



RANGE ROVER

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RR2961E

RANGEROVER WORKSHOP MANUAL

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West Midlands, B92 8NW
England

REAR -

TIMKIN LM 603049

(#37)

RACE ?

SEALS

INNER

OUTER

1" 2"
1" 2"

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INTRODUCTION

NOTE: This workshop manual covers 1987 to 1991 model year vehicles, pages that incorporate model year additions are identified by the header at the top of the page. Example: 1987-91 for a combination of previous model years or **1991** if change is only applicable to latest model year.

This Workshop Manual is designed to assist skilled technicians in the efficient repair and maintenance of Range Rover vehicles.

Individuals who undertake their own repairs should have some skill and training, and limit repairs to components which could not affect the safety of the vehicle or its passengers. Any repairs required to safety critical items such as steering, brakes, or suspension should be carried out by a Range Rover Dealer. Repairs to such items should NEVER be attempted by untrained individuals.

WARNINGS and **CAUTIONS** are given throughout this Manual in the following form:

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

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

NOTE: This calls attention to methods which make a job easier to perform.

REFERENCES

References to the left or right hand side in the manual are made when viewing the vehicle from the rear. With the engine and gearbox assembly removed, the water pump end of the engine is referred to as the front.

To reduce repetition, some 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. Alternative unit equivalents, shown in brackets following the dimensions, have been converted from the original specification.

REPAIRS AND REPLACEMENTS

When replacement parts are required it is essential that Range Rover parts are used.

Attention is particularly drawn to the following points concerning repairs and the fitting of replacement parts and accessories: Safety features embodied in the vehicle may be impaired if other than Range Rover parts are fitted. In certain territories, legislation prohibits the fitting of parts not to the vehicle manufacturer's specification. Torque wrench values given in the Workshop Manual must be strictly adhered to. Locking devices, where specified, must be fitted. If the efficiency of a locking device is impaired during removal it must be replaced with a new one. Certain fasteners must not be re-used. These fasteners are specified in the Workshop Manual.

POISONOUS SUBSTANCES

Many liquids and other substances used in motor vehicles are poisonous and should under no circumstances be consumed and should be kept away from open wounds. These substances among others include anti-freeze, brake fluid, fuel, windscreen washer additives, air conditioning refrigerant, lubricants and various adhesives.

Continued

FUEL HANDLING PRECAUTIONS

The following information provides basic precautions which must be observed if fuel is to be handled safely. It also outlines the other areas of risk which must not be ignored.

This information is issued for basic guidance only, and in any case of doubt, appropriate enquiries should be made of your local Fire Marshal or Fire Department.

Fuel vapor is highly flammable and in confined spaces is also very explosive and toxic.

When fuel evaporates it produces 150 times its own volume in vapor, which when diluted with air becomes a readily ignitable mixture. The vapor is heavier than air and will always fall to the lowest level. It can readily be distributed throughout a workshop by air current, consequently, even a small spillage of fuel is very dangerous.

Always have a fire extinguisher containing **FOAM CO, GAS, or POWDER** close at hand when handling fuel, or when dismantling fuel systems and in areas where fuel containers are stored.

WARNING: It is imperative that the battery is not disconnected during fuel system repairs as arcing at the battery terminal could ignite fuel vapor in the atmosphere. Always disconnect the vehicle battery **BEFORE** carrying out work on a fuel system. Whenever fuel is being handled, transferred or stored, or when fuel systems are being dismantled all forms of ignition must be extinguished or removed, any head-lamps used must be flameproof and kept clear of spillage.

NO ONE SHOULD BE PERMITTED TO REPAIR COMPONENTS ASSOCIATED WITH FUEL WITHOUT FIRST HAVING HAD FUEL SYSTEM TRAINING.

HOT FUEL HANDLING PRECAUTIONS

WARNING: Before commencing any operation requiring fuel to be drained from the fuel tank, the following procedure must be adhered to:

1. Allow sufficient time for the fuel to cool, thus avoiding contact with hot fuels.
2. Vent the system by removing the fuel filler cap in a well ventilated area. Refit the filler cap until the commencement of fuel drainage.

FUEL TRANSFER

WARNING: FUEL MUST NOT BE EXTRACTED OR DRAINED FROM ANY VEHICLE WHILE IT IS STANDING OVER A PIT.

The transfer of fuel from the vehicle fuel tank must be carried out in a well ventilated area. An approved transfer tank must be used according to the transfer tank manufacturer's instructions and local regulations, including attention to grounding of tanks.

FUEL TANK REMOVAL

A **FUEL VAPOR** warning label must be attached to the fuel tank upon removal from the vehicle.

FUEL TANK REPAIR

Under no circumstances should a repair to any tank be attempted.

RECOMMENDED SEALANTS

A number of branded products are recommended in this manual for use during maintenance and repair work. These items include: **HYLOMAR GASKET AND JOINTING COMPOUND** and **HYLOSIL RTV SILICON COMPOUND**.

They should be available locally from garage equipment suppliers. If there is any problem obtaining supplies, contact one of the following companies for advice and the address of the nearest supplier.

MARSTON BENTLEY INC.
1848 Star Batt Drive East
Rochester
Michigan 48063

Tel: 313 232 1534

BAYPORT CHEMICAL SERVICE INC.
223 North Brookman Street
Pasadena
Texas 77506

Tel: 713 472 5081

USED ENGINE OIL HANDLING PRECAUTIONS

Prolonged and repeated contact with engine or motor 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 should be provided.

WARNING:

1. Avoid prolonged and repeated contact with oils, particularly used engine oils.
2. Wear protective clothing, including impervious gloves where applicable.
3. Do not put oily rags in pockets.
4. Avoid contaminating clothes, particularly underwear, with oil.
5. Overalls must be cleaned regularly. Discard unwashable clothing and oil impregnated footwear.
6. First aid treatment must be obtained immediately for open cuts and wounds.
7. Use barrier creams, before each work period, to help the removal of oil from the skin.
8. 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.
9. Do not use gasoline, kerosene, diesel fuel, gas oil, thinners or solvents for washing the skin.
10. If skin disorders develop, obtain medical advice.
11. Where practicable, degrease components prior to handling.
12. Where there is a risk of eye contact, eye protection should be worn, for example, goggles or face shields; in addition an eye wash facility should be provided.

DISPOSING OF USED OILS

Environmental protection precaution

It is illegal to pour used oil onto the ground, down sewers or drains, or into waterways.

Dispose of used oil through authorised waste disposal contractors.

ACCESSORIES AND CONVERSIONS

DO NOT FIT unapproved accessories or conversions, as they could affect the safety of the vehicle. Land Rover will not accept liability for death, personal injury, or damage to property which may occur as a direct result of the fitment of non-approved conversions to the Range Rover.

WHEELS AND TYRES

WARNING: DO NOT replace the road wheels with any type other than genuine Range Rover wheels which are designed for multi-purpose on and off road use and have very important relationships with the proper operation of the suspension system and vehicle handling. Replacement tyres must be of the make and sizes recommended for the vehicle, and all tyres must be the same make, ply rating and tread pattern.

STEAM CLEANING

To prevent consequential rusting, any steam cleaning within the engine bay **MUST** be followed by careful re-waxing of the metallic components affected. Particular attention must be given to the steering column, engine water pipes, hose clips and ignition coil clamp.

SPECIFICATION

The specification details and instructions set out in this Manual apply only to Range Rover vehicles manufactured specifically for the U.S.A. and Canada. The Manufacturers reserve the right to vary their specifications with or without notice, and at such times and in such manner as they think fit. Major as well as minor changes may be involved in accordance with the Manufacturer's policy of constant product improvement.

While every effort is made to ensure the accuracy of the particulars contained in this Manual, neither the Manufacturer or Dealer, by whom this Manual is supplied, shall in any circumstances be held liable for any inaccuracy or the consequences thereof.

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SPECIAL SERVICE TOOLS

The use of approved special service tools is important. They are essential if service operations are to be carried out efficiently, and safely.

ABBREVIATIONS AND SYMBOLS USED IN THIS MANUAL

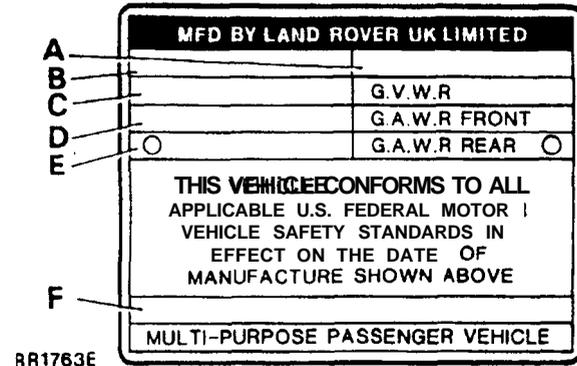
Across flats (bolt size)	AF	Low tension.....	lt
After bottom dead centre	ABDC	Maximum	max.
After top dead centre	ATDC	Metre	m
Alternating current	a.c.	Millilitre	ml
Ampere	amp	Millimetre	mm
Ampere hour	amp hr	Miles per gallon	mpg
Before bottom dead centre	BBDC	Miles per hour	mph
Before top dead centre	BTDC	Minute (angle)	'
Bottom dead centre	BDC	Minus (of tolerance)	-
Brake horse power	bhp	Negative (electrical)	-
British Standards	BS	Newton meters (torque)	Nm
Carbon monoxide	c o	Number	No.
Centimetre	cm	Ohms	ohm
Centigrade (Celsius)	C	Ounces (force)	ozf
Cubic centimetre	cm³	Ounces (mass)	oz
Cubic inch	in³	Ounce inch (torque)	ozf.in.
Degree (angle)	deg or °	Outside diameter	O.D.
Degree (temperature)	deg or °	Part number	Part No.
Diameter	dia.	Percentage	%
Direct current	d.c.	Pints	pt
Electronic Control Unit	E.C.U.	Pints (US)	US pt
Electronic Fuel Injection	E.F.I.	Plus (tolerance)	+
Fahrenheit	F	Positive (electrical)	+
Feet	ft	Pound (force)	lbf
Feet per minute	ft/min	Pounds inch (torque)	in.lbf.
Fifth	5th	Pound (mass)	lb
First	1st	Pounds per square inch	P.S.I.
Fluid ounce	fl oz	Ratio	ratio
Foot pounds (torque)	ft lb	Reference	ref.
Fourth	4th	Revolution per minute	rev/min
Gramme (force)	gf	Right-hand	RH
Gramme (mass)	g	Second (angle)	"
Gallons	gal	Second (numerical order)	2nd
Gallons (US)	US gal	Specific gravity	sp.gr.
High tension (electrical)	H.T.	Square centimetres	cm²
internal diameter	I.D.	Square inches	in²
Inches of mercury	in. Hg	Standard wire gauge	s.w.g.
Inches	in	Synchromesh/Synchromesh	synchro.
Kilogramme (force)	kgf	Third	3rd
Kilogramme (mass.)	kg	Top dead centre	TDC
Kilogramme centimetre (torque)	kgf.cm	United Kingdom	UK
Kilogramme per square millimetre	kgf/mm²	Vehicle Identification Number..	VIN
Kilogramme per square centimetre	kgf/cm²	Volts	V
Kilogramme metres (torque)	kgf.m	Watts	W
Kilometres	km		
Kilometres per hour	km/h	SCREW THREADS	
Kilovolts	kV	American Standard Taper Pipe	NPTF
Left-hand steering	LHS	British Standard Pipe	BSP
Left-hand thread	LHT	Unified Coarse	UNC
Litres	litre	Unified Fine	UNF

GLOSSARY OF TERMS

- Aerial - Antenna
- Anti-clockwise - Counter-clockwise
- Battery flat - Dead battery
- Bedding in - Break in
- Bonnet - Hood
- Bulkhead - Front of dash
- Circlip - Snap ring
- Crown wheel - Ring gear
- Dampers - Shock absorbers
- Direction indicators - Turn signals
- Down-change - Down-shift
- End float - end clearance
- Extractor - Puller
- Fascia - Dashboard
- Fascia panel - Dashboard
- Fuel filler flap - Fuel filler door
- Gaiters - Boots
- Gearbox - Transmission
- Grub screw - Lock or set screw
- Number plate - License plate
- Fuel - Gasoline
- Pipe - Hose
- Rear screen heater - Rear window defogger
- Renew/Refit - Replace/Reinstall
- Reversing lamps - Back-up lamps
- Set screw - Bolt
- Silencer - Muffler
- Sill - Rocker panel
- Spanner - Wrench
- Spigot - Pilot
- Spigot bearing - Pilot bearing
- Split pin - Cotter pin
- Spring washer - Lock washer
- Sump - Oil pan
- Swivel pin - Spindle
- Tappets - Lash adjusters
- Gudgeon pin - Piston pin
- Hydraulic damper - Shock absorber
- Ignition/No charge - Generator/No charge
- Inflammable - Flammable
- joint washer - Casket
- Throttle - Accelerator
- Top-up - Fill
- Transporter lashing - Transporter tie down
- Up-change - Up-shift
- Windscreen - Windshield
- Wing - Fender

VEHICLE IDENTIFICATION NUMBER (VIN)

The Federal Vehicle Identification Number, the gross axle weight ratings together with other information is stamped on a label riveted to the lock face of the front left hand door.

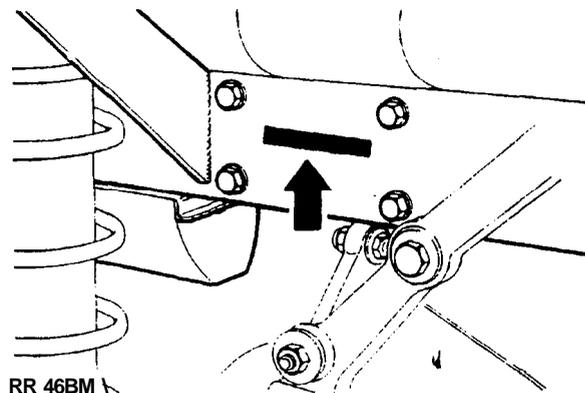


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KEY TO VEHICLE IDENTIFICATION LABEL

- A. Year of manufacture
- B. Month of manufacture
- C. Gross vehicle weight rating
- D. Gross axle weight rating for front axle
- E. Gross axle weight rating for rear axle
- F. Vehicle identification number (minimum of 17 digits)

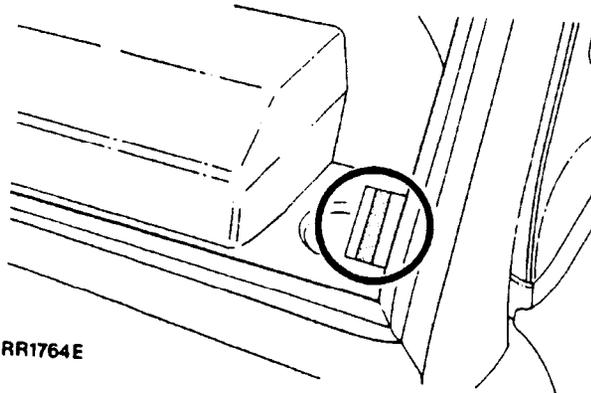
The European Vehicle Identification Number is stamped on the right hand side chassis member forward of the front spring mounting turret.



RR 46BM

FEDERAL VEHICLE IDENTIFICATION NUMBER

The Federal Vehicle Identification Number is stamped on a plate which is riveted to the upper left hand A - post adjacent to the instrument binnacle and is visible through the front screen of the vehicle.



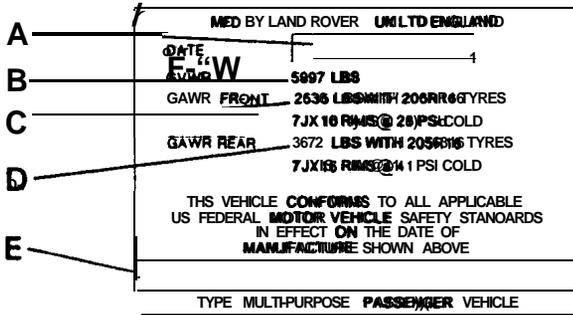
RR1764E

VEHICLE IDENTIFICATION NUMBER (VIN)

- 1989 model year onwards

An adhesive label containing the Federal Vehicle Identification Number, date of manufacture and gross axle weight ratings is fixed to the lock face of the front left hand door. The information includes wheel and tyre sizes and tyre pressures at gross axle weight ratings.

- 1989 model year



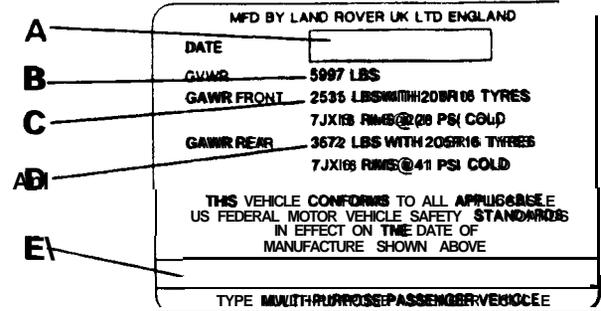
RR2629E

KEY TO VEHICLE IDENTIFICATION LABEL

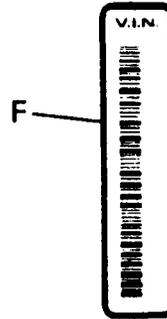
- A. Month and year of manufacture
- B. Gross vehicle weight rating
- C. Gross axle weight rating for front axle
- D. Gross axle weight rating for rear axle
- E. Vehicle identification number (minimum of seventeen digits)
- F. Vehicle identification number - bar code

- 1990 model year (interim condition)

An additional label contains the Vehicle Identification Number in both bar code and digit form.



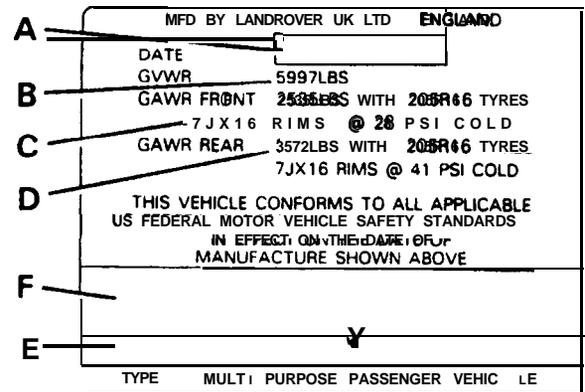
RR2629E



RR2797E

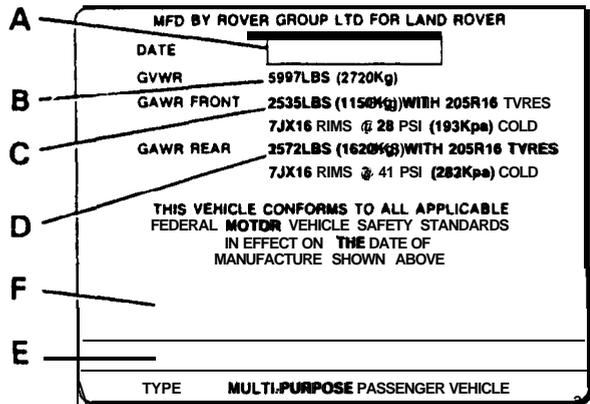
- 1990 model year

The Vehicle Identification Number bar code is incorporated in the VIN label.



RR271 5E

- 1991 model year



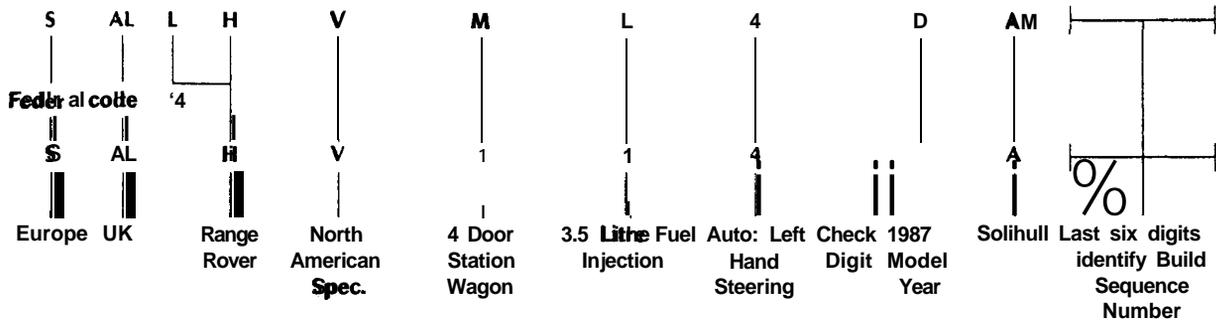
RR2944E

VEHICLE IDENTIFICATION NUMBER

The Federal Vehicle Identification Number consists of similar information to the European number and is made up of a minimum of 17 digits. These numbers are used, to identify manufacturer, model range, specification, body type, engine, transmission/steering, model year, plant and build sequence number and serve to identify the vehicle.

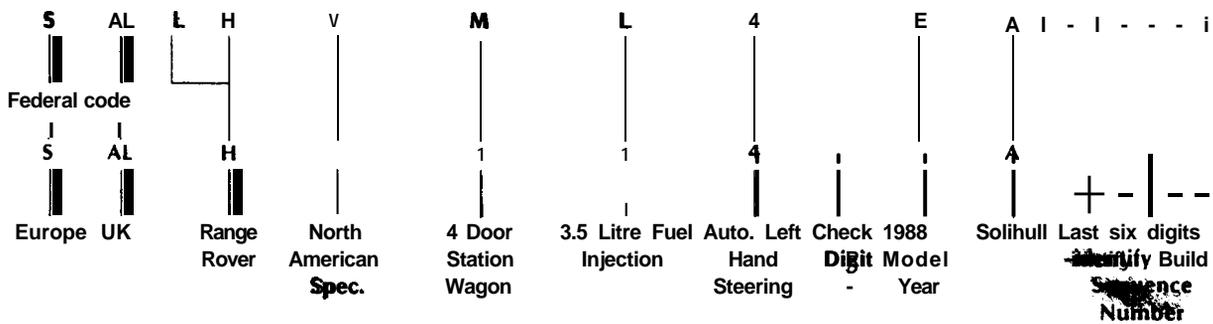
The following example briefly shows the coding process:

European code



1988 MODEL YEAR

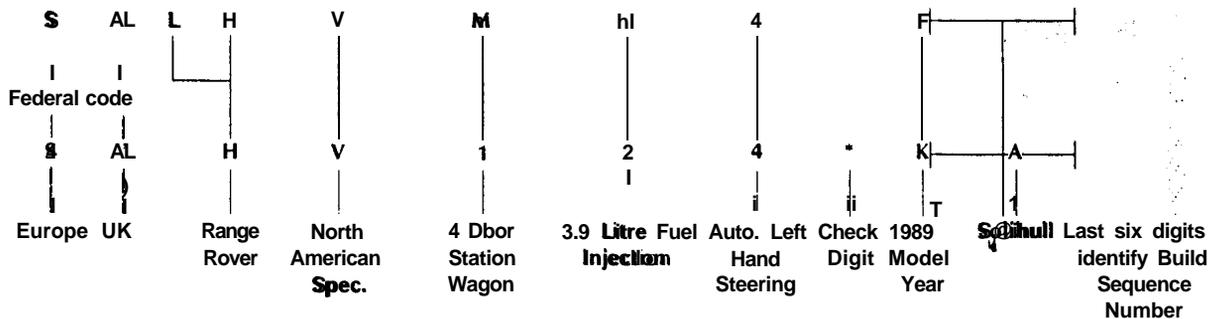
European code



1989 MODEL YEAR

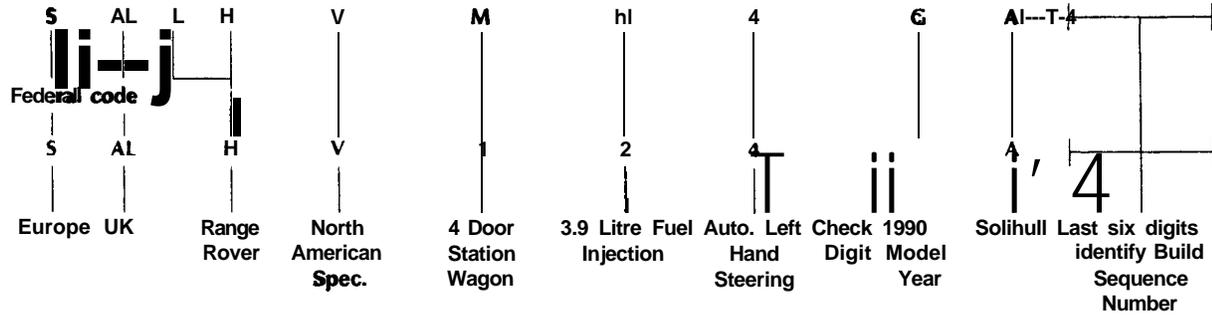
SRLHLY1+V hde 1241K 36233 21

European code



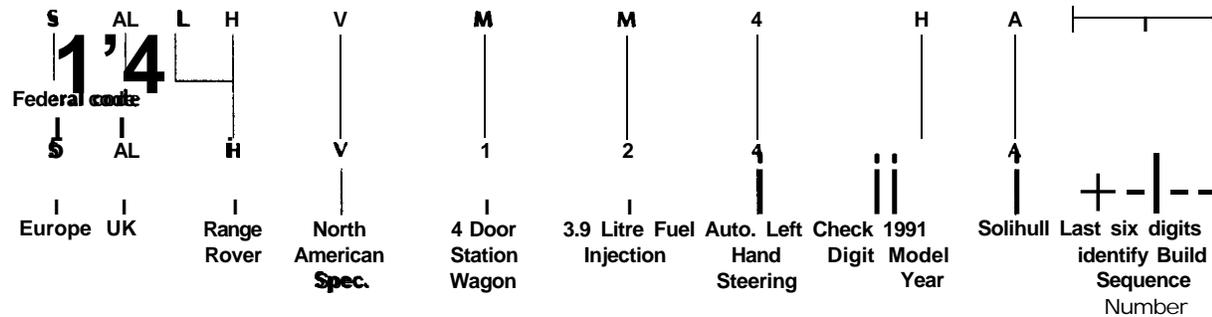
1990 MODEL YEAR

European code



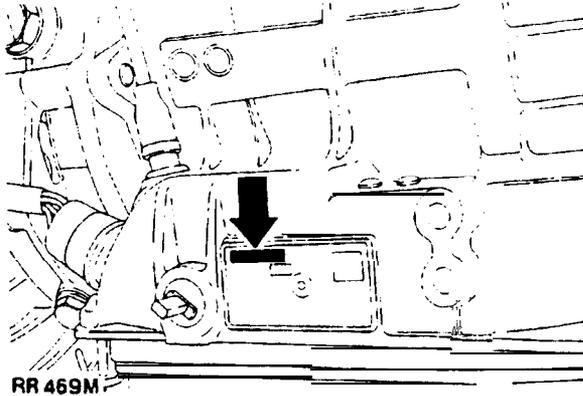
1991 MODEL YEAR

European code



AUTOMATIC GEARBOX ZF4HP222

The serial number is stamped on a plate riveted to the bottom left hand side of the gearbox casing.



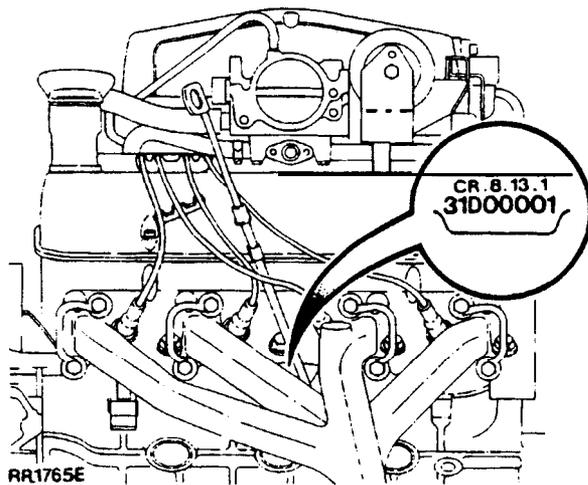
RR 469M

FRONT AND REAR AXLE

The axle serial numbers are stamped on the top of the left hand axle tubes.

ENGINE SERIAL NUMBER - 3.5 AND 3.9 V8 ENGINE

The V8 engine serial number and engine compression ratio is stamped on a cast pad on the cylinder block, between numbers 3 and 5 cylinders.

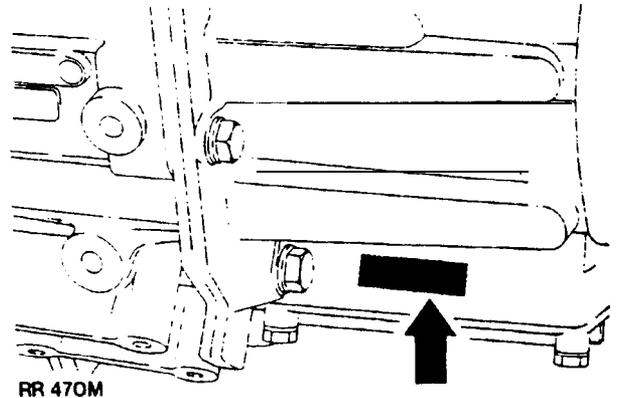


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NOTE: 3.9 Litre Models can be identified by the suffix 38D.

TRANSFER GEARBOX LT230

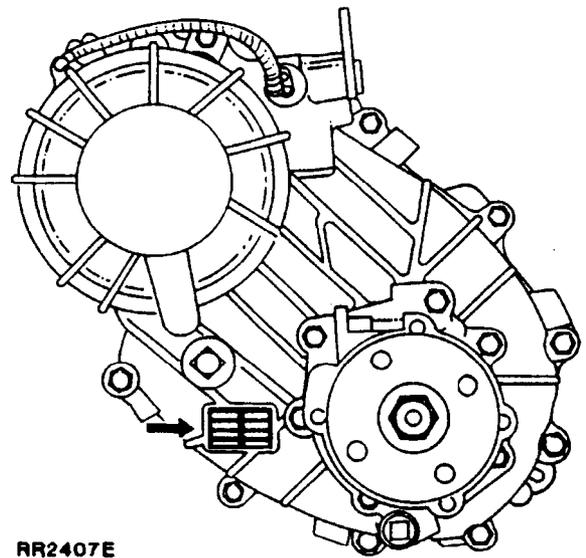
The serial number is stamped on the left hand side of the gearbox casing below the mainshaft rear bearing housing adjacent to the bottom cover.



RR 470M

TRANSFER GEARBOX-BORG WARNER -1989 MODEL YEAR

The gearbox serial number is stamped on a plate which is attached to the gearbox casing and is located between the filler/level and drain plug adjacent to the rear output housing.



RR2407E



4

