Place a layshaft spacer of nominal thickness 1,02 mm (0.040 in) on the layshaft bearing track, fit the front cover and a new gasket, securing with six bolts.
Using a dial gauge, check layshaft end-float.
Remove the front cover and provisional spacer.
The required layshaft end-float is 0,005 to 0,055 mm (0.0002 to 0.002 in). Check the thickness of the provisional spacer. Spacer thickness required is: provisional spacer thickness, plus end-float obtained, minus 0,055 mm (0.002 in).
Again fit the front cover and gasket, this time with the correct spacer arrived at in previous operation.
Check layshaft end-float to ensure it is within the limits specified previously.
Place a ball bearing in the centre of the input shaft. This facilitates checking mainshaft end-float.
Mount a dial gauge on the gearcase with the stylus resting on the ball; zero the gauge.
Check the mainshaft and input shaft combined end-float. Care must be taken when checking dial gauge readings to ensure that end-float only—as distinct from side movement of the input shaft—is recorded. If difficulty is encountered in differentiating between end-float and side movement, remove the front cover and wrap the plain portion of the input shaft below the splines with six turns of masking tape. Refit the front cover and again check end-float ensuring that rise and fall of the input shaft is not restricted by the tape.
Having ascertained end-float, select the spacer required as follows:
End-float minus 0,055 mm (0.002 in) = spacer thickness required.
Fit the spacer thus determined and again check end-float which must be within 0,005 to 0,055 mm (0.0002 to 0.002 in).
Remove the front cover and tape, if used.
Fit the oil seal to the front cover and lubricate the seal lips.
Mask the splines and fit the front cover; remove the spline masking.
Place the gearbox on a bench or stand and remove the slave bolts and washers from the centre-plate.
Fit the 5th gear spool and circlip to the selector shaft.

NOTE: The longer cam of the spool is fitted towards the bottom of the gearbox.

Fit the 5th gear selector fork and bracket.
Renew the selector shaft 'O' ring in the rear cover and fit the oil ring bush.
Fit a new rear gasket to the centre-plate and engage the oil pump shaft in the layshaft.
Fit the oil pump gears and cover to the gearbox rear cover.
Fit the rear cover ensuring that the oil pump drive engages the oil pump.
Fit the selector shaft ball, spring and plug to the centre-plate.
Fit the two spool locating bosses to both the 1st/2nd spool and 5th gear spool.
Fit the speedometer driving gear to the mainshaft ensuring that it engages the flats on the mainshaft.
Fit the spacer and ball race to the mainshaft.
Fit a new rear oil seal, lubricate the seal lip with gearbox oil.
Fit the output flange, washer and nut.
Fit the speedometer driven gear and housing.*
Refit the bell housing.
Refit the clutch pivot bolt.
Assemble the release bearing to the withdrawal lever and press the retaining clip over the head of the pivot bolt.
Fit the remote control housing.

***Later models**

Speedo drive pinion for electronic speedometer vehicles.

CONTENTS

LIST OF COMPONENTS

1. Converter securing bolt
2. Stoneguard
3. Converter housing
4. Rear oil seal
5. Rear extension housing
6. Gasket
7. Transmission case
8. Governor feed, lubrication and return pipes
9. Stoneguard
10. Converter

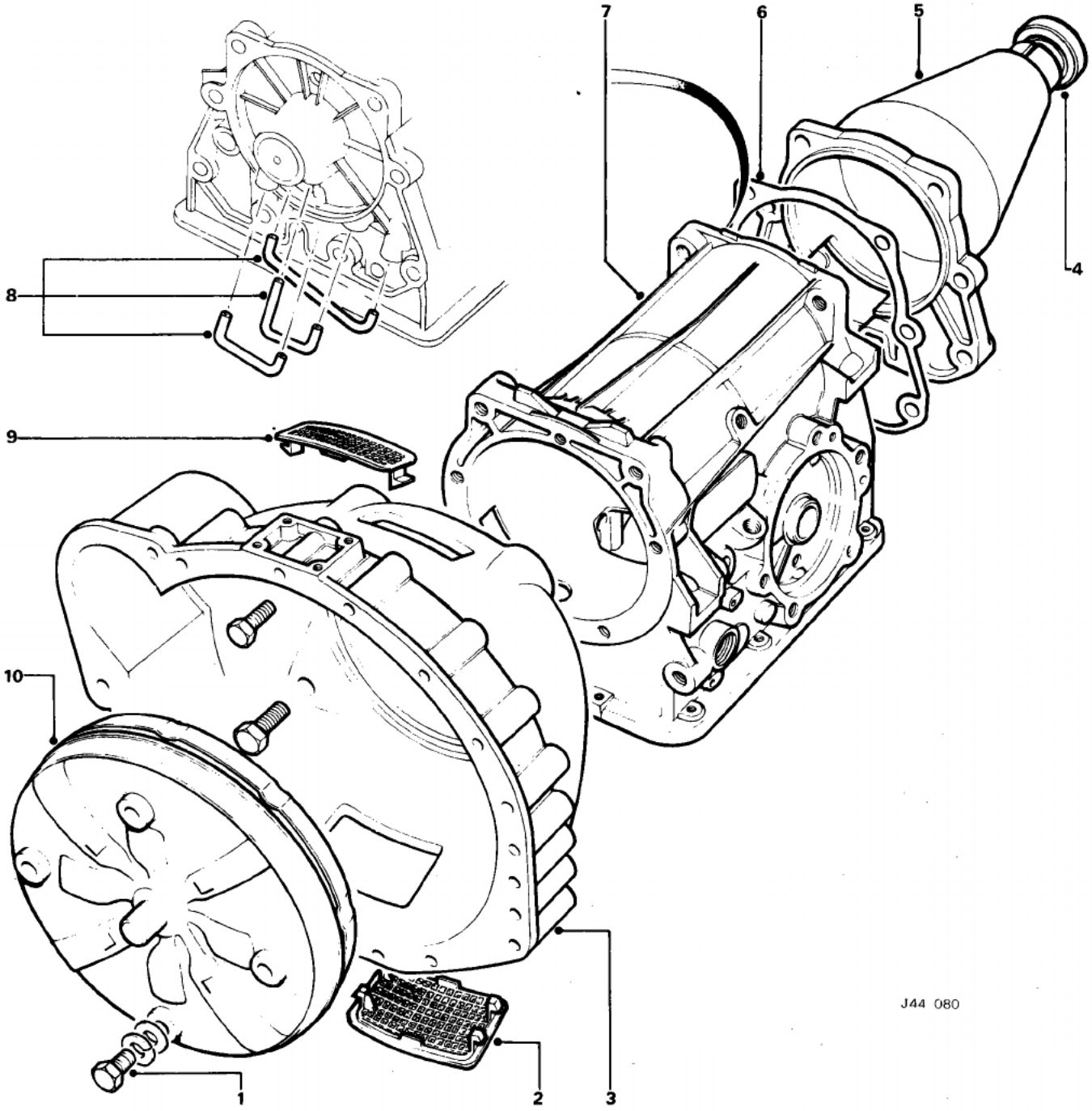


Fig. 1

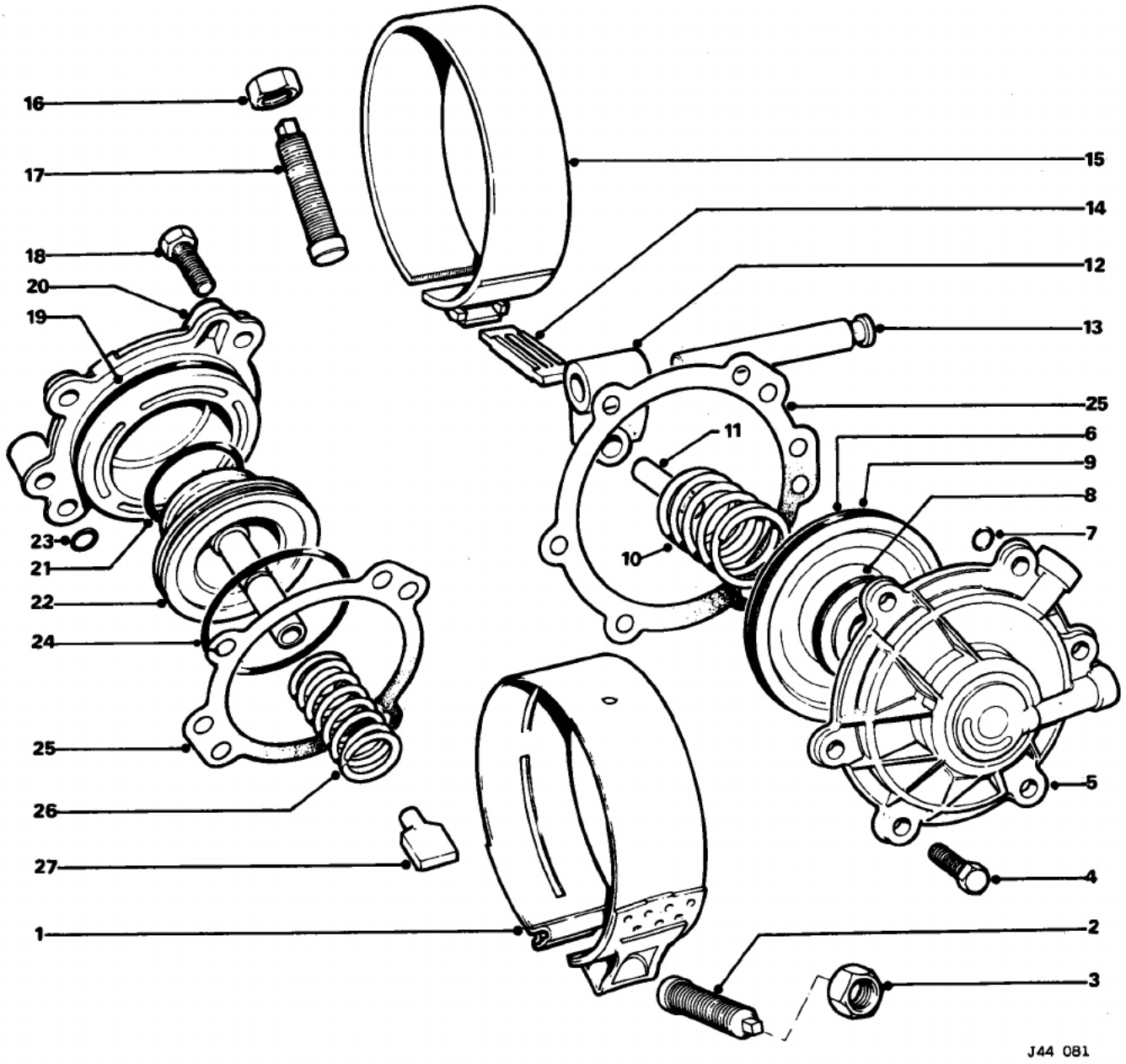


Fig. 2

LIST OF COMPONENTS

1. Front brake band
2. Adjusting screw
3. Locknut
4. Cover securing bolt
5. Rear servo cover
6. Piston
7. 'O' ring
8. Piston sealing ring
9. Piston sealing ring
10. Piston return spring
11. Operating rod
12. Fulcrum
13. Fulcrum pin
14. Brake band strut
15. Rear brake band
16. Locknut
17. Adjusting screw
18. Cover securing bolt
19. 'O' ring
20. Front servo cover
21. Piston sealing ring
22. Piston
23. 'O' ring
24. Piston sealing ring
25. Gasket
26. Piston return spring
27. Brake band strut

DESCRIPTION

TORQUE CONVERTER

The torque converter is of the three-element, single-phase type. The three elements are: impeller, connected to the engine crankshaft; turbine, connected to the gearbox input shaft, and stator, mounted on a one-way clutch on the stator support projecting from the gearbox case. The converter provides torque multiplication of from 1 : 1 to 2.3 : 1 and the speed range during which this multiplication is obtained varies with the accelerator position.

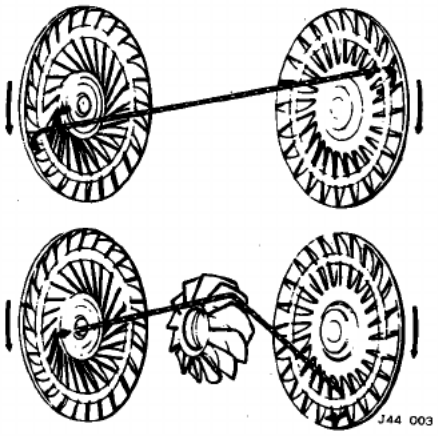


Fig. 3

GEAR SET

The planetary gear set consists of two sun gears, two sets of pinions, a pinion carrier and a ring gear.

Power enters the gear set via the two sun gears, the forward sun gear driving in forward gears, the reverse sun gear driving in reverse gear. The ring gear, attached to the output shaft, is the driven gear. The planet wheels connect driving and driven gears, two sets of planet wheels being used in forward gears and one set in reverse.

The planet carrier locates the planet wheels relative to sun and ring gears, also serving as a reaction member.

CLUTCHES

The gearbox input shaft is connected to the torque converter turbine at the front end and is therefore known as the turbine shaft. The rear end of the shaft is connected to the front and rear clutches; (the clutches are of the multi-disc type operated by hydraulic pressure). Engagement of the front clutch connects the turbine shaft to the forward sun gear. Engagement of the rear clutch connects the turbine shaft to the reverse sun gear.

BRAKE BANDS

The brake bands, operated by hydraulic servos, are used to hold drive train components stationary in order to obtain low, intermediate and reverse gears. The front band is clamped around the rear clutch outer drum to hold the reverse sun gear stationary. The rear band is clamped around the planet carrier to hold the planet carrier stationary.

ONE-WAY CLUTCH

The one-way clutch is situated between the planet carrier and the gearbox case. Rotation of the planet carrier and the gearbox against engine direction is prevented so providing the reaction member for low gear (drive). Rotation of the planet carrier in engine direction is allowed (free-wheeling) providing smooth changes from low to intermediate and intermediate to low gears.

MECHANICAL POWER FLOWS

Neutral and Park

In neutral the front and rear clutches are off, and no power is transmitted from converter to the gear set. The front and rear bands are also released. In 'P' the rear servo circuit is pressurized while the engine is running, so that the rear band is applied.

First gear ('D') selected

The front clutch is applied, connecting converter to the forward sun gear. The one-way

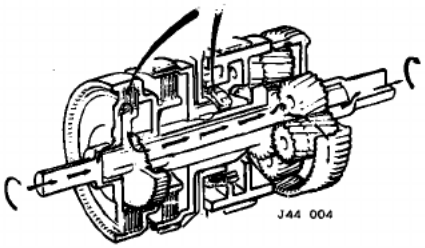


Fig. 4

clutch is in operation, preventing the planet carrier from rotating anti-clockwise. When the vehicle is coasting, the one-way clutch overruns and the gear set free-wheels.

First gear ('1' selected)

The front clutch is applied, connecting converter to forward sun gear. The rear band is applied, holding the planet carrier stationary.

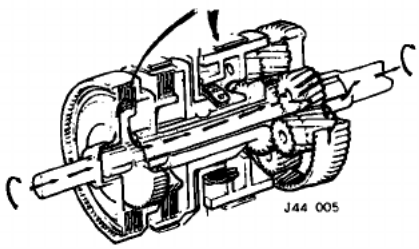


Fig. 5

Planet pinions drive ring gear, and reverse sun gear rotates freely in the opposite direction to the forward sun gear.

Second gear ('D', '2' or '1' selected)

Again the front clutch is applied, connecting converter to forward sun gear. The front band

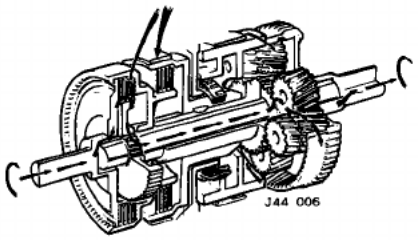


Fig. 6

is applied, holding the reverse sun gear stationary. Combined rotation of planet pinions and carrier drive the ring gear.

Third gear ('D' selected)

Again the front clutch is applied, connecting converter to forward sun gear. The rear clutch is applied, connecting the converter also to the

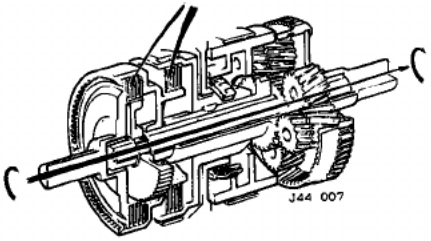


Fig. 7

reverse sun gear; thus both sun gears are locked together and the gear set rotates as a unit, providing a ratio of 1 : 1.

Reverse gear ('R' selected)

The rear clutch is applied, connecting converter to reverse sun gear. The rear band is

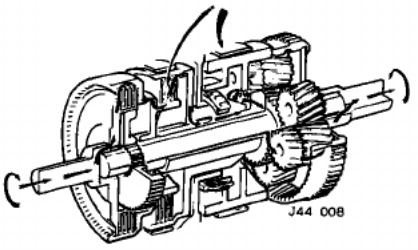


Fig. 8

applied, holding planet carrier stationary. Planet pinions drive ring gear in an opposite direction to engine rotation.

IDENTIFICATION

The Model 66 Automatic Gearbox was introduced on the Series III 6-cylinder Jaguar and Daimler Cars.

The two initial production transmissions were:

1. 066L transmission for use with the Jaguar XJ6 4.2. This can be identified by the yellow name-plate which will have 'Model 66' and the number 6066 in raised, polished figures.
2. 067H transmission for use with the Jaguar XJ6 3.4. This can be identified by the golden brown name-plate which will have 'Model 66' and the number 6067 in raised, polished figures.

Listed below are some of the improvements and modifications which have been built into this transmission.

CONVERTER

The Model 66 converter turbine hub has an increased spline size to take the larger input shaft.

The stator one-way clutch inner race has a revised profile and increase in hardness.

A Torrington race has been introduced into the impeller side of the stator.

The impeller blades have a rib formed in them to give added strength; this will be introduced into all 11 in torque converters.

Six impeller blades are welded in two places, equally spaced, to the impeller shell, again giving added strength.

The blower ring has been deleted on Model 66 converters, and the converter mounting bosses will be CO_2-welded to the front cover.

PUMP

A groove has been added to the pump/converter bush to improve lubrication of the bush. The groove stops short of the front edge of the bush (oil seal side) to prevent the oil seal being swamped.

A tin/aluminium pump drive gear bush, has also been introduced.

The new stator support will have an increased diameter bush to accommodate the increased diameter input shaft.

A large pump suction tube has been introduced to ensure that the end of the tube is immersed in oil under all conditions.

INPUT SHAFT AND FRONT CLUTCH ASSEMBLY

An increased diameter input shaft is being introduced on the Model 66 transmission.

REAR CLUTCH AND FRONT DRUM ASSEMBLY

To improve the lubrication path to the rear clutch and front band, changes have been made to this assembly. They are:

The rear clutch piston face (clutch plate side) will have four slots at right angles to one another to improve the oil flow from the inside diameter to outside diameter of the clutch pack.

The four wide grooves on the inside diameter of the front drum (steel clutch plate splines area) have been deepened to enable more oil flow around the plates.

Between the outside and inside diameter of the front drum, so that they line up with the four deepened grooves, four holes have been drilled to enable an oil feed to the front band to be maintained.

The rearmost lubrication groove between the three sealing ring grooves of the front drum has been deepened and the holes size increased in order to improve the oil flow.

The lubrication feed hole in the reverse sun gear has been increased in diameter.

ONE-WAY CLUTCH ASSEMBLY

An uprated 1st speed one-way clutch assembly has been introduced which will have 30 sprags instead of the 24 sprags on existing assemblies.

The centre support of the transmission has an increased diameter rear clutch and lubrication drillings.

CARRIER ASSEMBLY

An improved lubrication oil-flow has been achieved by introducing a wider bush into the carrier cover which has opposing helical oil grooves.

Non-crowned, shaved, short pinions have been introduced. In order to improve their durability, these pinions have no identification groove.

OUTPUT SHAFT

The lubrication hole in the output shaft has an increased diameter on Model 66 transmissions.

MAINCASE AND SERVOS

The front clutch and governor feed hole in the rear of the maincase has been increased to 5,0 mm.

The rear servo piston and cover have been strengthened.

OIL-PAN

In order to improve cooling and to ensure that the pump suction pipe is at all times below the fluid level a deep oil-pan is being used on the transmission.

VALVE BLOCK

An adjustable cam bracket is fitted.

A transmission oil filter spacer is being used on the transmission now that a deep oil-pan is employed.

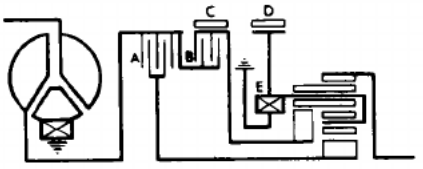
MISCELLANEOUS

A 5 mm spirol pin, secured by a split pin in the transmission cross-shaft is now fitted.

With the deep oil-pan, as fitted to the Model 66, the total fluid capacity, from dry, is approximately 7,9 litres (14 pints; 17 U.S. pints).

CLUTCH AND BAND APPLICATION CHART

A. Front clutch
B. Rear clutch
C. Front band
D. Rear band
E. One-way clutch



	A	B	C	D	E
1 (first gear)	●			●	
D (first gear)	●				●
2 & D (sec. gr.)	●		●		
D (third gear)	●	●			
R (rev. gear)		●		●	

J44 082

4.2 litre (cont)

Valve Guides and Seats	Valve guide material	Cast iron (Brico Alloy 2 or BS.1452/12	
	Inlet valve guide length	47,24 mm	1.86 in
	Exhaust valve guide length	49,53 mm	1.95 in
	Outside diameter (both guides):		
	Standard	12,725 to 12,751 mm	0.501 to 0.502 in
	First oversize	12,776 to 12,802 mm	0.503 to 0.504 in
	Second oversize	12,852 to 12,878 mm	0.506 to 0.507 in
	Third oversize	12,979 to 13,005 mm	0.511 to 0.512 in
	Interference fit in cylinder head	0,013 to 0,056 mm	0.0005 to 0.0022 in
	Valve seat material	Sintered iron (Brico AO25/M)	
	Inlet valve seat outside diameter: Standard	47,041 to 47,054 mm	1.852 to 1.8525 in
	Interference fit in cylinder head	0,0762 mm	0.003 in
	Exhaust valve seat outside diameter: Standard	43,066 to 43,078 mm	1.6955 to 1.6960 in
	Interference fit in cylinder head	0,0762 mm	0.003 in
Tappets	Tappet material	Chilled cast iron	
	Outside diameter of tappet	34,895 to 34,905 mm	1.3738 to 1.3742 in
	Tappet guide interference fit	0,185 to 0,221 mm	0.0073 to 0.0087 in
	Diametrical clearance of tappet in guide	0,020 to 0,048 mm	0.0008 to 0.0019 in
Lubricating System	Oil pump	Hobourn-Eaton rotor-type	
	Oil filter	Full-flow, renewable element	
	Min pressure — hot @ 3000 rev/min	2,8 kg/cm^2	40 lb/in^2
Timing Chains and Sprockets	Type	Duplex	
	Pitch	9,5 mm	⅜ in
	Number of pitches: Lower chain	82	
	Upper chain	100	
	Crankshaft sprocket: Teeth	21	
	Intermediate sprocket (outer): Teeth	28	
	Intermediate sprocket (inner): Teeth	20	
	Camshaft sprockets: Teeth	30	

ENGINE DATA — 5.3 LITRE

General Data	Number of cylinders	12	
	Stroke	70 mm	2.756 in
	Bore	90 mm	3.543 in
	Cubic capacity	5343 cm^3	326.0 in^3
	Ignition timing: Initial static setting, to start engine only		
	'A' Emission spec.	9° ± 1° B.T.D.C.	
	'B' Emission spec.	4° ± 1° B.T.D.C.	

VALVE SPRING IDENTIFICATION

The following spring identification table is given to assist in identifying valve springs when overhaul work is being carried out. When valve block is dismantled, springs should be compared with dimensions given. Any spring which is distorted or coil bound **must** be replaced.

DESCRIPTION	LENGTH		DIAMETER		NUMBER OF COILS	COLOUR
	mm	in	mm	in		
Secondary regulator valve	65,8	2.593	12,2 to 12,4	0.480 to 0.490	23	Blue
Primary regulator valve	74,6	2.94	15,3 to 15,5	0.604 to 0.610	14	Blue
*Servo orifice control valve—Model 65	32,0	1.281	5,0 to 5,3	0.198 to 0.208	17	Yellow
Servo orifice control valve—Model 66	27,5	1.08	5,0 to 5,3	0.198 to 0.208	17	Yellow
2–3 shift valve	40,4	1.59	6,9 to 7,2	0.275 to 0.285	22.5	Yellow
1–2 shift valve	27,7	1.094	5,8 to 6,1	0.230 to 0.240	13	Plain
Downshift valve	20,5	0.807	3,4 to 3,7	0.136 to 0.146	28	Yellow
Modulator valve	27,1	1.069	3,8 to 4,1	0.150 to 0.160	19	Plain
Throttle valve	29,8 to 30,1	1.175 to 1.185	5,8 to 6,1	0.230 to 0.240	18	Green
Dump ball valve	17,7	0.70	5,3 to 5,8	0.210 to 0.230	16	Plain or white

***NOTE:** Should 3–2 kick-down flare-up occur at speeds of approximately 80 km/h (50 m.p.h.) and front band adjustment is correct, the shorter spring (Model 66), should be fitted.

TORQUE WRENCH SETTINGS

SECTION 44

ITEM	DESCRIPTION	Nm	kgf m	lbf ft
Transmission case to converter housing	M10 X 30 (1.5P)	33,89 to 40,67	3,46 to 4,15	25 to 30
	M12 X 30 (1.75P)	54,23 to 67,79	5,53 to 6,90	40 to 50
Oil pan to transmission case	M6 X 15 (1.0P)	7,79	0,80	5.75
Front servo cover	M8 X 25 (1.25P)	17,62 to 24,40	1,80 to 2,48	13 to 18
Rear servo cover	M8 X 25 (1.25P)	17,62 to 24,40	1,80 to 2,48	13 to 18
Oil pump adaptor to oil pump housing	10—24 U.N.C. X 2A X 5/8	3,38	0,35	2.5
	5/16 in—18 U.N.C. 2A X 7/8	23,04 to 29,82	2,35 to 3,04	17 to 22
Oil pump adaptor to transmission case	M8 X 25 (1.25P)	17,62 to 24,40	1,80 to 2,48	13 to 18
Pressure point on transmission case	1/8 in—27 Dryseal N.P.T.F.	8,13 to 10,84	0,83 to 1,11	6 to 8
Oil pan drain plug	3/8 in—24 X 3/8 in	12,20 to 16,26	1,24 to 1,66	9 to 12
Upper valve body to lower valve body	10—24 U.N.C. 2A X 5/8 in	2,30 to 3,38	0,23 to 0,35	1.7 to 2.5
Lower valve body to upper valve body	10—24 U.N.C. 2A X 15/16	2,30 to 3,38	0,23 to 0,35	1.7 to 2.5
Lower valve body to upper valve body	10—24 U.N.C. 2A X 1 3/8 in	2,30 to 3,38	0,23 to 0,35	1.7 to 2.5
Suction tube assembly to lower valve body	10—24 U.N.C. 2A X 3/8 in	2,30 to 3,38	0,23 to 0,35	1.7 to 2.5
Oil tube plate to lower valve body	10—24 U.N.C. 2A X 5/8 in	2,30 to 3,38	0,23 to 0,35	1.7 to 2.5
	10—24 U.N.C. 2A X 15/16 in	2,30 to 3,38	0,23 to 0,35	1.7 to 2.5
End plate to lower valve body	10—24 U.N.C. 2A X 5/8 in	2,30 to 3,38	0,23 to 0,35	1.7 to 2.5
End plate to upper valve body	10—24 U.N.C. 2A X 3/8 in	2,30 to 3,38	0,23 to 0,35	1.7 to 2.5
Lower valve body to transmission case	1/4 in—20 U.N.C. 2A X 1 1/4 in	6,77 to 10,84	0,69 to 1,11	5 to 8
Lower valve body to cam bracket	No. 10 U.N.F. bolt	2,71 to 4,74	0,27 to 0,48	2 to 3.5
Tube location plate	M5 bolt (0.8P)	2,30 to 2,71	0,23 to 0,27	1.7 to 2.0
Detent spring to lower valve body		2,30 to 2,71	0,23 to 0,27	1.7 to 2.0
Servo adjusting screw locknuts	9/16 in U.N.C. nut	40,67 to 54,23	4,15 to 5,55	30 to 40
Oil cooler connector	1/4 in N.P.T.F.	27,11 to 29,82	2,77 to 3,04	20 to 22
Extension housing to case	7/16 in U.N.F. bolt	54,23 to 67,79	5,55 to 6,90	40 to 50
Extension housing to case	7/16 in U.N.C.	40,67 to 67,79	4,15 to 6,90	30 to 50
Inhibitor switch to main case	No. 10 U.N.C. bolt	5,42 to 6,77	0,55 to 0,69	4 to 5
Park cam plate to main case	M6 bolt (1.0P)	6,77 to 10,84	0,69 to 1,11	5 to 8
Coupling flange nut	M20 nut (1.5P)	98,02 to 117,68	10,0 to 12,0	72,3 to 86,8
Governor retainer	M24 bolt	20,33 to 24,40	2,07 to 2,49	15 to 18
Coupling flange	5/8 in U.N.C. nut	77,57 to 81,34	7,60 to 8,29	55 to 60
Centre support fixing	3/8 in U.N.C. bolt	13,55 to 20,33	1,38 to 2,07	10 to 15
Connector	1/2 in U.N.S. nut	13,55 to 16,26	1,38 to 1,66	10 to 12
Coupling flange	1/2 in U.N.F. bolt	54,23 to 67,79	5,55 to 6,90	40 to 50
Dipstick tube attachment	7/8 in U.N.S. nut	37,96 to 43,38	3,87 to 4,42	28 to 32

GEAR-CHANGE SPEEDS

	LIGHT THROTTLE		FULL THROTTLE		KICK DOWN		DOWN SHIFT	ROLL OUT
	1—2	2—3	1—2	2—3	3—2	3—1	3—2*	2—1
3,4 litre								
k.p.h.	11 to 16	25 to 29	55 to 60	96 to 106	96 to 105	55 to 60	70 to 74	8 to 11
m.p.h.	7 to 10	16 to 18	34 to 38	60 to 66	60 to 65	34 to 37	44 to 46	5 to 7
3.54:1 axle								
4,2 litre								
k.p.h.	13 to 19	21 to 29	66 to 82	117 to 130	101 to 117	40 to 56	51 to 67	8 to 16
m.p.h.	8 to 12	13 to 18	41 to 51	73 to 81	63 to 73	25 to 35	32 to 42	5 to 10
3,31:1 axle								
4,2 litre								
k.p.h.	13 to 19	21 to 30	67 to 85	120 to 134	104 to 120	42 to 59	53 to 69	8 to 16
m.p.h.	8 to 12	13 to 19	42 to 53	75 to 84	65 to 75	26 to 37	33 to 43	5 to 10
3.07:1 axle								
4,2 litre								
k.p.h.	14 to 19	21 to 30	67 to 85	120 to 136	104 to 120	42 to 59	53 to 69	8 to 16
m.p.h.	9 to 12	13 to 19	42 to 53	75 to 85	65 to 75	26 to 37	33 to 43	5 to 10
3.058:1 axle								
4,2 litre								
k.p.h.	14 to 21	22 to 32	72 to 90	128 to 144	110 to 128	45 to 62	56 to 74	8 to 18
m.p.h.	9 to 13	14 to 20	45 to 56	80 to 90	69 to 80	28 to 39	35 to 46	5 to 11
2.88:1 axle								

* Part throttle kick down

NOTE: The figures in these tables are theoretical and actual figures may vary slightly from those quoted due to such factors as tyre wear, pressures, etc.

CAUTION

Ensure that when the downshift cable is disconnected from the throttle linkage the crimp stop gap must be reset to achieve correct gearbox pressures. If there is no crimp fitted to the cable, the gearbox pressures must be reset using the appropriate special equipment.
Failure to carry out the above procedure could lead to a rapid deterioration of gearbox condition.

GENERAL DATA

Gear train end-float		0,21 to 0,73 mm	0.008 to 0.029 in
Pinion end-float		0,25 to 0,51 mm	0.010 to 0.020 in
Minimum clutch plate coning		0,25 mm	0.010 in
Thrust washer sizes: Standard		1,72 mm	0.068 in
Alternative		2,03 mm	0.080 in
Control pressure		4,2 to 6,33 kgf/cm^2	60 to 90 lbf/in^2
Stall speed (normal)		1,950 to 2,100 rev/min	
Cooling capacity of oil cooler	up to VIN 352906	2,8 Kw	
	from VIN 352906	5,3 Kw	

ROAD TEST AND FAULT DIAGNOSIS

The following points should be checked before proceeding with the road test.

1. Fluid level.
2. Engine idle speed.
3. Manual lever adjustment.

ROAD TEST

The road speed figures for the tests listed below are to be found under 'GENERAL DATA—GEAR CHANGE SPEEDS'.
Road testing should follow the complete sequence detailed below. Transmission should be at normal working temperature, i.e. after being driven on road or rollers.

1. With brakes applied and engine idling, move selector from:
   'N' to 'R'
   'N' to 'D'
   'N' to '2'
   'N' to '1'
   Engagement should be felt with each selection.
2. Check stall speed.
3. Select 'D', accelerate with minimum throttle opening and check speed of first gear to second gear shift.
4. Continue with minimum throttle and check speed of second gear to third gear shift.
5. Select 'D', accelerate with maximum throttle opening (kick-down) and check speed of first gear to second gear shift.
6. Continue with maximum throttle and check speed of second gear to third gear shift.
7. Check for kick-down shift third gear to second gear.
8. Check for kick-down shift second gear to first gear.
9. Check for kick-down shift third gear to first gear.
10. Check for 'roll-out' down-shift with minimum throttle, second gear to first gear.
11. Check for part throttle down-shift, third gear to second gear.

Should a fault be apparent during road test, first identify the problem from the list printed in the Fault Diagnosis Chart. The reference numbers shown opposite each fault may be translated by reference to the list headed 'TRANSMISSION FAULT KEY'.

TRANSMISSION FAULT KEY

ACTIONS	
1	Check fluid level.
2	Check manual selector/adjustment.
3	Reduce engine idle speed.
4	Check down-shift throttle cable/adjustment. If pressure cannot be corrected, dismantle and clean valve bodies. For low pressure also check strainer, alloy suction pipe, 'O' ring and pump.
5	Check front brake band adjustment.
6	Check rear brake band adjustment.
7	Check front servo seals and fit of pipes.
8	Check rear servo seals and fit of pipe.
9	Examine front clutch, support housing and forward sun gear shaft seals.
10	Check rear clutch feed pipe.
11	Strip valve bodies and clean.
12	Strip governor valve and clean.
13	Examine output shaft rings and governor pressure tube seals.
14	Check front brake band for wear.
15	Check rear brake band for wear.
16	Adjust/examine parking pawl, linkage, and gear.
17	Renew one-way clutch.
18	Examine pump gears and converter nose bush.
19	Strip and examine gear train.
20	Replace torque converter.
21	Examine rear clutch and sealing rings.
22	Test inhibitor switch, circuit, and check for operation.
23	Check one-way clutch (possibly fitted backwards).
24	Ball check valve in forward sun gear shaft faulty, no detriment to performance.

FAULT DIAGNOSIS

STATIONARY TEST FINDINGS	ACTION
Starter will not operate in 'P' or 'N' or operates in all positions	22
Faulty operation of reverse lights	22
Excessive bump on engagement of 'D', '1' and 'R'	3, 4
Drives in 'N' also giving judder or no drive in 'R' depending on degree of front clutch seizure	2, 9
STALL TEST FINDINGS	
Stall test shows over 2 100 rev/min (transmission slip), with possible squawk in '1' and 'R'	4
a. only in '1'	9
b. only in 'R'	6, 8, 10, 21, 15
Stall test shows under 1 300 rev/min (slipping stator)	20
DRIVING TEST FINDINGS	
Selection faults	
Incorrect selection of all positions except 'P'	2
Parking pawl does not hold vehicle	16
Ratio faults	
No drive in 'D', '2', '1' or 'R' but 'P' operates	1, 2, 4
No drive in 'D', '2' or '1'	12, 13, 9
No drive in 'D' 1st ratio	17
No drive in '1' and transmission binding during shift from '1' to 'D'	23
No second ratio	5, 7, 11
No D3 (Reverse indicating rear clutch normal)	11
Drag in 'D'	6
Drag in 'D', '1' and reverse	5
No engine braking in '1' and no drive in reverse ratio	6, 8, 15
Moves off in 2nd ratio in 'D' and '1' and no drive in reverse or engine braking in '1'	11
Shift point faults	
Incorrect or erratic 'kick-down' and/or light throttle shift points	4,12, 13
1–2 shift only incorrect	11
2–3 shifts only incorrect	11
No up-shifts	12, 13
Lack of 'up-shifts' and no reverse ratio	11
Moves off with possible transmission slip	12
Reduced maximum speed in all ratios, more so in 'D', and severe converter overheating	20
Shift quality faults	
Bumpy and possibly delayed shifts	4
Slip (engine 'flare-up') shifting into and out of second ratio	5, 7, 11, 14
Slip (engine 'flare-up') on 2–3 and 3–2 shifts*	10, 11, 21
Noise faults	
Whining noise from converter area, continuous whenever the engine is running	18
Irregular (possibly grating) noises from gearbox but not in 'D'	19
Whine from converter, for short period following engine starting after vehicle has been standing for, say, not less than 12 hours	24

* See Note on page 44–17.

DOWN-SHIFT CABLE

Remove and refit **44.15.01**

Service tool: Down-shift cable remover tool CBW 62

Removing

Unscrew the union nut (1, Fig. 19), withdraw the dipstick tube; drain and discard fluid.
Remove the bolts and plain washers (2, Fig. 19) securing oil pan to transmission case.
Lower the oil pan (3, Fig. 19) remove and discard the gasket.

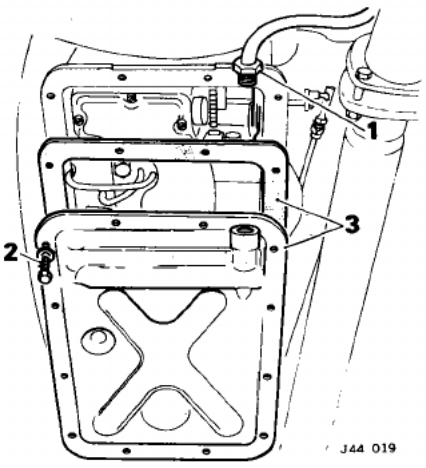


Fig. 19

Disconnect cable from cam.
Position cable remover tool CBW 62 on plastic ferrule, push the tool upwards until the ferrule, together with the cable is pressed out of the transmission case.
Remove the split pin, washer and clevis pin (1, Fig. 20) securing clevis to throttle linkage; discard the split pin.
Slacken the locknut (2, Fig. 20), withdraw down-shift cable.

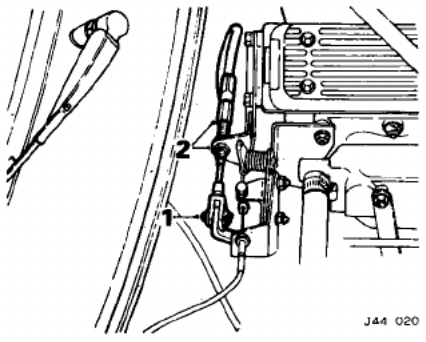


Fig. 20

Refitting

If old cable is being refitted, renew the 'O' ring on ferrule.
Lubricate the ferrule with clean transmission fluid.

CAUTION: Do not lubricate the inner cable.

Press the ferrule into the gearcase; connect cable to cam.
Connect clevis to throttle linkage; use a new split pin.
With the accelerator pedal released and the throttle levers resting on the idle speed screws, adjust the cable until the heel of the down-shift cam just makes contact with the down-shift valve.
With the accelerator pedal depressed, check that the lobe of the cam fully depresses the down-shift valve.
Refit the oil pan, smear the new gasket with grease.
Tighten bolts by diagonal selection to the specified torque figure.

CAUTION: Due to the method of construction it is not possible to completely drain the transmission fluid, and this should be taken into account when the transmission is being refilled.

Fill the transmission to the 'MAX' mark on the dipstick.
Apply the handbrake and select 'P' position.
Run the engine until it reaches normal operating temperature.
With the engine still running, withdraw the dipstick (1, Fig. 21), wipe clean and replace.
Immediately withdraw the dipstick and note the reading on the 'HOT' side of the dipstick (2, Fig. 21).
If necessary, add fluid to bring the level on the dipstick to 'MAX' (3, Fig. 21).

NOTE: The difference between the 'MAX' and 'MIN' marks on the dipstick represents approximately 0,75 litre (1½ pints, 2 U.S. pints).

Carry out the down-shift cable pressure check, see 44.30.03.

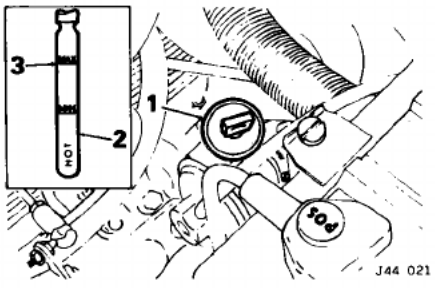


Fig. 21

GEAR SELECTOR CABLE

Remove and refit **44.15.08**

Removing

This operation requires the removal of the centre console side casing, details of which are to be found in Section 76.

Place the quadrant selector lever in '1'.
Unscrew the gear selector knob (1, Fig. 22).
Remove the four nuts (2, Fig. 22) securing the selector indicator assembly; withdraw the indicator assembly over the selector lever (3, Fig. 22).
Remove the split pin and washer (4, Fig. 22) securing the cable to selector lever; detach the cable (5, Fig. 22).
Unscrew the front locknut (6, Fig. 22) securing the cable to abutment bracket.
Lift the carpet from left-hand side of transmission tunnel.
Remove the screws (7, Fig. 22) securing the cable shroud to the transmission tunnel; withdraw the shroud.
Withdraw the cable from the abutment bracket.

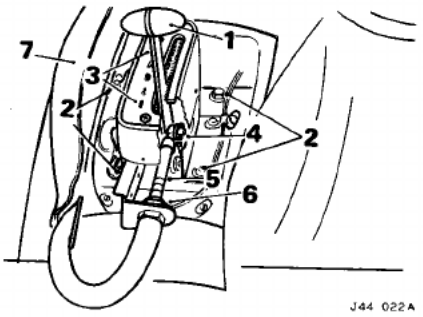


Fig. 22

Remove the screws securing the access panel to the transmission tunnel.
Withdraw the panel; clean off old sealing compound.
Ensure that the gearbox selector lever is in '1'.
Remove the nut securing the selector cable to the gearbox selector lever; detach the cable.
Remove the bolt and spring washer (1, Fig. 23) securing the trunnion block.
Withdraw the cable (2, Fig. 23).

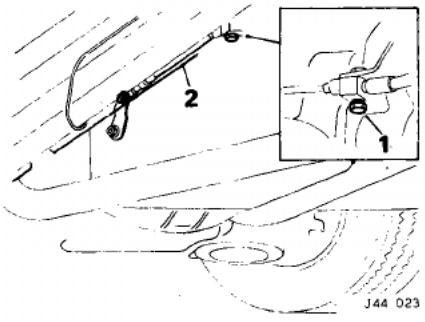


Fig. 23

Refitting

Refit the cable and position the selector lever in '1'.

Refit the panel, shroud and carpet.

CAUTION: Seal the access panel and the hole in the shroud with a suitable sealing compound.

Fit the front locknut (1, Fig. 24) to the cable but do not tighten at this stage.

Ensure that the gearbox selector and quadrant selector levers are in '1'

Adjust the front (1, Fig. 24) and rear (2, Fig. 24) locknuts until the cable can be connected to the quadrant lever without either quadrant or gearbox lever being disturbed.

Tighten the locknuts, secure the cable with a new split pin (3, Fig. 24).

Refit the selector indicator assembly and gear knob.

Place the selector lever in 'P' and replace the console as detailed in 76.25.01.

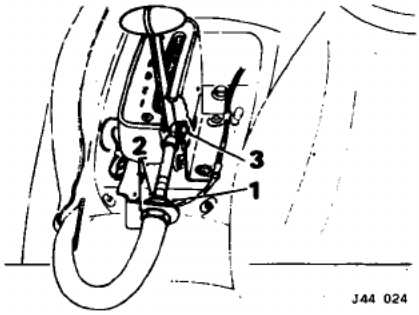


Fig. 24

STARTER INHIBITOR SWITCH

Check and adjust **44.15.18**

Adjusting

Disconnect the battery.

Unscrew the gear selector knob (1, Fig. 25).

Remove the three screws securing the gear selector surround panel, do not disconnect the window switches. Slightly displace the panel to obtain access to the cigar lighter terminals.

Note the fitted position of the cigar lighter terminals, before disconnecting.

Remove four nuts securing the selector indicator assembly and remove the assembly.

Detach the feed cable (2, Fig. 25) from the inhibitor switch.

Connect a test lamp and battery (3, Fig. 25) in series with the switch.

NOTE: Switch is in the earthed position.

Place selector lever (6, Fig. 25) in 'N' position.

Slacken the locknuts (5, Fig. 25) securing the switch and adjust the position of the switch until the lamp lights.

Tighten the locknuts, check that the lamp remains on with the lever in 'P' position and is off with the lever in drive position.

Remove the battery and test lamp, reconnect the feed cable to the switch.

Refit the selector indicator assembly.

Reconnect the cigar lighter and refit the gear selector surround panel.

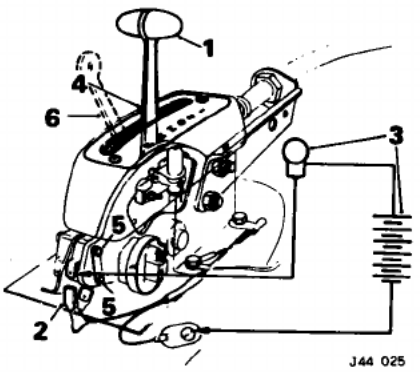


Fig. 25

Refit the gear selector knob and reconnect the battery.

Check operation of the window switches and cigar lighter.

TRANSMISSION UNIT

Remove and refit **44.20.01**

Includes:

Torque converter—remove and refit **44.17.07**

Torque converter housing—remove and refit **44.17.01**

Service tools: Engine support bracket MS 53A, transmission unit lift.

Removing

Drive the vehicle onto a ramp and disconnect the battery.

Remove the dipstick from the dipstick tube; remove the bolt securing the dipstick tube to the manifold.

Remove the bolts securing the upper fan cowl to the lower fan cowl. Slacken the bolts securing the cowl bracket to the radiator, to facilitate the removal of the top cowl.

Remove and discard the split pin securing the kick-down cable to the throttle bell-crank, withdraw the clevis pin and washer; slacken the locknut and disconnect the cable.

Raise the ramp.

Undo the union nut securing the dipstick tube to the transmission unit sump pan. Remove the dipstick tube; plug the ends to prevent the ingress of dirt. Drain and discard the transmission fluid.

Disconnect the exhaust intermediate pipe from the down-pipe, remove the olive. Remove the exhaust heat shields from the floor pan.

Position the transmission unit lift under the transmission unit, and take the weight. Secure the transmission unit to the lift.

Remove the bolts securing the crash plate to the transmission case studs, undo the nut securing the crash plate to the rear mounting spigot bolt.

Remove the bolts, spacers and washers securing the rear engine mounting to the floor pan.

Remove the bolts securing the propeller shaft tunnel spreader plate to the floor pan.

Chock the front wheels.

Using a ramp jack raise the rear wheels. This will enable the propeller shaft to be rotated and the propeller shaft to output flange fixings removed.

Move the propeller shaft clear of the output flange.

Lower the transmission unit lift to the position required for transmission unit removal; DO NOT REMOVE the transmission unit at this stage.

CAUTION: Take care not to damage the water heater valve.

Position the engine support bracket, MS 53A, and locate the hook to the engine rear lifting eye. Turn the adjusting nut to take the weight of the engine (Fig. 26).

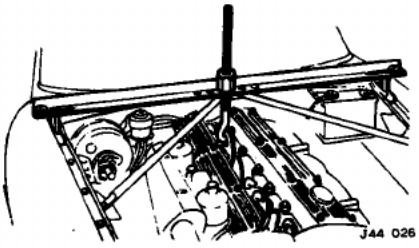


Fig. 26

Lower the ramp jack under rear of car.

Remove the rubber pad from the top of the transmission unit.

Remove the nut securing the selector lever bell-crank to the cross-shaft and remove the bell-crank.

Remove the bolt securing the selector cable trunnion to the mounting bracket.

Remove the bolts securing the tie-plate to the engine sump pan and transmission converter housing front cover-plate and remove the cover-plate.

Rotate the engine until a torque converter securing bolt is accessible; knock back the lock tab and remove the bolt; repeat this procedure for the three remaining torque converter securing bolts.

Remove and discard the tab washers.

Remove the bolt and washer securing the breather pipe clip.

Remove the screw securing the oil cooler pipe clamp plate to the sump bracket.

Disconnect the oil cooler and breather pipes from the transmission casing; plug or tape broken connections to prevent the ingress of dirt.

Disconnect the speedometer cable from the drive pinion (early models).

For later models fitted with electronic speedometer disconnect 2 pin connector only.

Disconnect the cables from the starter motor and solenoid.

Ensure that the transmission unit is secured to the unit lift and that the platform is at the correct angle.

Remove the nuts, bolts and washers securing the torque converter housing tp the cylinder block; withdraw the starter motor and spacer.

Withdraw the transmission unit lift rearwards and lower.

Remove the torque converter from the input shaft.

Remove the bolts and washers securing the torque converter housing to the transmission case.

continued

GENERAL SPECIFICATION DATA—12 Cylinder Cars

Braking System	Front brakes: Make and type	Girling; ventilated discs, bridge-type calipers	
	Rear brakes: Make and type	Girling; damped discs, bridge-type calipers incorporating handbrake friction pads	
	Handbrake: Type	Mechanical, operating on rear discs	
	Disc diameter: Front	284 mm	11.18 in
	Rear	263,5 mm	10.375 in
	Disc thickness: Front	24,13 mm	0.95 in
	Rear	12,7 mm	0.50 in
	Master cylinder bore diameter	22,23 mm	0.875 in
	Brake operation	Hydraulic	
	Hydraulic fluid	Castrol/Girling Universal Brake and Clutch Fluid—exceeding specification S.A.E. J.1703/D	
	Main brake friction pad material	Ferodo 2430 slotted	
	Hand brake friction pad material	Mintex M68/1	
	Servo unit refs.: L.H.D.	Girling 64049668	
	R.H.D.	Girling 64049670	
Front Suspension	Type	Independent coil spring	
	Castor angle	$3\frac{1}{2}° \pm \frac{1}{4}°$ positive	
	Camber angle	$\frac{1}{2}° \pm \frac{1}{4}°$ negative	
	Front wheel alignment	0 mm to 3,2 mm toe in	0 to $\frac{1}{8}$ in toe in
	Dampers	Telescopic, gas filled	
Rear Suspension	Type	Independent, coil springs, co-axial with dampers	
	Camber angle	¾° ± ¼° negative	
	Rear wheel alignment	Parallel ± 0,08 mm	Parallel ± $\frac{1}{32}$ in
	Dampers	Telescopic, gas filled	
Power Assisted Steering	Type	Rack and pinion	
	Number of turns lock to lock	2.75	
	Turning circle, wall to wall	13,5 m	44 ft
Electrical Equipment			
Battery	Make and type	Lucas, chloride or AC Delco	
Alternator	Make and type	Lucas 25ACR or Motorola 9AR2533P	
	Nominal voltage	12V	
	Cut-in voltage	13.5V at 1500 rev/min (Motorola 14V at 1100 rev/min	
	Polarity	Negative earth	
	Maximum output	66A (Motorola 70A)	
	Maximum operating speed	15 000 rev/min	
	Rotor winding resistance	3.6 ohms at 20°C	
	Brush spring pressure	255 to 369 gf	9 to 13 ozf
Starter Motor	Make and type	Lucas M45 pre-engaged	
	Lock torque (at 940 amps)	4,01 kgf m	29 lbf ft
	Torque at 1000 rev/min (at 535 amps)	1,80 kgf m	13 lbf ft
	Light running current	100A at 5000 to 6000 rev/min	
Wiper motor	Make and type	Lucas 16W	
	Light running speed, rack disconnected (after 60 seconds from cold)	Normal: 46 to 52 rev/min, high: 60 to 70 rev/	
	Light running current (after 60 seconds from cold)	Normal: 1.5A; high: 2.0A	

BRAKE PADS—REAR

Remove and refit **70.40.03**

Service tool: Brake piston retractor tool 64932392

Removing

Jack up rear of car and place on stands, or raise car on ramp.

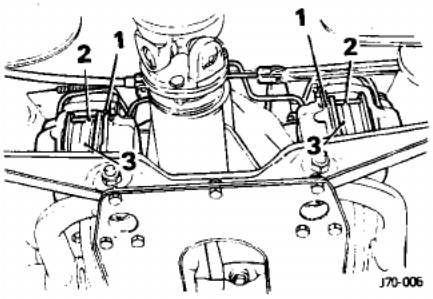


Fig. 7

Remove clips (1, Fig. 7) securing friction pad mounting pins.
Remove mounting pins (2, Fig. 7).
Withdraw friction pads (3, Fig. 7).

Refitting

NOTE: It is advisable to reduce the level of brake fluid in reservoir before fitting new pads.

If thickness of any pad is less than 4.0 mm (0.2 in) new pads MUST be fitted.
Using service tool 64932392 lever pistons into cylinder bores. Fit new brake pads, locate with mounting pins, ensure upper mounting pin enters caliper from centre line of car and lower mounting pin enters caliper from wheel side of car.
Fit retaining clips to pad mounting pins.
Top up brake fluid reservoir.
Remove stands.
Run engine and apply brake pedal several times until pedal feels solid.

BRAKE PADS—FRONT

Remove and refit **70.40.02**

Service tool: Brake piston retractor tool 64932392

Removing

Remove road wheel.
Remove clips (1, Fig. 8) securing retaining pins.
Remove retaining pins (2, Fig. 8).
Recover anti-chatter springs (3, Fig. 8).
Withdraw worn pads (4, Fig. 8).

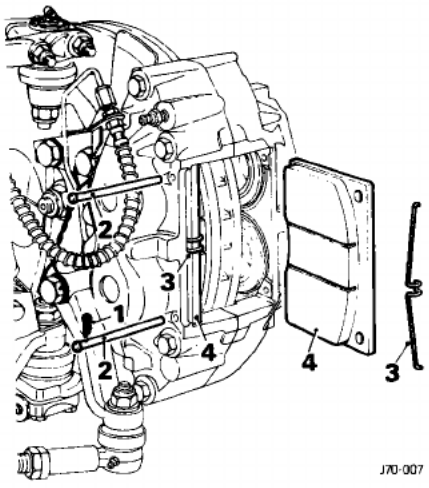


Fig. 8

Refitting

NOTE: It is advisable to reduce level of brake fluid in reservoir before fitting new pads.

If thickness of any pad is less than 4 mm (0.2 in) new pads MUST be fitted.
Lever pistons into cylinder bores using service tool 64932392.
Fit new brake pads to caliper.
Fit retaining pins.
Secure retaining pins with clips.
Fit anti-chatter springs.
Refit road wheel.
Top up brake fluid reservoir.
Run engine and apply brake pedal several times until pedal feels solid.

HOSES

General fitting and removal instructions **70.15.00**

Removing

Clean unions of hose to be removed.
Ensure pipe sealing plugs are at hand.
Fully release unions (1, Fig. 9) securing fluid pipes to hose ends.

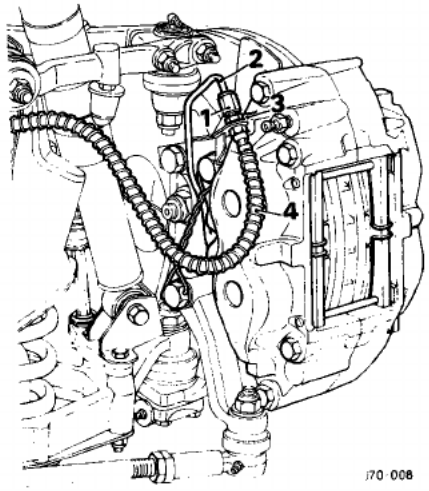


Fig. 9

Withdraw pipe unions (2, Fig. 9) from hose ends, plug pipes to prevent loss of fluid and ingress of dirt.
Remove locknuts (3, Fig. 9) securing hose ends to mounting brackets.
Remove hose (4, Fig. 9) from car.

Inspection

After thoroughly cleaning hose examine for any signs of deterioration or damage. If doubt exists, a new hose must be fitted.
Thoroughly clean bore of hose by feeding compressed air into one end of hose.

Refitting

Reverse removal operations.
Bleed brakes, see operation 70.25.02.

PIPE

General fitting and removal instructions **70.20.00**

Removing

Clean unions of pipe to be removed.
Ensure pipe sealing plugs are at hand.
Fully release pipe unions.
Withdraw pipe from car, plug open end of pipe remaining on car.

Inspection

Thoroughly clean bore of pipe by feeding compressed air into one end.
After thoroughly cleaning pipe examine for any sign of fracture or damage. If doubt exists, a new pipe must be fitted.

DISC SHIELD—FRONT

Remove and refit **70.10.18**

Removing

Remove road wheel.
Slacken upper bolt securing steering arm to stub axle carrier.
Remove locking wire securing caliper mounting bolts.
Remove upper caliper mounting bolt.
Remove clips (1, Fig. 10) securing lower, secondary and main shield assemblies to lower portion of stub axle carrier.
Withdraw lower and main shields (2, Fig. 10) from disc assembly.
Remove brake feed pipe between flexible pipe and caliper. Plug exposed ends to prevent ingress of dirt and loss of fluid.

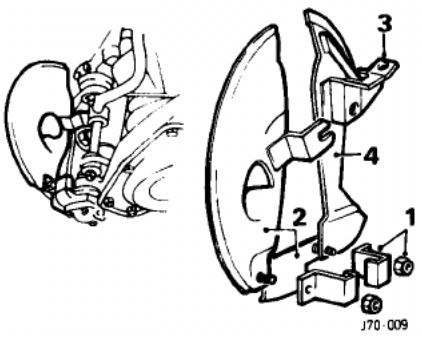


Fig. 10

Remove locknut (3, Fig. 10) securing brake hose union to secondary shield assembly; withdraw hose from securing bracket.
Withdraw shield (4, Fig. 10) from disc assembly.

Refitting

Reverse operations above, ensure brake hose is not twisted when securing to secondary shield bracket.
Fit new self-locking nuts to lower shield securing studs. Tighten steering arm bolt and caliper securing bolt to correct torque.
Refit road wheel.
Bleed brakes, see operation 70.25.02.

FRONT DISC

Remove and refit **70.10.10**

Removing

Remove brake caliper friction pads (1, Fig. 11), see operation 70.40.02.
Remove front hub, see operation 60.25.01.
Remove locking wire (2, Fig. 11) from caliper mounting bolts.

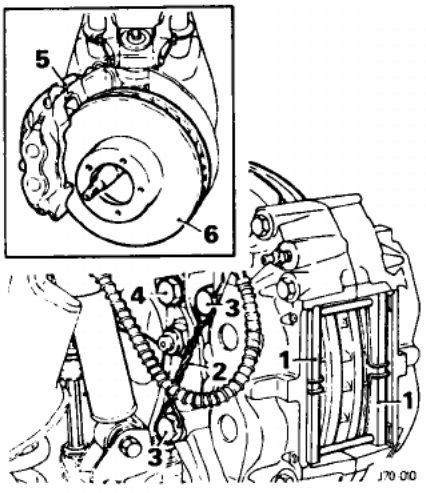


Fig. 11

Remove caliper mounting bolts (3, Fig. 11), recover and note position of shims located between steering arm and caliper.
Slacken bolt (4, Fig. 11) securing steering arm to hub carrier.
Gently easing caliper (5, Fig. 11) aside, remove disc (6, Fig. 11).

Inspection

Examine disc for cracks and heavy scoring; light scratches and scoring are not detrimental and may be ignored. If doubt exists a new disc should be fitted.

Refitting

If original disc is refitted reverse operations above and ensure caliper mounting bolts are tightened to the correct torque.
If new disc is fitted reverse operations above, ensuring mounting bolts are not wire locked.
Check gap between caliper abutments and disc face.
Gap on opposite sides of disc may differ by up to 0,25 mm (0.010 in) but gap on upper and lower abutment on same side of disc should be the same.
If disc is not central in caliper remove one caliper mounting bolt and add or withdraw shim required to centralize disc, refit caliper bolt.
Repeat above operation on remaining caliper mounting bolt.
Repeat gap check.
Tighten caliper mounting bolts to correct torque and wire lock.
Refit brake friction pads.

REAR DISCS

Remove and refit **70.10.11**

Removing

Place car on ramp, remove road wheel adjacent to brake disc to be removed.
Place rear of car on stands.
Remove brake caliper, see operation 70.55.03.
Remove shock absorber lower fulcrum pin (1, Fig. 12), recover distance piece and washers.

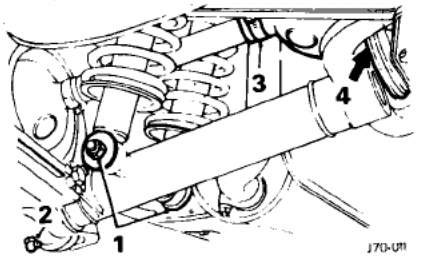


Fig. 12

Remove locking wire securing radius arm locking bolt (1, Fig. 13) and remove bolt.
Remove hub fulcrum shaft grease nipple (2, Fig. 12).
Place support blocks below hub.

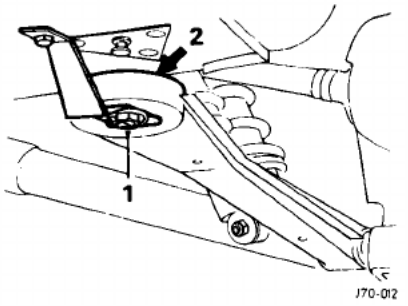


Fig. 13

Lower radius arm from spigot anchor point (2, Fig. 13).
Release clip (3, Fig. 12) securing inner universal joint cover, slide cover clear of joint.
Remove nuts securing universal joint to brake discs (4, Fig. 12).
Tap disc mounting bolts towards final drive unit.
Separate universal joint from brake disc, collect camber angle shims held on disc mounting bolts.
Jack up car sufficiently to allow removal of brake disc, lift out disc.

NOTE: Do not disturb shims mounted between final drive flange and brake disc.

Inspection

NOTE: The condition of discs are a vital factor in efficient functioning of the brakes.

Examine surface of disc, which should be smooth.
Scratches and light scoring are not detrimental after normal use.
Should doubt exist a new disc should be fitted.

Refitting

Locate new disc on mounting bolts, replace camber angle shims, fit universal joint over shims and tighten nuts to correct torque.
Check disc for run out, clamp dial test indicator to suspension unit cross-beam, position indicator rod against disc face and set reading to zero. Run out must not exceed 0,10 mm (0.004 in).
Offer brake caliper to mounting and secure with mounting bolts. Tighten to correct torque.
Check caliper centralization on brake disc. Dimensions between faces of disc and caliper abutments are to be equal within 0,25 mm (0.010 in). To adjust (if necessary) remove caliper and disc assembly, adding or withdrawing shims located between disc and axle unit output flange. Note thickness of shims added or withdrawn during this operation.

NOTE: On completion of centralization operation, (if necessary) add or withdraw a camber angle shim to size of centralization shim used in adjustment; e.g. if a 2,15 mm (0.06 in) shim was ADDED to centralization shims WITHDRAW same size shim from camber angle shims. If shims were WITHDRAWN in the centralization operation, ADD same size shim to camber angle shims. This operation corrects camber angle to that prior to the caliper centralization operation.

continued

Replace inner universal joint cover.

NOTE: Prior to fitting radius arm to body spigot, wirebrush spigot and smear with grease.
Refit radius arm locking bolt.
Wire lock caliper mounting bolts.

NOTE: Before refitting brake friction pads check pads for wear. Minimum thickness 4.0 mm (0.2 in).
Fit brake friction pads to caliper.
Refit handbrake caliper.
Fit brake feed pipe to caliper, tighten connector at three way union.
Refit suspension unit tie plate.
Bleed brakes.
Refit road wheel.
Check and if necessary adjust camber angle.

THREE-WAY CONNECTOR—REAR

Remove and refit **70.15.34**

Removing

Disconnect three feed pipe unions (1, Fig. 14) at connector, plug pipes to prevent loss of fluid and ingress of dirt.

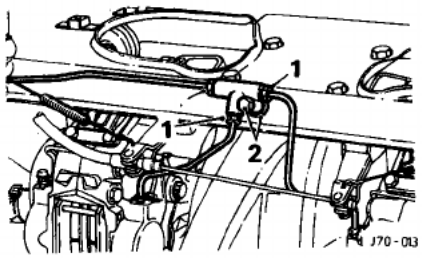


Fig. 14

Remove nut and bolt (2, Fig. 14) securing three-way connector to suspension unit, collect spacer and connector.

Refitting

Reverse removal operations, tightening nuts to correct torque and bleed system.

PRESSURE DIFFERENTIAL WARNING ACTUATOR

Remove and refit **70.25.13**

Removing

Disconnect battery.
Remove air cleaner cover and element where necessary to improve access (on R.H.D. cars only).

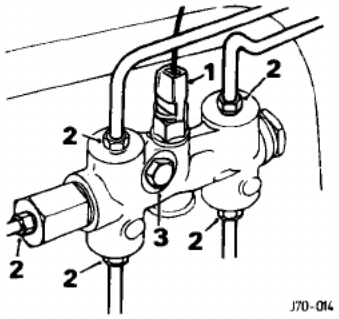


Fig. 15

Disconnect electrical lead (1, Fig. 15) from P.D.W.A. switch.
Disconnect all feed pipes (2, Fig. 15) from P.D.W.A. Plug pipes and P.D.W.A. unions to prevent loss of fluid and ingress of dirt.
Remove nut and bolt (3, Fig. 15) securing P.D.W.A. to wing valance.
Lift P.D.W.A. unit from car.

Refitting

Reverse operations above and bleed brakes.

TANDEM MASTER CYLINDER

Remove and refit **70.30.08**

Removing

Disconnect battery.
Remove reservoir cap and switch assembly (1, Fig. 16).

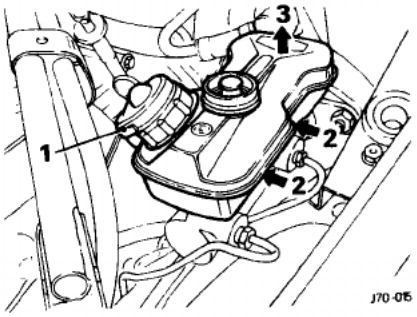


Fig. 16

Detach two spring clips and withdraw two retaining pins (2, Fig. 16).
Place suitable container in position to catch fluid.
Pull reservoir vertically away from master cylinder (3, Fig. 16).
Fit closing plugs to grommets in master cylinder ports.

NOTE: Before a master cylinder is removed from a direct acting servo it is imperative that the brake pedal is depressed and released at least 10 times. This is to ensure that no vacuum exists to operate the servo.
Operation of the servo when the master cylinder is not in place can cause its mechanism to travel past its normal limit. This can damage the servo beyond repair.

Disconnect master cylinder fluid delivery pipes, plug pipes to prevent ingress of dirt.
Remove nuts and washers securing master cylinder to servo unit.
Lift master cylinder from mounting studs.

Refitting

Fit replacement master cylinder over studs, replace washers and nuts, and tighten to correct torque.
Unplug delivery pipes and connect to master cylinder.
Prise grommets from master cylinder ports to reservoir.
Inspect ports for complete cleanliness and fit new grommets, lubricating them with brake fluid before insertion.
Press replacement reservoir into position.
Replace retaining pins and spring clips.
Fill reservoir to bottom of neck with recommended fluid (Castrol-Girling Universal Brake and Clutch Fluid).
Reconnect battery and bleed brakes.

FLUID RESERVOIR

Remove and refit **70.30.16**

Removing

Disconnect battery.
Remove reservoir cap and switch assembly (1, Fig. 16).
Detach two spring clips and withdraw two retaining pins (2, Fig. 16).
Place suitable container in position to catch fluid.
Pull reservoir vertically away from master cylinder (3, Fig. 16).
Fit closing plugs to grommets in master cylinder ports.

Refitting

Prise grommets from master cylinder ports.
Inspect ports for complete cleanliness and fit new grommets, lubricating them with brake fluid before insertion.
Press replacement reservoir into position.
Replace retaining pins and spring clips.
Fill reservoir to bottom of neck with recommended fluid (Castrol-Girling Universal Brake and Clutch Fluid).
Reconnect battery.
Bleed brakes.

PEDAL BOX

Remove and refit **70.35.03**

Removing

Disconnect battery.
Disconnect fluid delivery pipes from master cylinder, tape or plug pipes to prevent loss of fluid and ingress of dirt.
Peel cover from brake reservoir cap and disconnect leads from fluid level indicator switch.

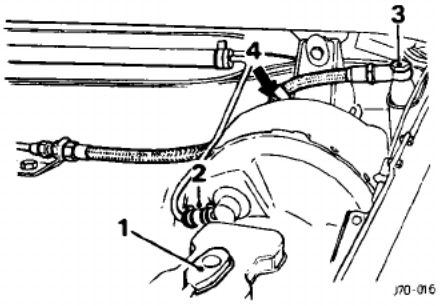


Fig. 17

Slacken clip (2, Fig. 17) securing brake vacuum hose to servo adaptor, slide hose from adaptor.

LEFT-HAND DRIVE CARS—Manual Transmission Only
Remove banjo bolt (3, Fig. 17) securing clutch slave cylinder hose to clutch master cylinder, recover copper washers and tape-up banjo union and master cylinder outlet.
Remove self-locking nut (4, Fig. 17) securing slave cylinder hose to pedal box; position hose clear of servo assembly.

RIGHT-HAND DRIVE CARS—Manual Transmission Only
Release nuts (1, Fig. 18) securing clutch feed pipe to master cylinder and slave cylinder hose, remove pipe from car. Tape-up open ends of pipe and master cylinder.

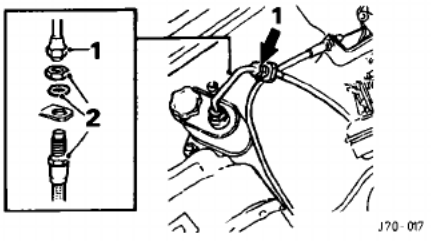


Fig. 18

Remove locknut (2, Fig. 18) securing slave cylinder hose to reservoir mounting bracket, disengage hose from bracket and tape-up open end of hose.
Remove self-locking nut (adjacent to clutch pedal housing) securing steering column lower mounting bracket to pedal box.

All Cars
Remove bolt, oval washer and spacer (1, Fig. 19) securing upper portion of pedal box to bulkhead.
Position driver's seat to rear as far as possible, remove seat cushion and lift out footwell carpets.
Remove brake stop light switch.

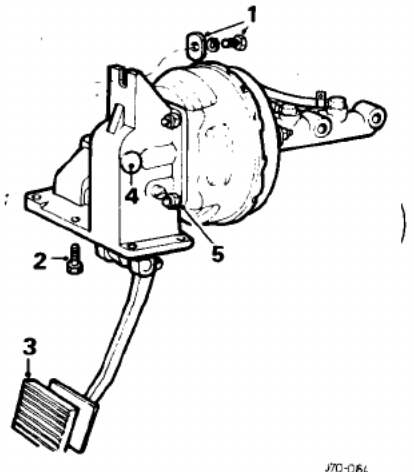


Fig. 19

Remove five bolts (2, Fig. 19) (right-hand drive cars), six bolts (left-hand drive cars), flat washers and spring washers securing pedal box base to bulkhead, recover clips retaining footwell noise absorbing mats.
Remove rubber pad (3, Fig. 19) from brake pedal.

Manual Transmission Cars Only
Remove nut and spring washer securing clutch pedal to operating lever, lift pedal from lever.

All Cars
Carefully raise servo unit, pedal box and master cylinder, draw complete assembly forward and lift from car.
Prise two rubber sealing plugs (4, Fig. 19) from sides of pedal box.
Remove split pin, washer and clevis pin securing brake pedal lever to servo operating rod.
Remove nuts (5, Fig. 19) securing pedal box to servo unit. Detach pedal box from servo unit.

Refitting

Reverse removal operations; fit new split pin to servo rod clevis pin.
Bleed clutch (manual transmission cars).
Bleed brakes.

HANDBRAKE LEVER ASSEMBLY

Remove and refit **70.35.08**

Removing

Disconnect battery.
Disconnect handbrake operating cable (1, Fig. 20) at under floor lever.

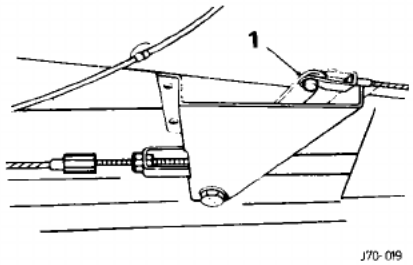


Fig. 20

Remove split pin, washer and clevis pin securing nylon roller to mounting bracket, withdraw roller.
Remove protective cover from nut securing nylon roller mounting bracket.
Remove nut securing roller mounting bracket.
Remove driver's side dash liner.
Remove steering column trim cover.

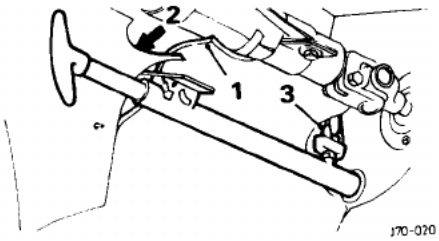


Fig. 21

Peel back trim (1, Fig. 21) covering handbrake mounting bracket securing bolts.
Remove bolts (2, Fig. 21) securing handbrake assembly to footwell side panel.
Noting terminal locations detach electrical leads (3, Fig. 21) from handbrake warning switch.

NOTE: If new handbrake assembly is to be fitted, remove warning switch from old handbrake.
Fit and adjust warning switch to new handbrake assembly.

Refitting

Reverse removal operations; fit new split pins to all clevis pins.

SERVO ASSEMBLY

Remove and refit **70.50.01**

Removing

Remove pedal box.
Remove nuts securing master cylinder to servo unit.
Detach master cylinder and vacuum pipe support bracket from servo unit.
Prise vacuum pipe connector from servo, recover rubber sealing washer.

Refitting

Reverse above operations, fit new sealing rubber to vacuum pipe connector.

HANDBRAKE CABLE ASSEMBLY

Remove and refit **70.35.16**

Removing

Set handbrake fully off.

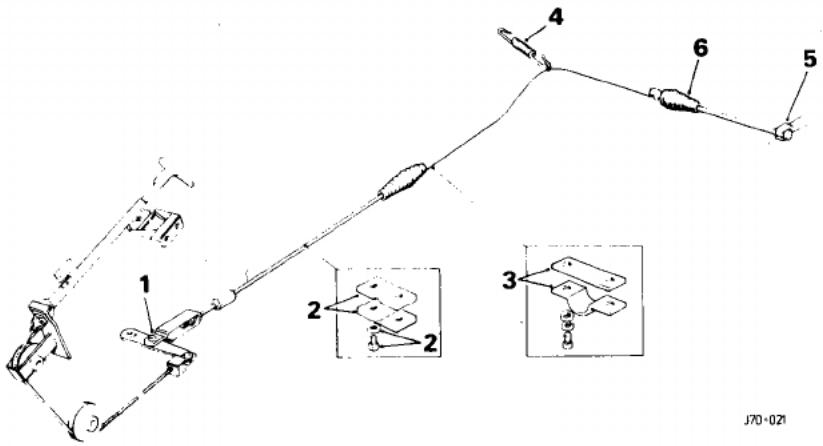


Fig. 22

Remove split pin, flat washer and clevis pin (1, Fig. 22) securing front yoke to lever.
Remove guide (2, Fig. 22) securing handbrake inner cable to underside of car body.
Remove guide (3, Fig. 22) securing outer cable to underside of car body.
Release guide spring (4, Fig. 22) from outer cable.
Remove split pin, flat washer and clevis pin (5, Fig. 22) securing rear yoke to handbrake caliper operating lever.
Slide rubber grommet (6, Fig. 22) clear of opposite handbrake lever, detach cable from lever.
Remove cable from car.

Refitting

Reverse removal operations; fit new split pins to clevis pins.
Check handbrake and adjust if necessary.

NON-RETURN VALVE

Remove and refit **70.50.15**

Removing

Slacken clips securing vacuum hoses to non-return valve.
Pull hoses from non-return valve, lift valve from car.

Refitting

Prior to refitting, blow through valve to test one way action.
Ensuring arrow stamped on barrel of valve points away from manifold vacuum hose, fit valve to hoses.
Fully tighten hose securing clips.

FRONT CALIPER

Remove and refit **70.55.02**

Removing

Slacken feed pipe union at caliper and disconnect feed pipe union (1, Fig. 23) at support bracket; plug pipe to prevent loss of fluid and ingress of dirt.

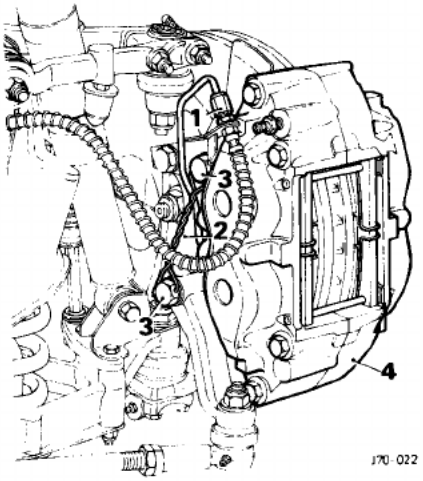


Fig. 23

Remove locking wire (2, Fig. 23) securing caliper mounting bolts.

CAUTION: Do not under any circumstances remove the four setbolts securing the two halves of caliper together.

Remove caliper mounting bolts (3, Fig. 23), note position and number of shims located between steering arm and caliper.
Withdraw caliper (4, Fig. 23) from disc.

Refitting

If original caliper is to be refitted, reverse removal operations, ensuring that shims are correctly replaced; if new caliper is fitted, carry out caliper/disc centralization.
Tighten mounting bolts to correct torque.
Bleed brakes.

REAR CALIPER

Remove and refit **70.55.03**

Removing

Remove handbrake caliper.
Slacken caliper feed pipe union at three-way connector (1, Fig. 24).

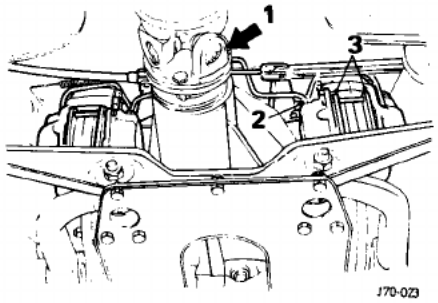


Fig. 24

Disconnect feed pipe at caliper (2, Fig. 24), swing pipe clear of caliper, plug holes to prevent ingress of dirt and loss of fluid.
Remove brake friction pads (3, Fig. 24).
Remove lock wire securing caliper mounting bolts.

CAUTION: Do not under any circumstances remove the four set bolts securing the two halves of caliper together.

Remove caliper mounting bolts.
Slide caliper around brake disc and withdraw through gap exposed by removal of tie plate.

Refitting

Offer caliper to mountings, fit mounting bolts and tighten to the correct torque.
Check that caliper is central of disc. Adjust as necessary, by adding or withdrawing brake disc shims.

NOTE: If adjustment is carried out camber angle must be checked as a final operation.

Wire lock caliper mounting bolts.

NOTE: Prior to fitting friction pads, check pads for wear, the minimum thickness being 4.0 mm (0.2 in)
Replace pads, feed pipe and handbrake caliper.
Bleed brakes.

HANDBRAKE MECHANISM

Remove and refit **70.55.04**

Removing

Place car on ramp; remove nuts and bolts securing tie plate to suspension unit, lift off tie plate.
Ensure handbrake is fully off. Remove clevis pin securing handbrake cable to caliper operating lever.
Detach handbrake cable from remaining operating lever (1, Fig. 25).

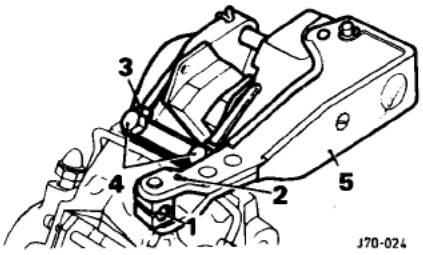


Fig. 25

Unclip return spring from handbrake operating lever (2, Fig. 25).
Bend back locking tabs (3, Fig. 25) securing handbrake caliper mounting bolts. Remove mounting bolts, tab washer and retraction lever (4, Fig. 25).
Slide caliper (5, Fig. 25) around brake disc and withdraw through gap exposed by removal of tie plate.

Refitting

If new pads are fitted, or mechanism overhauled, adjust caliper. Holding one pad carrier, rotate remaining one to give a dimension of 19,0 mm (0.75 in) between pad surfaces.
Refit caliper, mounting bolts and locking nuts.
Operate actuating lever until adjuster ratchet ceases to click, this adjusts pads to correct clearance.
Reverse remaining removal operations.

HANDBRAKE PADS

Remove and refit **70.40.04**

Removing

Remove handbrake caliper.
Remove nut and spring washer (1, Fig. 26) securing pads to brake pad carriers, remove pads (2, Fig. 26).

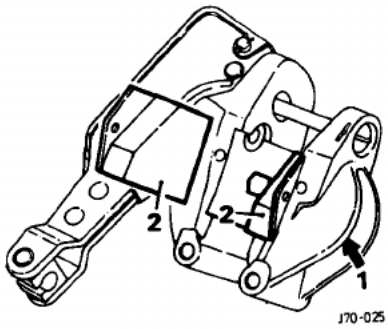


Fig. 26

Refitting

Holding one pad carrier, wind remaining one out two or three turns.
Fit new brake pads to carrier using new nut and spring washer.
Refit handbrake caliper.
Operate handbrake several times to adjust pads to correct clearance.

RESERVAC TANK (when fitted)

Remove and refit **70.50.04**

Removing

Jack up car, support on stands, and remove right hand front wheel.
Remove horn relay (1, Fig. 27).

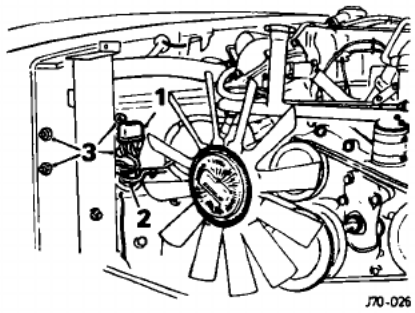


Fig. 27

Disconnect vacuum hose (2, Fig. 27) from reservac tank.
Remove nuts (3, Fig. 27) from securing straps, mounting reservac to wing valance.

Refitting

Reverse removal operations.

TANDEM MASTER CYLINDER

Overhaul **70.30.09**

Remove master cylinder.

NOTE: Overhaul of the master cylinder should be carried out with the work area, tools and hands in a clean condition.

Dismantling

Using suitable screwdriver, lever sealing grommets (1, Fig. 28) from master cylinder.

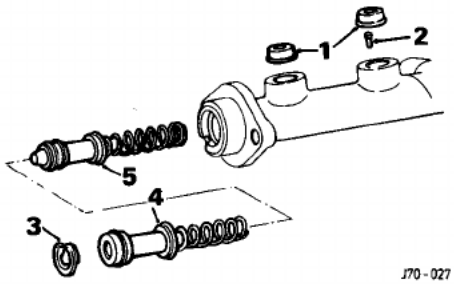


Fig. 28

Press primary piston into bore of cylinder and withdraw secondary piston stop pin (2, Fig. 28) from forward grommet housing.
Remove circlip (3, Fig. 28).
Tap flange end of cylinder on wooden block to remove primary piston and spring (4, Fig. 28), secondary piston and spring (5, Fig. 28).
It may prove necessary to feed compressed air into cylinder front delivery port.

NOTE: Once the piston assemblies are withdrawn the appropriate piston and spring must be kept together.
In the event of the springs being mixed, the secondary piston spring can be easily identified, it being slightly thicker and longer than the primary spring.

Remove spring, spring seat, recuperating seal and washer from secondary piston (1, Fig. 29).

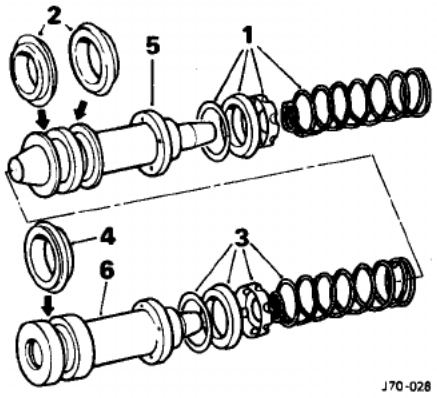


Fig. 29

Carefully prise seals (2, Fig. 29) from rear of secondary piston.
Remove spring, spring seat, recuperating seal and washer from primary piston (3, Fig. 29).
Carefully prise seal (4, Fig. 29) from rear of primary piston.
Discard all old seals and associated items that will be replaced by those contained within service kit.

continued

BULB CHART — 6 cyl. & 12 cyl. vehicles

See Section 86A for bulb charts

Refitting

Position ends of seal in the centre of the boot sill and press approximately 15 cm (6.0 in) of each portion of seal on the lower flange.
Join ends of seal with adhesive tape.
Position seal equally around boot aperture and fit the corners of the seal to the flange.

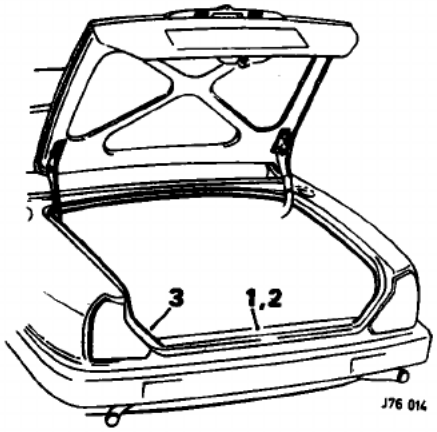


Fig. 19

Fit the remaining portion of the seal onto the flange taking care not to stretch the seal and ensuring that it is correctly bedded down.
Refit the screws to secure the sill cover-plate.
Cover the seal with french chalk and close boot. Check for transfer of chalk from seal to boot lid.
Where no transfer of chalk is evident, adjust the boot lid or striker, see operations 76.19.01. or 76.19.12.

BOOT LID HINGE

Remove and refit **76.19.07**

NOTE: Prior to removing the hinges, it will first be necessary to remove the boot lid as detailed in operation 76.19.01.

Removing

Remove four bolts, spring and plain washers securing the hinge to the body; withdraw the hinge.

Refitting

Place the hinge in position and secure with the four bolts, plain and spring washers.

BOOT LID LOCK

Remove and refit **76.19.11**

Removing

Release the clip (1, Fig. 20) securing the control link rod to the lock lever and detach the rod.
Remove the three screws (2, Fig. 20) securing the lock to the boot lid; withdraw the lock.

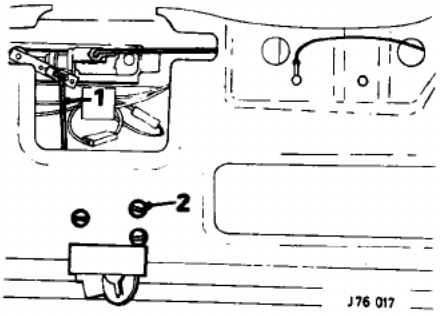


Fig. 20

Refitting

Position the lock in the boot lid and fit the securing screws.
Connect the control link rod to the lock lever and fit the retaining clip.
Check the lock for correct operation and that boot lid closes with 'push effort' only.
If boot does not close correctly, adjust the striker plate as detailed in operation 76.19.12.

BOOT LID LOCK STRIKER

Remove and refit **76.19.12**

Removing

Remove the screws securing the rear boot floor; lift out the floor.
Mark relative position (1, Fig. 21) of the striker to the clamp plate.
Slacken the bolts (2, Fig. 21) and remove the striker from the clamp plate.

Refitting

Position the striker in the clamp plate and check that reference marks made during the dismantling procedure are in alignment.
Tighten the retaining bolts ensuring that the relative positions of striker and clamp plate remain unchanged.
Check that boot lid closes with 'push effort' only.
If boot does not close correctly, adjust the striker and re-check boot lid closure.
Refit the rear boot floor.

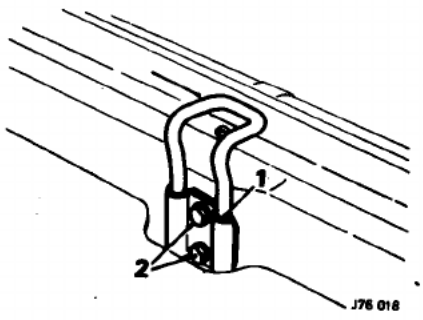


Fig. 21

FRONT BUMPER

Remove and refit—European cars only **76.22.08**

Removing

Disconnect the battery.
Remove the nuts, spring and plain washers (1, Fig. 22) securing the chrome finisher to the side mounting brackets.
Prise up plastic covers (2, Fig. 22) located beneath each inner headlamp and remove the bolts, spring and plain washers (3, Fig. 22) securing the finisher to the inner mounting brackets; lift off finisher and recover upper apron.
Remove clips securing the rubber finishers (4, Fig. 22) to the bumper beam; withdraw the finishers.
Disconnect the light units by rotating the connector (5, Fig. 22) in an anti-clockwise direction.

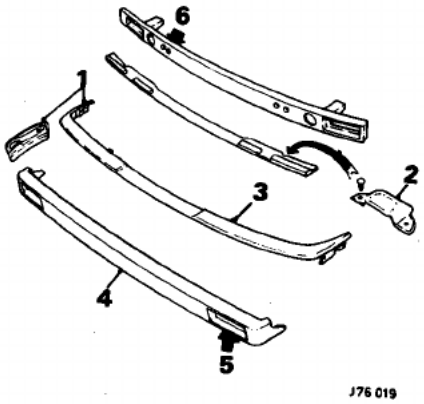


Fig. 22

Remove the bolts and spring washers (6, Fig. 22) securing the bumper beam to the mounting brackets; lift off the beam.

Refitting

Position the bumper beam on the mounting brackets and fit the retaining nuts and washers.
Connect the light units.
Refit the rubber and chrome finishers.
Connect the battery and check lights for correct operation.

FRONT BUMPER

Remove and refit—Non-European cars 76.22.08

Removing

Disconnect the battery.
Remove the nuts, spring and plain washers (1, Fig. 23) securing the chrome finisher to the side mounting brackets.
Prise up plastic covers (2, Fig. 23) located beneath each inner headlamp and remove the bolts, spring and plain washers (3, Fig. 23) securing the finisher to the inner mounting brackets; lift off finisher and recover upper apron.
Remove the bolts and washers (4, Fig. 23) securing the lower edge of rubber finisher to the energy absorbing beam and the trim clips (5, Fig. 23) securing the upper edge. Withdraw the finisher.
Remove the nuts and spring washers (6, Fig. 23) securing the side finishers to the mounting brackets; withdraw the finishers.
Disconnect the light units by rotating the connectors in an anti-clockwise direction.
Remove the nuts, bolts and washers (7, Fig. 23) securing the energy absorbing beam; lift off the beam.

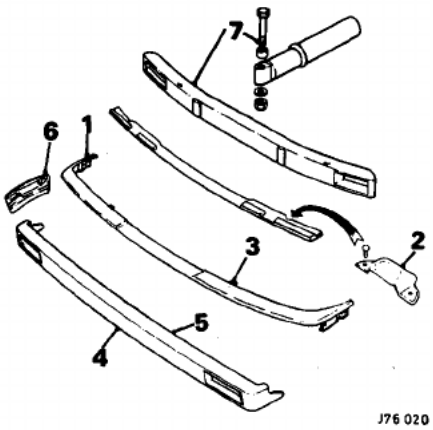


Fig. 23

Refitting

Position beam on the energy absorbing struts, refit the nuts, bolts and washers.
Connect the light units.
Refit the rubber and chrome finishers.
Connect the battery and check lights for correct operation.

REAR BUMPER CENTRE SECTION

Remove and refit—All cars 76.22.12

Removing

On cars fitted with rear fog guard lights, disconnect the battery.
Remove clips (1, Fig. 24) securing rubber buffer (2, Fig. 24) and remove buffer.
Remove nuts and washers securing the rear beam (3, Fig. 24) to the body mounting brackets.
Remove the beam (4, Fig. 24).
Remove the nuts and washers securing rear blade to the side blades and the body (5, Fig. 24).
Remove the blade (6, Fig. 24) and recover the sealing strips.

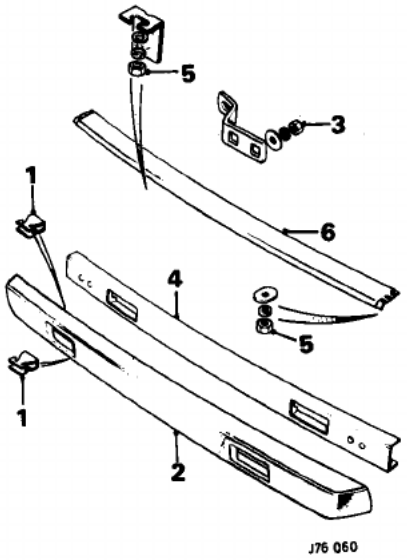


Fig. 24

Refitting

Position rear beam on mounting brackets/ energy absorbing strut and fit retaining nuts and washers.
Conect fog guard lights (if fitted).
Refit rubber and chrome finishers ensuring that rubber sealing strips are interposed between centre and side finishers.
Connect the battery and check fog guard lights for correct operation.

REAR BUMPER SIDE SECTION

Remove and refit—All cars 76.22.13

Removing

Remove rear bumper beam as detailed in operation 76.22.12.
Remove the nuts and washers (1, Fig. 25) securing the rubber buffer (2, Fig. 25) to the quarter blade (3, Fig. 25).
Remove the nuts, washers and bolts (4, Fig. 25) securing the quarter blade to the body mounting brackets (5, Fig. 25).
Remove the blade (3, Fig. 25).

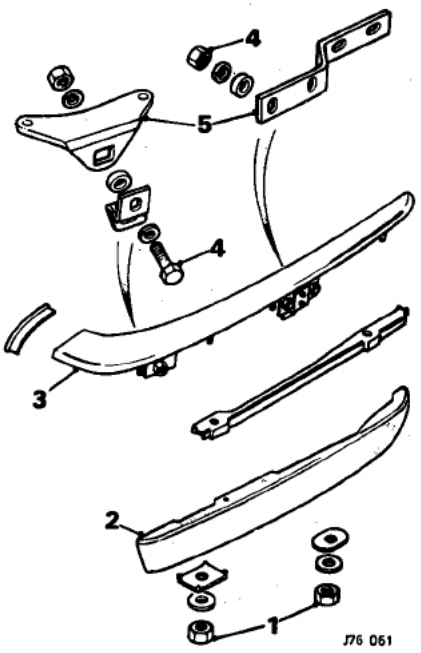


Fig. 25

Refitting

Refit rubber and chrome finishers ensuring that rubber sealing strips are interposed between the side and centre chrome finishers.

ENERGY ABSORBING STRUT—FRONT

Remove and refit 76.22.31

Removing

Remove front energy absorbing beam.
Open bonnet and remove nut and flat washer (1, Fig. 26) securing strut to mounting tube.
Position energy absorbing beam mounting bolt (2, Fig. 26) in strut locating hole.
Gently tapping bolt head with hammer, remove strut from mounting tube.

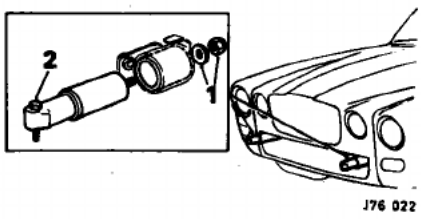


Fig. 26

Inspection

Examine rubber sleeve in strut mounting tube for any signs of damage or deterioration.
Reposition strut in mounting tube and check for any radial movement. If rubber sleeve is damaged or radial movement between strut and sleeve exists, a new rubber sleeve must be fitted.

Refitting

Place the beam mounting bolt in the strut locating hole. Position strut in the mounting and gently tap the bolt head until strut is correctly located in the mounting tube.
Refit the nut and flat washer.
Refit the energy absorbing beam.

ENERGY ABSORBING STRUT—REAR

Remove and refit **76.22.32**

Removing

Remove rear energy absorbing beam.
Remove tail pipe and rear silencer.
Remove nut and plain washer (1, Fig. 27) securing strut to mounting tube.
Position energy absorbing beam mounting bolt (2, Fig. 27) in strut locating hole.
Gently tapping bolt head with hammer, remove strut from mounting tube.

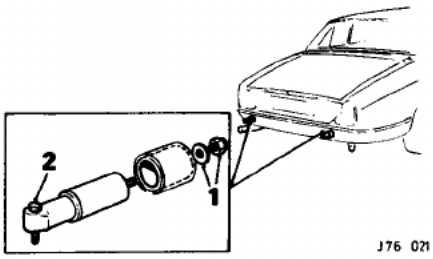


Fig. 27

Inspection

Examine rubber sleeve in strut mounting tube for signs of damage or deterioration.
Reposition strut in mounting tube and check for any radial movement.
If rubber sleeve is damaged or radial play between strut and sleeve exists, a new sleeve must be fitted.

Refitting

Place the beam mounting belt in the strut locating hole.
Position strut in the mounting and gently tap the bolt head until strut is correctly located in the mounting tube.
Refit the nut and flat washer.
Refit the energy absorbing beam, tail pipe and rear silencer.

CONSOLE ASSEMBLY

Remove and refit **76.25.01**

Removing

WARNING: Throughout the following operations it is imperative that the fitted positions of electrical harnesses and connections are noted prior to them being disconnected.

Disconnect the battery.
Remove the screws securing the ventilation louvres and side trim casings.
Pull each casing forward until it can be withdrawn.
Pull heater and ventilation knobs off the control spindles.
Remove threaded locking rings from heater and ventilation controls, withdraw panel sufficiently to gain access to centre parcel shelf securing screws; remove screws.

NOTE: Take care not to damage fibre optic elements.

Remove screws securing top of centre parcel shelf; withdraw shelf slightly and disconnect the sensor pipe.
Remove the cigar lighter and ashtrays.
Remove the screws securing the control escutcheon. Raise the escutcheon slightly and disconnect the cigar lighter, door lock and window switch harnesses. Lift off the escutcheon.
Remove the front seat cushions as described in operation 76.70.02.
Move both seats fully forwards.
Remove screws securing the rear window switch panel. Raise panel slightly and disconnect the wires from the switches and cigar lighter (where fitted). Remove the panel.
Remove the screws securing rear of the console to the transmission tunnel.
Disconnect the multi-plug connector at the rear of the console.
Raise rear of console and remove screws securing the wiring harness to the air duct.
Slide console towards rear of car until access to the electrical harness clipped to the front of the console is obtained. Release the harness from the clips.
Pass radio and ventilation panel through aperture in console at the same time sliding console away from the fascia.

CAUTION: Ensure that radio is adequately supported.

Disconnect the air ducting from the ventilation outlet.
Lift console over the transmission selector/gear lever.

Refitting

Position console over transmission selector/gear lever.
Connect air ducting to ventilation outlet.
Refit radio and panel.
Clip harness to front of console.
Slide console forwards until it is correctly positioned.
Raise rear of console slightly and attach the wiring harness to the air duct.
Connect the multi-plug and secure console to the transmission tunnel.
Connect rear window switches and cigar lighter (where fitted), refit the switch panel.
Refit the front seat cushions and move seats rearwards.
Connect window, door lock and cigar lighter harnesses; refit the control escutcheon.
Refit the centre parcel shelf; secure panel with locking rings.
Refit the heater and ventilation knobs.
Refit the side trim casings and ventilation louvres.
Connect the battery and test cigar lighter(s), window and door lock switches for correct operation.

CONSOLE SIDE CASING

Remove and refit **76.25.02**

Removing

Remove two screws securing side casing and ventilation louvres (1, Fig. 28) slide casing towards front of car until it can be withdrawn.

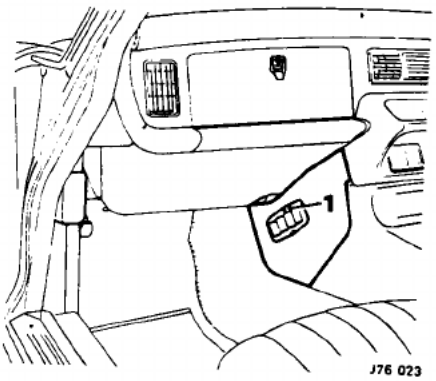


Fig. 28

Refitting

Place casing towards front of footwell and slide casing rearwards until securing screw holes are in alignment; refit the ventilation louvre and securing screws.

AUTOMATIC TRANSMISSION SELECTOR QUADRANT

Remove and refit **76.25.08**

Removing

Disconnect the battery.
Remove the screws securing the control escutcheon. Raise the escutcheon slightly and note the fitted position of the door lock, electric window and cigar lighter leads, disconnect the harnesses. Lift off the escutcheon.
Remove four nuts and washers securing quadrant cover to mounting plate (1, Fig. 29).

NOTE: Position of cable clips and electrical leads on quadrant cover mounting studs should be noted.

Detach cable feeding quadrant cover illumination bulb at snap connector.
Unscrew left- and right-hand sections of selector lever handle (2, Fig. 29).
Withdraw quadrant cover over selector lever (3, Fig. 29).
Noting location, detach electrical leads from reverse switch, inhibitor switch and seat belt warning switch (when fitted).
Remove screws securing fibre optic unit to bracket (4, Fig. 29).

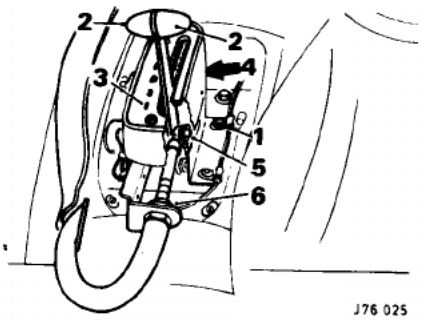


Fig. 29

Remove split pin and washer securing transmission operating cable to selector quadrant lever (5, Fig. 29), detach cable from mounting.
Remove forward locknut securing operating cable to quadrant extension bracket (6, Fig. 29).

NOTE: Position of quadrant bracket on mounting studs should be marked for reference when refitting.

Remove three bolts and washers securing quadrant assembly to transmission tunnel cover.
Remove quadrant assembly from car.

Refitting

Place selector quadrant on transmission tunnel and fit the securing bolts.
Connect selector cable and check cable adjustment as detailed in operation 44.15.08.
Re-connect leads to starter inhibitor, reverse light and seat belt warning switches (when fitted).
Connect the quadrant illumination bulb.
Refit the quadrant cover, selector lever knob and control escutcheon.
Connect battery and test operation of cigar lighter, door lock and window switches.

FRONT DOOR

Remove and refit **76.28.01**

Removing

Disconnect the battery.
Remove the door trim casing as detailed in operation 76.74.01 and the door pocket (Vanden Plas cars only), see operation 76.34.19.
If radio speaker is fitted, remove four screws securing speaker to door (1, Fig. 30). Noting position, detach leads from speaker unit, lift speaker from door—Not Vanden Plas cars.
Recover loom located in speaker mounting aperture.
Noting position of each electrical lead, detach leads from snap connectors.
Prise loom protective cover (2, Fig. 30) from forward face of door and 'A' post.
Withdraw loom and radio speaker cables through hole in forward face of door.

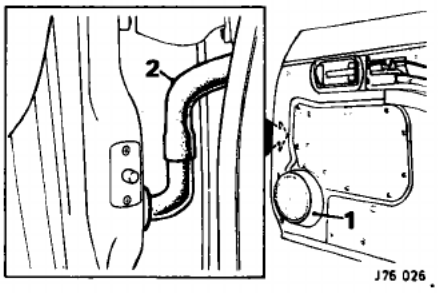


Fig. 30

Adequately supporting door, remove bolts securing door to hinges.
Remove door from hinges, recover packing pieces located between hinges and door.

Refitting

Fit bolts in hinges and place packing pieces over bolts, ensure door earthing strap is located behind one door securing bolt.
Fit door to hinges; do not fully tighten bolts.
Close door to correctly position and align with surrounding body.
Open door and fully tighten door mounting bolts.
Refit wiring loom, speaker cables and protective cover.
Refit radio speaker and door trim casing.
Connect the battery and test radio speaker, door lock and window switches for correct operation.

REAR DOOR

Remove and refit **76.28.02**

Removing

Disconnect the battery and door trim casing as described in operation 76.34.04.
Locate cable loom inside door casing; noting fitted position, separate cables at snap connectors.
Prise loom protective cover from forward face of door.
Withdraw loom and radio speaker cables through hole in forward face of door.
Ensuring door is adequately supported, remove six bolts securing door to hinges.
Lift door from car.

Refitting

Fit bolts on hinges; ensure door earthing strap is located behind head of top inner hinge securing bolt.
Offer door to hinges, slightly tighten securing bolts.
Close door; ensure door fully closes and locks.
Tighten door mounting bolts.
Refit wiring loom and speaker cables.
Insert loom cover into door panel.
Connect the battery, refit the door trim casing and radio speaker.
Check radio speaker, door lock and window switches for correct operation.

FRONT DOOR HINGES

Remove and refit **76.28.42**

Removing

Remove door as detailed in operation 76.28.01.
Jack up front of car and position wheels on full left or right lock.
Remove five bolts and washers securing wheel arch diaphragm panel to wing and 'A' post, remove panel from car (1, Fig. 31).
Remove two bolts located inside wheel arch securing lower section of wing to sill (2, Fig. 31).
Remove two bolts between door hinges securing wing to 'A' post, recover door earthing strap fitted behind top bolt (3, Fig. 31).
Remove bolts, flat washers and spring washers securing top edge of wing to valance.

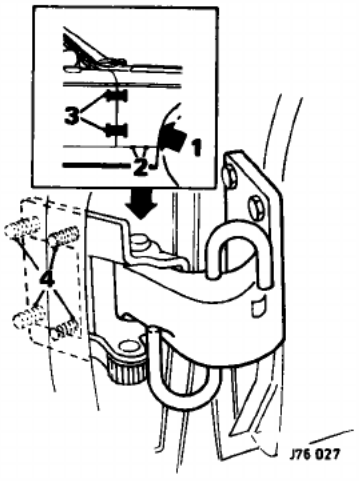


Fig. 31

Using suitable size wedge, separate lower portion of wing from body.
Remove eight bolts securing upper and lower hinges to 'A' post, lift hinges from car (4, Fig. 31).

Refitting

Coat mating faces of hinges with Bostik Sealant.
Refit hinges to body.
Bolt top edge of wing to valance.
Bolt wing to 'A' post and wheel arch.
Refit diaphragm panel, coat panel with underseal.
Refit the door.

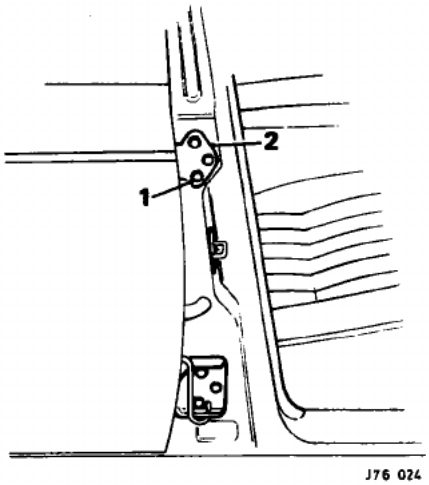
REAR DOOR HINGES

Remove and refit **76.28.43**

Removing

CAUTION: Throughout the following operation the door should be adequately supported in the closed position.

Remove bolts (1, Fig. 32) securing hinges to door and 'B—C' post, recover door earthing strap fitted to top hinge securing bolts.
Lift hinges (2, Fig. 32) from door.



J76 024

Fig. 32

Refitting

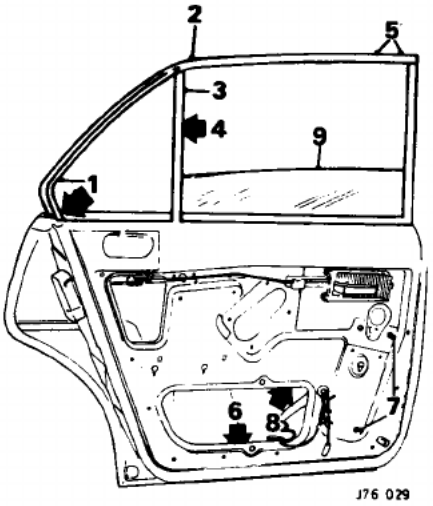
Coat mating faces of door hinges with Bostik Sealant.
Refit hinges and door.
Check that door closes correctly. If not, slacken hinge securing bolts, re-position door and re-tighten the bolts.

REAR DOOR GLASS

Remove and refit **76.31.02**

Removing

Remove rear door trim casing as detailed in operation 76.34.03.
Prise chrome trim free from door glass frame.
Remove screw securing inner chrome trim to door glass frame, prise trim from frame (1, Fig. 34).



J76 029

Fig. 34

Release rubber seal from door glass frame (2, Fig. 34).
Lower door glass and release upper portion of felt channel fitted to quarter-light (3, Fig. 34).
Remove screws exposed by removal of felt channel (4, Fig. 34).
Remove two screws adjacent to 'B–C' post securing vertical door glass frame to top glass frame and gently tap top glass frame free; lift frame from door (5, Fig. 34).
Remove screws securing glass buffer stop to door panel, lift buffer stop from door (6, Fig. 34).
Remove screw securing window lift mechanism to door panel (7, Fig. 34).
Disengage window lift arm from glass guide bracket (8, Fig. 34).
Withdraw glass from door (9, Fig. 34).
Remove guide bracket and seal from glass.

Refitting

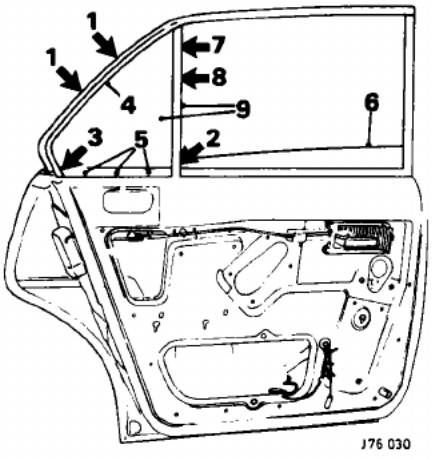
Cut the Everseal strip (Part No. BD 47937) to make it 38 to 50 mm (1½ to 2 in) shorter than the bottom channel.
Thoroughly clean mating surfaces of channel, Everseal strip and door glass.
Fit the Everseal strip midway in the channel, i.e. with 19 to 25 mm (¾ to 1 in) between each end of the strip and the end of the channel.
Replace bottom channel, complete with strip, on door glass.
Fill the ends of the channel with Dow Corning Silastik 732 or a similar silicone sealant, using a hand-gunned cartridge. Allow time for sealant to cure before refitting door glass.
Locate new seal in correct position over glass.
Position lift arm guide bracket over seal; using mallet gently tap either side of guide until seal and guide are firmly secured to glass.
Refit guide bracket.
Position glass inside door.
Engage window lift arm in glass bracket.
Fit screw to secure lift mechanism to door panel.
Refit buffer stop.
Refit glass frame and felt channel.
Refit rubber seal and chrome trim.
Refit trim casing.

REAR DOOR QUARTER-LIGHT

Remove and refit **76.31.31**

Removing

Remove rear door trim casing as detailed in operation 76.34.04.
Prise chrome trim free from quarter-light frame (1, Fig. 35).
Prise chrome beading from base of quarter-light (2, Fig. 35).
Remove screw securing inner chrome trim to door glass frame, prise trim from quarter-light frame (3, Fig. 35).



J76 030

Fig. 35

Release section of door seal fitted to quarter-light frame (4, Fig. 35).
Remove three screws securing base of quarter-light to door (5, Fig. 35).
Lower door glass to full extent (6, Fig. 35).
Release upper portion of felt channel fitted to quarter-light (7, Fig. 35).
Remove screws exposed by removal of quarter-light channel (8, Fig. 35).
Prise chrome trim from quarter-light vertical post, lift quarter-light from door (9, Fig. 35).

Refitting

Position quarter-light in door.
Fit chrome trim to quarter-light vertical post.
Fit upper portion of channel to quarter-light and raise door glass.
Refit screws to secure quarter-light.
Refit door seal and chrome trim.
Using suitable sealing compound, seal area between base of quarter-light and chrome beading.

FRONT DOOR TRIM CASING

Remove and refit **76.34.01**

Removing

Remove the arm-rest. For Vanden Plas see 76.34.22.

Carefully prise lower edge and sides of trim casing from door (1, Fig. 36).
Release upper edge of casing from crash roll (2, Fig. 37).

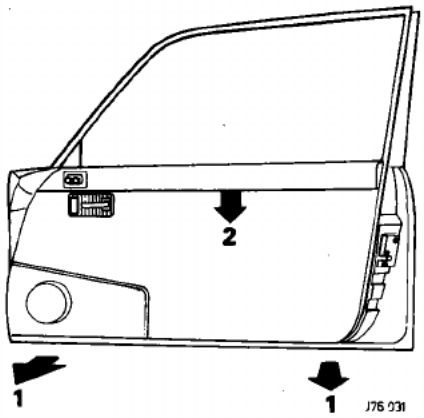


Fig. 36

Refitting

Align trim clips on casing and door.
Engage upper edge of casing with crash roll; refit the casing.
Refit the arm-rest.

REAR DOOR TRIM CASING

Remove and refit **76.34.04**

Removing

Remove rear door arm-rest as detailed in operation 76.34.23.
Carefully prise lower edge and sides of trim casing from door.
Release upper edge of casing from crash roll.

Refitting

Align trim clips on casing and door.
Engage upper edge of casing with the door crash roll; refit the casing.
Refit the arm-rest.

DOOR CRASH ROLL

Remove and refit **76.34.17**

Removing

Remove door trim casing as detailed in operations 76.34.01—Front or 76.34.04—Rear.
Remove screws securing mirror remote control operating lever surround (1, Fig. 37).
Withdraw surround slightly and remove setscrews securing control lever to surround (2, Fig. 37) (not Vanden Plas cars).
Unclip crash roll (3, Fig. 37) and lift it over the control lever assembly.

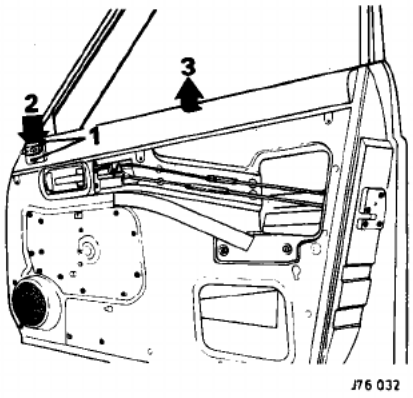


Fig. 37

Refitting

Clip crash roll to door casing.
Refit remote control lever assembly and surround.
Refit door trim casing.
Test remote control mirror for correct operation.

DOOR POCKET

Remove and refit — Vanden Plas only (early models)
Daimler (later models) **76.34.19**

Prior to carrying out this operation it will first be necessary to remove the arm-rest and door trim casing as described in operations 76.34.22 and 76.34.01.

Removing

Disconnect the battery.
Remove two screws securing the remote mirror control surround to the door pockets and partially withdraw the assembly until access to the lever locking setscrew is obtained.
Remove the setscrew and withdraw the surround.
Remove the screws securing the door pocket; withdraw the pocket slightly and disconnect the loudspeaker harness at the snap connectors.

Refitting

Connect the loudspeaker harness at the snap connectors and feed connectors back into the door casing.
Refit the door pockets.
Secure the remote mirror control to the surround and refit the surround.
Refit the door trim casing and arm-rest.
Reconnect the battery and check warning lamp and radio for correct operation.

FRONT DOOR ARM-REST

Remove and refit—Vanden Plas only **76.34.22**

Removing

Disconnect the battery and remove the screw securing the warning lamp lens to the arm-rest.
Slide the lens rearwards and remove the warning lamp bulb (1, Fig. 38).
Remove the screw adjacent to the bulb holder securing the rear of the arm-rest to the door (2, Fig. 38).
Remove the screw from beneath front of arm-rest (3, Fig. 38) and slide top portion of arm-rest towards rear of door.
Remove screws securing arm-rest to door; withdraw arm-rest slightly.
Note fitted position of the two electrical leads and disconnect the leads at the snap connectors.

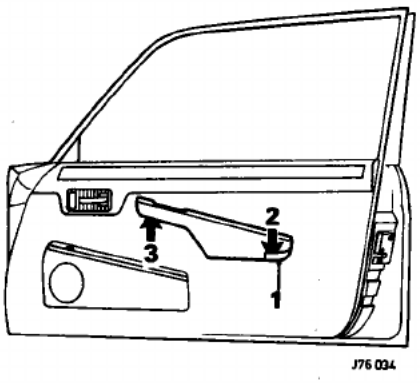


Fig. 38

TYRE DATA

Fitted as complete sets only

Type:	6 cylinder cars	Dunlop ER70 VR 15 Sport or Pirelli Cinturato P5 205/70 VR 15
	12 cylinder cars	Dunlop 205/70 VR 15 D1 SP Sport Super or Pirelli Cinturato P5 205/70 VR15
	from Sept. 83	Pirelli Cinturato 215/70 VR 15; Dunlop 215/70 VR 15 D7 Sport Super

PRESSURE:

All Series III 6 cyl. Engined Saloons

	Front	Rear
For speeds above 100 mph (160 km/h) with driver and two passengers	2.27 bar 2.32 kgf/cm^2 33 lbf/in^2	2.21 bar 2.25 kgf/cm^2 32 lbf/in^2
For speeds above 100 mph with full load (including luggage) of 410 kg (904 lb)	2.27 bar 2.32 kgf/cm^2 33 lbf/in^2	2.48 bar 2.53 kgf/cm^2 36 lbf/in^2

The above pressures may also be reduced by 0.41 bar; 0.42 kgf/cm^2; (6 lbf/in^2) on the front and rear tyres to obtain maximum comfort, provided the speed does not exceed 100 mph (160 km/h).

All Series III 12 cyl. Engined Saloons

	Front	Rear
For speeds above 100 mph (160 km/h) with driver and two passengers	2.48 bar 2.53 kgf/cm^2 36 lbf/in^2	2.21 bar 2.25 kgf/cm^2 32 lbf/in^2
For speeds above 100 mph with full load (including luggage) of 410 kg (904 lb)	2.48 bar 2.53 kgf/cm^2 36 lbf/in^2	2.48 bar 2.53 kgf/cm^2 36 lbf/in^2

The above pressures may also be reduced by 0.41 bar; 0.42 kgf/cm^2; (6 lbf/in^2) on the front and rear tyres to obtain maximum comfort, provided the speed does not exceed 100 mph (160 km/h).

Tyre Replacement and Wheel Interchanging
When replacement of tyres is necessary, it is preferable to fit a complete car set. Should either front or rear tyres only show a necessity for replacement, new tyres must be fitted to replace the worn ones. No attempt must be made to interchange tyres from front to rear or vice–versa as tyre wear produces characteristic patterns depending upon their position and if such position is changed after wear has occurred, the performance of the tyre will be adversely affected. It should be remembered that new tyres require to be balanced.

The radial–ply tyres specified above are designed to meet the high–speed performance of which the car is capable.

Only tyres of identical specification as shown under 'TYRE DATA' must be fitted as replacements and, if to different tread pattern, should not be fitted in mixed form.

UNDER NO CIRCUMSTANCES SHOULD CROSS–PLY TYRES BE FITTED.

RECOMMENDED SNOW TYRE

The following information relates to the only snow tyre recommended for Jaguar Cars.

Snow tyres MUST ONLY BE fitted in complete sets of four, failure to do so could adversely affect the handling of the car under certain conditions.
Tyre type – Pirelli Winter 190 215/65 R15 M&S
Tyre pressures – Are the same as the standard tyre equipment.
Maximum speed – without snow chains – 190 km/h (118 mph)
with snow chains – 50 km/h (30 mph)

Snow Chains

Rud Kantenspur snow chains may be fitted to the rear wheels only.
NOTE: Always ensure that they are correctly fitted and fully tensioned.
Snow chains must only be used with the recommended winter tyres.

SLIDING ROOF RACK

Renew **76.82.42**
76.82.43

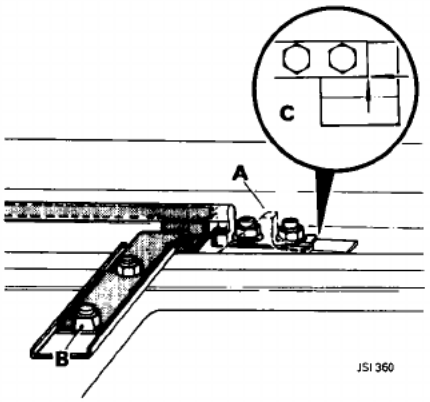


Fig. 69

Remove the roof sliding panel for access, refer to operation 76.82.05.
Fully close the under panel.
Remove the rear seat cushion and squab, refer to operation 76.70.37/38.
Remove the nuts securing the wheelbox cover and remove the cover.
Move the racks away from the housing.
Remove the black plastic lifting block (A, Fig. 69).
Bend back the lock tabs (B, Fig. 69) and remove the two nuts, lockplates, spring plates and rack mounting plate.
Mark the position of the rack stop (C, Fig. 69).
Remove the two nuts securing the rack stop and remove the stop from the rack tube.
Withdraw the rack from the tube and clear of the vehicle.

NOTE: Take care as the rack may be heavily greased.

Grease the rack as necessary and insert it into the tube. Ensure that the rack enters the second tube adjacent to the motor wheelbox.
Refit the rack stop and secure with the two nuts.
Refit the rack plate, spring plates, lockplates and secure with the two nuts. Bend up the locking tabs.
Refit the lifting block.
Fully close the under panel by hand ensuring that full travel of the sliding roof is obtained.
Refit the racks to the wheelbox housing. Fit the cover and secure with the nuts.
Operate the sunroof electrically to ensure that the fully open and closed positions can be obtained.
Refit the sliding roof panel.
Refit the seat squab and cushion.

SUNROOF MOTOR/WHEELBOX/ DRIVE GEAR

Renew **76.82.45**
76.82.44

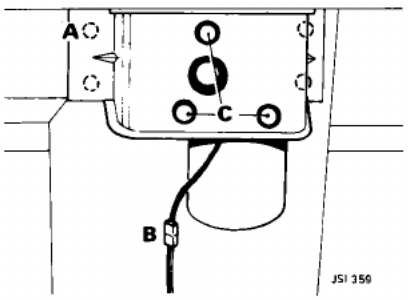


Fig. 70

Remove the rear seat cushion and squab, refer to operation 76.70.37/38.
Remove the two nuts securing the wheelbox cover and remove the cover.
Remove the racks from the housing.
Remove the four nuts securing the motor mounting bracket to the rear bulkhead (A, Fig. 70).
Open the boot lid and remove the front trim panel to gain access to the motor.
Disconnect the electrical harness (B, Fig. 70).
Remove the motor and mounting bracket assembly.
Remove the three hexagon headed screws securing the motor to the bracket (C, Fig. 70) and remove the motor.

MOTOR

Renew **86.76.01**

Reverse instructions above.

WHEELBOX/DRIVE GEAR

Renew **76.82.44**
76.82.45

Remove the four screws securing the wheelbox to the motor (A, Fig. 71).
If the drive gear (B, Fig. 71) is to be renewed it should be done prior to the refitting of the wheelbox.
Refit or renew the wheelbox (C, Fig. 71) securing with the four screws.

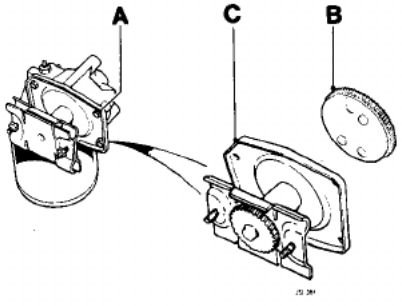


Fig. 71

SUNROOF ASSEMBLY

Renew **76.82.01**

Remove the sun visors, interior mirror, reading lights (where fitted), passenger grab handles, roof aperture flange finisher and necessary door finishers, side cantrail trim rolls, and rear seat cushion and squab.
Move the rear seat belt inertia mechanism (where fitted) away from the rear panel shelf.
Remove the rear parcel shelf trim panel, rear quarter trim panels, headlining rear trim roll and headlining.
Cut the plastic straps securing the drain tubes and release the tubes.
Remove the wheelbox cover securing nuts and remove the cover.
Release the cable clips from the bulkhead and 'D' post.
Remove the racks from the wheelbox housing.
Tape the tubes together to prevent the possibility of grease marks.
Mark the position of the sunroof mounting brackets to the body and remove the setscrews.
Remove the nuts securing the brackets to the sunroof and remove the brackets.
Lower the sunroof assembly into the car. Rotate through 90 degrees and remove diagonally through the sunroof aperture.

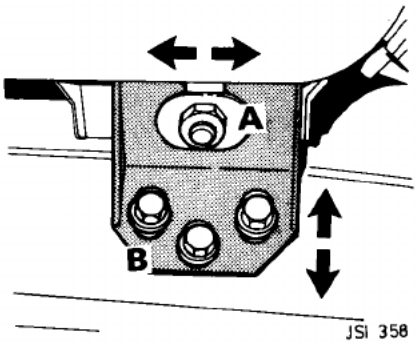


Fig. 72

Lower the sunroof, diagonally through the roof aperture, turn through 90 degrees and lift into position. Ensure that the inner seal is correctly fitted.
Fit the mounting brackets to the sunroof. Fit but do not tighten the securing nuts.
Fit but do nut fully tighten the setscrews securing the mounting brackets to the cantrail.
Reposition the rack tubes, fit the clips to the bulkhead and 'D' post. Fit but do not fully tighten the securing screws.
Ensure that the sunroof panel is fully closed and refit the rack cables. Refit the wheelbox cover and secure with the nuts.
Tighten the cable clip securing screws.
Reconnect the drain tubes and secure with the ratchet clips.
Refit the sliding roof panel.
Align the sliding panel to the roof profile and tighten the mounting bracket setscrews (B, Fig. 72).
Ensure that the sunroof is correctly aligned in the roof aperture and tighten the mounting bracket nuts (A, Fig. 72).
Reverse the remaining operations.

CONTENTS

BODY PANELS

Description 77.00.00

This section gives only body panel replacement details of use in repairing superficial damage. Repairing damage that may structurally alter the vehicle's driving geometry will require that the alignment check in Section 76 is carried out prior to and subsequent to repairs.

It is possible to carry out a repair using a variety of methods ranging from straightening procedures to the replacement of either individual parts or panel assemblies. The repairer is responsible for choice of repair method and this choice will normally be based on a balance between the economics of labour and material costs, and the available repair facilities.

It must be accepted that a repairer will choose the best and most economic repair he can, using the equipment available but, if a car is to be sold as new, the repairer must consider the legal implications of repair methods which differ from original production.

The instructions contained in this section are intended to assist skilled body repairers by explaining approved procedures for replacing panels so that a car body may be restored to a safe running condition. This does not necessarily mean that the car will be restored to new condition; repair facilities cannot always reproduce methods of construction used during production.

Damage may make it impossible or unnecessary to remove some of the mechanical and electrical components before carrying out a body repair, but when the components are being removed or refitted refer to the appropriate section for detailed instructions.

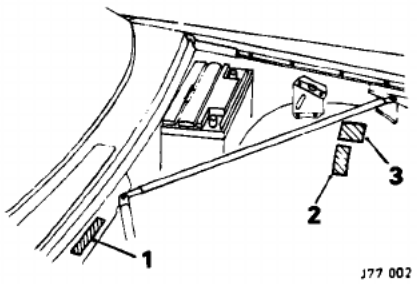
Legal requirements

'E' mark approved label

This label is attached to the L.H. valance. If it becomes detached or damaged, or if the valance is renewed, a new label should be ordered giving the vehicle chassis, commission body shell, and engine numbers. Attach the new label to the L.H. valance.

Preparation and techniques

To reduce the cost of repair, certain individual panels are available. The whole of each panel can be used but this may be found uneconomic due to the necessity for additional brackets, clips etc., and, in some cases, the complicated nature of the joints involved. The value of a separate panel is in the variety of ways with which it enables a repair to be made. With certain exceptions the panel can be cut at the most convenient point and only part of it need be used, leaving the remainder for possible future use. If damage is such that a complete new assembly is necessary, it is usually advisable to use the appropriate assembly rather than build it up from separate panels.



1. Chassis number-plate.
2. 'E' mark label
3. V.I.N. Plate

Fig. 1

Types of weld

Spot weld (in this manual the term 'spot-weld' refers to resistance spot weld unless otherwise stated)—suitable for lap, double lap and flange joints; can be used in single or double (staggered) rows.

Single row—space the spot welds 15 to 25 mm (⅝ to 1 in) apart.

Double row—space the spot welds 22 to 31 mm (⅞ to 1¼ in) apart.

External examination gives little indication of the quality of a spot weld. Make a test joint using similar material and then split the test pieces apart. If the metal tears or the weld pulls a hole in one piece, the joint was satisfactory. Repeat this test each time the electrodes are re-dressed or changed and each time a change of metal gauge is encountered.

Fusion weld—suitable for butt and lap joints, and should be used where possible to reinforce corners and notches in flanges.

If it is necessary to fusion weld a flange joint, care must be taken to preserve the designed strength of the joint. A fusion weld along the toe of a flange is not generally acceptable unless the flange is cut back.

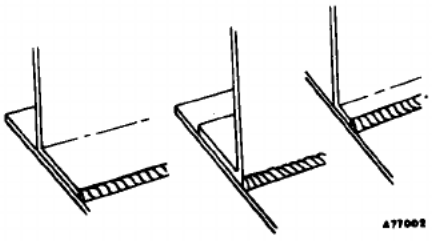


Fig. 2

NOT ACCEPTABLE ACCEPTABLE

Plug weld—To make a plug weld, drill a 5 to 8 mm (3/16 to 5/16 in) hole through the accessible component and weld the components together through the hole.

To clamp the components together use drive screws at intervals and plug weld between them, then remove the drive screws and plug weld the remaining holes.

Types of joint

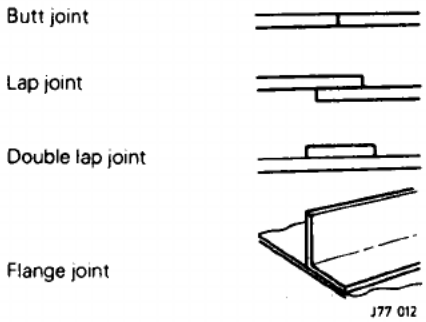


Fig. 3

Removal of spot welded components

Centre punch each spot weld securing the component to be removed. Adjust a spot weld cutter so that it cuts just through the thickness of the material to be removed. Holding the cutter square to the material, cut through each spot weld.

If the new joint is to be made with spot welds, cut the old spot welds from the component which is to be discarded.

If the new joint is to be made with plug welds, cut the old spot welds from the component which is to be retained and use the holes for plug welding.

Preparation

Remove all traces of sealer from the area of the joint likely to be affected by heat. Clean, to bare metal, both sides of the welding areas on old and new panels.

Grind old welds smooth and dress the panels or flanges to ensure that the welding faces fit closely. Mask the welding areas and paint any areas which will be inaccessible after the panels are fitted. Remove the masking.

Where spot welding is to be used apply zinc-rich welding primer to both mating surfaces and spot weld while the primer is moist.

Finishing

Grind smooth the plug welds and butt welds. Fill and smooth the surface where necessary. Clean and repair for sealing and painting.

Sealing

After fitting the panel(s) seal the joints. Apply underseal where required.

THIS SECTION WAS COMPILED IN CONJUNCTION WITH THE MOTOR INSURANCE REPAIR RESEARCH CENTRE AT THATCHAM. JAGUAR CARS LTD. WISH TO ACKNOWLEDGE AND THANK THEM FOR THEIR CO-OPERATION AND ASSISTANCE GIVEN IN THIS PUBLICATION.

REPAIR NOTES

During repair, all old and new panel surfaces to be resistance spot welded together have the existing primer removed and are then treated with zinc-rich, weld-through primer to provide corrosion protection in the weld area.

The vehicle is undersealed in production. Jaguar Cars Ltd. recommend the use of 'Unipart' underseal material (Part No. GAC 1003) in repair.

A Welding Diagram and a Welding Table, which show the location and type of each welded joint, are included where applicable with each method description.

The weld nugget produced by the resistance spot welding equipment available to the motor vehicle repair trade is smaller than that produced by production equipment. In the Welding Tables, the expression 'single row of resistance spot welds' is used. This means that resistance spot welds should be spaced 16 mm (⅝ in) to 25 mm (1 in) apart which will usually mean that more resistance spot welds will be replaced in the repair joint than were removed from the factory joint.

To remove resistance spot welds, a resistance spot weld cutter such as the Dormer Roto-Bor or Sykes-Pickavant Zipcut should be used. If the new joint is to be MIG plug welded, the old resistance spot welds should be cut from the panel that is to be retained, whenever possible, and the holes used for plug welding. Alternatively, holes may be drilled for this purpose.

It must be emphazised that all safety precautions must be observed and protective equipment used when carrying out welding and grinding operations, etc.

SYMBOLS

The following symbols are used on the illustrations in this section to indicate cutting areas and types of weld required.

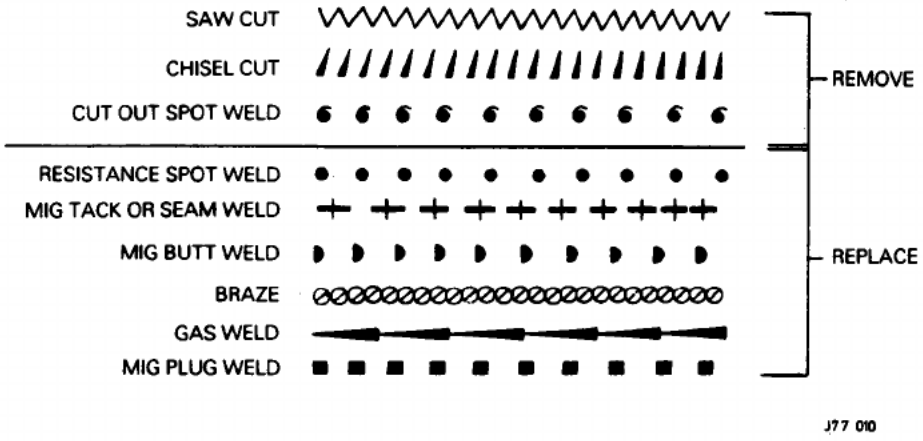


Fig. 4

TOOLS AND EQUIPMENT

The tools used to carry out the repairs detailed in this section are listed below:

General equipment

Air line
Asbestos blankets
Axle stands
Fume extractor
Petrol storage unit
Trolley jack

Power tools and attachments

Air drill
Belt driven sander
Cengarette saw
Cone grinder 1 inch diameter
Grinderette
Spray guns
Rotary wire brush
Random orbital sander
Zipcut resistance spot weld cutters

Welding/heating equipment

ARO N179 spot welder
ARO arms 242A, 100737, 103402, 105010, 105492
Flat foot electrode
ARO electrode tip trimmer
MIG welder
Oxy-acetylene plant
Propane gas torch
Transformer

DOOR PANEL

Front 77.70.16
Rear 77.70.19

Remove and strip the door as detailed in Section 76.
Remove panel.
Grind off door-skin edges and MIG welds at window frame. Remove metal remnants. Separate and remove door-skin from frame.
Clean old and new panel joint edges. Expose resistance spot welds at upper stiffener on old panel. Centre-punch and cut out resistance spot welds. Separate and remove stiffener. Clean joint surfaces on stiffener and new panel for resistance spot welding. Apply weld-through primer to all surfaces to be resistance spot welded. Offer up stiffener to new panel, align and clamp in position. Resistance spot weld stiffener to new panel; fit anti-drum pad to inner surface of new panel.
Offer up new panel; align and clamp in position. Resistance spot weld new panel to frame, MIG weld new panel to window frame at either end. Turn over door-skin flanges, MIG weld at inner surfaces of lower corners and at upper joint; dress MIG welds.
Rebuild and refit door.

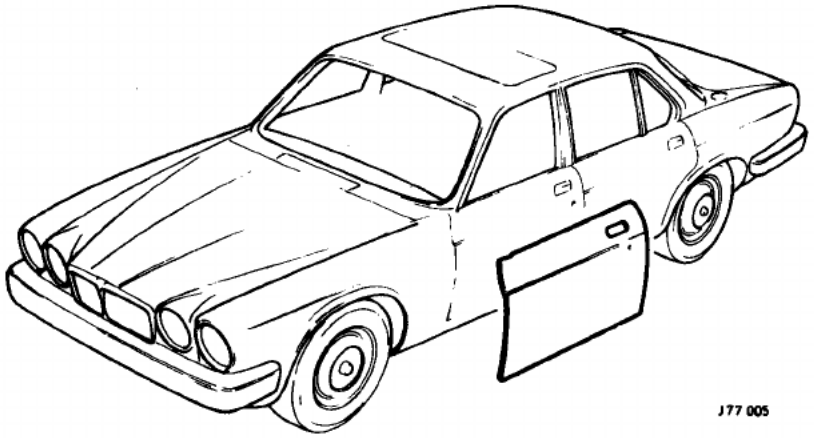


Fig. 5

LOWER PANEL

Front 77.28.26

Disconnect battery. Remove flasher lamps, bumper side mounting bolts; horns; upper mounting bolt grommets R.H. and L.H., chrome finisher and plastic apron assembly; centre iron-to-bumper mounting bolts R.H. and L.H. and remove front bumper assembly; remove lower air intake grille and retaining clips. Jack up vehicle and place on axle stands. Remove eight mounting bolts from front wings R.H. and L.H. and at cross-member. Separate and remove panel and grommets from panel.
Refit grommets to panel. Offer up new panel, align, replace and tighten eight mounting bolts to cross-member and to front wings R.H. and L.H. Removal axle stands and lower vehicle.
Replace parts in reverse order of removal, reconnect battery, test those electrical items that have been removed and replaced.

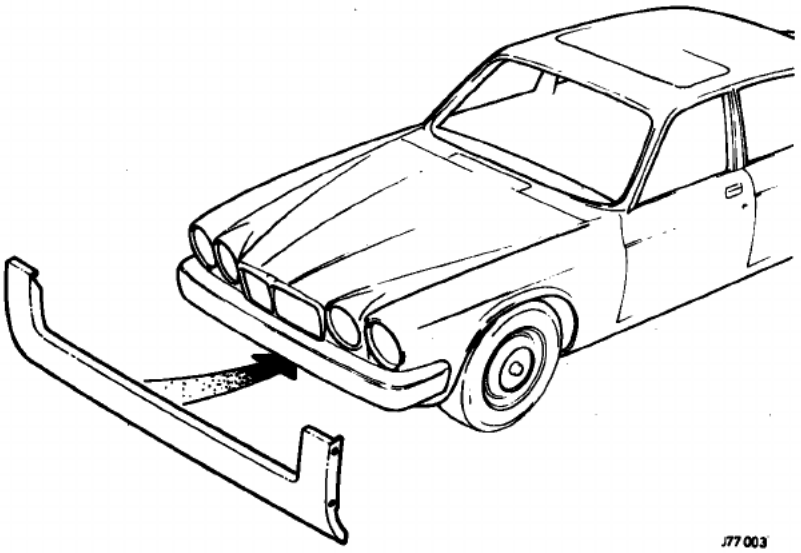


Fig. 6

LOWER PANEL

Rear 77.61.65

Disconnect battery and alternator. Remove spare wheel cover, spare wheel, fuel pump cover and rear boot trim assembly; scuff plate; boot aperture weatherseal; tail lamp assemblies R.H. and L.H. and rear wiring loom; radio aerial cover-plate. Disconnect wiring. Remove aerial drive unit. Disconnect earth wiring and aerial socket. Remove aerial, separate aerial at lower joint, remove inner cable, reassemble unit and place aside. Remove upper finisher support brackets. Lay aside boot carpets. Remove data labels, boot lid striker, insulation R.H. and L.H. grommets, petrol tanks R.H. and L.H., vent cover trim and pipes R.H. and L.H., petrol pump assembly.

Protect vehicle, expose resistance spot welds at points 1 (inside boot), 2, 4, 5, 6, 7, and 8 in Welding Diagram. Centre punch and cut out, cut panel at point 'Z' and 'Y', R.H. and L.H., separate and remove bulk of panel and metal remnants. Remove solder and brazes at point 3, remove surplus material. Grind off and retain bumper mounting reinforcement plates.

Clean old and new panel joint edges. Apply weld-through primer to joint edges to be resistance spot welded.

Offer up new panel, align with boot lid and clamp in position. Resistance spot weld at points 2, 5, 6, 7 and 8. MIG plug weld at points 1 and 4. MIGtack weld at point 11. MIG weld at points 9 and 10, braze at point 3. Dress welds and brazes. Prepare and apply solder to rear wings at flanges above bumper mountings, shape and dress soldered joints. Apply weld-through primer to exposed surfaces. Apply joint sealant using applicator gun and tube to edges of new and existing panels. Apply underseal to boot floor and to wheel arches. Remove protective covering, axle stands and lower vehicle.

Replace parts in reverse order of removal, reconnect battery, alternator, test those mechanical and electrical items that have been removed and replaced.

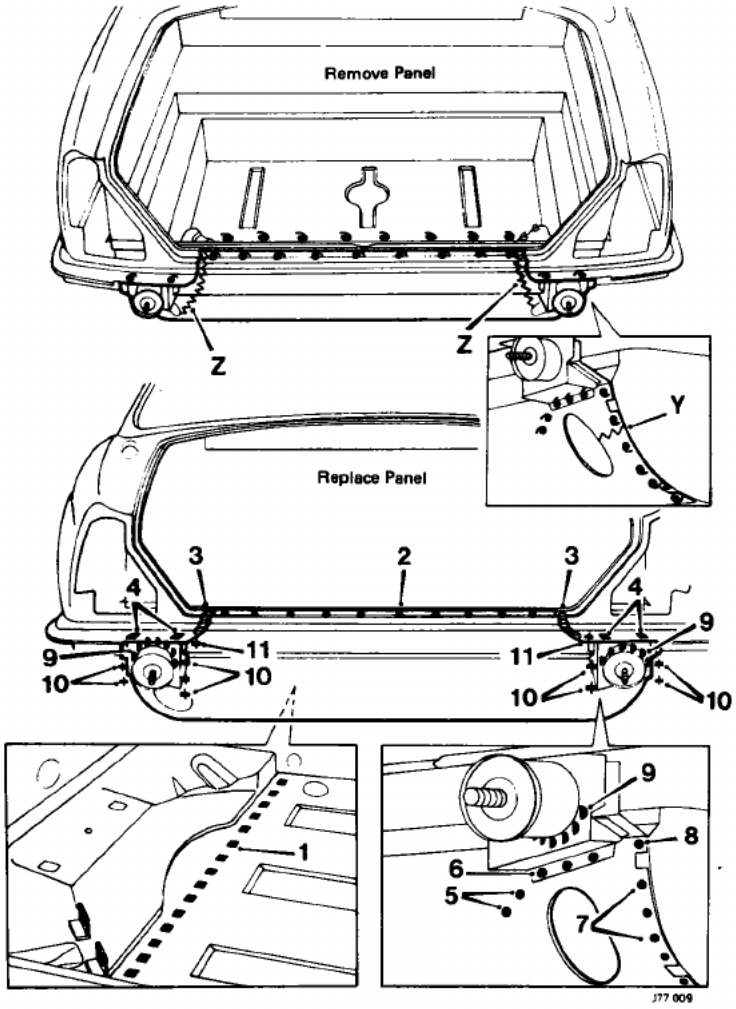


Fig. 7

NO.	LOCATION	FACTORY JOINT	REPAIR JOINT
1	To boot floor at front edge	15 resistance spot welds	15 MIG plug welds
2	To inner rear panel at boot drain channel	19 resistance spot welds	Single row of resistance spot welds ARO arms 242A
3	To rear wings R.H. and L.H. above flange	Braze each side	Braze each side
4	To rear wings R.H. and L.H. above bumper	1 resistance spot weld either side of mounting each side	1 MIG plug weld either side of mounting each side
5	To inner rear panel below bumper mountings R.H. and L.H.	2 resistance spot welds each side	2 resistance spot welds each side ARO arms 242A
6	To inner rear panel at bumper mountings R.H. and L.H.	3 resistance spot welds each side	3 resistance spot welds each side ARO arms 242A
7	To inner lower rear wings R.H. and L.H.	6 resistance spot welds each side	Single row of resistance spot welds each side ARO arms 242A
8	To inner rear panel and inner lower rear wings R.H. and L.H.	1 resistance spot weld each side	1 resistance spot weld each side ARO arms 242A
9	To bumper mountings R.H. and L.H.	Continuous MIG weld each side	Continuous MIG weld each side
10	To bumper mountings R.H. and L.H. at edges	Continuous MIG weld run either side of each bumper mounting	Continuous MIG weld run either side of each bumper mounting
11	To rear wings R.H. and L.H. at inner corner of flanges	MIG tack weld each side	MIG tack weld each side

XK ENGINES

A Emission North America and Japan (1978-80)
B Emission Rest of World
C Emission Canada and Japan 81 on and Australia 1986
D Emission Australia -85 Sweden and Switzerland
E Emission Saudia Arabia

	3.4 Pre 81	3.4 After 81
Ignition timing	8° B.T.D.C.	8° B.T.D.C.
$ = Vac off idle normal run temp	static	$
# = Vac off normal running temp		
! = at 3000 r.p.m.		
& = 700 r.p.m. with vac off		
Valve clearances	0.012 to 0.014 in	0.012 to 0.014 in
Spark plugs — make/type	N12Y	N12Y
— gap	0.025 in	0.035 in
Ignition coil — make Lucas/type	16C6	16C6
Primary resistance @ 20°C (ohms)	1.2 to 1.5	1.2 to 1.5
Output (open circuit) Kv min	25	25
Output at plug Kv min (assuming plug gap and lead to spec)	10	10
Distributor — make/type	45D6	45D6
Rotation of rotor view above	Anticlockwise	Anticlockwise
Points gap	0.015 in	0.015 in
Pick up coil resistance K Ohms	—	—
Firing order	1, 5, 3, 6, 2, 4@	1, 5, 3, 6, 2, 4@
@ — cylinders numbered from rear		
Spark plug lead resistances	Min — Max	
1	8.61 to 20.56K	
2	9.00 to 21.48K	
3	7.24 to 17.34K	
4	6.11 to 14.69K	
5	5.47 to 13.20K	
6	5.13 to 12.30K	
Exhaust emission reading Co	3% max	3% max
HC		
Idle speed	750 r.p.m.	750 r.p.m.
Compression pressure	135 to 150 lbf/in^2	135 to 150 lbf/in^2
Differential between cylinders	15% maximum	
Carburettor — type	SU HIF7	SU HIF7
— needle	BDW	BDW
— jet	0.100	0.100
— spring	Red	Red
Auto choke — type	TZX 1002	TZX 1002

Refitting

Offer unit up to mounting position and ease heater connectors through bulkhead apertures.

NOTE: Ensure sponge backing is in position.

Loosely fit retaining nuts, ensuring that pipes, speedometer cables and electrical harness are not trapped before tightening.
Refit the flexible ducting to the heater unit.
Reconnect the vacuum pipes as marked when dismantling.
Reconnect the electrical multi-pin connectors.
Ensure drain tubes from the unit are located through the grommets in side of transmisssion tunnel.
Refit the centre parcel tray.
Refit the glove compartment liner.
Refit the dash casings.
Refit the fascia and the fascia crash roll.
Reconnect the coolant hoses to the heater matrix bulkhead connectors in the engine compartment.

NOTE: Ensure sponge collars and metal washers are in place before connecting coolant hoses.

Refill with coolant.
Reconnect the battery earth lead.

HEATER MOTOR ASSEMBLY

Remove and refit
Right-Hand Unit 80.20.15

The blower fans are heavy duty motors with metal impellers attached. Speed variation is controlled by resistance units wired in series. Air flow control flaps are operated by a vacuum actuator mounted on the side of the inlet duct.

Removing

Disconnect the battery earth lead.
Remove the right-hand footwell trim pad, dash liner and console side pad as detailed in operation 76.46.11.
Remove the bulb failure unit from component panel.
Remove nuts securing component panel to blower assembly, and ease the panel clear.
Disconnect pliable trunking from the heater unit stub pipes.
Withdraw two screws securing fresh-air pull mounting bracket.
Remove two nuts retaining assembly from mounting posts.
Disconnect vacuum tube from actuator.
Disconnect electrical harness at snap connectors.
Ease fan motor assembly from car.

Refitting

Locate fan motor unit to its mounting positions.
Reconnect the electrical wiring harness.
Fit and tighten securing nuts.
Remove wedge holding the recirculation flap open.
Reconnect the pliable trunking to the stub pipes and the vacuum tube to the actuator.
Locate component panel to mounting studs and secure with securing nuts.
Refit the fresh-air pull mounting bracket.
Refit the bulb failure unit.
Refit the console side pad, dash liner and footwell trim pad.
Reconnect the battery earth lead.

NOTE: To refit assemblies successfully it is necessary to apply vacuum to the actuator, closing the top air flap. This simplifies insertion of the top flap and flange into its aperture and seal.

HEATER MOTOR ASSEMBLY

Remove and refit
Left-Hand Unit 80.20.15

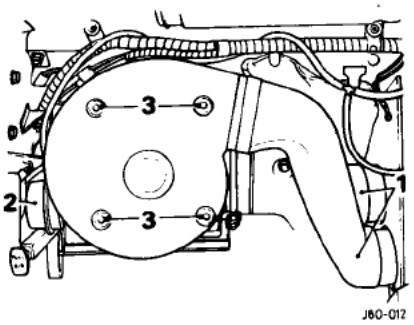


Fig. 19

Removing

Disconnect the battery earth lead.
Remove left-hand side footwell trim pad, dash liner, console trim pad, and glovebox as detailed in operation 76.46.11.
Remove nuts securing component panel to blower assembly, and ease the panel clear.
Disconnect the electrical feed to blower motor.
Disconnect the pliable trunking from the heater unit (1, Fig. 19), and the vacuum pipes from the actuator (2, Fig. 19).
Remove the motor assembly securing nuts and ease assembly from car (3, Fig. 19).

Refitting

Locate assembly to its mounting positions and secure with nuts.
Reconnect the pliable trunking and vacuum pipes.
Reconnect the electrical wiring harness.
Locate component panel to mounting studs and secure with the fixing nuts.
Refit the glovebox, dash liner, console trim pad, and footwell trim pad.
Reconnect the battery earth lead.

MOTOR RESISTANCE UNIT

Remove and refit
Left-Hand-Drive Cars 80.20.17

Removing

Disconnect the battery earth lead.
Remove the driver's side dash liner, and centre console side casing as detailed in operation 76.46.11.
Note position of cables at the resistance unit and disconnect (3, Fig. 20).
Withdraw the three retaining screws (1, Fig. 20) and remove resistance unit from the heater unit case (2, Fig. 10).

Refitting

Locate resistance unit into heater unit case and secure with the retaining screws.
Reconnect the electrical cables.
Refit the centre console side casing and dash liner.
Reconnect the battery earth lead.

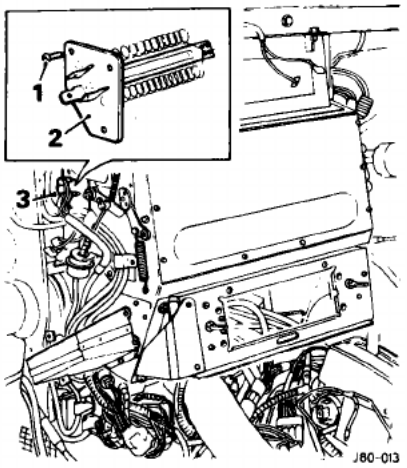


Fig. 20

MOTOR RESISTANCE UNIT

Remove and refit
Right-Hand-Drive Cars 80.20.17

Removing

Disconnect battery.
Remove glove compartment liner.
Note position of cables at the resistance unit and disconnect.
Withdraw the three retaining screws; and remove the resistance unit from the heater unit case.

Refitting

Locate resistance unit into heater unit case, and secure with the retaining screws.
Reconnect the electrical cables.
Refit the glove compartment liner.
Reconnect the battery.

continued

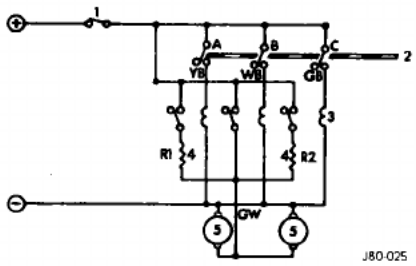


Fig. 21

KEY TO WIRING DIAGRAM

1. Ignition switch
2. Cam operated switches
3. Relays—motor speed
4. Resistors—motor speed
5. Fan motors

MOTOR RELAYS

Remove and refit **80.20.19**

Removing

Disconnect the battery earth lead.
Remove the left-hand centre console side casing.
Withdraw the retaining screws and remove the footwell air outlet duct.
Note and mark the position of cables at the connectors on relay box, and remove the cables (1, Fig. 22).
Remove the nuts and washers securing the relay box, and remove relay box (2, Fig. 22).

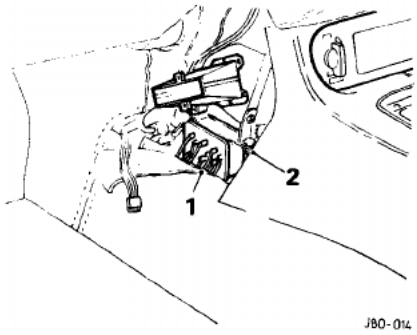


Fig. 22

Refitting

Fit and secure relay box with the retaining nuts and washers.

NOTE: Ensure earth strap tag is replaced under relay box securing unit.

Reconnect the electrical cables.
Refit the footwell air outlet duct, and left-hand centre console side casing.
Reconnect the battery.

BLOWER ASSEMBLY

Overhaul **80.20.20**

Dismantling

Remove blower motor assembly as detailed in operation 80.25.13/14.
Pull down air recirculation flap for access to flap box securing screw, and remove screw.
Remove screws securing flap box at top of motor housing (1, Fig. 23).
Disconnect motor electrical connections (2, Fig. 23)
Remove the flap box.

NOTE: It is recommended at this stage that the positions of various components are marked either with paint or a scriber. This will facilitate reassembly.
One cable Lucar has a raised projection which matches the aperture in the motor casing. This ensures that the connections are replaced correctly and the rotation of the motor is not altered.
Remove the bolts securing the motor mounting bracket to fan housing (3, Fig. 23).
Remove the motor and fan assembly from the fan housing.
Remove the mounting bracket from the motor.
Using the appropriate Allen key, remove the impeller fan from the spindle.

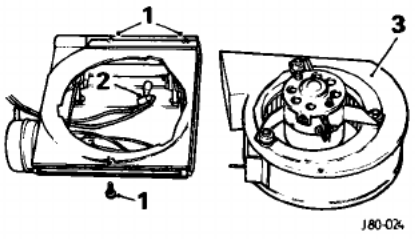


Fig. 23

Reassembling

Refit fan to the motor and secure to spindle.
Refit mounting bracket to motor.
Locate fan and mounting assembly into the fan housing
Fit and tighten bolts securing the assembly to fan housing
Place flap box assembly to fan housing and reconnect electrical connections.
Fit and tighten screws securing the flap box to the housing.
Raise the recirculation flap, fit and tighten the remaining screw.
Refit the blower motor assembly.
Reconnect the battery.

HEATER MATRIX

Remove and refit **80.20.29**

Removing

Remove the heater unit as detailed in operation 80.20.01.
Using scriber or a thin brush and white paint mark the positions of all control rods, knobs and cams.
Disconnect tensioning springs from the heater matrix control flap operating arms.
Disconnect the operating rods.
Remove the two clips securing the inlet and outlet pipes to the heater unit case.
Withdraw six screws securing matrix cover-plate.
Withdraw one screw securing the cam and operating arm to footwell outlet flap shaft and remove arm.
Withdraw the heater matrix from side of heater unit with a steady straight pull. Care must be taken not to damage the inlet and outlet pipes.

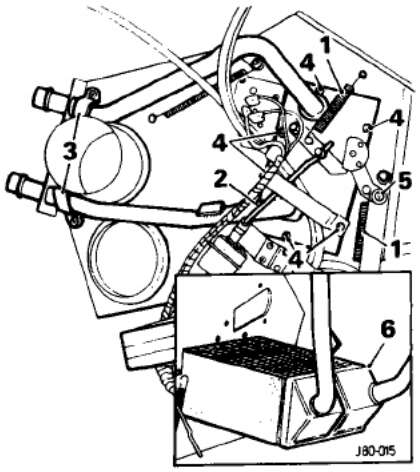


Fig. 24

Refitting

NOTE: Ensure that the sponge shock-absorbing pads are refitted correctly when replacing the matrix.
Refit the matrix into heater unit, taking care not to damage the inlet and outlet pipes.
Secure the cam and operating arm to footwell outlet flap shaft with the retaining screw.
Refit the matrix cover-plate and secure with the fixing screws.
Secure the inlet and outlet pipes to the heater unit with clips.
Reconnect the operating rods.
Reconnect the tensioning springs to the heater matrix control flap operating arms.
Refit the heater unit.

DEFROST AND DEMIST SYSTEM

Test **80.30.01**

Purpose

To ensure that the heating system is functioning correctly in the 'defrost' mode, and that adequate airflow is maintained in the heat mode to ensure that the windscreen remains mist-free.

Method

a. Set L.H. control to fan speed 'High'.

b. Set R.H. control to 'Defrost'.

c. Close end of dash outlets.

d. Start engine and run for seven minutes at 1500 rev/min.

e. During the running period measure the airflow from each screen outlet using checking ducts and velometer. Ensure that the centre dash outlet is closed and that it seals satisfactorily. The velocity from the screen outlets should be:

7,62 m/s (1500 ft/min) (minimum)

f. Also during the running period turn the R.H. control to 'Heat' and open end of dash outlets. Using the screen outlet and end of dash checking ducts measure the resulting air velocity. These should be:

Minimum velocity			
Screen		End of dash	
2,29 m/s	450 ft/min.	3,30 m/s	650 ft/min

g. At the end of seven minutes running at 1500 rev/min check that the water temperature gauge indicates 'Normal'. Using mercury in glass thermometers also check that the following minimum screen outlet temperatures are achieved.

Plenum Inlet		*Screen Outlet (minimum)*	
°C	°F	°C	°F
10	50	54	129.2
12	53.6	55	131
14	57.2	55.5	131.9
16	60.8	56.5	133.7
18	64.4	57	134.6
20	68	58	136.4
22	71.6	58.5	137.3
24	72.5	59.5	139.1

HEATER UNIT

Test **80.30.05**

1. Warm up and heat pick-up on vent and water valve operation.
   Turn the R.H. knob to 'Vent' and the L.H. knob to 'High'.
   Start the engine and warm up, run at 1000 rev/min. In this condition the inlet flaps should be open and the centre outlet flap open.
   With a thermometer placed in the air stream issuing from the centre vent, ensure that as the engine reaches normal operating temperatures, the air temperature does not rise above 5°C higher than it was in the engine cold state.
2. **Defrost mode**
   Turn the R.H. knob to 'Defrost'.
   The centre vent should close as should the upper mixing flap. The airflow to the footwell will be cut off apart from a small bleed.
   At this point the defrost schedule can be operated if so desired. This will also check that the upper mixing flap is operating.
3. **Fan speeds**
   Check that high, medium and low speeds can be obtained by rotating the L.H. knob.
4. **Temperature range**
   By rotating the R.H. knob ensure that the air temperature changes between hot and ambient over the heating range.
5. **Ram and off**
   On the road check that air flows from the vent when the L.H. knob is in the 'Ram' position, but is cut off in the 'Off' position.

Equipment required: 16 mm (⅝ in) bore hose at least 1,6 m (5 ft) long.
Water supply controlled by tap.
One 2 gallon or 10 litre capacity container.
Stop watch.

NOTE: All tests must be completed with the engine cold, i.e. with the thermostats closed. Should the engine temperature rise sufficiently to open the thermostats, the engine must be stopped and allowed to cool before the tests are continued.

1. Drain coolant; conserve for refill.
2. Disconnect hose from heater matrix outlet stub pipe (this hose connects to water pump intake). Plug open end of hose.
3. Connect 16 mm (⅝ in) bore hose to heater stub pipe and place other end in 10 litre or 2 gallon container.
4. Refill cooling system with water, leaving hose from supply tap in header tank.
5. Start engine, run at 1000 rev/min with 'defrost' selected on heater control. Adjust water supply to keep header tank filled.
6. When water from heater matrix is free from air, measure time required to fill the 10 litre or 2 gallon container. Stop engine. If the time to fill a 1 gallon container is more than 1 min. 11 secs, or for a 10 litre container more than 1 min. 18 secs, heater matrix is obstructed and must be cleared as detailed below.
7. Disconnect hose pipe from heater matrix output stub pipe, unplug car hose and refit to stub pipe.
8. Add one pint of Ferroclene to header tank, top-up system with water and replace both filler caps.
9. Start engine and run at 1000 rev/min for 15 minutes.
10. Stop engine and drain.
    Continue flushing system for at least 30 minutes to remove all traces of Ferroclene which would otherwise cause internal corrosion.
11. Repeat operations 2 to 6 above. If necessary, repeat operations 7 to 10.
12. Refill, using coolant conserved in operation 1 above.

HEATING AND VENTILATING VACUUM SYSTEM

Description

The vacuum is supplied from the vacuum reservoir located in the engine compartment on the driver's side of the vehicle, adjacent to the brake servo.
Vacuum actuators operate the blower and centre flap ventilators, the flap in the screen vent, the rods connected to the upper cooling flap and the lower heater flap.
When the system is switched to 'VENT' the actuator on the right hand side of the heater unit operates to fully open the upper cooling flap. When 'LO' is selected a vacuum switch releases the holding vacuum and the flap actuating lever drops onto an operating cam. When 'VENT' is re-selected vacuum is re-applied and the flap re-opens.
The left hand actuator is operative in all positions except when in the defrost mode. In the positions the actuator is operative the lower heating flap is free to be controlled by a cam and peg on the right hand side of the heater unit.
The water valve is closed as vacuum is applied and no water flows through the heater matrix. When heat is selected (either high or low) the vacuum feed is removed from the water valve which opens to allow water to flow through the heater matrix.

VACUUM SYSTEM

Function

Air Flo Control: OFF
Temp Control: VENT

1. The vacuum switches on both controls are all on and will conduct vacuum.
2. The centre flap is opened as vacuum is applied.
3. The demist flaps are closed as vacuum is applied.
4. The blower motor casing air intake flaps are closed as vacuum is applied and no air transfer from the exterior to the interior of the vehicle can take place.
5. The right hand side vacuum actuator is operative. This operates to open the upper cooling flap.
6. The left hand side vacuum actuator is operative. The lower heating flap in this mode is controlled by a cam and peg on the right hand side of the heater unit. These operate the flap in all positions except defrost.
7. The water valve is closed as vacuum is applied and water will not circulate through the heater matrix.

Air Flo Control: RAM, LO, MED or HI
Temp Control: VENT

The vacuum switches on the right hand control are all 'On' and conducting vacuum to the relevant units.
The units are:

1. The flaps in the screen vents.
2. The vaccum actuators on both sides of heater unit are operative.
3. The water valve is closed as vacuum is applied and water will not circulate through the heater matrix.
4. The centre flap is opened as vacuum is applied.

The vacuum switch on the left hand control is 'Off' and not conducting vacuum. The actuators on the blower motor casing are relaxed. The spring tension therefore opens the flaps to allow ambient air to the interior of the vehicle.

Air Flo Control: RAM, LO, MED or HI
Temp Control: LO—HI

1. The vacuum switch on the left hand control is 'Off' and not conducting vacuum. The actuators on the blower motor casing are relaxed. The spring tension therefore opens the flaps to allow ambient air to the interior of the vehicle.
2. The vacuum switches on the right hand are 'Off'.
3. Vacuum will be removed from the centre flap and the flap will close.
4. Vacuum will be removed from the right hand side actuator and the upper cooling flap will close to a position where the nylon disc and cam will take over the closing operation. The nylon disc is fitted with an additional abutment rod and lever that holds the upper cooling flap cam follower firmly against the cam profile.
5. The vacuum applied to the water valve has been removed therefore the valve opens to allow water to circulate the heater matrix.

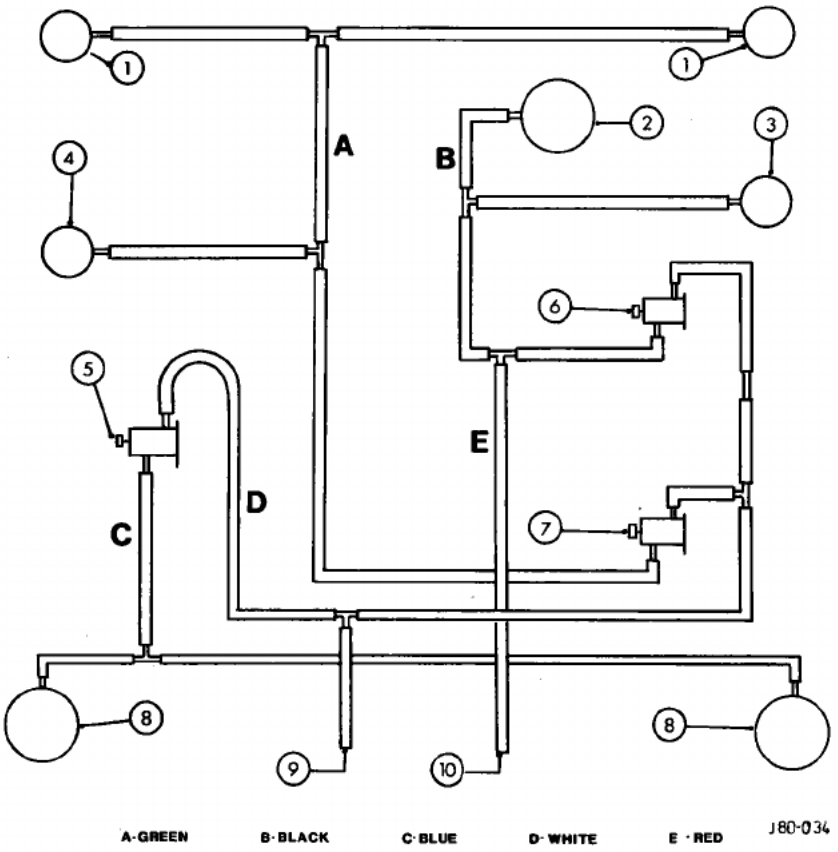
Air Flo Control: RAM, LO, MED or HI
Temp Control: DEF

1. In the 'DEF' mode vacuum is not applied to any of the actuators.
2. The centre flap is closed.
3. The vacuum actuator on the right hand side is inoperative and the upper cooling flap is closed.
4. The vacuum applied to the water valve has been removed therefore the valve opens to allow water to circulate the heater matrix.
5. The demist flaps to the screen are opened.
6. The vacuum actuator on the left hand side is inoperative and the lever attached to the lower heater flap is pushed upwards closing the flap. This overrides the action of the cam and peg on the right hand side of the lower heating pivot.

KEY TO VACUUM SYSTEM DIAGRAM

1. Demist flap actuator
2. Centre flap actuator
3. Actuator on the right hand side of heater unit
4. Actuator on the left hand side of heater unit
5. Switch on 'AIR FLO' control
6. Front switch on 'TEMP' control
7. Rear switch on 'TEMP' control
8. Blower flap actuator
9. To vacuum tank
10. To water valve actuator

HEATING AND VENTILATING VACUUM SYSTEM



CONTENTS

CONTENTS

WARNING: EXTREME CARE SHOULD BE EXERCISED IN HANDLING THE REFRIGERANT. LIQUID REFRIGERANT AT ATMOSPHERIC PERSSURE BOILS AT −29°C (−20°F). SERIOUS DAMAGE OR BLINDNESS MAY OCCUR IF REFRIGERANT IS ALLOWED TO CONTACT THE EYES.
Goggles and gloves must be worn while working with Refrigerant.

FIRST AID: If refrigerant should contact the eyes or skin, splash the eyes or affected area with cold water for several minutes. Do not rub. As soon as possible thereafter, obtain treatment from a doctor or eye specialist.

TORQUE LEVELS FOR THE AIR CONDITIONING HOSE CONNECTIONS

Item	Nm	Kgf.m	lbf.ft
1 Compressor/Condenser (Compressor End)	40.67 to 47.45	4.15 to 4.84	30 to 35
2 Condenser/Compressor (Condenser End)	28.47 to 36.30	2.90 to 3.73	21 to 27
3 Condenser/Receiver Drier (Condenser End)	20.34 to 27.12	2.10 to 2.76	15 to 20
4 Receiver Drier/Condenser (Receiver Drier End)	40.67 to 47.45	4.15 to 4.84	30 to 35
5 Receiver Drier/Evaporator (Receiver Drier End)	40.67 to 47.45	4.15 to 4.84	30 to 35
6 Evaporator/Receiver Drier (Evaporator End)	14.91 to 16.72	1.52 to 1.80	11 to 13
7 Expansion Valve/Evaporator (Expansion Valve End)	20.34 to 27.12	2.10 to 2.76	15 to 20
8 Evaporator/Compressor (Evaporator End)	28.47 to 36.60	2.90 to 3.73	21 to 27
9 Compressor/Evaporator (Compressor End)	40.67 to 47.45	4.15 to 4.84	30 to 35

SPECIAL TOOLS AND EQUIPMENT FOR SERVICING AIR CONDITIONING SYSTEM ON JAGUAR SERIES III

1 Pektron test unit
1 Charging station
1 Leak detector
1 Temperature test box
1 Compressor service tool kit
1 Setting jig for temperature differential control, 18G1363
1 Voltmeter
1 Ohmmeter

XK ENGINES

A Emission North America and Japan (1978-80)
B Emission Rest of World
C Emission Canada and Japan 81 on and Australia 1986
D Emission Australia -85 Sweden and Switzerland
E Emission Saudia Arabia

	4.2 Emiss A 1979-80	4.2 Emiss A 1982	4.2 Emiss A/D Pre 83	4.2 Emiss A 1983	4.2 Emiss A 1984-
Ignition timing	4° B.T.D.C.	14°B.T.D.C.	8°B.T.D.C.	14°B.T.D.C.	17°B.T.D.C.
$ =Vac off idle normal run temp	at 800 r.p.m.	$	&	&	&
# = Vac off normal running temp					
! = at 3000 r.p.m.					
& = 700 r.p.m. with vac off					
Valve clearances	0.012 to 0.014 in	0.012 to 0.014 in	0.012 to 0.014 in	0.012 to 0.014 in	0.012 to 0.014 in
Spark plugs — make/type	N12Y	N12Y	N12Y	N12Y	N12Y
— gap	0.035 in	0.035 in	0.035 in	0.035 in	0.035 in
Ignition coil — make Lucas/type	16C6	16C6	16C6	32C5	32C5
Primary resistance @ 20°C (ohms)	1.2 to 1.5	1.2 to 1.5	1.2 to 1.5	0.75 to 0.85	0.75 to 0.85
Output (open circuit) Kv min	25	25	25	25	25
Output at plug Kv min (assuming plug gap and lead to spec)	10	10	10	10	10
Ignition coil — Ducellier/type	—	—	—	—	520076A
Primary resistance @ 20°C (ohms)	—	—	—	—	0.8 to 1.0
Ballast resistance @ 20°C (ohms)	—	—	—	—	0.8 to 1.0
Output (open circuit) Kv min					25
Output at plug Kv min (assuming plug gap and lead to spec)					10
Distributor — make/type	45DM6	45DM6	45DM6	45DM6	45DM6
Rotation of rotor view above	Anticlockwise	Anticlockwise	Anticlockwise	Anticlockwise	Anticlockwise
Pick up mod/rot gap	0.008 to 0.014 in	0.008 to 0.014 in	0.008 to 0.014 in	0.008 to 0.014 in	0.008 to 0.014 in
Pick up coil resistance K Ohms	2.2 to 4.8	2.2 to 4.8	2.2 to 4.8	2.2 to 4.8	2.2 to 4.8
Firing order	1, 5, 3, 6, 2, 4@	1, 5, 3, 6, 2, 4@	1, 5, 3, 6, 2, 4@	1, 5, 3, 6, 2, 4@	1. 5, 3, 6, 2, 4@
@ — cylinders numbered from rear					
Spark plug lead resistances	Min — Max				
1	8.61 to 20.56K				
2	9.00 to 21.48K				
3	7.24 to 17.34K				
4	6.11 to 14.69K				
5	5.47 to 13.20K				
6	5.13 to 12.30K				
Exhaust emission reading Co	0.5 to 1.5%	0.5 to 1.5%	0.5 to 1.5%	0.5 to 1.5%	0.5 to 1.5%
HC					
Idle speed	750 r.p.m.	750 ± 50 r.p.m.	750 r.p.m.	800 r.p.m.	800 r.p.m.
Compression pressure	120 to 135 lbf/in^2	120 to 135 lbf/in^2	120 to 135 lbf/in^2	120 to 135 lbf/in^2	120 to 135 lbf/in^2
Differential between cylinders			15% maximum		
Fuel pressure			35.5 to 38.8 lbf/in^2		

AIR CONDITIONING SERVO UNIT

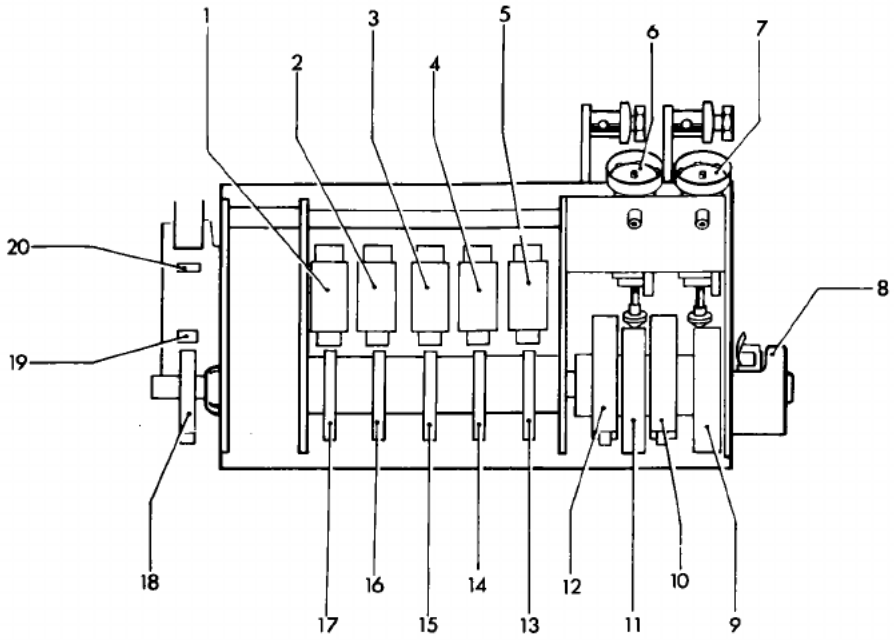


Fig 27

KEY TO SERVO UNIT

1. Full cooling micro switch
2. Full heating micro switch
3. Med 1 micro switch
4. Med 2 micro switch
5. Temperature override micro switch
6. Water valve vacuum switch
7. Centre flap vacuum switch
8. Feedback potentiometer
9. Cam S9
10. Cam S8
11. Cam S7
12. Cam S6
13. Cam S5
14. Cam S4
15. Cam S3
16. Cam S2
17. Cam S1
18. Cam S10
19. Ranco override micro switch
20. Recirculate Hi Speed switch

Test Procedure

Allow coolant temperature to stabilize to ambient by not running the engine for at least two hours, and open all of the vehicle windows for this period.

Set the car mode control to off, and the temperature selector to approximately the ambient temperature in the vehicle. Ensure that the ignition is switched off, then disconnect the plug at the servo control unit. Insert the tester 15 way socket into the servo input and join the harness socket to the tester 15 way plug.

Disconnect the plug and socket at the amplifier. Insert the tester 12 way socket into the amplifier input, and join the harness to the tester 12 way plug. Connect the tester earth lead to a good earth on the vehicle. Carry out the following operations and note the effects.

ACTION	EFFECT	WHEN INCORRECT
A Switch on Car Ignition	'VAC SOLENOID MANUAL' will illuminate. No other lights 'ON'	Check Ignition Supply, Fuse, etc. Ensure that A/C Mode Control is 'OFF'. Check Wiring to Vacuum Solenoid
B Start the Car Engine and switch car mode Control to LOW. Then switch SERVO POSITION to HEAT and press the DRIVE CONTROL until the DRIVE INDICATOR goes out. (Note: It only comes ON when DRIVE CONTROL is Pressed)	1 The Fan Speed $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ lights should be ON for Servo Position	If the DRIVE INDICATOR did not light, switch SERVO POSITION to COOL and press the DRIVE CONTROL. When this also does not light the DRIVE INDICATOR check the SERVO motor and servo components and wiring
	2 The vehicle cooling fans should be OFF	Ensure that the engine is not yet warmed up, then disconnect the water temperature switch in the car, and if fans continue to run suspect wiring and the Micro Switch Water Temp. override in the Servo Control Unit (5, Fig. 27).
	3 The VAC SOLENOID MANUAL lights should go out.	Check Switch C in mode control unit (Fig. 26) and wiring

ACTION	EFFECT	WHEN INCORRECT
C. Run the car engine fast to warm up the cooling water to working temperature	1. The fans will start to run at low rate and the SERVO MED 1 light will operate (FAN SPEED SERVO LIGHT) The majority of air will be directed through the floor vents	Check water temperature switch Check low speed relay Check blower resistors R1 & 2 Check fans Check wiring.
	2. The compressor clutch will operate as indicated by RANCO COMP. CLUTCH light	(A) Check 10A fuse, which if faulty will be indicated by the RANCO FUSED light being ON (B) Check Ranco thermostat by shorting out at the component terminals and monitoring the COMP clutch light.
D. Switch the SERVO POSITION to COOL and press DRIVE CONTROL until '$\frac{3}{4}$' light goes out then release.	MED 1 FAN SPEED SERVO light goes out.	Check MED 1 micro switch (3, Fig. 27) and wiring to SERVO Control Unit
E. Press DRIVE CONTROL until '$\frac{1}{2}$' light goes out then release.	The air emission is evenly distributed between face level and floor vents	Check adjustment of blend flaps, or vacuum system
F. Press DRIVE CONTROL until '$\frac{1}{4}$' light goes out then release.	MED 1 FAN SPEED SERVO light is 'ON'.	Check MED 1 micro switch (3, Fig. 27) and wiring to SERVO Control Unit.
G. Press DRIVE CONTROL until DRIVE INDICATOR goes out, then release.	HIGH SPEED SERVO light ON.	Check Hi-SPEED/RECIRC micro switch and wiring to SERVO Control Unit.
	COMP. CLUTCH light stays on when TEST O'RIDE switch is pressed.	Check ranco override micro switch (19, Fig. 27) and wiring to SERVO Control Unit.
	MED 2 FAN SPEED SERVO light is 'ON'	Check MED 2 Micro Switch (4, Fig. 27) and wiring to Servo Control Unit.
	VAC -SOLENOID SERVO light 'ON'.	Check Diode D3 in Servo control Unit harness
H. Switch car mode control to AUTO. Drive servo to '$\frac{1}{4}$' position by selecting DRIVE CONTROL unit '$\frac{1}{4}$' and '$\frac{1}{2}$' lights are 'ON'.	This has given the cooling compressor the protection of its freezing sensing thermostat.	----------
J. Press MED 1 switch (FAN SPEED SERVO lights).	Car Fan Speed increases.	Check Main Relay Check Resistor R3 Check Wiring
K. Keeping MED 1 pressed, operate MED 2 (FAN SPEED SERVO light).	Car Fan Speed increases further.	Check Main Relay Check Resistor R2 Check Wiring.
L. Release MED 1 and MED 2 switches. Select HI on car mode control	Car fan speed increases to maximum.	Check High Speed Micro Switch at mode control Check Main Relay Check Wiring.
	Ensure D5-FLT does not light	Check Diode D5 in mode control harness Check Wiring.
M. Select AUTO on car mode control.	To reduce fan speed to low rate.	----------

	ACTION	EFFECT	WHEN INCORRECT
N	Press TEST on AMPLIFIER fuse	AMPLIFIER Fuse light should be 'ON' Feed to amplifier good	Check feed to amplifier
P	Switch to AMPLIFIER on sensing Switching System (Tester) Rotate control 0-100 fully clockwise then fully anti-clockwise alternately.	Towards the '100' point HEATING light should come ON, then towards the '0' point COOLING light should come ON.	Check Wiring Replace Amplifier
O	Ensure that the car temperature setting control is at approximately the ambient temperature Switch to SENSOR on Sensing Switching System (Tester) Monitor LOW, DATUM, and HI lights and adjust rotary control 0-100 until only DATUM is illuminated.	If it is not possible to 'balance' the DATUM light, then the ambient temperature may be incorrectly set on the vehicle temperature selector, or out of its range, or there is a fault in the sensors, wiring or Temperature Control If OK proceed to Item R	Check sensors and wiring Check Micro Switch overriding sensing circuit in the mode control, and wiring Check temperature SELECTOR and wiring
R	Increase or decrease the car TEMPERATURE SELECTOR by 5°F from its set point, whichever is convenient	If increased the HI light will come ON in addition to the DATUM.	Check TEMPERATURE SELECTOR and wiring.
S	Adjust the rotary 0-100 control to cancel the HI or LOW light obtained in Item R Return the TEMPERATURE SELECTOR to its original point	If decreased to its original point the LOW light will come ON in addition to the DATUM If increased to its original point the HI light will come ON in addition to the DATUM	Check TEMPERATURE SELECTOR and wiring
T	Adjust the rotary 0-100 control to cancel the HI or LOW light obtained in Item S. Switch the mode control from AUTO to DEF.	The HI light operates in addition to the DATUM	Check Micro Switch override sensing circuit at mode control and resistance unit in mode control harness
U	Select the OFF on the Mode control. Switch off the vehicle engine and ignition circuit	All tester indicators are OFF	Check vehicle ignition switch Check relays and wiring.
V	Remove tester connectors and return the vehicle wiring and plugs and sockets to standard.	The complete system can now be tested following any corrective action taken as a result of the checks	Identify the problem area, and after carrying out the preliminary procedure of tester connection, repeat only the relevant parts of the schedule

Familiarity with the tester should be easily acquired, and then the Operator will find the flexibility of control offered by having access to test each sub-assembly will lead to quick identification of faults, and a system knowledge which allows him to extend this scope of the scheduled checks.

'IN-CAR' FAULT FINDING CHART

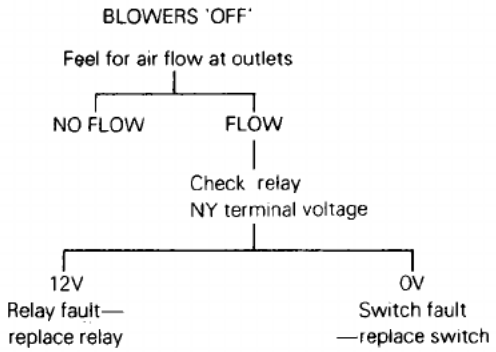
Equipment required

1. Voltmeter capable of covering 0 to 13 volts d.c.
2. Continuity tester.
3. Ohmmeter capable of covering 0 to 20K ohms.
4. Vacuum gauges (not essential) to check vacuum level.

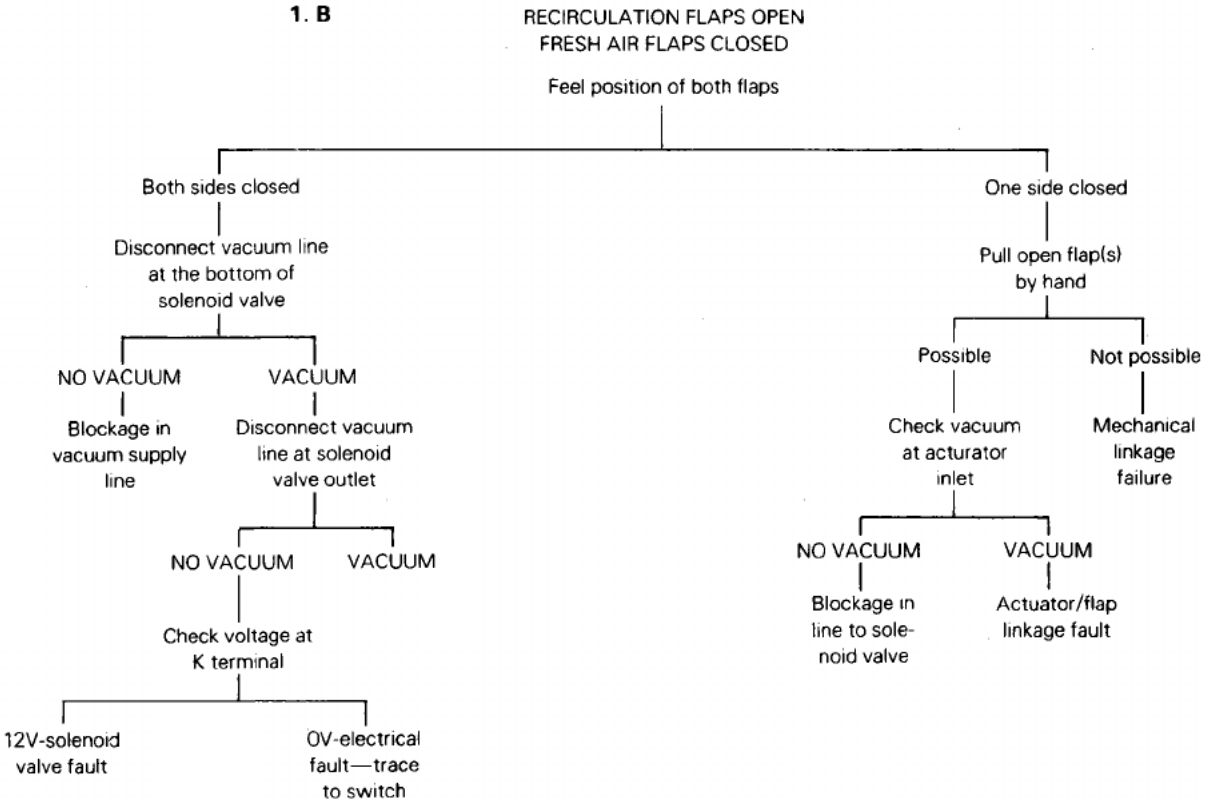
The battery should be disconnected whenever an electrical unit is being removed or refitted.

TEST 1 **R.H. OFF** **L.H. 75°**

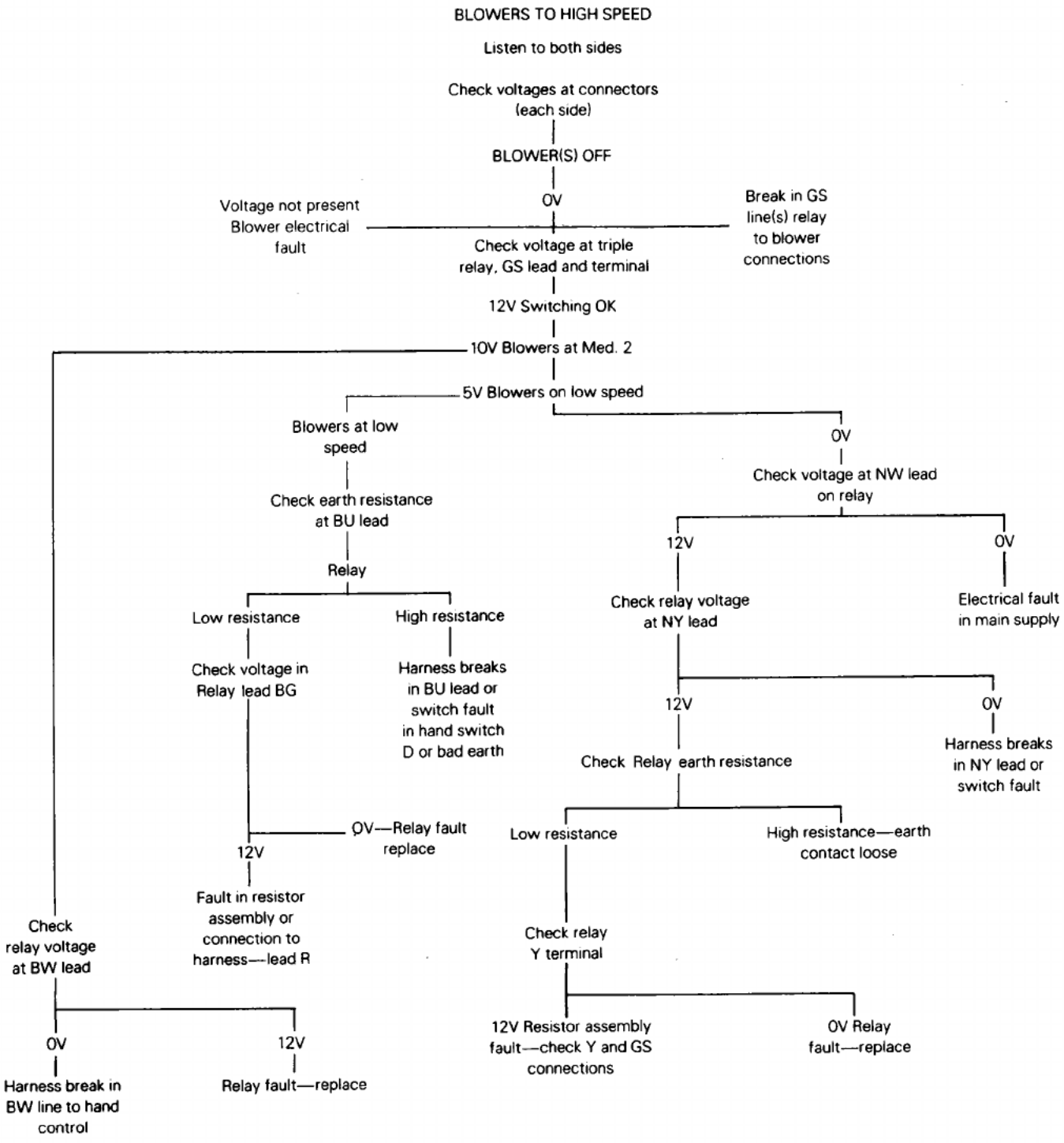
1. A



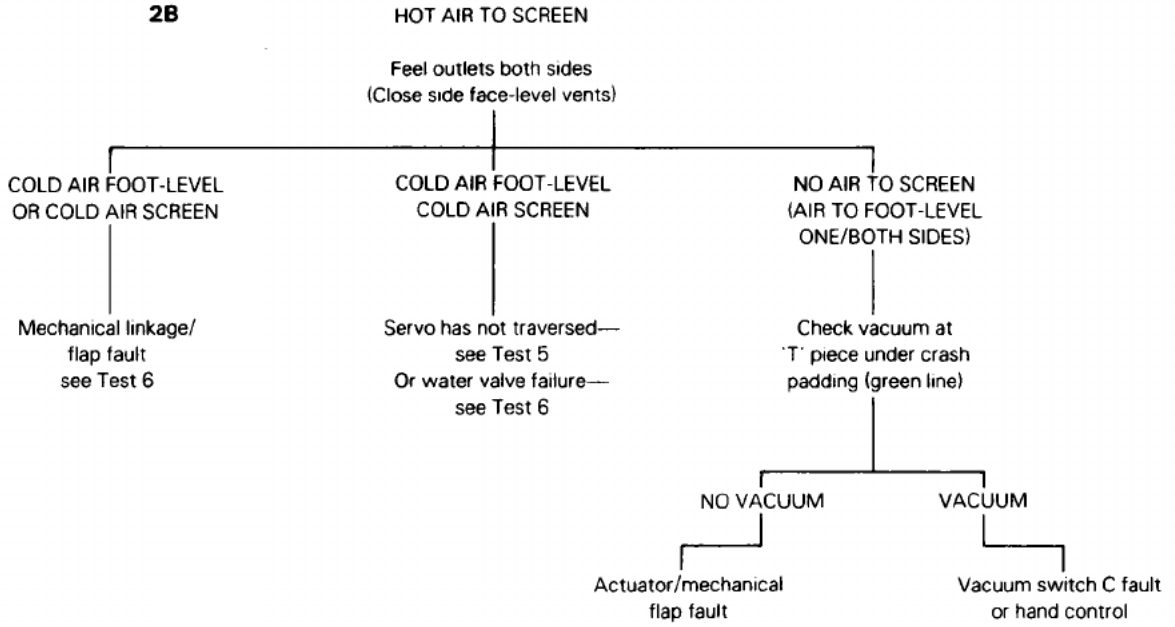
1. B



TEST 2 R.H. 'DEFROST' L.H. 75°



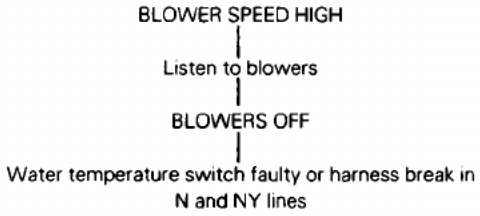
2B



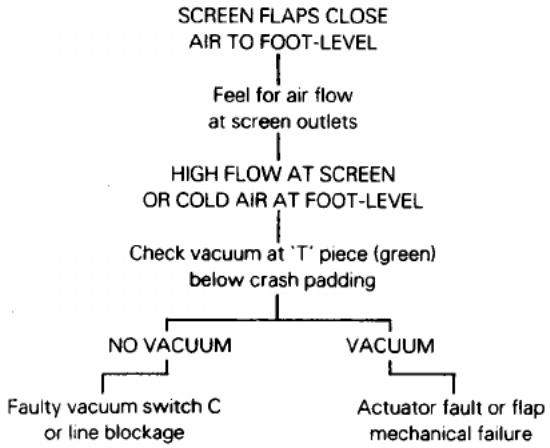
R.H. AUTO—HI **L.H. HEATING MODE (HIGHER THAN AMBIENT)**

TEST 3

3A



3B



XK ENGINES

A Emission North America and Japan (1978-80)
B Emission Rest of World
C Emission Canada and Japan 81 on and Australia 1986
D Emission Australia -85 Sweden and Switzerland
E Emission Saudia Arabia

	4.2 Emiss B	4.2 Emiss C 1985-6	4.2 Swiss 1985-6	4.2 Australia 1985
Ignition timing	6° B.T.D.C.	14°B.T.D.C.	4° ± 2	4°B.T.D.C.
$ =Vac off idle normal run temp	$	!	B.T.D.C.$	at 800 r.p.m.
# = Vac off normal running temp				
! = at 3000 r.p.m.				
& = 700 r.p.m. with vac off				
Valve clearances	0.012 to 0.014 in	0.012 to 0.014 in	0.012 to 0.014 in	0.012 to 0.014 in
Spark plugs — make/type	N10Y	N12Y	N12Y	N12Y
— gap	0.035 in	0.035 in	0.035 in	0.035 in
Ignition coil — make Lucas/type	32C5	32C5	32C5	32C5
Primary resistance @ 20°C (ohms)	0.75 to 0.85	0.75 to 0.85	0.75 to 0.85	0.75 to 0.85
Output (open circuit) Kv min	25	25	25	25
Output at plug Kv min (assuming plug gap and lead to spec)	10	10	10	10
Ignition coil — Ducellier/type	520076A	520076A	520076A	520076A
Primary resistance @ 20°C (ohms)	0.8 to 1.0	0.8 to 1.0	0.8 to 1.0	0.8 to 1.0
Ballast resistance @ 20°C (ohms)	0.8 to 1.0	0.8 to 1.0	0.8 to 1.0	0.8 to 1.0
Output (open circuit) Kv min	25	25	25	25
Output at plug Kv min (assuming plug gap and lead to spec)	10	10	10	10
Distributor — make/type	45DM6	45DM6	45DM6	45DM6
Rotation of rotor view above	Anticlockwise	Anticlockwise	Anticlockwise	Anticlockwise
Pick up mod/rot gap	0.008 to 0.014 in	0.008 to 0.014 in	0.008 to 0.014 in	0.008 to 0.014 in
Pick up coil resistance K Ohms	2.2 to 4.8	2.2 to 4.8	2.2 to 4.8	2.2 to 4.8
Firing order	1, 5, 3, 6, 2, 4@	1, 5, 3, 6, 2, 4@	1, 5, 3, 6, 2, 4@	1, 5, 3, 6, 2, 4@
@ — cylinders numbered from rear				
Spark plug lead resistances	Min — Max			
1	8.61 to 20.56K			
2	9.00 to 21.48K			
3	7.24 to 17.34K			
4	6.11 to 14.69K			
5	5.47 to 13.20K			
6	5.13 to 12.30K			
Exhaust emission reading Co	1.25 to 1.75	1.25 to 1.75	0.75 ± 25%	0.5 to 1.0%
HC			300 p.p.m. max	
Idle speed	750 r.p.m.	750 ± 50 r.p.m.	800 ± 100 r.p.m.	800 r.p.m.
Compression pressure	135 to 150 lbf/in^2	135 to 150 lbf/in^2	135 to 150 lbf/in^2	135 to 150 lbf/in^2
Differential between cylinders	15% maximum			
Fuel pressure	35.5 to 38.8 lbf/in^2			

IMPORTANT: On re-assembling the system. Fit a new receiver-drier.

Check the compressor oil level.
Thoroughly clean and refit the expansion valve filter
Refit the thermal bulb on to the evaporator outlet pipe
Refit the schrader valve into the high pressure pipe
Refit all the pipe connections and recharge the system

Charge

Charging the air conditioning system is the process of adding a specific quantity of refrigerant to the circuit. Before attempting the charging operation the system **must** have been evacuated and, if necessary, flushed through immediately beforehand. No delay between evacuation and charging procedures is permissible. The equipment should be fitted with a means of accurately weighing the refrigerant during the charging process. Great care must be taken to charge correctly, as undercharging will result in very inefficient operation, and overcharging will result in very high pressures and possible damage to components.
Evacuate the system with hoses (1 & 2, Fig. 42) connected as shown.
Connect the centre hose of the charging manifold (3, Fig. 42) to a supply of refrigerant. The supply available must be at least 3,3 kg (7 2 lb) weight.
Open the refrigerant supply valve.
Purge the centre hose by momentarily cracking the connection at the manifold block: retighten the connector.
Record the weight of refrigerant supply source. Open both valves on the charging manifold and allow the refrigerant source pressure to fill the vacuum in the system.
Between 0,23 kg and 0,45 kg ($\frac{1}{2}$ lb to 1 lb) weight will enter the system.
Record the quantity.

NOTE: The quantity drawn in will vary with ambient temperature.

Close the high pressure side valve on the manifold block.
Ensure that all is clear and start the vehicle engine. Run the engine at 1500 rev/min.
Set the air conditioning system blower speed control to **'Fast'.**

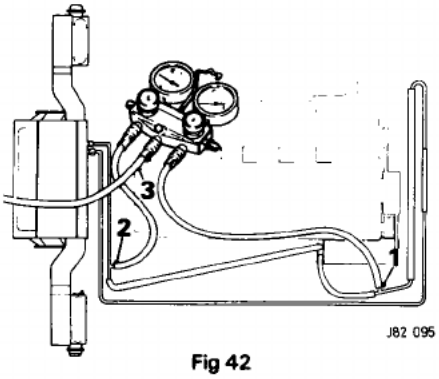


Fig 42

NOTE: This engages the compression clutch to start system circulation, and runs the blower motors at fast speed to heat the evaporator coil. Vapour will be turned to liquid in the condenser and stored in the receiver-drier.

Control the flow of refrigerant with the suction side valve on the charging manifold, and allow a total weight of 1,13 kg ± 0,028 kg (2$\frac{1}{2}$ lb ± 2 oz) refrigerant to enter system.
Close the suction side valve.

NOTE: Alternatively, observe the sight glass on receiver-drier until the sight glass clears, and no bubbles or foam are visible.

Re-open the suction valve for 2 to 5 minutes (2 minutes if the ambient temperature is low, 5 minutes if high).
This will allow an additional 0,11 kg ($\frac{1}{4}$ lb) of refrigerant to enter the system.
Run the system for 5 minutes, observing the sight glass.
If foaming is very slight, switch off the engine.

NOTE: It is normal for there to be slight foaming if the ambient air temperature is 21°C (70°F) or below.

Close the refrigerant supply valve, disconnect the hose
Quickly disconnect the hoses from the schrader valves
Fit protective sealing caps.
Switch on the engine and check the function of the air conditioning system.
Switch off the engine flush the engine compartment and interior of the vehicle with shop compressed air line
Conduct a leak test on the installation.

SUPERHEAT SWITCH AND THERMAL FUSE

Description

The superheat switch and a thermal fuse are included in the clutch circuit to provide a compressor protection system. This guards against low refrigerant charge and blockages causing extreme superheated inlet gas conditions and resulting compressor damage.

KEY TO DIAGRAM (Fig. 43)
1. To compressor clutch
2. Superheat switch
3. Thermal fuse
4. + Feed cable

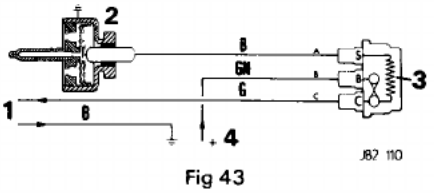


Fig 43

The superheat switch is located in the rear of the compressor in contact with the suction side gas, whose pressure drops and temperature rises with low refrigerant charge (ie Freon leak). This condition closes the superheat switch contacts.
The thermal fuse is a sealed unit containing a heater and meltable fuse. The superheat switch brings in the heater which melts the fuse and disconnects the compressor clutch and heater. The compressor stops and damage from insufficient lubrication will be avoided.

CAUTION: After a thermal fuse melt, establish and rectify the cause before replacing the thermal fuse unit complete.

Thermal fuse melt:
Temperature: 157 to 182°C (315 to 360°F)
Time: 2 minutes — 14V system voltage
5,5 minutes — 11,5V system voltage
Heater resistance, cold: 8 to 10 ohms.

Air Conditioning Superheat Switch

Testing

If the refrigerant level is satisfactory and there is not a blockage in the air conditioning system but the thermal fuse persists in melting.
Carry out the following checks.

Test Procedure 'A' — for use with a cold engine and at ambient temperatures below 30°C (86°F).

Connect a test lamp in series with the superheat switch (Fig. 44).

NOTE: With the test lamp connected in the circuit it will prevent the thermal fuse from operating as a safety device therefore care should be taken when carrying out the test.

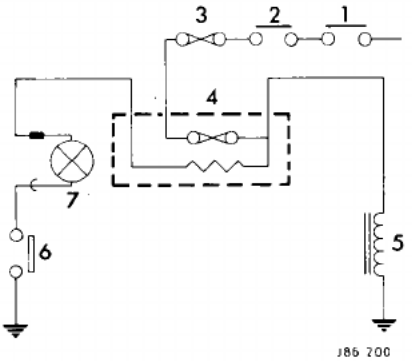


Fig 44

KEY TO DIAGRAM (Fig. 44)
1. Air conditioning switch
2. Ambient switch
3. Compressor clutch fuse
4. Thermal fuse
5. Compressor clutch coil
6. Superheat switch
7. Test lamp

With the ignition and air conditioning switched on.
Ensure a serviceable thermal fuse is fitted.
Evacuate the air conditioning system and then close the taps.
The test lamp should not light. If the test lamp does light then follow test procedure 'B'.
With the lamp not illuminated start and run the engine at about 2000 rpm. After a few minutes the lamp should light. As soon as the test lamp lights, open the taps to allow refrigerant to charge into the system. As the air conditioning system becomes charged the lamp should go out.
If the above lamp functions do not occur, replace the superheat switch.
After checking remove the test lamp from the circuit and reconnect the superheat switch lead onto the terminal.
Operate and check the system.

Test Procedure B — for use with a hot engine or at ambient temperatures above 30°C (86°F).

Connect the test lamp in series with the superheat switch.
Switch the ignition and air conditioning on.
Ensure a serviceable thermal fuse is fitted.
Evacuate the air conditioning system and then close the taps.
The test lamp should light. (If the lamp does not light carry on checks as in Procedure 'A').
With the test lamp illuminated open the taps and allow refrigerant to charge the system. As the system becomes charged the test lamp should go out.
If the lamp functions do not occur, then replace the superheat switch.
After checking remove the test lamp and reconnect the superheat switch lead onto the terminal.
Operate and check the system.

SUPERHEAT SWITCH

Renew

Discharge system.
Disconnect harness connector from superheat switch.
Remove suction (low pressure) and out-put (high pressure) hoses.
Remove superheat switch retaining circlip and remove switch by pulling out of the compressor housing.
Remove the superheat switch 'O' ring located in the compressor housing.
Lightly lubricate the new 'O' ring seal and fit into compressor housing.
Locate the replacement superheat switch into the compressor housing and gently push switch into housing until seated.
Fit new circlip and secure.
Connect the suction (low pressure) and out put (high pressure) hoses to the compressor. Evacuate and recharge system and check system for leaks using suitable leak detection equipment.

COMPRESSOR

Remove and Refit

WARNING: BEFORE COMMENCING WORK, REFER TO THE GENERAL SECTION. DO NOT OPERATE THE COMPRESSOR UNTIL THE SYSTEM IS CORRECTLY CHARGED.

NOTE: Ensure that clean, dry male and female caps are to hand.

Disconnect the battery earth lead.
Depressurize the system.
On NAS vehicles, remove the air pump. Note the position of the hoses.
Remove the clamping plate securing the high and low pressure hoses (1, Fig. 45).
Displace the hoses (2, Fig. 45). Fit blanking caps to the hoses and the compressor.
Remove the superheat switch cable connector (3, Fig. 45).
Slacken the compressor front and rear pivot bolts (4, Fig. 45).
Slacken the adjusting link locking and adjusting nuts.
Remove the bolts securing the adjusting link and remove the link.
Displace the drive belt. Disconnect the clutch cable connector (5, Fig. 45).
Remove the nuts securing the cruise control actuator and displace the actuator unit.
Remove the compressor pivot bolts and displace the compressor.
Manoeuvre the compressor from the engine compartment, keeping it horizontal and the sump down.
If a new compressor is being fitted, remove the mounting brackets from the old compressor and fit to new unit.
On refitting, ensure that new 'O' sealing rings are fitted.
Ensure the compressor drive belt is adjusted to the correct tension.
Correct tension as follows:
A load of 2,9 kg (6.4 lb) must give a total belt deflection of 4,32 mm (0.17 in) when applied at mid-point of the belt.
Recharge the air conditioning system.

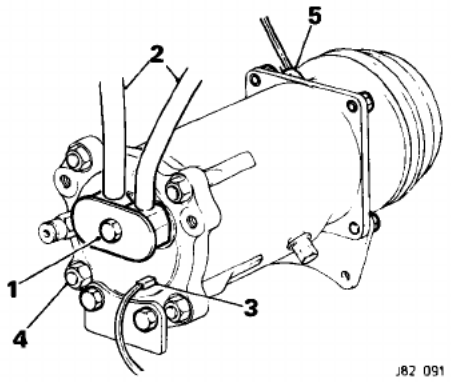


Fig 45

CAUTION: After recharging, cycle the clutch in and out 10 times by selecting OFF-LOW, AUTO-OFF on the mode selector switch with the engine running. This ensures that the pulley face and the clutch plate are correctly bedded-in before a high demand is made upon them.

Check the system for correct operation.
Check the cruise control for correct operation.

COMPRESSOR OIL — CHECKING PROCEDURE

The following procedure should be adopted when checking the amount of oil in a compressor prior to its being fitted to a car:

1. Remove drain plug from compressor sump and drain oil into container having capacity of at least 285 cc (10 fl oz).
2. Remove pressure plate across inlet and outlet ports at rear of compressor: more oil may flow from sump plug hole.
3. With pressure plate still removed, set compressor on its rear end so that inlet and outlet ports are over container; slowly rotate drive plate through several revolutions both clockwise and anti-clockwise. Oil may flow from ports.
4. Measure quantity of oil drained out; make this up to 199 cc (7 fl oz) and re-fill compressor with this amount of 525 viscosity refrigerant oil.

If the compressor is not to be fitted immediately, it is important that the pressure plate be refitted over the ports and secured there, to prevent ingress of foreign matter.
Should it be suspected that the compressor oil level is low, on a car in service, the checking procedure detailed should be followed after the car engine has been run for at least 10 - 15 minutes with the air conditioning system switched on; this will cause the refrigerant oil to be returned to the compressor sump.
Should a new receiver-drier bottle, condenser or evaporator be fitted, without the car engine being run as above, immediately before dismantling, the following quantities of 525 viscosity refrigerant oil must be added to the system:
(a) For a new receiver-drier bottle — add 28 cc (1 fl oz).
(b) For a new condenser — add 85 cc (3 fl oz).
(c) For a new evaporator — add 85 cc (3 fl oz).

Additional oil is not needed after renewal of hose assemblies.
Oil may be added to the system either directly into the compressor or into the compressor charging port.

Compressor Servicing Procedure

To enable the servicing of the air conditioning compressor the following components are now available. The following servicing procedures should be adopted in the event of a malfunction of the compressor which involves any of the parts listed, as opposed to the replacement of the compressor unit.

Part Description

Pulley Bearing
Superheat Switch
Pressure Relief Valve
'O' Ring Suction Discharge Port
$\frac{1}{4}$ Pint 525 Viscosity Oil
Clutch Driver Assembly
Shaft Nut
Woodruff Key
Coil and Housing Clutch
Pulley Bearing Assembly
Retainer Ring Kit
Body of Compressor less Clutch, Pulley and Coil Housing Assembly
Shaft Kit for Seal
Bearing Retaining Ring

The specialist tool kit required to service the compressor unit in conjunction with the following procedures are available from KENT MOORE.

Tool Kit	**10500**
Hub Holding Tool	**10418**
Thin Walled Socket	**10416**

Tool Kit Contents

Pulley Extractor Kit
Pulley Bearing Remover and Installer Kit
Seal Assembly Remover and Installer
Hub Drive Plate Remover Kit
Hub and Drive Plate Assembly Installer
'O' Ring Remover
'O' Ring Installer
Snap Ring Installer
Ceramic Seal Remover and Installer, and Shaft
Seal Protector
Hub Holding Tool
Thin Walled Socket

When Servicing the compressor, remove only the necessary components that preliminary diagnosis indicates are in need of service.

Seven service operations may be performed on the GM 6 cylinder compressor.

(i) Replacement of compressor assembly.
(ii) Replacement of clutch drive and pulley assembly.
(iii) Replacement of pulley bearing.
(iv) Replacement of clutch coil and housing assembly.
(v) Replacement of shaft seal.
(vi) Replacement of superheat switch.
(vii) Replacement of compressor cylinder and shaft assembly (less clutch drive, coil housing and pulley).

General Instructions During Servicing Operations

(i) Discharge system prior to removal of compressor unit.
(ii) During removal, maintain the compressor positioned so that the sump is downward. Do not rotate compressor shaft.
(iii) If the compressor is being replaced due to a component failure within the main body of the compressor, the clutch coil housing and clutch plate drive and hub assembly must be removed from the original compressor unit and fitted to the replacement unit. This also applies when fitting a replacement compressor body.
(iv) If the original compressor is being reinstalled following servicing, replace with the right quantity of 525 viscosity oil.
(v) Discard 'O' rings from suction and discharge ports of compressor and replace and with new 'O' rings.
(vi) Install compressor and adjust drive belt tension to service manual specifications.
(vii) Lubricate 'O' rings with refrigerant oil and attach suction and discharge hose connections and retaining plate to compressor torque to 2,764 - 3,455 kgfm (20 - 25 ft lbs).

Replacement of Clutch Drive Plate and Hub Pulley, Clutch Coil and Housing Assemblies.

Discharge the system.
Remove the compressor from the engine.
Using suitable mounting jig or vice, secure compressor.
Holding the hub of the clutch drive plate with the hub holding tool. Using the thin walled $\frac{9}{16}$ in socket remove the shaft nut. Refer to Fig. 46.

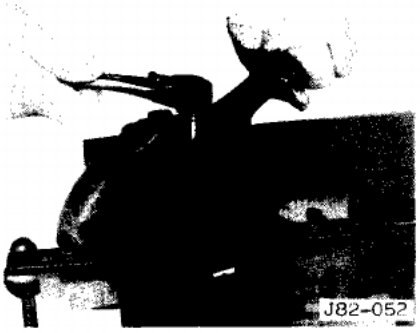


Fig 46

Screw the threaded hub puller to the hub. Hold the body of the hub puller with a suitable spanner, tighten centre screw of hub pulley (Fig. 47), until drive plate, hub and woodruff key can be removed (Fig. 48).

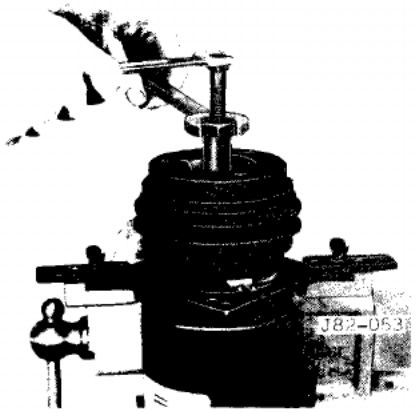


Fig 47

Fig 48

Using suitable circlip pliers remove the bearing to head retainer ring (Fig. 49).

Fig 49

Fig 50

Remove the absorbent felt sleeve retainer ring to enable the location of the pulley extraction tool.

Using the pulley extraction tool locate the puller pilot on hub of front head and remove the pulley assembly (Fig. 50).

NOTE: The next operation details removal of pulley bearing. DO NOT remove the pulley bearing unless it is to be replaced. Removal may cause the bearing to be damaged.

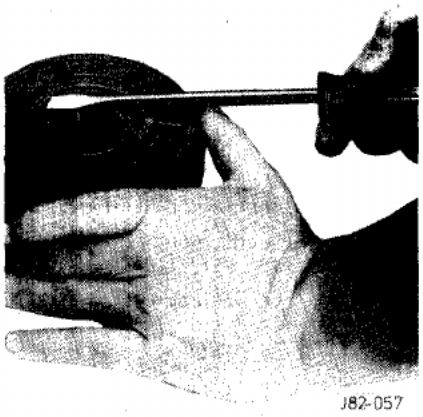


Fig 51

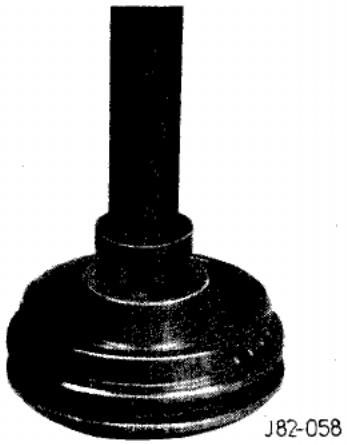


Fig 52

Remove bearing to pulley retaining ring with small screwdriver (Fig. 51). Drive out the bearing using bearing remover and handle (Fig. 52).

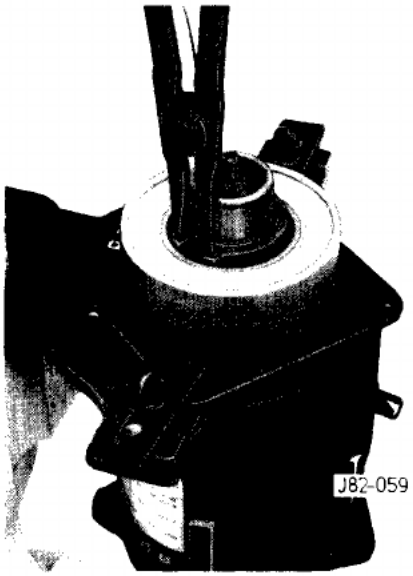


Fig 53

Mark position of the coil and housing assembly in relationship to the shell of the compressor. Remove the coil housing retainer ring using suitable circlip pliers (Fig. 53) and lift off the coil and housing assembly (Fig. 54).

Examine coil for loose or distorted terminals and cracked insulation. Check that the current consumption is 3.2 Amps at 12 volts. The resistance should be 3.75 Ohms at room temperature.

Fig 54

Reassemble coil and housing assembly by reversing the dismantling procedure. Be sure coil and housing assembly markings line up.

NOTE: If the pulley assembly is going to be reused, clean the friction surface with suitable solvent cleaner.

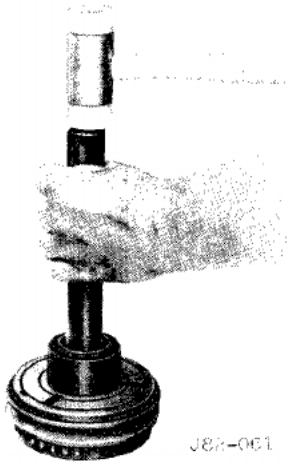


Fig 55

Drive the new bearing into the pulley assembly with the bearing installer and handle. The bearing installer will ride on the outer race of the bearing (Fig. 55).

Fig 56

Lock the bearing in position with the bearing to pulley retainer ring.

Press or tap the pulley assembly into the hub of front head using installer tool and handle (Fig. 56).

Check the pulley for binding or roughness, and that the pulley rotates freely.

Using suitable circlip pliers lock pulley assembly in position with bearing to head retainer ring (flat side of retainer ring should face towards pulley).

Install square drive woodruff key in the key way of the clutch drive hub.

Wipe frictional surface of clutch plate and pulley clean. Using a suitable solvent.

Place clutch plate and hub assembly on shaft, aligning shaft key way with key in hub (refer to Fig. 48 dismantling procedure).

NOTE: The woodruff key is made with a slight curvature to help hold it in the plate hub during assembly.

IMPORTANT: To avoid damage to the compressor, undue force should not be applied to the hub or shaft. This could misplace axial plate on shaft, resulting in damage to the compressor.

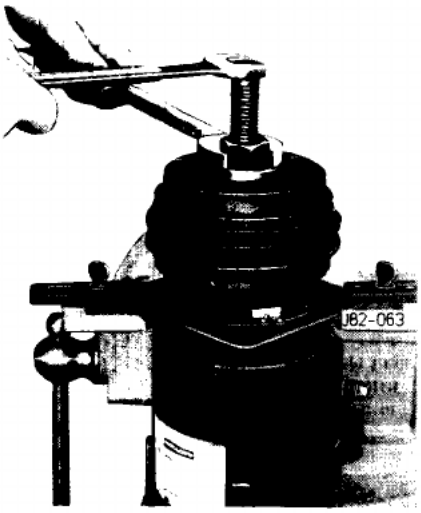


Fig 57

Place spacer on hub. Thread clutch plate and hub assembly installer tool onto end of the shaft (Fig. 57).

Hold the head of the bolt and turn tool body several revolutions to press hub partially on shaft. Remove clutch plate and hub assembly installer and spacer.

Check alignment of woodruff key with key way in shaft. If alignment is correct, replace installer tool and continue to press hub into shaft until there is approximately 2,38 mm ($\frac{3}{32}$ in) air gap between the frictional surfaces of pulley and clutch plate. Remove installer tool and spacer.

Install a new shaft lock nut with the small diameter boss of the nut against the hub using a thin wall $\frac{9}{16}$ in socket. Hold clutch with holding tool and tighten nut to 2,07 kg/fm (15 ft/lbs), using a 3,455 kg/fm (25 ft/lbs) torque wrench. The air gap between the frictional surfaces of pulley and clutch plate should now be approximately 0,56 mm to 1,45 mm (0.022 in to 0.057 in).

Shaft Seal Leak Detection

A compressor shaft seal should not be changed because of an oil line on the underside of the bonnet. The seal is designed to seep some oil for lubrication purposes. Only change a shaft seal when a leak is detected by the following procedures:

Ensure there is refrigerant is in the system.

Turn off the engine.

Blow off compressor clutch area with compressed air. Blow out clutch vent holes to completely remove any freon and oil deposits.

Allow car to stand for 5 minutes, without operating compressor.

Rotate the compressor clutch drive plate by hand until one of the vent holes is at the lower side of drive plate. Using leak detector, sense through vent hole at lower side of drive plate only.

Some compression shaft seal leaks may be the result of misplacement of the axial plate on the compressor shaft. The mispositioning of the axial plate may be caused by improper procedures used during pulley and driven plate removal, undue force collisions, or dropping the compressor.

Replacement of Shaft Seal

Remove clutch driven plate and hub assembly as previously described.

Remove compressor absorbent felt retaining ring and felt sleeve.

Fig 58

Thoroughly clean the area inside the compressor neck surrounding the shaft, the exposed portion of the seat and the shaft itself of any dirt or foreign material. This is absolutely necessary to prevent any such material from getting into the compressor.

Remove the seal seat retaining circlip (Fig. 58) using suitable circlip pliers.

Fig 59

Remove the ceramic seal seat using the seal seat remover and installer tool (Fig. 59). Position tool into seal seat recess, grasp flange of shaft seal seat and pull straight out.

Fig 60

Using the seal remover and installer tool grip the seal by inserting the tool into the seal recess. Turning clockwise. Withdraw the tool and seal (Fig. 60).

Fig. 61

Remove the seal seat 'O' ring (Fig. 61) using the 'O' ring remover tool.

Recheck the inside of the compressor neck and the shaft. Be sure these areas are perfectly clean and free of burrs before installing new parts.

Coat shaft and 'O' ring with clean compressor 525 viscosity oil.

Fig 62

Place 'O' ring on 'O' ring installer (Fig. 62) and insert tool and 'O' ring into seal recess. Release 'O' ring by sliding down tool hook, and remove tool.
(Fig. 63) illustrates the tool being removed following 'O' ring installations.

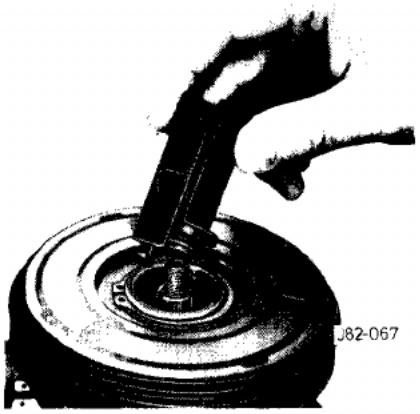


Fig 63

Place the seal protective sleeve over the compressor shaft and fit new shaft seal. Gently twisting the tool clockwise to engage the seal housing flats onto the compressor shaft. Withdraw the tool by pressing downwards and twisting the tool anti-clockwise.
Coat the seal face of the new ceramic seal seat with clean 525 viscosity oil. Mount the seal seat on to the remover and installer tool and carefully guide the seal into the compressor neck gently twisting it into the 'O' ring seal.
Disengage and remove tool, and compressor shaft protective sleeve.
Install new circlip with the flat side against seal seat, and press home.
Install the new absorbent sleeve by rolling the material into the cylinder, overlapping the ends and slipping it into the compressor neck with the overlap at the top of the compressor. Using a small screwdriver or similar tool carefully spread the sleeve so that in its final position, the ends butt together at the top vertical centre line.
Install the new absorbent sleeve retainer so that its flange face will be against the front end of the sleeve, press and tap with a mallet setting the retaining ring and absorbent sleeve until the outer edge of the sleeve retainer is recessed approximately 0,8 mm ($\frac{1}{32}$ in) from the face of the compressor neck.
Lightly lubricate absorbent felt sleeve with 525 viscosity oil.
Refit clutch drive plate and hub assembly
Check compressor oil level.
Refit compressor to vehicle, and connect the suction (low pressure) and discharge (high pressure) hoses using new 'O' ring seals.
Prior to fitment of compressor drive belt rotate the compressor drive plate clockwise several revolutions to prime lubrication pump.
Evacuate and recharge system.

NOTE: During charge procedure check compressor seals for leaks using suitable leak detection equipment.

Leak Test

A high proportion of all air conditioning work will consist of locating and repairing leaks. Many leaks will be located at points of connections and are caused by vibration. They may only require the retightening of a connection or clamp. Occasionally a hose will rub on a structural part of the vehicle and create a leak, or a hose will deteriorate and require a replacement. Any time the system requires more than $\frac{1}{2}$ lb of refrigerant after a period of operation, a leak is indicated which must be located and rectified.
The 'Robinair Robbitek 30001 Leak Detector' is designed for speedy detection of leaks. The leak detector is small and portable, and is battery operated. This instrument will indicate leaks electronically by sounding an alarm signal. Provision is made to plug in an earphone, which is useful in a noisy workshop; and it has the recommended sensitivity of 0,45 kg (1 lb) in 32 years.

FLAP LINKAGE

Adjust Air

Service Tools: 18G 1363, Setting Jig (Fig. 64)

Remove the console right hand panel and underscuttle trim panels to gain access to the air conditioning unit flap linkages. Note: On LH drive cars it is necessary to remove the glovebox compartment.
Remove the footwell outlet vent from the air conditioning unit.
Switch on the ignition, position the right hand control knob to 'DEF'. When the servo has reached its full heat position, switch off the ignition and disconnect the battery.
Disconnect the linkage rods (1, Fig. 66) from the servo lever connections.
Set the link bolt adjuster (2, Fig. 66) in its mid position.
Gently pull the wire link (3, Fig. 66) to detach it from the grommet in link (4, Fig. 66)

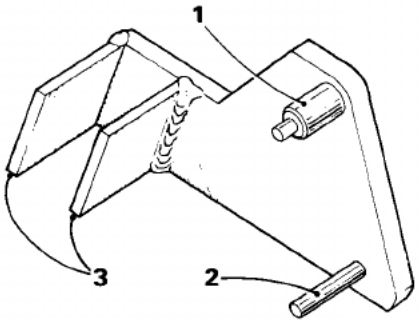


Fig 64 J82 104

Move the thumbwheel (Fig. 65), located in the radio console panel, fully to the right.
Using the jig setting tool 18G 1363, locate peg (1, Fig. 64) into the hole (7, Fig. 66) on the linkage protection bracket, and peg (2, Fig. 64) in the hole in linkage (4, Fig. 66), from which link (3, Fig. 66) was removed. The parallel end guides on the setting jig tool (3, Fig. 64), should locate over the linkage assembly (8, Fig. 66) so that the linkage is in a straight line. If linkage (8, Fig. 66) is not in line adjust the distribution temperature control cable (9, Fig. 66), until the linkage is straight. Tighten the cable clamp (6, Fig. 66).
With the jig setting tool in position adjust the linkage (10, Fig. 66) until post (11, Fig. 66) is at the top of the slot.
Remove the jig setting tool.
Position the setbolt adjuster (12, Fig. 66) at its furthest point away from fulcrum (13, Fig. 66). Refit the link rod (3, Fig. 66) to linkage (4, Fig. 66).
Reconnect the servo linkage rods (1, Fig. 66) to the servo motor levers, ensure that the servo lever cam followers locate against the servo cams.
Reconnect the battery and switch on the ignition. Motor the system to the full cooling position.
Switch off the ignition.
Check that the linkage (14, Fig. 66) abuts against the snail cam (15, Fig. 66).
The lower heat flap should now be fully sealed; check by manually pushing the snail cam, no movement should be evident.

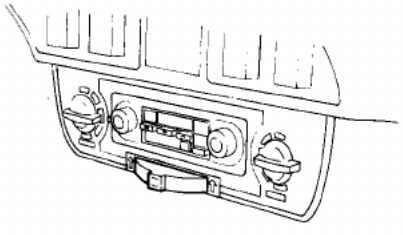


Fig 65 J82 105

V12 ENGINES

A Emission North America and Japan (1978-80)
B Emission Rest of World
C Emission Canada and Japan 81 on and Australia 1986
D Emission Australia -85 Sweden and Switzerland
E Emission Saudia Arabia

	D Jetronic	
	5.3 A Emiss	**5.3 D Emiss**
Ignition timing	10° B.T.D.C.	4°B.T.D.C.
$ =Vac off idle normal run temp	Static	Static
at 3000 r.p.m.		
Valve clearances	0.012 to 0.014 in	0.012 to 0.014 in
Spark plugs — make/type	N10Y	N10Y
— gap	0.035 in	0.035 in
Ignition coil — make/type	22C12	22C12
Primary resistance @ 20°C (ohms)	0.9 to 1.1	0.9 to 1.1
Output (open circuit) Kv min	25	25
Output at plug Kv min (assuming plug gap and lead to spec)	10	10
Distributor — make/type	36DE12	36DE12
Rotation of rotor view above	Anticlockwise	Anticlockwise
Pick up mod/rot gap	0.020 to 0.025 in	0.020 to 0.025 in
Pick up coil resistance K Ohms	——	——
Firing order	1A-6B-5A-2B-3A-4B-6A-1B-2A-5B-4A-3B*	
* — cylinders numbered from front		
Spark plug lead resistances	Min — Max	Min — Max
	1A 3.05 to 7.35K	1B 4.00 to 9.66K
	2A 2.09 to 5.04K	2B 2.78 to 6.72K
	3A 2.27 to 5.46K	3B 1.31 to 3.15K
	4A 3.48 to 8.40K	4B 2.00 to 4.83K
	5A 3.13 to 7.56K	5B 3.31 to 7.98K
	6A 3.22 to 7.77K	6B 3.92 to 9.45K
Exhaust emission reading Co	1 to 2%	1 to 2%
Idle speed	750 r.p.m.	750 r.p.m.
HC		
Compression pressure	135 lbf/in^2	135 lbf/in^2
Differential between cylinders	15% maximum	
Fuel pressure	28.5 to 30.8 lbf/in^2	

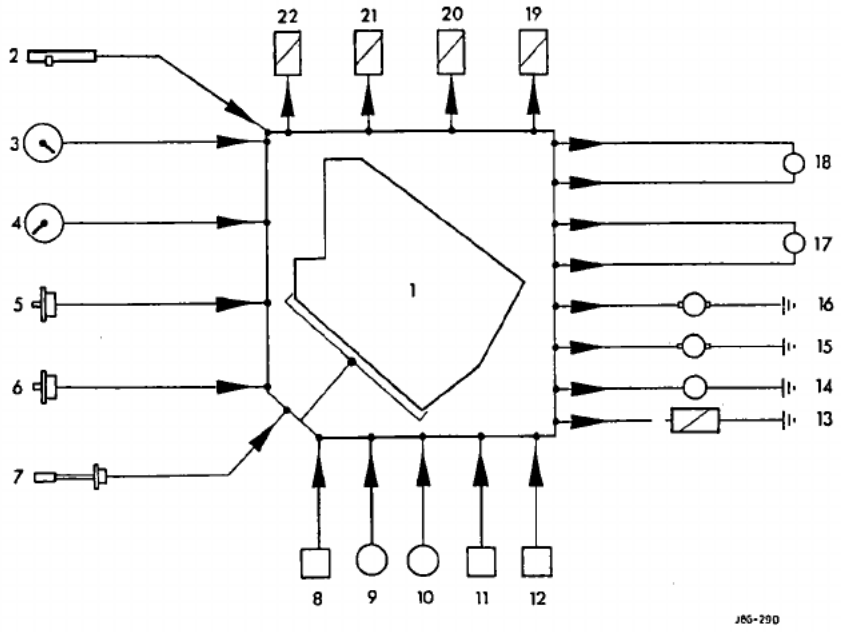


Fig. 1

Key to illustration:

1 Control Module
2 Differential temperature control
3 Temperature control switch
4 Mode control switch
5 Ambient temperature sensor
6 In-car temperature sensor
7 Evaporator temperature sensor
8 Coolant temperature switch
9 Flap feedback potentiometer
10 Flap feedback potentiometer
11 Blower motor feedback
12 Blower motor feedback
13 High speed relay
14 Compressor clutch
15 Blower motor
16 Blower motor
17 Servo motor
18 Servo motor
19 Defrost vacuum solenoid
20 Recirculation flaps solenoid
21 Centre vent solenoid
22 Water valve vacuum solenoid

Temperature Distribution System

The air conditioning unit case consists of three parts, the rear of which carries the evaporator, the front is then split in two to enable the rotary flaps to be inserted.

The method used to achieve the required air temperature is known as a series parallel system. All the air into the unit passes through the evaporator, then depending on the position of the flaps either passes through the heater matrix to be heated, or bypasses the heater matrix completely, or a combination of both to achieve the air temperature required. The system employs two flaps that are driven to the required position (determined by the control system) by two servo motors and gear box assemblies. The motor can rotate in either direction depending on the direction of the current flow through the motor. Full cooling is achieved by the air passing through the evaporator only and bypassing the heater matrix.

The flap position is monitored by 2K2 ohm feedback potentiometers (Fig. 2) which supply voltage signals to the control module indicating the flap positions.

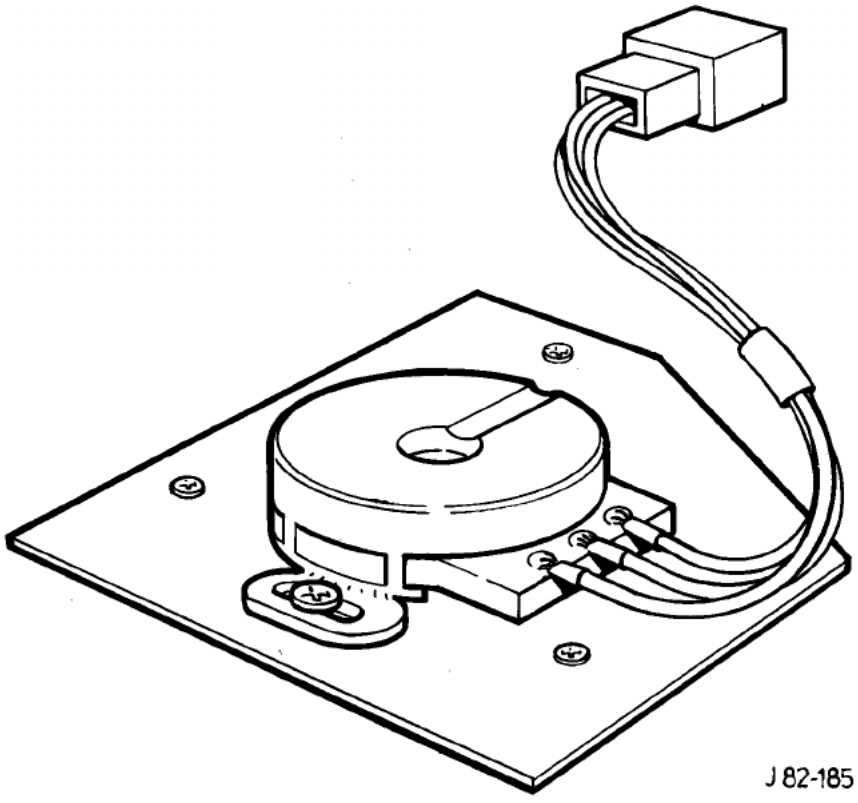


Fig. 2

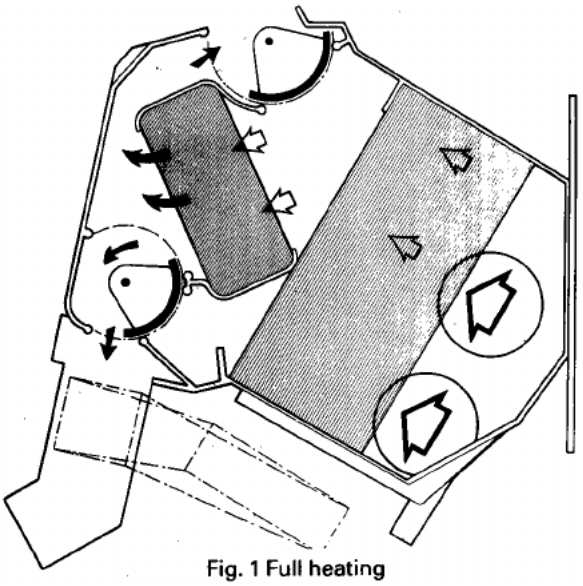


Fig. 1 Full heating

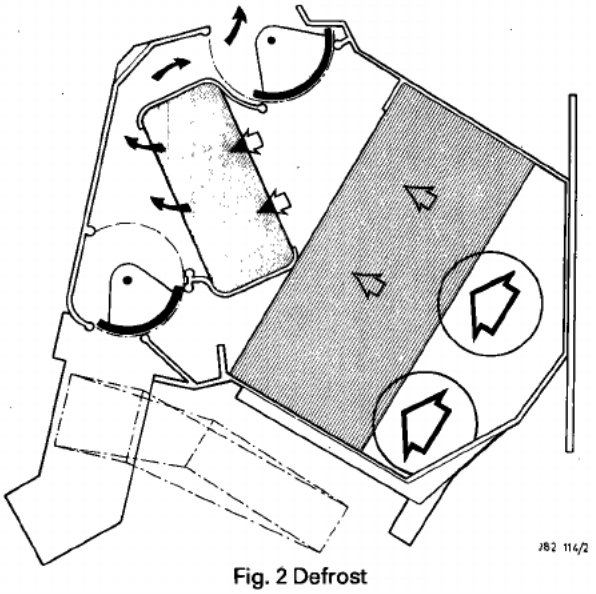


Fig. 2 Defrost

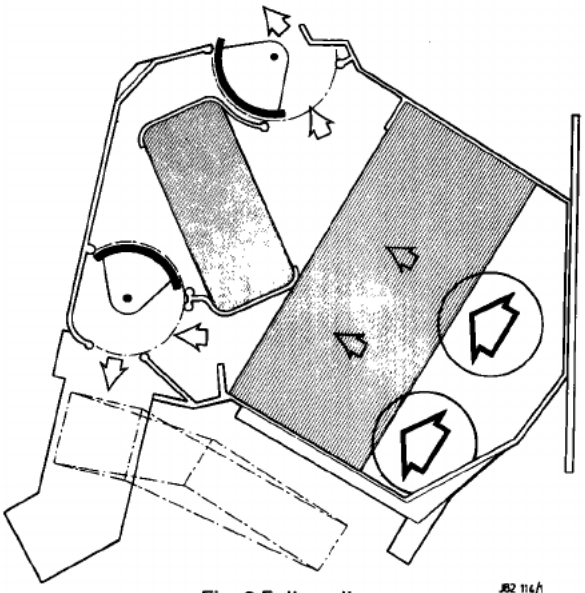


Fig. 3 Full cooling

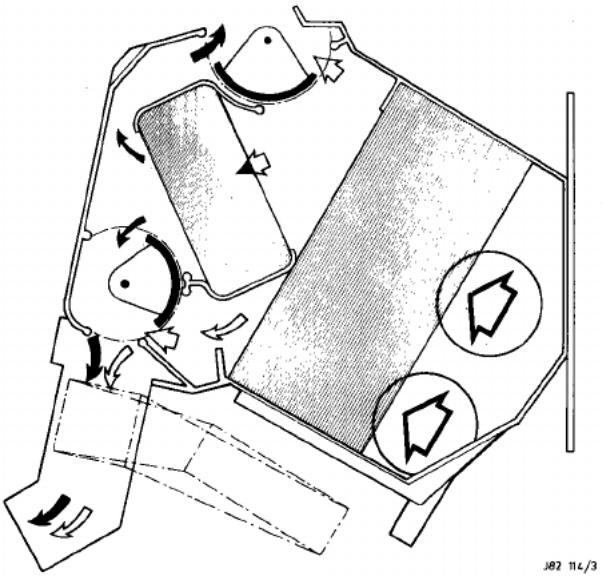


Fig. 4 Air blend

Temperature Selector:

The temperature requirement of the vehicle is selected by the setting of a 2K2 ohm potentiometer which is coupled to the temperature control switch (B fig. 5). 5 volts is supplied to the potentiometer from pin 43 of the control module. The output voltage is from zero to 2.885 volts which represents a range of temperatures from 10° to 29°C (66° to 84°F). The rotation of the potentiometer is restricted internally to 180° travel.

Incorporated in the switch is the facility to override the automatic function. This enables the temperature to be manually selected and is achieved by pulling out the control knob.

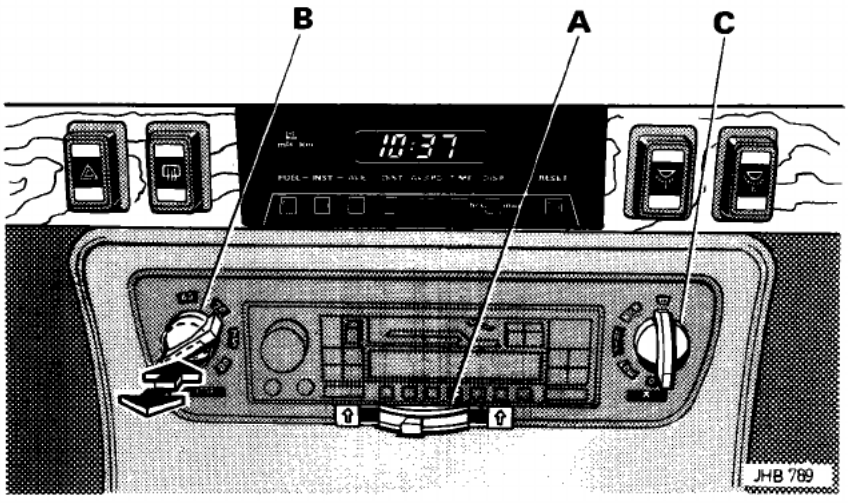


Fig. 5

Engaging the manual mode enables the operator to select the desired air temperature entering vehicle. This is maintained regardless of ambient temperature.

Temperature Differential Control

The temperature differential control (A fig. 1) is used to control the temperature of air being distributed by the face level vents. With the control fully right the air delivered to the fascia will be slightly cooler than that to the footwell. Moving the control to the left the air will reduce the temperature to the fascia and at its full left postioin it will be at its coolest.
A 10 K ohm slide potentiometer used for this purpose is coupled to the thumbwheel
Its supply voltage is from pin 7 and the signal voltage is then fed to pin 28 of the control module

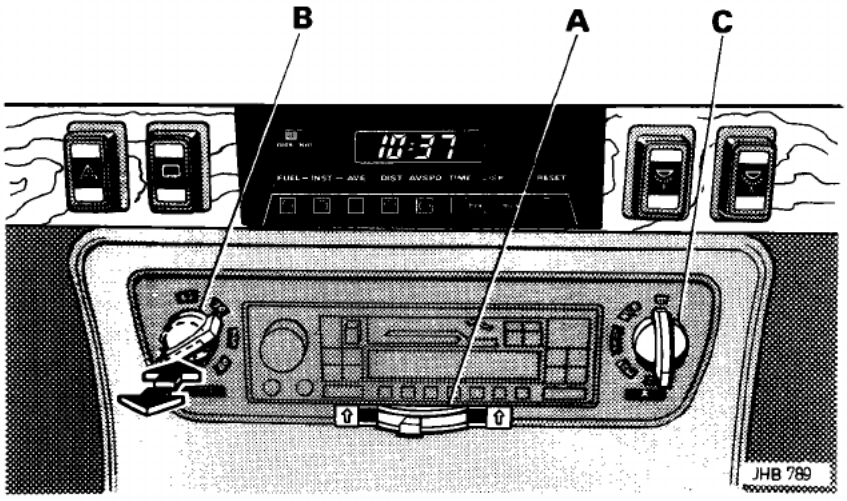


Fig. 1

Temperature Sensors:

There are three temperature sensors fitted into the system, an ambient temperature sensor, an in-car temperature sensor and an evaporator temperature sensor. All three sensors are electrically identical, but the evaporator temperature sensor (Fig. 2) is physically different and is not interchangeable with the other two. An input of 5 volts is supplied to the sensors from pin 43 of the control module.
The temperature sensing voltage from the sensor is then fed back into the control module. At 0°C (32°F) the sensing voltage should be 2.732 volts and with a temperature rise or fall of 1°C (1.8°F) the sensing voltage should rise or fall by 0.01 volts, for example if the temperature should rise to 5°C (41°F) from zero, the voltage will rise by 0.05 volts to 2.782 volts. The sensor is a semi-conductor device similar to a zenor diode in as much as it allows current to flow in reverse bias. The current flow through the device varies with temperature and is very accurate over a wide range.
The sensor assembly has a built in potentiometer which is preset and should not be adjusted.

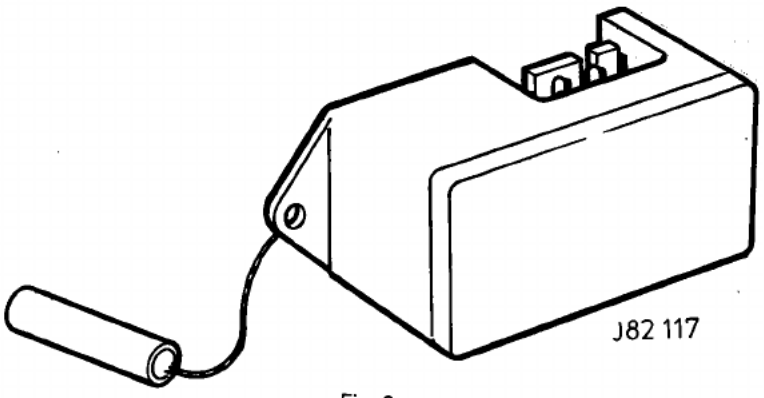


Fig. 2

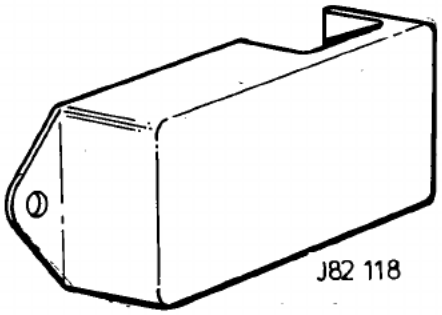


Fig. 3

Key to diagram:

1 Resistor
2 Semi conductor
3 Potentiometer
4 Pin 43 control module
5 Sensing voltage Pin 43 ambient Pin 4 in car, Pin 5 evap. sensors
6 Earth Pin

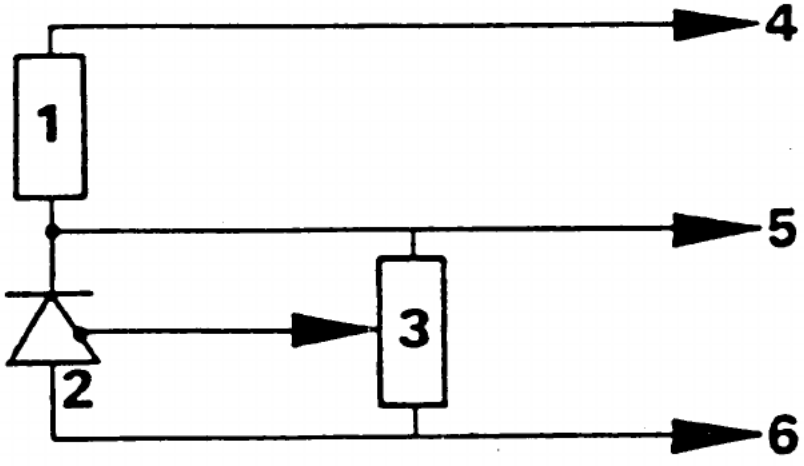


Fig. 4

J86 295

Coolant Temperature Switch:

A water temperature switch (fig. 1) is fitted to the lower side of the heater inlet pipe. Its contacts are open at temperatures below 40°C, this prevents the fans from operating until relatively hot coolant is flowing from the engine.

Fan Speed Switch:

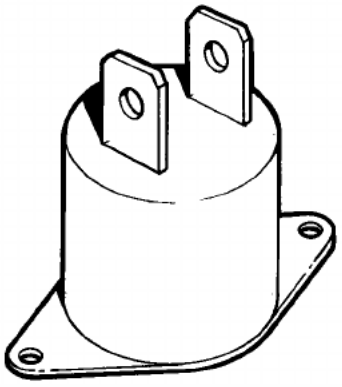
This control switch (C fig. 2) provides inputs to the control module giving information regarding the air required from the blower motors by the operator.

The switch has five positions: OFF, LOW, NORMAL, HIGH AND DEFROST.

In the OFF position the system is not operational, but a signal from the switch is sent to the control module to ensure the flaps in the fan motor assemblies are closed preventing outside air from entering the system. In the LOW, NORMAL and HIGH positions, information regarding the range of fan speed is received by the control module from the control switch, temperature selector and the various sensors. Should a low fan speed be selected the control module will maintain the speed of the fan motor within a range of low speeds depending on the temperature requirement of the vehicle. There are no distinct steps between the fan speeds.

The fan speeds are electronically controlled, and by selecting LOW, NORMAL or HIGH a level of speed in the range selected is received dependent of the operator requirements.

When DEFROST is selected the fans are electronically controlled to operate at maximum speed, the screen vents open, maximum heating is obtained and the lower level flaps fully close (this operation can take up to a maximum of 30 seconds).



J82119

Fig. 1

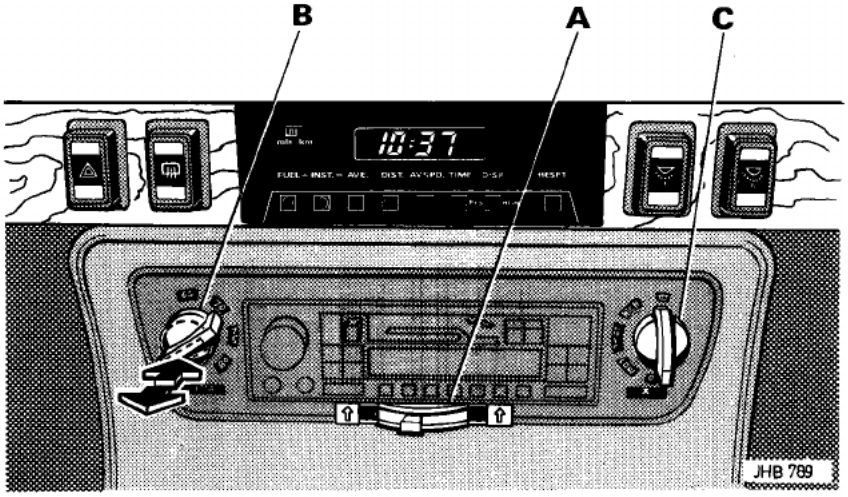


Fig. 2

Key to diagram

1 Pin 13 control module
2 Pin 14 control module
3 Pin 15 control module
4 Pin 27 control module
5 Pin 1 control module
6 Pin 12 control module
7 Pin 44 control module
8 Pin 9 control module

Switch positions:

A OFF
B LOW
C AUTO
D HIGH
E DEFROST

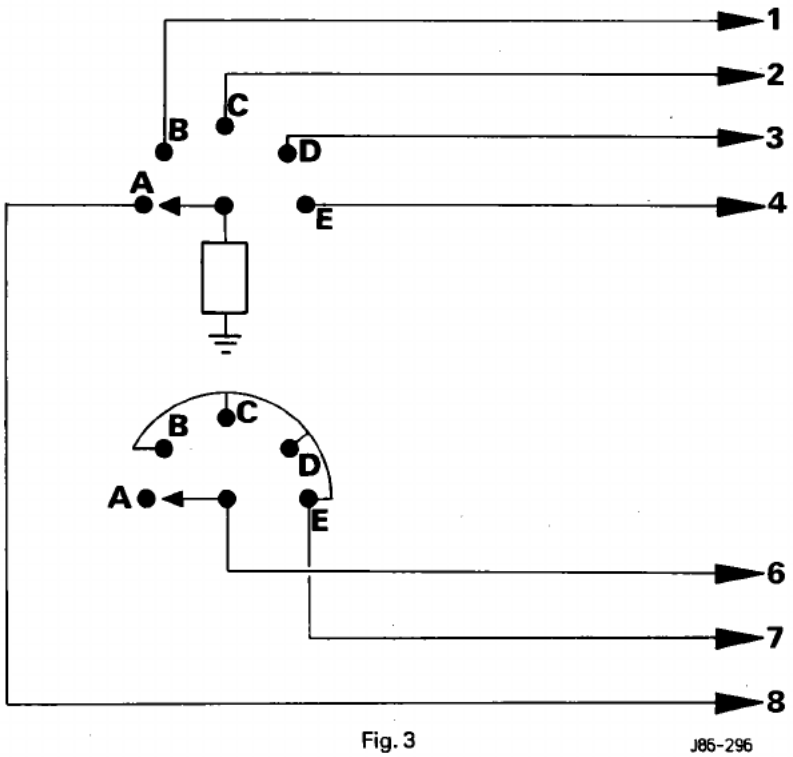


Fig. 3

J86-296

Fan Speed Drive Control:

Mounted in the outlet of the blower motor units are heatsink assemblies each of which consist of an interference suppressor diode (11 fig. 1) a feedback diode (8 fig. 1) and a power transistor (9 fig. 1).

The unit is supplied with positive battery voltage via an ignition controlled fuse. With the fan motor running at high speed the relay (12 fig. 1) is energised with a voltage from pin 16 of the control module thus closing the relay contacts. The negative circuit is therfore completed via the relay contacts.

On all the other fan speeds the negative circuit for the fan motor is via the power transistor and the control module.

The feedback diode (8 fig. 1) enables the control module to sense the voltage at the negative terminal of the fan motor and so calculate the speed of the blower motor.

Vacuum System:

The components operated by the vacuum solenoids (Fig. 2) are:

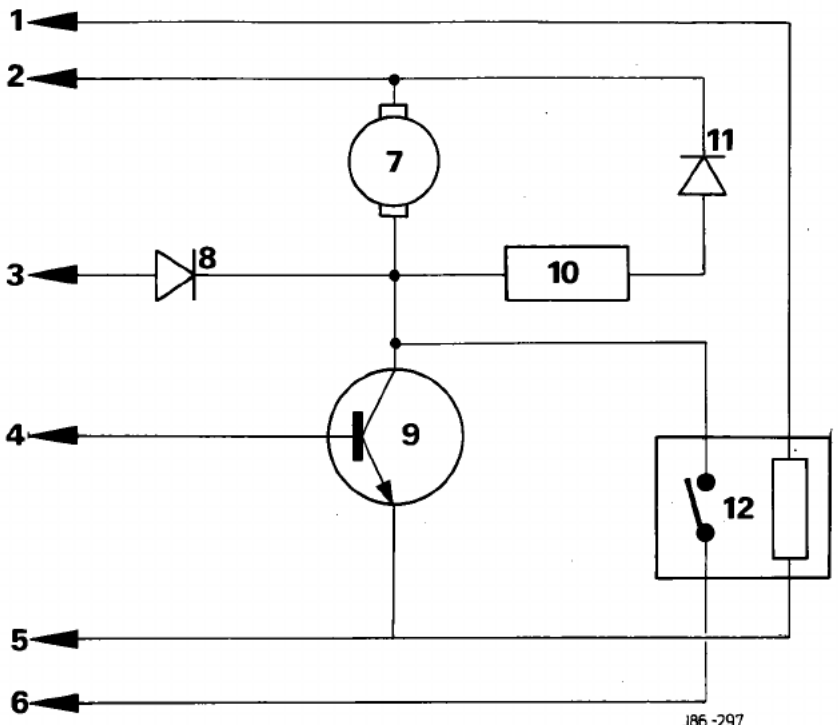
1 Defrost/Demist flaps which are held closed by vacuum. Identified by a green supply tube.

2 Recirculation/Fresh air flaps which are held closed by vacuum. Identified by a blue supply tube.

3 Centre vent which is opened by vacuum. Identified by a black supply tube vacuum tube.

4 Water valve which is closed by vacuum. Identified by a red supply tube.

The vacuum supply to the recirculate/fresh air flaps and the centre vent have built in restrictors so that the operation of these flaps is slowed down to avoid the risk of the system hunting due to the rapid change caused by fast operation time. The recirculation flaps can take up to 30 seconds to change state. The vacuum supply for the system is from the engine manifold via a reservoir and a non-return valve.

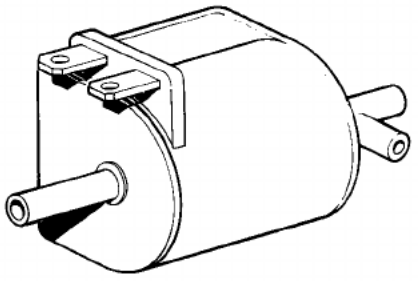


J86 -297

Fig. 1

Key to diagram:

1 Pin 16 control module	7 Fan motor
2 + Battery supply	8 Feedback diode
3 Pin 22 or 33 control module	9 Power transistor
4 Pin 31 or 32 control module	10 Resistor
5 Pin 45 control module	11 Protection diode
6 Earth	12 High speed relay

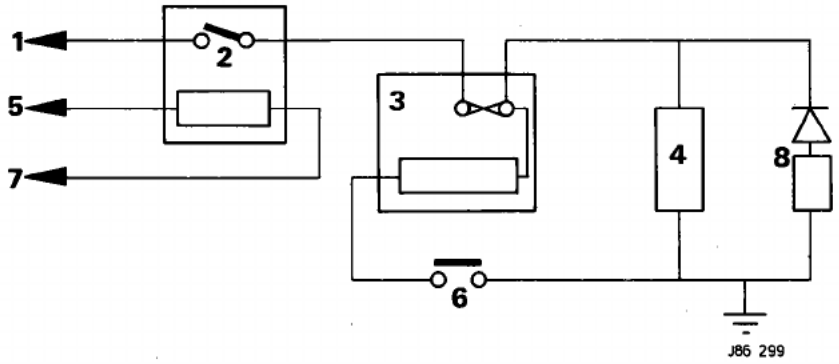


J82 115

Fig. 2

Key to diagram:

1 Positive battery supply
2 Clutch relay
3 Thermal time fuse
4 Compressor clutch
5 Pin 20 control module
6 Super heat switch
7 Negative pin control module
8 Protection diode and resistor



Compressor Clutch Control:

The output from pin 20 of the control module is used to energise the compressor clutch relay (2 fig. 1) which will result in the relay contacts closing allowing battery voltage to the clutch, which on early vehicles is via a thermal fuse (3 fig. 1).
The control module has protection circuits built in to protect the micro-processor from damage in case of incorrect connections which may be made to the compressor clutch relay.

Superheat Switch and Thermal Fuse

On early vehicles a superheat switch is included in the compressor clutch circuit to provide a compressor protection system. The superheat switch and thermal fuse guards against a low refrigerant charge or blockages causing extreme superheated refrigerant vapour conditions resulting in compressor damage. The thermal fuse is a sealed unit containing a heater and a meltable fuse. The superheat switch is located in the rear of the compressor in contact with the suction side refrigerant vapour. With a low refirgerant charge or a blockage the pressure drops and the temperature rises. This condition closes the superheat switch contacts which completes the thermal fuse heater circuit, melts the fuse, disconnects the battery supply to the compressor clutch winding and the thermal fuse heater. The compressor ceases to operate and damage from insufficient lubrication will be avoided.
The thermal fuse melts at 157 to 182°C.
Time taken 2 minutes – 14V system voltage.
5.5 minutes – 11.5V system voltage.
The heater resistance, cold 8 to 10 ohms.
CAUTION: After a thermal fuse melt, establish and rectify the cause before replacing the thermal fuse unit complete.

High Side Low Pressure Switch (HSLP)

On later vehicles the thermal fuse and superheat switch has been replaced by a high side low pressure switch (HSLP).
The HSLP switch is designed to monitor pressure drop on the high pressure side of the refrigerant cycle. At a low pressure condition of 25 lbf/in^2 + or – 5 lbf/in^2, the HLSP switch contacts open thus breaking the earth circuit of the compressor clutch coil, resulting in the compressor clutch disengaging.
Where a fault is present in the refrigerant system e.g. low refrigerant, restriction, etc. the HSLP switch contacts will remain open until the fault has been rectified. Following rectification and recharging the refrigerating system, the HSLP switch contacts will close thus completing the clutch coil earth circuit.

V12 ENGINES

A Emission North America and Japan (1978-80)
B Emission Rest of World
C Emission Canada and Japan 81 on and Australia 1986
D Emission Australia -85 Sweden and Switzerland
E Emission Saudia Arabia

	P System PI Digital			
	5.3 A Emiss Pre HE	5.3 B Emiss Pre HE 9:1	5.3 B Emiss Pre HE 10:1 to 301612	5.3 B Emiss Pre HE-
Ignition timing	25 to 27°	5°B.T.D.C.	10°B.T.D.C.	24°B.T.D.C.
$ =Vac off idle normal run temp	B.T.D.C. #	Vac on	#	#
# = Vac off normal running temp at 3000 r.p.m.				
Valve clearances	0.012 to 0.014 in	0.012 to 0.014 in	0.012 to 0.014 in	0.012 to 0.014 in
Spark plugs — make/type	N10Y	N10Y	N10Y	N10Y
— gap	0.035 in	0.035 in	0.035 in	0.035 in
Ignition coil — make/type	22C12	23C12	23C12	23C12
Primary resistance @ 20°C (ohms)	0.9 to 1.1	0.7 to 0.85	0.7 to 0.85	0.7 to 0.85
Output (open circuit) Kv min	25	25	25	25
Output at plug Kv min (assuming plug gap and lead to spec)	10	10	10	10
Distributor — make/type	36DE12	36DE12	36DE12	36DE12
Rotation of rotor view above	Anticlockwise	Anticlockwise	Anticlockwise	Anticlockwise
Points/pick up mod/rot gap	0.020 to 0.025 in	0.020 to 0.025 in	0.020 to 0.025 in	0.020 to 0.025 in
Pick up coil resistance K Ohms	2.2 to 4.8	2.2 to 4.8	2.2 to 4.8	2.2 to 4.8
Firing order	1A-6B-5A-2B-3A-4B-6A-1B-2A-5B-4A-3B*			
* — cylinders numbered from front				
Spark plug lead resistances	Min — Max	Min — Max		
	1A 3.05 to 7.35K	1B 4.00 to 9.66K		
	2A 2.09 to 5.04K	2B 2.78 to 6.72K		
	3A 2.27 to 5.46K	3B 1.31 to 3.15K		
	4A 3.48 to 8.40K	4B 2.00 to 4.83K		
	5A 3.13 to 7.56K	5B 3.31 to 7.98K		
	6A 3.22 to 7.77K	6B 3.92 to 9.45K		
Exhaust emission reading Co	1 to 2%	1 to 2%	1 to 2%	1 to 2%
Idle speed	750 r.p.m.	750 r.p.m.	750 r.p.m.	750 r.p.m.
HC				
Compression pressure	135 lbf/in^2	135 lbf/in^2	150 lbf/in^2	165 lbf/in^2
Differential between cylinders	15% maximum			
Fuel pressure	35.5 to 38.8 lbf/in^2			

RECIRCULATION VACUUM SOLENOID

Renew **82.20.67**

Disconnect the battery earth lead.
Remove the right hand console side casing.
Remove footwell duct securing screws.
Displace and remove the duct assembly.
Remove the bolts securing the solenoid bracket and reposition rearward from locating lugs for access.
Note and disconnect the vacuum hoses.
Disconnect the solenoid feed wires.
Remove the solenoid from mounting bracket.
Fitting a new solenoid is the reversal of the removal procedure.

DEFROST VACUUM SOLENOID

Renew **82.20.68**

Disconnect the battery earth lead.
Remove the left hand console side casing.
Remove the screws securing the footwell duct.
Displace and remove the footwell duct assembly.
Remove the bolts securing the solenoid bracket and displace bracket for access.
Disconnect the white vacuum hose from the 'T' piece.
Reposition the bracket for access.
Note and disconnect the vacuum hoses from the solenoid.
Note and disconnect the feed wires from the solenoid.
Remove the solenoid from the mounting plate.
Fitting a new solenoid is the reversal of the removal procedure.

WATER VALVE VACUUM SOLENOID

Renew **82.20.69**

Disconnect the battery earth lead.
Remove the left hand console side casing.
Remove the screws securing footwell duct.
Displace and remove the duct.
Remove the screws securing the solenoid mounting bracket and reposition the bracket rearward from the location lugs for access.
Note and disconnect the vacuum hoses.
Remove the solenoid from mounting bracket.
Fitting a new solenoid is the reversal of the removal procedure.

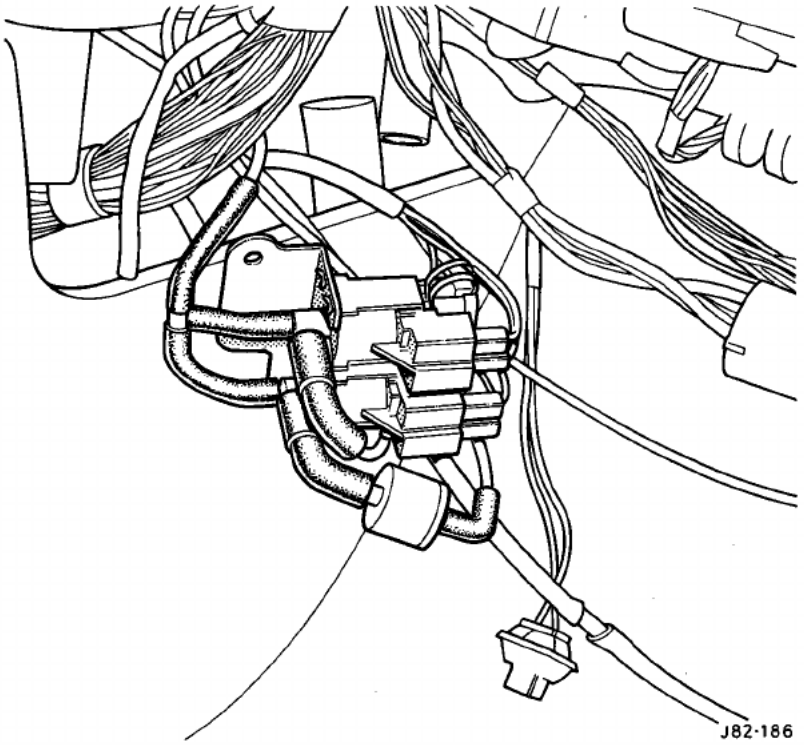


Fig 1.

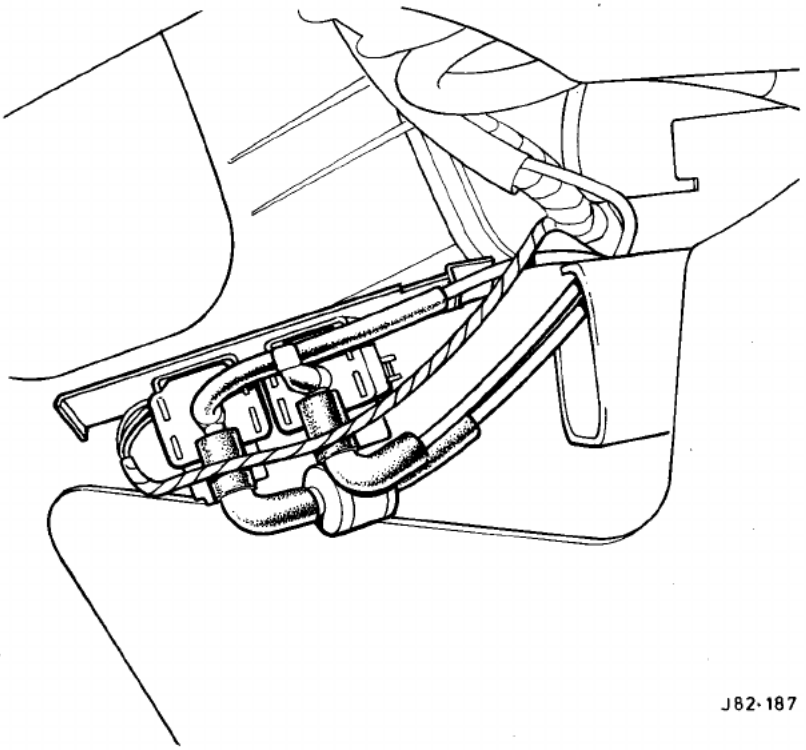


Fig. 2

WATER TEMPERATURE SWITCH

Renew **82.20.71**

Disconnect the battery earth lead.
Remove the left hand side console casing.
Remove the screws securing the footwell duct and remove the duct.
Note and disconnect the feed wires from the switch.
Displace and remove switch from water pipe (Fig. 1).
Fitting a new switch is the reversal of the removal procedure.

EXPANSION VALVE

Renew **82.25.01**

Depressurise the air conditioning system.
Undo the pipe to the expansion valve union nuts and disconnect the pipes.
Fit plugs to the expansion valve and to the pipes.
Reposition the pipes to one side.
Displace the heat protective material from capilliary tube.
Undo the capilliary tube union nut and carefully displace the tube aside.
Remove and discard 'O' rings.
Fit plugs to the unions.
Carefully displace the lower shield from the expansion valve location.
Remove the capilliary tube coil clamp screws and displace the clamp.
Undo the expansion valve union nut.
Displace and remove the expansion valve assembly (Fig. 2).
Fit plugs to the valve and pipe.
Remove and discard the heat protective material from the valve.
Fitting a new valve is the reversal of the removal procedure.
Ensure new 'O' rings to all unions connections are fitted.
Evacuate and recharge the system with R12 refrigerant.

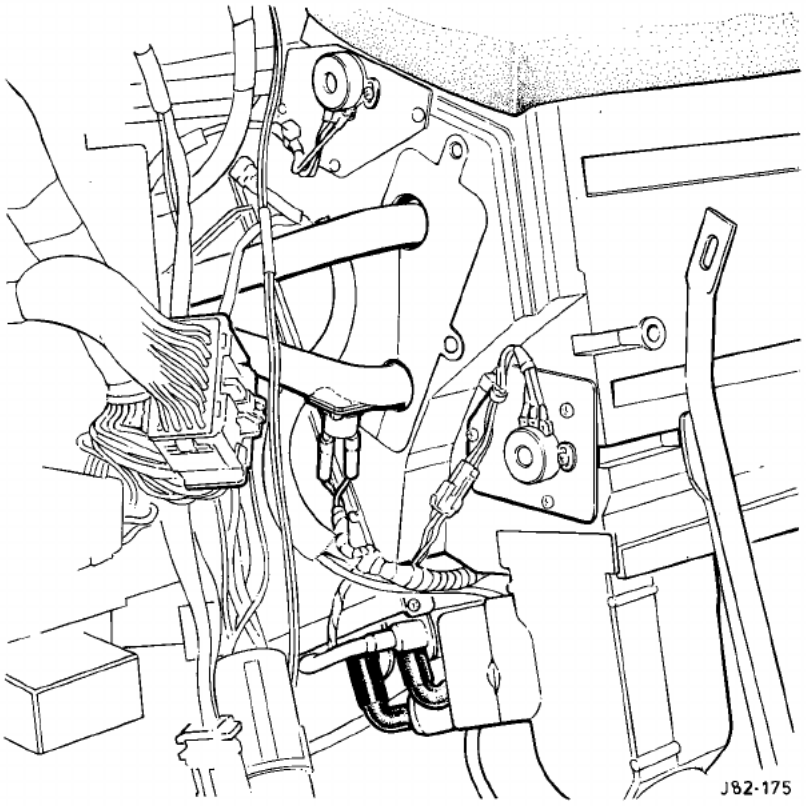


Fig 1.

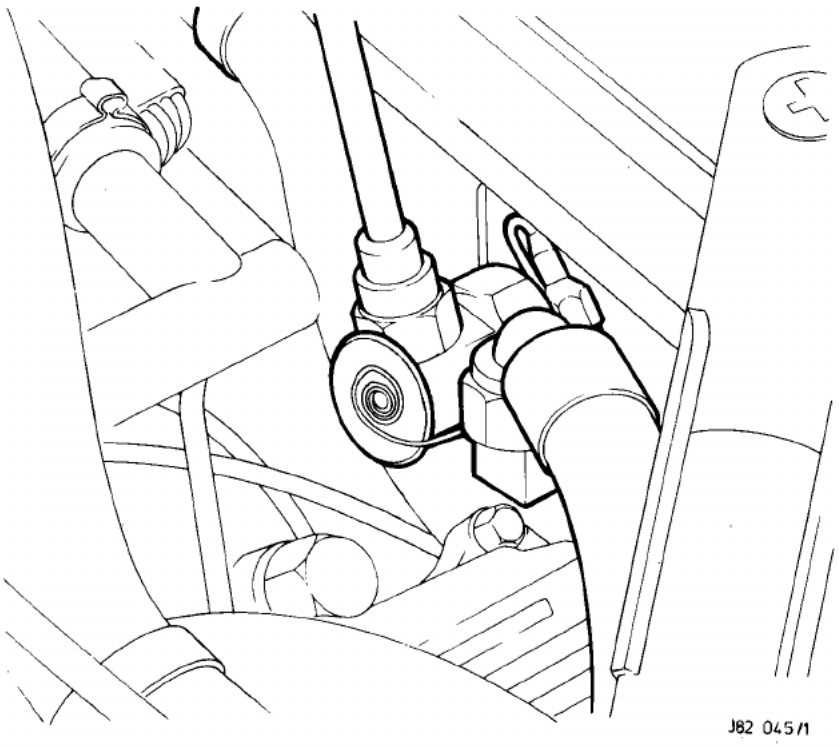


Fig. 2

HEATER MATRIX

Renew 82.25.10

Disconnect the battery earth lead.
Drain the engine coolant into a suitable container.
Remove both console side casings.
Remove both dash liners.
Remove the glove box assembly.
Remove the fascia crash roll.
Remove the feed and return pipes cover securing screws.
Remove the covers.
Displace the foam pad for access.
Undo the feed and return pipes securing bolts and displace the pipes from the matrix.
Displace and remove the gaskets.
Remove the screws securing the electronic control module and displace the module for access.
Remove tape from access panel.
Remove the screws securing the panel and remove the panel.
Displace and withdraw the heater matrix (Fig1).
Fitting a new heater matrix is the reversal of the removal procedure.

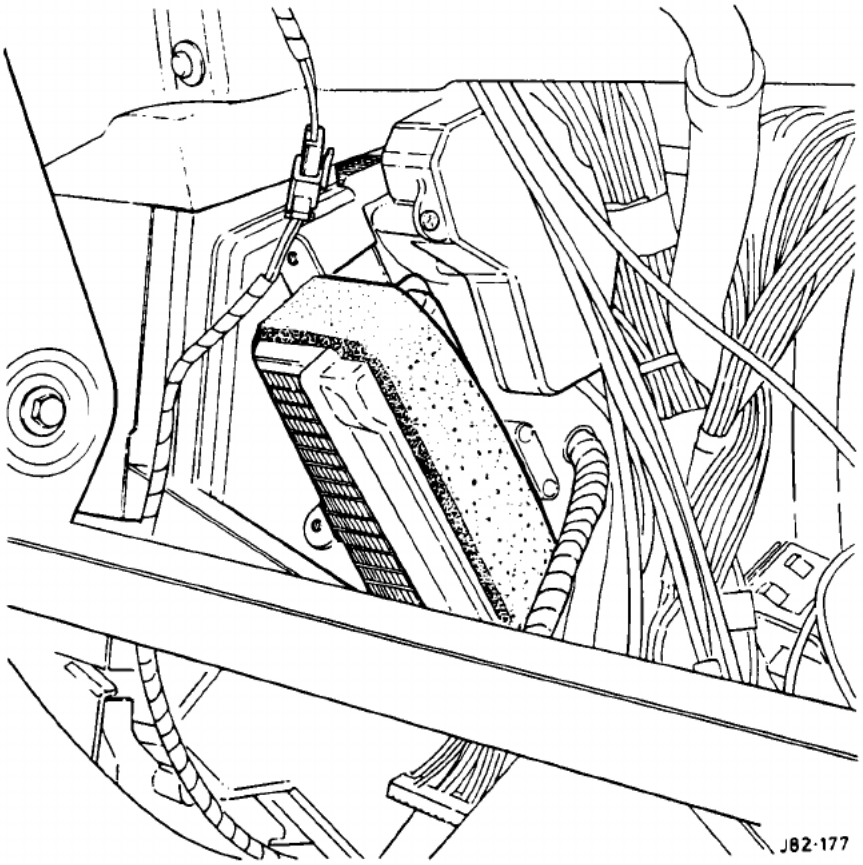


Fig 1

EVAPORATOR UNIT

Renew 82.25.20

Disconnect the battery earth lead.
Remove the console assembly.
Remove the fascia board.
Drain the engine coolant into a suitable container.
Depressurise the air conditioning system.
Remove the expansion valve.
Remove the air conditioning unit assembly.
Remove the heater pipe guide plate securing screws and remove the guide plate.
Remove the screws securing evaporator sensor and withdraw the sensor from evaporator.
Remove the screws securing the solenoid mounting plate and displace mounting plates from unit.
Remove harness to casing earth bolt and displace the harness.
Cut and remove harness to casing securing ratchet straps and displace the harness from casing.
Displace vacuum hose from casing.
Displace heat cladding from capilliary tube.
Undo expansion valve to unit union nut.
Undo capilliary tube union nut.
Remove the capilliary clamp screws.
Displace and remove the expansion valve assembly.
Remove and discard 'O' rings.
Fit plugs to expansion valve.
Displace and remove casing securing clips.
Split casing and remove evaporator from unit.
Remove expansion valve guide plate securing screws and remove plate.
Displace and remove plate from evaporator.
Fitting the new evaporator is the reversal of the removal procedure.
Refill the engine cooling system with coolant.
Recharge the air conditioning system.

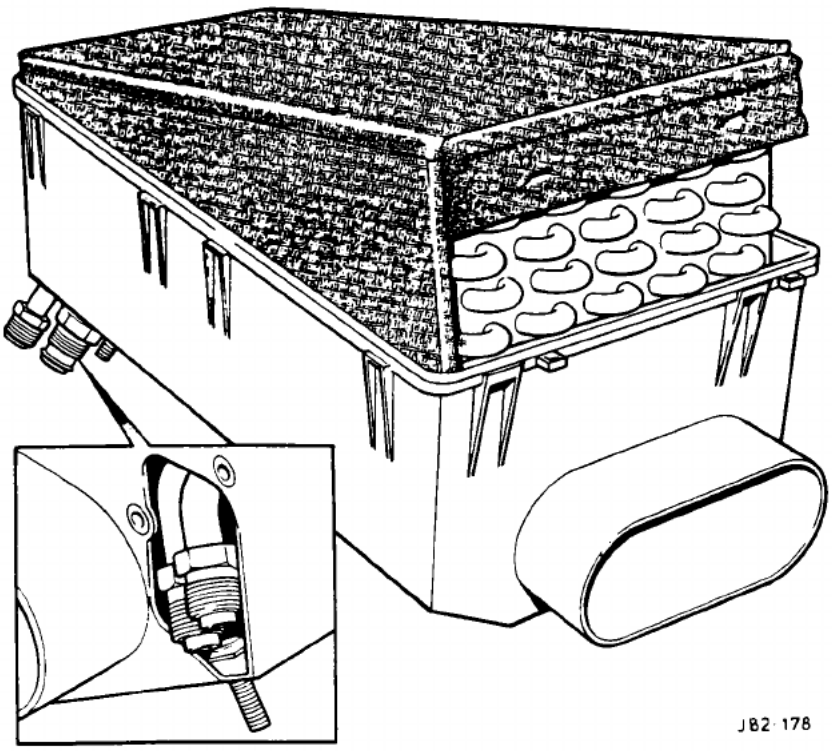
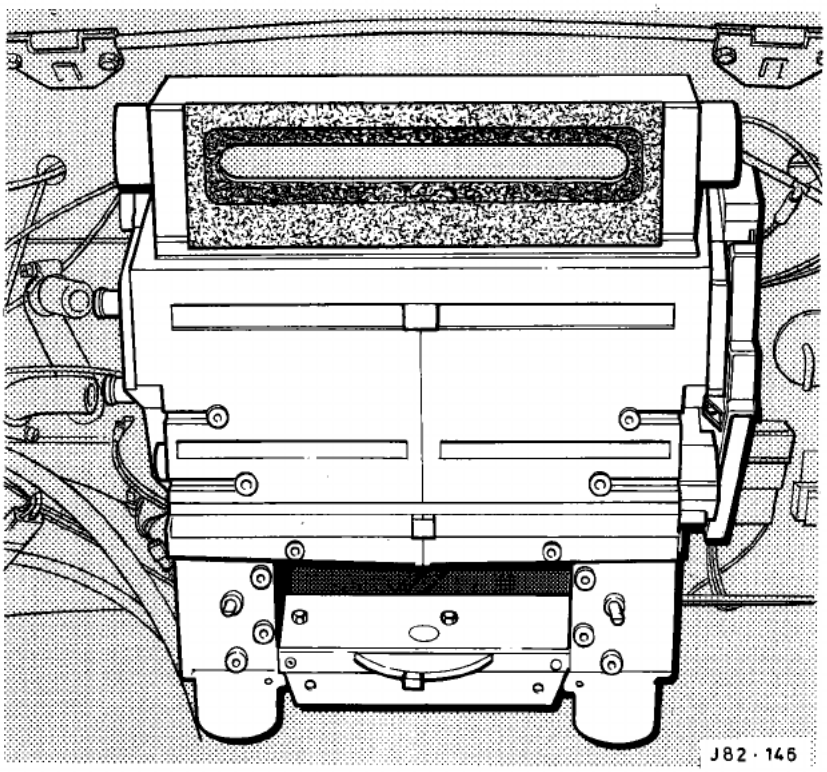


Fig 2

AIR CONDITIONING UNIT

Renew **82.25.21**

Disconnect the battery earth lead.
Drain the engine coolant into a suitable container.
Depressurise the air conditioning system.
Remove both console side casings.
Remove both dash liners.
Remove the glove box assembly.
Remove the fascia crash roll.
Remove the fascia.
Remove the air con unit to rear outlet air tubes.
Disconnect the trunking to volute outlet tubes and remove the tubes.
Slacken the feed and return coolant hose clips and disconnect the hoses from the heater matrix.
Undo the high and low refrigerant hose union nuts to the expansion valve, disconnect the hoses.
Remove and discard the 'O' ring seals.
Fit protective plugs to the hoses and expansion valve.
Remove the nuts securing the air con unit to the bulkhead.
Remove the spacers.
Remove the foam rings from the heater pipes.
Disconnect the condensate drain tubes.
Disconnect the right and left hand blower motor multi-plug connectors.
Note the position of and disconnect the vacuum hoses from the right and left hand side of the air con unit.
Disconnect the in-car sensor from grommet.
Disconnect the face level differential switch multi-plug connector.
Displace and remove the unit.
Displace and remove foam pads from the unit.
Fitting a new air conditioning unit is the reversal of the removal procedure.
Ensure new 'O' rings are fitted to all air conditioning hose connections.
Refill the engine coolant system.
Reconnect the battery.
Recharge the air conditioning system.



BLOWERS MOTOR (LEFT HAND)

Renew **82.25.13**

Disconnect the battery earth lead.
Remove the left hand dash liner and the console side casing.
Remove the glove box assembly.
Remove the nuts securing the component panel to the blower motor assembly.
Displace the earth strap from the inner stud.
Displace the fuse holder from the component panel.
Displace the component panel from the blower assembly.
Disconnect the pliable trunking from the volute outlet tubes.
Disconnect the aspirator tube from the trunking.
Disconnect the blower solenoid vacuum hose.
Open the lower flap and insert a suitable wedge to hold it open.
Remove the nuts and bolts securing the blower motor assembly.
Disconnect the multi-plug cable connector.
Displace and remove the blower motor assembly from the vehicle.
Fitting a new blower motor assembly is the reversal of the removal procedure.

BLOWER MOTOR (RIGHT HAND)

Renew **82.25.14**

Disconnect the battery earth lead.
Remove the right hand dash liner and the console side casing.
Remove the nuts securing the component panel to the blower motor assembly.
Displace relays for access.
Disconnect the pliable trunking from the volute outlet tubes.
Disconnect the blower solenoid vacuum hose.
Open the lower flap and insert a suitable wedge to hold it open.
Remove the nuts and bolts securing the blower motor assembly.
Displace the assembly, route trunking over the steering column.
Displace the component panel from the blower motor assembly.
Disconnect the multi-plug cable connector and remove the blower motor assembly from the vehicle.
Remove the tape securing the trunking to the blower assembly and remove the trunking.
Fitting a new blower motor assembly is the reversal of the removal procedure.

CONTENTS

V12 ENGINES

A Emission North America and Japan (1978-80)
B Emission Rest of World
C Emission Canada and Japan 81 on and Australia 1986
D Emission Australia -85 Sweden and Switzerland
E Emission Saudia Arabia

	P System PI Digital			
	5.3 A & B Em HE	5.3 A & B Em HE After 7P50275	5.3 Australia 1985	5.3 Switzerland 1985
Ignition timing	18° B.T.D.C.	18°B.T.D.C.	16°B.T.D.C.	18° +0–2 B.T.D.C.
$ =Vac off idle normal run temp	#	#	#	
# = Vac off normal running temp at 3000 r.p.m.				
Valve clearances	0.010 to 0.012 in	0.010 to 0.012 in	0.010 to 0.012 in	0.010 to 0.012 in
Spark plugs — make/type	BN5	RS5C	RS5C	RS5C
— gap	0.025 in	0.025 in	0.025 in	0.025 in
Ignition coil — make/type	35C6x2	35C6x2	35C6x2	35C6x2
Primary resistance @ 20°C (ohms)	0.6 to 0.8	0.6 to 0.8	0.6 to 0.8	0.6 to 0.8
Output (open circuit) Kv min	25	25	25	25
Output at plug Kv min (assuming plug gap and lead to spec)	10	10	10	10
Distributor — make/type	36DM12	36DM12	36DM12	36DM12
Rotation of rotor view above	Anticlockwise	Anticlockwise	Anticlockwise	Anticlockwise
Points/pick up mod/rot gap	0.006 to 0.014 in	0.006 to 0.014 in	0.006 to 0.014 in	0.006 to 0.014 in
Pick up coil resistance K Ohms	2.2 to 4.8	2.2 to 4.8	2.2 to 4.8	2.2 to 4.8
Firing order	1A-6B-5A-2B-3A-4B-6A-1B-2A-5B-4A-3B*			
@ — cylinders numbered from rear				
* — cylinders numbered from front				
Spark plug lead resistances	Min — Max	Min — Max		
	1A 3.05 to 7.35K	1B 4.00 to 9.66K		
	2A 2.09 to 5.04K	2B 2.78 to 6.72K		
	3A 2.27 to 5.46K	3B 1.31 to 3.15K		
	4A 3.48 to 8.40K	4B 2.00 to 4.83K		
	5A 3.13 to 7.56K	5B 3.31 to 7.98K		
	6A 3.22 to 7.77K	6B 3.92 to 9.45K		
Exhaust emission reading Co	1 to 2%	1 to 2%	0.5 to 1%	0.75 ± 0.25%
Idle speed	750 r.p.m.	750 r.p.m.	800 r.p.m.	800 ± 50 r.p.m.
HC				500 p.p.m. max.
Compression pressure	200 to 240 lbf/in²	200 to 240 lbf/in²	200 to 240 lbf/in²	200 to 240 lbf/in²
Differential between cylinders	15% maximum			
Fuel pressure	35.5 to 38.8 lbf/in²			

	5.3 All markets except U.K. and Europe After Engine No. 7P 56622	5.3 Middle East After Engine No 7P 56622	5.3 Australia, Canada, Japan After Engine No 7P 56622
Ignition timing	16° ± 1° BTDC	16° ± 1° BTDC	16° ± 1° BTDC

	5.3 Australia, Canada, Japan, USA After VIN 326520	5.3 All markets except Australia, Canada, Japan, USA After VIN 326520	5.3 Australia, Canada, Japan After Engine No 7P 56622
Spark plugs — make/type	EAC 9186 Champion RS9YC	EAC 8554 NGK BR7 EFS	EAC 8554 NGK BR7 EFS

CIRCUIT BREAKERS

Remove and refit **86.25.31**

Disconnect the battery.
Remove the L.H. side dash casing.
Disconnect the cables from the circuit breaker.

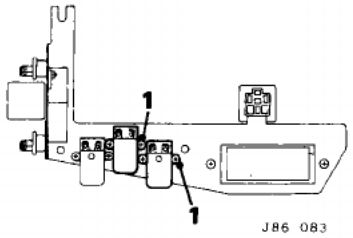


Fig. 37

Remove the screw securing the unit to the component panel and remove the unit (1, Fig. 37).

When refitting reverse the above procedure.

DOOR LOCK SOLENOIDS

Remove and refit **86.25.32**

With the window closed, disconnect the battery.
Remove the door arm-rests and door trim.
Remove the rod from the lock and the anchor point on solenoid (1, Fig. 38).

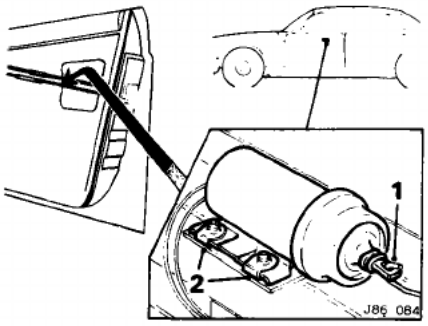


Fig. 38

Remove the bolts securing the solenoid (2, Fig. 38).
Disconnect the block connector from the cable harness and remove the solenoid.

When refitting reverse the above procedure.

DOOR LOCK SOLENOID RELAY—LEFT-HAND AND RIGHT-HAND SIDE

Remove and refit **86.25.33**
86.25.34

Disconnect the battery.

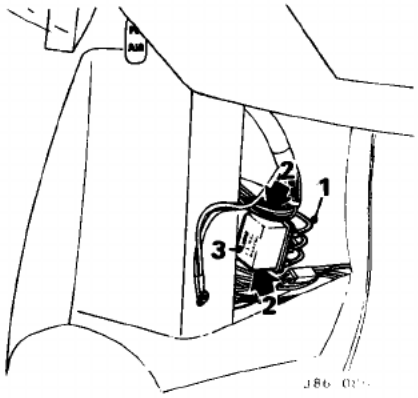


Fig. 39

Remove the R.H. or L.H. side footwell trim pad.
Identify and disconnect cables from the relay (1, Fig. 39).
Withdraw the screws securing the relay (2, Fig. 39), retrieve the distance pieces and remove the relay (3, Fig. 39).

When refitting reverse the above procedure.

BOOT LID LOCK SOLENOID

Remove and refit **86.26.02**

Disconnect the battery.
Open the luggage compartment.
Disconnect the solenoid multi-plug connector (1, Fig. 40).
Remove the solenoid securing bolts and disconnect the earth wire eyelet (2, Fig. 40).

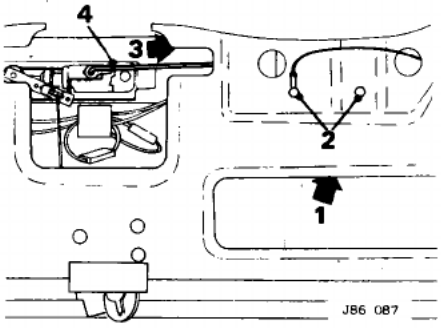


Fig. 40

Slacken the number-plate lamp securing nuts (3, Fig. 40) and withdraw the lamp as far as is necessary to allow the solenoid to be removed.
Remove the lock operating rod (4, Fig. 40).
Remove the solenoid.

Reverse the above procedure to refit.

HORNS

Description **86.30.00**

Twin horns are fitted. Both horns operate simultaneously and are energised by a relay. The relay is connected to the battery through the ignition switch so that the horns will only operate with ignition switched on.

HORN-PUSH

Remove and refit **86.30.01**

Disconnect the battery.
Slacken the steering-wheel adjusting nut, and pull the steering-wheel out to its maximum travel.
Remove the horn-push securing screws and remove the push from the steering wheel.

Reverse the above procedure to refit.

HORNS

Remove and refit **86.30.09**

Disconnect the battery.
Disconnect the wiring at the Lucar connectors (1, Fig. 41).

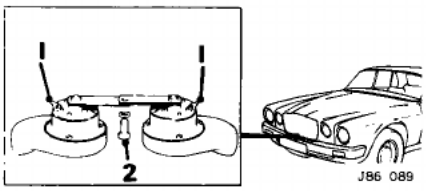


Fig. 41

Withdraw the retaining bolt and spacers (2, Fig. 41).
Remove the horns.

Reverse the above procedure to refit.

HORN RELAY

Remove and refit **86.30.18**

Disconnect the battery.
Remove the relay cover.
Displace the fan motor relay for access.

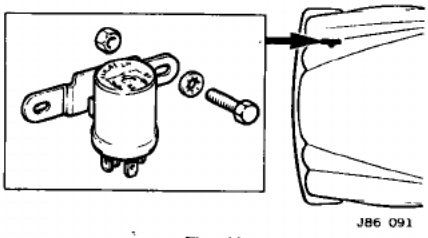


Fig. 42

Identify and disconnect the relay cables.
Remove the relay (Fig. 42).

After refitting, ensure that the cables are reconnected correctly. Refer to the wiring diagram if in doubt.

HORN RELAY CIRCUIT

Check in situ **86.30.17**

Switch on the ignition.

NOTE: Avoid leaving the ignition on for extended periods.

With the ignition on a 12-volt test lamp connected between 'W1' and earth should light up.
If the lamp does not light, check fuse no. 1.
Test lamp on 'W2'. If test lamp fails to light, an unserviceable relay is indicated.
If the relay operates when horn-push is pressed a test lamp connected between 'C1' and earth should light up. Failure to do so indicates that relay contacts are inoperative or fuse No. 4 is unserviceable.
If checks 1 and 2 are satisfactory and horns do not operate, substitute a test lamp for each horn in turn. If the lamp lights, horn units are unserviceable. If the lamp does not light, further investigation of the horn harness will be required.

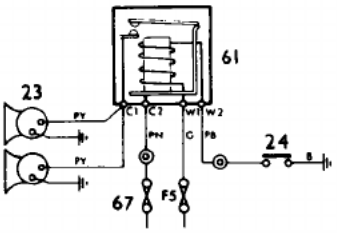


Fig. 43

HORN CIRCUIT CODE

23. Horns
24. Horn-push switch
61. Horn relay
67. Line fuse

HEADLAMP ASSEMBLY

Remove and refit

Headlamp rim finisher	**86.40.01**
Headlamp assembly (outer)	**86.40.02**
Headlamp assembly (inner)	**86.40.03**

Remove the top retaining screw and withdraw the headlight rim finisher, noting the retaining lug at the lower edge (1, Fig. 44).
Remove the three cross-headed screws and the headlight retaining rim (2, Fig. 44).

NOTE: On the inners the cross-headed screws require slackening only, the rim may be turned to remove. Do not turn the slot-headed screws as they are for headlamp alignment.

Withdraw the headlight and unplug the adaptor from the rear of the unit (3, Fig. 44).

When refitting, reverse the above procedure.

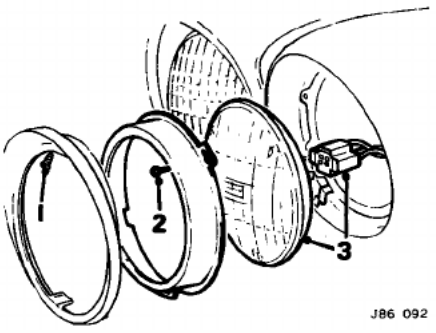


Fig. 44

HEADLAMP PILOT BULB

Remove and refit **86.40.11**

Remove the outer headlight as previously described. Withdraw the pilot bulb holder with bulb from the fitting on the rear of the reflector (Fig. 45).
Remove the bulb.

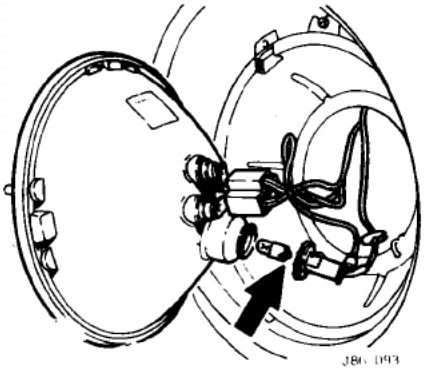


Fig. 45

Reverse the above procedure to refit.

HEADLIGHT ALIGNMENT

86.40.18

Headlight beam setting should only be carried out by qualified personnel, and with approved beam setting apparatus.

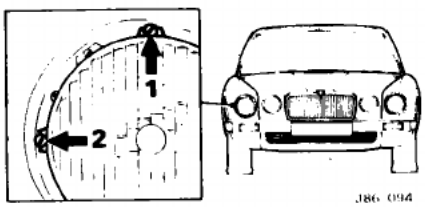


Fig. 46

Adjustment

Remove the headlight rim finisher.

Outer headlights.
Turn the top screw anti-clockwise to lower the beam, clockwise to raise the beam (1, Fig. 46).
Turn the side screw anti-clockwise to move the beam to the left, clockwise to move the beam to the right (2, Fig. 46).

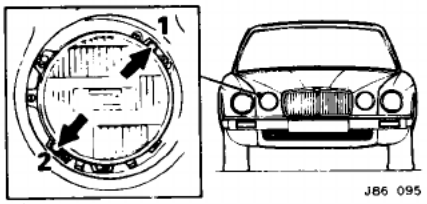


Fig. 47

Inner headlights
The adjustment screws are set diagonally opposite each other. The upper screw is for vertical alignment (1, Fig. 47), the lower screw is for horizontal alignment (2, Fig. 47).

CAUTION: Correct headlamp alignment is mandatory in certain countries.

FRONT FLASHER REPEATER ASSEMBLY

Remove and refit	**86.40.53**
Lens	**86.40.51**
Bulb	**86.40.52**

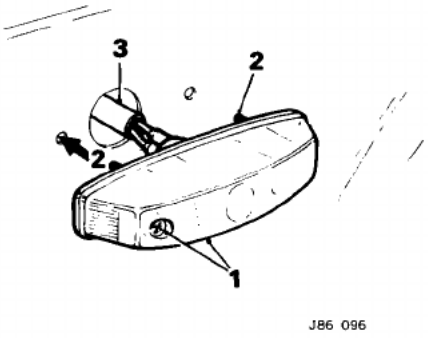


Fig. 48

Remove the retaining screw and detach the lens (1, Fig. 48).
Remove the bulb.
Remove the two nuts and lock washers from the captive retaining bolts (2, Fig. 48).
Disconnect the cables from the snap connectors (3, Fig. 48), check condition of seals while the assembly is removed from the car.

Reverse the above procedure to refit.

FRONT FLASHER ASSEMBLY

Remove and refit	**86.40.42**
Lens	**86.40.40**
Bulb	**86.40.41**

Disconnect the battery.
Remove the screws securing the lens assembly to the front bumper (1, Fig. 49).

Withdraw the assembly clear of the bumper for access. Rotate the assembly at the bulb holder and remove the lens assembly. Check condition of the seal.
Rotate the bulb holder anti-clockwise and withdraw it behind the bumper (2, Fig. 49).
Withdraw the bulb from the holder.
Remove the screw securing the fusebox to the front wing valance and ease the fusebox clear of the valance for access.
Disconnect the cables at the snap connectors.
Attach a draw string to the end of the flasher lamp cables.

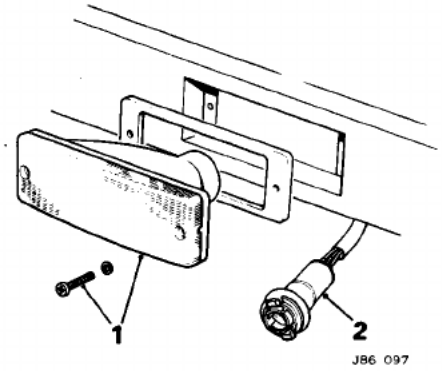


Fig. 49

Remove the plastic straps securing the harness to headlamp harness under the wing.
Remove the screws securing the flasher lamp assembly to the bumper, and withdraw the lamp with harness from its location.

Reverse the above procedure to refit.

SIDE MARKER ASSEMBLY

Remove and refit	**86.40.64**
	86.40.57
	86.40.58
	86.40.59
Bulb	**86.40.62**
Lens	**86.40.63**

Withdraw the crosshead retaining screw and remove the lens; note the retaining clip.
Withdraw the bulb (1, Fig. 50).

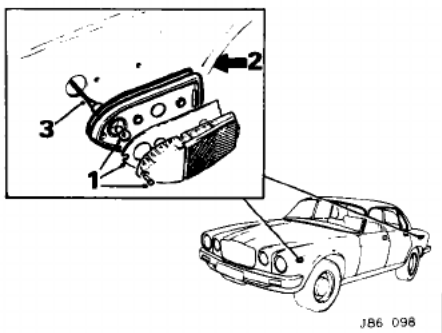


Fig. 50

Remove the retaining nuts and lock washers (2, Fig. 50).
Disconnect the cables from the snap connectors (3, Fig. 50).
Check the condition of seals while the assembly is removed from the car.

TAIL/STOP/FLASHER AND REVERSE LAMPS

Remove and refit	**86.40.72**
	86.40.73
	86.40.74

Remove the screws securing the lens, and detach the lens (1, Fig. 51).
Remove and check the sealing rubbers.
Remove the bulb (2, Fig. 51).
Remove the screw securing the assembly to the rear wing.

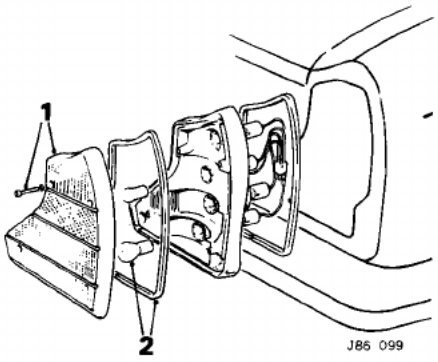


Fig. 51

Withdraw the assembly clear of the wing for access to the cable connections.
Disconnect the block and snap connectors and remove the assembly from the car.

NUMBER-PLATE LAMP ASSEMBLY

Remove and refit	**86.40.86**
Lens	**86.40.84**
Bulb	**86.40.85**

Remove the lens securing screws (1, Fig. 52).
Ease the lens/lamp assembly from its location (2, Fig. 52).

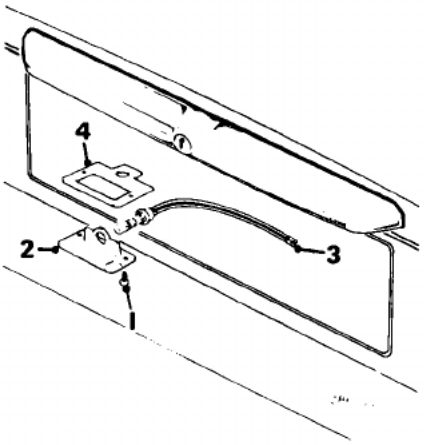


Fig. 52

Disconnect the cable snap connectors (3, Fig. 52)
Check the gasket while the assembly is removed from the car (4, Fig. 52).

NUMBER-PLATE LAMP ASSEMBLY HOUSING

Remove and refit	**86.40.98**

Open the boot lid, and release the solenoid operating rod from the clip. Withdraw the rod from the lock lever.
Remove the nuts, washers and shakeproof washers securing the number-plate lamp housing.

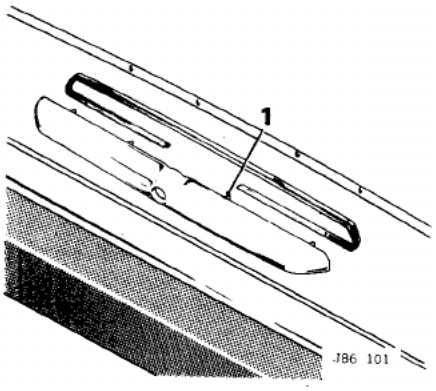


Fig. 53

Disconnect the number-plate lamp snap connectors and remove the assembly from the boot lid (Fig. 53).

Reverse the above operations.

REAR FOGLAMP ASSEMBLY

Remove and refit	**86.40.99**

Remove the rear lamp cluster for access.
Disconnect the fog lamp cables from the snap connectors and attach a draw-string to the cables.

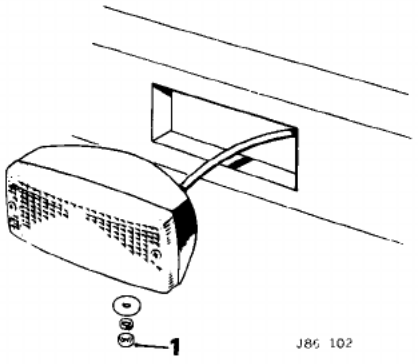


Fig. 54

Displace the rubber grommet from the body under the apron and withdraw the cables through the aperture.
Detach the draw-string from the cables.
Remove the nuts and washers securing the lamp assembly to the rear bumper (1, Fig. 54) and withdraw the lamp.

REAR FOG LAMP LENS AND BULB

Remove and refit **86.41.20**
86.41.21

Remove the screws securing the lens (1, Fig. 55) and remove the lens and bulb (2, Fig. 55).

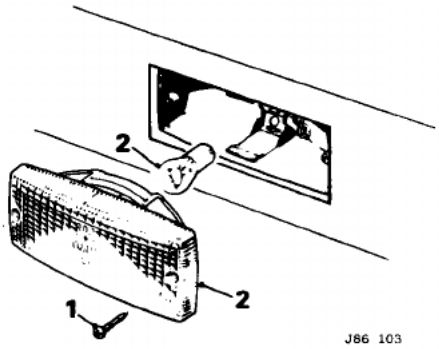


Fig. 55

FOG/SPOTLIGHT LENS UNIT AND BULB

Remove and refit **86.40.94**

Caution: Under no circumstances should bulbs in these units be touched with bare hands.

Disconnect the battery.

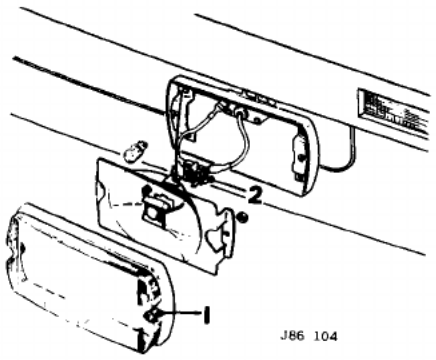


Fig. 56

Remove the two screws securing the light unit (1, Fig. 56).
Move the bulb retaining clip to one side and remove the bulb holder from the light unit (2, Fig. 56).
Using a cloth or glove, pull the bulb from the holder.
Remove the rubber retaining washers from the light unit retaining screws and separate the units.

FOG/SPOTLIGHT ASSEMBLY

Remove and refit **86.40.96**

Disconnect the battery.
Disconnect the cable at the snap connector.
Remove the shakeproof washers.
Remove the assembly.

DOOR POST LAMP ASSEMBLY AND BULB

Remove and refit **86.45.03**

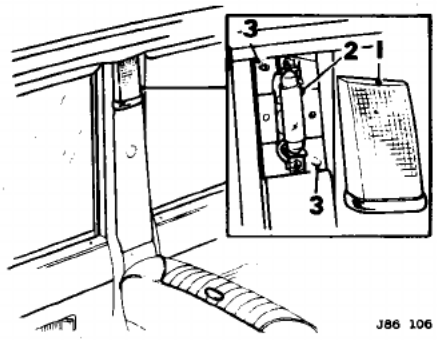


Fig. 57

Disconnect the battery.
Carefully lever the cover from the lamp (1, Fig. 57) and withdraw the festoon-type bulb from the holder (2, Fig. 57).
Withdraw the two retaining screws and lift the lamp from the post (3, Fig. 57).
Disconnect the cables from the snap connectors.

MAP LIGHT ASSEMBLY AND BULB

Remove and refit **86.45.09**

Withdraw the bulb holder by exerting pressure on the side clip and pulling the bulb holder downwards (1, Fig. 58).

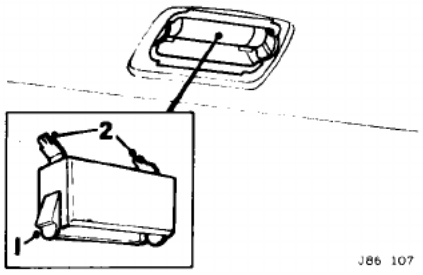


Fig. 58

Withdraw the festoon-type bulb.
Disconnect the cables from Lucar connectors and retain the lamp assembly (2, Fig. 58).

LUGGAGE COMPARTMENT LAMP ASSEMBLY AND BULB

Remove and refit **86.45.15**

Disconnect the battery.
The bulb is accessible through an aperture in the luggage compartment lid.
Carefully lever the lamp clear of the mounting plate on the boot lid.
Disconnect the cables and recover the lamp.

FIBRE OPTIC ILLUMINATION SYSTEM

Description

Consists of a centralized light source (Opticell) feeding localized illumination via fibre elements and diffuser lens units to specific areas. Control switches illuminated in this way are as follows:

1. Ignition switch (one element).
2. Lighting switch (one element).
3. Heater/air conditioning control switches (two elements to each control).

Failure of the light source will result in loss of illumination at all the above control units.

OPTICELL

Remove and refit **86.45.27**

Disconnect the battery.
Remove the centre console escutcheon and window lift switch panel.
Withdraw the two screws securing the Opticell to the transmssion selector quadrant (1, Fig. 59).

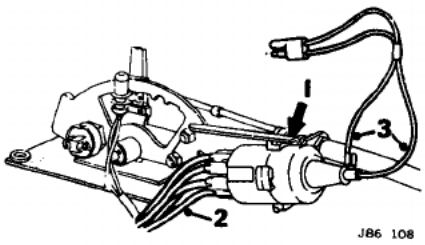


Fig. 59

Disconnect the fibre elements by pulling each one from the Opticell lens hood (2, Fig. 59).
Disconnect the cables (3, Fig. 59).

OPTICELL BULB

Remove and refit **86.45.28**

Disconnect the battery.
Remove the centre console escutcheon and window lift switch panel.
Pull the bulb holder from the Opticell reflector.
Withdraw the miniature bayonet capped bulb from the holder.

NOTE: Replace with a bulb of the correct size as necessary.

PANEL SWITCH ILLUMINATION BULB

Remove and refit **86.45.31**

Disconnect the battery.
Carefully lever the sub panel assembly clear of the clock mounting panel.

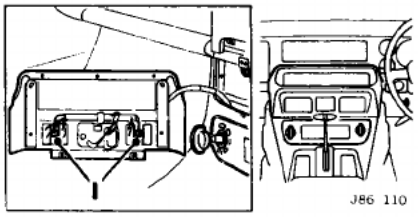


Fig. 60

Release the bulb holder from the lamp housing between the switches (1, Fig. 60), and remove the bulb from the holder.

TRANSMISSION INDICATOR BULB

Remove and refit **86.45.40**

Remove the control knob from the selector lever (1, Fig. 61).
Prise the window lift switch panel and the escutcheon from the centre console.

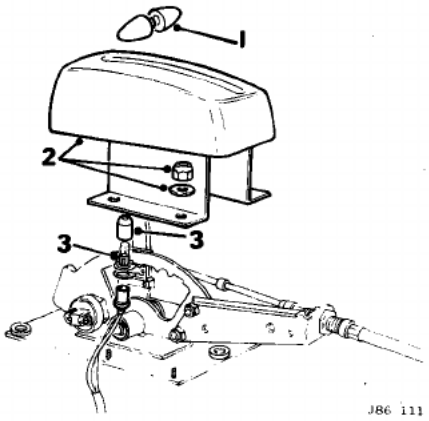


Fig. 61

Remove the four retaining nuts to release the transmission selector cover (2, Fig. 61).
Remove the bulb shroud and withdraw the bulb (3, Fig. 61).
Note: The bulbs used in this unit are of the capless design and only require a straight pull to remove them from the holder. Replace the bulb as necessary.

CIGAR LIGHTER ASSEMBLY

Remove and refit **86.65.60**

Includes:
Cigar lighter illumination bulb—remove and refit **86.45.55**

Disconnect the battery.
Remove the centre console cover retaining screws and raise the cover for access (1, Fig. 62).
Press together the sides of the cigar lighter bulb holder (2, Fig. 62) and remove from the cigar lighter.

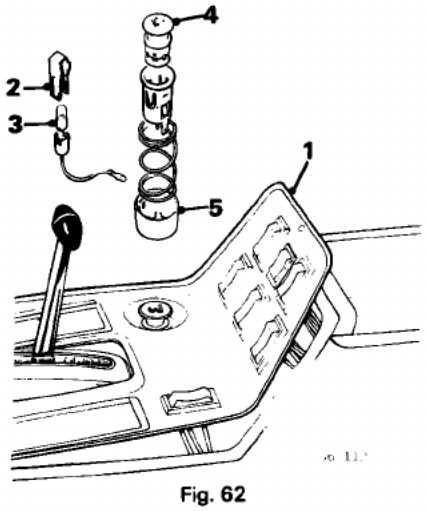


Fig. 62

Remove the bulb (3, Fig. 62).
Disconnect the cables from the cigar lighter.
Press the outer body of the cigar lighter towards the console panel and twist to release from the upper body and spring (4, Fig. 62)
Remove the outer body spring and upper body from the panel (5, Fig. 62).

REAR DOOR SPEAKER

Remove and refit **86.50.14**

Includes:
Rear door speaker grille —remove and refit **86.50.08**

Remove the rear arm-rest.
Remove the nuts securing the speaker/grille assembly.
Remove the grille and speaker from the housing

FRONT DOOR SPEAKER

Remove and refit **86.50.13**

Includes:
Front door speaker grille —remove and refit **86.50.09**

Remove the front door arm-rest and the front door lower trim panel.
Remove the screws securing the speaker assembly and lever carefully clear of adhesive on the door.
Disconnect the speaker wires and remove the nuts securing speaker grille assembly.
Remove the speaker and the grille.

AERIAL

Remove and refit **86.50.21**

Removing

Disconnect the battery.
Remove the boot carpet, boot floor, spare wheel, petrol pump cover, and the boot side trim.
Remove the rear lamp assembly.
Disconnect the aerial lead from the aerial extension lead (1, Fig. 63).
Loosen the knurled nut at the top of the aerial shaft under the wing (2, Fig. 63).

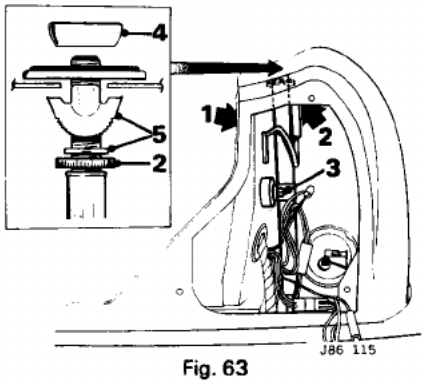


Fig. 63

Remove the bracket from the aerial shaft (3, Fig. 63).
Remove the domed chromed nut from the top of the aerial (4, Fig. 63).
Withdraw the aerial down in to the wing retaining the distance pieces (5, Fig. 63).
Remove the aerial drive shroud from the rear of the boot (1, Fig. 64).
Disconnect the aerial motor feed wires (2, Fig. 64).

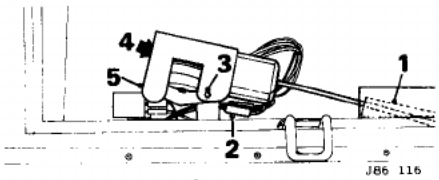


Fig. 64

Remove the bolt from the top of the aerial motor mounting bracket and tilt the assembly away from the rear of the boot (3, Fig. 64).
Remove the plastic drain tube from the bottom of the aerial motor (4, Fig. 64).
Remove the bracket from the aerial motor.
As the motor is withdrawn from the boot, guide the aerial drive and the aerial shaft through the rear of the body.

Refitting is the reversal of the above procedure.

AERIAL MOTOR RELAY

Remove and refit **86.50.27**

Disconnect the battery.
Remove the boot carpet and floor.
Identify and disconnect the cables from the aerial relay.
Withdraw the relay from the mounting bracket.

REAR AERIAL OPERATING SWITCH

Remove and refit **86.50.24**

Disconnect the battery.
Remove the centre console retaining screws and raise the console cover.
Disconnect the cables from the switch, depress the plastic lugs on the switch and withdraw the switch from the cover.

HEADLAMP RELAY

Remove and refit **86.55.17**

Disconnect the battery.
Identify and disconnect the cables from the relay (1, Fig. 65).
Withdraw the bolts securing the relay to the wing valance (2, Fig. 65) and remove the relay.

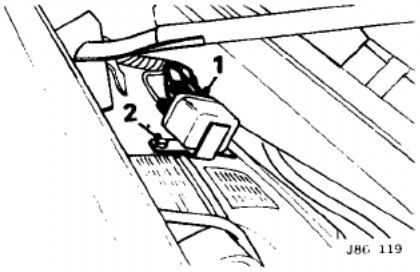


Fig. 65

HAZARD FLASHER UNIT

Remove and refit **86.55.12**

Includes:
Heated rear window/ back-light relay —remove and refit **86.55.19**
Ignition load relay —remove and refit **86.55.28**
Bulb failure indicator —remove and refit **86.55.45**

Disconnect the battery.
Remove the screws securing the right-hand dash casing and remove the dash casing.
The hazard flasher (1, Fig. 66), heated rear back-light relay (2, Fig. 66), ignition load relay (3, Fig. 66), and the bulb failure indicator (4, Fig. 66) are now accessible.
Displace the flasher socket from the retaining bracket on the component panel, and withdraw flasher unit (1, Fig. 66) from the socket.
Withdraw the heated back-light relay and cable socket assembly from the bracket on the component panel; remove the relay (2, Fig. 66) from the cable socket.

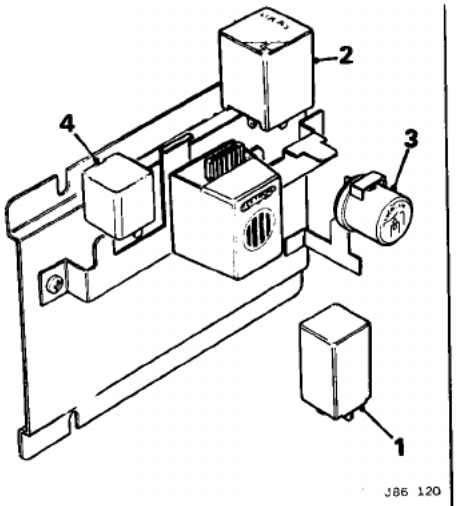


Fig. 66

Displace the ignition load relay and cable socket assembly from the component panel; remove the relay (3, Fig. 66) from the socket.
Remove the bulb failure unit and socket assembly from the bracket on the component panel; remove the unit (4, Fig. 66) from the socket.

STOP LIGHT AND REAR LAMP SENSOR UNITS

Remove and refit **86.55.34**
86.55.50

Remove the cover from the electronic control unit situated in the boot, for access to the sensors.
Identify and disconnect the cables from the appropriate sensor.
Withdraw the securing screws and remove the sensor from the mounting panel.

PARKING LAMP FAILURE SENSOR

Remove and refit **86.55.22**

Also:
Low coolant warning control unit —remove and refit **86.55.33**
Door, boot lock circuit breaker —remove and refit **86.55.36**
Courtesy light delay unit —remove and refit **86.55.49**

Removing

Disconnect the battery.
Remove the screws securing the left-hand-side dash casing and remove the casing.
The parking lamp failure sensor, low coolant warning control unit, door, boot lock circuit breaker, and the courtesy light delay unit are now accessible.
Identify and disconnect the cables from the parking lamp sensor unit.
Remove the nuts and screws securing the sensor unit to the component panel; remove the unit.
Remove the screw securing the coolant warning unit to the component panel.
Withdraw the screws securing the sensor unit to the component panel; remove the unit.
Remove the screws securing the coolant warning unit to the component panel.
Withdraw the screws securing the glovebox liner to the fascia, and ease the liner downwards for access to the warning unit multi-plug connector.
Disconnect the multi-plug connector from cable harness and remove the warning unit.
Disconnect the cables from the door lock circuit breaker.
Withdraw the drive screw securing the circuit breaker to the component panel and remove the unit.
Remove the courtesy delay unit and the cable socket assembly from the component panel, then withdraw the delay unit from the cable socket.

Refitting

Reverse the appropriate operations.

SEAT BELT SWITCH

Remove and refit
Driver's buckle **86.57.25**
Passenger's buckle **86.57.27**

Disconnect the battery.
Adjust the seat to its full forward position.
Withdraw the screws securing the rear window switch panel and raise the panel clear of its location.
Remove the screw securing the console side panel and ease the panel clear for access to the switch block connector.
Disconnect the switch block connector front cable harness.
Withdraw the bolt securing the seat belt buckle and remove the buckle.

STARTER MOTOR— 6 cylinder

Remove and refit **86.60.01**

Removing

Drive the car onto a ramp and disconnect the battery.
Remove the bolt securing the starter lead and the gearbox breather pipe to the bracket on the startor motor. Retrieve the distance piece from the bolt.
Displace the starter lead from the terminal post on the bulkhead.

GENERAL FITTING INSTRUCTIONS

Precautions Against Damage

Always fit covers to protect the wings before commencing work in the engine department.
Cover the seats and carpets, wear clean overalls and wash your hands or wear gloves before working inside the car.
Avoid spilling hydraulic fluid or battery acid on paintwork. Wash off with water immediately if this occurs.
Use polythene sheets in the bo ' to protect carpets.
Always use a recommended service ›l, or a satisfactory equivalent, where specified.
Protect temporarily exposed screw threads by replacing nuts or fitting plastic caps.

Safety Precautions

Whenever possible use a ramp or pit when working beneath a car, in preference to jacking. Chock the wheels as well as applying the handbrake.
Never rely on a jack alone to support a car. Use axle stands or blocks carefully placed at the jacking points to provide a rigid location.
Ensure that a suitable form of fire extinguisher is conveniently located.
Check that any lifting equipment used has adequate capacity and is fully serviceable.
Inspect power leads of any mains electrical equipment for damage, and check that it is properly earthed.
Disconnect the earth (grounded) terminal of a car battery.
Do not disconnect any pipes in the air conditioning refrigeration system, if fitted, unless trained and instructed to do so. A refrigerant is used which can cause blindness if allowed to contact the eyes.
Ensure that adequate ventilation is provided when volatile de-greasing agents are being used.

CAUTION: Fume extraction equipment must be in operation when trichlorethylene, carbon tetrachloride, methylene chloride, chloroform, or perchlorethylene are used for cleaning purposes.

Do not apply heat in an attempt to free stiff nuts or fittings; as well as causing damage to protective coatings, there is a risk of damage to electronic equipment and brake lines from stray heat.
Do not leave tools, equipment, spilt oil, etc., around or on work area.

Safe use of Petrol

When draining petrol tanks, choose a well ventilated area preferably out of doors. Never drain petrol over a pit; keep all sources of ignition well away; use a proper fuel retriever or syphon whenever possible; if draining into a container use a funnel.
Store petrol in secure containers, properly labelled in a store agreed by your local petroleum licensing authority (Trading Standard Dept of Fire Brigade).
Carry petrol in a clearly labelled metal or approved plastic can securely closed.
Use petrol as a fuel only and not for cleaning hands, clothing or components. Do not add petrol to diesel fuel or put petrol on bonfires.
Avoid splashes and spillages; always use a funnel or filling spout for filling in a well ventilated area. If clothing is splashed, change as soon as possible. Keep the clothing away from heat and sources of ignition and tell whoever washes it about the petrol splashes.
Clean up or contain any spillage straight away and open doors and windows.
Keep ignition sources, e.g. handlamps, heaters and welding sets away from petrol.
Dispose of any petrol soaked rags safely.
DO NOT smoke when handling petrol.
NEVER play with petrol, it is highly dangerous and illegal.

Used Engine Oils

Prolonged and **repeated** contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, **used** engine oil contains potentially harmful contaminants which may cause skin cancer. Adequate means of skin protection and washing facilities should be provided.

Health Protection Precautions

1. Avoid prolonged and repeated contact with oils, particularly used engine oils.
2. Wear protective clothing, including impervious gloves where practicable.
3. Do not put oily rags in pockets.
4. Avoid contaminating clothes, particularly underpants, with oil.
5. Overalls must be cleaned regularly. Discard unwashable clothing and oil impregnated footwear.
6. First Aid treatment should be obtained immediately for open cuts or wounds.
7. Use barrier creams, applying before each work period, to help the removal of oil from the skin.
8. Wash with soap and water to ensure all oil is removed (skin cleaners and nail brushes will help). Preparations containing lanolin replace the natural skin oils which have been removed.
9. Do not use petrol, kerosine, diesel fuel, gas oil, thinners or solvents for washing skin.
10. If skin disorders develop, obtain medical advice.
11. Where practicable, degrease components prior to handling.
12. Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.

Environmental Protection Precautions

It is illegal to pour used oil on to the ground, down sewers or drains, or into water courses.
The burning of used engine oil in small space heaters or boilers is not recommended unless emission control equipment is fitted; in cases of doubt, check with the Local Authority.
Dispose of used oil through authorised waste disposal contractors, or licensed waste disposal sites or to the waste oil reclamation trade. If in doubt, contact the Local Authority for advice on disposal facilities.

Preparation

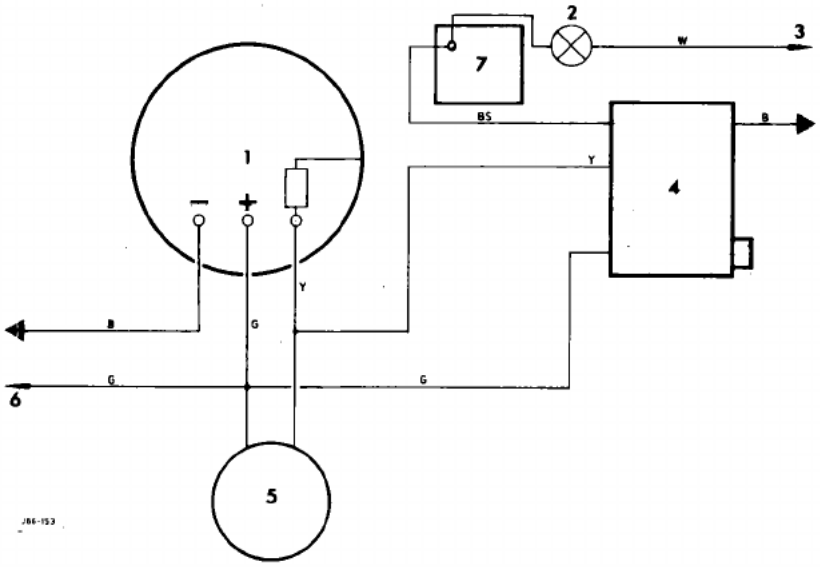
Before removing a component, clean it and its surrounding area as thoroughly as possible.
Blank off any openings exposed by component removal, using greaseproof paper and masking tape.
Immediately seal fuel, oil or hydraulic lines when separated, using plastic caps or plugs, to prevent loss of fluid and entry of dirt.
Close the open ends of oilways, exposed by component removal, with tapered hardwood plugs or readily visible plastic plugs.
Immediately a component is removed, place it in a suitable container; use a separate container for each component and its associated parts.
Before dismantling a component clean it thoroughly with a recommended cleaning agent; check that the agent is suitable for all materials of component.
Clean the bench and provide marking materials, labels, containers and locking wire before dismantling a component.

Dismantling

Observe scrupulous cleanliness when dismantling components, particularly when brake, fuel or hydraulic system parts are being worked on. A particle of dirt or a cloth fragment could cause a dangerous malfunction if trapped in these systems.
Blow out all trapped holes, crevices, oilways and fluid passages with an air line. Ensure that and 'O' rings used for sealing are correctly replaced or renewed if disturbed.
Mark mating parts to ensure that they are replaced as dismantled. Whenever possible use marking ink, which avoids possibilities of distortion or initiation of cracks, liable if centre-punch or scriber are used.
Wire together mating parts where necessary to prevent accidental interchange (e.g. roller bearing components).
Wire labels onto all parts which are to be renewed, and to parts requiring further inspection before being passed for reassembly; place these parts in separate containers from those containing parts for rebuild.
Do not discard a part due for renewal until after comparing it with a new part, to ensure that its correct replacement has been obtained.

Inspection – General

Never inspect a component for wear or dimensional check unless it is absolutely clean; a slight smear of grease can conceal an incipient failure. When a component is to be checked dimensionally against figures quoted for it, use correct equipment (surface plates, micrometers,



KEY TO DIAGRAM

1. Speedometer
2. Oxygen sensor warning light (USA only)
3. Feed to ignition switch
4. Service interval counter (SIC) (USA only)
5. Speed transducer
6. Feed to fuse
7. Warning light bulb failure unit

COLOUR CODE

G	Green
Y	Yellow
B	Black
BS	Black/Slate

Fig. 105

ELECTRONIC SPEEDOMETER

Description

The two major parts of the system are, an electronic speedometer head and an 8 pole transducer which is situated in the automatic/manual transmission unit in place of the conventional angle drive.

The electronic speedometer operates in a similar way to integrated circuit tachometers.

It should be noted that:

Due to the nature of the instrument a slight flickering of the speedometer pointer may be noticeable at below 15 km/h (10 mph).

The control for resetting the odometer is situated in the speedometer facia and is operated by depressing the control button.

The cause(s) of faults which result in incorrect operation are best diagnosed by substitution, having first checked for continuity of wiring/connectors and that battery voltage is supplied to both instrument and transducer. Ensure that earth connections are clean and tight. A fault diagnosis chart is given opposite to assist:

FAULT DIAGNOSIS

Apparent Fault	Probable Cause	Remedy
No reading on Speedometer	Defective Transducer	Substitute Transducer
	Defective Speedometer	Substitute Speedometer
	Defective Wiring	Check continuity of wiring with multimeter, check the positive supply connected to both speedometer and transducer.
Incorrect Speedo Reading	Defective Speedometer	Substitute Speedometer
	Defective Transducer	Substitute Transducer
	Ratio between idle and transducer driven gear incorrect	Check for discrepancy in gear ratios by undoing the knurled collar holding the transducer to the output/drive gear from the gearbox and marking the square drive end. Observe that for every six revolutions of the road wheels the square drive turns 7½ revolutions.
Pointer does not always return to Zero when the vehicle is stationary	Transducer Fault	Substitute Transducer
Excessive needle flicker up to 30 km/h (20 mph) and an odometer count when stationary	Transducer Fault	Substitute Transducer
Needle flicker when brake and trafficator used	Transducer Fault	Substitute Transducer
Various speed indications or needle deflection to max speed when stationary	Transducer Fault	Substitute Transducer

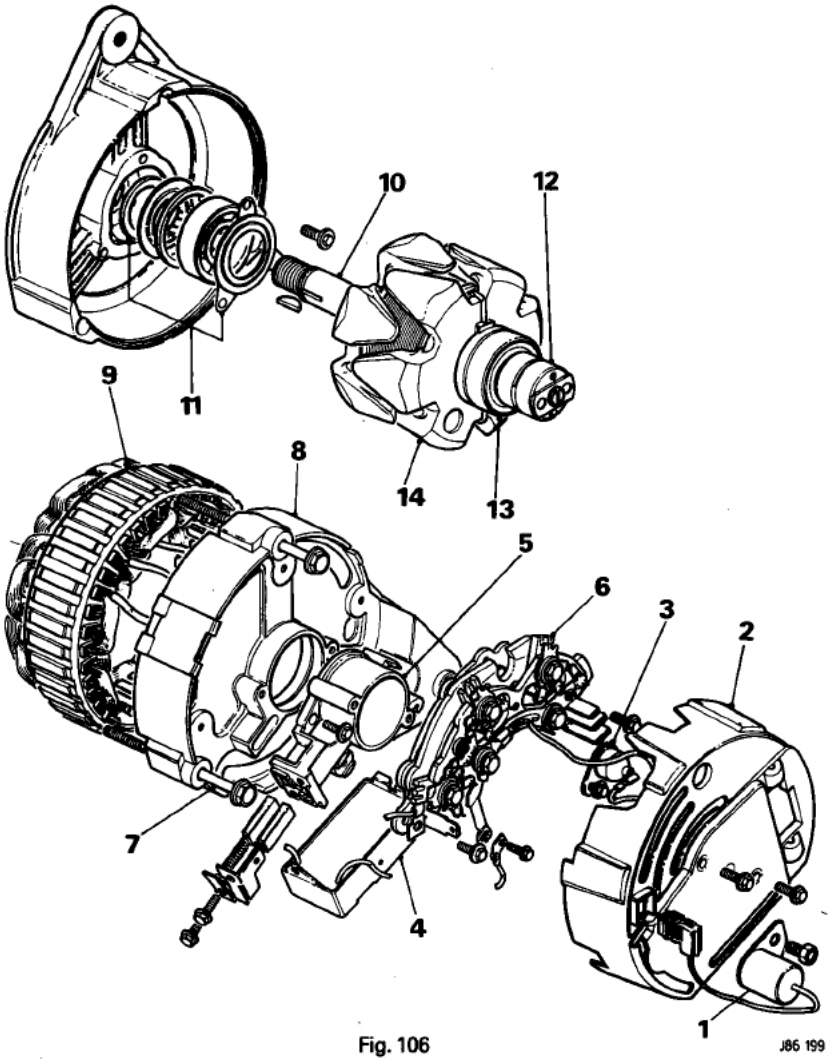


Fig. 106

KEY TO ALTERNATOR

1. Capacitor
2. Cover
3. Surge Protective Diode
4. Regulator
5. Brush Box Assembly
6. Rectifier Pack
7. Through Bolts
8. Slip-ring End Bracket
9. Stator
10. Rotor Shaft
11. Bearing Kit
12. Slip-ring
13. Slip-ring End Bearing
14. Rotor

ALTERNATOR

Description 86.10.00

The A133 alternator is a three phase machine with a delta wound stator, twelve pole rotor, full wave rectification and a 15TR voltage regulator. The alternator is machine sensed with an externally fitted radio suppression capacitor.

Operation

The rotor and stator windings generate a three phase alternating current which is rectified to a direct current suitable for charging the battery. The electronic voltage regulator unit controls the alternator output voltage by high frequency switching of the rotor field circuit.

Specification

Voltage	12 volts
Maximum rev/min	15,000 rev/min
Maximum Output	75 amps
Regulated Voltage	13.6 to 14.4 volts
Rotor Resistance	2,46 ohms
Stator Winding Resistance per phase	0.144 ohms
Maximum Brush Length	20 mm (0.79 ins)
Minimum Brush Length	10 mm (0.39 ins)
Warning Lamp Bulb	2.2 watts

The 'on the vehicle' testing procedures are the same as the ACR range of alternators.

Alternator 86.10.08

Dismantle.

Disconnect the capacitor Lucas connector.

Remove the capacitor securing screw and remove the capacitor (1, Fig. 106).

Remove the two screws securing the cover and remove the cover (2, Fig. 106).

Remove the surge protection diode (3, Fig. 106).

Note the arrangement of the regulator leads, disconnect the leads and remove the regulator (4, Fig. 106).

Remove the two screws securing the brush box assembly and remove the brush box (5, Fig. 106).

Apply a hot iron to the stator lead terminal tags on the rectifier pack and prise out the stator leads when the solder melts.

Remove the remaining two screws securing the rectifier pack assembly (6, Fig. 106) and lift the pack from the slip-ring end bracket (8, Fig. 106).

Remove the three through bolts (7, Fig. 106) and lift the slip-ring end bracket (8, Fig. 106) from the stator (9, Fig. 106) using a mallet if necessary.

Note the position of the stator leads relative to the alternator fixing lugs, and then lift the stator (9, Fig. 106) from the drive end bracket.

Remove the shaft nut, washer, pulley, cooling fan, woodruff key and spacers from the rotor shaft (10, Fig. 106).

Press the rotor shaft from the drive end bearing (11, Fig. 106).

To replace the slip-ring end bearing (13, Fig. 106) unsolder the outer and inner slip-rings (12, Fig. 106) then prise the slip-rings gently off the rotor shaft.

Using a suitable extractor withdraw the bearing from the rotor shaft.

NOTE: Care should be taken not to damage the insulation on the rotor leads when removing or refitting the slip-rings. Use a resin covered solder ensuring a build-up of solder does not occur on the upper face of the inner slip-ring.

Check all the components using normal procedures. Referring to the resistance values and brush lengths as detailed.

Re-assembly is the reversal of the dismantling procedure ensuring the brushes move freely in the brush box, also ensure the slip-rings are clean and smooth.

KIEKERT CENTRAL LOCKING SYSTEM

Description 86.25.00

The central door locking system fitted FROM 1986 MY vehicles incorporates a control module fitted in the driver's door and lock operating motors in the passenger doors. The control module is connected to the driver's door lock mechanism by mechanical linkage and is activated by the locking flap or the door key. The passenger doors and the boot lid are fitted with the motors which are connected to the locking mechanism by mechanical linkage. The motors are activated by voltage signals from the control module to lock or unlock. The motor fitted to the boot lid will lock electrically, but is inhibited from unlocking by the mechanical linkage. The boot lid is unlocked by using the boot lock key.

All the doors can be locked or unlocked from the drivers door either by using the door key or by operating the door locking flap from the inside of the vehicle. The front passenger door can be unlocked and locked with the door key without any of the other locks operating.

The driver's door control module and the lock motors are mounted on brackets welded to door intrusion rails as is the lock solenoid. The boot lock motor is mounted on the lid inner panel adjacent to the lock mechanism.

DOOR LOCK CONTROL MODULE

Renew 86.25.03

Remove the door trim casing (Operation No. 76.74.01).

With the door glass in the fully closed position, remove the adhesive tape securing the control module harness to the door interior, and disconnect the control module block connector from the door harness.

Remove the two setscrews securing the control module assembly to the bracket on the intrusion member, release the locking link from the module and remove from the door.

Separate the control module from the mounting bracket by removing the two self tapping screws.

To fit a new control module reverse operations 2 to 4. **Do not fully tighten the setscrews at this stage.**

DOOR LOCK CONTROL MODULE

Adjust 86.25.04

Remove the 'A' post lower trim panel, driver's side. (76.13.22).

Locate the door harness multiplug connector within the 'A' post with orange/red and orange/green leads. Disconnect the connector.

Connect a test lamp across the connector terminals on the door harness side.

Set the outer door lock to **full closed** position.

Set the door lock inner flap to **full locked** position.

Move the control module by hand fully towards the lock assembly, then carefully move the module slowly in the opposite direction until the test light flashes momentarily. The module should now be positioned correctly, tighten the setscrews.

To check the setting move the door lock inner flap slowly to the unlock position. If the setting is correct the lamp will flash momentarily just before the flap reaches full travel. When the flap is moved back towards the lock position, the lamp will flash again just before the flap reaches full travel.

Disconnect the test lamp and reconnect the harness block connector.

Operate the outer door handle to release the latch.

Close the door and recheck the operation of **all** doors using the key in the driver's door lock.

Refit trim panels to 'A' post and door.

CAUTION: Should it be necessary to connect an independent battery feed to the control module whilst in situ, the following connections must be observed:

Positive feed to purple wire.

Negative feed to black wire.

A wrong connection can destroy the control module and it is recommended that this operation is carried out with the unit removed from the vehicle.

FRONT PASSENGER DOOR LOCK MOTOR 86.25.46

REAR DOOR LOCK MOTOR

Renew 86.25.47

Remove door trim casing (76.74.01 Front Door) (76.34.04 Rear Door).

With the door glass in the fully closed position disconnect the door lock motor block connector from the door harness.

NOTE: It may be necessary to remove the plastic strap from around the harness for access.

Remove two setscrews securing the lock motor assembly to the mounting plate on the intrusion member, release the locking link from the motor and remove the motor assembly from the door.

Separate the motor from its mounting bracket by removing two self tapping screws.

To fit a new motor unit, reverse operations 2 to 4. **Do not fully tighten the setscrews at this stage.**

FRONT PASSENGER DOOR LOCK MOTOR

Adjust 86.25.51

Set the door lock to the **full closed** position,

Slide the lock motor assembly **towards** the door lockface to take up **all** free movement, tighten the setscrews.

Operate the exterior door handle, close door.

Check the setting by operating with the key from the driver's door.

REAR DOOR LOCK MOTOR

Adjust 86.25.52

Set the door outer lock to the **full closed** position.

Slide the lock motor assembly **away** from the door lockface to take up **all** free movement, tighten the setscrews.

Operate the exterior door handle, close door.

Check the setting by operating with the key from the driver's door.

BOOT LID LOCK MOTOR

Renew 86.25.49

Disconnect the lock motor block connector from the boot lid harness.

Remove the two setscrews securing the lock motor assembly to the boot lid inner panel.

Release the locking link from the motor and remove the motor assembly from the boot lid.

Separate the motor from its mounting bracket.

To fit a new boot lock, reverse operations 1 to 3. **Do not fully tighten the setscrews at this stage.**

BOOT LID LOCK MOTOR

Adjust **86.25.53**

Ensure that latch is in the unlocked position.
Slide the motor assembly towards the latch to take up all free movement, tighten the setscrews.
Close the boot lid and check the setting by locking with the key from the driver's door.

Fault Finding — All Locks Inoperative

Check the fuse, mounted above the passenger's side fuse box.
Fuse intact — check battery supply to 'A' post block connector at purple wire.
Feed established — check battery supply to control unit at the block connector inside the door (see caution).
Feed established — reconnect the connector inside the door, connect a test lamp across the door harness connector located in the 'A' post as previously described, and operate the door lock.
If the lamp does not light momentarily when operating the door lock, change the control unit.

Passenger Door Motor or Boot Motor Inoperative

Check the system with the test lamp connected across the cable harness block connectors.
If the test lamp lights momentarily when operating the driver's door lock at a motor block connector, change the motor.

HIGH MOUNTED STOP LAMP BULB

Renew **86.41.02**

Depress the two catches situated on the lower face of the cover (1, Fig. 107) and remove the cover (2, Fig. 107).
Turn and twist the relevent bulb holder (3, Fig. 107) and pull the bulb to remove.
Fit the replacement bulb and reverse the removal procedure to refit.

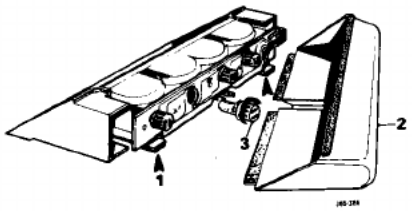


Fig. 107

HIGH MOUNTED STOP LAMP

Renew **86.41.01**

Depress the two catches situated on the lower face of the cover (1, Fig. 108) and remove the cover (2, Fig. 108).
Disconnect the harness (3, Fig. 108) from the lamp assembly and slide the holder assembly (4, Fig. 108) off the brackets attached to the rear screen.
Reverse the removal procedure to refit the replacement lamp assembly.

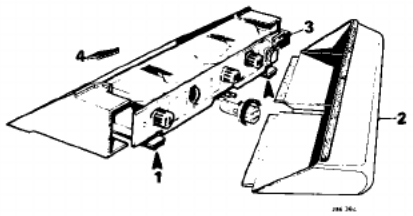


Fig. 108

DISTRIBUTOR BREATHER OUTLET TUBE

Renew **86.35.25**

Remove the auxiliary air valve elbow, slide the clip (1, Fig. 109) up the tube (2, Fig. 109) situated on top of the distributor cap, pull the tube from the connector. Remove the plastic right angled adaptor from the tube.
Fit the connector to the replacement tube, transfer the clip and feed back under the manifold, push the tube onto the connector on the distributor cap and secure with the clip.
Push the plastic right angled adaptor back into the elbow and refit the auxiliary air valve elbow.

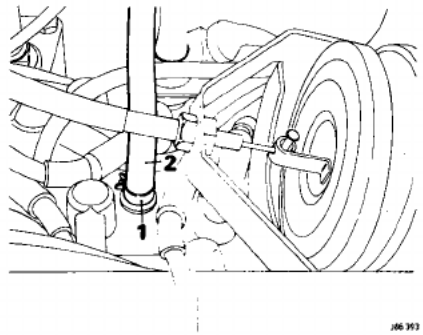


Fig. 109

DISTRIBUTOR CAP

Renew **86.35.11**

Disconnect the king lead from the cap.
Slacken the cruise control cable solderless nipple (1, Fig. 110), disconnect the inner cable (2, Fig. 110) from the actuator (3, Fig. 110) and collect the nipple.
Remove the cruise control cable bracket securing bolts, compress the actuator bellows (4, Fig. 110), displace the bracket (5, Fig. 110) and place the assembly to one side.

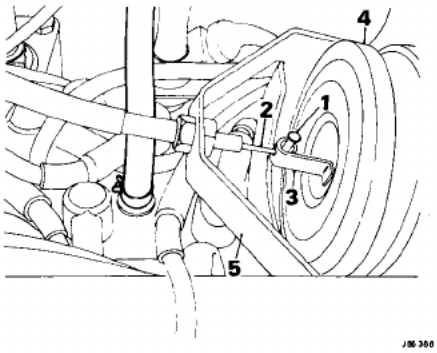


Fig. 110

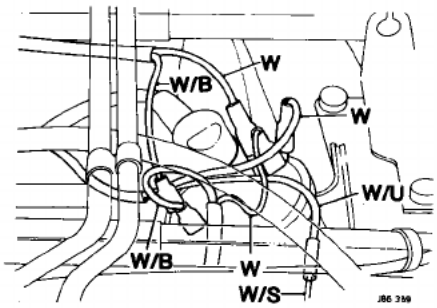


Fig. 111

Note the position of the high tension leads (Fig. 111) relative to the cap and disconnect.
Slide the upper (outlet) breather tube securing clip back along the tube and remove the tube.
Slacken the distributor cap securing screws and lift the cap for access to the clip securing the lower breather tube.
Slide the clip back along the tube, remove the tube, lift off the cap and discard the gasket.
Reverse the removal procedure ensuring that the replacement gasket is seated correctly.

IGNITION COIL

Renew **86.35.32**

Disconnect the king lead from the cap.
Note the position of the low tension leads relative to the ignition coil (Fig. 111).
Remove the bolts securing the ignition coil to the pedestal and lift out the ignition coil assembly.
Remove the nuts securing the male lucar terminals to the low tension connector posts (treble to positive post).
Discard the ignition coil and king lead assembly.
Place the insulation sleeve (1, Fig. 112) over the king lead mounting post (2, Fig. 112), fit the

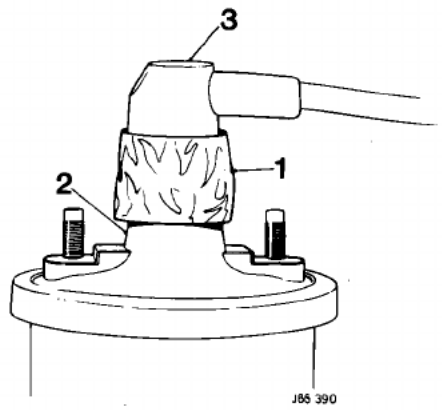


Fig. 112

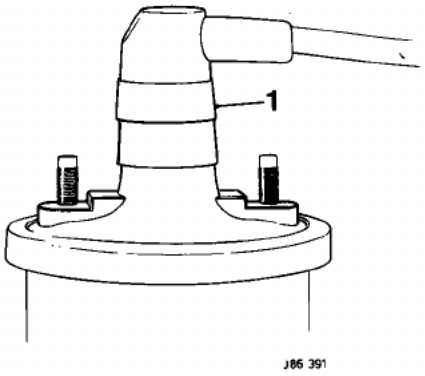


Fig. 113

replacement king lead (3, Fig. 112) to the ignition coil ensuring that the lead will face the front of the engine when the coil is fitted.
Place the sleeve over the king lead connecting plug and using an electrical heat gun apply heat to the sleeve until traces of the adhesive are visible at the top and bottom of the sleeve, when shrunk (1, Fig. 113) the lead should be securely attached to the ignition coil.
Reverse the remaining removal procedure to refit the ignition coil.

DISTRIBUTOR BREATHER FILTER

Renew **86.35.23**

Displace the ratchet strap (1, Fig. 114) away from the filter. Slide the pipe securing clip (1, Fig. 114) up the vacuum hose and pull the filter (3, Fig. 114) from the hose (4, Fig. 114).
Reverse the removal procedure to refit the replacement filter ensuring that the arrow on the filter faces towards the engine.

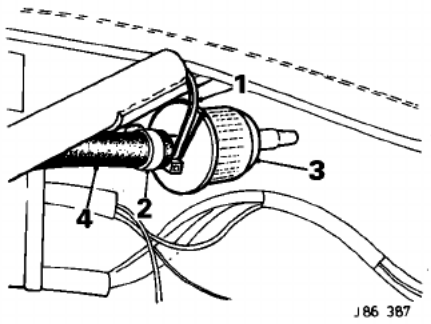


Fig. 114

DISTRIBUTOR BREATHER INLET TUBE

Renew **86.35.24**

Remove the distributor cap, displace the clip (1, Fig. 115) up the tube (2, Fig. 115) and remove the tube from the cap.
Cut the ratchet straps (3, Fig. 115), push the clip securing the filter up the tube and remove the filter (4, Fig. 115).
Transfer the clips to the replacement tube, fit the filter to the tube ensuring that the arrow is pointing towards the engine and secure with the clip.
Feed the tube back to the distributor cap, fit the tube to the cap and secure with the clip.
Refit the distributor cap and secure the tube to the wing tie bar ensuring that the tube is not compressed with the ratchet straps.

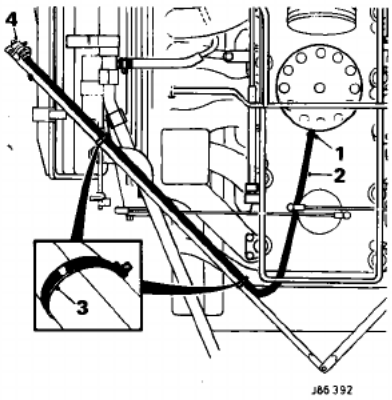


Fig. 115

SPEED CONTYROL SYSTEM

Description 19.75.00

Throttle Actuator

A vacuum operated Throttle Actuator is located under the bonnet, directly in front of the distributor.
The unit contains a control solenoid valve, which controls the vacuum allowed in the unit, a dump solenoid valve, which seals the unit when the system is engaged, and a set of bellows held extended by an internal spring.
One end of the bellows is fixed to the unit body, containing the valves, whilst the other is connected to the accelerator pedal mechanism, via the actuator cable.
An electrical signal transmitted by the speed control unit, triggers the solenoids, and as manifold vacuum evacuates the unit it overcomes the spring pressure, and the bellows compress so opening the throttle.

Speed Control Unit

The Electronic Speed Control Unit is situated on the passenger side under scuttle area, adjacent to the blower motor.

The unit receives signals from the speed transducer and sends out signals to the actuator solenoids, altering the vacuum in the actuator unit to open or close the throttle as required.
The control unit is engaged and the memory recorded when the set button is pressed. After an override the memorised speed may be recalled by operation of the 'RESUME' switch. The memory is cancelled when the control switch is moved to 'OFF'.
When the brake pedal is touched the unit signals the throttle actuator to dump its vacuum, causing the throttle to close.
Adjustment of the 'Set Speed' is possible via an access hole in the speed control unit.

Speed Sensing

On early model vehicles a magnetic speed transducer is mounted to the rear suspension cradle, adjacent to the propshaft flange. The transducer transmits a signal to the control unit indicating the speed of the vehicle.
Two magnets mounted diametrically opposite each other on the differential/propshaft flange, generate a signal which is picked up by the transducer and sent to the speed control unit. The air gap between the magnets and transducer should be 7 mm ± 1 mm (0.275 ± 0.040 in).
On later models the speed signal is obtained from a speed transducer mounted in the transmission units which also provides the speed signal for the speedometer.

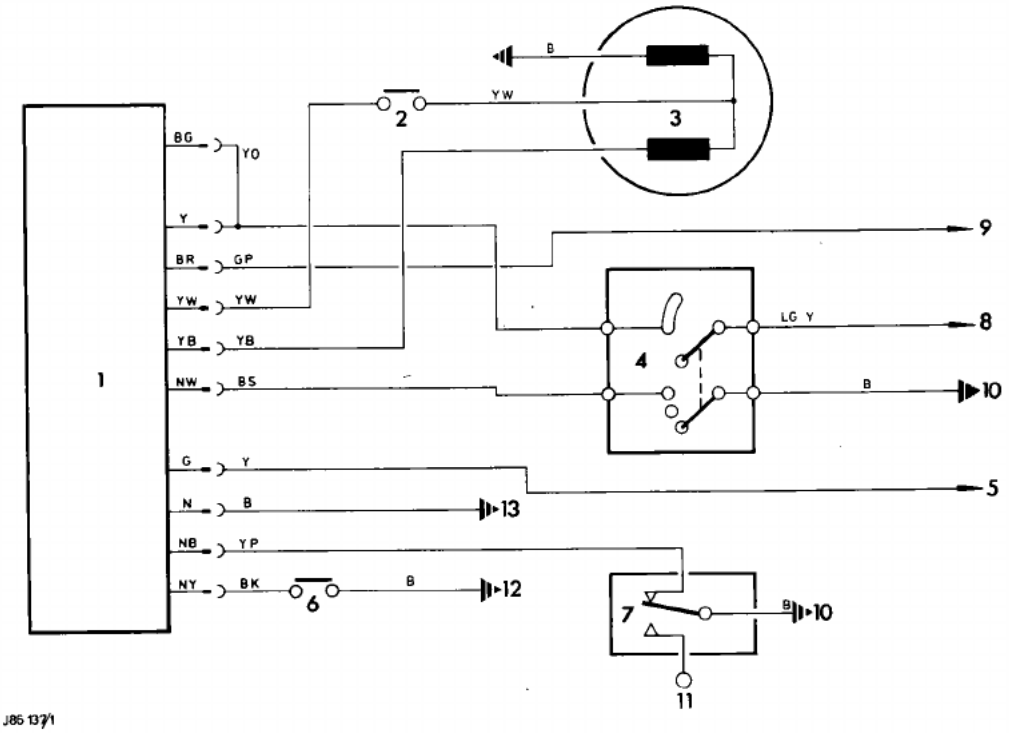
Master ON/OFF Resume Switch

The Master switch is positioned at the rear of the gear selector cover. This switch has three positions, 'OFF', 'ON' and 'RESUME'.
The 'RESUME' mode is spring biased to the 'ON' position. The 'OFF' position ensures that the control unit is isolated from its supply voltage, and consequently cancels the control system memory.

Set Switch

The set swtich is located in the end of the indicator stalk. The switch is used to trigger the speed control unit to bring the system into operation. A single push on the button will cause the vehicle to cruise within ± 1 mph of the

SPEED CONTROL SYSTEM



KEY TO DIAGRAM

1. Speed control unit
2. Brake operated switch
3. Actuator
4. Control switch
5. Magnetic pickup
6. Set switch
7. Inhibit switch
8. Kick down solenoid
9. Kick down switch
10. Fuse
11. To stop/lamp switch
12. Hazard switch
13. To fuse

Fig. 116

WEIGHTS

U.K. and European Models	XJ 3.4		XJ 4.2 Daimler Sovereign		XJ 5.3 Daimler Sovereign	
	kg	lb	kg	lb	kg	lb
Kerb weight	1766	3902	1830	4044	1930	4265
Gross vehicle weight	2186	4831	2250	4973	2350	6294
*Gross train weight	3453	7631	3517	7773	3617	7994
Maximum permitted front axle load	1055	2332	1085	2398	1170	2580
Maximum permitted rear axle load	1150	2742	1180	2607	1200	2652
Federal Models	XJ 6		XJ 12			
	kg	lb	kg	lb		
Gross vehicle weight rating	2258	4979	2371	5229		
Gross axle weight rating—Front	1074	2370	1170	2580		
Gross axle weight rating—Rear	1183	2609	1201	2649		

* Gross train weight is the gross vehicle weight plus maximum trailer weight.

RECOMMENDED HYDRAULIC FLUID

Braking System

Castrol-Girling Universal Brake and Clutch fluid. This fluid exceeds S.A.E. J1703/D specification.
NOTE: Check all pipes in the brake system at the start and finish of each winter period for possible corrosion due to salt and grit used on the roads.

FUEL REQUIREMENTS

General

The use of either leaded or unleaded fuel depends on the type of emission control system fitted to the engine and the legislative requirements in the country for which the vehicle is manufactured.
Vehicles with engines designed to use unleaded fuel are clearly marked 'UNLEADED FUEL ONLY' adjacent to the fuel filler cap.
Consult the vehicle handbook for the fuel type and octane rating to be used.

Leaded Fuel

All vehicles supplied for use in the United Kingdom and certain Overseas markets have engines which are designed to use leaded fuel only. It is important to realise that unleaded fuel although labelled 'PREMIUM' is not the same as 4-Star leaded fuel, and that THE USE OF FUEL WITH A LOWER OCTANE RATING CAN CAUSE SERIOUS ENGINE DAMAGE and could result in loss of warranty coverage.
Use leaded fuel with an octane rating of at least 97 in vehicles with high compression engines.
When refuelling, ensure that the petrol pump is clearly marked 'LEADED FUEL', if any doubt exists consult the service station operator for further advice.

Unleaded Fuel

Engines fitted with catalytic converters in the exhaust system are designed to use only unleaded fuel. Unleaded fuel must be used for the emission control system to operate properly. Its use will also reduce spark plug fouling, exhaust system corrosion and engine oil deterioration.
Using leaded fuel will damage the emission control system and could result in loss of warranty coverage. The effectiveness of the catalyst in the catalytic converter decreases after the use of as little as one tank of leaded fuel. Also, the vehicle is equipped with an electronic fuel injection system, which includes an oxygen sensor. Leaded fuel will damage the sensor, and deteriorate emission control.
Only petrol pumps delivering unleaded fuel have nozzles which fit the filler neck of the vehicle's fuel tank.
Using unleaded fuel with an octane rating lower than recommended can cause persistent, heavy 'spark knock' (a metallic rapping noise). If severe, this can lead to engine damage. However, occasional light 'spark knock' for a short time while accelerating or driving up hills may occur. Although this noise should not give cause for concern, it may be eliminated by the use of a fuel of a higher octane rating than that recommended.

Unleaded Fuels Containing Alcohol

Some fuel suppliers sell fuel containing alcohol without advertising its presence. Where uncertainty exists check with the service station operator.

Ethanol:

Fuels containing up to 10% ethanol may be used. Ensure the fuel has octane ratings no lower than those recommended for unleaded fuel. Most driver's will not notice any operating difference with fuel containing ethanol, but some may, in which case the use of conventional unleaded fuel should be resumed if preferred.

Methanol:

Some fuels contain methanol (methyl or wood alcohol). DO NOT USE fuels containing methanol that do not also contain cosolvents and corrosion inhibitors for methanol. Also, DO NOT USE fuels that contain more than 3% methanol even if they contain cosolvents and corrosion inhibitors. Fuel system damage or vehicle performance problems resulting from the use of such fuels is not the responsibility of Jaguar Cars Limited and may not be covered under the warranty.

Methyl Tertiary Butyl Ether (MTBE)

Unleaded fuel containing an oxygenate known as MTBE can be used provided the ratio of MTBE to petrol does not exceed 15%.
MTBE is an ether based compound, derived from petroleum, which has been specified by several refiners as the substance to enhance the octane rating of fuel.
Should driveability problems be encountered when using MTBE blended fuel, the use of conventional unleaded fuel should be resumed.

CAUTION: Take care to not spill fuel during refuelling. Fuel containing alcohol can cause paint damage, which may not be covered under the warranty.

Components of Emission Control Systems

The component with most impact on the running of the vehicle is the catalytic converter which, when fitted, always requires the use of unleaded fuel.
The specifications of vehicles depend on the country legislation and/or option level chosen at the time of purchase.

Exhaust Emission – Testing

In order that exhaust emissions are kept within the legislated limits, an exhaust emission test with the engine running at idling speed MUST be carried out after any unscheduled service operations which might affect the emission control system.

MAINTENANCE SUMMARY—UK & Europe—Early Cars (up to VIN 322373)

OPERATION	Interval in Kilometres x 1000 Interval in Miles x 1000	5 3	10 6	20 12
PASSENGER COMPARTMENT				
Fit seat cover, place protective cover on carpets		X	X	X
Drive car on lift (ramp)		X	X	X
Check function of original equipment, i.e. interior and exterior lamps, indicators, horns and warning lights		X	X	X
Check operation of window controls		X	X	X
Check handbrake operation		X	X	X
Check footbrake operation		X	X	X
Check clock is running and set to time		X	X	X
Check windscreen washers and wipers for correct operation and that jets are clear and correctly positioned		X	X	X
Check condition and security of seats and seat belts		X	X	X
Check rear-view mirrors for cracks and crazing		X	X	X
EXTERIOR AND LUGGAGE COMPARTMENT				
Check door locks for correct operation		X	X	X
Check luggage compartment light for correct operation		X	X	X
Check/adjust tyre pressures, including spare		X	X	X
Check that tyres comply with manufacturer's specification		X	X	X
Check tyres for tread depth, visually for cuts in fabric, exposure of ply or cord structure, lumps or bulges		X	X	X
Check tightness of road wheel fastenings and that spare is correctly stowed		X	X	X
Check for fuel leaks at pumps and pipes; ensure that all connections are tight		X	X	X
Check front wheel alignment			X	X
Lubricate all locks and hinges (not steering lock)			X	X
Check, if necessary renew, windscreen wiper blades		X	X	X
Check/adjust headlight alignment		X	X	X
ENGINE COMPARTMENT				
Open bonnet, fit wing covers		X	X	X
Check/top-up engine oil		X		
Top-up carburetter piston dampers (where applicable)		X	X	X
Check/top-up cooling system		X	X	X
Check/top-up windscreen washer reservoir		X	X	X
Check/top-up brake fluid reservoir		X	X	X
Check/top-up clutch fluid reservoir		X	X	X
Check/top-up fluid in power steering reservoir		X	X	X
Check/top-up automatic gearbox fluid			X	X
Check distributor points; adjust or renew (where applicable)			X	X
Clean/adjust spark plugs			X	
Renew spark plugs				X
Lubricate distributor			X	X
Lubricate accelerator control linkage and check operation			X	X
Clean engine breather filter				X
Renew fuel filter				X
Clean A.E.D. unit filter (where applicable)		X	X	X
Renew air cleaner element and seal				X
Check/adjust torque of cylinder head nuts (not V12 engine)				X
Check/adjust torque of exhaust manifold nuts (not V12 engine)				X
Check/adjust ignition timing and distributor characteristics using electronic equipment			X	X
Check/adjust carburetter idle speed (where applicable)			X	X
Check/adjust driving bolts		X	X	X
Check/top-up battery electrolyte; clean and grease terminals		X	X	X
Check cooling and heating systems for leaks		X	X	X
Check visually hydraulic pipes and unions for chafing, leaks and corrosion		X	X	X
Check visually all joints for petrol, oil or air leaks		X	X	X
Check exhaust system for leakage and security		X	X	X

MAINTENANCE SUMMARY – UK & EUROPE – Early Cars (up to VIN 322373)

OPERATION	Interval in Kilometres x 1000 Interval in Miles x 1000	5 3	10 6	20 12
UNDERBODY				
Raise ramp		x	x	x
Renew engine oil and filter			x	x
Check/top-up gearbox oil – cars fitted with manual transmission only			x	x
Check/top-up final drive oil			x	
Renew final drive oil				x
Check/adjust clutch push-rod free travel – cars fitted with manual transmission only			x	x
Lubricate clutch linkage			x	x
Lubricate automatic gearbox exposed selector linkage			x	x
Lubricate handbrake mechanical linkage and cable			x	x
Lubricate all grease points excluding hubs			x	x
Lubricate all grease points including hubs				x
Insert brake pads for wear and discs for condition		x	x	x
Check security of engine and suspension fixings				x
Check exhaust system for leakage and security		x	x	x
Check engine, power assisted steering, gearbox and final drive for oil leaks		x	x	x
Check condition and security of steering unit joints and gaiters		x	x	x
Check cooling and heating system for leaks			x	x
Check visually hydraulic pipes and unions for chafing, leaks and corrosion		x	x	x
Check visually all joints for petrol, oil or air leaks		x	x	x
Check/adjust tyre pressures		x	x	x
Lower ramp				
Remove wing covers, close bonnet and check bonnet for correct operation		x	x	x
ROAD OR DYNAMOMETER TEST				
(Clean hands before carrying out following items)				
Ensure that seat cover and protective cover on carpets are in place		x	x	x
Drive car off lift (ramp)		x	x	x
Carry out road/roller test and check function of all instrumentation. Check safety harness inertia reel mechanism		x	x	x
Remove seat cover and protective cover from carpets		x	x	x

ADDITIONAL MAINTENANCE OPERATIONS – ALL VEHICLES

Brake System – Preventive Maintenance

In addition to the periodical inspection of brake components it is advisable as the car ages and as a precaution against the effects of wear and deterioration to make a more searching inspection and renew parts as necessary.

It is recommended that:

1. Disc brake pads, hoses and pipes should be examined at intervals no greater than those laid down in the Passport to Service.

2. Brake fluid should be changed completely every two years.

3. All fluid seals in the hydraulic system should be renewed and all flexible hoses should be examined and renewed if necessary every three years or 96 000 km (60 000 miles) whichever is the sooner. At the same time the working surfaces of the pistons and the bores of the master cylinder, wheel cylinders and other slave cylinders should be examined and new parts fitted where necessary.

Care should be taken to observe the following:

a. At all times use the recommended brake fluid.

b. Never leave fluid in unsealed containers; it absorbs moisture quickly and can be dangerous if used in the braking system in this condition.

c. Fluid drained from the system or used for bleeding is best discarded.

d. The necessity for absolute cleanliness when carrying out any operations on the braking system cannot be over-emphasized.

MAINTENANCE SUMMARY — UK & EUROPE — Later Cars (from VIN 322374)

OPERATION	Interval in Kilometres x 1000 Interval in Miles x 1000	1.5 1	12 7.5	24 15
Fit protection kit		x	x	x
Check condition and security of seats and seat belts		x	x	x
Check operation of seat belt warning system		x		
Check footbrake operation		x	x	x
Check operation of lamps		x		
Check operation of horns		x		
Check operation of warning indicators		x		
Check operation of windscreen wipers		x		
Check operation of windscreen washers		x		
Check security of handbrake – release fully after checking		x	x	x
Check rear-view mirrors for security and function		x		
Mark stud to wheel relationship			x	x
Remove front wheels			x	
Remove road wheels – front and rear				x
Check that tyres are of the correct size and shape		x	x	x
Check tyre tread depth		x	x	x
Check tyres visually for external lumps, bulges and uneven wear		x	x	x
Check tyres visually for external exposure of ply or cord		x	x	x
Check/adjust tyre pressures		x	x	x
Inspect brake pads for wear and discs for condition			x	x
Adjust front hub bearing end-float				x
Grease hubs (up to VIN 481999)				x
Check for oil leaks from steering and fluid leaks from suspension system		x	x	x
Check condition and security of steering unit joints and gaiters		x	x	x
Refit road wheels in original position			x	x
Check tightness of road wheel fastenings		x	x	x
Drain engine oil		x	x	x
Check/top up gearbox oil (manual)		x	x	x
Renew automatic transmission filter 48 000 km (30 000 miles)				48 km
Renew automatic transmission fluid 48 000 km (30 000 miles)				48 km
Grease all points excluding hubs			x	x
Check/top up rear axle/final drive oil		x	x	x
Renew final drive oil 48 000 km (30 000 miles)				48 km
Check visually hydraulic hoses, pipes and unions for chafing, cracks, leaks and corrosion		x	x	x
Check exhaust system for leakage and security		x	x	x
Lubricate handbrake mechanical linkage and cables		x	x	x
Check condition of handbrake pads				x
Lubricate automatic gearbox exposed selector linkage		x	x	x
Check tightness of propshaft coupling bolts		x		x
Check security of accessible engine mountings		x		
Check condition and security of steering unit, joints and gaiters		x	x	x
Check security and condition of suspension fixings		x	x	x
Check steering rack for oil leaks		x	x	x
Check power steering for leaks, hydraulic pipes and unions for chafing, corrosion and security		x	x	x
Check shock absorbers for fluid leaks		x	x	x
Renew engine oil filter element			x	x
Refit engine drain plug		x	x	x
Check for oil leaks – engine and transmission		x	x	x

MAINTENANCE SUMMARY — UK & Europe — Later Cars

OPERATION	Interval in Kilometres x 1000 Interval in Miles x 1000	1.5 1	12 7.5	24 15
Check/adjust torque of cylinder head nuts/bolts (not V12 engine)		×		
Fill engine with oil		×	×	×
Lubricate accelerator control linkage and pedal pivot		×		
Top up carburetter piston dampers (where applicable)		×	×	×
Renew air cleaner element(s)				×
Check security of accessible engine mountings		×		
Check driving belts; adjust or renew		×		×
Clean and adjust spark plugs			×	
Renew spark plugs				×
Check/top-up battery electrolyte (where applicable)		×	×	×
Clean and grease battery connections		×	×	×
Check/top-up clutch fluid reservoir (where applicable)		×	×	×
Check/top-up brake fluid reservoir		×	×	×
Check brake servo hose(s) for security and condition		×	×	×
Check/top-up windscreen washer reservoir		×		
Check cooling and heater system for leaks and hoses for security and condition		×	×	×
Change coolant ensuring the correct antifreeze concentration 48.000 km (30 000 miles)				48 km
Check/top-up cooling system		×		
Renew fuel filter — 3.4				×
Clean engine breather filter (where applicable)				×
Check crankcase breathing system for leaks, hoses for security and condition		×		×
Clean A.E.D. filter (where applicable)		×	×	×
Check/top-up fluid in power steering reservoir; check security and condition of oil pressure hose at oil filter		×	×	×
Run engine and check for sealing of oil filter; stop engine			×	×
Check/top-up engine oil			×	×
Connect electronic instruments and check underbonnet label data		×		×
Check visually distributor points; adjust or renew (where applicable)		×		
Renew distributor points (where applicable)				×
Lubricate distributor (not cam wiping pad) V12 at 36.000 km (22 500 miles)		×		36 km
Disconnect vacuum pipe, check dwell angle, adjust as necessary		×		×
Check ignition timing (at normal operating temperature on HE models)		×	×	×
Check distributor automatic advance		×		×
Check advance increases as vacuum pipe is reconnected		×		×
Lubricate all locks, hinges and door check mechanisms (not steering lock)		×		×
Check operation of bonnet lock and boot and door locks and lights		×		
Check operation of window controls		×		
Check and if necessary renew windscreen wiper blades			×	×
Check/adjust engine idle speed and carburetter mixture settings (where applicable) stop engine — disconnect instruments		×		×
Check power steering system for leaks, hydraulic pipes and unions for chafing and corrosion		×	×	×
Check for oil leaks from engine and transmission		×	×	×
Check/top-up automatic gearbox fluid		×	×	×
Re-check tension if driving belt has been renewed		×		×
Remove spare wheel		×	×	×
Check that the tyre is the correct size and type		×	×	×
Check tyre tread depth		×	×	×

MAINTENANCE SUMMARY — UK & EUROPE — Later Cars

OPERATION	Interval in Kilometres x 1000 Interval in Miles x 1000	1.5 1	12 7.5	24 15
Check tyre visually for external exposure of cord or ply		x	x	x
Check tyre visually for external lumps or bulges		x	x	x
Check/adjust tyre pressure		x	x	x
Renew fuel filter (not 3.4)				x
Refit spare wheel		x	x	x
Check/adjust headlamp alignment		x		x
Check/adjust front wheel alignment		x		x
Carry out road or roller test		x	x	x
Check operation of seat belt inertia mechanism		x	x	x
Ensure cleanliness of controls, door handles, steering wheel, etc		x	x	x
Remove protection kit		x	x	x
Report additional work required		x	x	x

It is further recommended:
At 24 month intervals:
Change brake fluid.

At 96 000 km (60 000 mile) or 36 month intervals:
Renew all fluid seals in hydraulic system; examine and renew if necessary all flexible hoses.
Examine working surfaces of master cylinder and calipers. Renew if necessary.

OPTIONAL SERVICES

OPERATION	Interval in Kilometres x 1000 Interval in Miles x 1000	12 7.5	24 15
Check operation of lamps			x
Check operation of horns			x
Check operation of warning indicators			x
Check operation of windscreen wipers			x
Check operation of windscreen washers			x
Check operation of window controls		x	x
Check operation of boot lamp			x
Check operation of all door, bonnet and boot locks		x	x
Check sunroof and controls for correct operation (if fitted)			x
Check operation of headlamp wipe/wash (if fitted)			x
Check rear view mirrors for security and function			x
Check/top–up windscreen washer reservoir			x
Check/top–up cooling system		x	x
Lubricate all locks, hinges and door check mechanisms (not steering lock)		x	
Check operation of cruise control (if fitted)			x
Clean aerial mast		x	
Check/adjust headlamp alignment		x	
Check/adjust front wheel alignment		x	

MAINTENANCE SUMMARY — North American Markets

Service Code Letter	DISTANCE Mileage x 1000												
A	1												
B		7.5		22.5		37.5		52.5		67.5		82.5	97.5
C			15				45				75		
D					30				60				90

THE PERIOD BETWEEN SERVICES SHOULD NOT EXCEED 12 MONTHS

Maintenance, replacement or repair of the emission control devices and system may be performed by an automotive repair establishment or individual using any automotive part which has been certified by the part manufacturer. Your dealer will supply particulars.

MAINTENANCE SUMMARY North American Markets

1000 MILES
A INTERVAL

LUBRICATION

Lubricate handbrake mechanical linkage and cables
Renew engine oil and engine oil filter
Check/top-up rear axle oil
Check/top-up brake fluid reservoir
Check/top-up automatic transmission fluid
Check battery condition/clean and grease connections if necessary
Check/top-up cooling system
Check/top-up power steering reservoir
Check/top-up windscreen washer fluid
Lubricate all locks and hinges (not steering lock)
Renew fluid — manual transmission
Check/top-up clutch fluid

ENGINE

Check for oil leaks
Check all driving belts; adjust
Check cooling and heater system for leaks, for hose condition and security
Check security of engine mountings

FUEL AND EXHAUST SYSTEMS

Check fuel system for leaks, pipes and unions for chafing and corrosion
Check exhaust system for leaks and security

TRANSMISSION, BRAKES, STEERING AND SUSPENSION

Check for fluid/oil leaks
Check condition and security of steering unit, joints and gaiters
Check visually brake hydraulic pipes and unions for cracks, chafing, leaks and corrosion
Check suspension component condition and security
Check shock absorbers for leaks and condition
Check/adjust wheel alignment
Check brake servo hoses for security and condition
Check footbrake and handbrake operation

WHEELS AND TYRES

Check that tyres comply with manufacturer's specification
Check tyres for tread depth and visually for external cuts in fabric, exposure of ply or cord structure, lumps or bulges
Check tyres for irregular tread wear; perform necessary alignment/repair
Check and adjust tyre pressure, including spare wheel
Check for damaged/deformed wheel rims
Check tightness of road wheel fastenings

ELECTRICAL

Check/adjust operation of windscreen wipers and washers
Check function of all original equipment: lights, horns, warning indicators, radio, etc.
Check/adjust headlight alignment (refer to state and local requirement)

BODY

Check operation and security of seats and seat belts — front and rear
Check operation of all door, bonnet and boot locks
Check operation of window and sunroof controls
Check/open underbody drains (also during annual rust inspection)

GENERAL
Road Test:

Check vehicle performance, shifting, braking, handling
Check function of all instrumentation
Check function of trip computer
Check function of cruise control
Check function of climate control and ventilation systems

Report Additional Work Required After Road Test:

Check engine for leaks
Check/top-up automatic transmission fluid
Check/top-up brake fluid reservoir
Check/top-up power steering reservoir

MAINTENANCE SUMMARY North American Markets

7500 MILES
B INTERVAL

LUBRICATION

Lubricate all grease points (not wheel hubs or steering rack)
Lubricate handbrake mechanical linkage and cables
Renew engine oil and engine oil filter
Check/top-up rear axle oil
Check/top-up brake fluid reservoir
Check/top-up automatic transmission fluid
Check battery condition/clean and grease connections if necessary
Check/top-up cooling system
Check/top-up power steering reservoir
Check/top-up windscreen washer fluid
Lubricate all locks and hinges (not steering lock)
Renew brake fluid every 18 000 miles or 18 months
Renew coolant every 2 years
Check/top-up clutch fluid

ENGINE

Check for oil leaks
Check all driving belts; adjust/renew as necessary (applicable above 30 000 miles)
Check cooling and heater system for leaks, for hose condition and security

FUEL AND EXHAUST SYSTEMS

Check fuel system for leaks, pipes and unions for chafing and corrosion
Check exhaust system for leaks and security
Renew fuel filter (at 52 500 miles only)

TRANSMISSION, BRAKES, STEERING AND SUSPENSION

Check for fluid/oil leaks
Check condition and security of steering unit, joints and gaiters
Check visually brake hydraulic pipes and unions for cracks, chafing, leaks and corrosion
Check suspension component condition and security
Check shock absorbers for leaks and condition
Inspect brake pads for wear and discs for condition (including handbrake pads)
Check/adjust wheel alignment
Check brake servo hoses for security and condition

WHEELS AND TYRES

Check that tyres comply with manufacturer's specification
Check tyres for tread depth and visually for external cuts in fabric, exposure of ply or cord structure, lumps or bulges
Check tyres for irregular tread wear; perform necessary alignment/repair
Check and adjust tyre pressure, including spare wheel
Check for damaged/deformed wheel rims
Check tightness of road wheel fastenings

ELECTRICAL

Check/adjust operation of windscreen wipers and washers
Check function of all original equipment: lights, horns, warning indicators, radio, etc.
Check wiper blades and arms: renew if necessary
Check/adjust headlight alignment (refer to state and local requirement)

BODY

Check operation and security of seats and seat belts — front and rear
Check operation of all door, bonnet and boot locks
Check operation of window and sunroof controls
Check/open underbody drains (also during annual rust inspection)

GENERAL

Road Test:

Check vehicle performance, shifting, braking, handling
Check function of all instrumentation
Check function of trip computer
Check function of cruise control
Check function of climate control and ventilation systems

Report Additional Work Required After Road Test:

Check engine for leaks
Check/top-up automatic transmission fluid
Check/top-up brake fluid reservoir
Check/top-up power steering reservoir