

The purpose of this manual is to assist skilled mechanics in the efficient repair and maintenance of the range of vehicles given on the title-page. The procedures detailed, carried out in the sequence given and using the appropriate service tools, will enable the operations to be completed in the time stated in the Repair Operation Times.

Indexing

The content pages list the titles and reference numbers of the divisions in alphabetical order.

Operation Numbering

Each operation is followed by the number allocated to it in a master index. The number consists of six digits arranged in three pairs.

The master index of operations has been compiled for universal application to vehicles manufactured by British Leyland Motor Corporation and therefore continuity of the numbering sequence is not maintained throughout the manual.

Each instruction within an operation has a sequence number, and to complete the operation in the minimum time it is essential that these instructions are performed in numerical sequence commencing at 1 unless otherwise stated. Where applicable, the sequence numbers identify the components in the appropriate illustration.

Where performance of an operation requires the use of a service tool, the tool number is quoted under the operation heading and is repeated in, or following, the instruction involving its use.

An illustrated list of all service tools necessary to complete the operations described in the manual is also included.

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 genuine Land Rover replacements 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 genuine Land Rover replacements 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 genuine Land Rover parts.

All genuine Land Rover replacements have the full backing of the Owners Service Statement.

Land Rover Distributors and Dealers are obliged to supply only genuine Land Rover service parts.

POISONOUS 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 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 CO₂ 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 headlamps 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.

continued

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:

- a **STEAMING:** With the filler cap and tank unit removed, empty the tank. Steam the tank for at least 2 hours with low pressure steam. Position the tank so that condensation can drain away freely, ensuring that any sediment and sludge not volatilised 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 2 hours. After steaming or boiling a signed and dated label to this effect should be attached to the tank.

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SERVICE TOOLS 99

ABBREVIATIONS AND SYMBOLS

Across flats (bolt size)	A.F.	Negative (electrical)	—
After bottom dead centre	A.B.D.C.	Newton metre	Nm
After top dead centre	A.T.D.C.	Number	No.
Alternating current	a.c.	Ounces (force)	ozf
Amperes	A	Ounces (mass)	oz
Ampere-hour	Ah	Ounce inch (torque)	ozf in
Atmospheres	Atm	Outside diameter	o.dia
		Overdrive	O/D
Before bottom dead centre	B.B.D.C.	Paragraphs	para.
Before top dead centre	B.T.D.C.	Part Number	Part No.
Bottom dead centre	B.D.C.	Percentage	%
Brake horse power	b.h.p.	Pints (Imperial)	pt
Brake mean effective pressure	b.m.e.p.	Pints (U.S.)	U.S. pt
British Standards	B.S.	Plus or minus	±
		Plus (tolerance)	+
Carbon monoxide	CO	Positive (electrical)	+
Centigrade (Celsius)	C	Pounds (force)	lbf
Centimetres	cm	Pounds (mass)	lb
Cubic centimetres	cm ³	Pounds feet (torque)	lbf ft
Cubic inches	in ³	Pounds inches (torque)	lbf in
Cycles per minute	c/min	Pounds per square inch	lbf/in ²
		Radius	r
Degree (angle)	deg. or °	Ratio	:
Degree (temperature)	deg. or °	Reference	ref.
Diameter	dia.	Revolutions per minute	rev/min
Direct current	d.c.	Right-hand	R.H.
		Right-hand steering	R.H.Stg.
Fahrenheit	F		"
Feet	ft	Second (angle)	
Feet per minute	ft/min	Second (numerical order)	2nd
Fifth	5th	Single carburetter	SC
Figure (illustration)	Fig.	Society of Automobile Engineers	S.A.E.
First	1st	Specific gravity	sp. gr.
Fourth	4th	Square centimetres	cm ²
		Square inches	in ²
Gallons (Imperial)	gal	Standard	std.
Gallons (U.S.)	U.S. gal	Standard wire gauge	s.w.g.
Grammes (force)	gf	Synchronizer/synchromesh	synchro.
Grammes (mass)	g		
High compression	h.c.	Third	3rd
High tension (electrical)	h.t.	Top dead centre	T.D.C.
Horse-power	hp	Twin carburetters	TC
Hundredweight	cwt		
		United Kingdom	UK
Inches	in		
Inches of mercury	inHg	Volts	V
Independent front suspension	i.f.s.	Watts	W
Internal diameter	i.dia.		
		Screw threads	
Kilogrammes (force)	kgf	American Standard Taper	
Kilogrammes (mass)	kg	Pipe	N.P.T.F.
Kilogramme centimetre	kgf cm	British Association	B.A.
Kilogramme metres	kgf m	British Standard Fine	B.S.F.
Kilogrammes per square centimetre	kgf/cm ²	British Standard Pipe	B.S.P.
Kilometres	km	British Standard Whitworth	B.S.W.
Kilometres per hour	km/h	Unified Coarse	U.N.C.
Kilovolts	kV	Unified Fine	U.N.F.
King pin inclination	k.p.i.		
		Left-hand	L.H.
Left-hand	L.H.	Left-hand steering	L.H.Stg.
Left-hand thread	L.H.Thd.	Left-hand thread	L.H.Thd.
Low compression	l.c.	Low compression	l.c.
Low tension	l.t.	Low tension	l.t.
		Maximum	max.
Metres	m	Metres	m
Miniature Edison Screw	MES	Miniature Edison Screw	MES
Miles per gallon	m.p.g.	Miles per gallon	m.p.g.
Miles per hour	m.p.h.	Miles per hour	m.p.h.
Millimetres	mm	Millimetres	mm
Millimetres	mm	Millimetres	mm
Millimetres of mercury	mmHg	Millimetres of mercury	mmHg
Minimum	min.	Minimum	min.
Minus (of tolerance)	—	Minus (of tolerance)	—
Minute (of angle)	'	Minute (of angle)	'

GENERAL SPECIFICATION DATA

ENGINE — 2½ LITRE PETROL

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 pushrod
Crankshaft	
Main journal diameter	63,487 mm to 63,500 mm (2.4995 in. to 2.500 in.)
Minimum regrind diameter	62,48 mm (2.460 in.)
Crankpin journal diameter	58,72 mm to 58,733 mm (2.312 in. to 2.31275 in.)
Minimum regrind diameter	57,70 mm (2.272 in.)
Crankshaft end thrust	Taken on thrust washers at centre main bearing
Crankshaft end float	0,05 mm to 0,15 mm (0.002 in. to 0.006 in.)
Main bearings	
Number and type	3 halved shells
Material	Steel shell, tin-aluminium lined
Diametrical clearance	0,020 mm to 0,072 mm (0.0008 in. to 0.00285 in.)
Undersizes	0,25 mm, 0,50 mm, 0,76 mm, 1,01 mm (0.010 in., 0.020 in., 0.030 in., 0.040 in.)
Connecting rods	
Type	Horizontally split big end, plain small end
Length between centres	175,36 mm to 175,46 mm (6.904 in. to 6.908 in.)
Big end bearings	
Type and material	Steel shell, copper-lead lined
Diametrical clearance	0,019 mm to 0,068 mm (0.00075 in. to 0.0027 in.)
End float on crankpin	0,02 mm to 0,03 mm (0.007 in. to 0.012 in.)
Undersizes	0,25 mm, 0,50 mm, 0,76 mm, 0,01 mm (0.010 in., 0.020 in., 0.030 in., 0.040 in.)
Gudgeon pins	
Type	Floating
Fit in piston	Push fit by hand
Clearance in connecting rod	0,007 mm to 0,015 mm (0.0003 in. to 0.0006 in.)
Pistons	
Type	Aluminium alloy, flat top
Clearance in bore, measured at bottom of skirt at right angles to gudgeon pin	
Standard size pistons	0,0479 mm to 0,0612 mm (0.0019 in. to 0.0024 in.)
Oversize pistons	0,043 mm to 0,055 mm (0.0017 in. to 0.0022 in.)

Piston rings	
Compression	2
Gap in bore	0,38 mm to 0,50 mm (0.015 in. to 0.020 in.)
Clearance in groove	0,046 mm to 0,097 mm (0.0018 in. to 0.0038 in.)
Oil control	
Gap in bore	1
Clearance in groove	0,38 mm to 0,50 mm (0.015 in. to 0.020 in.)
Camshaft	
Location	Right-hand side (thrust side) of engine
End float	0,06 mm to 0,13 mm (0.0025 in. to 0.0055 in.)
Number of bearings	4
Material	Steel shell, white metal lined
Valves	
Length	
Inlet	111,25 mm to 111,60 mm (4.380 in. to 4.394 in.)
Exhaust	111,22 mm to 111,58 mm (4.379 in. to 4.393 in.)
Seat angle	
Inlet	30°
Exhaust	45°
Head diameter	
Inlet	44,45 mm to 44,57 mm (1.750 in. to 1.755 in.)
Exhaust	35,02 mm to 35,05 mm (1.375 in. to 1.380 in.)
Stem diameter	
Inlet	7,891 mm to 7,904 mm (0.3107 in. to 0.3112 in.)
Exhaust	8,661 mm to 8,674 mm (0.3410 in. to 0.3415 in.)
Stem to guide clearance	
Inlet	0,033 mm to 0,048 mm (0.0013 in. to 0.0019 in.)
Exhaust	0,058 mm to 0,073 mm (0.0023 in. to 0.0029 in.)
Valve lift	
Inlet	10,236 mm (0.403 in.)
Exhaust	9,85 mm (0.388 in.)

continued

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.)
Valve timing	
Inlet opens	6° B.T.D.C.
Inlet closes	52° A.B.D.C.
Inlet peak	113° A.T.D.C.
Exhaust opens	34° B.B.D.C.
Exhaust closes	24° A.T.D.C.
Exhaust peak	95° B.T.D.C.
Lubrication	
System	Wet sump, pressure fed
System pressure, engine warm at 2000 rev/min	2,45 to 4,5 kgf/cm ² (35 to 65 lbf/in. ²)
Oil pump	
Type	Double gear
Drive	Splined shaft from camshaft skew gear
End float of gears	
Steel gear	0,05 mm to 0,12 mm (0.002 in. to 0.005 in.)
Aluminium gear	0,07 mm to 0,15 mm (0.003 in. to 0.006 in.)
Radial clearance of gears	0,02 mm to 0,10 mm (0.001 in. to 0.004 in.)
Backlash of gears	0,15 mm to 0,28 mm (0.006 in. to 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 lb.) load	61,23 mm (2.450 in.)

ENGINE – 2¼ LITRE DIESEL

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
Crankshaft	
Main bearing journal diameter	63,487 mm to 63,500 mm (2.4995 in. to 2.5000 in.). Regrinding NOT permitted.
Crankpin journal diameter	58,72 mm to 58,733 mm (2.312 in. to 2.31275 in.). Regrinding NOT permitted.
Crankshaft end thrust	Taken on thrust washers at centre main bearing
Crankshaft end float	0,05 mm to 0,15 mm (0.002 in. to 0.006 in.)
Main bearings	
Number and type	3 halved shells
Material	Steel shell, copper-lead lined, tin plated
Diametrical clearance	0,020 mm to 0,063 mm (0.0008 in. to 0.0025 in.)
Connecting rods	
Type	Horizontally split big end, plain small end
Length between centres	175,38 mm to 175,43 mm (6.905 in. to 6.907 in.)
Big end bearings	
Type and material	Steel shell, copper-lead lined
Diametrical clearance	0,019 mm to 0,068 mm (0.00075 in to 0.0027 in.)
End float on crankpin	0,20 mm to 0,30 mm (0.007 in. to 0.012 in.)
Gudgeon pins	
Type	Floating
Fit in piston	Push fit by hand
Clearance in connecting rod	0,0076 mm to 0,0178 mm (0.0003 in. to 0.0007 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 mm to 0,134 mm (0.0044 in. to 0.0053 in.)
Oversize pistons	0,111 mm to 0,157 mm (0.0044 in. to 0.0062 in.)

Piston rings	
Compression No. 1 (top)	
Type	Square friction edge, chrome plated
Gap in bore	0,35 mm to 0,50 mm (0.014 in. to 0.019 in.)
Clearance in groove	0,06 mm to 0,11 mm (0.0025 in. to 0.0045 in.)
Compression Nos. 2 and 3	
Type	Bevelled friction edge. Marked 'T' or 'TOP' on upper side
Gap in bore	0,25 mm to 0,38 mm (0.010 in. to 0.015 in.)
Clearance in groove	0,06 mm to 0,11 mm (0.0025 in. to 0.0045 in.)
Oil control No. 4	
Type	Expander and rails
Gap in bore	0,38 mm to 1,14 mm (0.015 in. to 0.045 in.)
Clearance in groove	0,038 mm to 0,064 mm (0.0015 in. to 0.0025 in.)
Camshaft	
Location	Right-hand side (thrust side) of engine
End float	0,06 mm to 0,13 mm (0.0025 in. to 0.0055 in.)
Number of bearings	4
Material	Steel shell, white metal lined
Valves	
Length	
Inlet	116,38 mm to 116,58 mm (4.582 in. to 4.590 in.)
Exhaust	116,89 mm to 117,09 mm (4.602 in. to 4.610 in.)
Seat angle	
Inlet	45°
Exhaust	45°
Head diameter	
Inlet	39,16 mm to 39,26 mm (1.542 in. to 1.546 in.)
Exhaust	33,32 mm to 33,42 mm (1.312 in. to 1.316 in.)
Stem diameter	
Inlet	7,891 mm to 7,904 mm (0.3107 in. to 0.3112 in.)
Exhaust	8,661 mm to 8,674 mm (0.3410 in. to 0.3415 in.)
Stem to guide clearance	
Inlet	0,033 mm to 0,048 mm (0.0013 in. to 0.0019 in.)
Exhaust	0,058 mm to 0,073 mm (0.0023 in. to 0.0029 in.)
Valve lift	
Inlet	9,85 mm (0.388 in.)
Exhaust	10,26 mm (0.404 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 ..	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.)
Valve timing	
Inlet opens	16° BTDC
Inlet closes	42° ABDC
Inlet peak	103° ATDC
Exhaust opens	51° BBDC
Exhaust closes	13° ATDC
Exhaust peak	109° BTDC
Lubrication	
System	Wet sump, pressure fed
System pressure, engine warm at 2000 rev/min	2,5 to 4,57 kgf/cm ² (35 to 65 lbf/in. ²)
Oil pump	
Type	Double gear
Drive	Splined shaft from camshaft skew gear
End float of gears	
Steel gear	0,05 mm to 0,12 mm (0.002 in. to 0.005 in.)
Aluminium gear	0,07 mm to 0,15 mm (0.003 in. to 0.006 in.)
Radial clearance of gears	0,02 mm to 0,10 mm (0.001 in. to 0.004 in.)
Backlash of gears	0,15 mm to 0,28 mm (0.006 in. to 0.012 in.)
Oil pressure relief valve	
Type	Non-adjustable
Relief valve spring	
Free length	67,82 mm (2,670 in.)
Compressed length at 2.58 kg (5.7 lb.) load	61,23 mm (2.450 in.)

ENGINE – 2.6 LITRE PETROL

Type	6-cylinder
Bore	77,8 mm (3.063 in.)
Stroke	92,075 mm (3.625 in.)
Capacity	2625 cm ³ (160.3 in. ³)
Valve operation	Inlet – overhead by push rod Exhaust – side by cam follower
Crankshaft	
Main journal diameter	66,64 mm to 66,66 mm (2.624 in. to 2.6245 in.)
Minimum regrind diameter	65,63 mm (2.584 in.)
Crankpin journal diameter	47,62 mm to 47,64 mm (1.875 in. to 1.87575 in.)
Minimum regrind diameter	46,60 (1.835 in.)
Crankshaft end thrust	Taken on thrust washers at rear main bearing
Crankshaft end float	0,05 mm to 0,15 mm (0.002 in. to 0.006 in.)
Main bearings	
Number and type	7 halved shells
Material	Steel shell, copper-lead lined, tin plated
Diametrical clearance	0,015 mm to 0,050 mm (0.0006 in. to 0.002 in.)
Undersizes	0,25 mm, 0,50 mm, 0,76 mm, 1,01 mm (0.010 in., 0.020 in., 0.030 in., 0.040 in.)
Connecting rods	
Type	Horizontally split big end, plain small end
Length between centres	206,463 mm (8.1285 in.)
Big end bearings	
Type and material	Steel shell, copper-lead, tin plated
Diametrical clearance	0,019 mm to 0,063 mm (0.00075 in. to 0,0025 in.)
End float on crankpin	0,15 mm to 0,38 mm (0.006 in. to 0.015 in.)
Undersizes	0,25 mm, 0,50 mm, 0,76 mm, 1,01 mm (0.010 in., 0.020 in., 0.030 in., 0.040 in.)
Gudgeon pins	
Type	Fully floating
Fit in piston	Push fit by hand
Clearance in connecting rod	Zero to 0,0241 mm (0.00095 in.)
Pistons	
Type	Aluminium alloy, ridged top
Clearance in bore, measured at bottom of skirt at right angles to gudgeon pin. Standard size and oversize pistons	0,048 mm to 0,060 mm (0.0019 in. to 0.0024 in.)

Piston rings	
Compression	2
Gap in bore	0,38 mm to 0,50 mm (0.015 in. to 0.020 in.)
Clearance in groove	0,046 mm to 0,097 mm (0.0018 in. to 0.0038 in.)
Oil control	1
Gap in bore	0,38 mm to 0,80 mm (0.015 in. to 0.033 in.)
Clearance in groove	0,05 mm to 0,10 mm (0.002 in. to 0.004 in.)
Camshaft	
Location	Left-hand side of engine
End float	0,11 mm to 0,16 mm (0.0045 in. to 0.0065 in.)
Number of bearings	1
Material	Split 'Mazak' castings
Valves	
Length	
Inlet	96,57 mm to 96,77 mm (3.802 in. to 3.810 in.)
Exhaust	116,07 mm to 116,28 mm (4.570 in. to 4.578 in.)
Seat angle	
Inlet	30°
Exhaust	45°
Head diameter	
Inlet	45,54 mm to 45,64 mm (1.793 in. to 1.797 in.)
Exhaust	32,02 mm to 32,13 mm (1.261 in. to 1.265 in.)
Stem diameter	
Inlet	8,68 mm to 8,69 mm (0.342 in. to 0.3425 in.)
Exhaust	8,66 mm to 8,67 mm (0.341 in. to 0.3415 in.)
Stem to guide clearance	
Inlet	0,033 mm to 0,048 mm (0.0013 in. to 0.0019 in.)
Exhaust	0,058 mm to 0,073 mm (0.0023 in. to 0.0029 in.)
Valve lift	
Inlet	9,49 mm (0.374 in.)
Exhaust	10,23 mm (0.403 in.)

continued

Valve springs	
Type	Duplex. Interference coil
Inlet	
Inner	
Length, free	43,26 mm (1.703 in.)
Length under 9,7 kg (21.5 lb.) load	36,49 mm (1.437 in.)
Outer	
Length, free	49,80 mm (1.960 in.)
Length under 31,5 kg (69.5 lb.) load	41,27 mm (1.625 in.)
Exhaust	
Inner	
Length, free	43,26 mm (1.703 in.)
Length under 9,1 kg (16.4 lb.) load	38,10 mm (1.500 in.)
Outer	
Length, free	47,26 mm (1,861 in.)
Length under 18,9 kg (41.8 lb.) load	41,27 mm (1.625 in.)
Valve timing	
Inlet opens	12° BTDC
Inlet closes	46° ABDC
Inlet peak	107° ATDC
Exhaust opens	47° BBDC
Exhaust closes	17° ATDC
Exhaust peak	75° ABDC
Lubrication	
System	Wet sump, pressure fed
System pressure, engine warm at 2000 rev/min	2,81 to 3,51 kgf/cm ² (40 to 50 lbf/in. ²)
Oil pump	
Type	Spur gear
Drive	Splined shaft from camshaft skew gear
End float of gears	
Steel gear	0,05 mm to 0,12 mm (0.002 in. to 0.005 in.)
Aluminium gear	0,07 mm to 0,15 mm (0.003 in. to 0.006 in.)
Radial clearance of gears	0,02 mm to 0,102 mm (0.001 in. to 0.004 in.)
Backlash of gears	0,20 mm to 0,28 mm (0.008 in. to 0.012 in.)
Oil pressure relief valve	
Type	non-adjustable
Relief valve spring	
Free length	87,0 mm (3.425 in.)
Compressed length at 7,9 kg (17.5 lb.) load	50,55 (1.990 in.)

CLUTCH	
Make	Borg and Beck
Type	Diaphragm spring
Drive plate diameter	241 mm (9.500 in.)
Damper spring colour	Dark green (Petrol) Dark grey/Light green (Diesel)
Facing material	FERODO RYZ

TRANSMISSION	
Main gearbox	
Type	Single helical constant mesh with synchro-mesh on all forward speeds

Ratios:	
Top	Direct
Third	1.50:1
Second	2.22:1
First	3.68:1
Reverse: Suffix 'A' gearbox	3.887:1
Suffix 'B' gearbox	4.021:1

Transfer gearbox	
Type	Two speed reduction on main gearbox output
Front wheel drive	Two/four wheel drive control on transfer, box output

Ratios:		
Helical and spur gear transfer gearbox	High transfer	Low transfer
All helical transfer gearbox	1.15:1	2.35:1
Overall ratios (final drive) with helical and spur gear transfer gearbox.	1.53:1	3.27:1
Top	5.4:1	11.1:1
Third	8.05:1	16.5:1
Second	12.0:1	24.6:1
First	19.88:1	40.7:1
Reverse: Suffix 'A' gearbox	20.47:1	42.87:1
Suffix 'B' gearbox	21.6:1	44.31:1
Overall ratios (final drive) with all helical transfer gearbox.		
Top	7.19:1	15.4:1
Third	10.81:1	23.1:1
Second	15.96:1	34.1:1
First	26.46:1	56.56:1
Reverse: Suffix 'A' gearbox	27.87:1	59.76:1
Suffix 'B' gearbox	28.91:1	61.78:1

REAR AXLE	
Type	Spiral bevel fully floating
Ratio	4.7:1 109 in W/B 4.7:1 Hypoid

continued

FRONT AXLE

Differential	Spiral bevel
Front wheel drive	Enclosed universal joints
Ratio	4.7:1

PROPELLER SHAFTS

Type	Hardy-Spicer, needle bearing
Diameter of tubular shaft	50,8 mm (2.000 in.)
Overall length (face to face in midway position)	
Front shaft - 4-cylinder models ..	604,8 mm (23.812 in.)
Front shaft - 6-cylinder models ..	693,7 mm (27.312 in.)
Rear shaft - 88 models	554,00 mm (21.812 in.)
Rear shaft - 109 4-cylinder models .	1042,9 mm (41.062 in.)
Rear shaft - 109 6-cylinder models .	955,7 mm (37.625 in.)

COOLING SYSTEM

Type	Pressurized spill return system with thermostat control, pump and fan assisted
Thermostat	72°C (162°F)
Pressure cap	0,6 kgf cm ² (9 lbf in. ²)
Type of pump	Centrifugal

FUEL SYSTEM

Carburetter	see 'ENGINE TUNING DATA'
Air Cleaner	Oil bath with built in centrifugal pre-cleaner
Fuel pump	
2¼ litre 4-cylinder Petrol	
Type	Mechanical
Pressure range	0,10 to 0,17 kgf cm ² (1.5 to 2.5 lbf in. ²)
2¼ litre 4-cylinder Diesel	
Type	Mechanical
Pressure range	0,35 to 0,56 kgf cm ² (5 to 8 lbf in. ²)
2.6 litre 6-cylinder Petrol	
Type	Electrical - Dual inlet
Pressure range	0,15 to 0,26 kgf cm ² (2.25 to 3.75 lbf in. ²)
Injection system 2¼ litre Diesel	
Injection pump	CAV mechanically-governed distributor type
Injectors	CAV Pintaux
Nozzle size	BDNO/SPC 6209
Operating pressure of nozzle valve ..	135 atm
Back leakage rate 150 to 100 atm ..	
New nozzle	7 seconds
Original nozzle	5 seconds
Start of injection	13° BTDC