner is not damaged or ruptured before deploying.
- Notify relevant authorities.

1. Carry out deployment tool self test.
2. Remove seat belt pre-tensioner from vehicle.
See Repairs.



76M2371

3. Remove reel from gas generator by cutting flexible link approximately 10 mm from end of gas generator tube.



76M0623A

- Position gas generator tube vertically in vice with fly lead at bottom and tube bracket positioned on vice side to prevent tube being forced out of vice. Tighten vice to hold tube rigid and secure. DO NOT OVERTIGHTEN.

WARNING: Ensure deployment tool SMD 4082/1 is not connected to battery.

- Connect flylead SMD 4082/5 to pre-tensioner connector.
- Connect flylead SMD 4082/5 to tool SMD 4082/1.

WARNING: Do not lean over gas generator tube whilst connecting.

- Connect tool SMD 4082/1 to battery.

WARNING: Ensure all personnel are standing at least 15 metres away from vehicle.

- Press both operating buttons to deploy pre-tensioner.
- DO NOT return to the vehicle for 5 minutes.

WARNING: If a suspected 'live' unit fails to deploy using the above procedure, store the unit in accordance to the Storage Procedures outlined in this section and inform Rover Group.

- Using gloves, remove pre-tensioner from vice, place pre-tensioner in plastic bag, and seal bag.
- Transport deployed pre-tensioner to designated area for incineration.

NOTE: DO NOT transport pre-tensioner in the vehicle passenger compartment.

- Scrap all remaining parts of pre-tensioner assembly. DO NOT re-use or salvage any parts of the pre-tensioner assembly.

RESTRAINT SYSTEMS

Deployment of airbag module

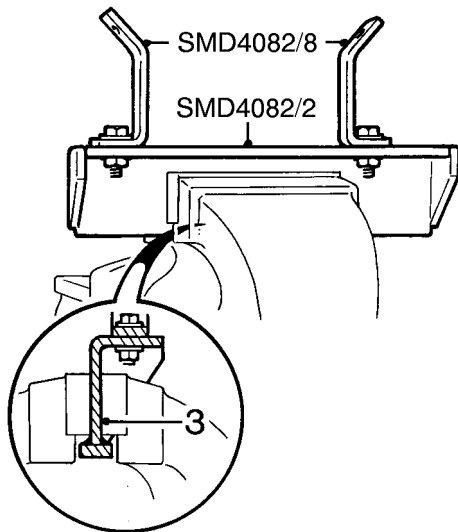
These guidelines are written to aid authorised personnel to carry out the safe disposal of airbag modules when removed from the vehicle.



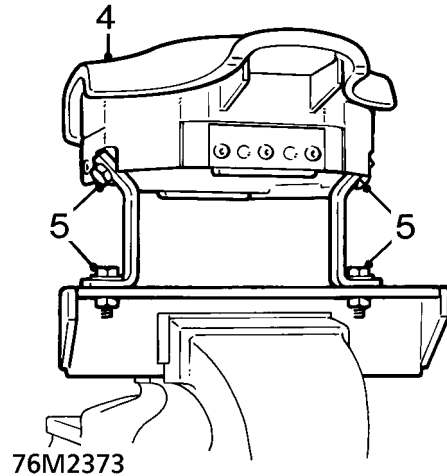
WARNING:

- Only use the Rover approved deployment equipment.
- Deploy airbag modules in a well ventilated designated area.
- Ensure airbag module is not damaged or ruptured before deploying.
- Notify relevant authorities.

1. Carry out deployment tool self test.
2. Remove airbag module from steering wheel.
See Repairs.



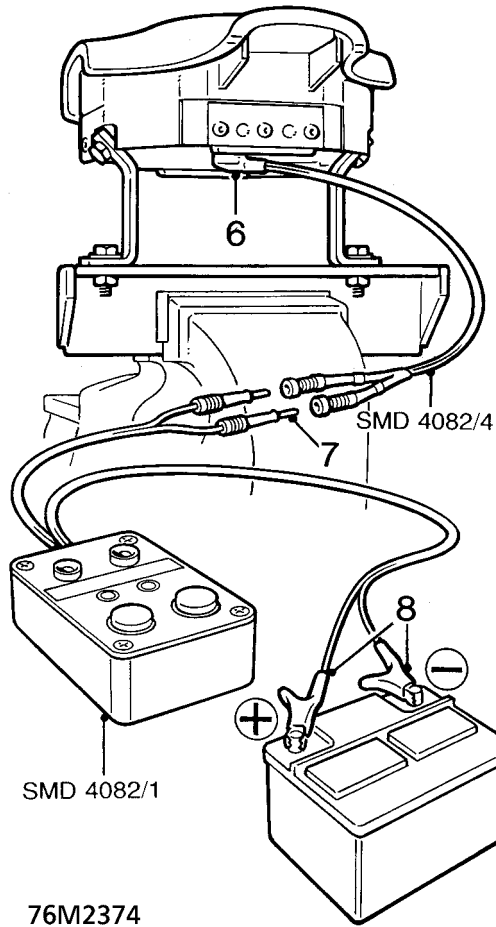
3. Position tool **SMD 4082/2** in vice, ensuring that vice jaws grip tool above bottom flange to prevent possibility of tool being forced upwards from vice. Tighten vice.



4. Secure airbag module to tool **SMD 4082/2**. Ensure module is correctly secured using both fixings.
5. Ensure airbag module mounting brackets are secure.



WARNING: Ensure deployment tool SMD 4082/1 is not connected to battery.

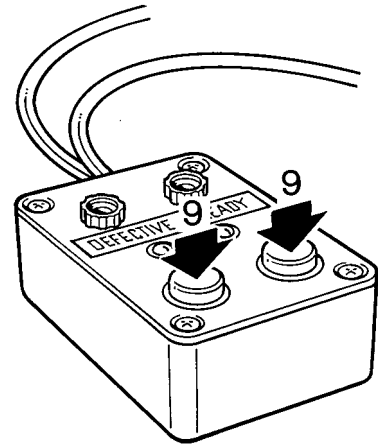


6. Connect flylead **SMD 4082/4** to airbag module.
7. Connect flylead **SMD 4082/4** to tool **SMD 4082/1**.

WARNING: Do not lean over airbag module whilst connecting.

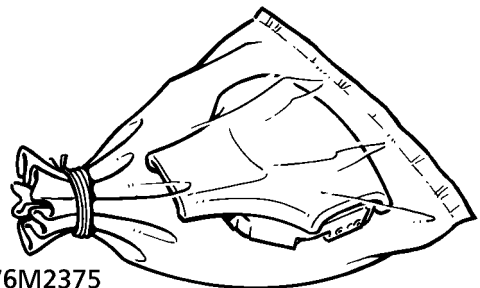
8. Connect tool **SMD 4082/1** to battery.

WARNING: Ensure all personnel are standing at least 15 metres away from module.



76M1352

9. Press both operating buttons to deploy airbag module.
10. **DO NOT** return to airbag module for 30 minutes.



76M2375

11. Using gloves and face mask, remove airbag module from tool, place airbag module in plastic bag, and seal bag.
12. Wipe down tool with damp cloth.
13. Transport deployed airbag module to designated area for incineration.

NOTE: DO NOT transport airbag module in the vehicle passenger compartment.

14. Scrap all remaining parts of airbag system. **DO NOT** re-use or salvage any parts of the airbag system.



DRIVERS AIRBAG MODULE

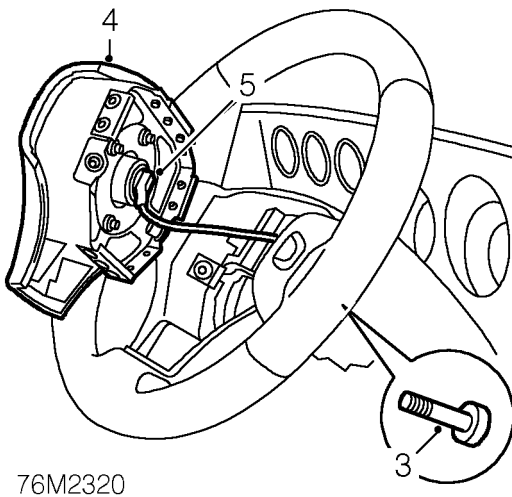
Service repair no - 76.73.71



CAUTION: See safety precautions before commencement of repair.

Remove

1. Remove key from starter switch, disconnect both battery leads, earth lead first, and wait 10 minutes for the SRS back-up power circuit to discharge before commencing work.



2. Remove 2 Torx bolts securing the air bag 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 harness connector 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 section.



NOTE: If the air bag module is to be replaced, the bar code must be recorded.

Refit

1. Position air bag module and make connection with harness upwards as shown in illustration.
2. Fit air bag to steering wheel and hand start the 2 Torx screws. Tighten screws to 7 Nm.
3. Connect battery leads, earth lead last.
4. Carry out system check by turning the ignition on and checking that the SRS warning light illuminates then extinguishes after 3 seconds.

RESTRAINT SYSTEMS

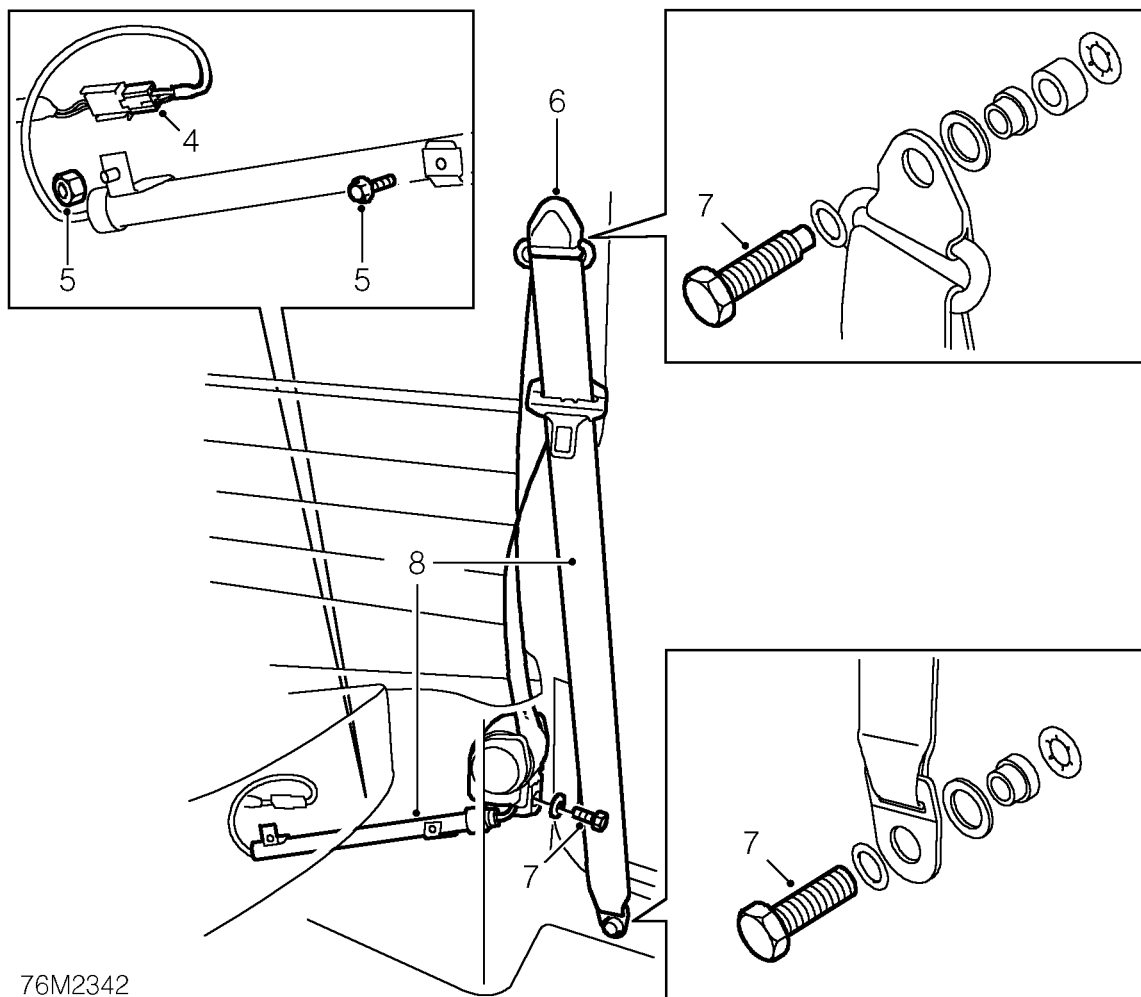
FRONT SEAT BELT PRE-TENSIONER

Service repair no - 76.73.31



WARNING: SRS safety procedures must be followed and ALL precautions observed. See Precautions.

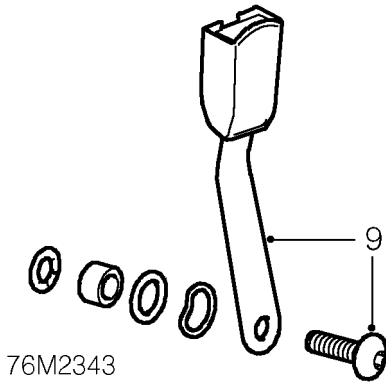
Replace pre-tensioner every 15 years.



76M2342

Remove

1. Remove key from starter switch.
2. Disconnect both battery leads, earth lead first, and wait 10 minutes for the SRS back-up power circuit to discharge before commencing work.
3. Remove rear quarter companion box. **See BODY, Interior trim components.**
4. Release multiplug from body and disconnect pre-tensioner harness multiplug.
5. Remove nut and bolt securing pre-tensioner to body.
6. Remove cover from seat belt upper securing bolt.
7. Remove 3 bolts securing seat belt to body, collect spacers and washers.
8. Remove seat belt and pre-tensioner assembly.



76M2343

9. Remove Torx screw securing seat belt stalk and remove stalk.

Refit

1. Position seat belt stalk, spacer and washers, fit Torx bolt and tighten to 32 Nm.
2. Position seat belt and pre-tensioner assembly to body, fit and tighten bolt to 30 Nm.
3. Extend seat belt and align to upper mounting. Fit upper mounting bolt, spacer and washers and tighten to 32 Nm.
4. Fit cover to upper seat belt securing bolt.
5. Extend seat belt and align to lower mounting. Fit lower mounting bolt, spacer and washers and tighten to 30 Nm.
6. Fit nut and screw securing pre-tensioner to body. Tighten nut to 6 Nm and screw to 1.5 Nm.
7. Connect multiplug to pre-tensioner harness and secure to bracket on body.
8. Fit rear quarter companion box. **See BODY, Interior trim components.**
9. Connect both battery leads, earth lead last.
10. Carry out system check by turning ignition on and check that the SRS warning light illuminates then extinguishes after 3 seconds.

SRS AND DIAGNOSTIC CONTROL UNIT

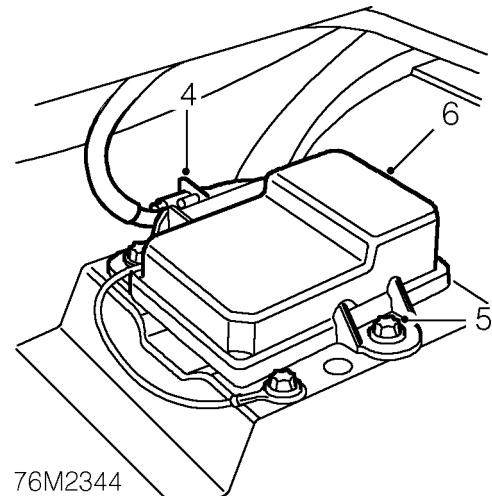
Service repair no - 76.73.72

Remove



CAUTION: See safety precautions before commencement of repair.

1. Remove key from starter switch, disconnect both battery leads, earth lead first, and wait 10 minutes for the SRS back-up power circuit to discharge before starting work.
2. Slide drivers seat forward and fold down squab.
3. Release carpet from under rear seat for access to SRS control unit.



76M2344

4. Disconnect multiplug from control unit.
5. Remove and discard 3 Torx screws securing control unit to floor.
6. Remove control unit.

Refit



CAUTION: Ensure unit and bracket faces are clean and free from burrs. An incorrectly mounted unit could cause the system to malfunction.

1. Position control unit, fit NEW Torx screws and tighten to 9 Nm.
2. Connect harness multiplug to control unit.
3. Position floor carpet.
4. Reposition drivers seat.
5. Connect battery leads, earth lead last.
6. Carry out system check by turning the ignition on and checking that the SRS warning light illuminates the extinguishes after 3 seconds.

RESTRAINT SYSTEMS

SUPPLEMENTARY RESTRAINT SYSTEM HARNESS

Service repair no - 76.73.73

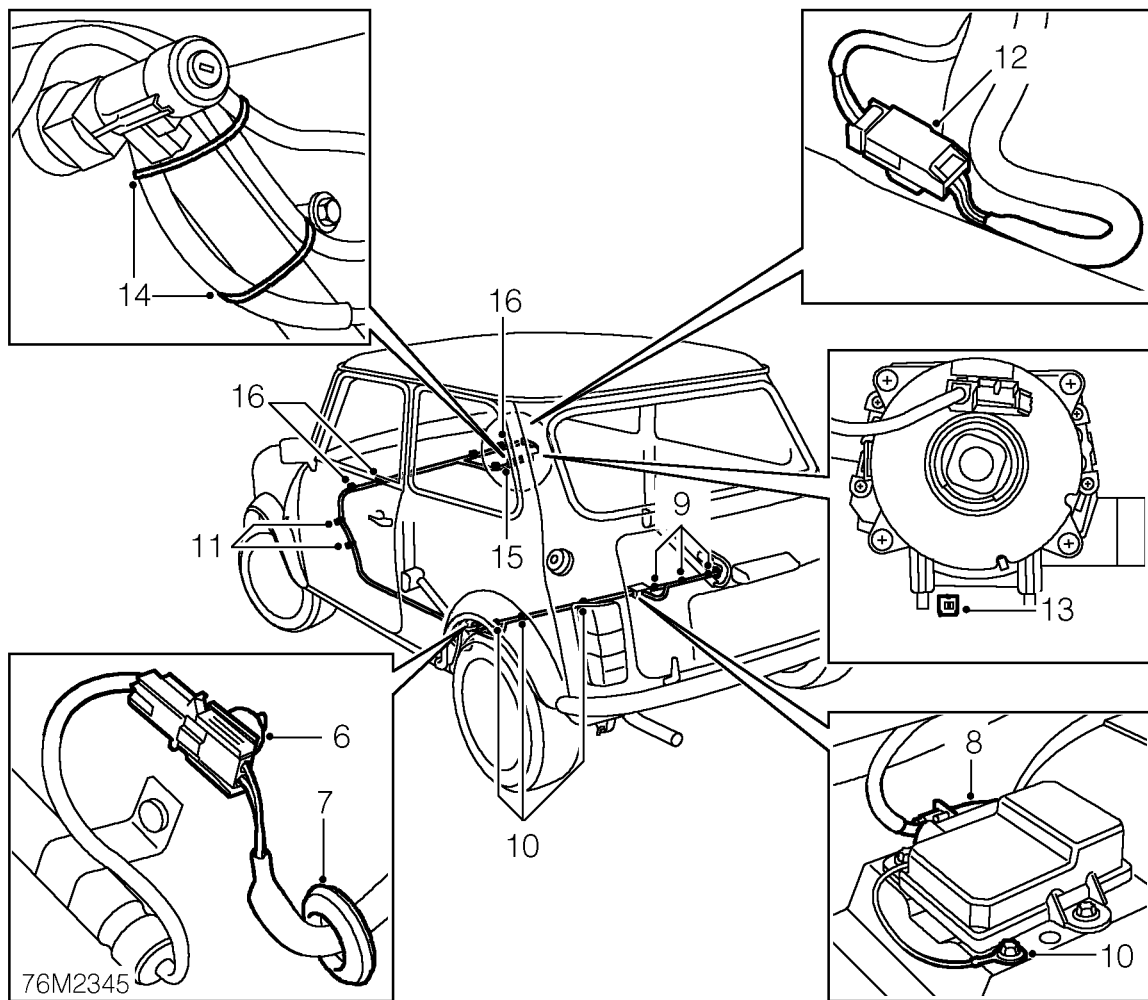


CAUTION:

- Do not install used SRS parts from another car. When repairing an SRS, use only genuine new ROVER parts.
- Never attempt to modify, splice, or repair SRS wiring.



NOTE: SRS wiring can be identified by its yellow or black with yellow stripe outer protective covering.





Remove

1. Remove key from starter switch, disconnect both battery leads, earth lead first, and wait 10 minutes for the SRS back-up circuit to discharge before commencing work.
2. Remove fascia. **See BODY, Interior trim components.**
3. Remove carpet. **See BODY, Interior trim components.**
4. Remove steering column nacelle. **See STEERING, Repairs.**
5. Remove quarter panel companion boxes. **See BODY, Interior trim components.**
6. Release and disconnect multiplugs from seat belt pre-tensioners.
7. Release pre-tensioner leads from companion box panels.
8. Disconnect multiplug from SRS control unit.
9. Raise rear seat cushion and release 6 harness clips.
10. Remove bolt securing SRS harness earth lead to body.
11. Release 2 clips securing SRS harness to bulkhead.
12. Release and disconnect multiplug from fuse box feed.
13. Disconnect multiplug from rotary coupler.
14. Remove 2 cable ties securing SRS harness to steering column.
15. Remove 2 clips securing SRS harness to body.
16. Remove 5 cable ties securing SRS harness to bulkhead and remove SRS harness.
17. Remove clips from harness.

Refit

1. Fit NEW clips to harness.
2. Fit harness to vehicle.



CAUTION: Always ensure SRS harness is routed correctly. Avoid trapping or pinching the SRS harness. Look out for possible points of chafing.

3. Route the harness to position and secure with cable ties.
4. Connect harness to rotary coupler and secure to steering column with cable ties.
5. Connect harness multiplug to fuse box.
6. Secure SRS harness clips to bulkhead.
7. Secure SRS harness clips to rear seat pan.
8. Connect harness multiplug to SRS control unit.
9. Fit bolt securing harness earth lead to body and tighten to 10 Nm.
10. Fit harness leads through companion box panels, secure grommets and connect seat belt pre-tensioner multiplugs.
11. Position rear seat cushion.



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

12. Fit rear quarter companion boxes. **See BODY, Interior trim components.**
13. Fit steering column nacelle. **See STEERING, Repairs.**
14. Fit carpet. **See BODY, Interior trim components.**
15. Fit fascia. **See BODY, Interior trim components.**
16. Connect battery leads, earth lead last.
17. Carry out system check by turning the ignition on and checking that the SRS warning light illuminates then extinguishes after 3 seconds.

CONTENTS

Page

EXTERIOR FITTINGS

BONNET	1
BONNET ALIGNMENT	2
BONNET RELEASE CABLE	3
DOOR STRIKER - ADJUST	4
FRONT GRILLE	5
FRONT BUMPER	5
REAR BUMPER	6
FRONT WHEEL ARCH EXTENSION	6
REAR WHEEL ARCH EXTENSION	7

INTERIOR TRIM COMPONENTS

REAR QUARTER WOODEN FINISHER	1
REAR QUARTER TRIM PAD	1
REAR QUARTER COMPANION BOX	2
DOOR WOODEN FINISHER	2
DOOR TRIM CASING	3
FASCIA TOP RAIL	4
FASCIA PANEL	5
CARPET	6
GLOVE BOX	7

SCREENS

WINDSCREEN	1
------------------	---

SEATS AND SEAT BELTS

FRONT SEAT BELT	1
FRONT SEAT	1
REAR SEAT BELT	2
REAR SEAT SQUAB	3
REAR SEAT CUSHION	3



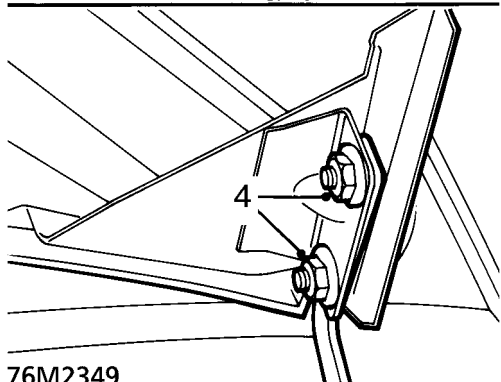
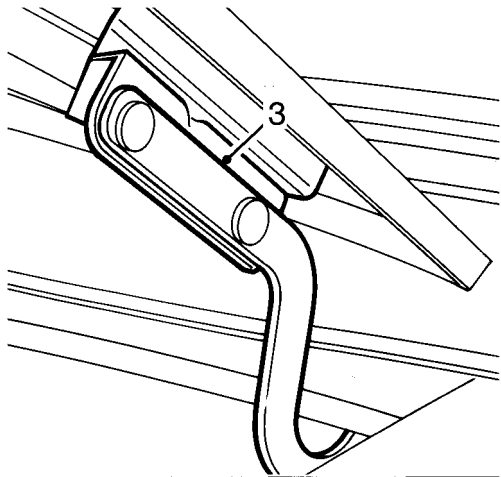


BONNET

Service repair no - 76.16.01.99

Remove

1. Support the bonnet in the fully open position.
2. Fit protective covers to wings.



76M2349

3. Mark outlines of hinges on bonnet.
4. Remove nuts and washers securing hinges to bonnet.
5. Release bonnet stay from body and secure to bonnet.
6. Remove bonnet.

Refit

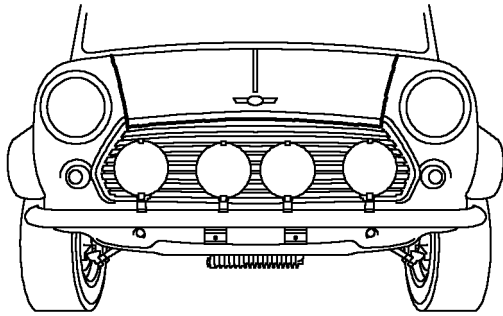
1. Using assistance, position bonnet on hinges.
2. Fit nuts and washers securing bonnet to hinges.
3. Align bonnet to hinge outlines.
4. Tighten nuts securing hinges to body to 10 Nm.
5. Remove protective covers.
6. Lower and close bonnet.
7. Adjust bonnet alignment. **See this section.**

BODY

BONNET ALIGNMENT

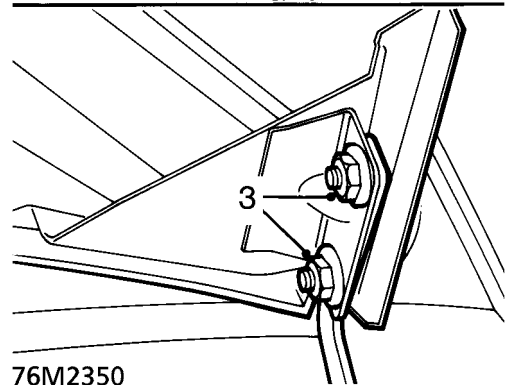
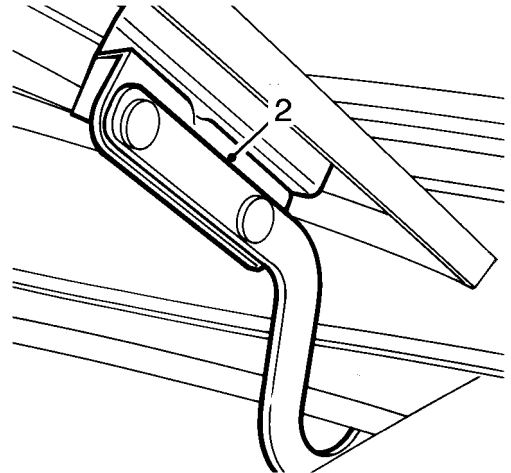
Service repair no - 76.16.02

Adjust



76M2351

1. Check alignment of bonnet against both wings.



76M2350

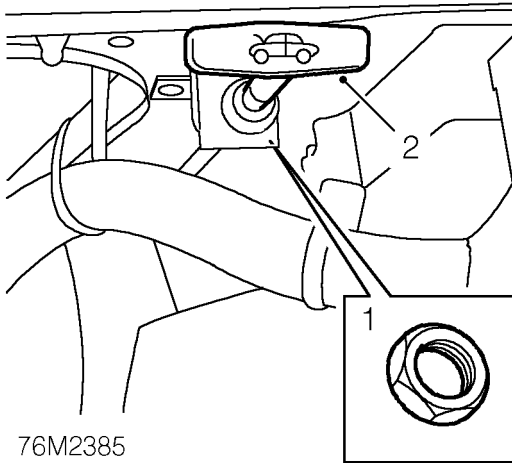
2. Open bonnet and mark outline of hinges.
3. Loosen 4 nuts and adjust position of bonnet.
4. Lightly tighten nuts securing hinges to body.
5. Close bonnet and check alignment against both wings.
6. Open bonnet and re-adjust bonnet position if necessary.
7. Tighten nuts securing hinges to body to 10 Nm.
8. Close bonnet and check alignment against both wings.
9. Open bonnet and repaint bare areas on hinges.



BONNET RELEASE CABLE

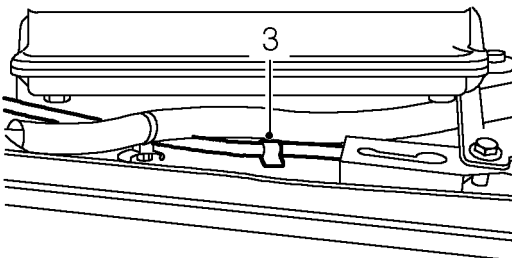
Service repair no - 76.16.29

Remove



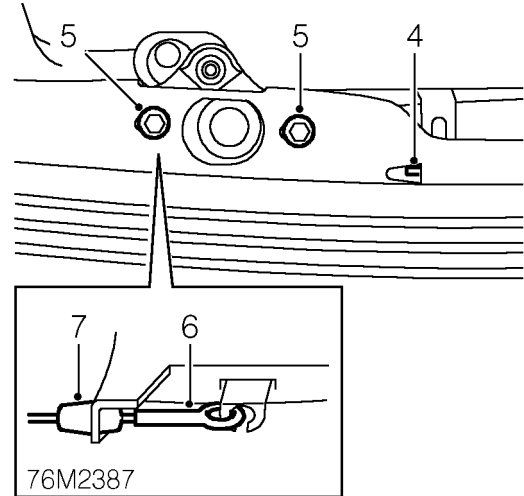
76M2385

1. Loosen lock nut securing bonnet release handle to mounting bracket.
2. Release handle from mounting bracket.



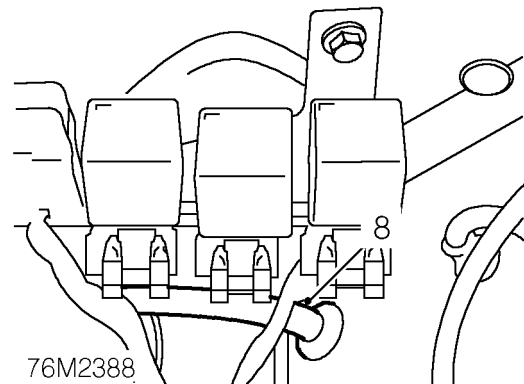
76M2386

3. Release clip securing cable to body.



76M2387

4. Disconnect bonnet lock return spring from body.
5. Remove 2 bolts securing bonnet catch to bonnet locking platform.
6. Release bonnet catch to gain access to bonnet release cable.
7. Disconnect cable from bonnet catch.



76M2388

8. Withdraw bonnet release cable through bulkhead into passenger compartment.
9. Remove bonnet release cable

BODY

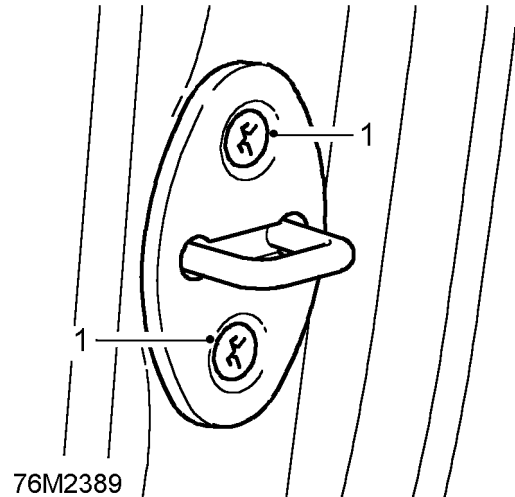
Refit

1. Feed bonnet release cable through grommet in bulkhead into engine compartment.
2. Secure cable to clip on body.
3. Connect cable to bonnet release catch.
4. Position bonnet release catch to bonnet locking platform, fit bolts but do not tighten.
5. Connect bonnet lock return spring to body.
6. Locate bonnet release handle on mounting bracket and tighten nut.
7. Lower bonnet and adjust position of bonnet catch to meet the bonnet lock pin.
8. Open bonnet and tighten bolts securing bonnet catch to bonnet locking platform to 9 Nm.

DOOR STRIKER - ADJUST

Service repair no - 76.28.05

Adjust



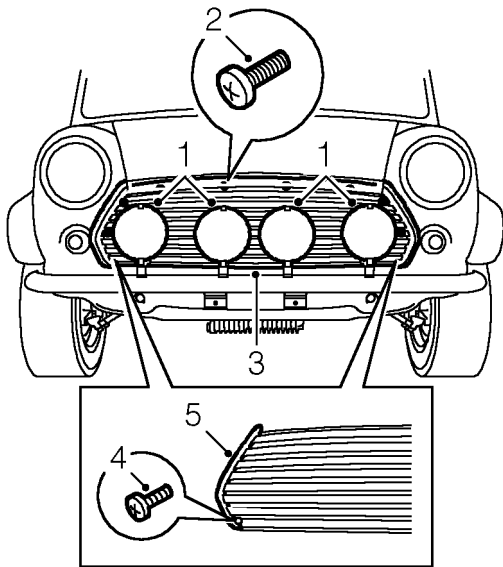
1. Loosen 2 screws securing striker to body and close door.
2. Check door for flush fit to adjacent panels and edges for equal gap.
3. Open door and tighten striker screws to 18 Nm.



FRONT GRILLE

Service repair no - 76.55.03

Remove



76M2330

1. If fitted, lower the driving lamps for access to grille.
2. Remove 8 screws securing front grille assembly to body.
3. Remove grille.

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

4. Remove 2 screws securing side finishers to grille.
5. Remove side finishers.

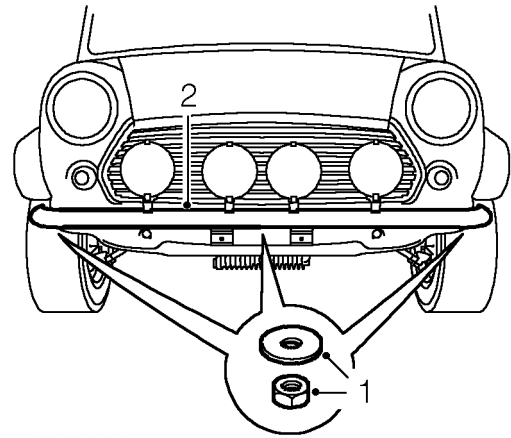
Refit

1. Fit side finishers to grille and secure with screws.
2. Fit grille and secure with screws.
3. Reposition driving lamps if fitted.

FRONT BUMPER

Service repair no - 76.22.08

Remove



76M2331

1. Remove 3 nuts securing front bumper to body and collect washers.
2. Remove front bumper.

Refit

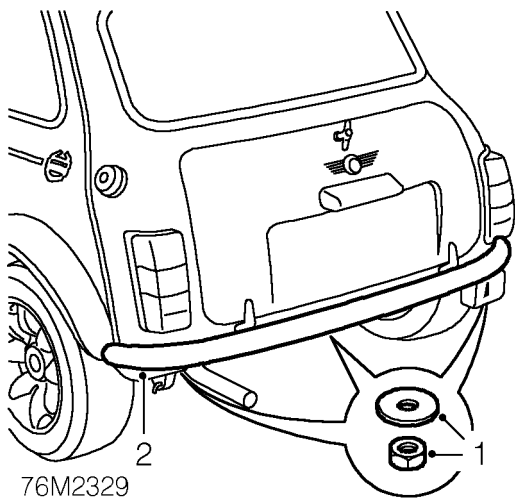
1. Fit front bumper to body.
2. Fit nuts and washers securing bumper to body and tighten nuts.

BODY

REAR BUMPER

Service repair no - 76.22.15

Remove



1. Remove 3 nuts securing rear bumper to body and collect washers.
2. Remove rear bumper.

Refit

1. Fit rear bumper to body.
2. Fit nuts and washers securing bumper to body and tighten nuts.

FRONT WHEEL ARCH EXTENSION

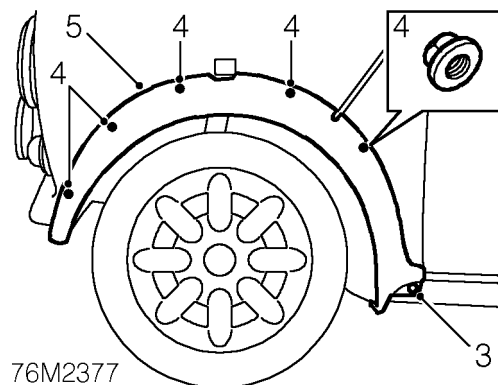
Service repair no - 76.43.54

Remove

1. Remove front bumper. **See this section.**
2. Raise front of vehicle, one side.



WARNING: Support on safety stands.



3. Using a 5mm drill, drill out rivet securing wheel arch extension to sill panel.
4. Remove 5 nuts securing wheel arch extension to wing.
5. Remove wheel arch extension.

Refit

1. Clean mating faces of wheel arch extension and wing.
2. Fit wheel arch extension to wing ensuring sealing rubber is correctly seated.
3. Fit nuts securing wheel arch extension to body and tighten to 9 Nm.
4. Rivet wheel arch extension to sill panel.
5. Fit front bumper. **See this section.**
6. Remove stand(s) and lower vehicle.

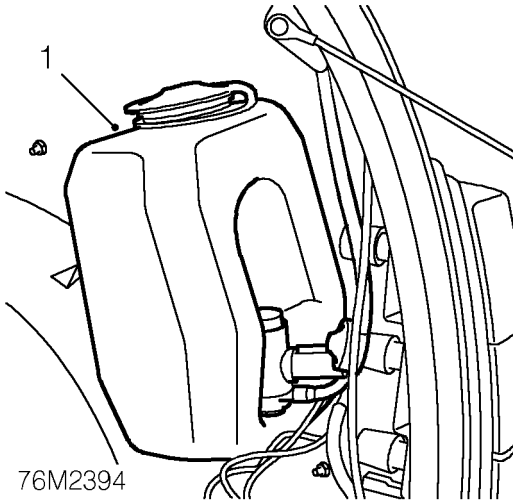


REAR WHEEL ARCH EXTENSION

Service repair no - 76.43.55

Remove

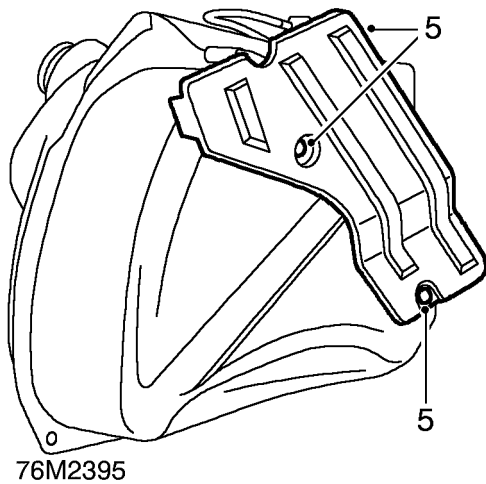
RH side only



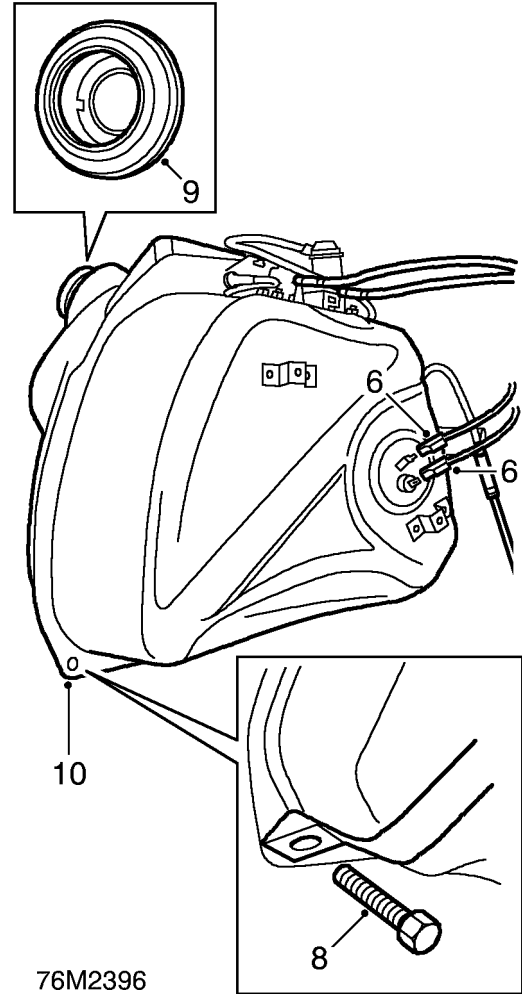
1. Release washer reservoir from mounting bracket in boot.

LH side only

2. Disconnect battery earth lead.
3. Drain fuel tank. **See FUEL DELIVERY SYSTEM, Repairs.**
4. Remove spare wheel.



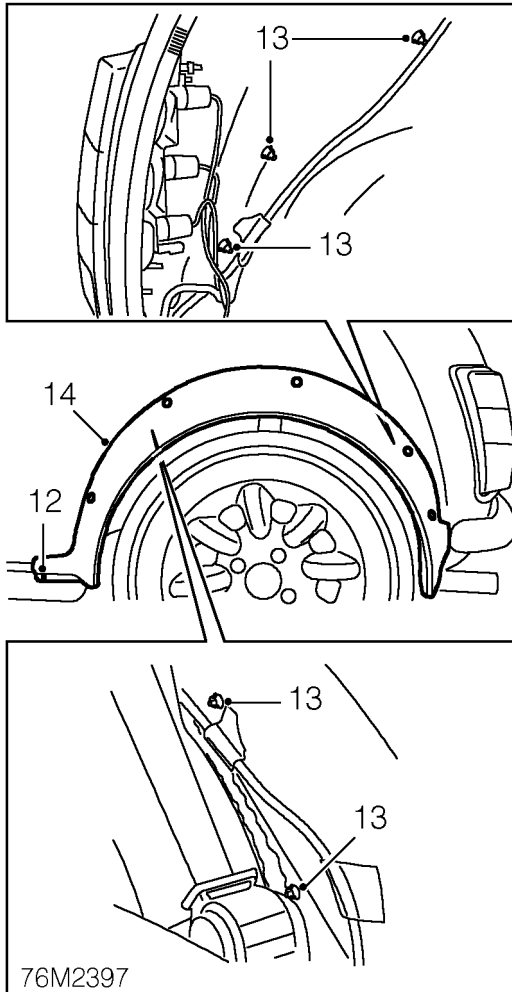
5. Remove studs securing fuel tank side cover and remove cover.



6. Disconnect 2 Lucars from fuel tank sender unit.
7. Remove fuel filler cap.
8. Remove bolt securing fuel tank retaining strap and move strap aside.
9. Release tank from filler neck grommet.
10. Manoeuvre fuel tank into boot space.

Both sides

11. Remove rear quarter trim pad. **See Interior trim components.**



12. Using a 5mm drill, drill out rivet securing wheel arch extension to sill panel.
13. Remove 5 nuts securing wheel arch extension to body.
14. Remove wheel arch extension.

Refit

1. Clean mating faces of wheel arch extension and body.
2. Fit wheel arch extension to body ensuring sealing rubber is correctly seated.
3. Fit nuts securing wheel arch extension to body and tighten to 9 Nm.
4. Rivet wheel arch extension to sill panel.
5. Fit rear quarter trim pad. **See Interior trim components.**

LH side only

6. Manoeuvre fuel tank into position and position restraining strap.
7. Fit and tighten strap retaining bolt.
8. Connect Lucars to sender unit.
9. Fit fuel tank side cover and secure with studs.
10. Fit spare wheel.
11. Refill fuel tank with fuel.
12. Connect battery earth lead.

RH side only

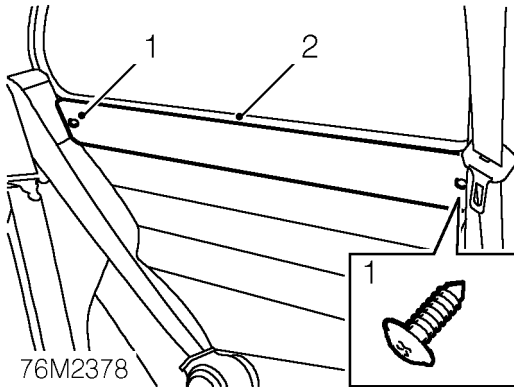
13. Secure washer reservoir to mounting bracket.



REAR QUARTER WOODEN FINISHER

Service repair no - 76.13.71

Remove



1. Remove 2 screws securing rear quarter wooden finisher to body.
2. Remove rear quarter finisher.

Refit

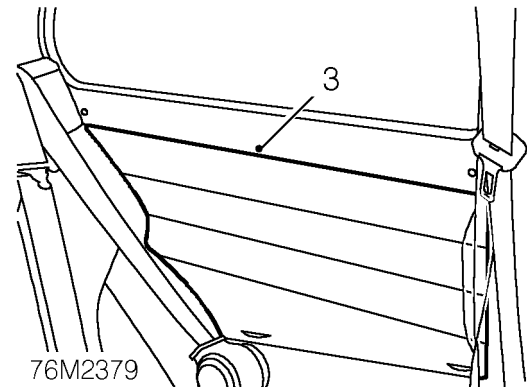
1. Position rear quarter finisher and secure with screws.

REAR QUARTER TRIM PAD

Service repair no - 76.13.12

Remove

1. Remove rear quarter companion box. **See this section.**
2. Remove rear quarter wooden finisher. **See this section.**



3. Release rear quarter trim pad from body.
4. Remove rear quarter trim pad.

Refit

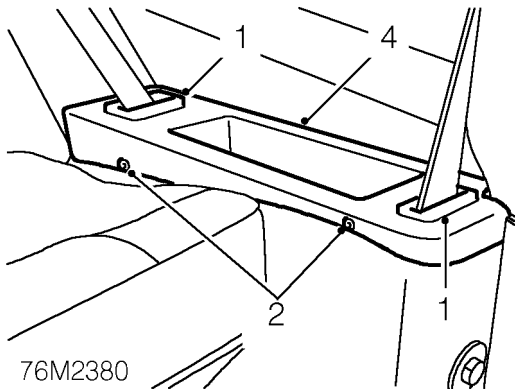
1. Fit rear quarter trim pad.
2. Fit rear quarter wooden finisher. **See this section.**
3. Fit rear quarter companion box. **See this section.**

BODY

REAR QUARTER COMPANION BOX

Service repair no - 76.13.51

Remove



1. Release 2 seat belt guides from companion box.
2. Remove 2 rivets securing companion box to body.
3. Raise companion box and release seat belts through slots.
4. Remove companion box.

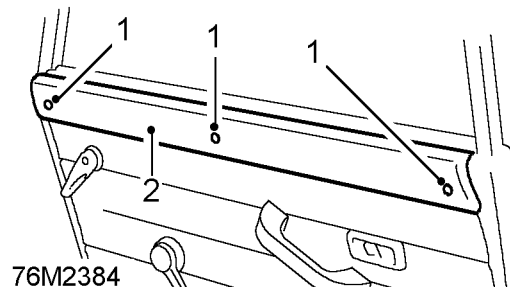
Refit

1. Position rear quarter companion box and locate seat belts.
2. Position companion box and secure with rivets.
3. Secure seat belt guides to companion box.

DOOR WOODEN FINISHER

Service repair no - 76.34.15

Remove



1. Remove 3 screws securing wooden finisher to front door.
2. Remove door finisher.

Refit

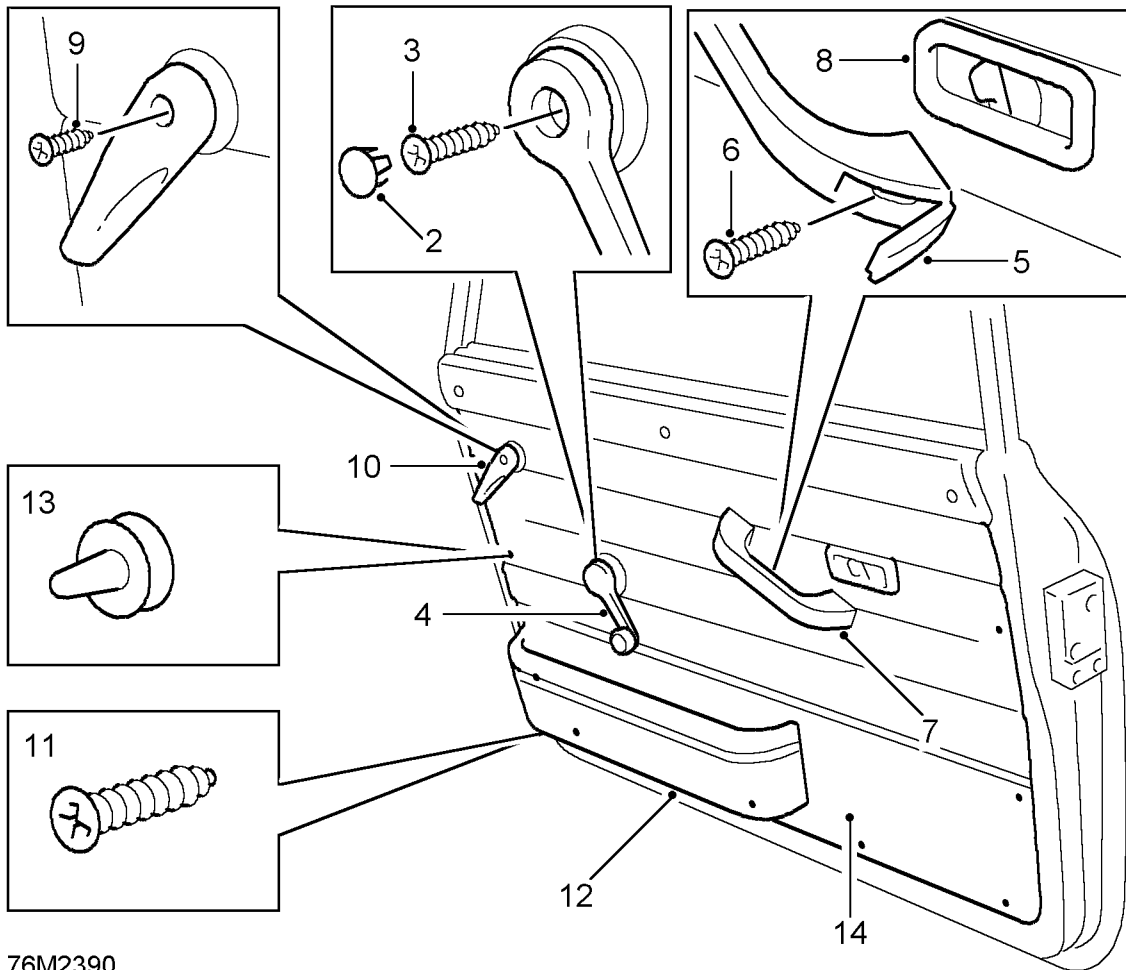
1. Position finisher to front door and secure with screws.



DOOR TRIM CASING

Service repair no - 76.34.01

Remove



76M2390

1. Remove wooden finisher from door. **See this section.**
2. Remove cover from door glass regulator handle.
3. Remove screw securing handle to door glass regulator.
4. Remove door glass regulator handle and bezel.
5. Release screw covers from door pull.
6. Remove 2 screws securing door pull to door.
7. Remove door pull.
8. Remove interior door lock escutcheon from trim casing.
9. Remove screw securing door interior release handle.
10. Remove door interior release handle.
11. Remove 5 screws securing door pocket to door.
12. Remove door pocket from door.
13. Carefully release 9 studs securing trim casing to door.
14. Remove door trim casing.

BODY

Refit

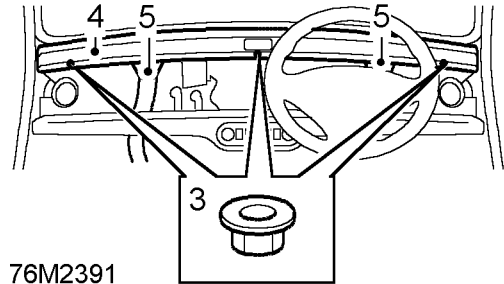
1. Fit new studs as necessary to trim casing and ensure all studs are slotted fully into position.
2. Position trim casing to door, align studs and press to engage on door.
3. Position door pocket to door and secure with screws.
4. Fit door interior release handle and secure with screw.
5. Fit interior door lock escutcheon and secure to trim casing.
6. Position door pull and secure with screws.
7. Fit screw covers to door pull.
8. Fit handle and bezel to door glass regulator and tighten screw.
9. Fit screw cover to door glass regulator handle.
10. Fit wooden finisher to door. **See this section.**

FASCIA TOP RAIL

Service repair no - 76.46.04

Remove

1. Remove windscreen. **See Screens.**
2. Remove fascia panel. **See this section.**



3. Remove 3 nuts securing fascia rail to body and release rail.
4. Remove fascia rail.
5. Remove demister ducts from fascia rail.

Refit

1. Fit demister ducts to fascia rail.
2. Position fascia rail to body, fit nuts and tighten to 9 Nm.
3. Fit fascia panel. **See this section.**
4. Fit windscreen. **See Screens.**

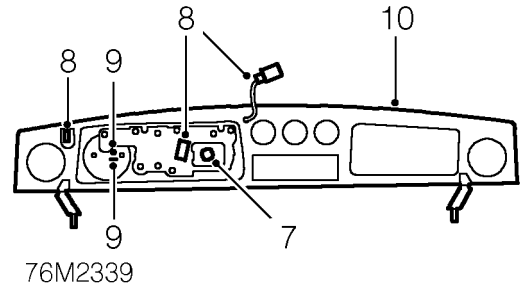


FASCIA PANEL

Service repair no - 76.46.23.99

Remove

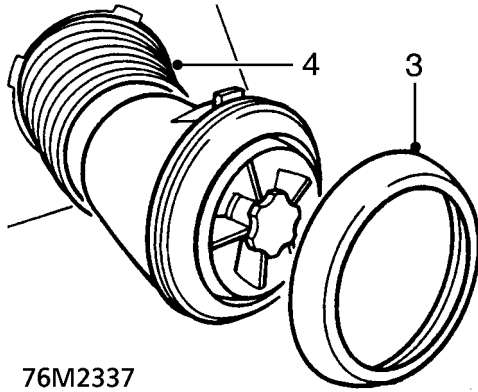
1. Disconnect battery earth lead.
2. Remove radio. *See ELECTRICAL, Repairs.*



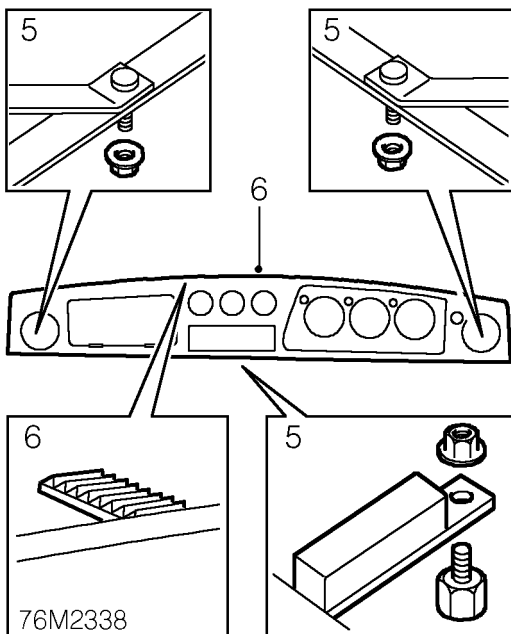
7. Disconnect speedometer cable.
8. Disconnect multiplugs from headlamp levelling switch, alarm warning light, main harness and instrument pack.
9. Disconnect leads from tachometer.
10. Release and remove fascia panel.

Refit

1. Position fascia panel.
2. Connect leads to tachometer.
3. Connect multiplugs to headlamp levelling switch, alarm warning light, main harness and instrument pack.
4. Connect speedometer cable.
5. Position fascia panel and tighten bracket nuts.
6. Fit air vent tubes.
7. Fit air vents and secure with locking rings.
8. Fit radio. *See ELECTRICAL, Repairs.*
9. Connect battery earth lead.



3. Remove locking rings from fascia air vents. Release and remove air vents.
4. Remove air vent tubes.



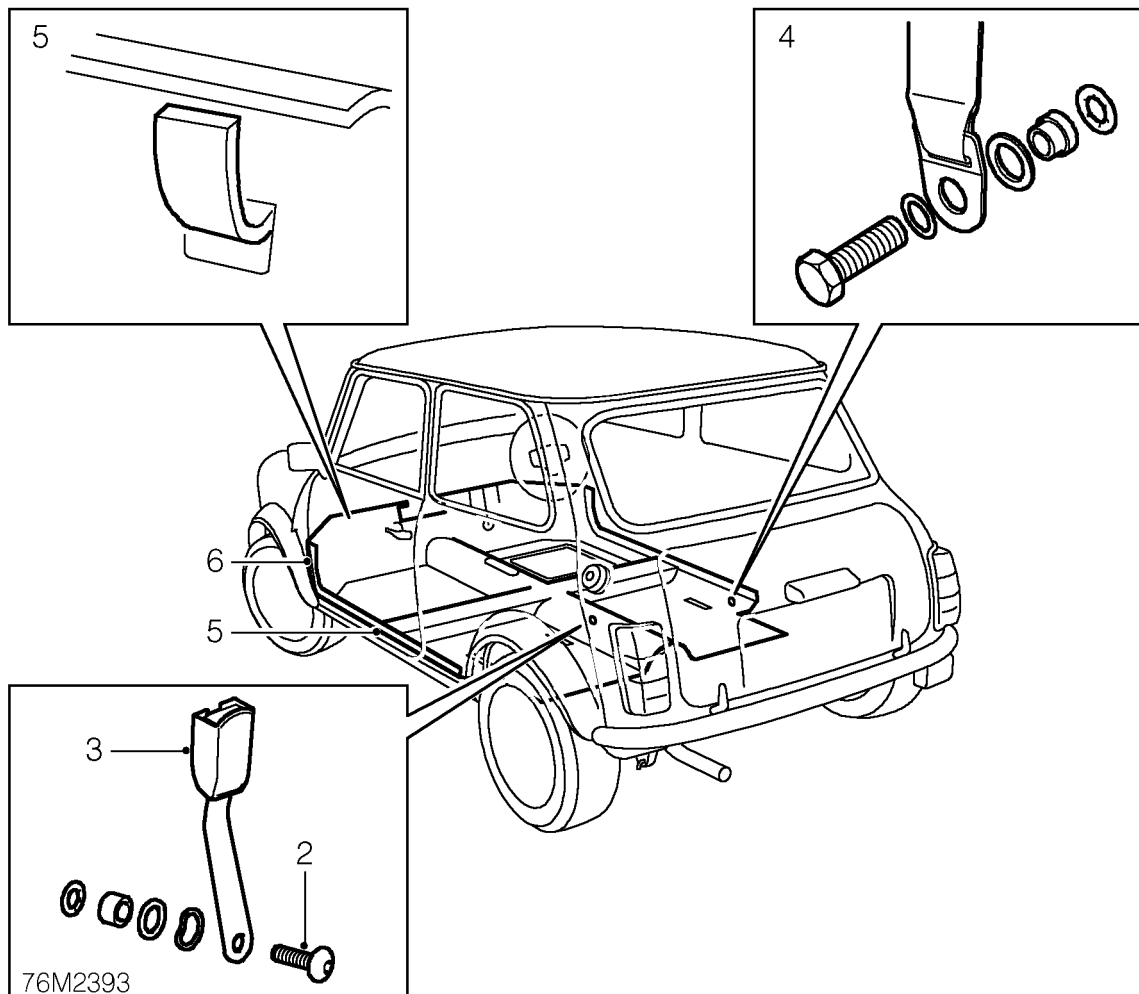
5. Remove 3 nuts securing fascia panel retaining brackets to body.
6. Release retaining brackets and carefully pull fascia forward for access.

BODY

CARPET

Service repair no - 76.49.12

Remove



1. Remove both front seats. **See Seats and seat belts.**
2. Remove 2 bolts securing front seat belt stalks to body.
3. Remove front seat belt stalks, collect washers.
4. Remove bolts securing front seat belt lower anchorage points to body, collect washers.
5. Release carpet from door seals, and bulkhead retainers.
6. Ease carpet from around foot pedals, gear lever and handbrake lever and remove carpet.

Refit

1. Position carpet in vehicle and fit around pedals, gear lever and handbrake lever.
2. Secure carpet to bulkhead with retaining clips.
3. Secure carpet under door seals.
4. Align front seat belt lower anchorage points to body, position washers, position washers, fit bolts and tighten to 30 Nm.
5. Position front seat belt stalks to body, fit bolts and tighten to 30 Nm.
6. Fit front seats. **See Seats and seat belts.**

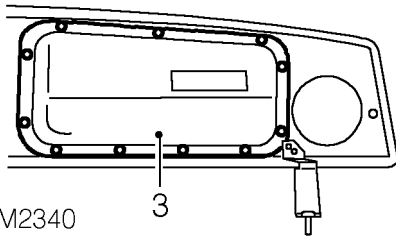
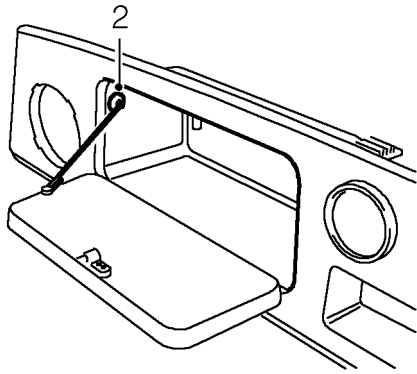


GLOVE BOX

Service repair no - 76.52.03

Remove

1. Remove fascia panel. **See this section.**



2. Release glove box lid support stud from glove box.
3. Remove 11 screws and remove glove box.

Refit

1. Fit glove box and tighten screws.
2. Align glove box lid support and secure retaining stud.
3. Fit fascia panel. **See this section.**

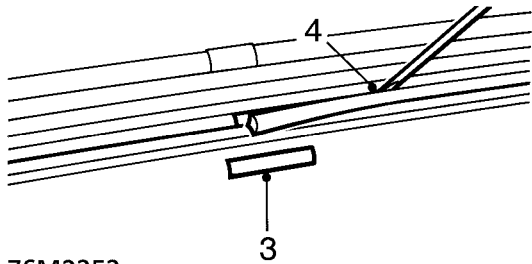


WINDSCREEN

Service repair no - 76.81.01

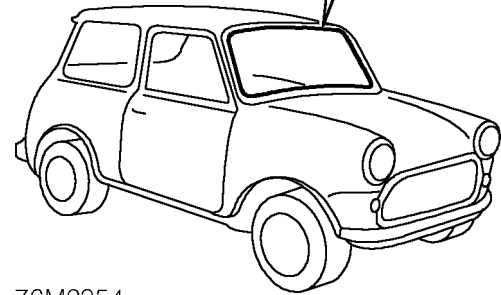
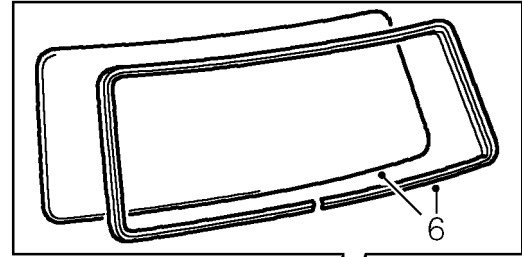
Remove

1. Fit protective covers to bonnet and wings.
2. Remove both windscreen wiper arms. **See WIPERS & WASHERS, Repairs.**



76M2353

3. Remove the chrome finisher plate from the windscreen sealing rubber.
4. Use a small screwdriver to extract one end of the finisher strip and withdraw it from the sealing rubber.
5. With an assistant supporting the glass from the outside, commencing at the top corner, press the windscreen outwards from the sealing rubber.



76M2354

6. Remove windscreen and sealing rubber.

Inspection

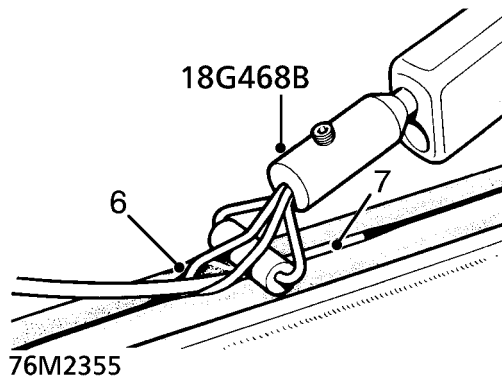
7. Remove any glass particles from sealing rubber channels and examine sealing rubber for cuts and other damage.
8. Check body aperture for distortion or damage to flange.
9. If windscreen has broken, ensure that all particles of glass have been removed from demister ducts, tubes and apertures.

Refit

1. Align windscreen sealing rubber to aperture and secure to body flange.
2. Insert a cord into the windscreen groove of the sealing rubber.
3. Position windscreen to sealing rubber.
4. Apply pressure to outside of screen and use cord to pull lip of seal over the edge of the screen.



NOTE: Apply a soap solution around seal to aid fitment of screen.



5. Thread end of the finisher strip through the eye of tool **18G 468B** and under the roller.
6. Starting at the top centre of the windscreen sealing rubber, insert eye of tool into finisher strip groove.
7. Slowly push tool around entire length of sealing rubber, feeding the finisher strip into the groove as the eyelet on the tool opens it and use the roller to bed it into the seal.
8. Remove tool **18G 468B** and fit chrome finisher plate into sealing rubber to cover the ends of the finisher strip.
9. Clean windscreen.
10. Fit windscreen wiper arms. **See WIPERS & WASHERS, Repairs.**
11. Remove protective covers from bonnet and wings.



FRONT SEAT BELT

Service repair no - 76.73.31

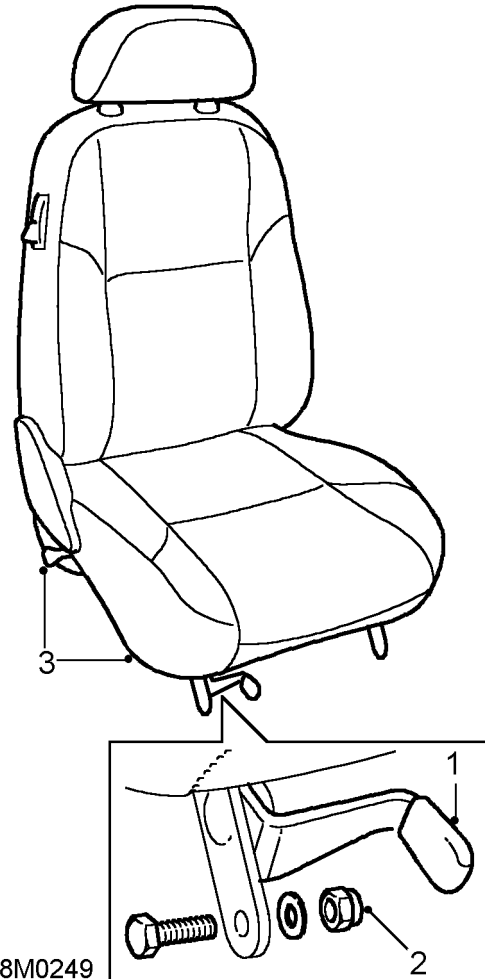
Remove

The front seat belt and pre-tensioner can only be renewed as an assembly, refer to Front seat belt pre-tensioner. **See RESTRAINT SYSTEMS, Repairs.**

FRONT SEAT

Service repair no - 78.10.44.99

Remove



78M0249

1. Raise lever and slide seat fully rearwards.
2. Remove 2 nuts and bolts securing seat to mounting brackets.
3. Pull rear seat access lever to release seat from floor and remove seat.

Refit

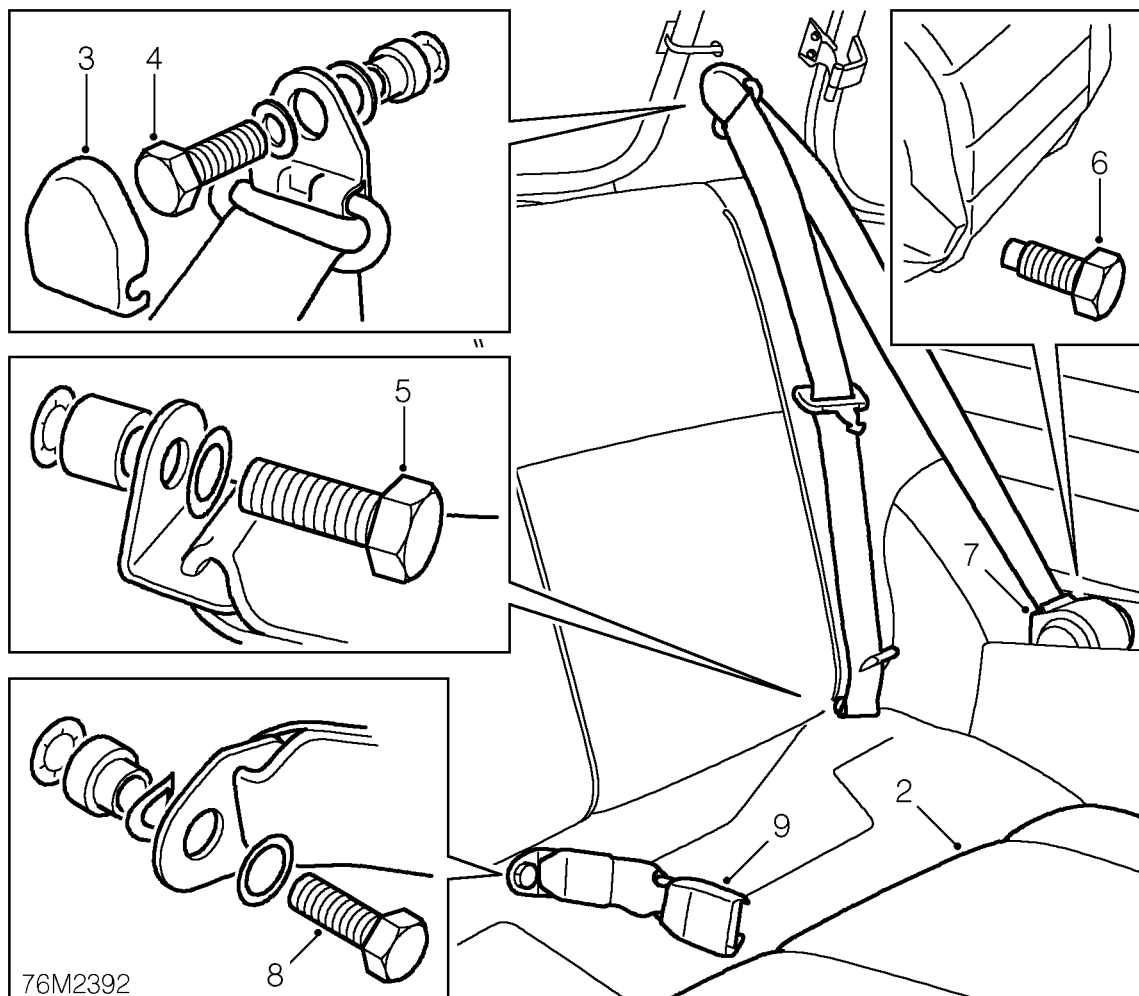
1. Position seat in vehicle.
2. Align seat to mounting brackets.
3. Fit nuts and bolts securing seat to mounting brackets and tighten to 25 Nm.

BODY

REAR SEAT BELT

Service repair no - 76.73.23

Remove



1. Remove rear quarter companion box. **See Interior trim components.**
2. Release rear seat cushion from seat panel.
3. Remove cover from seat belt upper anchorage bolt.
4. Remove bolt securing seat belt upper anchorage point to body, collect spacer and washers.
5. Remove bolt securing seat belt lower anchorage point to body, collect spacer and washers.
6. Remove bolt securing seat belt reel to body.
7. Remove rear seat belt reel.
8. Remove bolt and collect washer securing rear seat belt buckle to body.
9. Remove rear seat belt buckle.

Refit

1. Position rear seat buckle to body, fit bolt and washer and tighten to 30 Nm.
2. Position seat belt reel to body, fit bolt and tighten to 30 Nm.
3. Align seat belt lower anchorage point to body, position spacer and washers, fit bolt and tighten to 30 Nm.
4. Align seat belt upper anchorage point to body, position spacer and washers, fit bolt and tighten to 30 Nm.
5. Fit cover to seat belt upper anchorage point.
6. Position rear seat cushion.
7. Fit rear quarter companion box. **See Interior trim components.**

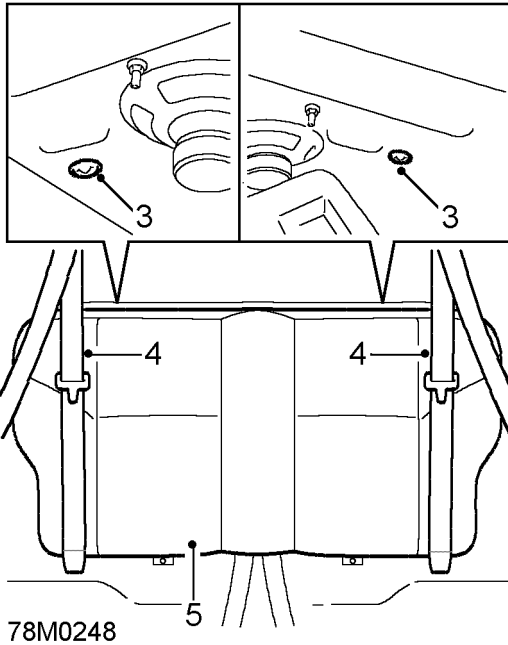


REAR SEAT SQUAB

Service repair no - 78.10.56.99

Remove

1. Remove rear seat cushion. **See this section.**
2. Open luggage compartment.



3. Remove 2 screws securing seat squab to body.
4. Pull seat belt harnesses away from squab.
5. Release and remove rear seat squab.

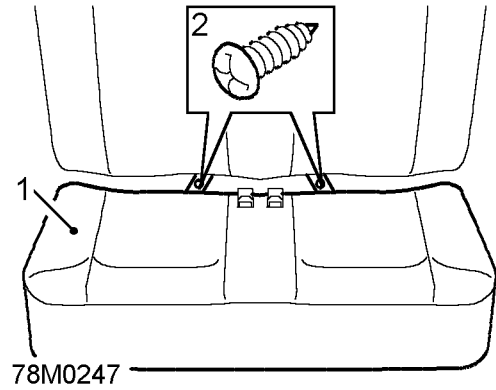
Refit

1. Position rear seat squab in vehicle.
2. Ensure seat belts are routed over squab.
3. Fit and tighten screws securing squab to body.
4. Fit rear seat cushion. **See this section.**

REAR SEAT CUSHION

Service repair no - 78.40.29

Remove



1. Release rear seat cushion from seat panel.
2. Remove 2 screws securing cushion straps to body.
3. Remove rear seat cushion.

Refit

1. Position rear seat cushion in vehicle.
2. Align cushion straps to body and secure with screws.
3. Position seat cushion on seat panel.

CONTENTS

Page

REPAIRS

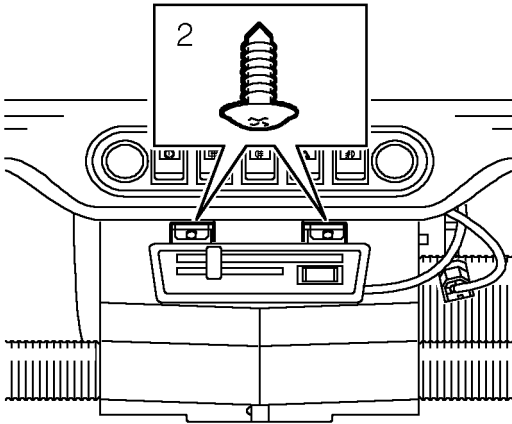
HEATER VALVE CONTROL CABLE	1
HEATER VALVE	2
HEATER FAN SWITCH	4
HEATER UNIT	4
HEATER MOTOR AND FAN	6
RESISTOR UNIT	7
HEATER MATRIX	8

HEATER VALVE CONTROL CABLE

Service repair no - 80.10.07

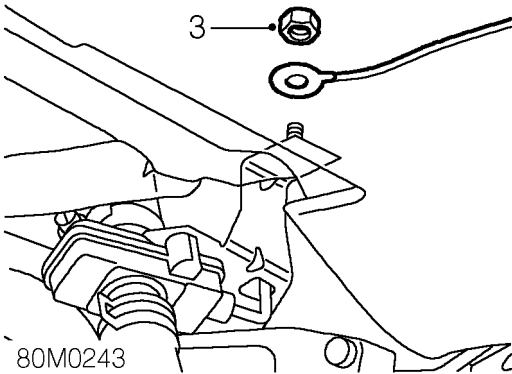
Remove

1. Disconnect battery earth lead.



80M0242

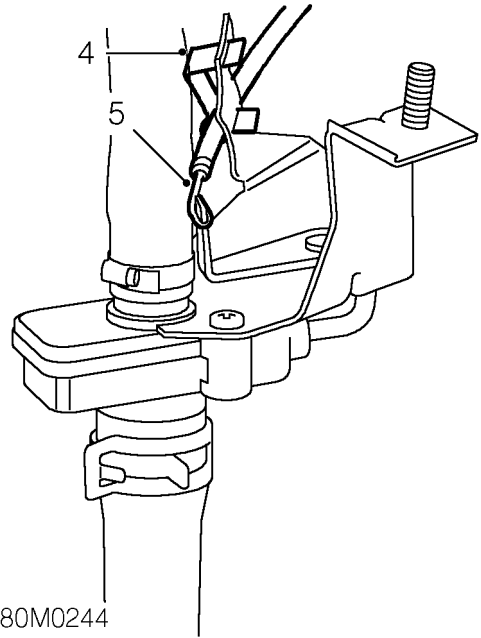
2. Remove 2 screws securing heater to lower fascia rail.



80M0243

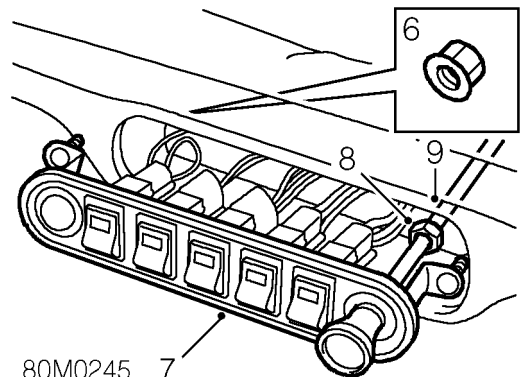
3. Remove nut securing heater valve to fascia rail.

NOTE: An earth lead is located on the heater valve stud.



80M0244

4. Remove clip securing control cable to heater valve.
5. Disconnect control cable from lever on valve.



80M0245

6. Remove 2 nuts securing switch panel to lower fascia rail.
7. Release switch panel from fascia rail.
8. Remove nut securing control cable to switch panel.
9. Remove heater control cable.

Refit

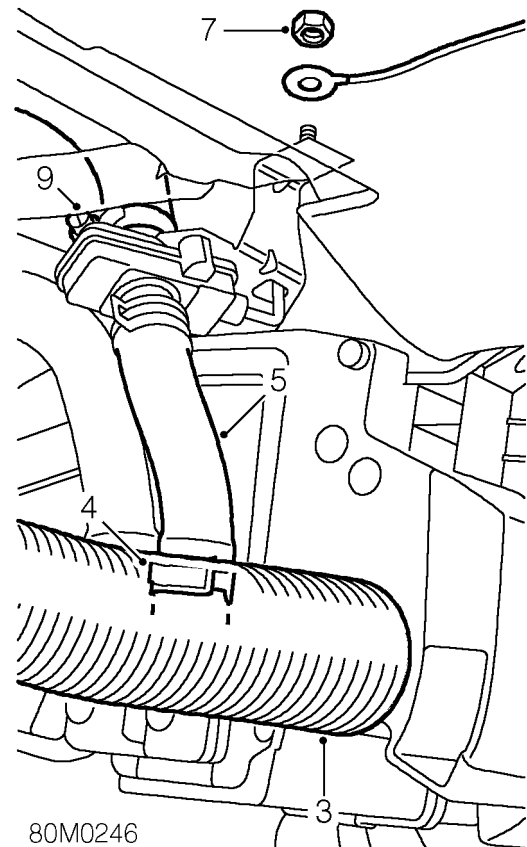
1. Fit heater control cable to switch panel and secure with nut.
2. Feed the cable over the top of the heater.
3. Ensure cable is routed correctly and heater valve is in the OFF position.
4. Connect control cable to lever on heater valve and secure with clip.
5. Check that heater valve control lever operates through its full range of travel, adjust position of outer cable if necessary.
6. Fit switch panel to fascia rail and secure with nuts.
7. Align heater to fascia rail and secure with screws.
8. Fit heater valve to fascia support rail, fit earth lead to heater valve stud and tighten nut.
9. Connect battery earth lead.

HEATER VALVE


Service repair no - 80.10.16

Remove

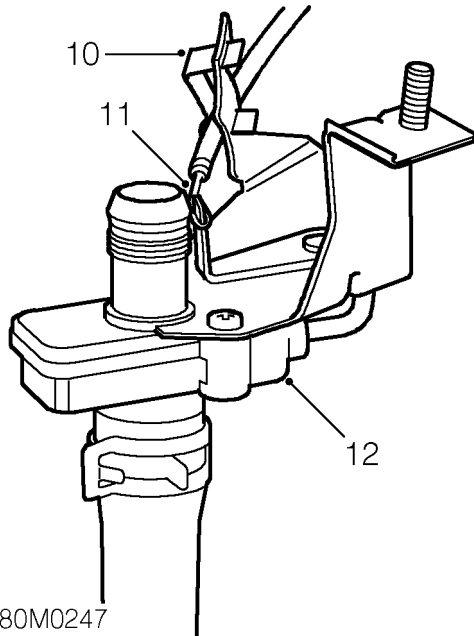
1. Drain cooling system. **See COOLING SYSTEM, Adjustments.**
2. Position container beneath heater to collect coolant spillage.



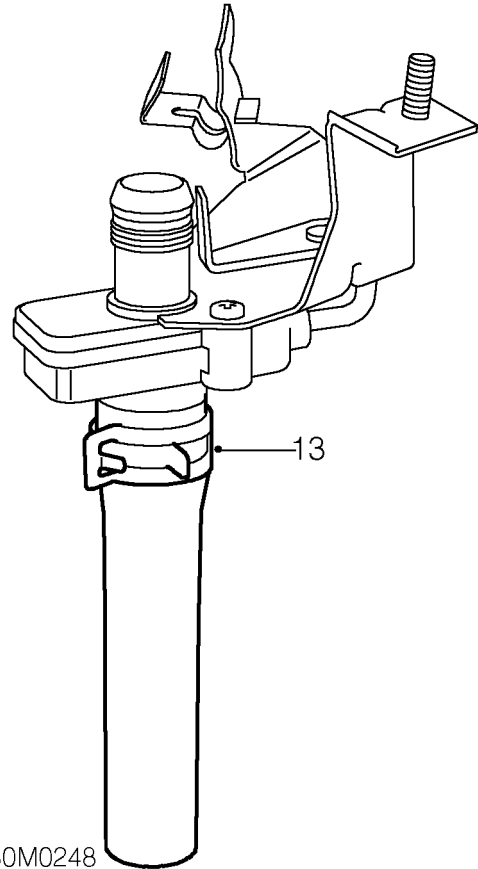
3. Disconnect demister duct from heater.
4. Release clip securing feed hose to heater.
5. Disconnect hose from heater.
6. Ensure heater valve is in the open position and allow coolant to drain.
7. Remove nut securing heater valve to fascia rail.

 **NOTE: An earth lead is located on the heater valve stud.**

8. Lower heater valve to gain access to heater hose.
9. Release clip and disconnect heater hose from valve.



10. Remove clip securing heater control cable to valve.
11. Disconnect control cable from lever on valve.
12. Remove heater valve.



13. Release clip and remove hose from heater valve.

Refit

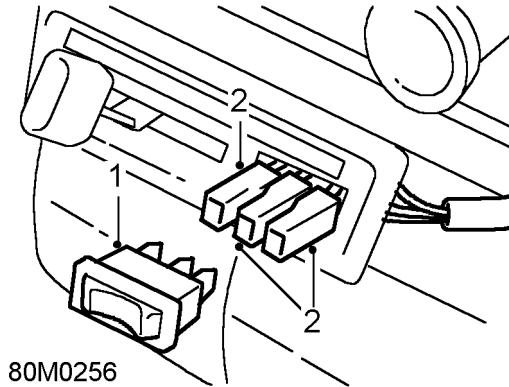
1. Fit heater hose to valve and secure with clip.
2. Position heater valve to fascia support rail.
3. Connect hose to heater valve and secure with clip.
4. Connect heater control cable to lever on valve and secure with clip.
5. Fit heater valve to fascia support rail, fit earth lead to heater valve stud and tighten nut.
6. Connect hose to heater and secure with clip.
7. Connect demister duct to heater.
8. Remove container to collect coolant spillage from heater.
9. Refill cooling system. **See COOLING SYSTEM, Adjustments.**

HEATING & VENTILATION

HEATER FAN SWITCH

Service repair no - 80.10.22

Remove



1. Release switch from heater panel.
2. Disconnect 2 Lucars from switch.
3. Remove switch.

Refit

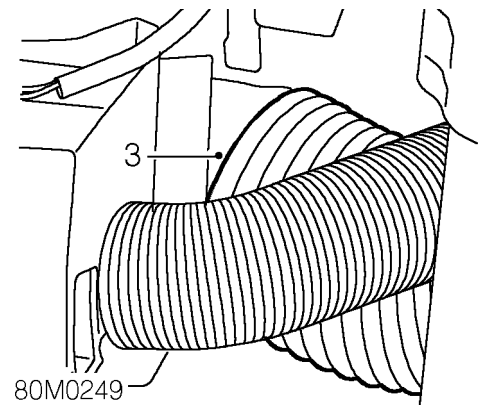
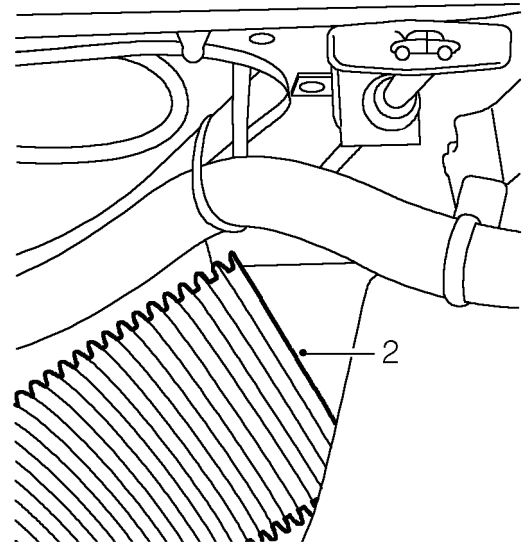
1. Position switch and connect Lucars.
2. Fit switch to heater panel.

HEATER UNIT

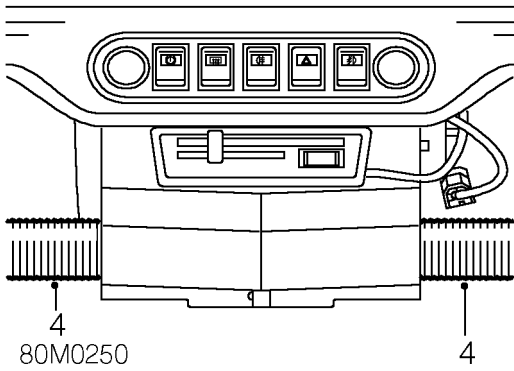
Service repair no - 80.20.01.99

Remove

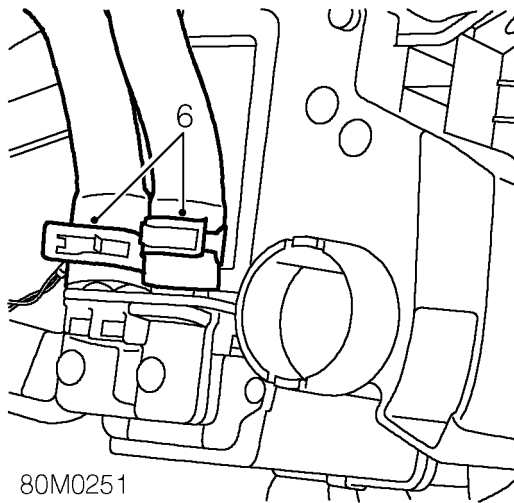
1. Drain cooling system. **See COOLING SYSTEM, Adjustments.**



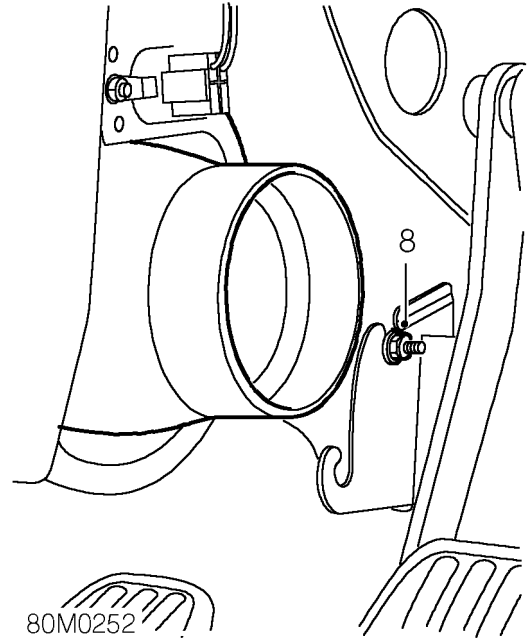
2. Release heater air intake duct from adaptor on body.
3. Remove air intake duct from heater.



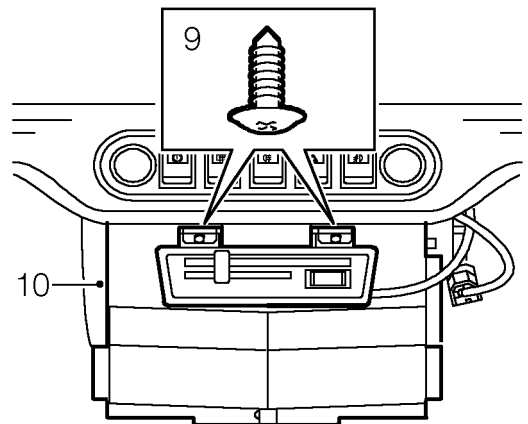
- 4. Disconnect both demister ducts from heater.
- 5. Position container to collect coolant spillage from heater.



- 6. Release clips and disconnect coolant hoses from heater.
- 7. Allow coolant to drain then plug the heater connections.

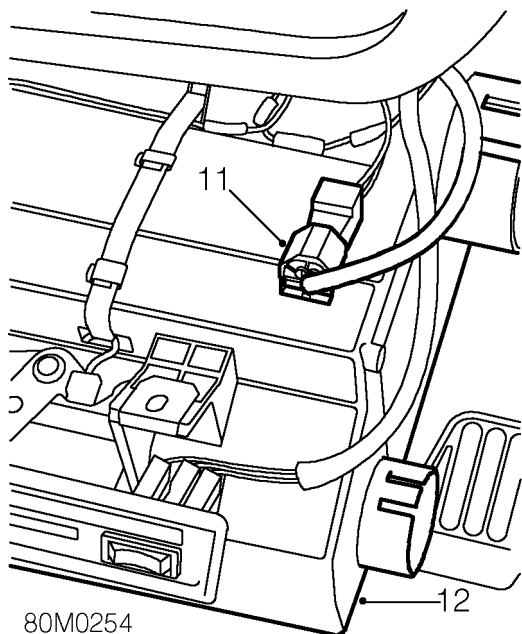


- 8. Loosen nut securing heater to bulkhead.



80M0253

- 9. Remove 2 screws securing heater to fascia rail.
- 10. Lower heater.



11. Disconnect multiplug from heater harness.
12. Release heater from bulkhead and remove heater.

Refit

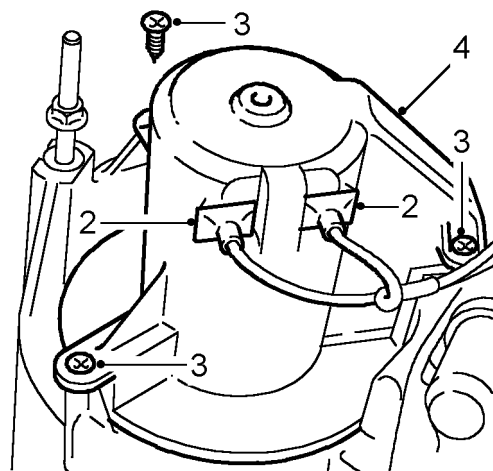
1. Position heater in vehicle and locate on mounting brackets on bulkhead.
2. Connect multiplug to heater harness.
3. Align heater to fascia rail and secure with screws.
4. Tighten nut securing heater to bulkhead.
5. Remove plugs from heater connections.
6. Connect coolant hoses to heater and secure with clips.
7. Fit air intake duct to heater.
8. Connect heater air intake duct to adaptor on body.
9. Connect demister ducts to heater.
10. Refill cooling system. **See COOLING SYSTEM, Adjustments.**
11. Remove container positioned to collect coolant spillage

HEATER MOTOR AND FAN

Service repair no - 80.20.15

Remove

1. Remove heater unit. **See this section.**



2. Disconnect 2 Lucars from heater motor.
3. Remove 3 screws securing heater motor to housing.
4. Withdraw heater motor and fan from housing and remove.



NOTE: The heater motor and fan can only be renewed as an assembly.

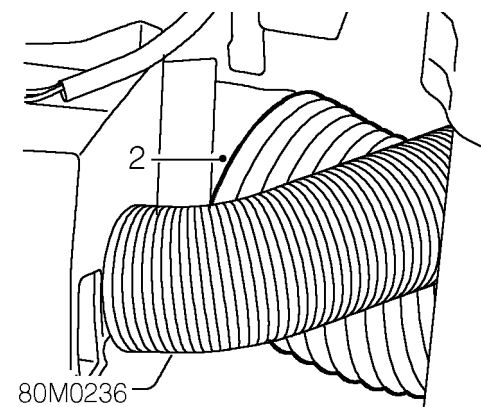
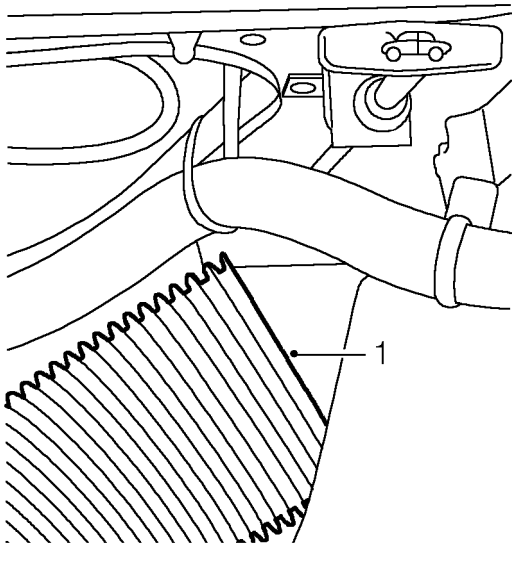
Refit

1. Fit heater motor and fan to housing and secure with screws.
2. Connect Lucars to heater motor.
3. Fit heater unit. **See this section.**

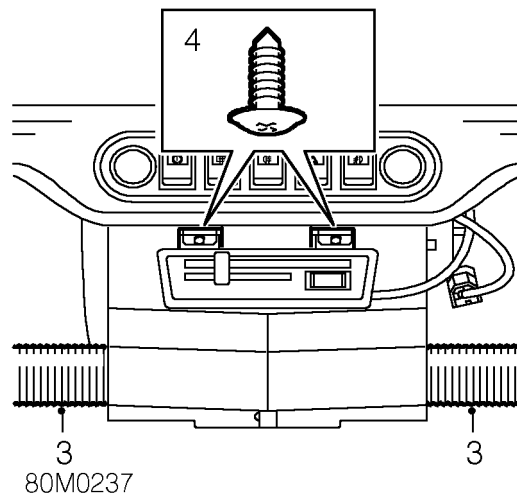
RESISTOR UNIT

Service repair no - 80.20.17

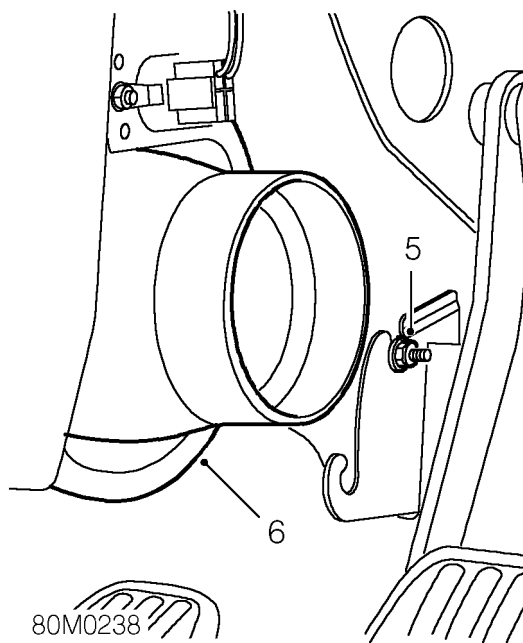
Remove



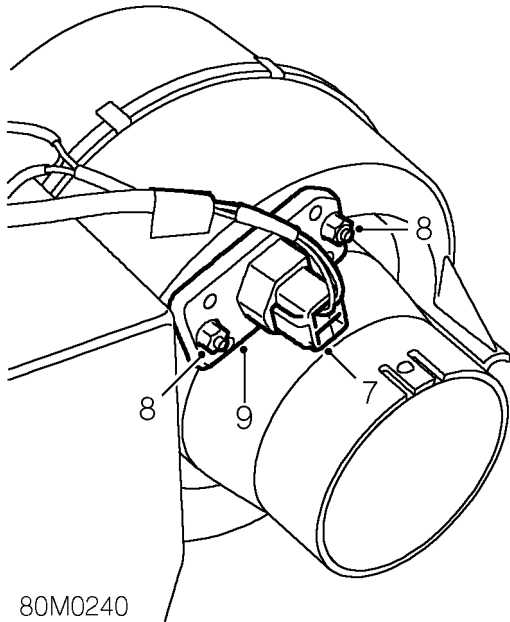
1. Release heater air intake duct from adaptor on body.
2. Remove air intake duct from heater.



3. Disconnect both demister ducts from heater.
4. Remove 2 screws securing heater to fascia rail.



5. Loosen nut securing heater to bulkhead.
6. Lower heater.



7. Disconnect multiplug from resistor unit.
8. Remove 2 nuts securing resistor unit to heater.
9. Remove resistor unit.

Refit

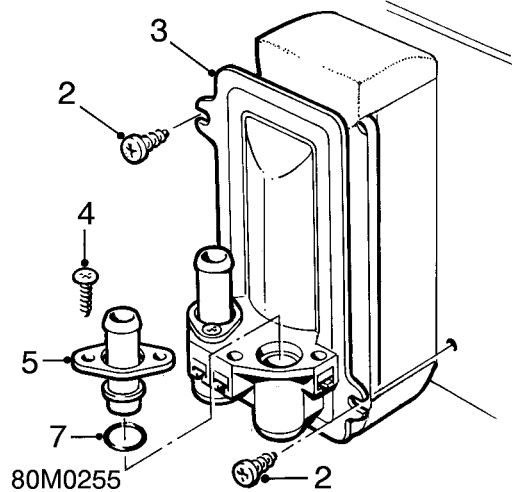
1. Fit resistor unit to heater and secure with nuts.
2. Connect multiplug to resistor unit.
3. Align heater to fascia rail and secure with screws.
4. Tighten nut securing heater to bulkhead.
5. Fit air intake duct to heater.
6. Connect heater air intake duct to adaptor on body.
7. Connect demister ducts to heater.

HEATER MATRIX

Service repair no - 80.20.29

Remove

1. Remove heater unit. *See this section.*



2. Remove 2 screws securing heater matrix end-plate to housing.
3. Withdraw heater matrix from housing.
4. Remove 4 screws securing heater pipe clamp plates to matrix.
5. Remove 2 heater pipe clamp plates.
6. Remove heater pipes from matrix.
7. Remove and discard 'O' rings from heater pipes.

Refit

1. Lubricate new 'O' rings and fit to heater pipes.
2. Fit heater pipes to matrix.
3. Fit heater pipe clamp plates and secure with screws.
4. Insert matrix into heater and secure with screws.
5. Fit heater unit. *See this section.*

CONTENTS

Page

REPAIRS

WASHER TUBE	1
WIPER ARM	3
WINDSCREEN WIPER MOTOR	3
WINDSCREEN WIPER WHEEL BOX AND CABLE RACK TUBE	5
WINDSCREEN WASHER AND WIPER SWITCH	7
DELAY UNIT	8

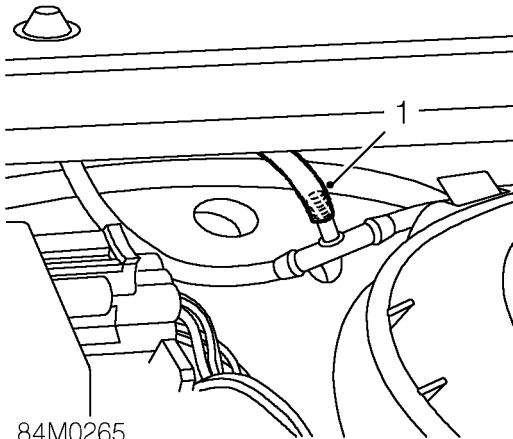




WASHER TUBE

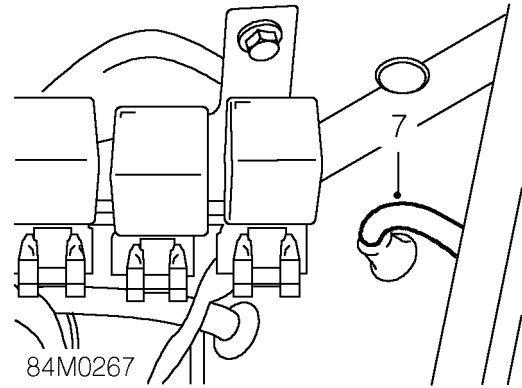
Service repair no - 84.10.15

Remove



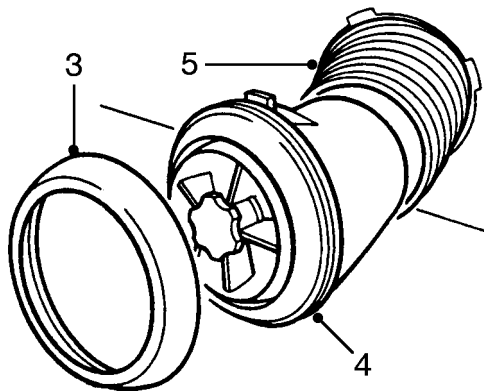
84M0265

1. Disconnect washer tube from 'T' connector underbonnet.
2. Release sound deadening pad from bulkhead.



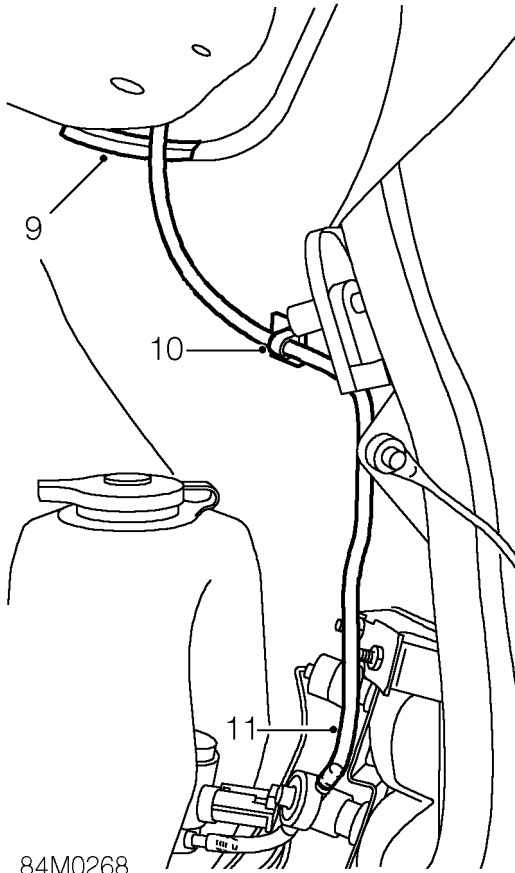
84M0267

7. Withdraw washer tube through grommet in bulkhead.
8. Attach draw string to washer tube and secure with tape.



84M0266

3. Remove locking ring securing RH air vent to fascia.
4. Release and remove air vent from fascia.
5. Remove air vent tube.
6. Release sound deadening pad from bulkhead.



84M0268

Refit

1. Measure and cut new length of washer tube.
2. Attach washer tube to draw string and secure with tape.
3. Using assistance feed/draw washer tube through body.
4. Remove tape securing draw string to washer tube and remove draw string.
5. Connect washer tube to one-way valve.
6. Secure washer tube to clip on body and fit foam strip between body panels.
7. Pass tube through grommet in bulkhead into engine compartment.
8. Secure sound deadening pad to bulkhead.
9. Fit air vent tube.
10. Fit air vent to fascia and secure with locking ring.
11. Secure sound deadening pad to bulkhead underbonnet.
12. Connect washer tube to 'T' connector.
13. Top up washer reservoir.

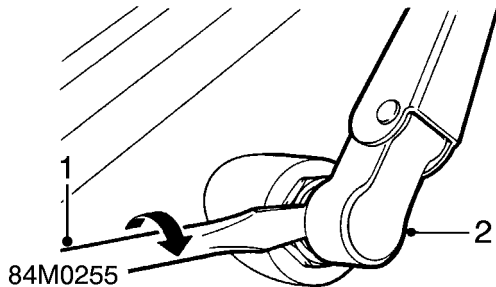
9. Remove foam strip from between body panels in boot.
10. Release washer tube from clip on body.
11. Disconnect washer tube from one-way valve.
12. Pull tube through body into boot space.
13. Remove tape securing draw string to washer tube.
14. Remove washer tube.



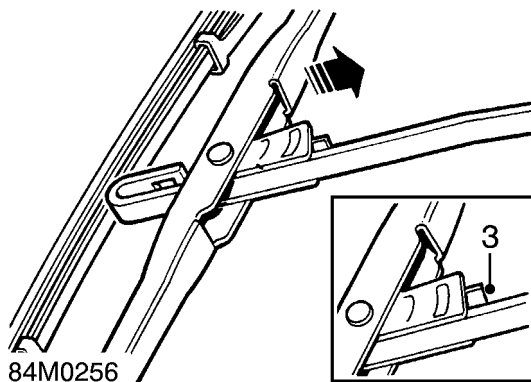
WIPER ARM

Service repair no - 84.15.01

Remove



1. Carefully lever wiper arm from splines on wheelbox spindle using a flat bladed screwdriver.
2. Remove wiper arm from wheelbox spindle.



3. Press clip and remove wiper blade from arm.

Refit

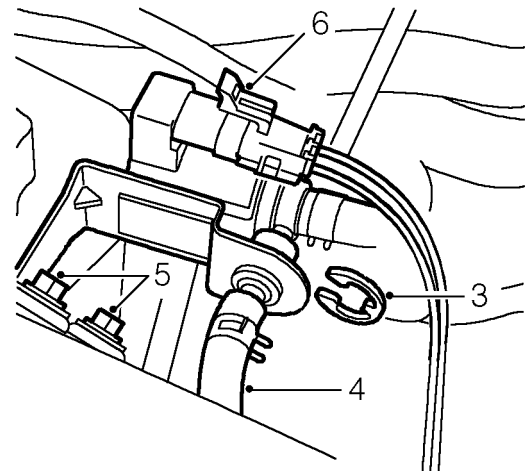
1. Fit wiper blade to arm.
2. Align wiper arm to screen and push onto wheelbox spindle.

WINDSCREEN WIPER MOTOR

Service repair no - 84.15.12

Remove

1. Disconnect battery earth lead.
2. Remove both windscreen wiper arms. **See this section.**

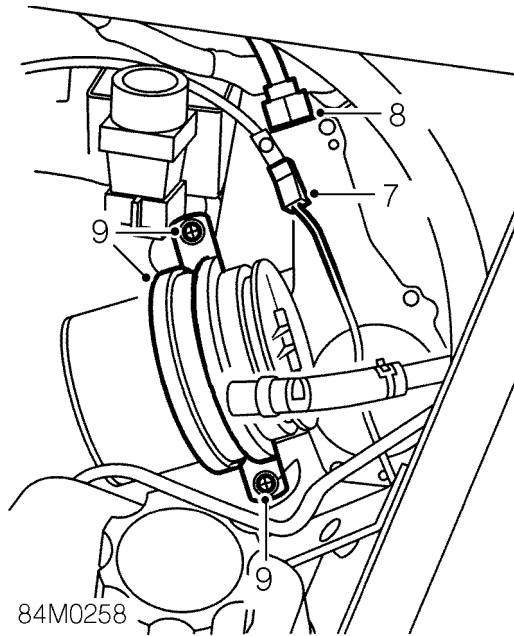


84M0257

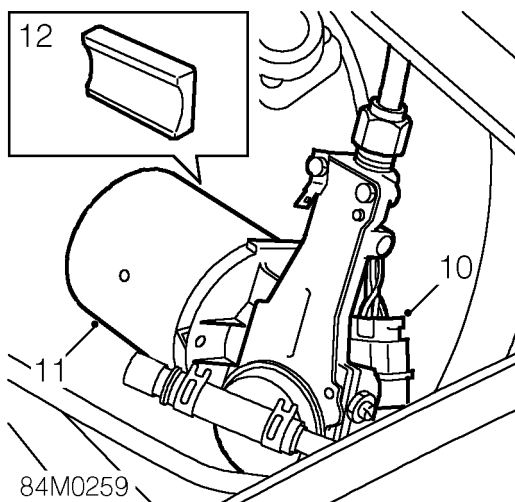
3. Remove 'E' clip securing emission canister pipe to mounting bracket.
4. Release emission canister pipe from mounting bracket.
5. Remove 2 bolts securing emission canister purge valve to body.
6. Position purge valve aside.

WIPERS & WASHERS

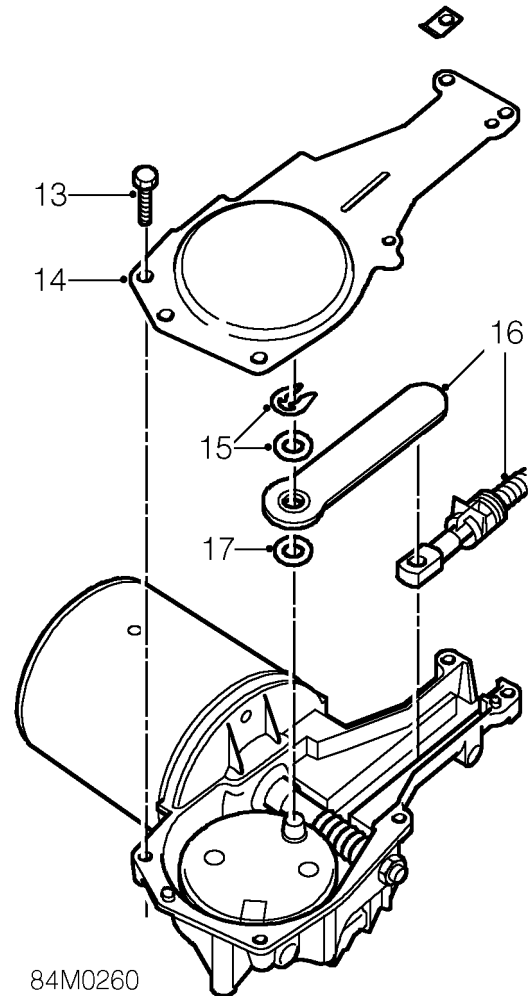
Do not carry out further dismantling if component is removed for access only.



7. Disconnect earth lead from wiper motor.
8. Loosen nut securing cable rack tube to wiper motor.
9. Remove 2 screws securing wiper motor calmp to body and remove clamp.



10. Disconnect multiplug from wiper motor.
11. Remove wiper motor complete with cable rack.
12. Collect wiper motor mounting pad.



13. Remove 4 bolts securing cover to wiper motor gearbox.
14. Remove cover from wiper motor gearbox. Note position of earth lead lug.
15. Remove circlip and washer securing cable rack connecting rod to wiper motor crank.
16. Remove connecting rod and cable rack assembly.
17. Collect flat washer from under cable rack connecting rod.
18. Fit flat washer to wiper motor crank.
19. Fit cable rack connecting rod to wiper motor crank and secure with flat washer and circlip.
20. Position cover and earth lead lug to wiper motor gearbox and secure with screws.



Refit

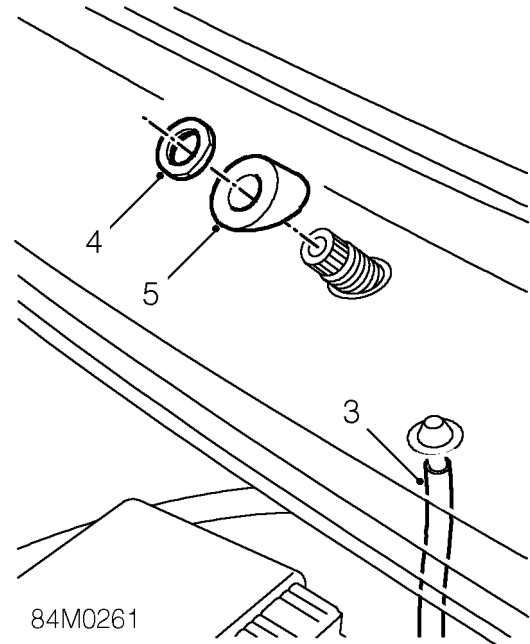
1. Position wiper motor mounting pad to body.
2. Lubricate wiper motor cable rack.
3. Feed cable rack into tube, ensuring the rack engages with the wheelbox teeth.
4. Position wiper motor to mounting pad.
5. Connect multiplug to wiper motor.
6. Position wiper motor retaining strap and secure with screws.
7. Tighten nut securing cable rack tube to wiper motor.
8. Connect earth lead to wiper motor.
9. Position emission canister purge valve to body, fit bolts and tighten to 9 Nm.
10. Connect emission canister pipe to purge valve and secure with 'E' clip.
11. Fit wiper arms. **See this section.**
12. Connect battery earth lead.

WINDSCREEN WIPER WHEEL BOX AND CABLE RACK TUBE

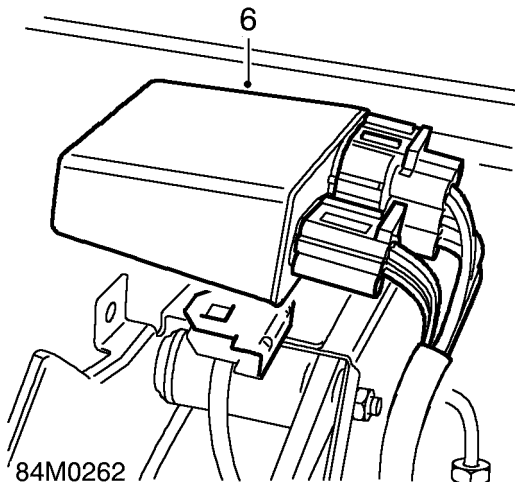
Service repair no - 84.15.27

Remove

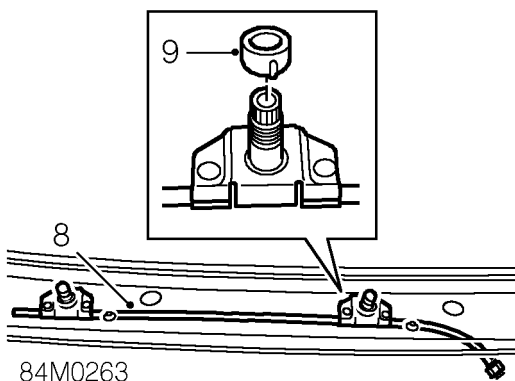
1. Remove windscreen wiper motor. **See this section.**
2. Remove air cleaner. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**



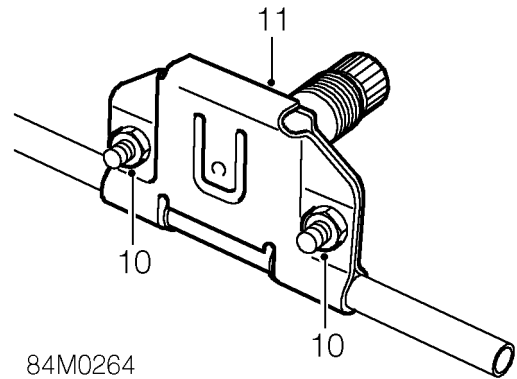
3. Disconnect washer tube from washer jets.
4. Remove 2 nuts securing wiper wheel boxes to body.
5. Remove rubber spacers from wheel boxes.



6. Release engine management relay module from mounting bracket and position aside.
7. Release wheel boxes from body.



8. Rotate wheel box and cable rack tube assembly and remove from vehicle.
9. Collect 2 rubber spacers.



10. Loosen nuts securing wiper wheel boxes to cable rack tube.
11. Remove wiper wheel boxes.

Refit

1. Lubricate wheel box gears and spindles.
2. Fit wheel boxes to cable rack tube but do not tighten securing nuts.
3. Fit rubber spacers to wheel box spindles.
4. Position wheel box and cable rack tube assembly to body.
5. Fit rubber spacers to wheel box spindles, fit nuts and tighten to 10 Nm.
6. Secure engine management relay module to mounting bracket.
7. Fit wiper motor. **See this section.**
8. Operate wiper motor and check that wipers move smoothly across screen.
9. Tighten nuts securing wheel boxes to cable rack tube.
10. Connect washer tube to washer jets.
11. Fit air cleaner. **See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.**

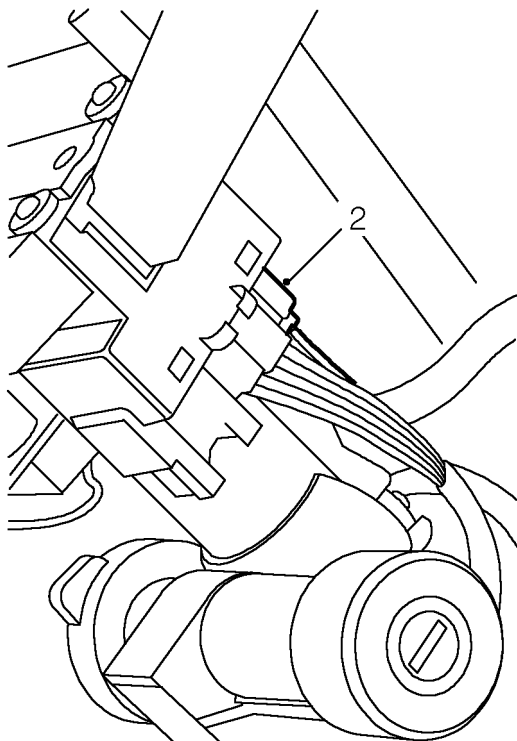


WINDSCREEN WASHER AND WIPER SWITCH

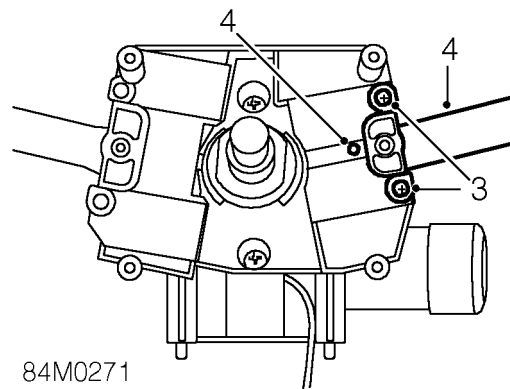
Service repair no - 84.15.34

Remove

1. Remove rotary coupler. *See ELECTRICAL, Repairs.*



2. Disconnect multiplug from switch.



3. Remove 2 screws securing switch to switch assembly
4. Depress retaining tag and remove switch.

Refit

1. Fit windscreen washer and wiper switch to switch assembly and secure with screws.
2. Connect multiplug to switch.
3. Fit rotary coupler. *See ELECTRICAL, Repairs.*

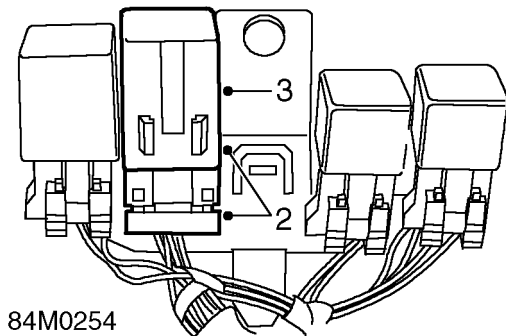
WIPERS & WASHERS

DELAY UNIT

Service repair no - 84.15.36

Remove

1. Remove fascia panel. *See BODY, Interior trim components.*



2. Release delay unit multiplug from mounting bracket.
3. Remove delay unit from multiplug.

Refit

1. Fit delay unit to multiplug and secure multiplug to mounting bracket.
2. Fit fascia panel. *See BODY, Interior trim components.*

CONTENTS

Page

DESCRIPTION AND OPERATION

ELECTRICAL CONTROL UNIT LOCATIONS	1
---	---

ADJUSTMENTS

AUXILIARY DRIVE BELT	1
HEADLAMP ADJUST	2

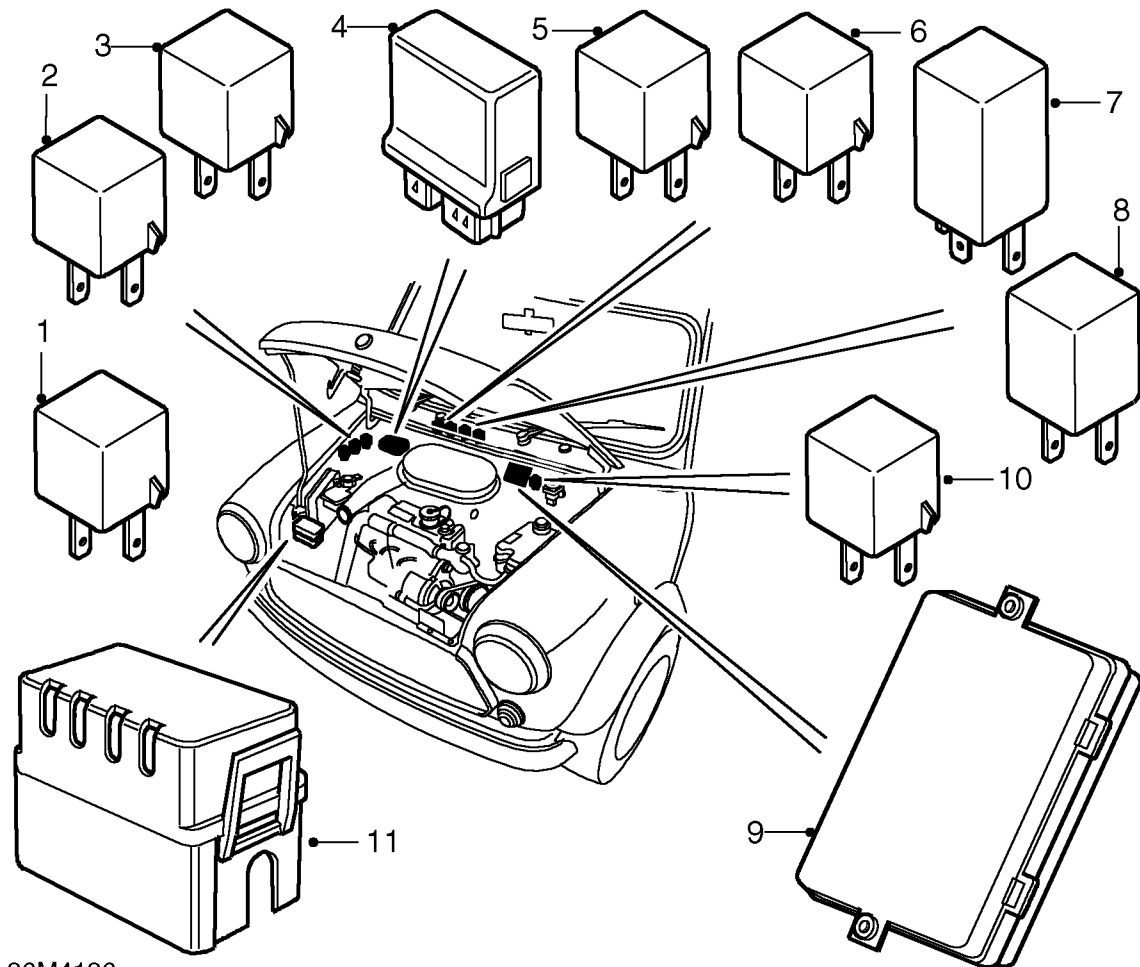
REPAIRS

ALTERNATOR	1
AUXILIARY DRIVE BELT	2
ALTERNATOR PULLEY	2
AUXILIARY DRIVE BELT TENSIONER	3
HORN	4
HEADLAMP	5
FRONT INDICATOR LAMP	6
SIDE REPEATER LAMP	6
TAIL LAMP	7
FOG OR DRIVING LAMP	9
HEADLAMP ADJUSTER UNIT	9
RADIO	10
REAR SPEAKER	11
AERIAL	11
COAXIAL CABLE	12
HORN RELAY	14
DIRECTION INDICATOR RELAY	14
FOG/DRIVING LAMP RELAY	15
AUXILIARY CIRCUITS RELAY	15
FLASHER UNIT	16
ANTI THEFT ALARM - ECU	16
STARTER MOTOR	17
HEADLAMP LEVELLING SWITCH	18
DRIVING/FOG LAMP SWITCH	19
HEATED REAR SCREEN SWITCH	20
HAZARD WARNING LIGHT SWITCH	21
INDICATOR/HEADLAMP SWITCH	22
STEERING COLUMN SWITCH ASSEMBLY	22
REAR FOG LAMP SWITCH	24
ROTARY COUPLER	25
ENGINE COMPARTMENT FUSE BOX	26
PASSENGER COMPARTMENT FUSE BOX	27
CD PLAYER	28





ELECTRICAL CONTROL UNIT LOCATIONS



86M4186

- | | |
|-----------------------------------|--|
| 1. Front fog light relay | 7. Wash/wipe delay unit |
| 2. Driving light relay | 8. Direction indicator/hazard warning flasher unit |
| 3. Direction indicator relay | 9. Anti theft alarm - ECU |
| 4. Engine management relay module | 10. Cooling fan relay |
| 5. Horn relay | 11. Engine compartment fuse box |
| 6. Auxiliary circuits relay | |

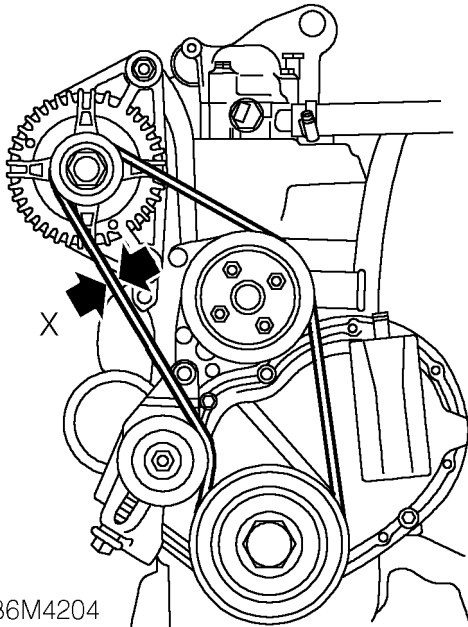


AUXILIARY DRIVE BELT

Service repair no - 86.10.05

Check

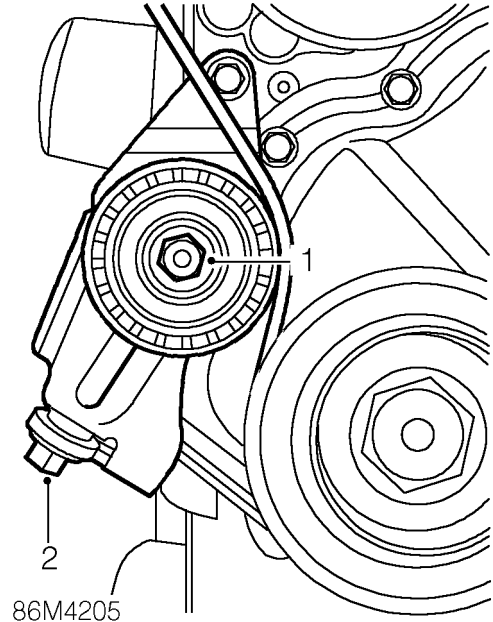
1. Remove nut and bolt securing auxiliary drive belt cover.
2. Remove auxiliary drive belt cover.
3. Check condition of drive belt, renew a drive belt that shows signs of wear and splitting.



86M4204

4. Apply a force of 10 kg to the drive belt at position 'X' and measure the deflection between the crankshaft pulley and alternator pulley.
Deflection must be 6 - 8 mm.

Adjust



86M4205

1. Loosen tensioner pulley retaining nut.
2. Increase drive belt tension by turning the tension adjusting bolt clockwise.



CAUTION: Do not apply excessive torque to adjusting bolt or damage to bolt will result. If bolt appears to be seized or is difficult to turn, apply suitable anti-seize lubricant to bolt.

3. Tighten tensioner pulley retaining nut to 25 Nm.
4. Recheck drive belt tension.
5. Fit auxiliary drive belt cover and secure with nut and bolt.

ELECTRICAL

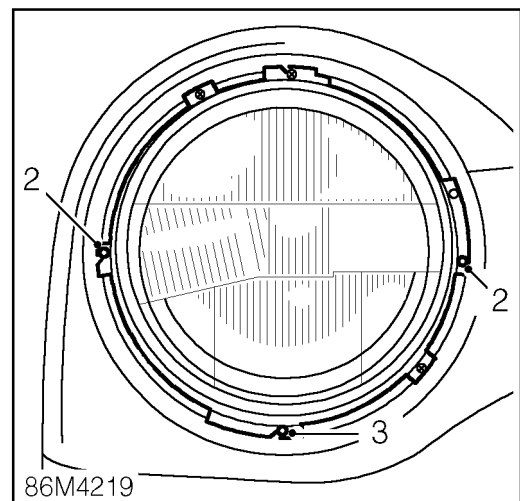
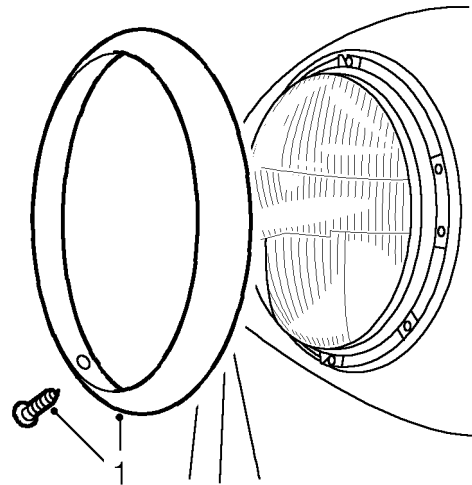
HEADLAMP ADJUST

Service repair no - 86.40.17

Inspect

1. Align suitable beam setting equipment to headlamp.
2. Ensure headlamp levelling switch is in position '0' and switch on headlamps.
Headlamp setting = 1.4% below horizontal and parallel.

Adjust



1. Remove screw securing headlamp finisher and remove.
2. Turn screws for vertical alignment.
3. Turn screw for horizontal alignment.
4. Fit headlamp finisher and secure with screw.
5. Align beam setting equipment to 2nd headlamp.
6. Adjust 2nd headlamp as detailed in steps 1 to 3 above.
7. Switch off headlamps.
8. Remove beam setter.

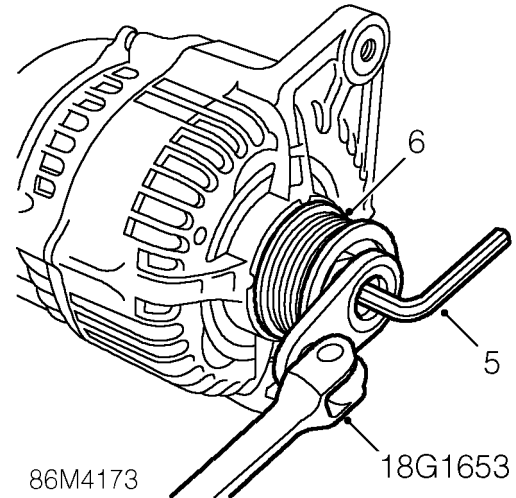
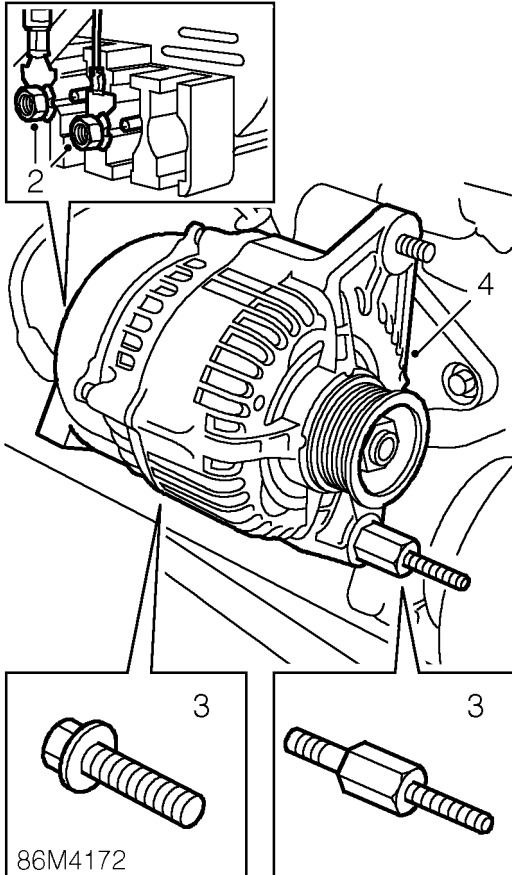


ALTERNATOR

Service repair no - 86.10.02

Remove

1. Remove auxiliary drive belt. **See this section.**



5. Hold alternator shaft with an 8 mm Allen key and remove pulley retaining nut with **18G 1653**.
6. Remove alternator pulley.

Refit

1. Clean mating face of alternator pulley and shaft.
2. Fit pulley to alternator and tighten nut to 25 Nm.
3. Fit alternator.
4. Fit and tighten bolts and nut and bolt securing alternator.
5. Connect leads to alternator and tighten nuts.
6. Fit auxiliary drive belt. **See this section.**

2. Remove 2 nuts and disconnect leads from alternator.
3. Remove 2 bolts and nut and bolt securing alternator.
4. Remove alternator.

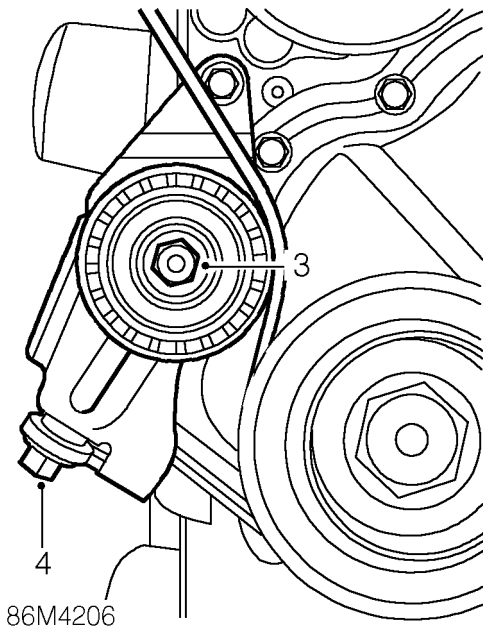
ELECTRICAL

AUXILIARY DRIVE BELT

Service repair no - 86.10.03

Remove

1. Disconnect battery earth lead.
2. Remove nut and bolt securing drive belt cover and remove cover.



3. Loosen tensioner pulley retaining nut.
4. Release drive belt tension by turning the tension adjusting bolt clockwise and remove drive belt.

CAUTION: Do not apply excessive torque to adjusting bolt or damage to bolt will result. If bolt appears to be seized or is difficult to turn, apply suitable anti-seize lubricant to bolt.

Refit

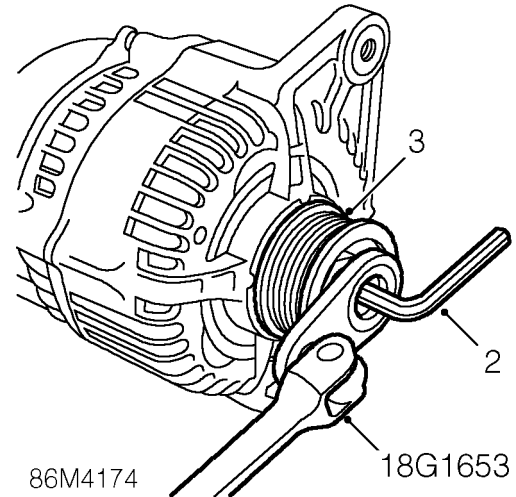
1. Clean pulleys.
2. Fit new drive belt to pulleys. Ensure grooves on pulleys and drive belt are correctly located.
3. Adjust drive belt tension. **See Adjustments.**
4. Connect battery earth lead.

ALTERNATOR PULLEY

Service repair no - 86.10.04

Remove

1. Remove auxiliary drive belt. **See this section.**



2. Hold alternator shaft with an 8 mm Allen key and remove pulley retaining nut with **18G 1653**.
3. Remove alternator pulley.

Refit

1. Clean mating face of alternator pulley and shaft.
2. Fit pulley to alternator and tighten nut to 25 Nm.
3. Fit auxiliary drive belt. **See this section.**

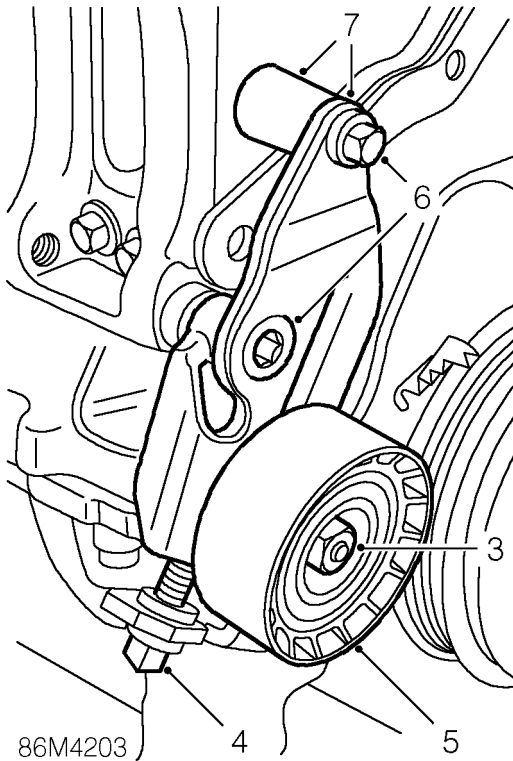


AUXILIARY DRIVE BELT TENSIONER

Service repair no - 86.10.06

Remove

1. Disconnect battery earth lead.
2. Remove auxiliary drive belt cover. **See Adjustments.**



3. Loosen nut securing auxiliary drive belt tensioner pulley.
4. Turn tensioner adjusting bolt clockwise to release belt tension.
5. Remove nut securing tensioner pulley and remove pulley.
6. Remove Torx screw and bolt securing tensioner.
7. Remove tensioner and spacer.

Refit

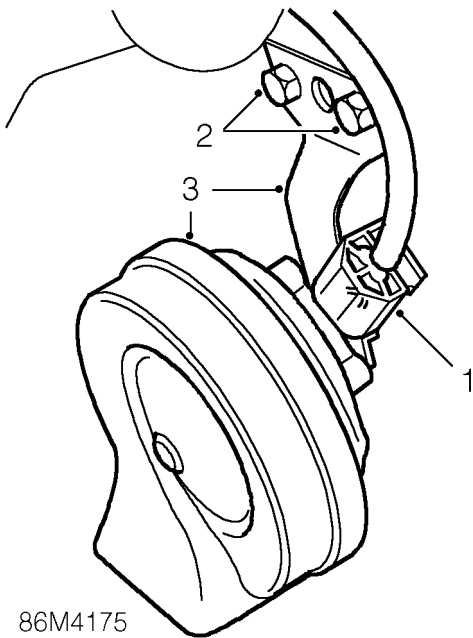
1. Clean mating face of pulley and pulley mounting bracket.
2. Fit tensioner pulley and tighten nut sufficiently only to stop pulley tilting.
3. Tension auxiliary drive belt. **See Adjustments.**
4. Connect battery earth lead.

ELECTRICAL

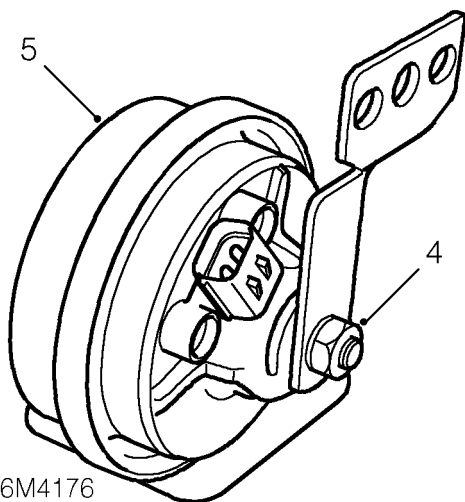
HORN

Service repair no - 86.30.10

Remove



1. Disconnect multiplug from horn.
2. Remove 2 bolts securing horn mounting bracket to body.
3. Remove horn and mounting bracket.



4. Remove nut and washer securing horn to mounting bracket.
5. Remove horn.

Refit

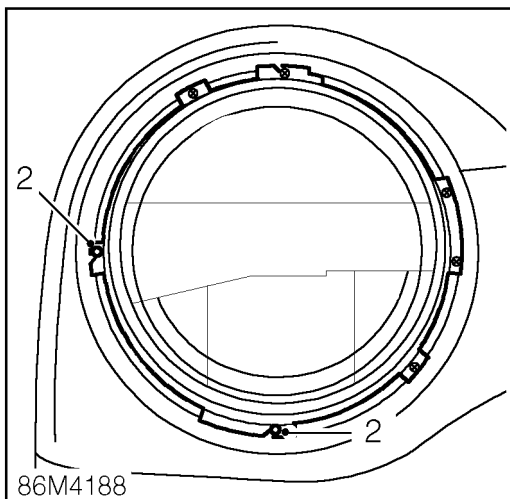
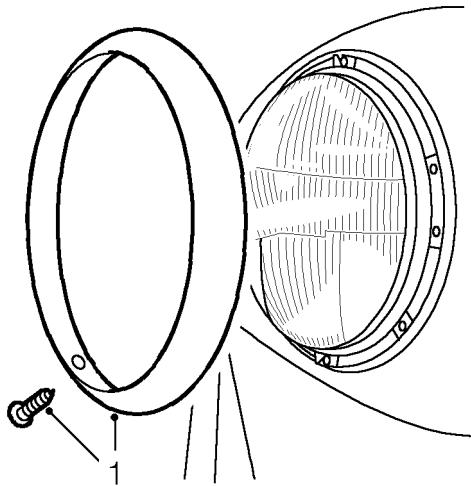
1. Fit horn to mounting bracket.
2. Fit nut and washer securing horn to mounting bracket and tighten to 10 Nm.
3. Align horn mounting bracket to body, fit bolts and tighten to 9 Nm.
4. Connect multiplug to horn.



HEADLAMP

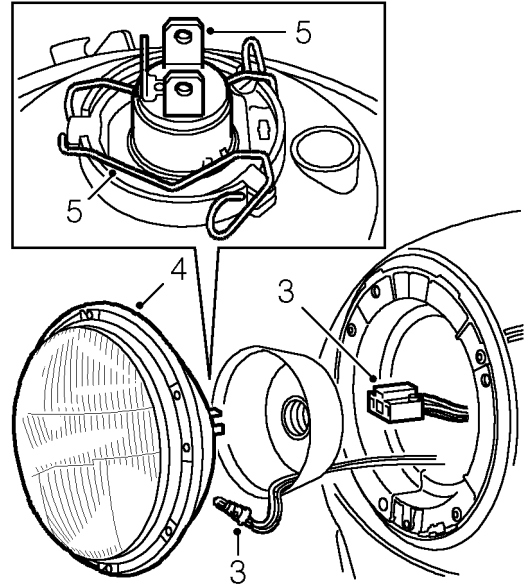
Service repair no - 86.40.27

Remove



86M4188

1. Remove screw securing headlamp finisher and remove finisher.
2. Release headlamp unit from RH retaining screw and levelling pivot.



86M4189

3. Pull unit forward and disconnect headlamp bulb multiplug and pilot lamp bulb.
4. Remove headlamp.
5. Release clip securing bulb to headlamp and remove bulb.

Refit

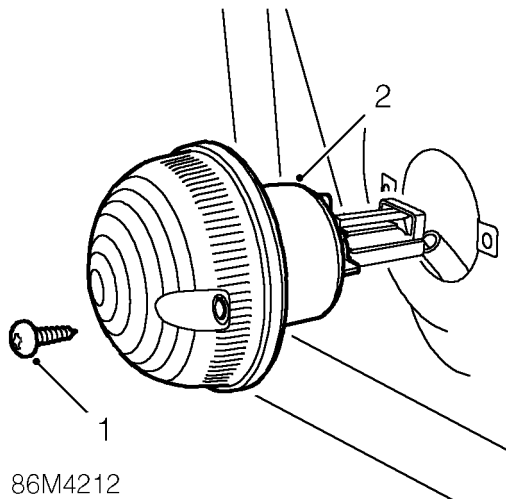
1. Fit bulb to headlamp and secure with clip.
2. Position headlamp unit, connect pilot lamp bulb and multiplug. Secure bulb cover.
3. Position headlamp unit to levelling pivot and secure to retaining screws.
4. Fit headlamp finisher and tighten screw.

ELECTRICAL

FRONT INDICATOR LAMP

Service repair no - 86.40.42

Remove



1. Remove 2 screws securing lamp to body.
2. Release lamp and disconnect bulb holder.

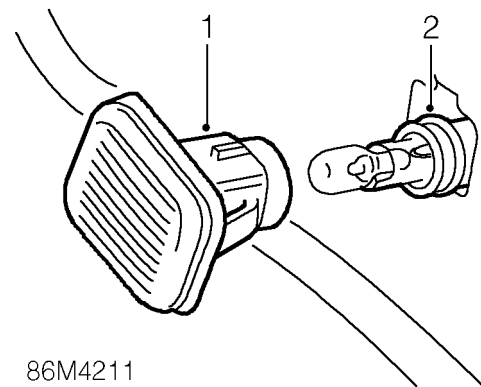
Refit

1. Connect bulb holder to lamp.
2. Position lamp to body and secure with screws.

SIDE REPEATER LAMP

Service repair no - 86.40.51

Remove



1. Squeeze lugs on repeater lamp to release from wing.
2. Release bulb holder from repeater lamp.

Refit

1. Connect bulb holder to repeater lamp.
2. Fit repeater lamp to wing.



TAIL LAMP

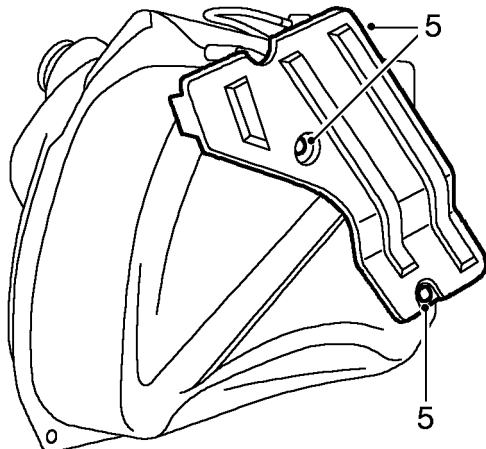
Service repair no -
 LH - 86.40.70
 RH - 86.40.71

Remove

1. Remove boot carpet.

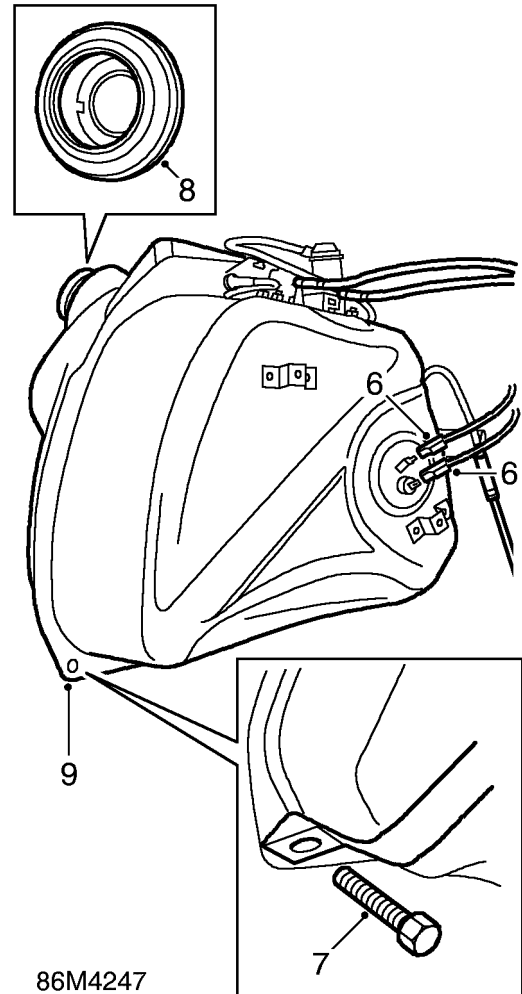
LH side only

2. Drain fuel tank. **See FUEL DELIVERY SYSTEM, Repairs.**
3. Remove spare wheel.
4. Disconnect battery earth lead.



86M4246

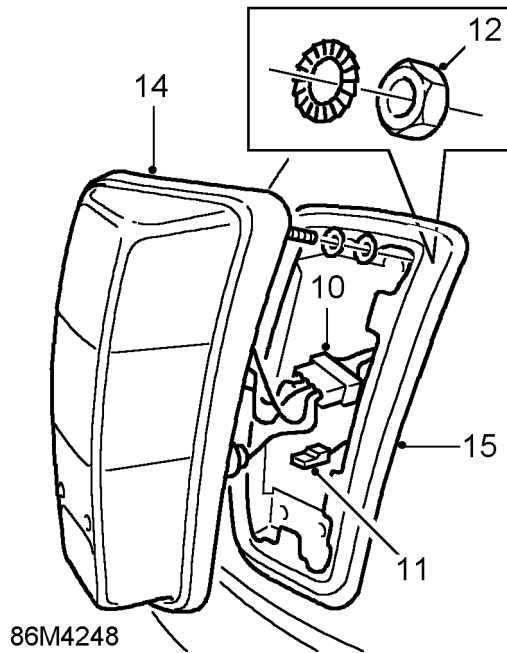
5. Remove studs securing fuel tank side 12 cover and remove cover.



86M4247

6. Disconnect 2 Lucars from fuel tank sender unit.
7. Remove bolt securing fuel tank retaining strap and move strap aside.
8. Release tank from filler neck grommet.
9. Manoeuvre fuel tank into boot space.

Both sides



10. Disconnect multiplug from tail lamp.
11. Disconnect Lucar from tail lamp.
12. Remove 4 nuts securing tail lamp to body.
13. Disconnect earth lead(s) from stud.
14. Remove tail lamp assembly.
15. Remove tail lamp seal.

Refit

1. Fit seal to tail lamp.
2. Clean mating faces of tail lamp and body.
3. Fit tail lamp assembly to body, fit earth lead(s) to stud.
4. Fit nuts securing tail lamp to body and tighten to 9 Nm.
5. Connect multiplug to tail lamp.

LH side only

6. Manoeuvre fuel tank into position and position restraining strap.
7. Fit and tighten strap retaining bolt.
8. Connect Lucars to sender unit.
9. Fit fuel tank side cover and secure with studs.
10. Position spare wheel
11. Fit boot carpet.
12. Refill fuel tank with fuel.
13. Connect battery earth lead.

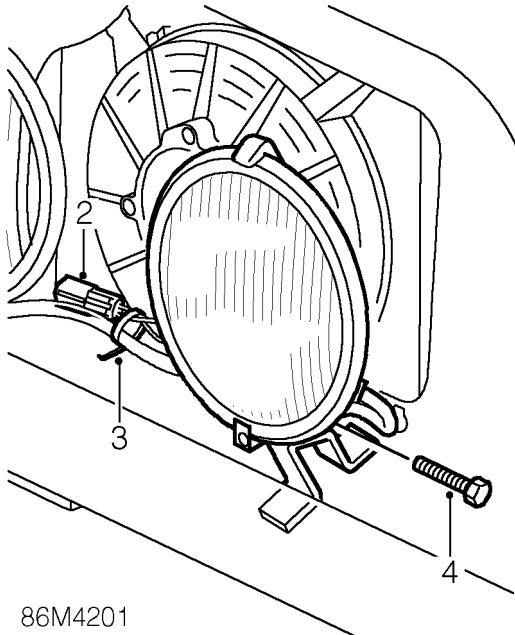


FOG OR DRIVING LAMP

Service repair no - 86.40.96

Remove

1. Remove front grille. *See BODY, Exterior fittings.*



2. Disconnect multiplug from lamp.
3. Release cable tie securing harness to body.
4. Remove bolt securing lamp to mounting bracket and remove lamp.

Refit

1. Position lamp to mounting bracket, fit and tighten bolt.
2. Connect multiplug to lamp and secure harness to body with cable tie.
3. Fit front grille. *See BODY, Exterior fittings.*

HEADLAMP ADJUSTER UNIT

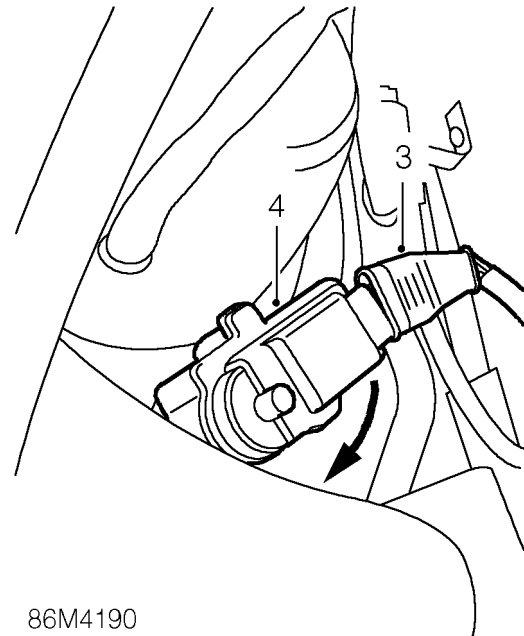
Service repair no - 86.41.16

Remove

1. Remove headlamp light unit. *See this section.*
2. Raise front of vehicle.



WARNING: Support on safety stands.



3. Locate headlamp adjuster under wing and pull back multiplug cover. Disconnect multiplug.
4. Rotate adjuster clockwise and release from headlamp.

Refit

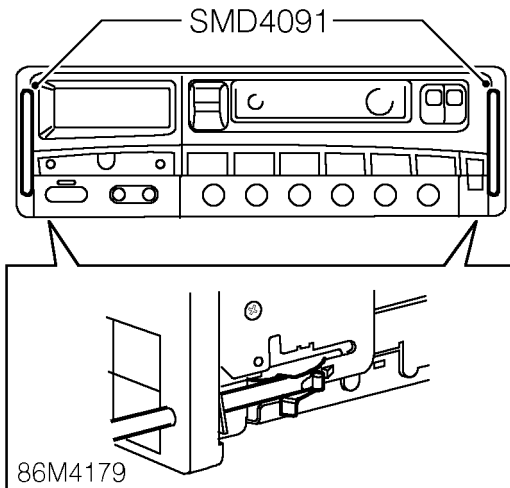
1. Position adjuster to headlamp and rotate to position.
2. Connect multiplug to adjuster and secure cover.
3. Fit headlamp light unit. *See this section.*
4. Remove stand(s) and lower vehicle.

ELECTRICAL

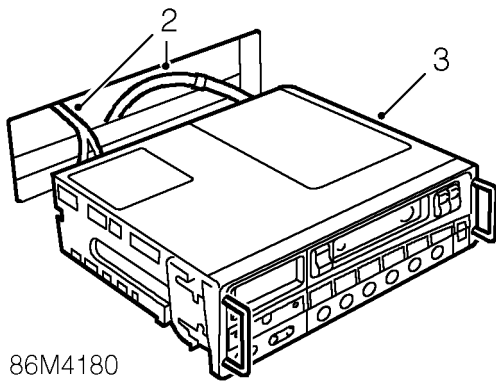
RADIO

Service repair no - 86.50.03

Remove



1. Fit radio removal tools **SMD 4091** to release retaining clips. Pull on tools to release radio from fascia.



2. Disconnect 2 multiplugs and aerial lead from radio.
3. Remove radio and remove tools from radio.

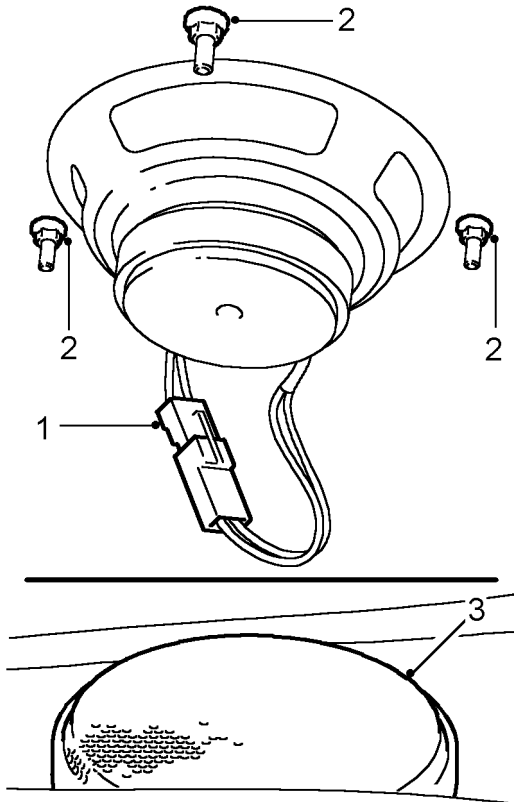
Refit

1. Position radio to aperture. Connect multiplugs and aerial lead.
2. Slide radio into fascia until retaining clips engage.
3. Enter security code and check radio for correct operation.



REAR SPEAKER

Service repair no - 86.50.12

Remove

86M4249

1. Disconnect speaker multiplug from harness.
2. From within boot area, remove 3 nuts securing speaker to body.
3. Remove speaker from rear parcel shelf.

Refit

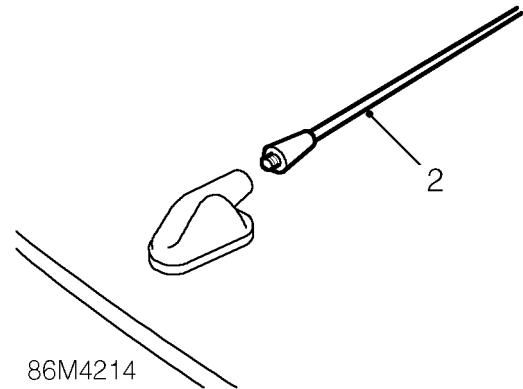
1. Fit speaker to parcel shelf.
2. Fit nuts securing speaker to body and tighten to 9 Nm.
3. Connect speaker multiplug to harness.

AERIAL

Service repair no - 86.50.18

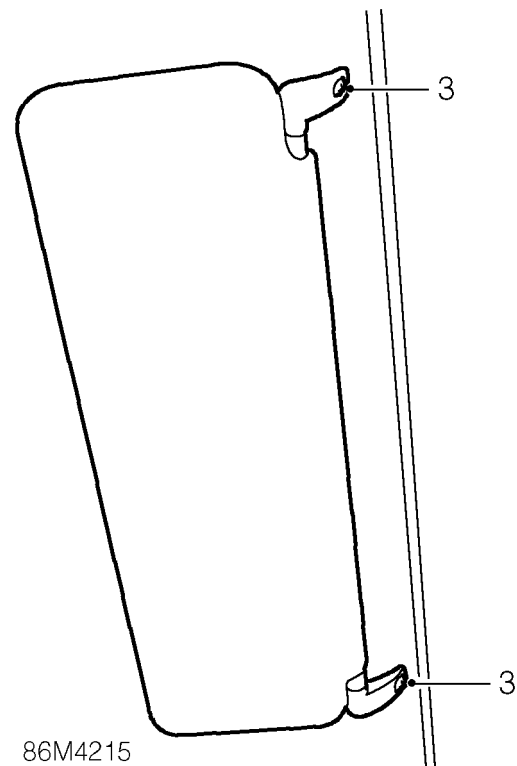
Remove

1. Remove windscreen. *See BODY, Screens.*



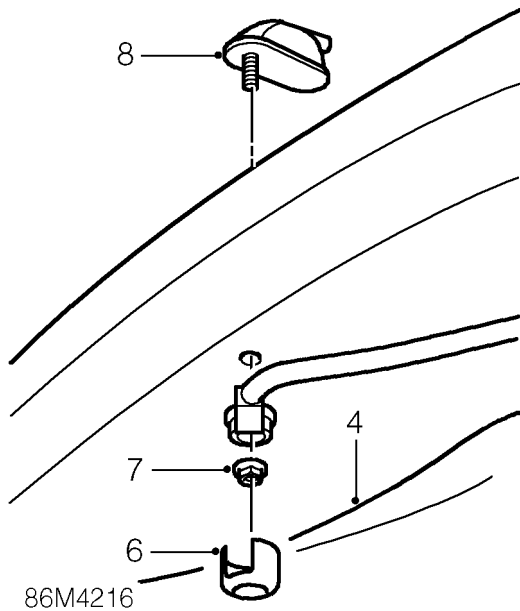
86M4214

2. Unscrew and remove aerial from aerial base.



86M4215

3. Remove 2 screws securing LH sun visor to roof and remove.



4. Release roof lining from front upper flange of windscreen aperture.
5. Carefully lower front edge of roof lining to gain access to aerial.
6. Remove cover from coaxial cable.
7. Remove nut securing coaxial cable to aerial base.
8. Remove aerial base from roof.

Refit

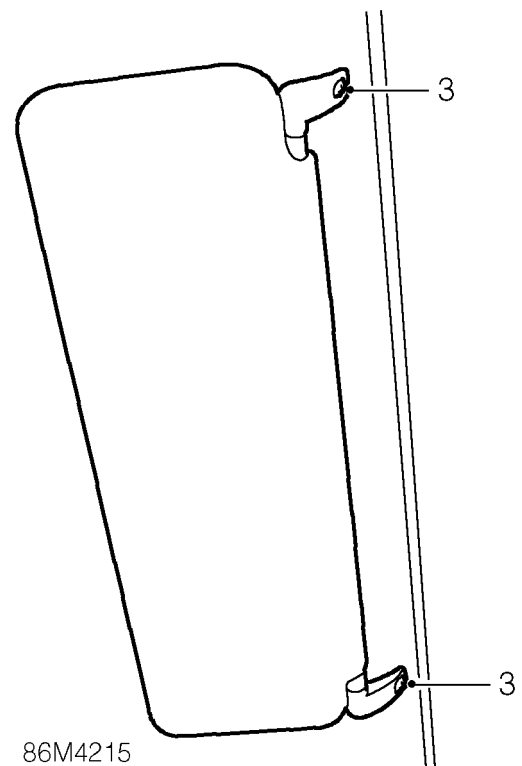
1. Clean mating face of aerial base and vehicle roof.
2. Fit aerial base to roof.
3. Connect coaxial cable to aerial base.
4. Fit nut securing coaxial cable to aerial base and tighten to 9 Nm.
5. Fit cover to coaxial cable.
6. Apply adhesive to edge of roof lining and carefully secure to windscreen aperture.
7. Position LH sun visor and secure with screws.
8. Fit windscreen. **See BODY, Screens.**

COAXIAL CABLE

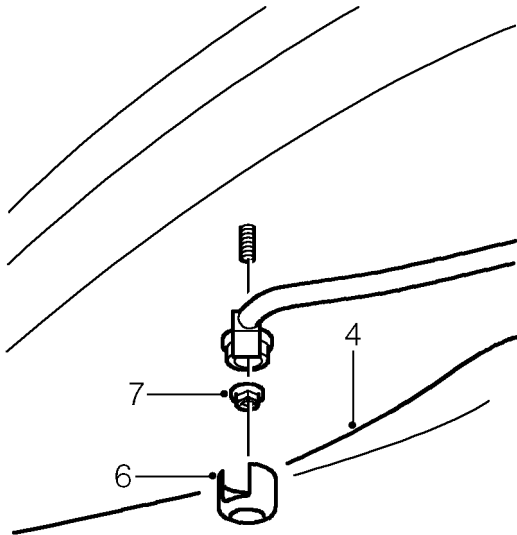
Service repair no - 86.50.24

Remove

1. Remove fascia. **See BODY, Interior trim components.**
2. Remove windscreen. **See BODY, Screens.**



3. Remove 2 screws securing LH sun visor to roof.

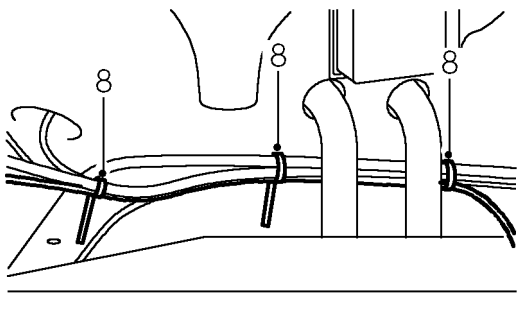


86M4217

Refit

1. Attach draw string to the radio end of the new coaxial cable and pull cable into position.
2. Remove draw string.
3. Secure coaxial cable to main harness with cable ties.
4. Connect coaxial cable to aerial base.
5. Fit nut securing coaxial cable to aerial base and tighten to 9 Nm.
6. Fit cover to coaxial cable.
7. Apply adhesive to edge of roof lining and carefully secure to windscreen aperture.
8. Position LH sun visor and secure with screws.
9. Fit windscreen. **See BODY, Screens.**
10. Fit fascia. **See BODY, Interior trim components.**

4. Release roof lining from front upper flange of windscreen aperture.
5. Carefully lower front edge of roof lining to gain access to aerial.
6. Remove cover from coaxial cable.
7. Remove nut securing coaxial cable to aerial base.



86M4218

8. Remove 3 cable ties securing coaxial cable to body harness.
9. Tie a draw string to the radio end of the coaxial cable and withdraw cable into roof area.
10. Untie draw string and remove coaxial cable.

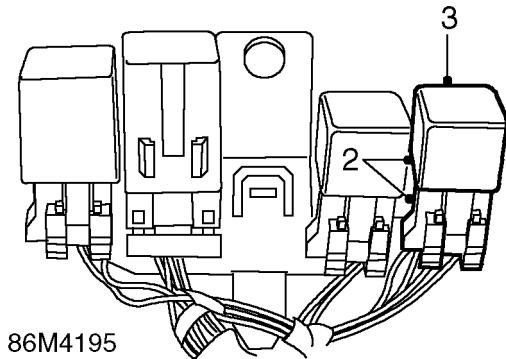
ELECTRICAL

HORN RELAY

Service repair no - 86.55.09

Remove

1. Remove fascia panel. *See BODY, Interior trim components.*



2. Release relay multiplug from mounting bracket.
3. Remove relay from multiplug.

Refit

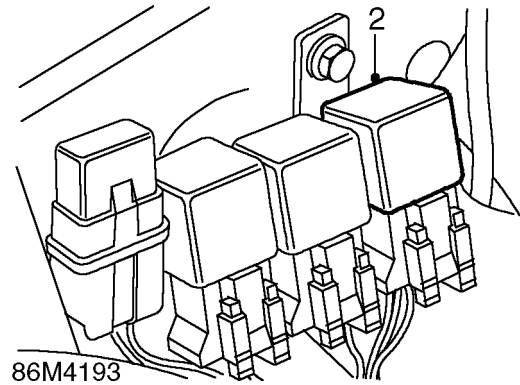
1. Fit relay to multiplug and secure multiplug to mounting bracket.
2. Fit fascia panel. *See BODY, Interior trim components.*

DIRECTION INDICATOR RELAY

Service repair no - 86.55.26

Remove

1. Open bonnet.



2. Remove relay from mounting bracket on RH wing valance.

Refit

1. Fit relay to mounting bracket.
2. Close bonnet.

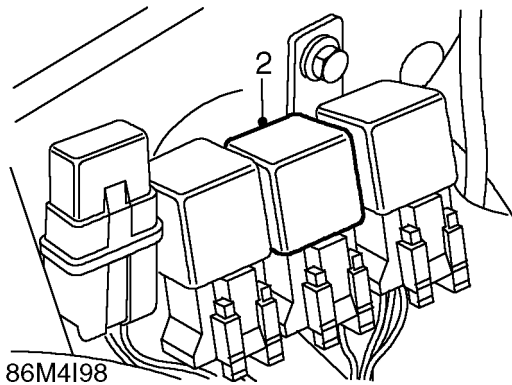


FOG/DRIVING LAMP RELAY

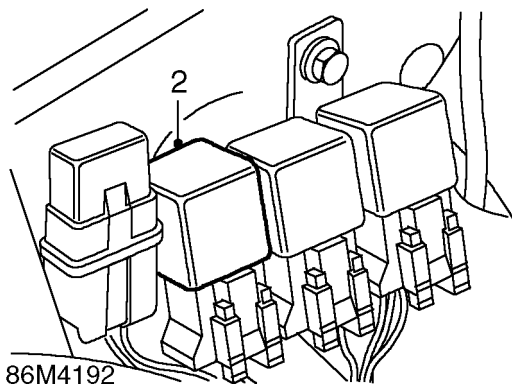
Service repair no - 86.55.51

Remove

1. Open bonnet.



Driving lamp relay



Fog lamp relay

2. Remove relay from mounting bracket on RH wing valance.

Refit

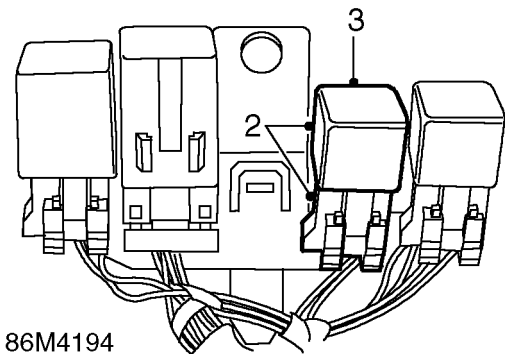
1. Fit relay to mounting bracket.
2. Close bonnet.

AUXILIARY CIRCUITS RELAY

Service repair no - 86.55.52

Remove

1. Remove fascia panel. *See BODY, Interior trim components.*



2. Release relay multiplug from mounting bracket.
3. Remove relay from multiplug.

Refit

1. Fit relay to multiplug and secure multiplug to mounting bracket.
2. Fit fascia panel. *See BODY, Interior trim components.*

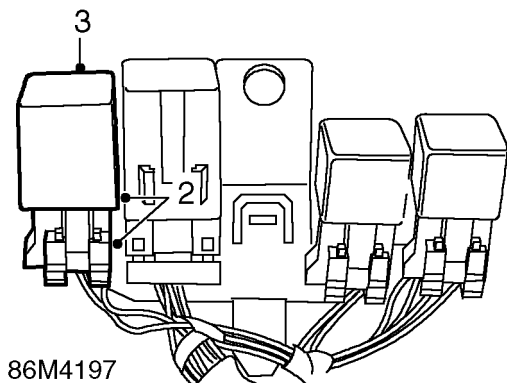
ELECTRICAL

FLASHER UNIT

Service repair no - 86.55.68

Remove

1. Remove fascia panel. *See BODY, Interior trim components.*



2. Release flasher unit multiplug from mounting bracket.
3. Remove flasher unit from multiplug.

Refit

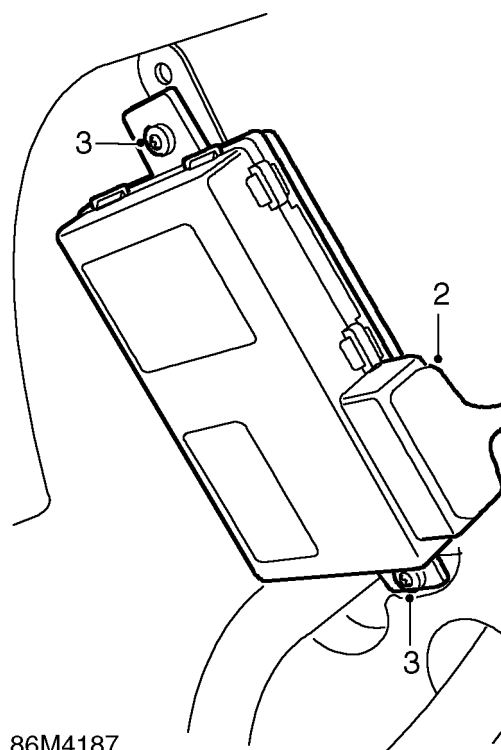
1. Fit flasher unit to multiplug and secure multiplug to mounting bracket.
2. Fit fascia panel. *See BODY, Interior trim components.*

ANTI THEFT ALARM - ECU

Service repair no - 86.55.85

Remove

1. Remove fascia panel. *See BODY, Interior trim components.*



2. Disconnect multiplug from anti theft alarm ECU.
3. Remove 2 screws securing ECU to mounting bracket.
4. Remove ECU.

Refit

1. Fit ECU to mounting bracket.
2. Fit and tighten screws.
3. Connect multiplug.
4. Fit fascia panel. *See BODY, Interior trim components.*



STARTER MOTOR

Service repair no - 86.60.01

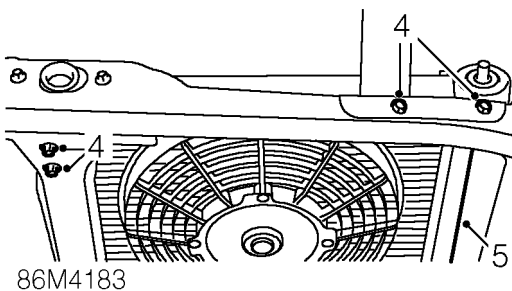
Remove

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



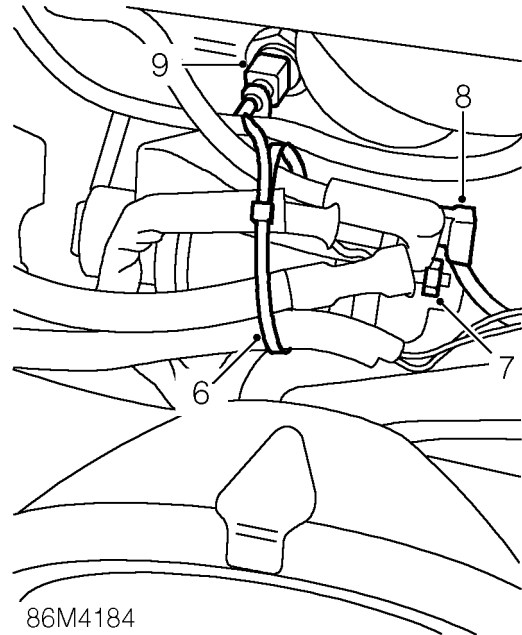
WARNING: Support on safety stands.

3. Remove front grille. *See BODY, Exterior fittings.*



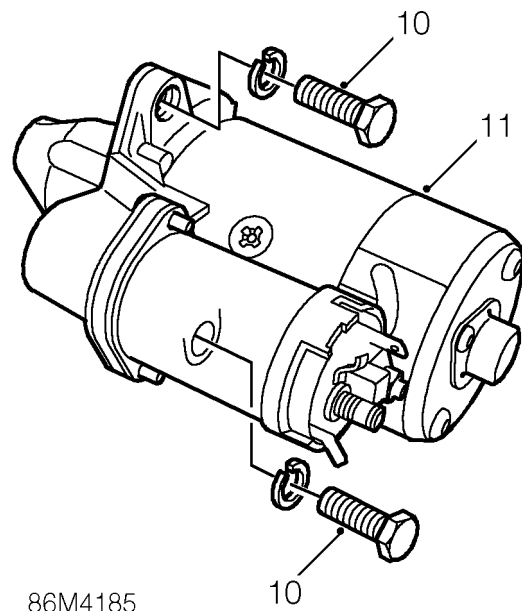
86M4183

4. Remove 4 bolts securing radiator upper mountings to bonnet platform.
5. Remove radiator from its lower mountings and move it to LH side for access to starter motor.



86M4184

6. Remove cable tie securing harness to starter motor solenoid.
7. Remove nut securing leads to starter solenoid.
8. Release Lucar connection from solenoid.
9. Disconnect multiplug from oil temperature transmitter



86M4185

10. Remove 2 bolts securing starter motor.
11. Remove starter motor.

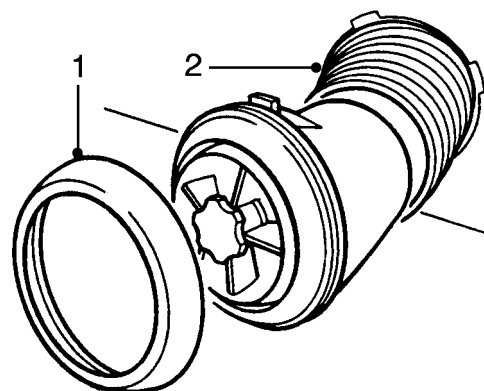
Refit

1. Ensure starter and mating face on flywheel housing is clean.
2. Fit starter motor and tighten bolts to 37 Nm.
3. Connect leads to solenoid terminal, fit nut and tighten to 4 Nm.
4. Connect Lucar to solenoid.
5. Connect multiplug to oil temperature transmitter.
6. Fit radiator to lower brackets
7. Align radiator upper brackets and secure with bolts.
8. Fit front grille. **See BODY, Exterior fittings.**
9. Remove stand(s) and lower vehicle.
10. Connect battery earth lead.

HEADLAMP LEVELLING SWITCH

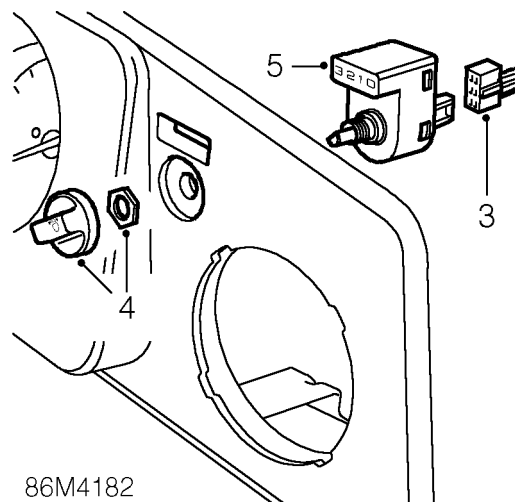
Service repair no - 86.65.16

Remove



86M4181

1. Remove fascia RH air vent locking ring. Release and remove air vent.
2. Remove air vent hose.



86M4182

3. Disconnect multiplug from headlamp levelling switch.
4. Remove knob from switch and remove nut securing switch to fascia panel.
5. Remove switch.



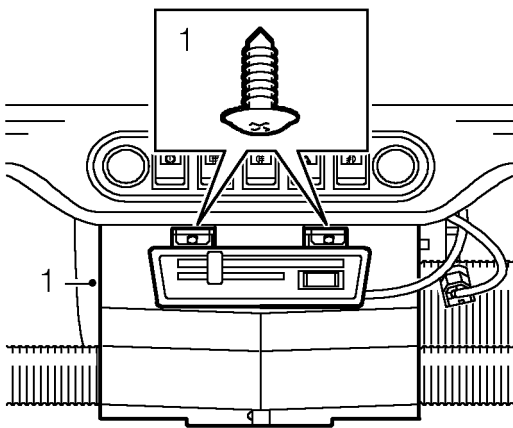
Refit

1. Position switch and tighten nut. Fit switch knob.
2. Connect multiplug.
3. Fit air vent hose.
4. Fit air vent and secure with locking ring.

DRIVING/FOG LAMP SWITCH

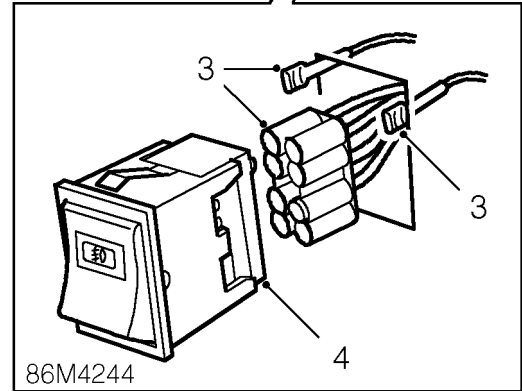
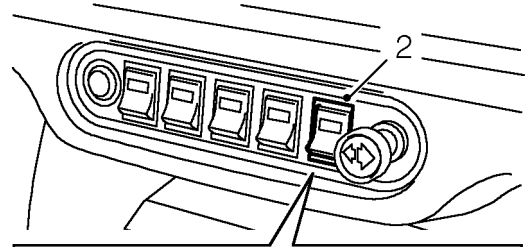
Service repair no - 86.65.35

Remove



86M4241

1. Remove 2 screws securing heater to fascia lower rail and lower heater.



2. Release switch from switch panel.
3. Disconnect multiplug and 2 Lucars from switch.
4. Remove switch.

Refit

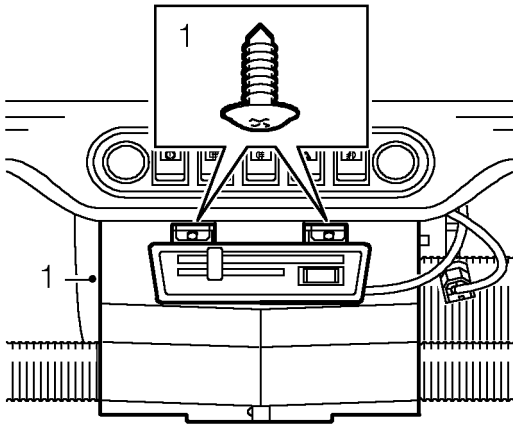
1. Position switch to panel.
2. Connect multiplug and Lucars to switch.
3. Fit switch to panel
4. Position heater to fascia rail and secure with screws.

ELECTRICAL

HEATED REAR SCREEN SWITCH

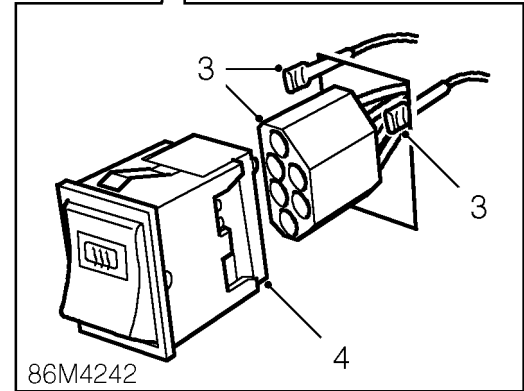
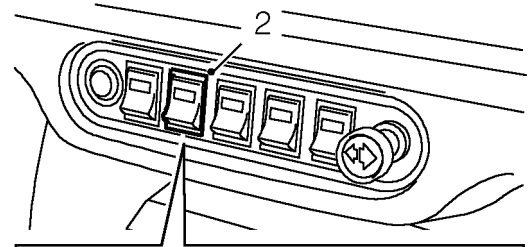
Service repair no - 86.65.36

Remove



86M4241

1. Remove 2 screws securing heater to fascia lower rail and lower heater.



2. Release switch from switch panel.
3. Disconnect multiplug and 2 Lucars from switch.
4. Remove switch.

Refit

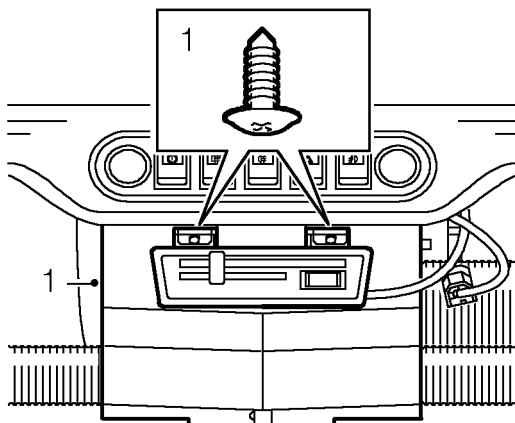
1. Position switch to panel.
2. Connect multiplug and Lucars to switch.
3. Fit switch to panel
4. Position heater to fascia rail and secure with screws.



HAZARD WARNING LIGHT SWITCH

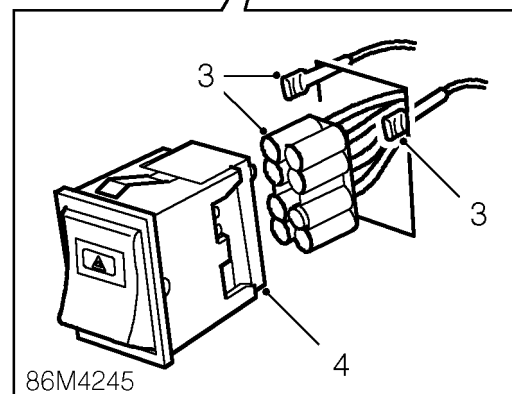
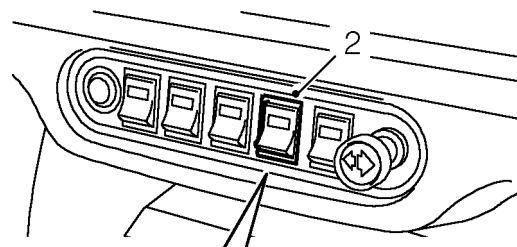
Service repair no - 86.65.50

Remove



86M4241

1. Remove 2 screws securing heater to fascia lower rail and lower heater.



86M4245

2. Release switch from switch panel.
3. Disconnect multiplug and 2 Lucars from switch.
4. Remove switch.

Refit

1. Position switch to panel.
2. Connect multiplug and Lucars to switch.
3. Fit switch to panel.
4. Position heater to fascia rail and secure with screws.

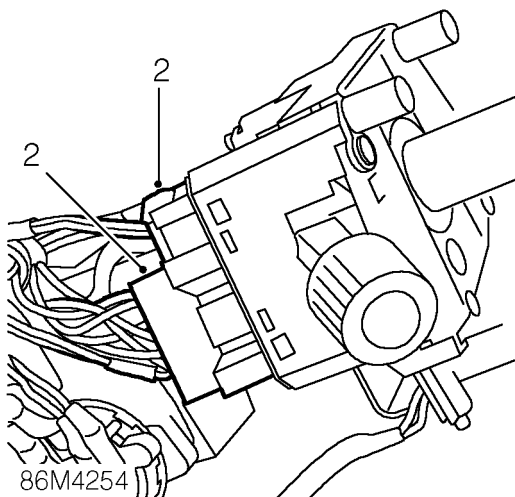
ELECTRICAL

INDICATOR/HEADLAMP SWITCH

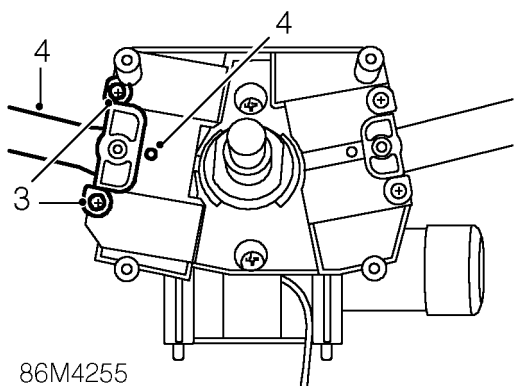
Service repair no - 86.65.55

Remove

1. Remove rotary coupler. **See this section.**



2. Disconnect 2 multiplugs from switch.



3. Remove 2 screws securing switch to switch assembly.
4. Depress retaining tag and remove switch.

Refit

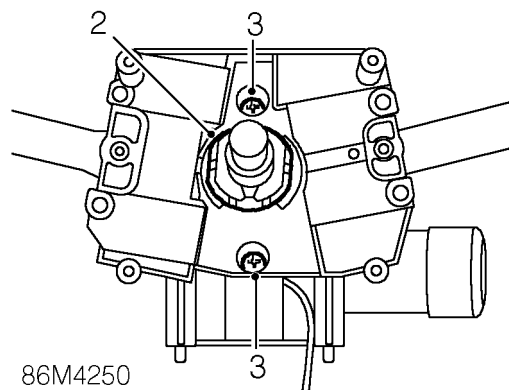
1. Fit indicator/headlamp switch to switch assembly and secure with screws.
2. Connect multiplugs to switch assembly.
3. Fit rotary coupler. **See this section.**

STEERING COLUMN SWITCH ASSEMBLY

Service repair no - 86.65.64

Remove

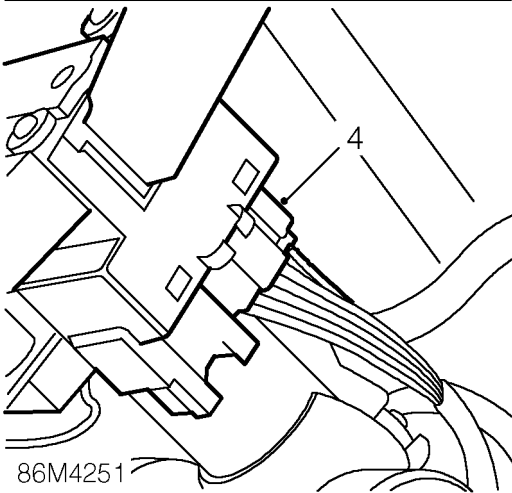
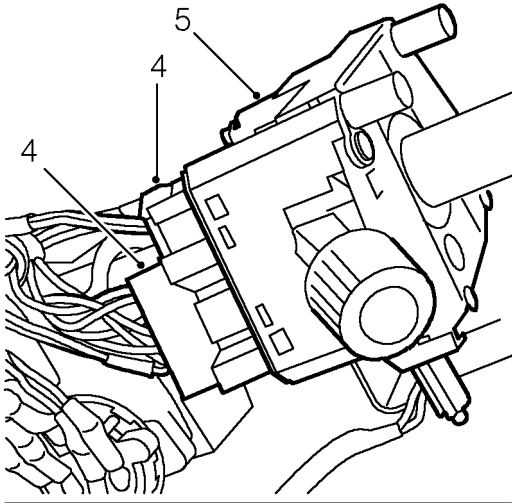
1. Remove rotary coupler. **See this section.**



2. Remove indicator cancelling cam from column.
3. Remove 2 screws securing switch assembly to steering column.

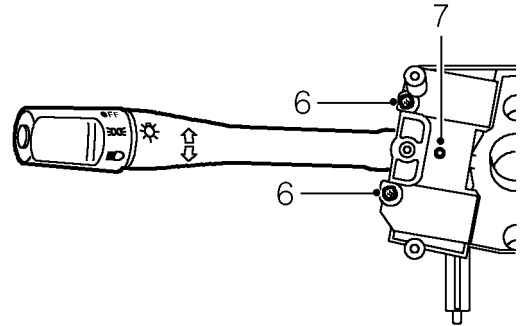


Do not carry out further dismantling if component is removed for access only.



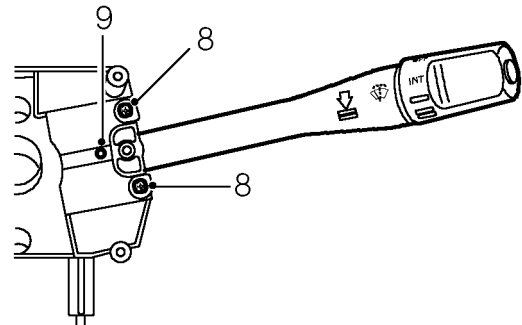
86M4251

4. Release switch assembly from column and disconnect 3 multiplugs.
5. Remove switch assembly.



86M4252

6. Remove 2 screws securing indicator/headlamp switch to switch assembly.
7. Depress retaining tag and remove indicator/headlamp switch.



86M4253

8. Remove 2 screws securing windscreen washer and wiper switch to switch assembly.
9. Depress retaining tag and remove windscreen washer and wiper switch.
10. Fit washer and wiper switch to switch assembly and secure with screws.
11. Fit indicator/headlamp switch to switch assembly and secure with screws.

Refit

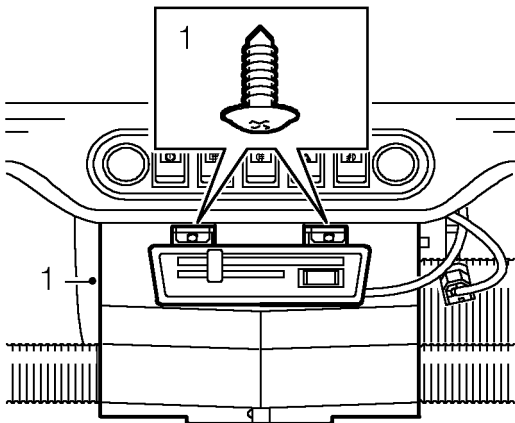
1. Position switch assembly to steering column, connect multiplugs and tighten retaining screws.
2. Fit direction indicator cancelling cam to steering column.
3. Fit rotary coupler. **See this section.**

ELECTRICAL

REAR FOG LAMP SWITCH

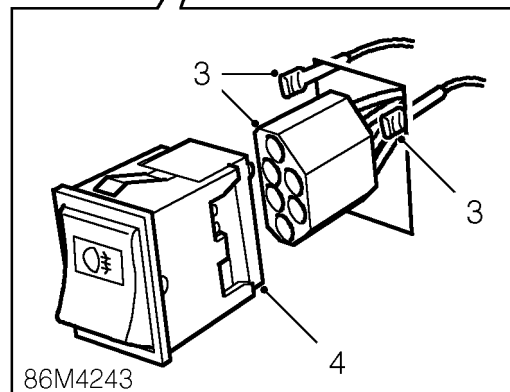
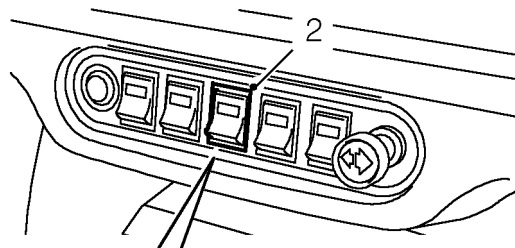
Service repair no - 86.65.65

Remove



86M4241

1. Remove 2 screws securing heater to fascia lower rail and lower heater.



2. Release switch from switch panel.
3. Disconnect multiplug and 2 Lucars from switch.
4. Remove switch.

Refit

1. Position switch to panel.
2. Connect multiplug and Lucars to switch.
3. Fit switch to panel
4. Position heater to fascia rail and secure with screws.



ROTARY COUPLER

Service repair no - 86.65.85

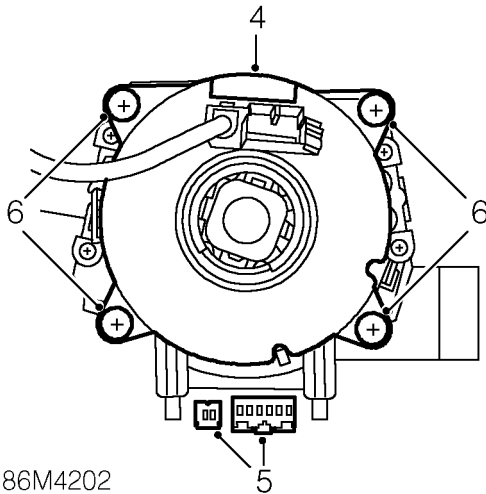


CAUTION: See SRS safety precautions before commencement of repair. See *RESTRAINT SYSTEMS, Precautions.*

- **Ensure wheels are aligned straight ahead.**

Remove

1. Remove key from starter switch, disconnect both battery leads, earth lead first, and wait 10 minutes for the SRS back-up power circuit to discharge before commencing work.
2. Remove steering column nacelle. **See *STEERING, Repairs.***
3. Remove steering wheel. **See *STEERING, Repairs.***



4. If the rotary coupler is being re-used place adhesive tape around moulding to prevent rotation.
5. Disconnect 2 multiplugs from rotary coupler.
6. Remove 4 screws and 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. Fit rotary coupler and secure with screws.
2. Connect multiplugs to rotary coupler.
3. Remove retaining tape from rotary coupler.
4. Fit steering column nacelle. **See *STEERING, Repairs.***
5. Fit steering wheel. **See *STEERING, Repairs.***

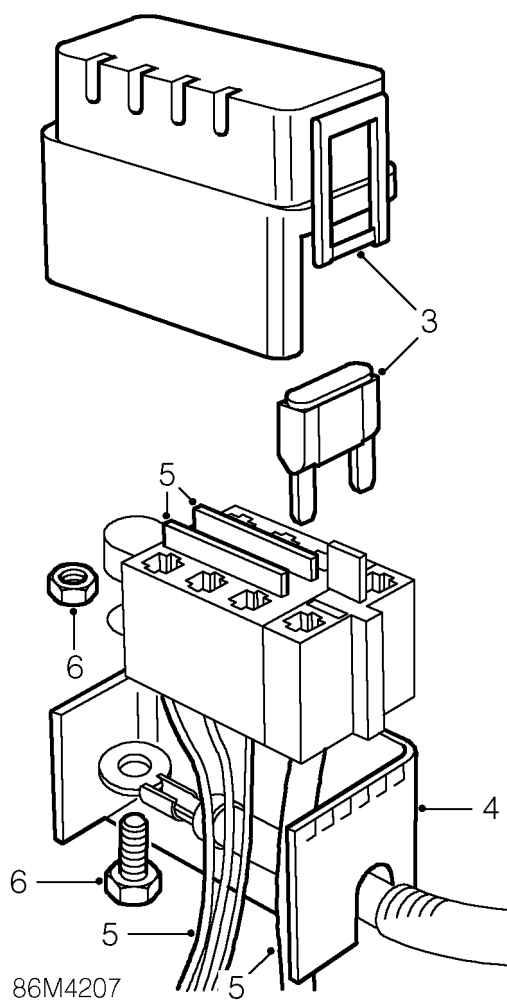
ELECTRICAL

ENGINE COMPARTMENT FUSE BOX

Service repair no - 86.70.01

Remove

1. Disconnect battery earth lead.
2. Release fuse box retainers from ECM mounting bracket.



3. Remove fuse box top cover and remove 4 fuses.
4. Release fuse box lower cover.
5. Remove fuse box lead anti-back out plates and release 4 leads from fuse box.
6. Remove nut and bolt and release starter lead from fuse box lower cover.

Refit

1. Remove cover from NEW fuse box.
2. Position starter lead to fuse box and tighten nut and bolt.
3. Remove anti-back out plates and secure leads to fuse box. Fit anti-back out plates to fuse box.
4. Fit fuses and fuse box top cover.
5. Position and secure fuse box to ECM mounting bracket.
6. Connect battery earth lead.

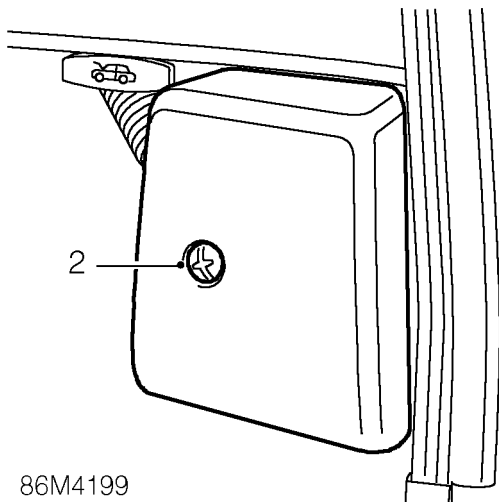


PASSENGER COMPARTMENT FUSE BOX

Service repair no - 86.70.04

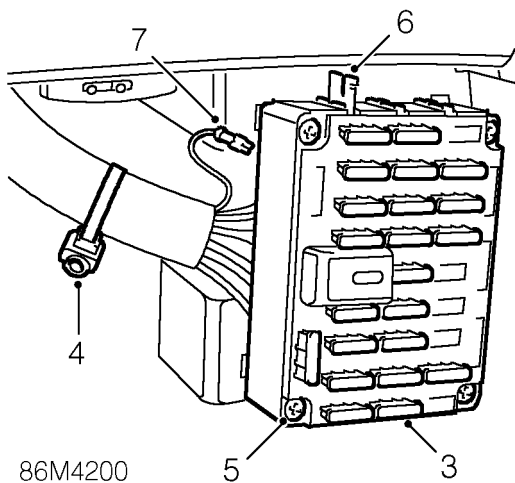
Remove

1. Disconnect battery earth lead.



86M4199

2. Release turnbuckle and remove fuse box cover.



86M4200

3. Note position and remove all fuses.
4. Release fuse box harness clip from stud on wheel arch.
5. Remove 4 screws and lower fuse box.
6. Release and remove 6 terminal retaining plates.
7. Note position and disconnect wires from rear of fuse box.

Refit

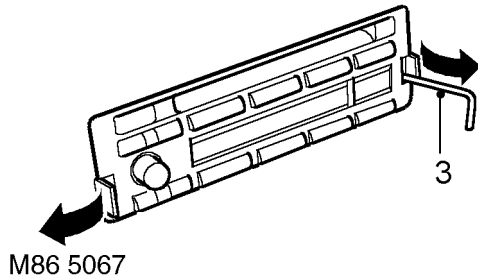
1. Remove terminal retaining plates from new fuse box.
2. Fit wires to fuse box.
3. Fit terminal retaining plates.
4. Fit fuse box and secure with 4 screws.
5. Secure harness to stud on wheel arch.
6. Fit and secure cover to fuse box.
7. Connect battery earth lead.

ELECTRICAL

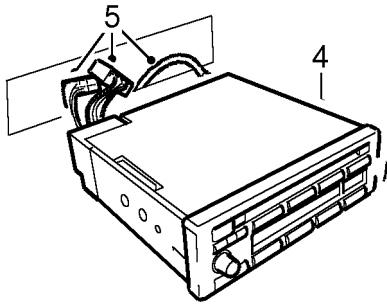
CD PLAYER

Remove

1. Disconnect battery earth lead.



2. Release access tab from each side of unit.
3. Using a 2.5 mm Allen key, slacken 2 captive screws securing unit.



4. Withdraw unit sufficiently to gain access to multiplugs and aerial lead.



CAUTION: Take care not to damage face of unit.

5. Noting their fitted positions, disconnect 2 multiplugs and aerial lead plug; remove unit.

Refit

1. Position unit, connect multiplugs and aerial lead plug.
2. Fit unit, tighten 2 captive screws.
3. Secure access tab to each side of unit.
4. Connect battery earth lead.
5. Enter security code and check unit for correct operation.

CONTENTS

Page

REPAIRS

BATTERY CONDITION INDICATOR	1
CLOCK	2
INSTRUMENT PANEL	3
PRINTED CIRCUIT	3
INSTRUMENT PANEL WINDOW	4
OIL TEMPERATURE GAUGE	5
COMBINED COOLANT TEMPERATURE GAUGE AND FUEL GAUGE	6
OIL TEMPERATURE GAUGE SENSOR	7
FUEL GAUGE TANK UNIT	7
SPEEDOMETER	8
SPEEDOMETER DRIVE CABLE	9
CABLE ASSEMBLY - SPEEDOMETER - UPPER	10
CABLE ASSEMBLY - SPEEDOMETER - LOWER	11
TACHOMETER	12



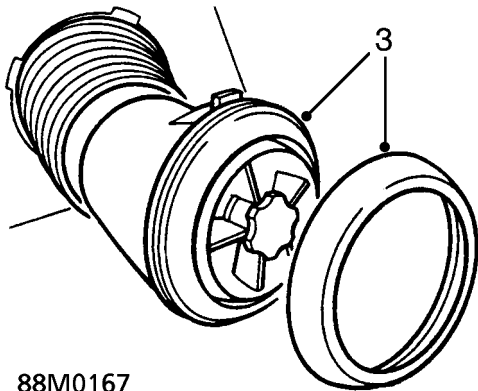


BATTERY CONDITION INDICATOR

Service repair no - 88.10.07

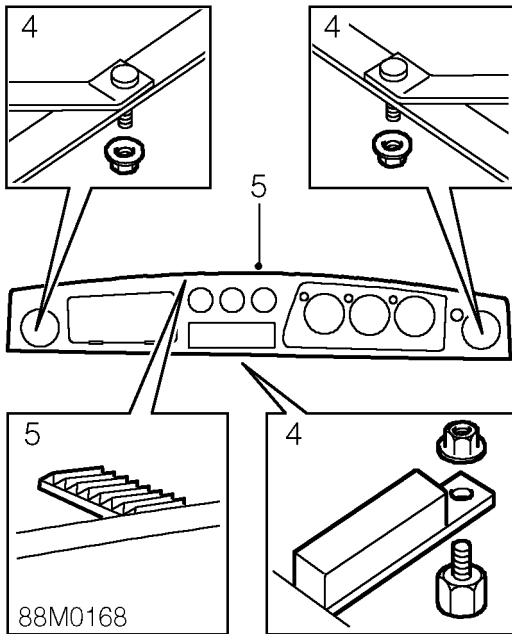
Remove

1. Disconnect battery earth lead.
2. Remove radio. *See ELECTRICAL, Repairs.*



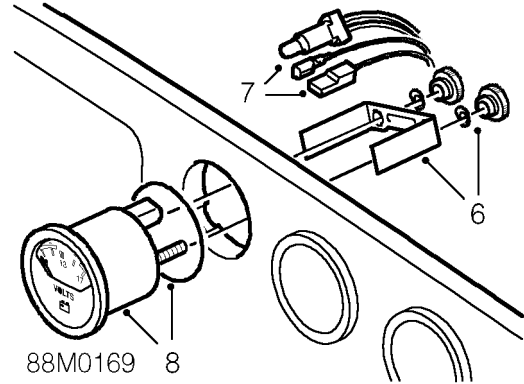
88M0167

3. Remove both fascia air vent locking rings. Release and remove air vents.



88M0168

4. Remove 3 nuts securing fascia panel retaining brackets to body.
5. Release retaining brackets and carefully pull fascia forward for access to gauges.



6. Remove nuts from battery condition indicator gauge and collect retainer.
7. Disconnect Lucar connectors and illumination lamp from gauge.
8. Remove battery condition indicator gauge.

Refit

1. Position gauge, identify and connect leads. Connect illumination lamp.
2. Position gauge to fascia, fit retainer and tighten nuts.
3. Position fascia panel and tighten nuts.
4. Fit air vents and secure locking rings.
5. Fit radio. *See ELECTRICAL, Repairs.*
6. Connect battery earth lead.

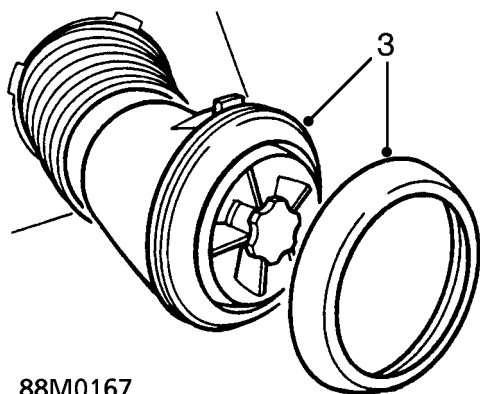
INSTRUMENTS

CLOCK

Service repair no - 88.15.07

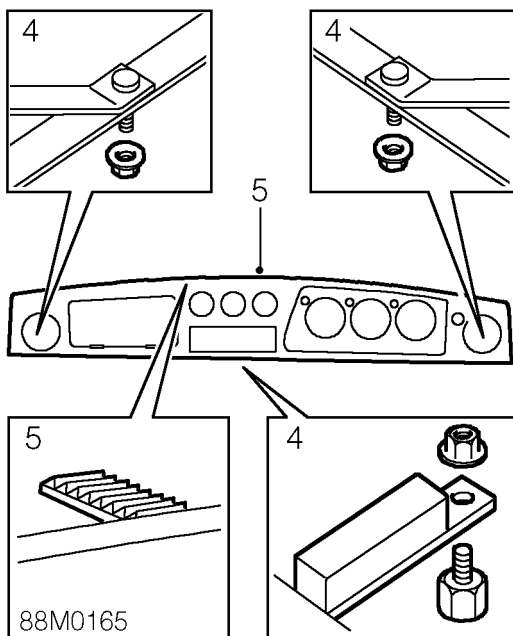
Remove

1. Disconnect battery earth lead.
2. Remove radio. **See *ELECTRICAL, Repairs.***



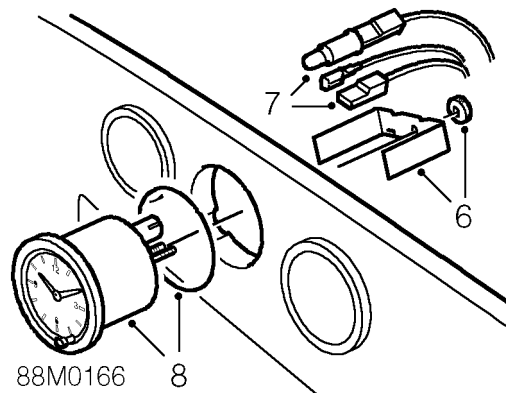
88M0167

3. Remove both fascia air vent locking rings. Release and remove air vents.



88M0165

4. Remove 3 nuts securing fascia panel retaining brackets to body.
5. Release retaining brackets and carefully pull fascia forward for access to gauges.



88M0166

6. Remove nut and release retainer from clock.
7. Disconnect lucar connectors and illumination lamp from clock.
8. Remove clock.

Refit

1. Position clock, identify and connect leads. Connect illumination lamp.
2. Position clock to fascia, fit retainer and tighten nut.
3. Position fascia panel and tighten nuts.
4. Fit air vents and secure locking rings.
5. Fit radio. **See *ELECTRICAL, Repairs.***
6. Connect battery earth lead.

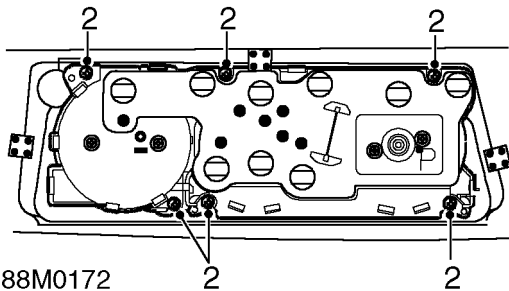


INSTRUMENT PANEL

Service repair no - 88.20.01/99

Remove

1. Remove fascia panel. *See BODY, Interior trim components.*



2. Remove 6 screws and remove instrument panel from fascia panel.

Refit

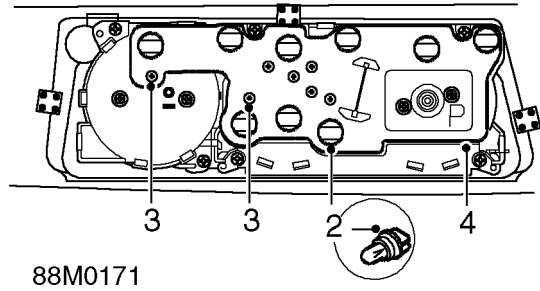
1. Position instrument panel to fascia panel and secure with screws.
2. Fit fascia panel. *See BODY, Interior trim components.*

PRINTED CIRCUIT

Service repair no - 88.20.19

Remove

1. Remove fascia panel. *See BODY, Interior trim components.*



2. Remove illumination and warning light bulbs from instrument pack. Note position of yellow bulbs.
3. Remove 7 screws securing printed circuit to instrument pack, noting position of long screws.
4. Release and remove printed circuit.

Refit

1. Position printed circuit. Fit and tighten screws.
2. Fit illumination and warning light bulbs.
3. Fit fascia panel. *See BODY, Interior trim components.*

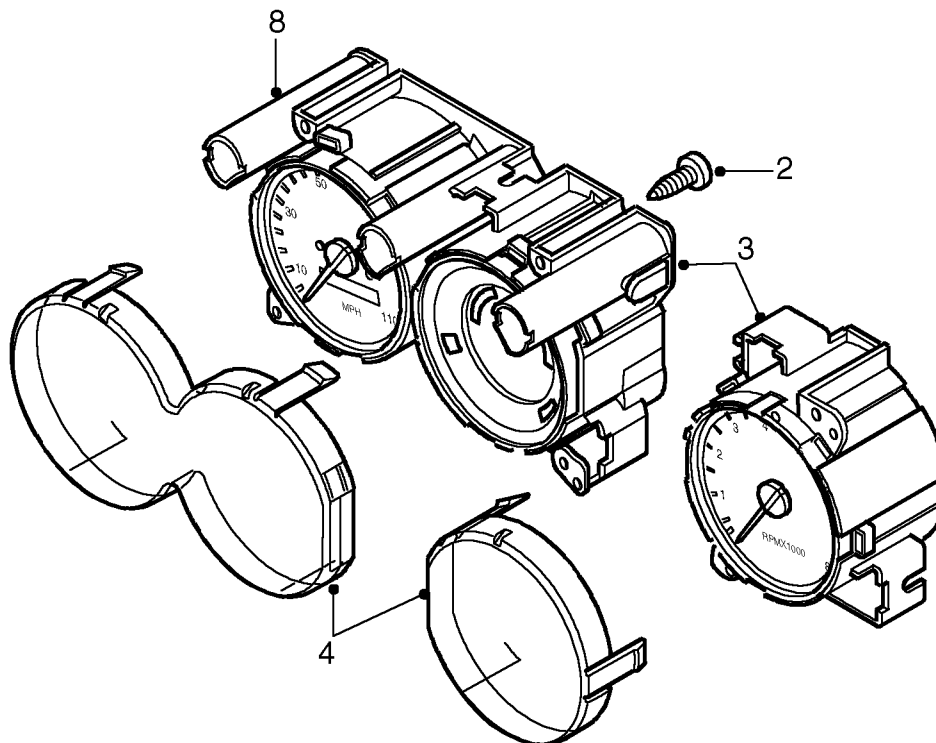
INSTRUMENTS

INSTRUMENT PANEL WINDOW

Service repair no - 88.20.16

Remove

1. Remove fascia panel. *See BODY, Interior trim components.*



88M0175

2. Remove 6 screws securing instrument housing to panel.
3. Remove instrument housing and release tachometer from housing.
4. Release retainers, remove window from speedometer housing.

Refit

1. Fit window to speedometer to housing.
2. Fit tachometer to housing.
3. Fit instrument housing to panel. Fit and tighten screws.
4. Fit fascia panel. *See BODY, Interior trim components.*

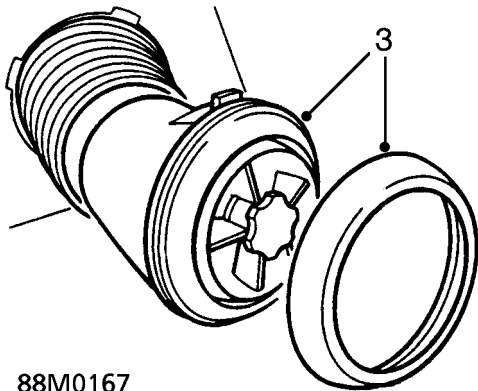


OIL TEMPERATURE GAUGE

Service repair no - 88.25.02

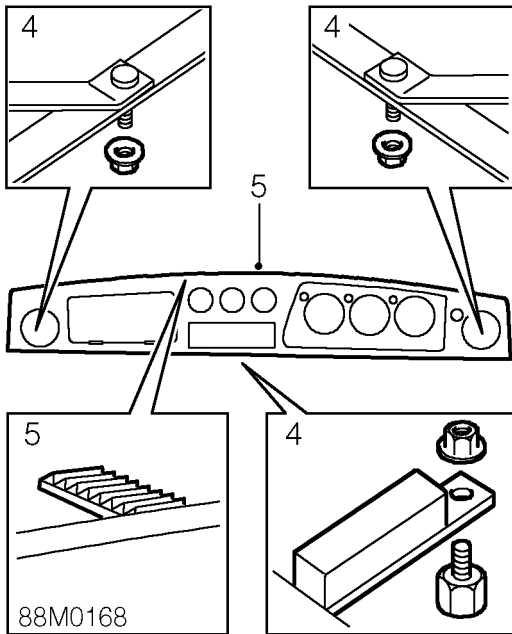
Remove

1. Disconnect battery earth lead.
2. Remove radio. *See ELECTRICAL, Repairs.*



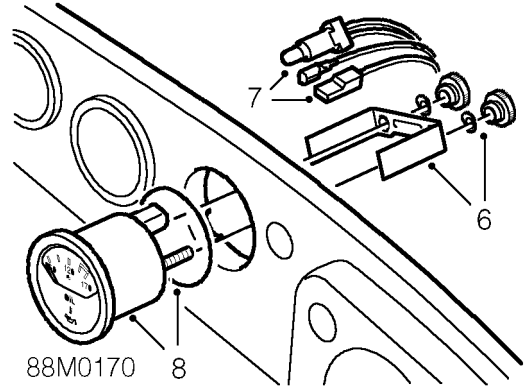
88M0167

3. Remove both fascia air vent locking rings. Release and remove air vents.



88M0168

4. Remove 3 nuts securing fascia panel retaining brackets to body.
5. Release retaining brackets and carefully pull fascia forward for access to gauges.



88M0170 8

6. Remove nuts from oil temperature gauge and collect retainer.
7. Disconnect Lucar connectors and illumination lamp from gauge.
8. Remove oil temperature gauge.

Refit

1. Position gauge, identify and connect leads. Connect illumination lamp.
2. Position gauge to fascia, fit retainer and tighten nuts.
3. Position fascia panel and tighten nuts.
4. Fit air vents and secure locking rings.
5. Fit radio. *See ELECTRICAL, Repairs.*
6. Connect battery earth lead.

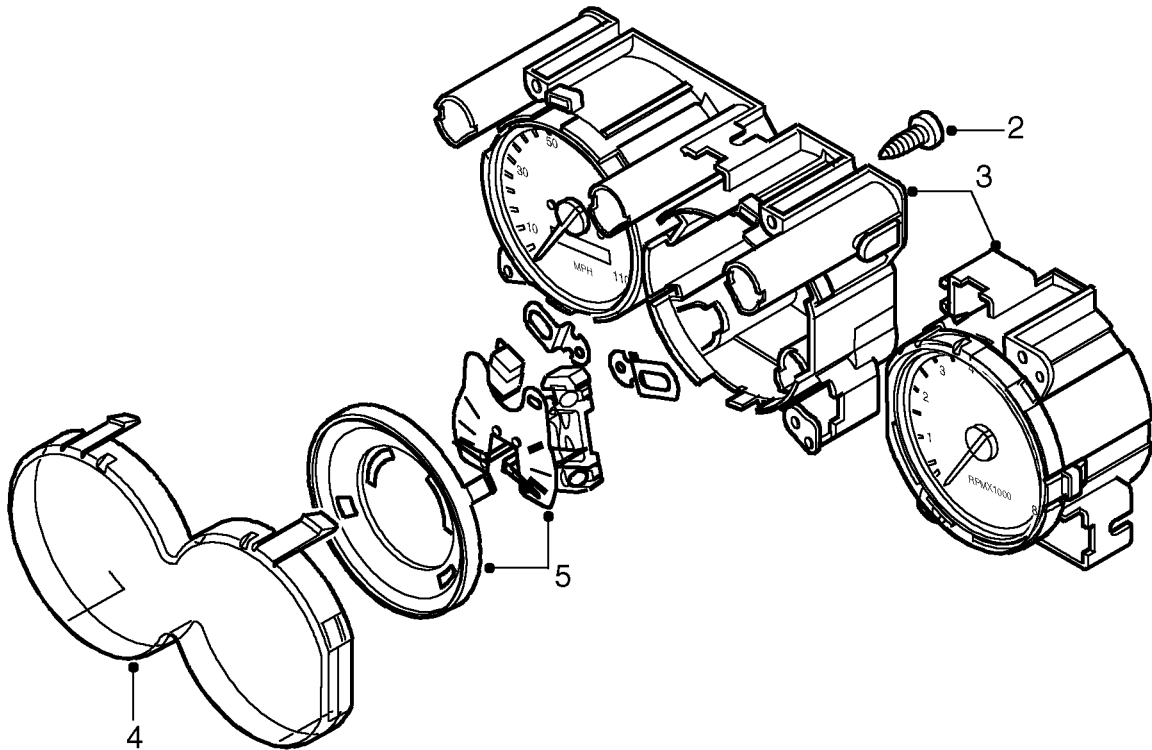
INSTRUMENTS

COMBINED COOLANT TEMPERATURE GAUGE AND FUEL GAUGE

Service repair no - 88.25.16

Remove

1. Remove printed circuit **See this section.**



88M0178

2. Remove 6 screws securing housing to instrument panel.
3. Remove instrument housing and release tachometer from housing.
4. Release retainers, remove window and surround from gauge housing.
5. Remove gauge from housing.

Refit

1. Fit gauge to housing.
2. Fit surround and window to housing.
3. Fit tachometer to housing.
4. Fit housing to instrument panel. Fit and tighten screws.
5. Fit printed circuit. **See this section.**

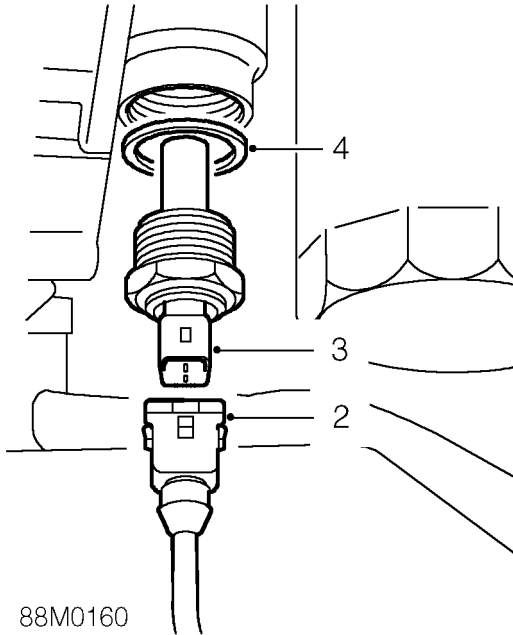


OIL TEMPERATURE GAUGE SENSOR

Service repair no - 88.25.21

Remove

1. Remove front grille. *See BODY, Exterior fittings.*



2. Disconnect multiplug from sensor.
3. Loosen oil temperature gauge sensor and remove.
4. Remove and discard sealing washer.

Refit

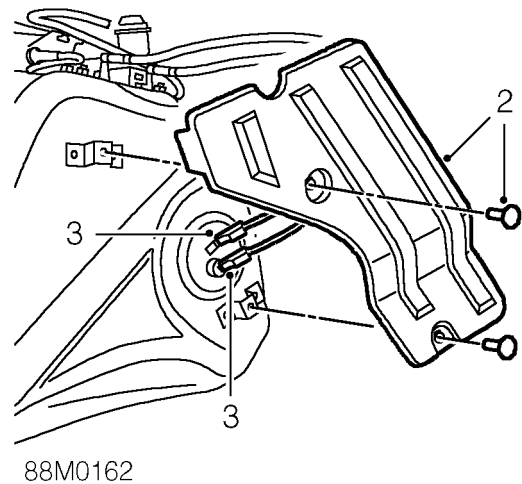
1. Clean mating face of oil temperature gauge sensor and cylinder block.
2. Fit new sealing washer to sensor.
3. Fit sensor and tighten to 60 Nm.
4. Connect multiplug to sensor.
5. Fit front grille. *See BODY, Exterior fittings.*

FUEL GAUGE TANK UNIT

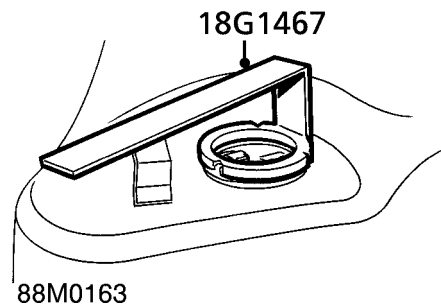
Service repair no - 88.25.32

Remove

1. Drain fuel tank. *See FUEL DELIVERY SYSTEM, Repairs.*



2. Remove studs securing fuel tank side cover and remove cover.
3. Disconnect 2 Lucars from tank unit.



4. Using tool **18G 1467** remove the tank unit retaining ring.
5. Remove the tank unit and discard seal.

Refit

1. Clean tank and tank unit mating faces.
2. Using a new seal locate the tank unit.
3. Position retaining ring and secure with tool **18G 1467**.
4. Connect 2 Lucars to tank unit.
5. Fit fuel tank side cover and secure with studs.
6. Return fuel to fuel tank.

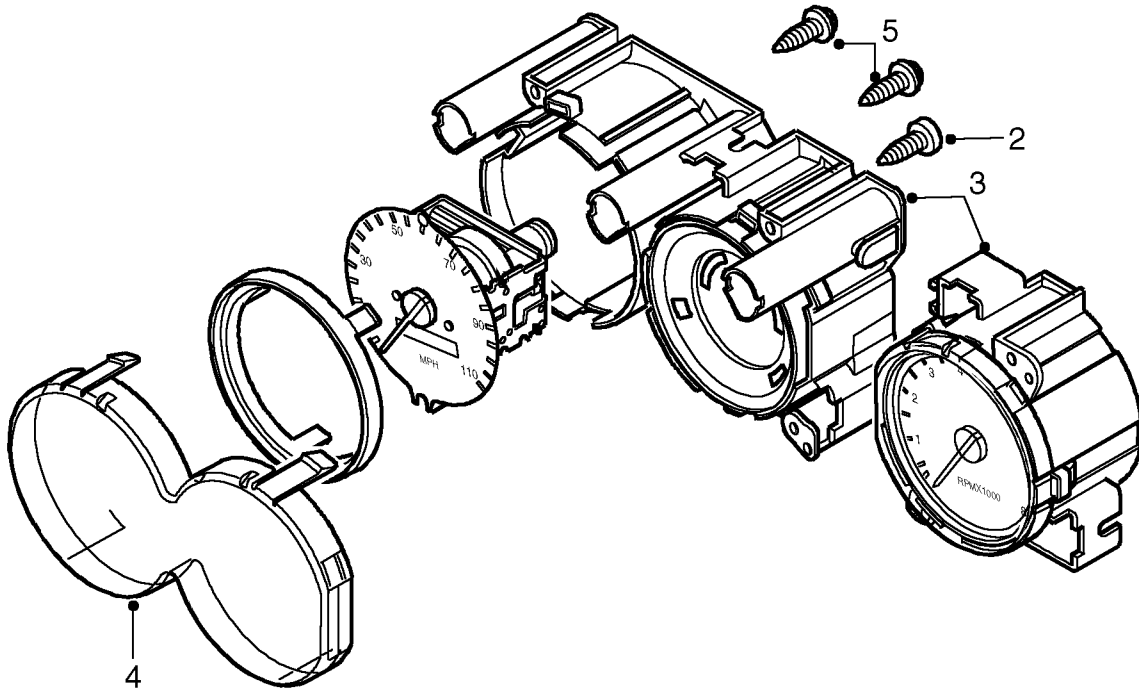
INSTRUMENTS

SPEEDOMETER

Service repair no - 88.30.01

Remove

1. Remove printed circuit **See this section.**



88M0179

2. Remove 6 screws securing instrument housing to panel.
3. Remove instrument housing and release tachometer from housing.
4. Release retainers, remove lens and surround from speedometer housing.
5. Remove 2 screws and remove speedometer from housing.

Refit

1. Fit speedometer to housing. Fit and tighten screws.
2. Fit surround and lens to housing.
3. Fit tachometer to housing.
4. Fit housing to instrument panel. Fit and tighten screws.
5. Fit printed circuit. **See this section.**

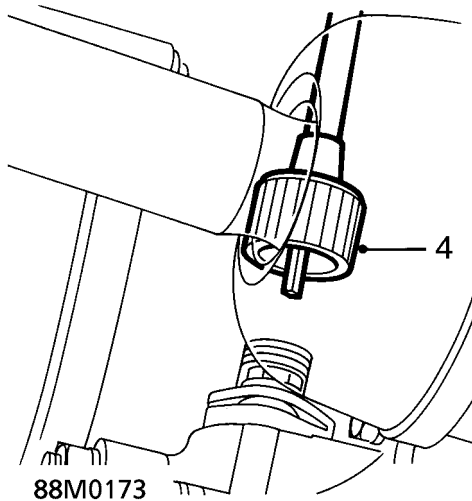


SPEEDOMETER DRIVE CABLE

Service repair no - 88.30.06

Remove

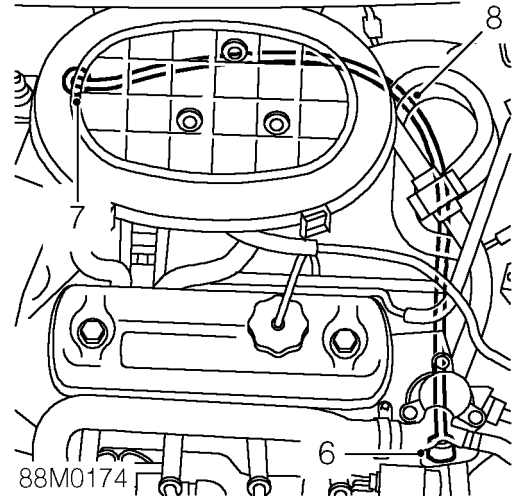
1. Disconnect battery earth lead.
2. Remove air cleaner. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*
3. Remove radio. *See ELECTRICAL, Repairs.*



4. Disconnect speedometer cable from rear of instrument pack.
5. Raise front of vehicle.



WARNING: Support on safety stands.



6. Loosen knurled nut securing speedometer cable to gearbox.
7. Release cable grommet from bulkhead.
8. Release cable and remove from vehicle.

Refit

1. Fit cable to vehicle.
2. Connect cable to gearbox and tighten nut.
3. Connect cable to instrument pack and secure grommet.
4. Ensure cable is routed correctly and is not kinked or twisted.
5. Fit radio. *See ELECTRICAL, Repairs.*
6. Fit air cleaner. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*
7. Remove stand(s) and lower vehicle.
8. Connect battery earth lead.

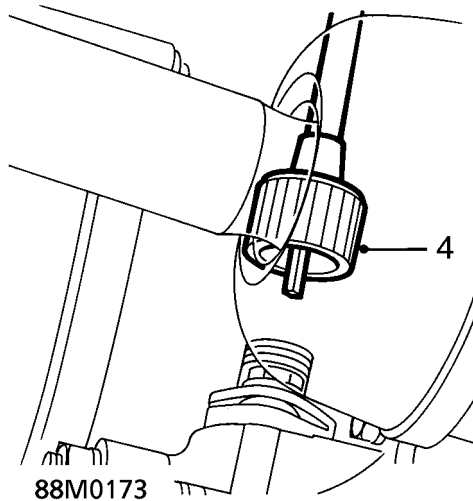
INSTRUMENTS

CABLE ASSEMBLY - SPEEDOMETER - UPPER

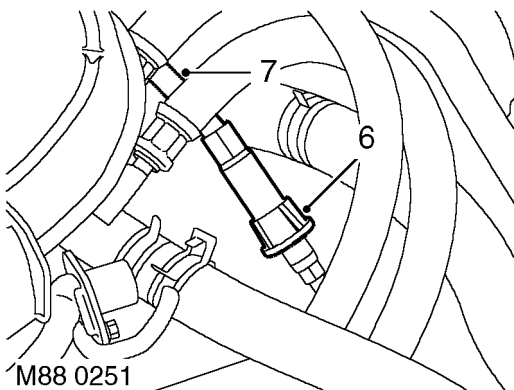
Service repair no - 88.30.08

Remove

1. Disconnect battery earth lead.
2. Remove air cleaner. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*
3. Remove radio. *See ELECTRICAL, Repairs.*



4. Using the radio aperture for access disconnect speedometer cable from rear of instrument pack.
5. Release cable grommet from bulkhead.



6. Slide back retaining clip and release upper cable from lower cable.
7. Release cable and remove from vehicle.

Refit

1. Fit cable to vehicle.
2. Connect upper cable to lower cable and secure retaining clip.
3. Ensure cable is routed correctly and is not kinked or twisted.
4. Connect cable to instrument pack and secure grommet.
5. Fit radio. *See ELECTRICAL, Repairs.*
6. Fit air cleaner. *See ENGINE MANAGEMENT SYSTEM - MEMS, Repairs.*
7. Connect battery earth lead.



CABLE ASSEMBLY - SPEEDOMETER - LOWER

Service repair no - 88.30.09

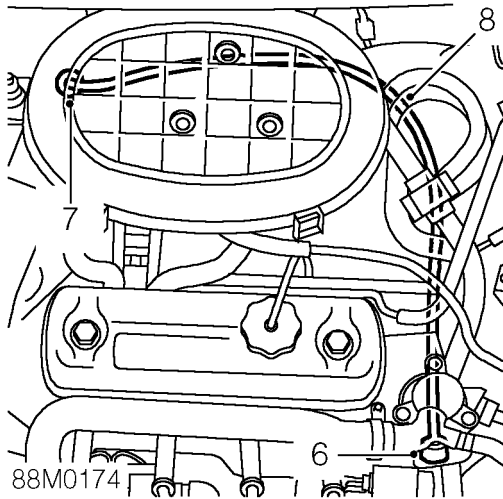
Remove

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

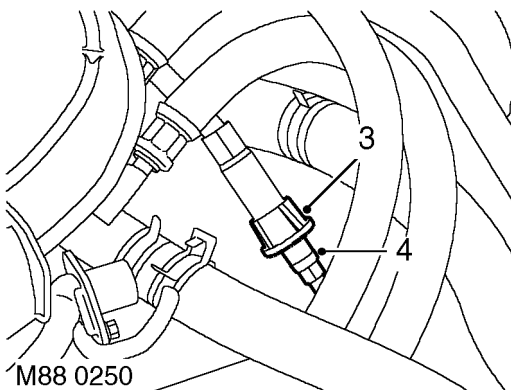
1. Fit cable to vehicle.
2. Connect lower cable to upper cable and secure retaining clip.
3. Ensure cable is routed correctly and is not kinked or twisted.
4. Connect cable to gearbox and tighten nut.
5. Remove stand(s) and lower vehicle.
6. Connect battery earth lead.



WARNING: Support on safety stands.



3. Loosen knurled nut securing speedometer cable to gearbox.



4. Slide back retaining clip and release lower cable from upper cable.
5. Release cable and remove from vehicle.

Refit

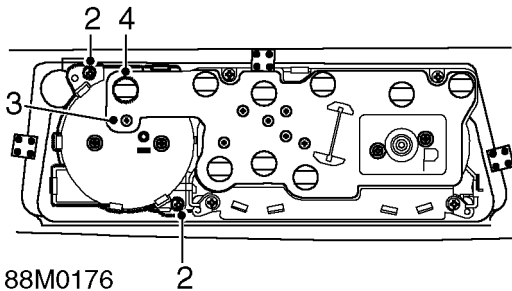
INSTRUMENTS

TACHOMETER

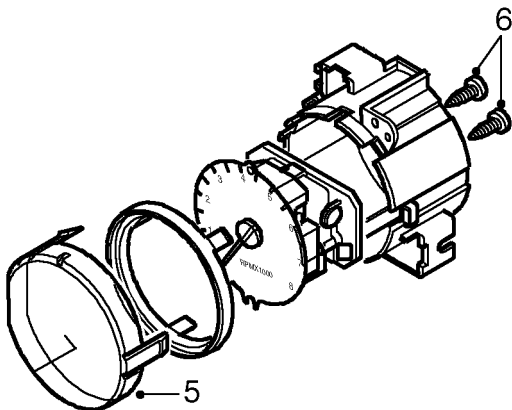
Service repair no - 88.30.21

Remove

1. Remove fascia panel. *See BODY, Interior trim components.*



2. Remove screw securing printed circuit to tachometer.
3. Remove 2 screws securing tachometer housing to instrument panel and remove housing.
4. Remove illumination light bulb from tachometer.



5. Release retainers, remove lens and surround from housing.
6. Remove 2 screws and remove tachometer from housing.

Refit

1. Fit tachometer to housing. Fit and tighten screws.
2. Fit surround and lens to housing.
3. Fit housing to instrument panel. Fit and tighten screws.
4. Align printed circuit to tachometer, fit and tighten screw.
5. Fit illumination bulb.
6. Fit fascia panel. *See BODY, Interior trim components.*