04 - GENERAL SPECIFICATION DATA

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INFORMATION

ENGINE - V8

Type		3.9 litre V8
Number of cylinders		Eight, two banks of four
Bore		94.00 mm
Stroke		71.12 mm
Capacity		3950 cm^3
Valve operation		Overhead by push-rod
Compression ratio		8.13:1 or 9.35:1
Valve operation		Overhead by push-rod
Maximum power:	- 8.13:1	127kW at 4550 rev/min
	- 9.35:1	134kW at 4750 rev/min

Type	4.2 litre V8
Number of cylinders	Eight, two banks of four
Bore	94.00 mm
Stroke	77.00 mm
Capacity	4275 cm^3
Valve operation	Overhead by push-rod
Compression ratio	8.94:1
Valve operation	Overhead by push-rod
Maximum power	149kW at 4850 rev/min

Crankshaft

Main journal diameter	58.409-58.422 mm
Minimum regrind diameter	57.393-57.406 mm
Crankpin journal diameter	50.800-50.812 mm
Minimum regrind diameter	49.784-49.797 mm
Crankshaft end thrust	Taken on thrust washers of centre main bearing
Crankshaft end float	0.10-0.20 mm

Main bearings

Number and type	5, Vandervell shells
Material	Lead-indium
Diametrical clearance	0.010-0.048 mm
Undersize bearing shells	0.254 mm, 0.508 mm

Connecting rods

Type	Horizontally split big-end, plain small-end
Length between centres	143.81-143.71 mm

Big-end bearings

Type and material	Vandervell VP lead-indium
Diametrical clearance	0.015-0.055 mm
End-float crankpin	0.15-0.36mm
Undersize bearing shells	0.254 mm, 0.508 mm

Piston pins

Length	72.67-72.79 mm
Diameter	22.215-22.220 mm
Fit-in connecting rod	Press fit
Clearance in piston	0.002-0.007 mm

Pistons

Clearance in bore, measured at bottom of skirt at right angles to piston pin ..... 0.018-0.041 mm

Piston rings

Number of compression rings	2
Number of control rings	1
No 1 compression ring	Molybdenum barrel faced
No 2 compression ring	Tapered and marked 'T' or 'TOP'
Width of compression rings	1.478-1.49 mm
Compression ring gap	0.40-0.65 mm
Oil control ring type	Hepworth and Grandage
Oil control ring width	3.0 mm
Oil control ring rail gap	0.38-1.40 mm

Camshaft

Location	Central
Bearings	Tin-aluminium
Number of bearings	5
Drive	Chain 9.52 mm pitch x 54 pitches.

Tappets ..... Hydraulic self-adjusting

Valves

Length:	Inlet	116.59-117.35 mm
	Exhaust	116.59-117.35 mm
Seat angle:	Inlet	45° - 45 1/2°
	Exhaust	45° - 45 1/2°
Head diameter:	Inlet	39.75-40.00 mm
	Exhaust	34.226-34.480 mm
Stem diameter:	Inlet	8.664-8.679 mm
	Exhaust	8.651-8.666 mm
Stem to guide clearance:	Inlet	0.025-0.066 mm
	Exhaust	0.038-0.078 mm
Valve lift (Inlet and Exhaust)		9.49 mm
Valve spring length fitted		40.4 mm at pressure of 29.5 kg

Lubrication

System type	Wet sump, pressure fed
Oil pump type	Eccentric rotor
Oil pressure	2.75 bar (40 lbf/in^2) at 2500 rev/min with engine at running temperature
Oil filter-internal	Wire screen, pump intake filter in sump
Oil filter-external	Full flow, self-contained cartridge

ENGINE - 300Tdi

Type	Direct injection, turbocharged, intercooled
Number of cylinders	4
Bore	90,47 mm
Stroke	97,00 mm
Capacity	2495 cm^3
Compression ratio	19.5:1 ± 0.5:1
Valve operation	O.H.V. pushrod operated
Turbo charger	Garrett T25

Crankshaft

Main bearing journal diameter	63,475 - 63,487 mm
Regrind dimensions	63,2333 - 63,246 mm Use 0.010 in U/S bearings
Crankpin journal diameter	58,725 - 58,744 mm
Regrind dimensions	58,4708 - 58,48985 mm 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

Main bearings

Number and type	5 halved shells with oil grooves
Diametrical clearance	0,0792 - 0,0307 mm

Connecting rods

Length between centres	175,38 - 175,43 mm
Diametrical clearance (big-end bearings)	0,025 - 0,075 mm
End float on crankpin	0,15 - 0,356 mm

Pistons

Type	Aluminium alloy, combustion chamber in crown
Skirt diametrical clearance (at right angle to gudgeon pin)	0,025 - 0,05 mm
Maximum height above combustion face	0,8 mm

Gudgeon pins

Type	Floating
Fit in piston	Hand push fit
Diameter	30,1564 - 30,1625 mm
Clearance in connecting rod	0,0025 - 0,0163 mm

Piston rings

Type:
- Top ..... Barrel edge, chrome plated
- Second ..... Taper faced
- Oil control ..... Expander and rails

Gap in bore:
- Top ..... 0,40 - 0,60 mm
- Second ..... 0,30 - 0,50 mm
- Oil control ..... 0,3 - 0,6 mm

Clearance in piston grooves:
- Top ..... 0,167 - 0,232 mm
- Second ..... 0,05 - 0,08 mm
- Oil control ..... 0,05 - 0,08 mm

Camshaft

Drive ..... 30 mm (1.2 in) wide dry toothed belt
Location ..... Right hand side (thrust side)
End float ..... 0,1 - 0,2 mm
Number of bearings 4
Material ..... Steel shell, white metal lined

Valves

Tappet clearance:
- Inlet and exhaust ..... 0,20 mm

Seat angle:
- Inlet ..... 30°
- Exhaust ..... 45°

Head diameter:
- Inlet ..... 39,75 - 39,05 mm
- Exhaust ..... 36,35 - 36,65 mm

Stem diameter:
- Inlet ..... 7,960 - 7,975 mm
- Exhaust ..... 7,940 - 7,960 mm

Valve lift:
- Inlet ..... 9,67 mm
- Exhaust ..... 9.97 mm

Cam lift:
- Inlet ..... 6,81 mm
- Exhaust ..... 7,06 mm

Valve head stand down:
- Inlet ..... 0,81 - 1,09 mm
- Exhaust ..... 0,86 - 1,14 mm

Valve springs

Type ..... Single coil
Length, free ..... 46,28 mm
Length, under 21 kg (46 lb) load ..... 40,30 mm

Lubrication

System	Wet sump, pressure fed
Pressure, engine warm at normal operating speeds	1.7-3.8 bar (25 - 55 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
- Radial clearance of gears	0,025 - 0,075 mm
- Backlash of gears	0,1 - 0,2 mm
Oil pressure relief valve	Non-adjustable
Relief valve spring:	
- Full length	51.6 mm
- Compressed length at 7.71 kg load	31.0 mm
Oil filter	Screw-on disposable canister
Engine oil cooler	Combined with coolant radiator and intercooler

FUEL SYSTEM - V8 Engine

Fuel system type	Lucas 14CUX hot wire system electronically controlled
Fuel pump-make/type	High pressure electrical, immersed in the fuel tank
Fuel pump delivery pressure	2.4-2.6 bar (34-37 lbf/in ^{2})
Fuel filter	Bosch in-line filter 'canister' type

Airflow Sensor
Make and type ..... Lucas 'Hot Wire' 5AM

Injectors
Make and type ..... Lucas 8NJ

Electronic Control Unit
Make and type ..... Lucas 14CUX

Fuel pressure regulator
Make and type ..... Lucas 8RV

Fuel temperature sensor
Make and type ..... Lucas 6TT

Coolant temperature sensor
Make and type ..... Lucas 3TT

Bypass Air valve (Stepper motor)
Make and type ..... Lucas 2ACM

Throttle potentiometer
Make and type ..... Lucas 215SA

Lambda sensor - catalyst vehicles
Make and type ..... Lucas 3LS

FUEL SYSTEM - 300Tdi Engine

Injection pump type	Bosch rotary VE4/11F. ***See ENGINE TUNING DATA, Information, Engine - 300Tdi***
Injectors	***See ENGINE TUNING DATA, Information, Engine - 300Tdi***
Heater plugs	***See ENGINE TUNING DATA, Information, Engine - 300Tdi***
Fuel lift pump type	Mechanical with hand primer
Fuel lift pump pressure	0.4 - 0.55 bar (6 - lbf/in^2) at 1800 rpm
Fuel filter	Paper element in disposable canister
Air cleaner	Paper element type
Turbocharger	Garrett T25. ***See ENGINE TUNING DATA, Information, Engine - 300Tdi***

COOLING SYSTEM - V8 ENGINE

Type	Pressurized system with cross- flow radiator and remote header tank, thermostat control, pump and fan assisted
Type of pump	Centrifugal
Thermostat	88° C
Expansion tank cap pressure (system pressure)	1.0 bar (15 lbf/in^2)

COOLING SYSTEM - 300Tdi ENGINE

System type	Pressurised, spill return, thermostatically controlled water and anti freeze mixture. Pump assisted thermo syphon. Coolant radiator combined with oil cooler and turbo intercooler.
Cooling fan	11 blade axial flow 433 mm diameter. 1.29:1 drive ratio. Viscous coupling.
Pump type	Centrifugal, impeller, belt driven.
Thermostat opening	88° C
Expansion tank cap pressure (system pressure)	1.0 bar (15 lbf/in^2)

TRANSMISSION

Clutch

Make and type - V8 engine	Borg and Beck, diaphragm spring
Clutch plate diameter	266.5mm
Make and type - Diesel engine	Valeo, diaphragm spring
Clutch plate diameter	235mm

Transfer gearbox

Borg Warner	Two speed reduction on main gearbox output, front and rear drive permanently engaged via a centre differential controlled by a Viscous unit giving a 50/50 nominal front and rear torque split.

Transfer gearbox ratios

High	1.206:1
Low	3.244:1

Manual gearbox

Type R380	5 speed, single helical constant mesh with synchromesh on all forward gears

Manual gearbox ratios:

5th	0.731:1
4th	1.000:1
3rd	1.397:1
2nd	2.132:1
1st	3.321:1
Reverse	3.429:1
Diesel models low first gear	3.692:1

Overall ratio (final drive):	**High transfer**	**Low transfer**
5th	3.119:1	8.39:1
4th	4.267:1	11.476:1
3rd	5.959:1	16.027:1
2nd	9.095:1	24.462:1
1st	14.172:1	38.115
Reverse	14.629:1	39.346:1
Diesel models low 1st gear	15.750:1	42.362

Automatic gearbox

Model	ZF4HP22
Type	Four speed and reverse epicyclic gears with fluid torque converter and lock up.

Automatic gearbox ratios

4th	0.728:1
3rd	1.000:1
2nd	1.480:1
1st	2.480:1
Reverse	2.086:1

Overall ratio (final drive):	**High transfer**	**Low transfer**
4th	3.11:1	8.36:1
3rd	4.27:1	11.48:1
2nd	6.32:1	17.00:1
1st	10.59:1	28.50:1
Reverse	8.91:1	23.96:1

SHIFT SPEED SPECIFICATION - AUTOMATIC ZF4HP22 GEARBOX

OPERATION	SELECTOR POSITION	VEHICLE SPEED APPROX		ENGINE SPEED APPROX (RPM)
		KICKDOWN		
		MPH	**KPH**	
KD4 - 3	D	84 - 92	136 - 150	
KD3 - 2	3(D)	57 - 62	91 - 99	
KD2 - 1	2(D,3)	27 - 34	44 - 56	
KD3 - 4	D	N/A	N/A	
KD2 - 3	D(3)	60 - 63	96 - 104	4750 - 5200
KD1 - 2	D(3,2)	34 - 40	56 - 64	4600 - 5250
		FULL THROTTLE		
FT4 - 3	D	61 - 67	98 - 108	
FT3 - 2	3(D)	40 - 46	64 - 73	
FT3 - 4	D	74 - 80	119 - 129	3980 - 4330
FT2 - 3	D(3)	55 - 60	88 - 96	4350 - 4800
T1 - 2	D(3,2)	29 - 34	48 - 56	3950 - 465
		PART THROTTLE		
PT4 - 3	D	47 - 54	75 - 86	
PT3 - 2	D(3)	29 - 37	48 - 59	
PT2 - 1	D(3,2)	10 - 12	16 - 19	
		LIGHT THROTTLE		
LT3 - 4	D	26 - 30	43 - 49	1430 - 1650
LT2 - 3	D(3)	18 - 22	29 - 35	1420 - 1820
LT1 - 2	D(3,2)	9 - 10	14 - 16	1180 - 1220
		ZERO THROTTLE		
ZT4 - 3	D	19 - 25	31 - 41	
ZT3 - 2	D(3)	12 - 15	19 - 24	
ZT2 - 1	D(3,2)	6 - 7	10 - 11	
		TORQUE CONVERTER		
Lock up (IN)	D	51 - 54	81 - 86	1875 - 2000
Unlock (OUT)	D	49 - 52	78 - 83	1825 - 1930

Note: The speeds given in the above chart are approximate and only intended as a guide. Maximum shift changes should take place within these tolerance parameters.

Propeller shafts

Type	
Front	Tubular 51mm diameter
Front - Catalyst vehicles	Solid bar 28.6mm diameter
Rear	Tubular 51mm diameter
Universal joints	Open type Hooks O3EHD

Rear axle

Type	Spiral bevel, fully floating shafts
Ratio	3.54:1

Front axle

Type	Spiral bevel, enclosed constant velocity joints, fully floating shafts
Ratio	3.54:1

STEERING

Power steering box

Make/type	Adwest Varamatic - worm and roller box
Ratio	Variable: straight ahead 19.3:1 on lock 17.2:1
Steering wheel turns, lock-to-lock	3.375

Steering pump

Make/type:	
V8 engine	ZF 'UNICORN'
Diesel engine	Hobourn-Eaton series 500
Operating pressure - straight ahead position - at idle	7 bar (100 p.s.i.) maximum
Full lock (left or right) at idle	28 bar (400 p.s.i.) minimum
Full lock (left or right) 1000 rev/min	70-77 bar (1000-1100 p.s.i.)

Steering geometry

Steering wheel diameter	406.4mm
Toe-out measurement	0 to 2mm toe out
Toe-out included angle	0° to 0° 16'
Camber angle	0° C
Castor angle	3°
Swivel pin inclination static	7°

Check with vehicle in static unladen condition, that is, vehicle with water, oil and five gallons of fuel. Rock the vehicle up and down at the front to allow it to take up a position

SUSPENSION

Type:	
- Coil spring suspension	Coil springs controlled by telescopic dampers front and rear.
- Air suspension	Air springs controlled by an ECU providing variable rate springs and 5 height settings.
Front	Lateral location of axle by Panhard rod, and longitudinal location by two radius arms.
Rear	Lateral location of axle by a centrally positioned 'A' frame bolted at the apex to a ball joint mounting. Coil spring suspension: A levelling unit is positioned between the ball joint and upper cross member. Longitudinal location of axle by two tubular trailing links.

SHOCK ABSORBERS

Type	Telescopic, double-acting non-adjustable
Bore diameter	35.47mm

ROAD SPRING DATA

V8i

LEFT HAND DRIVE	Part No.	Colour Code
Left hand front	NRC4306	Blue/White
Right hand front	572315	Blue
Left hand rear	ANR 3519	Brown/Red
Right hand rear	ANR 3520	Brown/Yellow
Heavy duty rear	NRC 4304	Red/White

RIGHT HAND DRIVE		
Left hand front	572315	Blue
Right hand front	572315	Blue
Left hand rear	ANR 3520	Brown/Yellow
Right hand rear	ANR 3520	Brown/Yellow
Heavy duty rear	NRC 4304	Red/White

Tdi Diesel

LEFT HAND DRIVE	Part No.	Colour Code
Left hand front	NTC 8476	White/Blue/Pink
Right hand front	NRC 8477	Green/Blue/Yellow
Left hand rear	ANR 3519	Brown/Red
Right hand rear	ANR 3520	Brown/Yellow
Heavy duty rear	NRC 4304	Red/White

RIGHT HAND DRIVE		
Left hand front	NRC 8477	Green/Blue/Yellow
Right hand front	NRC 8477	
Left hand rear	ANR 3520	Brown/Yellow
Right hand rear	ANR 3520	
Heavy duty rear	NRC 4304	Red/White

BRAKES

Front service brake

Type	Outboard discs with four piston calipers
Operation	Hydraulic, servo assisted self-adjusting
Pad material	Ferodo 3440 non asbestos

Rear service brake

Type	Outboard discs with two piston calipers
Operation	Hydraulic, servo assisted, self-adjusting
Pad material	Ferodo 3440 non asbestos

Parking brake

Type	Mechanical-cable operated drum brake on the rear of the transfer gearbox output shaft
Lining material	Non asbestos

Servo/master cylinder

Manufacturer	Lucas Girling
Servo type	LSC 115
Master cylinder type	AS/AS

Anti-lock brake system

Manufacturer/type	Wabco LRC M15 - 4 channel, 4 wheel sensed integrated anti-lock brake system.

WHEELS AND TYRES

Type and size	Alloy 7.00J X 16
Tyre size	205R16 (tubeless)
Type and size	Steel 6.00JK X 16
Tyre size	205R16 (tubed)

△ **NOTE: Petrol vehicles must be fitted with 'S' or 'T' rated tyres.**

AIR CONDITIONING

System	CFC free expansion valve system (Nippon Denso)
Compressor	Nippon Denso 10PA17 Fixed displacement swash plate

WIPER MOTORS

Tailgate wiper motor

Make/type	IMOS (non-serviceable)
Running current, wet screen at 20° C ambient	1.0 to 2.8 amps
Wiper speed, wet screen at 20° C ambient	37 to 43 cycles per minute

Windscreen wiper motor

Make/type	Lucas 28W 2-speed
Running current (Link disconnected)	1.5 amps at 39 to 45 rev/min (normal speed)
Rotary link speed	60 to 73 rev/min (high speed)

ELECTRICAL

System ..... 12 volt, negative ground

Battery

Make/type - basic ..... Land Rover Parts and Equipment/Chloride maintenance free 9-plate-210/85/90
Make/type - heavy duty ..... Land Rover Parts and Equipment/Chloride maintenance free 14-plate-380/120/90

Generator

Manufacturer ..... Magnetti Marelli
Type ..... A133 - 100A
Polarity ..... Negative ground
Brush length
- New ..... 20 mm
- Worn, minimum free protrusion from brush box ..... 10 mm

Brush spring pressure flush with brush box face ..... 136 to 279 g
Rectifier pack output rectification ..... 6 diodes (3 positive side and 3 ground side)
Field winding supply rectification ..... 3 diodes
Stator windings ..... 3 phase-delta connected
Field winding rotor poles 12
- Maximum speed ..... 16,000 rev/min
- Winding resistance at 20° C ..... 2.6 ohms

Control ..... Field voltage sensed regulation
Regulator-type ..... 15 TR
- voltage ..... 13.6 to 14.4 volts

Nominal output
- Condition ..... Hot
- Generator speed ..... 6000 rev/min
- Control voltage ..... 14 volt
- Amp ..... 100 amp

Fuses

Type ..... Autofuse (blade type) blow ratings to suit individual circuits

Horns

Make/type ..... Klamix (Mixo) TR99

Starter motor

V8 Engine
Make/type ..... Lucas M78R pre-engaged
- Minimum brush length ..... 3.5 mm
- Minimum commutator diameter ..... 28.8 mm

Diesel Engine
Make and type ..... Bosch 0.001.362.092

REPLACEMENT BULBS

REPLACEMENT BULBS	TYPE		
Exterior lights			
Headlamps	12V	60/55W	(Halogen)
Auxiliary driving lamps	12V	55W H3	(Halogen)
Sidelamps	12V	5W	bayonet
Tail lamps	12V	5/21W	bayonet
Reverse lamps	12V	21W	bayonet
Stop lamps	12V	21W	bayonet
Direction indicator lamps	12V	21W	bayonet
Rear side marker lamps	12V	4W	bayonet
Number plate lamps	12V	5W	capless
Interior lights			
Interior roof lamps	12V	10W	'Festoon'
Door shut face/puddle lamps	12V	5W	capless
Instrument panel lamps and warning lamps	14V	1.2W	bulb/holder unit
Ignition warning lamp (Instrument panel)	14V	2W	capless
SRS warning lamp (Instrument panel)	14V	1.4W	capless
Clock illumination	12V	2W	bayonet
Cigar lighter illumination	12V	1.2W	capless
Auxiliary switch illumination	12V	0.2W	capless
Auxiliary switch warning lamp	12V	0.2W	capless
Hazard warning switch illumination	14V	0.2W	capless
Automatic selector graphics illumination	12V	5W	capless
Heater/air conditioning graphics illumination	12V	1.2W	capless

⚠ **CAUTION: The fitting of new bulbs with wattages in excess of those specified will result in damage to vehicle wiring and switches.**

VEHICLE WEIGHTS AND PAYLOAD

When loading a vehicle to its maximum (Gross Vehicle Weight), consideration must be taken of the vehicle kerb 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.

Basic models		Front Axle kg	Rear Axle kg	Total kg
Manual				
V8 engine	EEC Kerb weight	990	1080	2070
	Gross Vehicle Weight*	1100	1510	2510
V8 engine SE	EEC Kerb weight	1055	1095	2150
	Gross Vehicle Weight*	1100	1510	2510
V8 engine LSE	EEC Kerb weight	1090	1095	2185
(long wheelbase models)	Gross Vehicle Weight*	1200	1620	2620
Diesel engine				
Tdi	EEC Kerb weight	1040	1070	2110
	Gross Vehicle Weight*	1200	1620	2620
Tdi SE	EEC Kerb weight	1105	1085	2110
	Gross Vehicle Weight*	1200	1620	2620

△ **NOTE: EEC KERB WEIGHT is the minimum vehicle specification, plus full fuel tank and 75 kg driver. GROSS VEHICLE WEIGHT is the maximum all-up weight of the vehicle including driver, passengers, and equipment. This figure is liable to vary according to legal requirements in certain countries.**

Maximum roof rack load (including weight of rack) 75 kg must be included in total vehicle weight.

VEHICLE DIMENSIONS

Overall length 4.48m
- Long wheelbase vehicles 4.68m
Overall width 1.82m
Overall height 1.80m
Wheelbase 2.54m
- Long wheelbase vehicles 2.74m
Track: front and rear 1.49m
Ground clearance: under differential 190mm
Turning circle 11.89m
- Long wheelbase vehicles 13.64m
Loading height 749mm
Maximum cargo height 1.028m
Rear opening height 0.87m
Usable luggage capacity, rear seat folded ..... 2.00m^3
Usable luggage capacity, rear seat in use ..... 1.03m^3

TYRE PRESSURES

Pressures: Check with tyres cold	**Normal on and off-road use. All speeds and loads**		**Off-road 'emergency' soft use maximum speed of 40 kph (25 mph)**	
	Front	Rear (*)	Front	Rear
bar	1.9	2.4 (2.6)	1.2	1.8
lbf/in^2	28	35 (38)	17	25
kgf/cm^2	2.0	2.5 (2.7)	1.2	1.8

(*) Long wheelbase vehicles (2.74m, 108").

The pressure of tyres must be increased be 0.3 bar (3 lbf in^2 0.2 kgf/cm^2). For use with sustained driving speeds above 160 km/hr (100 miles/hour) or with heavy axle loads.
Normal operating pressures should be restored as soon as reasonable road conditions or hard ground is reached. After any usage off the road, tyres and wheels should be inspected for damage particularly if high cruising speeds are subsequently to be used.

Towing: When the vehicle is used for towing, the reduced rear tyre pressures for extra ride comfort are not applicable.

WARNING: Vehicles fitted with tubeless alloy road wheels as original equipment, note that these wheels DO NOT accept inner tubes and tubed tyres MUST NOT be fitted.