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INTRODUCTION.

This Workshop Manual covers the Land Rover Ninety and One Ten range of vehicles. It is primarily designed to assist skilled technicians in the efficient repair and maintenance of Land Rover vehicles.

Using the appropriate service tools and carrying out the procedures as detailed will enable the operations to be completed within the time stated in the 'Repair Operation Times'.

The Manual has been produced in separate books; this allows the information to be distributed throughout the specialist areas of the modern service facility.

A table of contents in Book **1** lists the major components and systems together with the section and book numbers. The cover of each book details the sections contained within that book.

The title page of each book carries the part numbers required to order replacement books, binders or complete Service Manuals. This can be done through the normal channels.

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, 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.
During the period of running-in from new, certain adjustments may vary from the specification figures given in this Manual. These adjustments will be re-set by the Distributor or Dealer at the After Sales Service, and thereafter should be maintained at the figures specified in the Manual.

REPAIRS AND REPLACEMENTS

When replacement parts are required it is essential that only Land 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 Land Rover parts are fitted. In certain territories, legislation prohibits the fitting of parts not to the vehicle manufacturer's specification. Torque wrench setting figures given in the Repair Operation 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 renewed. Owners purchasing accessories while travelling abroad should ensure that the accessory and its fitted location on the vehicle conform to mandatory requirements existing in their country of origin. The terms of the Owners Service Statement may be invalidated by the fitting of other than Land Rover parts.
All Land Rover parts have the full backing of the Owners Service Statement.
Land Rover Distributors and Dealers are obliged to supply only Land Rover service parts.

POISONOUS SUBSTANCES

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 away from open wounds. These substances among others include antifreeze, brake fluid, fuel, windscreen washer additives, lubricants and various adhesives.

FUEL HANDLING PRECAUTIONS

The following information provides basic precautions which must be observed if petrol (gasoline) 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 Officer.

GENERAL

Petrol/gasoline vapour is highly flammable and in confined spaces is also very 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 current, consequently, even a small spillage of petrol/gasoline is potentially very dangerous.

Always have a fire extinguisher containing FOAM CO_2 GAS, or POWDER close at hand when handling or draining fuel, or when dismantling fuel systems and in 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 head-lamps used must be flameproof and kept clear of spillage.

NO ONE SHOULD BE PERMITTED TO REPAIR COMPONENTS ASSOCIATED WITH PETROL/ GASOLINE WITHOUT FIRST HAVING HAD SPECIALIST TRAINING.

FUEL TANK DRAINING

WARNING: PETROL/GASOLINE MUST NOT BE EXTRACTED OR DRAINED FROM ANY VEHICLE WHILST IT IS STANDING OVER A PIT.

Draining or extracting petrol/gasoline from 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.
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
On vehicles where the fuel line is secured to the fuel tank outlet by a spring steel clip, it is recommended that such clips are released before the fuel line is disconnected or the fuel tank unit is removed. This procedure will avoid the possibility of residual petrol fumes in the fuel tank being ignited when the clips are 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.

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

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 volatised by the steam, is washed out during the steaming process.

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.

SPECIFICATION
Purchasers are advised that the specification details set out in this Manual apply to a range of vehicles and not to any one. For the specification of a particular vehicle, purchasers should consult their Distributor or Dealer.

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.

Whilst every effort is made to ensure the accuracy of the particulars contained in this Manual, neither the Manufacturer nor the Distributor or Dealer, by whom this Manual is supplied, shall in any circumstances be held liable for any inaccuracy or the consequences thereof.

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. The amount of time which they save can be considerable.

Every special tool is designed with the close co-operation of Land Rover Ltd., and no tool is put into production which has not been tested and approved by us. New tools are only introduced where an operation cannot be satisfactorily carried out using existing tools or standard equipment. The user is therefore assured that the tool is necessary and that it will perform accurately, efficiently and safely.

Special tools bulletins will be issued periodically giving details of new tools as they are introduced.

All orders and enquiries from the United Kingdom should be sent direct to V. L. Churchill. Overseas orders should be placed with the local V. L. Churchill distributor, where one exists. Countries where there is no distributor may order direct from V. L. Churchill Limited. P.O. Box *3,* Daventry, Northamptonshire, England NN11 4NF.

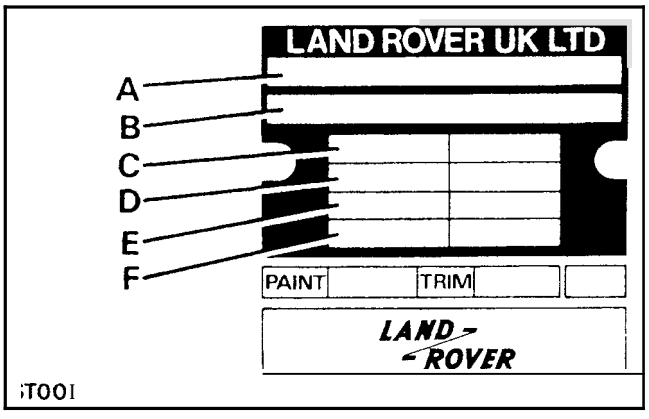
The tools recommended in this Workshop Manual are listed in a multi-language, illustrated catalogue obtainable from Messrs. V. L. Churchill at the above address under publication number 2217/2/84 or from Land Rover Ltd., under part number LSM0052TC from the following address, Land Rover Limited, Service Department, Lode Lane, Solihull, West Midlands. England B92 8NW.

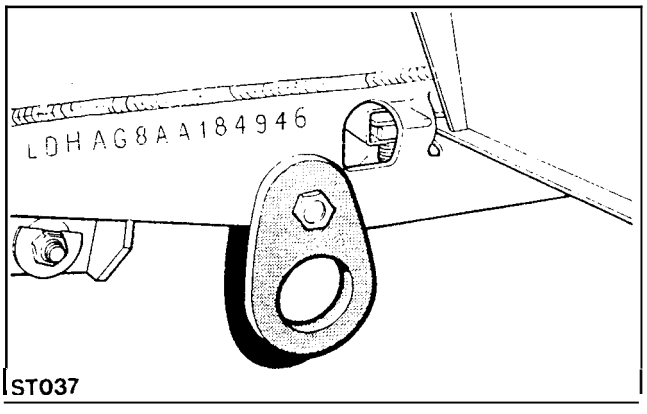
VEHICLE IDENTIFICATION NUMBER (MN)

The Vehicle Identification Number and the recommended maximum vehicle weights are stamped on a plate riveted to the top of the brake pedal box in the engine compartment.
The number is also stamped on the right-hand side of the chassis forward of the spring mounting turret.
Always quote this number when writing to Land Rover Limited.

Key to Vehicle Identification Number Plate

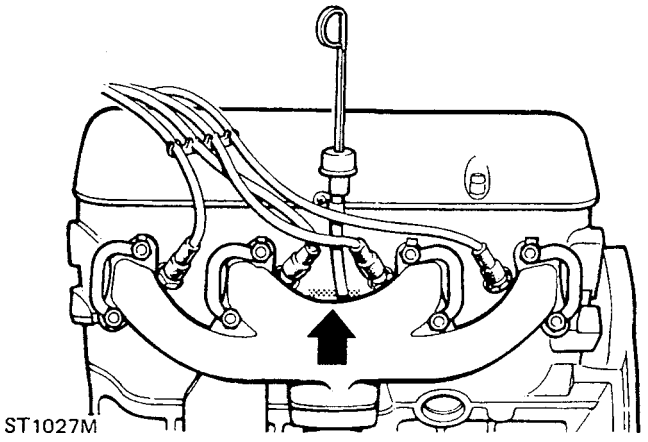
A Type approval
B VIN (minimum of 17 digits)
C Maximum permitted laden weight for vehicle
D Maximum vehicle and trailer weight
E Maximum road weight — front axle
F Maximum road weight — rear axle





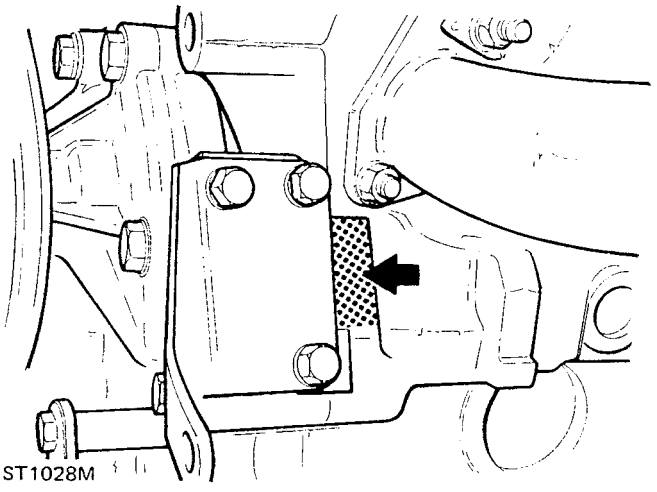
ENGINE SERIAL NUMBER — V8 ENGINE

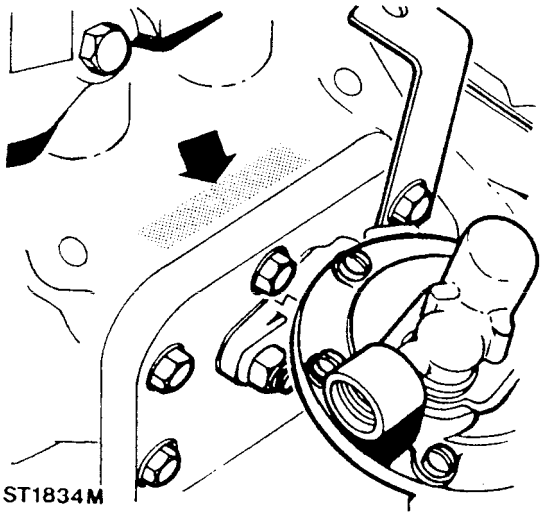
The V8 engine serial number is stamped on a cast pad on the cylinder block between numbers *3* and *5* cylinders.



ENGINE SERIAL NUMBER — 4 CYLINDER ENGINES

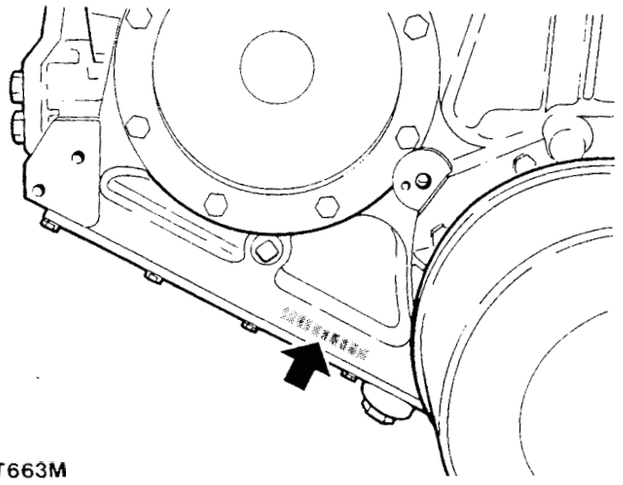
The **4** cylinder engine number is stamped on a machined surface at the front left-hand side of the engine adjacent to the exhaust manifold front flange. On later engines the number is stamped above the rear side cover, as the second illustration shows.





MAIN GEARBOX AND TRANSFER BOX LT95 — V8

Stamped on the rear of the transfer box on the opposite side to the transmission brake.



ST663M

FRONT AXLE

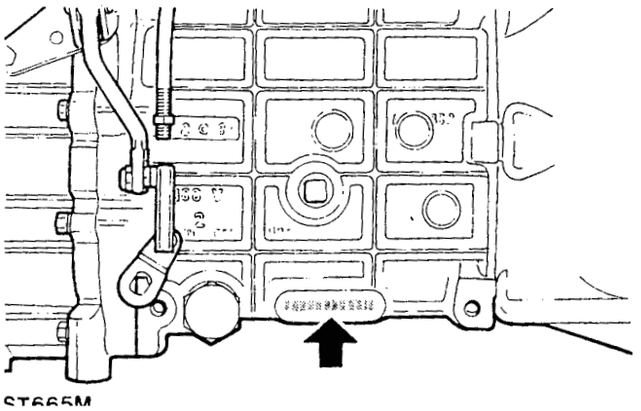
Stamped on top of the left-hand axle tube.

REAR AXLE

Stamped on rear of left-hand axle tube.

MAIN GEARBOX LT77 —4 CYLINDER VEHICLES

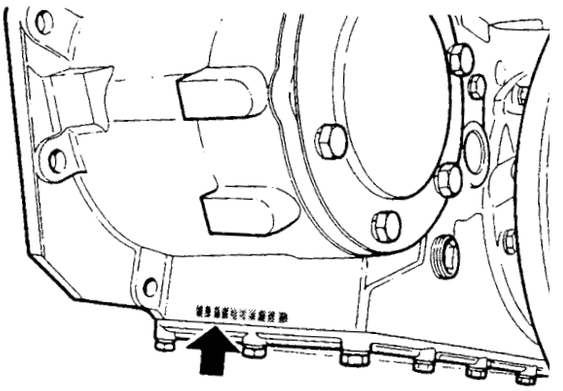
Stamped on a pad on the right-hand side of the gearbox immediately below the oil filler level plug.



ST665M

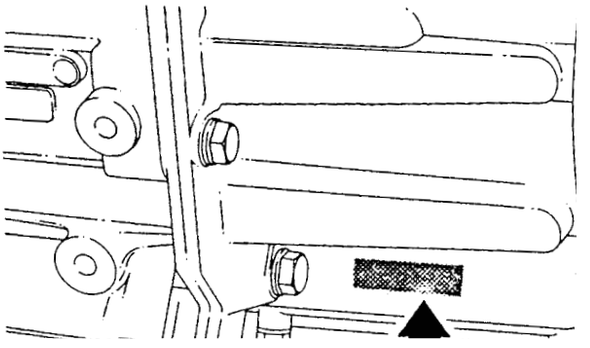
TRANSFER GEARBOX LT230R — 4 CYLINDER VEHICLES

Stamped on the casing on the left-hand side of the gearbox below the mainshaft rear bearing housing adjacent to the bottom cover.



ST664M

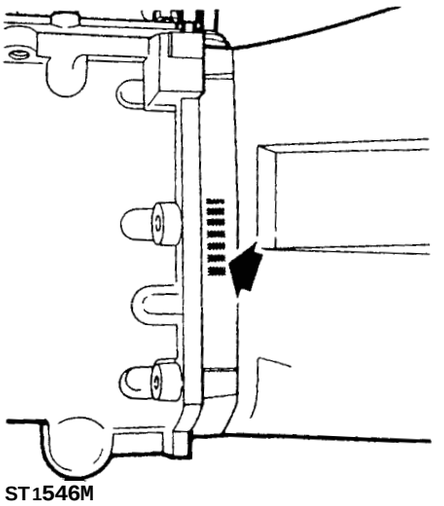
TRANSFER GEARBOX LT230T — 4 CYLIN AND V8 VEHICLES FROM SERIAL NUM SUFFIX 'B' ONWARD



RR 470M

MAIN GEARBOX LT85 FIVE SPEED —

Stamped on the right-hand side of the front bearing plate.



ST1546M

GENERAL SPECIFICATION DATA

V8 ENGINE

ENGINE	
Type	V8
Number of cylinders	Eight, two banks of four
Bore	88,90 mm (3.500 in)
Stroke	71,12 mm (2.800 in)
Capacity	3528 cc (215 in^3)
Valve operation	Overhead by push-rod
Maximum power — B.H.P.	113 at 4000 rpm
Maximum power — KW	84.6 at 4000 rpm
Maximum torque	251 Nm (185 lb ft) at 2500 rpm
Crankshaft	
Main journal diameter	58,409 - 58,422 mm (2.2996 - 2.3001 in)
Minimum regrind diameter	57,393 - 57,406 mm (2.2596 - 2.2601 in)
Crankpin journal diameter	50,800 - 50,812 mm (2.0000 - 2.0005 in)
Minimum regrind diameter	49,784 - 49,797 mm (1.9600 - 1.9605 in)
Crankshaft end thrust	Taken on thrust washers of centre main bearing
Crankshaft end-float	0,10 - 0,20 mm (0.004 - 0.008 in)
Main bearings	
Number and type	5, Vandervell shells
Material	Lead-indium
Diametrical clearance	0,010 - 0,048 mm (0.0004 - 0.0019 in)
Undersizes	0,254 mm, 0,508 mm (0.010 in, 0.020 in)
Connecting rods	
Type	Horizontally split big end, plain small end
Length between centres	143,81 - 143,71 mm (5.662 - 5.658 in)
Big end bearings	
Type and material	Vandervell VP lead-indium
Diametrical clearance	0,015 - 0,055 mm (0.0006 - 0.0022 in)
End-float on crankpin	0,15 - 0,36 mm (0.006 - 0.014 in)
Undersizes	0,254 mm, 0,508 mm (0.010 in, 0.020 in)
Gudgeon pins	
Length	72,67 - 72,79 mm (2.861 - 2.866 in)
Diameter	22,215 - 22,22 mm (0.8746 - 0.8749 in)
Fit-in connecting rod	Press fit
Clearance in piston	0,002 - 0,007 mm (0.0001 - 0.0003 in)
Pistons	
Clearance in bore, measured at bottom of skirt at right angles to gudgeon pin	0,018 - 0,033 mm (0.0007 - 0.0013 in)

Piston rings	
Number of compression	2
Number of oil	1
No. 1 compression ring	Chrome parallel faced
No. 2 compression ring..	Stepped to 'L' shape and marked 'T' or 'TOP'
Width of compression rings	1,56 - 1,59 mm (0.0615 - 0.0625 in)
Compression ring gap	0,44 - 0,57 mm (0.017 - 0.022 in)
Oil ring type	Perfect circle, type 98-6
Oil ring width	4,811 mm (0.1894 in) max
Oil ring gap	0,38 - 1,40 mm (0.015 - 0.055 in)
Camshaft	
Location	Central
Bearings	Non-serviceable
Number of bearings..	5
Drive	Chain 9,52 mm (0.375 in) pitch x 54 pitches
Valves	
Length:	
Inlet	116,59 - 117,35 mm (4.590 - 4.620 in)
Exhaust..	116,59 - 117,35 mm (4.590 - 4.620 in)
Seat angle:	
Inlet	45° - 45½°
Exhaust	45" - 45½°
Head diameter:	
Inlet	39,75 - 40,00 mm (1.565 - 1.575 in)
Exhaust..	34,226 - 34,480 mm (1.3475 - 1.3575 in)
Stem diameter:	
Inlet	8,664 - 8,679 mm (0.3411 - 0.3417 **in)**
Exhaust	8,651 - 8,666 mm (0.3406 - 0.3412 in)
Stem to guide clearance:	
Inlet	0,025 - 0,066 mm (0.0010 - 0.0026 in)
Exhaust..	0,038 - 0,078 mm (0.0015 - 0.0031 in)
Valve lift (inlet and exhaust).	9,49 mm (0.374 in)
Valve spring length fitted	40,4 mm (1.590 in) at pressure of 29,5 kg (65 lbs)
Lubrication	
System	Wet sump, pressure fed
System pressure, engine warm at 2400 rpm	2,1 - 2,8 kgf cm^2 (30 - 40 lbf in^2)
Oil filter (external).	Full-flow, self-contained cartridge
Oil filter (internal)	Gauze. Pump intake filter
Oil pump type	Gear
Oil pressure relief valve	
Type	Non-adjustable
Relief valve spring:	
Free length	81,2 mm (3.200 in)
Compressed length at 4,2 kg (9.3 lb) load	45,7 mm (1.800 in)
Oil filter by-pass valve	
Type	Non-adjustable
By-pass valve spring:	
Free length	37,5 mm (1.48 in)
Compressed length at 0,34 kg (0.75 lb)	22,6 mm (0.89 in)

2.25 LITRE PETROL ENGINE

ENGINE	
Type	4 cylinder
Bore	90,47 mm (3.562 in)
Stroke	88,9 mm (3.500 in)
Capacity	2286 cm^3 (139.500 in^3)
Valve operation	Overhead by push-rod
Compression ratio	8.0:1
Maximum power @ 4000 rpm	55.2 Kw (74 bhp)
Maximum torque @ 2000 rpm	163Nm (120 lbf ft)
Crankshaft	
Main journal diameter	63,487 - 63,500 mm (2.4995 - 2.500 in)
Minimum regrind diameter	63,246 - 63,2333 mm (2.4900 - 2.4895 in)
Crankpin journal diameter	58,725 - 58,744 mm (2.312 - 2.31275 in)
Minimum regrind diameter	58,48985 - 58,47080 mm (2.30275 - 2.30200 in)
Crankshaft end thrust	Taken on thrust washers at centre main bearing
Crankshaft end-float	0,05 - 0,15 mm (0.002 - 0.006 in)
Main bearings	
Number and type	5 halved shells
Material	Steel shell, tin-aluminium lined
Diametrical clearance	0,020 - 0,063 mm (0.0008 - 0.0025 in)
Undersizes	0,25 mm (0.010 in)
Connecting rods	
Type	Horizontally split big end, plain small end
Length between centres	175,36 - 175,46 mm (6.904 - 6.908 in)
Big end bearings	
Type and material	Steel shell, copper-lead lined
Diametrical clearance	0,019 - 0,068 mm (0.00075 - 0.0027 in)
End-float on crankpin	0,20 - 0,30 mm (0.007 - 0.012 in)
Undersizes	0,25 mm (0.010 in)
Gudgeon pins	
Type	Floating
Fit in piston	Push fit by hand
Clearance in connecting rod	0,007 - 0,015 mm (0.0003 - 0.0006 in)
Pistons	
Type 8.0:1 compression ratio	Aluminium alloy, flat top
Clearance in bore, measured at bottom of skirt at right angles to gudgeon pin:	
Standard size pistons	0,06 - 0,07 mm (0.0023 - 0.0027 in)
Oversize pistons	0,043 - 0,055 mm (0.0017 - 0.0022 in)

Piston rings

Compression	2
Gap in bore	0,38 - 0,50 mm (0.015 - 0.020 in)
Clearance in groove	0,046 - 0,097 mm (0.0018 - 0.0038 in)
Oil control	1
Gap in bore	0,38 - 0,50 mm (0.015 - 0.020 in)
Clearance in groove	0,038 - 0,089 mm (0.0015 - 0.0035 in)

Camshaft

Location	Right-hand side (thrust side) of engine
End-float	0,06 -0,13 mm (0.0025 -0.0055 in)
Number of bearings	4
Material	Steel shell, white metal lined
Drive	Chain

Valves

Length:	
.Inlet	111,20 - 111,66 mm (4.378 - 4.396 in)
Exhaust	111,22 - 111,58 mm (4.388 - 4.412 in)
Seat angle:	
Inlet	30"
Exhaust	45"
Head diameter:	
Inlet	44,32 - 44,57 mm (1.744 - 1.755 in)
Exhaust	34,93 - 35,18 mm (1.378 - 1.380 in)
Stem diameter:	
Inlet	7,899 - 7,912 mm (0.3109 - 0.3115 in)
Exhaust	8,682 - 8,694 mm (0.3418 - 0.3422 in)
Stem to guide clearance:	
Inlet	0,033 - 0,048 mm (0.0013 - 0.0019 in)
Exhaust	0,058 - 0,073 mm (0.0023 - 0.0029 in)
Valve lift:	
Inlet	10,236 mm (0.403 in)
Exhaust	9,85 mm (0.388 in)

Valve springs

Type	Duplex interference coil
Inner:	
Length, free	42,67 mm (1.680 in)
Length, under 8,0 kg (17.7 lb) load	37,13 mm (1.462 in)
Outer:	
Length, free	46,28 mm (1.822 in)
Length, under 21 kg (46 lb) load	40,30 mm (1.587 in)

Lubrication

System	Wet sump, pressure fed
System pressure, engine warm at 2000 rpm	2,45 - 4,50 kgf cm^2 (35 - 65 lbf in^2)
Oil pump: Early type	
Type	Double gear
Drive	Splined shaft from camshaft skew gear
End-float of gears:	
Steel gear	0,05 - 0,12 mm (0.002 - 0.005 in)
Aluminium gear	0,07 - 0,15 mm (0.003 - 0.006 in)
Radial clearance of gears	0,02 - 0,10 mm (0.001 - 0.004 in)
Backlash of gears	0,15 - 0,28 mm (0.006 - 0.012 in)

Lubrication (continued)

Oil pump: Latest type	
Type	Double gear, 10 teeth, sintered iron gears
Drive	Splined shaft from camshaft skew gear
End-float of both gears	0,026 - 0,135 mm (0.0009 - 0.0045 in)
Radial clearance of gears	0,025 - 0,075 mm (0.0008 - 0.0025 in)
Backlash of gears..	0,1 - 0,2 mm (0.0034 - 0.0067 in)

Oil pressure relief valve

Type	Non-adjustable
Relief valve spring:	
Full length..	67,82 mm (2.670 in)
Compressed length at 2,58 kg (5.7 lb) load	61,23 mm (2.450 in)

2.5 LITRE PETROL ENGINE

ENGINE

Type	4 cylinder
Bore	90,47 mm (3.562 in)
Stroke	97 mm (3.82 in)
Capacity	2495 cm^3 (152.25 in^3)
Valve operation..	Overhead by push-rod
Compression ratio..	8.0: 1
Maximum power @ 4000 rpm	59.5 Kw (80 bhp)
Maximum torque @ 2000 rpm.	175 Nm (129 lbf ft)
Commencing serial no.	17H00011C

Crankshaft

Main journal diameter	63,487 - 63,500 mm (2.4995 - 2.500 in)
Minimum regrind diameter	63,246 - 63,2333 mm (2.4900 - 2.4895 in)
Crankpin journal diameter.	58,725 - 58,744 mm (2.312 - 2.31275 in)
Minimum regrind diameter	58,48985 - 58,47080 mm (2.30275 - 2.30200 in)
Crankshaft end thrust	Taken on thrust washers at centre main bearing
Crankshaft end-float..	0,05 - 0,15 mm (0.002 - 0.006 in)

Main bearings

Number and type	5 halved shells
Material	Copper-lead lined
Diametrical clearance	0,018 - 0,06 mm (0.0007 - 0.0026 in)
Undersizes	0,25 mm (0.010 in)

Connecting rods

Type.	Horizontally split big end, plain small end
Length between centres	175,36 - 175,46 mm (6.904 - 6.908 in)

Connecting rod bearings

Type and material	Steel shell, copper-lead lined
Diametrical clearance	0,025 - 0,075 mm (0.001 - 0.003 in)
End-float on crankpin	0,20 - 0,30 mm (0.007 - 0.012 in)
Undersizes	0,25 mm (0.010 in)

Gudgeon pins	
Type	Floating
Fit in piston	Push fit by hand
Clearance in connecting rod	0,007 - 0,015 mm (0.0003 - 0.0006 in)
Pistons	
Type 8.O:1 compression ratio	Aluminium alloy. Recessed crown.
Clearance in bore measured @ 17mm from bottom of skirt at right angles to gudgeon pin:	
Standard and oversize pistons	0,043 - 0,067 mm (0.0017.-0.0026 in)
Piston rings	
Compression	2
Gap in bore	0,40 - 0,65 mm (0.016 - 0.026 in)
Clearance in groove..	0,046 - 0,097 mm (0.0018 - 0.0038 in)
Oil control	1
Gap in bore	0,30 - 0,55 mm (0.012 - 0.022 in)
Clearancc in groove.	0,026 - 0,076 mm (0.0012 - 0.003 in)
Camshaft	
Location	Right-hand side (thrust side) of engine
End-float	0,06 - 0,13 mm (0.0025 - 0.0055 in)
Number of bearings..	4
Material	Steel shell, white metal lined
Drive	76 link chain
Valves	
Length:	
Inlet	111,20 - 111,66 mm (4.377 - 4.396 in)
Exhaust	111,12 - 111,59 mm (4.374 - 4.393 in)
Seat angle:	
Inlet	30"
Exhaust..	45"
Head diameter:	
Inlet	44,32 - 44,58 mm (1.744 - 1.755 in)
Exhaust	34,43 - 34,18 mm (1.355 - 1.345 in)
Stem diameter:	
Inlet	7,899 - 7,912 mm (0.3109 - 0.3115 in)
Exhaust..	8,697 - 8,679 mm (0.3424 - 0.3416 in)
Stem to guide clearance:	
Inlet	0,033 - 0,048 mm (0.0013 - 0.0019 in)
Exhaust..	0,035 - 0,076 mm (0.0014 - 0.0022 in)
Valve lift:	
Inlet	10,236mm (0.403 in)
Exhaust	9,85 mm (0.388 in)
Exhaust valve seat insert:	
External diameter..	36,576 - 36,601 (1.440 - 1.441 in)
Internal diameter.	28,448 - 28,702 mm (1.120- 1.130 in)
Width	5,055 - 5,105 mm (0.199 - 0.201 in)
Seat angle and depth	45°. 0,635 - 0,889 mm (0.025 - 0.035 in)

Valve springs

Type	Duplex interference coil
Inner:	
Length, free	42,67 mm (1.680 in)
Length, under 8,0 kg (17.7 lb) load	37,13 mm (1.462 in)
Outer:	
Length, free	46,28 mm (1.822 in)
Length, under 21 kg (46 lb) load	40,30 mm (1.587 in)

Lubrication

System	Wet sump, pressure fed
System pressure, engine warm at 2000 rpm	2,45 - 4,50 kgf cm^2 (35 - 65 lbf in^2)
Oil pump:	
Type	Double gear, 10 teeth, sintered iron gears
Drive	Splined shaft from camshaft skew gear
End-float of both gears	0,026 - 0,135 mm (0.0009 - 0.0045 in)
Radial clearance of gears	0,025 - 0,075 mm (0.0008 - 0.0025 in)
Backlash of gears	0,1 - 0,2 mm (0.0034 - 0.0067 in)

Oil pressure relief valve

Type	Non-adjustable
Relief valve spring:	
Full length	67,82 mm (2.670 in)
Compressed length at 2,58 kg (5.7 lb) load	61,23 mm (2.450 in)

2.25 LITRE DIESEL ENGINE

ENGINE

Type	4 cylinder
Bore	90,47 mm (3.562 in)
Stroke	88,9 mm (3.500 in)
Capacity	2286 cm^3 (139 in^3)
Valve operation	Overhead by push-rod
Compression ratio	33:1
Maximum power	44Kw (59 bhp) at 4000 rpm
Maximum torque	136 Nm (100 lbf ft) at 1800 rpm

Crankshaft

Main bearing journal diameter	63,487 - 63,500 mm (2.4995 - 2.500 in)
Regrind dimensions:	
63,246 - 63,2333 mm (2.490 - 2.4895 in)	Use 0.010 in U/S bearings
Crankpin journal diameter	58,725 - 58,744 mm (2.312 - 2.31275 in)
Regrind dimensions:	
58,48985 - 58,4708 mm (2.30275 - 2.30200 in)	Use 0.010 in U/S bearings
Crankshaft end thrust	Taken on thrust washers at centre main bearing
Crankshaft end-float	0,05 - 0,15 mm (0.002 - 0.006 in)

Main bearings

Number and type	5 halved shells
Material	Steel **shell,** copper-lead lined tin plated
Diametrical clearance	0,020 - 0,063 mm (0.0008 - 0.0025 **in)**

Connecting rods

Type	Horizontally split big end, plain small end
Length between centres	175,38 - 175,43 mm (6.905 - 6.907 in)

Big end bearings

Type and material	Steel shell, copper-lead lined
Diametrical clearance	0,020 - 0,0635 mm (0.0008 - 0.0025 in)
End-float on crankpin	0,15 - 0,356 mm (0.006 - 0.014 in)

Gudgeon pins

Type	Floating
Fit in piston	Push fit by hand
Clearance in connecting rod	0,0196 - 0,0036 mm (0.0007 - 0.00014 in)
Diameter	30,1564 - 30,1625 mm (1.18726 - 1.1875 in)

Pistons

Type	Aluminium alloy, with V shape recess in crown
Clearance in bore, measured at bottom of skirt at right angles to gudgeon pin:	
Standard size pistons	0,111 - 0,134 mm (0.0044 - 0.0053 in)
Oversize pistons	0,111 - 0,157 mm (0.0044 - 0.0062 in)

Piston rings

Compression No. 1 (top):	
Type	Square friction edge, chrome plated
Gap in bore	0,35 - 0,50 mm (0.014 - 0.019 in)
Clearance in groove	0,06 - 0,11 mm (0.0025 - 0.0045 in)
Compression Nos. 2 and 3:	
Type	Bevelled friction edge. Marked 'T' or 'TOP' on upper side
Gap in bore	0,25 - 0,38 mm (0.010 - 0.015 in)
Clearance in groove	0,06 - 0,11 mm (0.0025 - 0.0045 in)
Oil control No. 4:	
Type	Ring and spring
Gap in bore	0,279 - 0,406 mm (0.011 - 0.016 in)
Clearance in groove	0,038 - 0,064 mm (0.0015 - 0.0025 in)

Valves

Length:	
Inlet	116,26 - 116,51 mm (4.377 - 4.587 in)
Exhaust	116,79 - 117,25 mm (4.598 - 4.616 in)
Seat angle:	
Inlet	45"
Exhaust	45°
Head diameter:	
Inlet	39,12 - 39,37 mm (1.540 - 1.550 in)
Exhaust	33,25 - 33,50 mm (1.309 - 1.318 in)
Stem diameter:	
Inlet	7,912 - 7,899 mm (0.3114 - 0.3109 in)
Exhaust	8,682 - 8,694 mm (0.3418 - 0.3422 in)
Stem to guide clearance:	
Inlet	0,033 - 0,048 mm (0.0013 - 0.0019 in)
Exhaust	0,058 - 0,073 mm (0.0023 - 0.0029 in)
Valve lift:	
Inlet	9,85 mm (0.388 in)
Exhaust	10,26 mm (0.404 in)

Camshaft

Location	Right-hand side (thrust side) of engine
End-float	0,1 - 0,2 mm (0.004 - 0.008 in)
Number of bearings	4
Material	Stee! shell, white metal lined
Drive	Chain

Valve springs

Type	Duplex Interference double coil
Inner:	
Length, free	42,67 mm (1.680 in)
Length, under 8,0 kg (17.7 Ib) load	40,30 mm (1.587 in)
Outer:	
Length, free	46,28 mm (1.822 in)
Length, under 21 kg (46 Ib) load	40,30 mm (1.587 in)

Lubrication

System	Wet sump, pressure fed
System pressure, engine warm at 2000 rpm	2,5 - 4,57 kgf cm^2 (35 - 65 lbf in^2)
Oil pump:	
Type	Double gear
Drive	Splined shaft from camshaft skew gear
End-float of gears:	
Steel gear	0,05 - 0,12 mm (0.002 - 0.005 in)
Aluminium gear	0,07 - 0,15 mm (0.003 - 0.006 in)
Radial clearance of gears	0,02 - 0,10 mm (0.001 - 0.004 in)
Backlash of gcars.	0,15 - 0,28 mm (0.006 - 0.012 in)

Oil pressure relief valve

Type	Non-adjustable
Relief valve spring:	
Full length	67,82 mm (2.670 in)
Compressed length at 2,58 kg (5.7 Ib) load	61,23 mm (2.450 in)

2.5 LITRE DIESEL ENGINE

ENGINE

Number of cylinders	4
Bore	90,47 mm (3.562 in)
Stroke	97,00 mm (3.810 in)
Capacity	2495 cc
Compression ratio	21:1
Piston area (total)	257,1 cm^3 (39.86 in^3)
Maximum power at 4000 rpm	65.5 bhp
Maximum torque at 1800 rpm	113 lbf ft

Crankshaft

Main bearing journal diameter	63,487 - 63,500 mm (2.4995 - 2.5000 in)
Regrind dimensions:	
63,246 - 63,2333 mm (2.490 - 2.4895 in)	Use 0.010 in U/S bearings
Crankpin journal diameter	58,725 - 58,744 mm (2.312 - 2.31275 in)
Regrind dimensions:	
58,48985 - 58,4708 mm (2.30275 - 2.30200 in)	Use 0.010 in U/S bearings
Crankshaft end thrust	Taken on thrust washers at centre main bearing
Crankshaft end-float	0,05 - 0,15 mm (0.002 -0.006 in)

Main bearings

Number and type	5 halved shells
Diametrical clearance	0,018 - 0,061 mm (0.0007 - 0.0024 in)

Connecting rods

Length between centres..	175,38 - 175,43 mm (6.905 - 6.907 in)
Diametrical clearance (big-end bearings).	0,025 - 0,075 mm (0.001 - 0.003 in)
End-float on crankpin	0,15 - 0,356 mm (0.006 - 0.014 in)

Pistons

Type	Aluminium alloy 'V' shaped valve recess in crown
Skirt diametrical clearance (at right angle to gudgeon pin)	0,025 - 0,05 mm (0.001 - 0.002 in)

Gudgeon pins

Type	Floating
Fit in piston	Hand push fit
Diameter	30,1564 - 30,1625 mm (1.18726 - 1.18750 in)
Clearance in connecting rod	0,0196 - 0,0036 mm (0.00077 - 0.00014 in)

Piston rings

Type:	Top	Square friction edge, chrome plated
	Second	Taper faced
	Oil control	Expander and rails

Camshaft

Drive	25,4 mm (0.1 in) wide dry toothed belt
Location	Right-hand side (thrust side)
End-float	0,1 - 0,2 mm (0.004 - 0.008 in)
Number of bearings..	4
Material	Steel shell, white metal lined

Valves

Seat angle:	
Inlet	45"
Exhaust	45"
Head diameter:	
Inlet	39,12 - 39,37 mm (1.540 - 1.550 in)
Exhaust	33,25 - 33,50 mm (1.309 - 1.319 in)
Valve lift:	
Inlet	9,85 mm (0.388 in)
Exhaust	10,26 mm (0.404 in)
Cam lift:	
Inlet	6,81 mm (0.268 in)
Exhaust	7,06 mm (0.278 in)
Stem diameter:	
Inlet	7,912 - 7,899 mm (0.3114 - 0.3109 in)
Exhaust	8,682 - 8,694 mm (0.3418 - 0.3422 in)

Valve springs

Type	Duplex Interference double coil
Inner:	
Length, free	42,67 mm (1.680 in)
Length, under 8,0 kg (17.7 lb) load	40,30 mm (1.587 in)
Outer:	
Length, free	46,28 mm (1.822 in)
Length, under 21 kg (46 lb) load	40,30 mm (1.587 in)

Lubrication

System	Wet sump, pressure fed
System pressure, engine warm at 2000 rpm	2,5 - 4,57 kgf cm^2 (35 - 65 lbf in^2)
Oil pump: Early type	
Type	Double gear
Drive	Splined shaft from camshaft skew gear
End-float of gears:	
Steel gear	0,05 - 0,12 mm (0.002 - 0.005 in)
Aluminium gear	0,07 - 0,15 mm (0.003 - 0.006 in)
Radial clearance of gears	0,02 - 0,10 mm (0.001 - 0.004 in)
Backlash of gears	0,15 - 0,28 mm (0.006 - 0.012 in)
Oil pump: Latest type	
Type	Double gear, 10 teeth, sintered iron gears
Drive	Splined shaft from camshaft skew gear
End-float of both gears	0,026 - 0,135 mm (0.0009 - 0.0045 in)
Radial clearance of gears	0,025 - 0,075 mm (0.0008 - 0.0025 in)
Backlash of gears	0,1 - 0,2 mm (0.0034 - 0.0067 in)

Oil pressure relief valve

Type	Non-adjustable
Relief valve spring:	
Full length	67,82 mm (2.670 in)
Compressed length at 2,58 kg (5.7 lb) load	61,23 mm (2.450 in)

GENERAL DATA

FUEL SYSTEM — 2.25 Petrol

Carburetter	See **'ENGINE TUNING DATA'**
Air cleaner	Oil bath with built-in centrifugal pre-cleaner

Fuel pump — Early Models

Type	Mechanical with sediment bowl and hand primer
Pressure range	3 - 5 psi

Fuel pump — Latest Models

Make and Type	Facet, electric. Mounted on R.H. side of chassis
Pressure range	3 - 5 psi

FUEL SYSTEM — 2.25 and 2.5 Diesel

Injection pump	See **'ENGINE TUNING DATA'**
Fuel lift pump type	Mechanical, with hand primer
Pressure range	0,35 - 0,56 kgf cm^2 (5 - 8 lbf ft^2)

FUEL SYSTEM — V8 engine

Carburetter	See **'ENGINE TUNING DATA'**
Fuel pump — Make, type	Facet, electric mounted vertically on R.H. side of chassis
Air cleaner	Cyclone, replaceable element

COOLING SYSTEM — 2.25 Petrol, 2.25 and 2.5 Diesel

Type	Pressurized spill return system with thermostat control, pump and fan assisted
Thermostat	82°C
Pressure cap	0,6 kgf cm² (9 lbf in²)
Type of pump	Centrifugal

COOLING SYSTEM — V8 engine

Type	Pressurized spill return system with thermostat control, pump and fan assisted
Thermostat	Emission and non-emission 82°C, Australia 88°C
Type of pump	Centrifugal

CLUTCH — 2.25 Petrol

Type	Borg and Beck diaphragm spring
Centre plate diameter	242,1 mm (9.500 in)
Facing material	Raybestos 1488-05
Facing material identification colour	White/violet on periphary
Number of damper springs	6
Damper spring colour	Dark grey/light green
Clutch release bearing	Ball journal

CLUTCH — 2.25 and 2.5 Diesel engine — Early type

Type	Verto diaphragm spring
Centre plate diameter	242,1 mm (9.500 in)
Facing material	Raybestos 1488-05
Number of damper springs	8
Damper spring colour	2 off white/green 2 off pigeon blue 4 off ruby red
Clutch release bearing	Ball journal

CLUTCH — Later type

Type	Verto diaphragm spring
Centre plate diameter (friction plate)	235 mm (9.25 in)
Facing material	Verto 791
Number of damper springs	8
Damper spring colour	2 off white/green — suffix 'C' 2 off pigeon blue — suffix **'A'** 4 off ruby red — suffix 'B'
Clutch release bearing	Ball journal

CLUTCH — V8 engine

Type	Borg and Beck diaphragm spring
Centre plate diameter	267 mm (10.5 in)
Facing material	Raybestos 1488-05. Grooved. White/violet
Damper spring colour	Light blue/dark blue
Release bearing	Ball journal
Number of damper springs	6

TRANSMISSION — 2.25 Petrol, 2.25 and 2.5 Diesel engine

Main gearbox

Type LT77	Single helical constant mesh
Speeds	5 forward 1 reverse
Synchromesh	All forward speeds
Ratios:	
Fifth	0.8314:1
Fourth (direct)	1.0000:1
Third	1.5074:1
Second	2.3008:1
First	3.5850:1
Reverse	3.7007:1

Transfer box

Type LT230R	Two-speed reduction on main gearbox output. Front and rear drive permanently engaged via a lockable differential
Ratios:	
High	1.6670
Low	3.3198

Overall ratios (final drive):	**In high transfer**	**In low transfer**
Fifth	4.9042:1	9.7666:1
Fourth	5.8987:1	11.7471:1
Third	8.8917:1	17.7075:1
Second	13.5715:1	27.0272:1
First	21.1472:1	42.1138:1
Reverse	21.8293:1	43.4723:1

Input gear	26 Teeth
Intermediate gear	19 x 41 x 35 Teeth
Output gear	40 x 37 Teeth

TRANSMISSION — V8 Engine

Main gearbox

Type LT95	Single helical constant mesh
Speeds	4 forward 1 reverse
Synchromesh	All forward speeds
Ratios:	
Fourth (direct)	1.0000:1
Third	1.5049:1
Second	2.4480:1
First	4.0691:1
Reverse	3.6643:1

Transfer box

Type LT95	Two-speed reduction on main gearbox output. Front and rear drive permanently engaged via a lockable differential
Ratios:	
High	1.3362
Low	3.3206

Overall ratios (final drive):	**In high transfer**	**In low transfer**
Fourth	4.7281:1	11.7497:1
Third	7.1154:1	17.6822:1
Second	11.5745:1	28.7634:1
First	19.2390:1	47.8101:1
Reverse	27.3250:1	43.0538:1

TRANSMISSION — Ninety and One Ten V8 with 5-speed gearbox

Main gearbox

Type — Manual.. ..... LT85 5-speed helical constant mesh, with synchromesh on all forward gears

Main gearbox ratios.. .....

Fifth (Cruising gear)	0.7951
Fourth	1.0000
Third	1.4362
Second	2.1804
First	3.6497
Reverse	3.8242

Transfer gearbox

Type ..... LT230T. Two-speed reduction on main gearbox output. Front and rear drive permanently engaged via a lockable differential.

— Ninety models	High	1.1923
	Low	3.3198
— One Ten models	High	1.410
	Low	3.3198

Overall ratio (including final drive) — Ninetymodels

	In high transfer	**In low transfer**
Fifth (Cruising gear)	3.3544	0.3401
Fourth	4.2189	11.7471
Third	6.0592	16.8712
Second	9.1989	25.6134
First	15.3977	42.8734
Reverse	16.1339	44.9233

Overall ratio (including final drive) — One Ten models

	In high transfer	In **low transfer**
Fifth (Cruising gear)	3.9695	9.3401
Fourth	4.9925	11.7471
Third	7.1702	16.8712
Second	10.8856	25.6134
First	18.2210	42.8734
Reverse	19.0922	44.9233

REAR AXLE — One Ten only

Type ..... Salisbury 8HA
Ratio 3.538
Track ..... 1485,90 mm (58.50 in)

FRONT AXLE — All models and Ninety rear

Type ..... Spiral bevel, enclosed constant velocity joints
Ratio 3.538

PROPELLER SHAFTS — All Models

Type: Front and rear ..... Single Hookes universal needle roller joints. Sliding portion on front shaft gaitered, rear shaft open

SUSPENSION — All Models

Type	Coil springs controlled by telescopic dampers front and rear
Front	Transverse location of axle by Panard rod, and fore and aft location by two radius arms
Rear	Fore and aft movement inhibited by two tubular trailing links. Lateral location of axle by **a** centrally positioned **'A'** bracket bolted at the apex to a ball joint mounting. **An** optional levelling unit is positioned between the ball joint and upper cross member

BRAKES 2.25 Petrol and V8 Engine

System	Direct acting servo assisted dual braking system with Girling tandem master cylinder and pressure differential warning actuator, combination valve, or G. valve

Footbrake — All Models

Front	Lockheed Disc
Disc diameter	300 mm (11.81 in)
Number of pistons per wheel	4
Total lining area	232 cm^2
Lining material..	Don 230
Rear	Girling single cylinder drum brake
Drum diameter	280 mm (11 in)
Total lining area	493 cm^2
Brake drum width..	63.9 mm
Lining material..	Ferodo 2629

Handbrake — All Models

Type	Transmission drum brake cable operated
Drum diameter	254 mm (10 in)
Lining material..	Don 269

BRAKES — 2.25 and 2.5 litre Diesel engine

System	Direct acting servo assisted dual braking system with Girling tandem master cylinder and pressure differential warning actuator, combination valve, or G. valve. Servo assistance initiated by an engine driven air evacuation pump and sustained by a vacuum tank (vacuum tank deleted on 2.5)

Evacuation pump — 2.25 litre Diesel

Maximum speed	5000 rpm. Belt drive
Oil capacity	40 cm^3 (2.4 in^3) **SAE** 15W-50

Evacuation pump — 2.5 litre Diesel

Maximum speed	4000 rpm. Gear drive from camshaft
Lubrication	Oil feed via skew gear
Minimum vacuum level at 2500 rpm	0,8 bar

STEERING — All Models

Type:	
Manual — Early Models only	Burman recirculating ball
Manual	Gemmer Hour-glass worm and wheel
Optional power assisted — Early Models	Adwest Varamatic
Optional power assisted — Later Models	Adwest Lightweight or Gemmer
Ratios:	
Manual Burman straight ahead	20,55:1
Manual Gemmer	20,2:Constant
Power assisted straight ahead	17.5:1
Number of turns lock to lock:	
Manual	4.75
Power assisted	3.49
Camber angle	Zero
Castor angle	3"
Swivel pin inclination	7"
Front wheel toe-out — permanent 4-wheel drive	1,19 - 2,38 mm ($\frac{3}{64}$ - $\frac{3}{32}$ in)
Turning circle between kerbs:	
Right-hand drive	14,0 m (45.67 ft)
Left-hand drive	13,28 m (43.58 ft)
Steering wheel diameter	420 mm (16.5 in)
Steering damper	Fitted to drag link
Track	1485,90 mm (58.50 in)
Steering column type	Collapsible coupling

WHEELS AND TYRES — All Models

Type of wheel	Ventilated disc
Wheel size	5.50 in F x 16 in
Number of studs	5
Tyre size	7.50 x 16

ELECTRICAL EQUIPMENT — All Models

System	12 volt, negative earth

Battery — 2.25 litre Petrol and V8 engine

Type:		
Lucas — standard 9 plate	B.B.M.S. No. 371	Designation
Chloride — standard 9 plate	B.B.M.S. No. 291	190/84/90
Lucas — cold climate 13 plate	B.B.M.S. No. 389	Designation
Chloride — cold climate 13 plate	B.B.M.S. No. 369	315/120/92

Battery — 2.25 and 2.5 iitre Diesel engine

Type	Chloride B.B.M.S. No. 243 15 plate designation 395/175/90

Alternator — 2.25 litre Petrol and Diesel and 2.5 Diesel

Type	Lucas A115-34
Maximum D.C. output at 6000 rpm	34 amps
Rotor — winding resistance	3.27 ohms at 20°C ± 5%
Stator — winding resistance per phase	0.138 ohms at 20°C ± 5%
New brush length	20 mm
Renew brush at	10 mm
Brush spring pressure	1.3- 2.7 N (4.7- 9.8 oz)
Regulator controlled voltage	13.6- 14.4 volts measured across battery

Note: From the following engine numbers a 45 amp output alternator is fitted.

12J05497C	Land Rover 90/110 2.5 litre Diesel
11H05639C	Land Rover 90 2.3 litre Petrol
11H05629C	Land Rover 110 2.3 litre Petrol

Alternator — V8 engine

Type	Lucas A115-45
Maximum D.C. output at 6000 rpm	45 amps
Rotor — winding resistance	3.2 ohms at 20°C ± 5%
Stator — winding resistance per phase	0.092 ohms at 20°C ± 5%
New brush length	20 mm
Renew brush at	10 mm
Brush spring prcssure	1.3- 2.7 N (4.7- 9.8 oz)
Regulator controlled voltage	13.6- 14.4 volts measured across battery

Starter motor — 2.25 Petrol engine

Type	Lucas 2M100
Brush spring tension	1020 gms (36 ozs)
Minimum brush length	9,5 mm (0.375 in)

Starter motor — 2.25 and 2.5 Diesel engine

Type	Lucas 2M113
New brush length	22.2 mm (0.875 in)
Renew brush at	8 mm (0.312 in)
Armature cnd-float —	
Cast aluminium intermcdiate brackct	0,03 - 1,4 mm (0.001 - 0.056 in)
Pressed steel intermediate bracket	0,03 - 1,55 mm (0.001 - 0.061 in)
Commutator minimum diameter	38 mm (1.5 in)

Starter motor — V8 engine

Type	Lucas 3M100 prc-engaged
Brush spring tension	1020 gms (36 ozs)
Brush minimum length	9,5 mm (0.375 ins)

Distributor — All Petrol engines .....

Coil — All Petrol engines .....

} See **'ENGINE TUNING DATA'**

Fuses — All Models

Type ..... 12 cartridge **fuses** of the following values:
Three 10 amp
Six 8 amp
One 12 amp
Two 2.5 amp

Starter motor — 2.5 litre Diesel — Later Models

Type ..... Paris Rhone D9R91 12 volt

TYRE PRESSURES

Tyres — size and type		Normal All load conditions		Emergency soft Unladen		Emergency soft Laden	
		Front	Rear	Front	Rear	Front	Rear
6.00-16	bar	2,4	3,25	1,1	1,1	1,1	1,6
CROSS-PLY	lbf/in²	35	47	16	16	16	23
	kgf/cm²	2,5	3,3	1,1	1,1	1,1	1,6
7.50-16	bar	1,9	2,4	1,1	1,1	1,1	1,6
CROSS-PLY	lbf/in²	28	35	16	16	16	23
	kgf/cm²	2,0	2,5	1,1	1,1	1,1	1,6
205R16	bar	1,9	2,4	1,1	1,1	1,1	1,6
RADIAL-PLY	lbf/in²	28	35	16	16	16	23
	kgf/cm²	2,0	2,5	1,1	1,1	1,1	1,6
7.50R16	bar	1,9	2,75	1,1	1,1	1,1	1,6
RADIAL-PLY	lbflin²	28	40	16	16	16	23
	kgf/cm²	2,0	2,8	1,1	1,1	1,1	1,6
7.50-16	har	1,9	2,9	1,1	1,1	1,1	1,8
CROSS-PLY	lbf/in²	28	42	16	16	16	26
	kgf/cm²	2,0	3,0	1,1	1,1	1,1	1,8
750R16	bar	1,9	3,3	1,1	1,1	1,1	1,8
RADIAL-PLY	lbf/in²	28	48	16	16	16	26
	kgf/cm²	2,0	3.4	1,1	1,1	1,1	1,8

General Notes

- Emergency soft pressures should only be used in extreme conditions where extra flotation is required. Max. speed 40 km/h (25 mph). Return pressures to normal immediately firm ground **is** regained.
- For extra ride comfort at part load the normal rear tyre pressures may be reduced to following:
  90 models — Not more than 1050 kg rear axle load.
  6.00-16 tyres: 2,4 bar (35 lbf/in²) 2,5 kgf/cm²
  All other tyre sizes: 1,9 bar (28 lbf/in²) 2,0 kgf/cm²
  110 models — Not more than 1250 kg rear axle load.
  Cross-ply and radial tyres: 2,2 bar (32 lbf/in²) 2,25 kgf/cm²
- Towing: When vehicle is used for towing the reduced rear tyre pressures for extra ride comfort are **not** applicable.

REPLACEMENT BULBS AND UNITS

Headlamps:

— **UK** and Europe (except France)	60/55 W Halogen bulb
— France and Algeria	60/55 W Halogen bulb, yellow
— Rest of world, right-hand steering	75/50 W Sealed beam unit
— Rest of world, left-hand steering	60/50 W Sealed beam unit
Front side lamps	12v 5 w
Side repeater lamps	12v 4 w
Stop/tail lamps	12V 21/5W
Flasher lamps	12v 21w
Number plate lamp	12v 4 w
Reverse lamp	12v 21W
Rear fog guard lamp	12v 21w
Interior lamp	12v 21w
Warning lights	12v 12w
Instrument illumination	12" 3W
Hazard switch warning light	12V 0.6W

VEHICLE WEIGHTS AND PAYLOAD

Payload figures quoted in the accompanying table are nominal values for a base specification vehicle and will in general represent the maximum, as any options or extras fitted to the vehicle will increase its unladen weight and hence decrease its allowable payload.

When loading a vehicle to its maximum (Gross Vehicle Weight), consideration must be taken *of* the unladen vehicle weight and the distribution *of* the payload to ensure that axle loadings do not exceed the permitted maximum values. It is the customer's responsibility to limit the vehicle's payload in an appropriate manner such that neither maximum axle loads nor Gross Vehicle Weight are exceeded.

Land Rover Ninety

Model — Petrol/Diesel		Soft Top			Pick-up			Hard Top			Station Wagon		
		2.5P	2.5D	3.5P	2.5P	2.5D	3.5P	2.5P	2.5D	3.5P	2.5P	2.5D	3.5P
Gross Vehicle Weight	STANDARD SUSPENSION 2400 kg												
EEC Kerb Weight	kg	1606	1643	1602	1635	1672	1631	1648	1685	1644	1690	1727	1686
EEC Payload	kg	794	757	798	765	728	769	752	715	756	710	673	714
Unladen Weight	kg	1487	1519	1483	1516	1548	1512	1529	1561	1525	1571	1603	1567
Payload	kg	913	881	917	884	852	888	871	839	875	829	797	833
Maximum Axle Weights, all Ninety models with Standard Suspension Front Axle 1200 kg Rear Axle 1380 kg													
Gross Vehicle Weight	HIGH LOAD SUSPENSION 2550 kg												
EEC Kerb Weight	kg	1633	1670	1629	1662	1699	1658	1675	1712	1671	1717	1754	1713
EEC Payload	kg	917	880	921	888	851	892	875	838	879	833	796	837
Unladen Weight	kg	1514	1546	1510	1543	1575	1539	1556	1588	1522	1598	1630	1594
Payload	kg	1036	1004	1040	1007	975	1011	994	962	998	952	920	956
Maximum Axle Weights, all Ninety models with High Load Suspension Front Axle 1200 ke Rear Axle 1500 ke													

Land Rover One Ten

Model — Petrol/Diesel		Soft Top			Pick-up			Hard Top			Station Wagon			High Capacity Pick-up		
		2.5P	2.5D	3.5P	2.5P	2.5D	3.5P	2.5P	2.5D	3.5P	2.5P	2.5D	3.5P	2.5P	2.5D	3.5P
Gross Vehicle Weight	UNLEVELLED SUSPENSION 3050 ke															
EEC Kerb Weight	kg	1723	1742	1698	1724	1743	1699	1777	1796	1752	1887	1906	1862	1813	1859	1778
EEC Payload	kg	1327	1308	1352	1326	1307	1351	1273	1254	1298	1163	1144	1188	1237	1191	1272
Unladen Weight	ke	1588	1599	1563	1589	1600	1564	1642	1653	1617	1752	1763	1727	1678	1716	1643
Payload	kg	1462	1451	1487	1461	1450	1486	1408	1397	1433	1298	1287	1323	1372	1334	1407
Maximum Axle Weights, all One Ten models with Unlevelled Suspension Front Axle 1200 kg Rear Axle 1850 kg																
Gross Vehicle Weight	LEVELLED SUSPENSION 2950 kg															
EEC Kerb Weight	kg	1733	1752	1708	1734	1753	1709	1787	1806	1762	1897	1916	1872	1823	1869	1788
EEC Payload	kg	1217	1198	1242	1216	1197	1241	1163	1144	1188	1053	1034	1078	1127	1081	1162
Unladen Weight	kg	1598	1609	1573	1599	1610	1574	1652	1663	1627	1762	1773	1737	1688	1726	1653
Payload	kg	1352	1341	1377	1351	1340	1376	1298	1287	1323	1188	1177	1213	1262	1224	1297
Maximum Axle Weights, all One Ten models with Levelled Suspension Front Axle 1200 kg Kedr Axle 1750 kg																

V8 PETROL ENGINE TUNING DATA
(with 4-speed gearbox and without electronic ignition)

ENGINE

Compression ratio	9.35:1 or 8.13:1 Dependent upon market
Firing order	1—8—4—3—6—5—7—2
Cylinder numbering system, front to rear:	
Left bank	1-3-5-7
Right bank	2—4—6—8
Compression pressure (minimum)	9,5 kgf cm² (135 lbf in')
Timing marks	On crankshaft pulley vibration damper
Valve clearance	Not adjustable
Valve timing:	
Inlet opens	36"B.T.D.C.
Inlet closes	64" A.B.D.C.
Inlet duration	280"
Inlet peak	99" A.T.D.C.
Exhaust opens	74" B.B.D.C.
Exhaust closes	26° A.T.D.C.
Exhaust duration	280°
Exhaust peak	119"B.T.D.C.

CARBURETTERS

Type	Two Solex
European Australian	175CDSE
Other markets —non-emission	175CD3
Needle:	
Australian	BIFH
Other markets —non-emission	BIFQ
—emission	BIFK
Idle speed (engine hot):	
Australian	700 - 750 rpm (run-in) 550 - 650 rpm (new engine)
Other markets —non-emission	550 - 650 rpm
—emission	700 - 750 rpm (run-in) 550 - 650 rpm (new engine)
Fast idle speed (engine hot)	1050 - 1150 rpm
Mixture setting —CO at idle:	
Australian	2% - 3.5% Pulsair connected
Other markets	1.5% - 3% Pulsair connected

IGNITION

Coil make/type	AC Delco with ballast resistor
Primary resistance at 20°C (68°F)	1.2 - **1.4** ohms
Consumption, ignition on, at 2000 rpm	1 amp
Sparking plug type	Champion N12Y or Unipart GSP131
Sparking plug gap	0,71 - 0,84 mm (0.028 - 0.033 in)
Ignition timing, dynamic or static	5" to 7" B.T.D.C.
Fuel octane rating Australia	97 RON minimum
Non-emission	97 RON minimum
Emission	90 RON minimum
Engine idle speed	750 rpm maximum with vacuum pipe disconnected