05 - ENGINE TUNING DATA

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ENGINE 3.9 V8

Type ..... 3.9 Litre V8

Firing order 1-8-4-3-6-5-7-2

Cylinder Numbers
Left bank 1-3-5-7
Right bank 2-4-6-8

No 1 Cylinder location ..... Pulley end of left bank

Timing marks ..... On crankshaft vibration damper

Spark plugs
Make/type(8.13:1 Compression) ..... Champion RN12YC
Gap ..... 0.84-0.96 mm (0.033-0.038 in)
Make/type(9.35:1 Compression) ..... Champion RN9YC
Gap ..... 0.84-0.96 mm (0.033-0.038 in)

Coil
Make/type ..... Bosch 0-221-122-392, (ETC 6574)

Compression ratio ..... 8.13:1 or 9.35:1

Fuel injection system ..... Lucas 14 CUX Hot-wire air flow sensor system electronically controlled

Valve Timing	**Inlet**	**Exhaust**
Opens	32° BTDC	70° BBDC
Closes	73° ABDC	35° ATDC
Duration	285°	285°
Valve peak	104° ATDC	114° BTDC

Idle speed - controlled by EFI system
all loads off in neutral ..... 665 to 735 rev/min
auto gearbox in gear, air con operating 650±28 rev/min
auto gearbox in gear, air con off ..... 600±28 rev/min
manual gearbox ..... 700±28 rev/min
manual gearbox, air con operating ..... 750±28 rev/min

Base idle speed ..... See setting procedure - 525 ± 25 rev/min.

Ignition Timing - dynamic at 800 rev/min max, vacuum disconnected
8.13:1 compression, non catalyst ..... 2° BTDC ± 1°
8.13:1 catalyst ..... 6° BTDC ± 1°
9.35:1 compression, non catalyst ..... 4° BTDC ± 1°
1993 Model Year
9.35:1 compression, catalyst ..... 5° BTDC ± 1°

Exhaust gas
CO content at idle ..... 0.5 to 1.0% max.

Distributor

Make/type	Lucas 35DLM8 electronic
Rotation	Clockwise
Air gap	0.20-0.35mm

Part number	Lucas	Rover
8.13:1, non catalyst	42518A	ERR 1250
8.13:1, catalyst	42648	ETC 6268
9.35:1, non catalyst	42510A	ERR 0744
9.35:1, catalyst	42543A	ERR 2986

Centrifugal Advance

Decelerating check-vacuum hose disconnected
Distributor rev/min decelerating speeds

8.13:1 non catalyst		
2000	Distributor advance	5° 30' to 8° 30'
1400		6° 18' to 8° 30'
800		2° to 4°
8.13:1 catalyst		
1600 - 2300	Distributor advance	8° 54' to 11°
1400		8° 36' to 10° 36'
600		1° 18' to 3° 18'
9.35:1 non catalyst		
2200	Distributor advance	7° to 10°
1400		7° 48' to 10°
650		1° to 3°
9.35:1 catalyst		
2200	Distributor advance	5° 30' to 8° 30'
1400		6° 18' to 8° 30'
800		2° to 4°

Fuel

8.13:1, non catalyst	91 RON minimum unleaded
8.13:1, catalyst	95 RON minimum unleaded
9.35:1, non catalyst	95 RON minimum unleaded
9.35:1, catalyst	95 RON minimum unleaded
USA-Premium unleaded (PUG)	CLC or AKI 90 octane minimum 95 RON minimum

Australian market variations

Fuel	91 RON minimum unleaded
Compression ratio	8.13:1
Spark plug	Champion RN12YC
Spark plug gap	0.84-0.96 mm (0.033-0.038 in)
Ignition Timing at 800 rev/min max (vacuum pipe disconnected)	2° BTDC ± 1°
Exhaust gas idle CO	1% max (hot)

DIESEL ENGINE 2.5

Type ..... 95A VM Type HR 4924 HI

Capacity ..... 2500 cm^3

Compression pressure ..... 24 to 26 kgf/cm^2

Injection order ..... 1 - 3 - 4 - 2

Idling speed
At running temperature ..... 750 - 800 rev/min
At cold start ..... 1000 - 1100 rev/min

Maximum light running speed ..... 4700 to 4730 rev/min

Maximum governed road speed ..... 4200 rev/min

Valve rocker clearances (cold)
Inlet ..... 0,30 mm
Exhaust ..... 0,30 mm

Fuel injection pump
Make and type ..... Bosch Rotary VE 4 10F 2100 L269
Injection pump timing ..... 3° ± 1° B.T.D.C.

Injectors
Make and type ..... Bosch KBE 58 S 4/4
Nozzle type ..... DNO SD263 or SDV 4011379
Opening pressure ..... 150 +8, -0 Bar

Heater plugs
Make and type ..... Bosch 0.250.201.012
Nominal voltage ..... 11 volts

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ENGINE 4.2 V8

Type ..... 4.2 Litre V8

Firing order 1-8-4-3-6-5-7-2

Cylinder Numbers
Left bank 1-3-5-7
Right bank 2-4-6-8

No 1 Cylinder location ..... Pulley end of left bank

Timing marks ..... On crankshaft vibration damper

Spark plugs
Make/type ..... Champion RN11YCC
Gap ..... 0.84-0.96 mm (0.033-0.038 in)

Coil
Make/type ..... Bosch 0-221-122-392, (ETC 6574)

Compression ratio 8.94:1

Fuel injection system ..... Lucas 14 CUX Hot-wire air flow sensor system electronically controlled

Valve Timing	**Inlet**	**Exhaust**
Opens	28° BTDC	72° BBDC
Closes	64° ABDC	20° ATDC
Duration	272°	272°
Valve peak	108° ATDC	116° BTDC

Idle speed - controlled by EFI system
- all loads off in neutral ..... 665 to 735 rev/min
- auto gearbox in gear, air con operating ..... 650±28 rev/min
- auto gearbox in gear, air con off ..... 600±28 rev/min
- manual gearbox ..... 700±28 rev/min
- manual gearbox, air con operating ..... 750±28 rev/min

Base idle speed ..... **See setting procedure - 525 ± 25 rev/min.**

Ignition Timing - dynamic at 800 rev/min max, vacuum disconnected
8.94:1, catalyst ..... 8° BTDC ± 1°

Exhaust gas
CO content at idle ..... 0.5 to 1.0% max.

Distributor

Make/type	Lucas 35DLM8 electronic
Rotation	Clockwise
Air gap	0.20-0.35 mm

Part number	Lucas	Rover
8.94:1, catalyst	42510A	ERR 0744

Centrifugal Advance

Decelerating check-vacuum hose disconnected
Distributor rev/min decelerating speeds

8.94:1 catalyst

2200	Distributor advance	7° to 10°
1400		7° 48' to 10°
800		1° to 3°

Fuel

8.94:1, catalyst	95 RON minimum unleaded
USA vehicles - Premium unleaded (PUG)	CLC or AKI 90 octane minimum 95 RON minimum

200Tdi ENGINE

ENGINE

Firing order	1-3-4-2	
Injection timing	1,54 mm lift at T.D.C.	
Timing marks:		
Valve timing	Slot for peg in flywheel and TDC mark on front pulley	
Injection timing	Special tool inserted in D.P.S. pump hub	
Tappet clearances inlet and exhaust	0,20 mm (0.008 in) cold	
Valve timing:	Inlet	Exhaust
- Opens	16° B.T.D.C.	51° B.B.D.C.
- Closes	42° A.B.D.C.	13° A.T.D.C.
- Peak	103° A.T.D.C.	109° B.T.D.C.
- Lift	9,93 mm (0.401 in)	10,26 mm (0.404 in)
Maximum governed speeds:		
- Full load (speed cut-off starts)	4000 rev/min	
- No load (flight speed)	4600 + 40 - 120 rev/min	
- Idle speed	720 ± 20 rev/min	
- Die-down time	4 seconds	

INJECTION PUMP

Make/type	Bosch rotary VE 4/11F type with boost control and two speed mechanical governor with auto advance and solenoid electrical shut-off. Tamper proof sealing on flight speed and fuel adjustment screws
Direction of rotation	Clockwise, viewed from drive end
Advance box (two stage)	7° advance with 3° start retard
Back leakage rate 150-100 Atm:	
- New nozzle	7 seconds
- Original nozzle	5 seconds
- Despatch nozzle	8520A290A

INJECTORS

Make/type	Bosch KBEL 98 P52 200 bar
Nozzle size	BDNO/SPC 6209
Opening pressure (working pressure)	Initial pressure 200 atmospheres Secondary 280 atmospheres
Injector pipe type	High pressure multi-bundy
Injector pipe size	1,94 - 2,06 mm

HEATER PLUGS

Make/type	Probe type, Beru 11 volts
Time to reach operating temperature of 850°C	8 seconds

TURBOCHARGER

Make/type	Garrett T25
Maximum boost pressure	0.78 bar (11.3 P.S.I.G.) measured at wastegate actuator 'T' piece
Fuel specification	Diesel BS2869 (certain levels down to 45 with adjustment