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INTRODUCTION

The purpose of this manual is to assist skilled mechanics in the efficient repair and maintenance of British Leyland vehicles. Using the appropriate service tools and carrying out the procedures as detailed will enable the operations to be completed in the time stated in the 'Repair Operation Times'.

Indexing

For convenience, the manual is divided into a number of divisions. Page 01-3 lists the titles and reference number of the various divisions.

A list of the operations within each division appears in alphabetical order on the page preceding each division.

Operation Numbering

A master index of numbered operations has been compiled for universal application to all vehicles manufactured by the British Leyland Motor Corporation and, therefore, because of the different specifications of various models, continuity of the numbering sequence cannot be maintained throughout this manual.

Each operation described in the manual is allocated a number from the master index and cross-refers with an identical number in the 'Repair Operation Times'. The number consists of six digits arranged in three pairs.

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

Service Tools

Where performance of an operation requires the use of a service tool, the tool number is quoted under the operation heading and is repeated in, or following, the instruction involving its use. An illustrated list of all necessary tools is included in section 99.

References

References to the left- or right-hand side in the manual are made when viewing from the rear. With the engine and gearbox assembly removed, the 'timing cover' end of the engine is referred to as the front. A key to abbreviations and symbols is given on page 01-5.

Amendments

Revised and additional procedures resulting from changes in the vehicle specifications will be issued as revised or additional pages.

The circulation of amendments will be confined to Distributors and Dealers of British Leyland Motor Corporation Limited.

REPAIRS AND REPLACEMENTS

When service parts are required it is essential that only genuine British Leyland Stanpart or Unipart replacements are used.

Attention is particularly drawn to the following points concerning repairs and the fitting of replacement parts and accessories.

Safety features embodied in the car may be impaired if other than genuine parts are fitted. In certain territories, legislation prohibits the fitting of parts not to the vehicle manufacturer's specification. Torque wrench setting figures given in the Repair Operation Manual must be strictly adhered to. Locking devices, where specified, must be fitted. If the efficiency of a locking device is impaired during removal it must be renewed. Owners purchasing accessories while travelling abroad should ensure that the accessory and its fitted location on the car conform to mandatory requirements in their country of origin.

The car warranty may be invalidated by the fitting of other than genuine British Leyland parts. All British Leyland Stanpart or Unipart replacements have the full backing of the factory warranty.

British Leyland Distributors and Dealers are obliged to supply only genuine service parts.

ABBREVIATIONS AND SYMBOLS

Across flats (bolt size)	A.F.	Miles per gallon	m.p.g.
After bottom dead centre	A.B.D.C.	Miles per hour	m.p.h.
After top dead centre	A.T.D.C.	Millimetres	mm
Alternating current	a.c.	Millimetres of mercury	mmHg
Amperes	amp	Minimum	min.
Ampere-hour	Ah	Minus (of tolerance)	—
**Atmospheres	Atm **	Minute (of angle)	—
Before bottom dead centre	B.B.D.C.	Negative (electrical)	—
Before top dead centre	B.T.D.C.	**Newton metres	Nm **
Bottom dead centre	B.D.C.	Number	No.
Brake horse-power	b.h.p.	Ohms	ohm
Brake mean effective pressure	b.m.e.p.	Ounces (force)	ozf
British Standards	B.S.	Ounces (mass)	oz
Carbon monoxide	CO	Ounce inch (torque)	ozf in
Centigrade (Celsius)	C	Outside diameter	o.dia.
Centimetres	cm	Overdrive	O/D
Cubic centimetres	cm ³	Paragraphs	para.
Cubic inches	in ³	Part Number	Part No.
Cycles per minute	c/min	Percentage	%
Degree (angle)	deg. or °	Pints (Imperial)	pt
Degree (temperature)	deg. or °	Pints (U.S.)	U.S. pt
Diameter	dia.	Plus or minus	±
Direct current	d.c.	Plus (tolerance)	+
Fahrenheit	F	Positive (electrical)	+
Feet	ft	Pounds (force)	lbf
Feet per minute	ft/min	Pounds (mass)	lb
Fifth	5th	Pounds feet (torque)	lbf ft
Figure (illustration)	Fig.	Pounds inches (torque)	lbf in
First	1st	Pounds per square inch	lb/in ²
Fourth	4th	Radius	r
Gallons (Imperial)	gal	Ratio	:
Gallons (U.S.)	U.S. gal	Reference	ref.
**Grammes (force)	gf	Revolutions per minute	rev/min
Grammes (mass)	g **	Right-hand	R.H.
High compression	h.c.	Right-hand steering	R.H.Stg.
High tension (electrical)	h.t.	Second (angle)	"
Horse-power	hp	Second (numerical order)	2nd
Hundredweight	cwt	Single carburetter	SC
Inches	in	Society of Automobile Engineers	S.A.E.
Inches of mercury	inHg	Specific gravity	sp. gr.
Independent front suspension	i.f.s.	Square centimetres	cm ²
Internal diameter	i.dia.	Square inches	in ²
Kilogrammes (force)	kgf	Standard	std.
Kilogrammes (mass)	kg	Standard wire gauge	s.w.g.
Kilogramme centimetre	kgf cm	Synchronizer/synchromesh	synchro.
Kilogramme metres	kgf m	Third	3rd
Kilogrammes per square centimetre	kg/cm ²	Top dead centre	T.D.C.
Kilometres	km	Twin carburetters	TC
Kilometres per hour	km/h	United Kingdom	UK
Kilovolts	kV	Volts	V
King pin inclination	k.p.i.	Watts	W
Left-hand	L.H.	Screw threads	
Left-hand steering	L.H.Stg.	American Standard Taper Pipe	N.P.T.F.
Left-hand thread	L.H.Thd.	British Association	B.A.
Low compression	l.c.	British Standard Fine	B.S.F.
Low tension	l.t.	British Standard Pipe	B.S.P.
Maximum	max.	British Standard Whitworth	B.S.W.
Metres	m	Unified Coarse	U.N.C.
Microfarad	mfd	Unified Fine	U.N.F.
Midget Edison Screw	MES		



LOCATION OF COMMISSION AND UNIT NUMBERS

LOCATION OF COMMISSION AND UNIT NUMBERS

The **Commission Number** is the identification number which is required for registration and other purposes. It is stamped on a plate riveted to the front wing valance immediately below the Body Serial Number Plate. The significance of Commission Numbers and Suffix Letters is as follows:

- **ADG or ADH** — these prefixes denote 'Toledo' model range with 1300 cm³ engine and 2-door body.
- ADF or ADK** — these prefixes denote 'Toledo' model range with 1300 cm³ engine and 4-door body.
- ADM** — this prefix denotes 'Toledo' model range with 1500 cm³ single-carburettor engine and 2-door body.
- ADP** — this prefix denotes 'Toledo' model range with 1500 cm³ single-carburettor engine and 4-door body.
- ADS** — this prefix denotes 'Toledo' model range with 1500 cm³ twin-carburettor engine and 4-door body.**
- 1234** — is the accumulated total build of this model.
- DL** — denotes body type, e.g. Saloon.
- LDL** — denotes body type, e.g. Saloon, with Left-Hand Steering. (No letter is given to Right-Hand Steering models.)

The commission number-plate also bears code symbols for identification of the vehicle's exterior colour, trim material and trim colour. Refer to page 04-6.

The **Engine Number** is stamped on a flange on the left-hand side of the cylinder block, adjacent to the distributor. The significance of Engine Numbers and Suffix Letters is as follows:

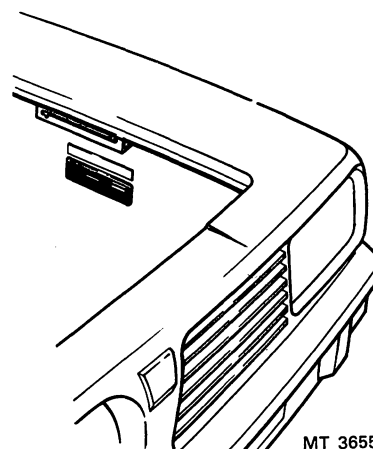
- DG** or alternative—this prefix denotes the model range using the last two digits of the Commission Number as above.
- 1234** — is the accumulated total build of this engine.
- HE** — denotes High Compression Engine.
- LE** — denotes Low Compression Engine.

The **Gearbox Number** is stamped on the right-hand side of the gearbox casing. The significance of the prefix and numbers is the same as that for the engine, explained above, but obviously the suffix letters are not used.

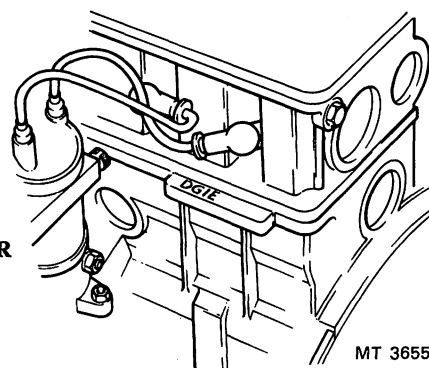
The **Rear Axle Number** is stamped on a flange on the underside of the hypoid housing. The significance of the prefix and numbers is the same as that for the engine, explained above, but obviously the suffix letters are not used.

Important: In all communications relating to Service and Spares it is essential to quote commission number, paint and trim codes and unit number (if applicable).

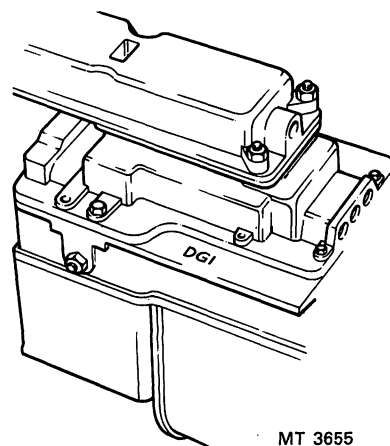
**COMMISSION
NUMBER**



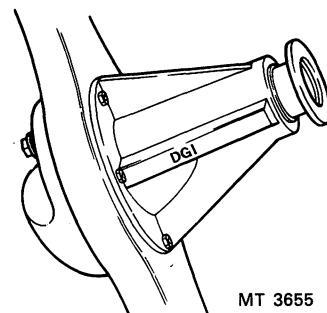
**ENGINE
SERIAL NUMBER**



**GEARBOX
SERIAL NUMBER**



**REAR AXLE
SERIAL NUMBER**



AMENDMENTS

To assist in identifying amendments on revised pages, two stars (**) will be inserted at the beginning and end of the amended paragraph, section, instruction or illustration.

To ensure that a record of amendments to this manual is available, this page will be re-issued with each set of revised pages. The amendment number, date of issue, appropriate instructions and revised page numbers will be quoted.

Revised pages must be inserted in place of existing pages carrying the same number, and the old pages discarded.

Additional pages or complete major assembly groups may be issued. In such cases the new pages must be inserted immediately following the existing pages carrying the next lowest number.

Issue Date	Filing Instructions				Issue Date	Filing Instructions			
	Discard	Issue	Insert	Issue		Discard	Issue	Insert	Issue
6.72	01-3	1	01-3	2	6.72	12.49.02	1	12.49.02	2
	01-7	1	01-7	2		12.65.08	1	12.65.08	2
	04-1	1	04-1	2		19.20.07	1	19.20.07	2
	04-3	1	04-3	2		19.40.19	1	19.40.19	2
	04-6	1	04-6	2		19.45.08	1	19.45.08	2
	05-1	1	05-1	2		26.10.01	1	26.10.01	2
	06-1	1	06-1	2		26.40.01	1	26.40.01	2
			06-3	**|**		37.12.19	1	37.12.19	2
	09-1	1	09-1	2		37.20.04 Sheet 3	1	37.20.04 Sheet 3	2
	10.00.02	1	10.00.02	2		47.15.01	1	47.15.01	2
	10.00.06	1	10.00.06	2		51.10.01 Sheet 2	1	51.10.01 Sheet 2	2
	10.00.07	1	10.00.07	2		51.15.07 Sheet 6	1	51.15.07 Sheet 6	2
	10.00.11	1	10.00.11	2		57.25.02	1	57.25.02	2
	10.00.13	1	10.00.13	2		57.40.22	1	57.40.22	2
	10.00.16	1	10.00.16	2		60.10.16	1	60.10.16	2
	12.17.01	1	12.17.01	2		60.25.01	1	60.25.01	2
	12.21.01	1	12.21.01	2		60.25.29	1	60.25.29	2
	12.21.33 Sheet 2	1	12.21.33 Sheet 2	2		60.35.01 Sheet 2	1	60.35.01 Sheet 2	2
	12.21.39 Sheet 2	1	12.21.39 Sheet 2	2		64.30.01	1	64.30.01	2
	12.29.18 Sheet 2	1	12.29.18 Sheet 2	2		70.10.10	1	70.10.10	2
	12.29.27	1	12.29.27	2		70.25.02	1	70.25.02	2
	12.41.05 Sheet 2	1	12.41.05 Sheet 2	2		70.55.02	1	70.55.02	2
	12.41.05 Sheet 3	1	12.41.05 Sheet 3	2		76.22.08	1	76.22.08	2
	12.41.05 Sheet 5	1	12.41.05 Sheet 5	2					

Issue Date	Filing Instructions				Issue Date	Filing Instructions			
	Discard	Issue	Insert	Issue		Discard	Issue	Insert	Issue
10/72	01-7	2	01-7	3	6/73	76-1	1	** 76-1**	2
	04-6	2	04-6	3				76.10.01 Sheet 1	1
	12-2	1	12-2	2				76.10.01 Sheet 3	1
	12-3	1	12-3	2		76.10.04	1	76.10.29	1
	** 12.21.01	2	12.21.01	3**		76.13.03	1	76.16.21	2
	12.21.26	1	12.21.26	2		76.22.08	2	76.22.08	3
	12.21.39 Sheet 1	1	12.21.39 Sheet 1	2		86-2	1	86-2	2
	12.21.39 Sheet 2	2	12.21.39 Sheet 2	3		86.00.02	1	86.00.02	2
	12.60.01	1	12.60.01	2		86.00.03	1	86.00.03	2
	37.20.04 Sheet 1	1	37.20.04 Sheet 1	2		86.10.00 Sheet 1	1	86.00.10	1
	37.20.04 Sheet 3	2	37.20.04 Sheet 3	3				86.00.11	1
	60.25.01	2	60.25.01	3		86.60.13 Sheet 1	1	86.60.13 Sheet 1	2
	76.46.01	1	76.46.01	2		86.65.00 Sheet 1	1	86.65.00 Sheet 1	2
	80.10.06	1	80.10.06	2		86.65.02	1	86.65.00 Sheet 3	1
	86.40.02	1	86.40.02	2				86.65.02	1
	86.40.86	1	86.40.86	2		01-8	3	01-8	4
2/73	01-2	1	01-2	2				01-9	1
	01-6	1	01-6	2		05-1	3	05-1	4
	01-8	3	01-8	3		06-2	2	06-2	3
	04-1	2	04-1	3		12.17.01	2	12.17.01	3
	04-3	2	04-3	3		12.17.16	1	12.17.16	2
	04-6	3	04-6	4		12.21.33 Sheet 2	2	12.21.33 Sheet 2	3
	05-1	2	05-1	3		12.29.18 Sheet 2	2	12.29.18 Sheet 2	3
	06-1	2	06-2	2		19.15.17 Sheet 2	1	19.15.17 Sheet 2	2
	06-3	**1	**			37.20.04 Sheet 1	2	37.20.04 Sheet 1	3
	09-1	2	09-1	3		37.20.04 Sheet 4	1	37.20.04 Sheet 4	2
	12-3	2	12-3	3		57-1	1	57-1	2
	12.29.18 Sheet 1	1	12.29.18 Sheet 1	2		57.40.01 Sheet 1	1	57.40.01 Sheet 1	2
	19-1	1	19-1	2		57.40.01 Sheet 2	1	57.40.01 Sheet 2	2
	19.15.30	1	19.15.28	1		57.40.02 Sheet 2	1	57.40.02 Sheet 2	2
	33-1	1	33-1	2				57.40.06	1
	33.20.07	1	33.20.07	2		57.65.01	1	57.65.01	2
	33.35.07	1	33.35.07	2		64.35.02	1	64.35.02	2
	51.25.01	1	51.25.01	2		70.55.02	2	70.55.02	3
	64.30.01	2	64.30.01	3		70.60.03	1	70.60.03	2
						70.60.18 Sheet 2	1	70.60.18 Sheet 2	2
						76.22.08	3	76.22.08	4



Issue Date	Filing Instructions				Issue Date	Filing Instructions			
	Discard	Issue	Insert	Issue		Discard	Issue	Insert	Issue
6/73	76.52.02	1	76.52.02	2					
	80.10.06	2	80.10.06	3					
	84-1	1	84-1	2					
	84.10.01	1	84.10.01	2					
			84.10.24	1					
	99-1	1	99-1	2					
	99.00.02	1	99.00.02	2					
12/73	01-5	1	01-5	2					
	01-9	1	01-9	2					
	04-1	3	04-1	4					
	04-6	4	04-6	5					
	05-1	4	05-1	5					
	06-2	3	06-2	4					
	12-2	2	12-2	3					
	12-3	3	12-3	4					
	12.17.01	3	12.17.01	4					
	12.21.01	4	12.21.01	5					
	12.29.57	1	12.29.57	2					
	12.53.07	2	12.53.07	3					
	33.10.01	1	33.10.01	2					
	57.35.09	1	57.35.09	2					
	57.65.01	2	57.65.01	3					
	64.20.01	1	64.20.01	2					
	64.35.02	2	64.35.02	3					
	76.81.01	1	76.81.01	2					
	86.65.51	1	86.65.51	2					
	★★								
6/74	01-9	2	01-9	3					
	09-1	3	09-1	4					
	12.29.10	1	12.29.10	2					
	12.60.56	1	12.60.56	2					
	30.10.01	1	30.10.01	2					
	76.31.01	1	76.31.01	2					
	76.31.46	1	76.31.46	2					
				★★					



ENGINE

Number of cylinders	..	..	..	..	..	4 in line
Bore of cylinders	..	..	..	..	..	2.9 in (73.7 mm)
Stroke of crank: 1300 engine	..	..	..	..	..	2.99 in (76 mm)
1500 engine	..	..	..	..	..	3.44 in (87.5 mm)
Capacity: 1300 engine	..	..	..	..	..	79 in ³ (1296 cm ³)
1500 engine	..	..	..	..	..	91 in ³ (1493 cm ³)
Piston area	..	..	..	..	..	26.5 in ² (171 cm ²)
Maximum power:						
1300 engine: 1972/73/74 model**	..	..	..	..	..	58 b.h.p. net at 5,500 rev/min
Pre-1972 model	..	..	..	..	..	58 b.h.p. net at 5,300 rev/min
1500 single carburetter: 1972/73 model**	..	..	..	..	..	65 b.h.p. net at 5,000 rev/min
Pre-1972 model	..	..	..	..	..	61 b.h.p. net at 5,000 rev/min
1500 twin carburetters: 1972/73 model**	..	..	..	..	..	69 b.h.p. net at 5,200 rev/min
Pre-1972 model	..	..	..	..	..	65 b.h.p. net at 5,500 rev/min
Maximum torque:						
1300 engine: 1972/73/74 model**	..	..	..	..	..	818 lbf in at 3,300 rev/min (equivalent to 130 lbf/in ² b.m.e.p.)
Pre-1972 model	..	..	..	..	..	840 lbf in at 3,000 rev/min (equivalent to 133 lbf/in ² b.m.e.p.)
1500 single carburetter: 1972/73 model**	..	..	..	..	..	957 lbf in at 3,000 rev/min (equivalent to 132 lbf/in ² b.m.e.p.)
Pre-1972 model	..	..	..	..	..	970 lbf in at 2,700 rev/min (equivalent to 134 lbf/in ² b.m.e.p.)
1500 twin carburetter: 1972/73 model**	..	..	..	..	..	967 lbf in at 3,300 rev/min (equivalent to 133.5 lbf/in ² b.m.e.p.)
Pre-1972 model	..	..	..	..	..	945 lbf in at 3,500 rev/min (equivalent to 130 lbf/in ² b.m.e.p.)
Crankshaft	..	..	..	..	..	3 main bearings
Pistons	..	..	..	..	..	Solid skirt
Camshaft	..	..	..	..	..	4-bearing, chain-driven
Valves	..	..	..	..	..	O.H.V. push-rod operated
Oil pump	..	..	..	..	..	High-capacity, internal gear rotor
Oil filter	..	..	..	..	..	Full-flow, replaceable element
Manifolds	..	..	..	..	..	Separate inlet and exhaust, water heater inlet
Crankcase ventilation	..	..	..	..	..	Closed-circuit breathing from rocker cover to depression side of carburetter

COOLING SYSTEM

	..	..	..	..	..	Water no-loss system incorporating a separate pressurized expansion tank
Circulation	..	..	..	..	..	By impeller-type pump. Thermostatically controlled flow
Fan	..	..	..	..	..	Seven blades, 11½ in (292 mm) dia. belt drive

FUEL SYSTEM

Pump	..	..	..	..	..	Mechanically operated, diaphragm type
Carburetter: 1300, 1500 2-door: 1972/73/74 model**	..	..	..	..	..	Single S.U. HS4E sidedraught—exhaust emission controlled
Pre-1972 model	..	..	..	..	..	Single S.U. HS4 sidedraught
1500 4-door: 1972/73 model**	..	..	..	..	..	Twin S.U. HS2E sidedraught—exhaust emission controlled
Pre-1972 model	..	..	..	..	..	Twin S.U. HS2 sidedraught
Air cleaner: 1300, 1500 2-door	..	..	..	..	..	Combined air cleaner and silencer with replaceable paper element
1500 4-door	..	..	..	..	..	Combined air cleaner and silencer with twin replaceable elements



GENERAL SPECIFICATION DATA

TRANSMISSION

Clutch: 1300	6.5 in (165 mm) dia. diaphragm spring type										
1500 2- and 4-door	7.250 in (184 mm) dia. diaphragm spring type										
Gearbox	Four forward ratios and one reverse. Synchromesh on all forward gears										
Gearbox ratios						<table><tr><td><i>Top</i></td><td><i>3rd</i></td><td><i>2nd</i></td><td><i>1st</i></td><td><i>Rev.</i></td></tr><tr><td>1 : 1</td><td>1.394 : 1</td><td>2.158 : 1</td><td>3.504 : 1</td><td>3.988 : 1</td></tr></table>	<i>Top</i>	<i>3rd</i>	<i>2nd</i>	<i>1st</i>	<i>Rev.</i>	1 : 1	1.394 : 1	2.158 : 1	3.504 : 1	3.988 : 1
<i>Top</i>	<i>3rd</i>	<i>2nd</i>	<i>1st</i>	<i>Rev.</i>												
1 : 1	1.394 : 1	2.158 : 1	3.504 : 1	3.988 : 1												
Overall ratio: 1300	4.11 : 1										
1500 2- and 4-door			3.89 : 1										
Final drive..	Drive to rear wheels through live axle via hypoid bevel gears and two-pinion differential										
Rear axle ratio: 1300	4.11 : 1										
1500 2- and 4-door	3.89 : 1										

SUSPENSION

Front	Independent, with coil springs controlled by telescopic hydraulic dampers operating on upper wishbones. Single lower transverse links with fore-and-aft location by trailing radius rods
Rear	Four-link system. Lower links carry combined coil springs and telescopic dampers

STEERING

Steering-wheel	Rack and pinion
Turns: Early models	16 in (407 mm) dia. with padded spokes and centre boss
Later models	3 turns lock to lock
Steering-column	3½ turns lock to lock
Turning circle	Incorporating anti-theft locking device.
	29 ft 9 in (9.1 m) between kerbs

BRAKES

Front: 1300, 1500 2-door pre-1973 models	Hydraulic, foot-operated drum, two leading shoe
1500 4-door and all 1973 models	Drum size: 9 in × 1½ in (228 mm × 44.5 mm) dia.
	Calliper disc type, disc diameter 8½ in (222 mm), servo assisted
Rear: 1300, 1500 2-door	Hydraulic foot-operated drum, leading and trailing shoe, 8 in dia. × 1½ in wide (204 mm × 38 mm)
1500 4-door	Drum-type, self-adjusting, 8 in dia. × 1½ in wide (204 mm × 38 mm), servo assisted
**Front lining area	60.5 in² (390 cm²)
Front swept area	99.0 in² (639 cm²)
Rear lining area	37.8 in² (244 cm²)
Rear swept area	75.5 in² (487 cm²)
Total lining area	98.3 in² (634 cm²)
Total swept area	174.5 in² (1128 cm²)
	} 1500 2-door models pre-1973, All 1300 models pre-1973
Front lining area	17.4 in² (112.2 cm²)
Front swept area	165 in² (1065 cm²)
Rear lining area	37.8 in² (245 cm²)
Rear swept area	75.5 in² (487 cm²)
Total lining area	55.2 in² (357.2 cm²)
Total swept area	240.5 in² (1552 cm²)
	} All models 1973 and all 1500 4-door models**

GENERAL SPECIFICATION DATA

WHEELS Steel disc type, 13×4J flat safety ledge rims. Stainless steel nave-plates

TYRES

1300 2-door pre-1973 model	5.20—13 Dunlop D75 (cross-ply)
Pressures, 1 to 4 up	Front: 25 lbf/in ² (1.75 kgf/cm ²)
	Rear: 30 lbf/in ² (2.10 kgf/cm ²)
Fully laden	Front: 26 lbf/in ² (1.82 kgf/cm ²)
	Rear: 32 lbf/in ² (2.25 kgf/cm ²)
1300/1500 4-door and 1300 2-door 1973 model ..	5.60—13 Dunlop D75 (cross-ply)
Pressures, all conditions	Front: 22 lbf/in ² (1.54 kgf/cm ²)
	Rear: 26 lbf/in ² (1.82 kgf/cm ²)
1500 2- and 4-door	155 SR—13 Dunlop SP68 (radial)
Pressures, all conditions	Front: 22 lbf/in ² (1.54 kgf/cm ²)
	Rear: 26 lbf/in ² (1.82 kgf/cm ²)

ELECTRICAL EQUIPMENT

Battery	Located under bonnet. 12-volt 40 Ah, negative earth
Coil	Lucas 16C6 6-volt, used with ballast resistor
Alternator	Lucas 15ACR, 318 watts output
Starter motor	Lucas M35 inertia type

OVERALL DIMENSIONS

Length	13 ft 0 $\frac{1}{8}$ in (3965 mm)
Width	5 ft 1 $\frac{3}{4}$ in (1568 mm)
Height (unladen)	4 ft 6 in (1372 mm)
Track:	
Front	4 ft 5 in (1346 mm)
Rear	4 ft 2 in (1270 mm)
Ground clearance.. .. .	4 $\frac{1}{4}$ in (108 mm)
Front wheel alignment	0 to $\frac{1}{16}$ in (1.58 mm) toe-in

WEIGHTS

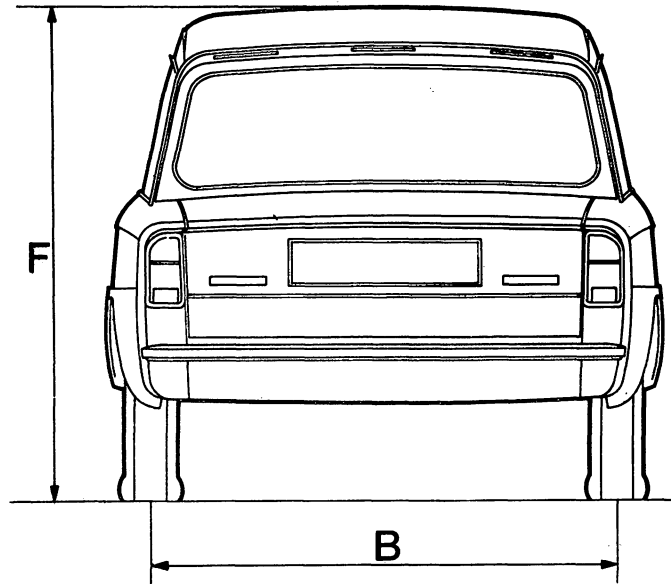
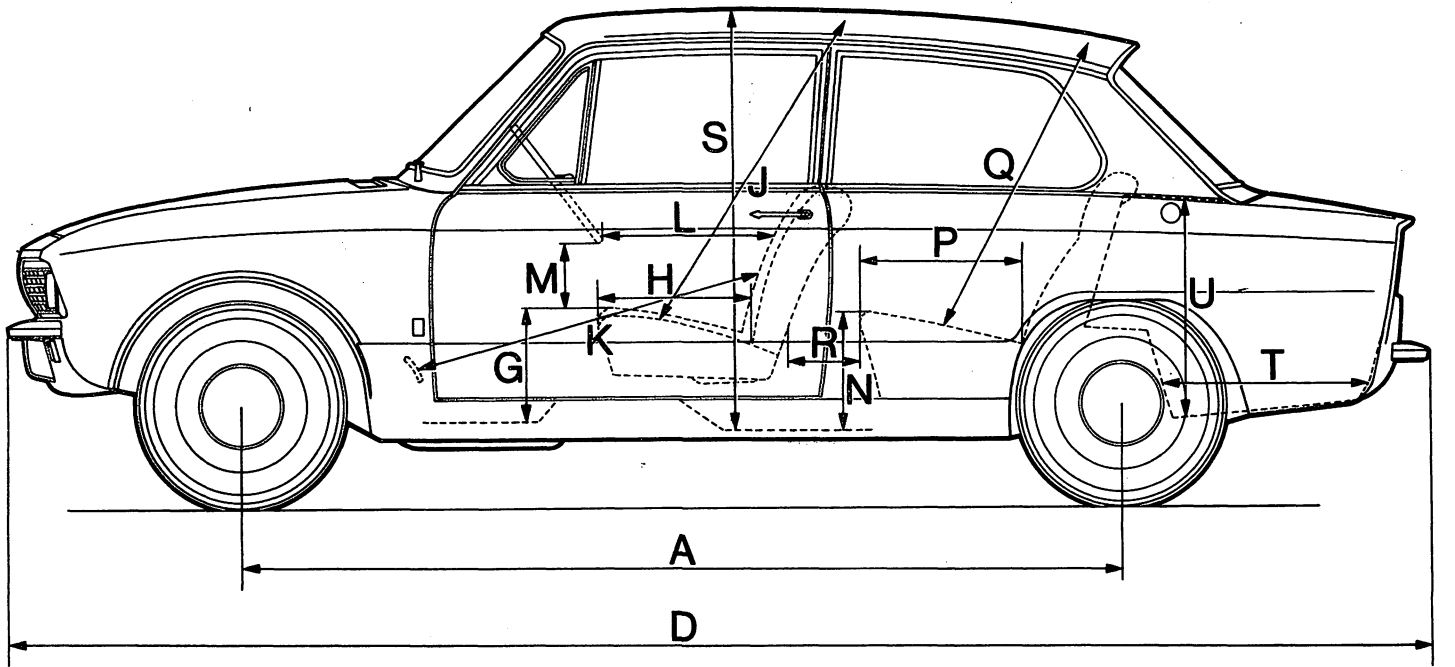
	<i>1300, 1500 2-Door</i>	<i>**1300 4-Door</i>
Dry (excluding extra equipment)	16 cwt (815 kg)	16 $\frac{1}{4}$ cwt (825 kg)
Basic kerb (includes tools, fuel, oil and water) ..	17 cwt (865 kg)	17 $\frac{1}{4}$ cwt (875 kg)
Gross vehicle weight—maximum	24 cwt (1230 kg)	24 $\frac{1}{4}$ cwt (1240 kg)**
	<i>1500 4-Door TC</i>	
Dry (excluding extra equipment)	16 $\frac{3}{4}$ cwt (850 kg)	
Basic kerb (includes tools, fuel, oil and water) ..	17 $\frac{3}{4}$ cwt (900 kg)	
Gross vehicle weight—maximum	24 $\frac{3}{4}$ cwt (1265 kg)	

TOWING INFORMATION

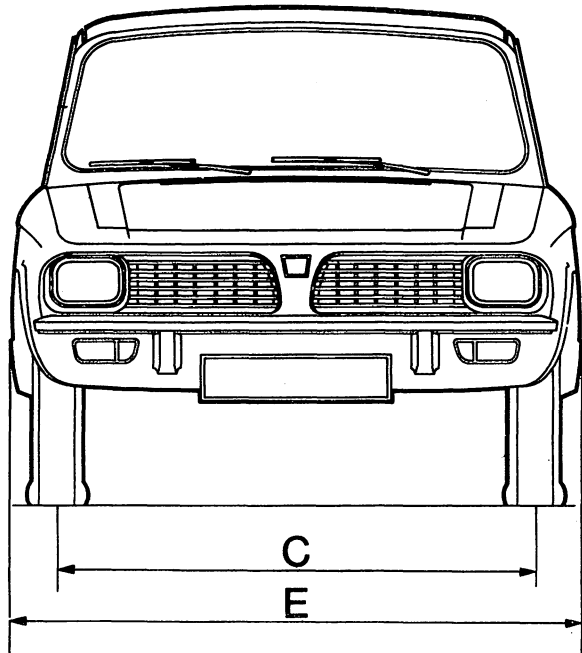
Maximum recommended trailer weight	15 cwt when the trailer being towed is equipped with brakes		
	3.94 cwt (200 kg) when the trailer being towed is not equipped with brakes—providing that the total car and trailer laden weights do not exceed the maximum gross vehicle weight (1300 and 1500 single carburettor engines) or 28.8 cwt (1465 kg) (1500 twin carburettor engine)		
		1500 single	1500 twin
	1300 engine	carburettor engine	carburettor engine
Maximum starting gradient (fully laden car and trailer)	1 in 6.5	1 in 5.8	1 in 5.7
Maximum climbable gradient (fully laden car and trailer)	1 in 5.0	1 in 4.5	1 in 4.4



GENERAL SPECIFICATION DATA



MTO 364





VEHICLE DIMENSIONS

Dim.	Description	inches	mm	Dim.	Description	inches	mm
A	Wheelbase	96.63	2454	M	Steering-wheel clearance from front seat cushion	6.5	165
B	Rear track	50.0	1270	N	Rear seat height—floor to cushion ..	13.0	330
C	Front track	53.0	1348	P	Rear seat depth	18.0	457
D	Overall length	156.13	3965	Q	Head room—from rear seat to cushion ..	33.5	852
E	Overall width	61.75	1568	R	Rear leg room:		
F	Overall height	54.0	1372		Max.	30.5	775
G	Front seat height—floor to cushion ..	13.0	330		Min.	24.5	622
H	Front seat depth	17.5	445	T	Luggage compartment depth:		
J	Head room—from front seat cushion ..	36.0	914		Max.	33.0	837
K	Front squab to clutch pedal:				Min.	26.0	660
	Max.	39.0	991	U	Luggage compartment height:		
	Min.	33.0	838		Max.	17.0	432
L	Steering-wheel clearance from front seat squab:				Min.	13.5	343
	Max.	19.0	483				
	Min.	13.0	330				

GENERAL SPECIFICATION DATA

PAINT AND TRIM CODING SYSTEM

The commission number plate bears code symbols for identification of the vehicle's exterior colour, trim material and trim colour.

Colour Code

Nine basic colours are allocated a number as shown in the table. Shades of these colours are classified as 1st shade, 2nd shade, 3rd shade, etc. The number of each shade change prefixes the basic colour to indicate the shade colour. Dual colours are identified by two code numbers separated by a stroke, e.g. 19/26 denotes 'White and 'Wedgwood', the predominant colour being White, this symbol being quoted first.

The main trim material is identified by prefixing the colour code number with a letter, e.g.:

Leathercloth — No prefix letter

Leather — Prefix letter H

Cloth — Prefix letter C

Basic colour	Basic colour number	1st shade	2nd shade	3rd shade	4th shade	5th shade	7th shade	6th shade	8th shade	9th shade	10th shade	11th shade	12th shade
Black	01	11											
Red	02	12 Matador	22 Cherry	32 Signal	42 Burgundy	52 Scarlet	62 Inca Red	72 Pimiento	82 Carmine	92 Magenta			
Brown	03	13 Light Tan	23 Sienna	33 New Tan	43 Saddle Tan	53 Dark Brown	63 Chestnut	** 73 Maple **					
Yellow	04	14 Jonquil	24 Wimpey	34 Jasmine	44 Beige	54 Saffron	64 Mimosa						
Green	05	15 Cactus	25 Confer	35 Olive	45 Lichfield	55 Laurel	65 Emerald						
Blue	06	16 Midnight	26 Wedgwood	36 Dark Blue	46 Renoir	56 Royal	66 Valencia	76 Print Blue	86 Navy Blue	96 Sapphire	106 Mallard	116 Ice	126 French
Purple	07	17 Damson	27 Shadow Blue										
Grey	08	18 Gunmetal	28 Dark Grey	38 Phantom	48 Dolphin	58 Shadow Blue	68 Slate	78 Grey					
White	09	19 White	29 Sebring White	39 Honey-suckle									

Thus: Paint 19/26 Trim 16 denotes that the vehicle is painted 'White' and 'Wedgwood', and trimmed in leathercloth coloured Midnight Blue.

NOTE: Acrylic paints bear the suffix 'A'.

ENGINE

Type	O.H.V. 4 in line
Capacity: 1300 engine	1296 cm ³
1500 engine	1493 cm ³
Compression ratio: 1300 engine	8.5 : 1
1500 engine	9.0 : 1
	7.5 : 1 low compression
Idle speed: single carburetter	700 to 750 rev/min
twin carburetter	**700 to 800 rev/min**
Fast idle speed	1,100 to 1,300 rev/min
Firing order	1-3-4-2
No. 1 cylinder	Front
Valve clearance (cold): inlet	0.010 in (0.25 mm)
exhaust	0.010 in (0.25 mm)
Valve clearance adjustment	Adjusting screw and locknut
Location of ignition timing marks	Crankshaft pulley and timing chain cover
	<i>After Engine No.</i> <i>Before Engine No.</i>
	DG 25001 DG 25001
	DM 5001 DM 5001
	DS 5001 DS 5001
Ignition timing:	
Static:	
1300 engine	10° B.T.D.C.
1500 engine: single carburetter	10° B.T.D.C.
twin carburetter	10° B.T.D.C.
Dynamic	See 86.35.00
	9° B.T.D.C.
	9° B.T.D.C.
	5° B.T.D.C.

IGNITION DISTRIBUTOR

Make/type	Lucas 25D4
Rotation viewed on rotor	Anti-clockwise
Dwell angle	60° ± 3°
Capacitor capacity	0.20 mfd
Centrifugal advance	See 86.35.00
Vacuum advance	See 86.35.00
Contact breaker gap	0.014 to 0.016 in (0.36 to 0.41 mm)

SPARKING PLUGS

Make/type	Champion N-9Y
Gap	0.025 in (0.64 mm)

IGNITION COIL

Make/type	Lucas 16C6
Primary winding resistance	1.43 to 1.58 ohms

BALLAST RESISTOR

Make/type	Lucas 3BR
Resistance	1.3 to 1.4 ohms

CARBURETTER

	<i>Before</i>	<i>From</i>	<i>After</i>
	<i>Eng. No.</i>	<i>Eng. No. to Eng. No.</i>	<i>Eng. No.</i>
	DG 25001	DG 25001	DH 1
	DM 5001	DM 5001	DM 10001
	DS 5001	DS 5001	DS 10001
Make/type: single carburetter engine	S.U. HS4	S.U. HS4E	S.U. HS4E
twin carburetter engine	S.U. HS2	S.U. HS2E	S.U. HS2E
Main jet	0.090 in	0.090 in	0.090 in
Venturi: single carburetter engine	1.500 in	1.500 in	1.500 in
twin carburetter engine	1.250 in	1.250 in	1.250 in
Needle: 1300 single carburetter engine	AAK	AAW	ABF or ABQ
1500 single carburetter engine	AAK	AAK	ABG
1500 twin carburetter engine	AAN	AAX	AAX



TORQUE WRENCH SETTINGS

Engine 1300

		kgf m	lbf ft
Alternator to mounting bracket and front engine plate	$\frac{5}{16}$ " U.N.F.	2.8	20
Alternator to adjusting link	$\frac{5}{16}$ " U.N.C.	2.8	20
Cylinder block oil gallery	$\frac{1}{4}$ " Dryseal plug	1.9	14
Cylinder block oil gallery seals	$\frac{5}{16}$ " U.N.F.	2.8	20
Cylinder block drain plug	$\frac{1}{2}$ " \times 20 N.P.T.	5.2	38
Crankshaft pulley to crankshaft	1" \times 16 T.P.I.	20.7	150
Connecting rod bolt	$\frac{3}{8}$ " U.N.F.**	{ Colour dyed 6.9 Phosphated 6.4	{ 50 46
Cylinder head to block	$\frac{3}{8}$ " U.N.F.	6.4	46*
Clutch to flywheel	$\frac{5}{16}$ " U.N.F.	2.8	20
Flywheel to crankshaft	$\frac{3}{8}$ " U.N.F.	{ Parkarized **6.2 Cad. plated 5.5	{ 45** 40
Gearbox and rear engine plate to block	$\frac{5}{16}$ " U.N.F.	1.9	14
Manifold inner to head	$\frac{3}{8}$ " U.N.F.	3.5	25
Manifold outer to head	$\frac{3}{8}$ " U.N.F.	3.5	25
Oil filters attachment	Proprietary	1.4	10
Oil sump drain plug	$\frac{3}{8}$ " Dryseal	3.5	25
Rocker pedestal to cylinder head	$\frac{3}{8}$ " U.N.F.	4.7	34
Rocker oil feed to block	$\frac{5}{16}$ " U.N.F.	2.8	20
Main bearing cap bolts	$\frac{7}{16}$ " U.N.F.	9.0	65
Rear crankshaft seal	$\frac{5}{16}$ " U.N.F.	2.8	20
Sealing block to engine plate	$\frac{5}{16}$ " U.N.F.	2.8	20
Sealing block to cylinder block	$\frac{5}{16}$ " U.N.F.	1.9	14
Starter motor attachment	$\frac{3}{8}$ " U.N.F.	4.7	34

Engine 1500

Air cleaner attachment	$\frac{5}{16}$ " U.N.C.	1.1	8
Alternator to mounting bracket and front engine plate	$\frac{5}{16}$ " U.N.F.	2.8	20
Alternator to adjusting link	$\frac{5}{16}$ " U.N.C.	2.8	20
Bearing caps to block	$\frac{7}{16}$ " U.N.F.	9.0	65
Clutch to flywheel	$\frac{1}{4}$ " U.N.F.	1.5	11
†Cylinder head to block	$\frac{3}{8}$ " U.N.F.	6.4	46
Crankshaft nut	1" \times 16 T.P.I.	20.7	150
Exhaust manifold to head	$\frac{5}{16}$ " U.N.F.	1.9	14
Flywheel to crankshaft	$\frac{3}{8}$ " U.N.F.	{ Parkarized **6.2 Cad. plated 5.5	{ 45** 40
Gearbox and rear engine plate to block	$\frac{5}{16}$ " U.N.F.	1.9	14
Manifold inner to cylinder head	$\frac{3}{8}$ " U.N.F.	3.5	25
Manifold outer to cylinder head	$\frac{3}{8}$ " U.N.F.	3.5	25
Oil sump drain plug	$\frac{3}{8}$ "—18 Dryseal	3.5	25
Oil filter attachment	Proprietary	2.8	20
Sealing block to cylinder block	$\frac{5}{16}$ " U.N.F.	1.9	14
Sealing block to engine plate	$\frac{5}{16}$ " U.N.F.	2.8	20

Gearbox

Extension to gearbox	$\frac{5}{16}$ " U.N.F.	2.8	20
Filler plug	$\frac{3}{8}$ " N.P.	3.5	25
Gearbox case to clutch housing	$\frac{3}{8}$ " U.N.F.	4.7	34

Rear Axle

Hypoid housing bearing cap retainer	$\frac{3}{8}$ " U.N.F.	5.2	38
Crown wheel retainer	$\frac{3}{8}$ " U.N.F.	6.4	46
Drain plug	$\frac{3}{8}$ "—18 Dryseal	3.5	25
Hypoid housing attachment	$\frac{5}{16}$ " U.N.F.	2.8	20
Hypoid flange to pinion	$\frac{3}{8}$ " U.N.F.	16.6	120
Hub to axle shaft	$\frac{3}{8}$ " U.N.F.	16.6	120
Propeller shaft attachment front and rear	$\frac{5}{16}$ " U.N.F.	2.8	20
Propeller shaft centre bearing bracket to floor	$\frac{5}{16}$ " U.N.F.	2.8	20
Rear shaft to pinion flange	$\frac{3}{8}$ " U.N.F.	4.7	34

† Studs to be tightened into block to 1.9 kgf m (14 lbf ft).



TORQUE WRENCH SETTINGS

Front Suspension

		kgf m	lbf ft
Brake backplate to vertical link	$\frac{3}{8}$ " U.N.F.	4.7	34
Brake drum retaining screw	$\frac{1}{4}$ " U.N.F.	1.0	7
Ball pin to vertical link	$\frac{1}{2}$ " U.N.F.	**7.0**	50
Brake backplate to vertical link	$\frac{5}{16}$ " U.N.F.	2.8	20
Damper to damper plate on upper wishbone	$\frac{3}{8}$ " U.N.F.	4.7	34
Front sub-frame mounting bracket to body member	$\frac{1}{2}$ " U.N.F.	6.6	48
Front damper and road spring assembly	$\frac{5}{16}$ " U.N.F.	2.8	20
Hub to stub axle	$\frac{1}{2}$ " U.N.F.		

Tighten to 0.7 kgf m (5 lbf ft), turn back one flat and install split pin to give 0.003 to 0.005 in (0.076 to 0.127 mm) hub end-float.

I.F.S. mounting bracket to front sub-frame—upper attachment	$\frac{5}{16}$ " U.N.F.	1.9	14
I.F.S. mounting bracket to front sub-frame—lower attachment	$\frac{3}{8}$ " U.N.F.	3.5	25
Lower ball pin attachment	$\frac{7}{16}$ " U.N.F.	6.2	45
Lower wishbone attachments	$\frac{3}{8}$ " U.N.F.	4.7	34
Rear mounting sub-frame to body	$\frac{1}{2}$ " U.N.F.	6.6	48
Rear damper assembly to lower link	$\frac{7}{16}$ " U.N.F.	**5.2	38
Strut to front sub-frame	$\frac{7}{16}$ " U.N.F.	5.2**	38
Strut to lower wishbone	$\frac{7}{16}$ " U.N.F.	9.0	65
Stub axle to vertical link	$\frac{9}{16}$ " U.N.F.	11.1	80
Tie-rod to vertical link	$\frac{7}{16}$ " U.N.F.	8.3	60
Upper ball joint and damper plate to upper wishbone	$\frac{3}{8}$ " U.N.F.	4.7	34
Upper wishbone to fulcrum shaft	$\frac{7}{16}$ " U.N.F.	**5.2**	38
Upper wishbone to fulcrum shaft	$\frac{7}{16}$ " U.N.F. jam nut	4.7	34
Upper wishbone to fulcrum shaft	$\frac{7}{16}$ " U.N.F. nyloc nut	**5.2**	38
Wheel to hub	$\frac{3}{8}$ " U.N.F.	6.6	48

Rear Suspension

Damper assembly to body	$\frac{1}{4}$ " U.N.F.	1.1	8
Damper assembly to lower link	$\frac{7}{16}$ " U.N.F.	**5.2	38
Lower link to axle	$\frac{7}{16}$ " U.N.F.	5.2**	38
Lower link to body	$\frac{7}{16}$ " U.N.F.	6.6	48
Rear damper detail	$\frac{1}{4}$ " U.N.F.	1.1	8
Rear suspension mounting bracket forward fixing	$\frac{5}{16}$ " U.N.F.	2.8	20
Upper link to axle	$\frac{7}{16}$ " U.N.F.	**5.2	38
Upper link to body bracket	$\frac{7}{16}$ " U.N.F.	5.2**	38
Wheel to hub	$\frac{3}{8}$ " U.N.F.	6.6	48

Steering

Clamp to steering-column	$\frac{1}{4}$ " U.N.F.	1.1	8
Lower coupling pinch bolts	$\frac{5}{16}$ " U.N.F.	**2.8	20**
Lower support tube to body	$\frac{5}{16}$ " U.N.F.	2.8	20
Rack to sub-frame	$\frac{5}{16}$ " U.N.F. 'U' bolt	1.9	14
Shoulder bolts lower coupling	$\frac{1}{4}$ " U.N.F.	1.1	8
Steering-column clamp to steering-column	$\frac{1}{4}$ " U.N.F. shearhead bolt	Tighten to shear	
Steering-column lock to housing	$\frac{5}{16}$ " U.N.C. shearhead bolt	Tighten to shear	
Steering-column support to lower rail	$\frac{1}{4}$ " U.N.F.	1.1	8
Steering-wheel retaining nut	$\frac{9}{16}$ " U.N.F. nut	4.7	34
Support bracket to dash front	$\frac{1}{4}$ " U.N.F.	1.1	8
Tie-rod end ball joint assembly	$\frac{1}{2}$ " U.N.F.	4.4	32
Tie-rod end locknuts	$\frac{1}{2}$ " U.N.F. (thin locknut)	5.2	38
Universal joint to steering-column	$\frac{5}{16}$ " U.N.F.	2.8	20

Chassis—Engine Mountings

Engine and rear engine plate to transmission unit	$\frac{5}{16}$ " U.N.F.	2.8	20
Engine and rear engine plate to transmission unit	$\frac{3}{8}$ " U.N.F.	4.7	34
Rubber to cross-member front engine mounting	$\frac{5}{16}$ " U.N.F.	2.8	20
Rear engine rubber to mounting plate	$\frac{3}{8}$ " U.N.F.	3.5	25



TORQUE WRENCH SETTINGS

Chassis—Brake and Clutch Systems

				kgf m	lbf ft
Brake cable to abutment bracket	..	..	1/4" U.N.F.	1.0	7
Brake pedal mounting details	..	..	3/8" U.N.F.	2.8	20
Brake pedal support bracket to scuttle	..	..	3/8" U.N.F.	4.7	34
Brake pedal support bracket to scuttle	..	..	1/4" U.N.F.	1.1	8
Clutch pedal to support bracket	..	..	5/16" U.N.F.	2.8	20
Clutch pedal to support bracket	..	..	3/8" U.N.F.	4.7	34
Clutch pedal support bracket to scuttle	..	..	5/16" U.N.F.	2.8	20
Hand brake and bracket clamp plate to floor	..	..	1/4" U.N.F.	1.1	8
Hand brake fulcrum pin	..	..	3/8" U.N.F.	3.5	25
Master cylinder support bracket to turret	..	..	5/16" U.N.F.	2.8	20
Plate to body	..	..	5/16" U.N.F.	2.8	20
Union four-way to body	..	..	1/4" U.N.F.	1.1	8

Chassis—Brake Pipe

Brake hose front (12 1/2" long)	..	..	3/8" U.N.F.	1.2	9
Clutch master cylinder to plate	..	..	5/16" U.N.F.	2.8	20
Clutch pipe to slave and master cylinder	..	..	3/8" U.N.F.	1.0	7
Pipe (bent) double-ended unit to rear hose	..	..	3/8" U.N.F.	1.2	9
Pipe (bent) four-way to R.H. front hose	..	..	3/8" U.N.F.	1.0	7
Pipe (bent) four-way to L.H. front hose	..	..	3/8" U.N.F.	1.0	7
Pipe (bent) rear hose to R.H. wheel cylinder	..	..	3/8"	1.2	9
Pipe (bent) R.H. wheel cylinder to L.H. wheel cylinder	..	..	3/8"	1.0	7
Union double-ended	3/8"	1.2	9

Body—(Exhaust System, Radiator, Fuel Tank)

Fuel tank drain plug	5/8" U.N.F.	5.2	38
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Body

Front seat tilt mechanism lever to bracket on seat	1/4" U.N.F.	1.0	8
Front seat safety harness eye bolt	7/16" U.N.F.	3.5	25
Front seat slide to floor	..	..	5/16" U.N.F.	1.9	14
Lock to truck lid	..	..	1/4" U.N.F.	**1.1**	8
Rear seat safety harness eyebolt	..	..	7/16" U.N.F.	3.5	25
Spring assembly to front bumper	..	..	3/8" U.N.F.	3.5	25
Spring bracket to front and rear bumper bar	..	..	3/8" U.N.F.	3.5	25
Safety harness pivot bolt	..	..	7/16" U.N.F.	3.5	25
Torsion bar to rear parcel shelf	..	..	1/4" U.N.F.	1.0	7



RECOMMENDED LUBRICANTS, FUEL AND FLUIDS—CAPACITIES

LUBRICANTS—BRITISH ISLES

(The products recommended are not listed in order of preference)

COMPONENT	BP	CASTROL	DUCKHAMS	ESSO	MOBIL	PETROFINA	TEXACO	SHELL
Engine Carburettor Dashpots and Oil-can	BP Visco-Static 20-50	Castrol GTX	Duckhams Q 20-50	Esso Uniflo	Mobiloil Super 10W/50 or Mobiloil Special 20W/50	Fina Super Grade Motor Oil S.A.E. 20W/50	Havoline Motor Oil 20W/50	Shell Super Multigrade
Gearbox and Final Drive	BP Gear Oil S.A.E. 90 EP	Castrol Hypoy	Duckhams Hypoid 90	Esso Gear Oil GX 90/140	Mobilube HD 90	Fina Pontonic MP XP 90-140	Multigear EP 90	Shell Spirax 90 EP
Front and Rear Hubs Brake Cables Grease Gun	BP Energrease L2	Castrol LM Grease	Duckhams LB 10	Esso Multipurpose- Grease H	Mobilgrease MP	Fina Marson HTL 2	Marfak All Purpose	Shell Retinax A

LUBRICANTS—OVERSEAS

(The products recommended are not listed in order of preference)

COMPONENT	Air temp.		API Designation	BP	CASTROL	DUCKHAMS		ESSO	MOBIL	PETROFINA	SHELL	TEXACO	
	°C	°F											
Engine	over 30	over 80	SD or SE	†BP Super Visco-Static	Castrol GTX or Castrol Super 20W/50	Q 20-50	Q 10-50	Esso Extra Motor Oil 20W/50	Uniflo	Mobiloil Super 10W/50 Mobiloil Special 20W/50	Fina Supergrade Motor Oil 20W/50	†Shell Super Motor Oil	Havoline 20W/50
Carburetter Dashpots	30 to 0	80 to 30	SD or SE										
Oil-can	0 to -20	30 to -4	SD or SE		Castrolite or Castrol GTZ	Q 10-40		Esso Extra Motor Oil 10W/30		Mobiloil Super 10W/50	Fina Supergrade Motor Oil 10W/40		Havoline 10W/30
	below -20	below -4	SD or SE		Castrol 5W/20	Q 5-30		Esso Extra Motor Oil 5W/20		Mobiloil 5W/20	Fina Supergrade 5W/30		Havoline 5W/20
Gearbox and Rear Axle	over 0	over 30	GL4	BP Gear Oil S.A.E. 90 EP	Castrol Hypoy	Duckhams Hypoid 90	Esso Gear Oil GX 90	Mobilube HD 90	Fina Pontonic MP S.A.E. 90	Shell Spirax 90 EP	Multigear Lubricant EP 90		
	below 0	below 30	GL4	BP Gear Oil S.A.E. 80 EP	Castrol Hypoy 80	Duckhams Hypoid 80	Esso Gear Oil GX 80	Mobilube HD 80	Fina Pontonic MP S.A.E. 80	Shell Spirax 80 EP	Multigear Lubricant EP 80		
Front and Rear Hubs Brake Cables Grease Gun				BP Energrease L2	Castrol LM Grease	Duckhams LB 10	Esso Multi-Purpose Grease H	Mobilgrease MP	Fina Marson HTL 2	Shell Retinax A	** Marfak All-purpose **		

† Oils marked thus are available in multigrade forms with viscosity characteristics appropriate to the ambient temperature range in individual markets.

BRAKE AND CLUTCH FLUIDS

Castrol Girling Brake and Clutch Fluid GREEN, or UNIPART 550 Brake Fluid.

FUEL

When optimum performance is required premium grade fuels with octane ratings of 97 must be used. Where such fuels are not available and it is necessary to use fuels of lower rating, the ignition timing must be retarded to prevent audible detonation under all operating conditions, otherwise damage to the engine may occur. The use of lower octane fuels will result in loss of engine power and performance.



RECOMMENDED LUBRICANTS, FUEL AND FLUIDS—CAPACITIES

APPROVED ANTI-FREEZE SOLUTIONS—BRITISH ISLES

(The products recommended are not listed in order of preference)

Smiths Bluecol	Duckhams anti-freeze	Fina Thermidor
BP anti-freeze	Esso anti-freeze	Shell anti-freeze
Castrol anti-freeze	Mobil Permazone	Texaco anti-freeze P.T.

APPROVED ANTI-FREEZE SOLUTIONS—OVERSEAS

(The products recommended are not listed in order of preference)

Smiths Bluecol	Duckhams anti-freeze	Fina Thermidor
BP anti-freeze	Esso anti-freeze	Shell anti-freeze
Castrol anti-freeze	Mobil Permazone	Startex anti-freeze

Where these proprietary solutions are not available, others which meet B.S.I. 3151 or 3152 specifications may be used.

ANTI-FREEZE CONCENTRATION		25%	30%	35%	50%
SPECIFIC GRAVITY OF COOLANT AT 15.5°C (60°F)		1.039	1.048	1.054	1.076
ANTI-FREEZE QUANTITY	PINTS IMP.	2.2	2.6	3.0	4.25
	PINTS U.S.A.	2.6	3.1	3.6	5.1
	LITRES	1.2	1.4	1.7	2.4
DEGREE OF PROTECTION	Complete Car may be driven away immediately from cold	−12°C 10°F	−16°C 3°F	−20°C −4°F	−36°C −33°F
	Safe Limit Coolant in mushy state. Engine may be started and driven away after short warm-up period	−18°C 0°F	−22°C −8°F	−28°C −18°F	−41°C −42°F
	Lower Protection Prevents frost damage to cylinder head, block and radiator. Thaw out before starting engine.	−26°C −15°F	−32°C −26°F	−37°C −35°F	−47°C −53°F

CAPACITIES

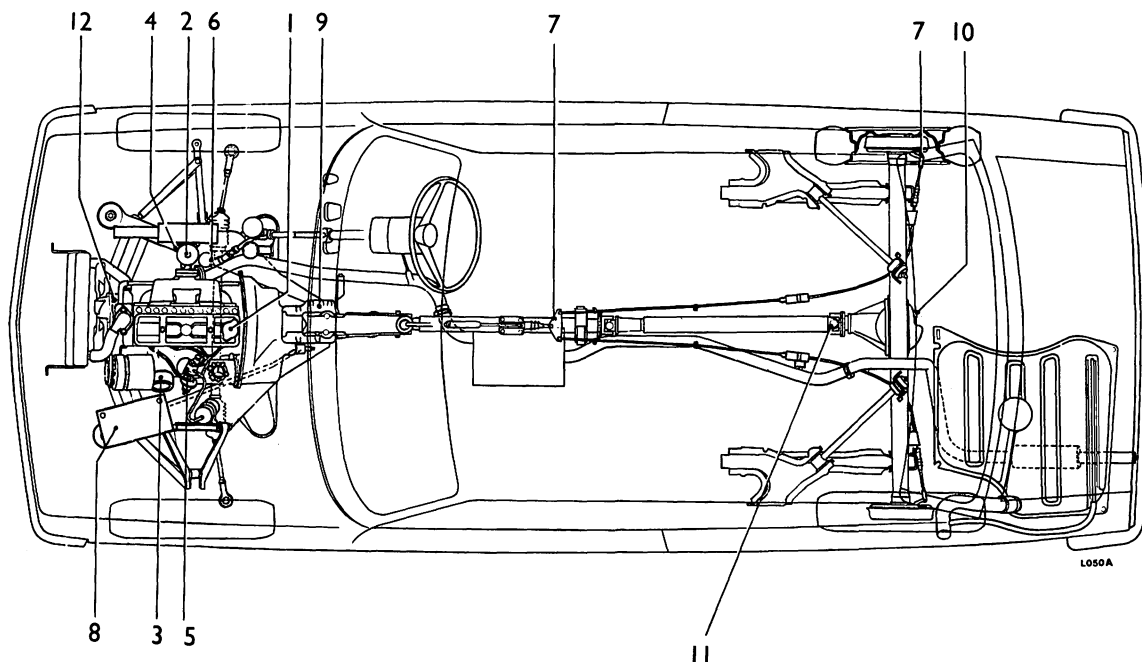
Petrol tank	..	..	..	..	..	10.5 gal (12.6 U.S. gal, 48.0 litres)
Engine sump	..	..	..	..	..	6.5 pints (7.8 U.S. pints, 3.7 litres)
Engine oil filter	..	..	..	..	..	1 pint (1.2 U.S. pints, 0.56 litres)
Gearbox from dry	..	..	..	..	..	1.375 pints (1.7 U.S. pints, 0.78 litres)
Rear axle from dry	..	..	..	..	..	1.5 pints (1.8 U.S. pints, 0.85 litres)
Cooling system with heater	..	..	..	..	..	8.5 pints (10.2 U.S. pints, 4.8 litres)
Heater	..	..	..	..	..	1 pint (1.2 U.S. pints, 0.56 litres)

MAINTENANCE OPERATIONS

Lubrication Chart	10.00.01
Pre-Delivery Inspection	10.10.01
Routine Maintenance Operations	
1,000 miles (1,600 km) Free Service	10.10.03
3,000 miles (5,000 km) Service	10.10.06
6,000 miles (10,000 km) Service	10.10.12
12,000 miles (20,000 km) Service	10.10.24
Summary Chart	10.00.02

LUBRICATION CHART

1. ENGINE. Check oil sump level with dipstick, and top up if necessary.
2. CARBURETTOR. Top up piston damper—oil can.
3. OIL FILTER. Renew oil filter and change engine oil.
4. ACCELERATOR CONTROL LINKAGE. Lubricate—oil can.
5. DISTRIBUTOR. Lubricate—oil can.
6. STEERING RACK AND PINION. Lubricate—grease gun.
7. HAND BRAKE LINKAGE. Lubricate—grease gun.
8. BATTERY. Vaseline connections.
9. GEARBOX. Top up oil level.
10. FINAL DRIVE. Top up oil level.
11. PROPELLER SHAFT SLIDING YOKE. Lubricate—grease gun.
12. WATER PUMP. Lubricate—grease gun (early models only).



SUMMARY CHART

Operation Number Intervals in Miles × 1,000 Intervals in Kilometres × 1,000	10.10.03 1 1·6	10.10.06 3 5	10.10.12 6 10	10.10.24 12 20
Operation Description				
ENGINE COMPARTMENT				
1. Check/top up engine oil level		X		
2. Check/top up cooling system	X	X	X	X
3. Check/top up brake fluid reservoir	X	X	X	X
4. Check/top up clutch fluid reservoir	X	X	X	X
5. Check/top up windscreen washer fluid reservoir	X	X	X	X
6. Check/top up battery	X	X	X	X
7. Check/top up carburettor pistons damper(s)	X		X	X
8. Drain engine oil and refill	X		X	X
9. Renew oil filter/element				X
10. Clean fuel pump sediment bowl	X			X
11. Lubricate distributor and check automatic advance	X		X	X
12. Check/adjust/report condition of distributor points	X		X	X
13. Check/adjust ignition timing, using electronic equipment	X		X	X
14. Clean/adjust sparking plugs			X	
15. Renew sparking plugs				X
16. Check/adjust torque of cylinder head nuts	X			
17. Check/adjust valve rocker clearances	X			X
18. Clean engine oil filler cap				X
19. Clean carburettor air cleaner element(s)			X	
20. Renew carburettor air cleaner element				X
21. Check/adjust/report condition of driving belt	X	X	X	X
22. Check security of starter motor and alternator retaining bolts	X			
23. Check security of engine mountings	X			
24. Check/adjust carburettor settings	X		X	X
25. Lubricate accelerator linkage/pedal fulcrum and check operation	X		X	X
26. Check battery condition: clean and grease connections			X	X
27. Check/report oil/fuel/fluid leaks	X	X	X	X
28.**Check/report leaks from cooling and heater systems	X		X	X
UNDERBODY				
29. Check/top up level of gearbox oil	X		X	X
30. Check/top up level of final drive unit oil	X		X	X
31. Lubricate steering rack and pinion			X	X
32. Lubricate propeller shaft			X	X
33. Lubricate hand brake linkage and cable guides			X	X
34. Check transmission, engine, final drive, suspension and steering unit for oil leaks and report	X	X	X	X
35. Check visually brake, fuel and clutch pipes, hoses, unions for chafing, leaks and corrosion, and report	X	X	X	X
36. Check/report exhaust system for leakage and security		X	X	X
37.**Check tightness of suspension fixings, tie-rod levers, steering unit attachments and steering universal joint coupling bolts and check gaiter for damage	X	X	X	X
38. Check tightness of propeller shaft coupling bolts				X
39.**Check tightness of sub-frame or body mountings	X			

Operation Number Intervals in Miles $\times 1,000$ Intervals in Kilometres $\times 1,000$	10.10.03	10.10.06	10.10.12	10.10.24
	1	3	6	12
	1.6	5	10	20
Operation Description				
EXTERIOR				
40. Adjust front hubs				X
41. Check/adjust front and rear wheel alignment with tracking equipment	X			
42. Check/report front and rear wheel alignment with tracking equipment			X	X
43. Inspect brake pads for wear, and discs for condition		X	X	X
44. Inspect and report brake linings for wear and drums for condition				X
45. Check tightness of road wheel fastenings	X	X	X	X
46. Check that tyres are in accordance with specification†		X	X	X
47. Check visually for cuts in tyre fabric, exposure of ply or cord structure, lumps or bulges and tread depth†	X	X	X	X
48. Check/adjust tyre pressures, including spare	X	X	X	X
49a Check/adjust headlamp alignment	X			
b Check/report headlamp alignment		X	X	X
50. Check, if necessary replace, windscreen wiper blades		X	X	X
INTERIOR				
51. Check brake pedal travel and hand brake operation, adjust if necessary	X			
52. Check/report brake pedal travel and hand brake operation		X	X	X
53. Check operation of window controls, locks and bonnet release	X			
54. Check function of all electrical systems and screenwasher	X	X	X	X
55. Lubricate clutch and brake pedal pivots			X	X
56. Lubricate all locks, door hinges, strikers and bonnet release	X		X	X
57. Check/report condition and security of seats and seat belts		X	X	X
58. Check/report rear view mirrors for looseness, cracks and crazing		X	X	X
ROAD-TEST				
59. Road/roller test and report additional work required	X		X	X
60. Ensure cleanliness of controls, door handles, steering-wheel, etc.	X	X	X	X

† Important.—If the tyres do not conform with legal requirements, report to the owner.



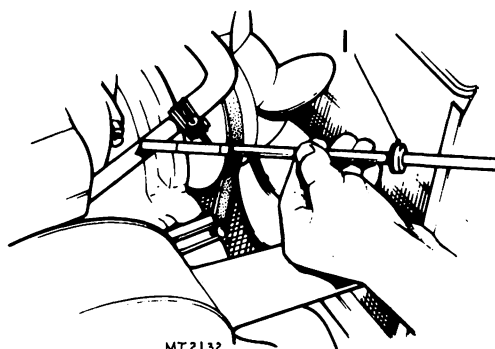
MAINTENANCE

The Maintenance Summary list on pages 10.00.02 and 10.00.03 gives details of mile and kilometre intervals for the following operations. The figure in parentheses to the left of each heading refers to the item number on the summary list.

ENGINE COMPARTMENT

(1) Check and top up engine oil level

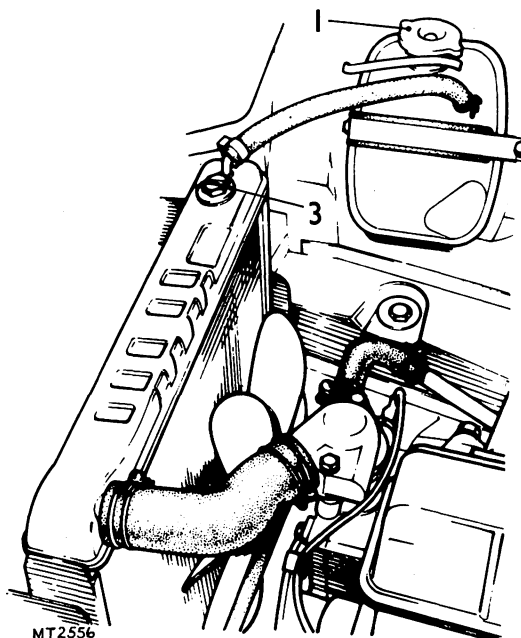
1. Withdraw dipstick. Wipe clean and replace. Remove dipstick again and note oil level. If necessary top up with a recommended grade of oil to the high mark on dipstick. Wipe dipstick before finally refitting. **DO NOT OVERFILL.**



(2) Check and top up cooling system

WARNING: Do not remove radiator filler plug and expansion tank filler cap when the engine is hot.

1. Remove radiator expansion tank cap.
2. If necessary, top up with soft water to maintain the level at half-full, and replace cap.
Should the expansion tank be allowed to empty
3. Remove the radiator filler plug and top up as necessary. Replace the filler plug and half-fill the expansion tank.



(3) Check and top up brake fluid reservoir

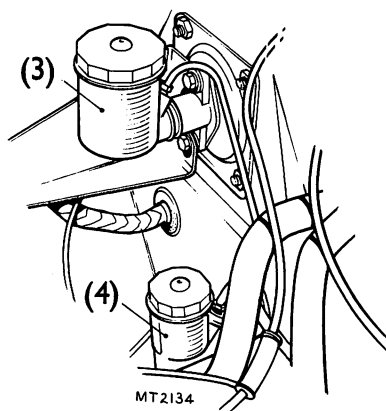
1. Wipe clean the reservoir cap and surrounding area and remove cap. Examine the fluid level and top up to level mark on side of reservoir. Investigate any sudden appreciable drop in the level.

On vehicles which have translucent brake fluid reservoirs there is no need to remove the cap to check the level. If the level requires topping up, clean cap and surrounding area first.

Use only new fluid of the correct specification taken from a sealed container for topping up; do not use unknown fluid or that which has been exposed to the atmosphere or discharged during bleeding operations.

(4) Check and top up clutch fluid reservoir

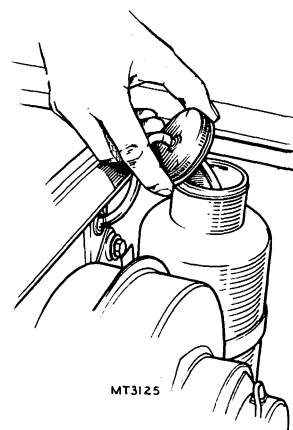
1. Wipe clean the clutch fluid reservoir cap and surrounding area.
2. Remove cap and top up with new fluid taken from a sealed container until level is in line with mark on the side of the reservoir.
3. Refit cap immediately.



(5) Check and top up windscreen washer fluid reservoir

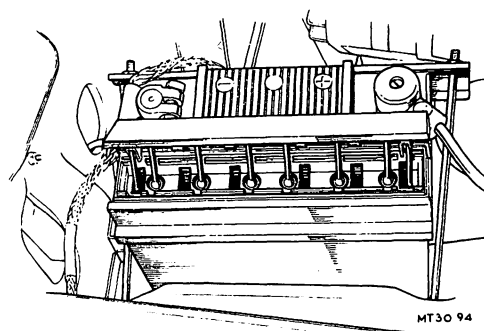
Examine water level in the plastic windscreen washer reservoir, and if necessary top up with soft water. As a precaution against freezing conditions, fill reservoir with a mixture of one part methylated spirits and two parts water.

CAUTION: Do not use glycol anti-freeze solutions as these may discolour the paintwork and damage wiper blades and sealing rubbers.



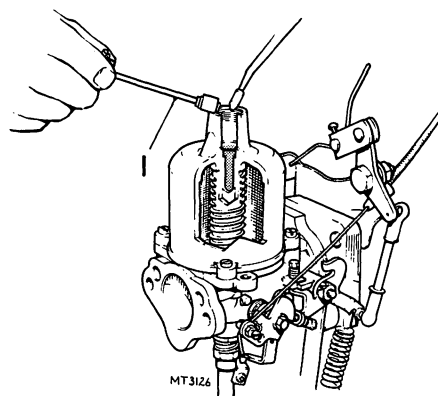
(6) Check and top up battery

1. Lift and tilt battery cover and check the electrolyte level which, when correct, should just cover the separators.
2. Top up if necessary with distilled water until the filling tubes are full and
3. The trough is just covered.



(7) Top up carburettor piston damper

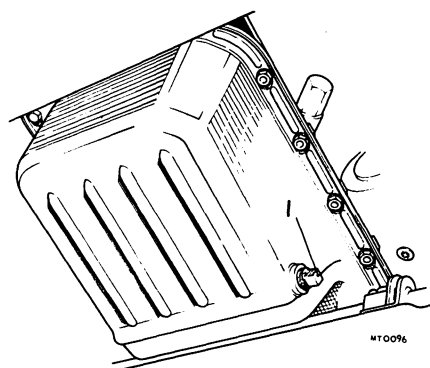
1. Unscrew and withdraw plug from top of the suction chamber.
2. Note the oil level, which when correct is $\frac{1}{2}$ in (13 mm) above the top of the hollow piston rod. Top up if necessary and refit hexagon plug.



(8) Drain engine oil and refill

This operation is best carried out when the engine is warm.

1. Place a suitable receptacle under the drain plug and uncrew the plug slowly until oil begins to escape. When the rate of flow lessens, remove the plug completely and allow the oil to drain for a few minutes.
2. Clean and refit the drain plug and refill sump via the oil filler cap with a recommended grade of oil.

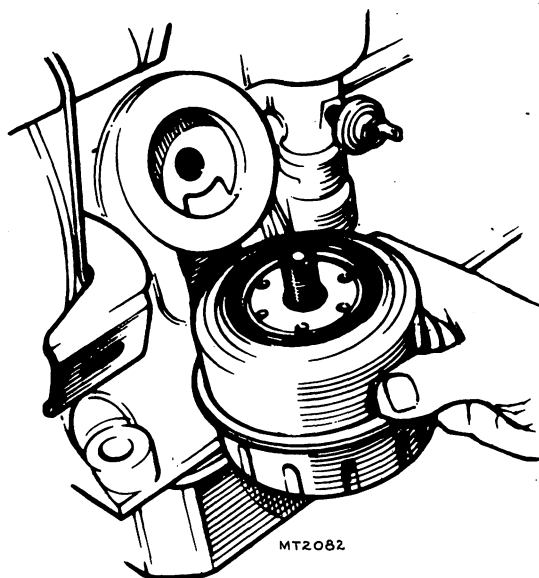


MAINTENANCE

(9) Renew oil filter element

NOTE: This operation is best carried out when engine is warm, and with alternate oil changes.

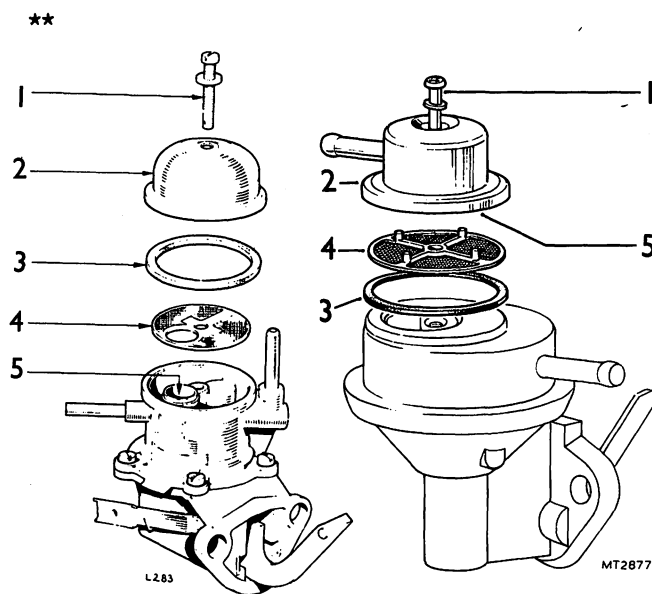
1. Place a suitable receptacle under the drain plug and unscrew the plug slowly until oil begins to escape. When rate of flow lessens, remove plug completely and allow oil to drain for a few minutes. Clean and replace drain plug.
2. Grasp the oil filter with both hands, turn anti-clockwise, remove and discard.
3. Clean the cylinder block face and smear with oil. Fit new filter and screw firmly home. Remove surplus oil.
4. Refill sump via oil filler with recommended grade of oil to high mark on dipstick.
5. Start engine and check for oil leaks between filter and cylinder block face.



(10) Clean fuel pump sediment bowl

****NOTE:** Two alternative fuel pumps are illustrated.**

1. Unscrew bolt complete with washer.
 2. Lift off domed cover.
 3. Carefully remove rubber sealing ring.
 4. Remove filter gauze and wash in petrol.
 5. ******Using a small screwdriver, loosen sediment in bowl. Take care not to damage non-return valve. Finally remove sediment with air line (L.H. drawing). ******
- Reverse 1 to 4 to reassemble.



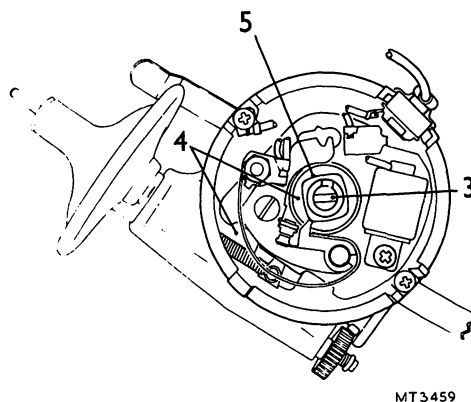
(11) Lubricate distributor and check automatic advance

Lubricate

1. Remove distributor cap.
2. Lift off rotor arm.
3. Apply a few drops of oil to centre of rotor spindle.
4. Apply oil to advance and retard mechanism.
5. Lightly grease the cam surface.
6. Wipe away surplus oil and grease.
7. Refit rotor arm and distributor cap.

Check automatic advance

1. Check freedom of movement by turning rotor spindle in the direction of rotation (anti-clockwise) to limit of its movement and allow it to return under spring pressure.
2. Check for leaks in vacuum advance mechanism by disconnecting the vacuum pipe at the carburettor end and, using suitable rubber tubing, connect a 'Tee' piece between the end of the vacuum pipe and the carburettor connection. Connect a vacuum gauge to the remaining outlet from the 'Tee' piece and start the engine and increase its speed until the vacuum gauge reads 15 to 20 inches of vacuum. Compress the rubber tube between the 'Tee' piece and carburettor and stop the engine. If the vacuum unit and pipes are free from leaks the gauge reading will remain constant.



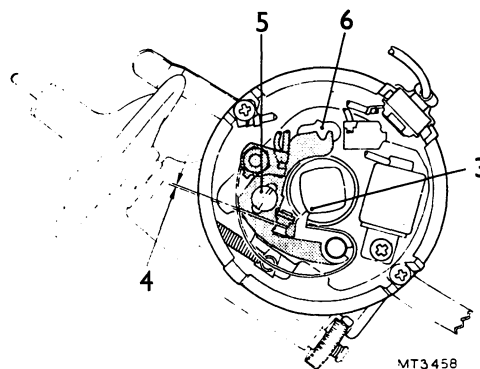
(12) Check/adjust/report condition of distributor points

Check and adjust points

1. Remove distributor cap.
2. Lift off rotor arm.
3. Turn the crankshaft in normal running direction until contact breaker lever is operating on the highest point of the cam lobe, i.e. gap at its widest.
4. Check gap with a 0.015 in (0.39 mm) feeler gauge between the points.
5. To adjust, slacken the fixed contact screw.
6. Insert a screwdriver blade into the 'V' shaped cut-away. Turn the screwdriver clockwise to decrease or anti-clockwise to increase the gap.

Tighten the fixed contact screw and re-check the gap.

Refit rotor arm and distributor cap.



(13) Check and adjust ignition timing, using electronic equipment

Use standard garage equipment following manufacturer's instruction and engine tuning data. See 86.35.15.

(14) Clean and adjust spark plugs

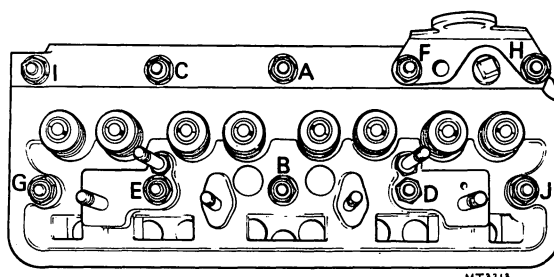
1. Remove each spark plug in turn from engine.
2. Clean the electrodes with a wire brush or plug cleaning machine.
3. Using a 0.025 in (0.60 mm) feeler gauge, check the gap, and adjust if necessary by bending the side electrode towards or away from the central electrode as necessary.
4. Discard plugs which have badly burnt or worn electrodes or cracked ceramic insulators.
- 5.**Refit plugs complete with washers and tighten to 15 to 20 lbf ft (2.1 to 2.8 kgf m).**

(15) Renew sparking plugs

1. Remove and discard each spark plug in turn from engine.
2. Check that the new spark plugs are of the correct type and using a 0.025 in (0.60 mm) feeler gauge, check the gap.
- 3.**Fit plugs to engine and tighten to 15 to 20 lbf ft (2.1 to 2.8 kgf m).**

(16) Check/adjust torque of cylinder head nuts

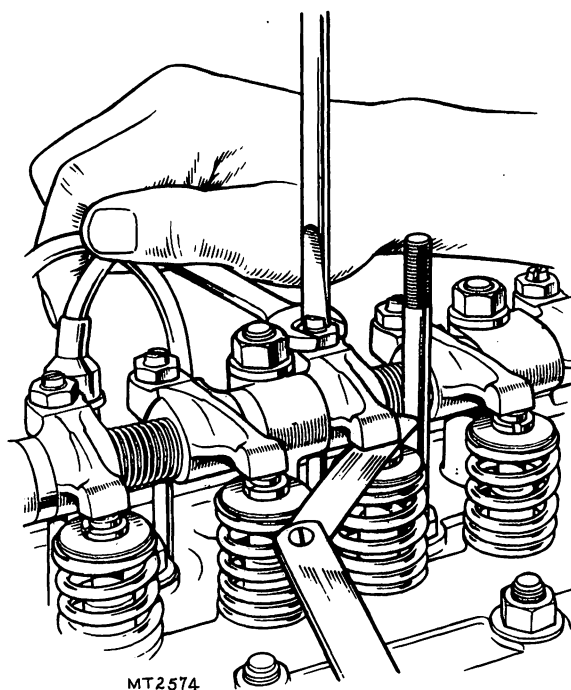
Nuts securing cylinder head to the block must be tightened, in the sequence shown, to 38 to 46 lbf ft (5.2 to 6.4 kgf m).



MAINTENANCE

(17) Check/adjust valve rocker clearances

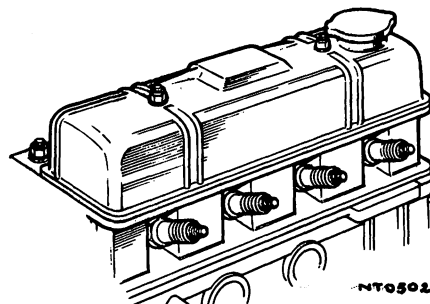
1. Remove rocker cover 12.29.42.
2. Remove spark plugs.
3. Turn engine in normal running direction until Nos. 8 and 6 valves are open.
4. Using a 0.10 in (0.25 mm) feeler gauge, check gap between the rocker pad and valve tip. Working from front of engine, check and if necessary adjust in the following sequence.
Adjust Nos. 1 and 3 valves with Nos. 8 and 6 valves open.
Adjust Nos. 5 and 2 valves with Nos. 4 and 7 valves open.
Adjust Nos. 8 and 6 valves with Nos. 1 and 3 valves open.
Adjust Nos. 4 and 7 valves with Nos. 5 and 2 valves open.
5. Refit spark plugs, connecting h.t. leads in correct sequence.
6. Refit rocker cover, renewing gasket if necessary, and secure with nuts and washers; tighten to 1 to 2 lbf ft (0.14 to 0.3 kgf m).



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(18) Clean engine oil filler cap

1. Remove cap and wash in clean fuel; dry and refit.

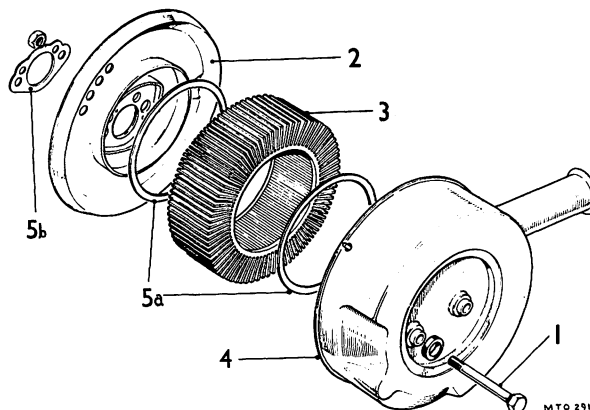


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(19) Clean air cleaner element(s)

Single carburettor models

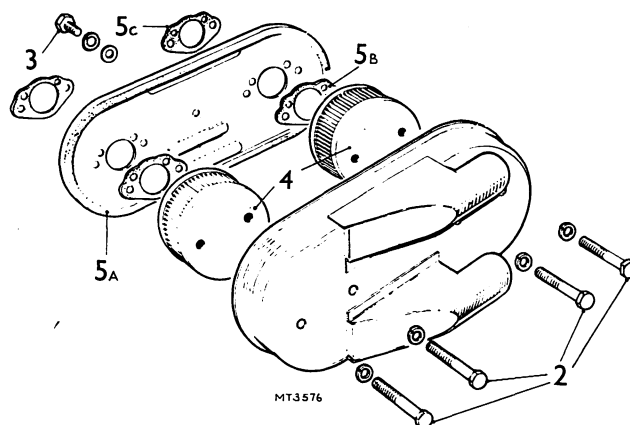
1. Release two bolts securing air cleaner to carburettor intake flange and withdraw air cleaner from engine compartment.
2. Detach cover-plate from container.
3. Remove paper element and clean between folds of element using a low pressure air line or soft brush.
4. Clean container.
5. Reassemble, reversing instructions 1 to 3, noting:
a. Sealing rings are correctly positioned.
b. Carburettor flange gasket in good condition and correctly positioned.



continued

Twin carburettor models

1. Disconnect fuel feed pipe linking float-chamber.
2. Release four bolts complete with spring washers securing air cleaner assembly to intake flanges, and lift complete assembly from carburetters.
3. Remove bolt and washers securing cover-plate to container and split assembly.
4. Remove paper element and clean between folds of element using a low pressure air line or soft brush.
5. Reassembly and refitting. Reverse 1 to 4 noting:
 - a. Cover-plate seal correctly located and in good condition.
 - b. Internal gaskets fitted correct way up and undamaged.
 - c. Carburettor flange gaskets in good condition and fitted correct way up.



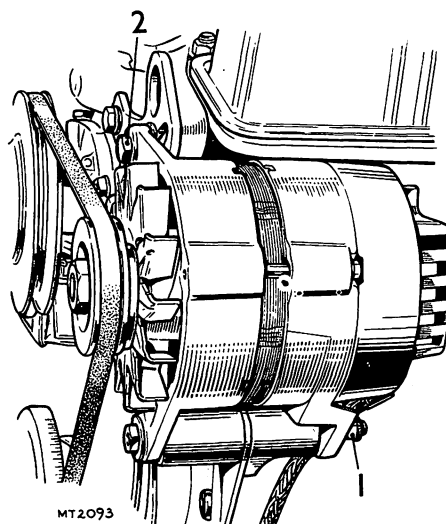
(20) Renew carburettor air cleaner element(s)

1. Renew element(s), adopting procedure detailed in previous operation.

(21) Check/adjust/report condition of driving belt

The fan belt should be sufficiently tight to drive the alternator and water pump without loading the bearings unduly. The adjustment is correct when the belt can be moved laterally $\frac{3}{4}$ in (20 mm) at the mid-point of its longest run. Should adjustment be required, proceed as follows:

1. Slacken alternator pivot bolt nut.
2. Loosen nut securing alternator to adjustment bracket.
3. Pivot alternator away from the engine until correct amount of slack is achieved. Maintaining alternator in this position, tighten the pivot bolt nut and adjustment bracket securing nut. Re-check the adjustment.

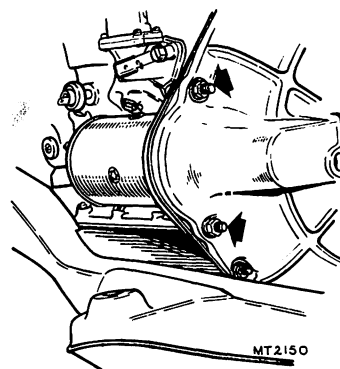


(22) Check security of starter motor and alternator retaining bolts

1. Using a torque wrench set to 26 to 32 lbf ft (3.6 to 4.4 kgf m), check tightness of attachment nuts and bolts.

Alternator

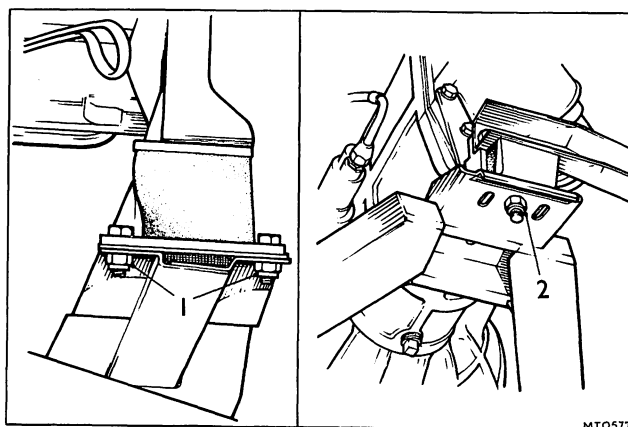
1. Check tightness of alternator pivot nut and bolt—16 to 20 lbf ft (2.2 to 1.2 kgf m).
2. Check alternator to adjusting link nut and bolt—16 to 20 lbf ft (2.2 to 1.2 kgf m).



(23) Check security of engine mountings

The engine and gearbox assembly is secured to the sub-frame at three points.

1. Check tightness of front R.H. and L.H. attachment nuts and bolts—16 to 20 lbf ft (2.2 to 2.8 kgf m).
2. Check tightness of rear attachment nut—20 to 24 lbf ft (2.8 to 3.3 kgf m).



(24) Check/adjust carburettor settings

Single carburettor

Start the engine and warm to normal running temperature as indicated by temperature gauge and push the choke control fully home.

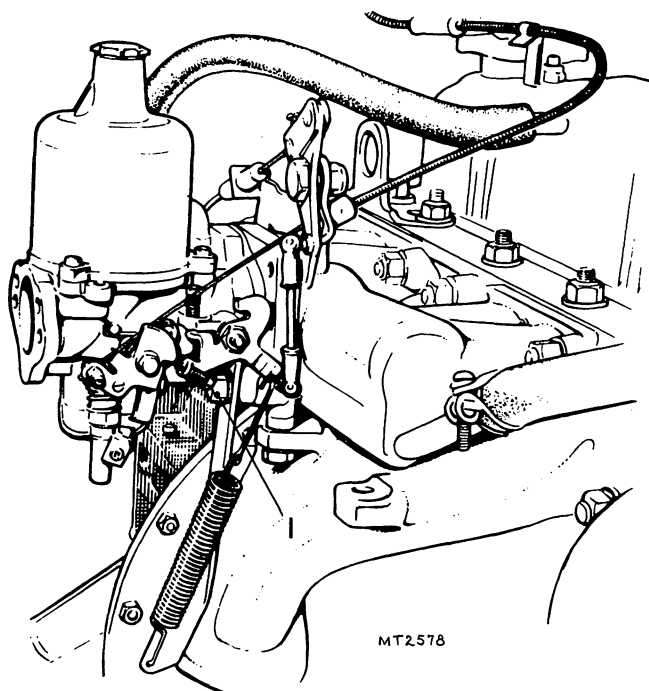
1. Ensure fast idling screw is clear of the cam.
2. Adjust idling screw to achieve an idling speed of approximately 800 to 850 rev/min.

Should these adjustments fail to achieve satisfactory results, refer to operation 19.15.01.

Twin carburetters

Start engine and warm to normal running temperature as indicated by temperature gauge and push the choke control fully home.

1. Remove air cleaner and ensure fast idling screws are clear of cams.
2. Adjust the throttle adjusting screws to give an idling speed of approximately 800 to 850 rev/min.
3. Using an air-flow meter, compare the carburettor air intake intensity on both carburetters and alter the throttle adjusting screws until the air flow is the same.
4. If an air-flow meter is not available, use a length of small bore rubber tubing and place one end in each carburettor intake in turn and hold the other to the ear. Adjust the throttle adjusting screws until the intensity of the intake 'hiss' is the same in both carburetters.



(25) Lubricate accelerator linkage/pedal fulcrum and check operation

1. Using an oil can, lubricate the accelerator pedal pivot, taking care to wipe away surplus oil to avoid staining carpet.
2. Lubricate throttle linkage on carburettor(s) and wipe away surplus oil.

(26) Check battery condition and grease connections

Check specific gravity

Specific gravity checks must be made before the addition of distilled water or after a run so that a gassing charge is available for an accurate test.

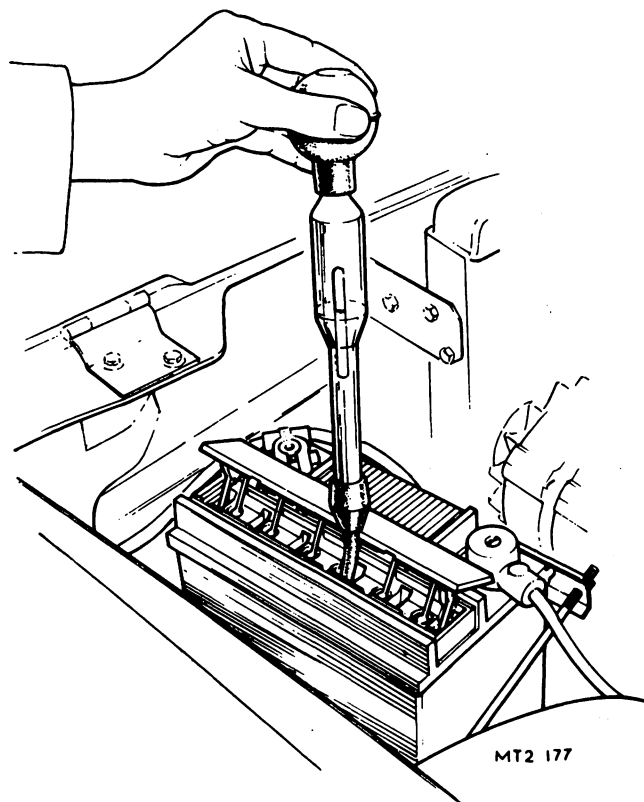
1. Lift and tilt battery cover.
2. Using a hydrometer, note the specific gravity reading of each cell.
3. Close battery cover immediately after check.

Specific gravity readings approximately equal for all cells indicate a battery in serviceable condition.

Cells that show a specific gravity reading lower than the others indicate that the battery is approaching the end of its reliable life.

Grease battery connections

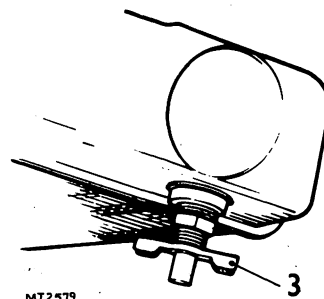
4. Remove battery connections, wipe clean and before refitting smear terminal posts with Vaseline.



(27) Check/report oil/fuel/fluid leaks

Examine the engine, gearbox and rear axle for oil leaks. Examine the fuel system pipes and carburettor(s) and fuel pump for fuel leaks.

Examine clutch system for leaks of hydraulic fluid.



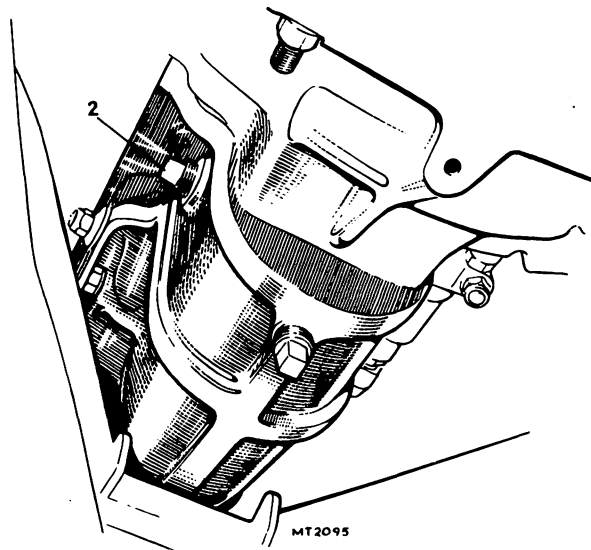
(28) Check/report leaks from cooling and heater systems

1. Check hose connections and tightness of clips.
2. Examine water pump.
- 3.**Check radiator drain tap (where fitted).
4. Check cylinder block drain tap (where fitted).**
5. Examine cylinder block core plugs.
6. Examine heater water system for leaks.

UNDERBODY

(29) Check/top up level of gearbox oil

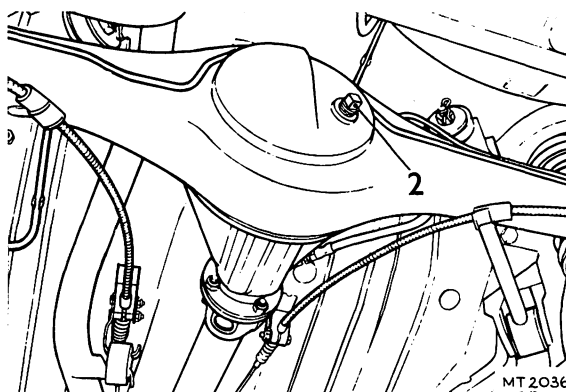
1. Place car on ramp or over pit.
2. Remove gearbox level plug and observe oil level which when correct is in line with the bottom of the level hole threads.
3. If necessary, top up via level hole using a pump type oil can with a flexible nozzle charged with a recommended E.P. oil until the level is correct.
- 4.**Wipe clean level plug, refit and tighten to 20 to 25 lbf ft (2.8 to 3.5 kgf m).**



MAINTENANCE

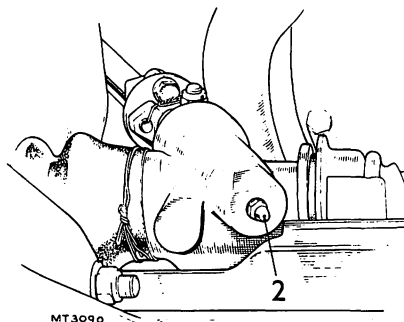
(30) Check/top up level of final drive oil

1. Place car on ramp or over pit.
2. Wipe clean level plug and surrounding area and remove plug.
3. Observe oil level which when correct is level with the bottom of the level hole threads.
4. If necessary, top up via level hole, using a pump-type oil can with a flexible nozzle, charged with a recommended E.P. oil, until the level is correct.
- 5.**Wipe clean level plug, refit and tighten to 20 to 25 lbf ft (2.8 to 3.5 kgf m).**



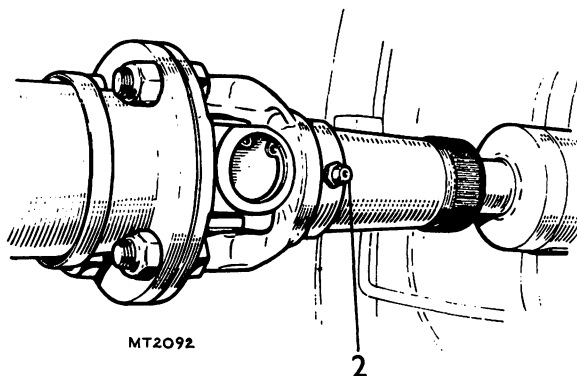
(31) Lubricate steering rack and pinion

1. Place car on ramp or over pit.
2. Wipe clean steering unit grease nipple and apply a grease gun charged with a recommended lubricant; give five strokes only. Remove surplus grease.



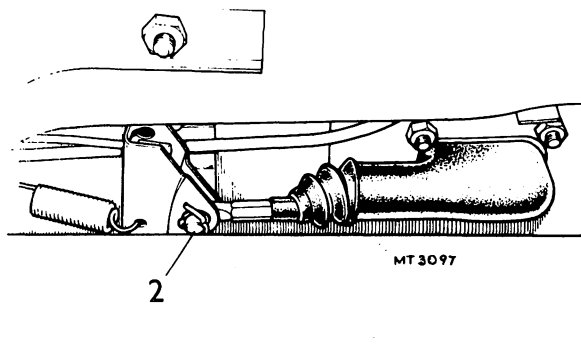
(32) Lubricate propeller shaft

1. Place car on ramp or over pit.
2. Using a grease gun charged with a recommended lubricant, apply grease via the nipple located at the gearbox end of the front propeller shaft.



(33) Lubricate hand brake linkage and cable guides

1. Place car on ramp or over pit.
2. Smear grease around hand brake compensator, working it well into the clevis pins.
3. Smear grease around rear brake-drum clevis pins.
4. Grease exposed sections of inner cable to resist corrosion.



(34) Check for oil leaks and report

Place car on ramp or over pit and examine carefully gearbox and final drive units for oil leaks. Check tightness of gearbox drain and level plugs and final drive level plug.

(35) Check visually and report hydraulic and fuel pipes and unions for chafing, leaks and corrosion

Follow the run of all brake and clutch hydraulic pipes and ensure that at no point are they chafing against body or sub-frame members. Note and report any corroded section of pipe. Examine all joints for leaks while a second operator applies pressure to brake pedal. Check that the flexible jump hoses are not kinked or strained when steering is turned lock to lock.

Examine the run of fuel line from tank to carburettor and ensure that at no point is it chafing against the body of fouling components. Check the rubber connections joining each section of pipe and make sure they are not unduly strained by any off-set of the pipe sections. Connectors which have split due to excessive pipe off-set must be renewed, and the pipe sections concerned set into line.

(36) Check and report exhaust system for leakage and security

With engine running, check security of connections, bolt tightness and for deterioration of system.

(37) Check tightness of suspension fixings, tie-rod levers, steering unit attachments and steering universal coupling

****bolts and check gaiters for damage.****

Rear suspension

1. Check tightness of nut and bolt securing forward end of lower link to body bracket.
2. Check tightness of nut and bolt securing rear end of lower link to axle casing bracket.
3. Check tightness of nut and bolt securing forward end of upper link to body bracket.
4. Check nut and bolt securing damper assembly to lower link.
5. Check nuts securing damper assembly to body.

Front suspension

6. Check tightness of bolts securing wishbone assembly to sub-frame.
7. Check tightness of bolts securing damper lower attachment bracket.
8. Check damper lower attachment bolt.
9. Check security of upper wishbone fulcrum locknuts.

Tie-rod levers

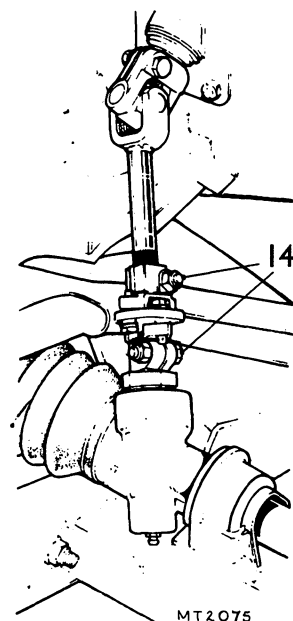
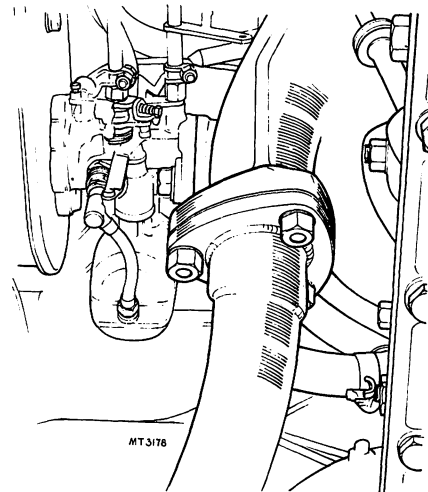
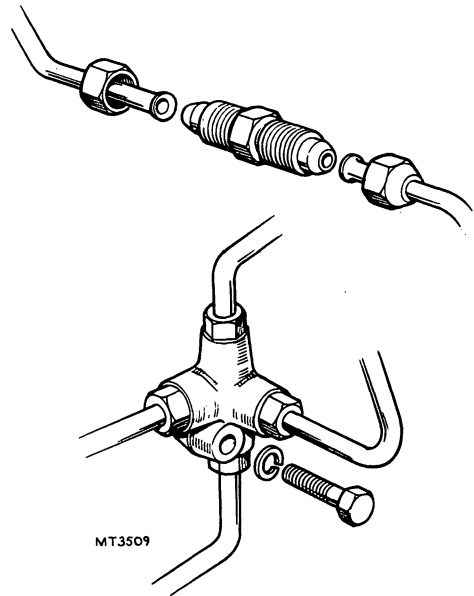
10. Check security of tie-rod lever to vertical link bolts.

Steering unit attachment

11. Check tightness of steering unit attachment nuts—11 to 14 lbf ft (1.5 to 2.0 kgf m).
12. Check and ascertain cause of any excessive backlash in steering.
13. Examine steering unit gaiters for condition. Report any defects.

Steering universal coupling bolts

14. Check bolts through steering universal joints.



(38) Check tightness of propeller shaft coupling bolts

1. Place car on ramp or over pit.
2. Check tightness of coupling bolts at gearbox end, rear axle end and centre.
3. Check tightness of centre bearing attachment bolts.

(39) Check tightness of sub-frame or body mountings

EXTERIOR

(40) Adjust front hubs

Refer to operation 60.25.13.

(41) Check/adjust front and rear wheel alignment with tracking equipment

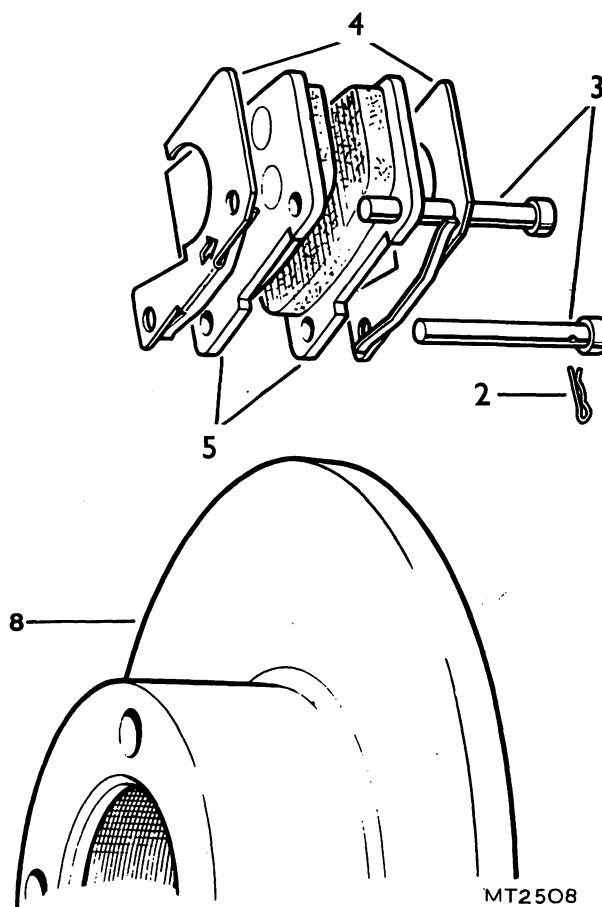
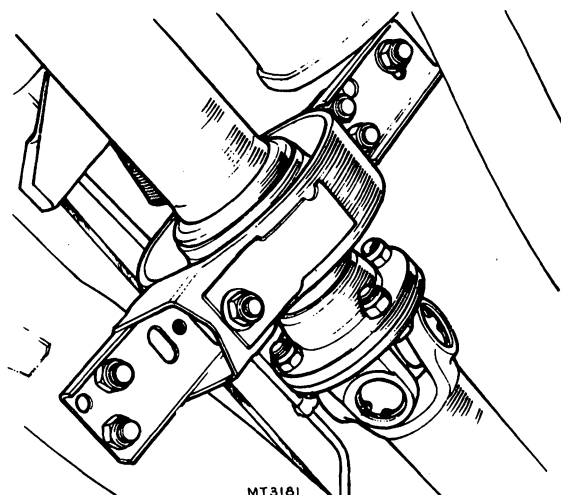
Use standard garage equipment; see General Specification for Data.

(42) Check/report front and rear wheel alignment with tracking equipment

Use standard garage equipment; see General Specification for Data.

(43) Inspect brake pads for wear and discs for condition (disc brakes only)

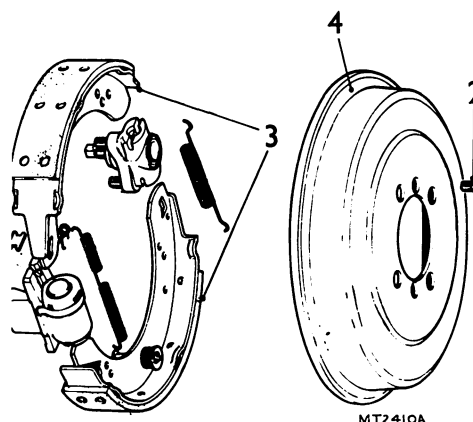
1. Apply hand brake, jack up front of car, remove nave-plates and road wheels.
2. Remove spring clips securing pad retaining pins.
3. Withdraw pad retaining pins.
4. Withdraw damper shims.
5. Lift out friction pads.
6. Report pad condition if the thickness has been reduced to 0.125 in (3 mm) or if there is insufficient material to provide 0.125 in (3 mm) thickness at the completion of a further 3,000 miles (5000 km).
8. Examine brake disc for excessive scoring and report if run-out is in excess of 0.004 in (0.1 mm).
9. Reverse instructions 1 to 5 for refitting pads and road wheels. Ensure that damper springs are fitted with arrows pointing in forward direction of road wheel rotation.



(44) Inspect and report brake linings for wear and drums for condition

Drum front brakes

1. Apply hand brake, jack up front of car and remove nave-plates and road wheels.
2. Remove two screws securing brake-drum to hub and remove brake-drum.
3. Examine brake linings for wear and report any excessive wear or contamination with grease.
4. Examine brake-drum for wear and scoring and report.
5. De-dust and remove oil or grease from back-plate.
6. Reverse instructions 1 and 2 to refit brake-drum and wheel.



Rear brakes

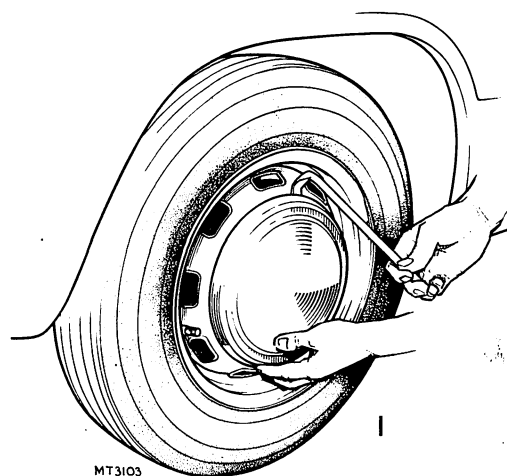
1. Release hand brake, jack up rear of car and check front wheels. Remove nave-plate and road wheel.
2. Remove two screws securing brake-drum to hub and withdraw drum.
3. Examine brake linings and report any excessive wear or contamination with grease.
4. Examine brake-drum for excessive wear or scoring.
5. De-dust and remove oil or grease from backplate.
6. Reverse instructions 1 and 2 to refit brake-drum and road wheel.

(45) Check tightness of road wheel retaining nuts

1. Remove nave-plate with tool provided in tool kit.
2. Check tightness of wheel retaining nuts—38 to 45 lbf ft (5.2 to 6.2 kgf m).
3. Refit nave-plate by placing inner edge over wheel projections and giving the plate a sharp tap with the hand to spring into position.
4. Repeat instructions 1 to 3 on remaining wheels.

(46) Check that tyres are in accordance with specification

Since it is dangerous (and illegal in U.K.), ensure that cross-ply and radial-ply tyres are not mixed on the same axle. Report any deviation from manufacturer's specification.



(47) Check visually and report depth of tread, cuts in tyre fabric, exposure of ply or cord structure, lumps or bulges

1. Check tyre tread with depth gauge and ensure that at least 1 mm of tread depth exists in a continuous band around the tyre of at least three-quarters of the tyre breadth.
2. Examine the tread and side walls of each tyre, including the spare, and report any damage or defects.

MAINTENANCE

(48) Check and adjust tyre pressure, including spare

Check tyre pressures when the tyres are cold, i.e. before a run. A worn tyre bled to the recommended pressure when hot will be underinflated when cold.

Using a tyre pressure gauge tested for accuracy, check pressures to the following figures:

★★

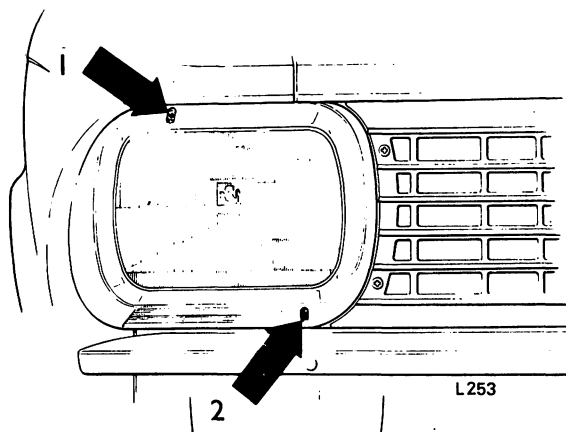
Tyre type and size	Front			Rear		
	lb/in ²	kg/cm ²	bar	lb/in ²	kg/cm ²	bar
Cross-ply 5·20—13D75 1 to 4 up Fully laden						
	25	1·75	1·73	30	2·11	2·05
	26	1·82	1·79	32	2·25	2·20
5·60—13D75 All conditions	22	1·54	1·52	26	1·82	1·79
Radial-ply 155 SR—13 SP68	22	1·54	1·5	26	1·82	1·8

★★

(49) Check/adjust/report headlamp alignment

Piercings provided in the headlamp rim enable beam aiming to be carried out without removing the rim. Beam aiming can best be accomplished using equipment such as Lucas Beamsetter or Lev-L-Lite.

1. Adjust beam in horizontal plane.
2. Adjust beam in vertical plane.

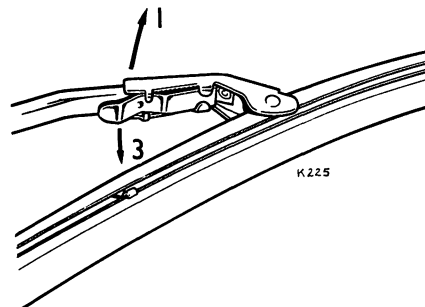


(50) Check, and if necessary replace, windscreen wiper blades

Replace wiper blades when vision is impaired due to unsatisfactory clearance of water from windscreen.

To remove wiper blades

1. Lift wiper arm complete with blade away from windscreen.
2. Tilt wiper blade assembly away from wiper arm (towards windscreen) to disengage it from locating lug.
3. Hold wiper blade assembly in this position and lift leaf-spring at back of wiper blade assembly and slide wiper blade off wiper arm.



To refit wiper blade

1. Slide wiper blade assembly over wiper arm until the lug on wiper arm locates in hole in wiper blade.

INTERIOR

(51) Check brake pedal travel, and hand brake operation; adjust if necessary

Toledo 1500 four-door—Self-adjusting rear brakes and disc front

Excessive foot pedal and hand brake travel indicates possible malfunction of self-adjusters and should be investigated.

Toledo 1300 two-door—Drum brakes front and rear

Excessive foot pedal and hand brake lever travel indicates need for adjustment of front and rear brake-shoes. Adjustment of rear brake-shoes should automatically reduce hand brake lever travel.

Front brake adjustment

1. Apply hand brake, jack up front of car.
2. Turn one of the adjusters clockwise whilst spinning the brake-drum until drum is locked.
3. Turn the adjuster anti-clockwise one notch at a time until brake-drum is just free to revolve.
4. Repeat instructions 2 and 3 with second adjuster.
5. Repeat instructions 2, 3 and 4 on opposite brake.
6. Lower jack.

Rear brake adjustment

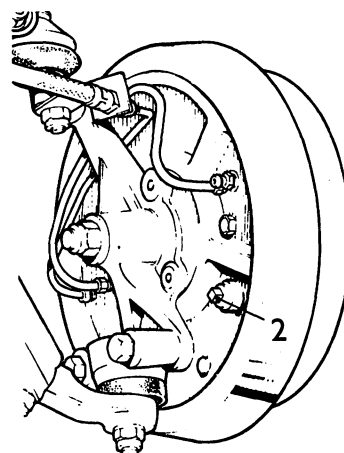
1. Release hand brake, chock front wheels and jack up rear of car.
2. Turn adjuster clockwise whilst spinning the wheel until the shoes have locked the drum.
3. Turn adjuster anti-clockwise one notch at a time until the drum is just free to rotate.
4. Repeat instructions 2 and 3 on opposite rear brake.
5. Lower jack, apply hand brake and remove chocks from front wheels.

(52) Check and report brake pedal travel and hand brake travel

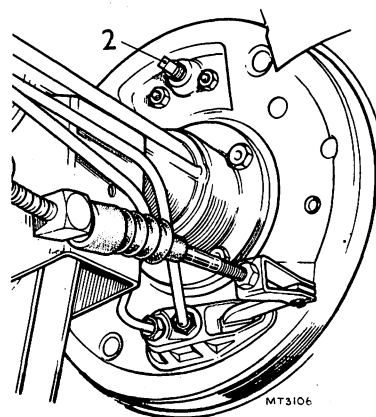
Apply hand and foot brakes and report any excessive travel that would indicate need for adjustment or possible malfunction of self-adjusting mechanism.

(53) Check operation of window controls, locks and bonnet release

Operate window controls, locks and bonnet release mechanism; adjust where necessary.



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MAINTENANCE

(54) Check function of all electrical systems and screen washers

Test the operation of the following equipment:

- Lights (main beams, dip beam, sidelights, panel lights, courtesy lights, rear number-plate lamp)
- Warning lights (main beam, oil pressure, ignition)
- Flashers
- Horns
- Heater
- Alternator
- Starter motor
- Windscreen wipers and washers.

(55) Lubricate clutch and brake pedal pivots

Use oil sparingly to lubricate the pivot bushes on the clutch and brake pedal bushes within the pedal mounting box. Wipe off surplus oil to prevent staining upholstery.

(56) Lubricate all locks, door hinges, strikers and bonnet release

Use oil can sparingly to lubricate the above components; smear grease around the catch mechanism of the bonnet.

(57) Check and report condition and security of seats and seat belts

1. Move seat adjuster towards the door and push seat back to its fullest extent.
2. Check tightness of front bolts securing seat runner to floor.
3. Move seat adjuster towards door and push seat forward to its fullest extent.
4. Check tightness of rear bolts securing seat runner to floor.
5. Two-door models; check security of forward tilt lock.

Repeat instructions 1 to 4 on opposite front seat.

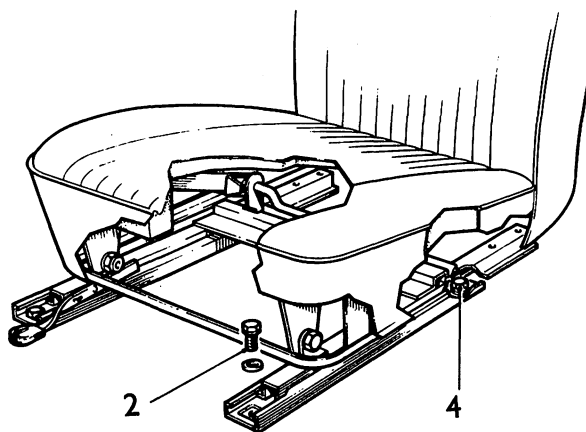
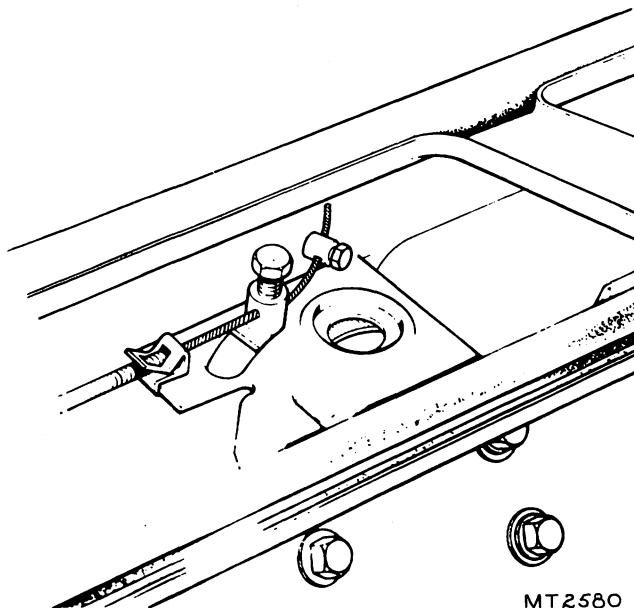
Examine seat belts for wear and damage and report condition. Check tightness of anchorage bolts.

(58) Check and report rear view mirrors for looseness, cracks and crazing

ROAD-TEST

(59) Road-test and report any additional work required

(60) Ensure cleanliness of controls, door handles and steering-wheel



ENGINE OPERATIONS

Cam followers—set—remove and refit	12.29.57
Camshaft—remove and refit	12.13.01
Centre and rear main bearings—remove and refit	12.21.42
Connecting rod bearing	
—set—remove and refit.. .. .	12.17.16
—one—remove and refit	12.17.17
—extra each—remove and refit	12.17.18
Connecting rods and pistons	
—remove and refit	12.17.01
—overhaul	12.17.10
Crankshaft—remove and refit	12.21.33
Crankshaft end-float—check and adjust.. .. .	12.21.26
Crankshaft pulley—remove and refit	12.21.01
Crankshaft rear oil seal—remove and refit	12.21.20
Crankshaft spigot bush—remove and refit	12.21.45
Cylinder block drain tap—remove and refit	12.25.07
Cylinder block front mounting plate gasket—remove and refit	12.25.10
Cylinder block—rebore	12.25.23
Cylinder head	
—overhaul	12.29.18
—remove and refit	12.29.10
—renew casting	12.29.22
Cylinder head gasket—remove and refit.. .. .	12.29.01
Cylinder head nuts—tighten	12.29.27
Cylinder pressures—check	12.25.01
Decarbonize, reface all valves and seats, grind-in valves, tune engine	12.29.21
Distributor drive shaft—remove and refit	12.10.22

continued

ENGINE OPERATIONS—*continued*

Engine assembly—strip and rebuild	..	..	..	..	..	..	..	..	12.41.05
Engine and gearbox assembly									
—remove, change ancillary equipment and refit	..	..	..	..	..	..	..	..	12.37.03
—remove and refit	..	..	..	..	..	..	..	..	12.37.01
Engine mounting									
—front L.H.—remove and refit	..	..	..	..	..	..	..	..	12.45.01
—front R.H.—remove and refit	..	..	..	..	..	..	..	..	12.45.03
—front set—remove and refit	..	..	..	..	..	..	..	..	12.45.04
—rear centre—remove and refit	..	..	..	..	..	..	..	..	12.45.08
Engine rear gearbox adaptor plate—remove and refit	..	..	..	..	..	..	..	..	12.53.03
Engine tune—check and adjust—valve clearance, distributor points, sparking plugs, ignition timing, tune carburetters, clean fuel pump filter, road test	..	..	..	..	..	..	..	..	12.49.02
Exhaust valve seats—remove and refit	..	..	..	..	..	..	..	..	12.29.77
Flywheel—remove and refit	..	..	..	..	..	..	..	..	12.53.07
Gudgeon pin bush—each—remove and refit	..	..	..	..	..	..	..	..	12.17.13
Inlet valve seat—remove and refit	..	..	..	..	..	..	..	..	12.29.76
Main bearing									
—**—centre and rear—remove and refit	..	..	..	..	..	..	..	..	12.21.42**
—front—remove and refit	..	..	..	..	..	..	..	..	12.21.41
—set—remove and refit	..	..	..	..	..	..	..	..	12.21.39
Oil filter assembly—remove and refit	..	..	..	..	..	..	..	..	12.60.01
Oil pick-up strainer—remove and refit	..	..	..	..	..	..	..	..	12.60.20
Oil pressure relief valve—remove and refit	..	..	..	..	..	..	..	..	12.60.56
Oil pump									
—overhaul	..	..	..	..	..	..	..	..	12.60.32
—remove and refit	..	..	..	..	..	..	..	..	12.60.26
Oil sump—remove and refit	..	..	..	..	..	..	..	..	12.60.44
Piston and/or rings									
—engine set—remove and refit	..	..	..	..	..	..	..	..	12.17.03
—extra each—remove and refit	..	..	..	..	..	..	..	..	12.17.06

continued

ENGINE OPERATIONS—*continued*

Push-rods—set—remove and refit	..	..	..	..	..	..	..	12.29.59
Rocker adjusting screws—set—remove and refit	..	..	..	..	..	..	..	12.29.56
Rocker cover—remove and refit	..	..	..	..	..	..	..	12.29.42
Rocker shaft assembly—overhaul	..	..	..	..	..	..	..	12.29.55
Rocker shaft—remove and refit	..	..	..	..	..	..	..	12.29.54
Starter ring gear—remove and refit	..	..	..	..	..	..	..	12.53.19
Timing chain—remove and refit	..	..	..	..	..	..	..	12.65.14
Timing chain and sprockets—remove and refit**	..	..	..	..	..	..	..	12.65.12
Timing chain tensioner—remove and refit	..	..	..	..	..	..	..	12.65.28
Timing cover oil seal—remove and refit..	..	..	..	..	..	..	..	12.65.05
Timing chain cover—remove and refit**	..	..	..	..	..	..	..	12.65.01
Valve clearance—check and adjust	..	..	..	..	..	..	..	12.29.48
Valve guides								
—exhaust—remove and refit	..	..	..	..	..	..	..	12.29.71
—inlet—remove and refit	..	..	..	..	..	..	..	12.29.70
Valve timing—check	..	..	..	..	..	..	..	12.65.08
Valves								
—exhaust—remove and refit	..	..	..	..	..	..	..	12.29.64
—inlet and exhaust—remove and refit	..	..	..	..	..	..	..	12.29.62
—inlet—remove and refit	..	..	..	..	..	..	..	12.29.63
**Valve seats								
—exhaust—remove and refit	..	..	..	..	..	..	..	12.29.77
—inlet—remove and refit**	..	..	..	..	..	..	..	12.29.76

DISTRIBUTOR DRIVE SHAFT AND GEAR

—Remove and refit

12.10.22

Removing

1. Remove the distributor. 86.35.20.
2. Remove the two nuts and washers securing the pedestal to the cylinder block studs.
3. Remove the pedestal and gasket (S).
4. Lift out the drive shaft and gear.

Refitting

NOTE: An end-float of 0.005 in ± 0.002 in (0.13 mm \pm 0.05 mm) must exist between the end of the distributor pedestal and the drive gear. The end-float is controlled by the selective use of gaskets on the pedestal/cylinder block interface. To measure the end-float adopt the following procedure.

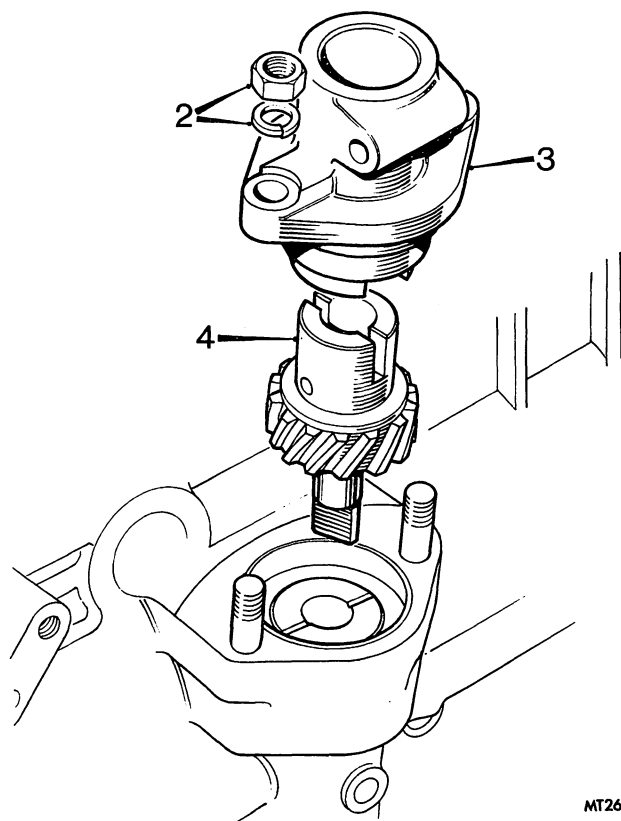
5. Measure, note the thickness of, and fit a plain washer 0.5 in (12.7 mm) i.dia. over the drive shaft below the gear.
6. Insert the shaft assembly and washer into position in the bush, ensuring that the oil pump drive is mated with the shaft.

NOTE: Use a screwdriver to turn the oil pump drive; try the drive gear in a different position in order to be sure that it is down correctly.

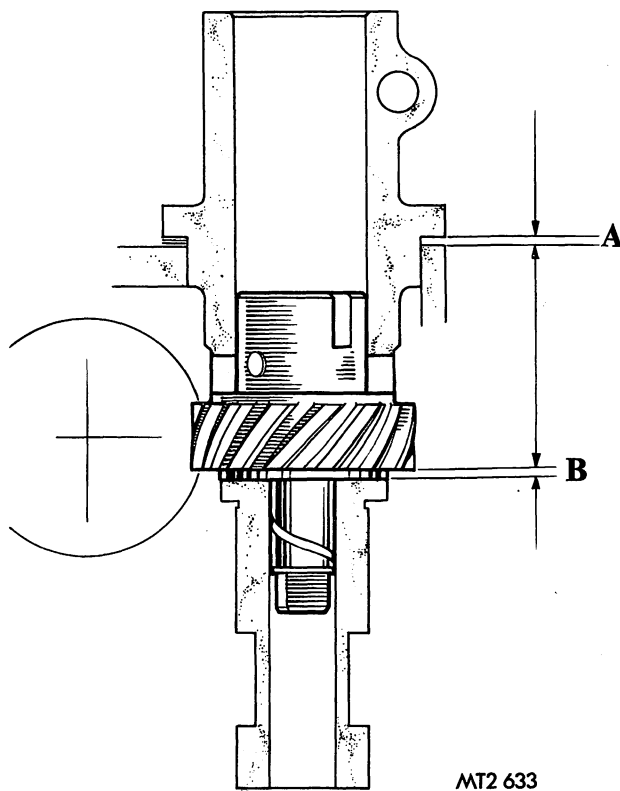
7. Fit the distributor pedestal into position without gasket(s).
8. Measure the gap between the pedestal and cylinder block (a) and subtract from (b) the thickness of the washer.

The result is gear end-float (or load) which must be adjusted, by gaskets, to give a mean end-float of 0.005 in (0.13 mm).

Example 1	in	mm
Thickness of washer (b)	0.100	2.54
Pedestal/cylinder block gap (a)	0.098	2.49
= gear end-float	+0.002	+0.05
add gasket of	0.003	0.08
for correct end-float of	0.005	0.13

continued

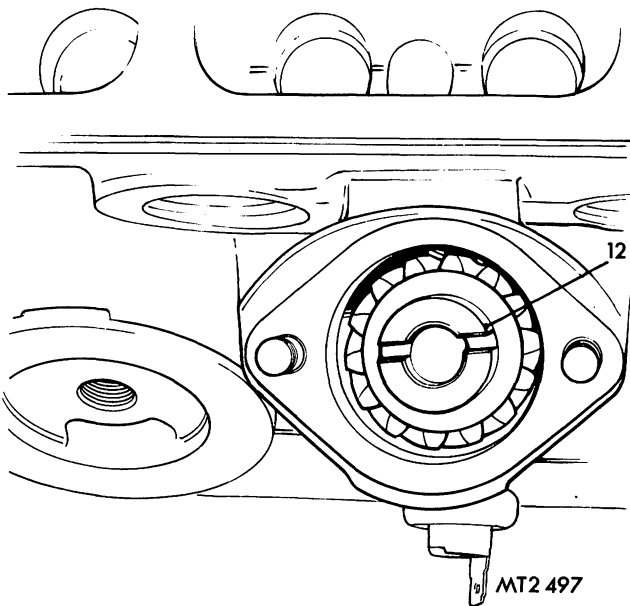
MT2634



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Example 2	in	mm
Thickness of washer (b)	0.100	2.45
Pedestal/cylinder block gap (a)	0.110	2.79
= gear load of	-0.010	-0.25
add gasket of	0.015	0.38
for correct end-float of	0.005	0.13

- 9. Remove the pedestal, shaft assembly and washer.
- 10. Turn the crankshaft to bring No. 1 piston to T.D.C. on compression stroke.
- 11. Lower the drive gear into the bush, allowing it to turn as it meshes with the camshaft gear and ensuring that it engages with the oil pump drive dog.
- 12. The gear is correctly positioned when the offset slot is nearest to the cylinder block and in line with the thread hole for the oil filter attachment.
- 13. Fit the pedestal and selected gasket(s).
- 14. Fit and tighten the nuts and washers.
- 15. Fit the distributor. 86.35.20.



DATA

Drive gear end-float..	..	..	..	..	..	0.003 to 0.007 in (0.08 to 0.18 mm)
Spindle diameter	..	..	..	..	..	0.4980 to 0.4985 in (12.65 to 12.67 mm)
Bush bore	..	..	..	..	..	0.5005 to 0.5010 in (12.71 to 12.73 mm)

CAMSHAFT

—Remove and refit

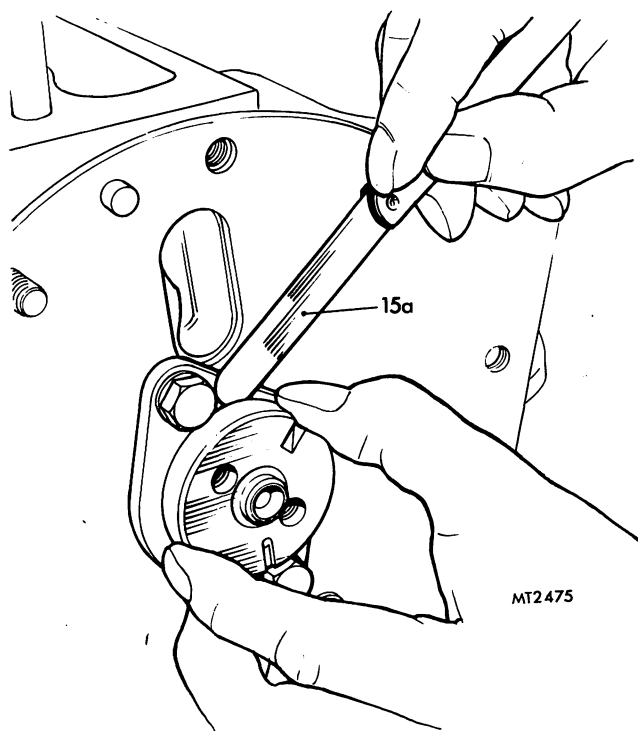
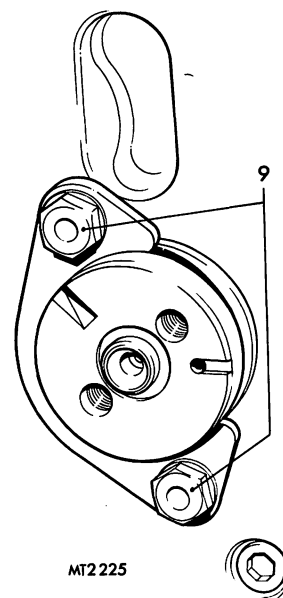
12.13.01

Removing

1. Isolate the battery.
2. Remove the radiator. 26.40.01.
3. Remove the L.H. grille (as from the driver's seat). 76.55.03.
4. Remove the cylinder head. 12.29.10.
5. Withdraw the cam followers, identifying for re-assembly.
6. Remove the distributor drive shaft and gear. 12.10.22.
7. Remove the fuel pump. 19.45.08.
8. Remove the timing chain and sprockets. 12.65.12.
9. Remove the two bolts and withdraw the camshaft location plate.
10. Support the front of the engine with a jack.
11. Remove the front R.H. engine mounting bolts.
12. Remove the front L.H. engine mounting bolts.
13. Jack up the front of the engine sufficiently to withdraw the camshaft through the grille aperture.
14. Withdraw the camshaft.

Refitting

15. Reverse instructions 1 to 14, and in addition:
 - a. Check the camshaft end-float, and reduce if necessary by fitting a new camshaft location plate. See instruction 55, 12.41.05.
 - b. Time the valves. 12.65.08.



DATA

Journal diameter	..	..	..	..	..	..	1.9649 to 1.9654 in (49.91 to 49.92 mm)
End-float	..	..	..	..	..	..	0.0042 to 0.0085 in (0.110 to 0.216 mm)
Bore in block	..	..	..	..	..	..	1.9680 to 1.9695 in (49.980 to 50.025 mm)

CONNECTING RODS AND PISTONS

—Remove and refit

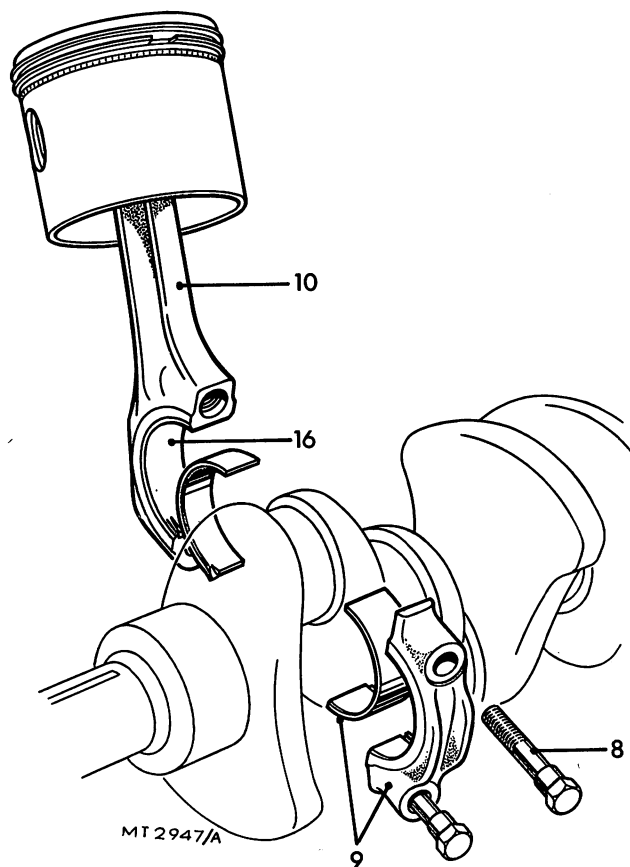
12.17.01

Removing

1. Isolate the battery.
2. Place the car on a ramp or over a pit.
3. Remove the cylinder head. 12.29.10.
4. Remove the oil sump. 12.60.44.
5. Remove the oil pick-up strainer. 12.60.20, 2 to 4.
6. Turn the crankshaft to bring Nos. 1 and 4 connecting rod bolts to an accessible position.
7. Check the identifying marks on the connecting rods and bearing caps. Mark if necessary.
8. Remove the connecting rod bolts.
9. Withdraw the bearing caps and lower half bearing shells complete with the bolt bushes.
10. Push the connecting rods and pistons upwards and carefully withdraw, identifying for reassembly.
11. Marry-up the top and bottom bearing shells and caps with their respective connecting rods and piston assemblies.
12. Repeat instructions 6 to 11 on Nos. 2 and 3 bearings.

Refitting

13. Position Nos. 1 and 4 crankpins at B.D.C. and lubricate them with clean engine oil.
14. Smear the pistons and cylinder bores with clean engine oil.
15. Carefully insert the connecting rods and pistons into the bores, ensuring that the arrow (thus ▲) is pointing to the front of the engine.
16. Ensure that the open face of the big-end bearing is towards the non-thrust side of the cylinder bore.
17. Stagger the piston ring gaps, avoiding a gap on the thrust side of the piston.
18. Using a piston ring compressor, gently push the pistons into the bore.
19. Fit the upper bearing shells to the connecting rod big-ends and pull the connecting rods onto the crankpins.
- 20.**Check that the connecting rod bolt dowels are correctly positioned.**
21. Fit the bearing shells to the bearing caps and fit to the connecting rods, securing with new bolts and tightening evenly (see 06-1 for correct torque).
22. Repeat instructions 13 to 21 on Nos. 2 and 3 cylinders.
23. Reverse instructions 1 to 5.
24. Replenish the sump with the correct grade of engine oil.



PISTONS AND/OR RINGS—ENGINE SET

—Remove and refit 12.17.03

Pistons and/or rings—extra each 12.17.06

See 12.17.10.

CONNECTING RODS AND PISTONS

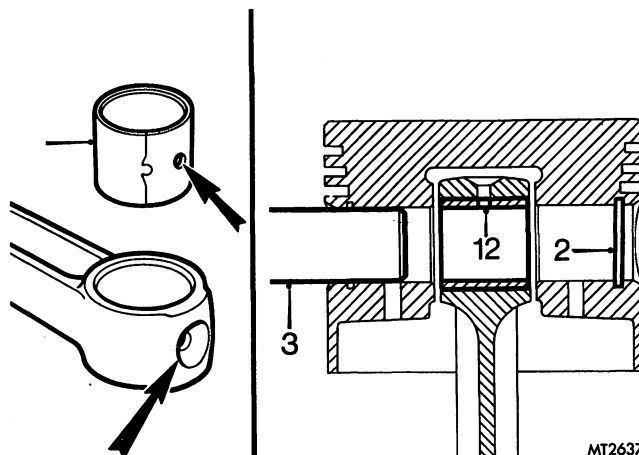
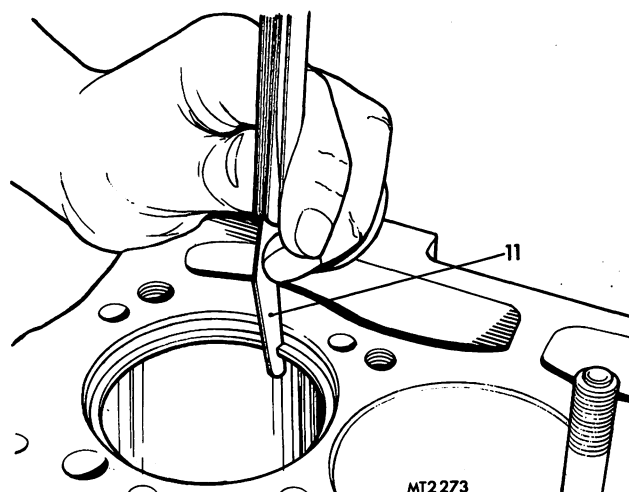
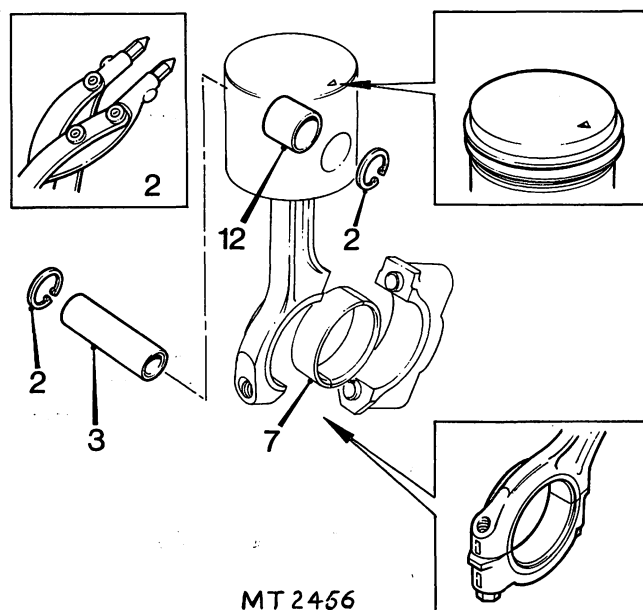
—Overhaul 12.17.10

Gudgeon pin bush—each—remove and refit 12.17.13

NOTE: Do not mix components during this operation

Service tools: 335, S336-4

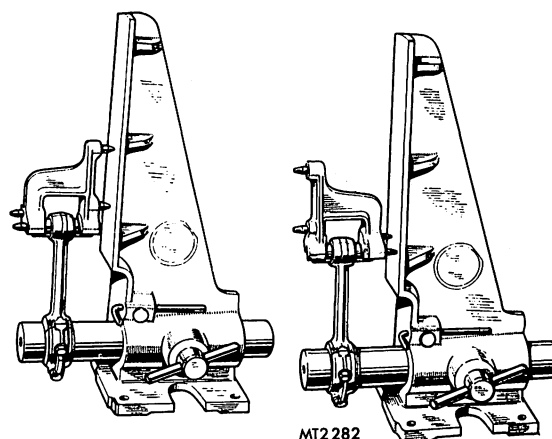
1. Remove the connecting rods and pistons. 12.17.01.
2. Remove the circlips from the pistons.
3. Remove the gudgeon pin.
4. Remove the piston from the connecting rod.
5. Remove the piston rings with the expander tool and clean.
6. Clean the pistons, removing all carbon deposits, particularly from the piston ring grooves.
7. Remove the big-end bearing shells.
8. Examine the gudgeon pin and check for wear—see Data.
9. Check the piston dimensions to grade and bore—see Data.
10. Check the dimensions of piston ring grooves—see Data.
11. Check the piston ring gaps in the bores—see Data.

continued

12.17.03

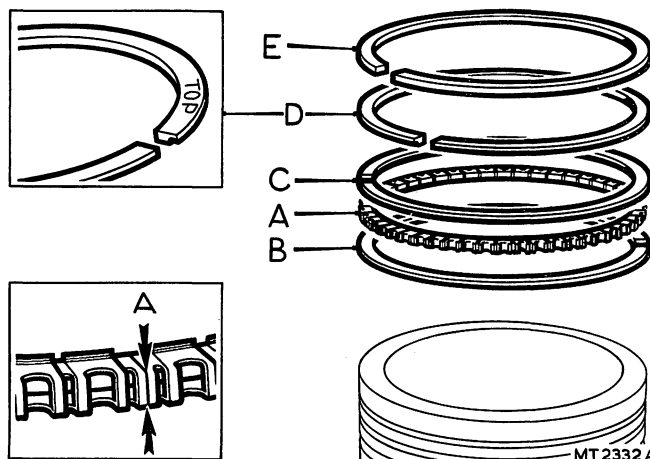
12.17.13 Sheet 1

12. Check the small end bushes for wear, and if necessary renew using a suitable hand press to remove the old bush and fit new. Ensure that the oil hole in the bush corresponds with the hole in the connecting rod. Ream the new bush to size—see Data. When assembled dry, the gudgeon pin is a thumb push-fit at 68°F room temperature. If the gudgeon pin passes through the bore under its own weight, it is too slack.
13. Check the connecting rods for bend and twist. Use tools 335, and arbor adaptor S336-4—see Data. Rods that exceed the tolerances in both conditions should be renewed or re-aligned.



Refitting

14. Reverse instructions 2 to 5:
 - a. Fitting oversize pistons as necessary.
 - b. Fitting the piston rings with care and in the following order: (A) expander ring into bottom groove, ensure that ends are butting but not overlapping, (B) bottom rail of expander from bottom of piston, (C) top rail from top of piston, (D) scraper ring—step uppermost to second groove, (E) compression ring to top groove.
 - c. Separating the ring gaps equally on the non-thrust side of piston.
15. Refit the connecting rods and pistons. 12.17.01.



DATA

Pistons

Bore size: Grade F	..	..	..	..	..	2.899 to 2.900 in (73.64 to 73.66 mm)
Grade G	..	..	..	..	..	2.9010 to 2.9005 in (73.86 to 73.67 mm)
Piston top diameter: Grade F	..	..	..	..	..	2.875 to 2.880 in (73.03 to 73.15 mm)
Grade G	..	..	..	..	..	2.875 to 2.880 in (73.03 to 73.15 mm)
Piston bottom diameter: Grade F	..	..	..	..	..	2.8976 to 2.8981 in (73.59 to 73.61 mm)
Grade G	..	..	..	..	..	2.8982 to 2.8987 in (73.617 to 73.620 mm)
Pistons available	..	..	..	..	..	0.020 in (0.52 mm) oversize
Groove width: bottom	..	..	..	..	..	0.1578 to 0.1588 in (3.99 to 4.01 mm)
centre and top	..	..	..	..	..	0.064 to 0.065 in (1.625 to 1.650 mm)
Ring width: bottom (oil control) 3-part	..	..	..	..	..	0.1540 to 0.1560 in (3.90 to 3.96 mm)
centre and top (compression)	..	..	..	..	..	0.0620 to 0.0625 in (1.575 to 1.5787 mm)
Rings available	..	..	..	..	..	0.010, 0.020, 0.030 in (0.25, 0.51, 0.76 mm) oversize

Connecting rods

Small end bush (fitted) i.dia.	..	..	..	..	0.8126 to 0.8129 in (20.64 to 20.65 mm)
Gudgeon pin diameter	..	..	..	..	0.8123 to 0.8125 in (20.63 to 20.64 mm)
Connecting rod bend not to exceed	..	..	..	..	0.0015 in (0.04 mm)
Connecting rod twist not to exceed	..	..	..	..	0.0045 in (0.114 mm)

Connecting rod and piston assemblies

Weight variation between heaviest and lightest assembly

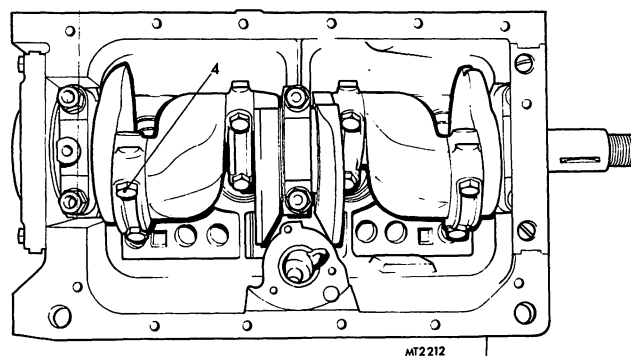
Max 4 drams

CONNECTING ROD BEARINGS—SET

—Remove and refit	12.17.16
Connecting rod bearing—one	12.17.17
Connecting rod bearings—extra each	12.17.18

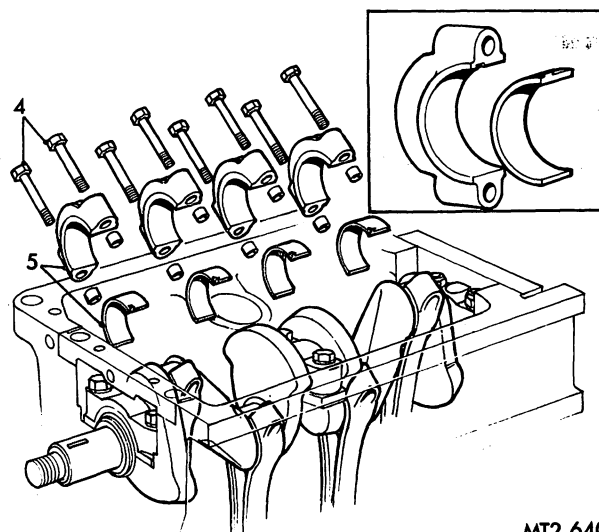
Removing

1. Remove the oil sump. 12.60.44.
2. Remove the oil pick-up strainer. 12.60.20, 2 to 4.
3. Turn the crankshaft to bring the connecting rod bearing to be removed to an accessible position.
4. Remove the connecting rod bolts.
5. Remove the bearing cap complete with the shell bearing and connecting rod bolt bushes.
6. Push the connecting rod and piston upwards sufficiently to clear the crankpin to enable the upper shell bearing to be removed.
NOTE: Do not push the piston higher than T.D.C. or the top piston ring may be released, necessitating removal of the cylinder head.
7. Remove the upper shell bearing.



Refitting

8. Insert the shell bearing in the connection rod big-end.
9. Lubricate the crankpin with clean engine oil.
10. Pull the connecting rod onto the crankpin.
11. Fit the shell bearing to the bearing cap and fit to the connecting rod.
NOTE: When fitting the bearing shells, ensure that the lug on the bearing locates correctly in the recess in the connections rod big-end and cap.
- 12.**Fit and tighten the bolts (see 06-1 for correct torque).**
13. Repeat the instructions on the remaining assemblies if necessary.
14. Reverse instructions 1 to 2.
15. Replenish the sump with the correct grade of engine oil.



ENGINE

CRANKSHAFT PULLEY

—Remove and refit

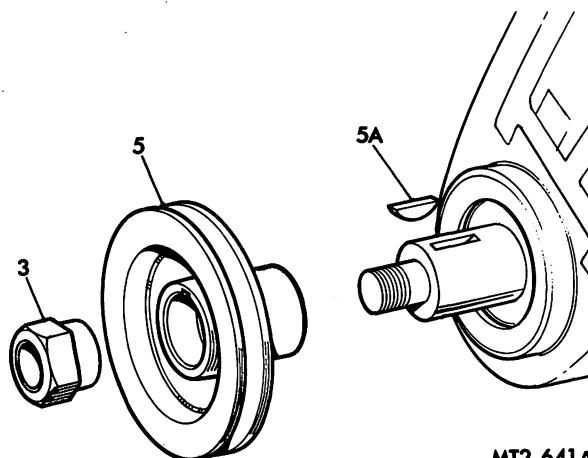
12.21.01

Removing

1. Slacken alternator mountings.
2. Remove fan belt.
3. Working below vehicle, remove pulley retaining nut.
4. Withdraw pulley, if necessary use extractor bearing on the centre nut, loosely replaced.

Refitting

5. Reverse 1 to 4, ensuring:
 - a. Drive key is square in the crankshaft keyway and is not burred.
 - b. Drive belt is correctly tensioned. 86.10.05.
 - c. Pulley retaining nut is tightened to 90 to 110 lbf ft (12.4 to 15.2 kgf m).



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CRANKSHAFT REAR OIL SEAL

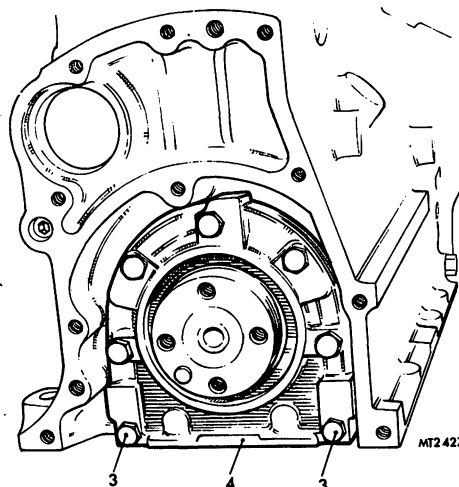
—Remove and refit

12.21.20

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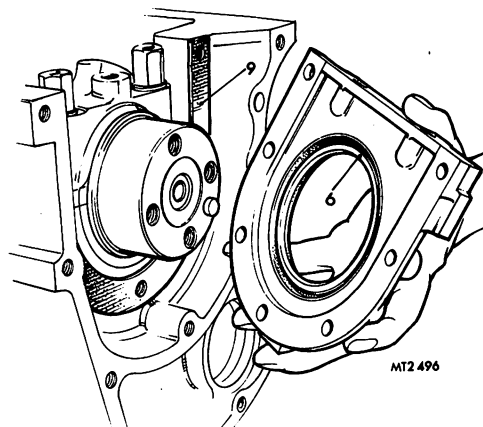
Removing

- 1.★ Remove the engine to gearbox adaptor plate. 12.53.03. ★★
2. Remove the two bolts securing the sump to the rear oil seal housing.
3. Remove the seven bolts holding the oil seal housing to the crankcase, noting that the top centre bolt has a copper washer.
4. Withdraw the oil seal and housing complete, taking care not to tear the sump gasket.
5. Press out the oil seal from the housing.



Refitting

6. Smear the outside diameter of the replacement oil seal with grease and press into housing, lip face to crankshaft.
7. Clean the crankcase joint face, removing all traces of old gasket and jointing compound.
8. Coat the crankcase face with sealing compound and smear the crankshaft with oil.
9. Place a new gasket in position on the crankcase joint face.
10. Slide the oil seal housing into contact with the crankcase joint face.
11. Fit and tighten evenly the seal housing securing bolts to 16 to 20 lbf ft (2.2 to 2.8 kgf m).
12. Reverse instructions 1 and 2.



12.21.01

12.21.20

CRANKSHAFT END-FLOAT

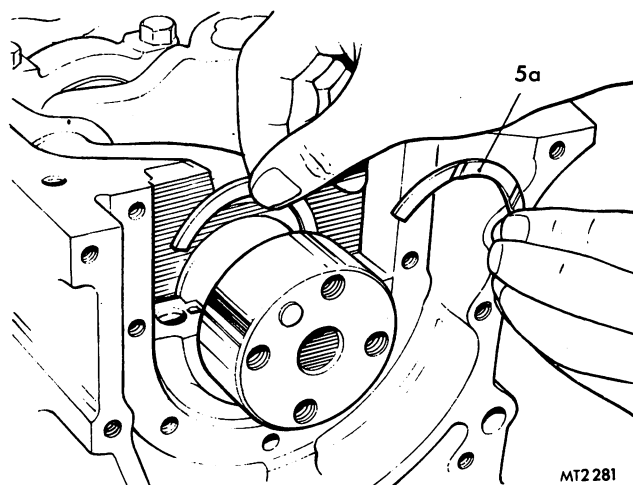
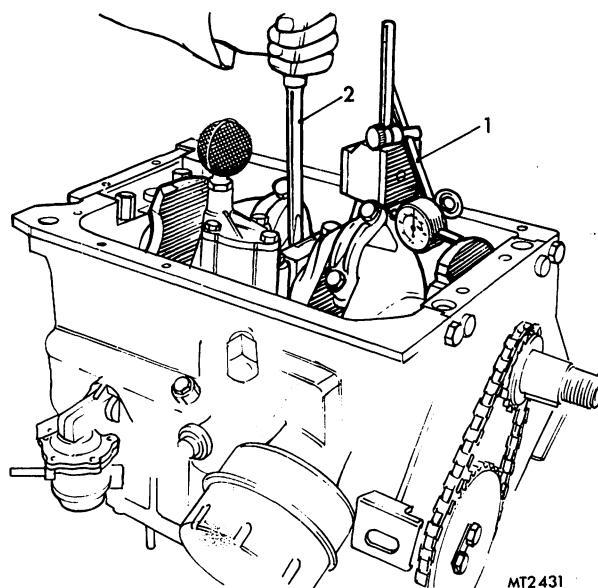
—Check and adjust

12.21.26

Operation performed during Engine—strip and rebuild 12.41.05, Crankshaft—remove and refit 12.21.33, Front main bearing—remove and refit 12.21.41, and Centre and rear main bearing—remove and refit 12.21.42.

1. Secure a dial gauge to the crankcase so that the indicator rod rests in a loaded condition on a machined surface of a crankshaft throw.
2. Using a screwdriver between the centre main bearing cap and an adjacent crankshaft throw, force the crankshaft against the dial indicator rod.
3. Zero the dial indicator.
4. **Force the crankshaft in the opposite direction and note the gauge reading, which should indicate an end-float of 0.006 to 0.014 in. (0.1524 to 0.3556 mm). **
5. If necessary, adjust the end-float by removing the rear main bearing cap and existing thrust washers and renewing with different washers of suitable thickness, ensuring:
 - a. Thrust washers are fitted so that the thrust faces—identified by oil grooves—bear against the crankshaft faces.
 - b. Locate in the register on both sides of the crankshaft bearing bore half.
6. Refit the main bearing cap complete with shell bearing and tighten the nuts to 50 to 65 lbf ft (7 to 9 kgf m).
7. Re-check the end-float.

NOTE: The end-float may be checked with a feeler gauge inserted between the thrust washer and crankshaft.



ENGINE

CRANKSHAFT

—Remove and refit

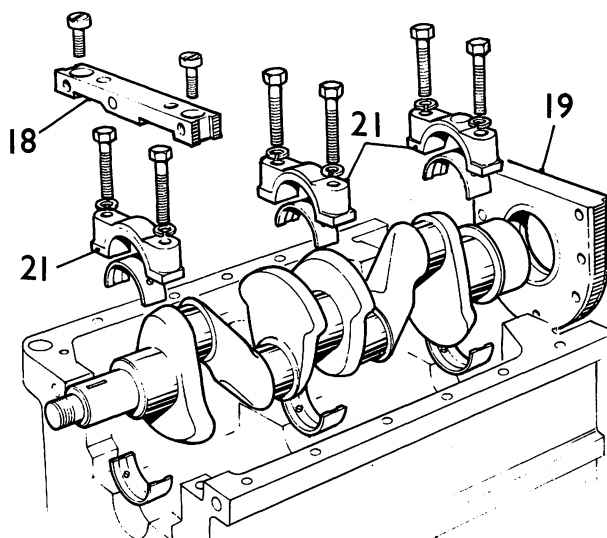
12.21.33

Removing

1. Remove the engine and gearbox assembly. 12.37.01.
2. Remove the starter motor.
3. Remove the nuts and bolts securing the bell housing to the engine and lift off the gearbox assembly.
4. Remove the clutch assembly. 33.10.01.
5. Remove the four bolts securing the flywheel to the crankshaft and lift off the flywheel. 12.53.07.
6. Remove the seven bolts securing the engine rear adaptor plate to the cylinder block and remove the adaptor plate. 12.53.03.
7. Remove the alternator. 86.10.02.
8. Remove the water pump housing complete with water pump, thermostat housing and fan. 26.50.03, instructions 8 to 10.
9. Remove the crankshaft pulley.
10. Remove the timing chain cover. 12.65.01, instructions 5 and 6.
11. Remove the oil thrower.
12. Remove the timing chain sprocket and shims.
13. Remove the two bolts securing the camshaft location plate and remove the plate.
14. Remove the front mounting plate. 12.25.10, instructions 9 to 12.
15. Remove the dipstick.
16. Remove the sump.
17. Remove the oil strainer. 12.60.20.
18. Remove the front sealing block.
19. Remove the crankshaft rear oil seal. 12.21.20, instructions 3 and 4.
20. Disconnect the connecting rods from the crankshaft. 12.17.16, instructions 4 to 7. Check the identification marks for reassembly. **DO NOT MIX.**
21. Remove the front centre and rear main bearing caps and shell. 12.21.39, instructions 6 to 8.
22. Remove the thrust washers from the rear main bearing.
23. Lift out the crankshaft.

continued

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Refitting

Lubricate all parts before assembly.

24. Fit the upper bearing shells to the crankcase and the thrust washers to the rear main bearing.
25. Fit the lower shells to the bearing caps.
26. Lower the crankshaft into the crankcase.
27. Fit the bearing caps and tighten the front centre and rear main bearing bolts to 50 to 65 lbf ft (7 to 9 kgf m).
28. Check, and adjust if necessary, the crankshaft end-float. 12.21.26.
29. **Reconnect the connecting rods to the crankshaft, 12.17.16 instructions 8 to 12 and fit the front sealing block, 12.21.39 instructions 14 to 17. **
30. Fit the rear main oil seal. 12.21.20, instructions 6 to 11.
31. Fit the oil pump strainer. 12.60.20.
32. Fit the sump, renewing the gasket. Tighten the retaining bolts evenly to 16 to 20 lbf ft (2.2 to 2.8 kgf m).
33. Fit the flywheel, 12.53.07, instructions 5 to 8, ensuring that the crankshaft spigot bush is in position.
34. Fit the clutch assembly. 33.10.01.
35. Fit the front mounting plate and gasket, ensuring that:
 - a. All traces of old gasket and jointing compound are removed from the cylinder block joint face.
 - b. The cylinder block face of the new gasket is smeared with jointing compound.
 - c. The mounting plate is located correctly over the dowels.
 - d. The retaining bolts and screws are tightened evenly.
36. Fit the timing chain and sprockets. 12.65.12, instructions 6 to 15.
37. Check the valve timing. 12.65.08.
38. Fit the oil thrower, ensuring that the dished periphery faces the timing cover.
39. Fit the timing cover. 12.65.01.
40. Fit the crankshaft pulley, tightening the retaining nut to 120 to 150 lbf ft (16.6 to 20.7 kgf m).
41. Fit the water pump housing complete with water pump, fan and thermostat housing. Ensure that the new gasket is fitted with jointing compound.
42. Fit the alternator and drive belt. 86.10.02.
43. Fit the gearbox.
44. Fit the starter motor.
45. Fit the engine and gearbox assembly to the car. 12.37.01.
46. Fit the dipstick and check the oil sump level.

DATA

Crankshaft end-float tolerance	.. .. .	0.004 to 0.008 (0.10 to 0.20 mm)
Thrust washer oversizes	.. .. .	0.005 in (0.13 mm)
Main bearing journals diameter (3)	.. .. .	2.3115 to 2.3120 in (58.713 to 58.725 mm)
Crankpins diameter (4)	.. .. .	1.8750 to 1.8755 in (47.625 to 47.638 mm)
Maximum run-out of centre journal (with front and rear supported)	.. .. .	0.003 in (0.076 mm)
Maximum out-of-balance of shaft (with key and dowel fitted)	.. .. .	0.3 oz. in. (3.36 g.cm.)
Crankshaft end-float tolerance	.. .. .	0.004 to 0.008 in (0.10 to 0.20 mm)
Main bearings and big-end bearings are available in the following undersizes	.. .. .	0.010, 0.020, 0.030 in (0.25, 0.51, 0.76 mm)

ENGINE

MAIN BEARING—SET

—Remove and refit

Front main bearing 1 to 6, and 9 to 18

12.21.39

12.21.41

Centre and rear main bearing 1, 2, 7, 8,
9 to 13 and 18

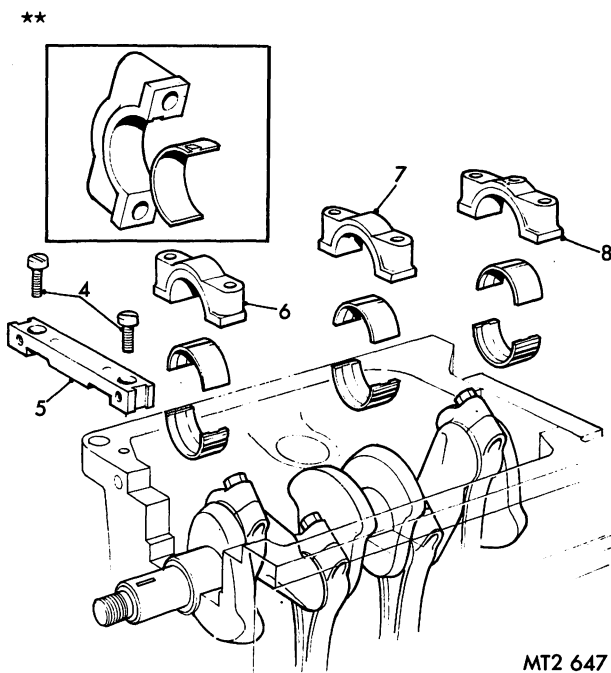
12.21.42

Removing

1. Remove the sump. 12.60.44.
2. Remove the oil pump strainer.
3. Remove the front mounting plate gasket. 12.25.10.

4. Remove the two screws securing the front sealing block to the crankcase.
5. Withdraw the sealing block.
6. Remove the front main bearing cap bolts and withdraw the cap complete with lower shell. Remove the upper shell and check that the cap is marked for reassembly.
7. Remove the centre main bearing bolts and withdraw the cap and lower shell. Check identification marks for reassembly and withdraw the upper shell.
8. **Remove the rear main bearing cap bolts and withdraw the cap and lower shell. Check that the cap is marked for reassembly, and remove the upper shell. **

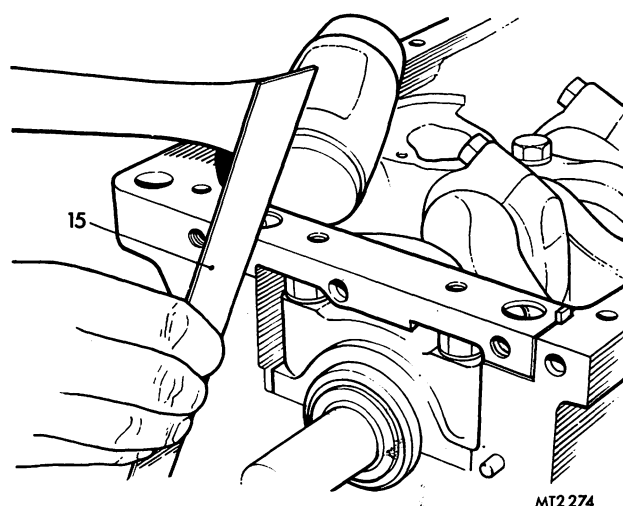
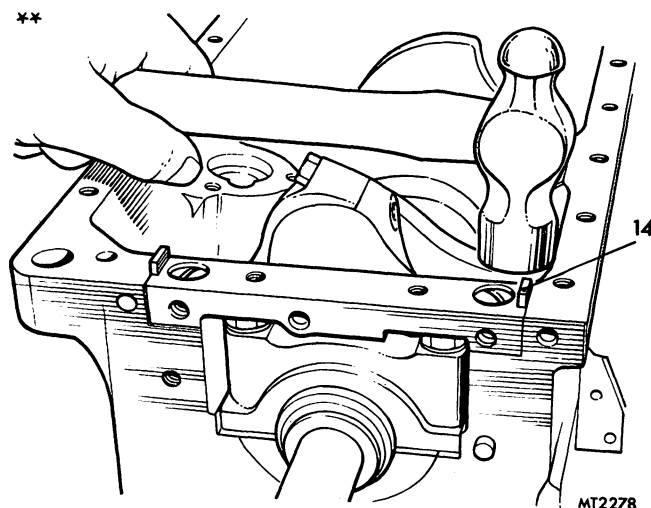
continued



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Refitting

9. Fit the shell bearings to the front, centre and rear main bearing caps, ensuring that the tags locate in the recesses.
10. Lubricate and feed the upper shells—tag end last—between the crankshaft journals and bearing bores, ensuring that the tags locate in the recesses.
11. **Lubricate the lower shells and refit the caps, tightening the front, centre and rear main bearing cap bolts to 50 to 65 lbf ft (7 to 9 kgf m). Ensure that the identification marks coincide. **
12. Check, and adjust if necessary, the crankshaft end-float. 12.21.26.
13. Smear the front sealing block gaskets with jointing compound and fit to the crankcase, loosely tightening the screws.
14. Drive wedges into the slots.
15. Align the face of the sealing block with the crankcase and tighten the retaining screws.
16. Trim the protruding ends of the wedges flush with the crankcase—do not under-cut.
17. Reverse instructions 1 to 3, ensuring that:
 - a. All gaskets are renewed.
 - b. The sump is replenished with the correct grade of oil to the 'HIGH' mark on the dip-stick.



**

CRANKSHAFT SPIGOT BUSH

—Remove and refit

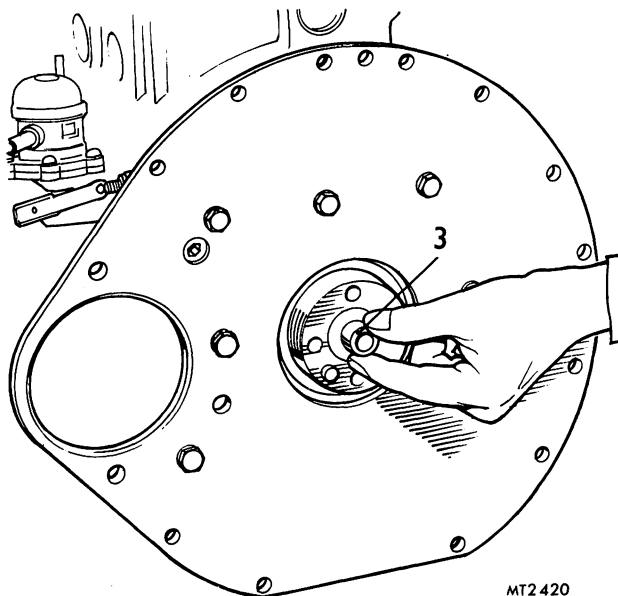
12.21.45

Removing

1. Isolate the battery.
2. Remove the flywheel. 12.53.07.
3. Remove the spigot bush which is a loose fit in the crankshaft flange.

Refitting

4. Smear the spigot bush with zinc oxide grease and refit.
5. Reverse instructions 1 and 2.



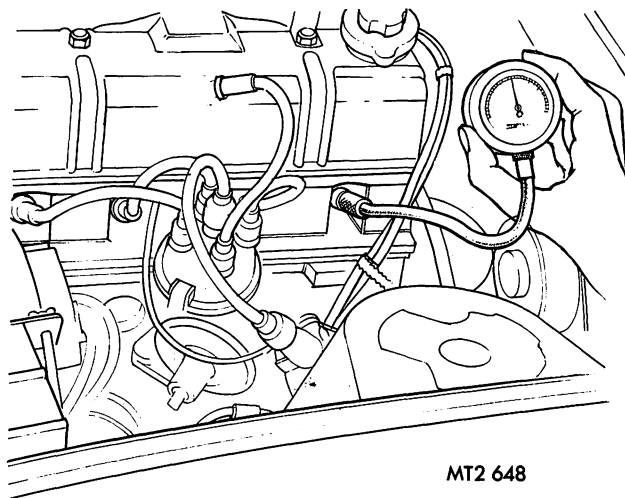
CYLINDER PRESSURES

—Check

12.25.01

1. Run the engine until normal temperature is attained as indicated by the temperature gauge.
2. Remove the spark plugs.
3. Fit a compression gauge to No. 1 cylinder.
4. Turn the engine over with the starter motor with the throttle wide open.
5. Note and record the gauge reading.
6. Repeat on the remaining cylinders.

NOTE: All cylinders should have pressures within 10 lb/in² (0.70 kg/cm²) differential.



CYLINDER BLOCK DRAIN TAP

—Remove and refit

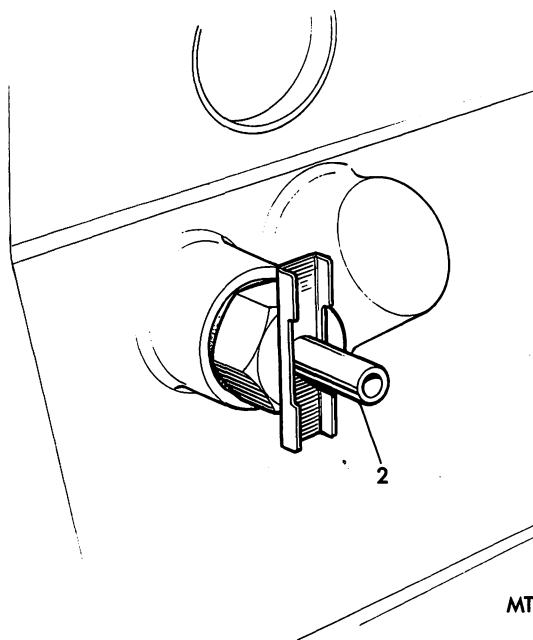
12.25.07

Removing

1. Drain the cooling system. 26.10.01.
2. Remove the drain tap and adaptor assembly.

Refitting

3. Reverse instructions 1 to 2 and check for leaks.



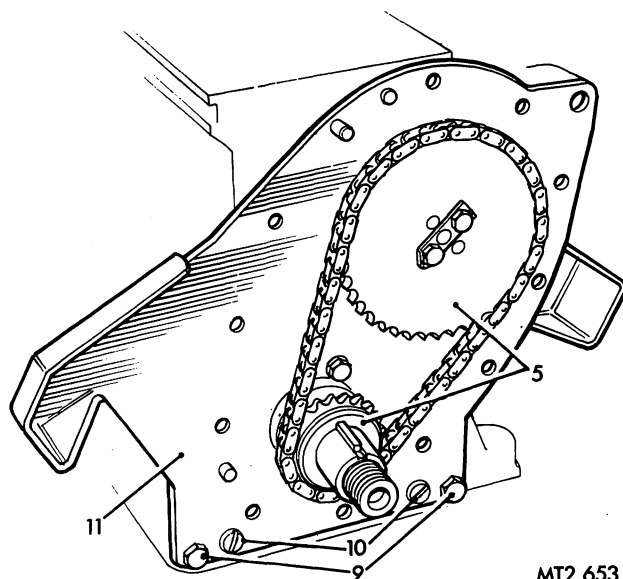
CYLINDER BLOCK FRONT MOUNTING PLATE GASKET

—Remove and refit

12.25.10

Removing

1. Isolate the battery.
2. Remove the alternator. 86.10.02.
3. Remove the water pump housing. 26.50.03, 1 to 9.
4. Remove the timing chain cover. 12.65.01, 3 to 6.
5. Remove the timing chain and sprockets. 12.65.12, 2 to 5.
6. Remove the two bolts securing the camshaft locating plate and remove the plate.
7. Support the engine under the sump.
8. Remove the two nuts and bolts (two each side) securing the L.H. and R.H. engine mounting bolts to the sub-frame.
9. Remove the three bolts securing the mounting plate to the cylinder block.
10. Remove the two screws securing the mounting plate to the sealing block.
11. Remove the front mounting plate complete with mounting rubbers.
12. Remove the front mounting plate gasket.



Refitting

13. Remove all traces of old jointing compound from the cylinder block face.
14. Coat the cylinder block face of the new gasket with Wellseal jointing compound.
15. Fit the new gasket.
16. Reverse instructions 1 to 11, ensuring:
 - a. The camshaft sprocket is refitted in its original position and that the timing marks line up.
 - b. A new water-pump housing gasket is fitted, using sealing compound.
 - c. The mounting plate locates correctly over the dowels.

ENGINE

CYLINDER BLOCK

—Rebore

12.25.23

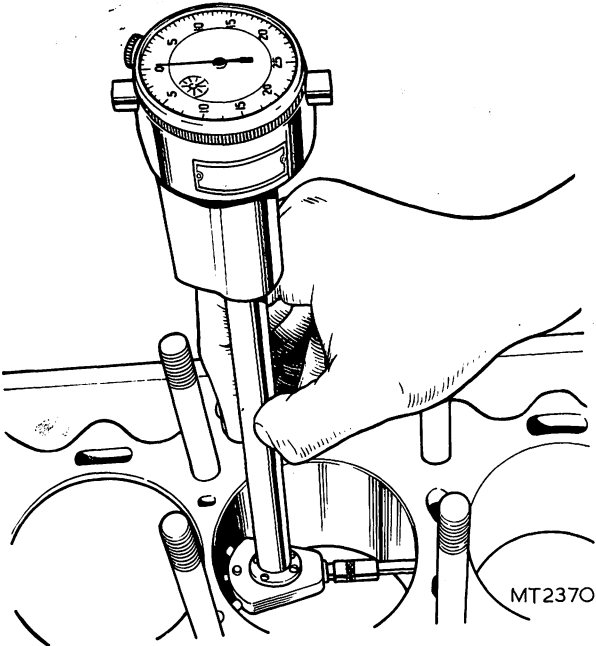
- 1. Strip engine. 12.41.05.
- 2. Measure bores for taper, ovality and maximum wear.
- 3. Rebore to dimensions in Data.

NOTE: Maximum rebore size is +0.020 in. Cylinders that cannot be rebored within this limit may be sleeved to restore them to the original size as follows:

- a. 1300 and 1500 engines bore out cylinders to 3.0302 to 3.0272 in dia.
- b. Remove sharp edges from top face of cylinder block.
- c. Lightly oil liner—**DO NOT GREASE**.
- d. Insert the liner into the bore so that the connecting rod cut-aways line up with the corresponding slots at the bottom of the bores (1500 engine only).
- e. Press the liner into the cylinder bore with 3 to 4 tonf maximum pressure until flush with top face of cylinder block.

NOTE: When pressing liners in with a screw-type press there is a tendency for it to 'creep' slightly in the same direction as the rotation of the press. It is therefore necessary to set the liner back about $\frac{1}{32}$ in (0.7937 mm) when lining-up the liner prior to pressing home.

- f. True-up connecting rods slot with a file.
- g. Bore liners to standard size—see Data.
- 4. Rebuild engine. 12.41.05.
- a. Fit new pistons to rebored dimensions, or
- b. Fit standard graded pistons to relined bores.
- c. Check alignment of connecting rods. 12.17.10, instruction 13.



DATA

Original size bore: Grade F	..	..	..	..	2.8995 to 2.9000 in (73.64 to 73.66 mm)
Grade G	..	..	..	..	2.9001 to 2.9005 in (73.66 to 73.77 mm)
Maximum rebore size	..	..	..	..	+0.020 in (+0.51 mm)



CYLINDER HEAD

—Remove and refit

12.29.10

Which includes:

Cylinder head gasket

12.29.01

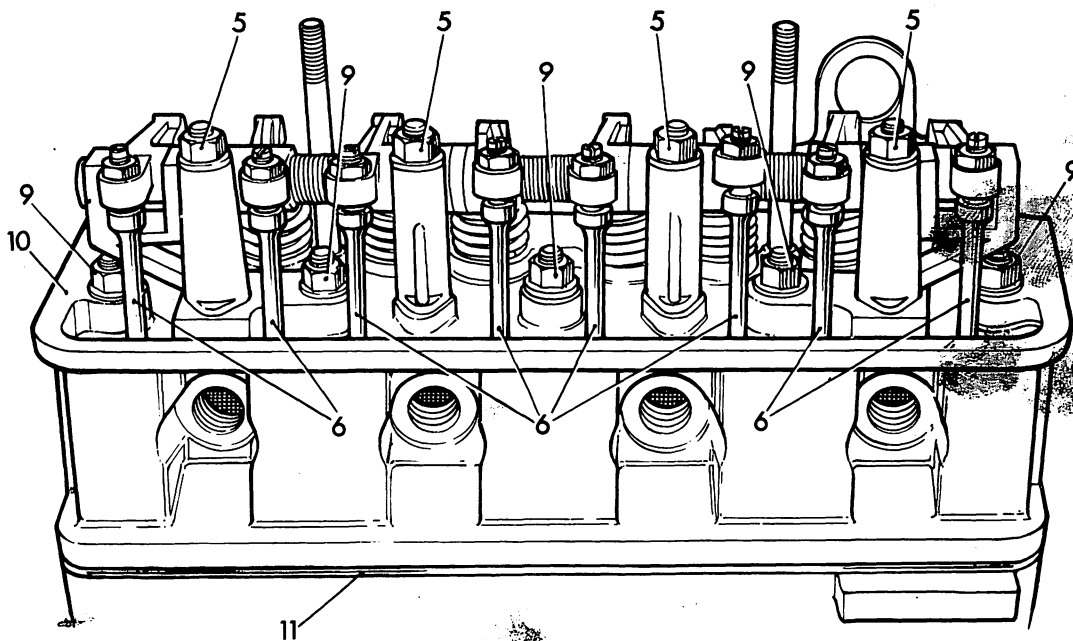
Removing

1. Isolate the battery.
2. Drain the cooling system. 26.10.01.
3. Remove the inlet and exhaust manifold assembly. 30.15.01.
4. Disconnect the plug leads and remove the distributor cap.
5. Remove the rocker shaft. 12.29.54.
6. Remove the push-rods, suitably identifying them for reassembly in the corresponding cam followers.
7. Remove the water pump housing. 26.50.03, 1 to 7.
8. Remove the alternator. 86.10.07.

9. Slacken and remove the 10 nuts securing the cylinder head to the block reversing the tightening sequence 12.29.27.
10. Lift off the cylinder head.
11. Remove the cylinder head gasket and discard.

Refitting

12. Reverse instructions 1 to 11, ensuring:
 - a. Cylinder head and cylinder block faces are clean.
 - b. New cylinder head gasket is fitted.
 - c. Cylinder head nuts are tightened to the correct torque figure and in the correct sequence.
 - d. All gaskets are renewed.
13. Adjust the valve clearances. 12.29.48.
14. **After 1600 kilometres (1000 miles) running, recheck the cylinder head nuts for correct tightness, as follows.
15. With the engine hot, and working in the sequence shown in operation 12.29.27, slacken each nut in turn approximately one flat, then retighten it to the correct torque figure. **



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12.29.10

12.29.01

ENGINE

CYLINDER HEAD

—Overhaul

12.29.18

Which includes:

Valves—inlet and exhaust—remove and refit 12.29.62

Valves—inlet—remove and refit 12.29.63

Valves—exhaust—remove and refit 12.29.64

Valve guide—inlet—remove and refit 12.29.70

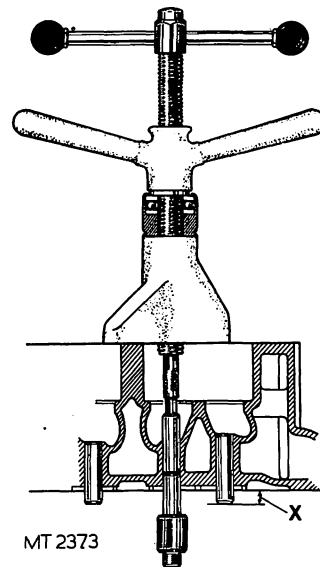
Valve guide—exhaust—remove and refit 12.29.71

Inlet valve seat—remove and refit 12.29.76

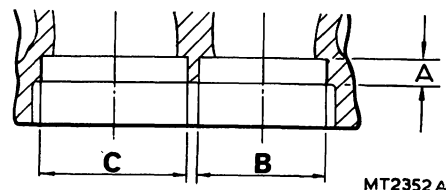
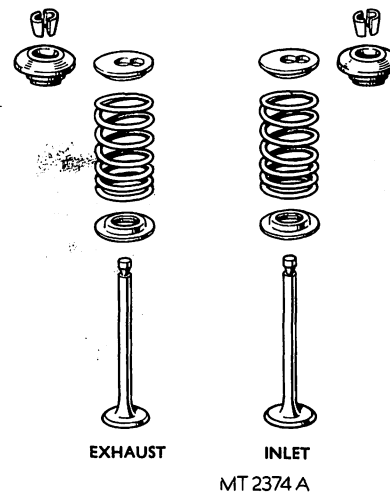
Exhaust valve seat—remove and refit 12.29.77

Service tools: 18G 106, 6118B, 60A, S60A-2A or S60A-2
S60A-6

1. Remove the cylinder head. 12.29.10.
2. Remove the spark plugs.
3. Using the valve spring compressor 18G 106 or 6118B, remove the inlet and exhaust valve spring collars or split collets.
4. Remove the inlet and exhaust valves, springs and identify for reassembly.
5. Check the inlet and exhaust valve guides for wear, and renew if necessary. Using Service tool S60A-6, assemble the replacement valve guide in the tool, with the chamfered end uppermost (leading). Position the tool on the combustion chamber face and pull the replacement guide in and the old one out. Ensure that the guide protrusion above the cylinder head top face is correct—see Data.
6. Examine the valve seats for pitting and wear. Reface where necessary, removing the minimum of material.
7. Fit valve seat inserts where the seats cannot be restored by refacing. Machine the cylinder head to the dimensions given (see Data).
NOTE: When fitting a pair of valve inserts, it will be necessary to bore the head and fit the first before boring the head and fitted insert for the second.
8. Press in the valve insert and peen over the cylinder head casting material insert to secure.
9. Cut seats in the inserts to the dimensions given below.
10. Examine the valves and renew any with bent or worn stems (see Data) and heads where the thickness is reduced to 0.0312 in (0.8 mm). Reface where necessary.
11. Test the valve springs for fatigue to the dimensions in Data. Renew as necessary.



MT 2373



Reassembling

12. Lap-in all valves, using coarse followed by fine carborundum paste, until a gas-tight seal is obtained. Remove all traces of paste and maintain identification of each valve.
13. Lubricate the valve stems with clean engine oil and assemble to the cylinder head. Ensure that the valve spring retaining collars or split collars are correctly positioned.
14. Refit the cylinder head, 12.29.10, fitting a new cylinder head gasket.

DATA

Valves

		Up to Engine No. { DG 25000 DM 5000 DS 5000		From Engine No. { DG 25001 DM 5001 DS 5001	
		Inlet	Exhaust	Inlet	Exhaust
Head diameter (1500 c.c.)	in	1.429 to 1.433	1.230 to 1.234	1.429 to 1.433	1.168 to 1.172
	mm	36.31 to 36.38	31.24 to 31.34	36.31 to 36.38	29.66 to 29.76
Head diameter (1300 c.c.)	in	1.304 to 1.308	1.168 to 1.172	1.437 to 1.443	1.168 to 1.172
	mm	33.12 to 33.22	29.66 to 29.76	36.49 to 36.65	29.66 to 29.76
Stem diameter	in	0.3107 to 0.3112	0.3100 to 0.3105	0.3107 to 0.3112	0.3100 to 0.3105
	mm	8.05 to 8.12	7.874 to 7.887	8.05 to 8.12	7.874 to 7.887
Seat face angle—total	°	90°	90°	90°	90°
Valve stem to guide clearance	in	0.0008 to 0.0023	0.0015 to 0.0030	0.0008 to 0.0023	0.0015 to 0.0030
	mm	0.02 to 0.06	0.03 to 0.07	0.02 to 0.06	0.03 to 0.07

Valve Guides

Length	2.0625 in	52.387 mm
Bore	0.312 to 0.313 in	7.92 to 7.95 mm
Outside diameter	0.501 to 0.502 in	12.72 to 12.75 mm
Valve guide height above cylinder head	0.749 to 0.751 in	19.025 to 19.075 mm

Valve Springs

	Type A	Type B	Type C
Internal diameter	0.795 in (20.193 mm)	0.795 in (20.193 mm)	0.795 in (20.193 mm)
Working coils	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$
Load at length	1.36 in=27 to 30 lb 34.54 mm=12.25 to 13.61 kg	1.074 in=105 to 115 lb 27.28 mm=47.3 to 52.2 kg	0.989 in=123 to 133 lb 25.1 mm=55.8 to 60.3 kg
Free length	1.61 in (40.9 mm)	1.59 in (40.4 mm)	1.52 in (38.6 mm)
Solid length	0.93 in (23.6 mm)	0.96 in (24.4 mm)	0.875 in (22.2 mm)
Rate	150 lb/in (2679 kg/m)	235 lb/in (4196 kg/m)	240 lb/in (4286 kg/m)

Note: Type A fitted to 1300 c.c. engines up to engine number DG 25001 with the exception of engines within the following three groups: DG 10731 to 10750, DG 10786 to 10909, DG 11116 to 11622.

Type B fitted to 1300 c.c. engines of the above three groups and 1500 c.c. engines up to DM 5001 and DS 5001.

Type C fitted to 1300 c.c. engines from DG 25001 and 1500 c.c. engines from DM 5001 and DS 5001.

Valve Seat Inserts

		Up to Engine No. { DG 25000 DM 5000 DS 5000		From Engine No. { DG 25001 DM 5001 DS 5001	
		1300 c.c.	1500 c.c.	1300 1500 c.c.	
Bore into cylinder head	in.	0.248 to 0.250	0.250 to 0.255	0.250 to 0.255	
Dimension 'A'	mm	6.30 to 6.35	6.35 to 6.45	6.30 to 6.35	
Bore into cylinder head	in.	1.249 to 1.250	1.347 to 1.348	**1.249 to 1.250**	
Dimension 'B' (Exhaust)	mm	31.72 to 31.75	34.21 to 34.24	31.72 to 31.75	
Bore into cylinder head	in.	1.437 to 1.438	1.566 to 1.567	1.5625 to 1.5635	
Dimension 'C' (Inlet)	mm	36.50 to 36.53	39.77 to 39.80	39.68 to 39.71**	

Note: Machine fitted inserts to 89° total inclusive angle.

Valve seat to be concentric with guide bore to within 0.002 in (0.0508 mm) Total Indicator Reading.



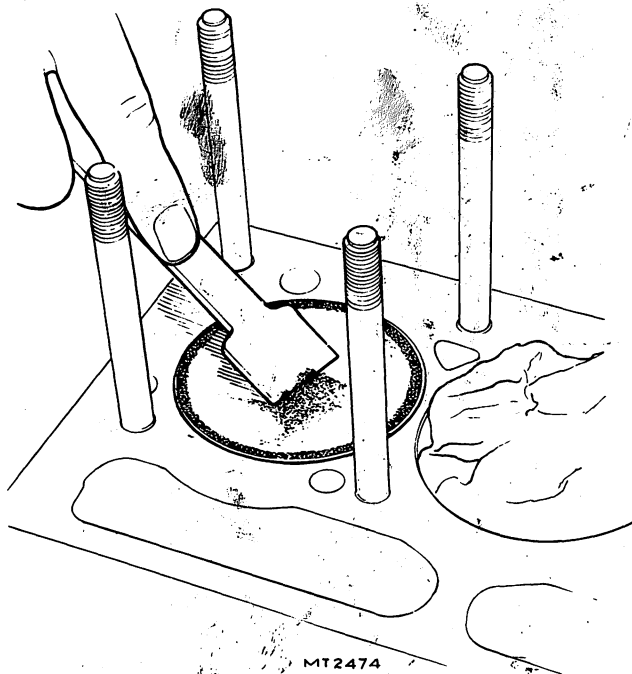
ENGINE

DECARBONIZE, REFACE ALL VALVES AND SEATS, GRIND-IN VALVES, TUNE ENGINE

12.29.21

Dismantling

1. Remove the cylinder head. 12.29.10.
2. Remove the inlet and exhaust valves. 12.29.62.
3. Remove carbon deposits from combustion chambers and ports.
4. Clean the face of the cylinder head, removing all traces of carbon and high spots.
5. Clean out the water-ways.
6. Reface all seats, removing the minimum of material.
7. Clean carbon from all valves and re-face.
8. Lap-in the valves, using coarse followed by fine grinding paste until a gas-tight joint is obtained. Do not mix the valves.
9. Turn the crankshaft until Nos. 1 and 4 pistons are at T.D.C.
10. Fill Nos. 2 and 3 cylinders with clean non-fluffy rag to prevent carbon falling into the bores, and cover the cam follower apertures.
11. Carefully, without scoring the piston crown, remove carbon deposits leaving a band of carbon round the periphery of the piston crown. Avoid carbon particles falling into the cylinder block water-ways.
12. Repeat instructions 9 to 11 on Nos. 2 and 3 cylinders.
13. Clean the cylinder block face, removing all traces of carbon and high spots.



Reassembling

14. Reverse instruction 1 to 2.
15. Tune the engine. 12.49.02.

CYLINDER HEAD—RENEW CASTING

—Dismantle and reassemble

12.29.22

Dismantling

1. Remove the cylinder head. 12.29.10.
2. Remove the inlet and exhaust valves. 12.29.62.
3. Remove the spark plugs.

Reassembling to new casting

4. Fit the rocker shaft pedestal studs.
5. Fit the rocker cover studs.
6. Fit the inlet and exhaust manifold studs.
7. Lap-in all valves, removing all traces of compound.
8. Reverse instructions 1 to 2.
9. Tune the engine. 12.49.02.

12.29.21 *

12.29.22

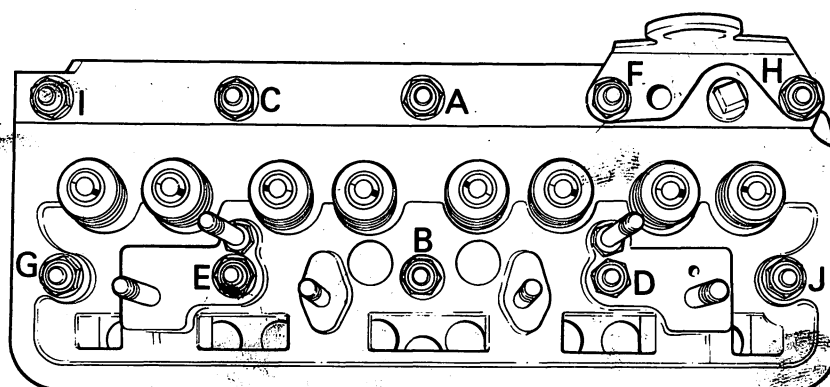
CYLINDER HEAD NUTS

—Tighten

12.29.27

1. Remove the rocker cover. 12.29.42.
2. Remove the rocker shaft. 12.29.54.
3. **To avoid distortion, tighten the cylinder head nuts to 38 to 46 lbf ft (5.2 to 6.4 kgf m) in the following sequence: A, B, C, D, E, F, G, H, I, J. **
4. Refit the rocker shaft. 12.29.54.
5. Refit the rocker cover. 12.29.42.

**



MT3213

**

ROCKER COVER

—Remove and refit

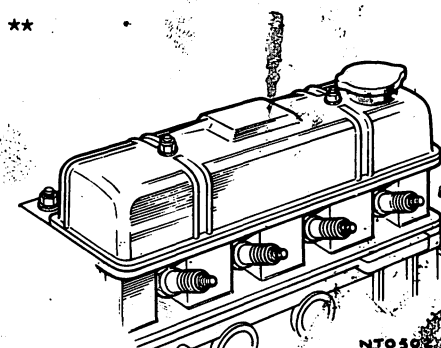
12.29.42

Removing

1. Unclip the mixture control cable from the fastener bracket—single carburetter R.H.Stg. only.
2. Disconnect the servo hose from the inlet manifold and throttle cable—twin carburetter L.H.Stg. only.
3. Disconnect the engine breather hose from the carburetter.
4. Remove the two nuts complete with plain and fibre washers securing the rocker cover to the cylinder head.
5. Lift off the rocker cover complete with gasket.

Refitting

6. Reverse instructions 1 to 5, ensuring that the rocker cover retaining nuts are tightened evenly and not beyond 1 to 2 lbf ft (0.14 to 0.3 kgf m) to avoid distortion of cover. Renew the gasket.



MT050



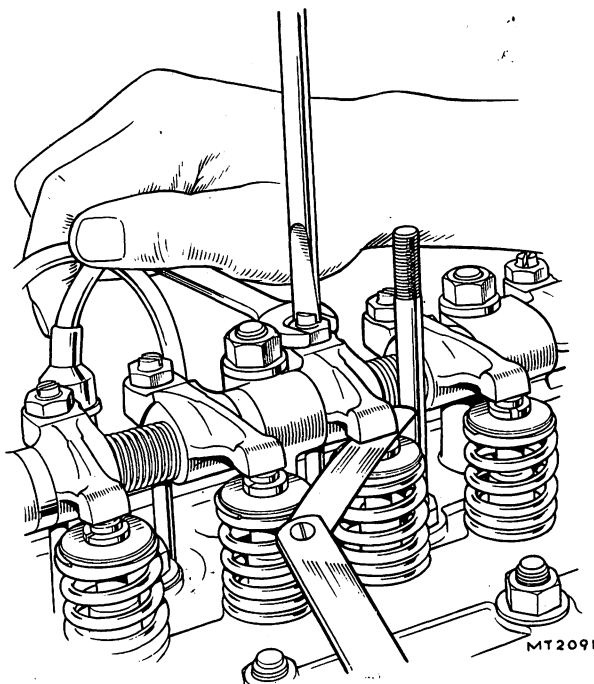
ENGINE

VALVE CLEARANCE

—Check and adjust

12.29.48

1. Isolate the battery.
2. Remove the rocker cover. 12.29.42.
3. Remove the spark plugs.
4. Counting from the front of the engine, turn the crankshaft until Nos. 8 and 6 valves are open, i.e. the valve springs fully compressed.
5. Using a 0.010 in (0.25 mm) feeler gauge, check the gap between the rocker pad and valve tip of Nos. 1 and 3 valves.
6. If adjustment is required, insert a screwdriver blade in the slot in the adjustment pin and slacken the locknut. Turn the adjustment pin clockwise to decrease and anti-clockwise to increase the gap.
7. Check and adjust the remaining valve clearances in the following sequence:
Adjust Nos. 5 and 2 valves with Nos. 4 and 7 valves open.
Adjust Nos. 8 and 6 valves with Nos. 1 and 3 valves open.
Adjust Nos. 4 and 7 valves with Nos. 5 and 2 valves open.



Refitting

8. Reverse instructions 1 to 3.

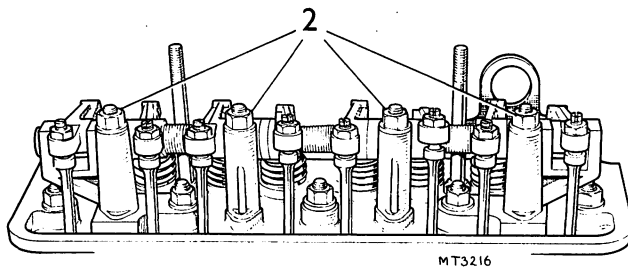
ROCKER SHAFT

—Remove and refit

12.29.54

Removing

1. Remove the rocker cover. 12.29.42.
2. Remove the four nuts complete with washers securing the rocker shaft pedestals to the cylinder head.
3. Lift off the rocker shaft.



Refitting

4. Reverse instructions 1 to 3, ensuring that:
 - a. The rocker adjustment screws are located correctly in the push-rod cups.
 - **b. The pedestal nuts are tightened evenly to 26 to 34 lbf ft (3.6 to 4.7 kgf m).**
5. Adjust the valve clearances. 12.29.48.

12.29.48

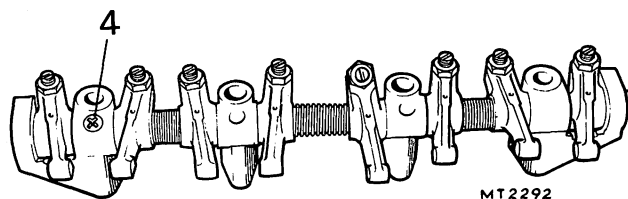
12.29.54

ROCKER SHAFT ASSEMBLY

—Overhaul

12.29.55

1. Remove the rocker shaft. 12.29.42.
2. Withdraw the cotter pin from the front end of the rocker shaft.
3. Slide off the rockers, pedestals, springs and spacers from the front end of the shaft, noting the order for reassembly.
4. Remove the screw locating the rear pedestal to the shaft.
5. Withdraw the rear pedestal and rocker.



MT2292

Reassembling

6. Reverse instructions 1 to 5, observing:
 - a. Renew all worn components. The grinding of worn rocker pads is not recommended.
 - b. Ensure that oil-ways in rockers and shaft are clear.
 - c. Ensure that the rear pedestal locating screw engages properly in the rocker shaft.
7. Adjust the valve clearances. 12.29.48.

ROCKER ADJUSTING SCREWS—SET

—Remove and refit

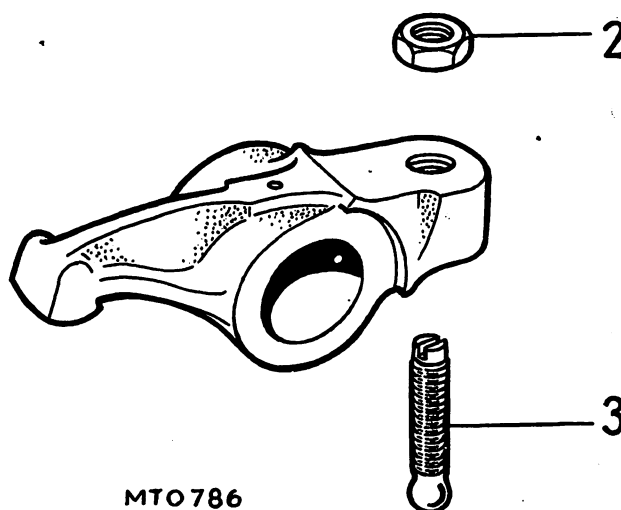
12.29.56

Removing

1. Remove the rocker shaft assembly. 12.29.54.
2. Remove the rocker adjusting screw locknuts.
3. Remove the rocker adjusting screws.

Refitting

4. Reverse instructions 1 to 3.
5. Adjust the valve clearances. 12.29.48.



MTO786



ENGINE

CAM FOLLOWERS—SET

—Remove and refit

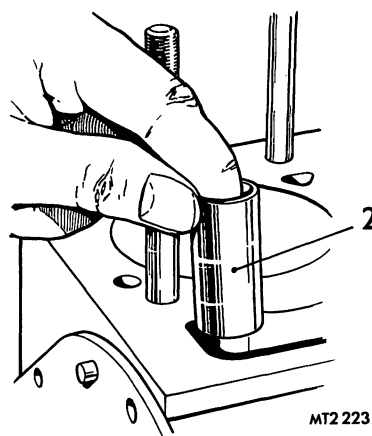
12.29.57

Removing

1. Remove the cylinder head. 12.29.10.
2. Lift out the eight cam followers and identify for reassembly.

Refitting

3. Reverse instructions 1 to 2, ensuring:
 - a. Worn or pitted cam followers are renewed.
 - b. Lubricated with clean engine oil before resetting.
 - c. Each follower is free to rotate and slide in its locating bore.



PUSH-RODS—SET

—Remove and refit

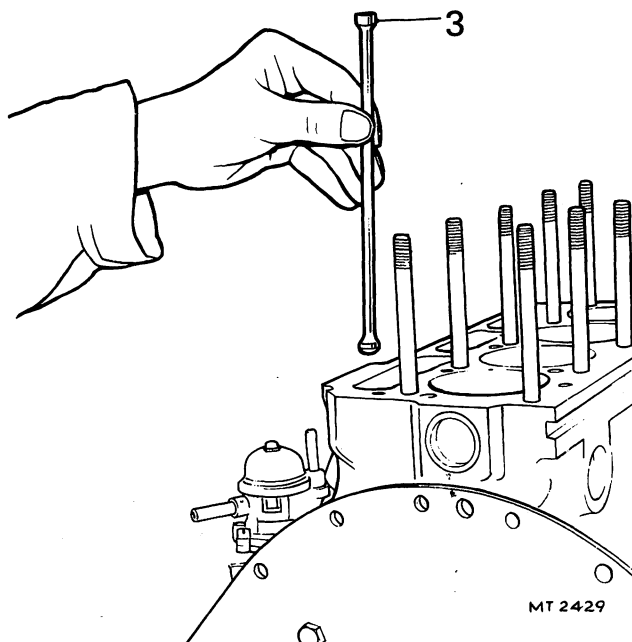
12.29.59

Removing

1. Remove the rocker cover. 12.29.42.
2. Remove the rocker shaft assembly. 12.29.54.
3. Lift out the push-rods, identifying them for re-assembly.

Refitting

4. Reverse instructions 1 to 3, ensuring:
 - a. Push-rods with worn or pitted cup and ball ends and bent shafts are renewed.
 - b. Ball and cup ends are lubricated.
 - c. Cup ends are located correctly in the rocker adjusting screw ball and ball ends are seated properly in the cam follower.
5. Adjust the valve clearances. 12.29.48.



Valves—inlet and exhaust—remove and refit 12.29.62

Valves—inlet—remove and refit 12.29.63

Valves—exhaust—remove and refit **12.29.64**

Valve guide—inlet—remove and refit 12.29.70

Valve guide—exhaust—remove and refit 12.29.71

Inlet valve seat—remove and refit 12.29.76

Exhaust valve seat—remove and refit 12.29.77

The above operations are included in 12.29.18.

12.29.57

12.29.77

ENGINE AND GEARBOX ASSEMBLY

—Remove and refit

12.37.01

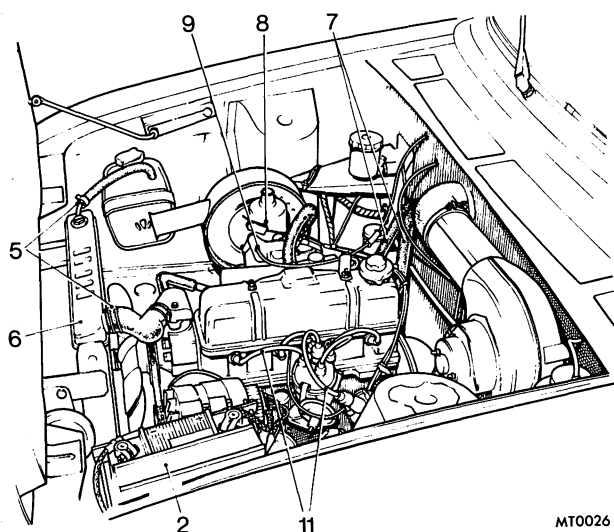
Removing

1. Remove bonnet—two bolts each side. 76.16.01.
2. Disconnect and remove battery. 86.15.01.
3. Drain coolant. 26.10.01.
4. Drain sump oil. See 'Maintenance'.
5. Disconnect top and bottom hoses at engine, plus hose at expansion tank. 26.30.01, 26.30.07.
6. Remove radiator—four bolts each side. 26.40.01.
7. Disconnect two heater hoses at engine.
8. Disconnect throttle cable at linkage. 19.20.06.
9. Disconnect choke cable from rocker cover and carburettor.
10. Remove three nuts and washers securing exhaust front pipe to manifold. 30.10.09.
11. Disconnect at the distributor, the high and low tension leads.
12. Disconnect starter cable. 86.60.01.
13. Disconnect multi-socket connector from the alternator.
14. Disconnect oil pressure switch wire.
15. Disconnect water temperature transmitter wire.
16. Disconnect battery earth lead from alternator mounting bracket.
17. Disconnect fuel feed pipe at fuel pump (plug end to prevent fuel siphoning or dirt entering the system).

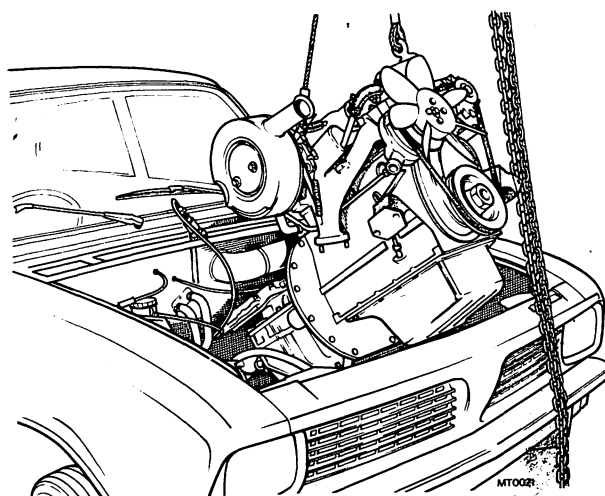
18. Disconnect propeller shaft at gearbox (raise one rear wheel to turn shaft). 47.15.02.
19. Disconnect gear lever at rear of extension.
20. Remove nut securing rear mounting to sub-frame. 12.45.08.
21. Remove nut and bolt securing exhaust pipe clip to support arm.
22. Disconnect speedometer drive cable. 88.30.06.
23. Remove two bolts securing clutch slave cylinder to gearbox—withdraw and move cylinder into engine compartment. 33.35.01.
24. Remove gear lever (carpets, rubber cap and bayonet clip).
25. Attach lifting equipment to engine lifting eyes.
26. Remove two nuts and bolts securing each front mounting to sub-frame. 12.45.04.
27. Lift engine to raise sump above sub-frame, pull forward, then raise and manoeuvre engine and gearbox clear of vehicle.

Refitting

28. Reverse 1 to 27, ensuring:
 - a. Sump filled with correct grade of engine oil to high mark on dipstick.
 - b. No pipes or wires are trapped between engine and frame.
 - c. Cooling system is filled, checked for leaks and then topped up, after the engine has been run.
 - d. All mountings are secure and tightened to specific torque.
 - e. Gearbox oil level checked.



MT0026



MT0027



ENGINE

ENGINE AND GEARBOX ASSEMBLY

—Remove, change ancillary equipment and refit 12.37.03

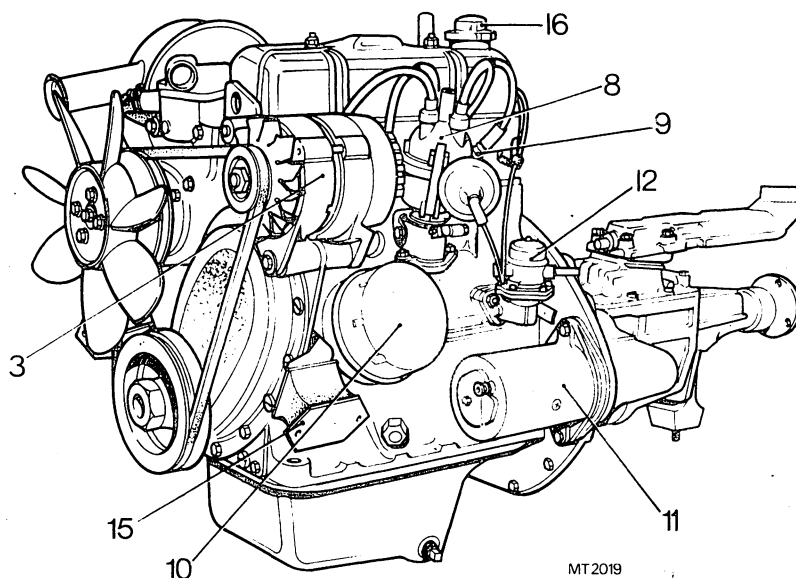
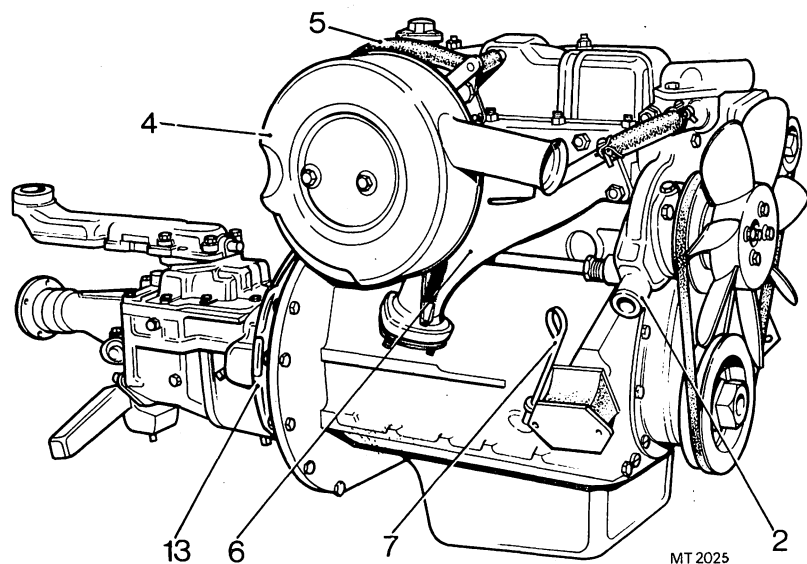
Removing

1. Remove the engine and gearbox assembly. 12.37.01.
2. Remove the water pump housing complete with thermostat housing, water pump, fan, pulley and belt. 26.50.03.
3. Remove the alternator and brackets.
4. Remove the air cleaner.
5. Remove the carburettor(s) and breather pipes.
6. Remove the inlet and exhaust manifolds.
7. Remove the dipstick.
8. Remove the distributor. 86.35.20.
9. Remove the spark plugs.
10. Remove the oil filter. 12.60.01.

11. Remove the starter motor.
12. Remove the fuel pump.
13. Remove the clutch housing complete with gearbox.
14. Remove the clutch unit.
15. Remove the engine mounting rubbers.
16. Remove the oil filler cap.
17. If the engine is to be returned for reconditioning, seal off all ports and apertures.

Refitting

18. Reverse instructions 1 to 16, ensuring:
 - a. New gaskets and seals are fitted where applicable.
 - b. Drive belt tension is adjusted. 86.10.05.
 - c. Distributor contact gap is adjusted. 86.35.14.
 - d. Check oil sump level, refill or top-up with recommended grade to high mark on dipstick.
 - e. Refit the cooling system. 26.10.01.



ENGINE ASSEMBLY

—Strip and rebuild

12.41.05

Stripping

1. Remove the engine and gearbox assembly and remove ancillary equipment. 12.37.03. ✓
2. Remove the rocker cover. ✓
3. Remove the rocker shaft. 12.29.54, instructions 2 and 3. ✓
4. Remove the cylinder head. 12.29.10, instructions 9 to 11, ensuring that the nuts are released in correct sequence. 12.29.27. ✓
5. Remove the valves and springs. 12.29.62, instructions 3 and 4, and identify for reassembly. ✓
6. Remove the push-rods and identify for reassembly. ✓
7. Withdraw the cam followers and identify for reassembly. 12.29.57. ✓
8. Remove the crankshaft pulley. 12.21.01 ✓
9. Remove the timing chain cover. 12.65.01, instructions 5 and 6. ✓
10. Remove the timing chain and sprockets, 12.65.12, instructions 2 and 5, ignoring reference to moving the crankshaft and camshaft. ✓
11. Remove the distributor pedestal and drive gear. 12.10.22, instructions 2 to 4. ✓
12. Remove the two bolts securing the camshaft locating plate to the cylinder block. Remove the plate and withdraw the camshaft.
13. Remove the cylinder block front mounting plate. 12.25.10, instructions 9 to 12.
14. Remove the flywheel. 12.53.07, instructions 3 and 4.
15. Remove the spigot bush from the crankshaft.
16. Remove the engine rear adaptor plate. 12.53.03, instructions 2 and 3.
17. Turn the cylinder block over so that the sump is uppermost.
18. Remove the bolts securing the sump to the crankcase and lift off the sump complete with gasket.

continued

19. Remove the oil pump strainer.
20. Remove the oil pump. 12.60.26, instructions 2 and 3.
21. Remove the oil pressure relief valve. 12.60.56.
22. Remove the crankshaft rear oil seal. 12.21.20, instructions 3 to 5.
23. Remove the two screws securing the front sealing block to the crankcase, and lift out the sealing block.
24. Remove the eight big-end bolts.
25. Withdraw the connecting rod bearing caps complete with lower bearing shells; **DO NOT MIX**. Check identification marks for reassembly.
26. Push the connecting rods and pistons down the cylinder bores and remove the upper bearing shells.
27. Turn the cylinder block on its side and with care withdraw the pistons and connecting rod assemblies. Mark them for reassembly.
28. Marry-up the connecting rods and piston assemblies with their respective bearing caps and shells.
29. Remove the front and centre main bearing cap bolts.
- 30.**Remove the rear main bearing cap bolts.**
31. Withdraw the main bearing caps, complete with lower shells. Check identification marks for reassembly. **DO NOT MIX**.
32. Lift out the crankshaft.
33. Remove the upper bearing shells and thrust washers from the rear main bearing.

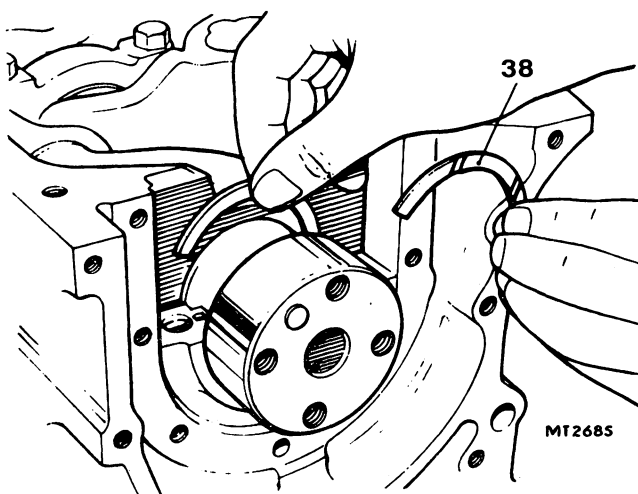
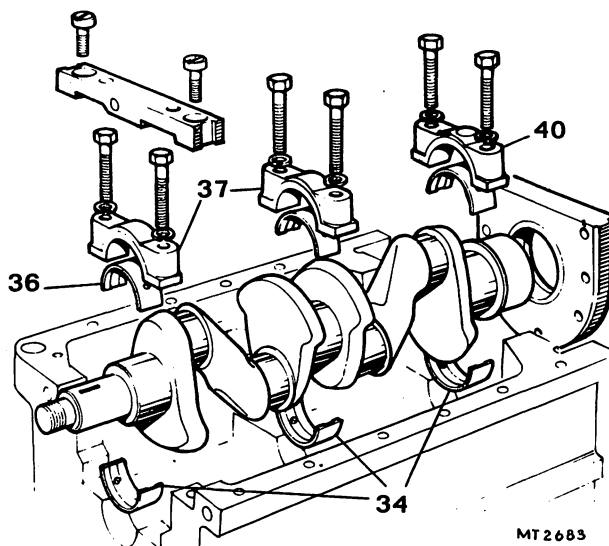
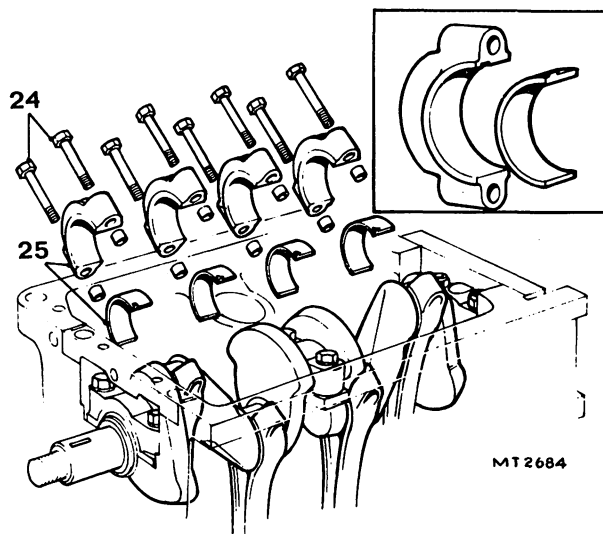
Rebuilding

Overhaul all sub-assemblies.

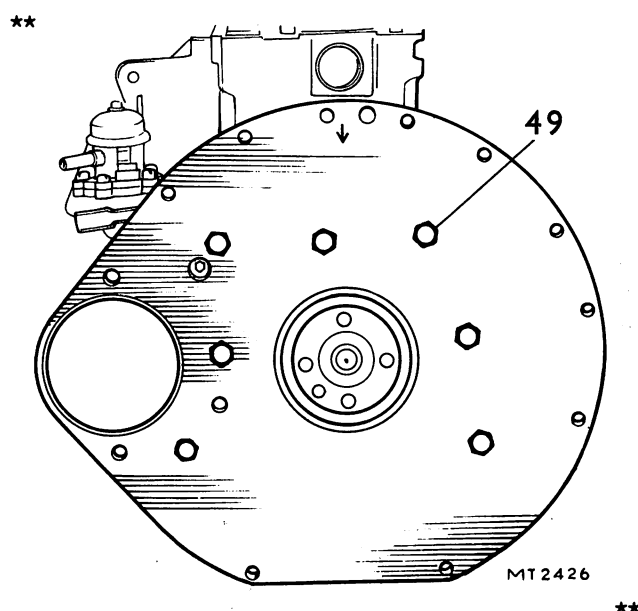
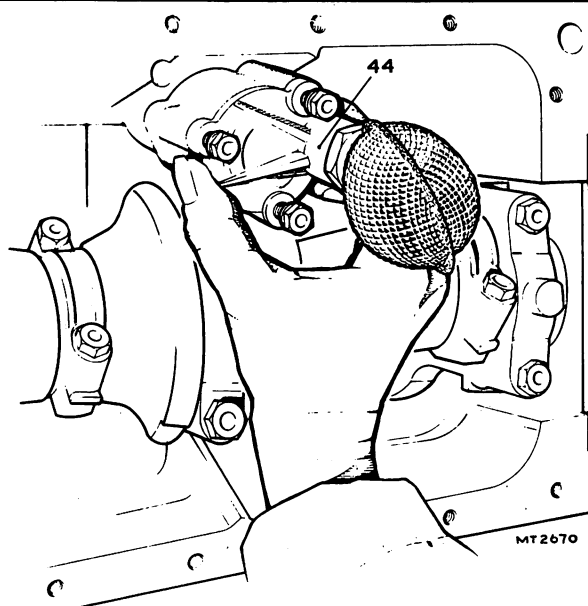
Clean and degrease all components before assembly. Lubricate all parts with clean engine oil before assembly unless otherwise stated.

34. Fit the main bearing shells to the crankcase, ensuring that the tags locate in the recesses.
35. Check that the crankshaft oilways are clear, and lower the crankshaft into the crankcase.
36. Fit the bearing shells to the main bearing caps, ensuring that the tags locate in the recesses.
37. Fit the centre and front main bearing caps and tighten to 50 to 65 lbf ft (7 to 9 kgf m).
38. Fit the thrust washers to the rear main bearing, ensuring that the thrust faces, identified by oil grooves, bear against the crankshaft faces and locate in the registers on both sides of the crankcase bearing bore half.

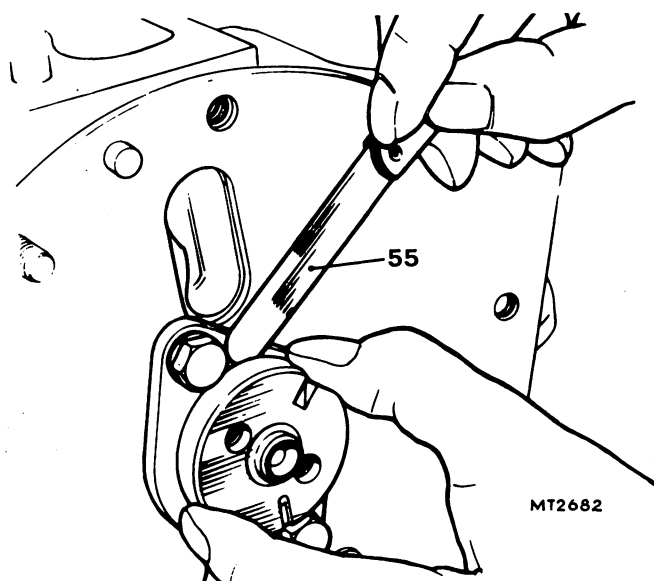
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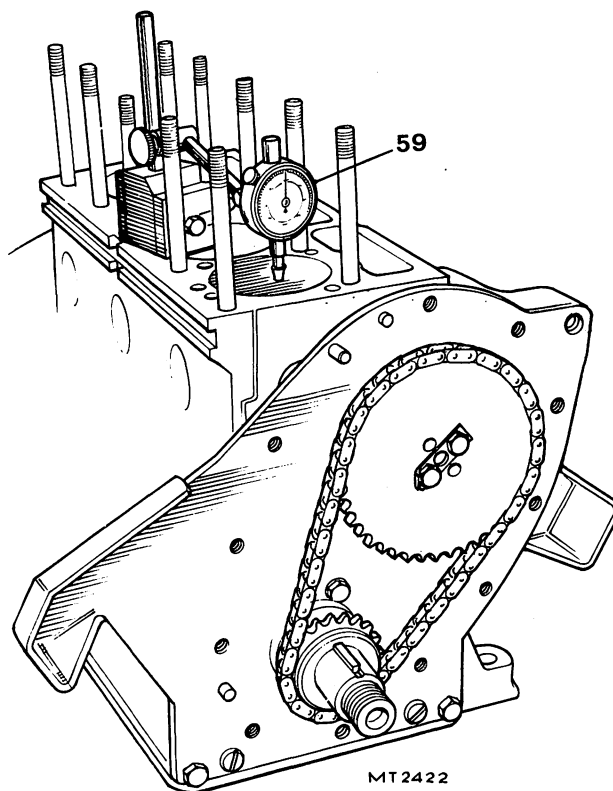
39. Check the crankshaft end-float. 12.21.26.
- 40.**Fit the rear main bearing cap and tighten the bolts to 50 to 65 lbf ft (7 to 9 kgf m).**
41. Fit the piston and connecting rod assemblies to the cylinder block bores. 12.17.01, instructions 14 to 21.
42. Fit the crankshaft rear oil seal. 12.21.20, instructions 6 to 11.
43. Fit the front sealing block. 12.21.39, instructions 14 to 17.
44. Fit the oil pump, ensuring that the spring washers are located under the bolt heads; tighten the bolts evenly.
45. Fit the oil strainer to the pump inlet.
46. Fit the sump with a new gasket and evenly tighten the retaining bolts.
47. Fit the oil pressure relief valve. 12.60.56.
48. Turn the cylinder block over, and secure in an up-right position.
49. Fit the engine rear adaptor plate, ensuring correct location over the studs and dowels and that the arrow is at the top. Evenly tighten the retaining bolts.
50. Fit the crankshaft spigot bush, which should be a loose fit in the crankshaft.
51. Fit the flywheel. 12.53.07, instructions 5 to 8.
52. Coat the cylinder block face of a new front mounting plate gasket with jointing compound and place it in position on the joint face.
53. Fit the mounting plate in position over the dowels. Secure it in position with three bolts into the cylinder block and three screws into the front sealing block.



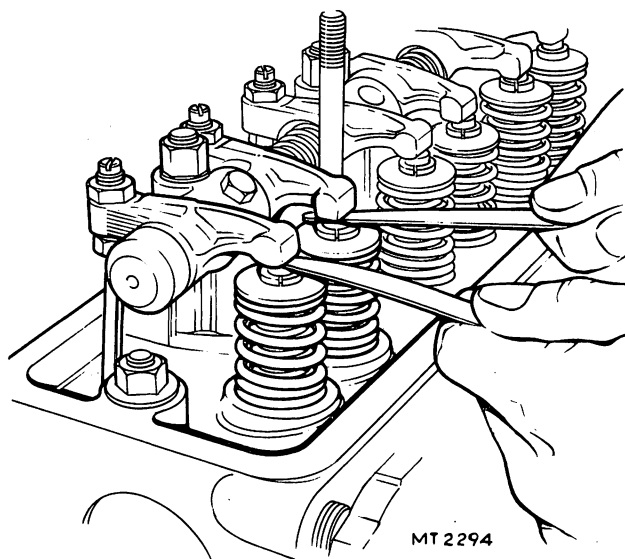
54. Assemble the camshaft into the cylinder block, secure it in position with the camshaft location plate, and tighten the retaining bolts.
55. Check the camshaft shaft end-float, which should be within 0.004 to 0.008 in (0.10 to 0.20 mm). Pull the camshaft out against the location plate and insert a feeler gauge between the groove and location plate. Reduce end-float by fitting a new location plate.



57. Reassemble the valves and springs to the cylinder head. 12.29.18, instructions 5 to 13.
58. Fit the cam followers to the cylinder block. 12.29.57, instruction 3.
59. Rotate the crankshaft until No. 1 piston is at T.D.C. by using a dial gauge on the piston crown. **Do not move the crankshaft again until the valves have been timed.**
60. Fit the cylinder head assembly with a new gasket. Tighten the retaining nuts in correct sequence and torque loading. 12.29.27.
61. Fit the push-rods, ensuring that the ball ends locate in the cam followers.
62. Fit the rocker shaft assembly, ensuring that the rocker adjusting screw balls locate in the push-rod cups.
63. **Tighten the rocker shaft pedestal nuts evenly to 26 to 34 lbf ft (3.6 to 4.7 kgf m). **
64. Adjust the valve clearances of Nos. 7 and 8 valves only to 0.050 in (0.397 mm) to give a working clearance. 12.29.48, instructions 6 and 7.



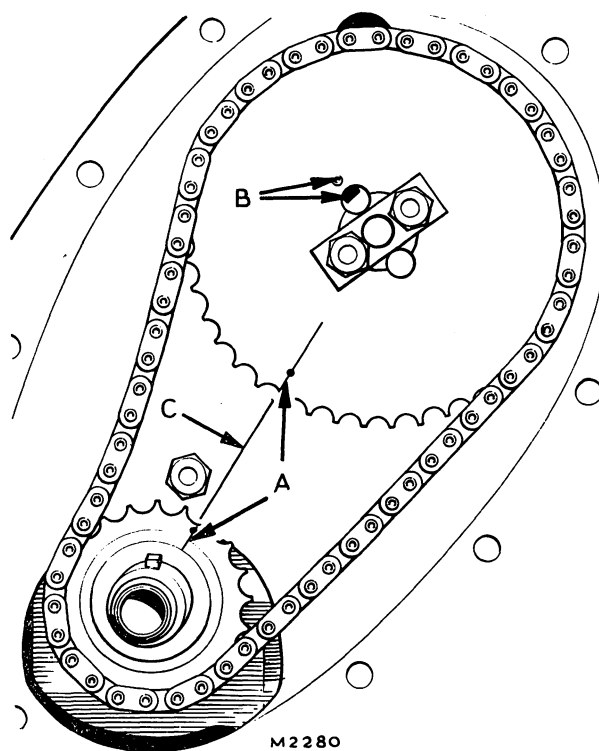
65. Turn the camshaft until Nos. 7 and 8 valves are on the 'rock', i.e. inlet valve about to open and exhaust valve about to close. This may be determined by oscillating the camshaft while measuring the rocker clearances of these two valves with feeler gauges. When the two clearances are the same, the valves and camshaft are in their correct relationship with the crankshaft.



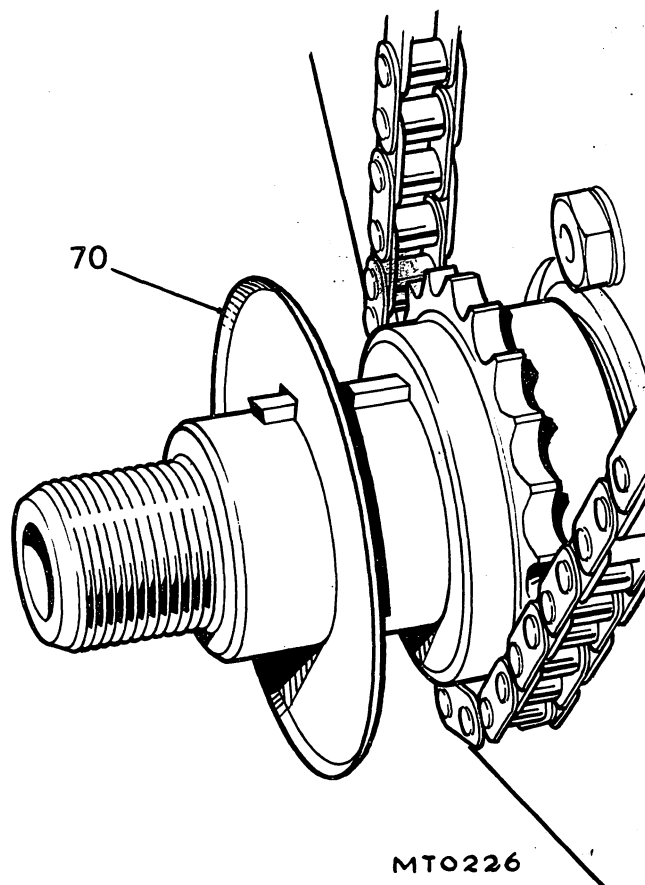
66. Encircle both sprockets with the timing chain and fit to crankshaft and camshaft respectively, keeping the chain taut on the drive side.

NOTE: The camshaft timing sprocket is provided with four holes which are equally spaced but offset from a tooth centre. Half-tooth adjustment is obtained by rotating the sprocket 90 degrees from its original position. A quarter-tooth adjustment is possible by turning the sprocket 'back to front'. By rotating the sprocket 90 degrees in this position three-quarters of-a tooth variation is available.

67. If new sprockets have been fitted, make a punch-mark (A) on the crankshaft and camshaft sprockets on a line (C) scribed through the diameters of the two sprockets. Make also a punch-mark (B) on the end of the camshaft through one of the sprocket holes and a corresponding punch-mark on the sprocket.



68. Check the sprockets for alignment. 12.65.12.
 69. Fit a new camshaft sprocket lock plate and tighten the bolts and bend over the tabs.
 70. Fit the oil thrower to the crankshaft, ensuring that the dished periphery faces the timing cover.
 71. Fit the timing chain cover complete with a new gasket. 12.65.01.
 72.**Fit the crankshaft pulley and tighten the retaining nut to 120 to 150 lbf ft (16.6 to 20.7 kgf m).**
 73. Adjust all valve clearances. 12.29.48, instructions 4 to 7.
 74. Fit the distributor drive shaft and gear. 12.10.22.
 75. Fit the rocker cover.
 76. Fit ancillary equipment. 12.37.03.
 77. Fit the clutch assembly.
 78. Fit the gearbox assembly.
 79. Fit the engine and gearbox assembly to the car. 12.37.01.
 80. Fill the oil sump with engine oil of the correct grade to the 'HIGH' mark on the dipstick, and replace the dipstick.
 81. Fill the cooling system. 26.10.01, instructions 5 to 10.
 82. Time the ignition. 86.35.16.
 83. Tune and adjust the carburetter(s). 19.51.01 or 19.15.02.



ENGINE

ENGINE MOUNTINGS—FRONT

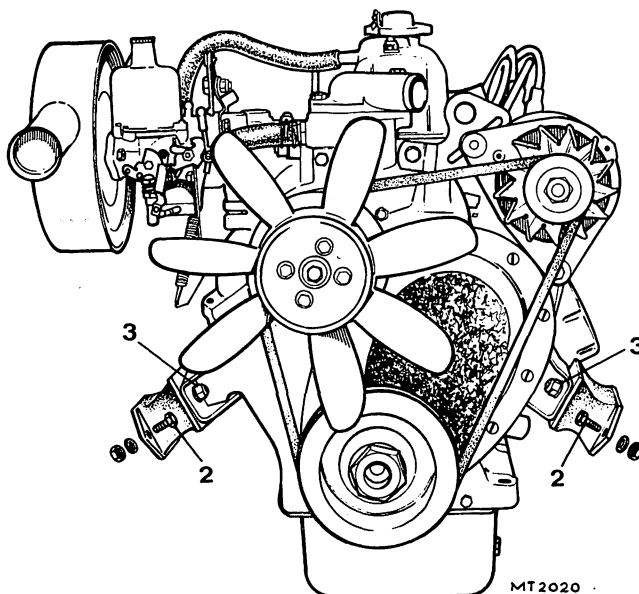
- L.H.—Remove and refit 12.45.01
- R.H.—Remove and refit 12.45.03
- Set—Remove and refit 12.45.04

Removing

1. Employ a jack or hoist to take the weight of the engine.
2. Remove the nuts and bolts securing the mounting to frame (two each side).
3. Remove the nut securing the mounting to the engine mounting plate.
4. Raise the engine slightly.
5. Remove the mounting(s).

Refitting

6. Reverse 1 to 5.



ENGINE MOUNTING—REAR

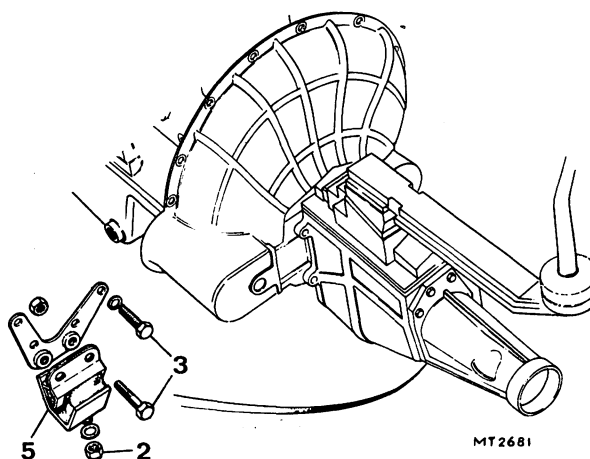
- Remove and refit 12.45.08

Removing

1. Employ a jack to take the weight at the rear of the gearbox extension.
2. Remove the nut securing the mounting to the sub-frame.
3. Remove the two nuts and bolts securing the mounting to the gearbox attachment bracket.
4. Raise the jack slightly.
5. Remove the mounting.

Refitting

6. Reverse 1 to 5, noting that the upper mounting lug fits between the gearbox attachment bracket and the exhaust pipe bracket.



ENGINE TUNE

—Check and adjust distributor points, spark plugs, ignition timing, tune carburetters, clean fuel pump filter, and road-test **12.49.02**

1. Check the condition and gap of distributor points; renew or adjust as required. 86.35.13.
2. Remove the spark plugs and check their condition; renew if necessary. Clean and adjust the gaps. 86.35.01.
3. Check the ignition timing, and adjust if necessary. 86.35.16.
4. Tune the carburetter(s). 19.15.01 or 19.15.02.
5. Clean the fuel pump filter. 19.45.02.

ENGINE REAR GEARBOX ADAPTOR PLATE

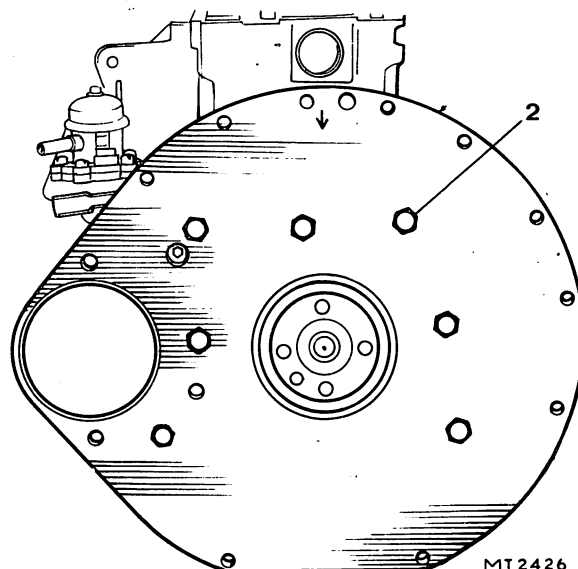
—Remove and refit **12.53.03**

Removing

1. Remove the flywheel. 12.53.07.
2. Remove the seven bolts securing the adaptor plate to the cylinder block.
3. Remove the adaptor plate.

Refitting

4. Reverse instructions 1 to 3, ensuring:
 - a. The adaptor plate is located correctly over the dowel at the top of the cylinder block.
 - **b. The adaptor plate retaining bolts are tightened evenly to 15 to 20 lbf ft (2.1 to 2.8 kgf m). **



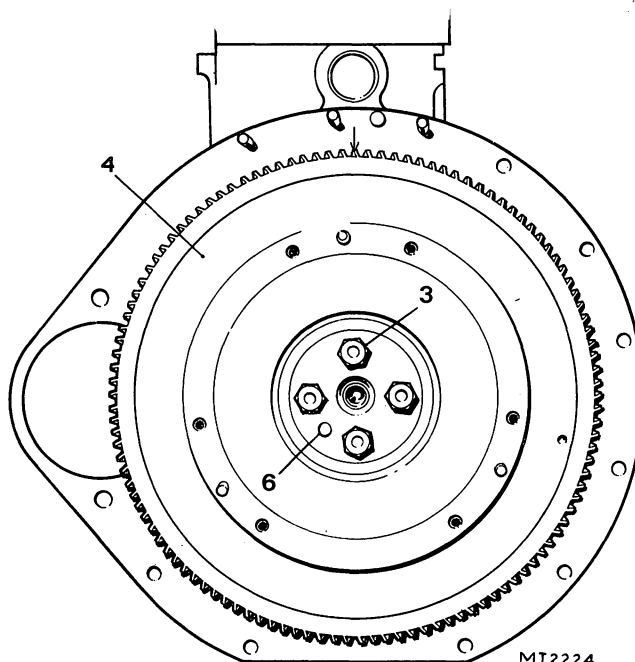
FLYWHEEL

—Remove and refit

12.53.07

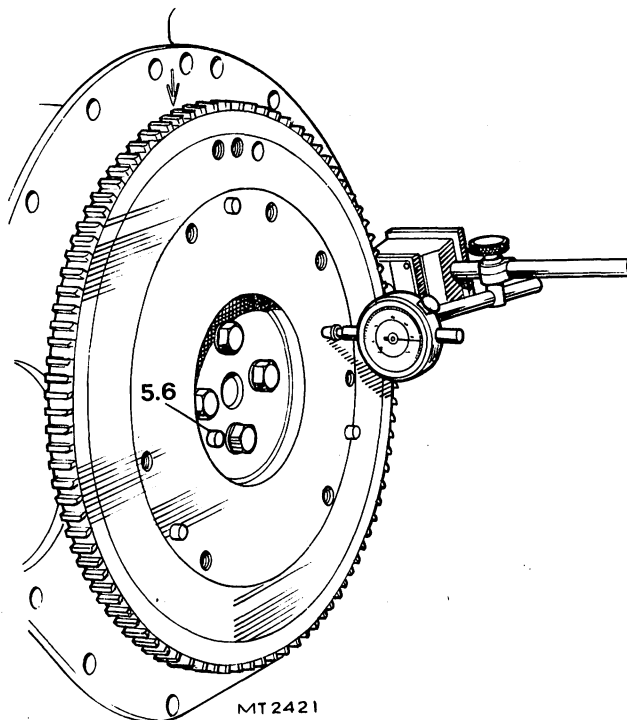
Removing

1. Remove the gearbox. 37.20.01.
2. Remove the clutch assembly. 33.10.01.
3. Remove the four bolts securing the flywheel to the crankshaft.
4. Lift off the flywheel.



Refitting

5. Clean the flywheel mating face with the crankshaft and crankshaft flange. Check the dowel for damage, and that the crankshaft spigot bush is in position.
6. Fit the flywheel to the crankshaft, locating over the dowel in the crankshaft.
7. Tighten the flywheel retaining bolts.
CAUTION: Two types of flywheel retaining bolts are used (in sets). It is most important to identify and to tighten to the correct torque figures given below.
 Type A: Cadmium-plated (coloured Silver), 35 to 40 lbf ft (4.8 to 5.5 kgf m).
 Type B: Parkerized (Black), 40 to 45 lbf ft (5.5 to 6.2 kgf m).
8. Using a dial indicator gauge, check the flywheel for run-out, not to exceed 0.002 in (0.051 mm) at 3.0 in (76.2 mm) radius from spigot centre. Check concentricity, not to exceed 0.004 in (0.100 mm).
9. Refit the clutch assembly. 33.10.01.
10. Refit the gearbox. 37.20.01.



STARTER RING GEAR

—Remove and refit

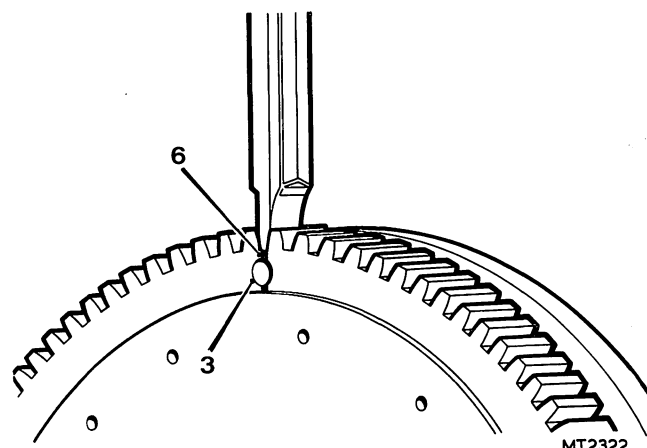
12.53.19

Removing

1. Isolate the battery.
2. Remove the flywheel. 12.53.07.
3. Drill a hole $\frac{1}{4}$ in (6.35 mm) diameter at the point of intersection of a scribe line between any two teeth and a scribe line midway between the root diameter and inside diameter of the ring gear.
4. Hold the flywheel assembly in a soft-jaw vice.
5. Place a cloth of heavy material over the ring gear for protection against flying fragments.

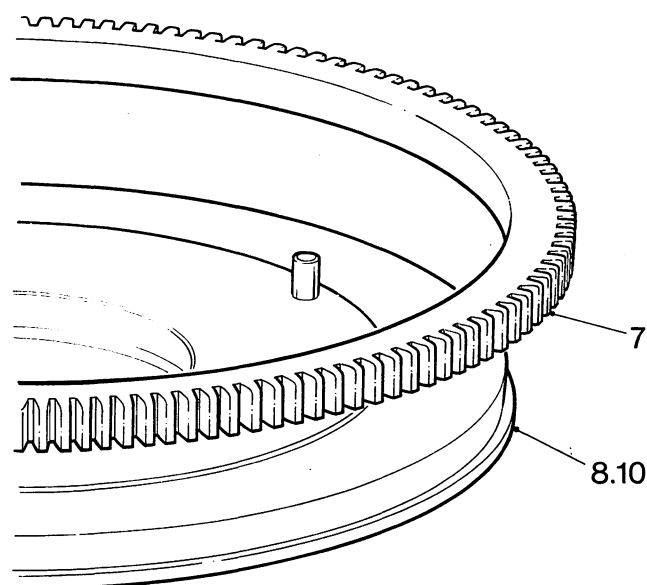
WARNING: Ensure adequate protection, particularly for the eyes, to prevent injury from flying fragments when the ring gear is split.

6. Place a cold chisel immediately above the centre line of the drilled hole and strike sharply to split the ring gear.



Refitting

7. Heat the replacement starter ring gear uniformly to a maximum of 200°C.
8. Place the flywheel on a flat surface, clutch face side uppermost, and clean the ring gear locating register.
9. Locate the ring gear and hold in position until it contracts sufficiently to grip the flywheel.
10. Allow the ring gear to cool gradually to avoid distortion. A maximum gap of 0.025 in (0.635 mm) is tolerable between the ring gear and the flywheel face in any one area of 6 in (15 cm) around the circumference.
11. Refit the flywheel, 12.53.07, and check that ring gear eccentricity does not exceed 0.010 in (0.254 mm).



ENGINE

OIL FILTER

—Remove and refit

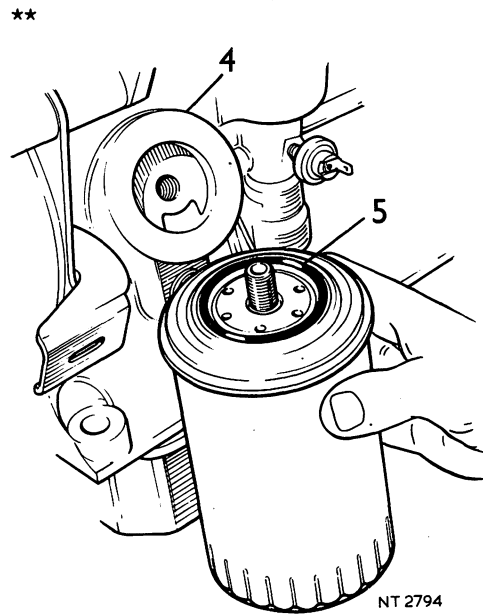
12.60.01

Removing

1. Isolate the battery
2. Grasp the oil filter with both hands and turn anti-clockwise.
3. Remove the filter.

Refitting

4. Clean the cylinder block face.
5. Smear the 'O' ring with grease to prevent 'picking up'.
6. Fit the filter, turning clockwise, and tighten.
7. Reconnect the battery.
8. Start the engine and check for oil leaks between the cylinder block and filter.



OIL PICK-UP STRAINER

—Remove, clean, and refit

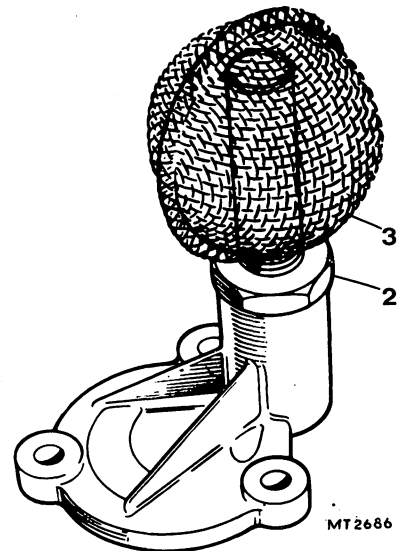
12.60.20

Removing

1. Remove the sump. 12.60.44.
2. Release the oil strainer locknut.
3. Unscrew the oil strainer and remove it.
4. Wash the oil strainer in petrol and dry it before refitting.

Refitting

5. Reverse instructions 1 to 3.



OIL PUMP

—Remove and refit

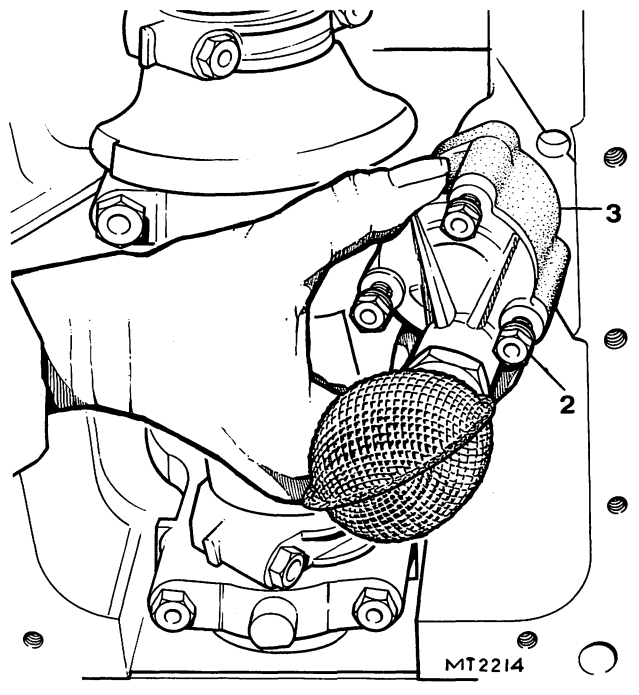
12.60.26

Removing

1. Remove the oil sump. 12.60.44.
2. Slacken and remove the three bolts complete with washers securing the oil pump to the crankcase.
3. Remove the oil pump complete with cover-plate.

Refitting

4. Reverse instructions 1 to 3, ensuring:
 - a. The oil pump drive shaft engages correctly into the drive gear shaft.
 - b. The securing bolts are evenly tightened.
 - c. Absolute cleanliness is observed.

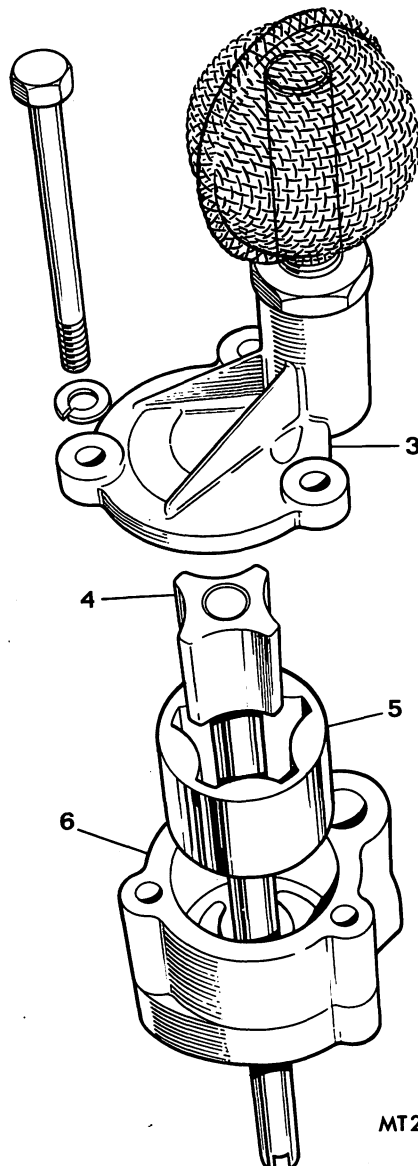


OIL PUMP

—Overhaul

12.60.32

1. Isolate the battery.
2. Remove the oil pump from the crankcase. 12.60.26.
3. Remove the cover-plate complete with strainer.
4. Remove the inner rotor and shaft assembly.
5. Remove the outer rotor.
6. Clean oil from the body and rotors, and reassemble.

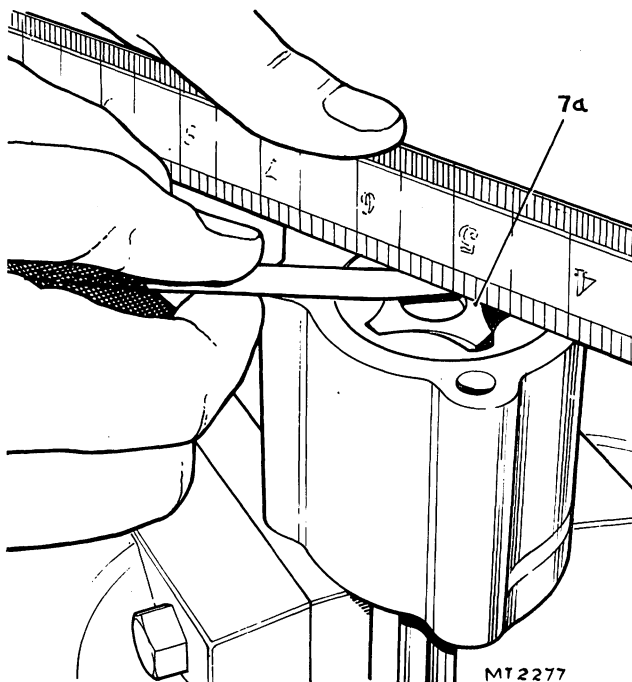
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MT2 298

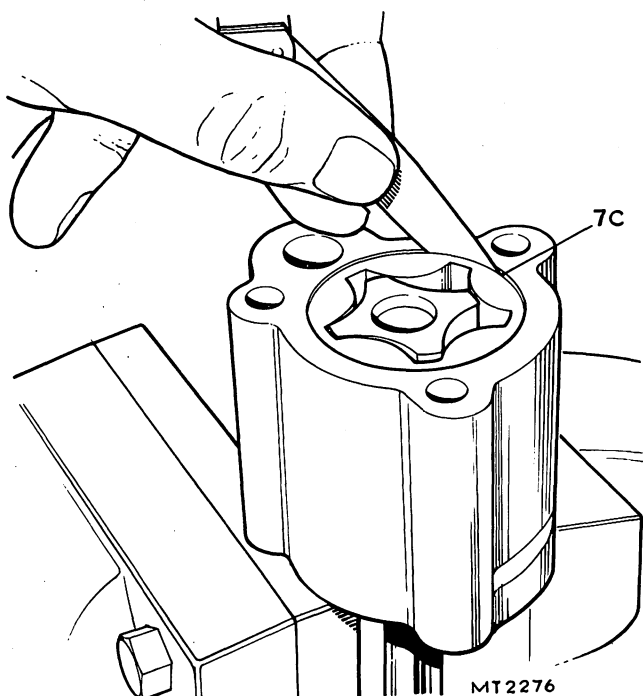
12.60.26

12.60.32 Sheet 1

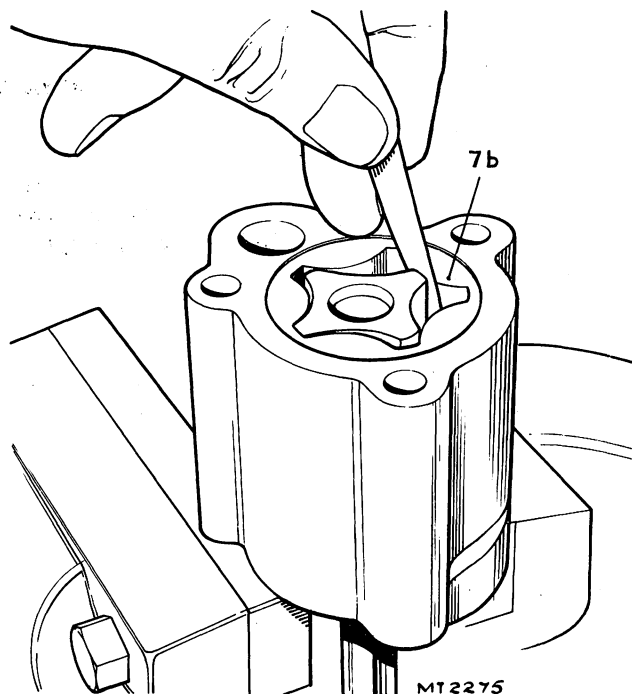
7. Place the oil pump in a vice and using a feeler gauge:
 - a. With a straight-edge across the pump body face, check the clearance between the rotors and straight-edge. This clearance must not exceed 0.004 in (0.1 mm).
 - b. Check the clearance between the inner and outer rotors. This must not exceed 0.010 in (0.25 mm).
 - c. Check the clearance between the outer rotor and body. This must not exceed 0.008 in (0.2 mm).
8. Check the cover-plate for scoring, and test on a surface plate for distortion. Renew if necessary.
9. Check the pump spindle bearing surface in the pump body for excessive wear.
10. Reassemble the pump, fitting any new parts necessary to satisfy the above quoted tolerances. Renew the complete pump if a satisfactory condition cannot be achieved.



MT 2277



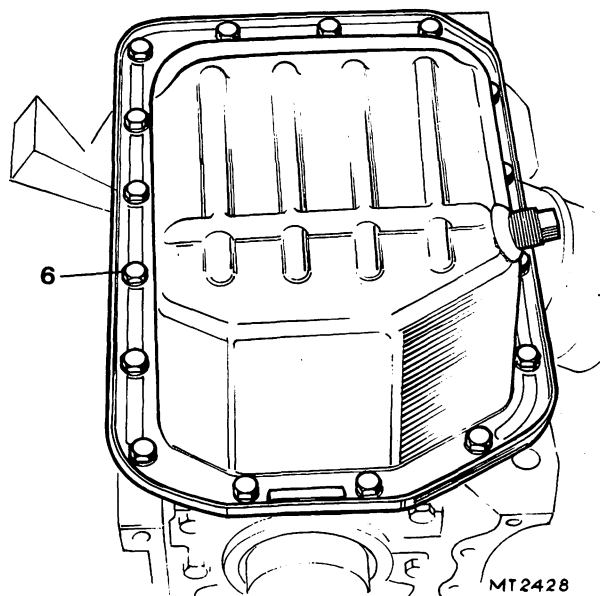
MT 2276



MT 2275

OIL SUMP**—Remove and refit****12.60.44****Removing**

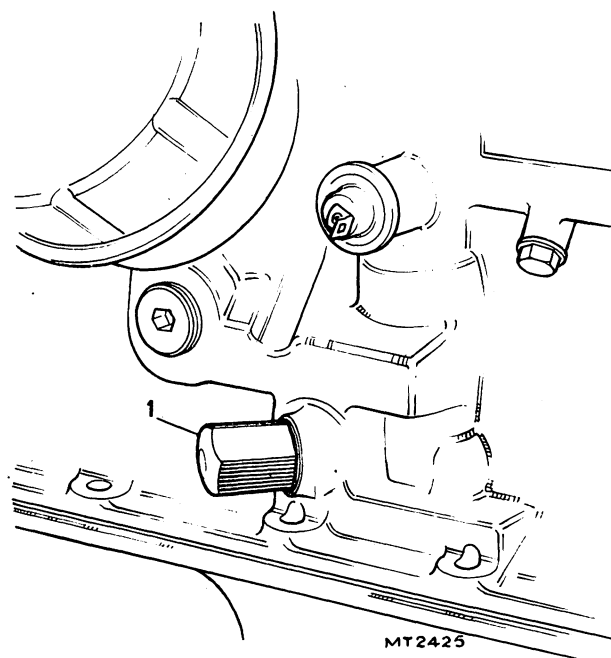
1. Drain the coolant. 26.10.01.
2. Disconnect the top and bottom hoses at the engine.
3. Employ a jack below the gearbox to take the weight of the engine.
4. Remove the four nuts and bolts (two each side) securing the engine mountings to the sub-frame.
5. Drain the sump oil.
6. Remove the 16 bolts securing the sump to the crankcase.
7. Raise the engine sufficiently to lower the sump, turn it 90 degrees and withdraw.

**Refitting**

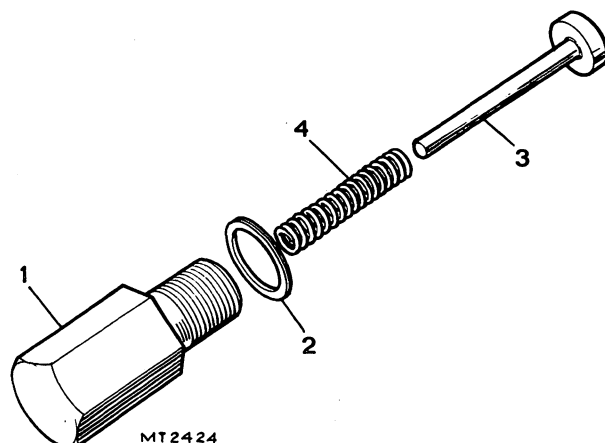
8. Reverse instructions 1 to 7, noting:
 - a. Clean the crankcase and sump faces.
 - b. Fit a new gasket.
 - c. The longer bolts are fitted at the rear of the sump.
 - **d. Tighten the retaining bolts to 15 to 20 lbf ft (2.1 to 2.8 kgf m).**

OIL PRESSURE RELIEF VALVE**—Remove and refit****12.60.56****Removing**

1. Unscrew the relief valve body from the cylinder block.
2. Remove the washer.
3. Take out the plunger.
4. Remove the spring.

**Refitting**

5. Reverse instructions 1 to 4, ensuring:
 - a. Cleanliness.
 - b. A new spring is fitted if free length is not in accordance with Data.

**DATA**

Oil pressure relief valve spring free length 1.53 in (38.8 mm)



ENGINE

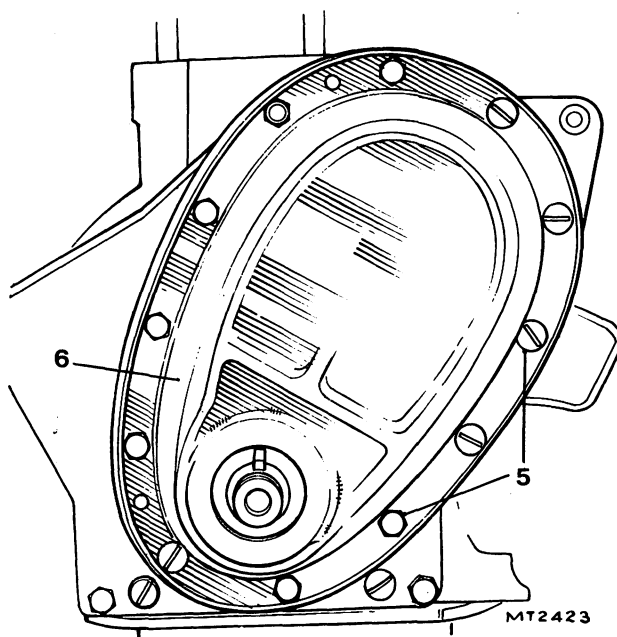
TIMING CHAIN COVER

—Remove and refit

12.65.01

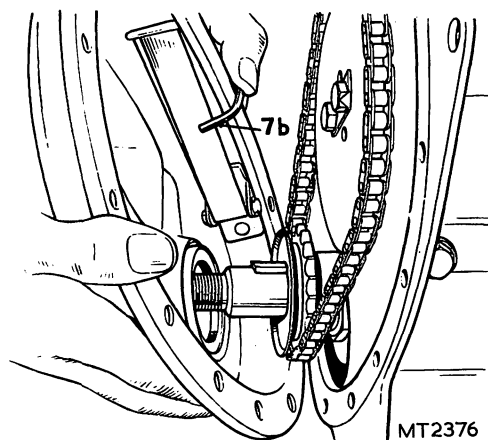
Removing

1. Remove the fan belt.
2. Remove the fan blades. 26.25.06.
3. Place the car on a ramp or over a pit.
4. Remove the crankshaft pulley. 12.21.01.
5. Remove the five screws, six bolts and one nut securing the timing chain cover to the cylinder block.
6. Remove the timing chain cover complete with gasket, taking care not to damage the oil seal.



Refitting

7. Reverse instructions 1 to 5, noting:
 - a. Fit a new cover gasket.
 - b. To facilitate refitment of the cover, compress the chain tensioner with a suitable bent length of rod taking care not to damage the gasket when withdrawing the rod.
 - c. The cover and gasket locate on dowels.



TIMING CHAIN COVER OIL SEAL

—Remove and refit

12.65.05

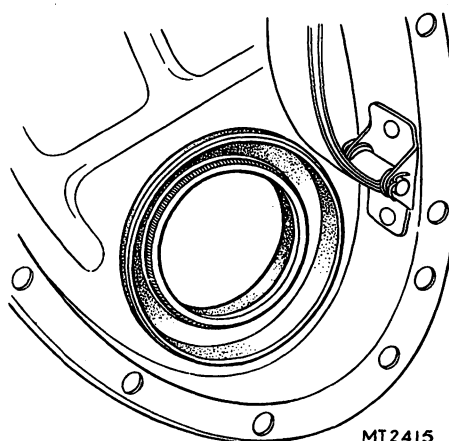
Removing

1. Remove the timing chain cover. 12.65.01.
2. Carefully remove the oil seal, avoiding damage to the timing cover.

Refitting

* **NOTE:** The latest type of oil seal has a spiral groove formed on the running diameter and is interchangeable with the earlier type. **

3. Reverse instructions 1 to 2, ensuring that the new oil seal is
 - a. Smeared with oil before fitting.
 - b. Fitted correctly, i.e. cavity face towards the engine.
 - c. Pressed home squarely.



12.65.01

12.65.05

VALVE TIMING

—Check

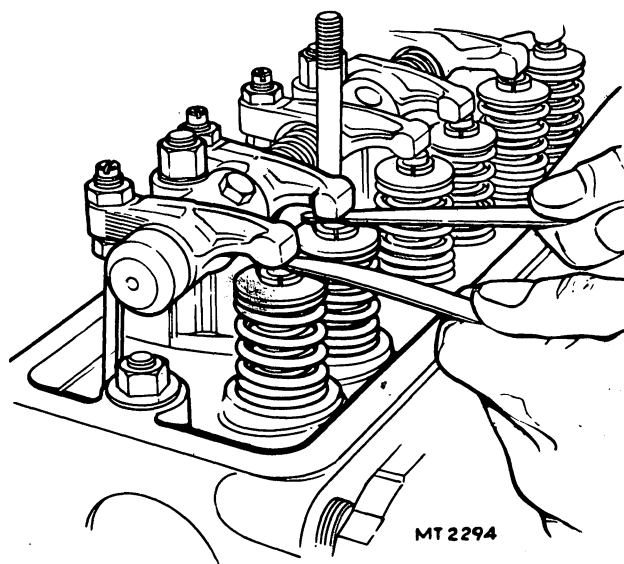
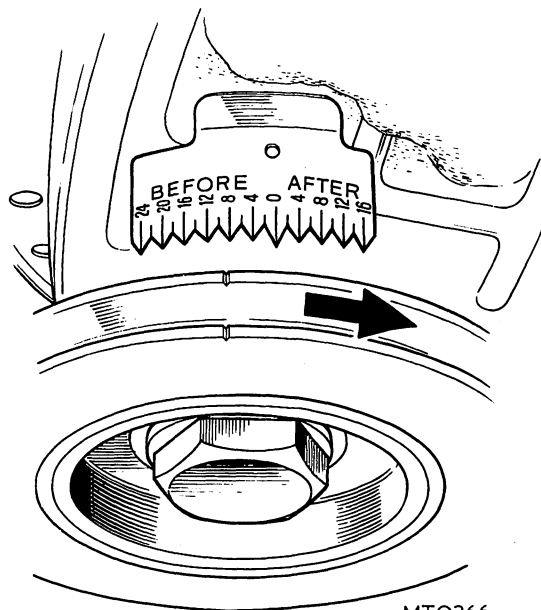
12.65.08

1. Remove the rocker cover. 12.29.42.
2. Adjust the rocker clearances of Nos. 7 and 8 valves to 0.050 in (1.27 mm), 12.29.48, instructions 6 and 7, to give a working clearance.
3. Turn the crankshaft until No. 1 piston is at T.D.C. on compression stroke, indicated by the mark on the crankshaft pulley coinciding with the pointer on the timing cover.

4. Check that Nos. 1 and 2 valves are fully closed by inserting a feeler gauge between the valve tip and rocker pad to ascertain clearance.
5. Using two feeler gauges of the same thickness, check that the rocker clearances of Nos. 7 and 8 valves are the same. Oscillate the crankshaft to achieve this condition, but ensure that when the rocker clearances are the same the conditions in instructions 3 and 4 are maintained within a few degrees.

NOTE: The actual valve clearance does not matter providing the clearances are the same.

6. Should the valve timing prove to be incorrect, retiming will be necessary. 12.41.05, instructions 59 to 67.
7. Re-adjust Nos. 7 and 8 valves to 0.010 in (0.25 mm). 12.29.48, instructions 6 and 7.
8. Refit the rocker cover. 12.29.42.



DATA

Valve timing

Inlet opens...	..	..	..	..	..	..
closes...	..	..	..	..	..	..

Exhaust opens	..	..	..	..	..	..
closes	..	..	..	..	..	..

**1300, 1500 SC

& 1500 TC

Engine No. 5001 onwards

18° B.T.D.C.

58° A.B.D.C.

58° B.B.D.C.

18° A.T.D.C.

1500 TC

Up to Engine No. 5001**

25° B.T.D.C.

65° A.B.C.D.

65° B.B.D.C.

25° A.T.D.C.



ENGINE

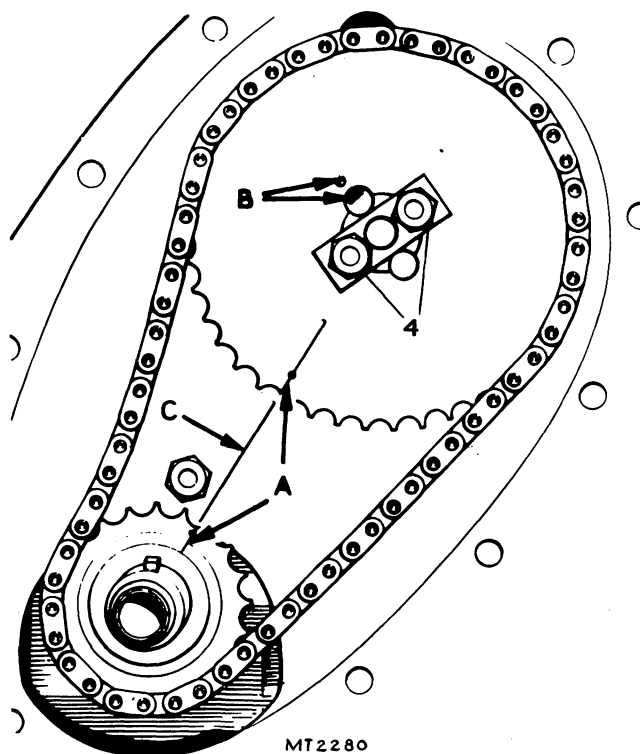
TIMING CHAIN AND SPROCKETS

—Remove and refit 12.65.12

Timing chain 1 to 5, 12, and 15 to 17 12.65.14

Removing

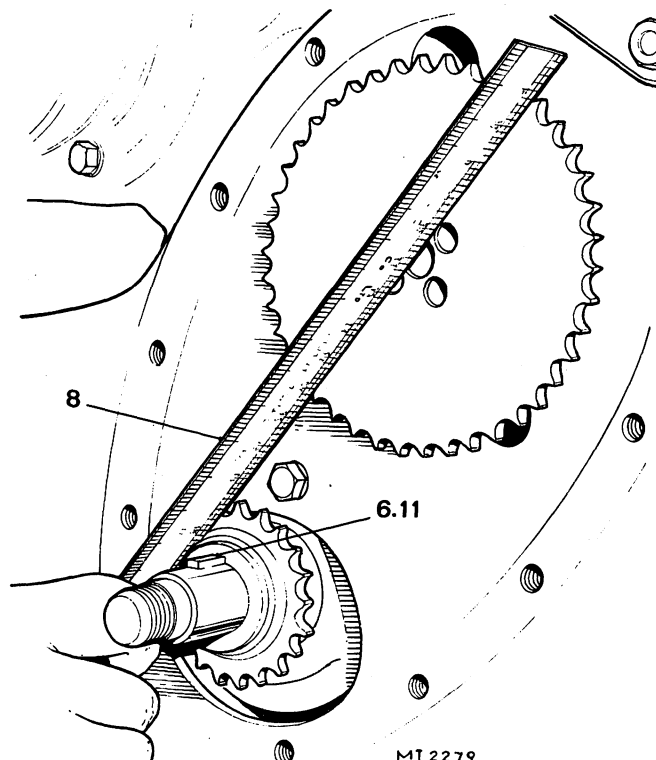
1. Remove the timing chain cover. 12.65.01.
2. Remove the oil thrower.
3. Turn the crankshaft until the mark 'A' is in line with scribe mark 'C' and marks 'B' correspond. The crankshaft keyway should be at 12 o'clock.
4. Bend back the lock plate tabs and remove the two bolts securing the sprocket to the camshaft.
5. Taking care not to turn the crankshaft or camshaft, remove both sprockets together with the timing chain.



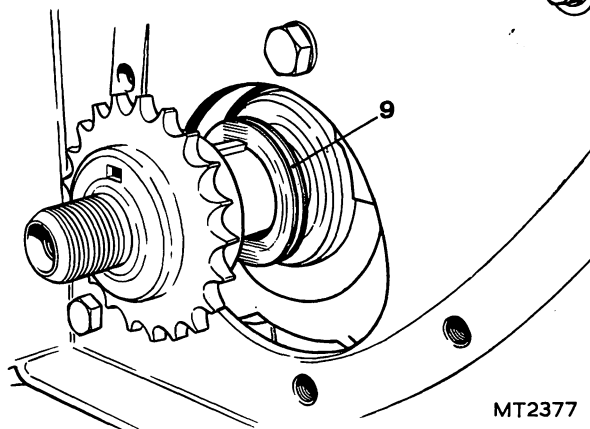
Refitting

6. Remove the crankshaft drive key.
7. Temporarily refit both sprockets.
8. Check the alignment of the sprockets by placing a straight-edge across the teeth of both sprockets.

continued

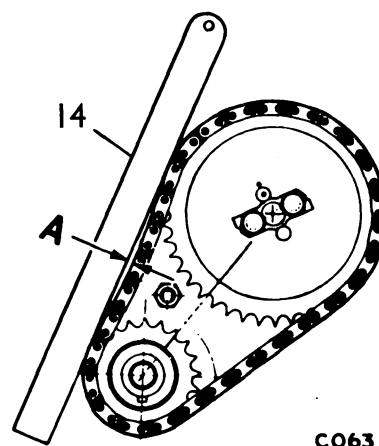


9. Correct any misalignment by fitting selective shims behind the crankshaft sprocket.
10. Remove the sprockets.
11. Refit the drive key.
12. Encircle the sprockets with the timing chain and refit ensuring that the marks on the sprockets and engine plate line up.
13. Refit the camshaft sprockets securing bolts (temporarily).



MT2377

14. Check timing chain wear by placing a straight-edge along the slack run of chain. If movement at the mid-point 'A' exceeds 0.4 in (10 mm), renew the chain.
 15. Fit a new camshaft sprocket lock plate, refit the bolts and bend the tabs.
 16. Refit the oil thrower with the dished periphery towards the timing chain cover. 12.41.05.
 17. Refit the timing chain cover. 12.65.01.
- NOTE:** If new sprockets are fitted see instructions 67 and 68, 12.41.05.



C063

TIMING CHAIN TENSIONER

—Remove and refit

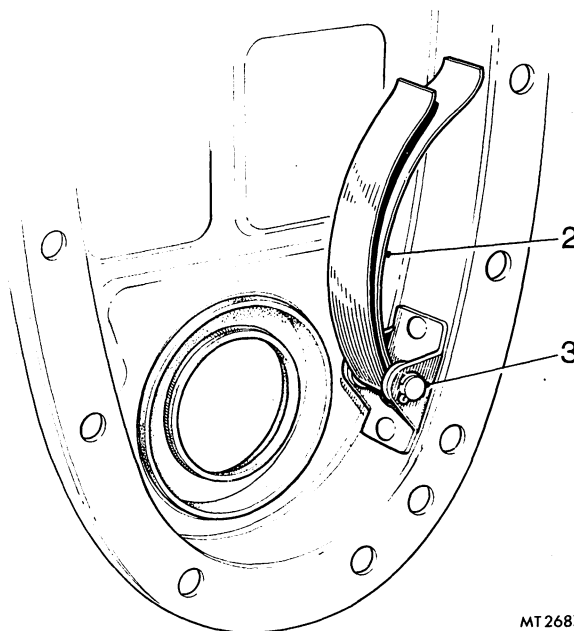
12.65.28

Removing

1. Remove the timing chain cover. 12.65.01.
2. Prise open the tensioner blades.
3. Slide the tensioner off the anchor pin.

Refitting

4. Reverse instructions 1 to 3, ensuring that the tensioner is fitted correctly, i.e. convex surface towards the timing chain.



MT2687

FUEL SYSTEM OPERATIONS

Air cleaner—single carburetter										
—remove and refit	..	..	..	..	..	..	..	..	..	19.10.01
—renew element	..	..	..	..	..	..	..	..	..	19.10.08
Air cleaner—twin carburetters										
—remove and refit	..	..	..	..	..	..	..	..	..	19.10.02
—renew elements	..	..	..	..	..	..	..	..	..	19.10.09
Carburetter—single										
—overhaul	..	..	..	..	..	..	..	..	..	19.15.17
—remove and refit	..	..	..	..	..	..	..	..	..	19.15.09
—tune and adjust	..	..	..	..	..	..	..	..	..	19.15.01
Carburetters—twin										
—overhaul	..	..	..	..	..	..	..	..	..	19.15.18
—remove and refit	..	..	..	..	..	..	..	..	..	19.15.11
—tune and adjust	..	..	..	..	..	..	..	..	..	19.15.02
Float-chamber needle and seat—remove and refit	..	..	..	..	..	..	..	..	..	19.15.24
Fuel pump										
—clean filter	..	..	..	..	..	..	..	..	..	19.45.05
—overhaul	..	..	..	..	..	..	..	..	..	19.45.15
—remove and refit	..	..	..	..	..	..	..	..	..	19.45.08
—test on vehicle	..	..	..	..	..	..	..	..	..	19.45.01
Fuel tank—remove and refit	..	..	..	..	..	..	..	..	..	19.55.01
Hose—filler to tank—remove and refit	..	..	..	..	..	..	..	..	..	19.40.19
Mixture control cable—remove and refit	..	..	..	..	..	..	..	..	..	19.20.13
Petrol pipe										
—engine end section—remove and refit	..	..	..	..	..	..	..	..	..	19.40.04
—main line—complete assembly—remove and refit	..	..	..	..	..	..	..	..	..	19.40.01
Piston and suction chamber—remove, clean and refit	..	..	..	..	..	..	..	..	..	19.15.28
Throttle cable—remove and refit	..	..	..	..	..	..	..	..	..	19.20.06
Throttle linkage—remove and refit	..	..	..	..	..	..	..	..	..	19.20.07
Throttle pedal—remove and refit	..	..	..	..	..	..	..	..	..	19.20.01

AIR CLEANER—Single Carburettor

—Remove and refit 1, 2, 3, 6 b and c 19.10.01

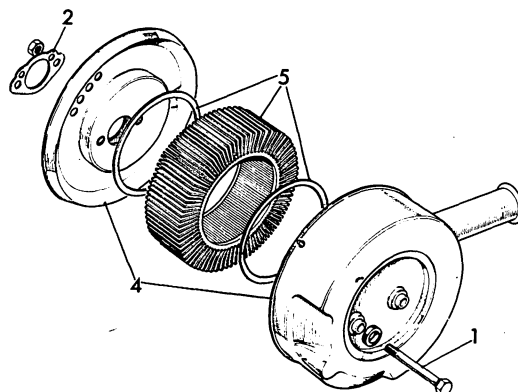
—Element—remove and refit 19.10.08

Removing

1. Remove the nuts from the bolts securing the air cleaner to the carburettor.
2. Lift off the air cleaner with the gasket and bolts.
3. Remove the bolts and rubber washers.
4. Separate the base and cover.
5. Remove the element and seals.

Refitting

6. Reverse 1 to 5, noting:
 - a. Seals and element are correctly located.
 - b. Air cleaner to carburettor gasket is fitted correct way up.
 - c. Do not overtighten the bolts.



MTO 563

AIR CLEANER—TWIN

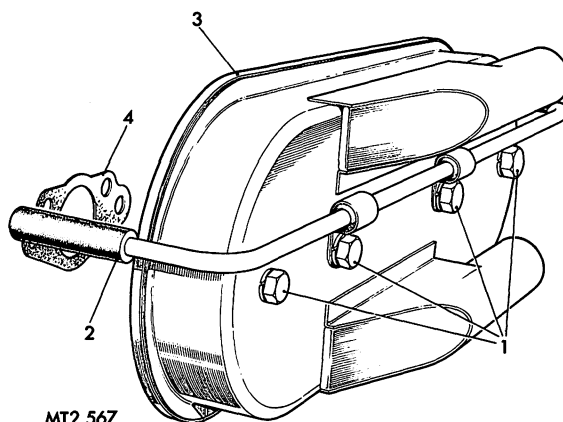
—Remove and refit 19.10.02

Removing

1. Remove the four bolts securing the air cleaner assembly to the carburettor intakes.
2. Disconnect the fuel link pipe.
3. Remove the air cleaner assembly complete with gaskets.

Refitting

4. Reverse instructions 1 to 3, renewing the gaskets.



MT2 567

AIR CLEANER—TWIN—RENEW ELEMENTS

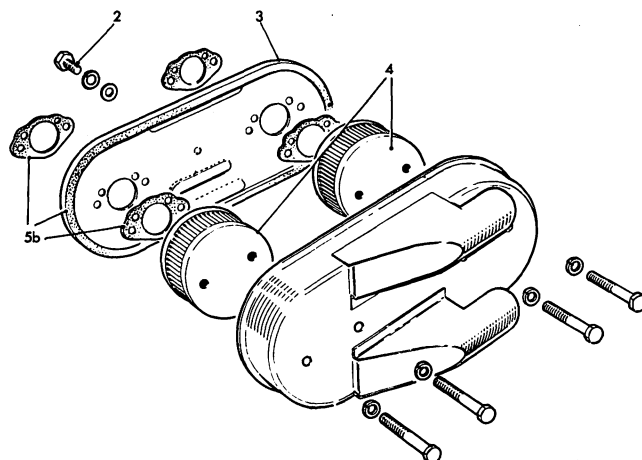
—Remove and refit 19.10.09

Removing

1. Remove the air cleaner assembly. 19.10.02.
2. Remove the bolt securing the cover-plate to the container.
3. Separate the cover-plate from the container.
4. Remove and discard the paper elements.

Refitting

5. Reverse instructions 1 to 4, ensuring:
 - a. New elements are fitted.
 - b. Gaskets and cover-plate seal are renewed if originals are unsatisfactory.



MTO 369

19.10.01

19.10.09

FUEL SYSTEM

CARBURETTER—Single

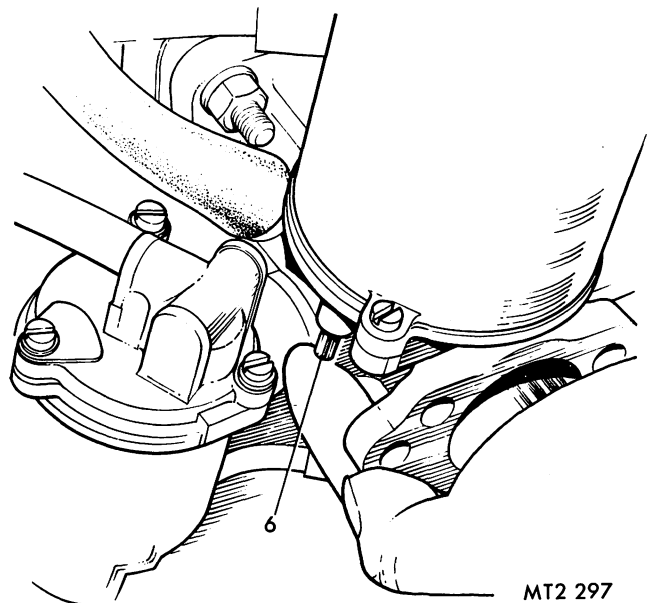
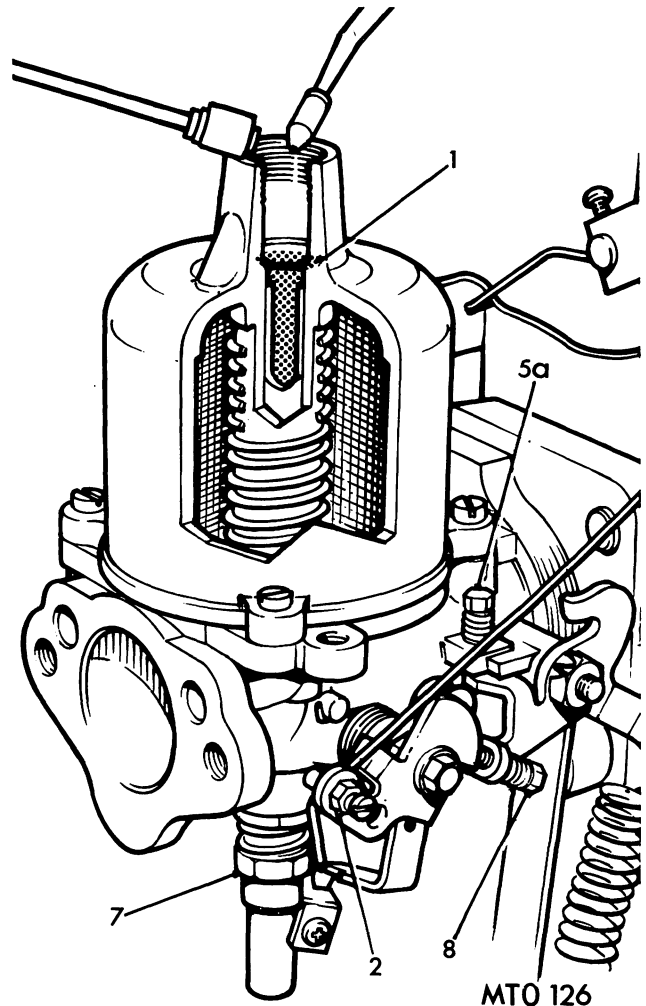
—Tune and adjust

19.15.01

Idling—check and adjust 1 to 5

Mixture—check and adjust 1 to 8

1. Check, and top-up if necessary, the piston damper with a recommended engine oil until the level is $\frac{1}{2}$ in (13 mm) above the top of the hollow piston rod.
2. Check the throttle action for signs of sticking and that the mixture control cable has $\frac{1}{16}$ in (1.6 mm) free movement.
3. Connect up a suitable tachometer.
4. Start and run the engine until it reaches normal running temperature, indicated by the temperature gauge. Continue running the engine at 2,500 rev/min for approximately one minute before commencing tuning.
5. Check the engine idling speed against the tachometer, which should be 700–750 rev/min. Should the speed be incorrect, proceed as follows:
 - a. Adjust the idle speed by turning the throttle adjusting screw—clockwise to increase and anti-clockwise to decrease.
 - b. Should the engine not idle smoothly at the correct speed, check the mixture setting.
6. Switch off the engine and raise the carburetter piston with the lifting pin. Release the pin and check that the piston falls freely on to the carburetter bridge, indicated by a soft metallic click. If the piston does not fall freely, refer to 19.15.17.
7. Start the engine and turn the jet adjusting nut up or down until the fastest engine speed (indicated by tachometer) consistent with smooth running is achieved.
 - a. Turn the jet adjusting nut down until the engine speed just begins to fall, and then turn the nut up one flat to obtain the correct idle speed mixture setting.
 - b. Re-check the idling speed, and adjust if necessary to give an idle speed of 700–750 rev/min.
8. Pull out the mixture control approximately $\frac{1}{2}$ in (13 mm) until the linkage is just about to move the jet. Start the engine and adjust the fast idle screw to give an engine fast idle speed of 1,100 to 1,200 rev/min.
9. Disconnect the tachometer.



CARBURETTERS—Twin

—Tune and adjust

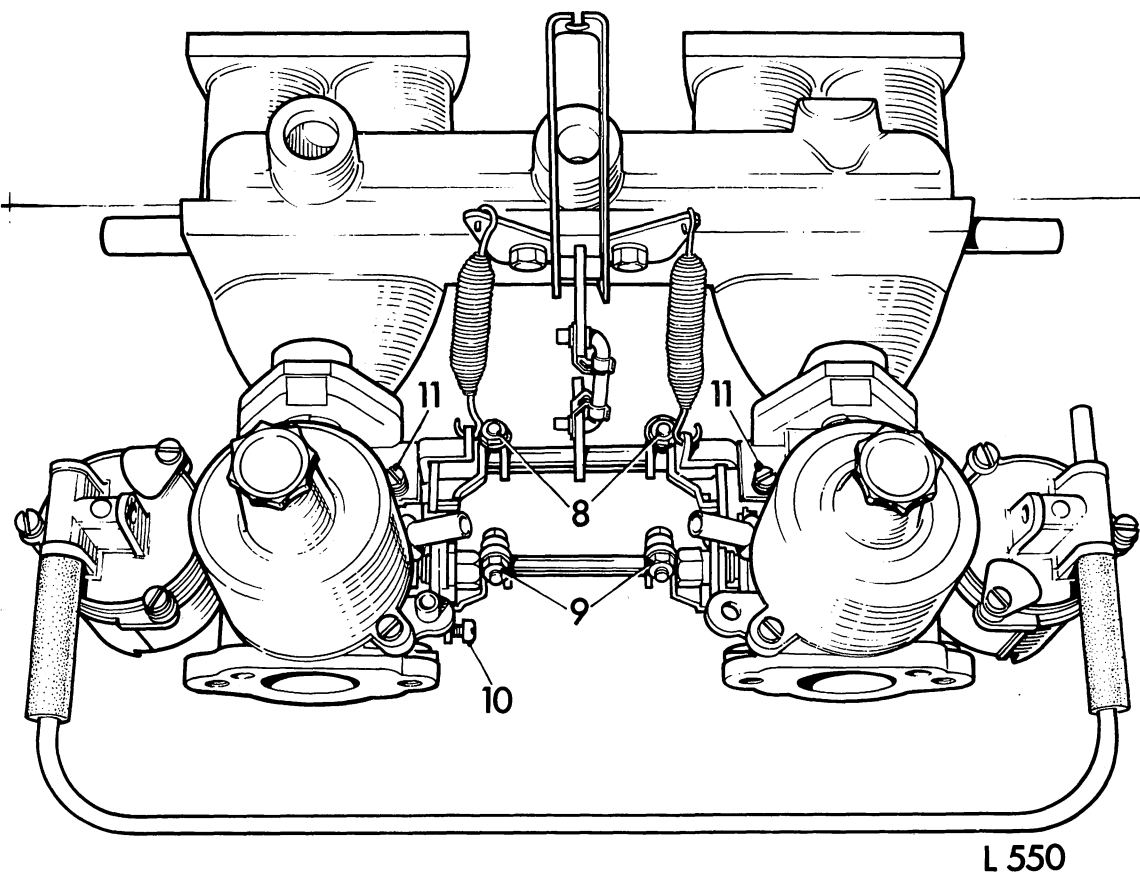
19.15.02

Idling—check and adjust 1 to 11 and 16

Mixture—check and adjust 1 to 20.

1. Check each piston damper, and top-up if necessary with a recommended engine oil until the level is $\frac{1}{2}$ in (13 mm) above the top of the hollow piston rod. See 19.15.01.
2. Check the throttle action for signs of sticking, and that the mixture control cable has $\frac{1}{16}$ in (1.6 mm) free movement.
3. Remove the air cleaner. 19.10.01.
4. Connect up a suitable tachometer.
5. Start and run the engine until it reaches normal running temperature, as indicated by the temperature gauge. Continue running the engine at 2,500 rev/min for approximately one minute before commencing tuning. Repeat this operation as often as necessary.
6. Stop the engine and raise each carburettor piston with the respective lifting pins. Release the pin and check that each piston falls freely on to the carburettor bridge with a soft metallic click. Should either piston fail to fall freely, refer to 19.15.18.
7. Start the engine and check the idling speed with the tachometer, which should be 750–800 rev/min.
 - a. If the reading is not correct, continue with instructions 8 to 11 and 15 and 16.
 - b. If the idle speed is correct but is not consistent with smooth running, continue with instructions 8 to 21.
8. Slacken both throttle interconnection clamp nuts.
9. Slacken both jet control interconnection clamp nuts.
10. Slacken the trunnion bolts securing the mixture control inner cable.
11. With the engine running, check the carburettor balance with a meter or by comparing the intake hiss in each carburettor by holding one end of a length of small bore rubber tubing to each carburettor intake in turn and the other end to the ear. Turn the throttle adjusting screw on each carburettor until the intensity of the hiss is equal in both intakes with the correct idling speed of 750–800 rev/min as indicated by the tachometer.
 - a. If with the carburetters correctly balanced the idling is still erratic, continue with instructions 12 to 21.
 - b. If the idle speed is correct and consistent with smooth running, follow instructions 15 to 21.

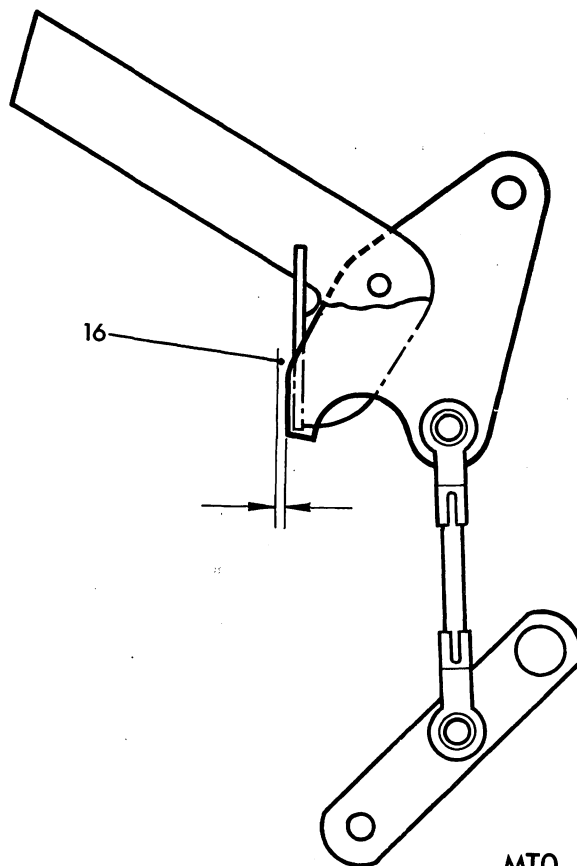
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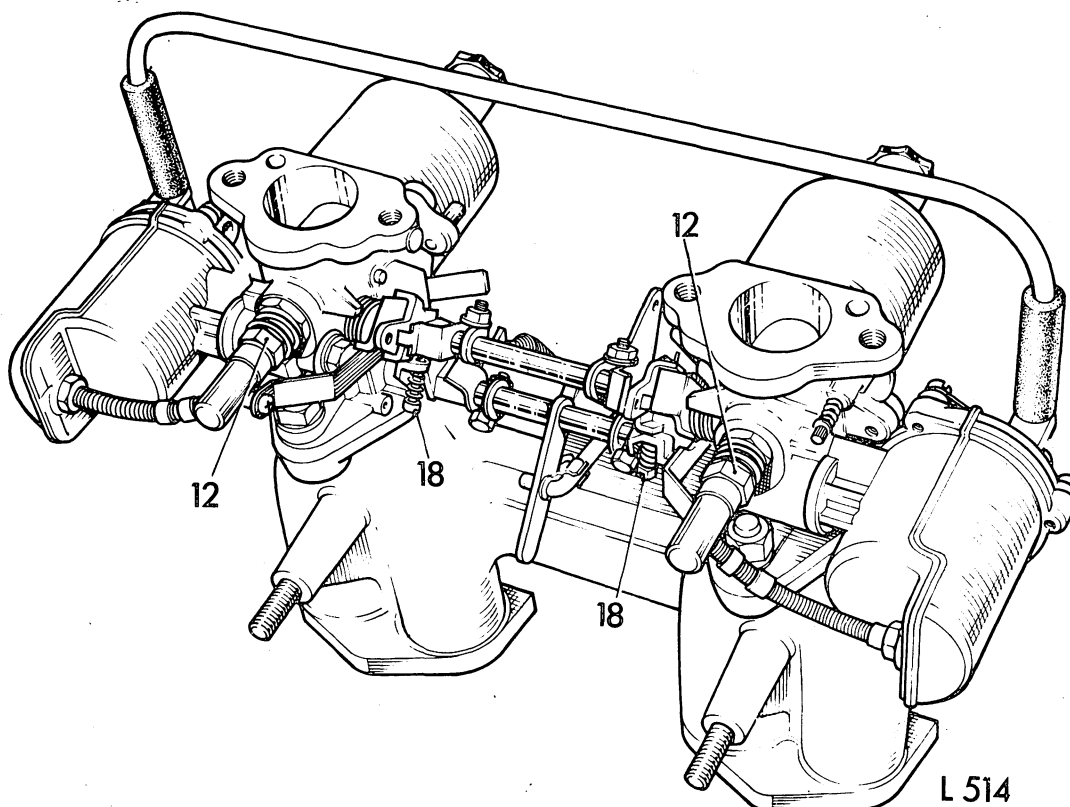
L 550

FUEL SYSTEM

12. Screw the jet adjusting nuts fully up and then turn each one down two complete turns.
13. Run the engine as in instruction 5, turn the jet adjusting nut on both carburettors one flat at a time up or down until the fastest engine speed consistent with smooth running is obtained. Turn each nut down one flat at a time until the engine speed starts to decrease, and then turn each nut up one flat.
14. Re-check the idling speed, 750–800 rev/min, and adjust by turning each throttle adjusting screw an equal amount; see instruction 11.
15. Set the throttle interconnection clamping levers until the lever pins rest on the lower arm of the forks.
16. Insert feeler gauges to the value of 0.030 to 0.035 in (0.76 to 0.89 mm) between the heel of the fulcrum plate and the machined surface of the manifold and tighten the clamping nuts while holding the lever pins on the lower arm of the fork.
Following this instruction a clearance should exist between the lever pins and the bottom arm of the forks. The actual clearance is not important providing it is the same on both forks.
17. Position the choke control interconnecting rod with approximately $\frac{1}{32}$ in (0.8 mm) end clearance, and tighten the clamp nuts.
18. Pull out the mixture control approximately $\frac{1}{2}$ in (13 mm) until the linkage is just about to move the jet. Start the engine and adjust the fast idle screws to give an engine speed of 1,100 to 1,200 rev/min.
19. Refit the air cleaner. 19.10.01.
20. Disconnect the tachometer.



MT0 629



L 514

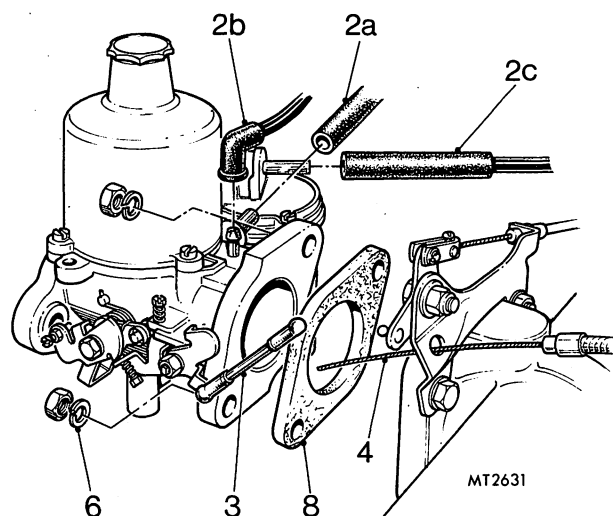
CARBURETTER—Single

—Remove and refit

19.15.09

Removing

1. Remove the air cleaner. 19.10.01.
2. Disconnect from the carburetter, (a) the engine breather pipe, (b) the vacuum advance pipe, and (c) the fuel feed pipe.
3. Disconnect the throttle link rod at the lower connection.
4. Disconnect the choke cable at the carburetter.
5. Remove the throttle return spring.
6. Remove the two nuts securing the carburetter to the inlet manifold (the lower nut retains the spring bracket).
7. Lift off the carburetter.
8. Remove the gasket.



Refitting

9. Reverse 1 to 8.

CARBURETTERS—Twin

—Remove and refit

19.15.11

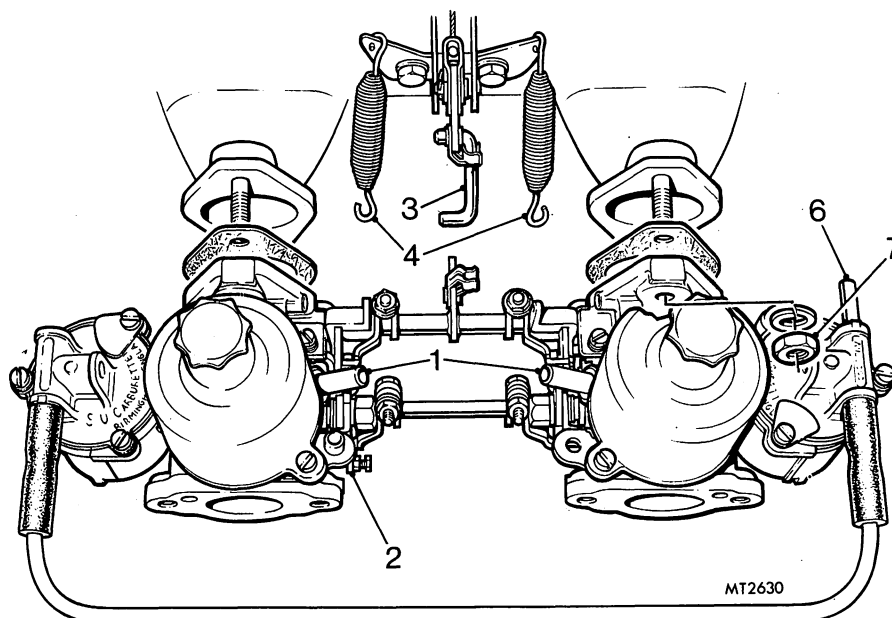
Removing

1. Pull off the breather pipes from the carburetters.
2. Disconnect the choke cable at the trunnion.
3. Disconnect the link rod between the cable linkage and throttle interconnection shaft lever.
4. Disconnect the two throttle return springs.
5. Disconnect the vacuum pipe.
6. Disconnect the main fuel feed pipe.

7. Remove the four carburetter flange to manifold nuts (two per carburetter) complete with washers.
8. Remove the carburetters complete with air cleaner assembly and gaskets.
9. Remove the four bolts securing the air cleaner assembly to the carburetter intake flanges. 19.10.02.
10. Remove the air cleaner assembly complete with gaskets.

Refitting

11. Reverse instructions 1 to 10, ensuring that all gaskets are renewed.



CARBURETTER(S)

—Overhaul and adjust

Single

19.15.17

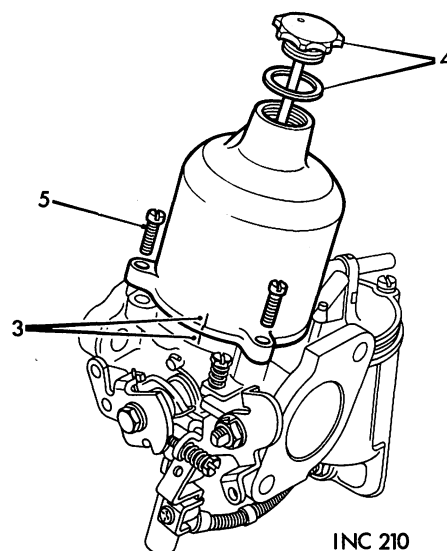
Twin

19.15.18

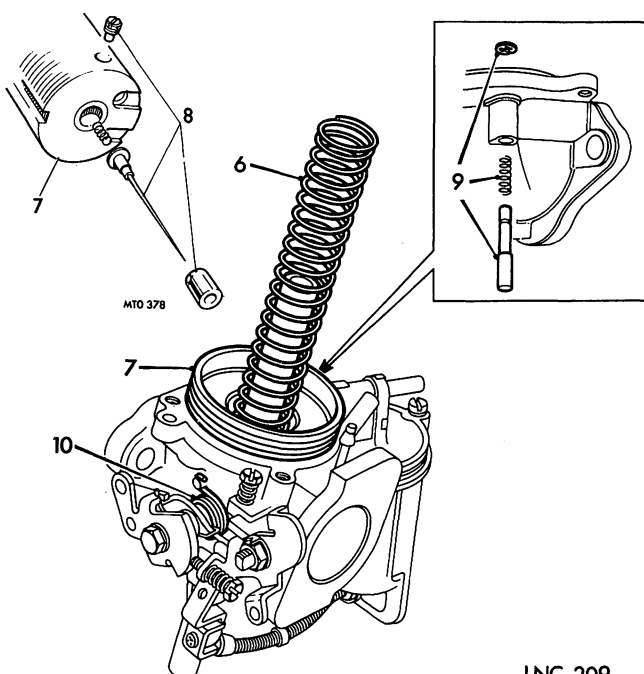
Dismantling

1. a. Remove the carburettor (single). 19.15.09.
b. Remove the carburetters (twin). 19.15.11.
2. Thoroughly clean the outside of the carburettor(s).
3. Mark the relative position of the suction chamber and the carburettor body.
4. Remove the damper and its washer.
5. Unscrew the suction chamber securing screws and lift off the chamber.
6. Remove the piston spring.
7. Carefully lift out the piston assembly and empty the oil from the piston rod.
8. Remove the guide locking screw and withdraw the needle assembly, taking care not to bend the needle. Withdraw the needle from the guide and remove the spring from the needle.
9. Push the piston lifting pin upwards, detach its securing circlip and withdraw the pin and spring downwards.
10. Release the pick-up lever return spring from its retaining lug.
11. Support the plastic moulded base of the jet and remove the screw retaining the jet pick-up link and link bracket (when fitted).
12. Unscrew the flexible jet tube sleeve nut from the float-chamber and withdraw the jet assembly. Note the gland, washer and ferrule at the end of the jet tube.
13. Remove the jet adjusting nut and spring.
14. Unscrew the jet locking nut and detach the nut and jet bearing; withdraw the bearing from the nut.

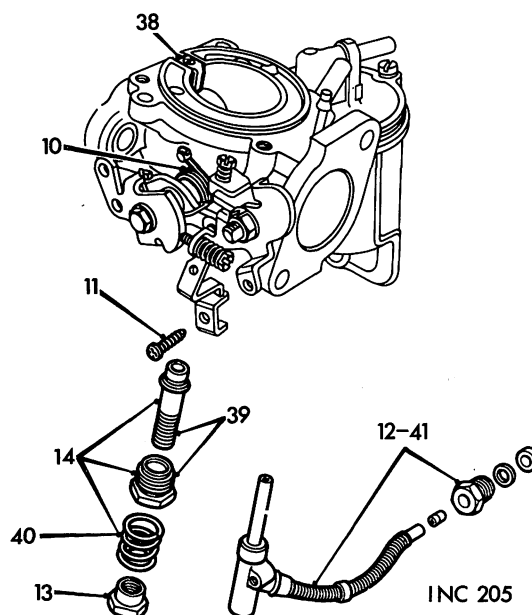
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INC 210



INC 209



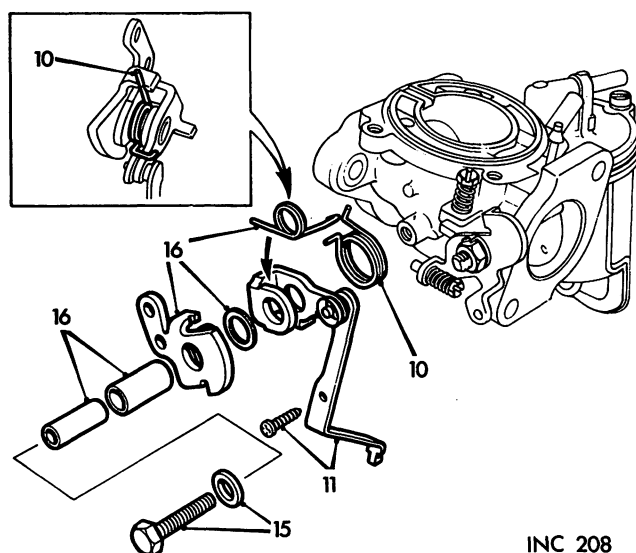
INC 205

15. Unscrew and remove the lever pivot bolt and spacer.
16. Detach the lever assembly and return springs, noting the pivot bolt tubes, skid washer and the locations of the cam and pick-up lever springs.
17. Remove the float-chamber securing bolt and the chamber.
18. Mark the float-chamber lid location.
19. Remove the lid securing screws and detach the lid with its joint washer and float.
20. Hold the float hinge pin at its serrated end and withdraw the pin and float.
21. Extract the float needle from its seating and unscrew the seating from the lid.
22. Close the throttle and mark the relative position of the throttle disc and the carburettor flange.
CAUTION: Do not mark the throttle disc in the vicinity of the limit valve.
23. Unscrew the disc retaining screws, open the throttle and ease the disc from its slot in the throttle spindle. Store the disc in a safe place until required for assembly.
24. Tap back the tabs of the lock washer securing the spindle nut; remove the nut and detach the lever arm, washer and throttle spindle; note the location of the lever arm in relation to the spindle and carburettor body.

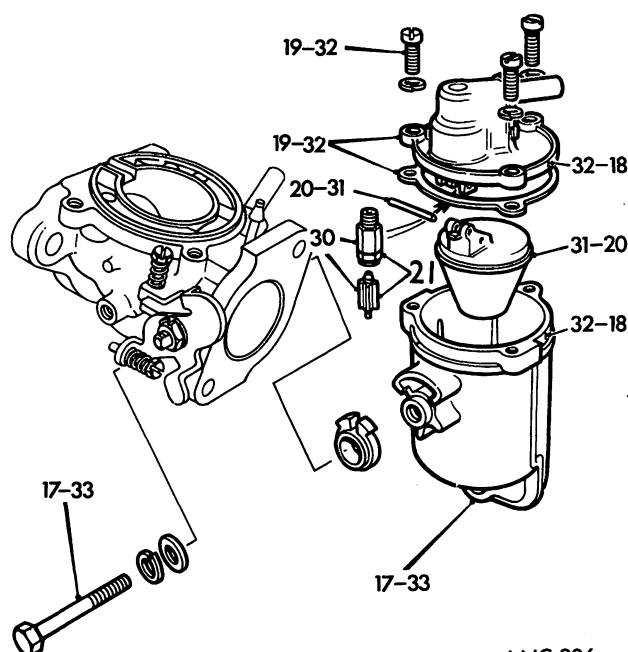
Inspecting

25. Examine the components as follows:
 - a. Check the throttle spindle in the body for excessive play, and renew if necessary.
 - ** b. Examine the float needle for wear, i.e. small ridges or grooves in the seat of the needle, and ensure that the spring-loaded plunger on the opposite end operates freely. Replace the needle and seating if necessary.
 - c. Inspect all other components for wear and damage; renew unserviceable components. **

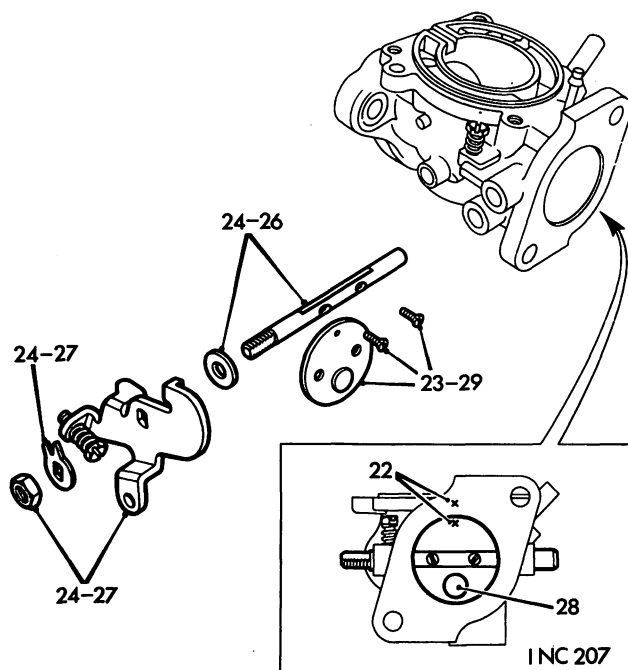
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INC 208



INC 206



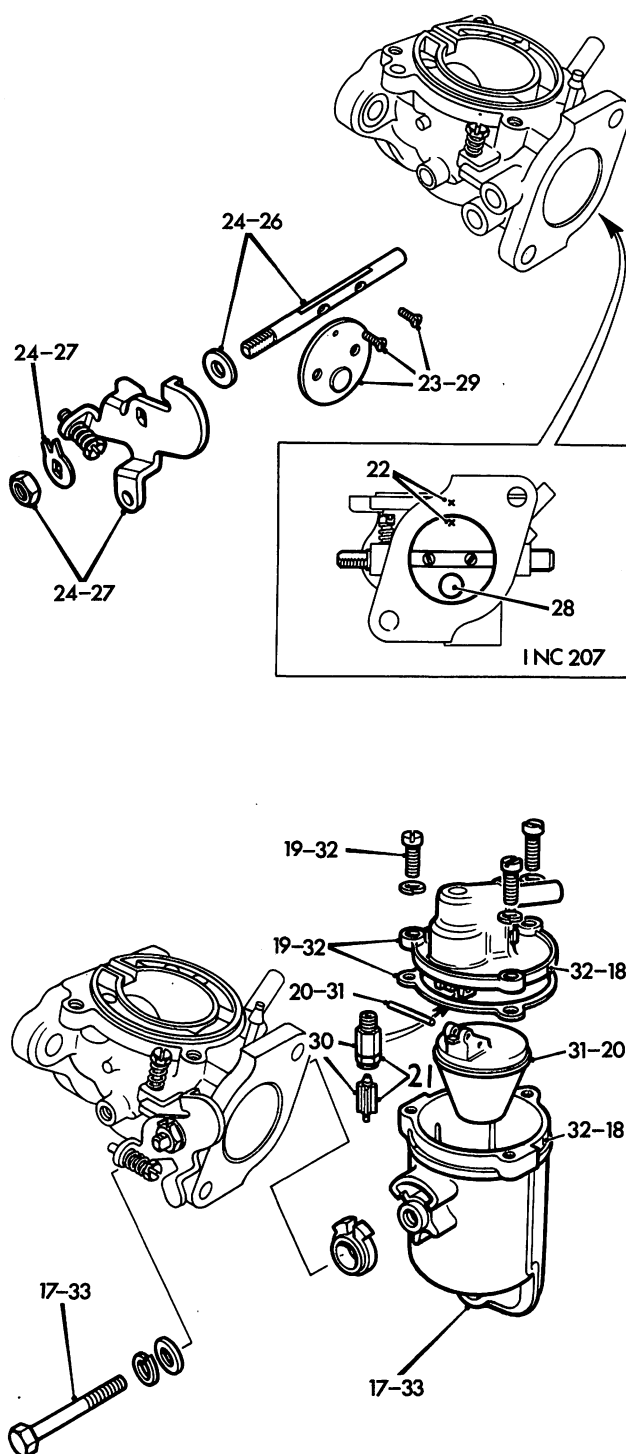
INC 207



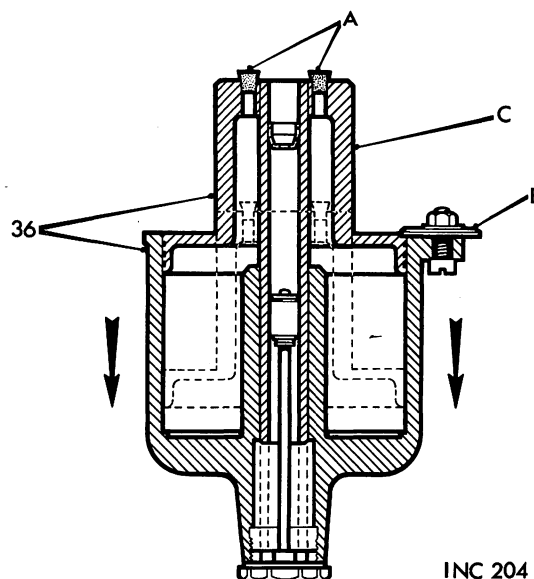
Reassembling

26. Refit the spindle to the body, with the countersunk holes in the spindle facing outwards.
 27. Assemble the spacing washer, lever, lock washer and securing nut, ensure that the idling stop on the lever is against the idling screw abutment on the body in the closed throttle position. Tighten the spindle nut and lock with the tab washer.
 28. Insert the throttle disc into the spindle slot; note the markings for reassembling, i.e. the limit valve (fitted on twin carburettor installations only) positioned at the bottom of the disc with the head of the valve towards the engine. Manoeuvre the disc in the spindle until the throttle can be closed, snap the throttle open and closed to centralize it in the bore of the carburettor.
 29. Fit new disc retaining screws but do not fully tighten; check that the disc closes fully and adjust its position as necessary. Tighten the screws fully and spread their split ends just enough to prevent them turning.
 30. Screw the seating into the float-chamber; do not overtighten. Insert the needle coned-end first into the seating.
 31. Refit the float to the chamber lid and insert the hinge pin.
 32. Refit the float-chamber lid with a new joint washer, noting the assembly markings, tighten the securing screws evenly.
 33. Refit the float-chamber to the body and tighten the retaining bolt.
 34. Refit the piston lifting pin, spring and circlip.
 35. Clean fuel deposits off the suction chamber and piston with fuel or methylated spirit and wipe dry.
- CAUTION: Do not use abrasives.**

continued



36. Check the operation of the suction chamber and piston (without the spring fitted) as follows:
- Refit the damper and washer to the suction chamber; temporarily plug the piston transfer holes with rubber plugs or Plasticine and insert the piston fully into the suction chamber.
 - Secure a large flat washer to one of the fixing holes with a screw and nut so that it overlaps the bore.
 - With the assembly upside-down, hold the piston and check the time taken for the suction chamber to fall the full extent of its travel. The time taken should be five to seven seconds; if this time is exceeded, check the piston and chamber for cleanliness and mechanical damage. Renew the assembly if the time taken is still not within these limits.

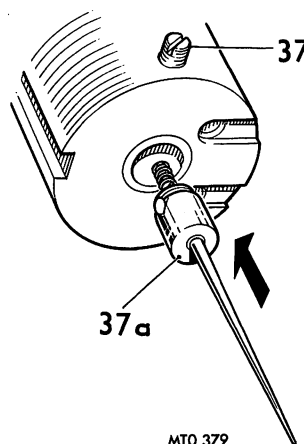


INC 204

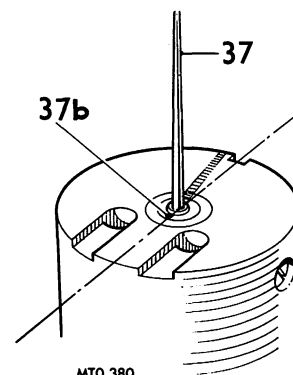
37. Fit the spring and guide to the needle and insert the assembly into the piston, ensuring:
- The lower edge of the guide is flush with the face of the piston.
 - The guide is positioned so that the etched locating mark on its lower face is adjacent to, and in line with, the centre line between the two piston transfer holes.
 - A new guide locking screw is fitted.

NOTE: Alternative needle guides may be fitted which have a flat machined on the guide and must be positioned so that the guide locking screw tightens down on to the flat. If the guide is incorrectly positioned, the locking screw will not tighten down on the flat and will remain proud of the piston resulting in damage to the piston bore.

continued



MTO 379



MTO 380

FUEL SYSTEM

-

FLOAT-CHAMBER NEEDLE AND SEAT

19.15.24

Removing

-
- This diagram illustrates the assembly of a fuel filter. The components are labeled as follows:
- 1**: Fuel inlet hose.
 - 2**: Fuel filter housing (top and bottom).
 - 3**: Bolts for securing the top housing.
 - 4**: Fuel filter element.
 - 5**: Locking pin for the filter element.
 - 6**: O-ring seal.
 - 7**: Gaskets for the filter housing.
- The diagram shows the filter element (4) being inserted into the top housing (2) and secured with a pin (5). The top housing is then bolted (3) to the bottom housing (2), with gaskets (7) and an O-ring (6) ensuring a proper seal. The fuel inlet hose (1) connects to the top housing.

Inspecting

7. Clean any sediment from the float-chamber, and fit a new joint washer if required.
8. Reverse procedure 1 to 5.

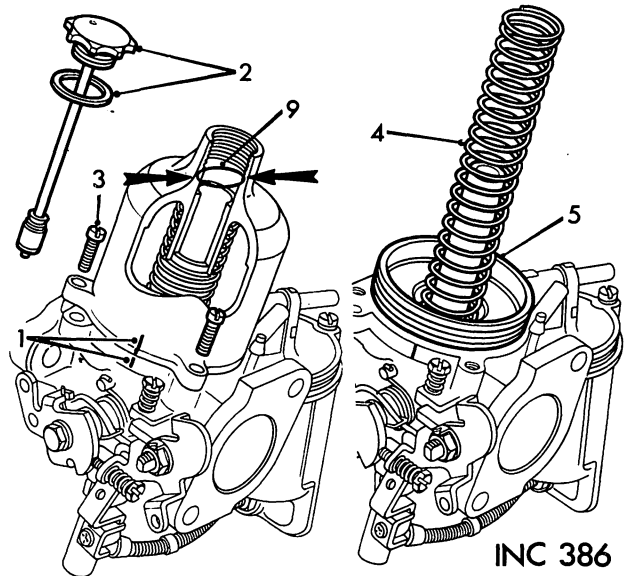
PISTON AND SUCTION CHAMBER

—Remove, clean and refit

****19.15.28****

Removing

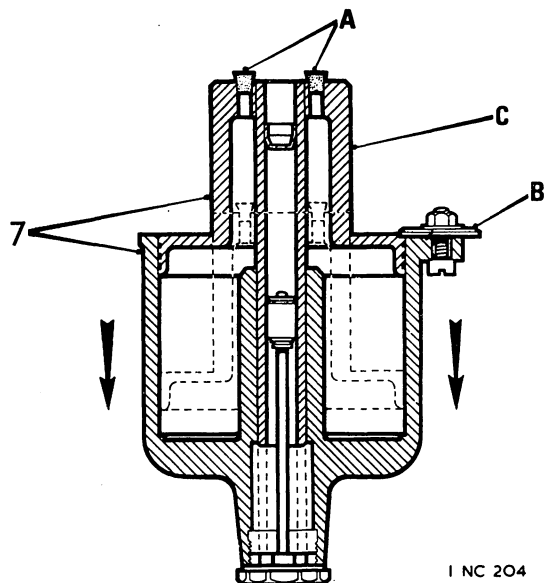
1. Mark the relative position of the suction chamber and the carburettor body.
2. Remove the damper and its washer.
3. Unscrew the suction chamber securing screws and lift off the chamber.
4. Remove the piston spring.
5. Carefully lift out the piston assembly and empty the oil from the piston rod.
6. Clean fuel deposits off the suction chamber and piston with fuel or methylated spirit and wipe dry.
CAUTION: Do not use abrasives.
7. Check the operation of the suction chamber and piston (without the spring fitted) as follows:
 - a. Refit the damper and washer to the suction chamber; temporarily plug the piston transfer holes with rubber plugs or Plasticine and insert the piston fully into the suction chamber.
 - b. Secure a large flat washer to one of the fixing holes with a screw and nut so that it overlaps the bore.
 - c. With the assembly upside-down, hold the piston and check the time taken for the suction chamber to fall the full extent of its travel. The time taken should be five to seven seconds; if this time is exceeded, check the piston and chamber for cleanliness and mechanical damage. Renew the assembly if the time taken is still not within these limits.



INC 386

Refitting

8. Refit the piston, spring and suction chamber to the carburettor (noting the assembly marks) and tighten the screws evenly.
9. Top up each piston damper with multigrade engine oil until the level is $\frac{1}{2}$ in (13 mm) above the top of the hollow piston rod.
10. Refit each piston damper with its washer.



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FUEL SYSTEM

THROTTLE PEDAL

—Remove and refit

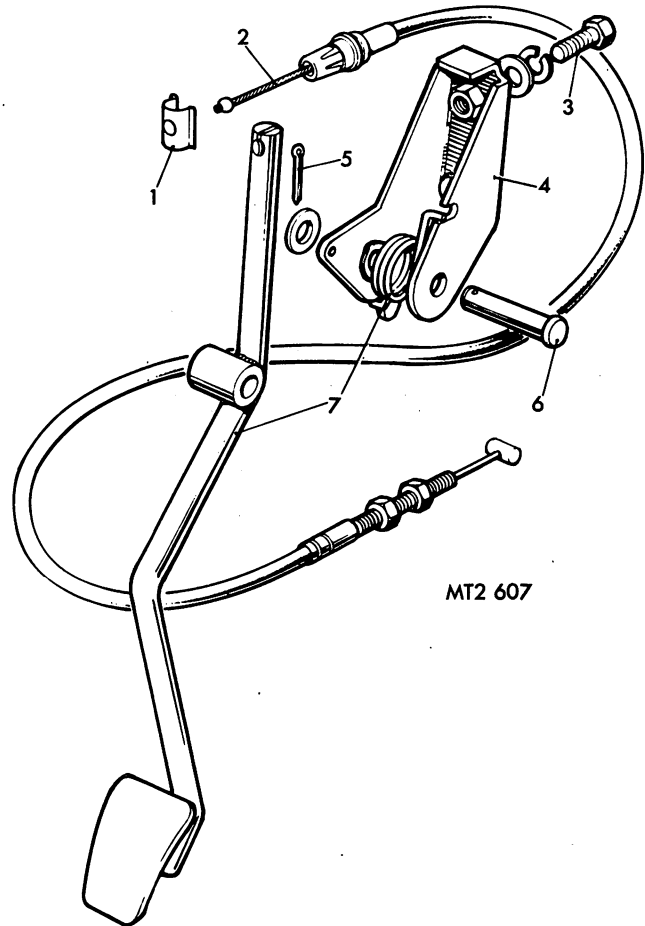
19.20.01

Removing

1. Remove the cable retaining clip.
2. Lift out the exposed inner throttle cable from the fork end of the pedal.
3. Remove the two bolts complete with plain and spring washers securing the pedal bracket to the bulkhead.
4. Remove the bracket.
5. Remove the cotter pin.
6. Withdraw the clevis pin complete with wavy and plain washer.
7. Remove the pedal and return spring.

Refitting

8. Reverse instructions 1 to 7, ensuring:
 - a. The return spring is positioned so that the pedal returns positively.
 - b. A new cotter pin is fitted.
 - c. The cable clip is correctly positioned so that the inner cable is gripped and cannot slip out.



MT2 607

THROTTLE CABLE—Single Carburettor

—Remove and refit

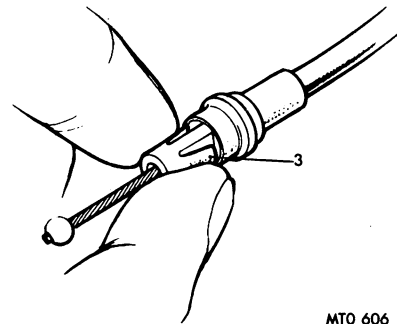
19.20.06

Removing

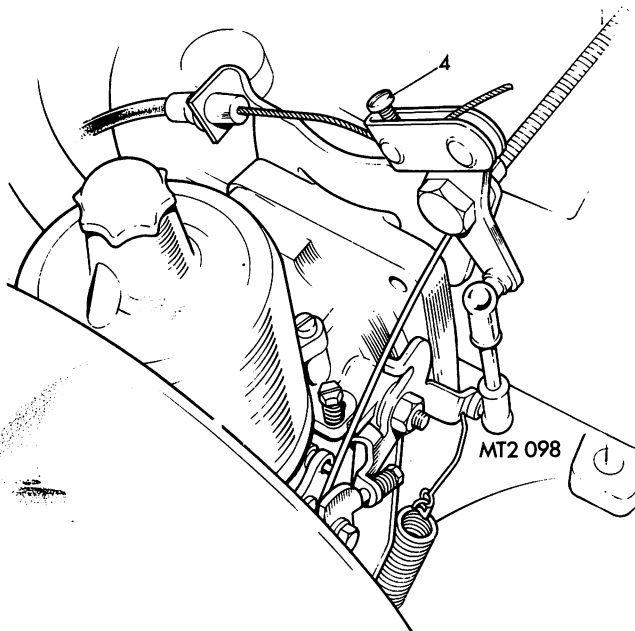
1. Remove the cable retaining clip from the pedal. 19.20.01.
2. Withdraw the exposed throttle inner cable from the fork end of the throttle pedal.
3. Remove the outer cable complete with inner cable from the bulkhead by squeezing ears of ferrule.
4. Disconnect the exposed inner cable from the carburettor linkage.
5. Remove the outer cable complete with inner cable.

Refitting

6. Reverse instructions 1 to 5, ensuring:
 - a. The cable clip is correctly positioned so that the cable will not slip out of the fork.
 - b. The cable is not kinked or subjected to sharp bends.



MT0 606



MT2 098

19.20.01

19.20.06

THROTTLE CABLE—Twin Carburetter

—Remove and refit

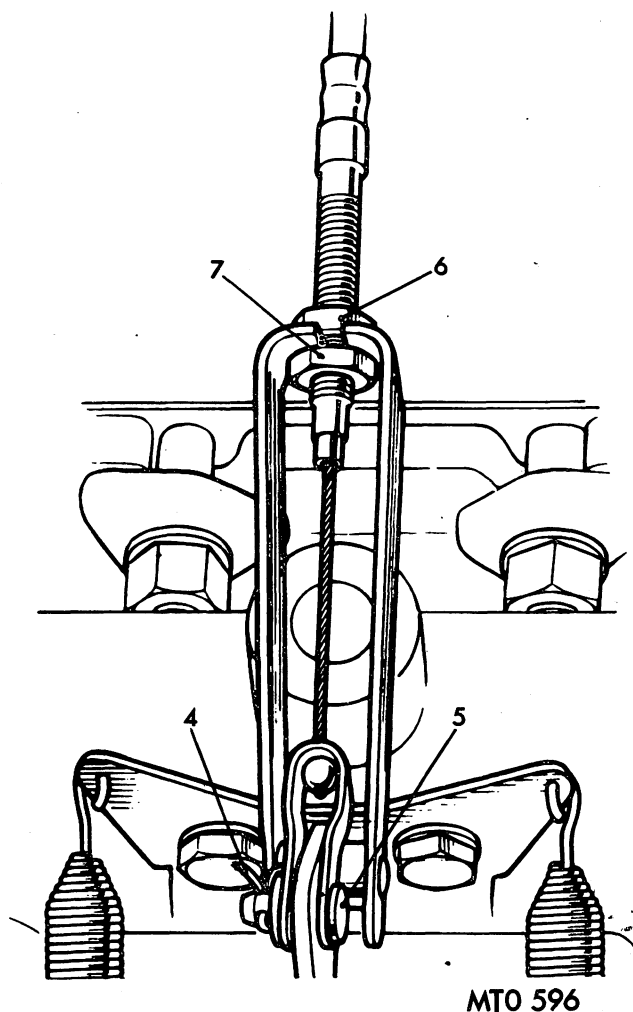
19.20.06

Removing

1. Remove the cable retaining clip from the throttle pedal.
2. Withdraw the exposed end of the inner cable from the fork end of the throttle pedal.
3. Pull the outer cable complete with inner cable from the bulkhead.
4. Remove the cotter pin from the linkage clevis pin.
5. Withdraw the clevis pin complete with washer.
6. Slacken the cable adjuster locknut.
7. Screw the lower adjuster nut off the end of the cable.
8. Remove the inner and outer cable complete through the slot in the adjuster bracket.

Refitting

9. Reverse instructions 1 to 9, ensuring:
 - a. The cable clip on the pedal is correctly fitted so that the cable will not slip out of the fork.
 - b. The cable is not kinked or subjected to sharp bends.
 - c. Cable tension is adjusted so that the heel of the fulcrum plate is just touching the machined face of the manifold.



MT0 596

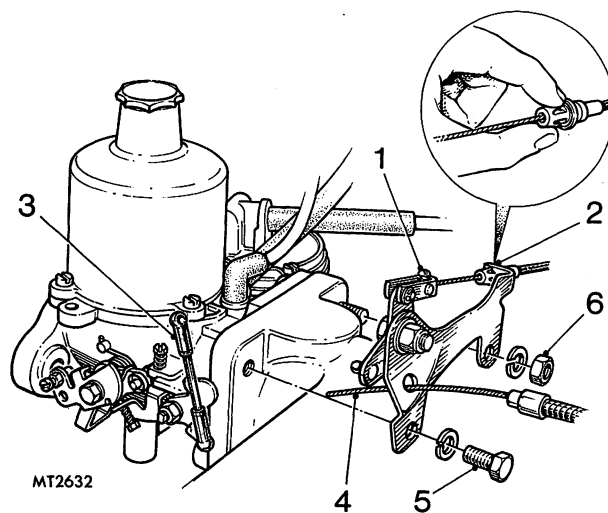
THROTTLE LINKAGE—Single Carburetter

—Remove and refit

19.20.07

Removing

1. Slacken the throttle inner cable clamp bolt.
2. Squeeze between the thumb and finger the ferrule retaining the outer cable to the linkage and withdraw the inner and outer cable complete.
3. Disconnect the ball joint linkage.
4. Disconnect the choke cable and remove it from the bracket.
5. Remove the bolt complete with washer securing the linkage to the manifold.
6. Remove the nut and washer securing the linkage to the manifold.
7. Remove the linkage.



MT2632

Refitting

8. Reverse instructions 1 to 7



FUEL SYSTEM

THROTTLE LINKAGE—Twin Carburetter

—Remove and refit

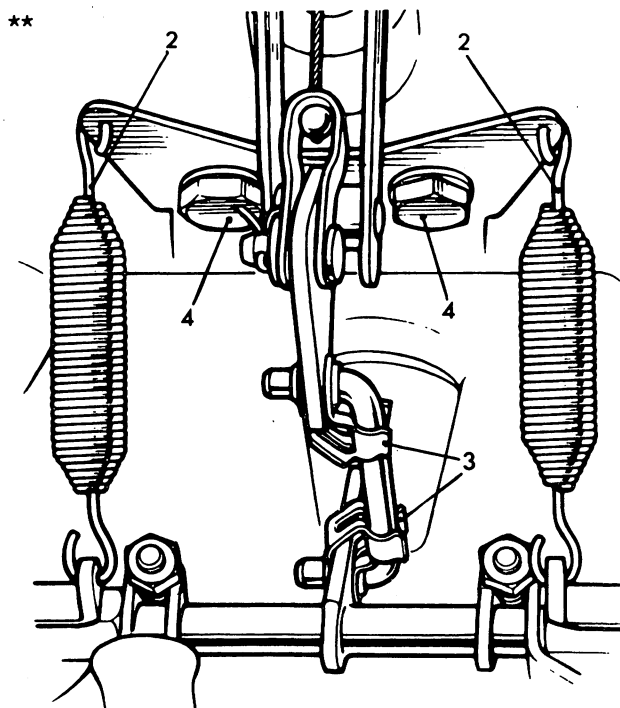
19.20.07

Removing

1. Disconnect the throttle cable from the linkage. 19.20.06, instructions 4 to 8.
2. Disconnect the two return springs from the bracket attached to the manifold.
3. Release the clips securing the link rod between the throttle interconnection lever and fulcrum plate and remove the rod.
4. Remove the two bolts securing the linkage bracket to the manifold and remove the bracket complete.

Refitting

5. Reverse instructions 1 to 4.



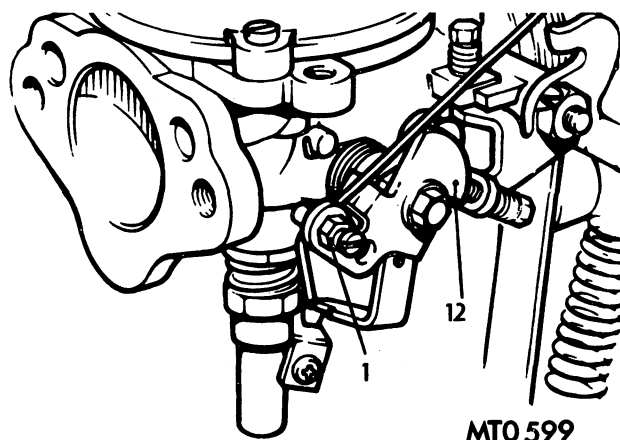
MIXTURE CONTROL CABLE

—Remove and refit

19.20.13

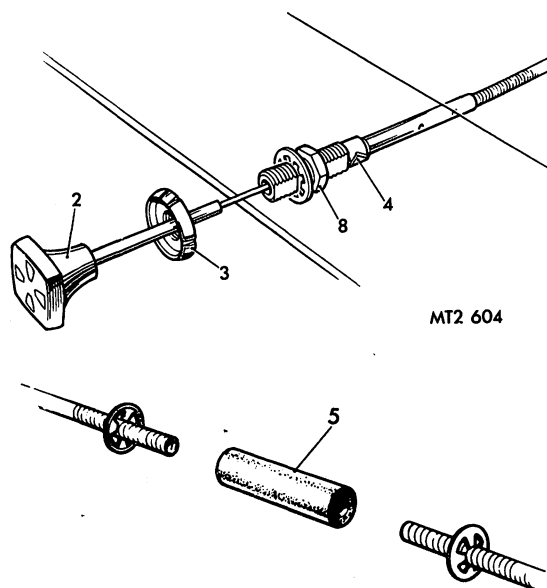
Removing

1. Disconnect the inner cable from the carburetter.
2. Separate the inner cable from the outer by pulling the control knob on the control panel.
3. Carefully unscrew and remove the ferrule securing the outer cable to the control panel.
4. Remove the outer cable from the control panel.
5. Separate the carburetter end-section of the outer cable from the control panel end-section at the connector.
6. Drop the outer cable below the control panel and pull the cable through the bulkhead grommets into the interior of the car, and remove.



Refitting

7. Feed the control panel end of the outer cable below the panel and through the bulkhead grommets.
8. Secure the outer cable to the control panel with the ferrule and locknut.
9. Feed the inner cable into the outer cable from the interior of the car.
10. Feed the carburetter end of the outer cable over the inner cable and join with rubber connector and clips.
11. Connect the inner cable to the carburetter.
12. Allow $\frac{1}{16}$ in (1.6 mm) free movement of cable before the linkage is about to move the cam.



19.20.07

19.20.13

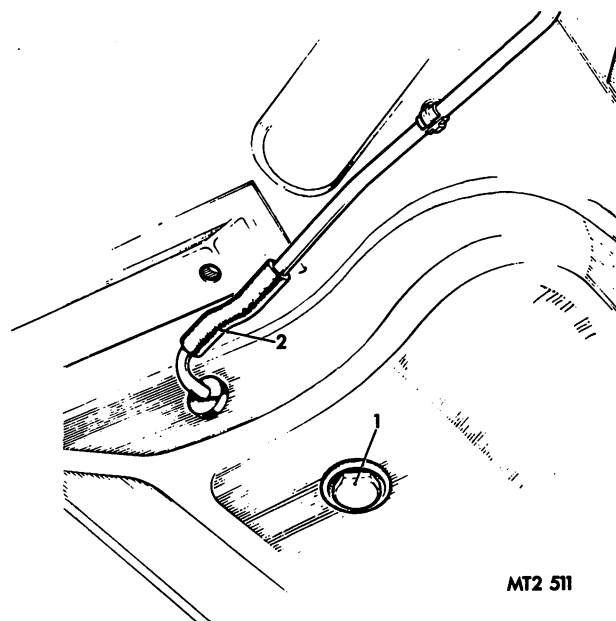
PETROL PIPE—MAIN LINE—COMPLETE ASSEMBLY

—Remove and refit

19.40.01

Removing

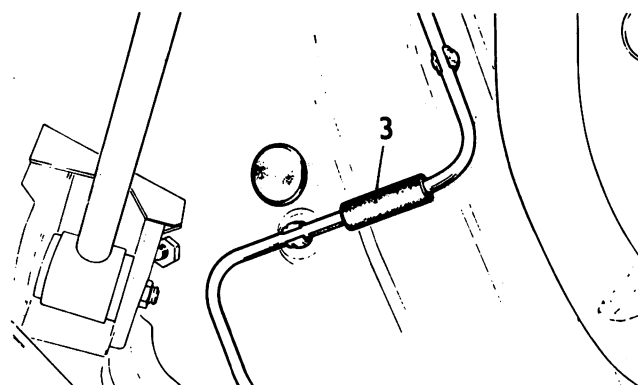
1. Remove petrol tank drain plug and drain tank.
2. Disconnect main line pipe from fuel tank outlet pipe.
3. Unclip and disconnect rear pipe section from centre section.
4. Unclip and disconnect centre pipe section from engine end section. 19.40.04.
5. Disconnect and unclip engine end section from fuel pump. 19.40.04.



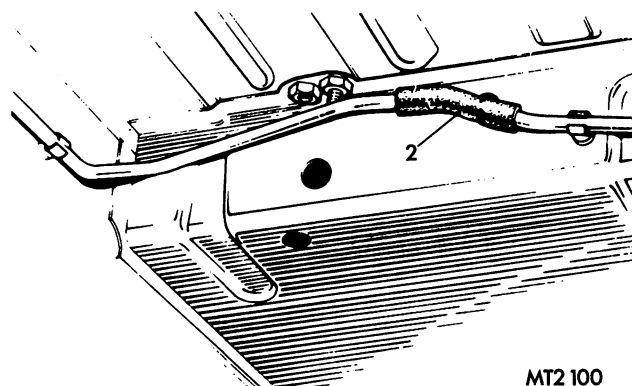
MT2 511

Refitting

6. Reverse instructions 1 to 5, ensuring:
 - a. New rubber connectors linking each pipe section are renewed if cracked or damaged.
 - b. The connecting ends of each pipe section are not fitted so that there is any strain on the rubber connectors.
 - c. Pipes are not chafing or fouling body or components.



MT2 564



MT2 100

PETROL PIPE—MAIN LINE—ENGINE END SECTION

—Remove and refit

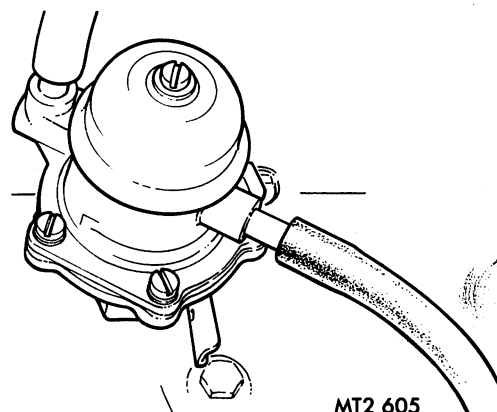
19.40.04

Removing

1. Drain fuel tank. 19.40.01.
2. Unclip engine end section and disconnect from centre section.
3. Disconnect engine end section from fuel pump inlet.

Refitting

4. Reverse instructions 1 to 3.



MT2 605

19.40.01

19.40.04



FUEL SYSTEM

HOSE—FILLER TO TANK

—Remove and refit

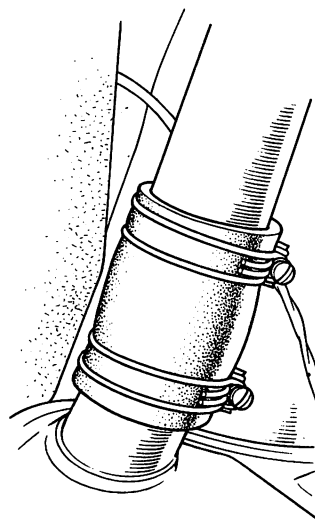
19.40.19

Removing

1. Disconnect the hose clips.
2. Slide the hose downwards off the filler pipe and pull upwards off the tank extension.

Refitting

3. Reverse instructions 1 and 2.



MT0 218

FUEL PUMP

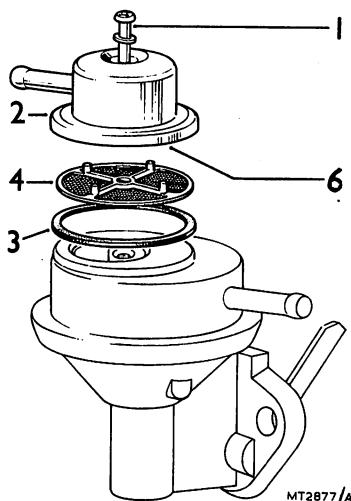
—Test on vehicle

19.45.01

1. Connect a pressure gauge into the pump to carburettor fuel line.
2. Start the engine, and observe the pressure which should be 2.5 to 3.5 lb/in².
3. Remove the pressure gauge.

NOTE: Where pressure is high, it may be reduced by fitting extra paper washers between the pump and cylinder block. Where pressure is too low, overhaul the pump, 19.45.15, or renew, 19.45.08.

★★



MT2877/A

★★

FUEL PUMP

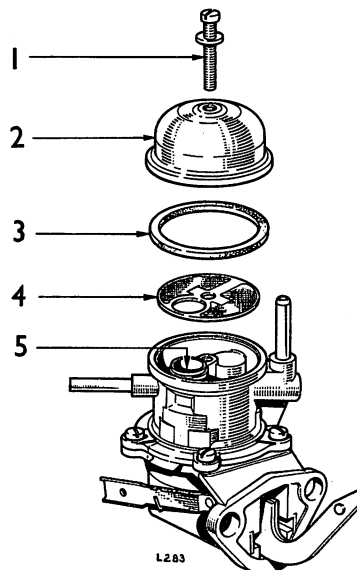
—Clean filter

19.45.05

★★**Note:** Two alternative fuel pumps are illustrated.★★

1. Remove the screw in the top of the pump.
2. Lift off the dome cover.
3. Lift off the cover sealing ring.
4. Lift out the filter.
5. Use clean lint-free cloth and soak up the fuel in the pump.
6. Clean sediment from the pump and blow out the filter. (4)
7. Examine the dome seal; renew if necessary.
8. Fit the filter and dome; tighten the retaining screw.
9. Reverse instructions 1 to 4.

★★



L283

★★

19.40.19

19.45.05

FUEL PUMP

—Remove and refit

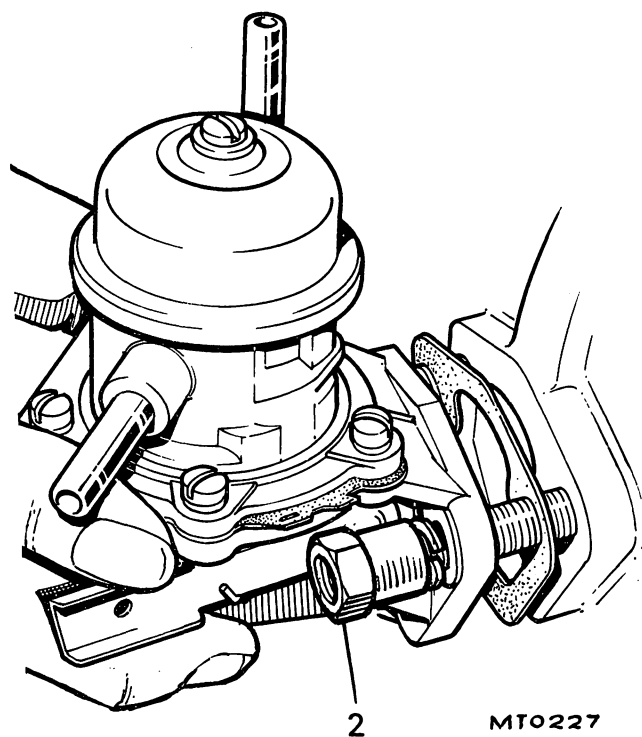
19.45.08

Removing

1. Disconnect the two pipes to the pump; plug the pipes and pump to prevent dirt entering the system.
2. Remove one plain and one special nut securing the pump to the cylinder block.
3. Remove the pump and gasket.

Refitting

4. Reverse 1 to 3.



FUEL PUMP

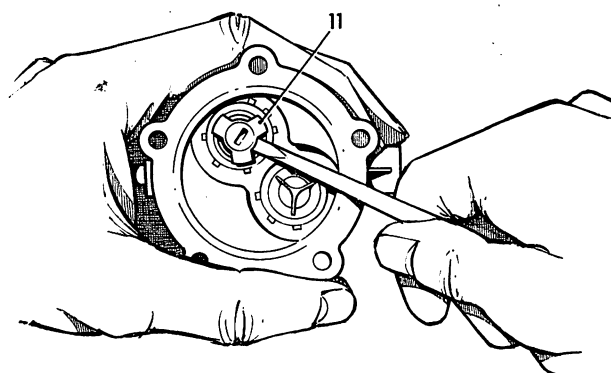
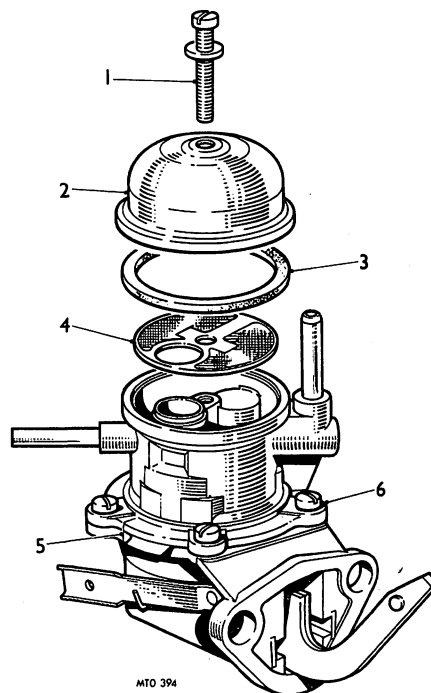
—Overhaul

19.45.15

****Note:** This operation does not apply to the alternative fuel pump illustrated for operation 19.45.05. Overhaul of this alternative fuel pump is not recommended.**

Dismantling

1. Remove screw complete with plain washer securing dome cover to upper body.
2. Remove dome cover.
3. Remove sealing ring.
4. Lift out filter.
5. Mark for reassembly the relationship between upper and lower body of pump.
6. Remove five screws complete with spring washers securing upper body to lower body.
7. Lift off upper part of body.
8. Mark for reassembly the relationship of diaphragm to lower body.
9. Turn diaphragm clockwise or anti-clockwise until it can be released from lower body.
10. Remove diaphragm spring from diaphragm assembly.
11. Using a screwdriver, prise out the valves.

continued

MT2 390

19.45.08

19.45.15 Sheet 1



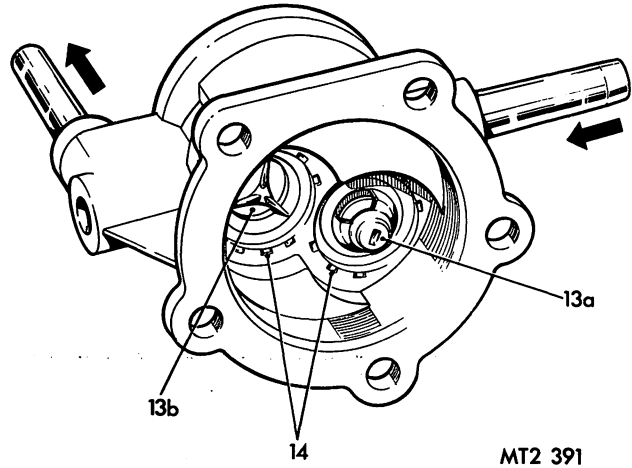
FUEL SYSTEM

Examination

12. Examine the dismantled components for wear and damage and renew where necessary. Since the valves are damaged during removal, these must be renewed.

Reassembling

13. Renew valves in lower body by pressing them into casting with a suitable tool (a piece of steel tubing $\frac{9}{16}$ in (14.28 mm) inside diameter and $\frac{3}{4}$ in (19.05 mm) outside diameter. Ensure valves are positioned correctly, i.e.
 - a. Inlet to pump valve, press in so raised side faces downwards.
 - b. Outlet to engine valve, press in so concave side faces downwards.
14. Stake casting round each valve in six places with a suitable punch.
15. Reverse instructions 1 to 10, renewing all seals and washers.



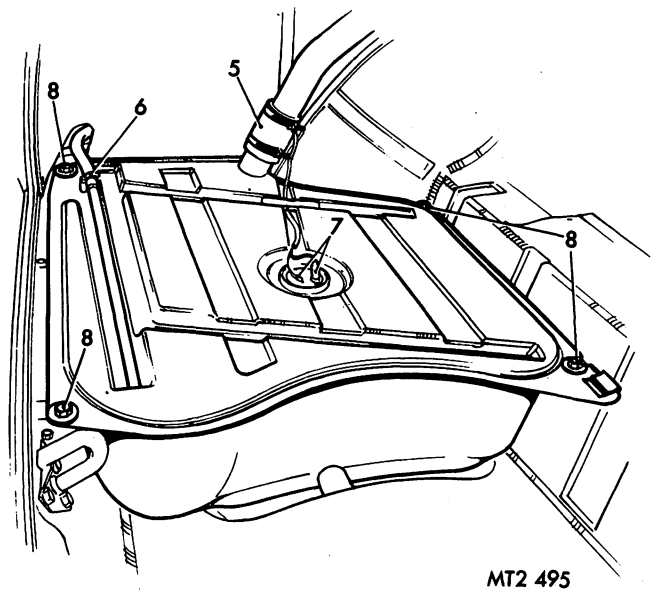
FUEL TANK

—Remove and refit

19.55.01

Removing

1. Isolate the battery and extinguish all naked lights.
2. Remove the petrol tank drain plug and drain the tank. 19.40.01.
3. Disconnect the main line fuel pipe from the tank outlet pipe and clamp the rubber connector to prevent fuel leakage from the main line pipe.
4. Remove the luggage compartment carpet and spare wheel cover and spare wheel.
5. Disconnect the hose connecting the filler pipe to the tank. 19.40.19.
6. Disconnect the breather hose from the tank breather pipe.
7. Disconnect the leads to the fuel tank gauge unit.
8. Remove the four bolts and washers securing the fuel tank to the body.
9. Lift out the tank, taking care not to damage the tank outlet pipe.



Refitting

10. Reverse instructions 1 to 9.

COOLING SYSTEM OPERATIONS

Coolant—drain and refill	26.10.01
Drive belt—remove and refit	26.20.07
Expansion tank—remove and refit	26.15.01
Fan blades—remove and refit	26.25.06
Fan blades and pulley—remove and refit	26.25.01
Radiator—remove and refit	26.40.01
Radiator drain tap—remove and refit	26.40.10
Radiator hoses	
—bottom hose—remove and refit	26.30.07
—expansion tank hose—remove and refit	26.30.37
—top hose—remove and refit	26.30.01
Thermostat	
—remove and refit	26.45.01
—test	26.45.10
Water pump—remove and refit	26.50.01
Water pump housing—remove and refit	26.50.03

COOLANT

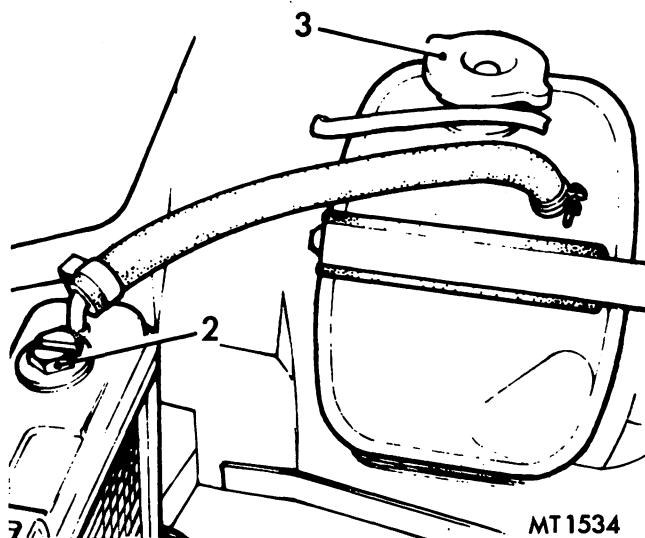
—Drain and refill

26.10.01

Draining

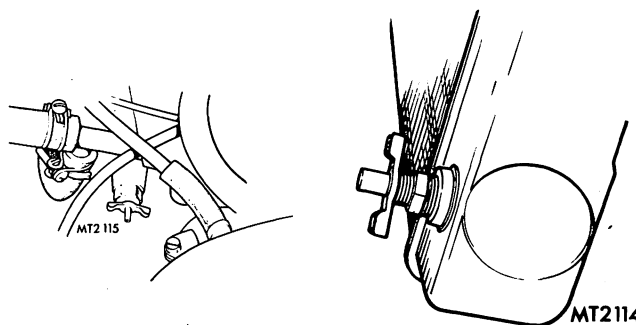
WARNING: Do not remove the filler plug or expansion tank cap when the engine is hot.

1. Move the heater control knob to the 'HOT' position.
2. Remove the radiator filler plug.
3. Remove the expansion tank filler cap.
- 4.**Open the radiator and cylinder block drain taps (where fitted).
or
Remove bottom radiator hose.**



Refilling

- 5.**Close the drain taps (where fitted).
or
Refit bottom radiator hose.**
6. Half fill the expansion tank with soft water.
7. Fill the cooling system with soft water via the radiator filler plug.
8. Fit the filler plug and expansion tank cap.
9. Run the engine at fast idle speed for three minutes.
10. Top up the system and replace the plug.



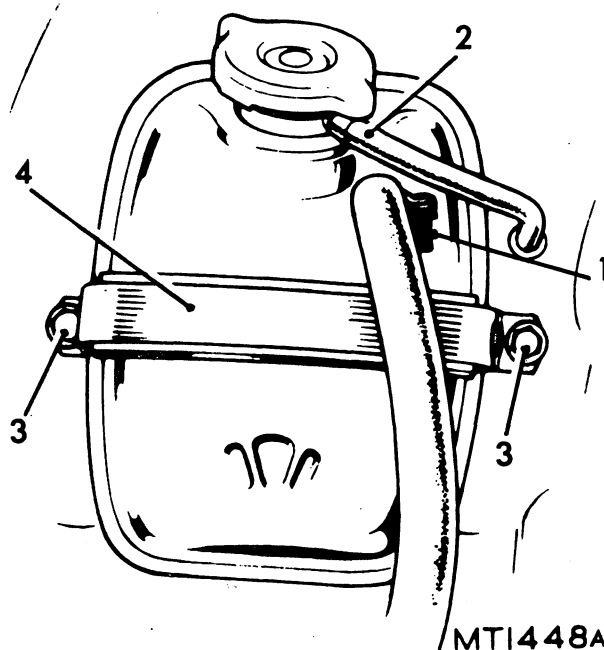
EXPANSION TANK

—Remove and refit

26.15.01

Removing

1. Disconnect the radiator connecting hose at the expansion tank.
2. Disconnect the overflow hose.
3. Remove the two bolts securing the tank retaining strap to the body.
4. Lift off the strap and rubber packing-piece.
5. Lift off the tank and drain the coolant.



Refitting

6. Reverse 1 to 5. Top up the tank with the required coolant.



COOLING SYSTEM

FAN BLADES AND PULLEY (Up to engine No. DG 1604 only)

—Remove and refit

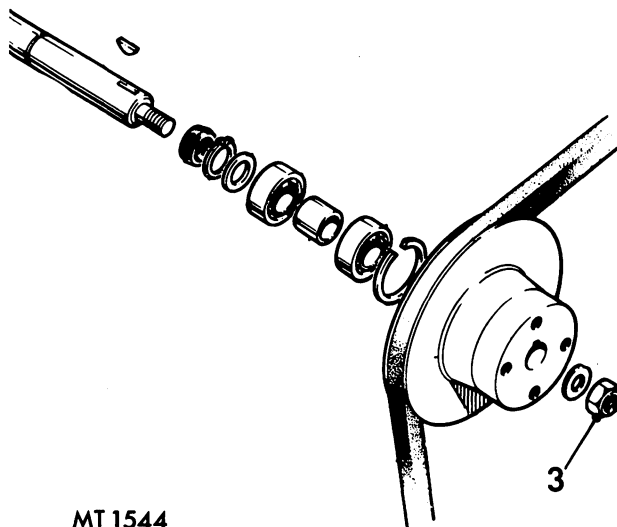
26.25.01

Removing

1. Remove the fan blades. 26.25.06.
2. Remove the water pump complete with pulley. 26.50.01.
3. Remove the nut complete with washer securing the pulley to the water pump shaft.
4. Using a suitable puller, remove the pulley from the shaft.

Refitting

5. Reverse instructions 1 to 4, ensuring that the drive key is correctly positioned.



FAN BLADES AND PULLEY (From engine No. DG 1605 only)

—Remove and refit

26.25.01

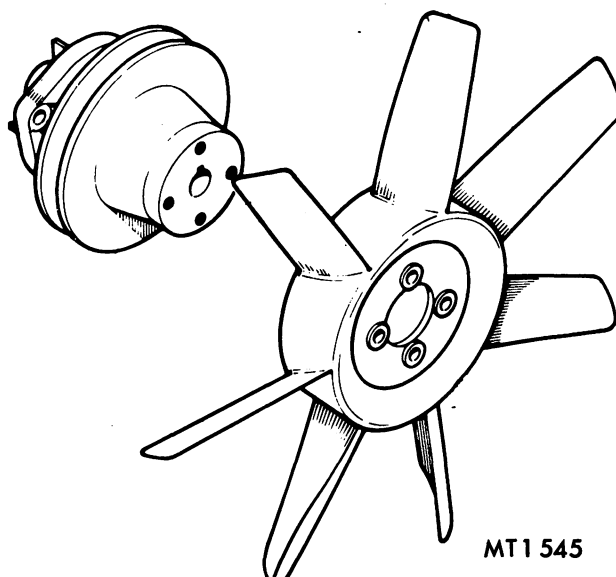
Removing

1. Remove the fan blades. 26.25.06.
2. Remove the water pump complete with pulley. 26.50.01.

NOTE: Water pump complete with pulley is only serviced as a complete assembly. Not available as separate items.

Refitting

3. Reverse instructions 1 to 2, ensuring that a new water pump to housing gasket is fitted with compound.



FAN BLADES

—Remove and refit

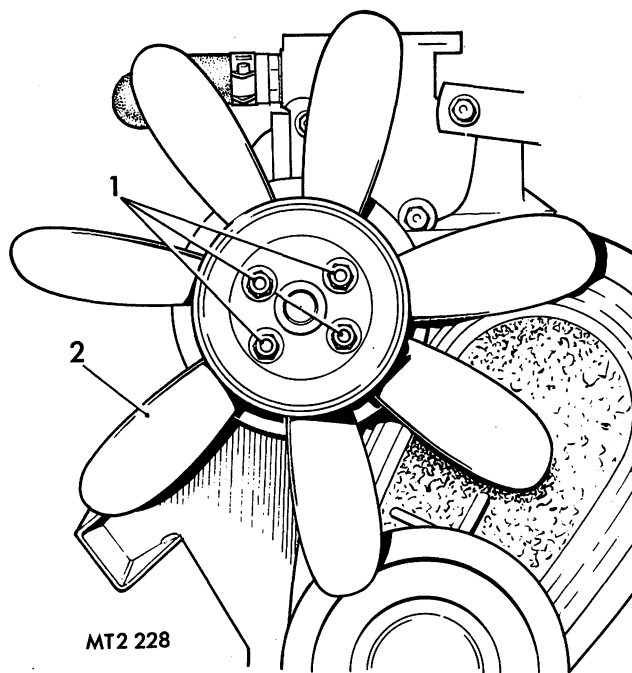
26.25.06

Removing

1. Remove the four bolts securing the fan blade to the pulley.
2. Remove the fan blades.

Refitting

3. Reverse instructions 1 to 2, ensuring that the bolts are tightened evenly.



26.25.01

26.25.06

DRIVE BELT

—Remove and refit

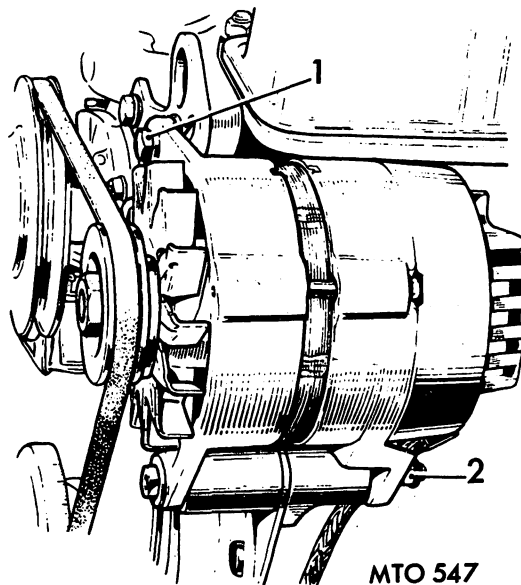
26.20.07

Removing

1. Slacken the alternator adjusting bolt.
2. Slacken the pivot bolt.
3. Push the alternator towards the engine.
4. Remove the belt.

Refitting

4. Fit the belt over the pulleys, and adjust. 86.10.05.



RADIATOR HOSES

—Remove and refit

Top hose

26.30.01

Bottom hose

26.30.07

Radiator to expansion tank hose

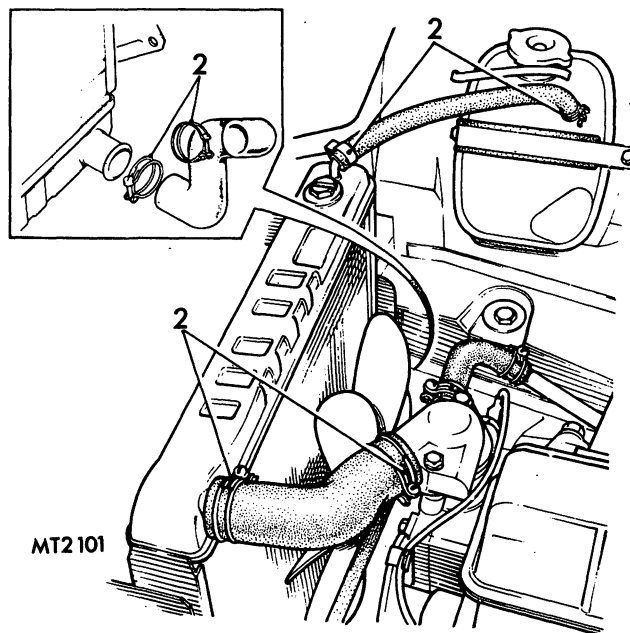
26.30.37

Removing

1. Drain coolant from the system. 26.10.01.
2. Slacken the wire clip at each end of the hose.
3. Remove the hose.

Refitting

4. Reverse 1 to 3.



COOLING SYSTEM

RADIATOR

—Remove and refit

26.40.01

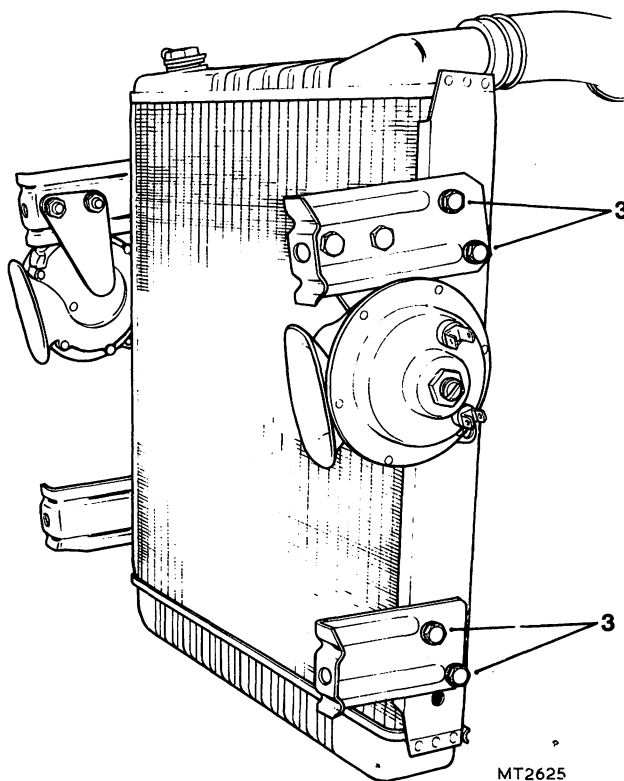
Removing

1. Drain the coolant. 26.10.01.
2. Disconnect the top, bottom and expansion tank hoses at the radiator. 26.30.01, 26.30.07, 26.30.37.
3. Remove the four bolts each side securing the radiator to the mounting brackets.
4. Lift out the radiator.

NOTE: It may be more convenient to remove the bolt securing each mounting bracket to the body, disconnecting the hoses, and lifting the radiator and horns out together.

Refitting

5. Reverse 1 to 4.



RADIATOR DRAIN TAP (when fitted)

—Remove and refit

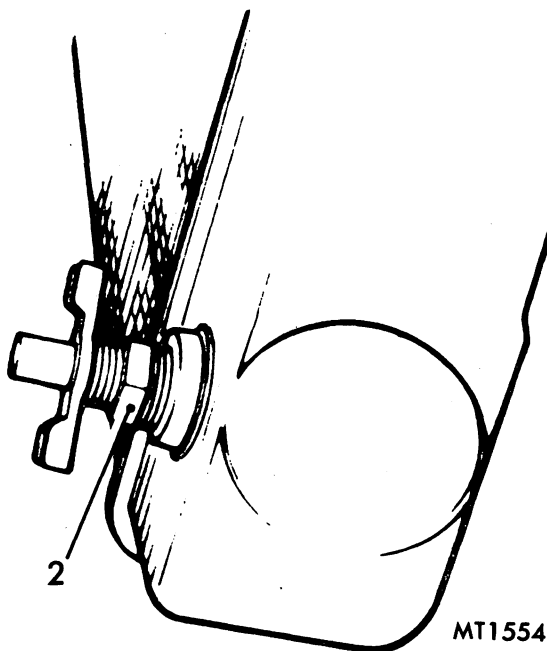
26.40.10

Removing

1. Drain the coolant. 26.10.01.
2. Unscrew the tap assembly from the radiator block.

Refitting

3. Reverse 1 and 2.



26.40.01

26.40.10

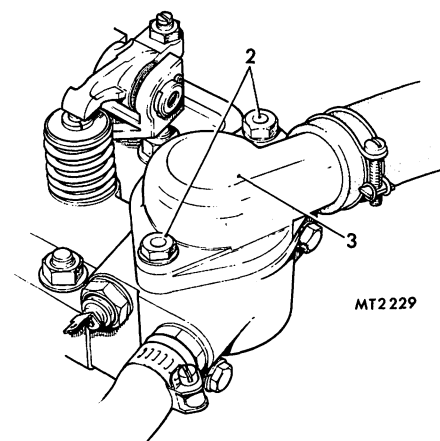
THERMOSTAT

—Remove and refit

26.45.01

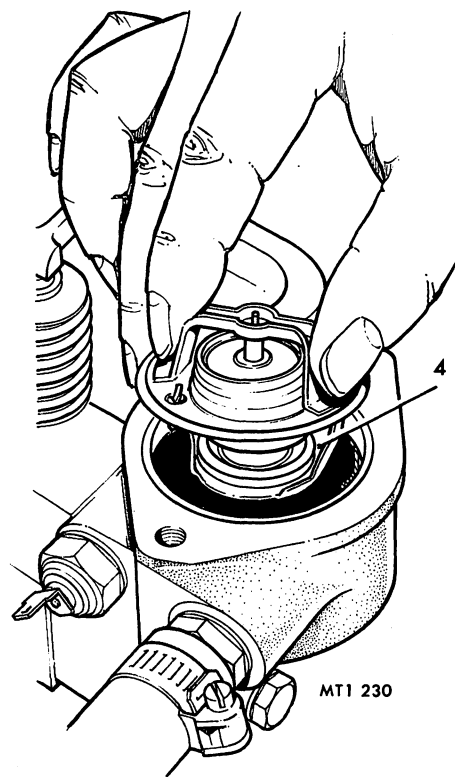
Removing

1. Partially drain the radiator.
2. Remove the two bolts securing the water elbow to the water pump housing.
3. Lift off the elbow complete with gasket.
4. Lift out the thermostat.



Refitting

5. Reverse instructions 1 to 4, ensuring:
 - a. The replacement thermostat has the correct opening temperature.
 - b. A new water elbow gasket is fitted.
 - c. The radiator coolant is replenished with the correct anti-freeze concentration.



THERMOSTAT

—Test

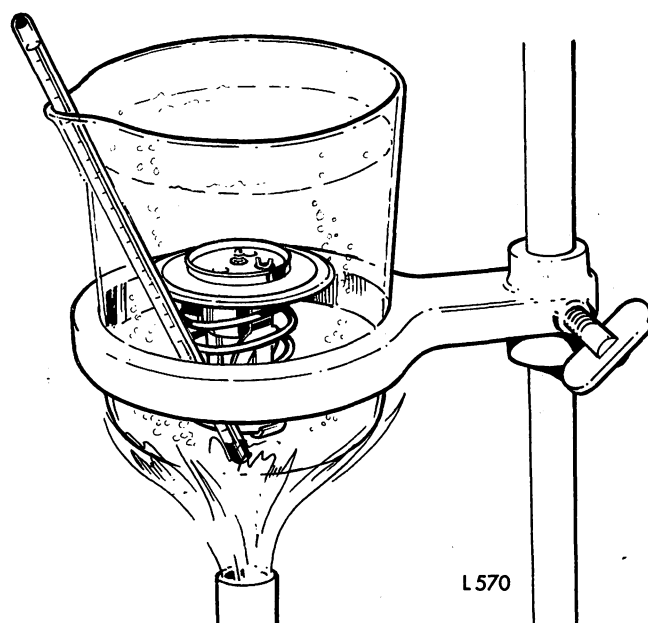
26.45.10

Removing

1. Remove the thermostat. 26.45.01.
2. Determine the opening temperature of the thermostat stamped on the flange or base.
3. Immerse the thermostat in water heated to the opening temperature of the thermostat.
4. If the thermostat does not commence to open, renew it.

Refitting

5. Replace the thermostat.



COOLING SYSTEM

WATER PUMP

—Remove and refit

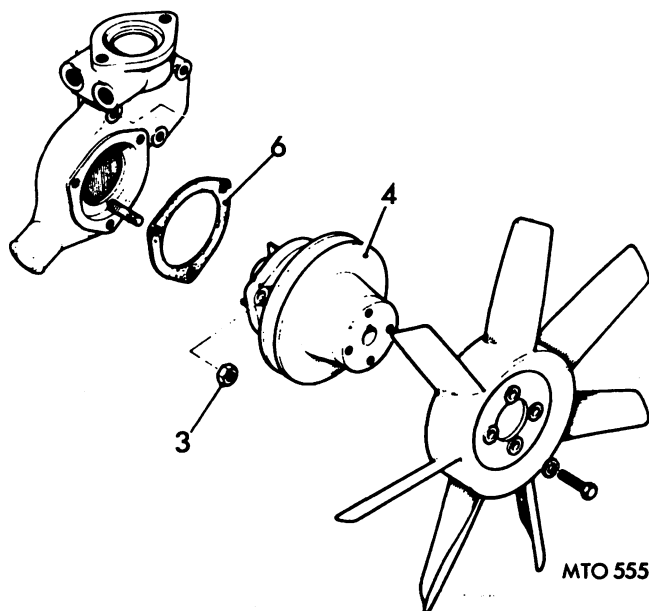
26.50.01

Removing

1. Drain the coolant. 26.10.01.
2. Remove the drive belt. 26.20.07.
3. Remove the three nuts securing the water pump to the housing.
4. Remove the water pump complete with pulley and fan.
5. Remove the fan blades. 26.25.06.

Refitting

6. Reverse instructions 1 to 5, ensuring that a new gasket is fitted between the pump and housing.



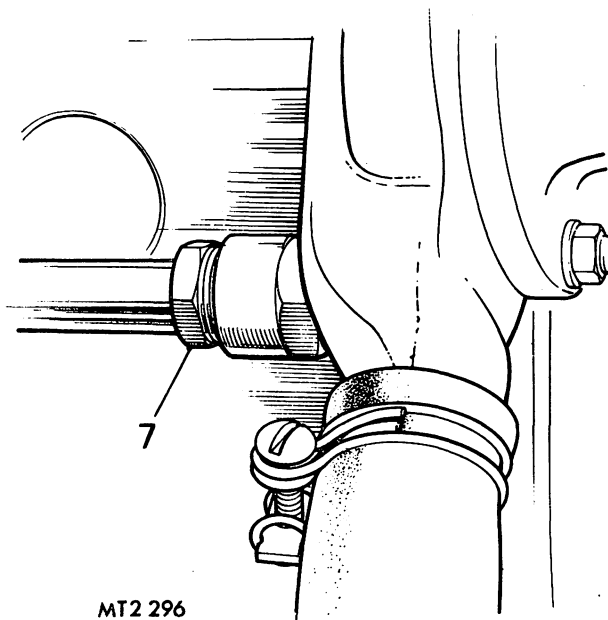
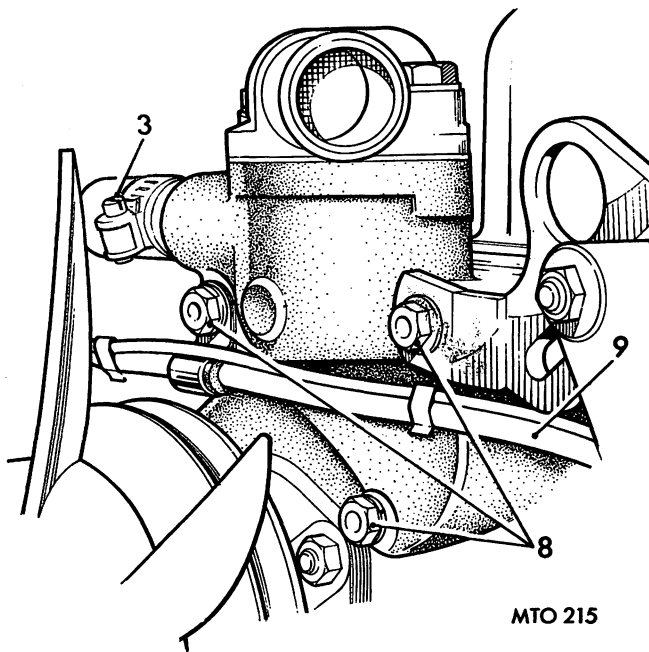
WATER PUMP HOUSING

—Remove and refit

26.50.03

Removing

1. Drain the cooling system. 26.10.01.
2. Disconnect the bottom radiator hose from the housing.
3. Disconnect the inlet manifold heater hose from the thermostat housing.
4. Disconnect the Lucas connector from the temperature transmitter.
5. Remove the two bolts securing the thermostat housing to the water pump housing. 26.45.01.
6. Slacken the alternator mountings and remove the belt. 26.20.07.
7. Disconnect the heater by-pass pipe union.
8. Remove the three bolts securing the water pump housing to the cylinder block.
9. Remove the fuel feed pipe and vacuum pipe.
10. Remove the water pump housing complete with water pump and fan.
11. Remove the three nuts securing the water pump assembly to the housing and lift off the pump.
12. Remove from housing, thermostat and heater pipe unions, and water temperature transmitter.



Refitting

13. Reverse instructions 1 to 12, ensuring that:
 - a. Gasket faces are clean.
 - b. Gaskets are coated with jointing compound.
 - c. Drive belt is adjusted. 86.10.05.

26.50.01

26.50.03

MANIFOLD AND EXHAUST SYSTEM OPERATIONS

Down-pipe flange packing—remove and refit	..	..	..	..	..	..	..	30.10.26
Exhaust system complete—remove and refit	..	..	..	..	..	..	..	30.10.01
Front pipe—single or left-hand—remove and refit	..	..	..	..	..	..	..	30.10.09
Induction or exhaust manifold—remove and refit	..	..	..	..	..	..	..	30.15.01
Intermediate pipe—remove and refit	..	..	..	..	..	..	..	30.10.11
Tail pipe or silencer—remove and refit	..	..	..	..	..	..	..	30.10.22

EXHAUST SYSTEM COMPLETE

—Remove and refit

30.10.01

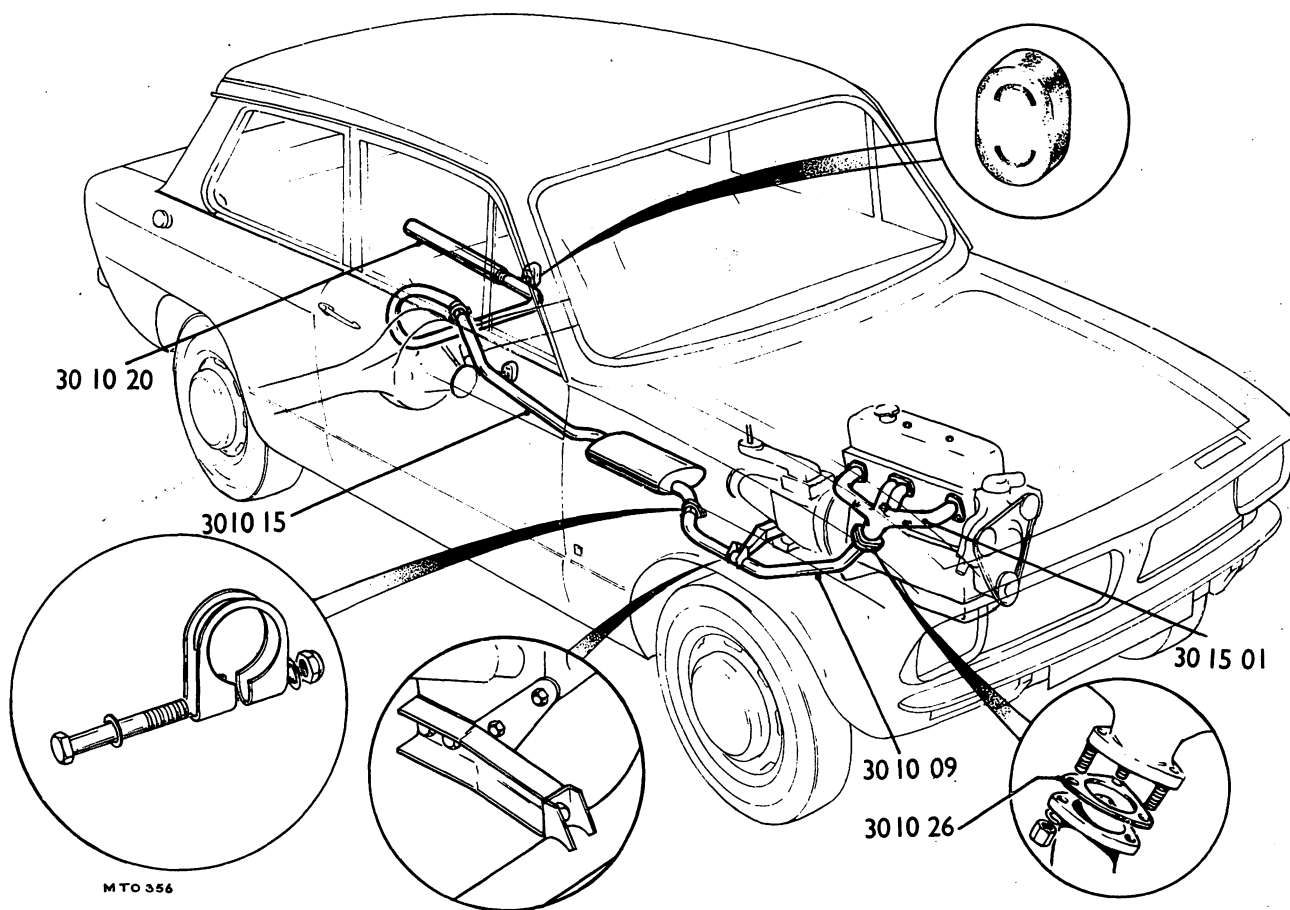
Removing

1. Release clip holding intermediate pipe to tail pipe.
2. Remove rubber mounting holding tail pipe to bracket.
3. Remove tail pipe.
4. Remove flexible mounting on intermediate pipe.
5. Release bolt on front pipe support bracket.
6. Remove three nuts holding front pipe to manifold.
7. Remove front pipe and intermediate pipe.

Refitting

**** NOTE:** An exhaust pipe sealant such as Holts Fire Gum Sealer should be used at the exhaust pipe joints. ******

8. Align front pipe and intermediate pipe in the correct position.
9. Refit and tighten the three nuts holding the front pipe to the manifold.
10. Refit and tighten bolt holding front pipe to the supporting bracket.
11. Replace flexible mounting on intermediate pipe.
12. Align and slide tail pipe over intermediate pipe.
13. Replace flexible mounting holding tail pipe to mounting bracket.
14. Tighten clip holding intermediate pipe to tail pipe.



MANIFOLD AND EXHAUST SYSTEM

FRONT PIPE

—Remove and refit

30.10.09

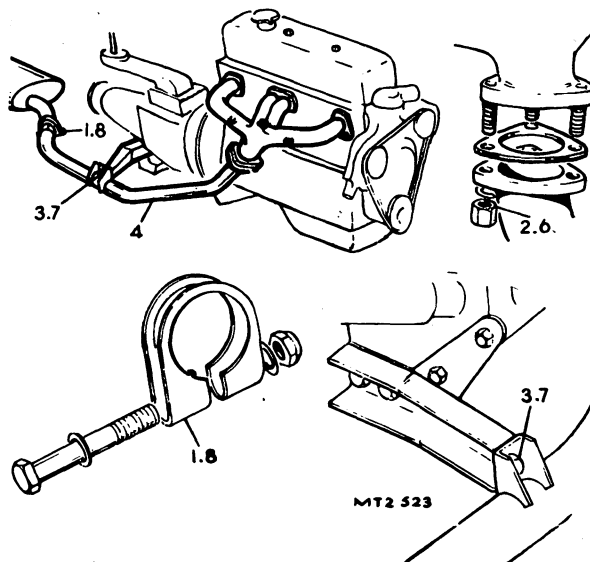
Removing

1. Release clip holding front pipe to intermediate pipe.
2. Remove three nuts holding front pipe to manifold.
3. Remove bolt on front pipe support bracket.
4. Remove front pipe.

Refitting

**** NOTE:** An exhaust pipe sealant such as Holts Fire Gum Sealer should be used at the exhaust pipe joints. ******

5. Slide front pipe over intermediate pipe.
6. Align front pipe over manifold studs and replace and tighten the nuts.
7. Replace bolt through front pipe support bracket and tighten.
8. Tighten clamp around front pipe to intermediate pipe.



INTERMEDIATE PIPE

—Remove and refit

30.10.11

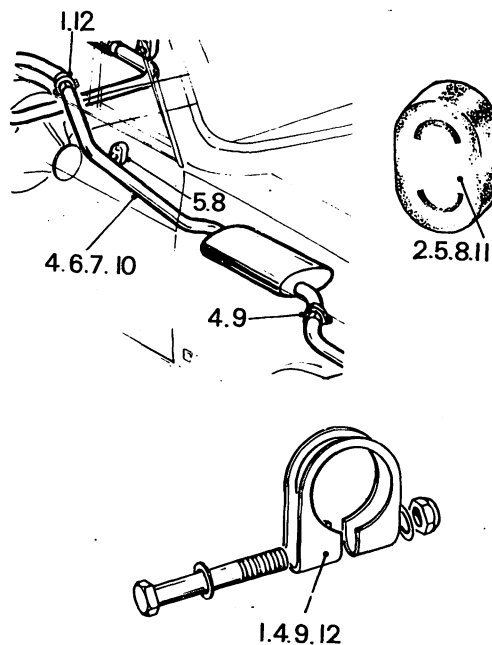
Removing

1. Release clip holding tail pipe to intermediate pipe.
2. Remove rubber mounting on tail pipe.
3. Remove tail pipe.
4. Release clip holding intermediate pipe to front pipe.
5. Remove rubber mounting on intermediate pipe.
6. Remove intermediate pipe and silencer.

Refitting

**** NOTE:** An exhaust pipe sealant such as Holts Fire Gum Sealer should be used at the exhaust pipe joints. ******

7. Slide intermediate pipe over front pipe.
8. Replace mounting rubber holding intermediate pipe to body.
9. Align pipe and tighten clip holding intermediate pipe to front pipe.
10. Slide tail pipe over intermediate pipe.
11. Replace rubber mounting on tail pipe.
12. Align tail pipe and tighten clip holding tail pipe to intermediate pipe.



MT2522

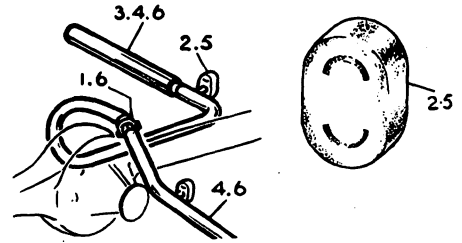
TAIL PIPE OR SILENCER

—Remove and refit

30.10.22

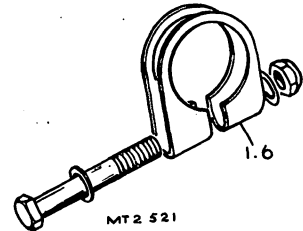
Removing

1. Release clip holding tail pipe to intermediate pipe.
2. Remove rubber mounting on the tail pipe.
3. Remove the tail pipe.



Refitting

4. Align and slide the tail pipe over the intermediate pipe.
5. Replace the tail pipe mounting rubber.
6. Tighten the clip around the tail pipe and intermediate pipe.



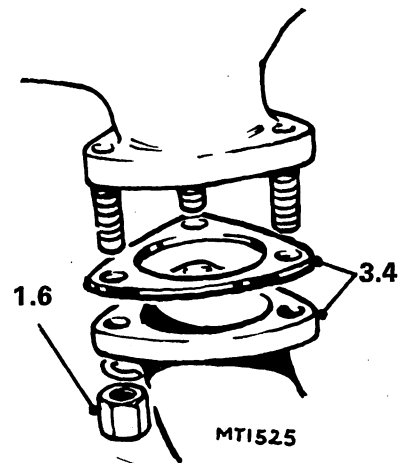
DOWN-PIPE FLANGE PACKING

—Remove and refit

30.10.26

Removing

1. Remove three nuts holding the front pipe to manifold.
2. Remove nut and bolt holding front pipe to support bracket.
3. Pull down front pipe and remove flange packing.



Refitting

4. Pull front pipe down and replace packing.
5. Refit front pipe and tighten manifold stud nuts.
6. Refit nut and bolt in front pipe mounting bracket.

MANIFOLD AND EXHAUST SYSTEM

INDUCTION AND EXHAUST MANIFOLD

—Remove and refit

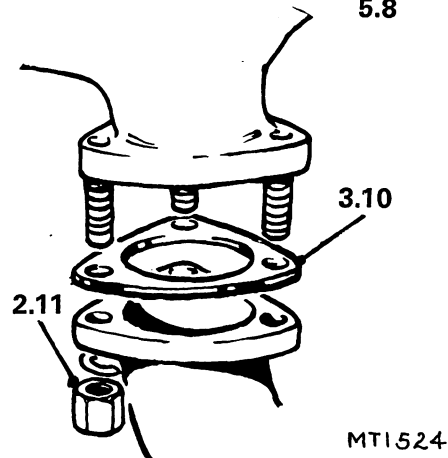
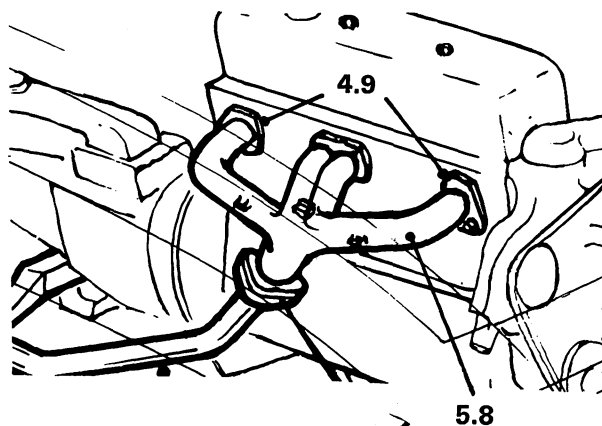
30.15.01

Removing

1. Remove carburetter and inlet manifold as in operation 19.15.09 single, 19.15.11 twin.
2. Remove three nuts on down-pipe flange and pull clear.
3. Remove down-pipe flange packing.
4. Remove two nuts holding exhaust manifold to cylinder head.
5. Pull manifold clear of studs and remove from engine.
6. Remove induction and exhaust manifold gasket.

Refitting

7. Renew and refit the manifold gasket up to cylinder head.
8. Refit the manifold onto the head studs.
9. Tighten nuts holding manifold to head.
10. Renew down-pipe flange packing and fit over studs.
11. Replace and tighten three nuts holding down-pipe in position.
12. Refit carburetter and inlet manifold as in operation 19.15.02 single, 19.15.09 twin.



MT1524

CLUTCH OPERATIONS

Bearing assembly—overhaul	..	..	..	..	..	..	..	..	..	33.25.17
Clutch assembly—remove and refit	..	..	..	..	..	..	..	..	..	33.10.01
Clutch pedal										
—remove and refit	..	..	..	..	..	..	..	..	..	33.30.02
—overhaul	..	..	..	..	..	..	..	..	..	**33.30.07**
—return spring—remove and refit	..	..	..	..	..	..	..	..	..	33.30.03
Fluid pipe—remove and refit	..	..	..	..	..	..	..	..	..	33.15.09
Hydraulic system—bleed	..	..	..	..	..	..	..	..	..	33.15.01
Master cylinder										
—overhaul	..	..	..	..	..	..	..	..	..	33.20.07
—remove and refit	..	..	..	..	..	..	..	..	..	33.20.01
Release bearing assembly—remove and refit	..	..	..	..	..	..	..	..	..	33.25.12
Slave cylinder										
—overhaul	..	..	..	..	..	..	..	..	..	33.35.07
—remove and refit	..	..	..	..	..	..	..	..	..	33.35.01

CLUTCH ASSEMBLY

—Remove and refit

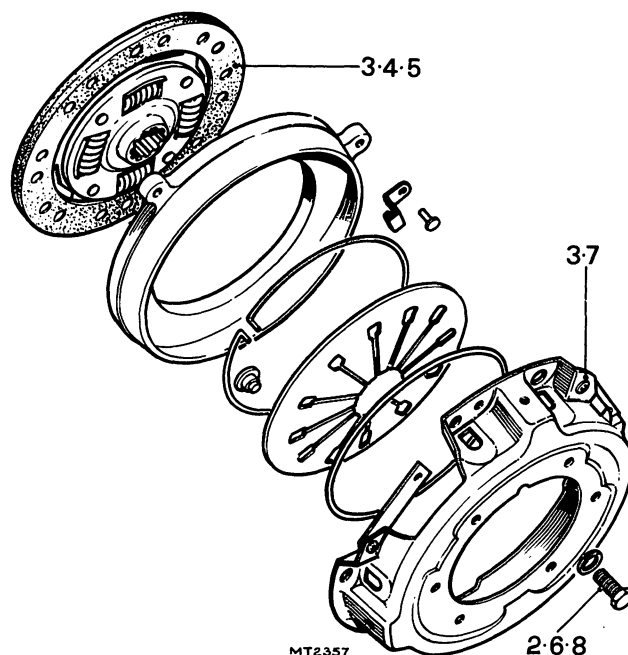
33.10.01

Removing

1. Remove the gearbox. 37.20.01.
2. **Working under the car, remove six bolts holding clutch to flywheel.**
3. Remove the clutch driven plate and pressure plate.

Refitting

4. With the longer boss of the splined hub towards the gearbox, offer up the driven plate to the flywheel.
5. Centralize the driven plate with the bush at the rear of the crankshaft.
6. Insert the bolts holding the clutch to the flywheel.
7. Ensure that the pressure plate locates correctly on the dowels on the flywheel.
8. Tighten the six bolts holding the pressure plate to the flywheel.
9. Refit the gearbox. 37.20.01.

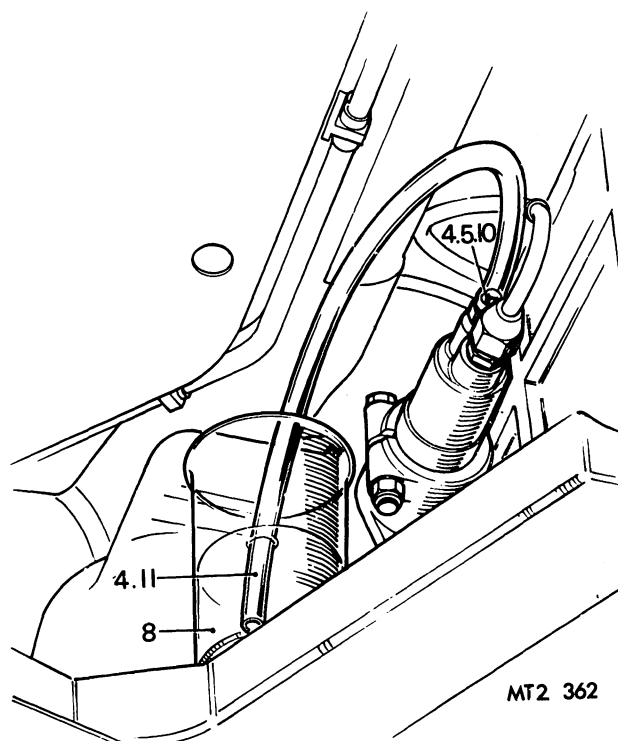


HYDRAULIC SYSTEM

—Bleeding

33.15.01

1. Ensure that the reservoir is topped up to $\frac{1}{4}$ " from the top.
2. Remove the gearbox cover.
3. Wipe the bleed nipple clean.
4. Attach a piece of small bore tubing to the nipple and let it hang in a container partially filled with hydraulic fluid.
5. Unscrew the bleed nipple one complete turn.
NOTE: During bleeding, care should be taken to ensure that the reservoir does not become empty, resulting in air being drawn into the system. Ensure that fluid used is **new** or air-free.
6. Depress the clutch pedal fully and let it return without assistance.
7. Repeat this operation with a slight pause between each depression of the pedal.
8. Observe the fluid being discharged from the pipe.
9. When it is air-free, hold the pedal in the depressed position.
10. Securely tighten the bleed screw.
11. Remove the pipe from the slave cylinder.
12. Refit the gearbox cover.



CLUTCH

FLUID PIPE

—Remove and refit

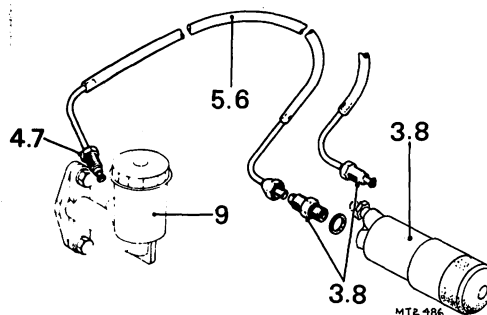
33.15.09

Removing

1. Drive the car onto a ramp.
2. Drain the hydraulic system.
3. Unscrew hydraulic pipe from slave cylinder.
4. Unscrew pipe from master cylinder.
5. Remove pipe from car.

Refitting

6. Align new pipe in approximate position in car.
7. Screw hydraulic pipe into the master cylinder.
8. Screw pipe into the slave cylinder.
9. Top up master cylinder with new brake fluid.
10. Bleed hydraulic system. 33.15.01.
11. Lower car on ramp.



MASTER CYLINDER

—Remove and refit

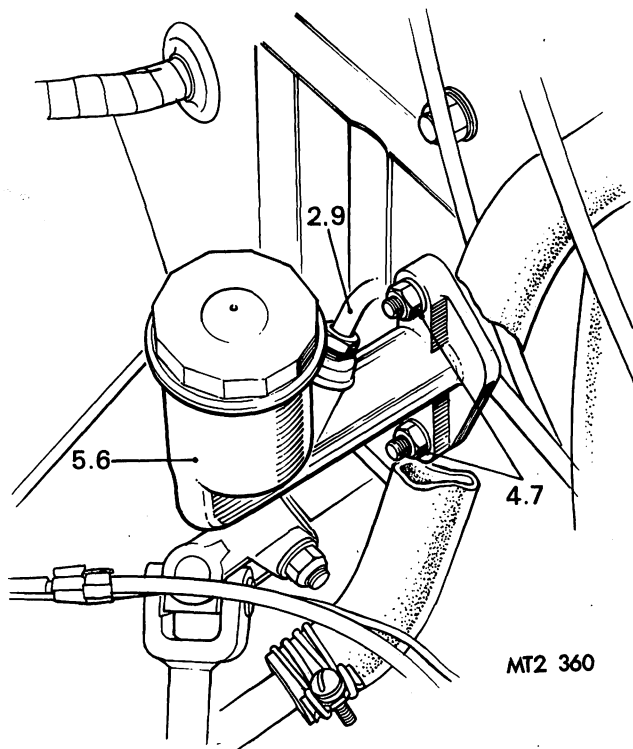
33.20.01

Removing

1. Drain the fluid system.
2. Disconnect the fluid pipe at the master cylinder.
3. Remove the cotter pin from top of pedal.
4. Remove two nuts securing master cylinder to body.
5. Remove master cylinder from car.

Refitting

6. Hold master cylinder in place in engine compartment.
7. Renew two nuts securing master cylinder to body, and fit.
8. Refit cotter pin and renew circlip.
9. Connect the fluid pipe to the master cylinder.
10. Bleed the system. 33.15.01.



35.15.09

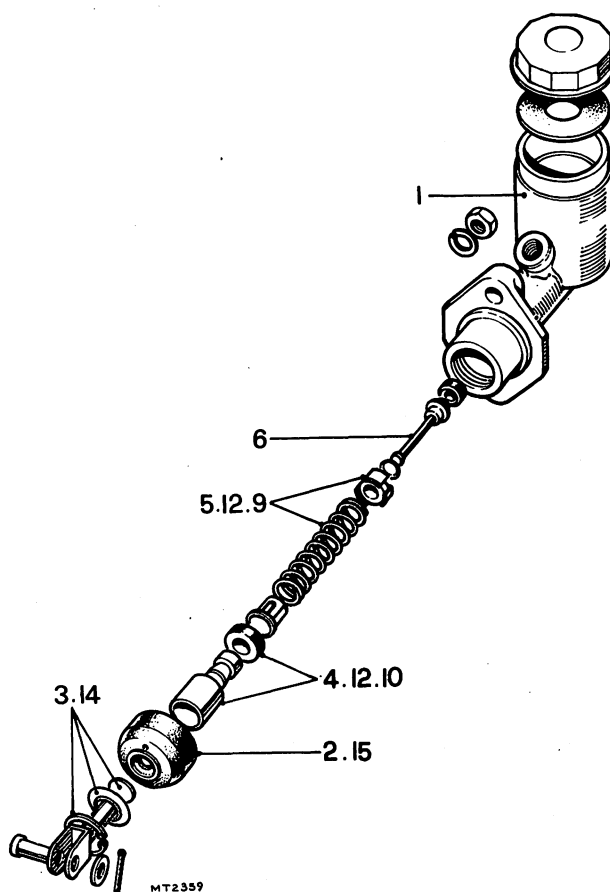
33.20.01

MASTER CYLINDER

—Overhaul

33.20.07

1. Drain the fluid reservoir.
2. Slide the rubber along the push-rod.
3. Remove the circlip from the end of the master cylinder and withdraw the push-rod and washer.
4. Withdraw the piston spring and seal assembly from the master cylinder. Withdrawal may be facilitated by applying a compressed air line to the fluid outlet union.
5. Straighten the prong of the spring thimble and remove the thimble and spring from the piston.
6. Release the valve stem from the keyhole slot in the thimble.
7. Slide the valve seal spacer along the valve stem.
8. Remove the valve seal from the valve stem and fit a new seal.
9. Assemble the spacer, spring and thimble to the valve stem.
10. Remove the seal from the piston and fit a new seal (seal lip towards the spring).
11. Engage the spring thimble on the piston and carefully depress the thimble prong.
12. Lubricate the bore of the master cylinder with clean brake fluid and insert the seal assembly spring and piston.
13. Fit a new rubber to the push-rod.
14. Fit the push-rod and washer to the master cylinder and secure with the clip.
15. Slide the rubber into position on the master cylinder.
16. Bleed the cylinder.



RELEASE BEARING ASSEMBLY

—Remove and refit

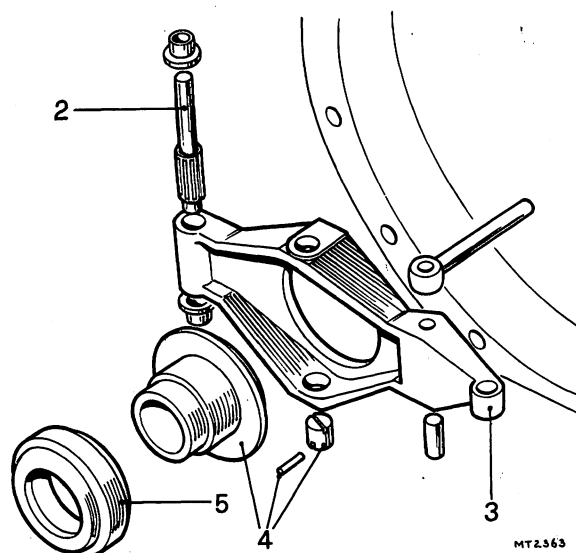
33.25.12

Removing

1. Remove the gearbox. 37.20.01.
2. Drive the pin from the clutch housing.
3. Remove the operating lever from the housing.
4. Press out Mills pin and release bearing sleeve by extracting plugs.
5. Withdraw the bearing from the sleeve.

Refitting

6. Reverse procedure 1 to 5.



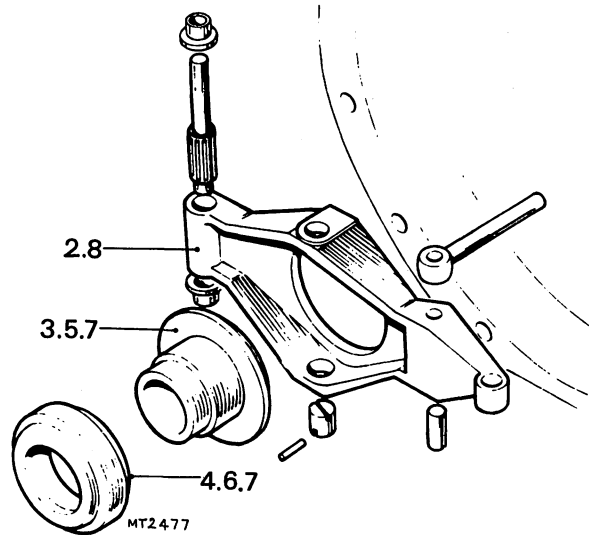
CLUTCH

BEARING ASSEMBLY

—Overhaul

33.25.17

1. Remove the gearbox. 37.20.01.
2. Remove operating lever assembly.
3. Remove bearing sleeve.
4. Remove bearing.
5. Renew bearing sleeve.
6. Renew bearing.
7. Grease bearing and sleeve.
8. Replace and refit operating lever.
9. Refit gearbox. 37.20.01.



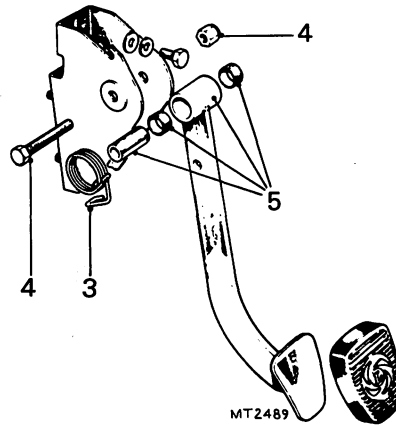
CLUTCH PEDAL

—Remove and refit

33.30.02

Removing

1. Remove the parcel shelf.
2. Remove the clevis pin securing the pedal to the master cylinder rod.
3. Disconnect the pedal return spring.
4. Remove the pedal pivot bolt and nut.
5. Withdraw the clutch pedal complete with bushes and pivot sleeve.



Refitting

6. Reverse instructions 1 to 5.

CLUTCH PEDAL RETURN SPRING

—Remove and refit

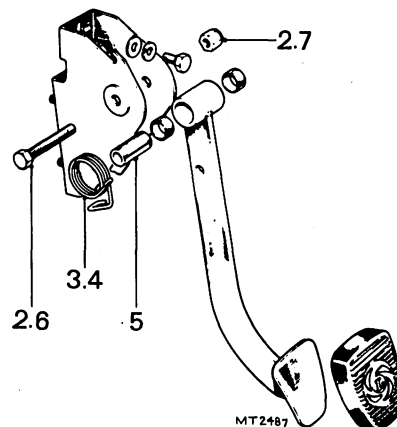
33.30.03

Removing

1. Remove cotter pin washer and split pin securing pedal to master cylinder.
2. Remove nut and carefully slide out bolt holding pedal.
3. Remove spring from pedal.

Refitting

4. Renew and position spring on pedal.
5. Align bush with holes in bracket.
6. Lubricate bolt and insert in bush.
7. Renew and tighten nut on end of bolt.
8. Refit cotter pin washer and split pin.



33.25.17

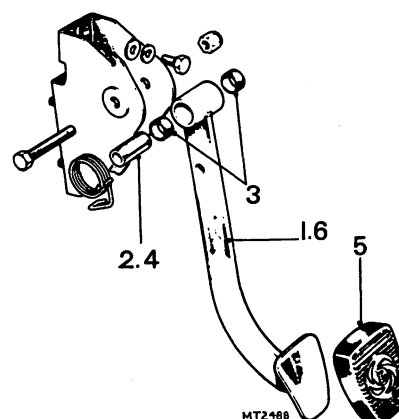
33.30.03

CLUTCH PEDAL

—Overhaul

33.30.07

1. Remove clutch pedal. 33.30.02.
2. Withdraw the sleeve from the pedal.
3. Remove the pedal bushes.
4. Fit new bushes, lubricate and insert new sleeve.
- 5.**Replace the pedal pad rubber if worn.**
6. Fit the pedal to the car. 33.30.02.



SLAVE CYLINDER

—Remove and refit

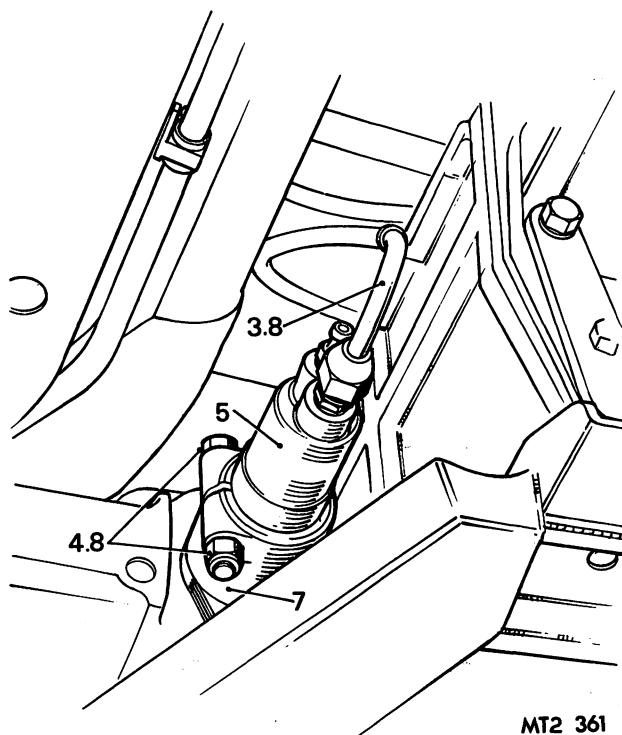
33.35.01

Removing

1. Drive the car onto a ramp and raise the ramp.
2. Drain the clutch system.
3. Remove hydraulic pipe and push clear.
4. Remove locating bolt, nut and washer.
5. Pull slave cylinder clear of housing.

Refitting

6. Centralize push-rod in housing.
7. Push slave cylinder into housing.
8. Line up groove with hole and place bolt in through hole and tighten nut.
9. Line up hydraulic pipe and tighten nut up in slave cylinder.
10. Bleed the system.

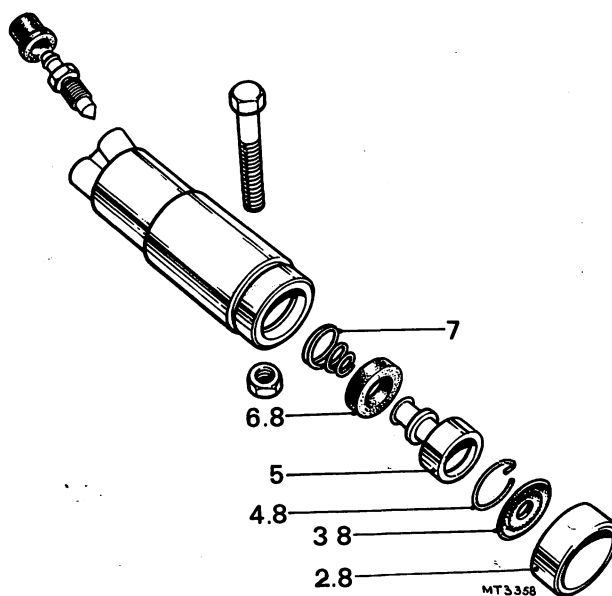


SLAVE CYLINDER

—Overhaul

33.35.07

1. Remove slave cylinder from car. 33.35.01.
2. Remove dust cover retainer.
3. Remove dust cover.
4. Remove circlip.
5. Remove plunger.
6. Remove the seal.
7. Remove the spring.
8. Fit new seal, spring circlip, dust cover and retainer and lubricate.
9. Refit slave cylinder to car. 33.35.01.



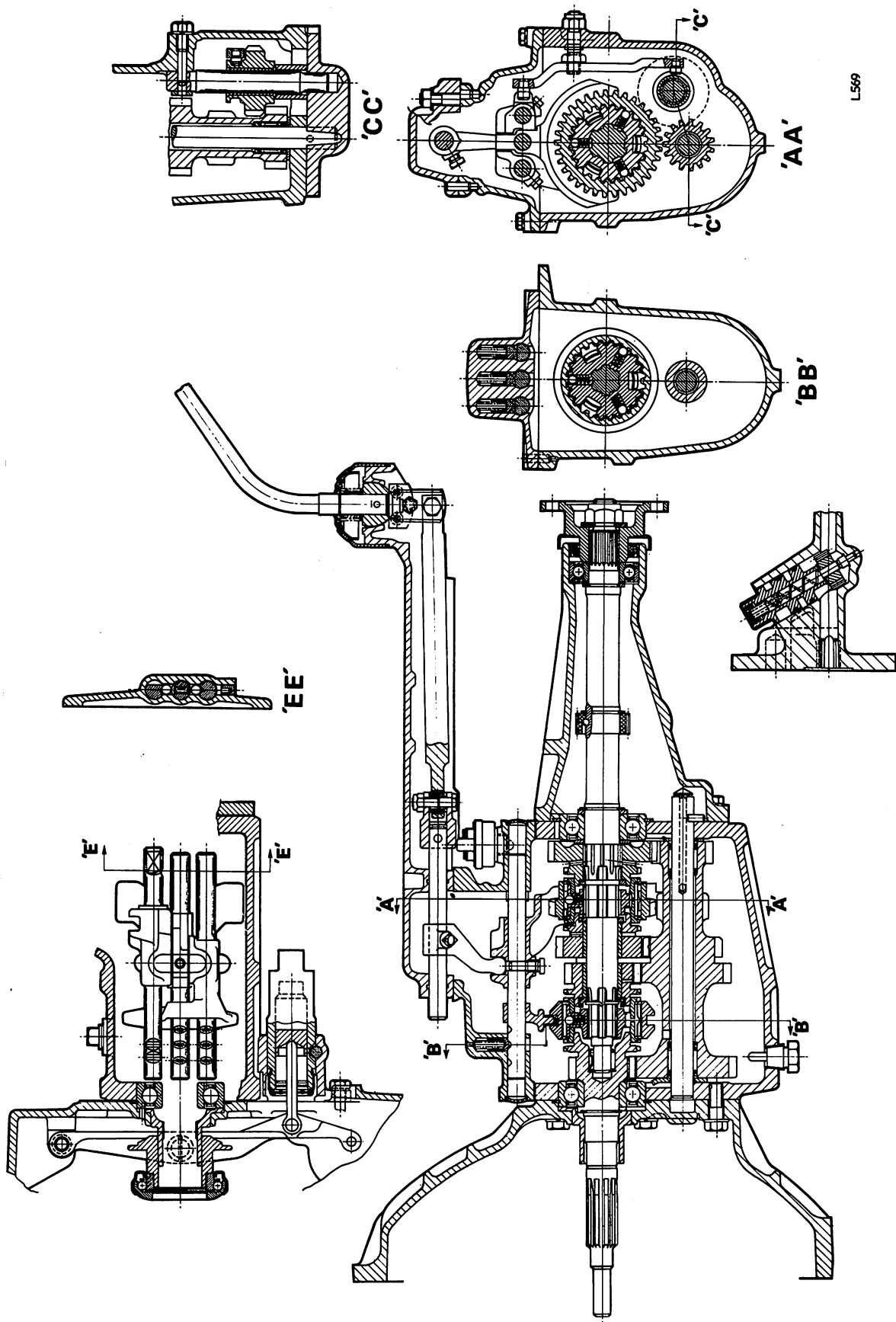
33.30.07

33.35.07



SYNCHROMESH GEARBOX OPERATIONS

Bell housing—remove and refit	..	..	..	..	..	..	..	..	..	37.12.07
Constant pinion—overhaul	..	..	..	..	..	..	..	..	..	37.20.34
Drive flange—remove and refit	..	..	..	..	..	..	..	..	..	37.10.01
Gearbox assembly										
—overhaul	..	..	..	..	..	..	..	..	..	37.20.04
—remove and refit	..	..	..	..	..	..	..	..	..	37.20.01
Gear-change lever										
—check and adjust	..	..	..	..	..	..	..	..	..	37.16.01
—overhaul	..	..	..	..	..	..	..	..	..	37.16.10
—remove and refit	..	..	..	..	..	..	..	..	..	37.16.04
Gear-change lever draught excluder—remove and refit	..	..	..	..	..	..	..	..	..	37.16.05
Layshaft cluster assembly—overhaul	..	..	..	..	..	..	..	..	..	37.20.29
Rear extension										
—overhaul	..	..	..	..	..	..	..	..	..	37.12.04
—remove and refit	..	..	..	..	..	..	..	..	..	37.12.01
Rear oil seal—remove and refit	..	..	..	..	..	..	..	..	..	37.23.01
Speedometer drive gear—remove and refit	..	..	..	..	..	..	..	..	..	37.25.01
Speedometer drive gear pinion—remove and refit	..	..	..	..	..	..	..	..	..	37.25.05
Synchronizer assemblies—overhaul	..	..	..	..	..	..	..	..	..	37.20.08
Top cover										
—overhaul	..	..	..	..	..	..	..	..	..	37.12.19
—remove and refit	..	..	..	..	..	..	..	..	..	37.12.16
Top cover extension										
—overhaul	..	..	..	..	..	..	..	..	..	37.12.13
—remove and refit	..	..	..	..	..	..	..	..	..	37.12.10



L569

Section Through Gearbox Assembly

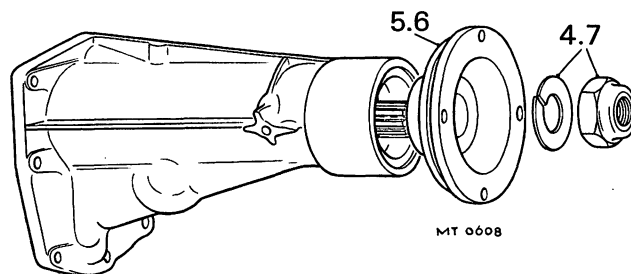
DRIVE FLANGE

—Remove and refit

37.10.01

Removing

1. Drive the vehicle onto a ramp and raise the ramp.
2. Disconnect the propeller shaft from the gearbox drive flange.
3. Select first gear.
4. Unscrew the flange nut and remove the washer.
5. Carefully remove the flange.



Refitting

6. Locate the flange in position.
7. Fit and tighten the nut and washer.
8. Attach the propeller shaft to the drive flange.
9. Lower the ramp.

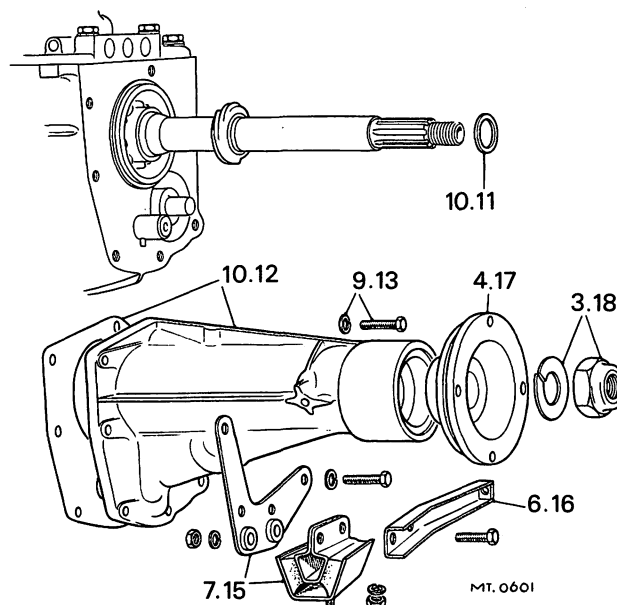
REAR EXTENSION

—Remove and refit

37.12.01

Removing

1. Drive the vehicle onto a ramp. Raise the ramp and drain the gearbox oil.
2. Remove the propeller shaft assembly.
3. Unscrew and remove the nut and washer.
4. Remove the drive flange.
5. Support the engine under the sump, using a ramp jack (interpose a piece of wood between the jack head and sump to spread the load).
6. Disconnect the exhaust support bracket from the front pipe.
7. Remove the gearbox mounting assembly.
8. Disconnect the speedometer cable from the rear extension.
9. Remove the bolts and spring washers.
10. Withdraw the rear extension assembly, joint washer and mainshaft washer.



Refitting

11. Locate the washer on the end of the mainshaft.
12. Refit the rear extension and a new joint washer.
13. Fit and tighten the bolts and spring washers.
14. Reconnect the speedometer drive cable.
15. Refit the gearbox mounting assembly and remove the ramp jack.
16. Attach the exhaust front pipe to the support bracket.
17. Refit the drive flange.
18. Fit and tighten the nut.
19. Refit the propeller shaft assembly.
20. Refill the gearbox with oil.

SYNCHROMESH GEARBOX

REAR EXTENSION

—Overhaul

37.12.04

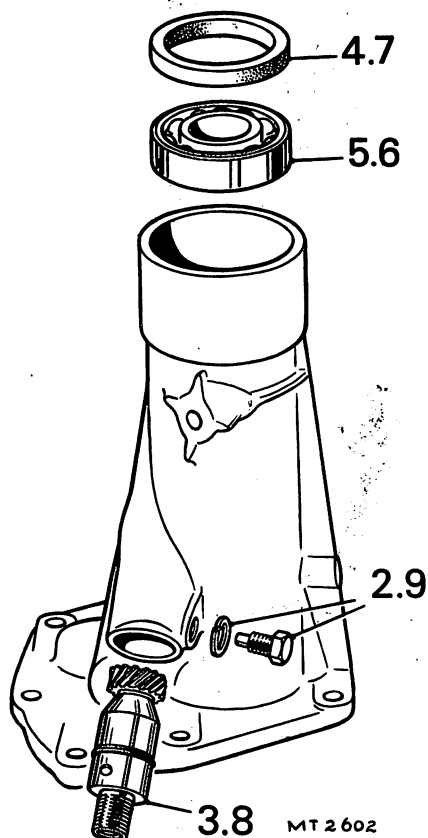
1. Remove the rear extension. 37.12.01 or 37.20.04.

Dismantling

2. Unscrew and remove the peg bolt and washer.
3. Withdraw the speedometer driven gear and housing assembly.
4. Extract the seal.
5. Drive out the bearing.

Reassembling

6. Press the bearing into the extension.
7. Press a new seal into the housing.
8. Refit the speedometer driven gear and housing assembly.
9. Fit and tighten the peg bolt and washer.
10. Refit the rear extension. 37.12.01 or 37.20.04.



CLUTCH HOUSING

—Remove and refit

37.12.07

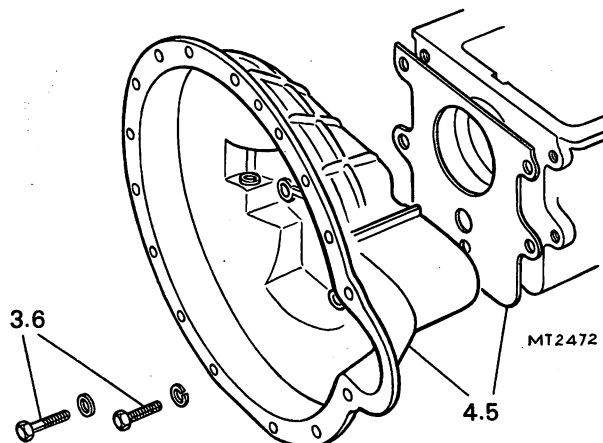
1. Remove the gearbox assembly. 37.20.01.

Removing

2. Remove the clutch release mechanism. 33.35.12, operation 2.
3. Unscrew and remove the bolts.
4. Remove the clutch housing and joint washer.

Refitting

5. Replace the clutch housing and a new joint washer.
6. Fit and tighten the bolts; ensure that the copper washer and bolt with plain shank is fitted at the bottom.
7. Refit the clutch release mechanism. 33.35.12, operation 2.
8. Refit the gearbox assembly. 37.20.01.



37.12.04

37.12.07

TOP COVER EXTENSION

—Remove and refit

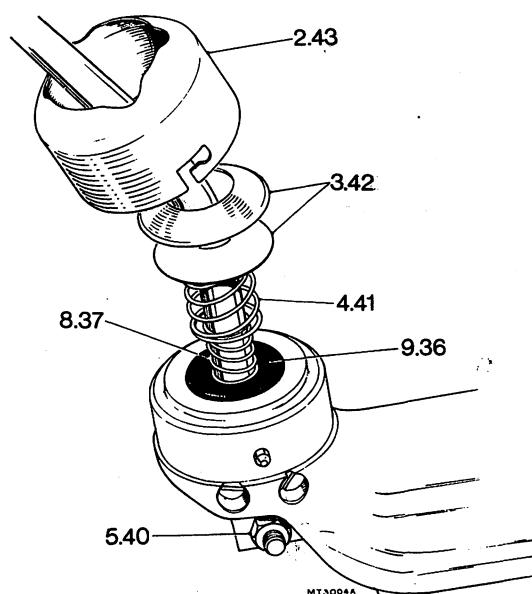
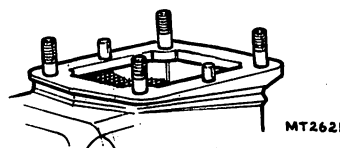
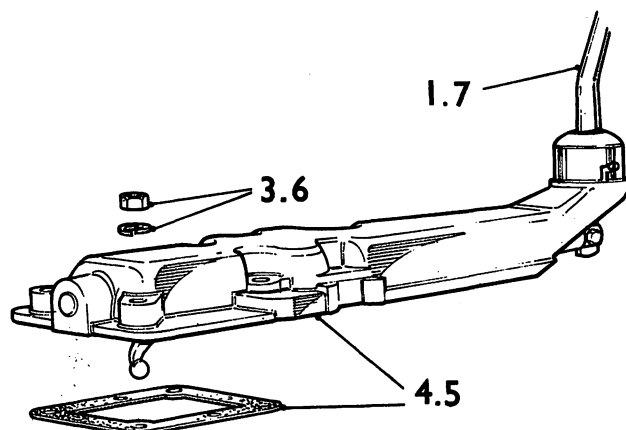
37.12.10

Removing

1. Remove the gear-change lever. 37.16.04.
2. Open the bonnet.
3. Working in the engine compartment, unscrew the nuts and washers securing the extension to the top cover.
4. Lift off the extension and remove the joint washer.

Refitting

5. Fit the extension and a new joint washer onto the top cover.
6. Fit and tighten the nuts and washers. Close the bonnet.
7. Refit the gear-change lever 37.16.04.



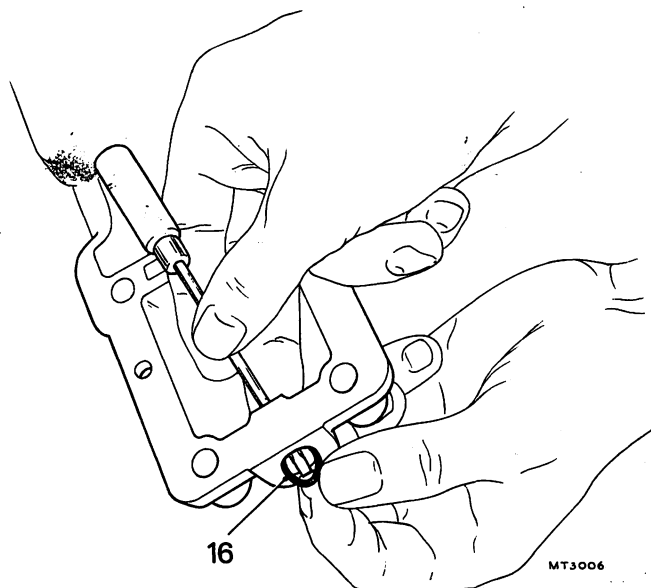
TOP COVER EXTENSION

—Overhaul

37.12.13

Dismantling

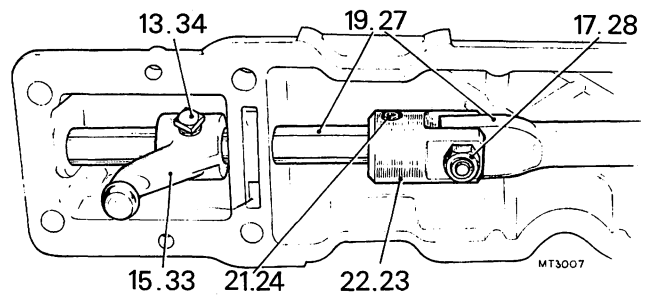
1. Remove the top cover extension. 37.12.10.
2. Remove the cap.
3. Lift off the steel and nylon cups.
4. Remove the spring.
5. Release the lever from the operating shaft.
6. Withdraw the lever.
7. Remove the circlip.
8. Take off the spring.
9. Remove the nylon sphere.
10. Unscrew the stop-bolt and locknut.
11. Drill out the two rivets.
12. Remove the reverse stop plate.
13. Unscrew the taper locking pin.
14. Withdraw the shaft assembly.
15. Remove the actuator.
16. Remove the 'O' rings from the extension housing bores.
17. Unscrew and remove the nut.
18. Withdraw the bolt.
19. Separate the shafts and remove the washers.
20. Press out the bush.
21. Drive out the Mills pin.
22. Remove the fork end.



SYNCHROMESH GEARBOX

Reassembling

23. Fit the fork end onto the actuator shaft.
24. Refit the Mills pin.
25. Press the bush into the primary shaft.
26. Fit washers on both sides of the bush.
27. Assemble the shafts and fit the bolt from the underside.
28. Fit and tighten the nut to a torque loading of 1.1 to 1.4 kgf m (8 to 10 lbf ft).
29. Fit the 'O' rings to the extension housing bores.
30. Place the reverse stop plate in position.
31. Secure the stop plate with Pop rivets.
32. Fit the actuator shaft through the rear bore of the extension housing.
33. Locate the actuator onto the shaft.
34. Push the shaft into position and align the taper pin holes in actuator and shaft. Fit the taper locking pin.
35. Loosely fit the stop-bolt and locknut to the lever.
36. Fit the nylon sphere to the lever.
37. Fit the reverse baulk spring.
38. Secure the circlip.
39. Fit the lever assembly into the extension.
40. Secure the lever to the shaft.
41. Fit the spring.
42. Refit the nylon and steel cups.
43. Refit the cap.
44. Refit the top cover extension and adjust the reverse stop bolt. 37.12.13 and 37.16.01.



TOP COVER

—Remove and refit

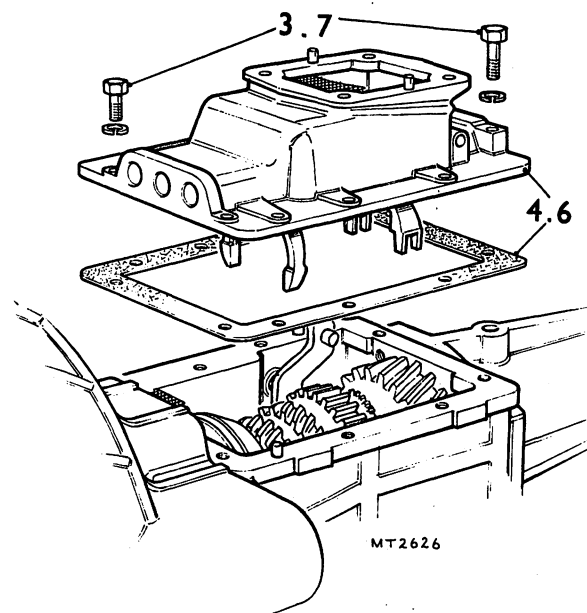
37.12.16

Removing

1. Select first gear.
2. Remove the top cover extension. 37.12.13.
3. Working from the engine compartment, unscrew and remove the bolts and washers.
4. Remove the top cover and joint washer.

Refitting

5. Ensure that the first gear position is selected.
6. Fit the top cover and a new joint washer.
7. Fit and tighten the bolts and washers.
8. Refit the top cover extension. 37.12.13.
9. Check that each gear position may be selected.



TOP COVER

—Overhaul

37.12.19

1. Remove the top cover. 37.12.16.

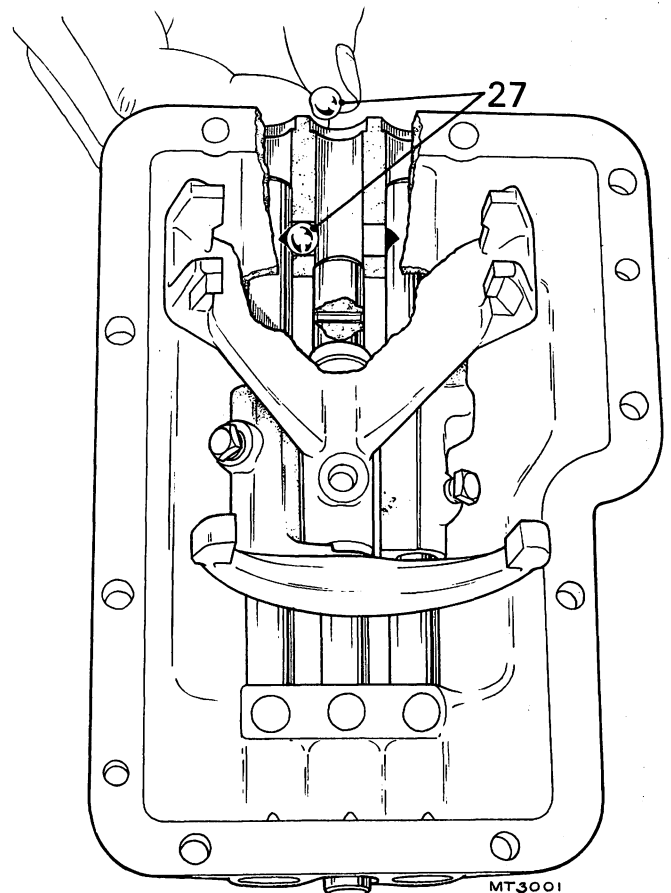
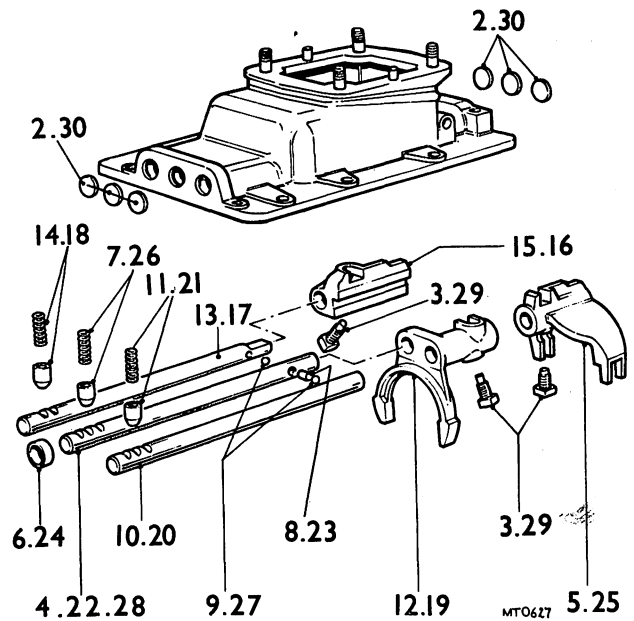
Dismantling

2. Using a 3.0 mm (0.125 in) dia. pin punch, drive out the selector shaft welch plugs.
3. Unscrew the taper locking pins.
4. Drive out the 1st/2nd selector shaft towards the rear of the top cover.
5. Remove the 1st/2nd selector fork.
- 6.**Remove the sleeve fitted on earlier models.**
7. Remove the detent plunger and spring.
8. Remove the interlock plunger from the shaft.
9. Shake out the interlock balls.
10. Drive out the 3rd/top selector shaft towards the rear of the top cover.
11. Remove the detent plunger and spring.
12. Remove the 3rd/top selector fork.
13. Drive out the reverse selector shaft.
14. Remove the detent plunger and spring.
15. Remove the reverse actuator.

****NOTE:** For 11 above and 21 below. A packing disc may be fitted between the spring and detent plunger. This disc should be refitted in position when reassembling the 3rd/top selector shaft.**

Reassembling

16. Invert the top cover and place the reverse actuator inside.
17. Slide the reverse selector shaft through the rear end of the top cover and through the reverse actuator.
18. Fit the spring and detent plunger into the top cover and push the selector shaft into the neutral position (2nd detent).
19. Place the 3rd/top selector fork into the top cover.
20. Slide the 3rd/top selector shaft through the rear end of the top cover and through the 3rd/top fork.
21. Fit the spring and detent plunger into the top cover and push the shaft into the neutral position (middle detent).
22. Slide the 1st/2nd selector shaft through the rear end of the top cover.
23. Fit the interlock plunger into the shaft.
- 24.**Fit the sleeve over the shaft (earlier models only).**
25. Fit the 1st/2nd selector fork in position and slide the shaft through both selector forks.
26. Fit the spring and detent plunger into the top cover and push the shaft through until it just protrudes through the front end of the cover.
27. Locate the interlock balls in the top cover.
28. Push the 1st/2nd selector shaft rearwards until it locates in the neutral (middle detent) position.
29. Fit and tighten the three taper locking pins.
30. Apply sealing compound to the edges of six new welch plugs and fit them into the top cover.
31. Refit the top cover. 37.12.16.



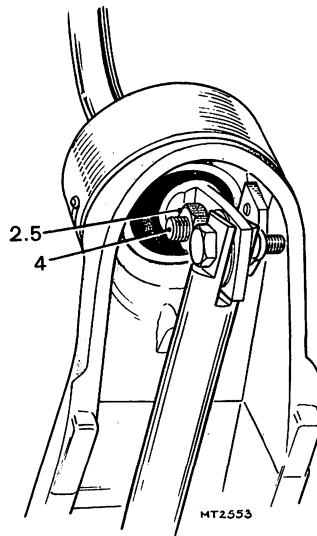
SYNCHROMESH GEARBOX

GEAR-CHANGE LEVER

—Check and adjust

37.16.01

1. Drive the vehicle onto a ramp and raise the ramp.
2. Slacken the locknut.
3. Place the gear lever in the neutral position of the 1st/2nd gate.
4. Adjust the stop bolt to prevent inadvertent selection of the reverse gate without depressing the lever. Check that the reverse gate can be selected by depressing the lever.
NOTE: Failure to obtain the required adjustment will necessitate the renewal of the reverse stop bolt and reverse stop plate.
5. Tighten the locknut.



GEAR-CHANGE LEVER

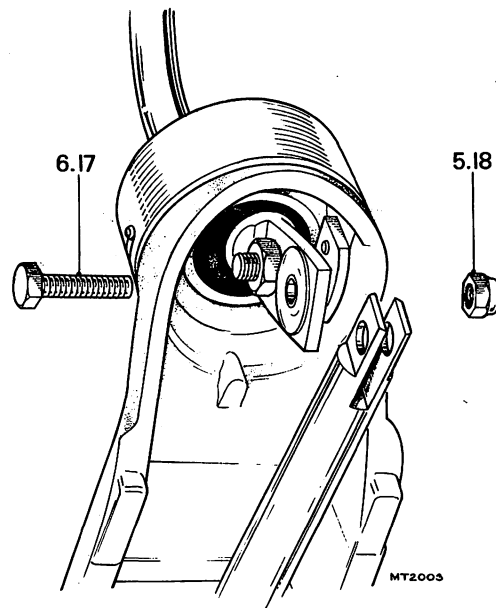
—Remove and refit

37.16.04

1. Drive the vehicle onto a ramp.
2. Remove the gear lever grommet. 37.16.05.

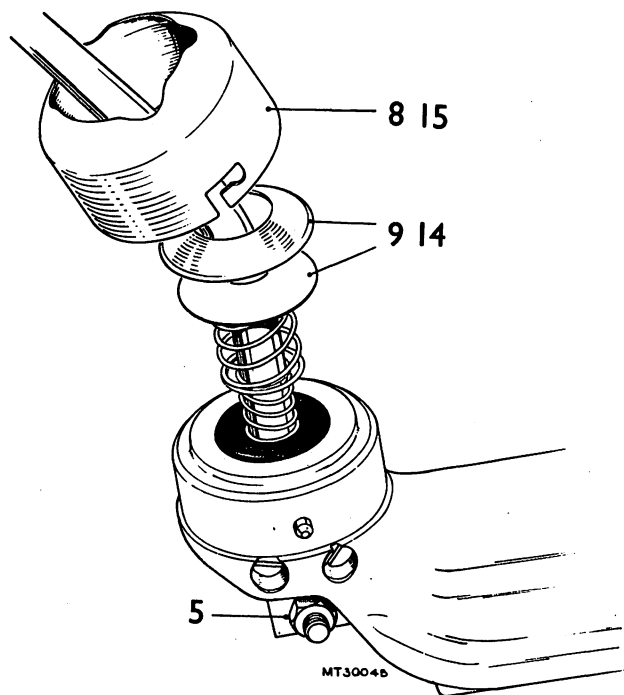
Removing

3. Remove the fabric washer (if fitted).
4. Raise the ramp.
5. Working from below the vehicle, unscrew the nut.
6. Remove the bolt and washer.
7. Lower the ramp.
8. Working from the passenger compartment, release the cap.
9. Remove the steel and nylon cups.
10. Remove the spring.
11. Withdraw the gear-change lever.



Refitting

12. Fit the gear-change lever into the extension.
13. Replace the spring.
14. Replace the nylon and steel cups.
15. Refit the cap.
16. Raise the ramp.
17. Working from below the vehicle, assemble the lever to the selector shaft and fit the bolt and washer.
18. Fit and tighten the nut to a torque loading of 0.8 to 1.1 kgf m (6 to 8 lbf ft).
19. Adjust the reverse stop bolt. 37.16.01.
20. Lower the ramp.
21. Working from the passenger compartment, refit the fabric washer.
22. Refit the gear lever grommet. 37.16.05.



37.16.01

37.16.04

GEAR LEVER GROMMET

—Remove and refit

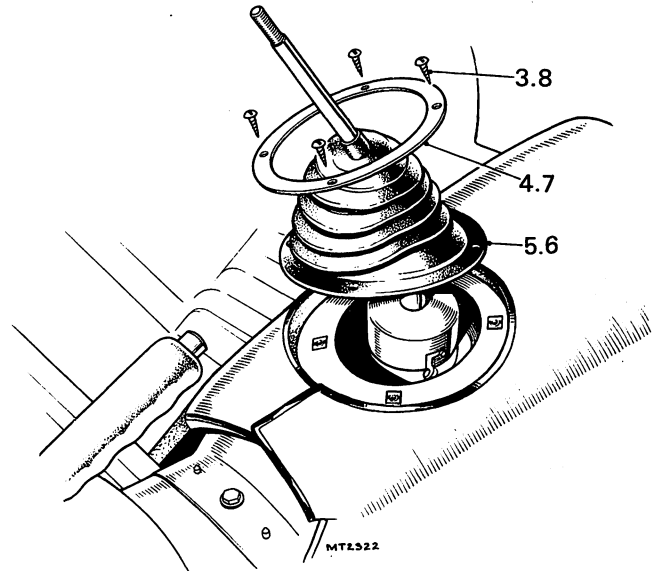
37.16.05

Removing

1. Unscrew the gear lever knob and locknut.
2. Remove the gearbox cover carpet.
3. Take out four screws.
4. Remove the clamp ring.
5. Remove the gear lever grommet.

Refitting

6. Fit the grommet over the gear lever.
7. Replace the clamp ring.
8. Fit and tighten the four screws.
9. Refit the gearbox cover carpet.
10. Refit the gear lever knob and locknut.



GEAR-CHANGE LEVER

—Overhaul

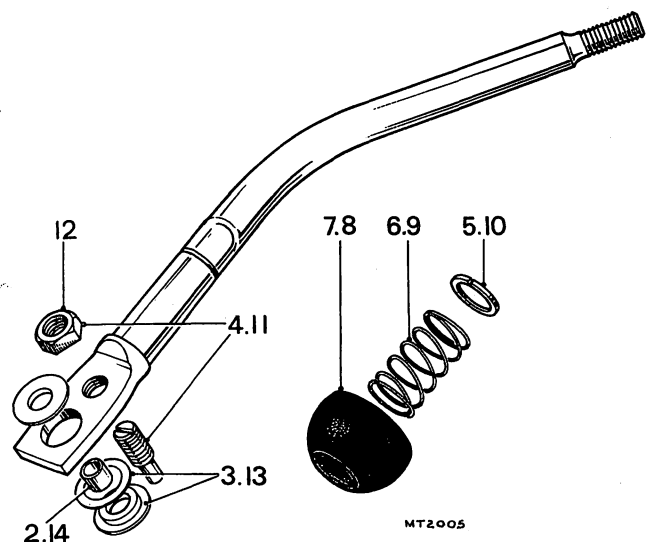
37.16.10

Dismantling

1. Remove the gear-change lever. 37.16.04.
2. Take out the pinch sleeve.
3. Remove the bushes and washers.
4. Slacken and remove the locknut and unscrew the stop bolt.
5. Remove the snap-ring.
6. Take off the spring.
7. Remove the nylon sphere.

Reassembling

8. Fit a new nylon sphere to the lever.
9. Fit a new spring.
10. Fit a new snap-ring.
11. Screw a new reverse stop bolt into the lever.
12. Refit the locknut.
13. Assemble new bushes and the washers to the lever.
14. Refit the pinch sleeve.
15. Refit the gear-change lever assembly. 37.16.04.



SYNCHROMESH GEARBOX

GEARBOX ASSEMBLY

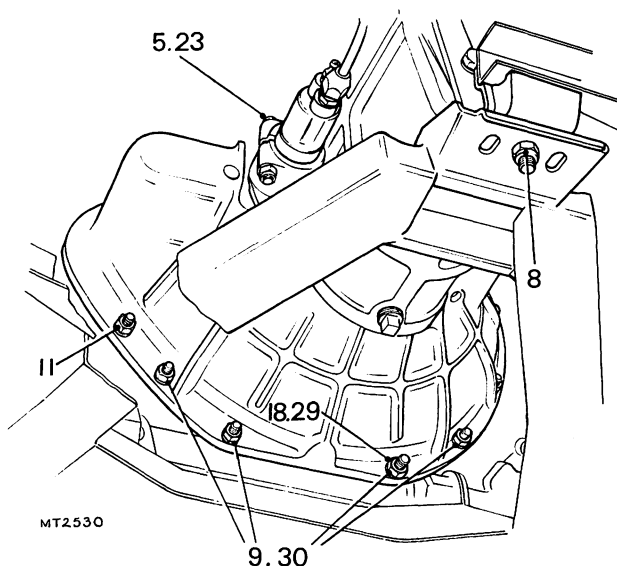
—Remove and refit

37.20.01

1. Drive the vehicle onto a ramp, and disconnect the battery.
2. Take out the gearbox cover. 76.25.07.

Removing

3. Disconnect the propeller shaft from the gearbox drive flange.
4. Disconnect the speedometer cable from the gearbox.
5. Take out the pinch-bolt and withdraw the clutch slave cylinder.
6. Raise the ramp, drain the gearbox oil and support the sump with a ramp jack.
7. Disconnect the exhaust pipe from the support bracket.
8. Remove the gearbox mounting nut and washer.
9. Take out the bell housing bolts accessible from below.
10. Lower the ramp and open the bonnet.
11. Take out the starter motor attachment bolts.
12. Working inside the vehicle, remove the bolts.
13. Detach the gearbox mounting assembly.
14. Remove the remaining bell housing bolts and nuts.
15. Carefully withdraw the gearbox assembly and remove it from the vehicle.



Refitting

16. Check that the clutch driven plate is centralized.
17. Fit the gearbox in position, ensuring that the constant pinion shaft is not allowed to hang on the clutch plate splines.
18. Fit the dowel bolt and nut.
19. Fit and tighten the nuts and washers.
20. Secure the upper bell housing bolts and nuts.
21. Refit the gearbox mounting assembly.
22. Fit and tighten the bolts.
23. Refit the clutch slave cylinder.
24. Fit and tighten the pinch-bolt and nut.
25. Refit the speedometer drive cable.
26. Refit the propeller shaft to the gearbox drive flange.
27. Working under the bonnet, refit the starter motor.
28. Raise the ramp.
29. Tighten the dowel bolt and nut.
30. Fit and tighten the remaining bell housing bolts.
31. Lower and remove the ramp jack.
32. Fit and tighten the gearbox mounting nut.
33. Refit the exhaust front pipe to the support bracket.
34. Lower the ramp.
35. Refill the gearbox with oil.
36. Refit the gearbox cover.
37. Refit the parcel shelf.
38. Connect the battery and close the bonnet.

37.20.01

GEARBOX ASSEMBLY

—Overhaul

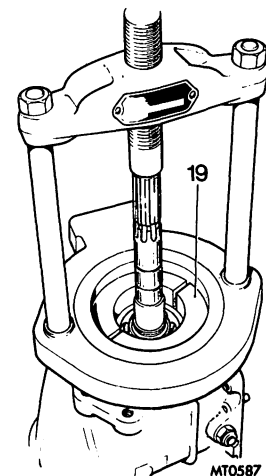
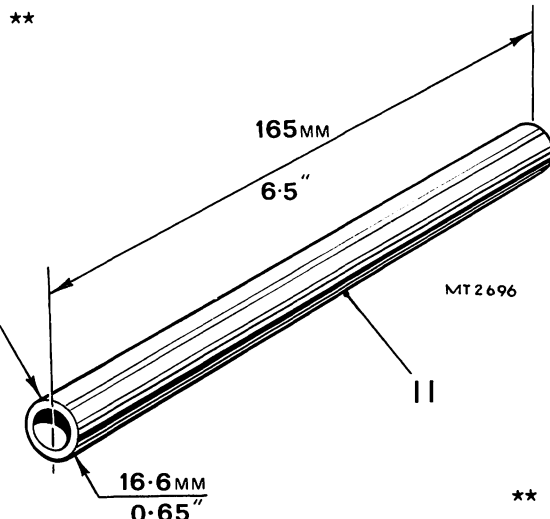
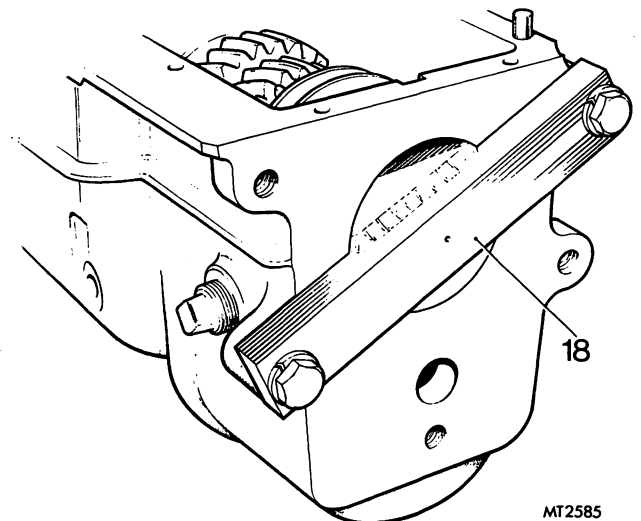
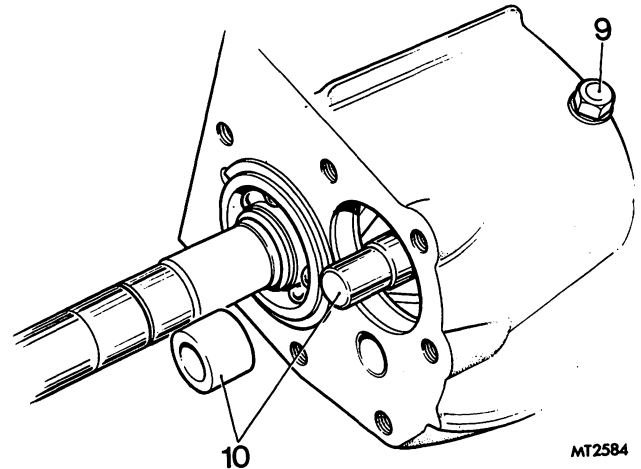
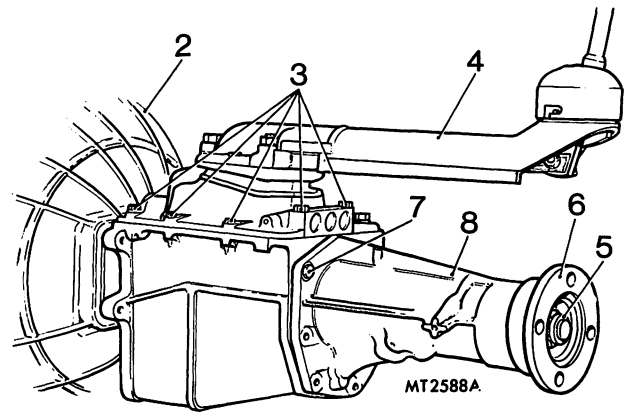
37.20.04

** Service tools: S4235A, S4235A-2, S4221A, S4221A-19, S4221A-19/1, S4221A-19/2, S4221A-19/3, RG421, S144 or S144A, S145, S314/1, Needle-roller retaining tube**

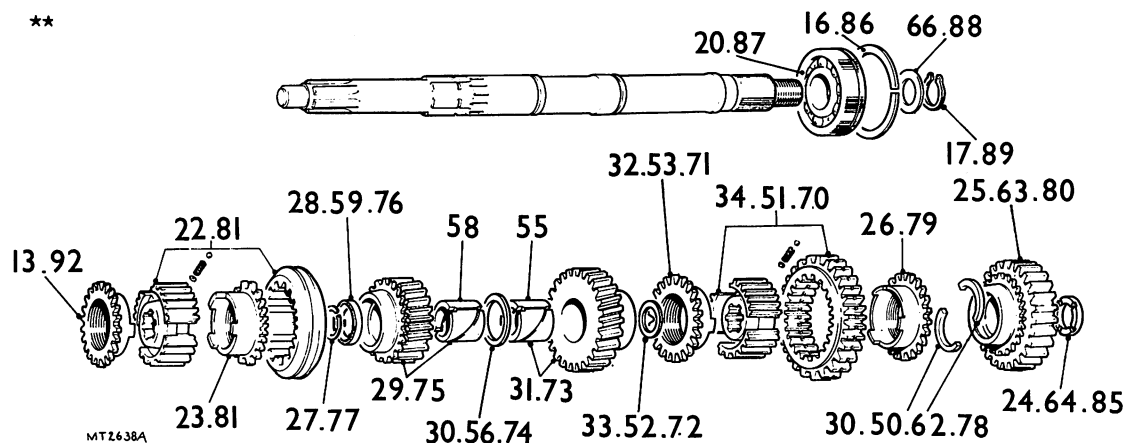
1. Remove the gearbox. 37.20.01.

Dismantling

2. Remove the bell housing. 37.12.07.
3. Take out the bolts.
4. Lift off the top cover and extension and the joint washer.
5. Unscrew the flange nut and remove the washer
** (use service tool RG 421 to hold flange as necessary). **
6. Withdraw the flange.
7. Unscrew the bolts.
8. Withdraw the rear extension and joint washer.
9. Unscrew the retaining bolt.
10. Withdraw the reverse idler spindle and distance tube.
11. Insert the needle-roller retaining tube (corresponding to the dimensions given) and eject the layshaft spindle to the rear. Allow the layshaft cluster to drop to the bottom of the gearbox.
12. Using Tool No. S4235A-2, withdraw the constant pinion assembly.
13. Remove the top gear baulk ring.
14. Remove the circlip retaining the speedometer drive gear.
15. Remove the speedometer drive gear and ball.
16. Remove the snap-ring from the mainshaft ball race.
17. Remove the circlip from the mainshaft ball race.
18. Fit the abutment plate, Tool No. S4221A-19.
19. Fit Tool No. S4221A and adaptor S4221A-19/1 to the annular groove in the mainshaft centre ball race.
20. Withdraw the ball race.

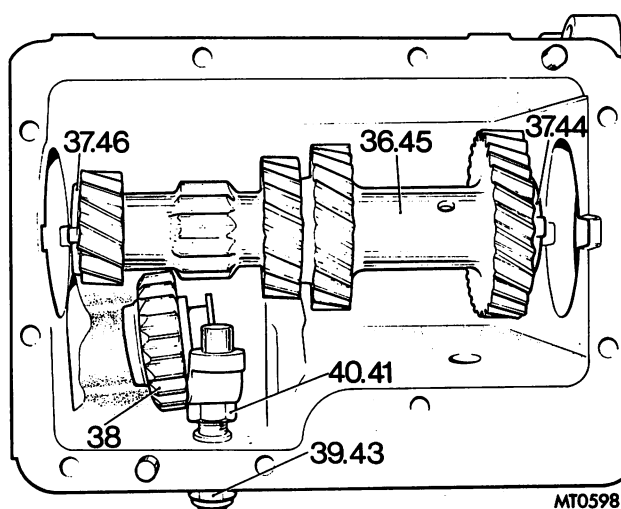


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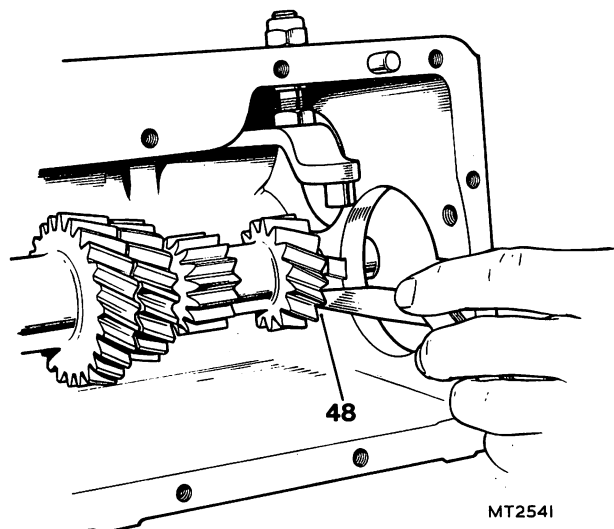
21. Tilt the mainshaft and remove it from the gearbox.
22. Remove the 3rd/top synchro unit.
23. Remove the 3rd gear baulk ring.
24. From the rear of the mainshaft, remove the thrust washer.
25. Remove the 1st speed gear.
26. Remove the 1st gear baulk ring.
- 27.★★Remove the circlip. Where the third gear mainshaft thrust washer has three lugs use Tool S144. Where the washer has six lugs use Tool S144A.★★
28. Withdraw the washer.
29. Remove the 3rd speed gear and bush.
30. Remove the thrust washer.
31. Remove the 2nd speed gear and bush.
32. Remove the 2nd gear baulk ring.
33. Remove the thrust washer.
34. Remove the 1st/2nd synchro unit.
35. Remove the split collars.
36. Lift out the layshaft cluster.
37. Take out the layshaft thrust washers.
38. Remove the reverse idler gear.
39. Unscrew the nut.
40. Remove the reverse actuator and pivot pin.

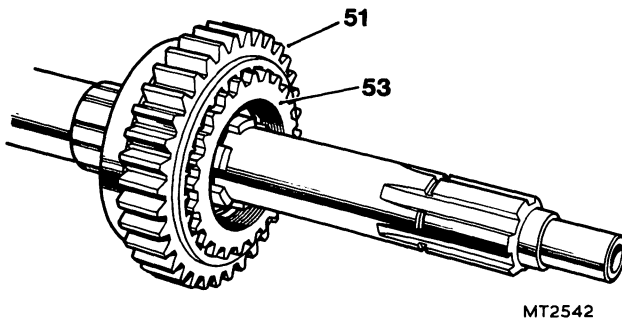
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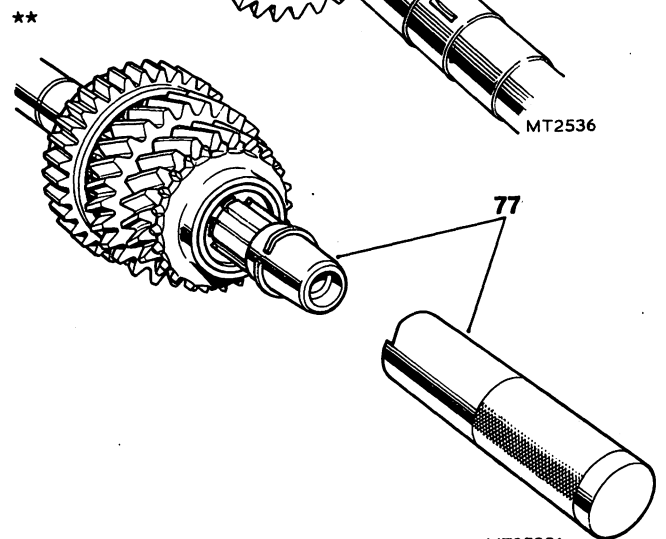
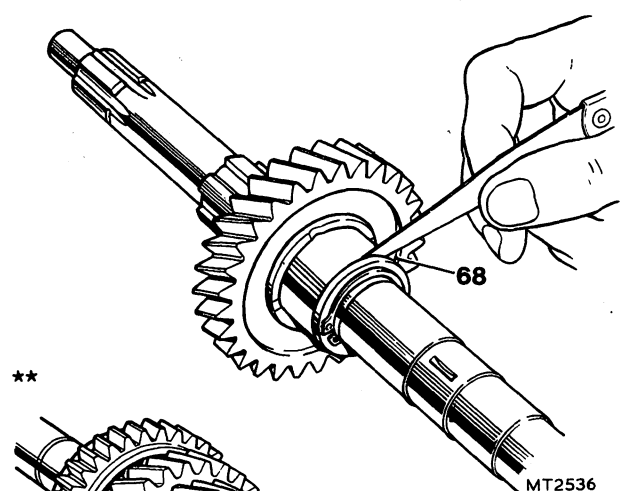
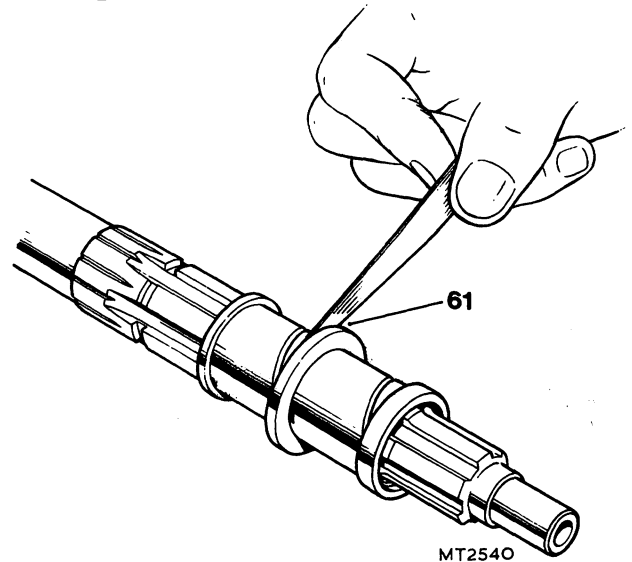
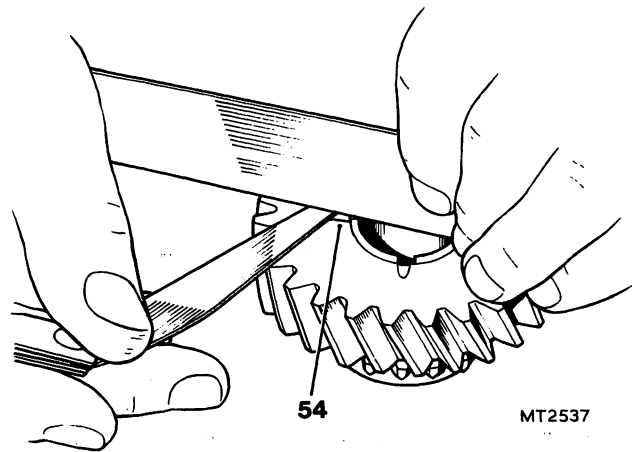
Reassembling

41. Screw the pivot pin into the reverse actuator until one full thread protrudes through the lever boss.
42. Fit the actuator and pivot pin into the gear casing
43. Fit the plain washer and tighten the nut.
44. Smear the front face of the layshaft front thrust washer with grease and stick it in position in the gear casing. Insert the end of the layshaft spindle through the casing to centralize the washer.
45. Lower the layshaft cluster assembly into the gear-box.
46. Fit the rear thrust washer in position.
47. Insert the layshaft spindle and eject the needle-roller retaining tube.
48. Measure the layshaft cluster end-float. Adjust the layshaft end-float to 0.18 to 0.33 mm (0.007 to 0.013 in), by selective use of thrust washers, repeating 44 to 48 as necessary. Do not remove metal from the bronze face of the thrust washers.
49. Insert the needle-roller retaining tube, eject the layshaft spindle and allow the cluster to drop to the bottom of the gearbox.



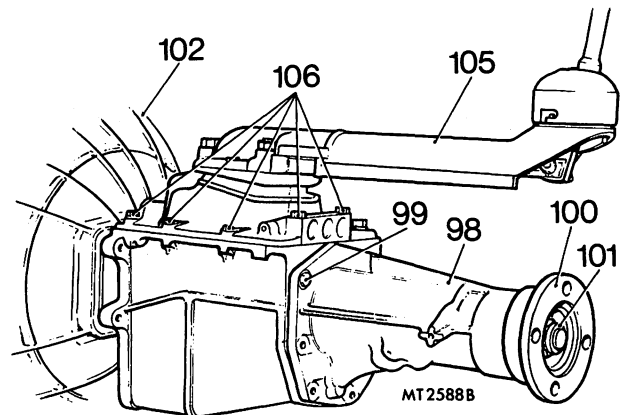
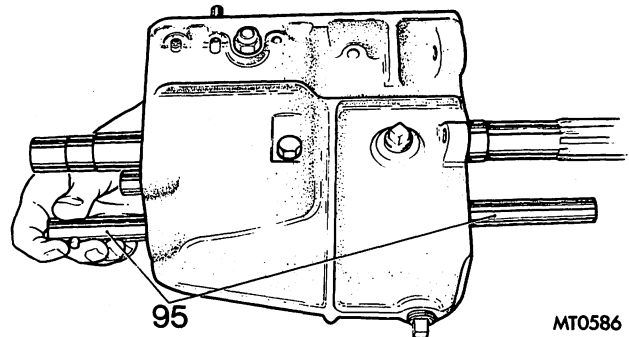
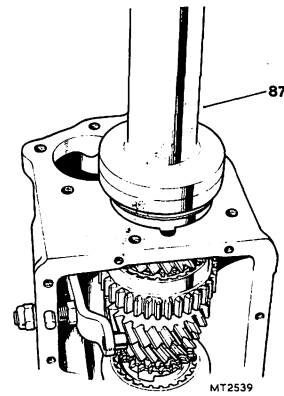


50. Fit the split collars to the mainshaft.
51. Slide the 1st/2nd synchro unit onto the shaft.
52. Refit the thrust washer.
53. Fit the 2nd gear baulk ring.
- 54.**Check the end-float of the second gear on the bush, which if correct will be not more than 0.006 in. (0.1524 mm). Reduce the length of the bush to reduce the end-float, renew the bush to increase the end-float.**
55. Fit the second gear bush to the shaft.
56. Refit the thrust washer.
57. Check the end-float of the 3rd gear on the bush. (Ref. 54).
58. Fit the 3rd gear bush to the shaft.
59. Refit the washer.
60. Secure the assembly using a discarded half circlip.
61. Measure the end-float of the bushes on the mainshaft and adjust by selective use of thrust washers until an end-float of 0.00 to 0.15 mm (0.000 to 0.006 in) is obtained. Dismantle the mainshaft.
62. Fit the split collars to the mainshaft.
63. Fit the 1st speed gear.
64. Fit the thrust washer.
65. Fit a discarded bearing inner race or distance tube 18.99 to 19.05 mm (0.748 to 0.750 in) long.
66. Measure the thickness of the circlip washer and assemble to the shaft.
67. Fit a discarded half circlip.
68. Measure the 1st speed gear end-float and determine the thickness of the circlip washer required to provide an end-float of 0.00 to 0.05 mm (0.00 to 0.002 in).
69. Dismantle the mainshaft.
Assemble components to the mainshaft as follows:
70. First/second synchro unit.
71. Second gear baulk ring.
72. Thrust washer.
73. Second speed gear and bush.
74. Thrust washer.
75. Third speed gear and bush.
- 76.**Refit the thrust washer with the lip facing forward.
77. Using Tool No. S145, refit the circlip with the tang facing forward and located in a spline groove.**
78. Split collars.
79. First gear baulk ring.
80. First speed gear.
81. Third/top synchro unit.
82. Position the reverse idler gear in the casing.
83. Place the mainshaft assembly in the gearbox.



SYNCHROMESH GEARBOX

84. Fit the abutment plate to the gearbox and mount in a vice.
85. Fit the thrust washer over the mainshaft.
86. Assemble the snap-ring to the ball race.
87. Place the ball race over the mainshaft and drive into position using Tool No. S314/1 and adaptor S4221A-19/3.
88. Fit the circlip washer selected (Ref. 68).
89. Fit a new circlip.
90. Refit the speedometer drive gear, ball and circlip.
91. Remove the gearbox from the vice and take off the abutment plate.
92. Place the top gear baulk ring in the 3rd/top synchro unit.
93. Refit the constant pinion assembly using Tool No. S314/1 and adaptor S4221A-19/3, ensuring that the top gear baulk ring is correctly located.
94. Invert the gearbox and align the layshaft cluster and thrust washers.
95. Insert the layshaft spindle from the rear and eject the needle-roller retaining tube.
96. Position the reverse idler gear and fit the spindle and distance tube. Fit the locating bolt.
97. Locate the washer on the end of the mainshaft.
98. Refit the rear extension assembly and a new joint washer.
99. Fit the bolts and washers.
100. Replace the drive flange.
101. **Fit and tighten the nut and washer. (Use Service tool RG421 to hold flange as necessary). **
102. Refit the bell housing assembly and a new joint washer. 37.12.07.
103. Fit and tighten the bottom bolt and copper washer.
104. Select 1st gear on the top cover and the gearbox.
105. Fit the top cover and a new joint washer.
106. Fit and tighten the bolts and washers.



SYNCHRONIZER ASSEMBLIES

—Overhaul

37.20.08

Service tools: spring balance and adaptor

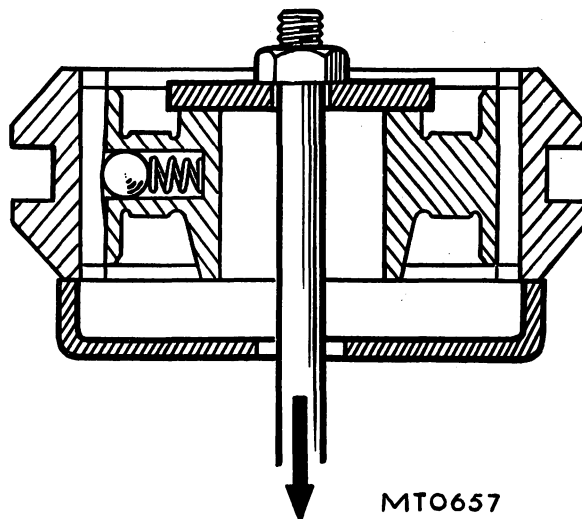
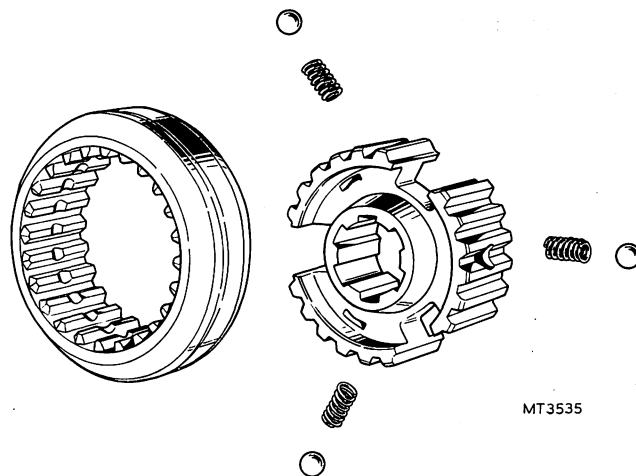
1. Remove the gearbox assembly. 37.20.01.
2. Dismantle the gearbox. 37.20.04.

Dismantling

3. Place the assembly in a small box to prevent losing the spring-loaded balls, and press the hub through the sleeve.

Reassembling

4. Assemble the synchro springs and balls to the synchro hub and retain them in position with petroleum jelly.
5. Carefully press the sleeve onto the hub.
6. Using the spring balance and adaptor, check the axial release loads, which should be:
 1st/2nd 8.6 to 9.5 kg (19 to 21 lb).
 3rd/top 8.6 to 9.5 kg (19 to 21 lb).
 If the release loads differ from the specified figures, fit new springs and/or add shims under the springs until the correct loading is achieved.
7. Reassemble the gearbox. 37.20.04.
8. Refit the gearbox. 37.20.01.



SYNCHROMESH GEARBOX

LAYSHAFT CLUSTER

—Overhaul

37.20.29

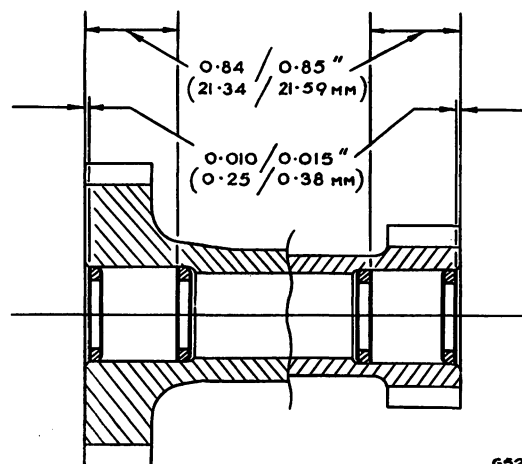
1. Remove the gearbox. 37.20.01.
2. Remove the layshaft cluster. 37.20.04.

Dismantling

3. Withdraw the needle-roller retaining tube.
4. Shake out the needle rollers.
5. Prise out the retaining rings.

Reassembling

6. Using a shouldered mandrel, drive the retaining rings into the end bores of the layshaft cluster to the depth shown.
7. Using heavy grease to retain them, refit the needle rollers.
8. Insert the needle-roller retaining tube.
9. Refit the layshaft cluster. 37.20.04.
10. Refit the gearbox. 37.20.01.



6524

CONSTANT PINION

—Overhaul

37.20.34

Service tools: S4221A, S4221A-19/1

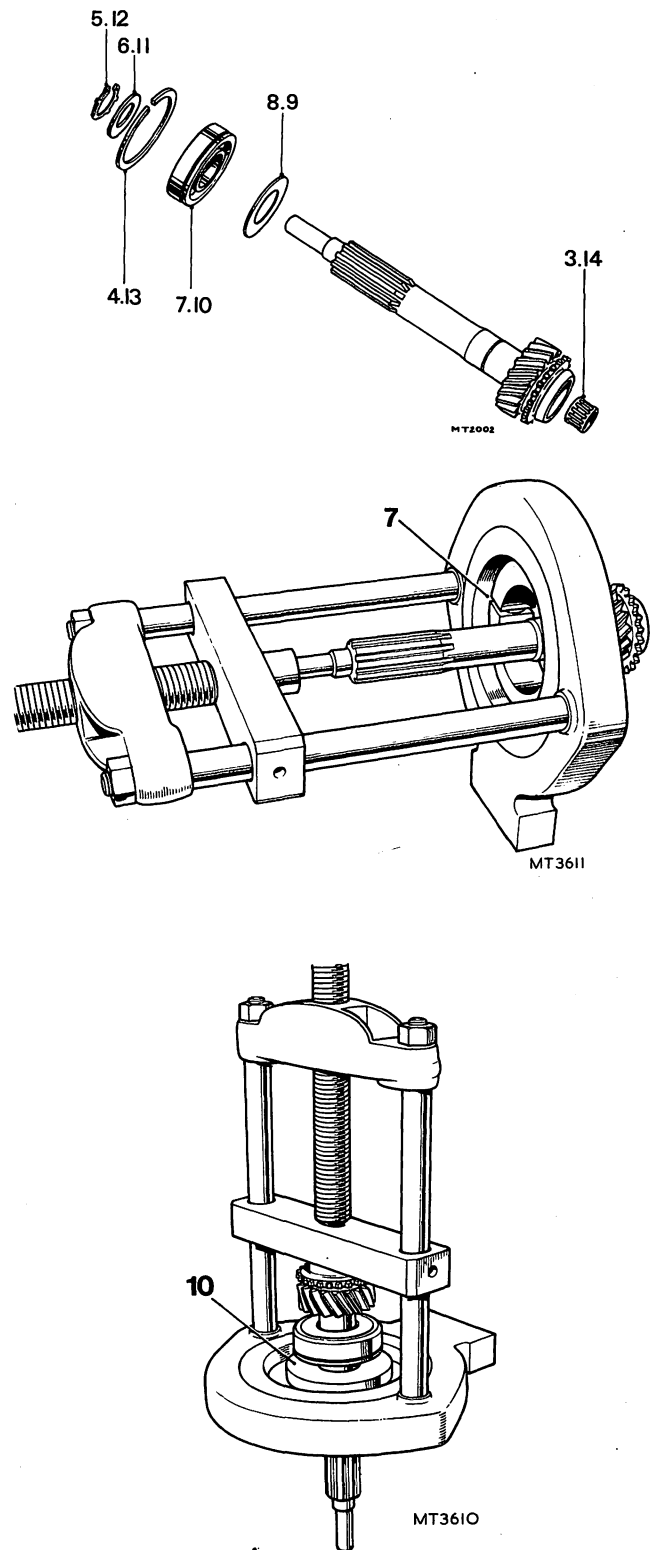
1. Remove the gearbox. 37.20.01.
2. Remove the constant pinion. 27.20.04, operation 12.

Dismantling

3. Remove the roller bearing.
4. Remove the snap-ring.
5. Extract the circlip.
6. Remove the washer.
7. Utilizing Tool No. S4221A and adaptor S4221A-19/1, withdraw the bearing.
8. Remove the oil thrower.

Reassembling

9. Refit the oil thrower.
10. Utilizing Tool No. S4221A and adaptor S4221A-19/1, draw the bearing onto the pinion ensuring that the oil thrower is correctly located.
11. Replace the washer.
12. Refit the circlip.
13. Refit the snap-ring.
14. Replace the roller bearing.
15. Refit the constant pinion. 37.20.04, operation 93.
16. Refit the gearbox. 37.20.01.



REAR OIL SEAL

—Remove and refit

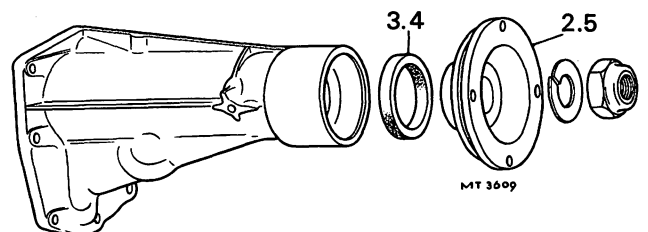
37.23.01

Removing

1. Remove the propeller shaft assembly.
2. Remove the gearbox drive flange. 37.10.01.
3. Prise out the seal.

Refitting

4. Drive a new seal into the rear extension.
5. Refit the gearbox drive flange. 37.10.01.
6. Refit the propeller shaft.



SYNCHROMESH GEARBOX

SPEEDOMETER DRIVE GEAR

—Remove and refit

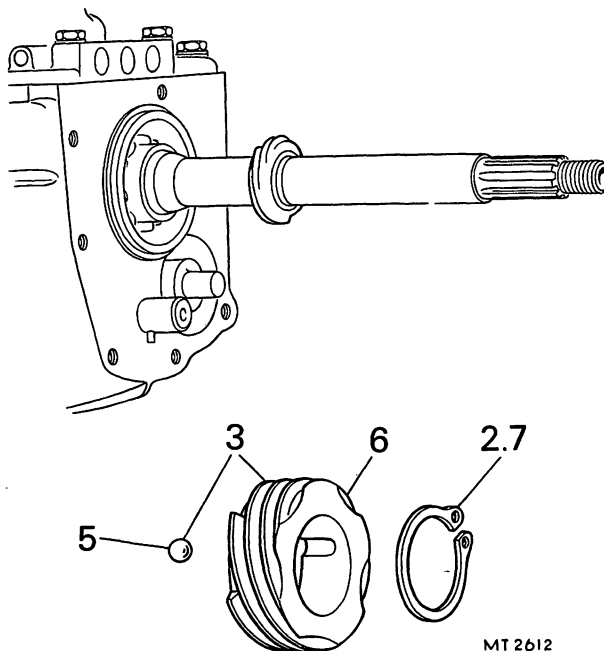
37.25.01

Removing

1. Remove the rear extension. 37.12.01.
2. Remove the circlip.
3. Remove the speedometer drive gear and ball.

Refitting

4. Turn the mainshaft until the drive ball detent is uppermost.
5. Locate the drive ball in the detent.
6. Fit the drive gear over the ball.
7. Replace the circlip.
8. Refit the rear extension. 37.12.01.



SPEEDOMETER DRIVE GEAR PINION

—Remove and refit

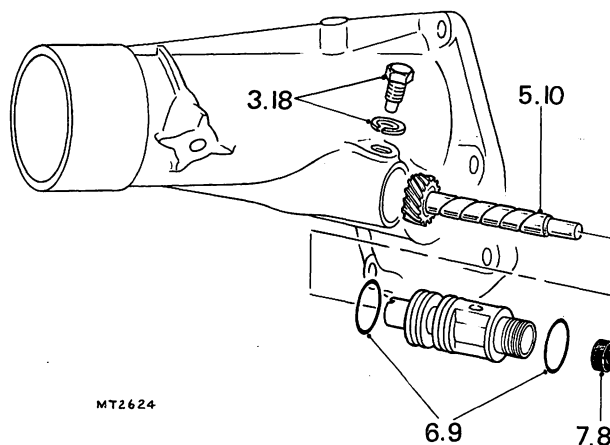
37.25.05

Removing

1. Drive the vehicle onto a ramp. Raise the ramp.
2. Disconnect the speedometer cable from the gearbox.
3. Unscrew and remove the peg bolt and washer.
4. Withdraw the speedometer pinion and housing.
5. Withdraw the pinion from the housing.
6. Remove the 'O' rings.
7. Prise out the seal.

Refitting

8. Fit a new seal into the housing.
9. Fit new 'O' rings.
10. Fit the pinion into the housing.
11. Refit the assembly to the gearbox.
12. Fit and tighten the peg bolt and washer.
13. Reconnect the speedometer cable.



37.25.01

37.25.05

PROPELLER SHAFT OPERATIONS

Centre bearing—overhaul	..	..	..	..	..	..	..	..	47.15.39
Propeller shaft assembly—remove and refit	..	..	..	..	..	..	..	..	47.15.01
Propeller shaft									
—front—remove and refit	..	..	..	..	..	..	..	..	47.15.02
—rear—remove and refit	..	..	..	..	..	..	..	..	47.15.03
Universal joint—overhaul	..	..	..	..	..	..	..	..	47.15.18

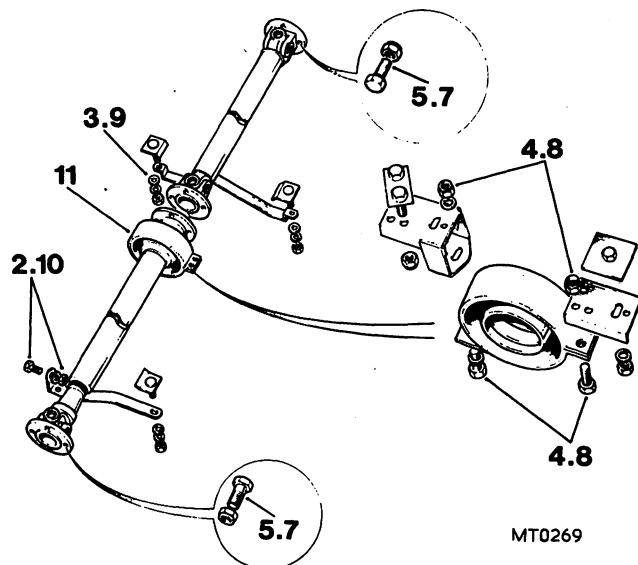
PROPELLER SHAFT ASSEMBLY

—Remove and refit

47.15.01

Removing

1. Drive the vehicle onto a ramp. Select neutral, chock the wheels but do not apply the hand brake. Raise the ramp.
- 2.**Remove the nut, washer and bolt and disconnect the right-hand side of the front strap from the floor panel. (Strap fitted on earlier models only.)
3. Remove the nut and washer and disconnect the right-hand side of the rear strap from the floor. (Strap fitted on earlier models only.)**
4. Remove the nuts, bolts and washers securing the centre bearing housing to the support brackets.
5. Support the propeller shaft and disconnect it from the gearbox and rear axle flanges.
6. Remove the propeller shaft from the vehicle.



Refitting

7. Attach the propeller shaft to the gearbox and axle flanges.
8. Loosely secure the centre bearing housing to the support brackets.
- 9.**Refit the rear strap to the floor (earlier models only).
10. Refit the front strap to the floor (earlier models only).**
11. Move the centre bearing to align the shafts, and tighten the nuts and bolts.

PROPELLER SHAFT

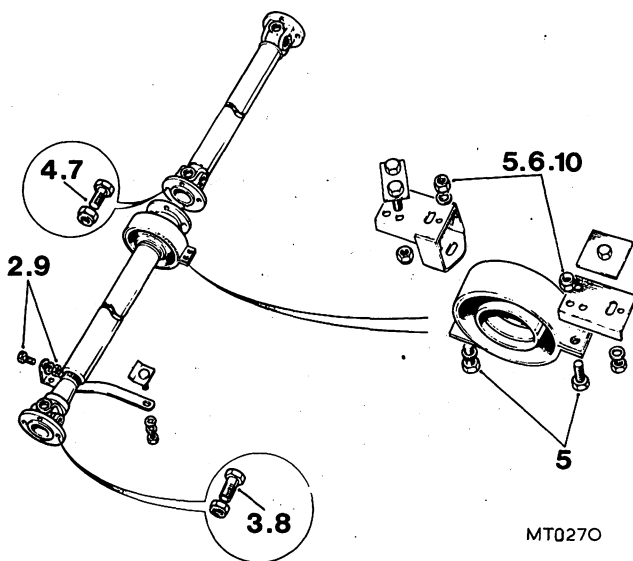
PROPELLER SHAFT—FRONT

—Remove and refit

47.15.02

Removing

1. Drive the vehicle onto a ramp. Select neutral, chock the wheels but do not apply the hand brake.
- 2.**Remove the nut, washer and bolt securing the front strap to the floor panel. (Strap fitted to earlier models only).**
3. Disconnect the propeller shaft from the gearbox drive flange.
4. Mark the relative positions of the flanges and disconnect the front propeller shaft from the rear propeller shaft.
5. Remove the nuts, washers and bolts securing the centre bearing to the support brackets. Remove the shaft.



Refitting

6. Loosely secure the centre bearing to the support brackets.
7. Attach the front propeller shaft to the rear shaft, noting the marks made in 4.
8. Attach the shaft flange to the gearbox drive flange.
- 9.**Secure the strap to the floor, using the nut, bolt and washer (earlier models only).**
10. Move the centre bearing to align the shafts, and tighten the nuts and bolts.

PROPELLER SHAFT—REAR

—Remove and refit

47.15.03

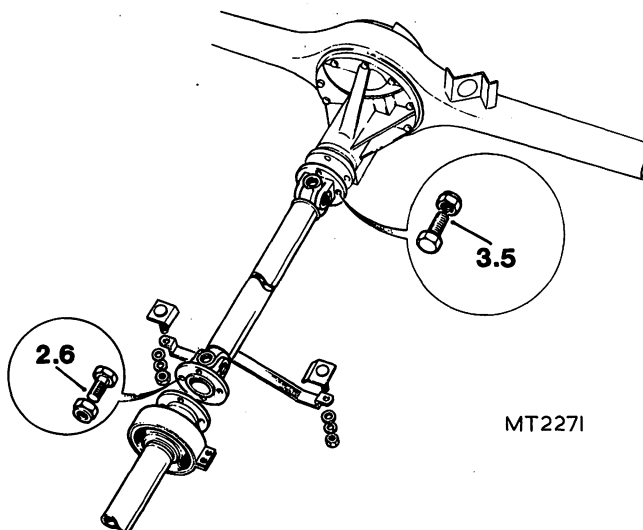
Removing

1. Drive the vehicle onto a ramp. Select neutral, chock the wheels but do not apply the hand brake.
2. Mark the relative positions of the flanges and disconnect the rear shaft from the front shaft.
3. Disconnect the rear shaft from the rear axle flange and remove the shaft.

Refitting

4. Fit the rear shaft in position.
5. Attach the shaft to the rear axle flange.
6. Attach the rear shaft to the front shaft, noting the marks made in 2.

NOTE: The guard strap illustrated is only fitted on earlier models.



47.15.02

47.15.03

UNIVERSAL JOINT

—Overhaul

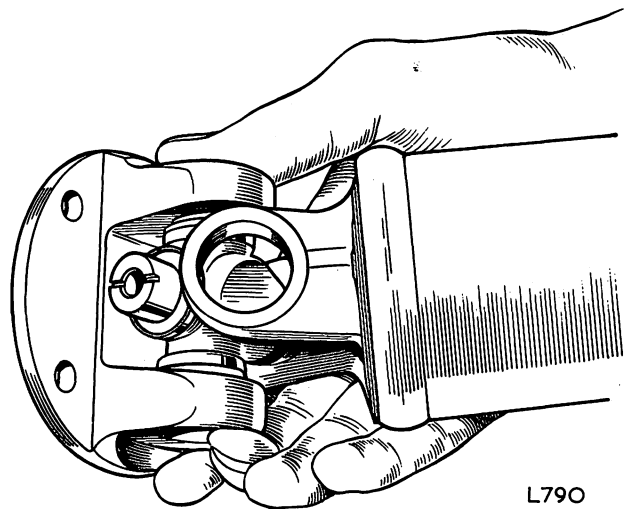
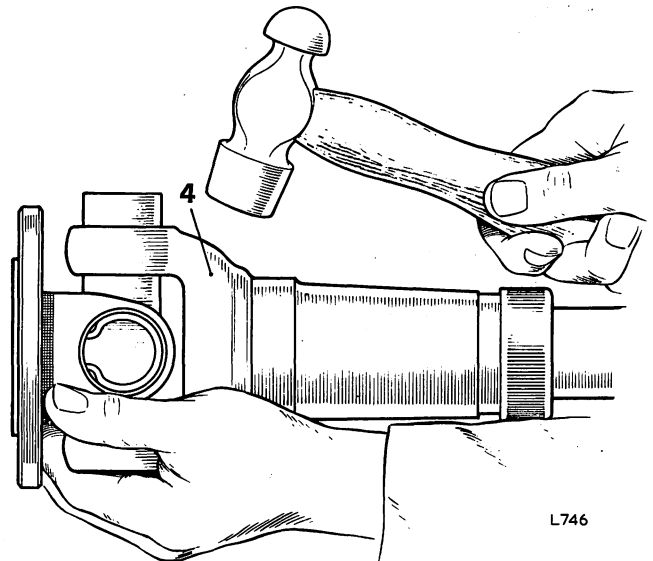
47.15.18

Dismantling

1. Remove the propeller shaft. 47.15.01, 02 or 03.
2. Remove paint, rust, etc., from the vicinity of the bearing cups and circlips.
3. Remove the circlips.
4. Tap the yokes to eject the bearing cups.
5. Withdraw the bearing cups and spider.

Reassembling

6. Remove the bearing cups from the new spider.
7. Ensure that the cups contain approved lubricant (one-third full) and that the needle bearings are complete and in position.
8. Fit the spider to the propeller shaft yoke.
9. Engage the spider trunnion in the bearing cup and insert the cup into yoke.
10. Fit the opposite bearing cup to the yoke and carefully press both cups into position, ensuring that the spider trunnion engages the cups and that the needle bearings are not displaced.
11. Using two flat-faced adaptors of slightly smaller diameter than the bearing cups, press the cups into the yokes until they reach the lower land of the circlip grooves. Do not press the bearing cups below this point or damage may be caused to the cups and seals.
12. Fit the circlips.



PROPELLER SHAFT

CENTRE BEARING

—Overhaul

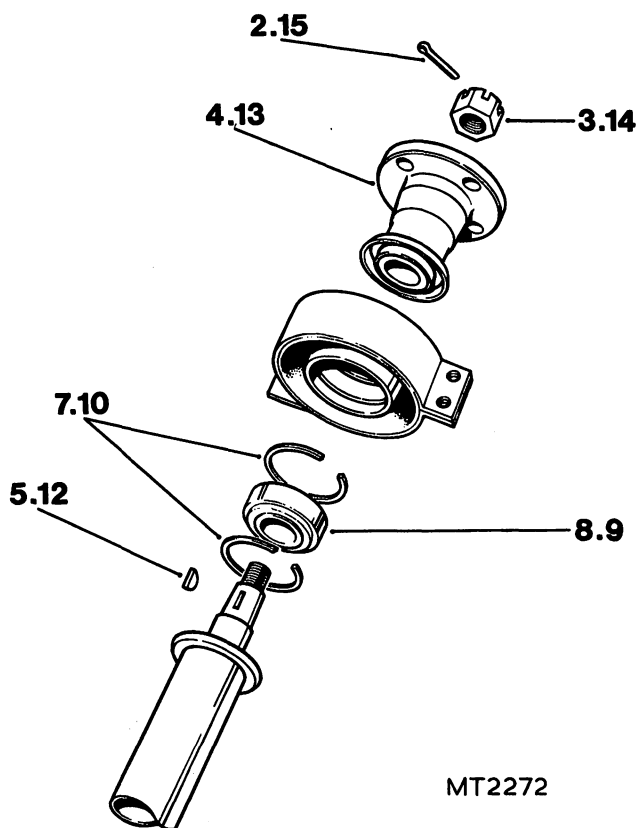
47.15.39

Dismantling

1. Remove the front propeller shaft. 47.15.02.
2. Take out the split pin.
3. Unscrew the nut.
4. Withdraw the drive flange.
5. Remove the key.
6. Withdraw the bearing and housing assembly from the shaft.
7. Remove the wire circlips.
8. Separate the bearing and housing.

Reassembling

9. Fit the bearing into the housing.
10. Refit the wire circlips.
11. Fit the assembly onto the shaft.
12. Ensure that the key and keyways are free from burrs, and fit the key.
13. Refit the drive flange.
14. Fit and tighten the nut.
15. Replace the split pin.



MT2272

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HALF SHAFT, BEARING AND OIL SEAL

—Remove and refit 51.10.02

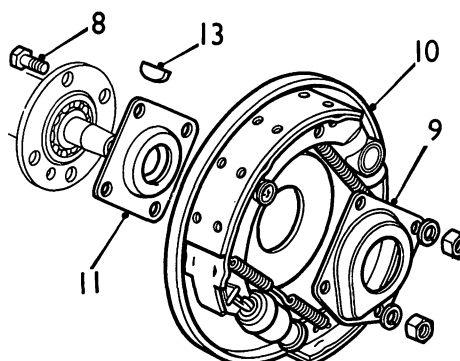
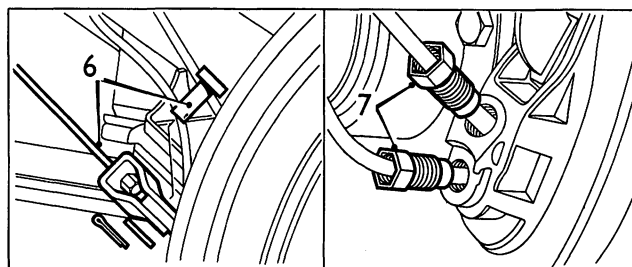
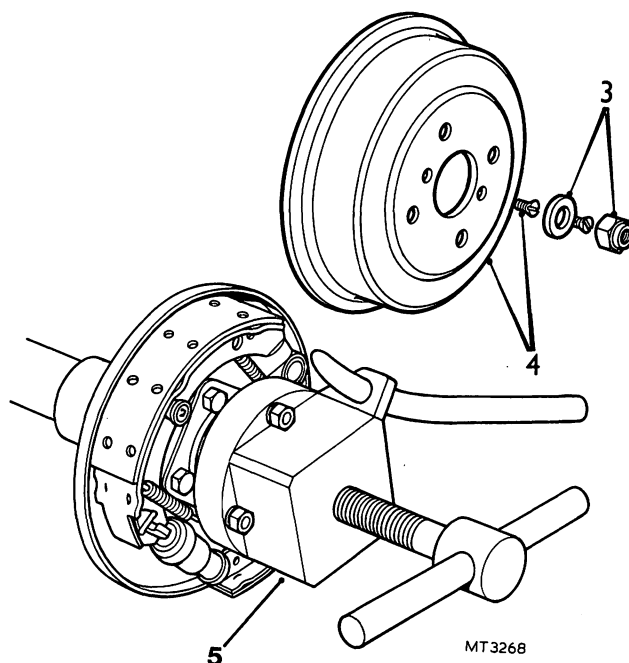
Half shaft 1 to 15, 17, 18 and 20 51.10.01

Service tools: S109C, S4235A, S4235A-1

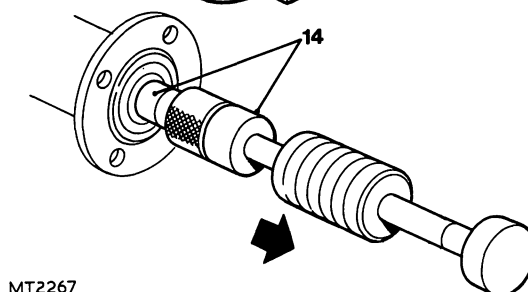
Removing

1. Raise and support the rear of the car.
 2. Remove the hub cap and road wheel.
 3. Remove the axle shaft nut and plain washer.
 4. Remove two screws retaining the brake-drum.
 5. Withdraw the rear hub from the axle shaft, using S109C.
 6. Remove the clevis pin and disconnect the hand brake cable from the wheel cylinder operating lever.
 7. Disconnect the brake pipe(s) from the wheel cylinder.
 8. Remove the nuts, spring washers and bolts retaining the brake backplate to the axle casing.
 9. Remove the oil catcher.
 10. Remove the backplate assembly.
 11. Remove the rear hub oil seal and housing assembly.
 12. Remove the oil seal from the housing.
 13. Remove the axle shaft key.
- CAUTION:** Place a container directly beneath the end of the axle casing to collect the spillage of oil when the axle shaft and oil seal are removed.
14. Withdraw the axle shaft from the casing, using S4235A and adaptor S4235A-1.
 15. Remove the inner oil seal.
 16. Press the bearing from the axle shaft.

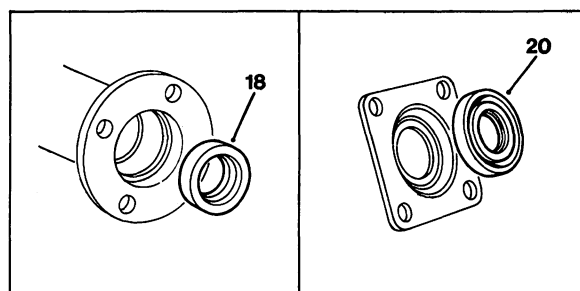
(continued)



INC 313



MT2267



51.10.01 Sheet 1

51.10.02 Sheet 1

REAR AXLE AND FINAL DRIVE

Refitting

17. Pack the bearing with lithium-based grease, and dip the new oil seal in light oil before reassembling.
18. Fit a new oil seal to the axle casing with the lip of the seal facing inwards.
19. Press the bearing onto the axle shaft until the dimension given in DATA exists from the bearing to the threaded end of the axle shaft.
20. Reverse 1 to 14, noting:
 - a. Refit the hub oil seal in its housing.
 - b. If renewing an axle shaft oil seal only, ensure that the dimension from the bearing to the end of the axle shaft is as specified in DATA.
 - c. Renew the rear hub joint washer.
 - d. Tighten the backplate securing nuts to 18 lbf ft (2.5 kgf m).
- ** e. Tighten the axle shaft nut to 90 to 120 lbf ft (12.4 to 16.6 kgf m).**

DATA

Bearing to threaded end of axle shaft 2.84 in (69.94 mm)

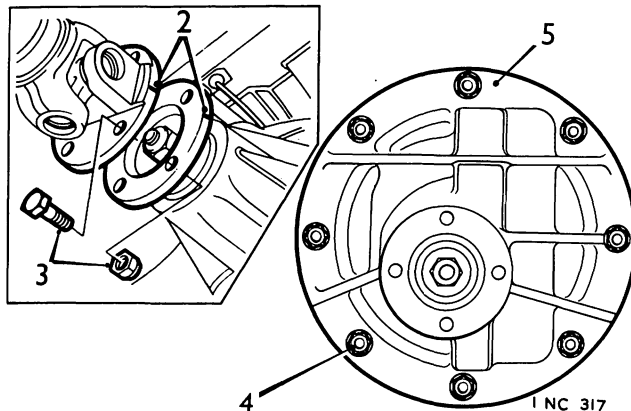
DIFFERENTIAL ASSEMBLY

—Remove and refit

51.15.01

Removing

1. Remove both half shafts. 51.10.01.
2. Mark the differential pinion and propeller shaft drive flange to ensure correct re-alignment.
3. Remove the four nuts and bolts from the drive flange.
4. Remove the nuts and washers retaining the differential assembly unit to the axle casing.
NOTE: Place a container beneath the differential assembly unit to collect the oil when the unit is removed.
5. Withdraw the differential assembly.



Refitting

- 6.**Clean the differential assembly unit and axle casing mating faces, and apply Wellseal jointing compound to the mating faces.
7. Reverse 1 to 5, using a new joint washer.
 - a. Tighten the differential retaining nuts to 20 lbf ft (2.7 kgf m).
8. Refill the axle with 1.25 pt (0.71 litre) of a recommended lubricant, see 'MAINTENANCE'.**

DIFFERENTIAL ASSEMBLY

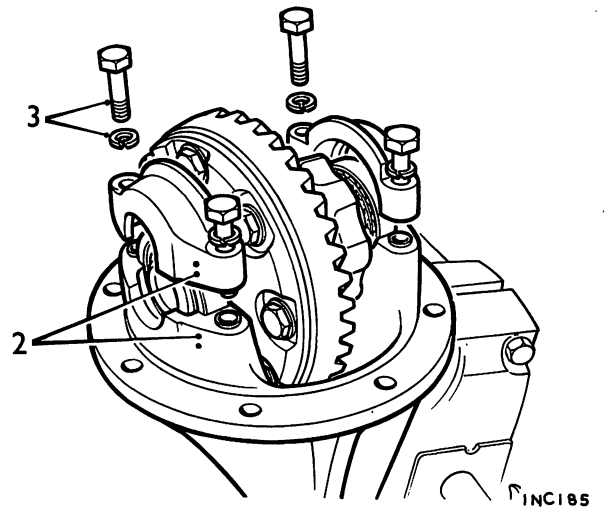
—Overhaul

51.15.07

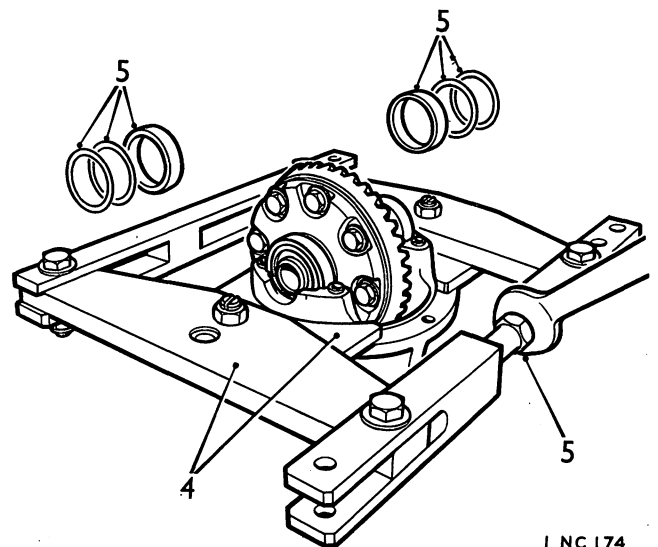
Service tools: S101, S101-1, S4221A, S4221A-8C, S4221A-17, S337 (or RG 421), 18G 134, 18G 134 DH, 18G 191, 18G 191 M

Dismantling

1. Remove the differential assembly. 51.15.01.
2. Place the unit upright in a vice and mark one bearing cap and adjacent side of the differential carrier to ensure the bearing caps are refitted in their original positions.
3. Remove the bearing cap retaining bolts and spring washers and remove the bearing caps.

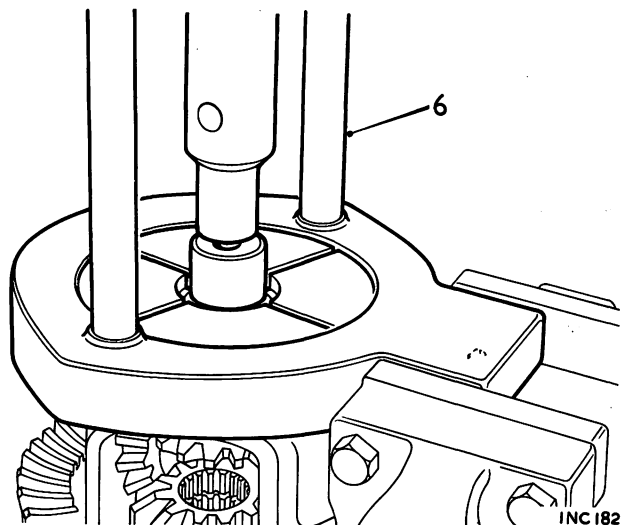


4. Assemble the spreader S101 and adaptor S101-1 to the casing.
5. Stretch the unit case by tightening the turnbuckle three to four flats until the differential carrier can be levered out and the bearing shims and caps removed.
IMPORTANT: To avoid damaging the case, do not spread any more than is necessary. Each flat on the turnbuckle is numbered to provide a check on the amount turned. The maximum stretch is 0.008 in (0.20 mm). Do not lever against the stretcher.

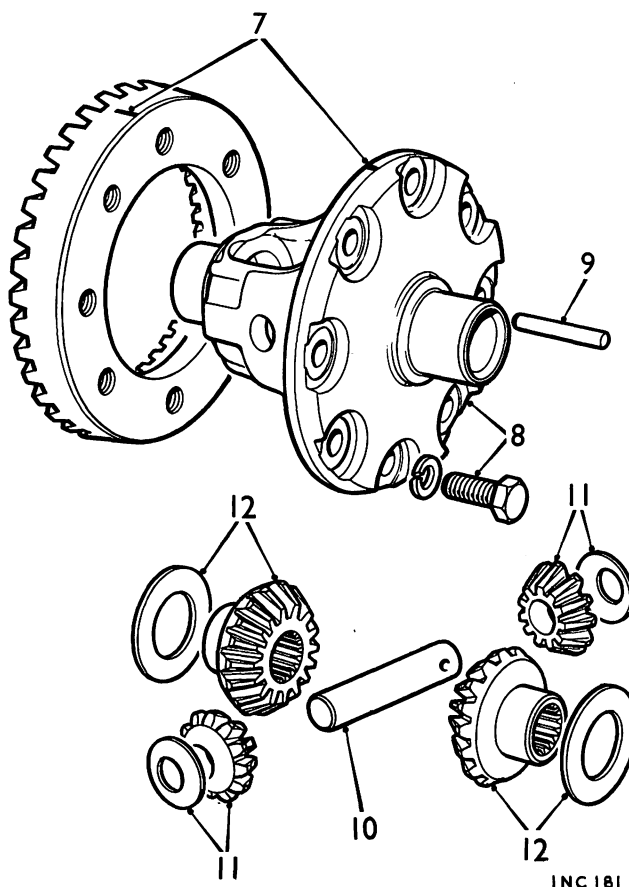


6. Remove the gear carrier bearing cups, using 18G 47 C and 18G 47 BD or S4221A and S4221A-8C (first 8,000 units only).

(continued)

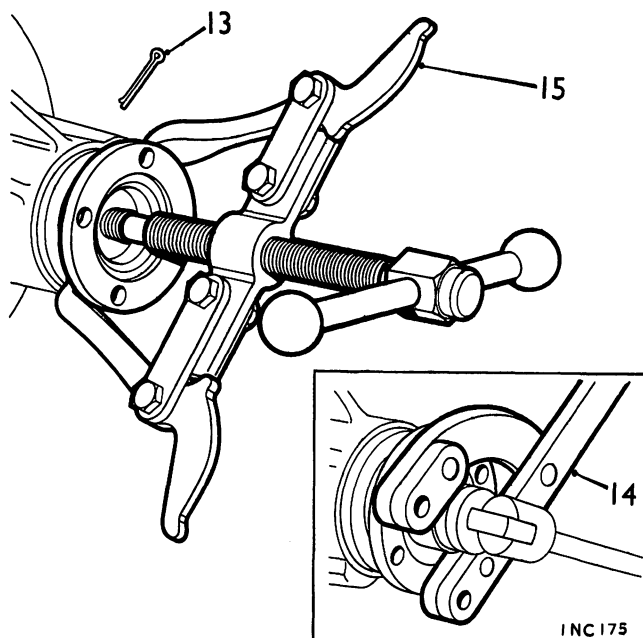


7. Mark the crown wheel and differential carrier to ensure correct replacement.
8. Remove the crown wheel retaining bolts and spring washers and remove the crown wheel.
9. Drive out the differential pinion pin locking peg.
10. Drive out the differential pinion pin.
11. Turn the differential gear wheels by hand until the differential pinions are opposite the openings in the differential gear case; remove the differential pinions and their selective thrust washers.
12. Remove the differential gear wheels and their thrust washers.

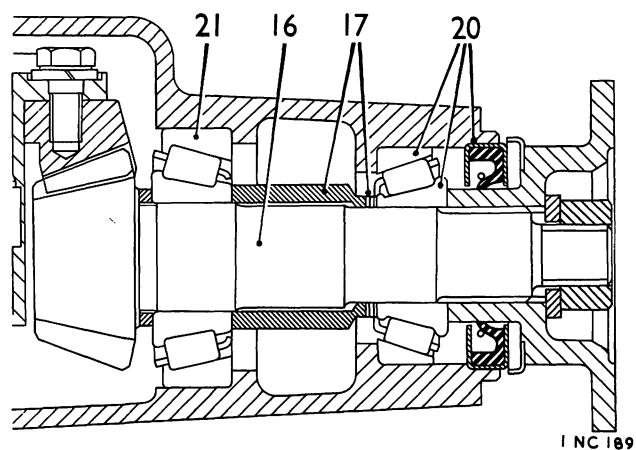


13. Remove the drive flange nut split pin.
14. Retain the drive flange, using RG421 or S337, and remove the drive flange nut.
15. Remove the drive flange.

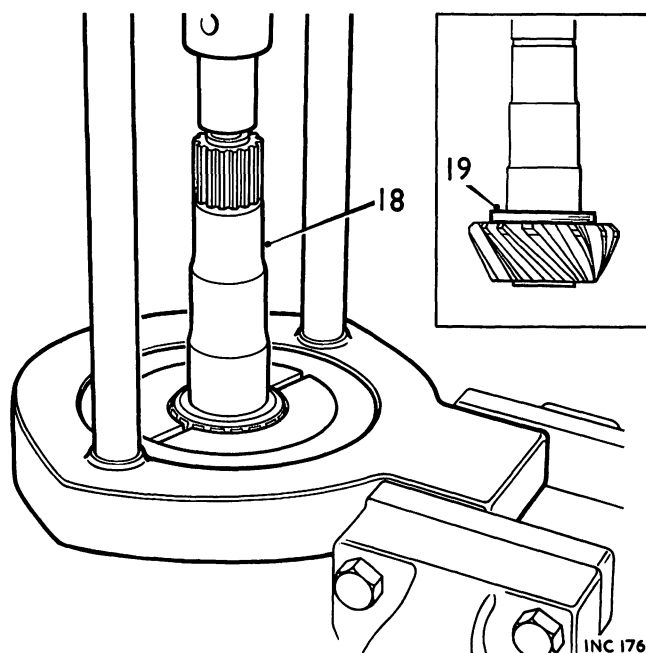
(continued)



16. Press out the pinion.
17. Remove the pinion bearing shims and pinion bearing spacer.



18. Using S4221A and adaptor S4221A-17, remove the inner bearing from the pinion.
19. Remove the pinion head washer.
20. Drift out the pinion outer bearing cup, bearing and oil seal.
21. Drift out the pinion inner bearing cup.



Inspection

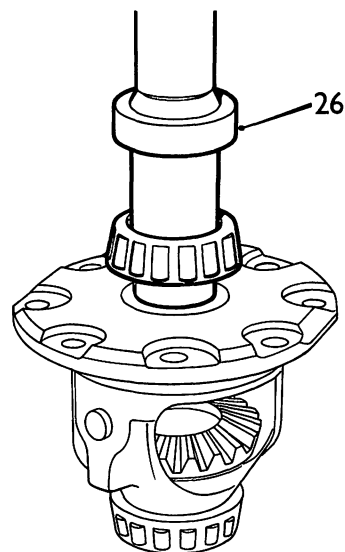
22. Clean all components.
23. Renew all worn or damaged parts.
24. The crown wheel and pinion must only be replaced as a matched pair. The pair number is etched on the outer face of the crown wheel and the forward face of the pinion.
25. If one differential bearing is defective replace both differential bearings. If one pinion bearing is defective replace both pinion bearings.

(continued)

Reassembly

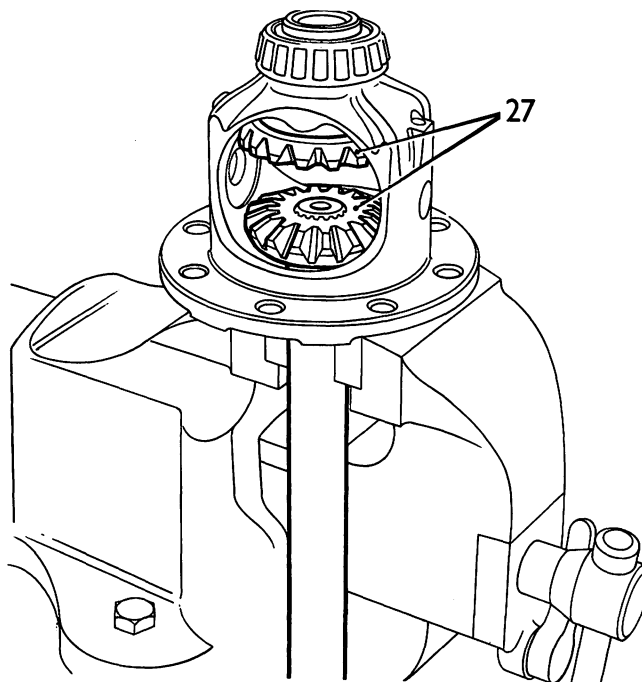
Setting the crown wheel position

26. Fit the differential bearing cones to the gear carrier, using 18G 134 and adaptor 18G 134 DH.

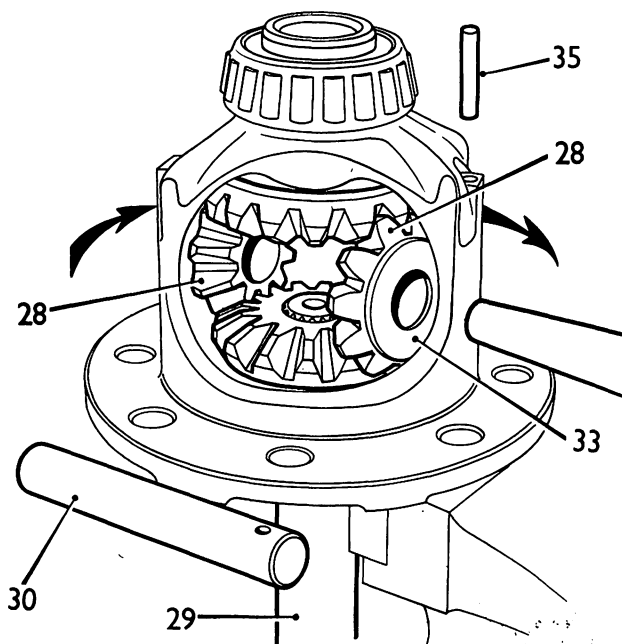


INC183

27. Fit the two differential gears to the carrier, ensuring each thrust washer is correctly positioned.

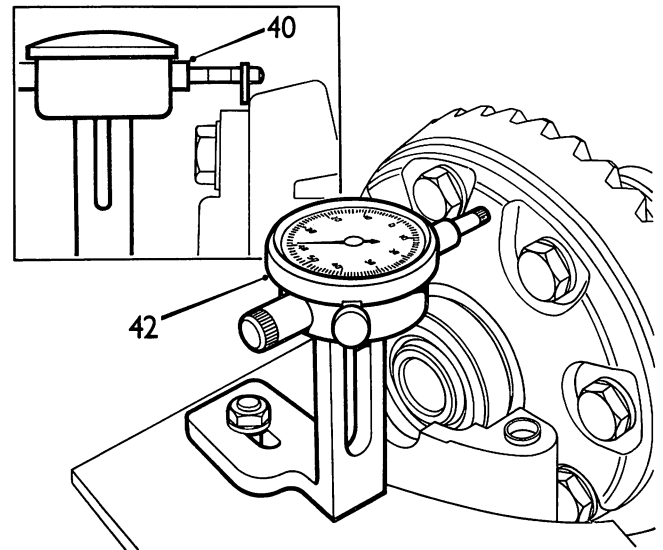


28. Position the two pinion gears, one each side of the carrier, and mesh them with the differential gears.
29. Using an axle shaft inserted in a differential gear, turn the gears and ensure the two pinions rotate into mesh and align with the pinion pin hole in the carrier.
30. Fit the pinion pin.
31. Press each pinion in turn firmly into mesh with the differential gears and assess the required pinion thrust washer thickness.
32. Remove the pinion pin and the two pinions.
33. Select a thrust washer of the thickness required for each pinion. Eight thrust washers are available in 0.002 in (0.05 mm) steps from 0.027 in to 0.041 in (0.685 mm to 1.03 mm).
34. By selection from the above range of pinion shims, reduce the end-float to give ZERO backlash. Note that at zero backlash the assembly will be tight and difficult to rotate. Lubricate prior to final assembly.
35. Fit the pinion pin locking peg and secure by peening the metal of the differential carrier.



(continued)

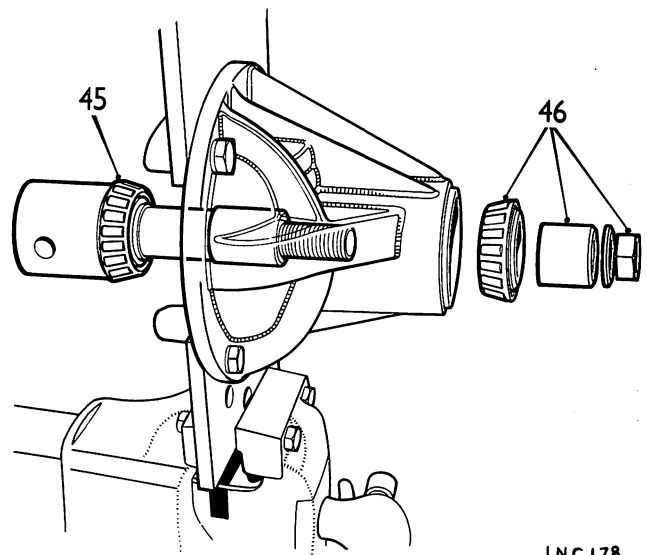
36. Clean the crown wheel mounting and gear carrier face and fit the crown wheel and secure with the bolts and spring washers.
37. Tighten the bolts.
38. Assemble the carrier bearing cups to the bearings and position the assembly in the case; do not fit the bearing shims.
39. Fit and secure the bearing caps as originally marked.
40. Using 18G 191 mounted on the axle spreader adaptor plate S101-1 with the plunger operating squarely on the rear of the crown wheel. Rotate the carrier and check the 'run-out'. Maximum 'run-out' must not exceed 0.003 in (0.076 mm).
41. Remove the bearing caps.
42. Press the differential bearings cups onto the bearings and move the carrier assembly to one side of the case. Zero the dial gauge and move the carrier assembly fully in the opposite direction. The indicated movement, which should be noted, is the **Total side-float** and is referred to as **Dimension 'A'**.
43. Remove the differential assembly from the case.



INC 177

Setting the pinion position

44. Drift the pinion inner and outer bearing cups into the casing.

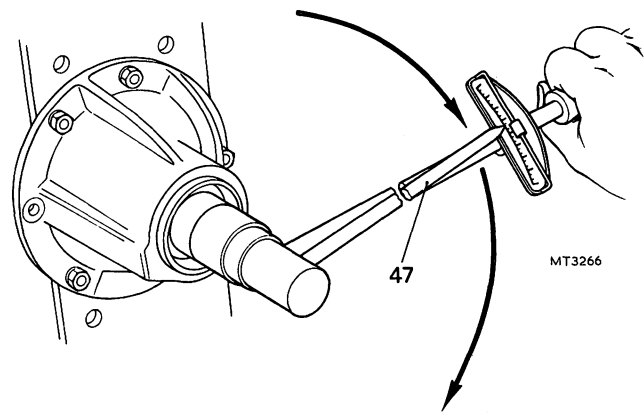


INC 178

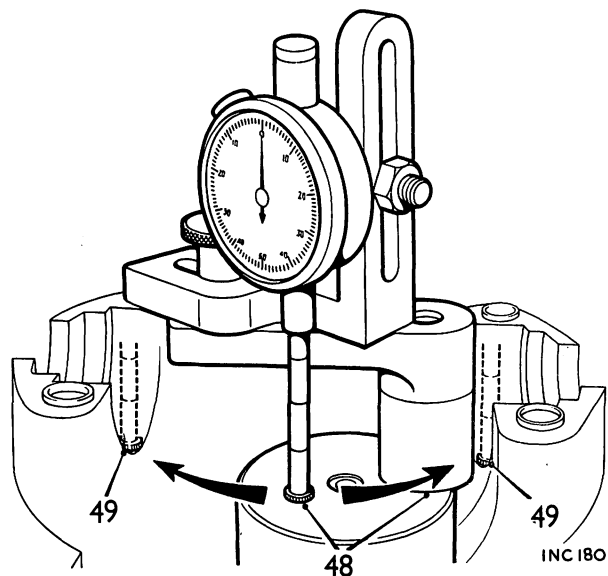
45. Fit the pinion inner bearing to the dummy pinion 18G 191 M.
The standard pinion head spacer 0.077 in (1.95 mm) is incorporated in the dummy pinion.
46. Oil the bearings and fit the dummy pinion, outer bearing, tool spacer, washer and nut.

(continued)

47. Tighten the nut gradually until a bearing pre-load of 15 to 18 lbf in (0.17 to 0.21 kgf m) is obtained. This can be measured using a lbf in (kgf m) scale torque wrench and suitable size socket.



48. Clean the dummy pinion head. Position the dial gauge foot of 18G 191 on the dummy head and zero the gauge onto the head.
49. Move the gauge foot over the centre of one differential bearing bore. Note the indicated measurement. Repeat for the opposite bearing bore.
50. Add the two measurements figures and divide by two.
51. Twenty-two pinion head washers are available ranging in size from 0.075 to 0.096 in (1.91 to 2.44 mm).
52. Remove the dummy pinion 18G 191 M.
53. Remove the inner bearing from the dummy pinion.



Calculating pinion head washer size

Example

Sum of each bore measurement divided by two	..	..	..	..	..	..	0.002 in	(0.05 mm)
Plus dummy pinion washer allowance from 18G 191 M	..	..	..	..	..	..	0.077 in	(1.95 mm)
Required size of pinion head washer	..	..	..	..	..	..	0.079 in	(2.00 mm)

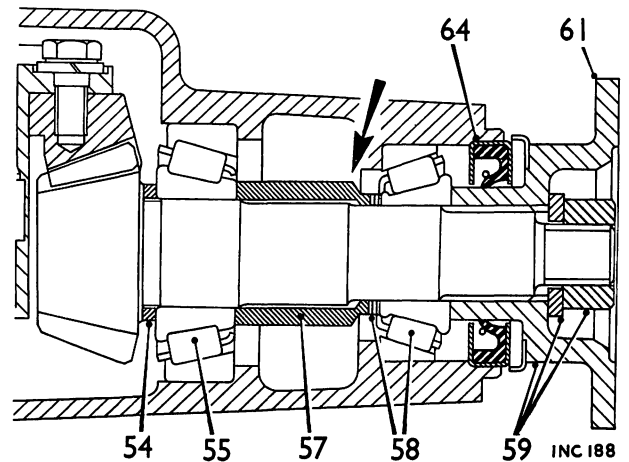
****Note:** Whilst etched +, -, or 'N' markings will be found on the pinion face these should be ignored since they are taken into consideration in the design and method of using the dummy pinion.**

(Continued)



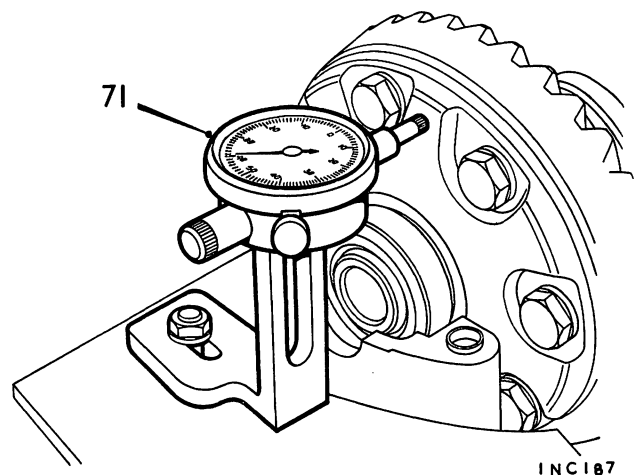
Setting the pinion bearing pre-load

54. Fit the correct **pinion head washer** to the pinion.
55. Fit the inner bearing, using S4221A and adaptor S4221A-17.
56. Oil the bearing and fit the pinion to the casing.
57. Fit the bearing spacer, chamfered end towards the drive flange.
58. Fit the shims: oil and fit the outer bearing.
59. Fit the drive flange washer and nut.
60. Gradually tighten the nut, **do not exceed** 90 lbf ft (12.4 kgf m), checking the bearing pre-load during tightening operations.
61. Rotate the flange to settle the bearings, and check the pre-load using S98A. Pre-load should be set at 15 to 18 lbf in (0.17 to 0.21 kgf m) at 90 lbf ft (12.4 kgf m) torque on the flange nut.
If the pre-load is high, increase shim thickness.
If the pre-load is low, decrease shim thickness.
62. Four shims are available ranging in size from 0.003 to 0.030 in (0.076 to 0.762 mm). Note: 0.001 shim thickness equals approximately 4 lbf in (0.46 kgf m) pre-load.
63. Remove the drive flange nut washer and flange.
64. Soak the new oil seal in oil for **one hour** and fit the seal.
65. Fit the drive flange, washer and flange nut.
66. Tighten the drive flange nut to 90 lbf ft (12.4 kgf m) using RG421 or S337 to retain the flange.
67. Lock the nut, using a new split pin.



Setting the backlash

68. Place the bearing cups on the differential bearings and fit the differential carrier in the case.
69. Position dial gauge 18G 191 on the axle spreader adaptor plate S101-1, crown wheel side.
70. Move the crown wheel fully into mesh with the pinion and zero the gauge on the rear of the crown wheel.
71. Move the crown wheel and carrier in the opposite direction until the bearing crown-wheel-side is butted in its housing. The indicated measurement, which should be noted, is the 'IN-OUT' of mesh clearance.



(continued)

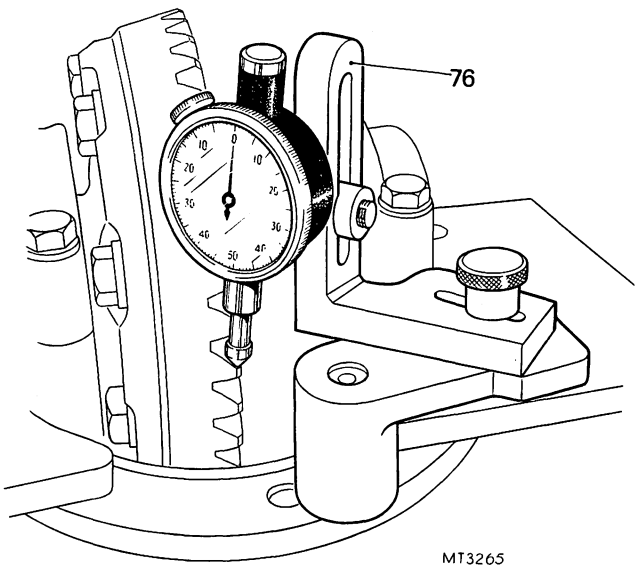
Setting the crown wheel backlash

In-Out of mesh clearance (from operation 71)	..	..	..	..	..	..	..	0.025 in	(0.63 mm)
Minus backlash (see DATA)	..	..	..	..	..	..	..	0.005 in	(0.13 mm)
Required crown wheel side shim pack	..	..	..	..	..	..	..	0.020 in	(0.50 mm)
Total side-float (dimension 'A', operation 42)	..	..	..	..	..	..	..	0.060 in	(1.52 mm)
Minus crown wheel side shim pack	..	..	..	..	..	..	..	0.020 in	(0.50 mm)
Required shim pack opposite crown wheel	..	..	..	..	..	..	..	0.400 in	(1.02 mm)

Pre-load: add 0.002 in (0.051 mm) to each shim pack calculated above.

72. Fit S101 and S101-1, and stretch the unit case by tightening the turnbuckle three to four flats.
73. From the calculations made in 76 and 77, select the required shim pack from those available; 0.003 in (0.76 mm), 0.005 in (0.127 mm), 0.010 in (0.25 mm), 0.20 in (0.50 mm).
74. Fit the differential assembly to the case and fit the shim packs. Slacken S101 and remove.
75. Refit the bearing caps as originally marked, and secure using the bolts and spring washers.
76. Rotate the pinion to settle the differential bearings. Position dial gauge service tool 18G 191 on the adaptor plate and position the foot on the crown wheel gear. Measure the total backlash at several positions, which must be 0.004 to 0.006 in (0.10 to 0.15 mm).
NOTE: A movement of 0.002 in (0.05 mm) shim thickness from one differential bearing to the other will vary the backlash by approximately 0.002 in (0.05 mm).
77. Tighten the bearing cap bolts.
78. Remove S101-1.
79. Refit the differential assembly. 51.15.01.

(continued)



DATA

Differential bearing shims	0.003 in (0.076 mm)	
	0.005 in (0.127 mm)	
	0.010 in (0.254 mm)	
	0.020 in (0.508 mm)	
Differential case, maximum stretch	0.008 in (0.20 mm)	
Differential pinion gears thrust washer	8, in 0.002 in (0.05 mm) steps	
Sizes	0.027 in (0.685 mm)	0.035 in (0.889 mm)
	0.029 in (0.737 mm)	0.037 in (0.940 mm)
	0.031 in (0.787 mm)	0.039 in (0.991 mm)
	0.033 in (0.838 mm)	0.043 in (1.092 mm)
Crown wheel run-out	Max. 0.003 in (0.076 mm)	0.004 to 0.006 in (0.102 to 0.152 mm)
Optimum setting	0.005 (0.127 mm)	
Pinion bearing pre-load	15 to 18 lbf in (0.17 to 0.21 kgf m)	
Pinion head washer sizes:		
STD:	0.077 in (1.956 mm)	
Alternatives:		
0.075 in (1.905 mm)	0.082 in (2.083 mm)	0.087 in (2.210 mm)
0.0765 in (1.930 mm)	0.0825 in (2.095 mm)	0.0885 in (2.247 mm)
0.078 in (1.981 mm)	0.083 in (2.108 mm)	0.090 in (2.286 mm)
0.079 in (2.007 mm)	0.084 in (2.134 mm)	0.0915 in (2.323 mm)
0.0795 in (2.019 mm)	0.085 in (2.159 mm)	0.0935 in (2.337 mm)
0.080 in (2.032 mm)	0.0855 in (2.171 mm)	0.0945 in (2.400 mm)
0.081 in (2.057 mm)	0.086 in (2.184 mm)	0.096 in (2.438 mm)
Pinion bearing shims sizes	0.003 in (0.076 mm)	
	0.005 in (0.127 mm)	
	0.010 in (0.254 mm)	
	0.030 in (0.762 mm)	

REAR AXLE AND FINAL DRIVE

PINION OIL SEAL

—Remove and refit

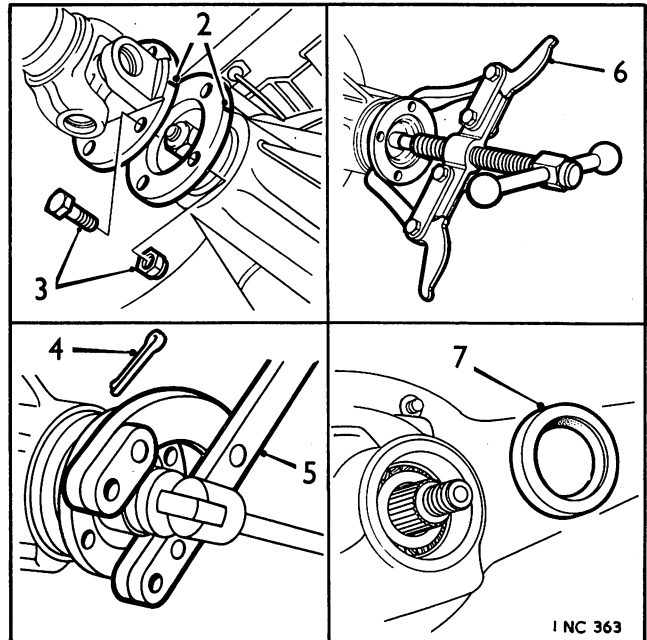
51.20.01

Drive flange 1 to 6, 8c, and 9

Service tools: 18G 2, 18G 1205

Removing

1. Raise and support the rear of the car.
2. Mark the propeller shaft and pinion flanges for correct re-alignment.
3. Remove the four nuts and bolts from the pinion flange.
4. Remove the flange nut split pin.
5. Retain the driving flange, using S337 or RG421, and remove the nut and washer.
- CAUTION:** Place a container directly beneath the driving flange to collect the spillage of oil when the driving flange and oil seal are removed.
6. Remove the driving flange.
7. Remove the oil seal.



Refitting

8. Reverse 1 to 7, noting:
 - a. Immerse the new seal in light oil for one hour before fitting.
 - b. Fit the new seal with the lip of the seal facing inwards.
 - c. Tighten the driving flange nut to 90 lbf ft (12.4 kgf m).
9. Check the rear axle oil level, and top up as necessary.

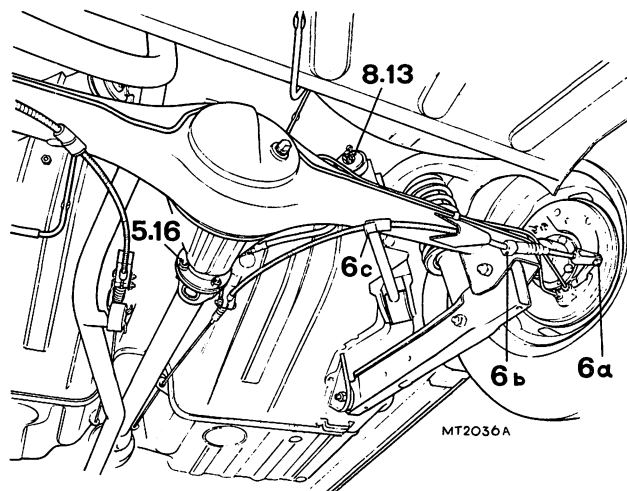
REAR AXLE

—Remove and refit

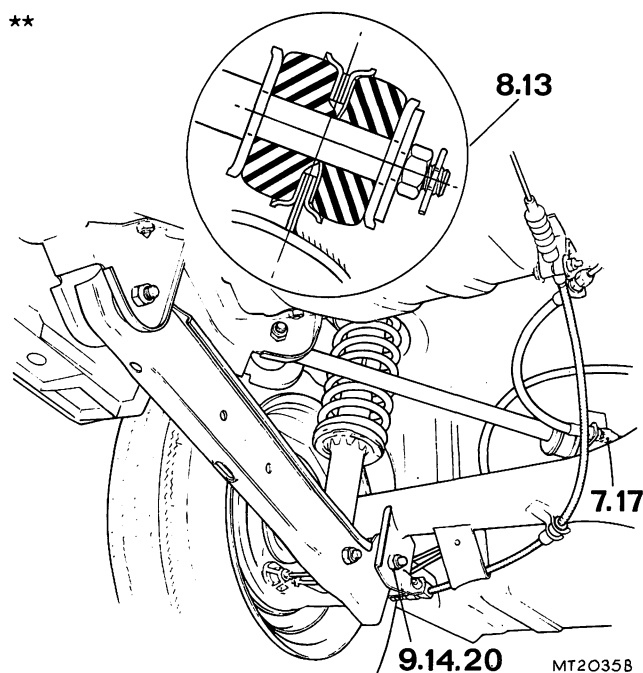
51.25.01

Removing

1. Jack up the rear of the car and support the body on stands.
2. Locate a jack under the differential.
3. Remove the road wheels.
4. Release the hand brake.
5. Disconnect the rear propeller shaft from the differential flange.
6. Disconnect both hand brake cables at:
 - a. Brake backplate lever.
 - b. Rear suspension bracket.
 - c. Rear axle tube clip.
7. Disconnect the brake pipe union at the flexible hose and disconnect the hose from the axle bracket. Seal the pipe and hose to prevent the entry of grit.
8. Remove the nuts, washers and bushes securing the radius rods to the axle casing.
9. Remove the bolts and nuts securing the rear suspension arms to the axle.
10. Raise the axle and remove rearwards to clear the suspension arms.
11. Withdraw the axle from the car.



★★



★★

Refitting

12. Position the axle below the car and support on a jack.
13. Raise the jack, engage the rear ends of the radius rods through the axle brackets and fit the bushes, washers, nuts and pins.
14. Engage the rear ends of the suspension arms in the axle casing brackets and fit the retaining bolts and nuts.
15. Connect the hand brake cables to the axle clips, suspension brackets, and backplate levers.
16. Connect the rear propeller shaft to pinion flange.
- 17.★★Connect the brake pipe union at the flexible hose.
18. Bleed the brakes.
19. Refit the road wheels and lower the car to the ground.
20. Tighten the suspension arm bolts and nuts to the correct torque (see 06) with the car standing unladen on its road wheels.★★

REAR AXLE AND FINAL DRIVE

REAR AXLE CASING

—Remove and refit

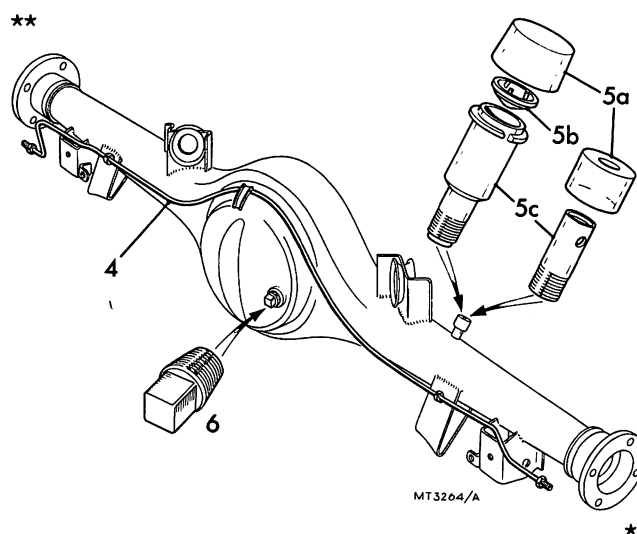
51.25.04

Removing

1. Remove the half shafts. 51.10.01.
2. Remove the differential assembly. 51.15.01.
3. Remove the rear axle assembly. 51.25.01.
4. Remove the brake pipe.
5. **a. Pull the breather cap from the breather assembly.
b. On later model breather assemblies remove the insert.
c. Unscrew the stem from the axle case. **
6. Remove the combined filler level plug.

Refitting

7. Reverse 1 to 6.



STEERING OPERATIONS

Camber—check and adjust	..	..	..	..	..	..	..	..	57.65.05
Front wheel alignment—check and adjust	..	..	..	..	..	..	..	..	57.65.01
Intermediate shaft									
—flexible coupling—remove and refit	..	..	..	..	..	..	..	..	57.40.25
—remove and refit	..	..	..	..	..	..	..	..	57.40.22
Nacelle—remove and refit	..	..	..	..	..	..	..	..	57.40.29
Steering-column									
—bushes—remove and refit	..	..	..	..	..	..	..	..	57.40.18
** —description	..	..	..	..	..	..	..	..	57.40.00
—lower column—remove and refit	..	..	..	..	..	..	..	..	57.40.05
—mast—remove and refit	..	..	..	..	..	..	..	..	57.40.06 **
—remove and refit	..	..	..	..	..	..	..	..	57.40.01
—upper column—remove and refit	..	..	..	..	..	..	..	..	57.40.02
Steering geometry—check	..	..	..	..	..	..	..	..	57.65.02
Steering lock/ignition switch—remove and refit	..	..	..	..	..	..	..	..	57.40.31
Steering rack									
—damper—adjust	..	..	..	..	..	..	..	..	57.35.09
—damper—remove and refit	..	..	..	..	..	..	..	..	57.35.10
—gaiter—remove and refit	..	..	..	..	..	..	..	..	57.25.02
—overhaul	..	..	..	..	..	..	..	..	57.25.07
—remove and refit	..	..	..	..	..	..	..	..	57.25.01
Steering-wheel									
—pad—remove and refit	..	..	..	..	..	..	..	..	57.60.03
—remove and refit	..	..	..	..	..	..	..	..	57.60.01
Tie-rod ball joint									
—inner—remove and refit	..	..	..	..	..	..	..	..	57.55.03
—outer—remove and refit	..	..	..	..	..	..	..	..	57.55.02

STEERING RACK AND PINION

—Remove and refit

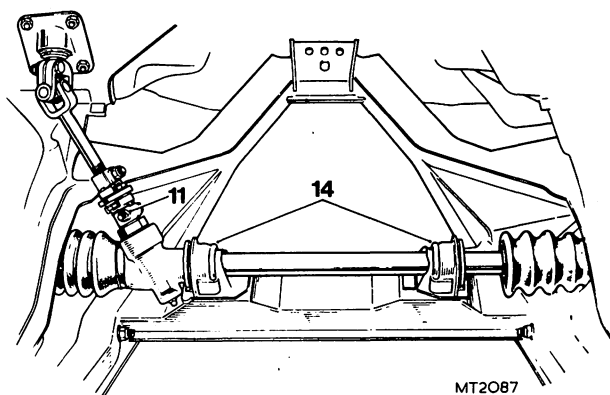
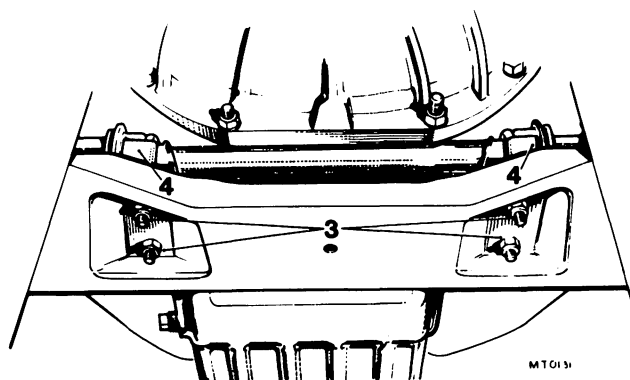
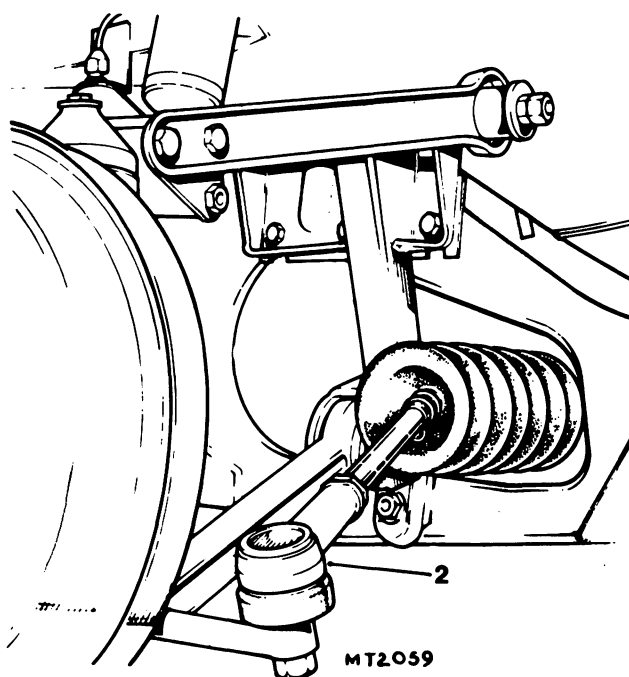
57.25.01

Removing

1. Remove the right-hand front wheel (right-hand steer models)
or
Left-hand front wheel (left-hand steer models).
2. Disconnect the rack tie-rod outer ball joints from the steering arms.
3. Remove the four nuts and washers securing the rack 'U' bolts to the sub-frame.
4. Withdraw the 'U' bolts and rack clamp brackets.
5. Scribe the lower end of the intermediate shaft lower flexible coupling and rack pinion shaft to ensure original spline engagement on reassembly.
6. Remove the pinch bolt from the intermediate shaft lower flexible coupling.
7. Ease the rack forward to disengage the pinion shaft from the flexible coupling.
8. Withdraw the rack from the car.

Refitting

9. Carefully guide the rack into position on the car.
10. Engage the pinion shaft splines in the intermediate shaft flexible coupling, ensuring that the previously marked scribe lines are aligned. If no scribe marks are present it will be necessary to centralize the rack shaft, locate the rack in its fitted position and ensure that the steering-wheel spokes are horizontal before engaging the pinion shaft in the flexible coupling.
11. Fit and tighten the pinch bolt in the flexible coupling.
12. Check that the rack mounting rubbers are correctly located.
13. Fit the bearer plate under the rack mounting rubber (not pinion side).
14. Fit the rack clamp brackets and 'U' bolts.
15. Compress the rack rubbers and tighten the 'U' bolts.
16. Connect the tie-rod ball ends to the steering arms.
17. Fit the road wheel.



STEERING

STEERING RACK GAITER

—Remove and refit

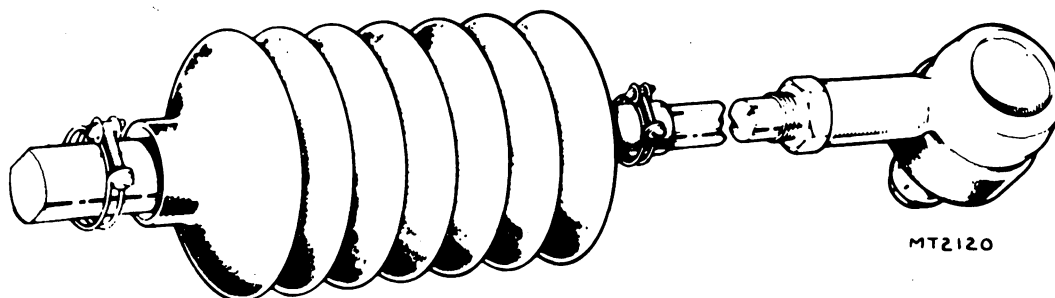
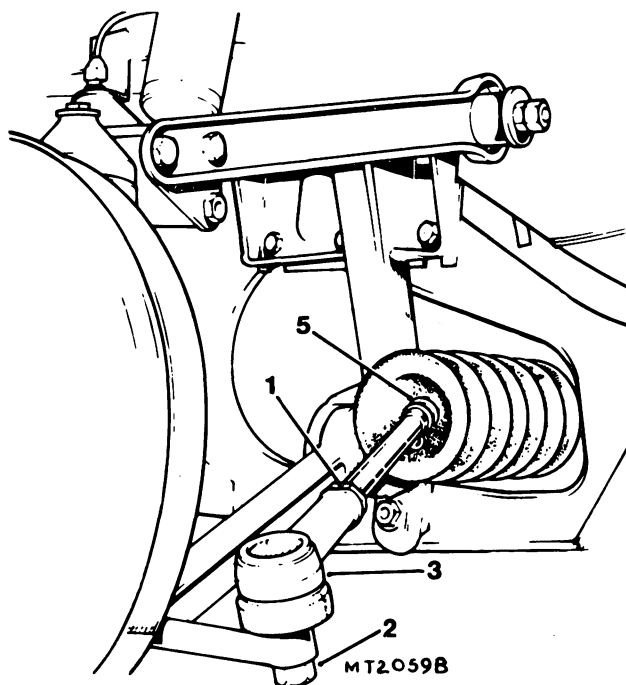
57.25.02

Removing

1. Slacken the locknut securing tie-rod outer ball joint.
2. Remove the nut and washer securing the tie-rod outer ball joint to the steering arm.
3. Release the ball joint from the steering arm.
4. Unscrew the ball joint from the tie-rod and remove the retaining locknut.
5. Remove the inner and outer clips retaining the gaiter to the rack and tie-rod respectively.
6. Withdraw the gaiter.
7. Repeat instructions 2 to 6 on the opposite tie-rod.

Refitting

8. Lubricate the tie-rod inner ball joint with fresh grease.
9. Slide the new gaiter along the tie-rod into position on the rack.
10. With the rack centralized, fit the inner clip to the gaiter and rack housing.
11. **Position the outer end of the gaiter on the tie-rod so that it is capable of accommodating movement of the tie-rod from lock to lock.
12. Secure the outer end of the gaiter to the tie-rod end with a clip.
13. Fit the locknut to the tie-rod, locating it as near as possible to its original location. **
14. Fit the outer ball joint to the tie-rod.
15. Connect the tie-rod outer ball joint to the steering arm and secure it with the plain washer and nut.
16. Repeat instructions 8 to 15 on the opposite tie-rod.
17. Check, and re-set the front wheel track as necessary.
18. Tighten the locknut securing the tie-rod outer ball joint.



STEERING RACK AND PINION

—Overhaul

57.25.07

Dismantling

Rack plunger

1. Remove the plug securing the plunger assembly to the rack housing.
2. Withdraw the spring, shim(s), and plunger.

Pinion

3. Unscrew and withdraw the plug securing the pinion assembly to the rack housing.
4. Remove the internal 'O' ring from the plug.
5. Invert the plug and fit it to the pinion shaft.
6. Engage the two short bolts in the tapped holes in the plug and tighten to grip the pinion shaft.
7. Using two screwdrivers, evenly prise the pinion shaft clear of the rack housing.
8. Slacken the bolts and remove the inverted plug from the pinion. Remove the bolts from the plug.
9. Remove the circlip securing the ball race to the pinion shaft and withdraw the ball race.

Tie-rods and rack shaft

10. Release the clips securing the gaiters to the rack housing and tie-rods and slide the gaiters clear of the rack.
11. Slide the pinion end of the rack housing towards its adjacent tie-rod inner ball joint.
12. Grip the exposed rack shaft in protected vice jaws.
13. Slacken the locknuts at both ends of the rack shaft and unscrew the tie-rod inner ball joint assemblies.
14. Remove the locknuts and withdraw the rack shaft.

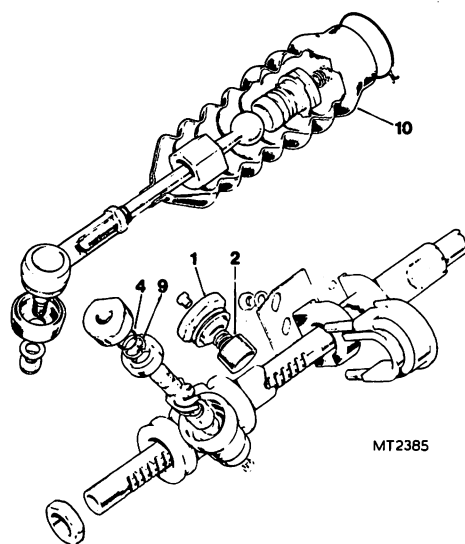
Rack housing bush

15. Remove the bush from the rack housing.

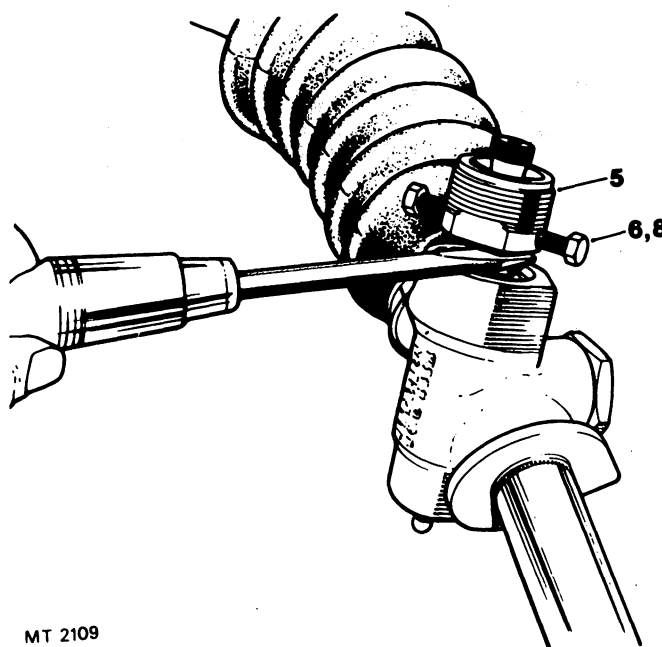
Pinion housing lower bush

16. Remove the grease nipple from the pinion housing.
17. Carefully drive or press out the end cover and pinion shaft lower bush.

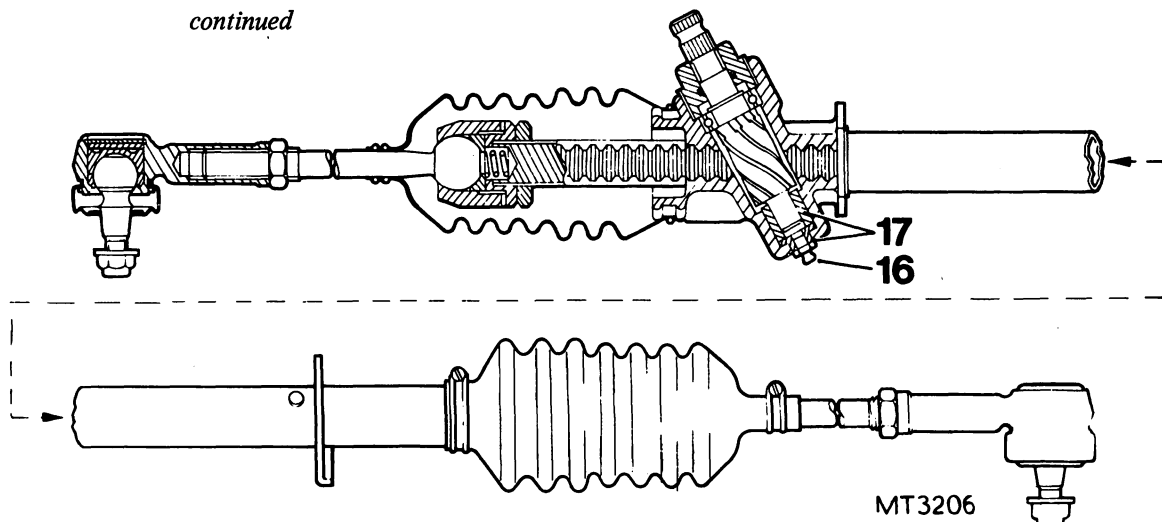
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MT2385



MT 2109



MT3206

STEERING

Reassembling

Rack housing bush

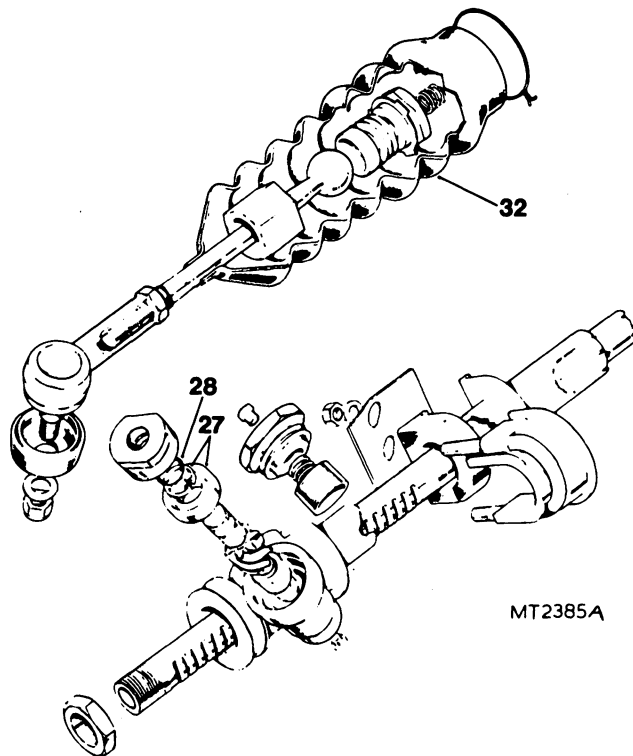
18. Fit a new bush to the rack housing.

Pinion

19. Fit a new end cover to the lower end of the pinion housing.
20. Fit a new lower bush to the pinion housing, ensuring that the recessed end of the bush is fitted adjacent to the end cover.

Rack shaft and tie-rods

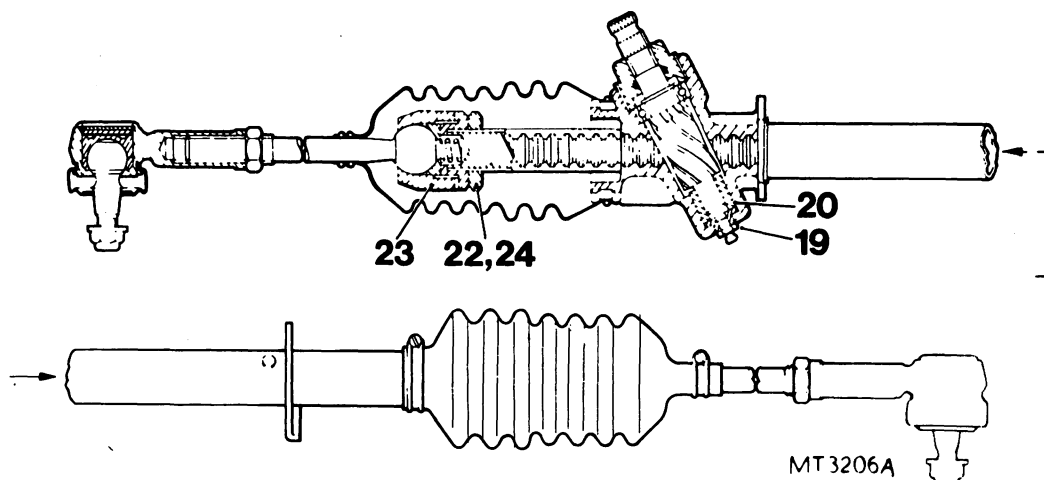
21. Hold the plain (toothless) portion of the rack shaft in protected vice jaws.
22. Fit the locknut to the plain end of the rack shaft.
23. Fit the tie-rod assembly and spring to the plain end of the rack shaft.
24. Secure the tie-rod assembly with the locknut (torque 80 lbf ft, 11.06 kgf m).
25. Fit the rack shaft to the rack housing, ensuring that the toothed end of the shaft is located at the pinion housing.
26. Fit the locknut and tie-rod assembly to the pinion end of the rack shaft and tighten the locknut to 80 lbf ft (11.06 kgf m).



MT2385A

Pinion

27. Fit the ball race to the pinion and secure it with the circlip.
28. Fit a new internal 'O' ring to the pinion end plug.
29. Position the rack shaft teeth to permit pinion entry and install the pinion in the rack.
30. Lubricate the pinion shaft and fit and tighten the end plug.
31. Fit the grease nipple to the base of the pinion housing and lubricate the pinion and lower bush.
32. Pack the ends of the rack shafts and tie-rod inner ball joints with clean grease and fit and secure the gaiters.



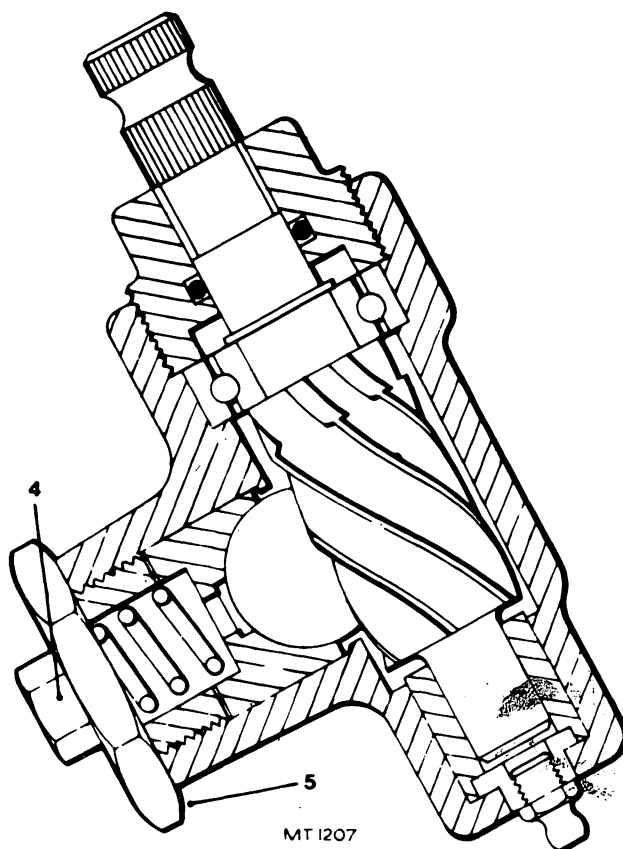
MT 3206A

STEERING RACK DAMPER

—Adjust

57.35.09

1. Remove the rack. 57.25.01.
2. Locate the rack shaft in mid-position.
3. Release the gaiter clips at the pinion end of the rack and slide the gaiter along the tie-rod to expose the rack shaft.
4. Remove the centre plug from the damper plug and insert a stylus or dial gauge and check the rack shaft for side movement (90 degrees to shaft axis). Side movement should be within 0.004 to 0.008 in (0.1016 to 0.2032 mm).
5. Adjust as required by removing the damper plug and adding or removing shim(s) as required.
or
- 5a. In the absence of a dial gauge, remove the damper plug and shims.
- 5b. Remove the shims and replace the damper plug.
- 5c. Gently tighten the damper plug until the plunger grips the rack, eliminating all side-play.
- 5d. With feeler gauges inserted between the rack pinion housing and the underside of the damper plug flange, check the clearance existing.
- ** 5e. To the thickness of the feeler gauge pack, add the rack side movement required, 0.006 in (0.154 mm). This gives the thickness of shims to be fitted under the damper plug flange.**
- 5f. Remove the damper plug and fit the required shim pack. Tighten the damper plug.
6. Ensure that the rack shaft is adequately lubricated and fit the gaiter.
7. Refit the rack. 57.25.01.



STEERING RACK DAMPER

—Remove and refit

57.35.10

Removing

1. Remove the rack. 57.25.01.
2. Remove the clips securing the gaiter at the pinion end of the rack and slide the gaiter along the tie-rod to expose the rack shaft.
3. Unscrew and remove the damper plug and shims.
4. Withdraw the spring and plunger.

Refitting

5. Locate the rack shaft in mid-position.
6. Fit the plunger and spring.
7. Check, and adjust, the rack shaft side movement as required (instructions 4 to 6, operation 57.35.09).
8. Refit the rack. 57.25.01.



STEERING

**STEERING-COLUMN

57.40.00

Two types of steering column assembly have been fitted. Up to Trim No. T.720 D.H./T. 6490 D.M. a two-piece steering column mast was fitted. On subsequent cars a one-piece steering column mast was fitted.

A change in clamp bracket details at Trim No. T.243D.G./T.1753D.G. altered the method of removing and refitting the complete assembly.**

STEERING-COLUMN ASSEMBLY

**—Remove and refit (Up to Trim No.

T.243 D.G.—L.H. Steer,

T.1753 D.G.—R.H. Steer) **

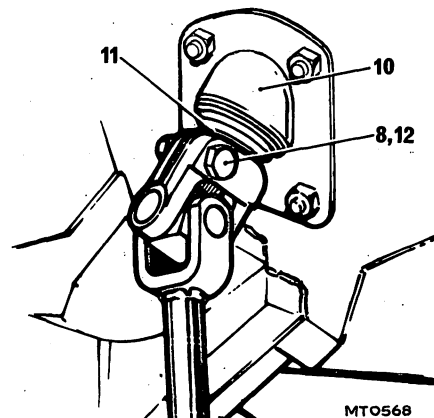
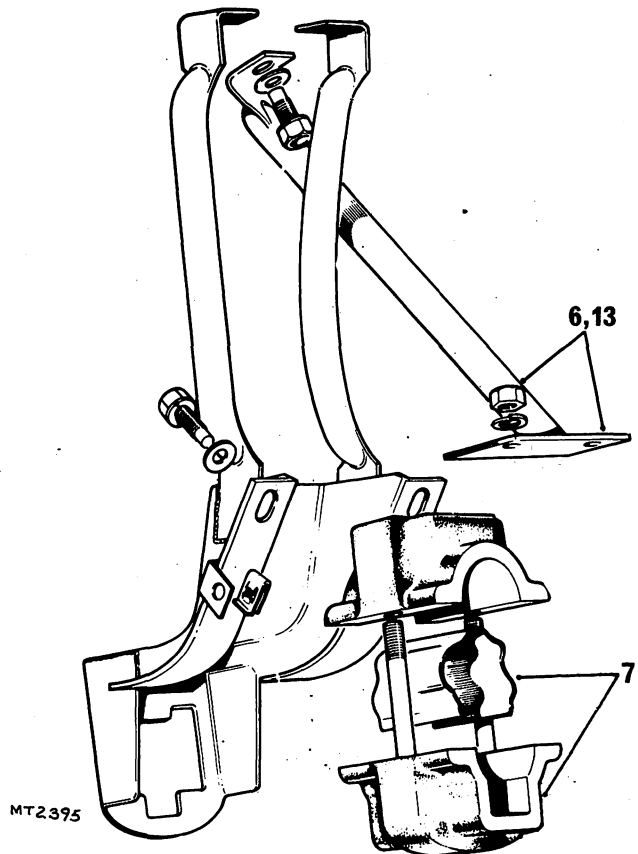
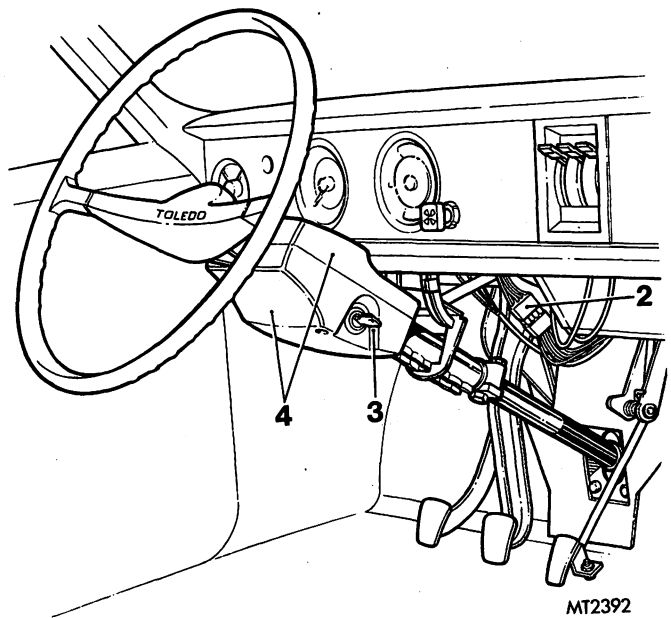
57.40.01

Removing

1. Disconnect the battery.
2. Disconnect the plug-in connectors (2) for the ignition/starter and horn/trafficator/lights.
3. Withdraw the ignition key.
4. Remove the three screws clamping the nacelle halves and remove the nacelle.
5. Remove the trafficator/horn stalk and brackets.
6. Remove the two nuts and spring washers securing the steering-column clamp bracket to the column upper support bracket.
7. Detach the clamp bracket and spring clips.
8. Remove the pinch bolt and nut securing the lower end of the column to the intermediate shaft universal joint.
9. Withdraw the steering-column complete.

Refitting

10. Locate the steering-column assembly in position and engage the lower end of the column in the bottom bush fitted to the scuttle.
11. Fit the nylon washer to the lower end of the column and with the road wheels straight ahead and the steering-wheel spokes horizontal, engage the column splines in the universal joint.
12. Fit and tighten the pinch bolt and nut.
13. Fit the spring clip and clamp bracket to the column and secure with two spring washers and nuts.
14. Fit the trafficator/horn stalk and brackets.
15. Re-connect the plug-in connectors for the ignition/starter and horn/trafficator/lights circuits.
16. Fit the nacelle halves and secure them with three screws.
17. Connect the battery.



STEERING-COLUMN ASSEMBLY

****—Remove and refit (From Trim No. **
T.244 D.G.—L.H. Steer,
T.1753 D.G.—R.H. Steer)**

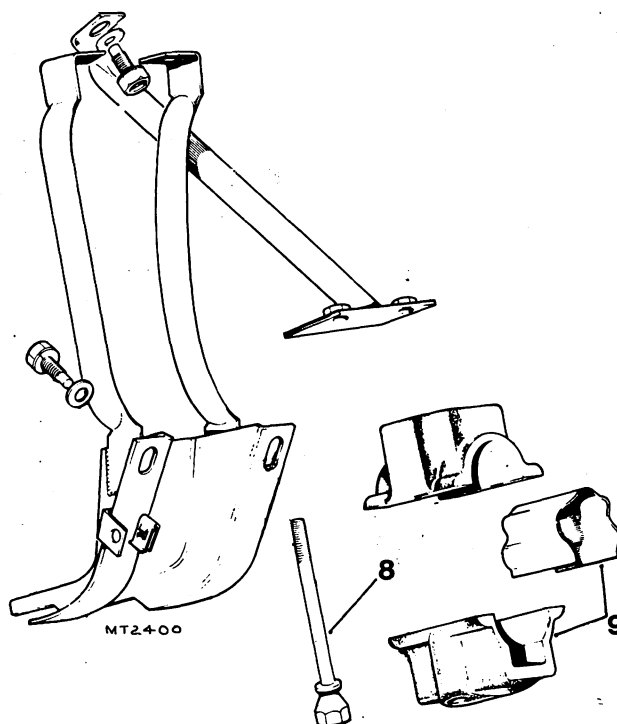
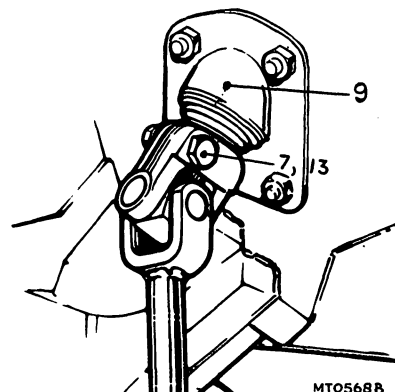
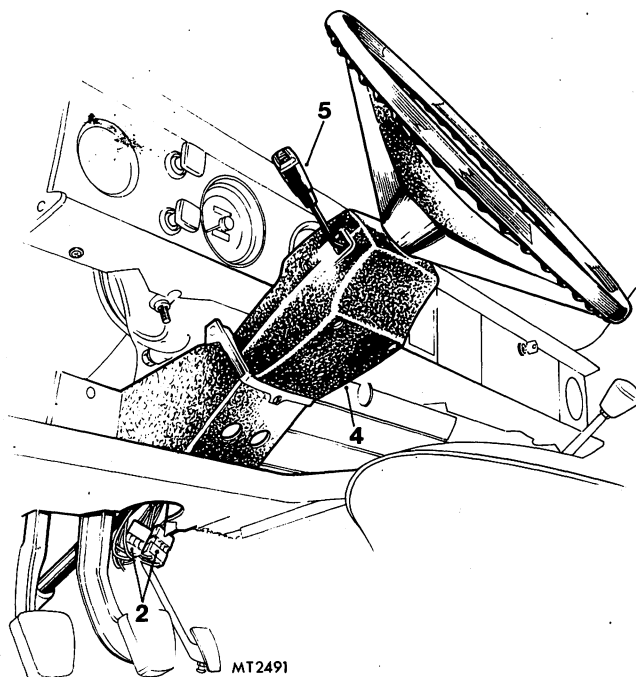
57.40.01

Removing

1. Disconnect the battery.
2. Disconnect the plug-in connectors for the ignition/starter and horn/trafficator/lights.
3. Withdraw the ignition key.
4. Remove the three screws clamping the nacelle halves and withdraw the nacelle.
5. Remove the trafficator/horn stalk and brackets.
6. Remove the parcel shelf. 76.67.01.
7. Remove the pinch bolt and nut securing the lower end of the steering-column to the universal joint.
8. Remove the two bolts securing the steering-column clamp bracket to the column upper support bracket. These bolts are of the shear-headed type, the heads being twisted off on installation. Removal of these bolts can be accomplished using a drill and an Easiout type extractor.
9. Remove the steering-column bracket and spring clip.
10. Withdraw the steering-column complete.

Refitting

11. Locate the steering-column assembly in position and engage the lower end of the column in the bottom bush fitted to the scuttle.
12. Fit the nylon washer to the lower end of the column and with the road wheels straight ahead and the steering-wheel spokes horizontal, engage the column splines in the universal joint.
13. Fit and tighten the pinch bolt and nuts.
14. Fit the spring clip, clamp bracket, and two new shear bolts to the column.
15. Tighten the shear bolts evenly and shear off the heads.
16. Fit the parcel shelf. 76.67.01.
17. Fit the plastic finishing rim to the parcel shelf and secure it with the three screws.
18. Fit the trafficator/horn stalk and brackets.
19. Connect the plug-in connectors for the ignition/starter and horn/trafficator/lights.
20. Fit the nacelle.
21. Connect the battery.



STEERING-COLUMN—UPPER

****—Remove and refit (Up to Trim No. ****

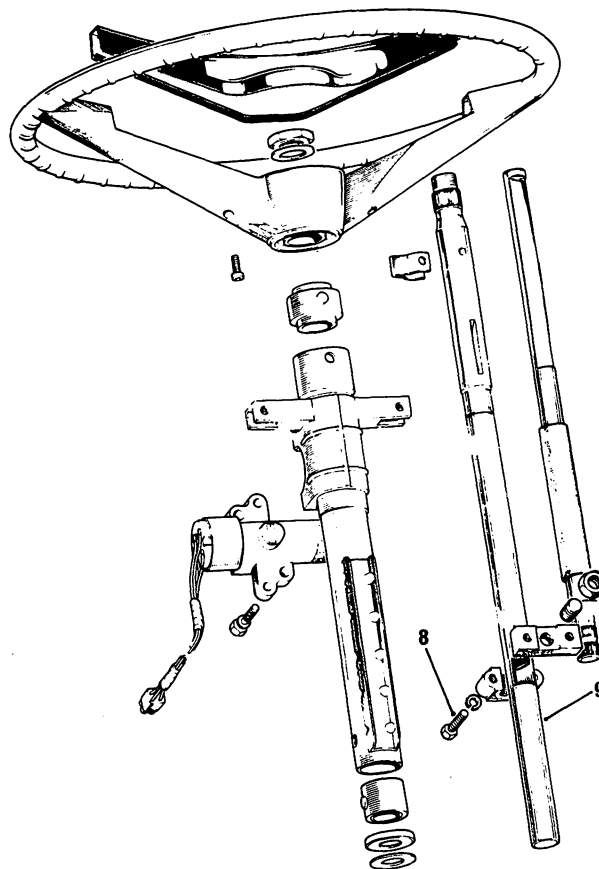
T.244 D.G.—L.H. Steer,

T.1573 D.G.—R.H. Steer)

57.40.02

Removing

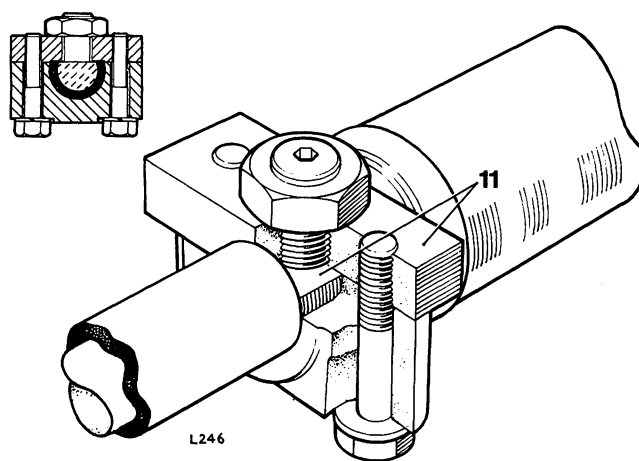
1. Disconnect the battery.
2. Withdraw the ignition key and remove the three screws clamping the nacelle halves.
3. Remove the nacelle.
4. Remove the steering-wheel. 57.60.01.
5. Remove the trafficator/horn stalk and brackets.
6. Remove the two nuts and spring washers securing the steering-column clamp to the steering-column bracket.
7. Insert the ignition key in the switch and release the steering lock.
8. Remove the two bolts and spring washers securing the steering-column safety clamp, and remove the clamp.
9. Carefully withdraw the upper inner steering-column, taking care to avoid dislodging the column bushes.



MT0570

Refitting

10. Enter the upper steering-column in the tubular housing and carefully engage the lower steering-column.
11. Align the milled flat in the lower column with the slot in the upper column and fit the safety clamp but do not tighten the securing bolts.
12. Slide the tubular housing downward until the safety clamp butts against the edge of the slot in the upper column and the collapsible tube enclosing the lower column has no axial float.
13. Ensure that turning clearance exists between the safety clamp and nylon thrust washer fitted between the safety clamp and the tubular housing.
14. Tighten the bolts securing the safety clamp.
15. Fit and tighten the two nuts and spring washers securing the tubular housing clamp.
16. Fit the trafficator/horn stalk and brackets.
17. Fit the nacelle.
18. Fit the steering-wheel.
19. Connect the battery.



STEERING-COLUMN—UPPER

** —Remove and refit (From Trim No.

T.244 D.G.—L.H. Steer,

T.1753 D.G.—R.H. Steer

Up to Trim No.

T.720 D.H.—2 door

T.6490 D.M.—4 door)**

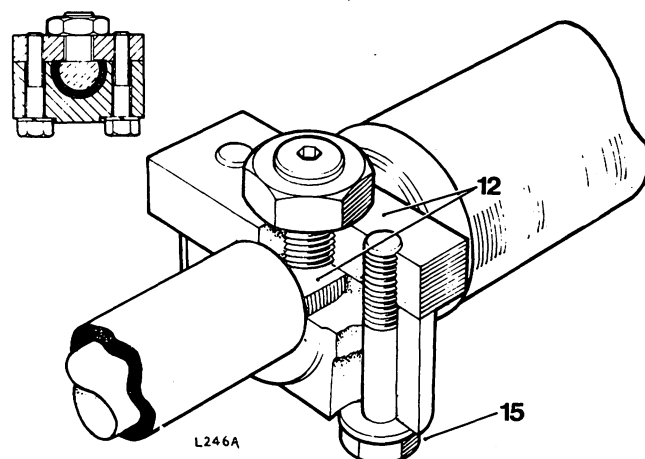
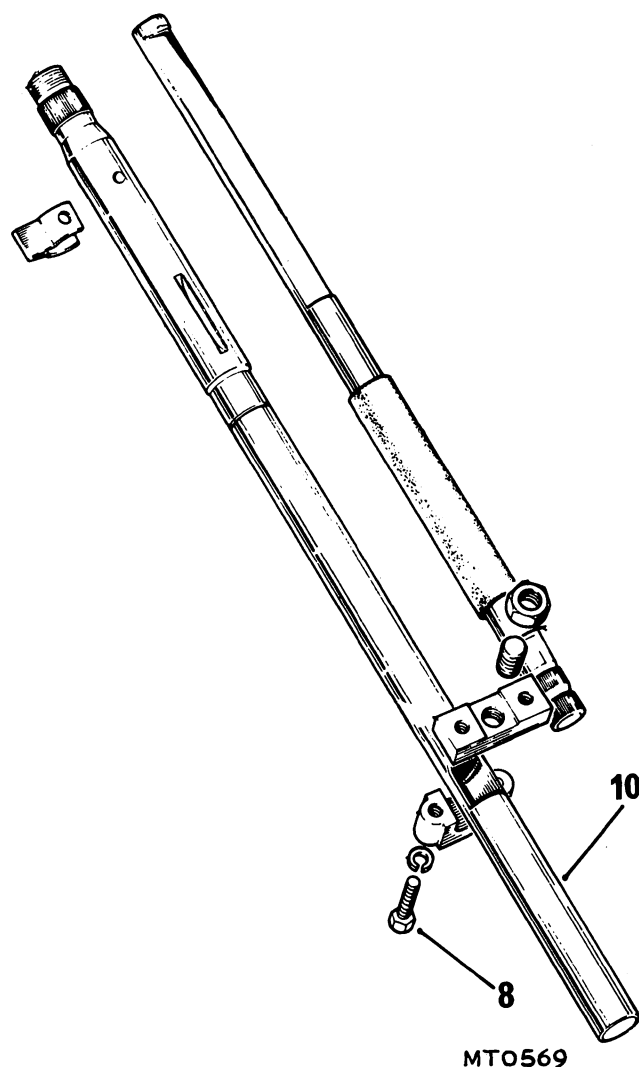
57.40.02

Removing

1. Disconnect the battery.
2. Withdraw the ignition key and remove the three screws clamping the nacelle halves.
3. Remove the nacelle.
4. Remove the steering-wheel. 57.60.01.
5. Remove the trafficator/horn stalk and brackets.
6. Remove the parcel shelf. 76.67.01.
7. Remove the shear-headed bolts securing the tubular housing clamp.
8. Remove the two bolts and spring washers securing the steering-column safety clamp and remove the clamp.
9. Insert the ignition key in the switch and release the steering lock.
10. Carefully withdraw the upper inner steering-column from the tubular housing, taking care to avoid dislodging the column bushes.

Refitting

11. Enter the upper steering-column in the tubular housing and carefully engage the lower steering-column.
12. Align the milled flat in the lower column with the slot in the upper column and fit the safety clamp but do not tighten the securing bolts.
13. Slide the tubular housing downward until the safety clamp butts against the edge of the slot in the upper column and the collapsible tube enclosing the lower column has no axial float.
14. Ensure that turning clearance exists between the safety clamp and the nylon thrust washer fitted between the safety clamp and the tubular housing.
15. Tighten the securing safety clamp.
16. Fit the tubular housing clamp and engage two new shear bolts. Tighten the bolts evenly until the heads shear.
17. Fit the parcel tray. 76.67.01.
18. Fit the nacelle.
19. Fit the trafficator/horn stalk and brackets.
20. Fit the steering-wheel.
21. Connect the battery.



STEERING

STEERING-COLUMN—LOWER

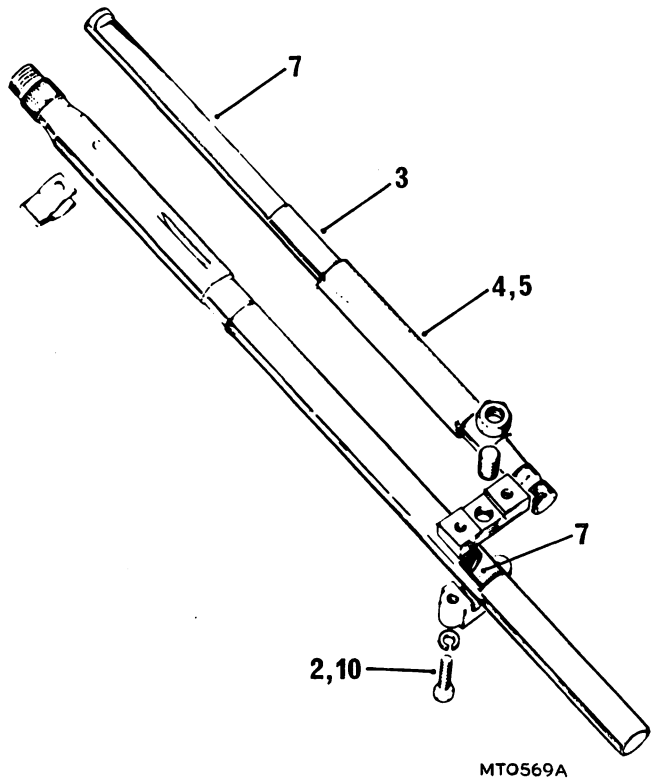
- ** —Remove and refit (Up to Trim No. 57.40.05
T.720 D.H.—2 door
T.6490 D.M.—4 door)**

Removing

1. Remove the steering-column complete. 57.40.01.
2. Remove the two bolts and spring washers securing the safety clamp and remove the safety clamp.
3. Withdraw the lower column complete with collapsible spacer.
4. Remove the collapsible spacer.

Refitting

5. Locate the collapsible spacer against the welded collar on the lower column.
6. Enter the lower column in the upper column, ensuring that the nylon washer is located below the tubular housing.
7. Align the slot in the upper column with the milled flat in the lower column and fit the safety clamp. Do not tighten the securing bolts.
8. Telescope the upper and lower columns to reduce their combined overall length as far as possible but do not apply force.
9. Ensure that turning clearance exists at the nylon washer fitted between the safety clamp and the tubular housing.
10. Tighten the safety clamp securing bolts.
11. Install the steering-column in the car. 57.40.01.



**

STEERING-COLUMN MAST

—Remove and refit (From Trim No.

57.40.06

T.720 D.H.—2 door

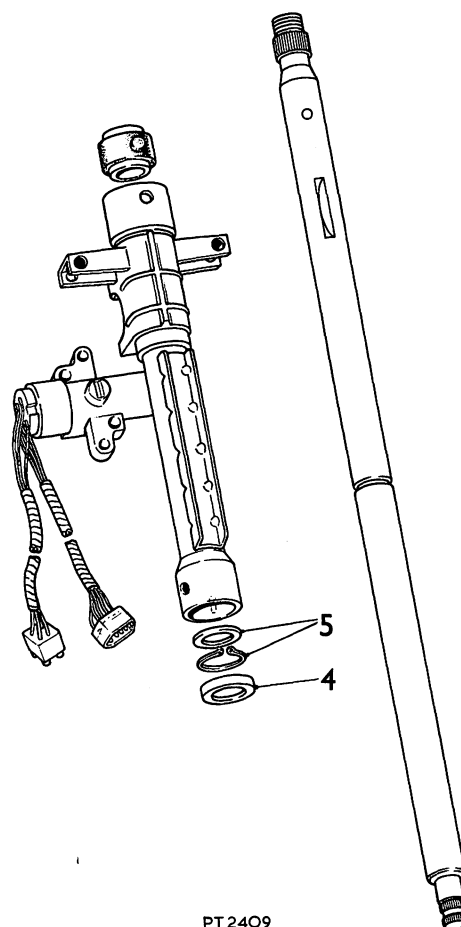
T.6490 D.M.—4 door)

Removing

1. Remove the steering-column. 57.40.01 later models.
2. Remove the steering wheel. 57.60.01.
3. Remove the trafficator switch cancelling clip.
4. Prise off the end cap from the lower end of the tubular housing.
5. Remove the circlip and slide off the washer.
6. Release the steering lock and withdraw the steering mast.

Refitting

7. Reverse instructions 1 to 6.



PT 2409

STEERING-COLUMN BUSHES

—Remove and refit

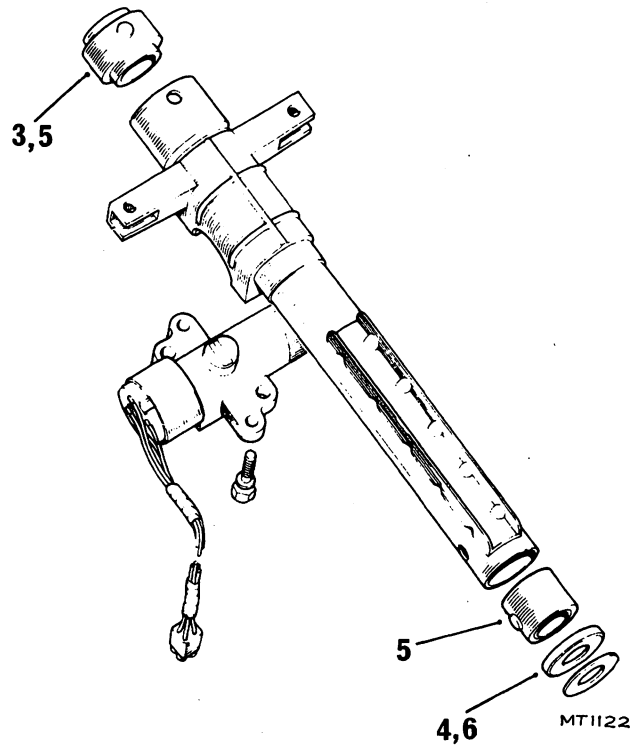
57.40.18

Removing

1. Remove the steering-column complete. 57.40.01.
2. **Remove the upper and lower columns where applicable or the single column from the tubular housing. **
3. Depress the rubber dowels locating the upper bush in the tubular housing and withdraw the upper bush.
4. Withdraw the end cap from the tubular housing and repeat instruction 3 for the lower bush.

Refitting

5. Insert the upper and lower bushes into the tubular housing, ensuring that the rubber dowels engage the holes in the housing.
6. Fit the end cap to the tubular housing.
7. **Install the upper and lower columns where applicable or the single column in the tubular housing. **
8. Install the steering-column.



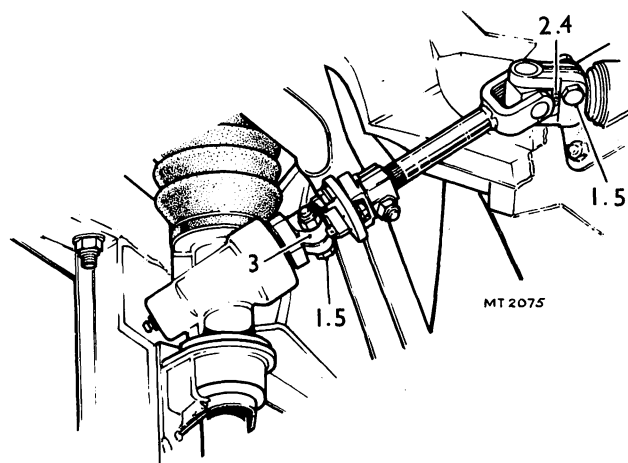
INTERMEDIATE SHAFT

—Remove and refit

57.40.22

Removing

1. Remove the upper and lower pinch bolt and the nut securing the intermediate shaft to the steering-column and steering rack pinion.
2. Remove the 'U' bolts clamping the rack to the sub-frame.
3. Ease the rack forward to release the pinion shaft from the intermediate shaft flexible coupling.
4. Detach the intermediate shaft from the steering-column.



Refitting

5. Set the road wheels to the straight-ahead position.
6. With the steering-wheel spokes horizontal, connect the intermediate shaft universal joint to the column and the flexible joint to the rack pinion.
7. Fit the 'U' bolts to the rack, and tighten.
8. Fit the pinch bolts to the universal joint and flexible coupling.

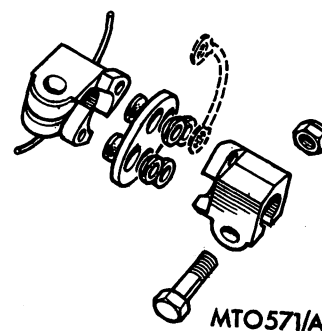
INTERMEDIATE SHAFT FLEXIBLE COUPLING

—Remove and refit

57.40.25

Removing

1. Remove the intermediate shaft, 57.40.22.
2. Remove the pinch bolt securing the flexible coupling to the intermediate shaft and withdraw the flexible coupling.



Refitting

3. Reverse instructions 1 and 2.

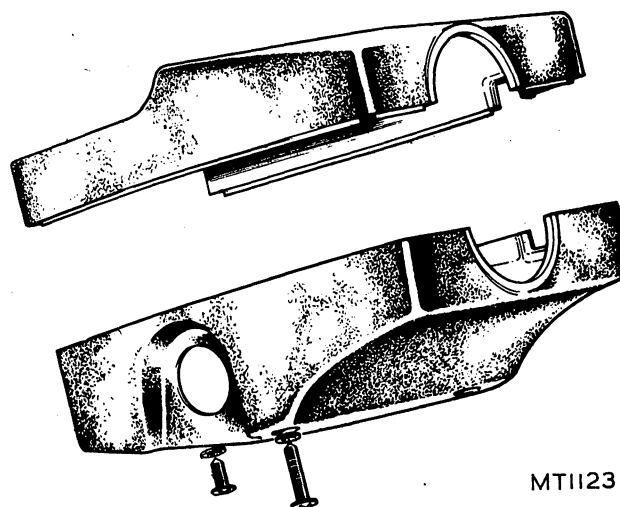
STEERING-COLUMN NACELLE

—Remove and refit

57.40.29

Removing

1. Withdraw the key from the steering lock/ignition switch.
2. Remove the three screws clamping the nacelle halves.
3. Remove the nacelle halves.



Refitting

4. Reverse instructions 1 to 3.



STEERING

STEERING LOCK/IGNITION SWITCH

—Remove and refit

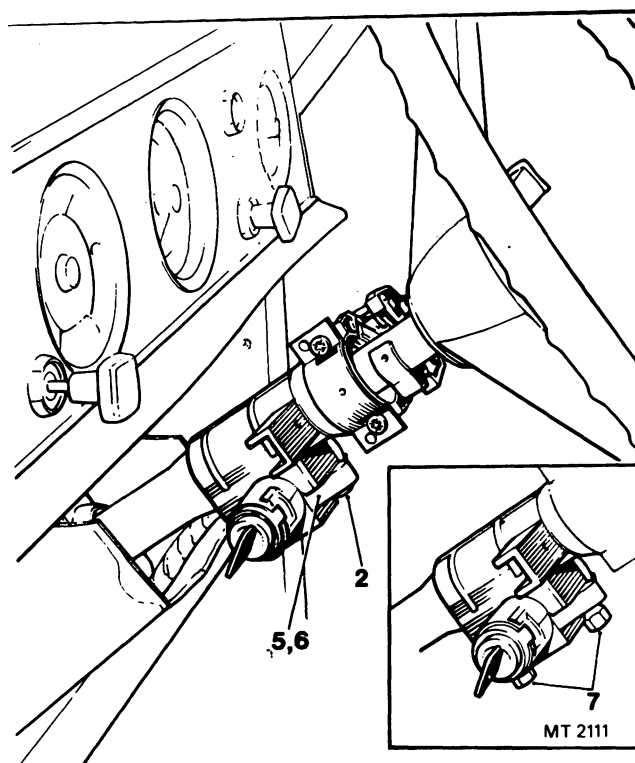
57.40.31

Removing

1. Remove the nacelle.
2. Using a centre-punch, mark the centre of the two shear-head bolts securing the steering lock to the column.
3. Using a small chisel, unscrew the shear-head bolts.
or
- 3a. If instruction 3 proves to be unsuccessful, drill into the shear-head bolts where previously marked by centre-punch and, using an Easiout extractor, unscrew the shear-head bolts.
4. Disconnect the plug-in connector to the ignition switch.
5. Remove the steering lock.

Refitting

6. Locate the steering lock on the column and align the mounting holes.
7. Fit two new shear-head bolts and tighten evenly until both heads shear.
8. Connect the plug-in connector for the ignition switch.
9. Fit the nacelle.



TIE-ROD BALL JOINT—OUTER

—Remove and refit

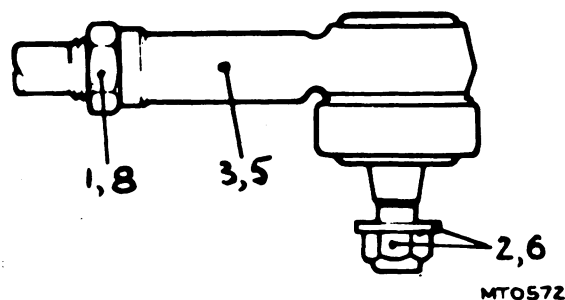
57.55.02

Removing

1. Slacken the locknut securing the tie-rod to the outer ball joint.
2. Remove the nut and washer securing the ball joint to the steering arm.
3. Release the ball joint from the steering arm.
4. Unscrew the ball joint from the tie-rod.

Refitting

5. Screw the ball joint onto the tie-rod. The distance between tie-rod ball joint centres (inner to outer) is $9\frac{3}{16}$ in (233.4 mm).
6. Connect the ball joint to the tie-rod and secure with the washer and nut.
7. Check and adjust the front wheel track as necessary.
8. Tighten the tie-rod locknut.



57.40.31

57.55.02

TIE-ROD BALL JOINT—INNER

—Remove and refit

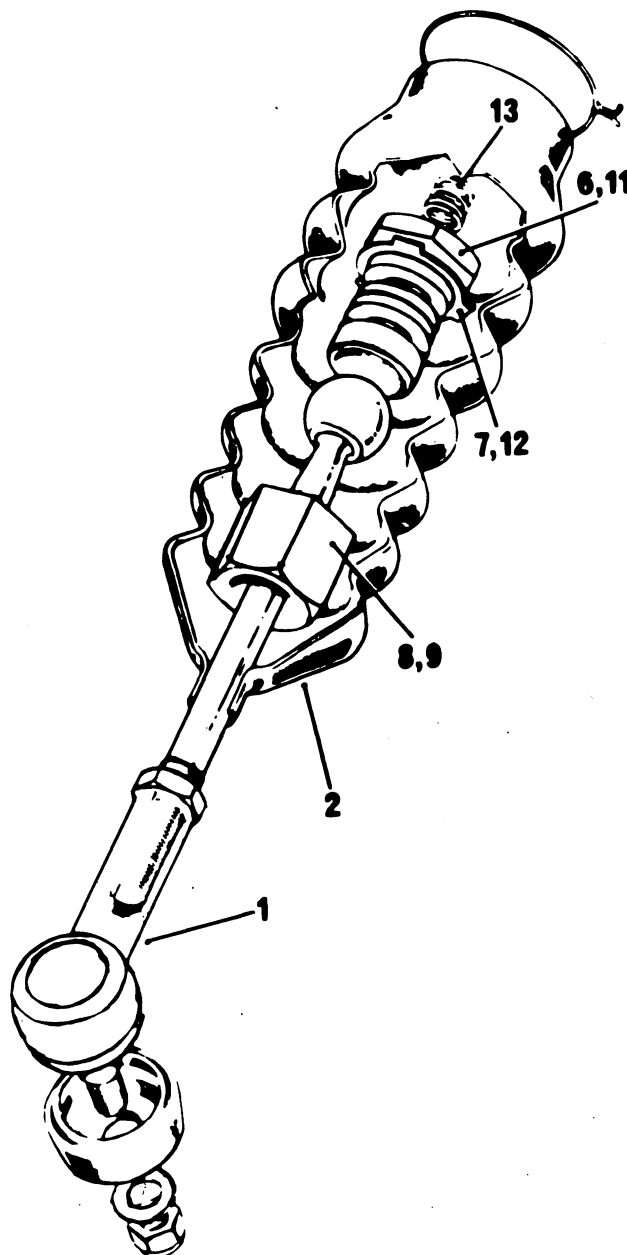
57.55.03

Removing

1. Remove the tie-rod outer ball joint. 57.55.02.
2. Release the gaiter clips and remove the gaiter from the inner ball joint to be serviced.
3. Release the gaiter clips and slide the gaiter along the tie-rod at the opposite end of the rack.
4. Wipe the inner ball joints clear of grease.
5. Slacken the locknut on the ball joint to be removed. To prevent stress being applied to the rack pinion, the opposite inner ball housing should be held with a spanner.
6. Unscrew the ball adaptor from the rack shaft, observing the precaution mentioned in instruction 5.
7. Straighten the lock tabs on the washer securing the ball adaptor and housing.
8. Unscrew the adaptor from the housing and withdraw the shim(s), spring, ball seat and tie-rod.

Refitting

9. Lubricate the ball housing and insert the rod.
10. Fit the ball seat, shim(s), new tab washer and adaptor.
11. Tighten the adaptor torque 80 lbf ft (11.06 kgf m), and check the ball end for end-float and articulation. End-float should be within 0.0005 to 0.003 in (0.0127 to 0.0762 mm). There must be no tight spots in articulation. Adjust by adding or removing shims as necessary. Shims available are: 0.002, 0.004 and 0.010 in (0.0508, 0.1016 and 0.254 mm).
12. If end-float and articulation are satisfactory, bend over the lock washer tabs to secure the adaptor and ball housing.
13. Slide the spring into the adaptor.
14. Fit the locknut to the rack shaft and fit the adaptor and ball housing to the rack shaft.
15. To avoid stress being applied to the rack pinion, it is necessary to prevent rack shaft movement when the adaptor and locknut are tightened. When tightening the adaptor and locknut, employ a spanner at the opposite end of the rack shaft to prevent rotation of the rack shaft.
16. Tighten the locknut to 80 lbf ft (11.06 kgf m).
17. Pack the inner ball ends with fresh grease and fit the gaiters and clips.
18. Fit the tie-rod outer end. 57.55.02.
19. Check and adjust the front wheel track as necessary.



MT0573

STEERING

STEERING-WHEEL

—Remove and refit

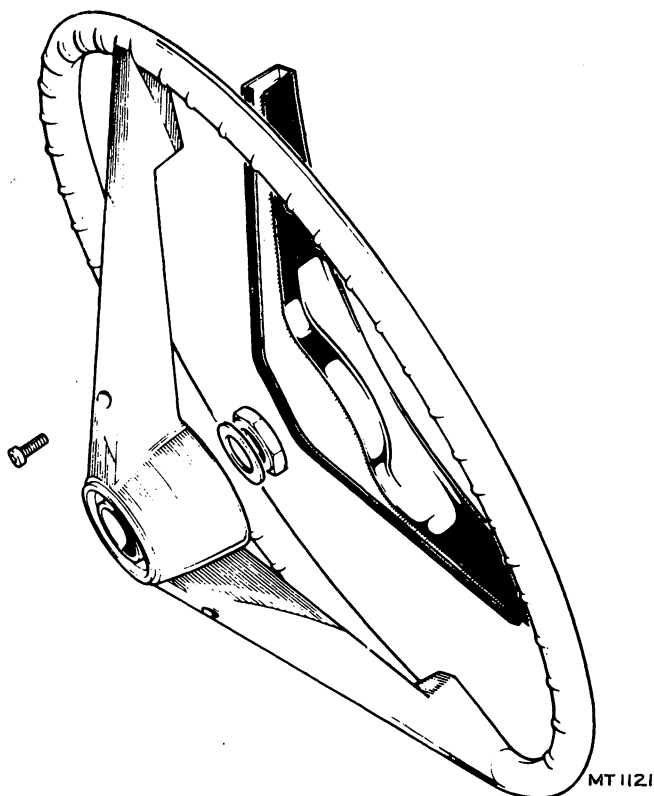
57.60.01

Removing

1. Remove the two screws (underside of steering-wheel spokes) securing the steering-wheel pad.
2. Withdraw the steering-wheel pad.
3. Disengage the steering lock and remove the nut and washer securing the steering-wheel hub to the steering-column.
4. Scribe the steering-wheel hub and the top of the steering-column to ensure re-engagement of the original splines.
5. Withdraw the ignition key from the switch.
6. Remove the three screws clamping the nacelle halves and withdraw the nacelle.
7. Using a suitable extractor, remove the steering-wheel from the steering mast.

Refitting

8. Engage the steering-wheel hub on the steering-column, ensuring that the scribe marks are aligned. If no markings are present, set the road wheels in the straight-ahead position with the steering-wheel spokes horizontal.
9. Fit the washer and nut to the steering-column and tighten with the steering lock disengaged.
10. Fit the nacelle halves and secure them with the three screws.
11. Fit the steering-wheel pad and secure it with the two screws.



STEERING-WHEEL PAD

—Remove and refit

57.60.03

Removing

1. Remove the two screws (underside of steering-wheel spokes) securing the steering-wheel pad.
2. Withdraw the steering-wheel pad.

Refitting

3. Reverse instructions 1 and 2.

57.60.01

57.60.03

FRONT WHEEL ALIGNMENT

—Check and adjust

57.65.01

Checking

1. Locate the car on level ground and position the front wheels in straight-ahead position.
2. Using wheel alignment equipment, check the front wheels for toe-in. Four requirements should be met:
 - a. Steering-wheel spokes horizontal.
 - b. Steering rack centralized.
 - c. Front wheels parallel to $\frac{1}{16}$ in (1.59 mm) toe-in.
 - d. Ball centres of both tie-rods equal.

Adjusting

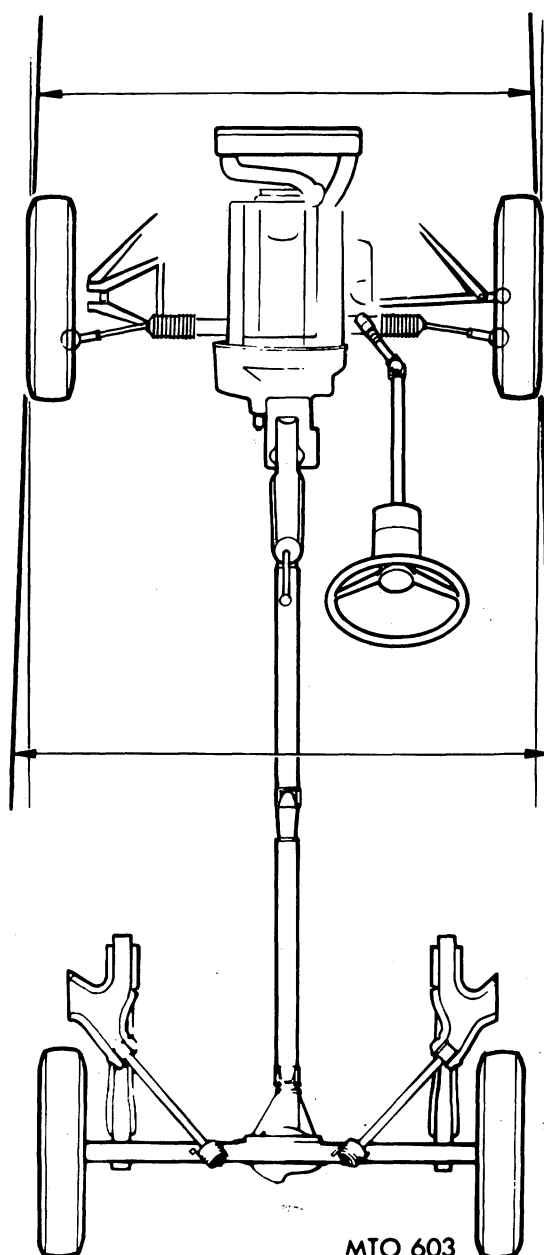
3. Slacken the outer clips on the rack gaiter.
4. Slacken the locknuts at the tie-rod outer ball joints.
5. Shorten or extend both tie-rods an equal amount to obtain the required setting (0 to $\frac{1}{16}$ in, 0 to 1.59 mm toe-in).
6. Tighten the locknuts at the tie-rod outer ball joints.
7. Tighten the gaiter outer clips.

STEERING GEOMETRY

—Check

57.65.02

Only two adjustments are possible: Camber 57.65.05, and toe-in 57.65.01.



**DATA

	Kerb condition			Laden condition (4 up)		
	'A'	'B'	'C'	'A'	'B'	'C'
Camber angle ..	$\frac{1}{2}^{\circ}$ positive $\pm 1^{\circ}$	$1\frac{1}{4}^{\circ}$ positive $\pm 1^{\circ}$	1° positive $\pm 1^{\circ}$	$\frac{3}{4}^{\circ}$ negative $\pm \frac{3}{4}^{\circ}$	$\frac{1}{2}^{\circ}$ positive $\pm \frac{3}{4}^{\circ}$	$\frac{1}{4}^{\circ}$ positive $\pm \frac{3}{4}^{\circ}$
Castor angle ..	$2\frac{1}{4}^{\circ} \pm 1^{\circ}$	$2\frac{1}{4}^{\circ} \pm 1^{\circ}$	$2\frac{1}{4}^{\circ} \pm 1^{\circ}$	$2\frac{3}{4}^{\circ} \pm \frac{1}{2}^{\circ}$	$2\frac{3}{4}^{\circ} \pm \frac{1}{2}^{\circ}$	$2\frac{3}{4}^{\circ} \pm \frac{1}{2}^{\circ}$
King pin inclination	$6\frac{1}{2}^{\circ} \pm 1^{\circ}$	$5\frac{3}{4}^{\circ} \pm 1^{\circ}$	$5\frac{3}{4}^{\circ} \pm 1^{\circ}$	$7\frac{3}{4}^{\circ} \pm \frac{3}{4}^{\circ}$	$6\frac{1}{2}^{\circ} \pm \frac{3}{4}^{\circ}$	$6\frac{1}{2}^{\circ} \pm \frac{3}{4}^{\circ}$
Wheel alignment ..	0 to $\frac{1}{16}$ in (0 to 1.59 mm) toe-in—all conditions.					

Condition 'A'—up to Commission Numbers ADG 11512 and ADS 648 only.

Condition 'B'—from Commission Numbers ADG 11512 and ADS 648 and other models.

Condition 'C'—from Commission Number ADH 1 and ADF 50,001.**

STEERING

CAMBER ANGLE

—Check and adjust

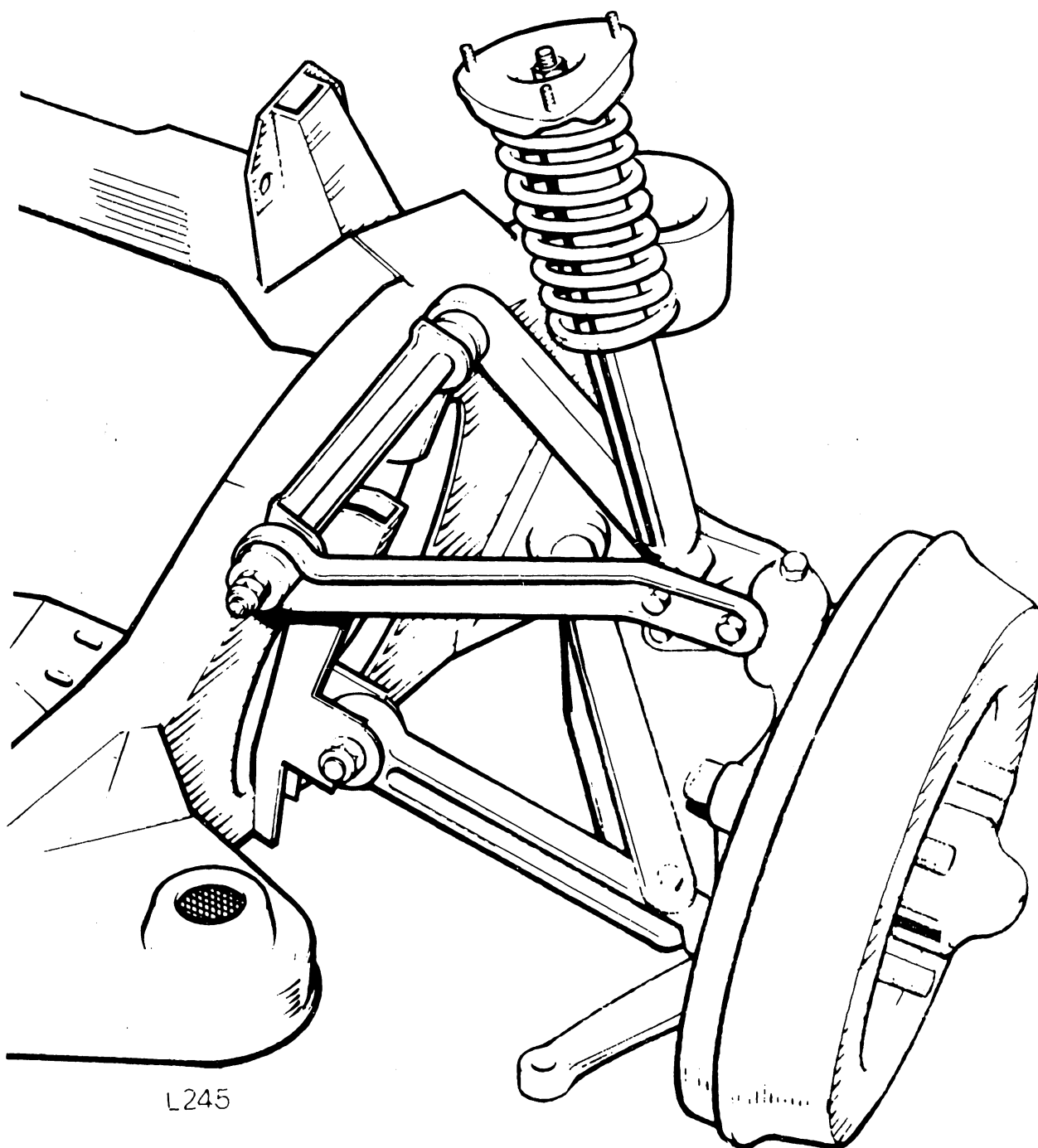
57.65.05

Checking

** Front wheel camber should be within the limits given in 57.65.02. **

Adjusting

1. Jack up the car and support the body on stands.
2. Slacken the four bolts and nuts (3 top, 1 bottom) securing the front suspension bracket to the sub-frame.
3. Remove shim(s) between the top of the bracket and the sub-frame for negative adjustment: add shim(s) for positive adjustment.
One shim equals approximately 1 degree camber angle.
4. Tighten the suspension bracket bolts and nuts and remove the body stands.



FRONT SUSPENSION OPERATIONS

Ball joint

—lower—overhaul	60.15.13
—lower—remove and refit	60.15.03
—upper—overhaul	60.15.12
—upper—remove and refit	60.15.02

Damper

—bush—remove and refit	60.30.07
—remove and refit	60.30.02

Hub

—bearing end-float—check and adjust	60.25.13
—bearings—remove and refit	60.25.14
—oil seals—remove and refit	60.25.15
—overhaul	60.25.07
—remove and refit	60.25.01
—stub axle—remove and refit	60.25.22
—wheel stud—remove and refit	60.25.29

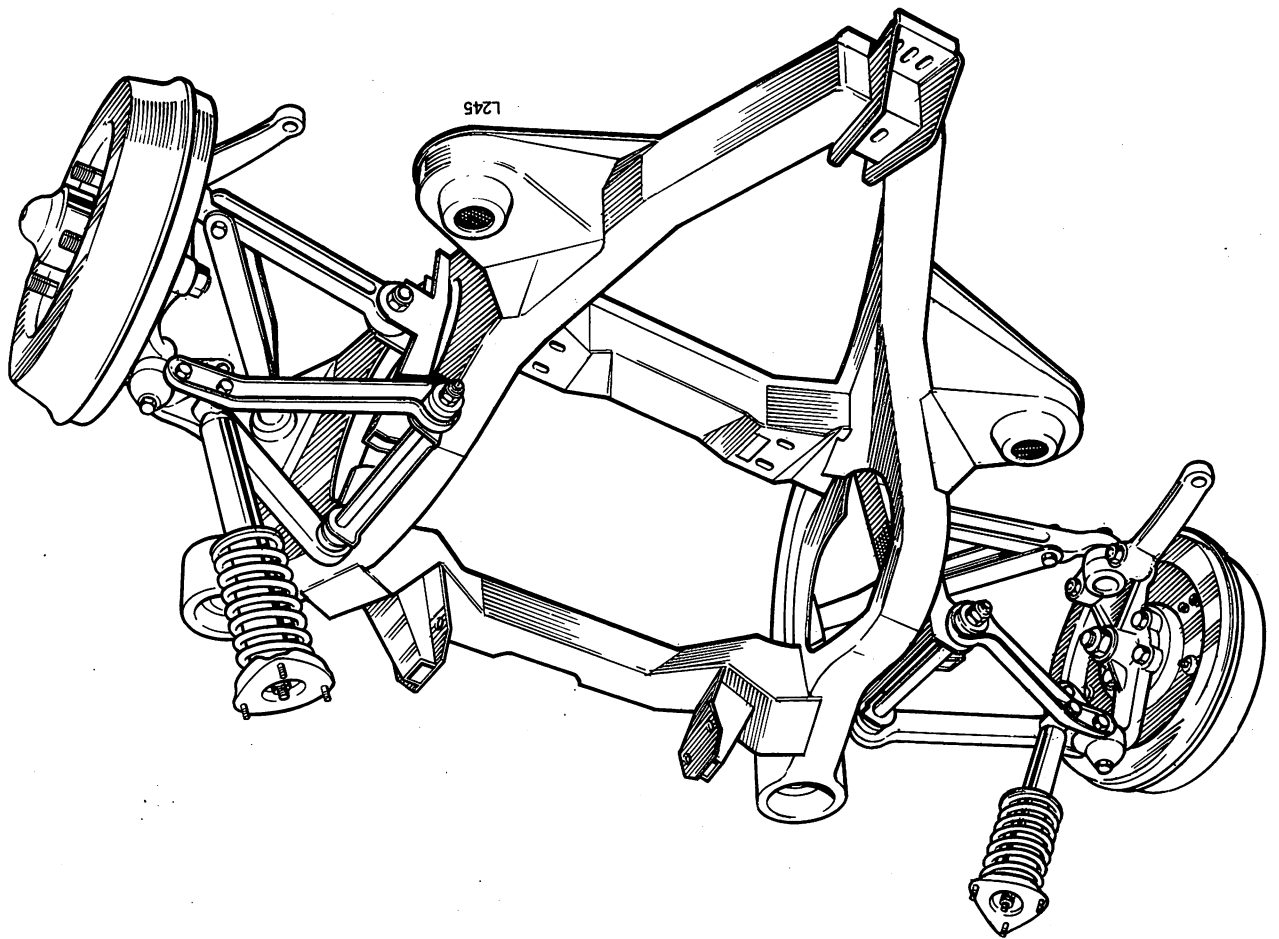
Radius rod—remove and refit	60.10.16
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Road spring—remove and refit	60.20.01
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Vertical link—remove and refit	60.25.23
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Wishbone

—lower—overhaul	60.35.09
—lower—remove and refit	60.35.02
—upper—remove and refit	60.35.01



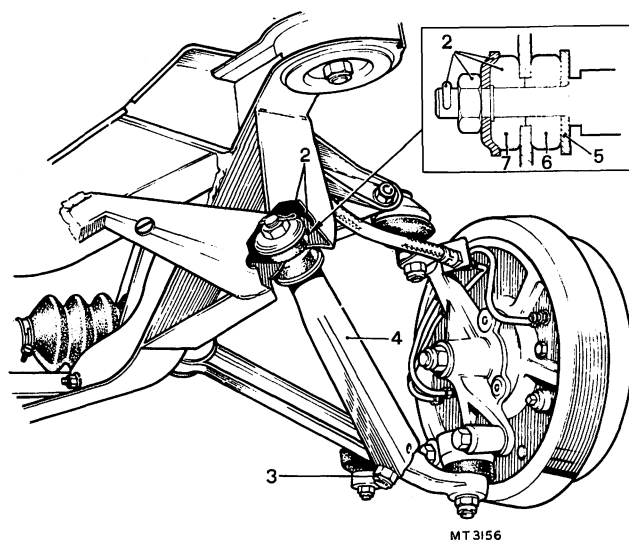
RADIUS ROD

—Remove and refit

60.10.16

Removing

1. Raise the car on a jack.
2. Remove the hairpin-type cotter, nut, dished washer and outer rubber bush from the front (sub-frame) end of the radius rod.
3. Remove the nut and bolt securing the radius rod to the lower wishbone.
4. Detach the radius rod from the lower wishbone and withdraw the radius rod complete with inner rubber bush and flat washer from the sub-frame.



MT 3156

Refitting

5. Assemble the flat washer to the radius rod (radiused inner diameter adjacent to the spigot).
6. Fit the inner rubber bush to the radius rod (plain face of bush adjacent to the flat washer).
7. Insert the radius rod in the sub-frame and fit the outer rubber bush (plain face of rubber bush towards the front of the car).
8. Fit the dished washer (concave surface towards the outer rubber bush) and nut.
- 9.**Fit the rear end of the radius rod to the lower wishbone and secure it with the bolt and Nyloc nut. (Torque 50 to 65 lbf ft (7.0 to 9.0 kgf m.))
10. Tighten the nut at the front of the radius rod to 30 to 38 lbf ft (7.0 to 9.0 kgf m) and insert the hairpin cotter.**
11. Remove the jack.

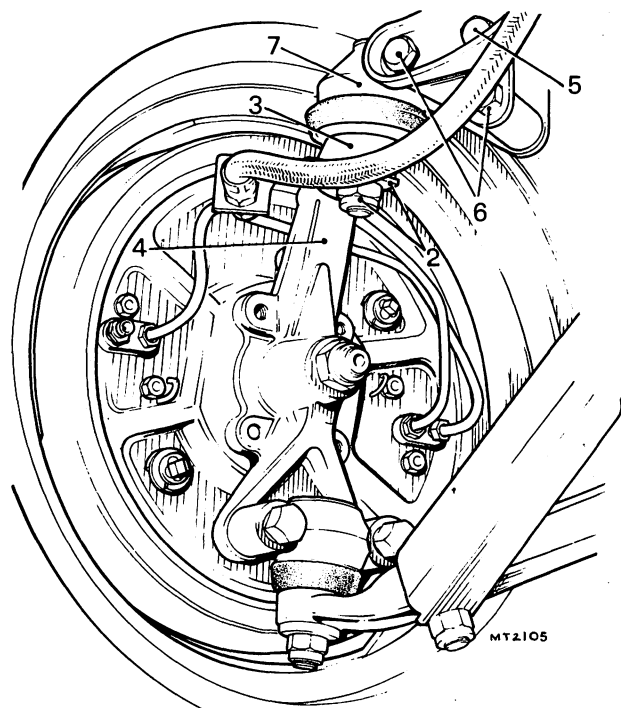
BALL JOINT—UPPER

—Remove and refit

60.15.02

Removing

1. Jack up the car, support the body on stand(s) and remove the front wheel.
2. Remove the nut, washer and brake hose bracket from the upper wishbone ball joint shank.
3. Release the ball joint shank from the vertical link.
4. Support the vertical link/hub assembly with a cord or wire to avoid stressing the flexible brake hose.
5. Slacken the nut and bolt securing the lower end of the damper to the wishbone.
6. Remove the two bolts and nuts securing the stem of the ball joint to the wishbone arms.
7. Withdraw the ball joint.



MT 2105

Refitting

8. Reverse instructions 1 to 7.



FRONT SUSPENSION

BALL JOINT—LOWER

—Remove and refit

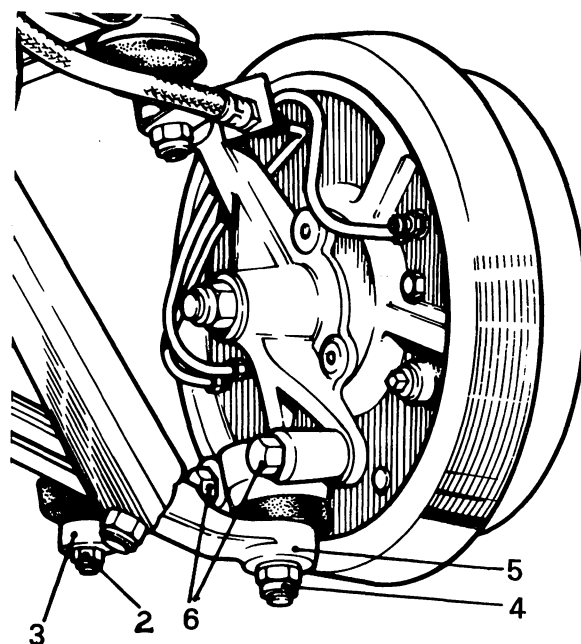
60.15.03

Removing

1. Jack up the car and support the body on stand(s).
2. Remove the Nyloc nut and washer from the tie-rod outer ball joint.
3. Release the tie-rod outer ball joint from the steering arm.
4. Remove the Nyloc nut and washer securing the lower ball joint to the lower wishbone.
5. Release the lower ball joint from the wishbone.
6. Remove the two bolts and spring washers securing the lower ball joint/steering arm assembly to the vertical link.
7. Withdraw the lower ball joint and steering arm assembly.

Refitting

8. Reverse instructions 1 to 7.



MT2060

BALL JOINT—UPPER

—Overhaul

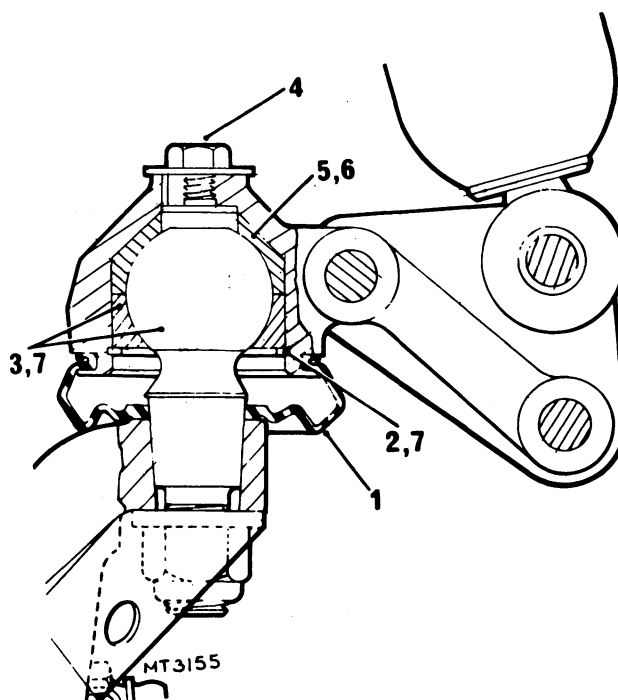
60.15.12

Dismantling

1. Remove the rubber boot.
2. Remove the circlip retaining the ball seat to the housing.
3. Withdraw the ball pin, shims and lower seat.
4. Remove the plug and washer from the ball housing.
5. Using a suitable chisel, remove the plastic upper seat, taking care to avoid damaging the housing.

Reassembling

6. Using the ball pin and vice, carefully press the new upper seat into position.
7. Fit the ball pin, lower seat and circlip and check the ball pin for freedom of movement and end-float. The ball bearing should articulate freely and have a maximum end-float of 0.004 in (0.1016 mm). Three alternative sizes of lower ball seat are available, also shims of 0.005 and 0.010 in (0.127 and 0.254 mm). Select a lower ball seat and shim(s) to satisfy the requirements of free articulation and end-float.
8. Remove the ball pin and lower seat, lubricate with clean grease and reassemble. The circlip retaining the lower seat must be fitted with its open end at right angles to the ball housing shank.
9. Partially pack the rubber boot with clean grease, and fit it to the ball housing.
10. Fit the grease nipple to the plug hole and charge the assembly with grease.
11. Remove the nipple and fit the washer and plug.



MT3155

60.15.03

60.15.12

BALL JOINT—LOWER

—Overhaul

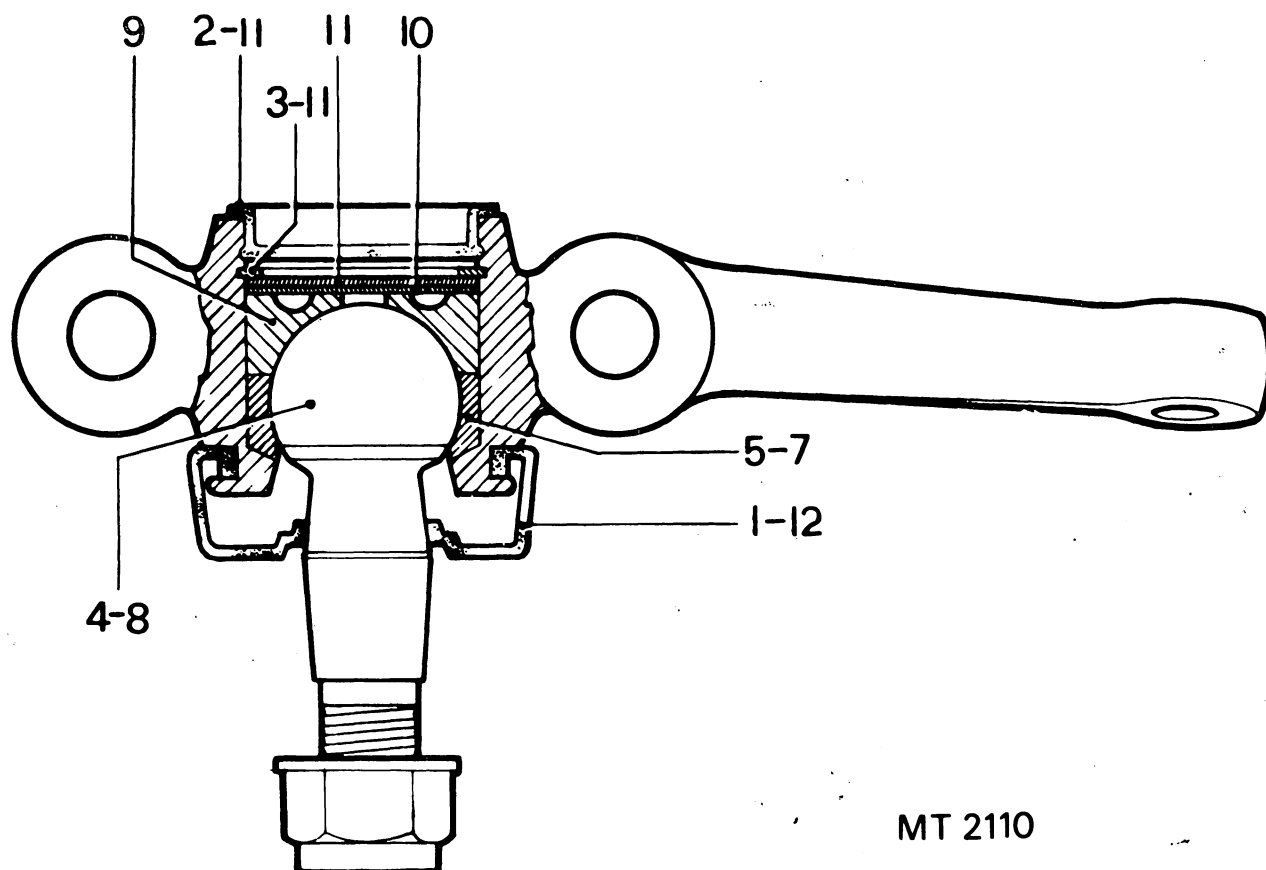
60.15.13

Dismantling

1. Remove the rubber boot.
2. Prise off the top sealing cap.
3. Remove the circlip.
4. Remove the ball pin complete with upper socket, disc, spring and top cover.
5. Remove the lower seat.
6. Clean all components, and renew as necessary.

Reassembling

7. Fit the lower ball seat.
8. Lubricate the ball with clean grease and insert it in the housing.
9. Fit the upper ball seat.
10. Fit the disc spring (concave adjacent to ball seat).
11. Fit the top cover, circlip and sealing cap.
12. Partially fill the rubber boot with clean grease and fit it to the housing.



MT 2110



FRONT SUSPENSION

FRONT ROAD SPRING

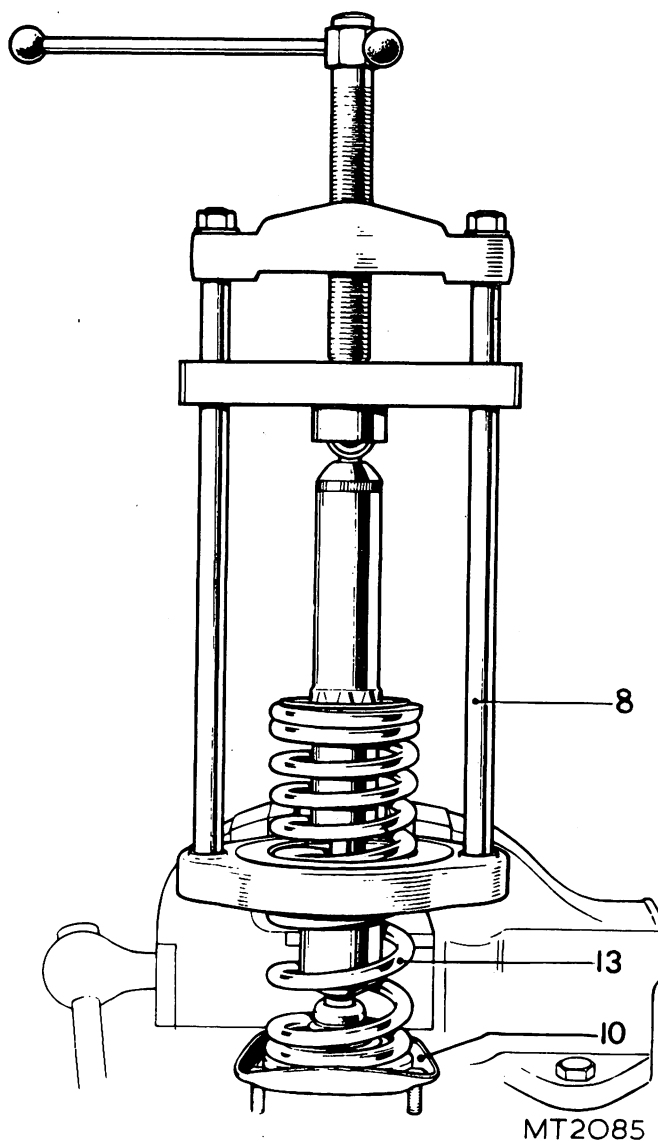
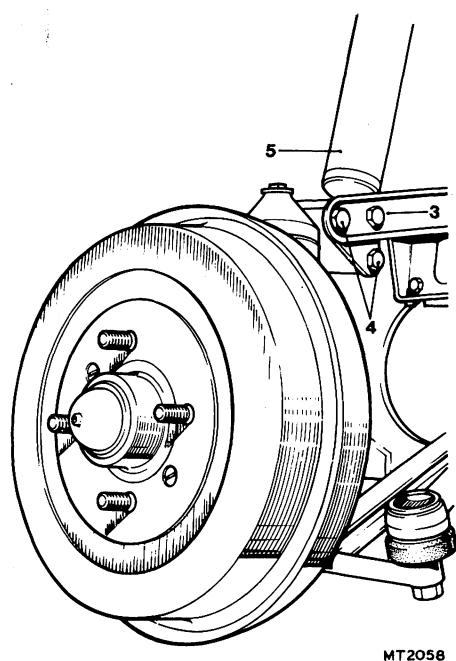
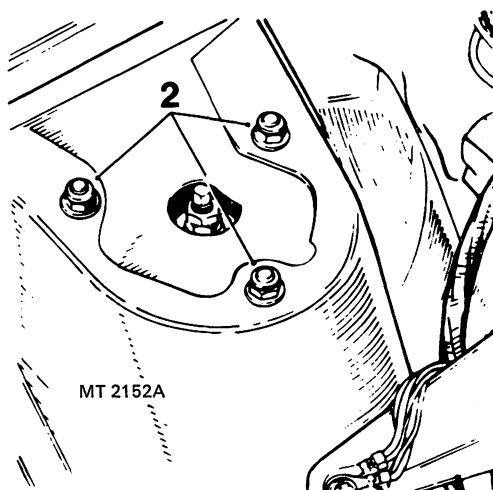
—Remove and refit

60.20.01

Service tools: S4221A-5-18

Removing

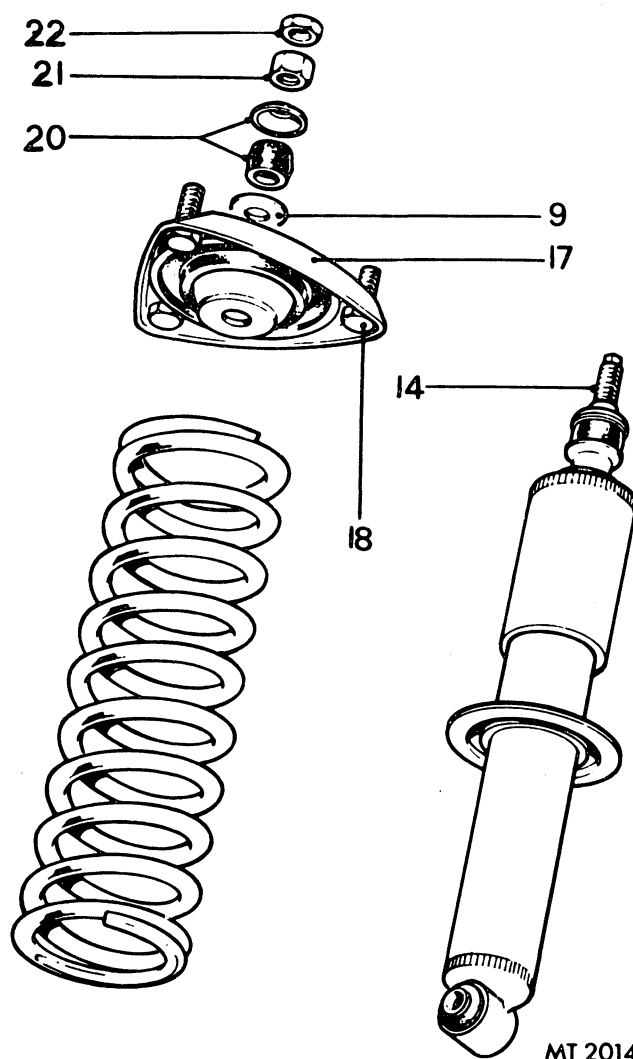
1. Jack up the car and remove the front wheel.
2. Raise the bonnet and remove the three Nyloc nuts and plain washers from the top of the suspension turret.
3. Remove the nut and bolt securing the lower end of the damper to the upper wishbone.
4. Slacken the two nuts and bolts securing the upper wishbone to the ball joint stem.
5. Release the lower end of the damper from the wishbone.
6. Withdraw the damper and spring assembly from the turret.
7. Remove the spacing washers from the mounting flange studs.
8. Using tool S4221A and adaptors S4221A-5 and S4221A-18, compress the road spring until the upper mounting flange can be rotated freely.
9. Remove the locknut and nut securing the upper mounting flange to the damper rod.
10. Withdraw the mounting flange complete with upper rubber bush, washers, and spring insulating ring.
11. Withdraw the lower rubber bush and washers.
12. Release spring tension and remove the tool.
13. Remove the spring.



Refitting

If spring renewal is intended it is essential to check that a correct replacement is employed. In some models identical springs are not fitted to left- and right-hand sides and Parts Lists must be consulted to ascertain the correct part number and spring colour code.

14. Fully extend the damper rod and locate the road spring on the damper flange.
15. Using tool S4221A and adaptors 5 and 18, compress the spring until the free end of the spring is below the damper rod end.
16. Fit the washers and lower rubber bush to the damper rod, ensuring that the collar of the upper washer is positioned to engage the mounting flange.
17. Fit the insulating ring to the spring, engaging the lip inside the coils.
18. Fit the mounting flange to the damper rod, ensuring that the centre of the flange engages the collar of the lower bush washer.
19. Fit the lower washer of the upper rubber bush, engaging the collar in the mounting flange.
20. Fit the rubber bush and upper washer.
21. Fit and tighten the damper rod nut.
22. Fit and tighten the locknut.
23. Remove the spring and damper from the tool.
24. Fit the spacing washers to the mounting flange studs.
25. Enter the mounting flange studs in the turret and fit the plain washers and Nyloc nuts. Tighten the nuts.
26. Fit the lower end of the damper to the wishbone and secure it with the bolt and nut.
27. Fit the road wheel and remove the jack.
28. Close the bonnet.



MT 2014

FRONT SUSPENSION

FRONT HUB

—Remove and refit

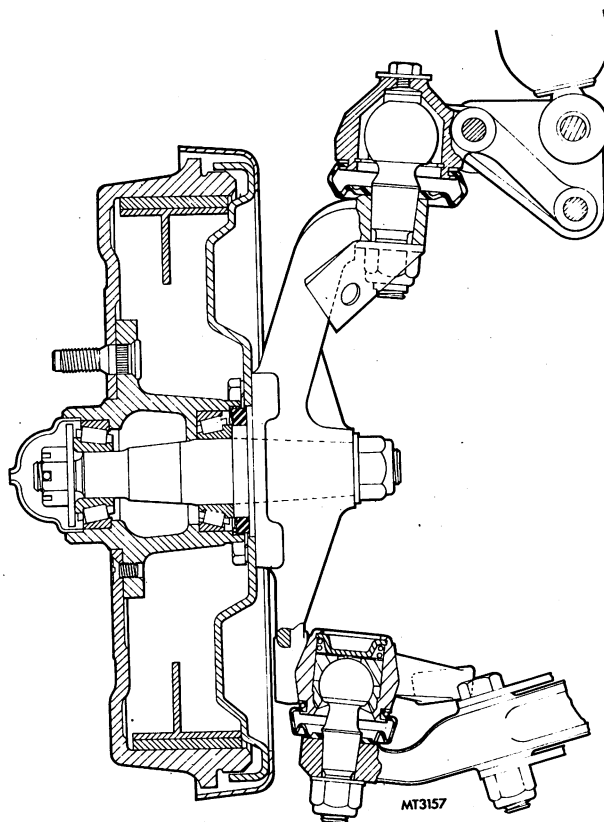
60.25.01

Removing

1. Jack up the car and remove the front wheel.
2. Remove the brake-drum (drum brakes only).
or (disc brakes only):
 - 2a. Remove the nut and bracket securing the brake hose to the vertical link.
 - 2b. Remove the two bolts and spring washers securing the calliper to the vertical link.
 - 2c. Withdraw the calliper clear of the brake disc, ensuring that strain is not imposed on the brake hose.
3. Prise off the hub cap and wipe grease from the end of the stub axle.
4. Remove the cotter pin, slotted nut and washer from the stub axle.
5. Withdraw the hub complete with bearings and oil seal.

Refitting

6. Partially pack the hub with fresh grease.
7. Locate the oil seal in the hub and enter the hub and bearings on the stub axle.
8. Fit the washer and slotted nut to the stub axle.
- 9.**Tighten the slotted nut to obtain hub end-float of 0.002 to 0.005 in (0.0508 to 0.1270 mm.)**
10. Fit a new cotter pin to the slotted nut.
11. Partially fill the hub cap with fresh grease and fit the cap to the hub.
12. Fit the brake-drum (drum brakes only).
or (disc brakes only):
 - 12a. Fit the calliper to the vertical link.
 - 12b. Fit the hose support bracket to the upper ball joint.
13. Fit the road wheel and remove the jack.



FRONT HUB

—Overhaul

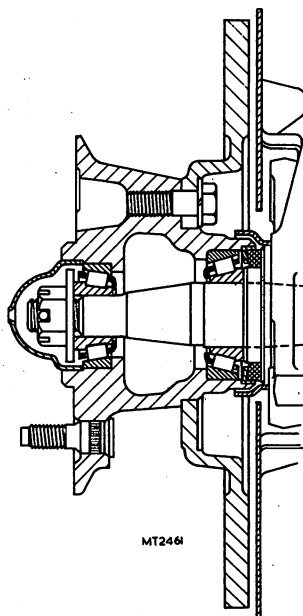
60.25.07

Dismantling

1. Remove the front hub. 60.25.01.
2. Withdraw the outer bearing.
3. Withdraw the inner oil seal, inner bearing shield and inner bearing.
4. Extract the inner and outer bearing tracks.
5. Thoroughly clean all components.

Reassembling

6. Examine all components, and renew as necessary.
7. Fit the bearing inner and outer tracks to the hub.
8. Fit the inner bearing.
9. Fit the inner bearing shield.
10. Partially fill the hub with fresh grease.
11. Lubricate the new felt seal and enter the seal in the hub.
12. Fit the outer bearing.
13. Install the hub on the stub shaft. 60.25.01.



60.25.01

60.25.07

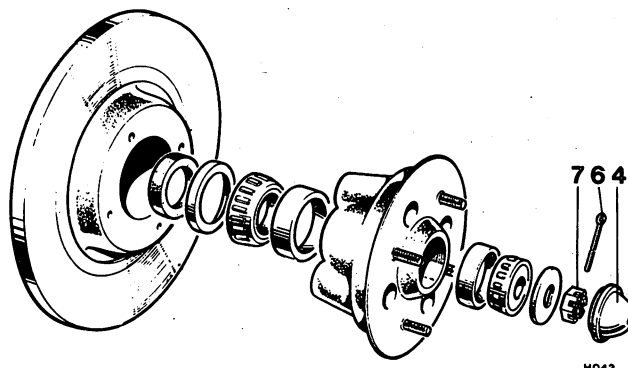
FRONT HUB BEARING END-FLOAT

—Check and adjust

60.25.13

Checking

1. Jack up the car and remove the front wheel.
2. Ensure that the brake-shoes are not dragging or restricting movement and rotation of the hub. Slacken off the shoes or remove the brake-drum as necessary (drum brakes only).
or (disc brakes only):
- 2a. Remove the brake pads.
3. Check the bearing end-float. A correctly adjusted hub will have end-float within 0.002 to 0.008 in (0.0508 to 0.2032 mm). A dial gauge can be used for checking purposes.



Adjusting

4. Prise off the hub cap.
5. Wipe grease from the end of the stub axle.
6. Remove the cotter pin.
7. Tighten or slacken the slotted nut as necessary to obtain 0.002 to 0.008 in (0.0508 to 0.2032 mm) end-float.
8. Fit a new cotter pin.
9. Clean the hub cap and partially fill it with fresh grease.
10. Fit the hub cap.
11. Fit the brake-drum (if removed) and adjust the front brakes (drum brakes only).
or (disc brakes only):
- 11a. Fit the brake pads.
12. Fit the front road wheel and remove the jack.

FRONT HUB BEARINGS

—Remove and refit

60.25.14

As operation 60.25.07.

FRONT HUB OIL SEAL

—Remove and refit

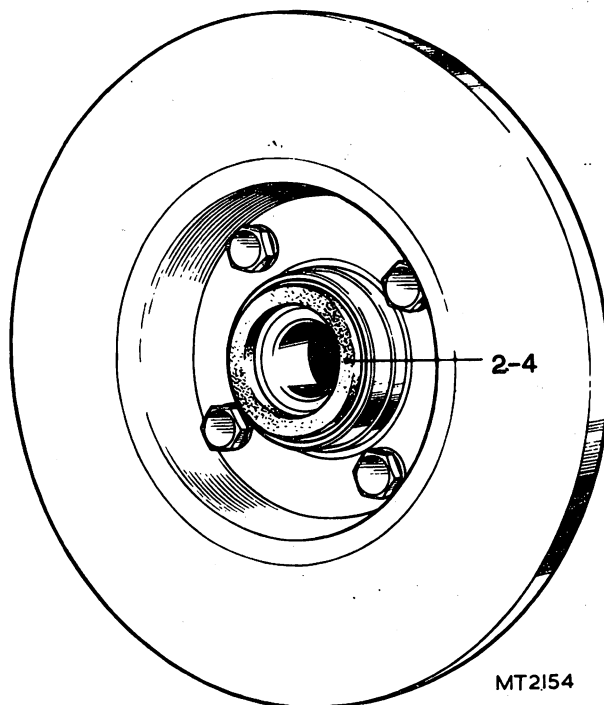
60.25.15

Removing

1. Remove the front hub. 60.25.01.
2. Withdraw the oil seal.

Refitting

3. Partially pack the hub with fresh grease.
4. Lubricate the new hub seal and enter the seal in the hub.
5. Fit the hub to the stub axle. 60.25.01.



FRONT SUSPENSION

FRONT HUB STUB AXLE

—Remove and refit

60.25.22

Removing

1. Remove the vertical link. 60.25.23.
2. Remove the Nyloc nut and plain washer securing the stub axle to the vertical link.
3. Press out the stub axle from the vertical link.

Refitting

4. Reverse instructions 1 to 3.
5. Fit the vertical link and hub assembly. 60.25.23.

VERTICAL LINK

—Remove and refit

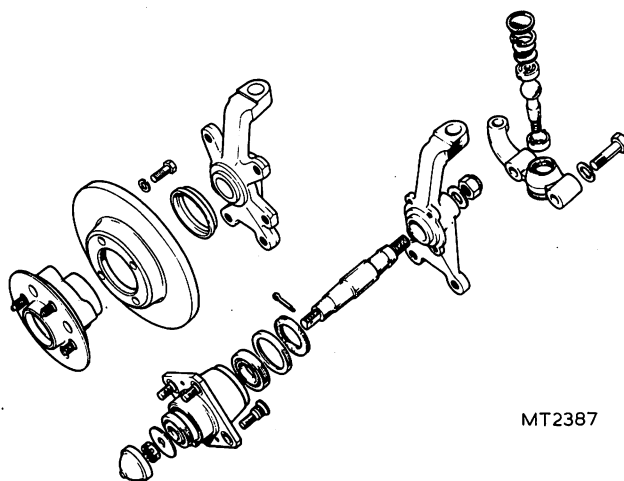
60.25.23

Removing

1. Jack up the front of the car and support the body/sub-frame on stand(s).
2. Remove the road wheel.
3. Remove the front hub. 60.25.01.
4. Remove the four bolts and spring washers securing the brake backplate to the vertical link (drum brakes only).
5. Remove the disc upper shield (disc brakes only).
6. Detach the backplate and suspend it on string or wire, ensuring that the brake hose is relieved of stress (drum brakes only).
7. Remove the Nyloc nut, washers and brake hose bracket from the upper wishbone ball joint.
8. Detach the upper ball joint from the vertical link.
9. Remove the two bolts and spring washers securing the steering arm to the vertical link (and the lower disc shield—disc brakes only).
10. Withdraw the vertical link.

Refitting

11. Reverse instructions 1 to 10.



MT2387

FRONT HUB WHEEL STUD

—Remove and refit

60.25.29

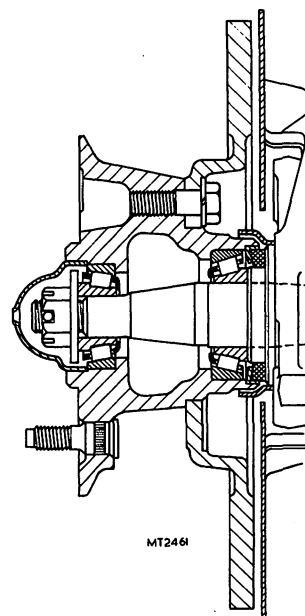
Removing

1. Jack up the car and remove the front wheel.
2. Remove the brake-drum (drum brakes only).
3. Tap the hub stud towards the backplate.
4. Withdraw the stud.

Refitting

5. Ensure that the mating countersunk faces of stud and hub flange are clean.
6. Enter the stud from the rear of the hub flange.
7. Using suitable packing (e.g. a short length of steel tubing), draw the stud into position.
8. Remove the nut and packing.
9. Fit the brake-drum (drum brakes only).
10. Fit the road wheel and remove the jack.

★★



★★

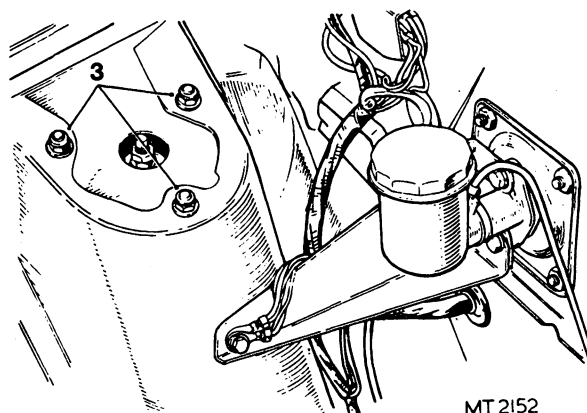
FRONT DAMPER

—Remove and refit

60.30.02

Removing

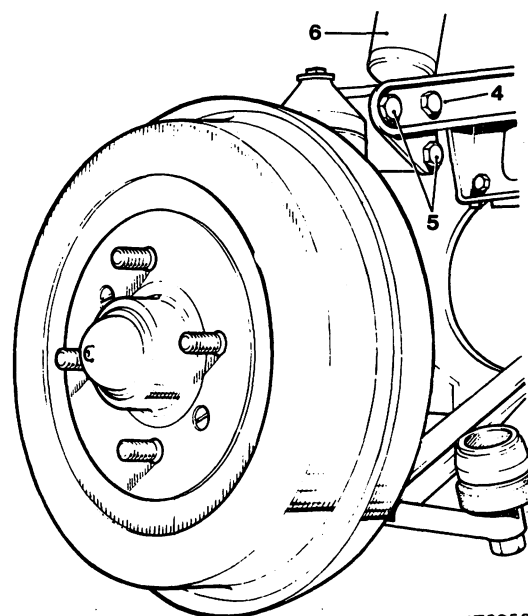
1. Jack up the car and remove the front wheel.
2. Raise the bonnet.
3. Remove the three nuts and washers securing the front damper/road spring assembly to the front suspension turret.
4. Remove the nut and bolt securing the lower end of the damper to the wishbone.
5. Slacken the two bolts securing the damper mounting plates to the wishbone and ball joint.
6. Release the lower end of the damper from the wishbone and withdraw the damper and spring assembly from the turret.



MT 2152

Refitting

7. Ensure that the three spacing washers are fitted to the damper mounting flange and engage the mounting flange studs in the turret.
8. Fit the three plain washers and Nyloc nuts to the damper studs. Tighten the nuts.
9. Engage and align the lower end of the damper in the mounting plates on the upper wishbone. Fit the nut and bolt and tighten.
10. Tighten the two nuts and bolts securing the wishbones to the upper ball joint.
11. Fit the road wheel and lower the car to the ground.
12. Close the bonnet.



MT2058A

60.25.29

60.30.02



FRONT SUSPENSION

DAMPER BUSH

—Remove and refit

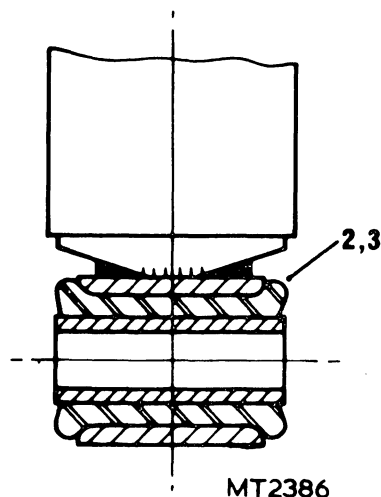
60.30.07

Removing

1. Remove the damper and front spring assembly from the car. 60.30.02.
2. Press out the damper lower bush.

Refitting

3. Press in the new bush and centralize it in the damper eye.
4. Fit the damper and road spring to the car. 60.30.02.



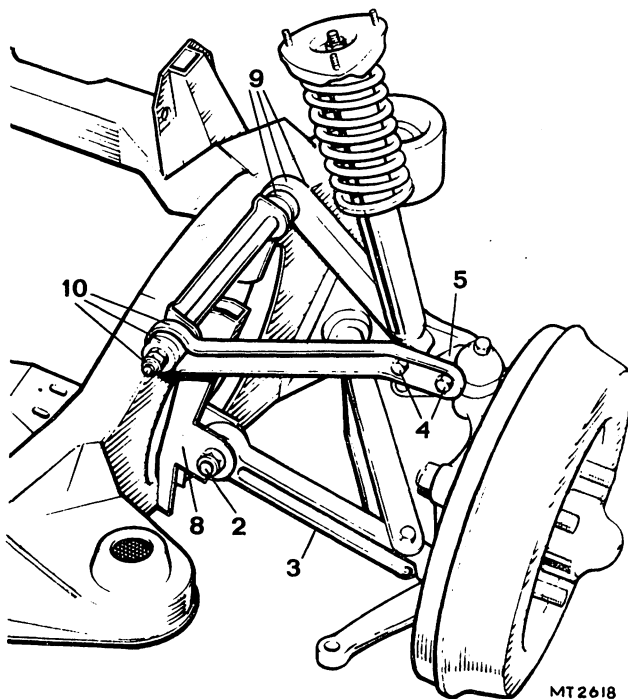
SUSPENSION WISHBONE—UPPER

—Remove and refit

60.35.01

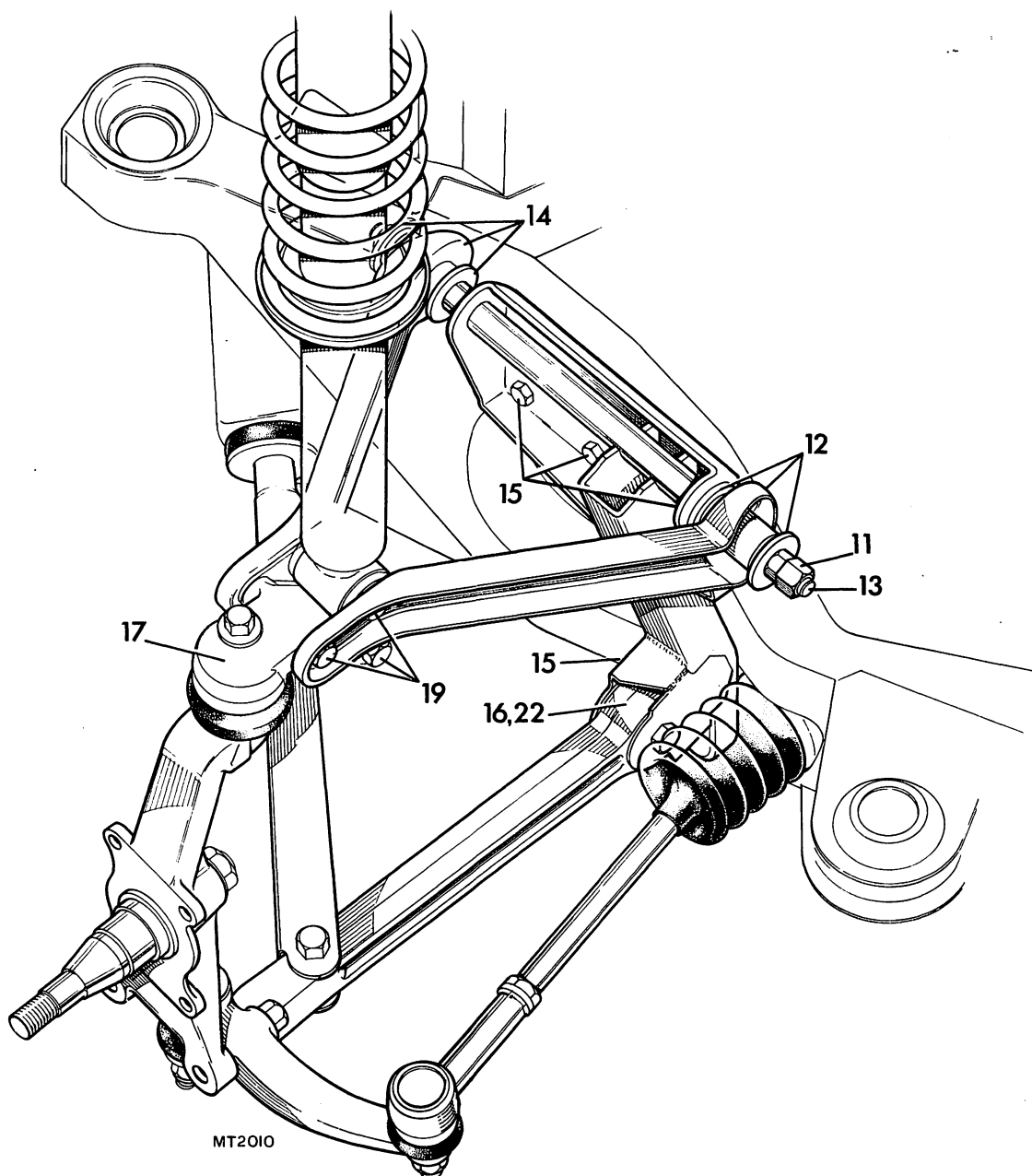
Removing

1. Jack up the car and remove the front wheel.
2. Remove the bolt and nut securing the inner end of the lower wishbone to the wishbone bracket.
3. Withdraw the lower wishbone from the bracket.
4. Remove the two bolts and nuts securing the upper wishbone to the ball joint and damper.
5. Detach the ball joint from the wishbone.
6. Using string or wire, support the hub assembly to the road spring to prevent strain being applied to the brake hose.
7. Remove the four bolts and nuts (three upper, one lower) securing the wishbone bracket to the sub-frame.
8. Withdraw the wishbone bracket and shim(s).
9. Remove the Nyloc nut and washer at the forward end of the upper wishbone fulcrum shaft and withdraw the front wishbone arm and inner washer.
10. Withdraw the fulcrum shaft, rear wishbone arm and plain washers.



Refitting

- 11.**Check the position and tightness of the two nuts on the end of the fulcrum shaft. They should be located on the shaft with one full thread projecting beyond the locknut. Tighten the inner nut to 30 to 38 lbf ft (4.1 to 5.2 kgf m) and the locknut to 26 to 34 lbf ft (3.6 to 4.7 kgf m).**
12. Fit the outer plain washer, upper rear wishbone arm (cranked end away from nuts) and inner plain washer to the fulcrum shaft.
13. Insert the fulcrum shaft into the rear of the wishbone bracket.
14. Fit the inner plain washer, upper front wishbone arm (cranked end towards rear arm), plain washer and Nyloc nut. Do not tighten the Nyloc nut at this stage.
15. Fit the wishbone bracket and shim(s) to the sub-frame and secure with the four bolts and nuts.
16. Fit the lower wishbone to the wishbone bracket and secure with the bolt and nut. Do not tighten at this stage.
17. Engage the ball joint in the upper wishbone and insert the triangular plates. Fit the two bolts and nuts to the wishbone arms, plates, and ball joint stem.
18. Fit the lower end of the damper to the wishbone and secure with the nut and bolt.
19. Tighten the three nuts and bolts securing the ball joint and damper to the wishbone.
20. Remove the string or wire used to relieve the weight of hub assembly from the brake hose.
21. Fit the road wheel and remove the jack.
22. Tighten the nut and bolt securing the lower wishbone to the suspension bracket.
- 23.**Tighten the Nyloc nut on the upper fulcrum shaft to 30 to 38 lbf ft (4.1 to 5.2 kgf m).**



FRONT SUSPENSION

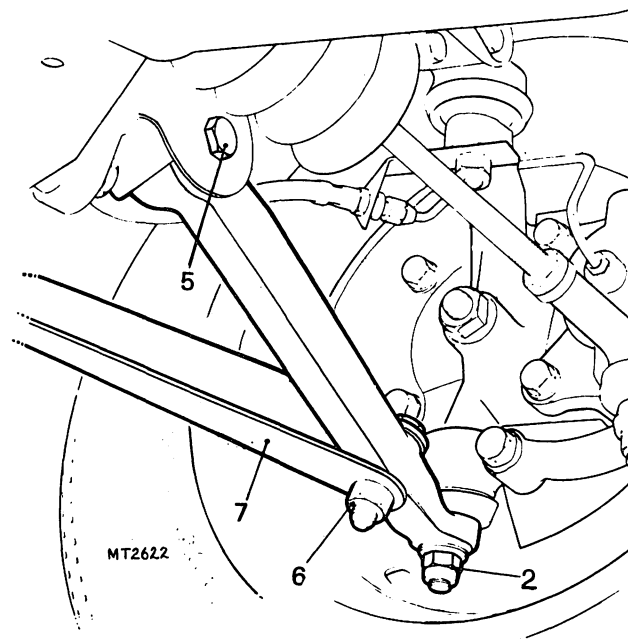
SUSPENSION WISHBONE—LOWER

—Remove and refit

60.35.02

Removing

1. Jack up the front of the car and support the body on stand(s).
2. Remove the Nyloc nut and washer from the lower wishbone ball joint.
3. Release the ball joint from the lower wishbone.
4. Remove the hairpin-type cotter from the front end of the radius rod and slacken the nut.
5. Remove the nut and bolt securing the wishbone to the inner bracket.
6. Remove the nut and bolt securing the radius rod to the wishbone.
7. Withdraw the wishbone.



Refitting

8. Reverse instructions 1 to 7. Do not tighten the bolt and nut securing the wishbone to the inner bracket until the vehicle is resting on its wheels.

SUSPENSION WISHBONE—LOWER

—Overhaul

60.35.09

1. Remove the lower wishbone from the car. 60.35.02.
2. Press out the wishbone rubber bush.
3. Press in the new rubber bush, ensuring that it is centred in the wishbone.
4. Fit the wishbone to the car. 60.35.02.

REAR SUSPENSION OPERATIONS

Bump stop—remove and refit	..	..	..	..	..	..	..	..	..	64.30.15
Radius rod										
—bushes—remove and refit	..	..	..	..	..	..	..	..	..	64.35.29
—remove and refit	..	..	..	..	..	..	..	..	..	64.35.28
Rear damper—remove and refit	..	..	..	..	..	..	..	..	..	64.30.01
Rear hub										
—oil seal—remove and refit	..	..	..	..	..	..	..	..	..	64.15.15
—remove and refit	..	..	..	..	..	..	..	..	..	64.15.01
—wheel studs—remove and refit	..	..	..	..	..	..	..	..	..	64.15.26
Road spring										
—insulating ring—remove and refit	..	..	..	..	..	..	..	..	..	64.20.17
—remove and refit	..	..	..	..	..	..	..	..	..	64.20.01
Suspension arm										
—bushes—remove and refit	..	..	..	..	..	..	..	..	..	64.35.05
—remove and refit	..	..	..	..	..	..	..	..	..	64.35.02

REAR HUB

—Remove and refit

64.15.01

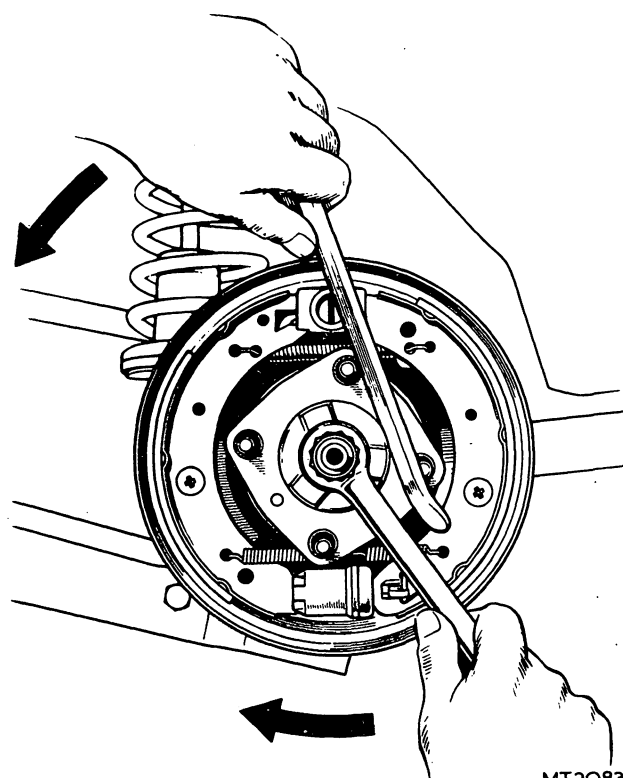
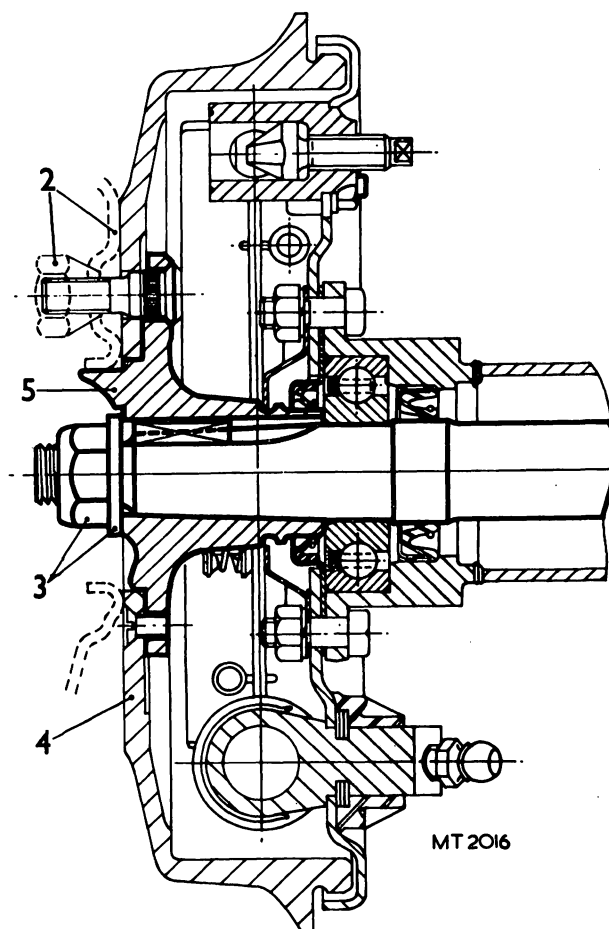
Service tool: S109C

Removing

1. Jack up the car and support the rear axle on stand(s).
2. Remove the road wheel.
3. With the hand brake applied, remove the nut and washer securing the hub to the half-shaft.
4. Release the hand brake and remove the brake-drum.
5. Using Tool S109C, remove the hub from the half-shaft.

Refitting

6. Install the hub on the half-shaft and fit the washer and nut. If a new key is fitted it is essential to ensure that it does not prevent the half-shaft from fully entering the hub.
7. Tighten the hub nut. To prevent stress being transmitted to the crown wheel and pinion teeth a tyre lever should be positioned across the wheel studs to resist tightening torque.
8. Fit the brake-drum and road wheel.
9. Remove the axle stands.



REAR SUSPENSION

REAR HUB OIL SEAL

—Remove and refit

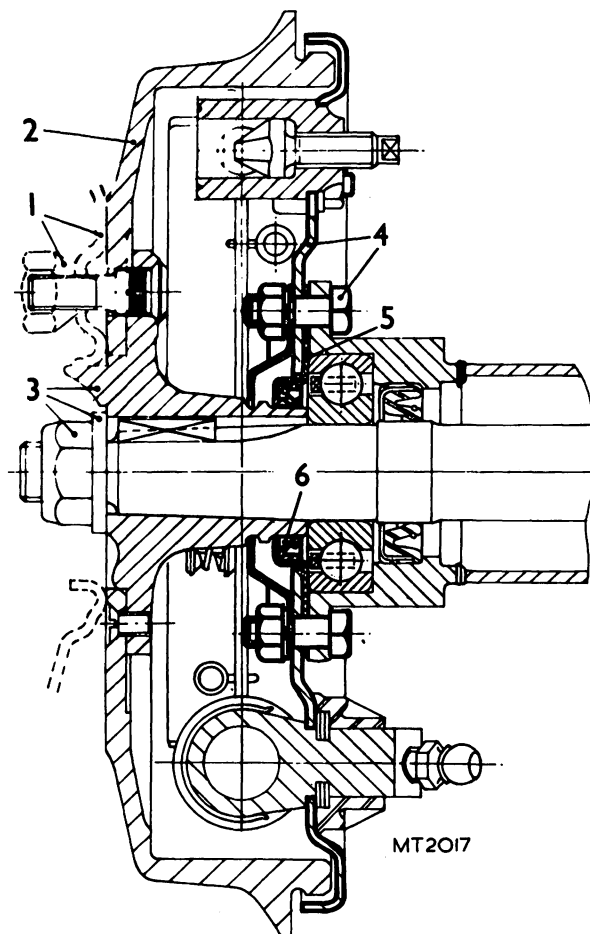
64.15.15

Removing

1. Jack up the car and remove the road wheel.
2. Release the hand brake and remove the brake-drum.
3. Remove the rear hub. 64.15.01.
4. Remove the rear backplate. 70.10.26.
5. Withdraw the oil seal housing.
6. Extract the oil seal from the housing.

Refitting

7. Carefully press the oil seal into the housing, ensuring that the seal lip is fitted adjacent to the seal housing flange.
8. Reverse instructions 1 to 6.
9. Bleed the brakes.



REAR HUB WHEEL STUDS

—Remove and refit

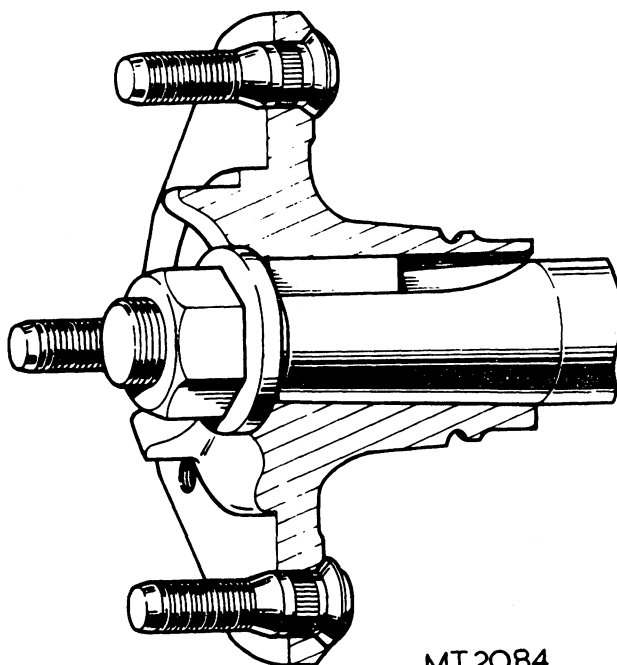
64.15.26

Removing

1. Remove the rear wheel.
2. Remove the brake-drum.
3. Tap out the wheel studs towards the brake backplate. The removal of wheel studs is not recommended unless for purposes of renewal.

Refitting

4. Enter the stud squarely in the hub flange, ensuring that the countersunk faces on both the stud and the rear of hub flange are clean.
5. Using suitable packing (e.g. a short length of tubing and washers) inserted over the wheel stud and with the wheel nut reversed (plain face adjacent to the hub flange) draw the stud into the hub flange. If new studs are a loose fit in the hub flange, a new hub should be fitted.
6. Fit the brake-drum.
7. Fit the road wheel.



REAR ROAD SPRING (REMOVAL FROM CAR)

—Remove and refit

64.20.01

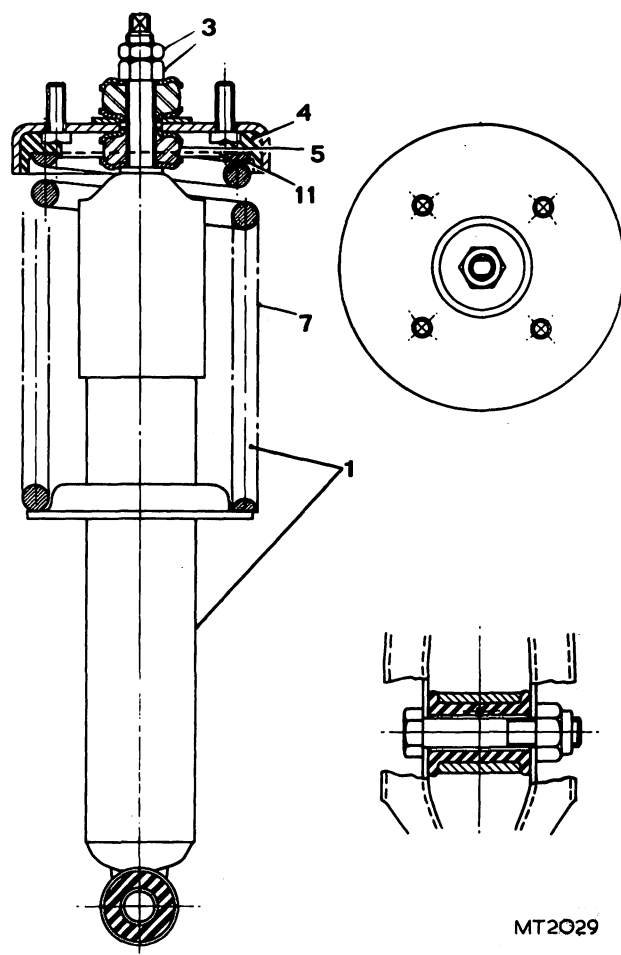
Service tools: S4221A-5-18

Removing

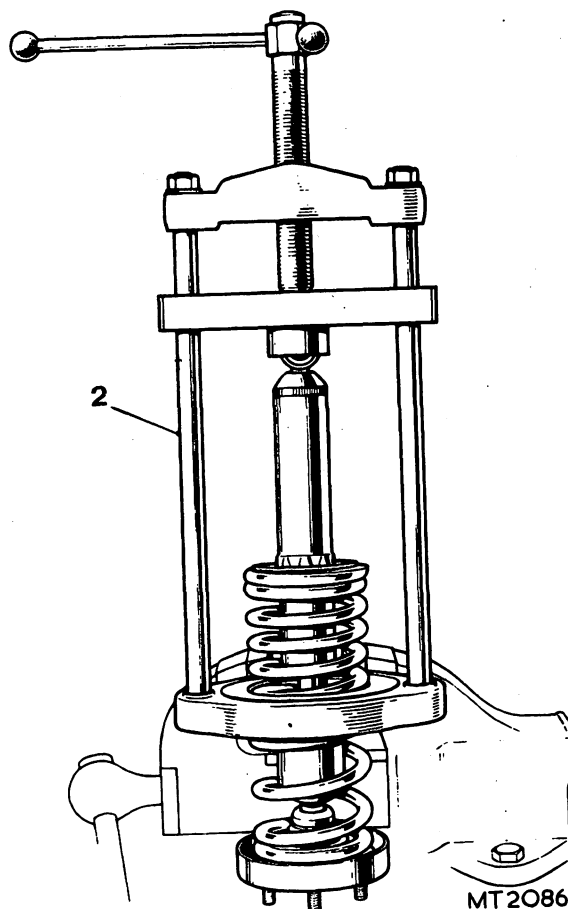
1. Remove the rear damper and spring assembly from the car. 64.30.01.
2. Using hand press S4221A and adaptors 5 and 18, compress the road spring.
3. Remove the locknut and nut securing the damper rod to the mounting flange.
4. Withdraw the mounting flange complete with upper rubber bush, washers, and spring insulating ring.
5. Withdraw the lower rubber bush and washers.
6. Remove the damper and spring from the press.
7. Lift off the road spring.

Refitting

8. Locate the road spring on the damper flange.
9. Using the hand press and adaptors, compress the road spring.
- **NOTE: When fitting the road spring to the damper, special note should be made of the radial position of the upper spring coil relative to the damper eye bush and upper spring location plate. The finishing tip of the upper coil of the spring should be located away from the car (i.e. nearest the wheel) to avoid adverse side loading on the damper spindle which may cause the spindle bearing to bind.**
10. Fit the washers and lower rubber bush to the damper rod, ensuring that the collar of the upper washer is positioned to engage the mounting flange.
11. Fit the insulating ring to the spring.
12. Fit the mounting flange to the damper rod, ensuring that the centre of the flange engages the collar of the lower bush washer.
13. Fit the lower washer of the upper rubber bush, engaging the collar in the mounting flange.
14. Fit the rubber bush and upper washer.
15. Fit and tighten the damper rod nut.
16. Fit and tighten the locknut.
17. Remove the damper assembly from the press.
18. Fit the damper and spring assembly to the car. 64.30.01.



MT2029



MT2086

REAR ROAD SPRING INSULATING RING

—Remove and refit

64.20.17

As operation 64.20.01.



REAR SUSPENSION

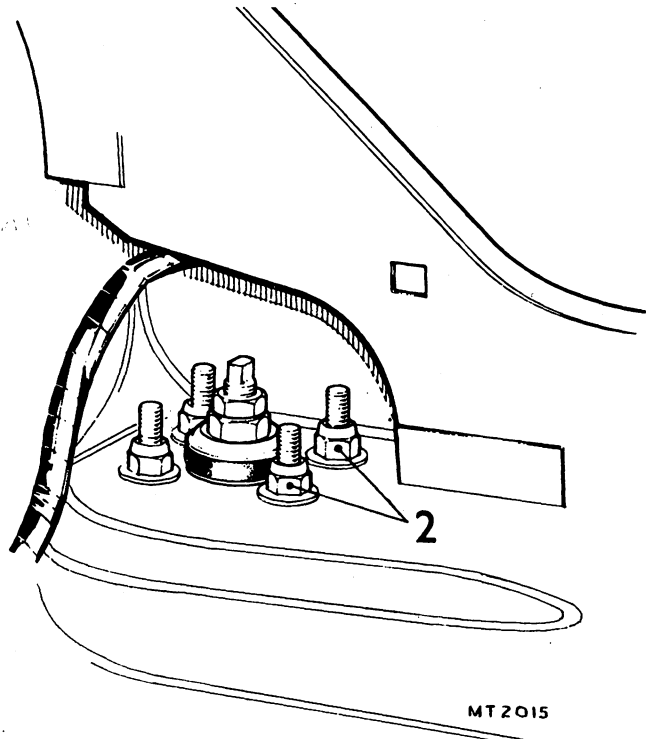
REAR DAMPER

—Remove and refit

64.30.01

Removing

1. Jack up the car and support the body on stands. Locate the jack under the rear axle.
2. Remove the four nuts and plain washers securing the damper upper mounting studs to the top of the rear spring turret (inside boot).
3. Remove the bolt and nut securing the lower end of the damper to the rear suspension arm.
4. Remove the bolt and nut securing the rear suspension arm to the body.
5. Detach the suspension arm from the body and lift out the damper.

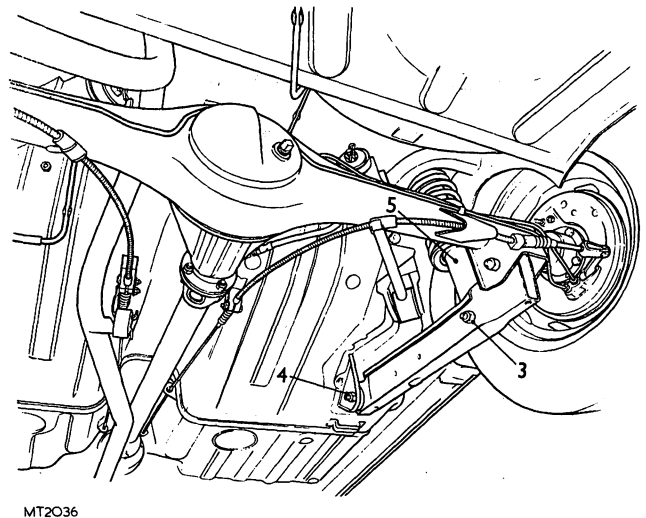


Refitting

6. Reverse instructions 1 to 5.

NOTE: Where there is a depression in the spring cup it is fitted towards the rear of the car.

Do not fully tighten the bolt and nut securing the rear suspension arm to the body until the weight of the car is supported on the road wheels.



BUMP STOP

—Remove and refit

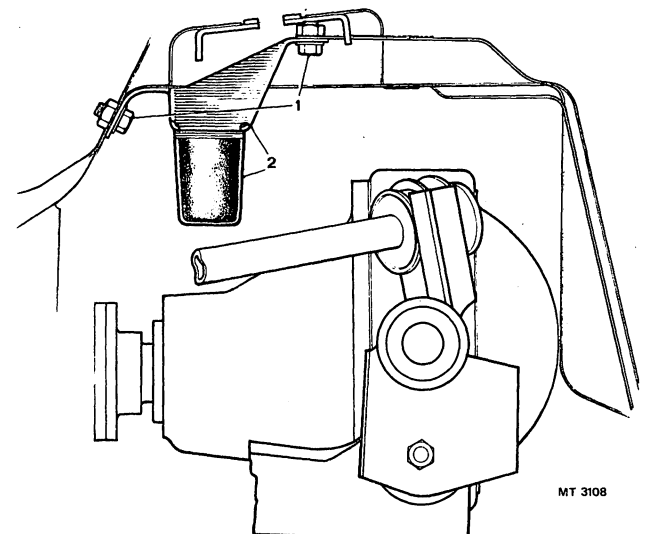
64.30.15

Removing

1. Remove the two bolts and spring washers securing the bump stop bracket to the car body.
2. Withdraw the bump stop and bracket.
- 3.**Remove the nut and spring washer securing the bump stop to the bracket (earlier models only).**

Refitting

4. Reverse instructions 1 to 3.



64.30.01

64.30.15

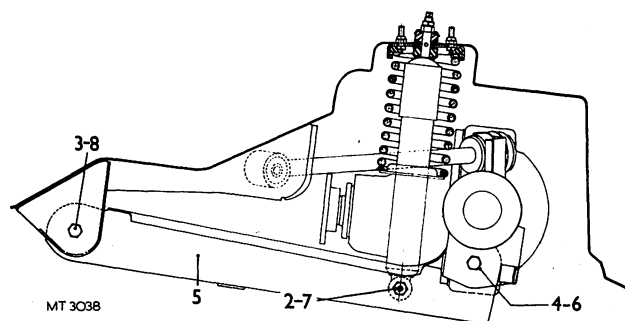
SUSPENSION ARM

—Remove and refit

64.35.02

Removing

1. Jack up the car and support the body on stands. Locate the jack under the rear axle.
2. Remove the bolt and nut securing the lower end of the damper to the suspension arm.
3. Remove the bolt and nut securing the forward end of the suspension arm to the body bracket.
4. Remove the bolt and nut securing the rear end of the suspension arm to the rear axle tube bracket.
5. Detach the suspension arm from the damper, axle bracket and body bracket.



Refitting

6. Engage the rear end of the suspension arm in the axle bracket. Fit the retaining bolt and nut.
7. Engage the lower end of the damper in the suspension arm. Fit the retaining bolt and nut.
8. Engage the front end of the suspension arm in the body bracket and fit the retaining bolt and nut.
9. Remove the body stands and jack.
10. Tighten the attachment bolts at the damper, axle bracket, and body bracket.

SUSPENSION ARM BUSHES

—Remove and refit

64.35.05

Removing

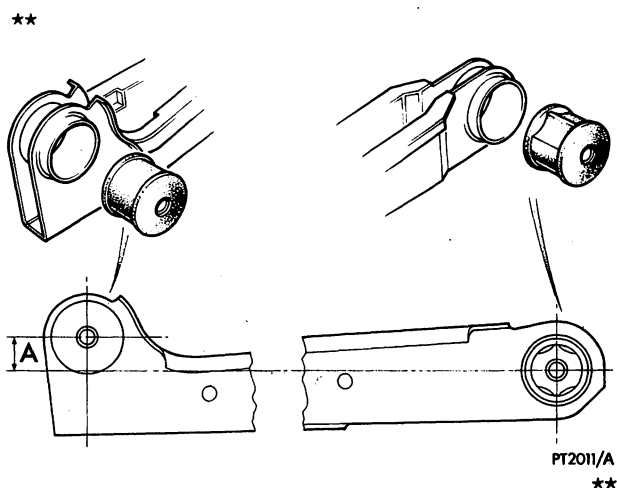
1. Remove the suspension arm. 64.35.02.
2. Press out the old bushes.

Refitting

3. Press in the new bushes ensuring they are centralised in the suspension arm. Note that the front bush must be installed in the position illustrated.

**Dimension 'A' equals 1 in (25.4 mm). **

4. Fit the suspension arm. 64.35.02.



REAR SUSPENSION

RADIUS ROD

—Remove and refit

64.35.28

**

NOTE: Two conditions of washers and mounting bushes have been used.

The earlier condition, up to Commission Numbers ADF 36051, ADG 28991, ADS 5476 and ADM 5172, is shown in the top illustration.

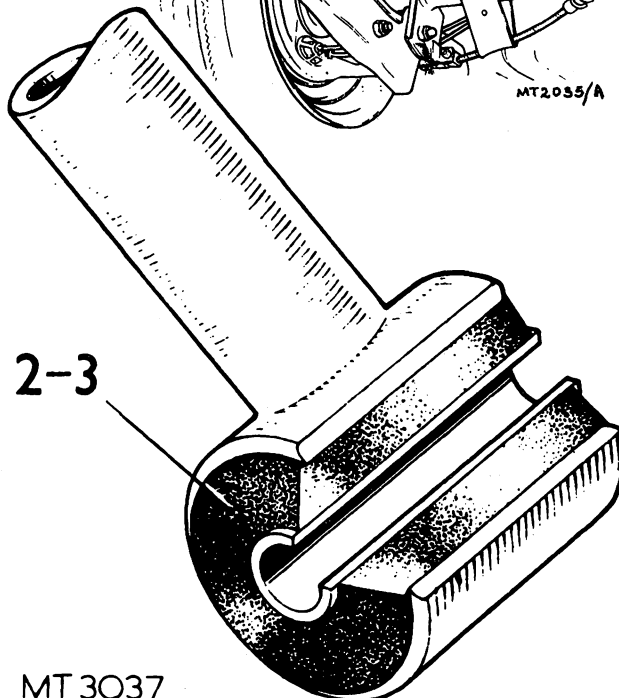
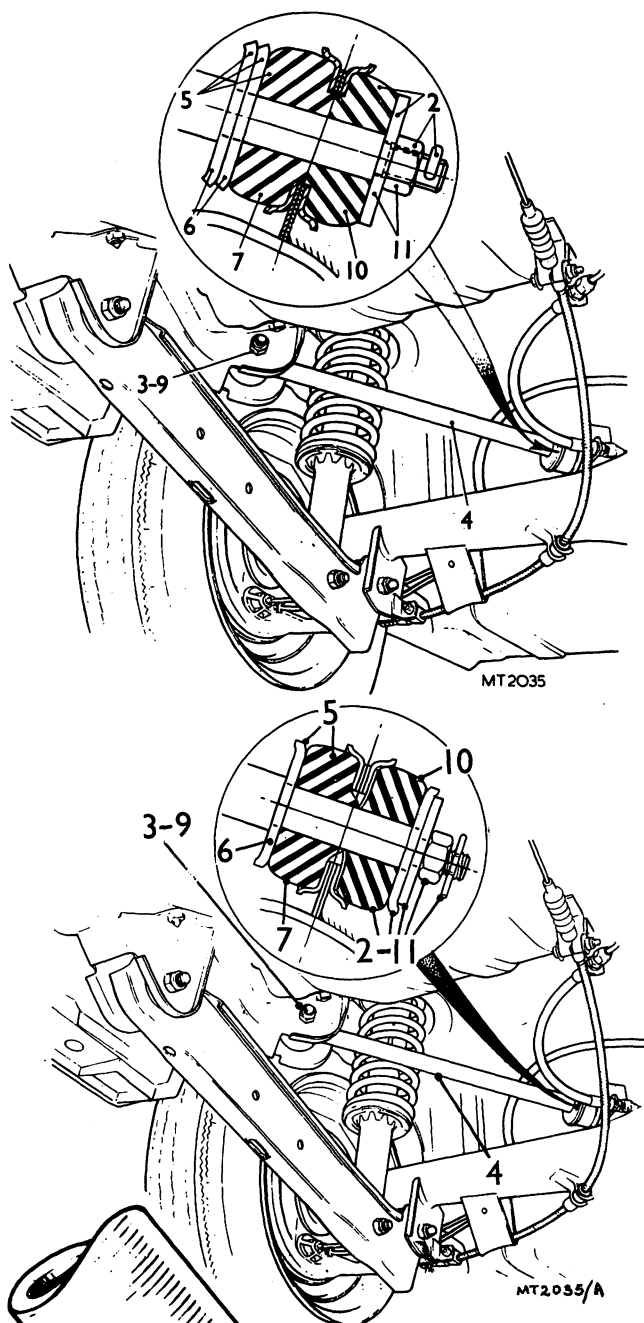
The later condition is shown in the lower illustration.**

Removing

1. Raise the car on the jack and support the body on stands.
- 2.**Remove the spring pin, nut, washers and outer rubber bush from the axle end of the radius rod.**
3. Remove the nut and bolt securing the radius rod to the body bracket.
- 4.**Withdraw the radius rod complete with inner rubber bush and dished washer.
5. Remove the inner rubber bush and dished washer(s) from the screwed end of the radius rod.**

Refitting

- 6.**Fit the dished washer(s) to the screwed end of the radius rod, ensuring that the curved peripheral rims of the washer(s) are inclined towards the bushed eye of the radius rod.
7. Fit the inner rubber bush (plain face of bush against washer(s)).**
8. Enter the screwed end of the radius rod in the axle bracket and engage the bushed end in the body bracket.
9. Fit the bolt and nut to the body bracket.
- 10.**Fit the nylon washer (later models only) and the outer rubber bush to the screwed end of the radius rod, ensuring that the stepped face of the bush (earlier models only) is adjacent to the axle bracket.
11. Fit the washers, nut and spring pin.**
12. Tighten the body bracket bolt.



RADIUS ROD BUSHES

—Remove and refit

64.35.29

Removing

1. Remove the radius rod from the car. 64.35.28.
2. Press out the bush from the radius rod.

Refitting

3. Fit a new bush to the radius rod.
4. Install the radius rod in the car. 64.35.28.

64.35.28

64.35.29

BRAKE OPERATIONS

Brake hose									
—front L.H.—remove and refit	..	..	..	..	..	..	..	..	70.15.02
—front R.H.—remove and refit	..	..	..	..	..	..	..	..	70.15.03
—rear—remove and refit	..	..	..	..	..	..	..	..	70.15.17
Brake pedal									
—bracket—remove and refit	..	..	..	..	..	..	..	..	70.35.05
—overhaul—remove and refit	..	..	..	..	..	..	..	..	70.35.02
—remove and refit	..	..	..	..	..	..	..	..	70.35.01
Brakes									
—adjust	..	..	..	..	..	..	..	..	70.25.03
—bleed	..	..	..	..	..	..	..	..	70.25.02
Connector									
—2-way—remove and refit	..	..	..	..	..	..	..	..	70.15.32
—4-way—remove and refit	..	..	..	..	..	..	..	..	70.15.35
Front brake—disc									
—calliper—remove and refit	..	..	..	..	..	..	..	..	70.55.02
—calliper seals—remove and refit	..	..	..	..	..	..	..	..	70.55.13
—disc—remove and refit	..	..	..	..	..	..	..	..	70.10.10
—disc shield—lower—remove and refit	..	..	..	..	..	..	..	..	70.10.20
—disc shield—upper—remove and refit	..	..	..	..	..	..	..	..	70.10.18
—pads—remove and refit	..	..	..	..	..	..	..	..	70.40.02
Front brake—drum									
—backplate—remove and refit	..	..	..	..	..	..	..	..	70.10.25
—drum—remove and refit	..	..	..	..	..	..	..	..	70.10.02
—shoes—remove and refit	..	..	..	..	..	..	..	..	70.40.02
—wheel cylinder—overhaul	..	..	..	..	..	..	..	..	70.60.11
—wheel cylinder—remove and refit	..	..	..	..	..	..	..	..	70.60.03
Hand brake									
—cable—remove and refit	..	..	..	..	..	..	..	..	70.35.16
—cables—adjust	..	..	..	..	..	..	..	..	70.35.10
—lever assembly—remove and refit	..	..	..	..	..	..	..	..	70.35.08
—lever, pawl and ratchet—remove and refit	..	..	..	..	..	..	..	..	70.35.09
Hydraulic pipes									
	..	..	..	..	..	..	..	..	70.20.00
Master cylinder									
—overhaul	..	..	..	..	..	..	..	..	70.30.02
—remove and refit	..	..	..	..	..	..	..	..	70.30.01
Rear brake									
—adjuster—remove and refit	..	..	..	..	..	..	..	..	70.40.17
—backplate—remove and refit	..	..	..	..	..	..	..	..	70.10.26
—drum—remove and refit	..	..	..	..	..	..	..	..	70.10.03
—shoes—remove and refit	..	..	..	..	..	..	..	..	70.40.03
—wheel cylinder—overhaul	..	..	..	..	..	..	..	..	70.60.26
—wheel cylinder—remove and refit	..	..	..	..	..	..	..	..	70.60.18
Servo									
—non-return valve—remove and refit	..	..	..	..	..	..	..	..	70.50.15
—remove and refit	..	..	..	..	..	..	..	..	70.50.01
—renewing filter	..	..	..	..	..	..	..	..	70.50.25
—vacuum hose—remove and refit	..	..	..	..	..	..	..	..	70.50.14

FRONT BRAKE-DRUM

—Remove and refit

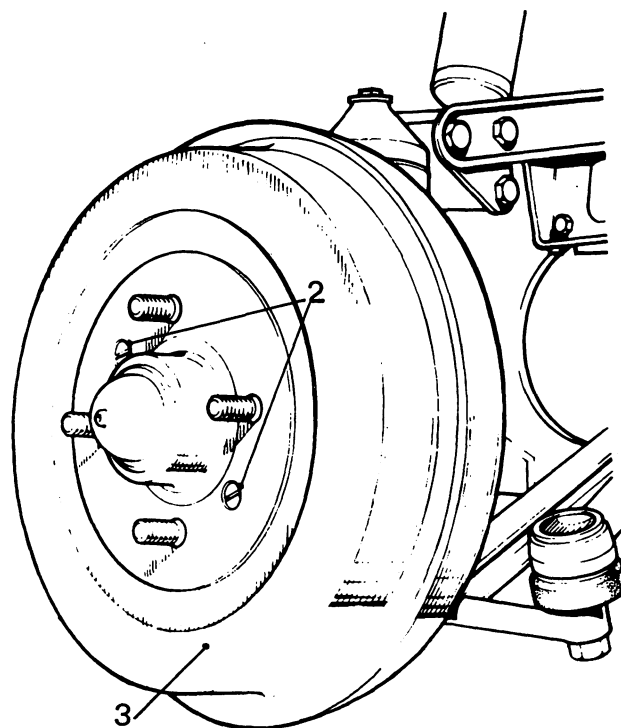
70.10.02

Removing

1. Jack up the car and remove the front wheel.
2. Remove the two countersunk screws securing the brake-drum to the hub.
3. Withdraw the brake-drum. Where brake-drums are worn or ridged it may be necessary to slacken both brake adjusters.

Refitting

4. Align the countersunk holes in the drum with the tapped holes in the hub.
5. Engage the wheel studs in the drum.
6. Slide the drum into position. If the brake-shoes were disturbed, they may require to be centralized on the backplate to allow drum entry.
7. Fit and tighten the two countersunk screws.
8. Adjust the brakes (if previously slackened off).
9. Fit the road wheel and remove the jack.



MT2058A

REAR BRAKE-DRUM

—Remove and refit

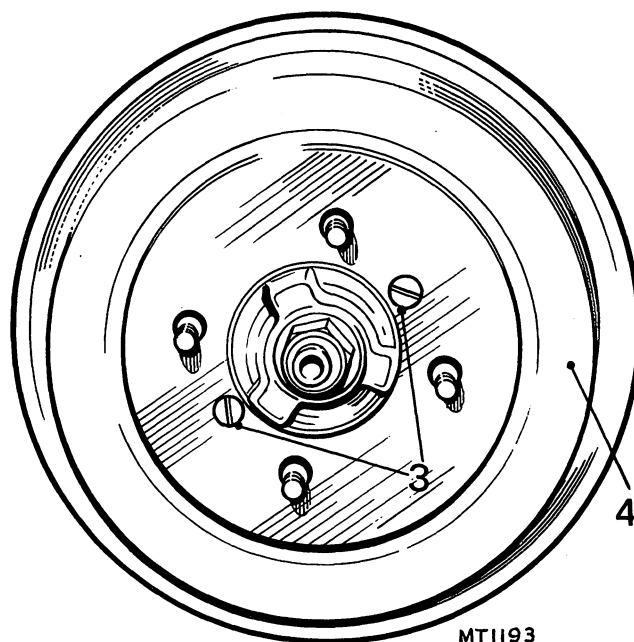
70.10.03

Removing

1. Jack up the car and remove the rear wheel.
2. Release the hand brake.
3. Remove the two countersunk screws securing the brake-drum to the hub.
4. Withdraw the brake-drum.

Refitting

5. Align the countersunk holes in the drum with the tapped holes in the hub.
6. Engage the wheel studs in the drum.
7. Slide the drum into position. If the brake-shoes were disturbed, they may require to be centralized on the backplate to allow drum entry.
8. Fit and tighten the two countersunk screws.
9. Fit the road wheel and remove the jack.
10. Operate and release handbrake several times to adjust brake (self-adjusting only).



MT1193



BRAKES

BRAKE DISC

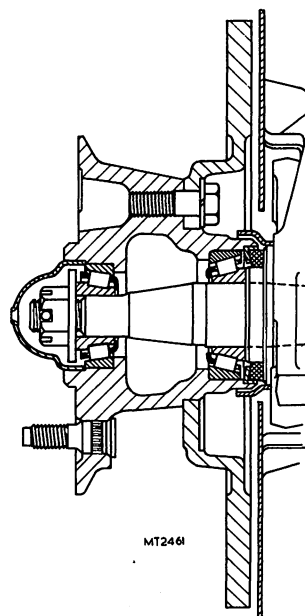
★★

—Remove and refit

70.10.10

Removing

1. Jack up the car and remove the front wheel.
2. Release front brake hose bracket from upper ball joint.
3. Remove the two bolts securing the calliper lugs to the vertical link and withdraw the calliper. Do not allow the weight of the calliper to hang suspended by brake hose.
4. Remove the hub. 60.25.01.
5. Remove the four bolts and spring washers securing the disc to the hub.
6. Withdraw the disc.



★★

Refitting

7. Offer up the disc to the hub.
8. Fit and tighten the four bolts and spring washers.
9. Locate the felt oil seal in the hub.
10. Fit the hub and disc to the stub axle.
11. Adjust the bearing end-float and fit the hub cap. 60.25.01.
12. Fit brake hose bracket to upper ball joint.
13. Fit the calliper assembly.
14. Fit the road wheel and remove the jack.

FRONT DISC SHIELD—UPPER

—Remove and refit

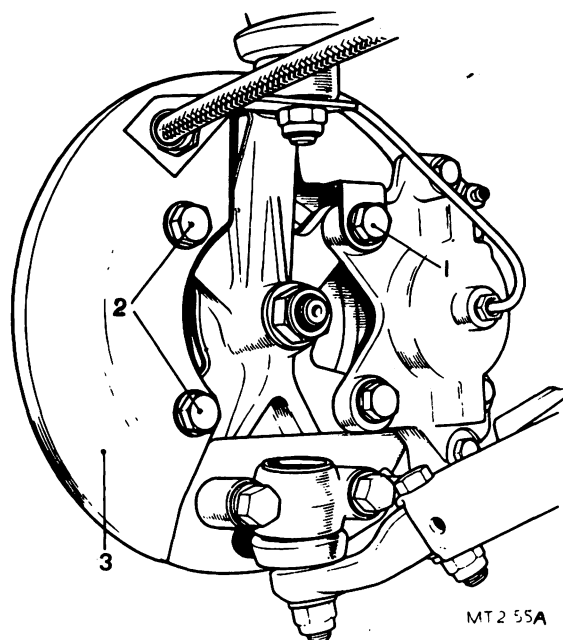
70.10.18

Removing

1. Remove the upper bolt and spring washer securing the calliper to the vertical link.
2. Remove the two bolts and spring washers securing the disc shield to the vertical link.
3. Withdraw the upper disc shield.

Refitting

4. Reverse instructions 1 to 3.



FRONT DISC SHIELD—LOWER

—Remove and refit

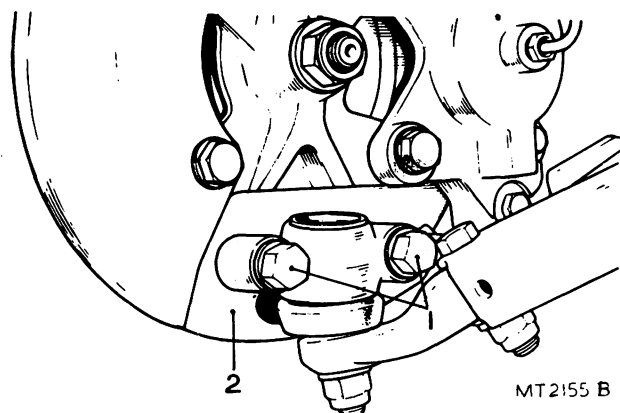
70.10.20

Removing

1. Remove the two bolts and spring washers securing the lower ball joint and steering arm to the vertical link.
2. Remove the lower disc shield.

Refitting

3. Reverse instructions 1 and 2.



70.10.10

70.10.20

FRONT BRAKE BACKPLATE

—Remove and refit (Drum brakes only)

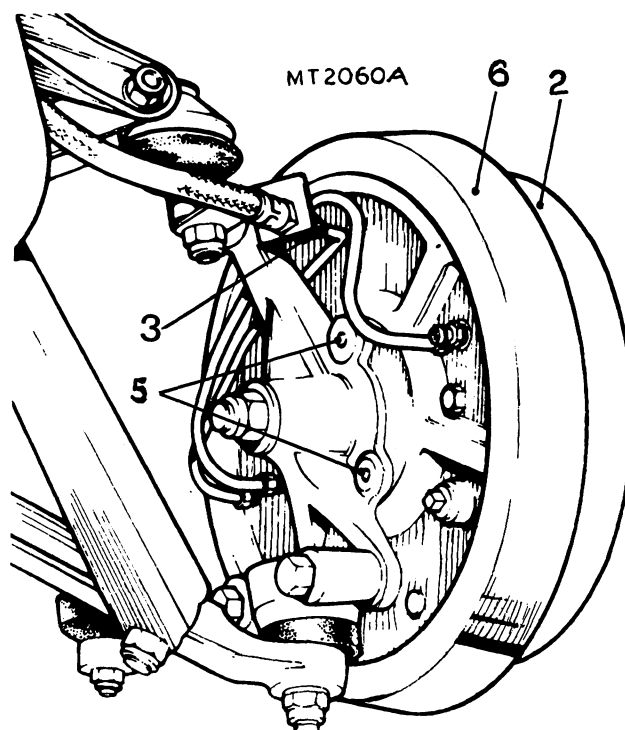
70.10.25

Removing

1. Jack up the car and remove the front wheel.
2. Remove the brake-drum. 70.10.02.
3. Disconnect the brake feed pipe union at the flexible hose.
4. Remove the front hub. 60.25.01.
5. Remove the four bolts and spring washers securing the backplate to the vertical link.
6. Withdraw the backplate complete with brake-shoes.

Refitting

7. Reverse instructions 2 to 6.
8. Bleed the brakes. 70.25.02.
9. Fit the front wheel and remove the jack.



REAR BRAKE BACKPLATE

—Remove and refit

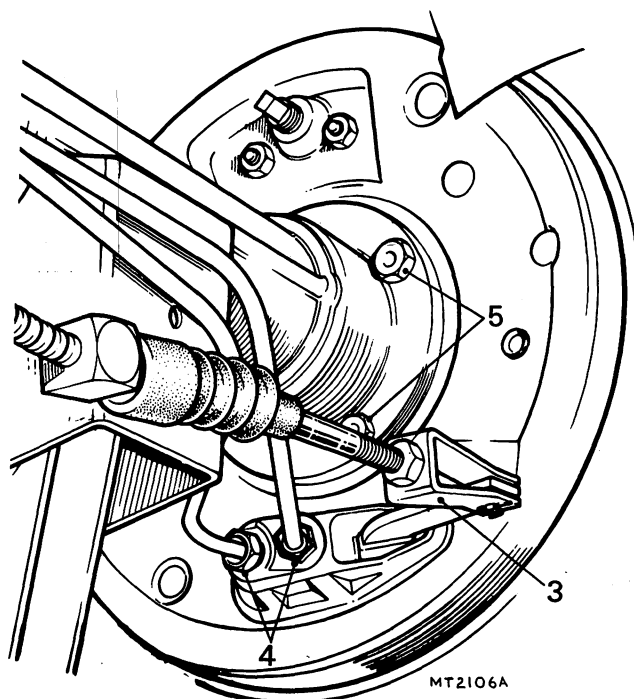
70.10.26

Removing

1. Jack up the car, remove the rear wheel and release the hand brake.
2. Remove the rear hub. 64.15.01.
3. Disconnect the hand brake cable at the rear of the backplate.
4. Disconnect the fluid feed pipe union at the wheel cylinder (left-hand side only).
- or
- Disconnect the fluid feed and transfer pipe unions at the wheel cylinder (right-hand side only).
5. Remove the four nuts, spring washers, and bolts securing the backplate to the axle casing flange.
6. Withdraw the deflector plate and backplate.

Refitting

7. Reverse instructions 1 to 6.
8. Bleed the brakes.



BRAKES

BRAKE HOSE—FRONT

—Remove and refit

Left-hand

70.15.02

Right-hand

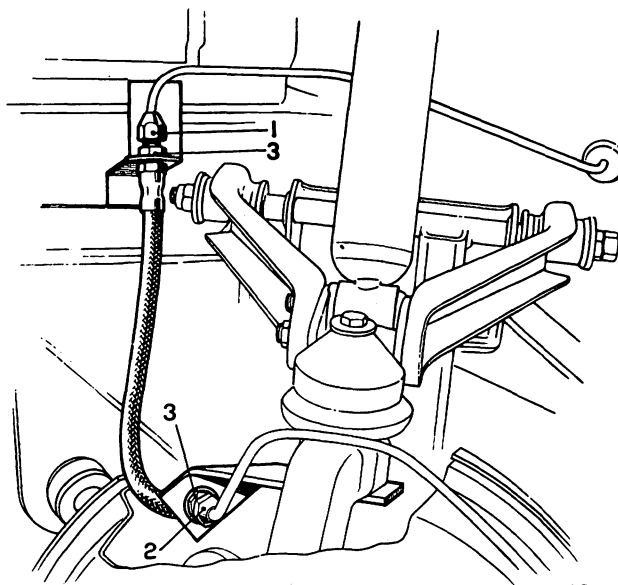
70.15.03

Removing

1. Disconnect the brake pipe and union from the inboard end of the flexible hose.
2. Disconnect the brake pipe and union from the outboard end of the flexible hose.
3. Using two spanners, remove the locknuts and washers securing the hose to the support brackets and remove the hose.

Refitting

4. Reverse instructions 1 to 3. Ensure that the hose is neither kinked nor twisted when installed.
5. Bleed the brakes.



BRAKE HOSE—REAR

—Remove and refit

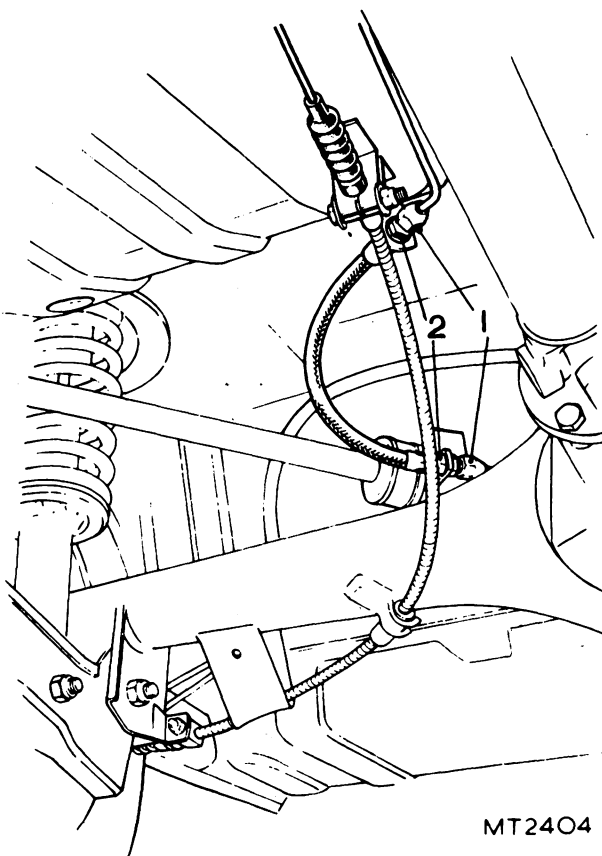
70.15.17

Removing

1. Disconnect the brake pipes and unions from the forward and rearward ends of the flexible hose.
2. Using two spanners, remove the locknuts and washers securing the hose to the body and rear axle brackets. Do not twist the hose.
3. Remove the hose from the brackets.

Refitting

4. Reverse instructions 1 to 3. Ensure that the hose is neither kinked nor twisted when installed.
5. Bleed the brakes.



CONNECTOR—2-WAY

—Remove and refit

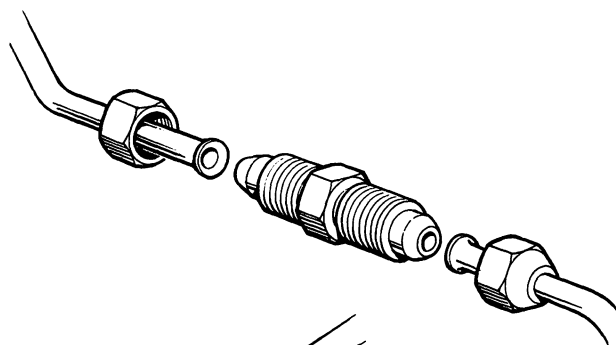
70.15.32

Removing

1. Clean the connector and unions.
2. Disconnect the brake pipe unions from the connector.

Refitting

3. Fit and tighten the brake pipe unions to the connector.
4. Bleed the brakes.



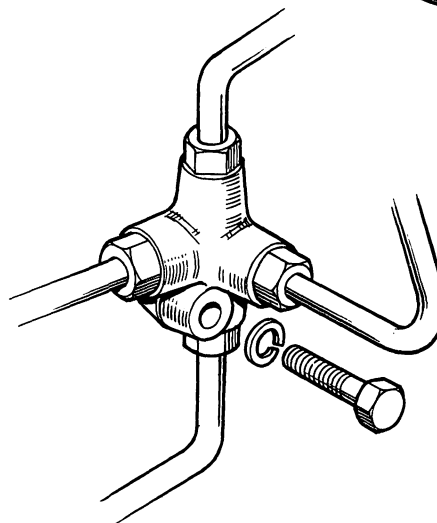
CONNECTOR—4-WAY

—Remove and refit

70.15.35

Removing

1. Clean the connector and unions.
2. Disconnect the brake pipe unions from the connector.
3. Remove the bolt securing the connector to the scuttle.



MT0 509

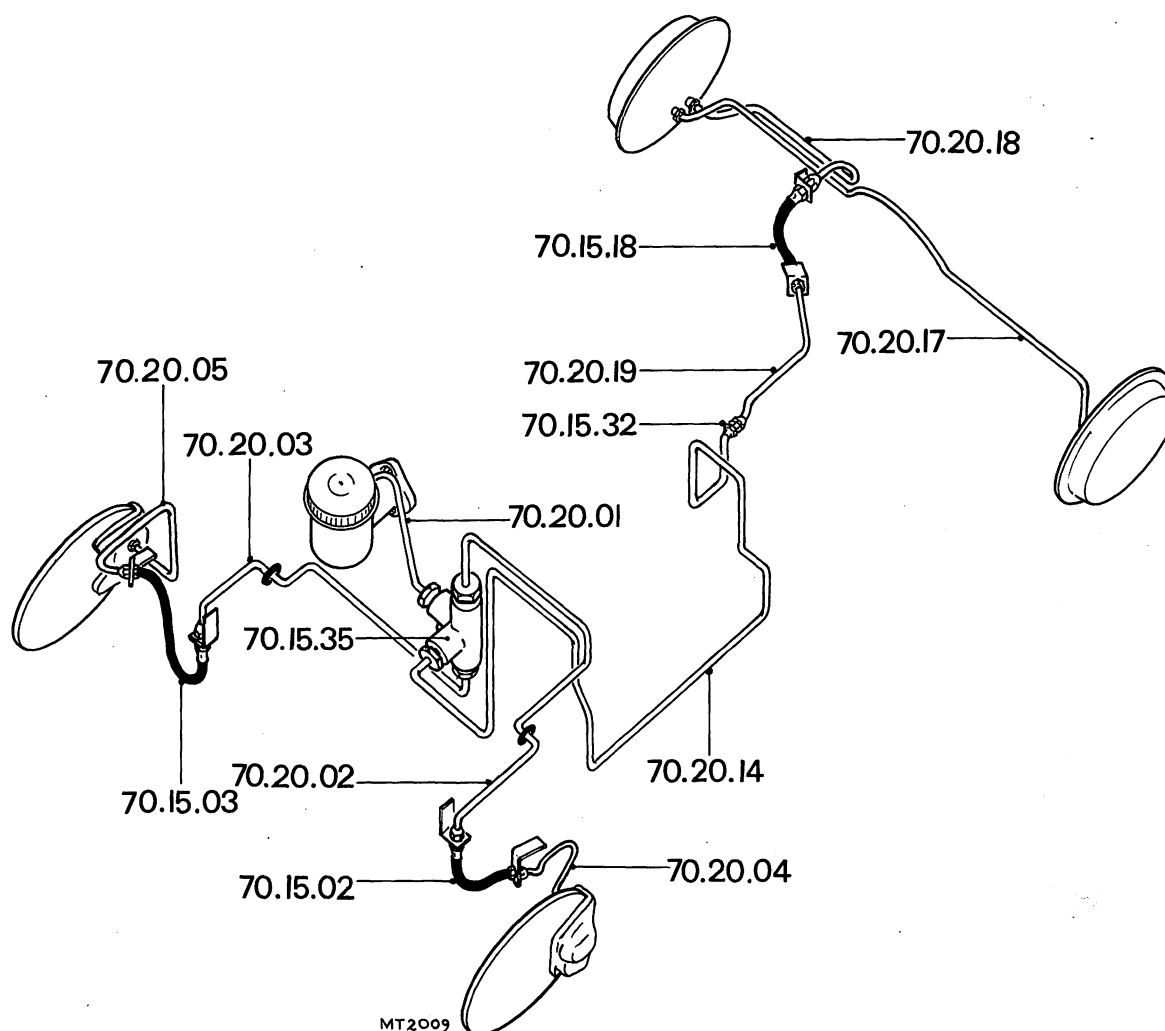
Refitting

4. Reverse instructions 2 and 3.
5. Bleed the brakes.

HYDRAULIC PIPES

To aid identification of individual pipes, operation numbers are included in the illustration showing the general arrangement of the brake system.

Pipe—master cylinder to 4-way connector—remove and refit	70.20.01
Pipe—4-way connector to L.H. front hose—remove and refit	70.20.02
Pipe—4-way connector to R.H. front hose—remove and refit	70.20.03
Pipe—L.H. front hose to calliper/wheel cylinder—remove and refit	70.20.04
Pipe—R.H. front hose to calliper/wheel cylinder—remove and refit	70.20.05
Pipe—wheel cylinder to wheel cylinder (front)—remove and refit	70.20.08
Pipe—4-way connector to 2-way connector—remove and refit	70.20.14
Pipe—R.H. rear cylinder to L.H. cylinder—remove and refit	70.20.17
Pipe—rear hose to R.H. rear wheel cylinder—remove and refit	70.20.18
Pipe—2-way connector to rear hose—remove and refit	70.20.19



70.20.19



BRAKES

—Bleed (Drum brakes only)

70.25.02

Do not allow the fluid level in the reservoir to fall below half capacity. When topping-up during the bleeding process, do not use aerated fluid exhausted from the system.

1. Release the hand brake.
2. Fully slacken off the adjustment on the front shoes.
3. Expand the rear adjusters and lock the rear wheels.
4. Attach the bleed tube to the left-hand rear nipple. The open end of the bleed tube must be immersed in brake fluid in a transparent container. Slacken the bleed nipple (90 to 180 degrees).
5. Depress the brake pedal fully and follow with three rapid successive strokes. Allow the pedal to return. Repeat until fluid free from air bubbles is seen to issue from the wheel cylinder.
6. Close the nipple with the brake pedal depressed and remove the tube.
7. Attach the bleed tube to the left-hand front nipple and slacken the nipple (90 to 180 degrees). Repeat instruction 5.
8. Close the nipple and repeat the procedure on the right-hand front wheel.
9. Adjust the brakes.

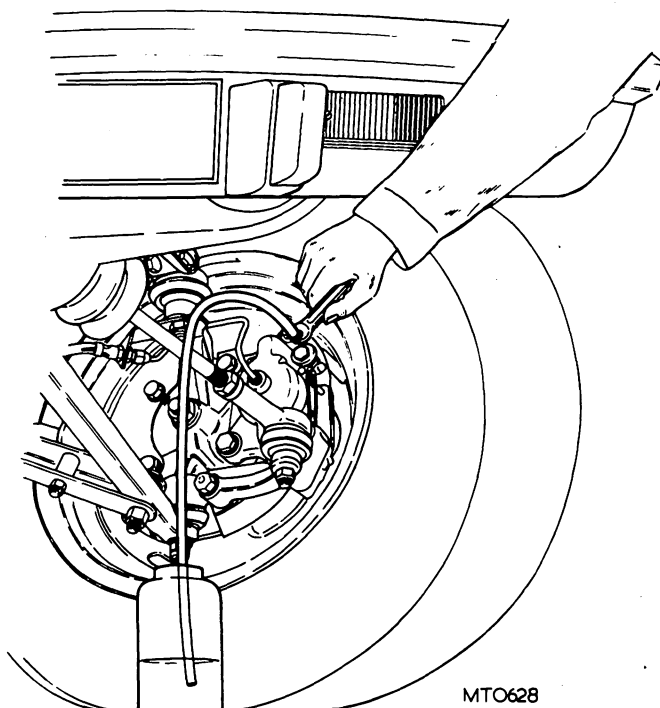
BRAKES

—Bleed (Disc and drum)

70.25.02

Do not allow the fluid level in the reservoir to fall below half capacity. When topping-up during the bleeding process, do not use aerated fluid exhausted from the system. Do not bleed the system with the servo in operation (engine running).

1. Release the hand brake.
2. Attach the bleed tube to the bleed nipple of the front calliper farthest from the master cylinder, allowing the free end of the bleed tube to hang submerged in brake fluid in a transparent container.
3. Open the bleed nipple (90 to 180 degrees).
4. Depress the brake pedal fully and follow with three rapid successive strokes. Allow the pedal to return. Repeat until fluid free from air bubbles issues from the wheel cylinder.
5. Depress the brake pedal, close the nipple and release the pedal. Remove the tube.
6. Attach the bleed tube to the opposite front calliper and repeat instructions 4 and 5.
- 7.**Attach the bleed tube to the single nipple on the rear backplate and repeat instructions 4 and 5.**
8. Remove the bleed tube.



MTO628



BRAKES

BRAKES

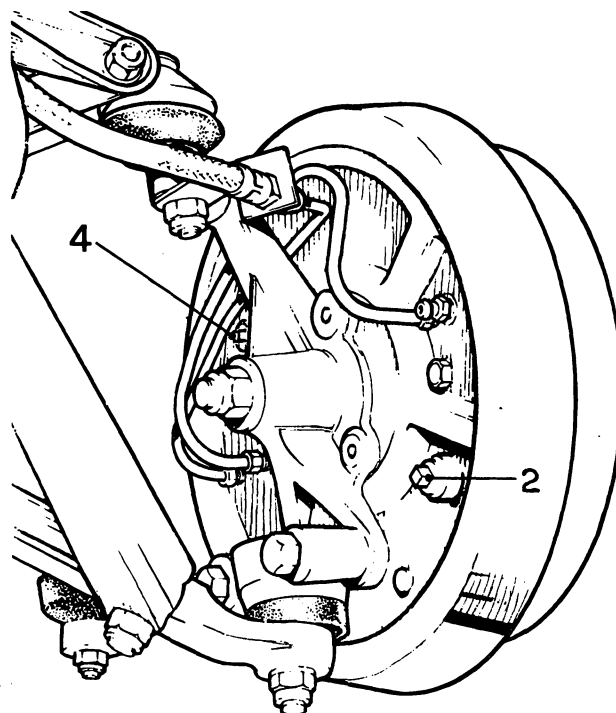
—Adjust (Drum brakes only)

70.25.03

Front

A square-ended snail cam adjuster is provided for each front brake-shoe. Rotate each adjuster clockwise (viewed from the rear of the backplate) to expand the shoe; anti-clockwise to retract the shoe.

1. Jack up the front of the car.
2. Apply a spanner to the front adjusters on the backplate and rotate in a clockwise direction until the wheel is locked.
3. Rotate the adjuster anti-clockwise until the wheel can be turned freely.
4. Repeat operations 2 and 3 on the rear adjuster on the backplate.
5. Repeat operations 2 to 4 on the opposite front wheel. If rotation of a snail cam fails to expand a brake-shoe sufficiently to lock a road wheel, it is indicative of extensively worn liners.
6. Remove the jack.

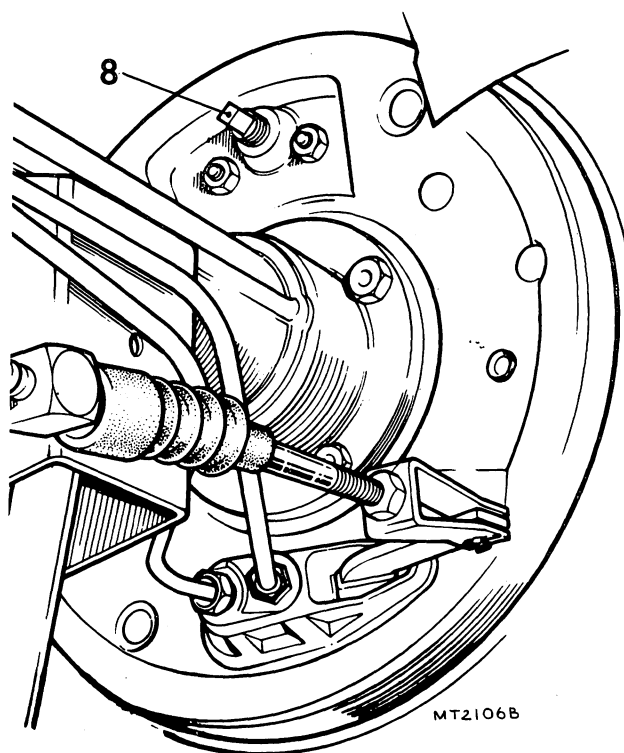


MT2060B

Rear

A single wedge-type adjuster with a square-ended shank is provided on the rear backplates.

7. Jack up the rear of the car and release the hand brake.
8. Rotate the adjuster clockwise (viewed from the rear of the backplate) until the wheel is locked.
9. Rotate the adjuster anti-clockwise until the wheel can be turned freely.
10. Repeat operations 8 and 9 on opposite rear wheel. Failure of an adjuster to lock a road wheel is indicative of excessively worn liners.
11. Remove the jack.



MT2106B

BRAKES

—Adjust (Disc and drum only)

70.25.03

Self-adjusting brakes are fitted to front and rear. Front adjustment is hydraulically self-compensating to provide for brake pad wear. Rear adjustment is mechanically automatic via the hand brake linkage.

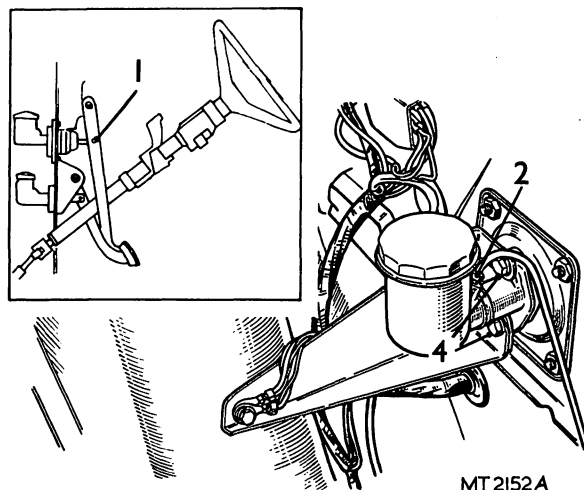
MASTER CYLINDER

—Remove and refit (Non-servo only)

70.30.01

Removing

1. Remove the cotter pin and clevis pin securing the master cylinder push-rod to the brake pedal.
2. Disconnect the delivery union and pipe from the master cylinder. Plug the aperture to prevent fluid spillage. Alternatively the master cylinder reservoir can be drained (siphoned) before disconnecting the union.
3. Slacken the bolt securing the master cylinder bracket to the front spring turret.
4. Remove the two bolts securing the bracket and master cylinder to the scuttle.
5. Withdraw the master cylinder.



Refitting

6. Reverse instructions 1 to 5.
7. Top up the reservoir with clean fluid.
8. Bleed the brakes.

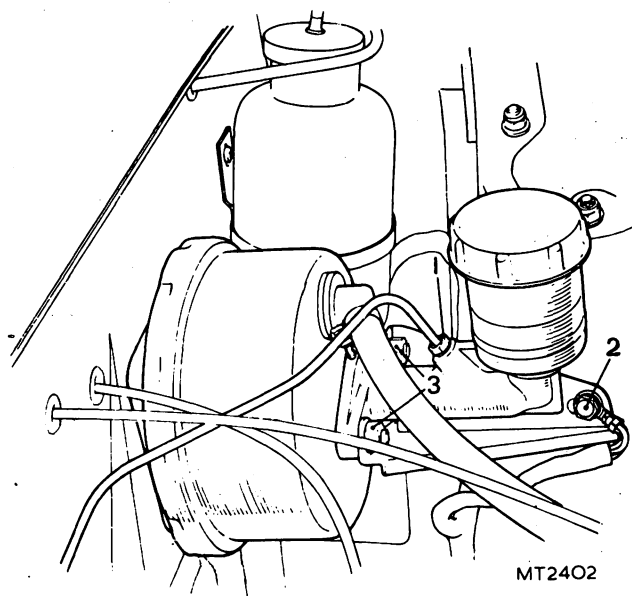
MASTER CYLINDER

—Remove and refit (Servo only)

70.30.01

Removing

1. Disconnect the brake pipe at the master cylinder. Plug the master cylinder to prevent fluid discharge from the reservoir. Seal the brake pipe to prevent ingress of foreign matter.
2. Remove the bolt securing the earth wires and the front end of the master cylinder bracket to the valance.
3. Remove the two nuts and shakeproof washers securing the bracket and master cylinder to the servo and withdraw the bracket and master cylinder.



Refitting

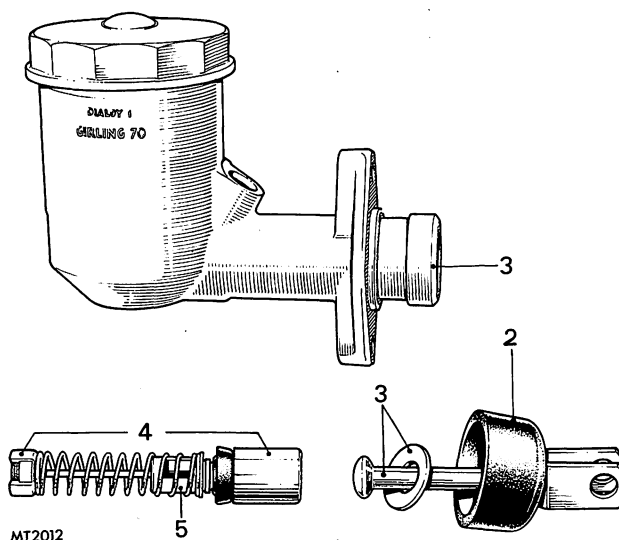
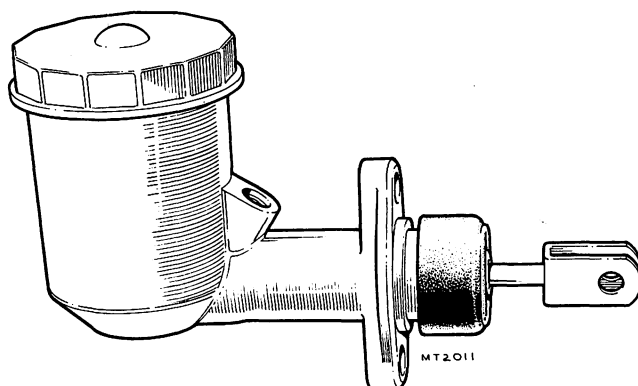
4. Reverse instructions 1 to 3.
5. Bleed the brakes.

MASTER CYLINDER

—Overhaul (Non-servo only)

70.30.02

1. Drain the fluid reservoir.
2. Slide the rubber boot along the push-rod.
3. Remove the circlip from the end of the master cylinder and withdraw the push-rod and washer.
4. Withdraw the piston, spring and seal assembly from the master cylinder. Withdrawal may be facilitated by applying a compressed air line to the fluid outlet union.
5. Straighten the prong of the spring thimble and remove the thimble and spring from the piston.
6. Release the valve stem from the keyhole slot in the thimble.
7. Slide the valve seal spacer along the valve stem.
8. Remove the valve seal from the valve stem and fit a new seal.
9. Assemble the spacer, spring and thimble to the valve stem.
10. Remove the seal from the piston and fit a new seal (seal lip towards the spring).
11. Engage the spring thimble on the piston and carefully depress the thimble prong.
12. Lubricate the bore of the master cylinder with clean brake fluid and insert the seal assembly, spring, and piston.
13. Fit a new boot to the push-rod.
14. Fit the push-rod and washer to the master cylinder and secure with the circlip.
15. Slide the boot into position on the master cylinder.

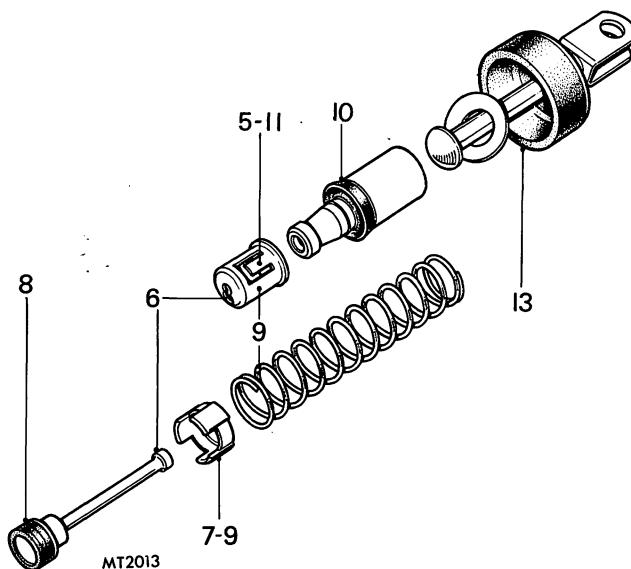


MASTER CYLINDER

—Overhaul (Servo only)

70.30.02

1. Drain the fluid reservoir.
2. Apply a low pressure air line to the fluid outlet and eject the piston and seal assembly from the cylinder.
3. Perform operations 5 to 12 given in master cylinder overhaul (non-servo type).



BRAKE PEDAL

—Remove and refit

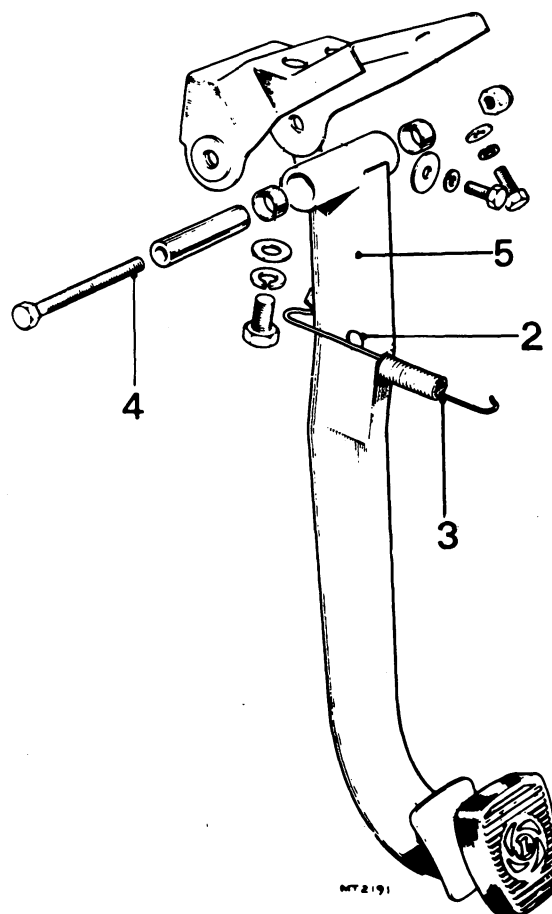
70.35.01

Removing

1. Remove the parcel shelf.
2. Remove the clevis pin securing the pedal to the master cylinder rod.
3. Disconnect the pedal return spring.
4. Remove the pedal pivot bolt and nut.
5. Withdraw the brake pedal complete with bushes and pivot sleeve.

Refitting

6. Reverse instructions 1 to 5.



BRAKE PEDAL

—Overhaul

70.35.02

1. Remove the brake pedal. 70.35.01.
2. Withdraw the sleeve from the pedal.
3. Remove the pedal bushes.
4. Fit new bushes, lubricate, and insert new sleeve.
5. Remove and renew the pedal pad rubber.
6. Fit the pedal to the car. 70.35.01.

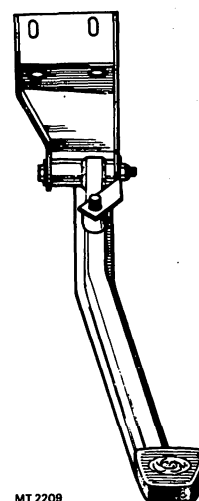
BRAKE PEDAL AND BRACKET

—Remove and refit

70.35.05

Removing

1. Remove the fascia.
2. Remove the windscreen wiper linkage.
3. Remove the clevis pin securing the brake pedal to the master cylinder rod.
4. Disconnect the pedal return spring.
5. Remove the bolts, spring washers and plain washers securing the pedal bracket to the scuttle.
6. Withdraw the brake pedal and bracket.



Refitting

7. Reverse instructions 1 to 6.



BRAKES

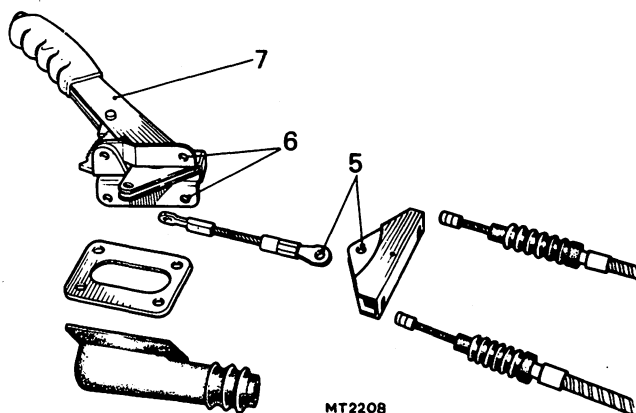
HAND BRAKE LEVER ASSEMBLY

—Remove and refit

70.35.08

Removing

1. Remove both front seats and seat runners. 76.70.04/05.
2. Peel back the carpet to expose the hand brake.
3. Remove the hand grip from the hand brake lever and withdraw the hand brake gaiter.
4. Release the hand brake.
5. Remove the clevis pin securing the hand brake rod to the compensator.
6. Remove the four bolts and spring washers securing the hand brake bracket to the floor of the car.
7. Withdraw the hand brake lever and bracket assembly.



Refitting

8. Reverse instructions 1 to 7.

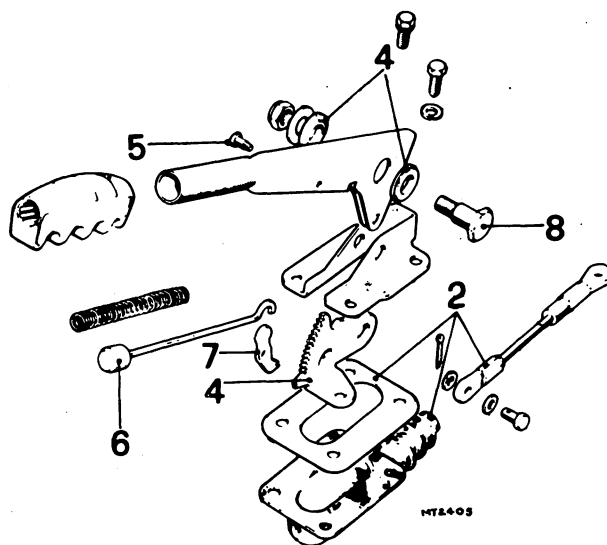
HAND BRAKE LEVER, PAWL, AND RATCHET

—Remove and refit

70.35.09

Removing

1. Remove the hand brake lever assembly. 70.35.08.
2. Remove the link, gaiter and lower plate.
3. Remove the nut and fulcrum pin from the hand brake mounting bracket.
4. Withdraw the ratchet and bushes from the hand brake lever.
5. Drill or file the riveted end of the pawl fulcrum pin until the end of the pin is flush with the hand brake lever.
6. Depress the hand brake button and retain it in this position with tape.
7. Remove the pawl fulcrum pin and withdraw the pawl.



Refitting

8. Enter a new pawl in the hand brake lever, ensuring that the curved end of the pawl engages the release rod.
9. Fit a new pawl fulcrum and secure it by riveting.
10. Fit the ratchet and bushes to the hand brake lever.
11. Fit the hand brake bracket, ratchet and fulcrum pin.
12. Remove the tape from the release button.
13. Refit the hand brake link, and gaiter and lower plate.
14. Fit the hand brake lever assembly to the car. 70.35.08.

70.35.08

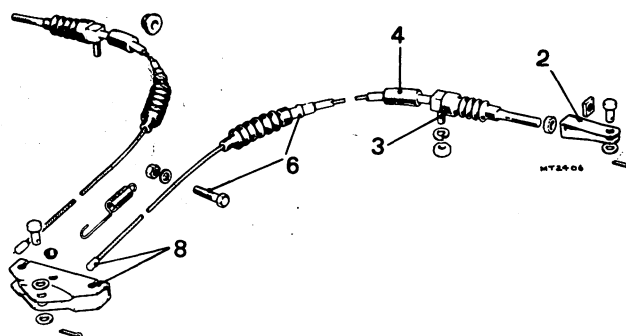
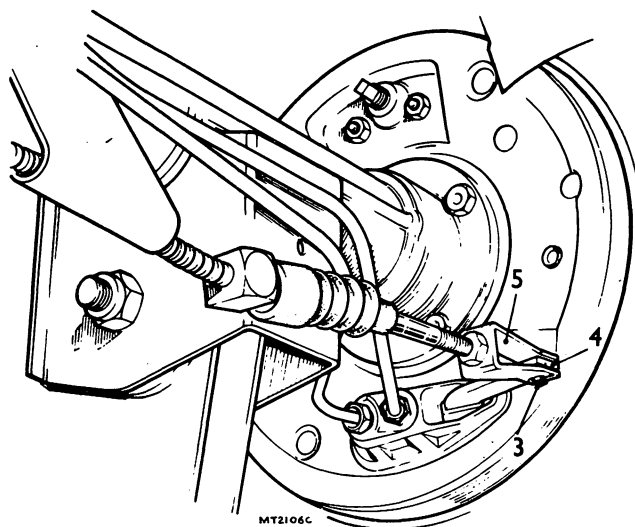
70.35.09

HAND BRAKE CABLES

—Adjust

70.35.10

1. Jack up the rear wheels and support the car on stands.
2. Release the hand brake.
3. Disconnect the hand brake cables at the rear backplates.
4. Expand the brake adjusters on the backplates and lock the wheels (manually adjusted brake only).
or
Operate the hand brake lever on the backplates to obtain minimum brake-shoe/brake-drum clearance (self-adjusting brake only).
5. Maintaining the compensator in the central position, adjust the cable forks so that the clevis pins can be entered without straining the cables. Ensure that the rear wheels do not drag (self-adjusting brake only).
6. Tighten the locknuts on the cable forks and fit new cotters to the clevis pins. Release the brake adjusters (manually adjusted brake only).
7. Remove the stands and lower the jack.



HAND BRAKE CABLE ASSEMBLY

—Remove and refit

70.35.16

Removing

1. Release the hand brake.
2. Disconnect the cable fork from the backplate lever.
3. Remove the nut securing the cable rear support to the suspension bracket and detach the cable support.
4. Release the cable sheath and rubber bush from the clip on the axle casing.
5. Withdraw the cable fork through the bracket on the axle casing.
6. Remove the pinch bolt, nut and plain washers from the cable sheath front bracket.
7. Withdraw the cable sheath rearwards clear of the front bracket and ease the cable wire downwards.
8. Release the nipple on the front end of the cable from the hand brake compensator, and withdraw the cable.

Refitting

9. Expand the brake-shoes in the rear drum and lock the wheel (manual adjustment only).
10. Engage the nipple on the front end of the cable in the hand brake compensator.
11. Slide the cable into position in the front bracket and engage the cable sheath in the bracket. Fit the bolt, plain washers and nut. Do not overtighten the pinch bolt. Slide the rubber boot rearwards to engage the cable sheath.
12. Thread the cable fork through the bracket on the axle casing.
13. Insert the rubber bush and cable sheath into the axle casing clip.
14. Attach the cable sheath rear support to the suspension bracket and secure it with the nut.
15. Adjust the fork at the rear end of the cable so that the clevis pin engages the fork and backplate lever. Ensure that the hand brake compensator remains central.
16. Fit the cotter pin to the clevis pin and slacken the brake adjuster on the backplate.

70.35.10

70.35.16



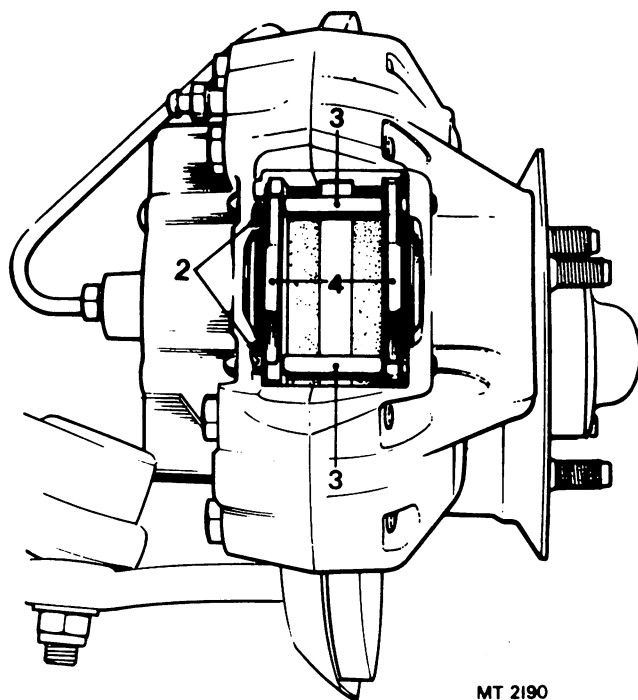
FRONT BRAKE PADS

—Remove and refit (Disc brake only)

70.40.02

Removing

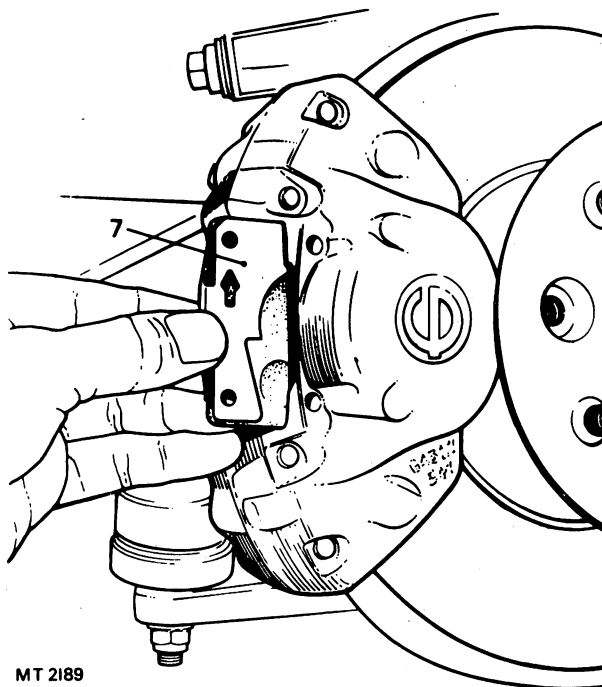
1. Jack up the car and remove the road wheel.
2. Withdraw the two spring pins from the brake pad retaining pins.
3. Withdraw the brake pad retaining pins (2).
4. Lift out the brake pads complete with damping shims. If the brake pads and damping shims are not to be renewed it is important to ensure that they are not intermixed.



MT 2190

Refitting

5. Ease the calliper pistons into the bores to provide the extra clearance to accommodate the new, unworn brake pads. This operation can be facilitated by applying pressure to the piston and at the same time opening the calliper bleed nipple. Close the nipple when the piston has moved the required amount and repeat on the opposite piston in the calliper. Subsequent bleeding is not usually necessary.
6. Remove dust and clean the brake pad locations in the calliper.
7. Fit brake pads complete with damping shims to the calliper. Ensure that the angled edge of the shim rests on the brake pad and that the arrow on the shim points in the direction of disc forward rotation.
8. Engage the pad retaining pins in the calliper and secure with spring pins.
9. Fit the road wheel and remove the jack.
10. Check the fluid level in the reservoir, and top up as necessary.



MT 2189

FRONT BRAKE-SHOES

—Remove and refit (Drum brake only)

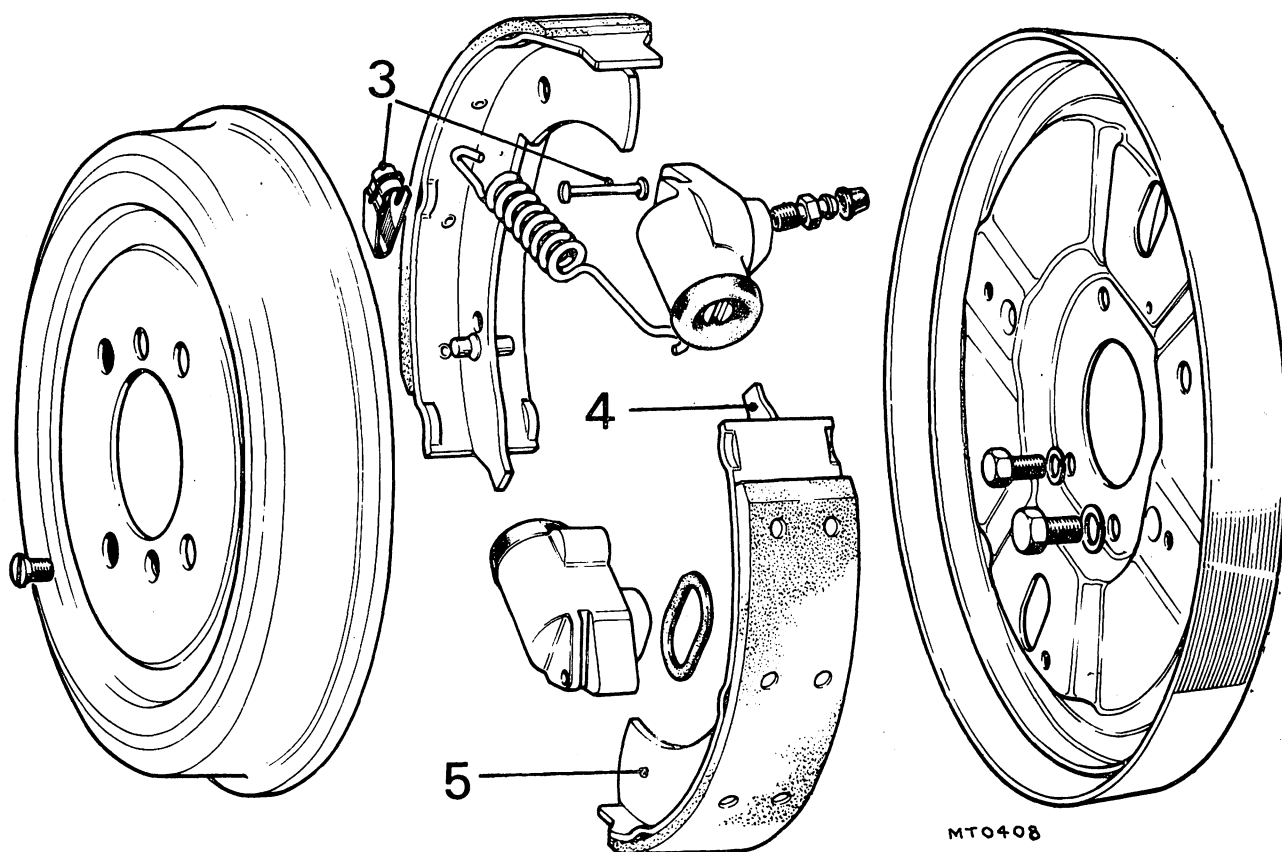
70.40.02

Removing

1. Fully slacken off the adjustment on both snail cams.
2. Remove the brake-drum.
3. Remove the shoe steady pins and spring plates.
4. Release the leading end of the front shoe from the wheel cylinder.
5. Release the trailing end of the front shoe from the wheel cylinder and unhook the shoe return spring.
6. Withdraw the shoe.
7. Repeat instructions 4 to 6 on the rear shoe.

Refitting

8. Offer up the bottom shoe to the backplate, ensuring that the pointed end of the shoe web is adjacent to the front piston.
9. Connect the return spring to the backplate and shoe web.
10. Engage the rear end of the shoe (trailing end) in the rear cylinder.
11. Engage the front end of the shoe in the front cylinder.
12. Fit the upper shoe in similar manner (pointed end of the shoe to the rear cylinder).
13. Fit the shoe steady pins and spring plates.
14. Fit the brake-drum and adjust the brakes.



BRAKES

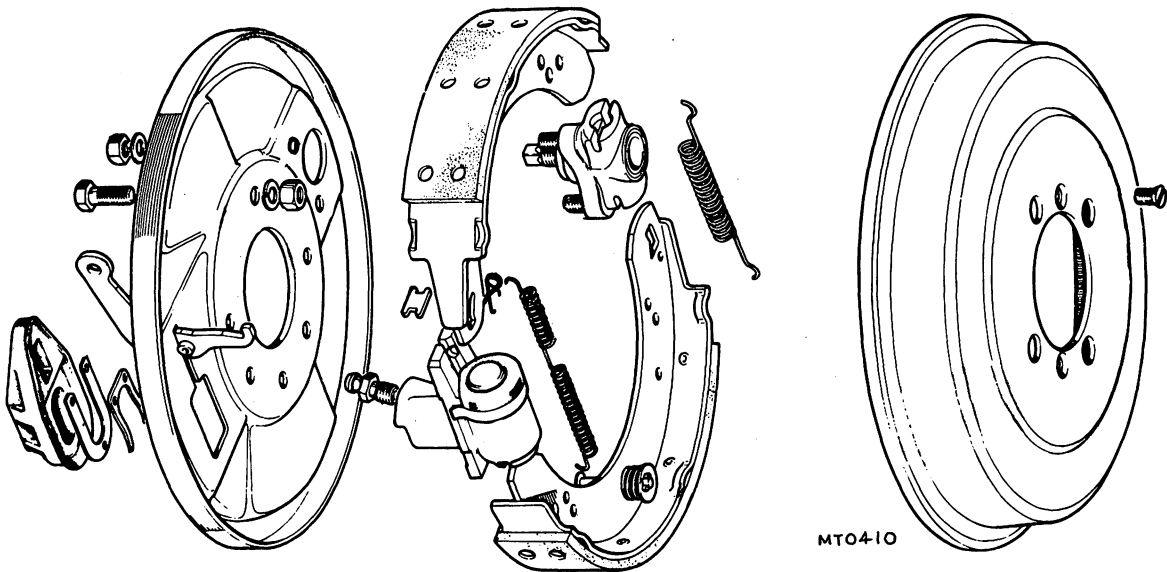
REAR BRAKE-SHOES (Manually adjusted brake only)

—Remove and refit

70.40.03

Removing

1. Release the hand brake and remove the road wheel and rear brake-drum.
2. Fully slacken off the adjuster.
3. Remove the shoe steady pins and springs.
4. Release the spring securing the hand brake lever plate to the rear brake-shoe web. Remove the spring and plate.
5. Release the shoe ends from the adjuster.
6. Release the shoe ends from the wheel cylinder.
7. Unhook the springs and withdraw the brake-shoes.



MTO4-10

Refitting

8. Arrange the shoes in the manner in which they will be offered to the backplate (slotted end of the rear shoe to the rear of the wheel cylinder: slotted end of the front shoe to the front of the adjuster).
9. Engage the upper spring ends in the holes in the shoe webs (spring fitted inboard).
10. Offer up both shoes to the backplate and engage the shoe ends in the adjuster.
11. Engage the bottom end of the rear shoe in the hand brake lever and rear of the wheel cylinder.
12. Fit the lower spring (installed outboard of the web), ensuring that the shorter coil is rearwards.
13. Engage the lower end of the front shoe in the wheel cylinder.
14. Fit the shoe steady pins and springs.
15. Fit the hand brake lever plate between the lever and shoe web and secure it with the spring.
16. Fit the brake-drum and adjust the brakes.
17. Fit the road wheel.

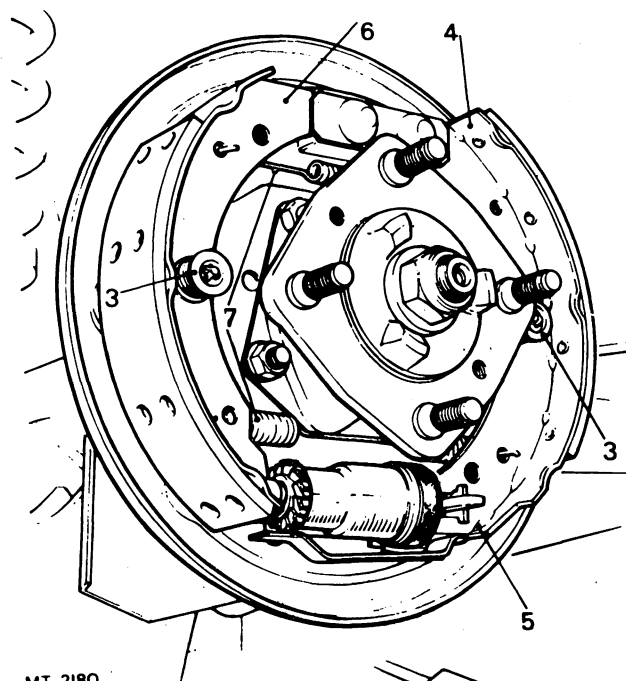
REAR BRAKE-SHOES (Self-adjusting only)

—Remove and refit

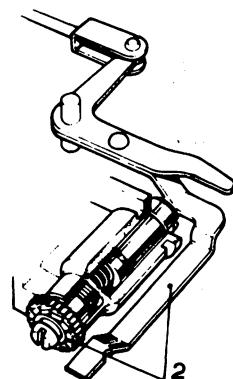
70.40.03

Removing

1. Release the hand brake and remove the rear road wheel and brake-drum.
2. Spring the operating lever on the underside of the wheel cylinder clear of the ratchet wheel and rotate the ratchet wheel to release brake adjustment.
3. Remove the shoe steady springs, cups and pins.
4. Release the leading shoe from the anchor plate.
5. Release the leading shoe from the ratchet end of the wheel cylinder.
6. Release the trailing shoe from the anchor plate.
7. Disconnect the shoe return springs and remove the brake-shoes.

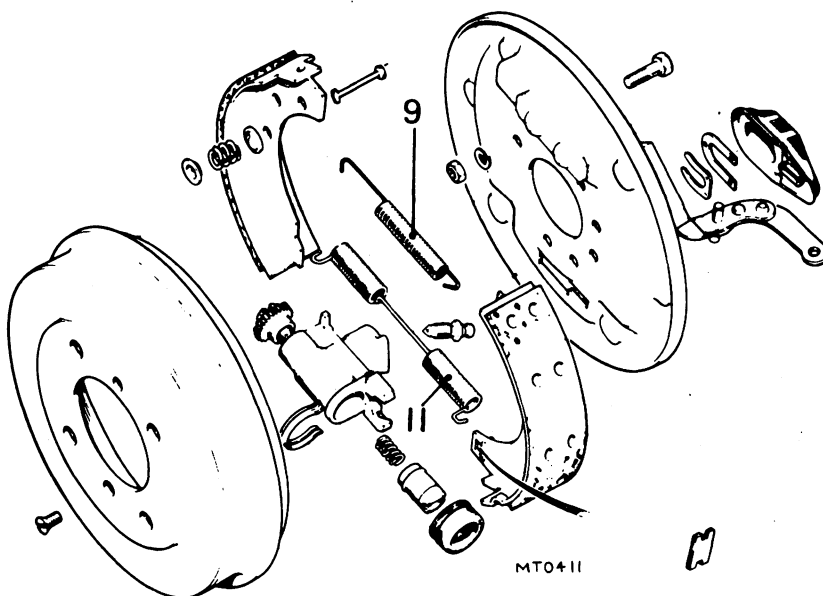


MT 2180



Refitting

8. Arrange the shoes in the manner in which they will be offered to the backplate.
9. Engage the upper spring ends in the shoe webs (spring fitted inboard).
10. Offer up both shoes to the backplate and engage the shoe ends in the anchor plate.
11. Fit the lower spring ends to the shoe webs (spring fitted inboard).
12. Engage the trailing shoe in the hand brake operating lever, ensuring that the lever pad is properly located in the shoe web.
13. Engage the leading shoe in the ratchet spindle.
14. Fit the shoe steady pins, springs and cups.
15. Centralize the shoes and fit the brake-drum and road wheel.
16. Operate and release the hand brake several times to adjust the brake.



MT0411

BRAKES

REAR BRAKE ADJUSTER (Manually adjusted brake only)

—Remove and refit

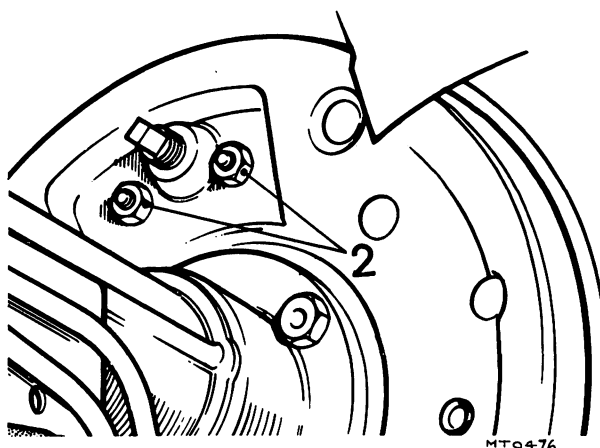
70.40.17

Removing

1. Remove the brake-shoes. 70.40.03.
2. Remove the two nuts and spring washers securing the adjuster to the backplate.
3. Withdraw the adjuster.

Refitting

4. Offer up the adjuster to the backplate and engage the adjuster body and studs in the corresponding holes in the backplate.
5. Fit and tighten the two spring washers and nuts.
6. Fit the brake-shoes, brake-drum, and road wheel.



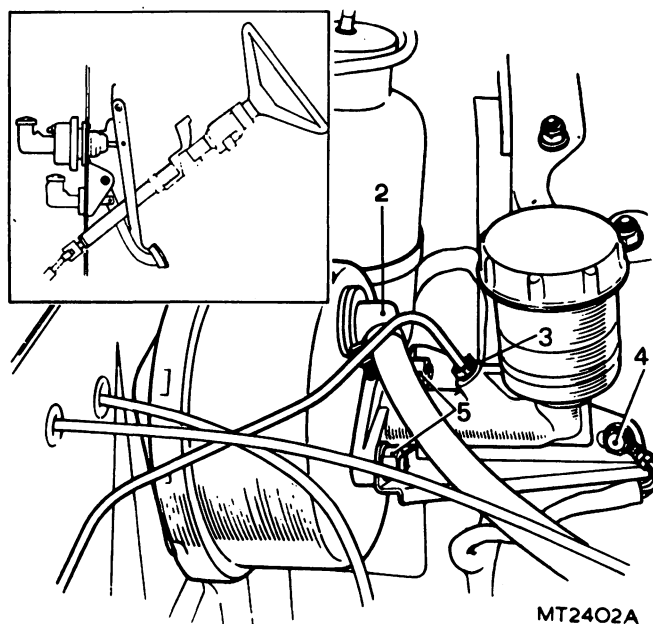
BRAKE SERVO

—Remove and refit

70.50.01

Removing

1. Remove the clevis pin securing the master cylinder push-rod to the brake pedal.
2. Disconnect the vacuum hose at the servo non-return valve.
3. Disconnect the brake pipe at the master cylinder. Plug the master cylinder to prevent fluid discharge from the reservoir. Seal the brake pipe to prevent ingress of foreign matter.
4. Remove the bolt securing the earth wires and the front end of the master cylinder bracket to the valance.
5. Remove the two nuts and shakeproof washers securing the bracket and master cylinder to the servo and withdraw the bracket and master cylinder.
6. Remove the four nuts and spring washers securing the servo to the scuttle and withdraw the master cylinder.



Refitting

7. Fit the servo to the scuttle and secure it with the spring washers and nuts.
8. Engage the push-rod in the brake pedal and fit the clevis and cotter pin.
9. Fit the master cylinder end bracket to the master cylinder and secure it with the two nuts and shakeproof washers.
10. Fit and tighten the bolt at the front of the bracket, ensuring that the earth wire terminals are fitted under the bolt head.
11. Fit and tighten the brake pipe union to the master cylinder.
12. Connect the vacuum hose to the servo non-return valve.
13. Top-up the reservoir and bleed the brakes.

70.40.17

70.50.01

VACUUM HOSE (Servo brakes only)

—Remove and refit

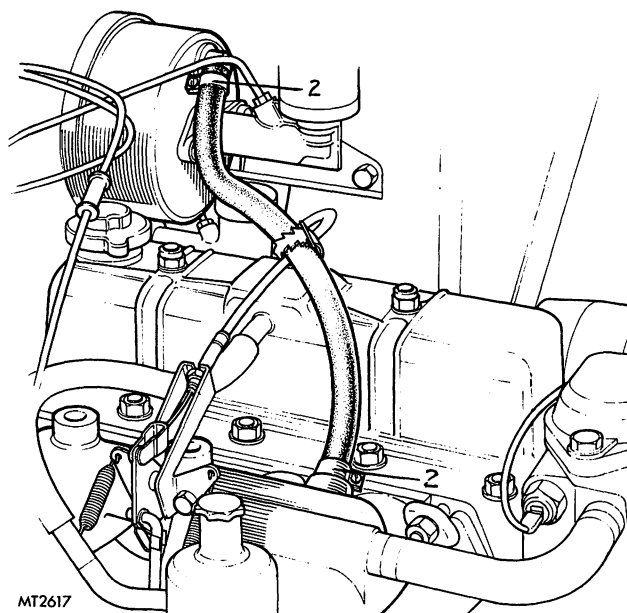
70.50.14

Removing

1. Slacken the vacuum hose clips at the manifold and servo non-return valve.
2. Release the hose from the manifold and non-return valve.

Refitting

3. Reverse instructions 1 and 2.


NON-RETURN VALVE

—Remove and refit (Servo brakes only)

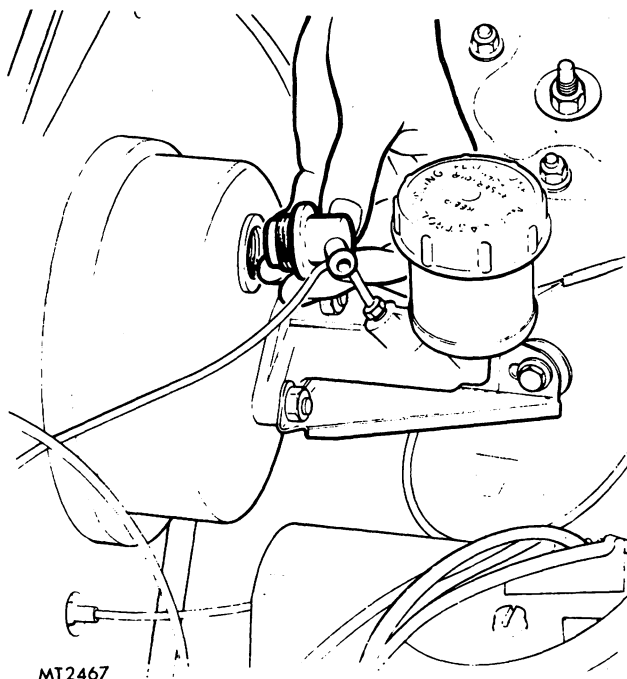
70.50.15

Removing

1. With the engine stopped, depress the brake pedal to destroy the vacuum in the servo.
2. Slacken the hose clip securing the vacuum hose to the non-return valve and disconnect the hose.
3. Withdraw the non-return valve from the servo.

Refitting

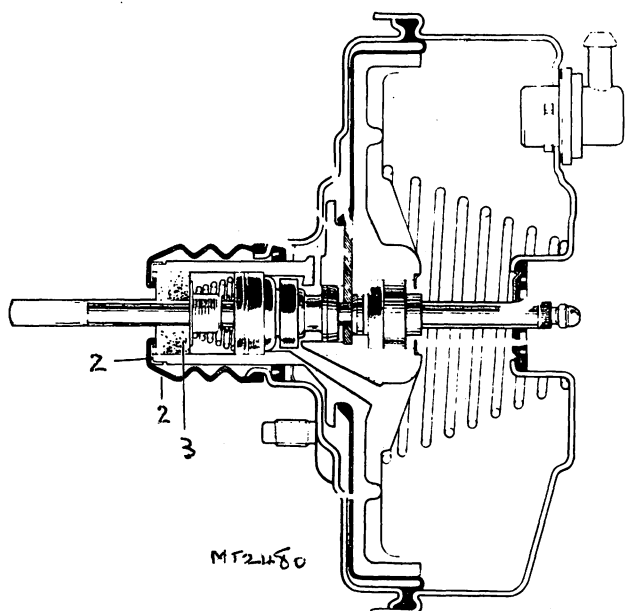
4. Renew the sealing rubber as necessary, and press the non-return valve into position in the servo.
5. Connect the vacuum hose to the non-return valve and tighten the hose clip.


BRAKE SERVO

—Renewing filter

70.50.25

1. Remove the servo from the car. 70.50.01.
2. Slide the rubber boot and end cap along the push-rod.
3. Remove the old filter from the neck of the diaphragm housing.
4. Sever the new felt filter obliquely from the periphery to the centre hole.
5. Fit the filter into the neck of the diaphragm housing.
6. Fit the end cap and rubber boot.



BRAKES

BRAKE CALIPER—FRONT

—Remove and refit

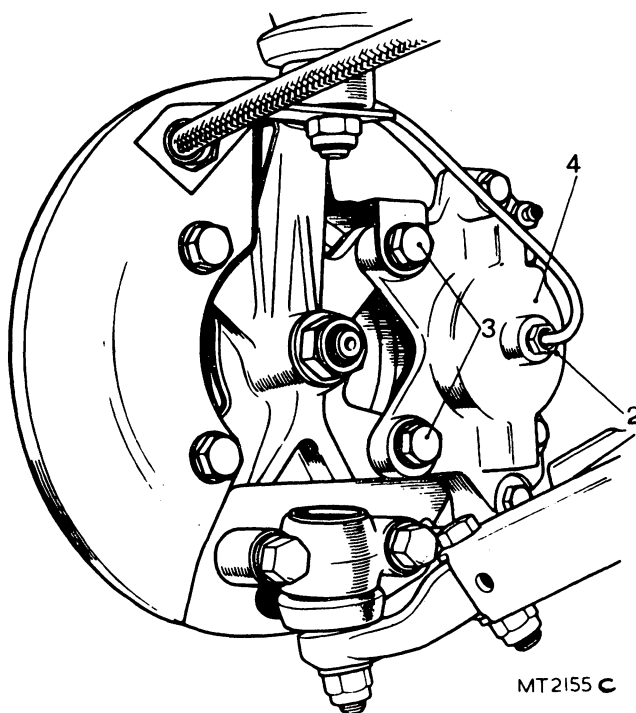
70.55.02

Removing

1. Jack up the car and remove the front wheel.
2. Disconnect the brake pipe union at the caliper and seal the fluid connections to prevent entry of grit.
3. Remove the two bolts and spring washers securing the caliper lugs to the vertical link.
4. Withdraw the caliper.

Refitting

5. Engage the caliper on the disc and align the locating lugs on the vertical link.
6. Fit and tighten the two bolts and spring washers.
7. Connect the brake pipe to the caliper.
8. Bleed the brakes.
9. Fit the road wheel and remove the jack.



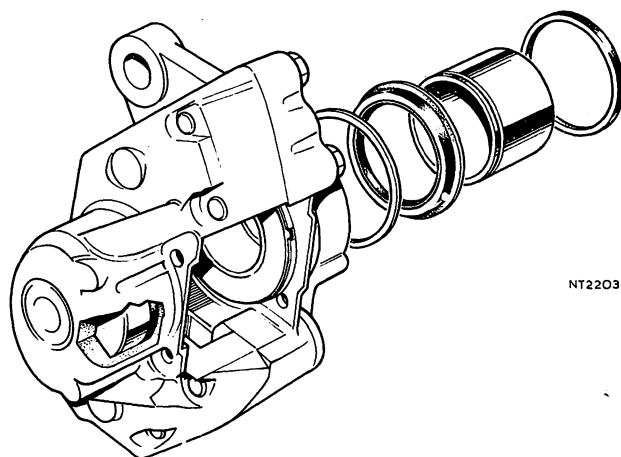
BRAKE CALIPER—FRONT

—Renew seals

70.55.13

Dismantling

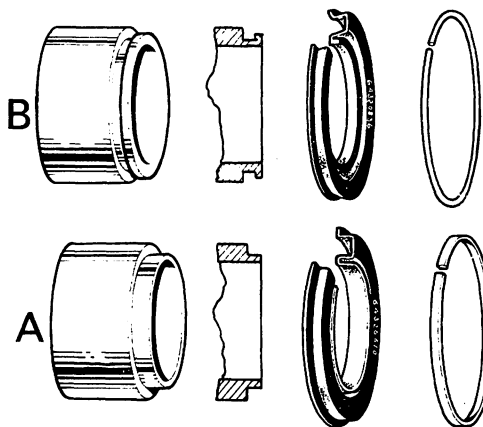
1. Remove the caliper. 70.55.02.
2. Remove the spring pins from the brake pad retaining pins.
3. Withdraw the pad retaining pins and remove the brake pads and shims.
4. Remove the circlip retaining the piston dust covers.
5. Remove the dust covers.
6. Extract the caliper pistons. Piston removal may be facilitated by using a low pressure air line. Do not interchange the pistons.
7. Prise out the cylinder seals, taking care not to damage the cylinder bore.
8. Thoroughly clean the caliper and pistons using brake fluid or methylated spirit. If either pistons or bores are scored or corroded, a new caliper must be obtained.



Reassembling

9. Carefully install new seals in the cylinder bores.
- ** **CAUTION:** Two types of caliper pistons and seals are in use. On early cars a non lipped piston and seal 'A'. On later cars a lipped piston and seal 'B'. When renewing the seals on early pistons 'A' either type of seal is suitable. Later pistons 'B' must NOT be fitted with the early type seals 'A'. **
10. Lubricate the bores with clean brake fluid.
11. Evenly enter the pistons into their original locations in the caliper.
12. Fit new dust covers and circlips.
13. Fit the caliper to the vertical link and connect the brake pipe. 70.55.02.
14. Fit the brake pads and shims, ensuring that the arrow on the shims points in the direction of disc forward rotation.
15. Fit the pad retaining pins and spring pins.
16. Bleed the brakes.
17. Fit the road wheel and remove the jack.

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70.55.02

70.55.13

FRONT WHEEL CYLINDER

—Remove and refit (Drum brakes only)

70.60.03

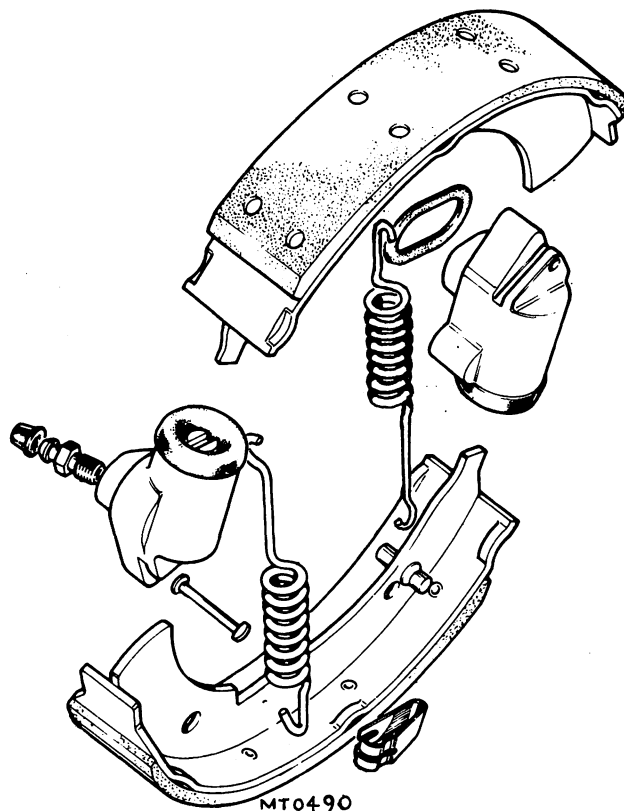
Removing

1. Remove the brake-drum.
2. Remove the brake-shoes.
3. Disconnect the feed pipe union from the wheel cylinder (front).
or
Disconnect the feed pipe and transfer pipe unions from the cylinder (rear).
4. Remove the two nuts and spring washers securing the cylinder to the backplate.
5. Withdraw the cylinder.

Refitting

6. Reverse instructions 1 to 5. The cylinder must be mounted with the live end adjacent to the snail cam.

****CAUTION:** To prevent water entering the brake assembly, it is essential that the seal between the wheel cylinder and the back plate is in good condition and fitted correctly.**

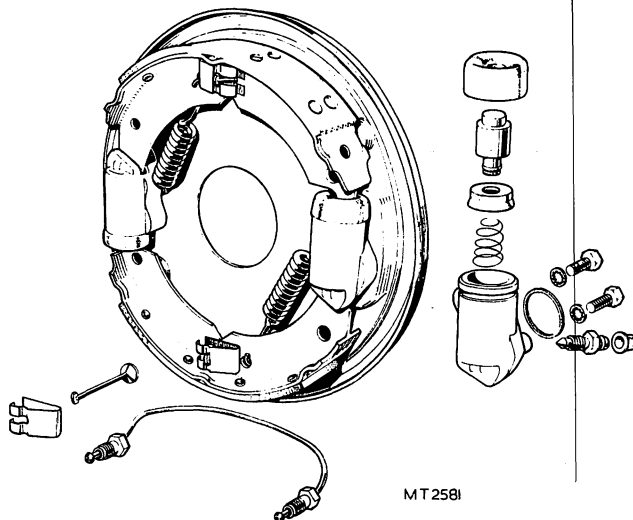


FRONT WHEEL CYLINDER

—Overhaul (Drum brakes only)

70.60.11

1. ****Remove the wheel cylinder. 70.60.03.**
2. Remove the rubber boot.
3. Withdraw the piston and seal.
4. Thoroughly clean the cylinder and piston and examine for wear and scoring. Renew the wheel cylinder assembly if wear or damage is evident.
5. Remove and renew the piston seal.
6. Lubricate the cylinder bore with clean brake fluid.
7. Fit the boot and piston to the cylinder.
8. Refit the wheel cylinder. 70.60.03**

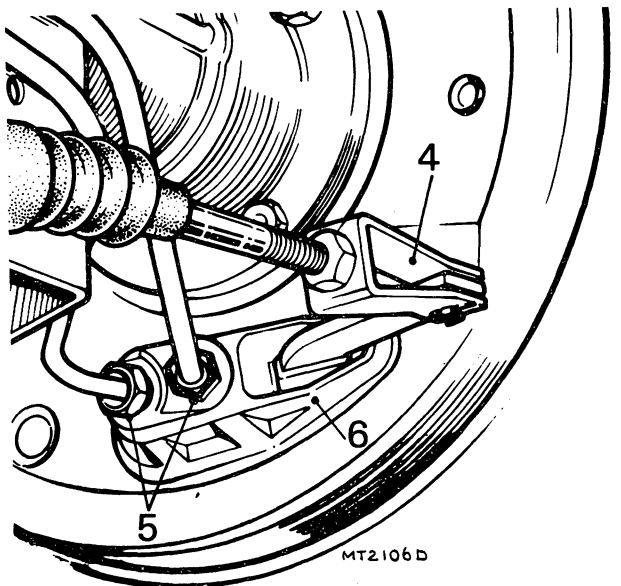


REAR WHEEL CYLINDER

—Remove and refit (Manual brake adjustment) 70.60.18

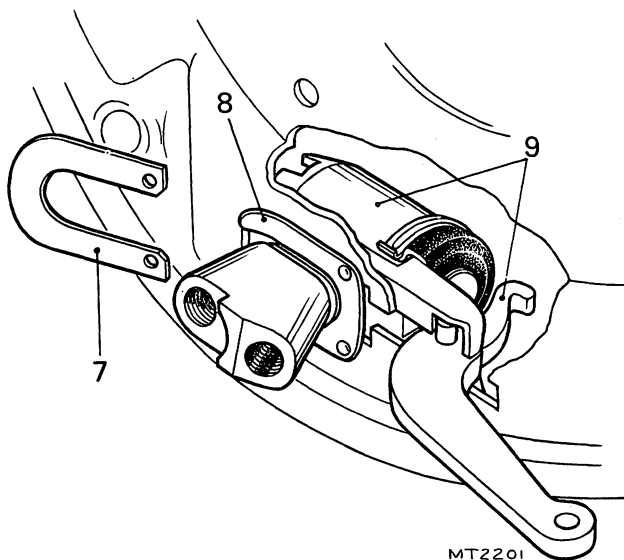
Removing

1. Jack up the car, remove the rear wheel and release the hand brake.
 2. Remove the brake-drum. 70.10.03.
 3. Remove the brake-shoes. 70.40.03.
 4. Disconnect the hand brake cable at the rear of the backplate.
 5. Disconnect the fluid feed pipe union at the wheel cylinder (left-hand side only).
- or
- Disconnect the fluid feed and transfer pipe unions at the wheel cylinder (right-hand side only).
6. Remove the wheel cylinder rubber boot at the rear of the backplate.
 7. Remove the horse-shoe clip securing the wheel cylinder to the backplate.
 8. Remove the spring plate located behind the horse-shoe clip.
 9. Withdraw the wheel cylinder complete with lever.



Refitting

10. Ensure that the wheel cylinder mounting faces and backplate are clean.
11. Lightly smear the mounting faces on the wheel cylinder and both sides of the backplate with a zinc base grease.
12. Install the lever in the wheel cylinder.
13. Enter the wheel cylinder in the backplate.
14. Install the spring plate from the rear of the backplate (open end of plate towards front of car: dimples on plate projecting towards differential).
15. Install the horse-shoe clip from the front end of the cylinder, ensuring that the holes at the open end of the clip engage the dimple protrusions on the spring plate. Check that the cylinder is free to 'float' (centralize) on the backplate.
16. Fit the boot, pressing it firmly into position against the backplate.
17. Reverse instructions 1 to 5.
18. Bleed the brakes.



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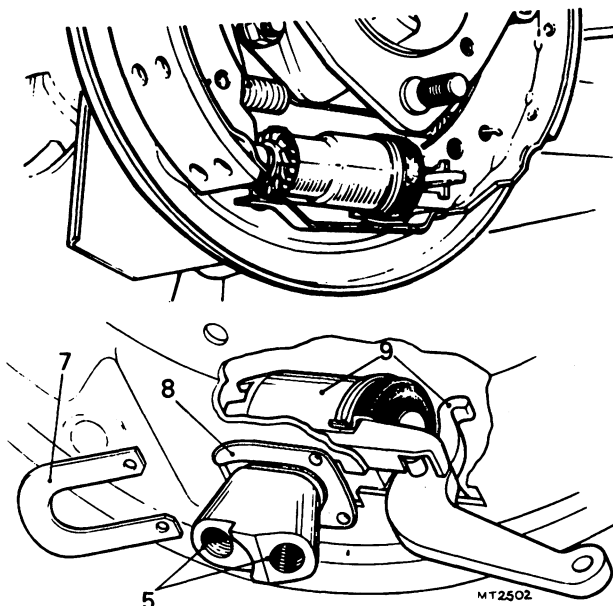
REAR WHEEL CYLINDER (Self-adjusting brakes)★★

—Remove and refit

70.60.18

Removing

1. Jack up the car, remove the rear wheel and release the hand brake.
 2. Remove the brake-drum. 70.10.03.
 3. Remove the brake-shoes. 70.40.03.
 4. Disconnect the hand brake cable at the rear of the backplate.
 5. Disconnect the fluid feed pipe union at the wheel cylinder (left-hand side only).
- or
- Disconnect the fluid feed and transfer pipe unions at the wheel cylinder (right-hand side only).
6. Remove the wheel cylinder rubber boot at the rear of the backplate.
 7. Remove the horse-shoe clip securing the wheel cylinder to the backplate.
 8. Remove the spring plate located behind the horse-shoe clip.
 9. Withdraw the wheel cylinder complete with lever.



Refitting

10. Reverse instructions 1 to 9.
11. Apply and release the hand brake several times to adjust the rear brakes.
12. Bleed the brakes.

★★

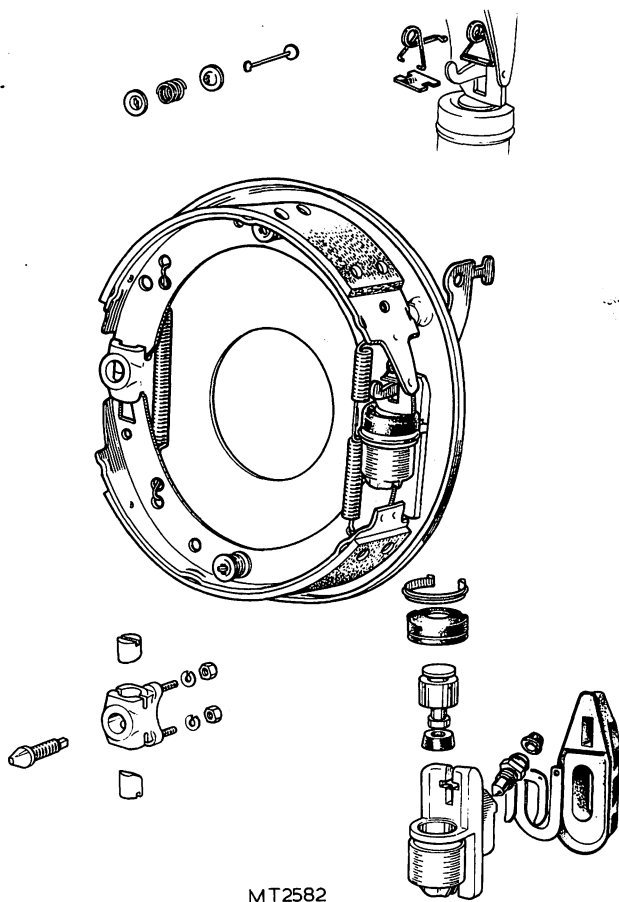
REAR WHEEL CYLINDER (Manual brake adjustment)★★

★★

—Overhaul

70.60.26

- 1.★★Remove the wheel cylinder. 70.16.18 (Manual brake adjustment).
2. Remove the clip retaining the rubber boot to the wheel cylinder body.
3. Withdraw the piston, complete with rubber boot and seal, from the cylinder.
4. Examine the piston and cylinder bore for corrosion or scoring. If either are damaged, renew the wheel cylinder. If undamaged, thoroughly clean using brake fluid or methylated spirit.
5. Renew the piston seal (lip of seal adjacent to reduced end of piston).
6. Renew the rubber boot.
7. Lubricate the cylinder bore and piston with clean brake fluid and insert the piston in the bore.
8. Fit the boot to the cylinder and secure it with the clip.
9. Refit the wheel cylinder. 70.16.18 (Manual brake adjustment).★★



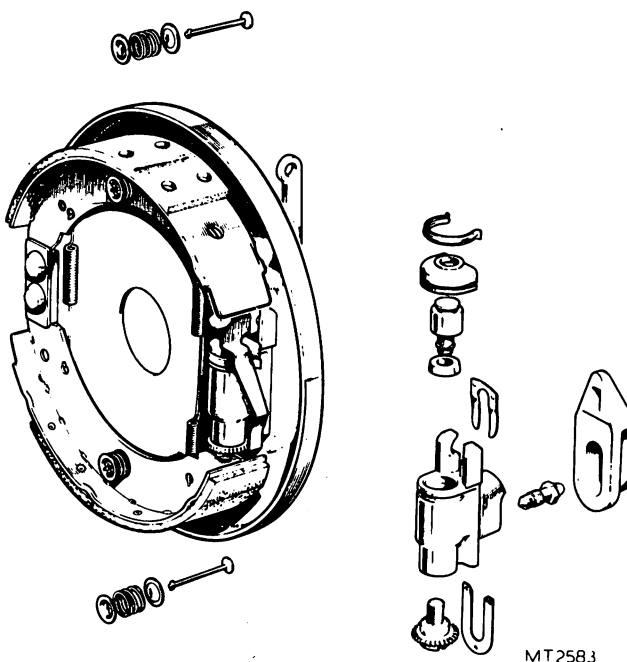
**

REAR WHEEL CYLINDER (Self-adjusting brakes)**

—Overhaul

70.60.26

1. **Remove the wheel cylinder. 70.60.18 (Self-adjusting brakes).
2. Detach the lever from the wheel cylinder.
3. Remove the clip retaining the rubber boot to the wheel cylinder body.
4. Remove the rubber boot, piston and seal.
5. Remove the screwed rod and adjuster wheel from the closed end of the wheel cylinder.
6. Clean and examine the cylinder and piston, and renew as necessary.
7. Check that the adjusting wheel rotates freely on the screwed rod.
8. Smear the cylinder bore with clean brake fluid.
9. Renew the piston seal and rubber boot and insert the piston in the cylinder.
10. Fit the clip to the rubber boot.
11. Insert the adjuster wheel and screwed rod in the cylinder, ensuring that the adjustment is fully slackened off.
12. Fit the hand brake operating lever to the wheel cylinder.
13. Refit the wheel cylinder. 70.60.18. (Self-adjusting brakes). **



MT2583

WHEEL AND TYRE OPERATIONS

Nave plate—remove and refit	..	..	..	..	..	..	..	..	..	74.20.02
Tyres—general	..	..	..	..	..	..	..	..	..	74.10.00
Wheel and tyre balance	..	..	..	..	..	..	..	..	..	74.15.00
Wheels										
—general	..	..	..	..	..	..	..	..	..	74.20.00
—remove and refit	..	..	..	..	..	..	..	..	..	74.20.01



DATA—TYRES

Model	Type	Size	Loading Condition	PRESSURES			
				Front		Rear	
				lb/in ²	kg/cm ²	lb/in ²	kg/cm ²
1300	Tubeless Cross-ply	520—13	1 to 4 up	25	1.76	30	2.11
			More than 4 up	26	1.83	32	2.25
		560—13	All	22	1.55	26	1.83
1500	Tubeless Radial-ply	155SR—13	All	22	1.55	26	1.83

Tyres of the correct type and dimensions, at the correct cold inflation pressures, are an integral part of the vehicle's design and regular maintenance of tyres contributes not only to safety but to the designed functioning of the vehicle. Road-holding, steering and braking are especially vulnerable to incorrectly pressurized, badly fitted or worn tyres.

Tyres of the same size and type but of different make may have widely varying characteristics. It is therefore recommended that tyres of the same make are fitted to all wheels.

Radial and cross-ply tyres

It is both dangerous and, in the U.K. illegal, to use on the public roads a vehicle fitted with unsuitable combinations of tyres. The following recommendations should therefore be observed:

1. Do not mix radial-ply and cross-ply tyres on the same axle.
2. Do not fit radial-ply tyres to the front wheels and cross-ply to the rear wheels.
3. With suitable tyre pressure adjustments it may be possible to obtain acceptable handling with cross-ply tyres on the front wheels and radial-ply tyres on the rear wheels, but this combination is not recommended.

Size, type, pressures

The pressures recommended (see chart) provide optimum ride and handling characteristics for all normal operating conditions. The pressures should be checked, and adjusted if necessary, once per week. This should be done with the tyres cold. Tyre temperatures and pressures increase when running. Bleeding a warm tyre to the recommended pressure will result in under-inflation which may be dangerous. A slight natural pressure loss occurs with time. If this exceeds 2 lb/in² (0.14 kg/cm²) per week, the cause should be investigated and rectified.

It should be noted that it is an offence in the U.K. to use a motor vehicle if a tyre is not so inflated as to make it fit for the use to which the vehicle is being put.

The spare wheel tyre should be maintained at the highest pressure quoted in the chart, and adjusted to the correct pressure for its position when fitted for use.

Wear

All tyres fitted as original equipment include wear indicators in their tread pattern. When the tread has worn to a remaining depth of 0.06 in (1.5 mm) the indicators appear at the surface as bars which connect the tread pattern across the full width of the tyre. It is illegal in the U.K. and certain other countries to continue to use tyres on which the indicators are visible.

It should be noted that the properties of many tyres alter progressively with wear. In particular the 'wet grip' and aquaplaning resistance are gradually but substantially reduced. Extra care and speed restriction should therefore be exercised on wet roads as the effective tread depth diminishes.

Incorrect wheel alignment will accelerate tyre wear. Fins on the inside or outside edges of the tread pattern are caused by excessive toe-in or toe-out respectively. As fins may also be caused by high cornering speeds or road camber it is better to have the cause ascertained by having the wheel alignment checked (see 'General Specification' for data).

Damage

Excessive local distortion can cause the casing of a tyre to fracture and may lead to premature tyre failure. Tyres should be examined especially for cracked walls, exposed cords, etc. Flints and other sharp objects should be removed from the tyre tread; if neglected they may work through the cover. Any oil or grease which may get onto the tyres should be cleaned off by using fuel sparingly. Do not use paraffin (kerosene), which has a detrimental effect on rubber.

Repairs

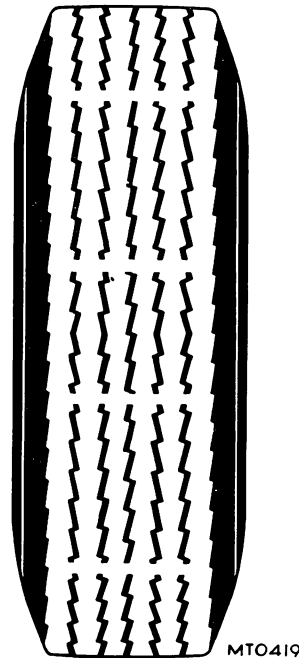
Tubeless tyres

A temporary repair can be made to tubeless tyres, using a special kit, provided the puncturing hole is small and confined to the central tread area. The following precautions must, however, be observed.

1. Do not use more than one plug in each hole.
2. Do not use the tyre for high speeds.
3. Ensure that a permanent 'cold patch' or vulcanized repair is made at the earliest opportunity.

Tubes

When repairing tubes, have punctures or injuries vulcanized. Ordinary patches should only be used for emergencies. Vulcanizing is absolutely essential for tubes manufactured from synthetic rubber.



Winter tyres

Winter tyres are designed to give improved traction and braking in mud and snow. Their performance on hard surfaces may, however, be inferior to normal road tyres and extra care is required when using them under normal conditions.

Racing and competition tyres

Should the vehicle be tuned to increase its maximum speed, or be used for racing or competition, consult the respective tyre company regarding the need for tyres of special or racing construction.

Valves

Whenever a new tubeless tyre is fitted, the Schrader snap-in type valve must also be renewed. To facilitate fitting, lubricate the valve with soap solution before using a special tool to snap the valve squarely into an airtight position in the rim hole.

WHEEL AND TYRE BALANCE

General

74.15.00

Using standard equipment, tyres and wheels should be statically balanced to within 5 ozf in. Balance weights are available in $\frac{1}{2}$ oz increments from $\frac{1}{2}$ oz to 3 oz.

WHEELS

General

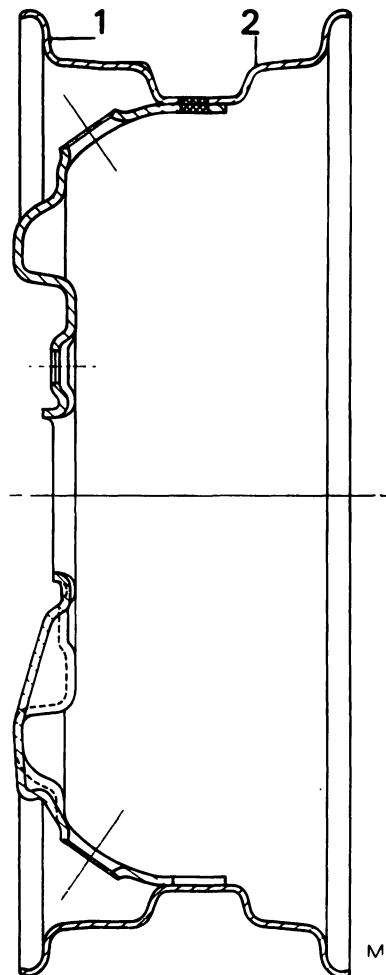
74.20.00

Steel disc type 4J \times 13 flat safety ledge rims. Three lugs on periphery of wheel centre provide location for stainless steel nave plate.

Wheel location and retention on hubs by four $\frac{3}{8}$ in U.N.F. studs and nuts tightened to 38 to 45 lbf ft (5.2 to 6.2 kgf m).

Wheel tolerances

1. Wobble—The lateral variation measured on the vertical inside face of a flange must not exceed 0.045 in (1.143 mm).
2. Lift—On a truly mounted and revolving wheel the difference between the high and low points measured on either rim ledge shall not exceed 0.045 in (1.143 mm).



WHEEL AND TYRE

WHEELS

—Remove and refit

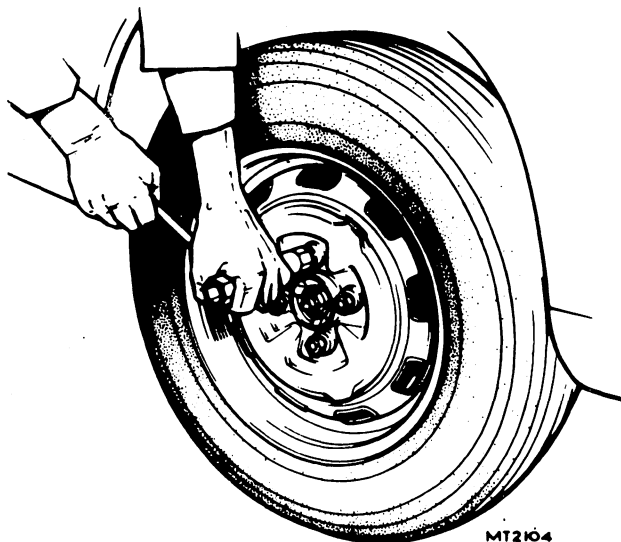
74.20.01

Removing

1. Remove nave plate. 74.20.02.
2. Slacken off four wheel retaining nuts.
3. Locate jack in body cavity adjacent to wheel being lifted and raise jack sufficiently to clear wheel off ground.
4. Remove wheel retaining nuts and lift off wheel.

Refitting

5. Reverse instructions 1 to 4. Ensure that wheel retaining nuts are refitted with chamfered ends inboard.



NAVE PLATE

—Remove and refit

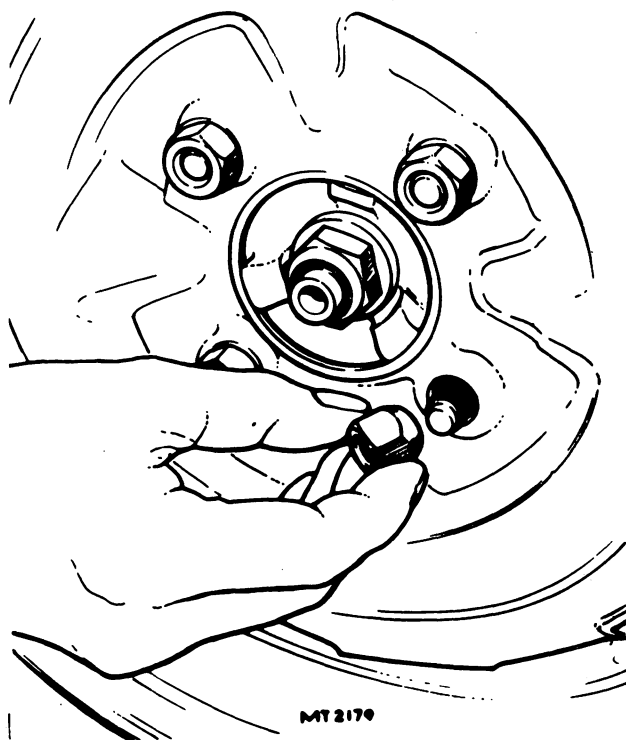
74.20.02

Removing

1. Using special tool in tool kit, insert hooked end between inner edge of nave plate and wheel.
2. Holding nave plate at a point diametrically opposite to the tool, lever the nave plate off the wheel location lugs.

Refitting

3. Place nave plate over two of the three retaining lugs on wheel and give the plate a sharp tap with the hand to spring it over the third lug.



BODY OPERATIONS

Ashtray—front—remove and refit	76.67.13
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Bonnet stay—remove and refit	76.16.14
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Door glass—rear—remove and refit	76.31.02
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Door glass regulator—rear—remove and refit	76.31.46
Door handle—front—remove and refit	76.58.01
Door handle—rear—remove and refit	76.58.02
Door hinges—front—remove and refit	76.28.42
Door hinges—rear—remove and refit	76.28.43
Door lock—front—remove and refit	76.37.12
Door lock—rear—remove and refit	76.37.13
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Door lock striker—rear—remove and refit	76.37.24
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Door private lock—remove and refit	76.37.39
Door push-button—remove and refit	76.58.12
Door seal—front—remove and refit	76.40.01
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Fascia support rail—remove and refit	76.46.06
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BODY OPERATIONS—continued

Gearbox tunnel cover—remove and refit	76.25.07
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Luggage compartment lid hinges—remove and refit	76.19.07
Luggage compartment lid lock—remove and refit	76.19.11
Luggage compartment lid lock striker—remove and refit	76.19.12
Luggage compartment lid seal—remove and refit	76.19.06
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Parcel shelf—rear—remove and refit	76.67.06
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Seat squab catch release cable—remove and refit	76.70.26
Seat squab cover—front—remove and refit	76.70.03
Sub-frame—remove and refit	76.10.29
Sub-frame—alignment check	76.10.04

****BODY UNIT**

—Alignment check

76.10.01

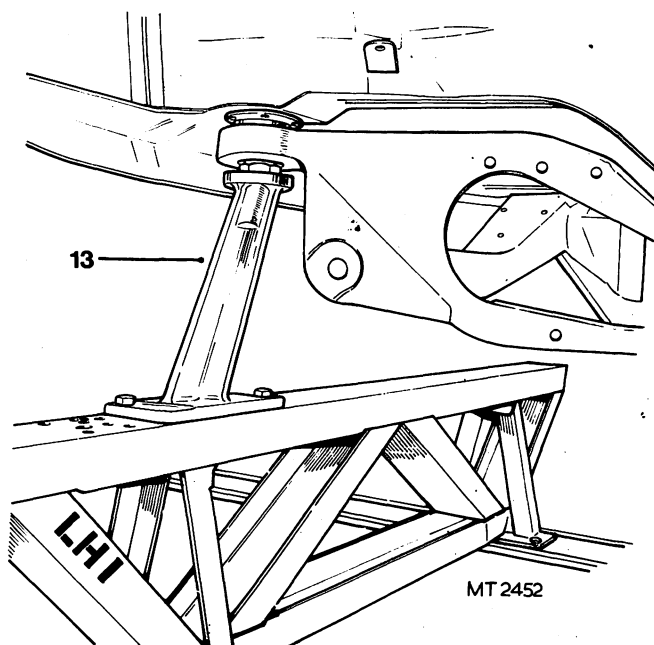
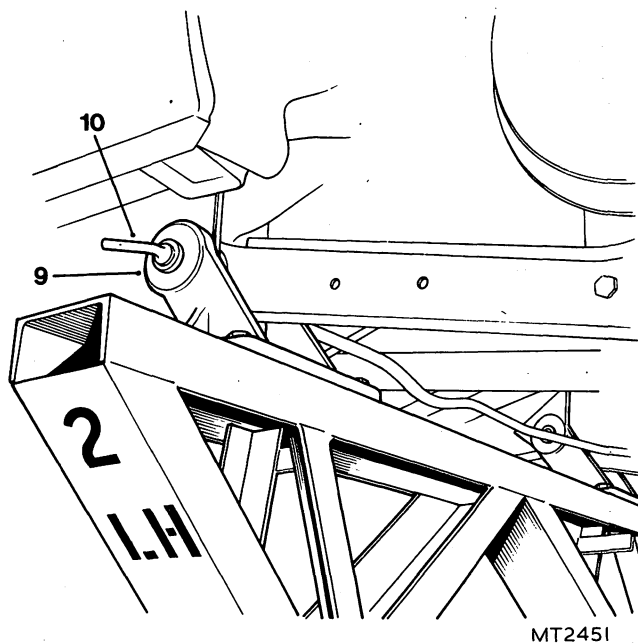
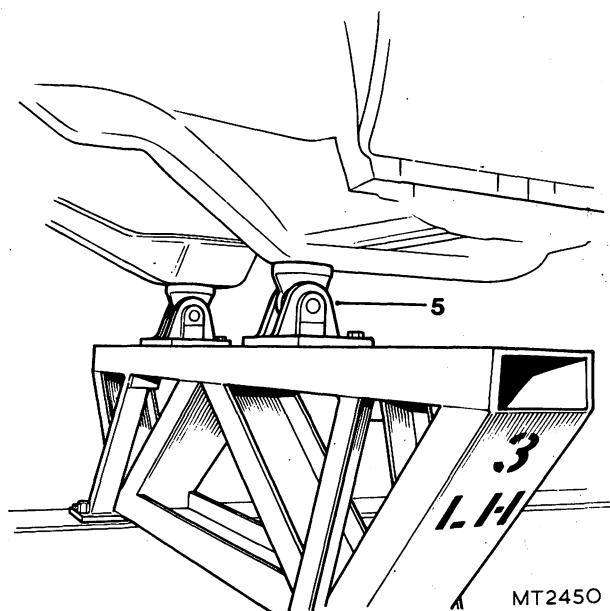
(Using Churchill 700 or 707 system)

Whilst severe underframe damage is readily detected, less serious damage may cause distortion that is not visually apparent.

If steering or suspension checks indicate a fault which cannot be attributed to anything other than underframe distortion, initial checking should be carried out to determine the area and the extent of the distortion.

Initial check

1. Clip the location tape to the right-hand side of the jig and make a chalk mark on the floor at each required location for initial checking.
2. Remove the tape to avoid damage.
3. Position the car centrally over the jig with the front wheel centres approximately 30 in (76 cm) from the front of the jig.
4. Raise the front of the car and fit transverse member No. 3 to the jig.
5. Fit two brackets (part No. S700-38) to the transverse member, locating the inner bolt in hole 'J'.
6. Lower the car to locate the bracket pegs in the front tooling holes in the floor side-member.
7. Raise the rear of the car by jacking on a wooden beam placed under the front edge of the luggage compartment floor. The beam must pass under the full width of the car and be notched to accept the exhaust and fuel feed pipes, etc.
8. Support the rear suspension arms, remove the forward pivot bolts and fit transverse member No. 2.
9. Fit brackets S700-27/1 (L.H.) and S700-27/2 (R.H.) to the transverse member, locating the outer bolt in hole 'G'.
10. Lower the car and fit the four bushes S700-27/3 and two pins S700-27/5 to the trailing arm hangers.
11. Fit transverse member No. 1.
12. Support the sub-frame and remove the front mounting nuts, washers and the lower two retainers and mounting rubbers.
13. Fit brackets S700-15/1 (L.H.) and S700-15/2 (R.H.) together with adaptors S700-15/4, locating the outer bracket bolt in hole 'D'.
14. Tighten the sub-frame front mounting bolts into the adaptors. Distortion, if any, of the underframe will now be apparent if the brackets do not engage with the body locations at any point. The following operations are only necessary if repairs are required.**



**Repair stage

It may not be necessary to fit the full set of repair brackets. If damage is confined to the front end of the car, repair brackets can be fitted at the front and the initial check brackets retained at the rear or vice versa in the case of rear-end damage.

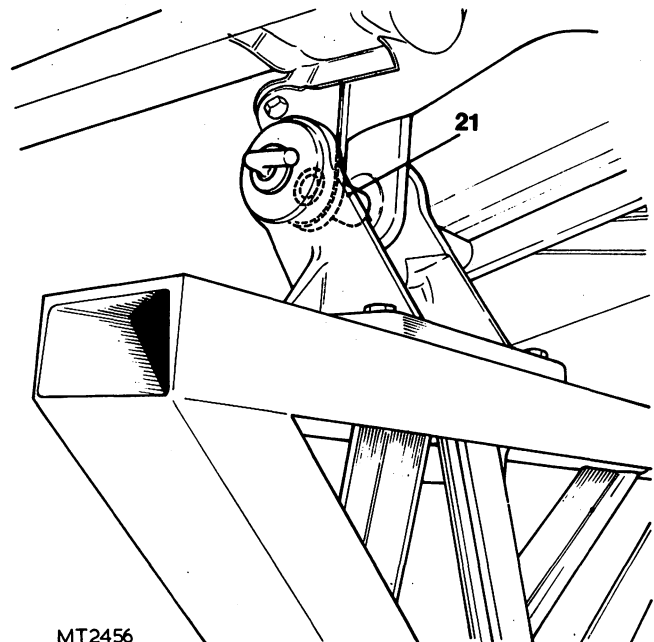
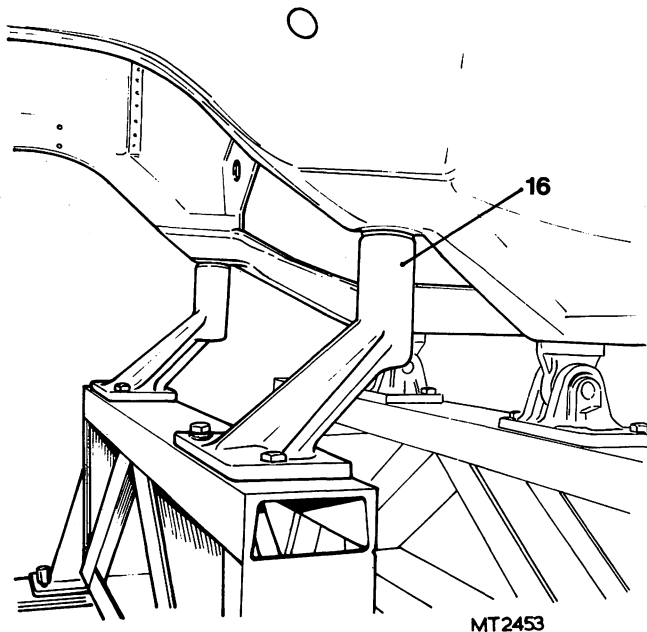
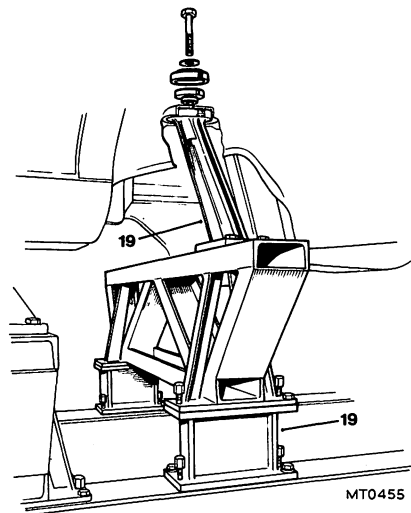
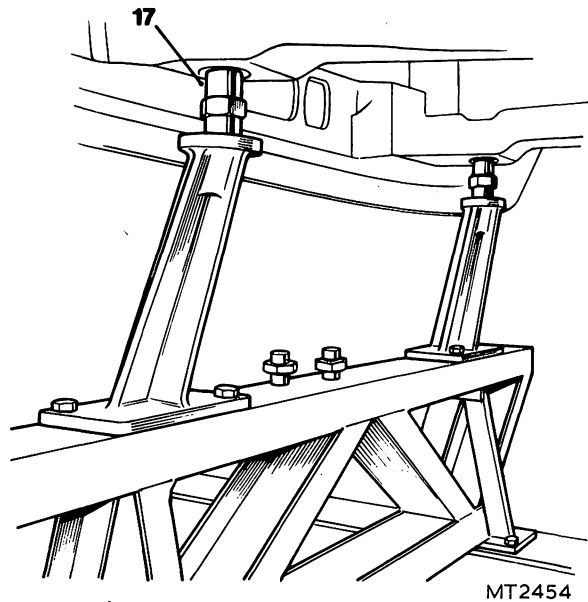
Where it is necessary to remove sub-assemblies before fitting repair brackets, reference should be made to the appropriate workshop manual section.

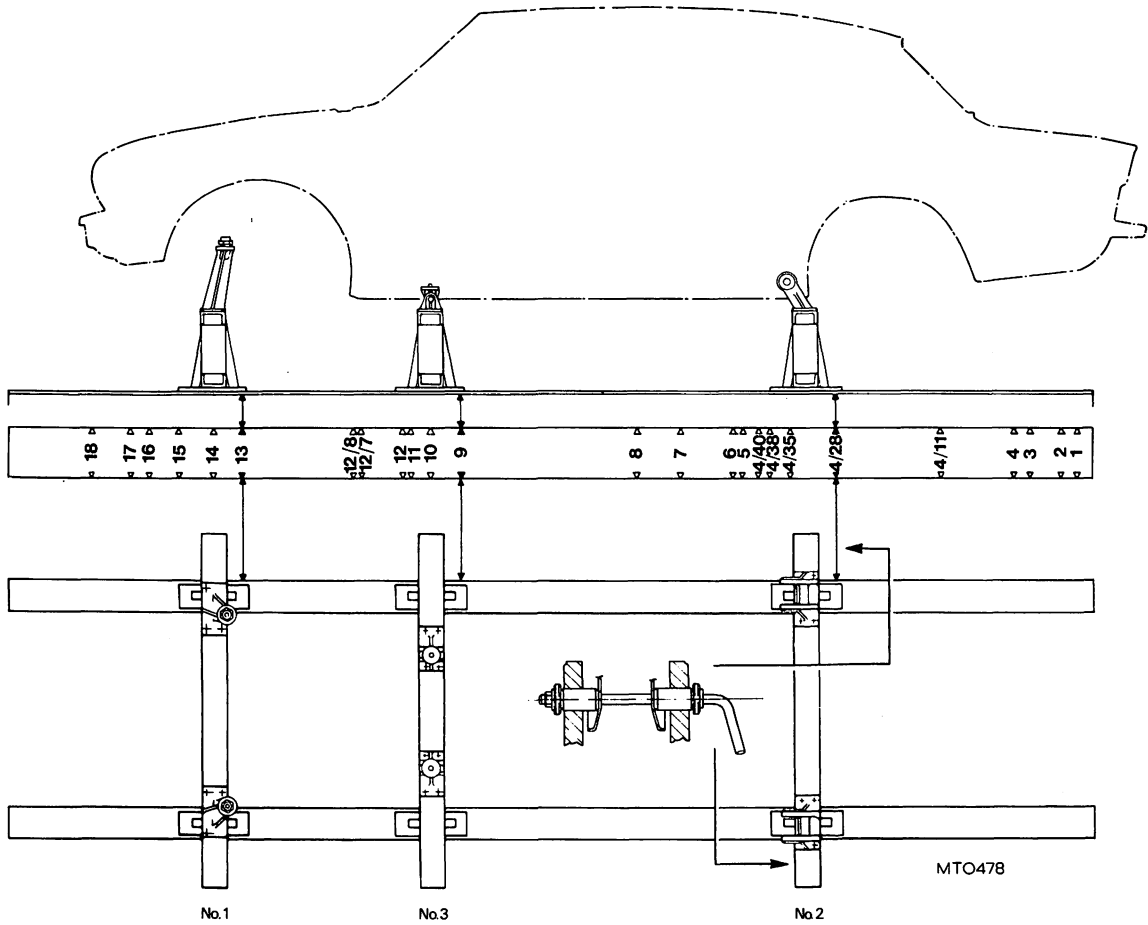
For front end repairs, the transverse members and brackets used for initial checking are used again in their original positions with the following additions:

15. Fit transverse member No. 4.
16. Fit brackets S700-49/1 (L.H.) and 700-49/2 (R.H.), locating the outer bracket bolt in hole 'C', with the brackets located on the sub-frame rear mounting tubes.
17. Remove the adaptors S700-15/4 from transverse member assembly No. 1 and fit adaptors S700-15/3, locating them in the sub-frame front mounting tubes.

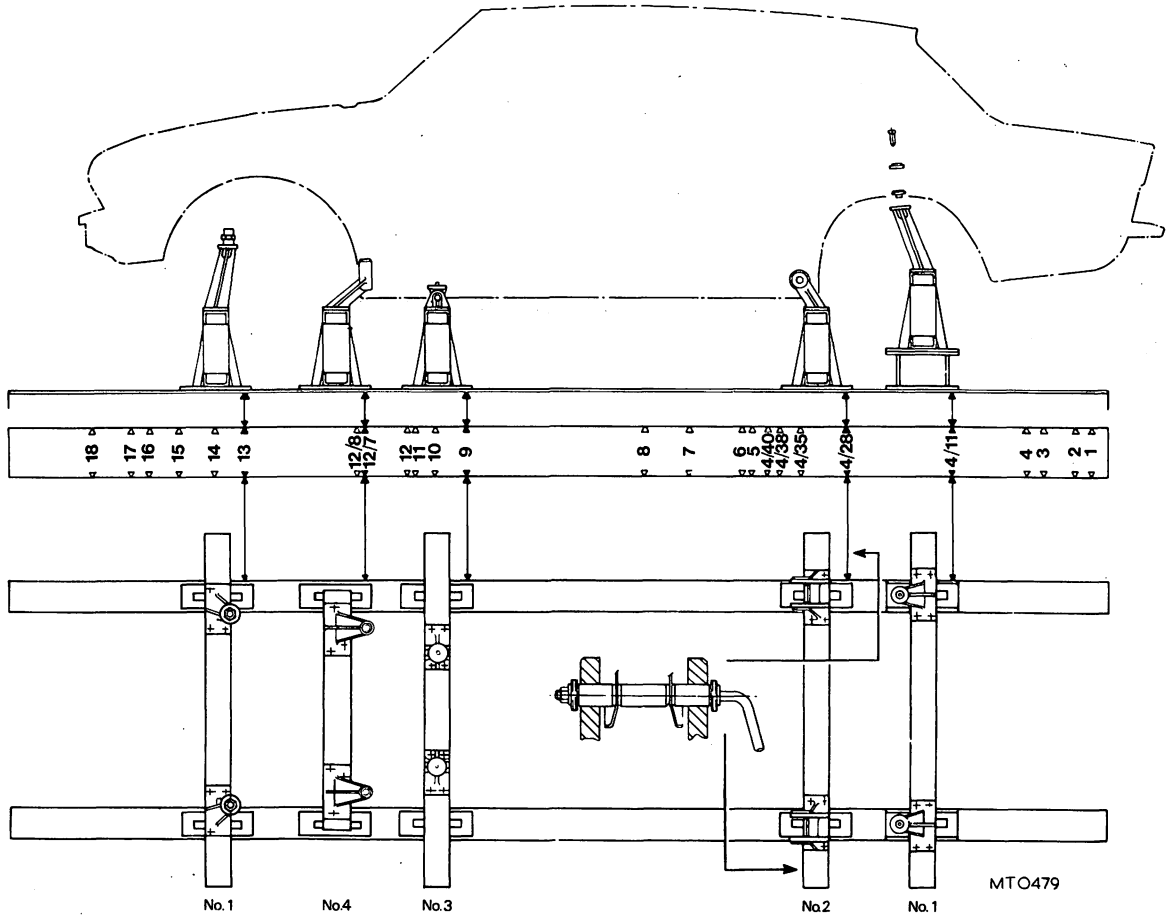
For rear end repairs, proceed as follows:

18. Fit transverse member No. 1 with the rear mounting holes at tape position 4/11.
19. Fit risers 700-2A and brackets S700-16/1 (L.H.) and S700-16/2 (R.H.), locating the outer mounting bolts in hole 'G'.
20. Locate adaptors S700-16/3 and S700-16/4 with rear shock absorber upper mountings and fit bolts.
21. Fit two bushes S700-27/6 to the trailing arm brackets in conjunction with transverse member assembly No. 2 and the bushes, pins and brackets used for initial checking.**





Transverse member locations for initial check



Transverse member locations for repair

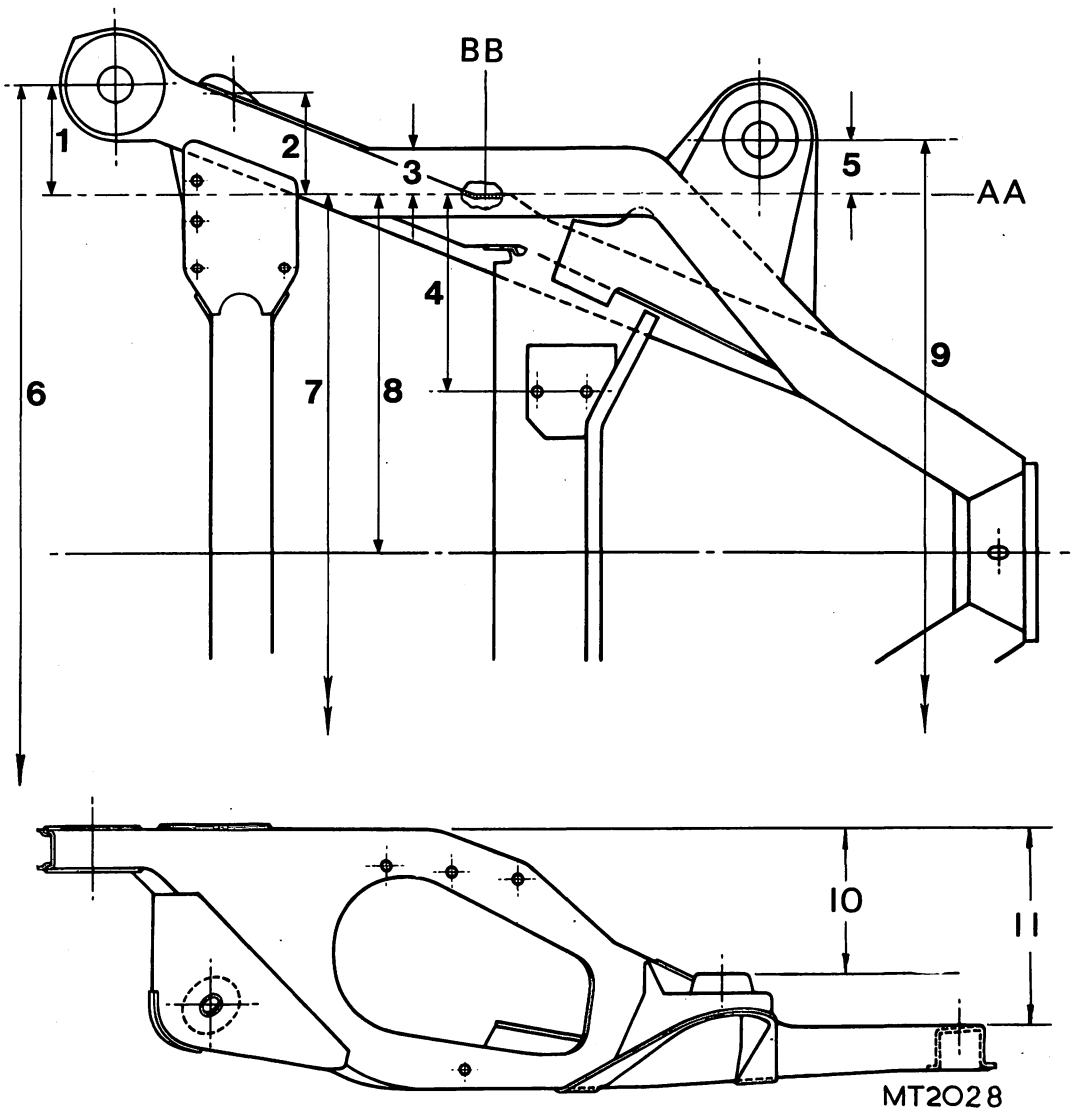
BODY

SUB-FRAME

—Alignment check

76.10.04

Diagram Number	Inches	Millimetres
AA Datum line		
BB Datum face		
1	3.57±0.060	90.68±1.53
2	3.19±0.030	81.03±0.76
3	1.47±0.030	37.3±0.76
4	6.256±0.010	158.9±0.25
5	1.72±0.060	43.69±1.53
6	30.20±0.030	767.1±0.76
7	23.06±0.060	585.7±1.53
8	11.53±0.030	292.9±0.76
9	26.50±0.060	673.1±1.53
10	5.01	127.2
11	6.95	176.5



FRONT SUB-FRAME

—Remove and refit

76.10.29

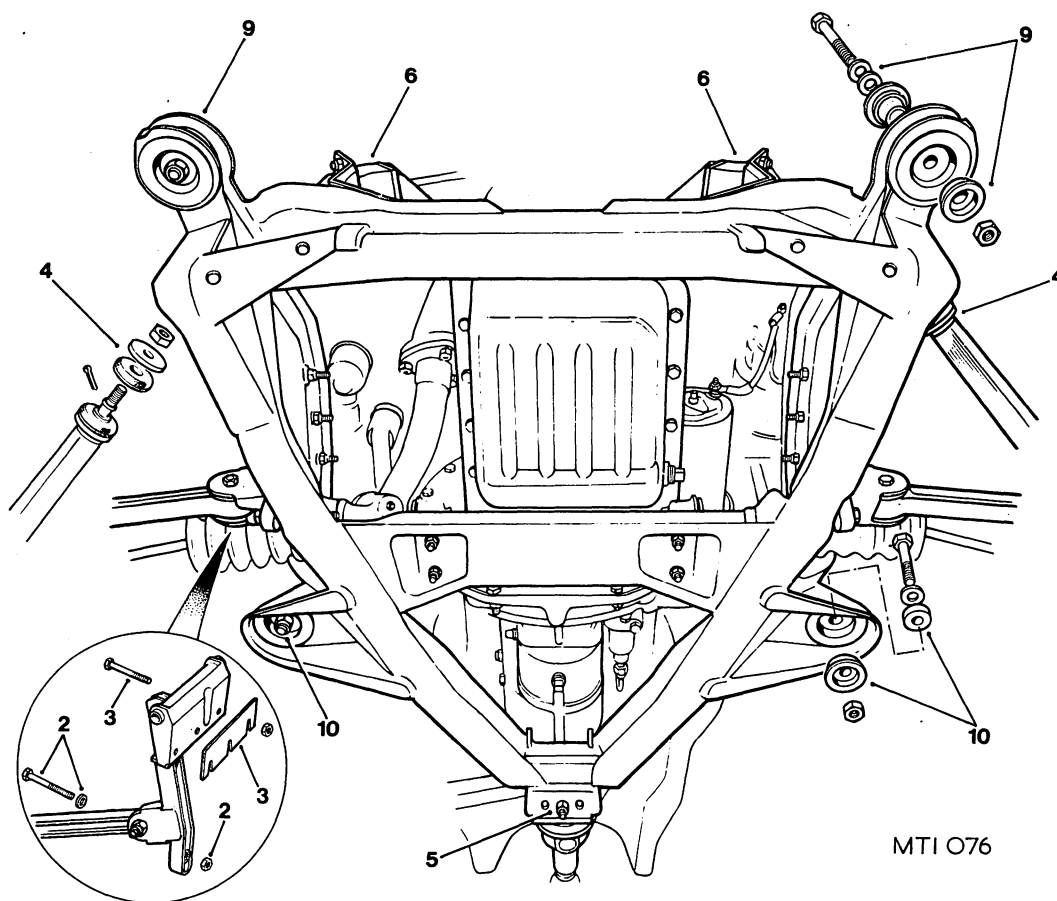
Removing

1. Jack up the front of the vehicle and support the engine.
2. Remove the two nuts, bolts and plain washers from the mounting brackets.
3. Remove the six bolts and two shims from the mounting brackets.
4. Remove the two cotter pins, nuts, dished washers and rubber washers. Disconnect the radius rods from the sub-frame and support the suspension units.

5. Remove the nut and washer from the gearbox mounting rubber.
6. Remove the four nuts and bolts from the engine mounting rubbers.
7. Remove the steering rack. 57.25.01.
8. Support the sub-frame.
9. Remove the two nuts, bolts and plain washers and the four retainers and mounting rubbers.
10. Remove the two nuts, bolts, plain washers and retainers and the four mounting rubbers.
11. Remove the sub-frame.

Refitting

12. Reverse 1 to 11.



BODY

REAR QUARTER TRIM PAD

—Remove and refit

76.13.03

Removing

1. Remove the rear seat cushion. 76.70.37.
2. Remove the rear seat squab. 76.70.38.
3. Prise off the trim pad—12 clips.

Refitting

4. Reverse 1 to 3.

'B' POST TRIM

—Remove and refit

76.13.08

Removing

1. Remove the door draught welts.
2. Remove the safety harness top bolts.
3. Pull the trim pad edges from the body flanges, and detach.

Refitting

4. Reverse 1 to 3, using Dunlop SP758 adhesive on the trim pad and body flanges.

BONNET

—Remove and refit

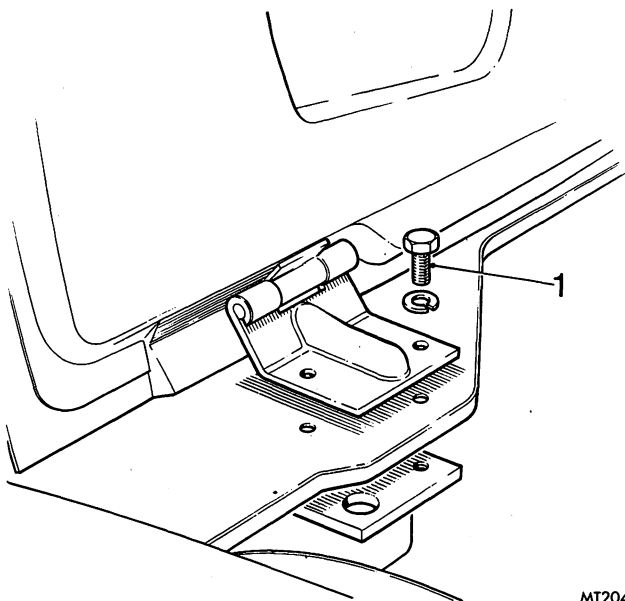
76.16.01

Removing

1. Remove the four bolts, spring washers and two location plates. Lift off the bonnet.

Refitting

2. Reverse 1, ensuring correct alignment.



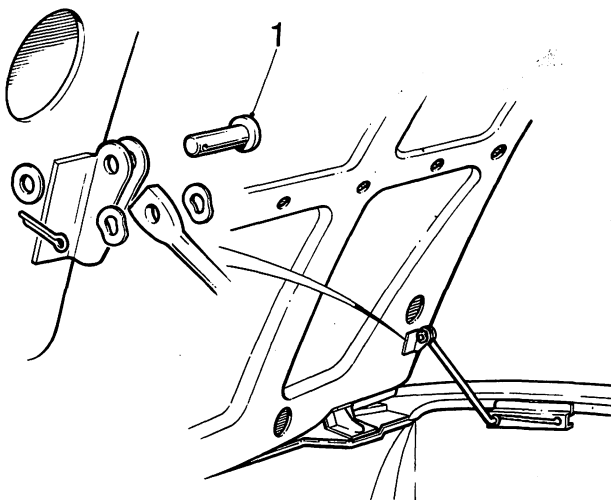
MT2049

BONNET STAY

—Remove and refit

76.16.14

1. Remove the split pin, washers and clevis pin. Detach the bonnet stay. Refit in the reverse order.



MT2050

76.13.03

76.16.14

BONNET LOCK

—Remove and refit

76.16.21

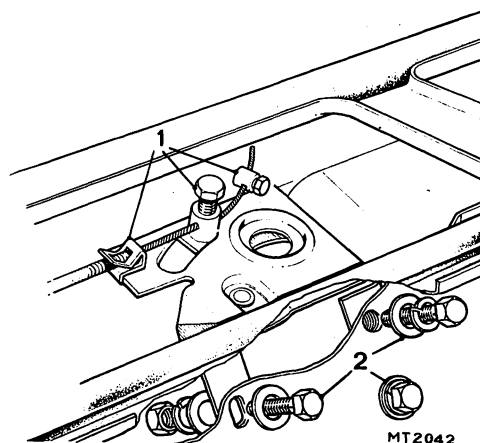
Removing

1. Detach the release cable.
2. Remove the nut, bolts, spring and plain washers, and remove the lock.

NOTE: On L.H.Stg. models, the fan motor must be removed (80.20.15) before the lock can be removed.

Refitting

3. Reverse 1 and 2, ensuring correct positioning of the lock.



BONNET RELEASE CABLE

—Remove and refit

76.16.29

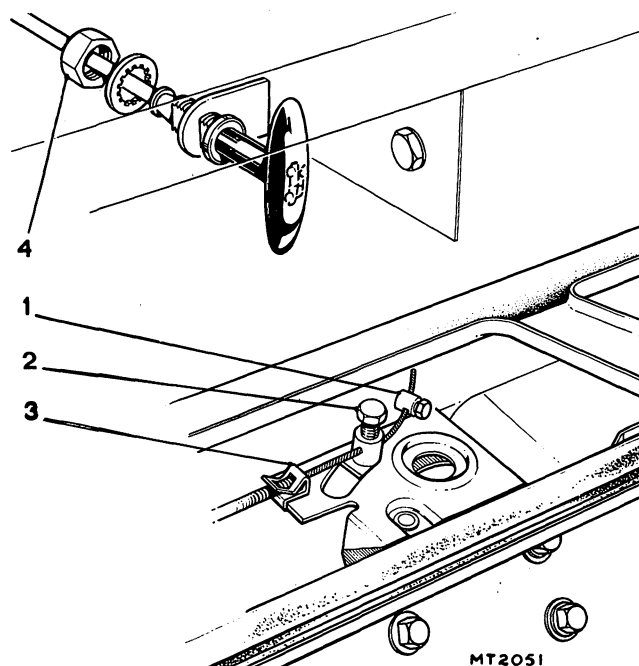
Removing

1. Remove the trunnion.
2. Slacken the pinch-bolt.
3. Pull the cable and clip from the catch plate.
4. Unscrew the nut.
5. Pull the cable out.

CAUTION: Do not close the bonnet with the cable removed or loose.

Refitting

6. Reverse 1 to 5.



BONNET CATCH

—Remove and refit

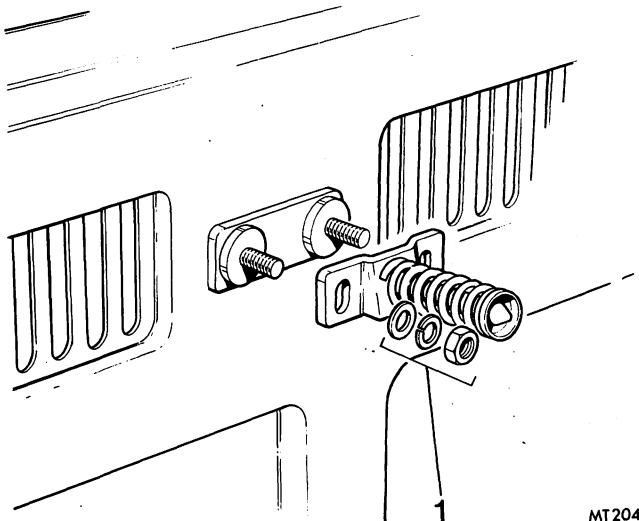
76.16.34

Removing

1. Remove the two nuts, spring washers and plain washers. Remove the catch from the bonnet.

Refitting

2. Reverse 1, ensuring correct alignment of the catch and locking plate aperture.



BODY

LUGGAGE COMPARTMENT LID

—Remove and refit

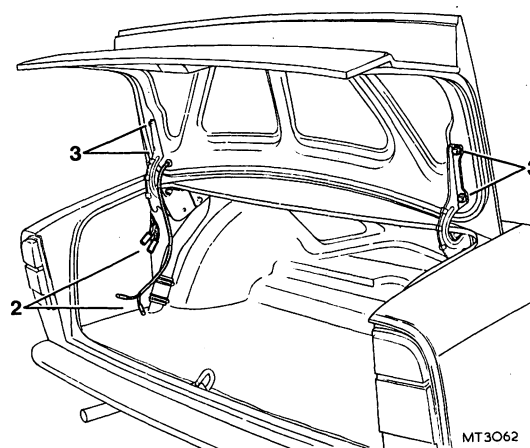
76.19.01

Removing

1. Disconnect the battery.
2. Disconnect the two number-plate lamp cables.
3. Remove the four bolts, spring washers and plain washers, and lift off the lid.

Refitting

4. Reverse 1 to 3, ensuring correct alignment.



LUGGAGE COMPARTMENT LID SEAL

—Remove and refit

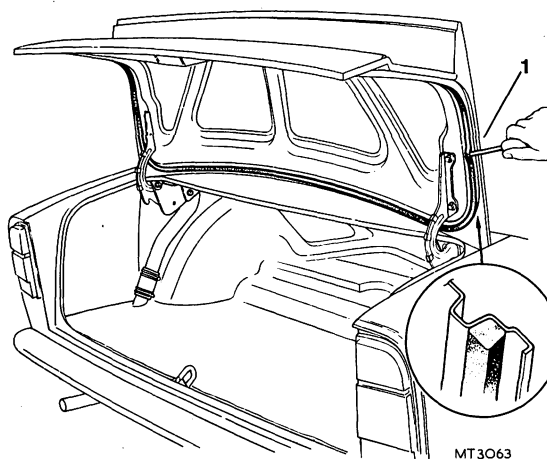
76.19.06

Removing

1. Free the seal from the trunk lid, using a suitably blunt tool if necessary.

Refitting

2. Fit the seal, using Dunlop 758.



LUGGAGE COMPARTMENT LID HINGES

—Remove and refit

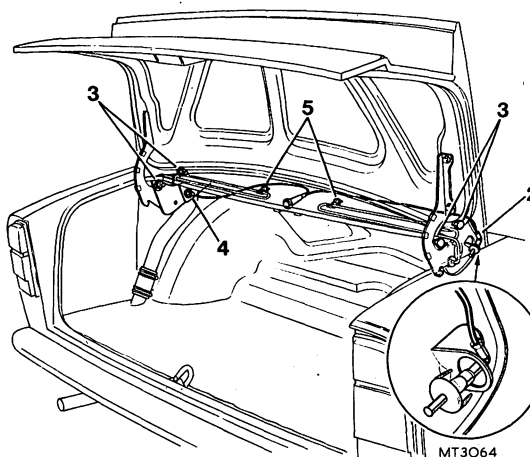
76.19.07

Removing

1. Remove the lid. 76.19.01.
2. Disconnect the lead from the switch, and pull it clear of the hinge.
3. Remove the four nuts, spring and plain washers.
4. Remove one nut, bolt, plain washer and spring washer (L.H. hinge only).
5. Pull the hinges free of the clips.

Refitting

6. Reverse 1 to 5, ensuring correct alignment of the lid.



LUGGAGE COMPARTMENT LOCK

(Wilmot Breeden)

—Remove and refit

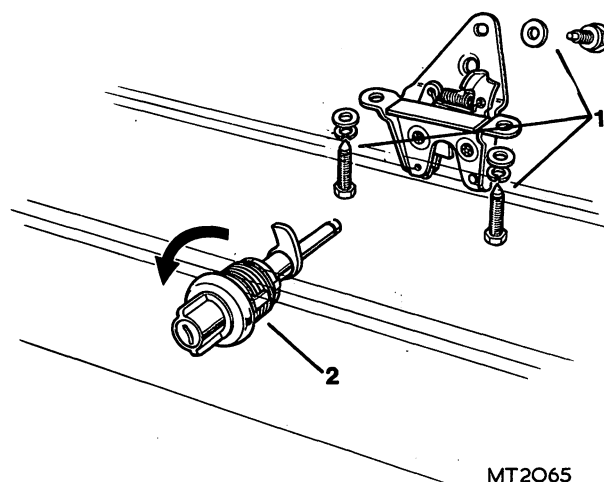
76.19.11

Removing

1. Remove the three bolts, spring washers and plain washers and lift off the latch.
2. Rotate the locking ring through 90 degrees and withdraw the lock assembly and sealing ring.

Refitting

3. Reverse 1 and 2.



MT2065

LUGGAGE COMPARTMENT LOCK

(C. E. Marshall)

—Remove and refit

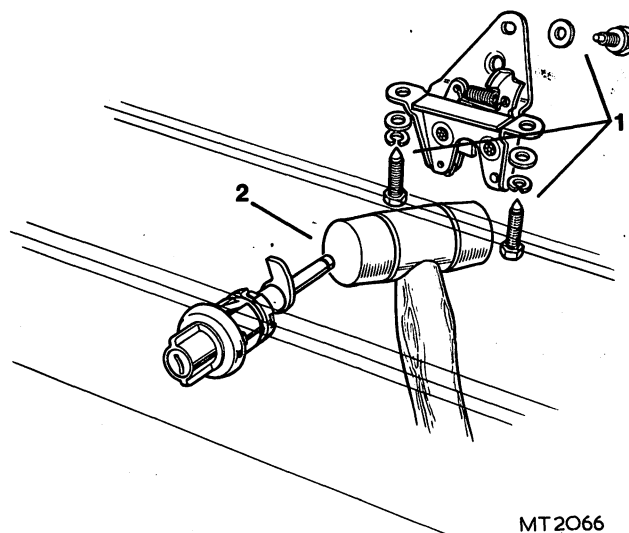
76.19.11

Removing

1. Remove the three bolts, spring washers and plain washers and lift off the latch.
2. Disengage the retaining spring by tapping the spindle lightly with a hide hammer. Withdraw the lock.

Refitting

3. Locate the lock in the lock aperture slots and press firmly to engage the retaining spring.
4. Reverse 1.



MT2066

LUGGAGE COMPARTMENT LOCK STRIKER

—Remove and refit

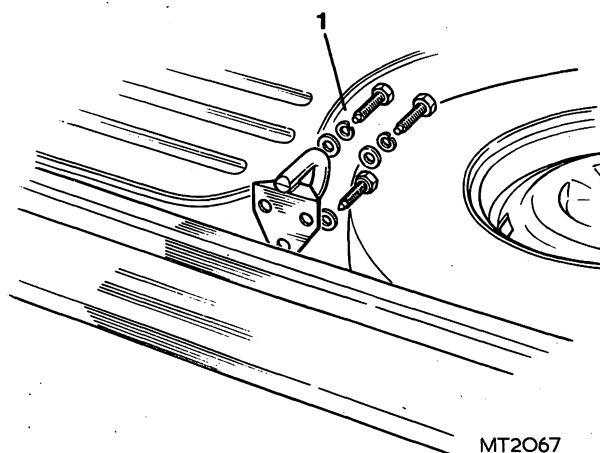
76.19.12

Removing

1. Remove the three bolts, spring washers and plain washers and lift off the striker.

Refitting

2. Reverse 1, ensuring correct alignment of the trunk lid.



MT2067

BODY

BUMPER—FRONT

—Remove and refit

76.22.08

Removing

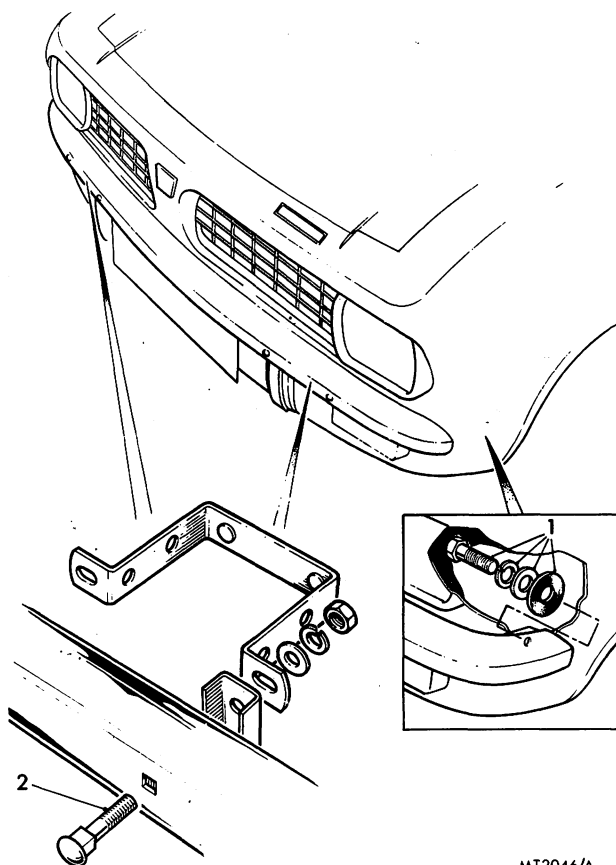
1. Remove the two bolts, spring washers, plain washers and spacers (except earlier 2-door models).
2. Remove the four bolts, nuts, washers and spacers and lift off the bumper.

Refitting

3. Reverse instructions 1 and 2.

**

NOTE: On a limited number of earlier 4 door cars the front and rear bumpers were secured by bolts passing through the body brackets into captive nuts behind the bumper rail.**



MT2046/A

BUMPER—REAR

—Remove and refit

76.22.15

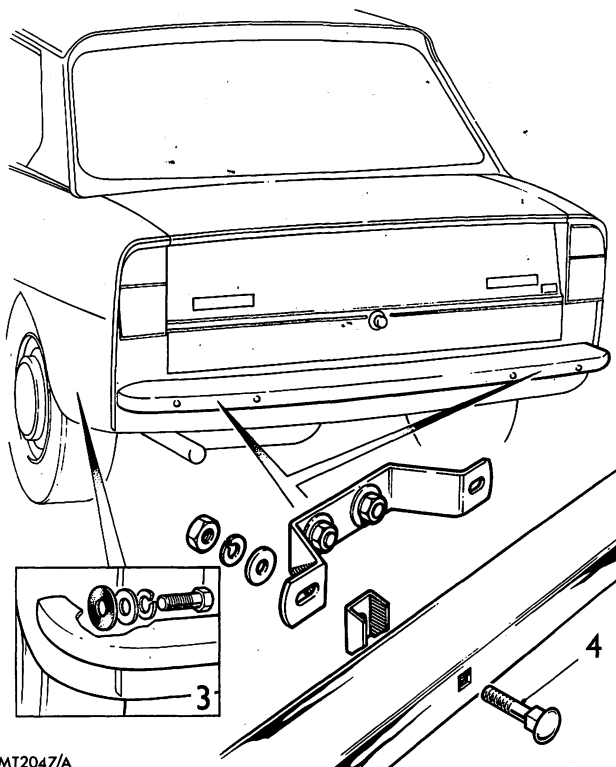
Removing

Earlier 2-door models—Instructions 3 and 4 only.
Other models—Instructions 1 to 4.

1. Remove the luggage compartment side trim pads —4 screws and washers.
2. Remove the fuel tank. 19.55.01.
3. Remove two bolts, spring washers, plain washers and spacers.
4. Remove the four bolts, nuts, washers and spacers and lift off the bumper.

Refitting

5. Reverse instructions 1 to 4.



MT2047/A

76.22.08

76.22.15

GEARBOX TUNNEL COVER

—Remove and refit

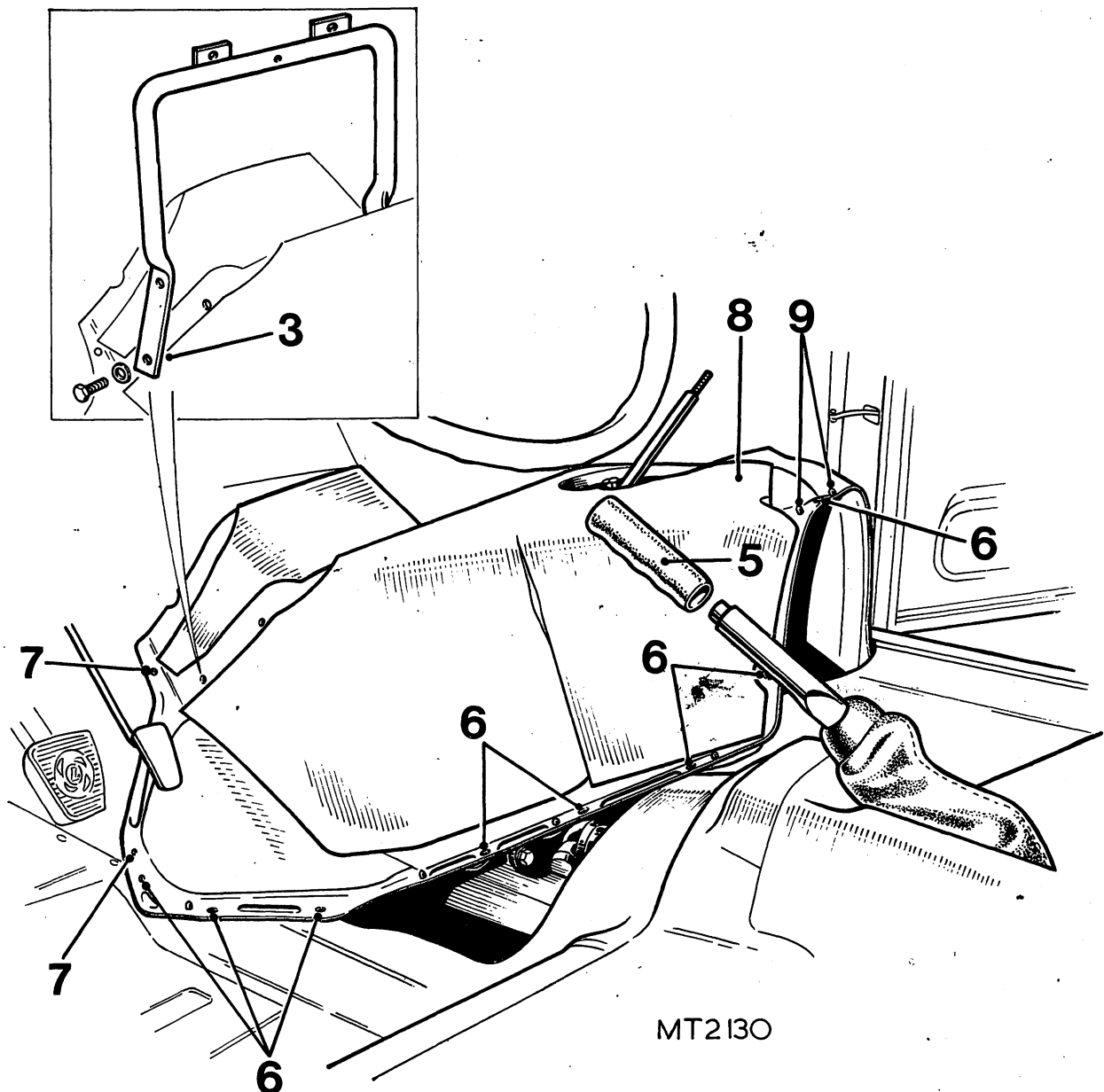
76.25.07

Refitting

9. Reverse 1 to 8. Apply Seelastik to the mating surfaces of seal, tunnel cover and floor. Ensure that the seal retainers are correctly located in the cover.

Removing

1. Remove the front seats. 76.70.04/76.70.05.
2. Remove the parcel shelf. 76.67.01.
3. Remove the reinforcement tube—two bolts and plain washers.
4. Remove the gear lever grommet. 37.16.05.
5. Pull off the hand brake lever grip.
6. Remove the 15 bolts.
7. Remove the four nuts (set screws on earlier cars).
8. Break the seal between the tunnel cover and the floor and carefully lift out the tunnel cover over the gear lever.



MT2130

BODY

DOOR—FRONT

—Remove and refit

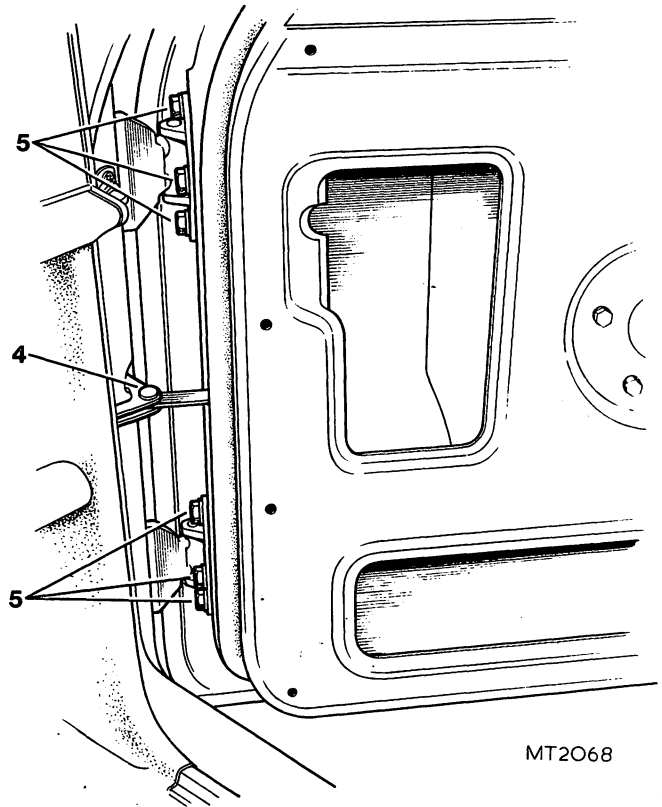
76.28.01

Removing

1. Disconnect the battery.
2. Remove the trim pad. 76.34.01.
3. Remove the water curtain.
4. Drill out the rivet and remove the check strap.
5. Support the door and remove the six bolts and spring washers.

Refitting

6. Reverse 1 to 5. Check the door closing action, and adjust if necessary.



DOOR—REAR

—Remove and refit

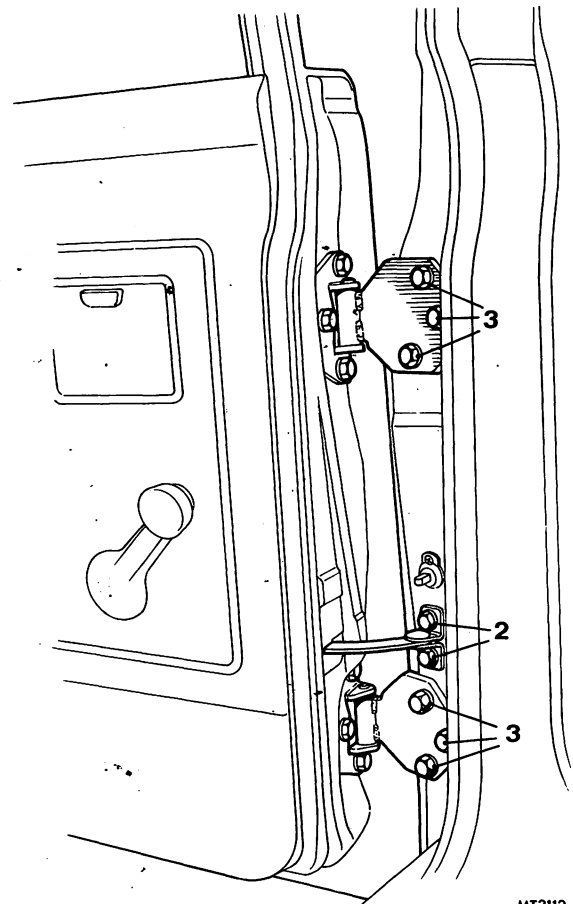
76.28.02

Removing

1. Disconnect the battery.
2. Remove the two bolts and spring washers.
3. Support the door and remove the six bolts and spring washers.

Refitting

4. Reverse 1 to 3. Check the door closing action, and adjust if necessary.



76.28.01

76.28.02

DOOR HINGES—FRONT

—Remove and refit

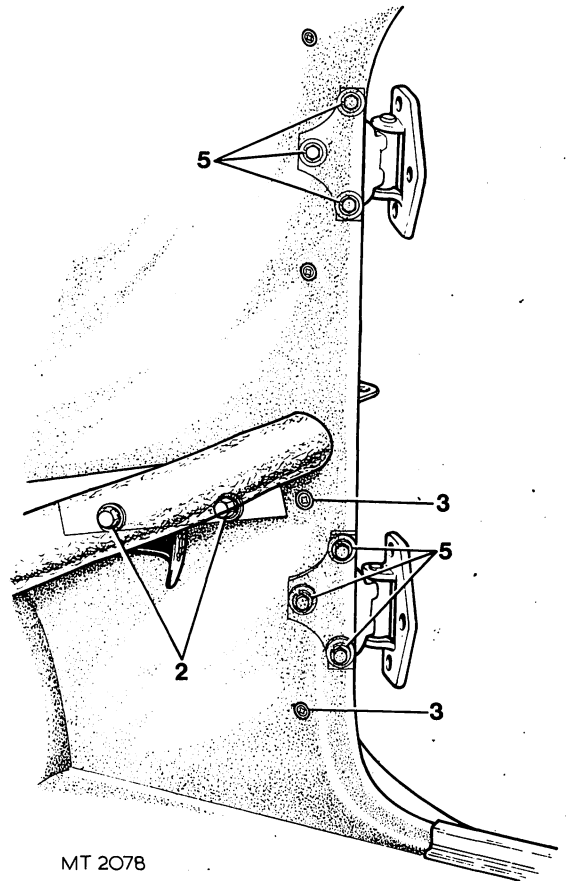
76.28.42

Removing

1. Remove the door. 76.28.01.
2. Remove the two bolts, spring washers and plain washers.
3. Remove the two screws and washers.
4. Ease the parcel shelf slightly upwards and the dash side trim pad slightly outwards to gain access to the lower hinge fixings.
5. Remove the six nuts, spring washers and plain washers. Withdraw the hinges.

Refitting

6. Reverse 1 to 5. Check the door closing action, and adjust if necessary.



MT 2078

DOOR HINGES—REAR (4-door)

—Remove and refit

76.28.43

Removing

1. Remove the door. 76.28.02.
2. Remove the hinges, six bolts and spring washers.

Refitting

3. Reverse 1 and 2.

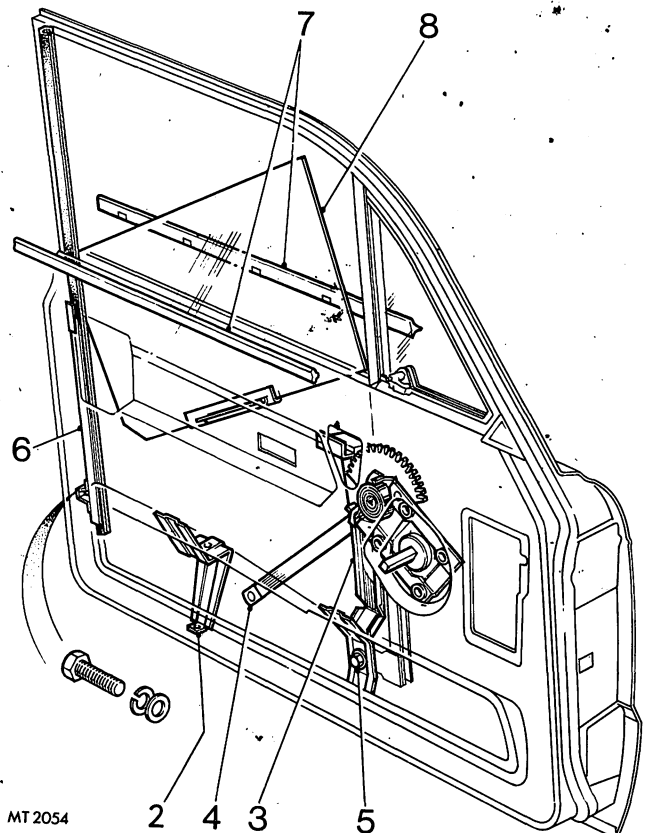
DOOR GLASS—FRONT

—Remove and refit

76.31.01

Removing

1. Remove the trim pad. 76.34.01.
 2. Remove the glass stop—three screws.
 - 3.**Remove the anti-drum stiffener—three screws (earlier models only).**
 4. Wind the glass fully down and detach the regulator arm from the channel.
 5. Remove one bolt and plain washer.
 6. Remove the channel, one bolt, spring washer and plain washer.
 7. Detach the inner and outer door waist seals from the clips.
 8. Turn the glass sideways and lift it clear.
- NOTE:** Avoid scratching the glass on seal clips during removal.



MT 2054

Refitting

9. Reverse 1 to 8.



BODY

DOOR GLASS—REAR (4-door)

—Remove and refit

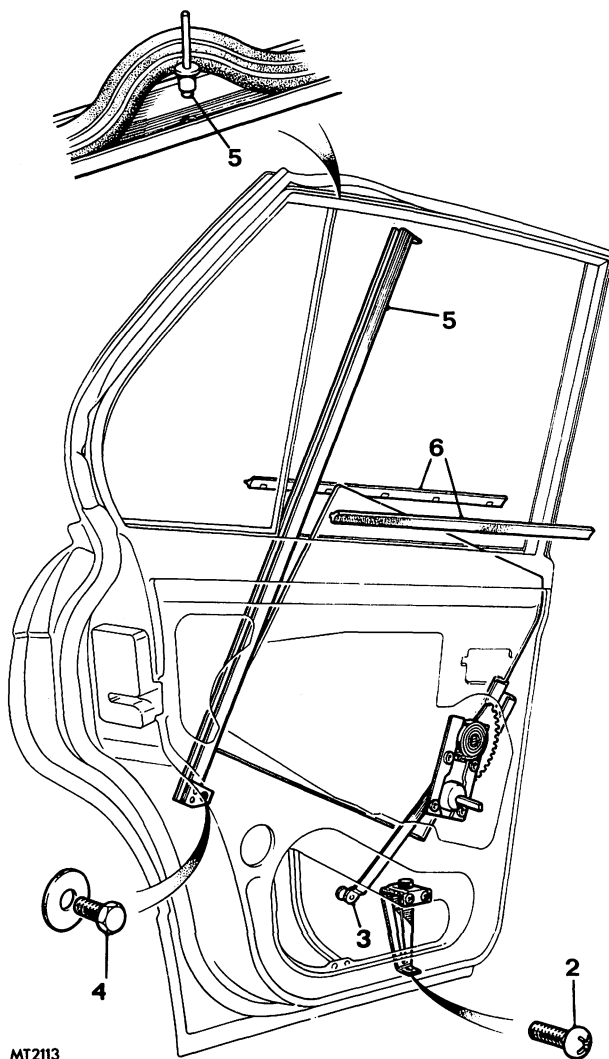
76.31.02

Removing

1. Remove the trim pad. 76.34.04.
 - 2.** Remove the glass stop—three screws (earlier models only).**
 3. Wind the glass fully down and detach the regulator arm from the channel.
 4. Remove one bolt and plain washer.
 5. Drill out the rivet and pull the channel away from the quarter-light glass.
 6. Detach the inner and outer door waist seals from the clips.
 7. Turn the glass sideways and lift it clear.
- NOTE:** Avoid scratching the glass on the seal clips during removal.

Refitting

8. Reverse 1 to 7.



QUARTER VENT—FRONT DOOR

—Remove and refit

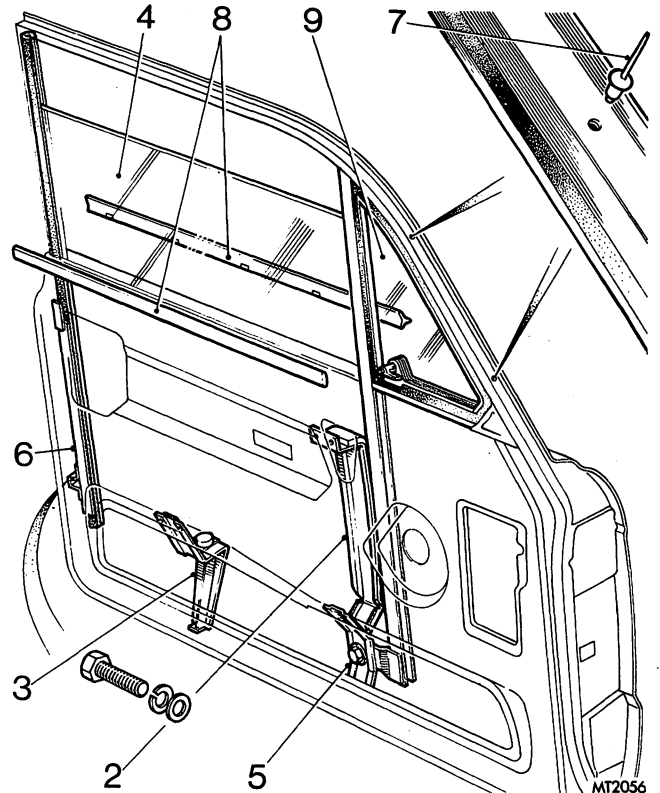
76.31.28

Removing

1. Remove the trim pad. 76.34.01.
2. Remove the anti-drum stiffener—three screws.
- 3.** Remove the glass stop—three screws (earlier models only). **
4. Wind the glass fully down.
5. Remove one bolt and plain washer.
6. Remove the channel—one bolt, spring washer and plain washer.
7. Pull away the weatherstrip to expose the two rivets. Drill out the rivets.
8. Detach the inner and outer door waist seals from the clips.
9. Lift out the vent assembly.

Refitting

10. Reverse 1 to 9.



QUARTER-LIGHT—REAR (4-door)

—Remove and refit

76.31.31

Removing

1. Follow instructions 1 to 6, operation 76.31.02.
2. Break the weatherstrip seal, using a suitable blunt tool.
3. Pull the glass out of the door frame.

Refitting

4. Reverse 1 to 3, using a new weatherstrip if necessary, and applying Seelastik to the mating surfaces before fitting.

REGULATOR—DOOR GLASS

—Remove and refit—front
—rear

76.31.45

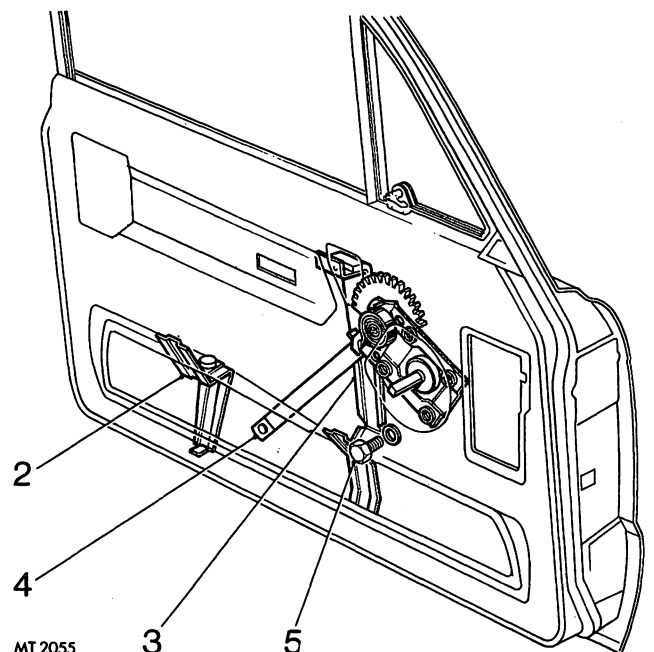
76.31.46

Removing

1. Remove the trim pad. 76.34.01.
- 2.** Remove the glass stop—three screws (earlier models only). **
3. Remove the anti-drum stiffener—three screws.
4. Wind the glass fully down and detach the regulator arm.
5. Remove the four bolts and plain washers. Withdraw the regulator.

Refitting

6. Reverse 1 to 5.



BODY

DOOR TRIM PAD

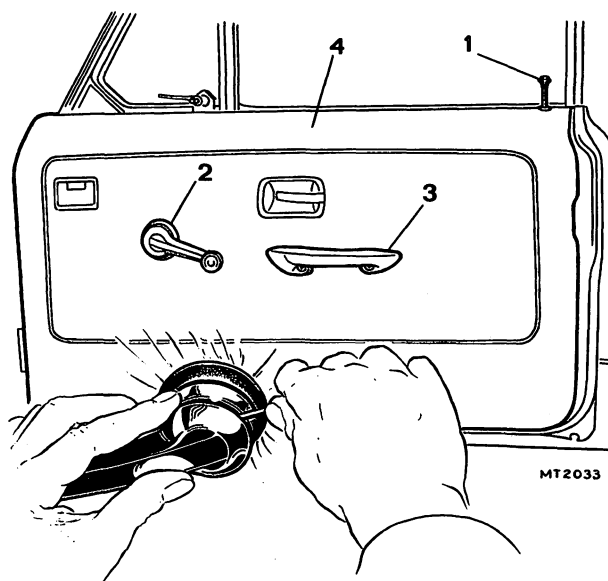
- Remove and refit—front 76.34.01
—rear 76.34.04

Removing

1. Unscrew and remove the plunger knob.
2. Depress the bezel and press out the pin. Remove the handle and bezel.
3. Remove the arm-rest. 76.34.23.
4. Prise off the trim pad—16 clips.

Refitting

5. Reverse 1 to 4.



ARM-REST

- Remove and refit 76.34.23

1. Remove the two screws, spring washers and plain washers and remove the arm-rest.
2. Refit in reverse order.

DOOR LOCK

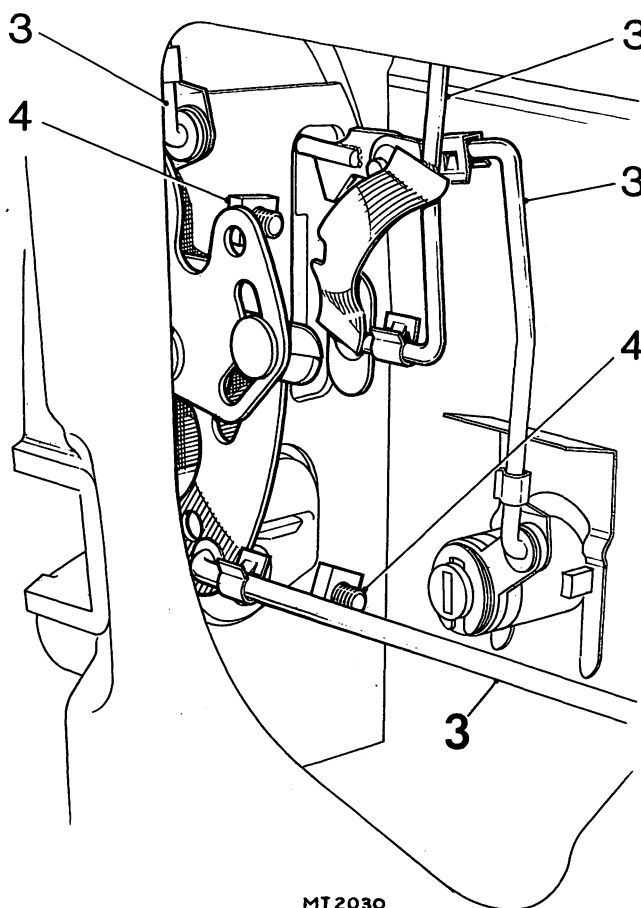
- Remove and refit—front 76.37.12
—rear 76.37.13

Removing

1. Remove the trim pad. 76.34.01/76.34.04
2. Remove the water curtain.
3. Release the linkages.
4. Remove the four screws and pull the lock clear.

Refitting

5. Reverse 1 to 4.



DOOR LOCK STRIKER

- Remove and refit—front 76.37.23
—rear 76.37.24

Removing

1. Remove the two screws and lift off the striker.

Refitting

2. Reverse 1, adjusting if necessary to ensure correct door locking action.

76.34.01

76.37.24

REMOTE CONTROL—FRONT DOOR LOCK

—Remove and refit

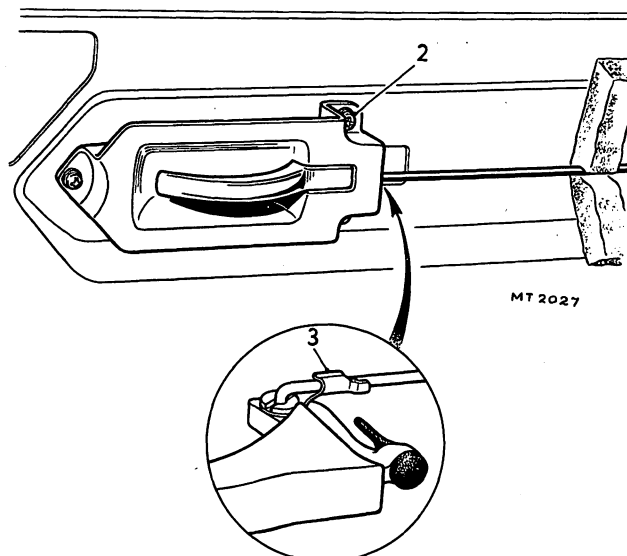
76.37.31

Removing

1. Remove the trim pad. 76.34.01.
2. Remove the three screws, spring washers and plain washers and remove the handle.
3. Detach the clip from the control rod.

Refitting

4. Reverse 1 to 3.



PRIVATE LOCK—FRONT DOOR

—Remove and refit

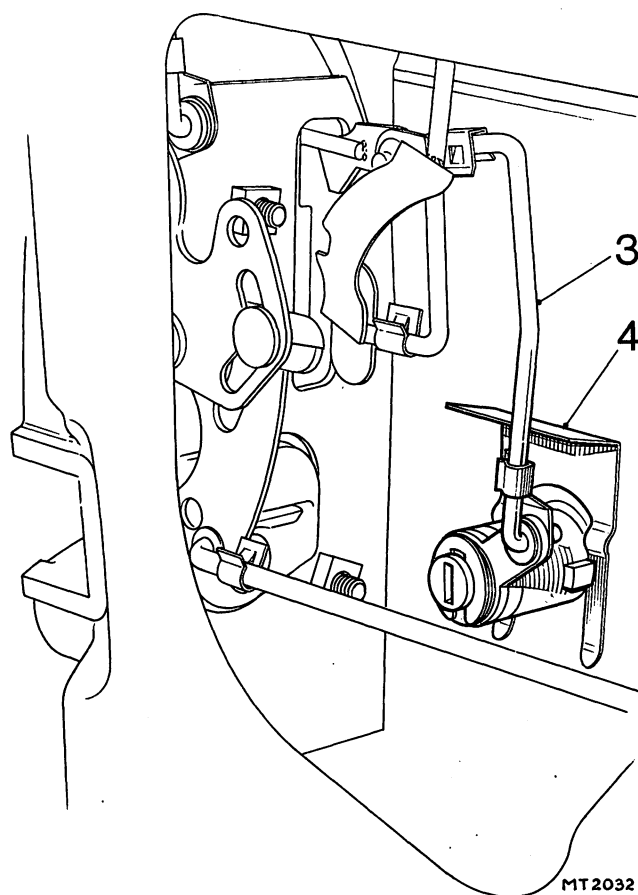
76.37.39

Removing

1. Remove the trim pad. 76.34.01.
2. Remove the water curtain.
3. Release the linkage.
4. Remove the clip.
5. Push the lock out.

Refitting

6. Reverse 1 to 5.



DOOR SEAL

—Remove and refit—front
—rear

76.40.01

76.40.02

1. Pull the seal from the door, using a suitable blunt tool.
2. Ensure correct location in the channel when refitting.

76.37.31

76.40.02



BODY

DOOR CHECK STRAP—FRONT

—Remove and refit

76.40.27

1. Follow operations 1 to 4, operation 76.28.01.
2. Refit in reverse order.

DOOR CHECK STRAP—REAR (4-door)

—Remove and refit

76.40.27

Removing

1. Disconnect the battery.
2. Remove the trim pad. 76.34.04.
3. Drill out the rivet.
4. Remove the check strap.

Refitting

5. Reverse instructions 1 to 4.

EXTERIOR MOULDINGS

—Remove and refit

76.43.06

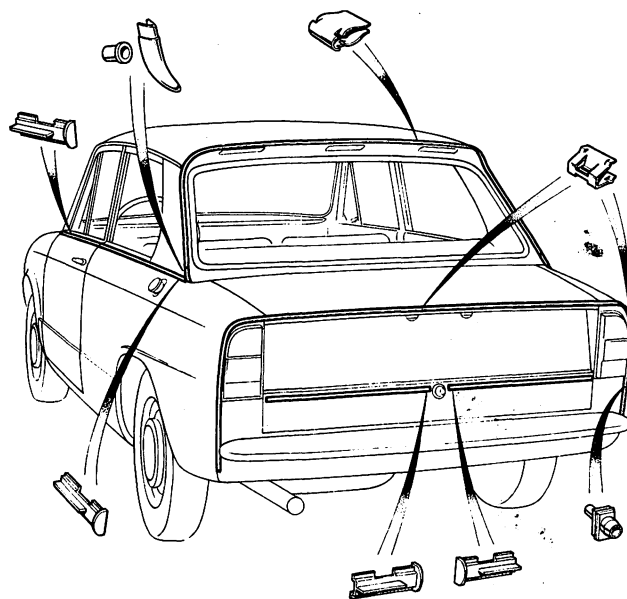
The exterior mouldings, fitted to the doors, rear roof, tonneau and luggage compartment lid, are secured to the body by clips and retainers.

Removing

1. Starting at one end, pull the moulding firmly and progressively away from the panel.

Refitting

2. Renew worn or damaged clips or retainers, if any, and reverse 1.



MT2219

76.40.27

76.43.06

FASCIA

—Remove and refit

76.46.01

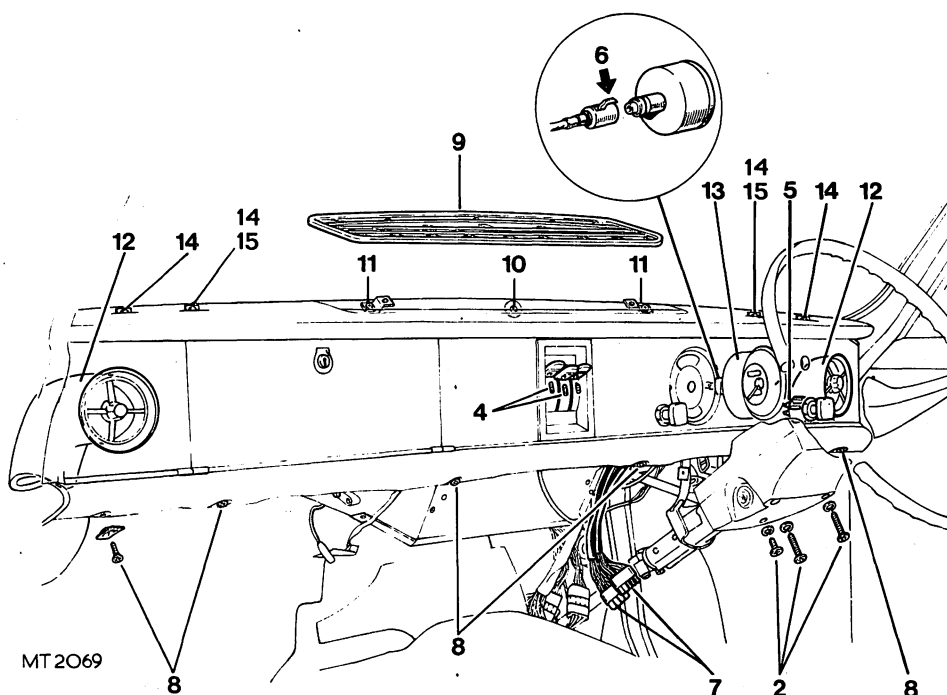
Removing

1. Disconnect the battery.
2. Remove the steering-column nacelles, three screws and spring washers.
3. Remove the choke control cable. 19.20.13.
- 4.**Remove the heater control knobs (on early models a grub screw is used to secure the knob).
5. Disconnect the screen washer tubes from the pump.**
6. Press down the connector button and disengage the speedometer drive.
7. Disconnect the harness plugs.
8. Remove the five screws and fix nuts.
9. Remove the demister grille—six screws.
10. Remove one screw and washer.
11. Remove two brackets, screws and washers.
12. Pull the hoses off the vents.
13. Remove the speedometer. 88.30.01.
14. Remove the four nuts, plain washers and spring washers.
15. Lift the two centre studs and pull the fascia clear.

Refitting

16. Reverse 1 to 15.

NOTE: Care must be taken to ensure that the flasher unit leads cannot be trapped by the wiper linkage.



BODY

FASCIA SUPPORT RAIL

—Remove and refit

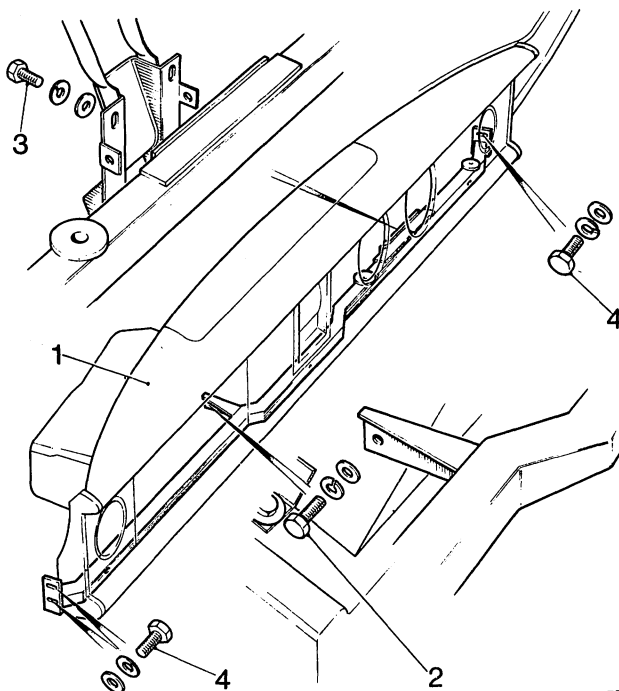
76.46.06

Removing

1. Remove the fascia. 76.46.01.
2. Remove one bolt, spring washer and plain washer.
3. Remove two bolts, spring washers and plain washers.
4. Remove four bolts, spring washers and plain washers. Remove the support rail.

Refitting

5. Reverse 1 to 4.



MT3052

CARPET—GEARBOX COVER

—Remove and refit

76.49.01

1. Remove the gear lever knob and locknut.
2. Remove the carpet.
3. Refit in reverse order.

CARPET—REAR

—Remove and refit

76.49.03

Removing

1. Remove the front seats. 76.70.04/05.
2. Remove the front seat belts buckle unit. 76.73.05.
3. Disconnect the four fasteners at the front and lift the carpet clear of the hand brake lever.

Refitting

4. Reverse 1 to 3.

76.46.06

76.49.03

GLOVEBOX LID ASSEMBLY

—Remove and refit

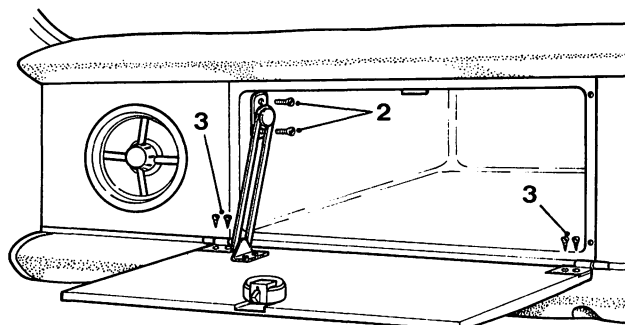
76.52.02

Removing

1. Disconnect the battery.
2. Remove the two screws securing the check link to the fascia.
3. Support the lid and remove the four screws. Remove the lid.

Refitting

4. Reverse 1 to 3.



MT2039

GLOVEBOX LOCK

—Remove and refit

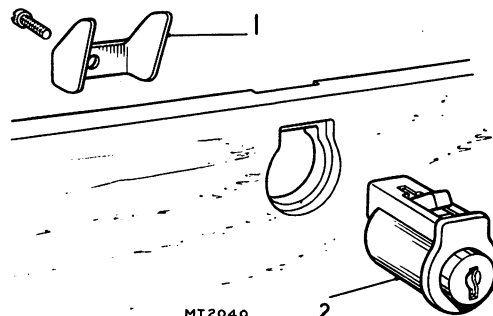
76.52.08

Removing

1. Remove the retainer bracket, one screw and washer.
2. Withdraw the lock.

Refitting

3. Reverse 1 and 2.



MT2040

FRONT GRILLE

—Remove and refit

76.55.03

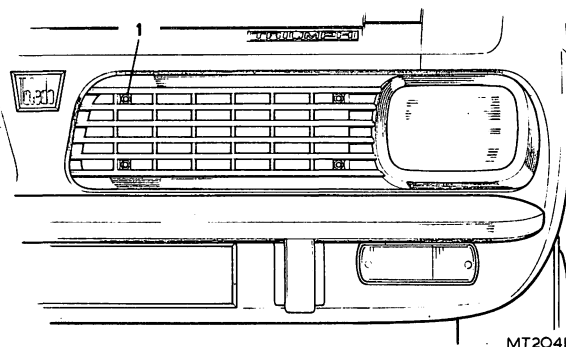
Removing

1. Remove the four nuts, bolts and plain washers.
 (On later models the four nuts and studs are replaced by nylon fix nuts and self tapping screws).
2. Withdraw the grille and rim.

NOTE: A separate grille and rim are fitted on early models. The grille is additionally secured by two rivets which must be drilled out.

Refitting

3. Reverse 1 to 2.



MT2041



BODY

DOOR HANDLE

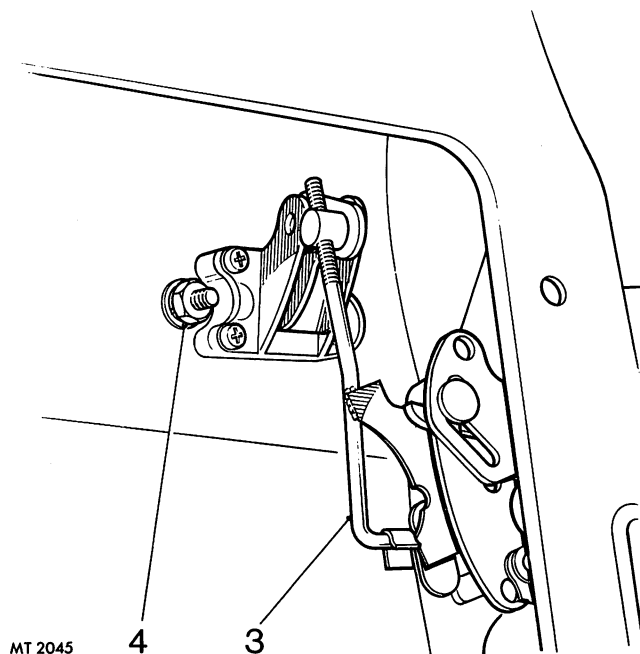
- Remove and refit—front **76.58.01**
—rear **76.58.02**

Removing

1. Remove the trim pad. 76.34.01/76.34.04
2. Remove the water curtain.
3. Release the linkage from the lock.
4. Remove the two nuts, spring washers and plain washers, and remove the handle.

Refitting

5. Reverse 1 to 4.



DOOR PUSH-BUTTON

- Remove and refit **76.58.12**

Removing

1. Remove the door handle. 76.58.01/76.58.02.
2. Remove the two nuts and detach the push-button.

Refitting

3. Reverse 1 and 2.

HEADLINING

—Remove and refit

76.64.01

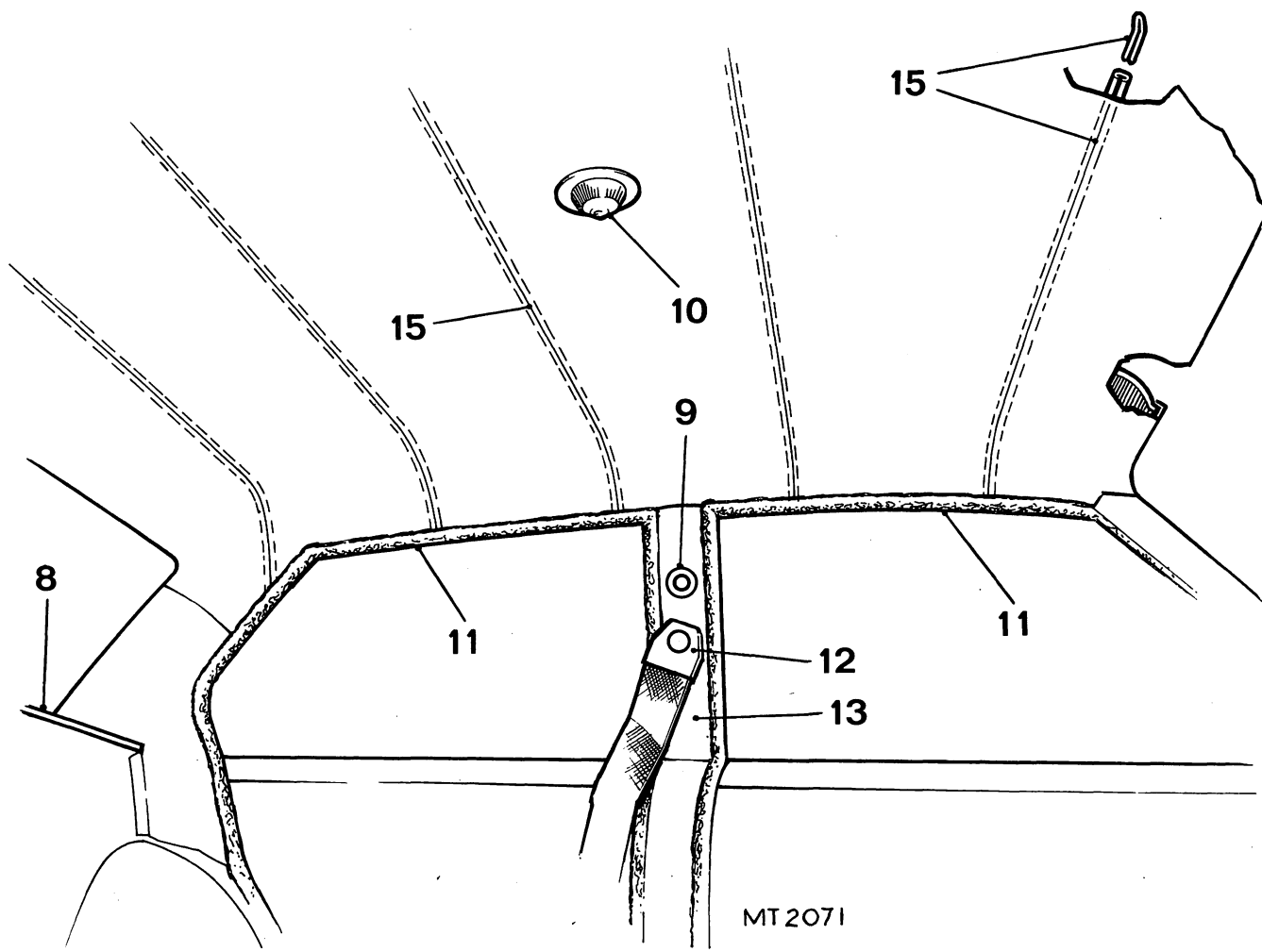
Removing

1. Disconnect the battery.
2. Remove the windscreen. 76.81.01.
3. Remove the back-light. 76.81.10.
4. Remove the quarter-lights. 76.81.20 (2-door only).
5. Remove the mirror and visors.
6. Remove the rear seat cushion. 76.70.37.
7. Remove the rear seat squab. 76.70.38.
8. Remove the rear parcel shelf. 76.67.06.
9. Remove the coat hangers.
10. Remove the roof lamp. 86.45.02.

11. Remove the door draught welts.
12. Remove the safety harness top bolts.
13. Remove the 'B' post trims. 76.13.08.
14. Pull the lining edges away from the body flanges.
15. Detach the listing rails and remove the headlining.

Refitting

16. Apply a two-inch border of Dunlop SP758 adhesive to the headlining, around the roof light aperture and on the body flanges. Allow 10 minutes for the adhesive to become tacky.
 17. Reverse 1 to 15, cutting off any excess material.
- NOTE:** The listing rails are colour-coded and must be fitted in the following order from front to rear: Green, White, Brown, Orange, Purple.



BODY

PARCEL SHELF—FRONT

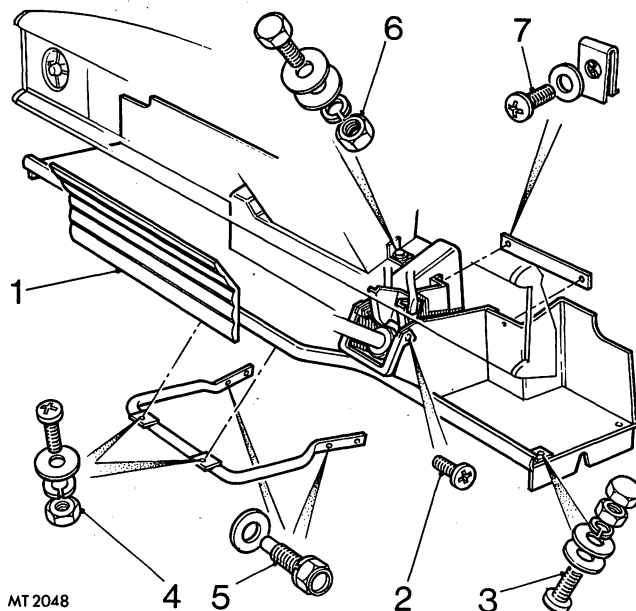
—Remove and refit

76.67.01

CAUTION: Ensure that the air distribution lever is in the 'OFF' position before removing or refitting the parcel shelf.

Removing

1. Prise off the trim board—four clips.
2. Remove the finisher—three screws.
3. Remove the four screws, nuts, cap nuts, lock washers and eight plain washers.
4. Remove the two screws, washers and nuts.
5. Remove the two bolts and washers.
6. Remove the two bolts, nuts and washers.
7. Remove the strap, two screws and washers.
8. Pull the parcel shelf clear.



Refitting

9. Reverse 1 to 8.

PARCEL SHELF—REAR

—Remove and refit

76.67.06

1. From inside the luggage compartment, remove the four screws and plain washers securing the underside of the shelf to the squab support.
2. Lift out the shelf.
3. Refit in reverse order.

ASHTRAY

—Remove and refit—front

76.67.13

—rear

76.67.14

Removing

1. Remove the trim pad. 76.13.03/76.34.01/76.34.04.
2. Pull out the ashtray bowl.
3. Remove the retainer—two screws.

Refitting

4. Reverse 1 to 3.

76.67.01

76.67.14

FRONT SEAT CUSHION COVER

—Remove and refit

76.70.02

Removing

1. Remove the seat(s). 76.70.04/76.70.05.
2. Remove the seat catch knob (2-door).
3. Remove the escutcheon—2 screws (2-door).
4. Remove the cushion cover—11 clips.

Refitting

5. Reverse 1 to 4.

FRONT SEAT SQUAB COVER

—Remove and refit

76.70.03

Removing

1. Remove the seat(s). 76.70.04/76.70.05.
2. Remove the squab cover—13 clips.

Refitting

3. Reverse 1 and 2.

SEATS—FRONT

—Remove and refit

Driver's seat

76.70.04

Passenger's seat

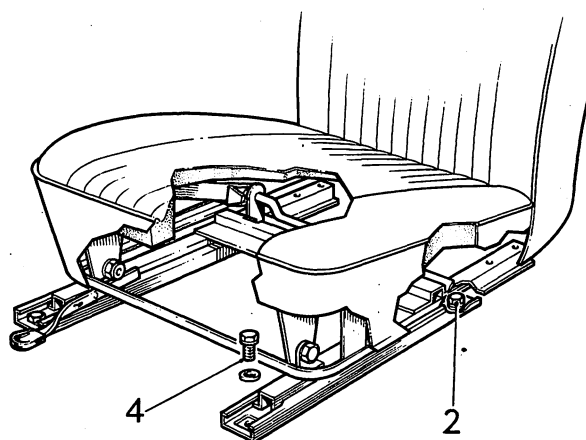
76.70.05

Removing

1. Move the seat fully forward.
2. Remove the two bolts.
3. Move the seat fully rearwards.
4. Remove the two bolts.
5. Lift out the seat complete with runners.

Refitting

6. Ensure that the packing washers are correctly positioned.
7. Reverse 1 to 5.



MT2053



BODY

SEAT RUNNERS

—Remove and refit

76.70.21

1. Remove the seat. 76.70.04/76.70.05.
2. Detach the runners—nuts, bolts, and plain washers.

Refitting

3. Reverse 1 and 2.

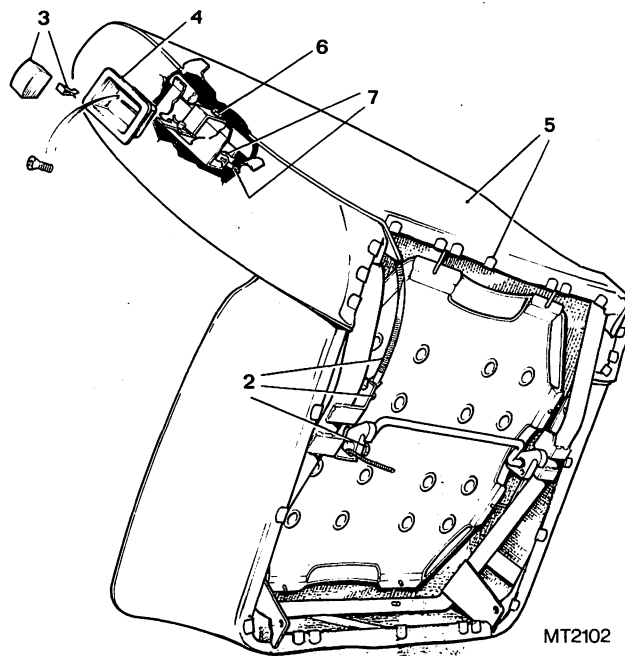
SEAT SQUAB CATCH RELEASE CABLE (2-door)

—Remove and refit

76.70.26

Removing

1. Remove the seat. 76.70.04/76.70.05.
2. Slacken the trunnion screw, pull off the clip and detach the cable.
3. Pull off the knob.
4. Remove the escutcheon—two screws.
5. Remove the squab cover. 76.70.03.
6. Remove one bolt.
7. Pull off the clip, remove the cable and lever assembly.



SEAT CUSHION—REAR

—Remove and refit

76.70.37

SEAT SQUAB—REAR

—Remove and refit

76.70.38

Removing

1. Raise the cushion front clear of the spring clip.
2. Lift out the cushion.
3. Remove the two screws.
4. Lift out the squab.

Refitting

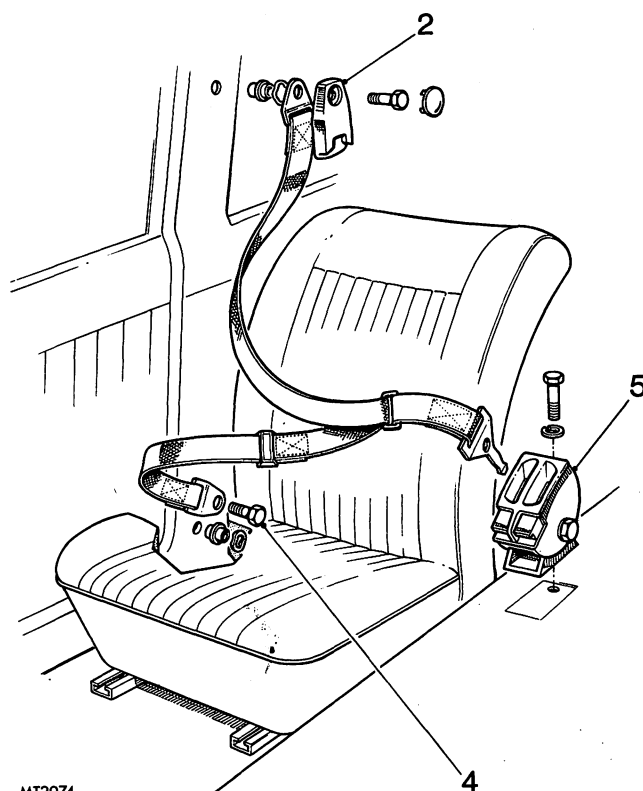
5. Reverse 1 to 4.

SEAT BELT—STATIC—FRONT

—Fitting

76.73.01

1. Remove the blanking plug from the door pillar.
2. Fit the shoulder strap bracket, spacer, wavy-washer, cover, and bolt to door pillar. Fit the cap.
3. Remove the blanking plug from the sill.
4. Fit the lap strap bracket, spacer, wavy washer and bolt to sill.
5. Remove the bolt and spring washer from the tunnel, then refit together with the buckle unit.



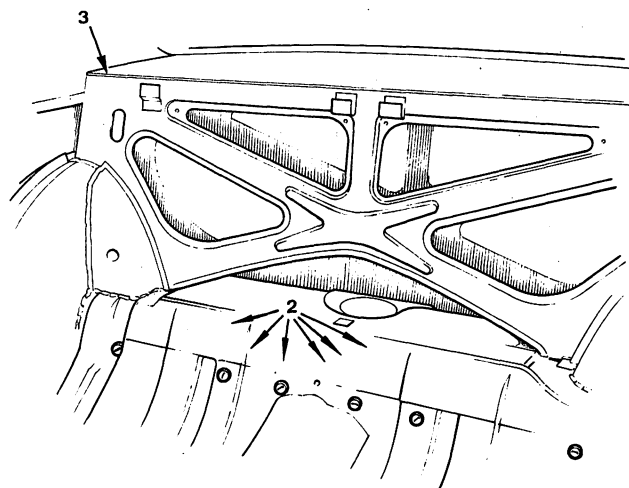
MT2074

SEAT BELT—STATIC—REAR

—Fitting

76.73.17

1. Remove the rear seat cushion. 76.70.37.
2. Remove the plugs.
3. Prise up the rear deck trim panel to reveal the fixing points. Cut through the trim above these points (shoulder strap type belts only).
4. Fit the seat belt in accordance with the manufacturer's instructions.



MT2073



BODY

WINDSCREEN AND BODY GLASSES

—Remove and refit

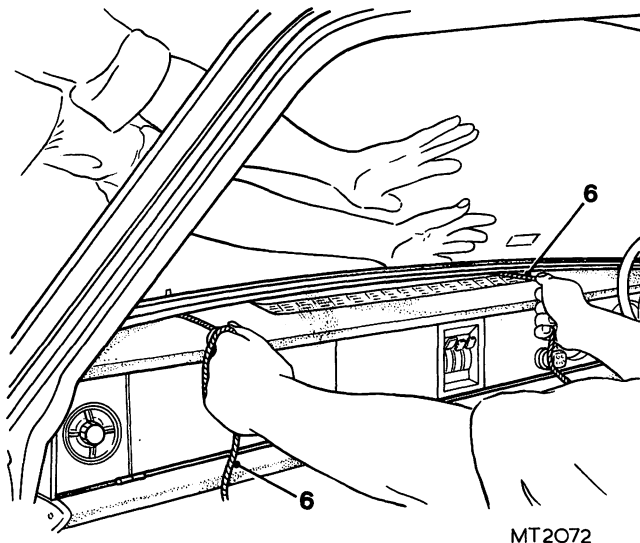
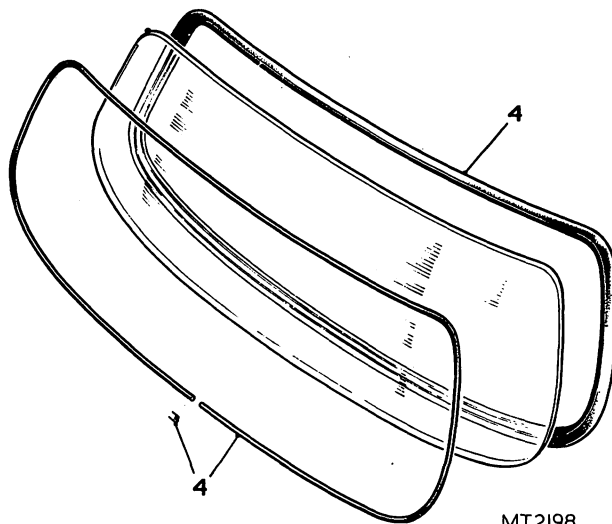
Windscreen 1 to 8	76.81.01
Back-light 2 to 9	76.81.10
Quarter-light 2 to 8	76.81.20

Removing

1. Remove the wiper arms. 84.15.01.
- 2.**a. Break the seal, using a suitably blunt tool.
b. Heated back-light only—disconnect the electrical leads.**
3. Push the glass outwards.
CAUTION: Take care to avoid scratching the glass, which must be steadied by an assistant.
4. Remove the cover and finisher (windscreen only) and weatherstrip, noting positions for refitting.

Refitting

5. Reverse 4, using new weatherstrip if necessary, and applying Seelastik to the glass channel before fitting.
6. Insert a strong cord into the weatherstrip inner channel, allowing the ends to protrude from the lower edge.
7. Have an assistant position the glass centrally in the aperture, and maintain a steady pressure whilst the cord ends are pulled to locate the weatherstrip on the body flange.
8. Seal the outer channel of weatherstrip to the body using Seelastik.
- 9.**Heated back-light only—reconnect the electrical leads.**



HEATING AND VENTILATION OPERATIONS

Air flow control cable—remove and refit	..	..	..	..	..	..	..	80.10.06
Air intake hose—remove and refit	..	..	..	..	..	..	..	80.15.30
Air valve assembly—remove and refit	..	..	..	..	..	..	..	80.10.35
Fan								
—motor—remove and refit	..	..	..	..	..	..	..	80.20.15
—resistor unit—remove and refit	..	..	..	..	..	..	..	80.20.17
—switch—remove and refit	..	..	..	..	..	..	..	80.10.22
Heater unit								
—control assembly—remove and refit	..	..	..	..	..	..	..	80.10.02
—fan switch—remove and refit	..	..	..	..	..	..	..	80.10.22
—remove and refit	..	..	..	..	..	..	..	80.20.01
—water valve—remove and refit	..	..	..	..	..	..	..	80.10.16
Heating and ventilation—description	..	..	..	..	..	..	..	80.00.00
Pipe—water pump to heater hose—remove and refit	..	..	..	..	..	..	..	80.25.16
Swivelling cold air vent								
—L.H.—remove and refit	..	..	..	..	..	..	..	80.15.22
—R.H.—remove and refit	..	..	..	..	..	..	..	80.15.23
Water hose								
—engine to heater—remove and refit	..	..	..	..	..	..	..	80.25.07
—engine to water valve	..	..	..	..	..	..	..	80.25.10

HEATING AND VENTILATING SYSTEM 80.00.00

The heater unit comprises a water-heated element 'E' mounted inside a distribution box 'D' having two flap valves which are independently connected to three levers on the fascia. One inlet 'A' and two outlet apertures 'C' and 'G' are formed in the distribution box.

Fresh air flowing into the plenum chamber via an air intake at the base of the screen passes through the blower rotor into the distribution box from where it is directed, by manipulating the levers, either through top aperture 'C' to the screen, through bottom aperture 'G' to the car interior, or through both at the same time. The right-hand lever operates the top flap 'B' which, when moved to its 'hot' position, directs all incoming air through the heating element. As the lever is moved down the quadrant, the flap gradually closes, giving a progressively varying mixture of hot and cold air. Further movement of the lever to the 'cold' position closes the water valve so that the heater is no longer effective.

Cold air ventilation

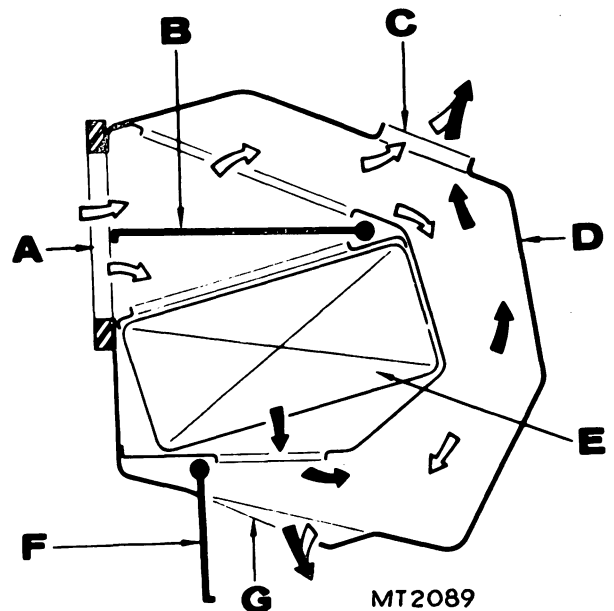
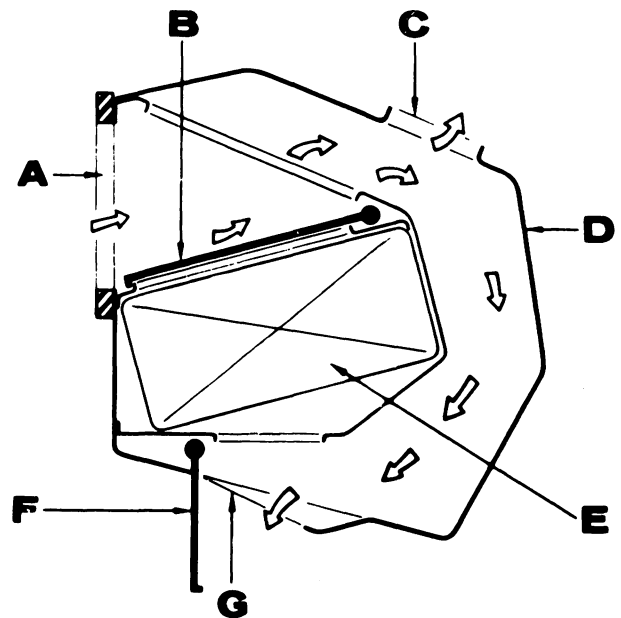
Move the right-hand lever to the 'cold' position and set the left-hand lever to 'screen' or 'screen and car' as required. Place the central lever in its midway position. Further movement of the lever will operate the blower to provide greater air flow if needed.

Warm air ventilation

Move the right-hand lever to the position required. Position the left-hand lever to 'screen and car'. Move the central lever to its midway position and, if necessary, switch on the blower by moving the lever to either the low- or fast-speed position.

The left-hand lever operates the bottom flap 'F' which, when moved to its 'off' position, directs all air to the screen. Downward movement of the lever causes air to be distributed progressively to both the screen and the car interior.

The central lever operates a valve in the blower which controls the flow of air through inlet 'A'. When the lever is in the 'off' position the passage of air to the heater is cut off. Downward movement of the lever operates the two-stage blower to give high- or low-speed air flow as required.

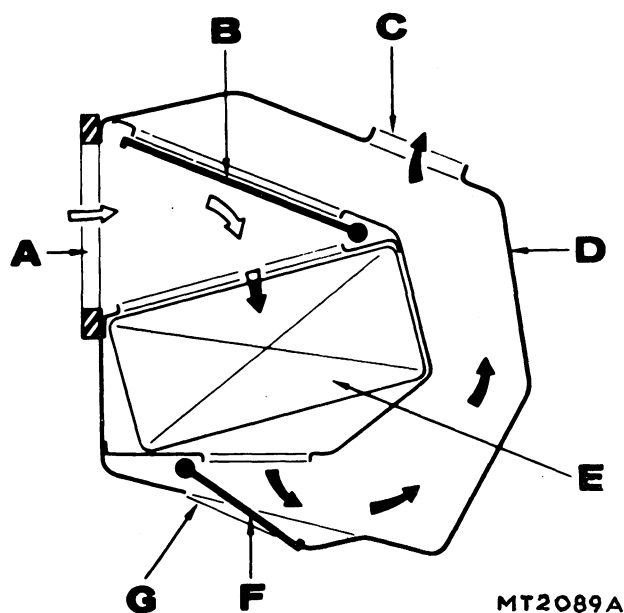


HEATING AND VENTILATION

Windscreen defrosting

Move the right-hand lever to 'hot', the left-hand lever to 'screen', and the central lever to its midway position.

NOTE: Any desired combination of temperature and distribution may be obtained by suitable manipulation of the controls.



Ventilation

Air entering the car through the heater or fresh-air vents passes down the inside of the back-light, through the slots in the grille below the rear parcel shelf trim panel, into the luggage compartment. From there it passes up through the side tonneau panels into the roof and out through the louvres over the back-light. Flap valves are located in the louvres, preventing air entering the car but allowing stale air to flow out.

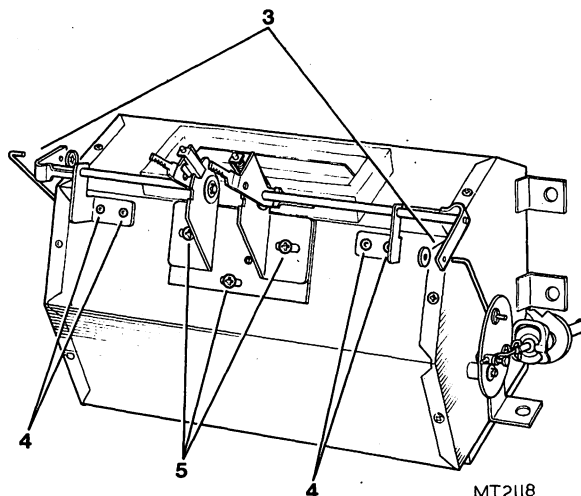
CONTROL ASSEMBLY

—Remove and refit

80.10.02

Removing

1. Remove the fascia. 76.46.01.
2. Follow instructions 3 to 5 inclusive, operation 80.10.22.
3. Detach the control rods.
4. Drill out the four rivets.
5. Remove the three screws and lift off the distribution and temperature switch assemblies.



Refitting

6. Reverse 1 to 5.

HEATER AIR FLOW CONTROL CABLE

—Remove and refit

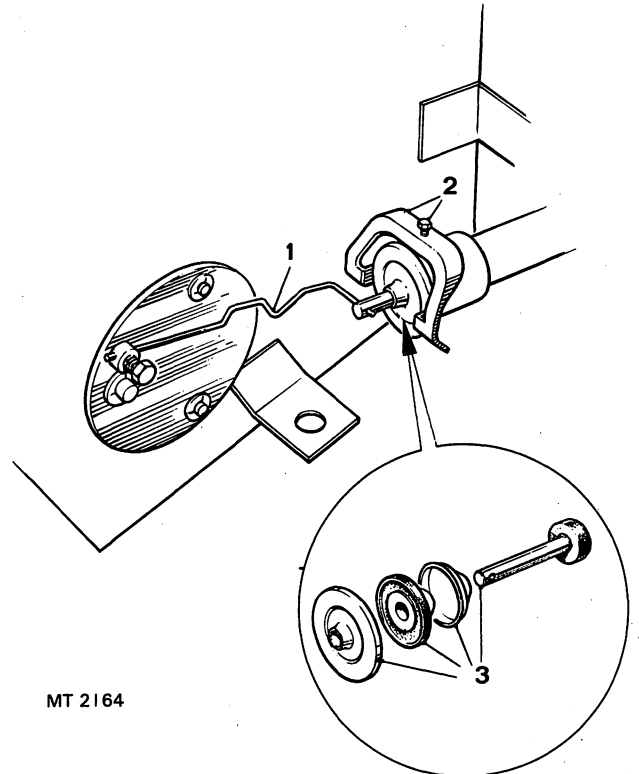
80.10.06

Removing

1. Slacken the trunnion on the blower flap lever and detach the cable.
2. Detach the inner cable from the fan switch and pull the cable assembly clear.

Refitting

3. Reverse instructions 1 and 2, ensuring that the fan switch is in the 'OFF' position and the blower flap lever positioned fully to the left (R.H. Stg.) or right (L.H. Stg.) before refitting.



MT 2164

HEATER WATER VALVE

—Remove and refit

80.10.16

Removing

1. Detach the control rod.
2. Slacken the screw and remove the retainer.
3. Withdraw the valve assembly.

Refitting

4. Reverse 1 to 3, ensuring that the control rod is positioned to allow free movement of the valve.

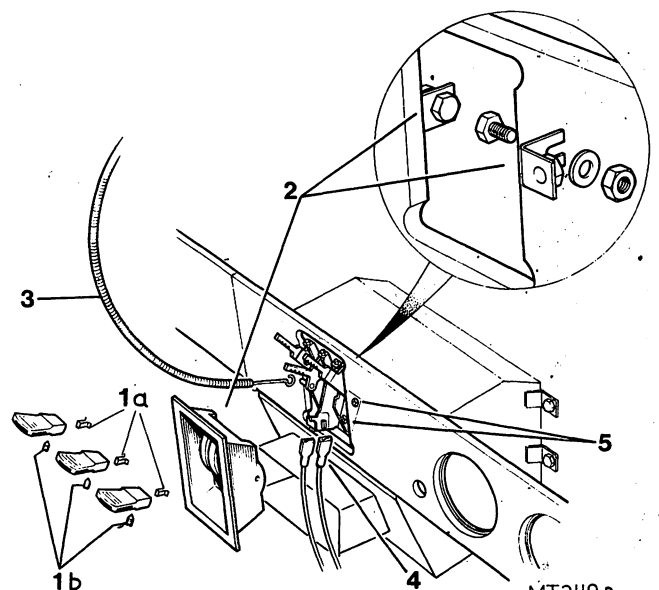
FAN SWITCH

—Remove and refit

80.10.22

Removing

- 1a.**Later models—Where the heater control knobs are secured by clips, pull off the knobs.
- or
- 1b. Earlier models—Remove the three grub screws and pull off the heater control knobs.**
- 2.**Remove the escutcheon, two nuts, bolts and plain washers as illustrated (Up to Body Nos. 14152 DM/3726 DH) or four clips (after these Body Nos.).
3. Disconnect the control cable.
4. Disconnect the two leads.
5. Remove the switch—two screws.



MT2119 B

Refitting

6. Reverse 1 to 5.



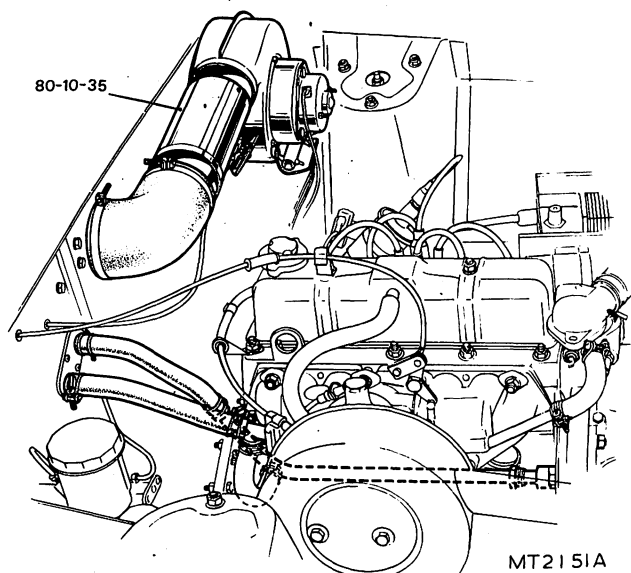
HEATING AND VENTILATION

AIR VALVE ASSEMBLY

—Remove and refit

80.10.35

The air valve is secured to the fan motor by three screws.



SWIVELLING COLD AIR VENT

—Remove and refit

L.H.

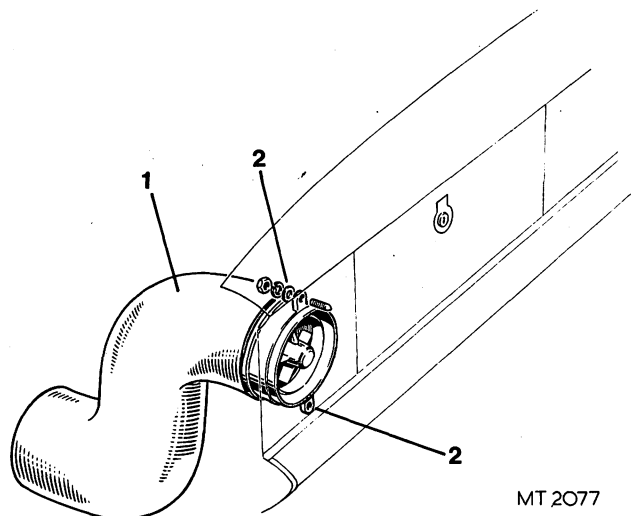
80.15.22

R.H.

80.15.23

Removing

1. Remove the cold air hose.
2. Remove the two nuts, spring washers and plain washers.
3. Withdraw the vent from behind the fascia.



Refitting

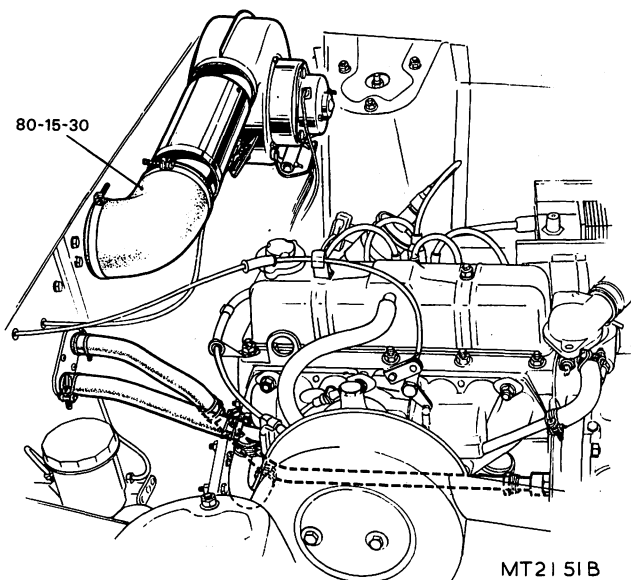
4. Reverse instructions 1 to 3.

AIR INTAKE HOSE

—Remove and refit

80.15.30

The fresh-air intake hose is secured by two clips.



80.10.35

80.15.30

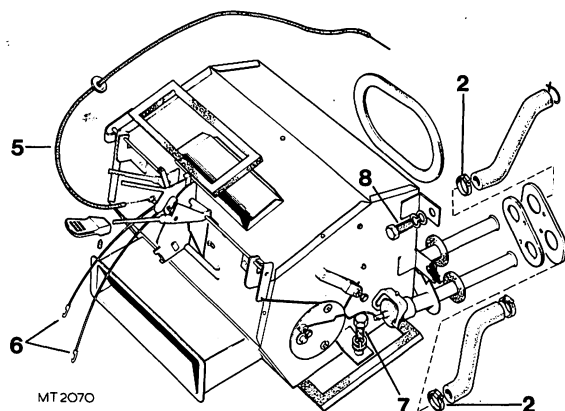
HEATER UNIT

—Remove and refit

80.20.01

Removing

1. Drain the cooling system.
2. Slacken the clips and disconnect the hoses.
3. Remove the fascia. 76.46.01.
4. Remove the fascia support rail. 76.46.06.
5. Disconnect the control cable from the central lever.
6. Disconnect the two leads from the central lever.
7. Remove the two nuts, bolts and plain washers.
8. Remove the four nuts, bolts, plain washers and spring washers.
9. Pull the heater unit clear, taking care to avoid spillage of coolant remaining in the matrix.



Refitting

10. Reverse 1 to 9, applying Seelastik S.R.51 to the dash seals and rear fixing brackets.

FAN MOTOR

—Remove and refit

80.20.15

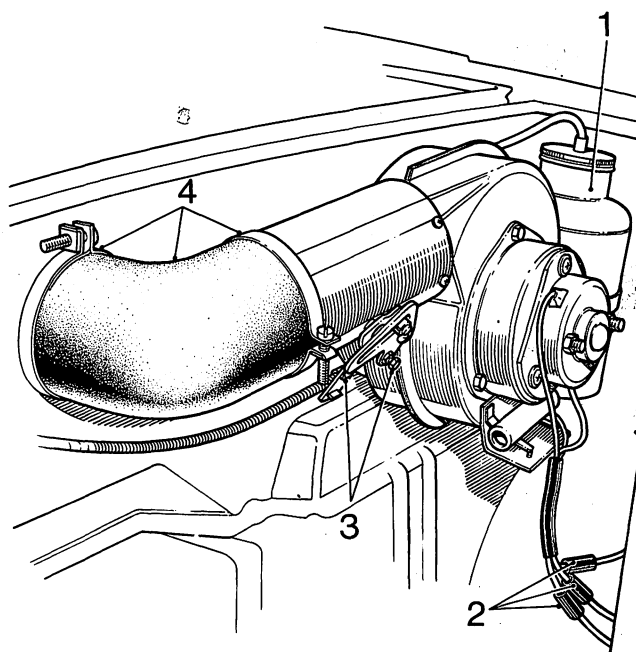
Removing

1. Remove the screen washer bottle (R.H.Stg. only).
2. Disconnect the three leads.
3. Slacken the trunnion bolt, detach the cable and clip.
4. Remove the air tube—two clips.
5. Remove the fan motor, three bolts, spring washers and plain washers.

Refitting

6. Reverse 1 to 5, using Seelastik S.R.51 to seal the fan motor to the dash.

NOTE: Ensure that the heater central control lever is in the 'off' position and the fan motor flap lever is positioned fully to the left (R.H.Stg.) or right (L.H.Stg.) before refitting the cable.



MT 2044

HEATING AND VENTILATION

FAN MOTOR RESISTOR UNIT

—Remove and refit **80.20.17**

The resistor unit is secured to the fan motor by two rivets.

HEATER WATER HOSES

—Remove and refit

Feed hose **80.25.07**

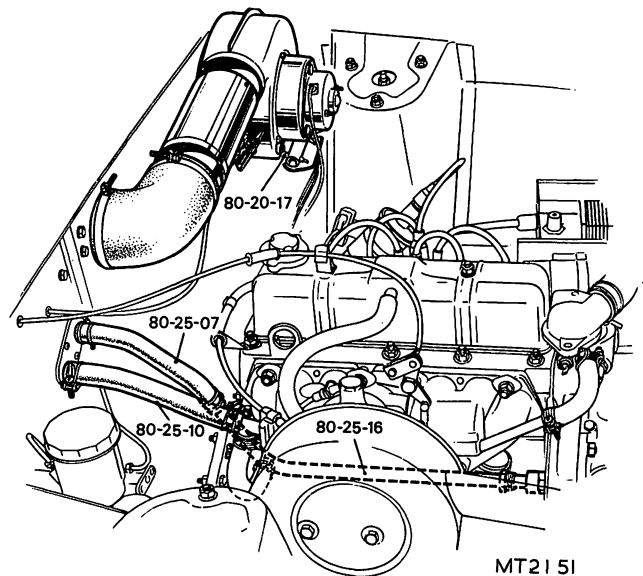
Return hose **80.25.10**

The heater water hoses are each secured by two clips. Drain the cooling system before removal.

PIPE—WATER PUMP TO HEATER HOSE

—Remove and refit **80.25.16**

The pipe is secured to the water pump by a tubular nut and is also retained by the rear manifold fixing stud.



WINDSCREEN WIPERS AND WASHERS OPERATIONS

Windscreen washer system

—jet—remove and refit	..	..	..	..	..	..	..	..	84.10.09
—pump—remove and refit	..	..	..	..	..	..	..	..	84.10.21
**—pump and reservoir—overhaul	..	..	..	..	..	..	..	..	84.10.24
—pump and reservoir—remove and refit	..	..	..	..	..	..	..	..	84.10.21**
—reservoir—remove and refit	..	..	..	..	..	..	..	..	84.10.01
—switch—remove and refit	..	..	..	..	..	..	refer to	86.65.41	

Windscreen wiper system

—data and description	..	..	..	..	..	..	..	..	84.15.00
—linkage—remove and refit	..	..	..	..	..	..	..	..	84.15.26
—motor—overhaul	..	..	..	..	..	..	..	..	84.15.18
—motor—remove and refit	..	..	..	..	..	..	..	..	84.15.12
—switch—remove and refit	..	..	..	..	..	..	..	..	84.65.38
—wiper arm—remove and refit	..	..	..	..	..	..	..	..	84.15.01
—wiper blade—remove and refit	..	..	..	..	..	..	..	..	84.15.05

WINDSCREEN WASHER RESERVOIR

**** Manual washer system only ****

—Remove and refit

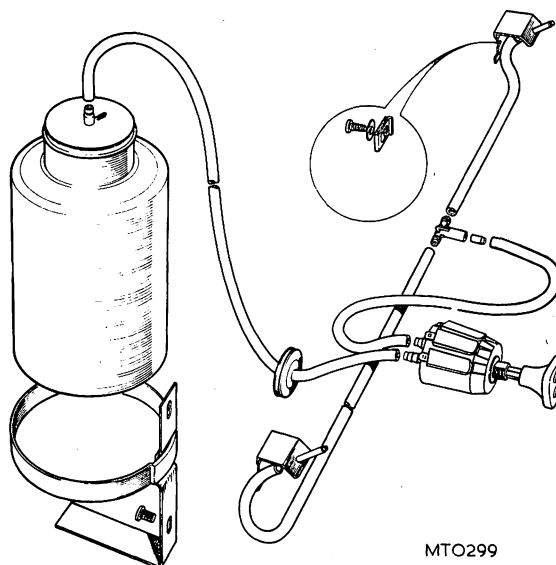
84.10.01

Removing

1. Unscrew the top and pull off the pipe.
2. Manoeuvre the bottle upwards from the carrier.

Refitting

3. Reverse 1 to 2.



MTO299

WINDSCREEN WASHER JET

—Remove and refit

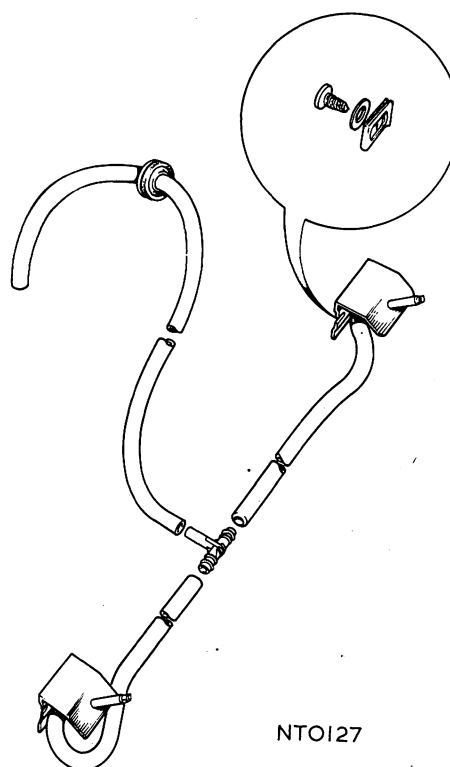
84.10.09

Removing

1. Remove the two screws and washers.
2. Pull the pipe from the jet.

Refitting

3. Reverse 1 to 2.
4. Close the bonnet and operate the pump to check the jet aim. The jet must pass unobstructed through a bonnet air intake louvre and provide satisfactory windscreen washing.
5. If necessary, adjust the jet aim by slight bending of the jet tube bracket or slackening the two screws and repositioning the jet.



NTO127

WINDSCREEN WIPERS AND WASHERS

WINDSCREEN WASHER PUMP

**** Manual washer system only****

—Remove and refit

84.10.21

The manual washer pump and electrical wiper switch is a single integral component. For removing and refitting refer to 86.65.38.

****WINDSCREEN WASHER PUMP AND RESERVOIR**

Electric washer system only

—Remove and refit

84.10.21

Removing

1. Disconnect two Lucar connectors.
2. Remove the cover. Pull off the outlet pipe and withdraw it from the cover. Refit the cover.
3. Manœuvre the unit upwards from the carrier.

Refitting

4. Reverse instructions 1 to 3. To ensure that the motor runs in the correct direction observe polarity. Connect the Lucar connectors as follows:
Light green/black wire to the positive terminal.
Black wire to the negative terminal.**

WINDSCREEN WASHER PUMP AND RESERVOIR —LUCAS TYPE 9SJ

Electric washer system only

—Overhaul

84.10.24

It is not advisable to attempt to overhaul the pump assembly. If the pump operation is suspect repair by replacement of the complete pump and cover assembly.

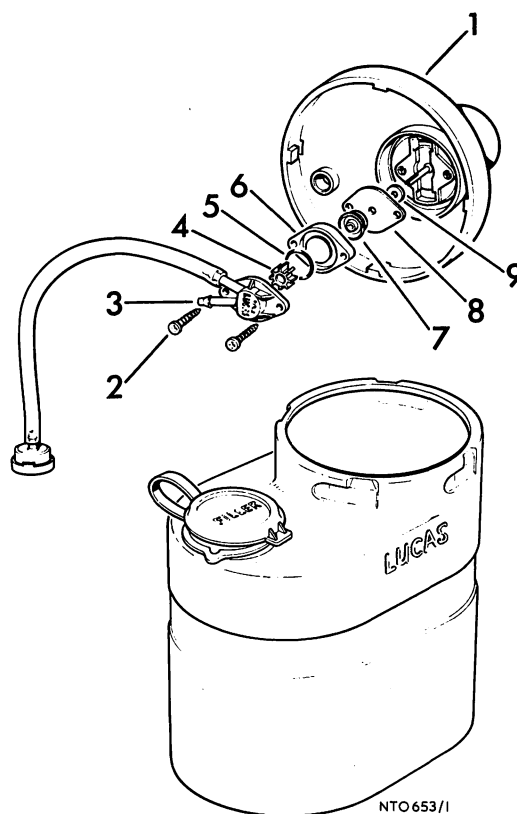
The motor is a sealed unit and can not be serviced. It is possible to dismantle and clean the interior of the pump as detailed below but no individual Stanpart spare parts are available.

Dismantle

1. Rotate the cover anti-clockwise to release the bayonet fitting. Lift the pump and cover assembly from the reservoir.
2. Remove two screws.
3. Lift off the pump housing.
4. Carefully withdraw the rotor and rotor drive plate.
5. Lift out the rubber 'O' ring.
6. Lift off the seal housing.
7. Withdraw the seal from the shaft.
8. Remove the plate.
9. Withdraw the small rubber disc from the shaft.

Assemble

10. Reverse instructions 1 to 9.



WINDSCREEN WIPER SYSTEM

—Data and description

84.15.00

Motor

								Single speed	Two speed
Manufacturer	..	..	..	..	..	..	..	AC. Delco	AC. Delco
AC. Delco Part No.	R.H. Steer	..	..	..	..	..	..	7975284	**7996148**
	L.H. Steer	..	..	..	..	..	..	7975283	7975285
Stanpart No.	R.H. Steer	..	..	..	..	..	..	215751	**216720**
	L.H. Steer	..	..	..	..	..	..	215750	215588
Running speed—with linkage arm disconnected from crank pin and terminal voltage of 14 volts									
Normal speed	..	..	..	..	..	..	..	54 to 64 rev/min	48 to 58 rev/min
High speed	..	..	..	..	..	..	..	—	66 to 84 rev/min
Running current—with linkage arm disconnected from crank pin and terminal voltage of 14 volts									
Normal speed	..	..	..	..	..	..	..	1.5 amp	2.3 amp
High speed	..	..	..	..	..	..	..	—	3.0 amp
Armature end float	..	..	..	..	..	..	..	None	None
								See 84.15.18	See 85.15.18

The motor unit consists of a permanent magnet motor and a gearbox unit which drives a rotating crank arm.

On vehicles built to a market specification that requires a two speed wiper motor, two speed operation is provided by a third brush. When high speed is selected, the positive supply is transferred from the normal speed brush to the high speed brush.

A switching feature stops the blades in the park position irrespective of their position when the fascia switch is selected off. This is effected by a two stage switch unit in the gearbox. Two static contacts are swept by a slip ring arrangement on the final gear.

When the fascia switch is selected off, the motor will continue to run until the slip ring break aligns with the inner static contact. A momentary period follows during which no contact is made. The inner static contact then aligns with the earthed projection causing regenerative braking of the armature which maintains consistent parking of the blades.

The motor and one spindle assembly are mounted to a plate and arm unit. Rotation of the motor crank arm is converted to a reciprocating motion of the spindle lever by a 'solid' primary link. The second spindle assembly is mounted direct to the vehicle body and is driven by a 'solid' secondary link positioned between the two spindle levers.

WINDSCREEN WIPERS AND WASHERS

+ Supply

- ### 1. Fascia switch

Used when single-speed wiper motor is fitted to vehicle. Terminal 4 is not used.

PARK 1 to 2

ON 2 to 3

Used when two-speed wiper motor and electric washer pump are fitted to vehicle.

PARK 1 to 2

NORMAL SPEED 2 to 3

HIGH-SPEED	3 to 4
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- ## 2. Normal supply brush

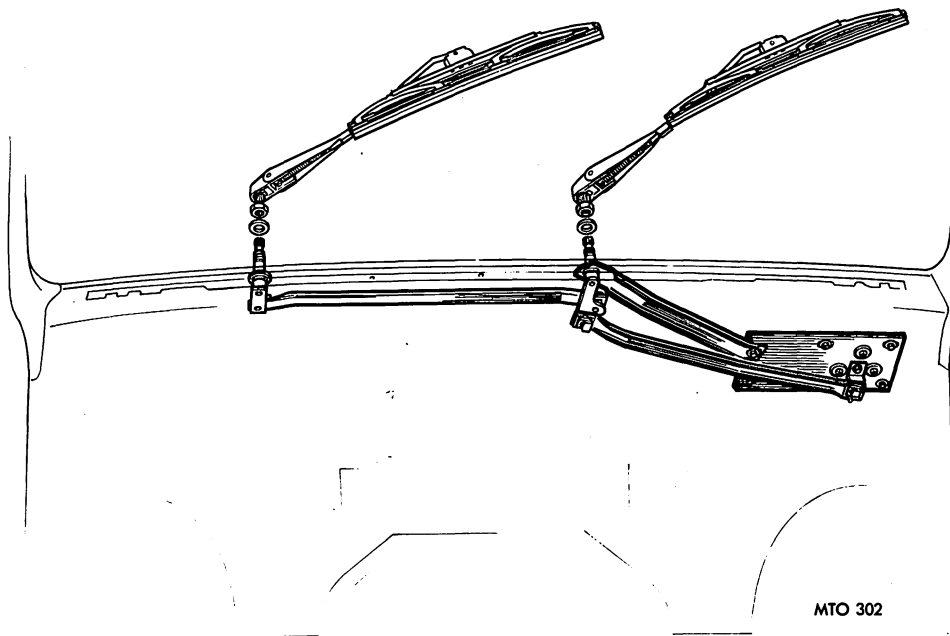
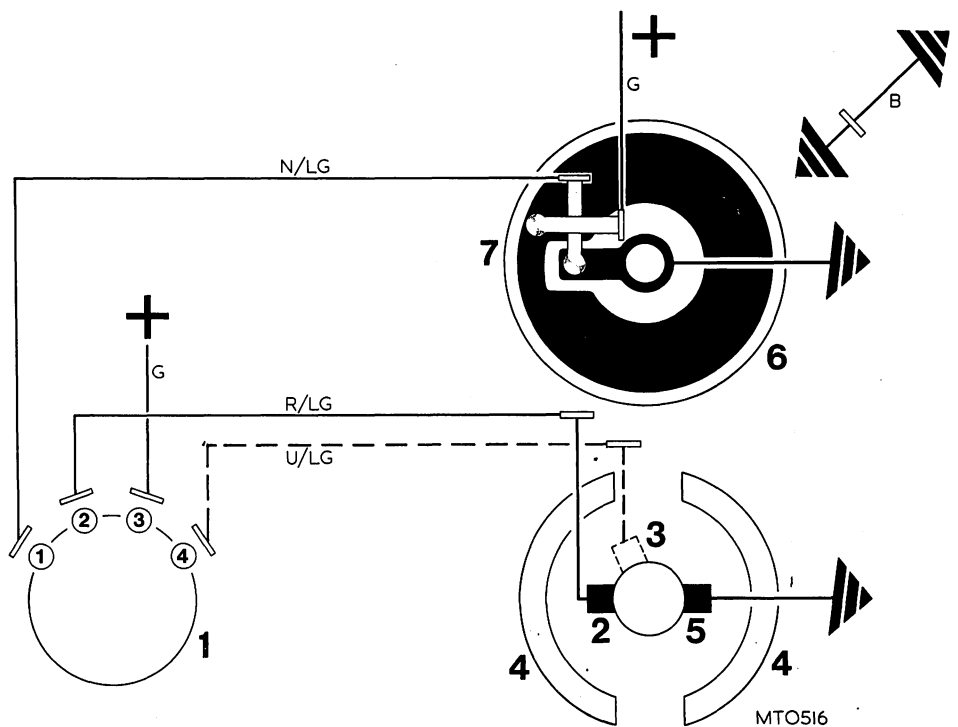
3. High speed brush. (Two-speed wiper motor only)

- #### 4. Permanent magnet

- ## 5. Earth brush

6. Final gear slip ring arrangement.

- ## 7. Static contacts



WINDSCREEN WIPERS AND WASHERS

WINDSCREEN WIPER ARM

—Remove and refit

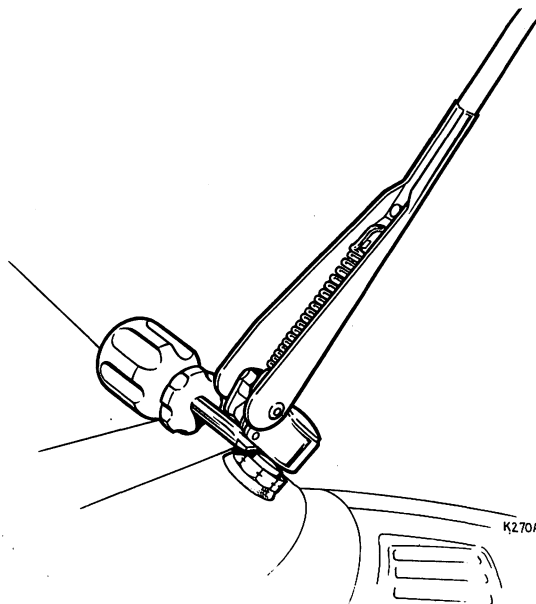
84.15.01

Removing

1. Lift the wiper arm and blade from the screen so that it falls into its service position.
2. Position a screwdriver as shown and impart a twisting action to lift the clip from the spindle groove.
3. The assembly may now be removed by hand.

Refitting

4. Ensure that the spindles are in the 'park' position.
5. Hinge the wiper arm against the spring to adopt its service position.
6. Locate the splines for a suitable 'park' position. Push on to engage the clip to the spindle groove.
7. Lower the wiper arm to the screen.



WINDSCREEN WIPER BLADE

—Remove and refit

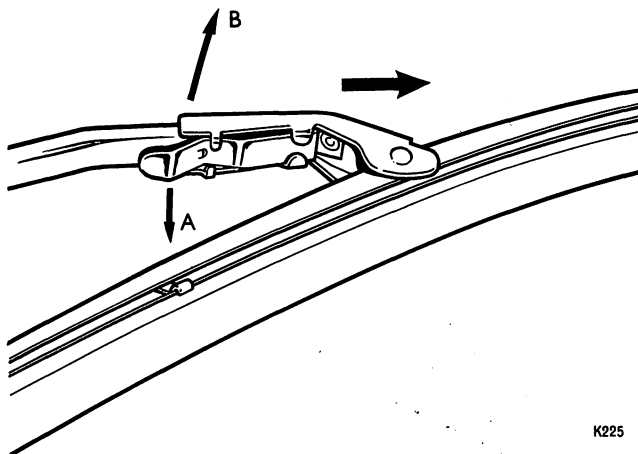
84.15.05

Removing

1. Lift the wiper arm and blade from the screen so that it falls into its service position.
2. Simultaneously lift the clip 'A', tilt cage 'B' and gently pull the wiper blade from the arm.

Refitting

3. Locate the cage and clip assembly to the wiper arm. Push on to engage 'pip'.
4. Lower the wiper arm to the screen.



K225

WINDSCREEN WIPER MOTOR

—Remove and refit

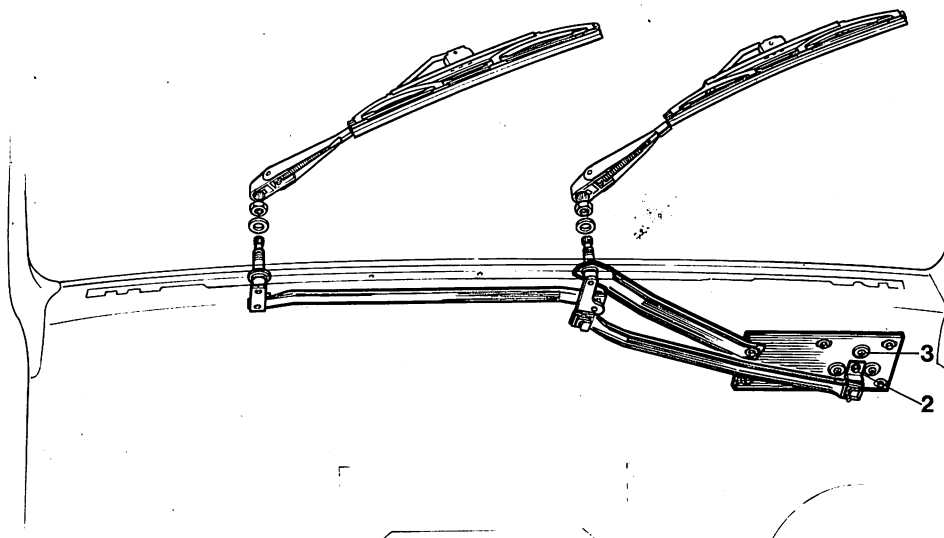
84.15.12

Removing

1. Isolate the battery.
2. Remove the motor shaft nut and withdraw the crank.
3. Remove the three screws and lift off the motor.
4. Disconnect the four Lucar connectors from the motor.
5. Collect the six washers and three spacers.

Refitting

6. Reverse 1 to 5.



MTO 301

WINDSCREEN WIPERS AND WASHERS

WINDSCREEN WIPER MOTOR

—Overhaul

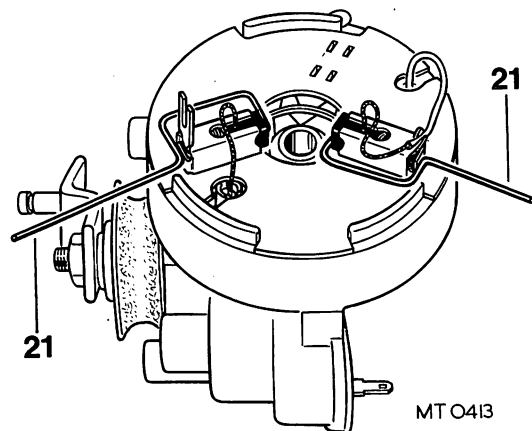
84.15.18

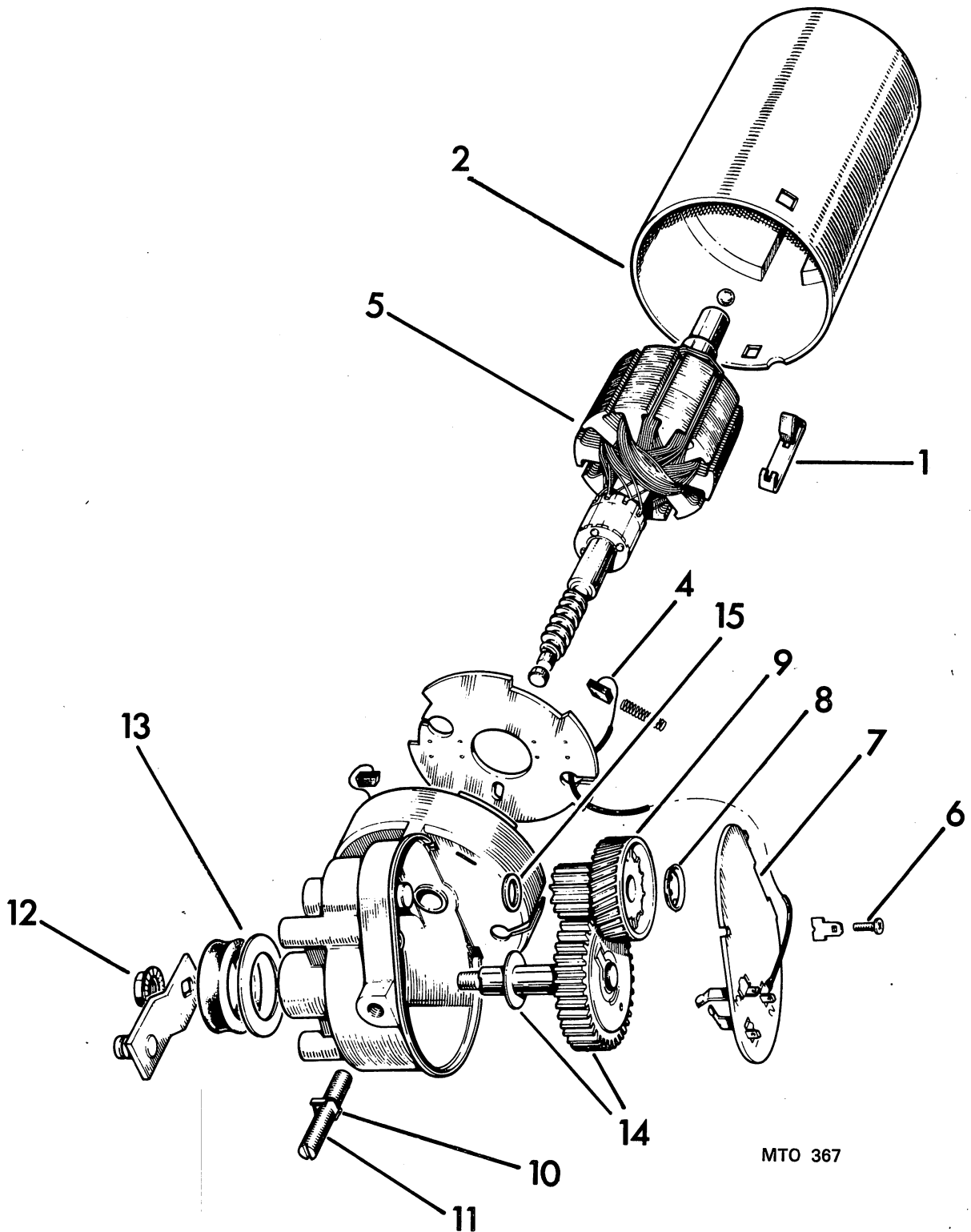
Dismantling

1. Release three clips from end frame.
2. Carefully withdraw end frame and armature 0.25 in (6 mm).
3. Use two small screwdrivers to hold back two brushes and continue withdrawal. Ensure that brushes are not contaminated with grease.
4. Remove two brushes and springs.
5. Pull armature from end frame against action of permanent magnets.
6. Remove single screw and Lucar blade.
7. Remove gear cover and brush plate joined together by single wire.
8. Carefully lever retainer from shaft.
9. Withdraw wormwheel and pinion assembly.
10. Using pliers, carefully unscrew locknut.
11. Screw out thrust screw.
12. Remove motor shaft nut and withdraw crank.
13. Remove rubber sealing ring and washer.
14. Withdraw final gear and thrust washer.
15. Withdraw thrust washer.

Reassembling

16. During assembly the gearbox should be generously lubricated with high temperature water resistant grease.
17. Reverse 12 to 15.
18. Reverse 5 to 9.
19. Ensure that earth brush is not hidden under brush plate.
20. Ensure that brushes are not contaminated with grease.
21. Fit two springs and brushes and retain deep in brushbox using slave clips locally made from paper clips or similar wire as shown.
22. Carefully insert armature shaft through bearing screwing in as required to engage wormgear. Ensure that brushes are not contaminated with grease. Ensure that commutator clears brushes. Continue insertion until end frame is 0.25 in (6 mm) from seat.
23. With brushes over commutator remove slave clips.
24. Seat end frame against gearbox.
25. Fit three clips to end frame.
26. Screw in thrust screw and locknut assembly.
27. Adjust armature end float as follows. Slacken locknut and screw out thrust screw to free position. Connect motor in series with 12 volt battery and ammeter. Run motor with crank free and note ammeter reading. Screw thrust screw in until current increases by 0.1 amp—maintain in this position and tighten locknut.





WINDSCREEN WIPERS AND WASHERS

WINDSCREEN WIPER LINKAGE

—Remove and refit

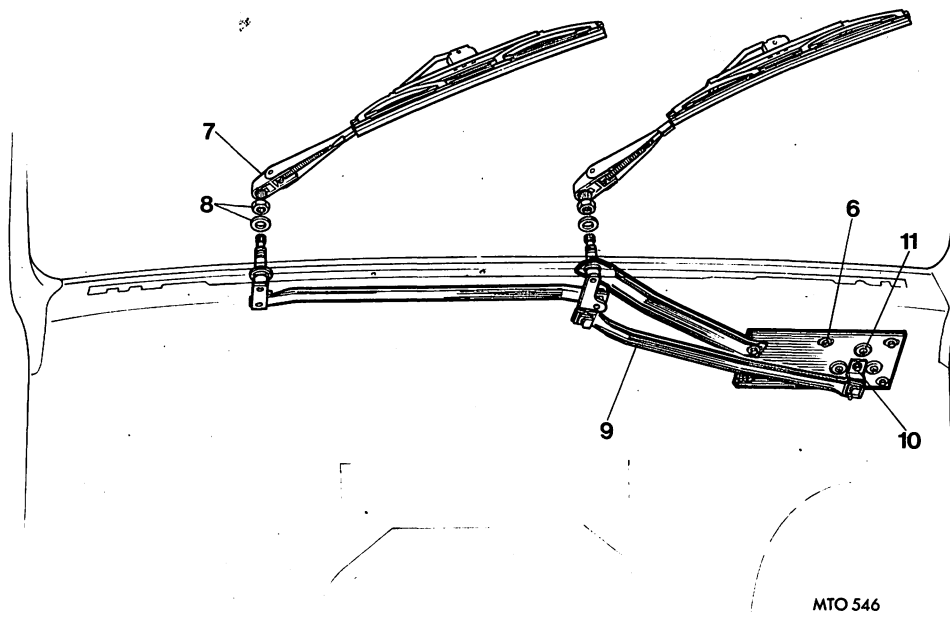
84.15.26

Removing

1. Isolate the battery.
2. Remove the parcel shelf. 76.67.01.
3. Remove the fascia. 76.46.01.
4. Disconnect the four Lucar connectors from the motor.
5. Pull out the two buttons to release the millboard cover.
6. Remove the six bolts.
7. Remove the two wiper arms. 84.15.01.
8. Remove the two spindle nuts and rubber washers.
9. Withdraw the linkage and motor assembly from the vehicle.
10. Remove the motor shaft nut and withdraw the crank.
11. Remove the three screws and lift off the motor.
12. Collect the six washers and three spacers.

Refitting

13. Reverse 1 to 12.



ELECTRICAL OPERATIONS

Alternator

—data and description	86.10.00
—drive belt—adjust	86.10.05
—functional check	86.10.01
—overhaul	86.10.08
—remove and refit	86.10.02

Battery—remove and refit	86.15.01
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Bulbs—bulb chart	86.00.01
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Flasher unit—turn signal flasher unit—remove and refit	86.55.11
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Fuse system

—fuse chart	86.70.00
—fuse—remove and refit	86.70.02

Ignition coil and ballast resistor

—ballast resistor—remove and refit	86.35.33
—data and description	86.35.00
—ignition coil—remove and refit	86.35.32

Ignition distributor

—contact assembly—remove and refit	86.35.13
—contact gap—adjust	86.35.14
—data and description	86.35.00
—ignition timing—adjust	86.35.15
—lubrication	86.35.18
—overhaul	86.35.26
—remove and refit	86.35.20

Lamps

—front parking and flasher lamp—remove and refit	86.40.26
—headlamp—beam aiming	86.40.18
—headlamp—remove and refit	86.40.02
—plate illumination lamp—remove and refit	86.40.86
—rear tail/stop and flasher lamp—remove and refit	86.40.70
—roof lamp—remove and refit	86.45.02

Relays

—starter solenoid—data and description	86.55.00
—starter solenoid—remove and refit	86.55.05

Starter motor

—data and description	86.60.00
—inertia drive—remove and refit	86.60.06
—overhaul	86.60.13
—remove and refit	86.60.01

continued

Switches

—data	86.65.00
—door switch—remove and refit	86.65.14
—heater switch—remove and refit	80.10.22
—ignition/starter switch—remove and refit	86.65.02
—luggage boot illumination switch—remove and refit	86.65.22
—master light switch—remove and refit	86.65.09
—oil pressure switch—remove and refit	86.65.30
—roof lamp switch—remove and refit	86.45.02
—steering-column combination switch—remove and refit	86.65.55
—stop lamp switch—remove and refit	86.65.51
—windscreen wiper switch—remove and refit	86.65.38

Wiring diagram

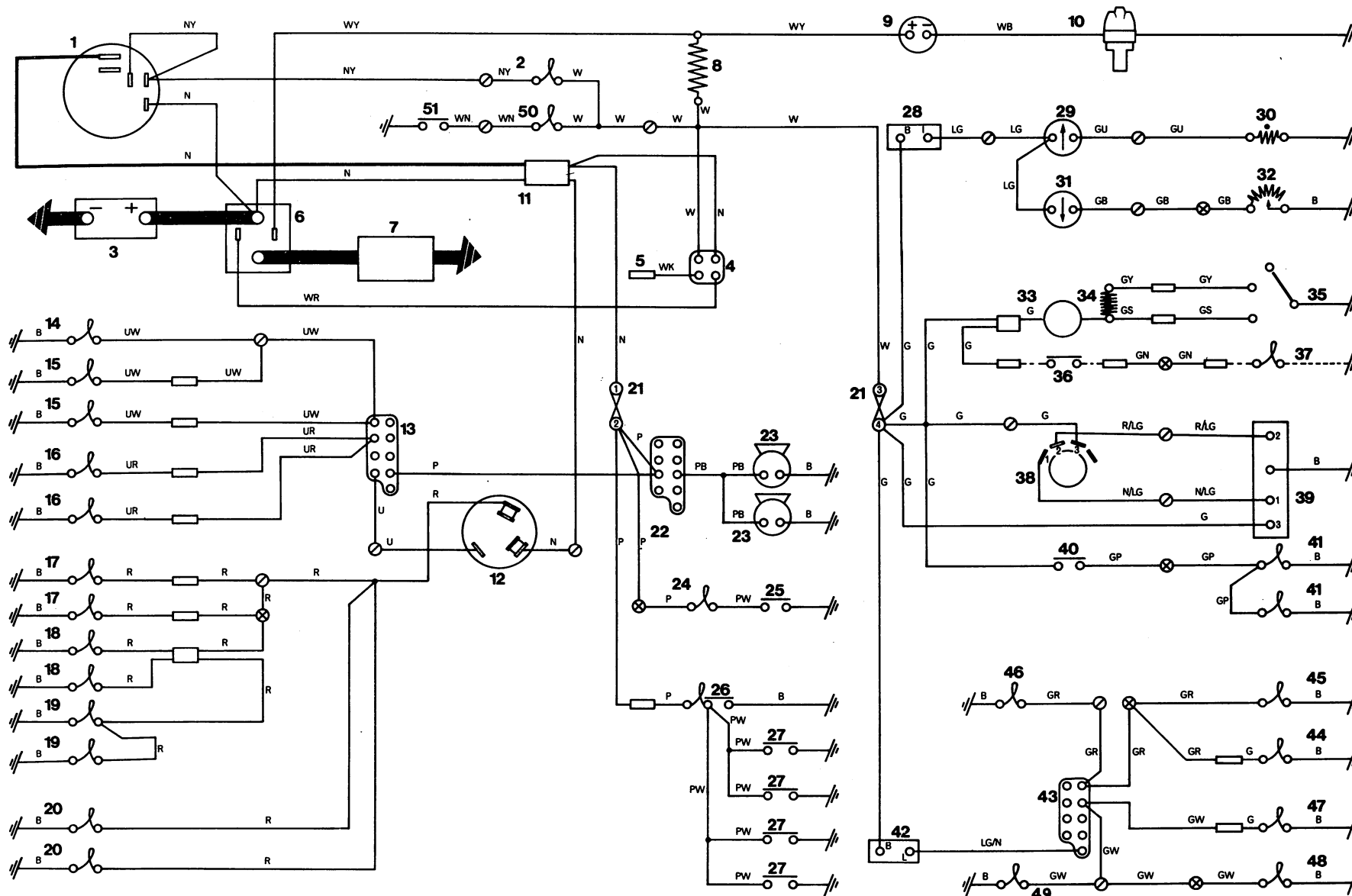
★★—left-hand steer—maximum equipment condition	86.00.08
—left-hand steer—minimum equipment condition	86.00.06
—right-hand steer—1970 to 1972 models	86.00.02
—right-hand steer—1973 model	86.00.10★★

BULB CHART

	Watts	Lucas Part No.	Unipart No.	Stanpart No.	
Headlamps—two rectangular					
L.H. Dip	75/60	54525012		518726	*
R.H. Dip—Normal	45/40	410	GLB410	510218	
France	45/40	411		510219	
Front parking lamps	5	989	GLB989	59467	
Front flasher lamps	21	382	GLB382	502379	
Rear flasher lamps	21	382	GLB382	502379	
Tail/stop lamps	5/21	380	GLB380	502287	
Plate illumination lamps	5	501	GLB501	514797	
Luggage boot illumination	2·2	987	GLB987	59492	
Roof lamp	6	254	GLB254	59897	
Instrument illumination	2·2	987	GLB987	59492	
Warning lights	2·2	987	GLB987	59492	

* Sealed beam light unit



****RIGHT-HAND STEER—1970 TO 1972 MODELS****

L 094





KEY TO WIRING DIAGRAM—TOLEDO
****RIGHT-HAND STEER—1970 TO 1972 MODELS****

- | | | |
|-----------------------------|------------------------------|--|
| 1. Alternator | 18. Plate illumination lamp | 35. Heater switch |
| 2. Ignition warning light | 19. Tail lamp | 36. Reverse lamp switch (optional extra) |
| 3. Battery | 20. Instrument illumination | 37. Reverse lamp (optional extra) |
| 4. Ignition/starter switch | 21. Fuse | 38. Windscreen wiper switch |
| 5. Radio supply | 22. Horn switch | 39. Windscreen wiper motor |
| 6. Starter solenoid | 23. Horn | 40. Stop lamp switch |
| 7. Starter motor | 24. Luggage boot lamp | 41. Stop lamp |
| 8. Ballast resistor | 25. Luggage boot lamp switch | 42. Turn signal flasher unit |
| 9. Ignition coil—6-volt | 26. Roof lamp | 43. Turn signal switch |
| 10. Ignition distributor | 27. Door switch | 44. L.H. front flasher lamp |
| 11. Connector block | 28. Voltage stabilizer | 45. L.H. rear flasher lamp |
| 12. Master light switch | 29. Temperature indicator | 46. L.H. turn signal warning light |
| 13. Main/dip/flash switch | 30. Temperature transmitter | 47. R.H. front flasher lamp |
| 14. Main beam warning light | 31. Fuel indicator | 48. R.H. rear flasher lamp |
| 15. Main beam | 32. Fuel tank unit | 49. R.H. turn signal warning light |
| 16. Dip beam | 33. Heater motor | 50. Oil pressure warning light |
| 17. Front parking lamp | 34. Heater resistor | 51. Oil pressure switch |



LEFT-HAND STEER WIRING DIAGRAMS

Left-hand steer Toledo's are built with variations in electrical equipment according to market specification requirements.

Due to the number of permutations possible a wiring diagram for every market cannot be included in this manual.

To provide all wiring diagram information two wiring diagrams are featured. One shows the 'Minimum equipment condition' while the other indicates the 'Maximum equipment condition'.

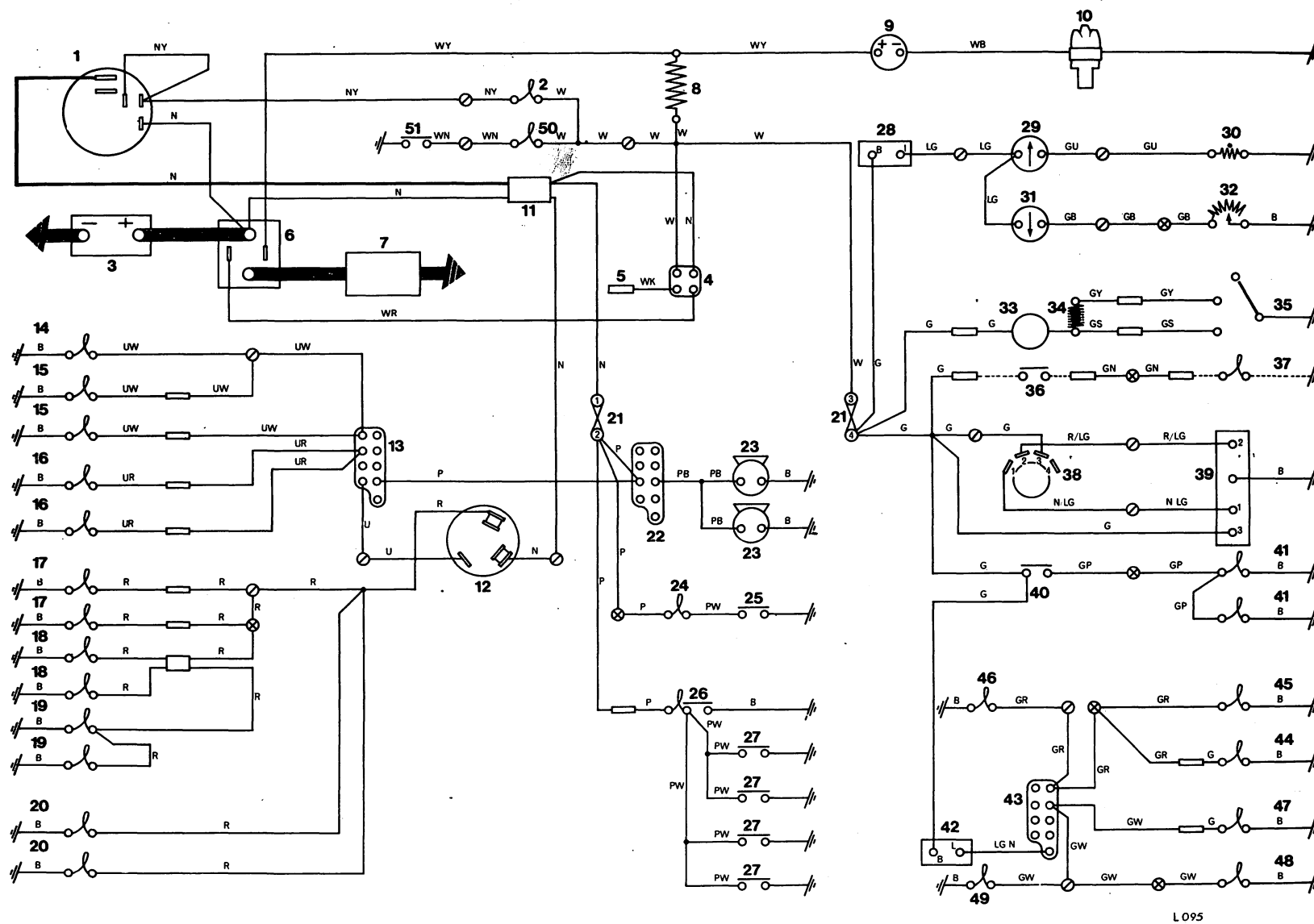
By referring to both wiring diagrams service personnel should be able to obtain total wiring diagram information for any specific vehicle.

The primary electrical equipment variations are as follows:

MINIMUM EQUIPMENT CONDITION	MAXIMUM EQUIPMENT CONDITION
Starter motor with conventional inertia drive.	Starter motor with pre engage drive for cold climate markets.
Single-speed windscreen wiper motor.	Two-speed windscreen wiper motor.
Manual windscreen washer pump.	Electric windscreen washer pump.
No hazard warning system.	Hazard warning system.
Single line brake system.	Tandem line brake system with line failure warning light.

WIRING DIAGRAM—TOLEDO LEFT-HAND STEER—MINIMUM EQUIPMENT CONDITION

Please see page 86.00.05



L 095





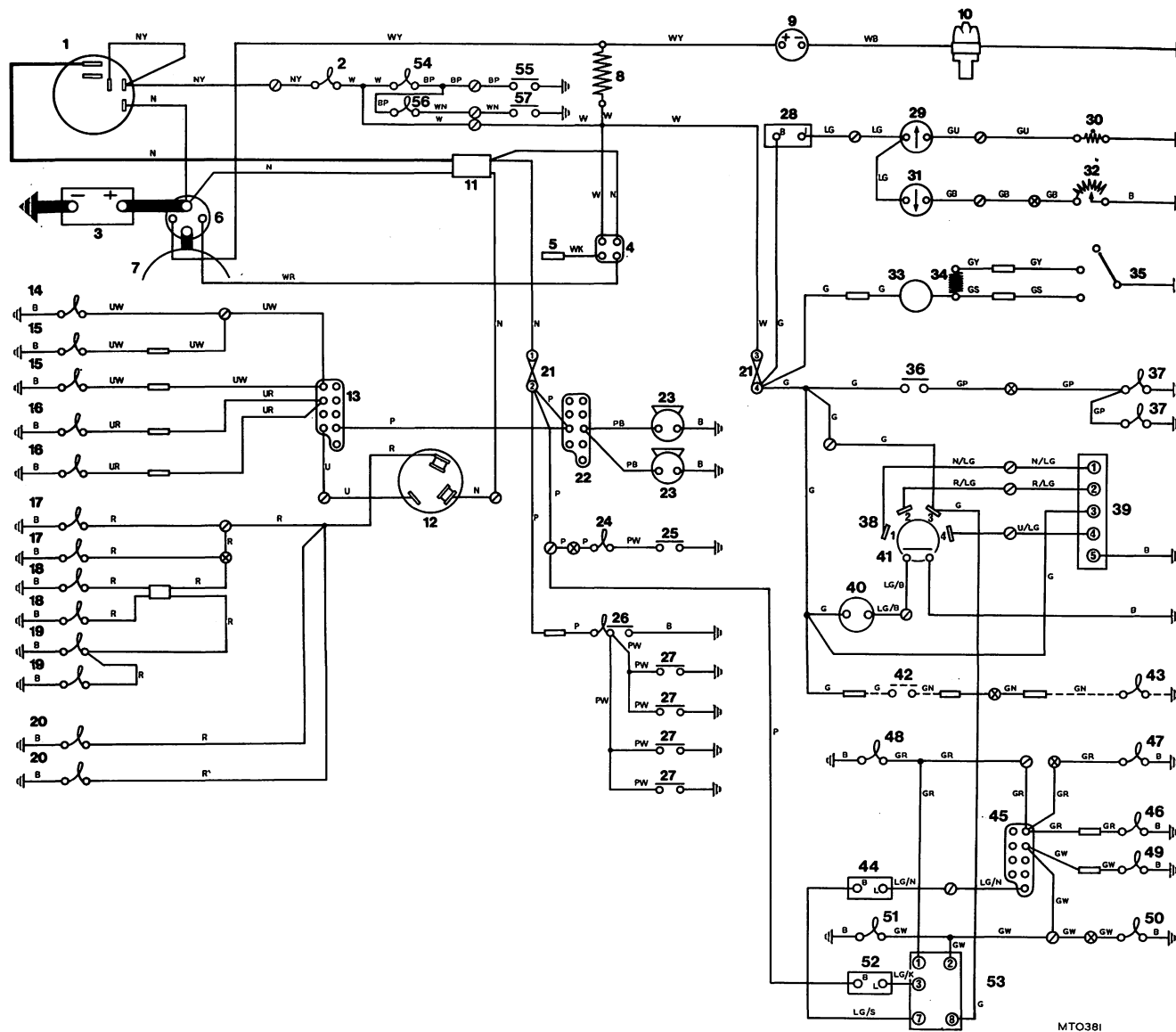
KEY TO WIRING DIAGRAM—TOLEDO **LEFT-HAND STEER—MINIMUM EQUIPMENT CONDITION**

Please see page 86.00.05

- | | | |
|-----------------------------|------------------------------|--|
| 1. Alternator | 18. Plate illumination lamp | 35. Heater switch |
| 2. Ignition warning light | 19. Tail lamp | 36. Reverse lamp switch (optional extra) |
| 3. Battery | 20. Instrument illumination | 37. Reverse lamp (optional extra) |
| 4. Ignition/starter switch | 21. Fuse | 38. Windscreen wiper switch |
| 5. Radio supply | 22. Horn switch | 39. Windscreen wiper motor |
| 6. Starter solenoid | 23. Horn | 40. Stop lamp switch |
| 7. Starter motor | 24. Luggage boot lamp | 41. Stop lamp |
| 8. Ballast resistor | 25. Luggage boot lamp switch | 42. Turn signal flasher unit |
| 9. Ignition coil—6-volt | 26. Roof lamp | 43. Turn signal switch |
| 10. Ignition distributor | 27. Door switch | 44. L.H. front flasher lamp |
| 11. Connector block | 28. Voltage stabilizer | 45. L.H. rear flasher lamp |
| 12. Master light switch | 29. Temperature indicator | 46. L.H. turn signal warning light |
| 13. Main/dip/flash switch | 30. Temperature transmitter | 47. R.H. front flasher lamp |
| 14. Main beam warning light | 31. Fuel indicator | 48. R.H. rear flasher lamp |
| 15. Main beam | 32. Fuel tank unit | 49. R.H. turn signal warning light |
| 16. Dip beam | 33. Heater motor | 50. Oil pressure warning light |
| 17. Front parking lamp | 34. Heater resistor | 51. Oil pressure switch |

WIRING DIAGRAM—TOLEDO
LEFT-HAND STEER—MAXIMUM EQUIPMENT CONDITION

Please see page 86.00.05



MT0381



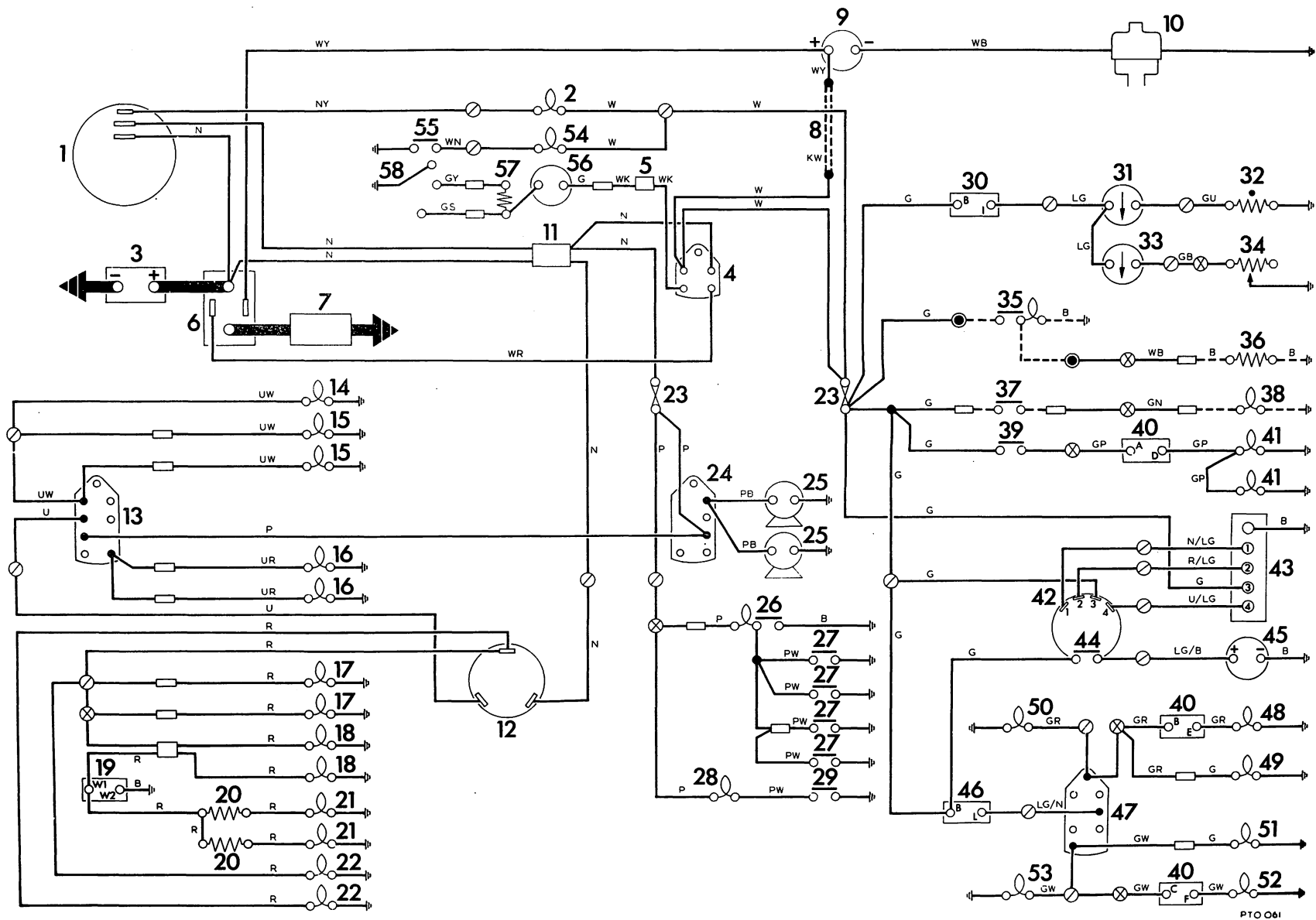


KEY TO WIRING DIAGRAM—TOLEDO **LEFT-HAND STEER—MAXIMUM EQUIPMENT CONDITION**

Please see page 86.00.05

- | | | |
|-----------------------------|------------------------------|--|
| 1. Alternator | 20. Instrument illumination | 39. Windscreen wiper motor |
| 2. Ignition warning light | 21. Fuse | 40. Windscreen washer pump |
| 3. Battery | 22. Horn switch | 41. Windscreen washer switch |
| 4. Ignition/starter switch | 23. Horn | 42. Reverse lamp switch (optional extra) |
| 5. Radio supply | 24. Luggage boot lamp | 43. Reverse lamp (optional extra) |
| 6. Starter solenoid | 25. Luggage boot lamp switch | 44. Turn signal flasher unit |
| 7. Starter motor | 26. Roof lamp | 45. Turn signal switch |
| 8. Ballast resistor | 27. Door switch | 46. L.H. front flasher lamp |
| 9. Ignition coil—6-volt | 28. Voltage stabilizer | 47. L.H. rear flasher lamp |
| 10. Ignition distributor | 29. Temperature indicator | 48. L.H. turn signal warning light |
| 11. Connector block | 30. Temperature transmitter | 49. R.H. front flasher lamp |
| 12. Master light switch | 31. Fuel indicator | 50. R.H. rear flasher lamp |
| 13. Main/dip/flash switch | 32. Fuel tank unit | 51. R.H. turn signal warning light |
| 14. Main beam warning light | 33. Heater motor | 52. Hazard flasher unit |
| 15. Main beam | 34. Heater resistor | 53. Hazard switch |
| 16. Dip beam | 35. Heater switch | 54. Brake line failure warning light |
| 17. Front parking lamp | 36. Stop lamp switch | 55. Brake line failure switch |
| 18. Plate illumination lamp | 37. Stop lamp | 56. Oil pressure warning light |
| 19. Tail lamp | 38. Windscreen wiper switch | 57. Oil pressure switch |

****WIRING DIAGRAM—TOLEDO
RIGHT-HAND STEER—1973 MODEL**





****KEY TO WIRING DIAGRAM—TOLEDO
RIGHT-HAND STEER—1973 MODEL**

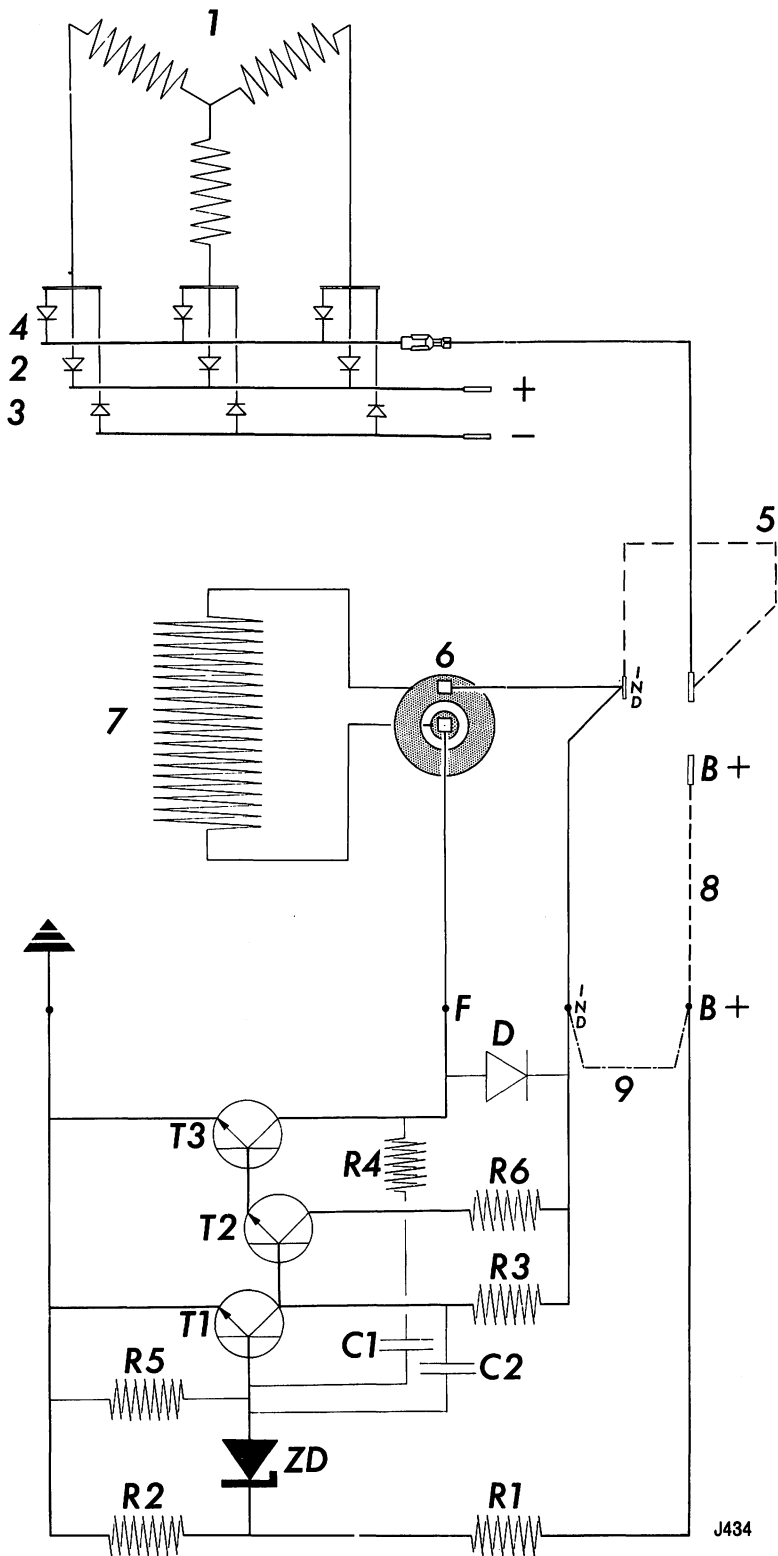
- | | | |
|---------------------------------|--|------------------------------------|
| 1. Alternator | 21. Tail lamp | 40. Night dimming relay contacts |
| 2. Ignition warning light | 22. Instrument illumination | 41. Stop lamp |
| 3. Battery | 23. Fuse | 42. Windscreen wiper switch |
| 4. Ignition/starter switch | 24. Horn switch | 43. Windscreen wiper motor |
| 5. Radio supply | 25. Horn | 44. Windscreen washer switch |
| 6. Starter solenoid | 26. Roof lamp | 45. Windscreen washer pump |
| 7. Starter motor | 27. Door switch | 46. Turn signal flasher unit |
| 8. Ballast resistor wire | 28. Luggage boot lamp | 47. Turn signal switch |
| 9. Ignition coil—6 volt | 29. Luggage boot lamp switch | 48. L.H. rear flasher lamp |
| 10. Ignition distributor | 30. Voltage stabilizer | 49. L.H. front flasher lamp |
| 11. Connector block | 31. Temperature indicator | 50. L.H. turn signal warning light |
| 12. Master light switch | 32. Temperature transmitter | 51. R.H. front flasher lamp |
| 13. Main/dip/flash switch | 33. Fuel indicator | 52. R.H. rear flasher lamp |
| 14. Main beam warning light | 34. Fuel transmitter | 53. R.H. turn signal warning light |
| 15. Main beam | 35. Heated back-light switch—when fitted | 54. Oil pressure warning light |
| 16. Dip beam | 36. Heated back-light—when fitted | 55. Oil pressure switch |
| 17. Front parking lamp | 37. Reverse lamp switch—when fitted | 56. Heater motor |
| 18. Plate illumination lamp | 38. Reverse lamp—when fitted | 57. Heater resistor |
| 19. Night dimming relay winding | 39. Stop lamp switch | 58. Heater switch |
| 20. Tail lamp resistor | | |

**

ALTERNATOR WIRING DIAGRAM

Manufacturer
Type

Lucas
15ACR



KEY TO ALTERNATOR WIRING DIAGRAM

1	Stator windings	
2	Live side output diodes	
3	Earth side output diodes	
4	Field winding supply diodes	
5	Harness loop	Circuit is made when multi-socket connector is fitted and broken when connector is removed
6	Brushes and slip rings	
7	Field winding	
8	Connection to external harness wire	Alternative to item 9. Fitted to battery sensed units
9	Internal B+ connection	Alternative to item 8. Fitted to machine sensed units
R3	Resistor	Restricts T2 base current supplied from 'field winding supply' diodes
T2	Intermediate transistor	Controls T3 base current direct
R6	Resistor	Restricts T3 base current supplied from 'field winding supply' diodes
T3	Output transistor	Controls field winding earth return circuit
R1 and R2	Potential divider	Senses battery reference voltage
ZD	Zener diode	Voltage sensitive component. Opposes passage of current until breakdown voltage—approximately 8 volts—is reached. Controls T1 base current direct
T1	Input transistor	Controls T2 base current by diverting current passing through R3 to earth when ZD is conducting
C1 and R4	Capacitor and Resistor	Prevents transistor overheating by providing positive feed back circuit to ensure quick switching of transistors from 'fully on' to 'fully off'
R5	Resistor	Path for small leakage current which may pass through ZD at high temperatures
D	Surge quench diode	Connected across field winding. Protects T3 from field winding high induced voltage surge and smooths field winding current
C2	Condenser	Radio interference suppression

ELECTRICAL

ALTERNATOR

—Functional check

86.10.01

This operation must be performed in two parts. The first is to prove the alternator's capacity to produce current, while the second is to prove the performance of the integral control unit.

Check capacity to produce current

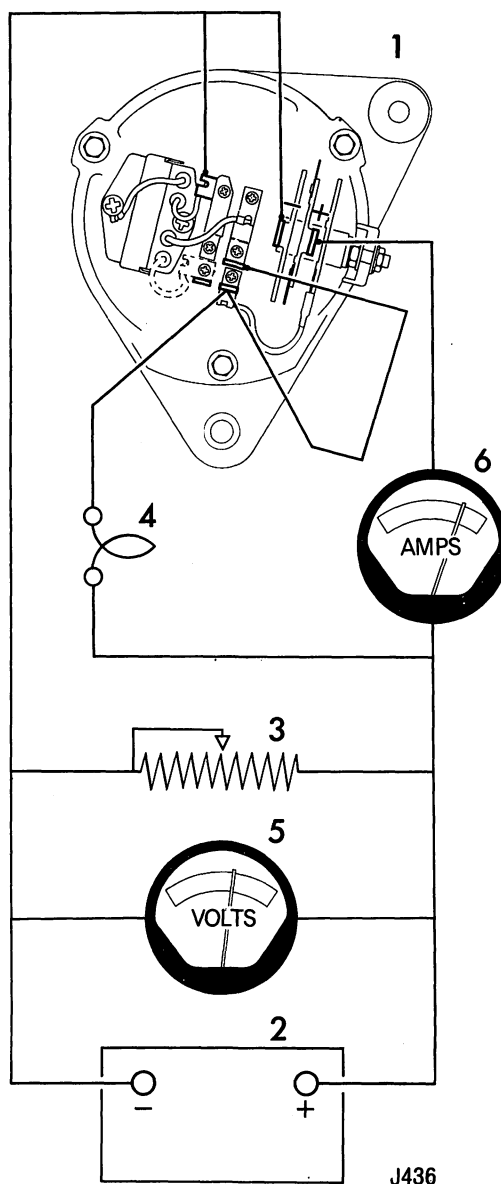
NOTE: The stated output may be exceeded slightly when the alternator is cold. To avoid misleading results, the check should be performed with the unit as near to its normal operating temperature as possible.

1. Check drive belt adjustment. 86.10.05.
2. Disconnect the multi-socket connectors.
3. Remove the moulded cover.
4. Provide a test circuit as shown.

CAUTION: The alternator contains polarity-sensitive components that may be irreparably damaged if subjected to incorrect polarity. Observe polarity of alternator and battery terminals.

5. Do not connect the variable resistor across the battery for longer than is necessary to perform the check.
6. Run the engine.
7. Gradually increase the speed. At 1,500 alternator rev/min (620 engine rev/min) the light should be extinguished.
8. Hold the speed at approximately 6,000 alternator rev/min (2,480 engine rev/min). Adjust the variable resistor so that the voltmeter reads 14 volts. The ammeter reading should now be approximately 28 amps.
9. If the ammeter reading is not approximately 28 amps, the indication is that the alternator requires overhaul or replacement.

continued

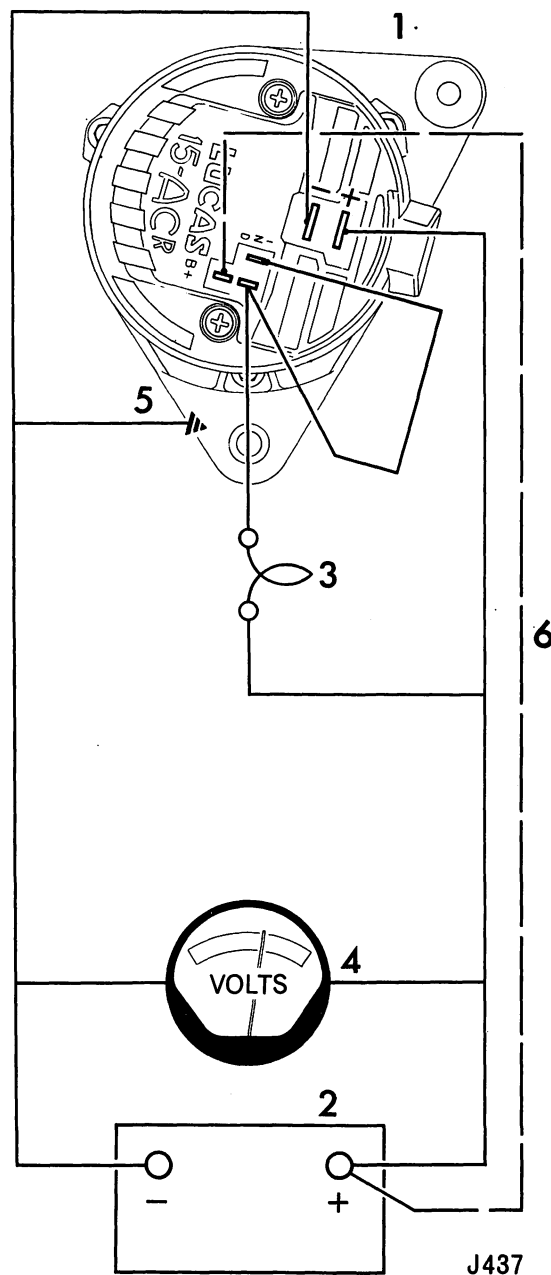


- | | | |
|-------------------------|------------------|--|
| 1. Alternator | | |
| 2. Battery | 12 volt | |
| 3. Variable resistor .. | 0-15 ohm—35 amp | |
| 4. Light | 12 volt—2.2 watt | |
| 5. Voltmeter .. | 0-20 volt | |
| 6. Ammeter .. | 0-40 amp | |

Check control unit

NOTE: The stated output may be exceeded slightly when the alternator is cold. To avoid misleading results, the check should be performed with the unit as near to its normal operating temperature as possible.

10. Check drive belt adjustment. 86.10.05.
11. Disconnect multi-socket connectors.
12. Provide test circuit as shown.
CAUTION: The alternator contains polarity-sensitive components that may be irreparably damaged if subjected to incorrect polarity. Observe polarity of alternator and battery terminals.
13. Run the engine.
14. Gradually increase the speed. At 1,500 alternator rev/min (620 engine rev/min) the light should be extinguished.
15. Hold the speed at approximately 6,000 alternator rev/min (2,480 engine rev/min). The voltmeter reading should now be steady at 14.0 to 14.4 volts.
16. If the voltmeter reading is not steady at the above figure—and a satisfactory 'Check capacity to produce current' has been performed—the indication is that the control unit should be replaced.



1. Alternator
2. Battery 12 volt
3. Light 12 volt—2.2 watt
4. Voltmeter .. 0-20 volt
5. Earth connection to alternator body
6. This wire is only necessary for Lucas battery sensed 15 ACR alternators. It is not required for Lucas machine sensed 15 ACR alternators.



ELECTRICAL

ALTERNATOR

—Remove and refit

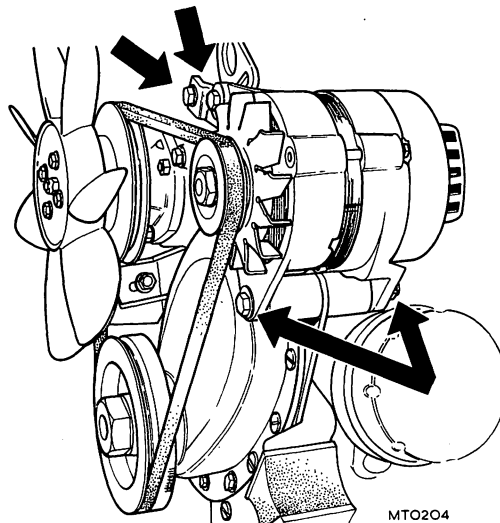
86.10.02

Removing

1. Disconnect the multi-socket connectors.
2. Slacken the main mounting bolt assembly and the two adjustment bracket bolts.
3. Push the alternator towards the engine and remove the drive belt from the pulley.
4. Remove the outer adjustment bracket bolt.
5. Support the weight of the alternator and withdraw the main mounting bolt.

Refitting

6. Position the alternator. Fit the main mounting bolt assembly.
7. Fit the outer adjustment bracket bolt.
8. Push the alternator towards the engine and fit the drive belt to the pulley.
9. Adjust the drive belt. 86.10.05.
10. Connect the multi-socket connectors.



ALTERNATOR

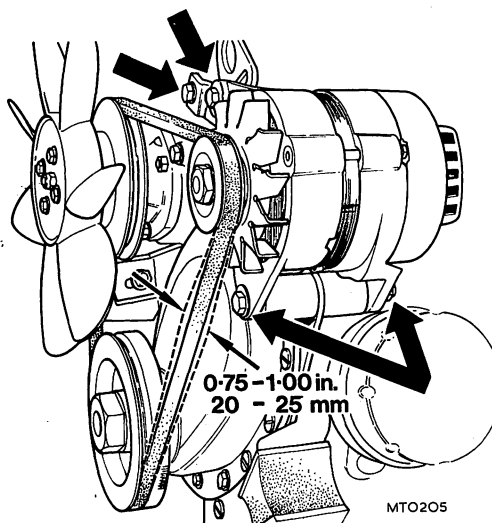
—Drive belt adjust

86.10.05

1. Slacken the main mounting bolt assembly and the two adjustment bracket bolts.
2. Carefully lever the alternator away from the engine to tension the belt.

CAUTION: To prevent bearing damage when tensioning the belt use a lever of soft material—preferably wood—applied to the alternator drive end bracket. Do not lever on any other part of the alternator.

3. Tighten the three bolts.
4. Check the belt tension; movement should be 0.75 to 1.00 in (20 to 25 mm) at the mid-point of the longest run.



ALTERNATOR

—Overhaul

86.10.08

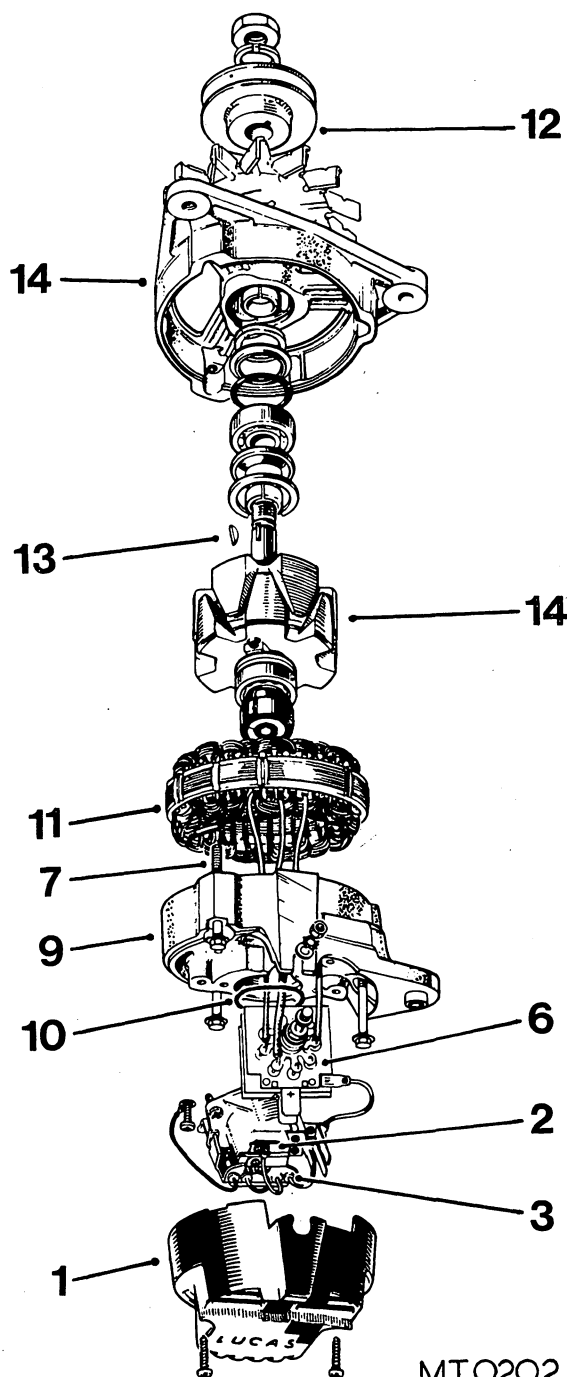
Dismantling

1. Remove the moulded cover.
2. Remove the brush box and control unit assembly by disconnecting the Lucar type connector from the rectifier pack and unscrewing three screws.
3. If required, the control unit may be detached from the assembly. Note the position of the three wire eyelets. Withdraw the screw to release the control unit and three screws to release the wire eyelets.
4. Note the position of the three stator wires on the rectifier pack.
5. Unsolder the three stator wire connections. Do not overheat the diodes or bend the diode pins. Solder quickly and provide a heat sink by gripping the diode pin with pliers.
6. Slacken the nut and withdraw the rectifier pack.
7. Remove the through-bolts.
8. Provide an extractor tool as shown.
9. To remove the slip-ring end bracket, position the extractor tool to engage with the outer journal of the slip-ring end bearing. Employ a second operator to support the slip-ring end bracket by hand. Carefully tap the extractor tool to drive the bearing from the housing.

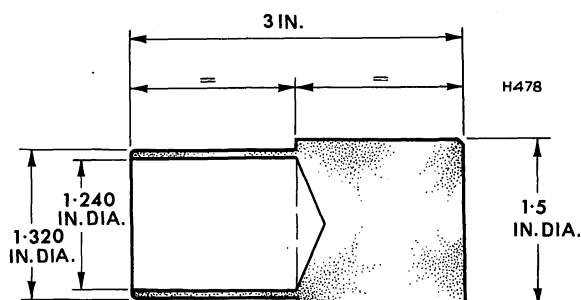
NOTE: It may be necessary to carefully file away surplus solder from the two field winding connections on the slip-ring moulding if the extractor tool will not pass over the moulding.

10. The rubber 'O' ring fitted in the slip-ring end bracket bearing housing may remain *in situ* unless replacement is contemplated.
11. Remove the stator windings from the drive end bracket.
12. Prevent the rotor turning by wrapping a scrap fan belt round the pulley and retaining by hand or vice. Remove the nut, spring washer, pulley and fan. If necessary, use a suitable extractor.
13. Remove the key.
14. Using a suitable press, remove the rotor from the drive end bracket.

CAUTION: Do not attempt to remove the rotor by applying hammer blows to the shaft end. Such action may burr over and damage the thread.



MT0202

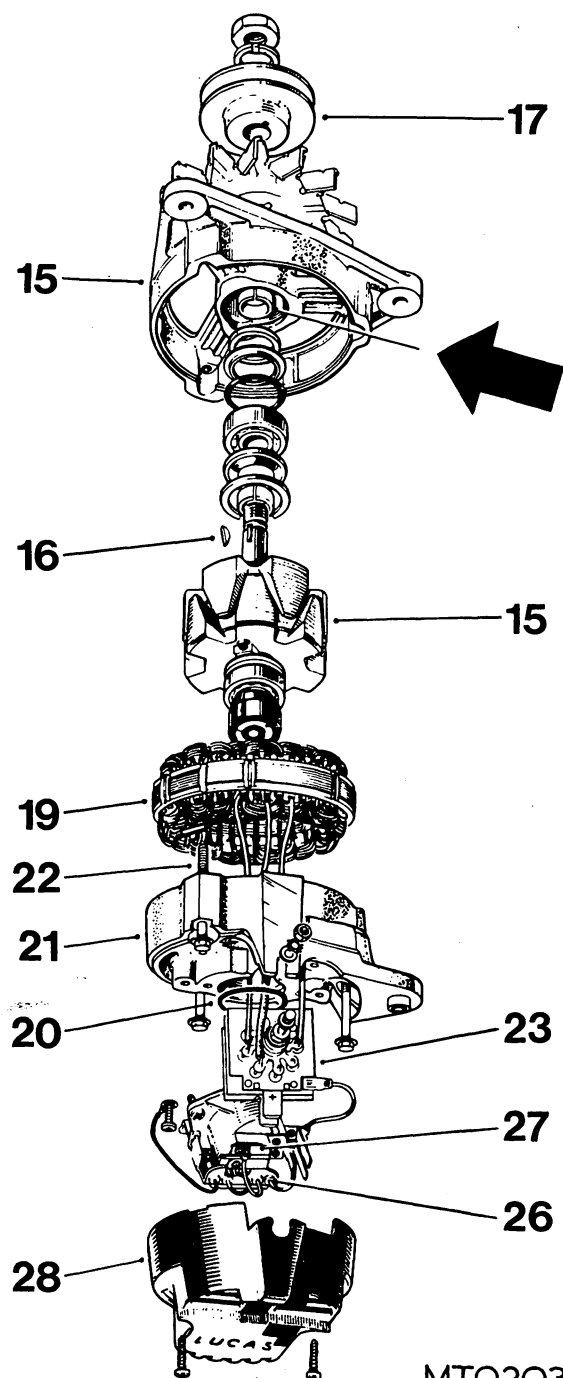


Reassembling

15. Using the spacer (arrowed) and a suitable tube, fit the rotor to drive end bracket by applying pressure to the bearing inner journal.

CAUTION: Do not use the drive end bracket as a support while fitting the rotor. If the spacer is not employed, the felt ring may be damaged.

16. Fit the key.
17. Fit the fan, pulley, spring washer and nut. Prevent the rotor turning by wrapping a scrap fan belt round the pulley and retaining by hand or vice. Torque load the nut to 25 to 30 lbf ft (3.46 to 4.15 kgf m).
18. Observe the relationship of the stator windings to the drive end bracket determined by the stator wire connections, the rectifier pack position on the slip-ring end bracket, the alignment of the mounting lugs on the end brackets and the through-bolt clearances on the stator windings.
19. Position the stator windings to the drive end bracket.
20. Ensure that the rubber 'O' ring is fitted correctly in the slip-ring end bracket bearing housing.
21. Fit the slip-ring end bracket by carefully pushing the bearing into the housing.
22. Fit the through-bolts, tightening evenly.
23. Ensure that the rubber locating piece is correctly fitted to the rectifier pack. Position the rectifier pack and secure it with the nut.
24. Position the three stator wires on rectifier pack as noted operation 4.
25. Solder the three stator wire connections. Note the precautions stated in operation 5 and use 'M' grade 45-55 tin-lead solder.
26. If required, attach the control unit to the brush box. Position the three wire eyelets on the brush box as noted in operation 3. Insert the screw to secure the control unit and the three screws to secure the wire eyelets.
27. Ensure that the brushes are entered correctly in the brush box. Fit the brush box and control unit assembly by inserting three screws and connecting the Lucar type connector to the rectifier pack.
28. Fit the moulded cover.



MT0203

BATTERY

—Remove and refit

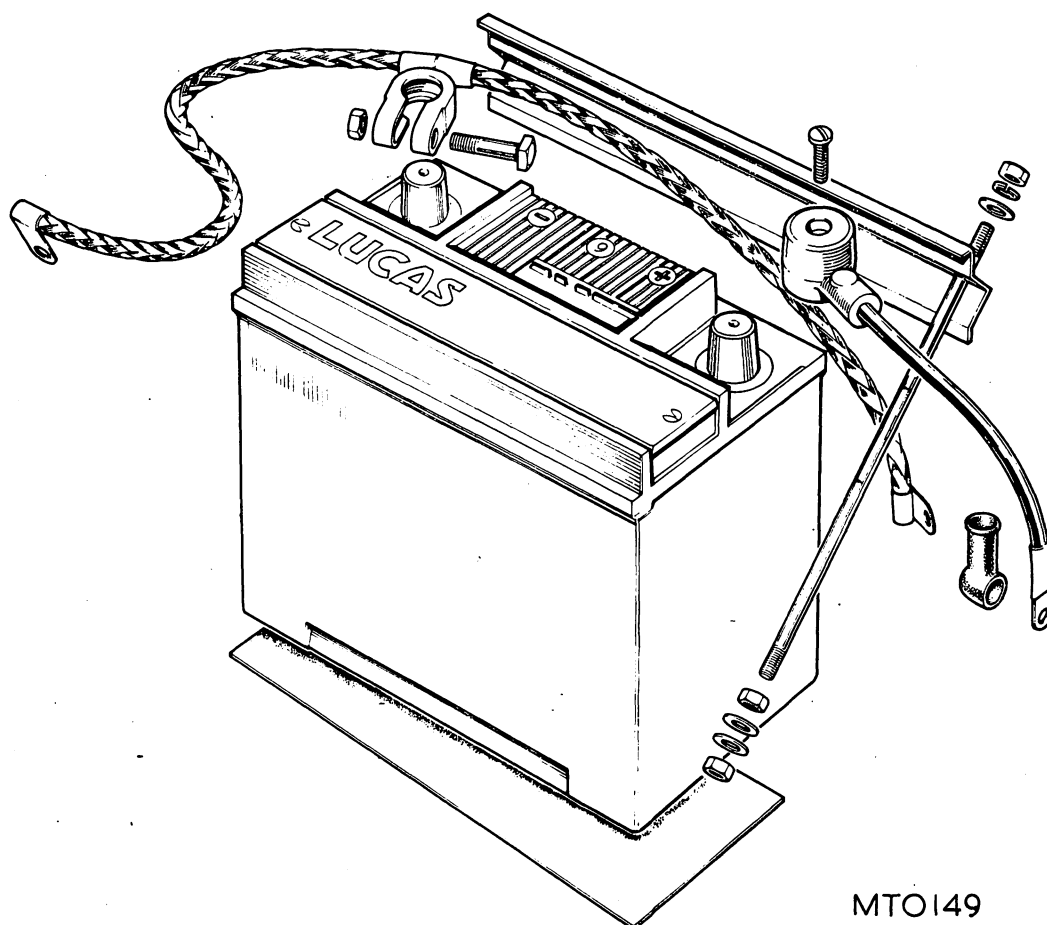
86.15.01

Removing

1. Remove the battery leads.
2. Slacken the nuts and swing down the battery retaining assembly.
3. Lift the battery from the vehicle.

Refitting

4. Lift the battery into the tray.
5. Swing up the battery retaining assembly. Tighten the nuts.
6. Fit the battery leads. Do not hammer the terminals to the terminal posts.
7. Coat the terminals with petroleum jelly (Vaseline) to prevent corrosion.



MTO149

IGNITION DISTRIBUTOR

The Toledo model range is equipped with a conventional Lucas 25D4 distributor fitted with a 'Quikafit' one piece contact set.

Toledos are built with variations in power unit according to current market specification requirements. Distributor units with variations in centrifugal advance and vacuum advance characteristics are employed to match each power unit.

An 'Ignition distributor applicability chart' is featured below. Data information for each unit is given on the following pages.

IGNITION DISTRIBUTOR APPLICABILITY CHART

<i>Ignition distributor Stanpart No.</i>	<i>Power units</i>		
	<i>1300 Single carburetter</i>	<i>1500 Single carburetter</i>	<i>1500 Twin carburetter</i>
212292	Fitted up to Engine No. DG 25000 H or L		
217031		Fitted up to Engine No. DM 5000 H or L	
217613			Fitted up to Engine No. DS 5000 H or L
218106	Fitted from Engine No. DG 25001 H or L	Fitted from Engine No. DM5001 H or L	Fitted from Engine No. DS 5001 H or L

The above change over points coincide with the introduction of the 1972 model year engine unit.

DATA—IGNITION DISTRIBUTOR—STANPART No. 212292

Manufacturer	..	..	..	..	..	Lucas
Type	..	..	..	..	..	25D4
Lucas part No.	..	..	..	..	..	41127
Stanpart No.	..	..	..	..	..	212292
Contact gap	..	..	..	..	..	0.014 to 0.016 in (0.36 to 0.41 mm)
Rotation—viewed on rotor	..	..	..	..	..	Anti-clockwise
Firing angles	..	..	..	..	..	90±1 degree
Dwell angle	..	..	..	..	..	60±3 degrees
Open angle	..	..	..	..	..	30±3 degrees
Moving contact spring tension	..	..	..	..	..	18 to 24 oz (500 to 700 g)
Capacitor capacity	..	..	..	..	..	0.20 mfd
Engine firing order	..	..	..	..	..	1-3-4-2
Lucas vacuum code	..	..	..	..	..	6-20-7

Centrifugal Advance

Check at decelerating speeds

Distributor rev/min	Degs. distributor advance		Crankshaft rev/min	Degs. crankshaft advance	
	Minimum	Maximum		Minimum	Maximum
Below 300	No advance to occur		Below 600	No advance to occur	
400	0	1.0	800	0	2
550	0.5	2.5	1,100	1	5
850	3.5	5.5	1,700	7	11
1,100	6.0	8.0	2,200	12	16
1,500	6.0	8.0	3,000	12	16

Vacuum Advance

Inches of mercury vacuum	Degs. distributor advance		Degs. crankshaft advance	
	Minimum	Maximum	Minimum	Maximum
Below 3.5	No advance to occur			
5	0	0.5	0	1
8	0	2.5	0	5
12	2.5	5.0	5	10
16	5.0	7.0	10	14
20	6.0	8.0	12	16
25	6.0	8.0	12	16

DATA—IGNITION DISTRIBUTOR—STANPART No. 217031

Manufacturer	..	..	..	..	..	..	Lucas
Type	..	..	..	..	..	..	25D4
Lucas part No.	..	..	..	..	..	..	41331
Stanpart No.	..	..	..	..	..	..	217031
Contact gap	..	..	..	..	..	..	0.014 to 0.016 in (0.36 to 0.41 mm)
Rotation—viewed on rotor	..	..	..	..	..	..	Anti-clockwise
Firing angles	..	..	..	..	..	..	90±1 degree
Dwell angle	..	..	..	..	..	..	60±3 degrees
Open angle	..	..	..	..	..	..	30±3 degrees
Moving contact spring tension	..	..	..	..	..	..	18 to 24 oz (500 to 700 g)
Capacitor capacity	..	..	..	..	..	..	0.20 mfd
Engine firing order	..	..	..	..	..	..	1-3-4-2
Lucas vacuum code	..	..	..	..	..	..	5-14-9

Centrifugal Advance

Check at decelerating speeds

Distributor rev/min	Degs. distributor advance		Crankshaft rev/min	Degs. crankshaft advance	
	Minimum	Maximum		Minimum	Maximum
Below 200	No advance to occur		Below 400	No advance to occur	
300	0	1	600	0	2
800	1	3	1,600	2	6
2,000	6	8	4,000	12	16
2,800	8	10	5,600	16	20

Vacuum Advance

Inches of mercury vacuum	Degs. distributor advance		Degs. crankshaft advance	
	Minimum	Maximum	Minimum	Maximum
Below 3	No advance to occur			
5	0	1.5	0	3
8	2.0	5.5	4	11
12	6.5	9.5	13	19
16	8.0	10.0	16	20

DATA—IGNITION DISTRIBUTOR—STANPART No. 217613

Manufacturer	..	..	..	..	..	..	Lucas
Type	..	..	..	..	..	..	25D4
Lucas part No.	..	..	..	..	..	..	41357
Stanpart No.	..	..	..	..	..	..	217613
Contact gap	..	..	..	..	..	..	0.014 to 0.016 in (0.36 to 0.41 mm)
Rotation—viewed on rotor	..	..	..	..	..	..	Anti-clockwise
Firing angles	..	..	..	..	..	..	90±1 degree
Dwell angle	..	..	..	..	..	..	60±3 degrees
Open angle	..	..	..	..	..	..	30±3 degrees
Moving contact spring tension	..	..	..	..	..	..	18 to 24 oz (500 to 700 g)
Capacitor capacity	..	..	..	..	..	..	0.20 mfd
Engine firing order	..	..	..	..	..	..	1-3-4-2
Lucas vacuum code	..	..	..	..	..	..	8-20-8

Centrifugal Advance

Check at decelerating speeds

Distributor rev/min	Degs. distributor advance		Crankshaft rev/min	Degs. crankshaft advance	
	Minimum	Maximum		Minimum	Maximum
Below 200	No advance to occur		Below 400	No advance to occur	
400	0.5	2.5	800	1	5
700	5.0	7.0	1400	10	14
900	6.0	8.0	1800	12	16
2200	11.0	13.0	4400	22	26
3000	14.0	16.0	6000	28	32

Vacuum Advance

Inches of mercury vacuum	Degs. distributor advance		Degs. crankshaft advance	
	Minimum	Maximum	Minimum	Maximum
Below 6	No advance to occur			
11	0	3.0	0	6
14	3.0	5.5	6	11
18	5.5	8.5	11	17
20	7.0	9.0	14	18
25	7.0	9.0	14	18



DATA—IGNITION DISTRIBUTOR—STANPART No. 218106

Manufacturer	..	..	..	..	..	..	Lucas
Type	..	..	..	..	..	..	25D4
Lucas part No.	..	..	..	..	..	..	41381
Stanpart No.	..	..	..	..	..	..	218106
Contact gap	..	..	..	..	..	..	0.014 to 0.016 in (0.36 to 0.41 mm)
Rotation—viewed on rotor	..	..	..	..	..	..	Anti-clockwise
Firing angles	..	..	..	..	..	..	90±1 degree
Dwell angle	..	..	..	..	..	..	60±3 degrees
Open angle	..	..	..	..	..	..	30±3 degrees
Moving contact spring tension	..	..	..	..	..	..	18 to 24 oz (500 to 700 g)
Capacitor capacity	..	..	..	..	..	..	0.20 mfd
Engine firing order	..	..	..	..	..	..	1-3-4-2
Lucas vacuum code	..	..	..	..	..	..	5-12-6

Centrifugal Advance

Check at decelerating speeds

Distributor rev/min	Degs. distributor advance		Crankshaft rev/min	Degs. crankshaft advance	
	Minimum	Maximum		Minimum	Maximum
Below 450	No advance to occur		Below 900	No advance to occur	
600	0.5	2.5	1200	1	5
800	3.0	5.0	1600	6	10
1400	5.0	7.0	2800	10	14
1900	6.5	8.5	3800	13	17
2800	7.0	9.0	5600	14	18

Vacuum Advance

Inches of mercury vacuum	Degs. distributor advance		Degs. crankshaft advance	
	Minimum	Maximum	Minimum	Maximum
Below 2	No advance to occur			
3.0	0	0.5	0	1
6.5	0.5	3.0	1	6
8.5	2.5	4.5	5	9
11.0	4.5	6.5	9	13
18.0	5.0	7.0	10	14

IGNITION COIL AND BALLAST RESISTOR

Ignition coil

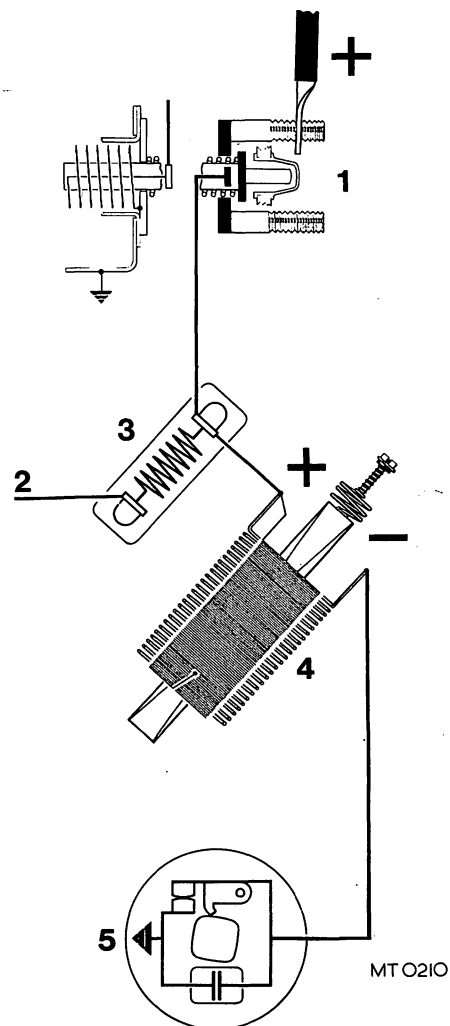
Manufacturer	..	..	..	..	..	Lucas
Type	..	..	..	..	..	16C6
Lucas part No.	..	..	..	..	..	45232
Stanpart No.	..	..	..	..	..	154272
Primary winding resistance	..	..	..	..	..	1.43 to 1.58 ohms

Ballast resistor

Manufacturer	..	..	..	..	..	Lucas
Type	..	..	..	..	..	3BR
Lucas part No.	..	..	..	..	..	47170
Stanpart No.	..	..	..	..	..	134176
Resistance	..	..	..	..	..	1.3 to 1.4 ohms

This system is designed to assist engine starting under adverse conditions. A ballast resistor is positioned in series in the normal supply to the ignition coil. This unit causes a voltage drop in the circuit so that the 12-volt supply from the ignition switch may be employed to power the nominally rated 6-volt ignition coil.

During engine start the resistor is by-passed and the battery voltage (reduced from 12-volt by the starter motor load) is applied to the coil direct from the starter solenoid. This slight voltage overload provides an increased high tension voltage at the spark plugs.



1. Starter solenoid
2. Normal ignition supply
3. Ballast resistor
4. Ignition coil—6 volt
5. Ignition distributor

ELECTRICAL

IGNITION DISTRIBUTOR

—Contact assembly—remove and refit

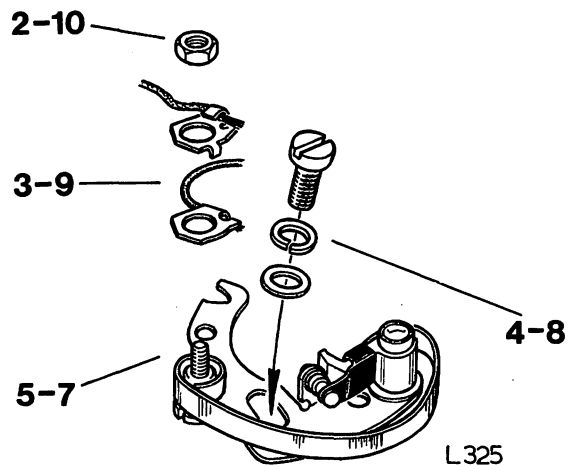
86.35.13

Removing

1. Remove the cover and rotor.
2. Remove the nut.
3. Remove the low tension wire eyelet and capacitor wire eyelet from the post.
4. Remove the lock screw, spring washer and washer.
5. Lift out the Quikafit contact assembly.

Refitting

6. Wipe preservative from the new contact faces.
7. Position the Quikafit contact assembly.
8. Fit the lock screw, spring washer and washer.
9. Position the capacitor wire eyelet and low tension wire eyelet to the post.
10. Fit the metal nut to the nylon thread finger tight. Tighten by rotating half a turn only with a spanner.
11. Adjust the contact gap. 86.35.14.

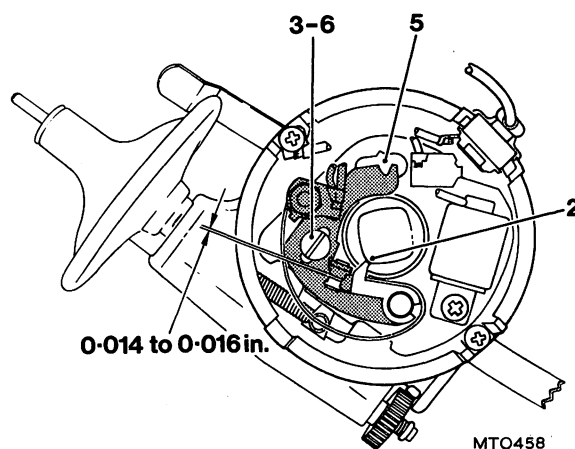


IGNITION DISTRIBUTOR

—Contact gap—adjust

86.35.14

1. Remove the cover and rotor.
2. Rotate the crankshaft to position the contact heel on a cam peak.
3. Slacken the lock screw.
4. Position a 0.014 to 0.016 in (0.36 to 0.41 mm) feeler gauge between the contacts.
5. Move the fixed contact about the pivot to adjust the gap. This may be facilitated by inserting a screwdriver in the slots and twisting to position the fixed contact.
6. Tighten the lock screw.
7. Check that the correct gap has been maintained.
8. Fit the rotor and cover.



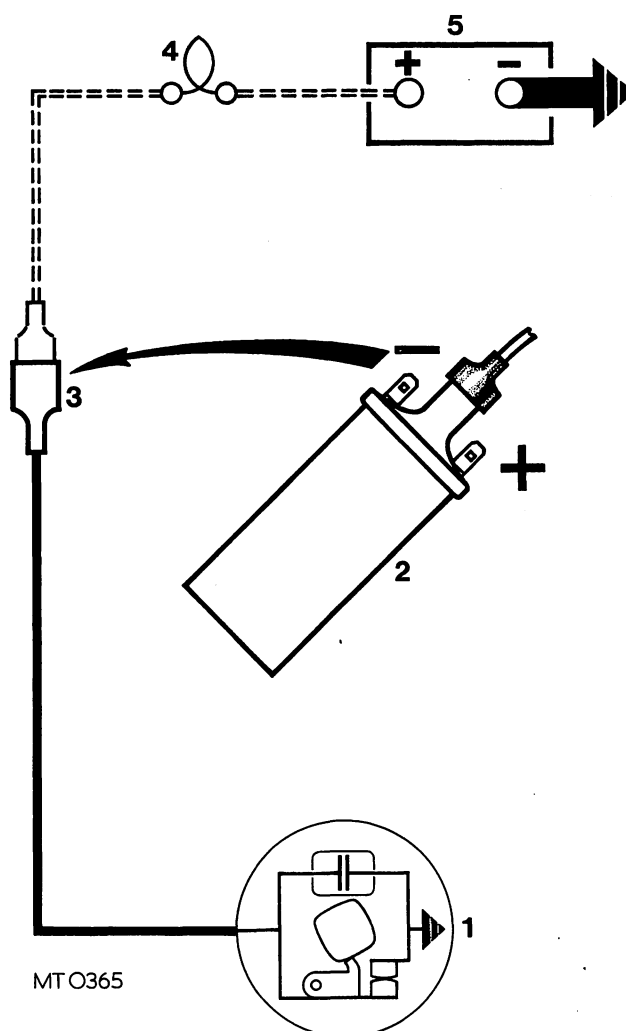
IGNITION DISTRIBUTOR

—Ignition timing—adjust

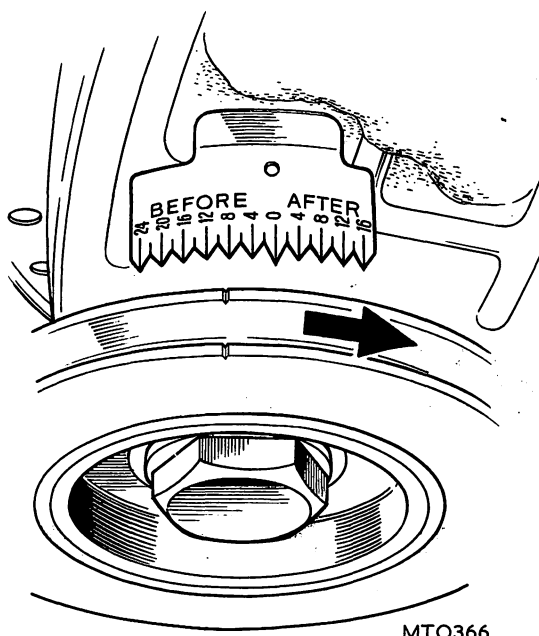
86.35.15

Static

1. Adjust the contact gap. 86.35.14.
2. Disconnect the distributor lead from the coil.
3. Provide a test lamp circuit as shown.
4. Rotate the crankshaft in engine run direction to approximately align the pulley notch with the 24 degree BEFORE on the scale. The test lamp should now be illuminated.
5. Carefully rotate the crankshaft further until the lamp just goes out.
6. If the timing is correct the pulley notch will be aligned with the 9 degree BEFORE on the scale.
7. When the timing is correct operations 8 to 10 may be ignored.
8. If a small correction is required, rotate the micro-meter adjustment nut to advance or retard the timing.
9. If a large correction is required centre the micro-meter adjustment nut and slacken the clamp bolt. Align the pulley notch with the 9 degree BEFORE on the scale. Rotate the distributor body anti-clockwise past the test lamp illumination position. Carefully rotate clockwise until the lamp just goes out. Tighten the clamp bolt with unit in this position.
10. Repeat operation 4 onwards.



1. Distributor—diagrammatic layout
2. Ignition coil
3. Distributor lead removed from coil
4. Test lamp—12 volt
5. Vehicle battery

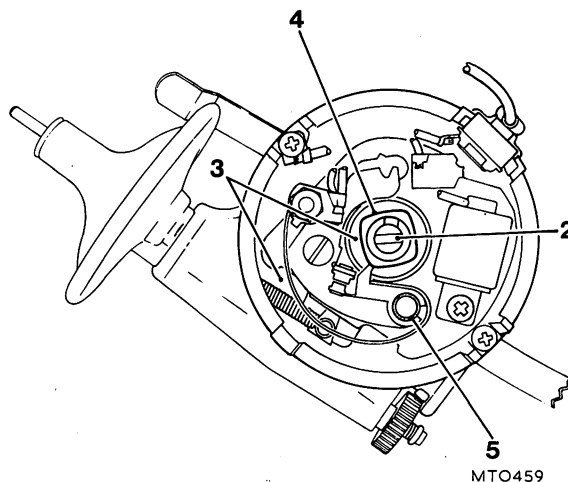


IGNITION DISTRIBUTOR

—Lubrication

86.35.18

1. Remove the cover and rotor.
2. Apply a few drops of engine oil to lubricate the cam spindle bearing.
3. Inject a few drops of engine oil through the apertures to lubricate the centrifugal timing control.
4. Lightly grease the cam with Mobilgrease No. 1 or equivalent.
5. If the moving contact is removed from the post lightly grease post with Shell Retinax A or equivalent.



IGNITION DISTRIBUTOR

—Remove and refit

86.35.20

Removing

1. Pull off the high tension connection to the ignition coil.
2. Pull off the four high tension connections to the spark plugs.
3. Remove the distributor cover.
4. Disconnect the low tension Lucar connector from the distributor.
5. Pull off the vacuum timing control pipe.
6. Remove the nut, washer and bolt to release the clamp plate from the pedestal.
7. Withdraw the distributor from the pedestal.

Refitting

8. Insert the distributor into the pedestal. Ensure that the coupling offset key locates correctly in the drive gear slot.
9. Reverse 1 to 6.
10. Adjust the ignition timing. 86.35.16.

IGNITION DISTRIBUTOR

—Overhaul

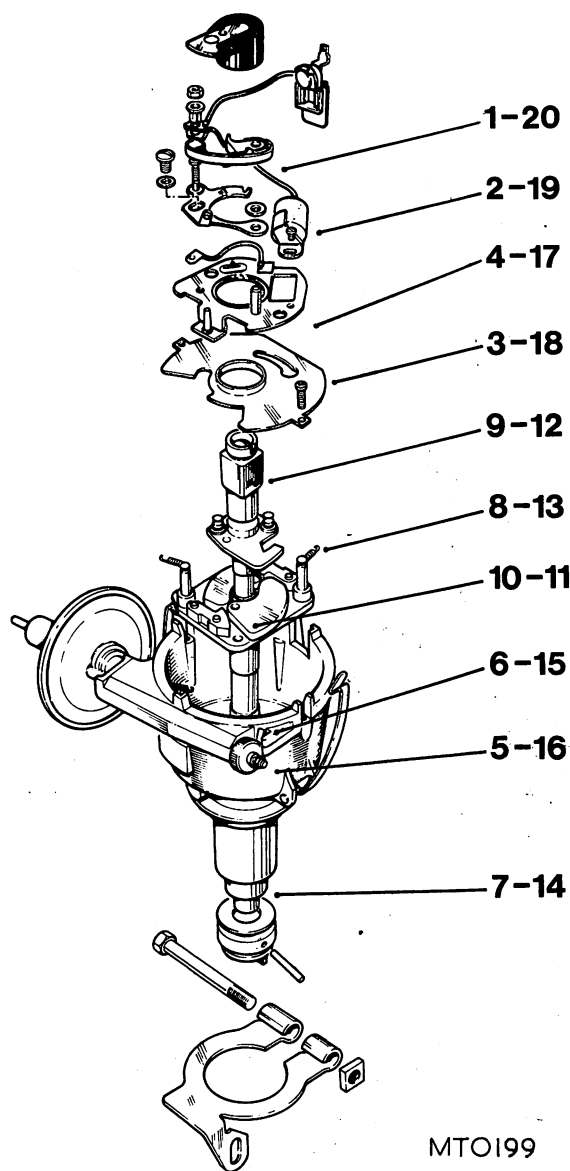
86.35.26

Dismantling

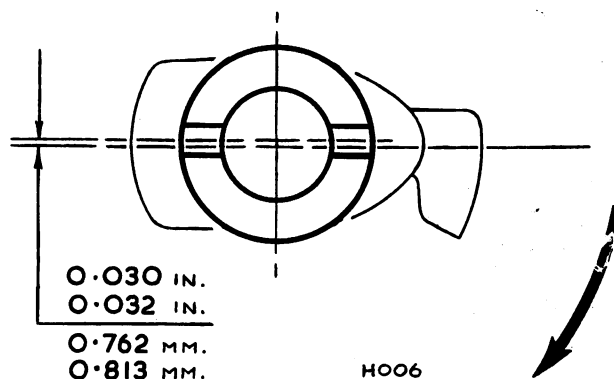
1. Remove the contact assembly. 86.35.13.
2. Remove the screw and lift out the capacitor.
3. Remove the two side screws and spring washers.
4. Withdraw the terminal block. Lift off the link. Withdraw the plate assembly.
5. Prise off the circlip. Unscrew the micrometer adjustment nut and remove the spring. Withdraw the vacuum timing control.
6. Push off the ratchet spring.
7. Tap out the coupling pin. Remove the coupling and thrust washer. Ensure that the shaft is burr-free and withdraw it.
8. Remove the control springs, exercising care not to distort the springs.
9. Remove the cam spindle screw. Withdraw the cam spindle.
10. Remove the weights.

Reassembling

11. Lubricate the action plate sliding surfaces and cam surfaces with Rocol 'Moly pad'. Position the weights on the action plate.
12. Lubricate the cam spindle bearing and cam spindle weight pillars with Rocol 'Moly pad'. Fit the cam spindle either way round to the weights and secure it with the cam spindle screw.
13. Fit the control springs, exercising care not to distort the springs.
14. Lubricate the shaft with Rocol 'Moly pad' and insert it into the body. Fit the thrust washer and coupling. Ensure that the coupling is the correct way round so that the relationship of the coupling offset key to the rotor will be as shown. Secure with the coupling pin.
15. Push on the ratchet spring.
16. Insert the vacuum timing control. Fit the spring and screw on the micrometer adjustment nut. Prise on the circlip.
17. Insert the plate assembly. Lift on the link. Insert the terminal block.
18. Fit the two side screws and spring washers. Include the moving plate earth lead tag in the appropriate screw assembly.
19. Position the capacitor and secure it with the screw.
20. Fit the contact assembly. 86.35.13.
21. Lubricate. 86.35.18.



MTO199



H006

ELECTRICAL

IGNITION COIL AND BALLAST RESISTOR

Ignition coil—remove and refit

86.35.32

Removing

1. Disconnect the two low tension Lucar connectors.
2. Pull off the high tension lead.
3. Remove the two screws, spring washers and washers, and lift out the coil.

Refitting

4. Position the coil and secure it with two washers, spring washers and screws. Include in the rear screw assembly the ballast resistor lug.
5. Push on the high tension lead.
6. Connect the two low tension Lucar connectors as follows:
White/yellow wire to positive terminal.
White/black wire to negative terminal.

IGNITION COIL AND BALLAST RESISTOR

Ballast resistor—remove and refit

86.35.33

Removing

1. Locate the ballast resistor on the left-hand engine bay valance adjacent to the ignition coil.
2. Disconnect the Lucar connectors.
3. Remove the screw, spring washer and washer, and lift out the ballast resistor.

Refitting

4. Position the ballast resistor and secure it with the washer, spring washer and screw.
5. Connect the Lucar connectors as follows:
White wire to lower terminal.
White/yellow wire to upper terminal.

LAMPS

—Headlamp—remove and refit

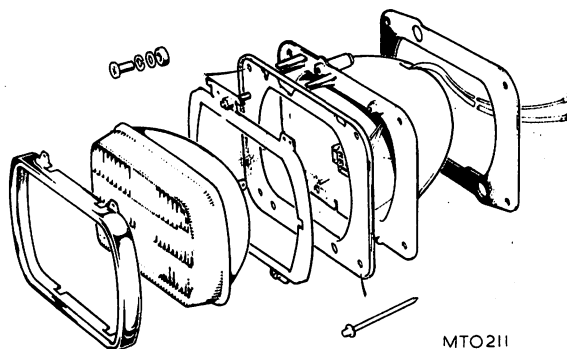
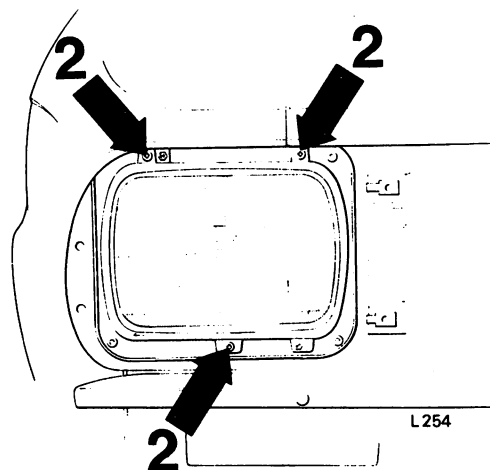
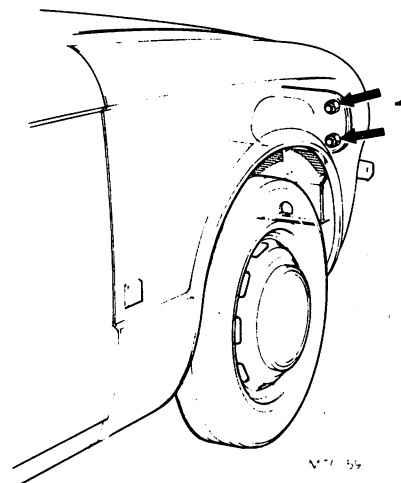
86.40.02

Removing

1. Remove the four screws and washers and two nuts and washers. Withdraw the grille and rim moulding.
2. Remove the three screws to release the retaining rim and light unit.
3. Sealed beam light unit only: Pull the connector block from the light unit.
4. Light unit fitted with bulb only: Pull the connector block from the bulb. Disengage the clip and withdraw the bulb.
- 5.**Early vehicles only—
To remove the housing assembly, drill out four Pop rivets. Lift the bonnet. Disconnect the appropriate connections at the harness breakout. Withdraw the housing assembly.
6. Later vehicles only—
To remove the housing assembly, drill out three Pop rivets. Remove one screw. Lift the bonnet. Disconnect the appropriate connections at the harness breakout. Withdraw the housing assembly.

Refitting

7. Reverse 1 to 6.**



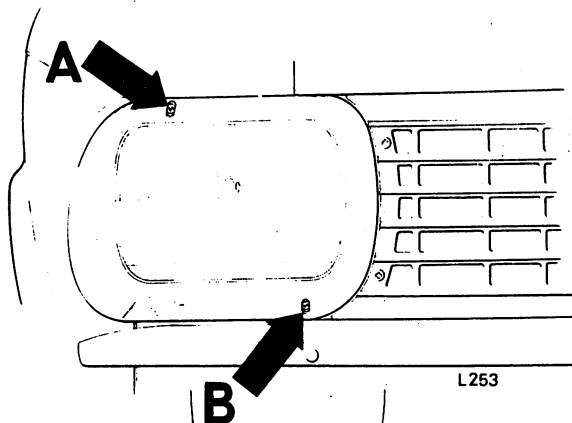
LAMPS

—Headlamp—beam aiming

86.40.18

Two holes in the rim make it possible to adjust the beams without removing the grille and rim moulding. Screw 'A' positions the beam in the horizontal plane. Screw 'B' controls beam height.

Beam aiming can best be accomplished using equipment such as Lucas 'Beam-setter' or 'Lev-L-Lite'. This service is available at Triumph distributors or dealers and will ensure maximum road illumination with minimum discomfort to other road users.



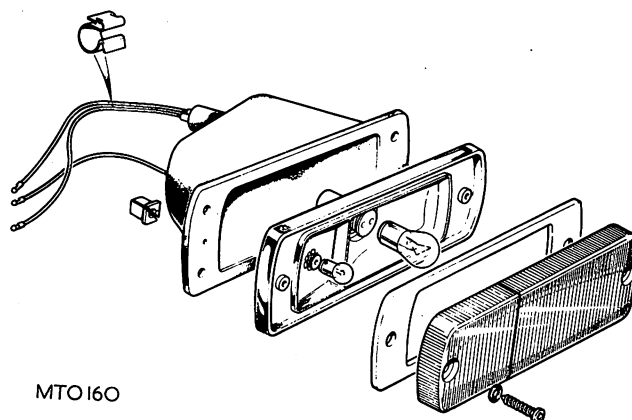
ELECTRICAL

LAMPS

—Front parking and flasher lamp—remove and refit 86.40.26

Removing

1. Remove the two screws and withdraw the lens.
2. Remove the two bulbs from the bayonet fittings.
3. Lift the bonnet. Disconnect the appropriate connections at the harness break-out.
4. Withdraw the complete lamp assembly from the panel.



MT0160

Refitting

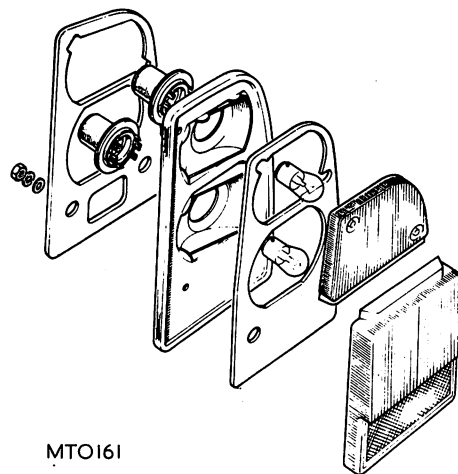
5. Reverse 1 to 4.

LAMPS

—Rear tail/stop and flasher lamp—remove and refit 86.40.70

Removing

1. Open the luggage boot lid.
2. Remove the luggage boot floor covering.
3. Right-hand lamp only: Remove the floor panel.
4. Remove the two screws and withdraw the side trim panel.
5. Disconnect the earth Lucar connector from the lamp base.
6. Pull the two bulb holders from the lamp base. Remove the bulbs from the bayonet fittings.
7. Remove the four nuts, spring washers and washers. Withdraw the lamp assembly from the panel.
8. Remove the two rubber washers and withdraw the upper lens.
9. Remove the two rubber washers and withdraw the lower lens.
10. Lift out the interior gasket.



MT0161

Refitting

11. Reverse 1 to 10.

LAMPS

—Plate illumination lamp—remove and refit 86.40.86

Removing

1. Open the luggage boot lid.
2. Remove the two screws and lift off the cowled rim.
3. Turn back the rubber lip and remove the lens.
4. Pull out the bulb.
5. Disconnect the two wires from the snap connectors.
6. Manoeuvre the rubber lamp body outwards from the panel.

Refitting

7. Reverse 1 to 6. Ensure that the cowled rim is fitted so that light is directed towards the plate.

LAMPS

—Roof lamp—remove and refit 86.45.02

****Early vehicles only****

Removing

1. Isolate the battery.
2. Rotate the lens until the two screws are exposed.
3. Remove the screws and lower the lamp.
4. Carefully remove the festoon bulb.
5. Note the wire colour codes and positions.
6. Disconnect the three Lucar connectors.

Refitting

7. Reverse 1 to 6.

****LAMPS**

—Roof lamp—remove and refit 86.45.02

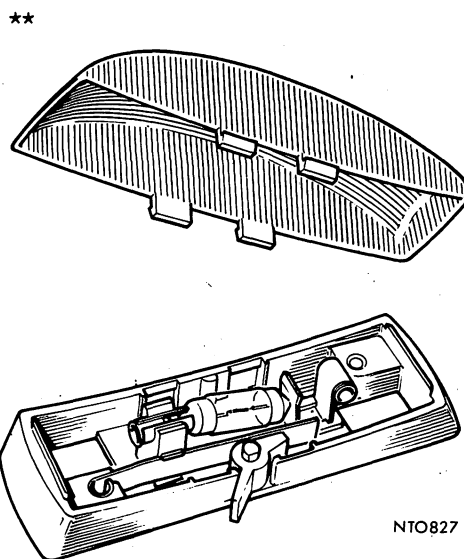
Later vehicles only

Removing

1. Isolate the battery.
2. Gently squeeze the lens adjacent to the clip projections and remove the lens.
3. Carefully remove the festoon bulb.
4. Note the wire colour codes and positions.
5. Disconnect the two terminal ends.
6. Remove two screws and lift off the lamp base.

Refitting

7. Reverse 1 to 6. Include the earth wire tag under the appropriate screw head.**



ELECTRICAL

RELAYS

—Starter solenoid—remove and refit

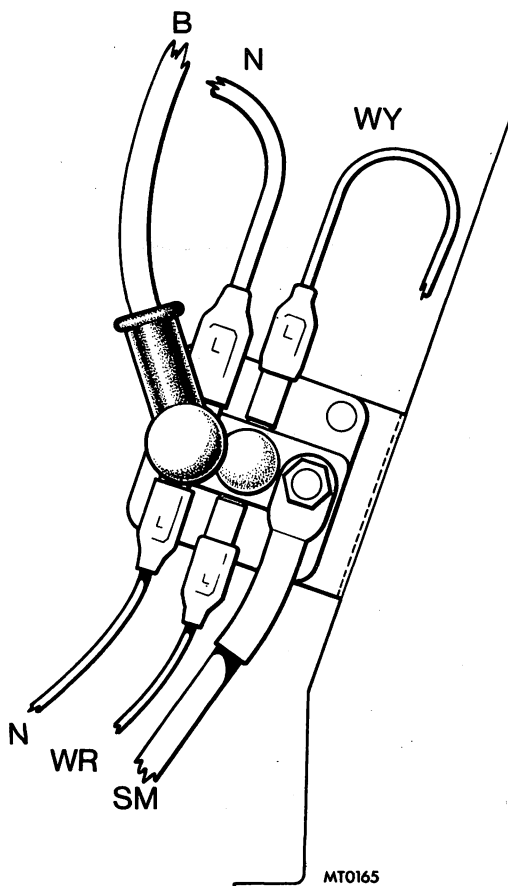
86.55.05

Removing

1. Isolate the battery.
2. Note the four wire colour codes and positions.
3. Disconnect the four Lucar connectors.
4. Note the position of the battery lead and starter motor lead. This is important to ensure correct operation of the ballast resistor starter system.
5. Pull back the rubber protector.
6. Remove the two nuts and spring washers. Disconnect the battery lead and starter motor lead.
7. Note the position of the solenoid.
8. Remove the two screws, washers and spring washers, and lift the solenoid from the vehicle.

Refitting

9. Reverse 1 to 8. Ensure that the battery lead, starter motor lead and four Lucar connectors are positioned as shown. Ensure good electrical contact between the solenoid and the vehicle body.



- B Battery lead
- N Brown wire
- WY White/yellow wire
- N Brown wire
- WR White/red wire
- SM Starter motor lead

FLASHER UNIT

—Turn signal flasher unit—remove and refit

86.55.11

Removing

1. Locate the flasher unit mounted in clip on the forward face of the fascia panel adjacent to the washer/wiper switch.
2. Pull the flasher unit from the clip.
3. Disconnect the Lucar connectors.

Refitting

4. Connect the Lucar connectors: Green wire to terminal 'B'. Light green/brown wire to terminal 'L'.
5. Fit the flasher unit to the clip.

STARTER MOTOR

Data and description

86.60.00

Manufacturer	..	..	..	..	..	..	Lucas
Type	..	..	..	..	..	..	M35J
Lucas part No.	..	..	..	..	..	..	25149
Stanpart No.	..	..	..	..	..	..	200535
Yoke diameter	..	..	..	..	..	..	3.5 in (88.90 mm)
Light running—current	..	..	..	..	..	..	65 amp
speed	..	..	..	..	..	..	8,000 to 10,000 rev/min
Running torque—force	..	..	..	..	..	..	4.4 lbf ft (0.60 kgf m)
current	..	..	..	..	..	..	260 to 275 amp
speed	..	..	..	..	..	..	1,000 rev/min
Lock torque—force	..	..	..	..	..	..	7.0 lbf ft (0.95 kgf m)
current	..	..	..	..	..	..	350 to 375 amp
Commutator minimum skimming thickness	..	..	..	..	..	..	0.080 in (2.03 mm)

Brush length—new	..	..	..	..	..
renew if less than	..	..	..	..	..

Early		Later	
0.625 in	15.88 mm	0.500 in	12.70 mm
0.375 in	9.53 mm	0.375 in	9.53 mm

Brush spring pressure	28 oz (800 g)
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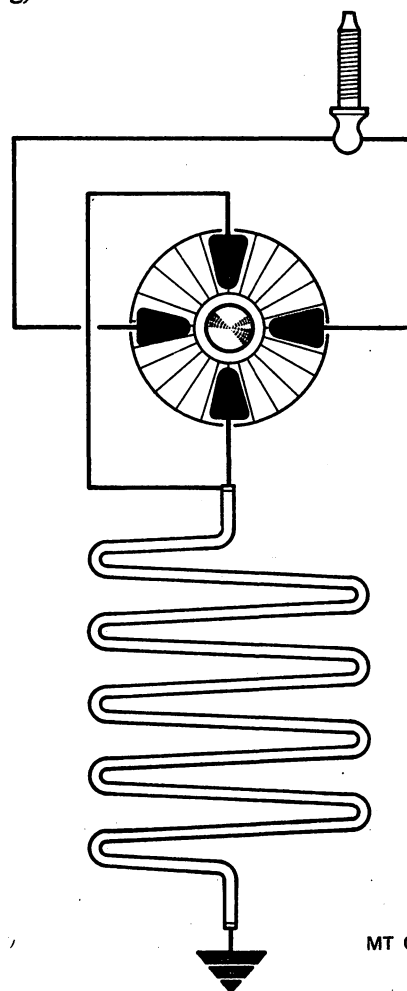
A series-wound, four-pole, four-brush motor with an extended shaft which carries a conventional inertia drive.

The armature shaft rotates in two porous bronze bushes. A squared extension of the shaft protrudes to enable the shaft to be rotated to clear any jamming between the inertia drive and engine flywheel ring gear. The armature features a face-type moulded commutator.

A plastic brush box is riveted to the commutator end bracket. It holds four wedge-shaped brushes and captive coil springs. The brushes are keyed to ensure correct fitting.

The field winding is a continuously wound strip with no joints. One end is attached to two brush flexibles, while the other is attached to a single flexible which is earthed to the yoke.

The yoke is windowless and has no through-bolts. The commutator end bracket is secured by four screws which align with tappings in the yoke. The drive end bracket is attached by two slot-headed bolts which screw into tappings provided in the end faces of two of the pole-shoes.



MT 0166

86.60.00



ELECTRICAL

STARTER MOTOR

—Remove and refit

86.60.01

Removing

1. Isolate the battery.
2. Remove the nut and spring washer. Disconnect the lead from the terminal post.
3. Note the relationship between the starter motor, shims if fitted, packing and clutch housing.
4. Working from below the engine, remove the lower mounting bolt.
5. Working from above the engine, remove the upper mounting bolt.
6. Working from below the engine, withdraw the starter motor downwards from the vehicle complete with the packing and shims if fitted.

Refitting

7. Reverse 1 to 6.

STARTER MOTOR

—Inertia drive—remove and refit

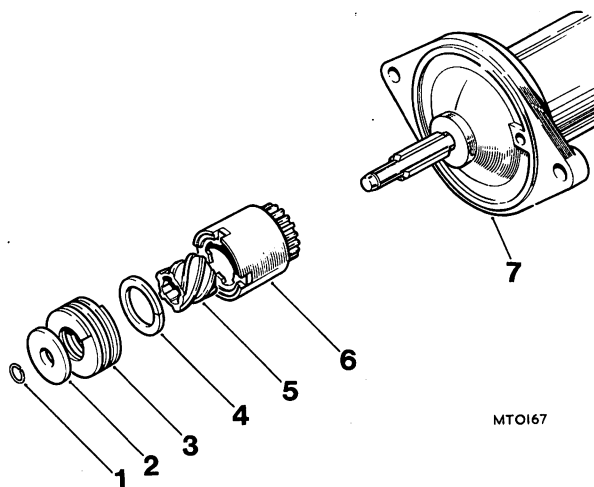
86.60.06

Removing

1. Dismantle the starter motor. 86.60.13, operations 1 to 5.
2. Using a suitable press, compress the main spring and ease the jump ring from the shaft. Churchill hand press S4221A and adaptor S4221A-14 may be employed to perform this operation.
3. Withdraw the inertia drive components from the shaft.

Refitting

4. Lightly lubricate the drive end bracket bush with thin engine oil. Position the drive end bracket.
5. Fit the inertia drive components to the shaft as shown. The screwed sleeve may be fitted either way round.
6. Using a suitable press, compress the main spring and fit the jump ring to the shaft.
7. Reassemble the starter motor. 86.60.13, operations 22 to 26.



1. Jump ring
2. Shaft collar
3. Main spring
4. Buffer washer
5. Screwed sleeve
6. Pinion and barrel
7. Drive end bracket

86.60.01

86.60.06

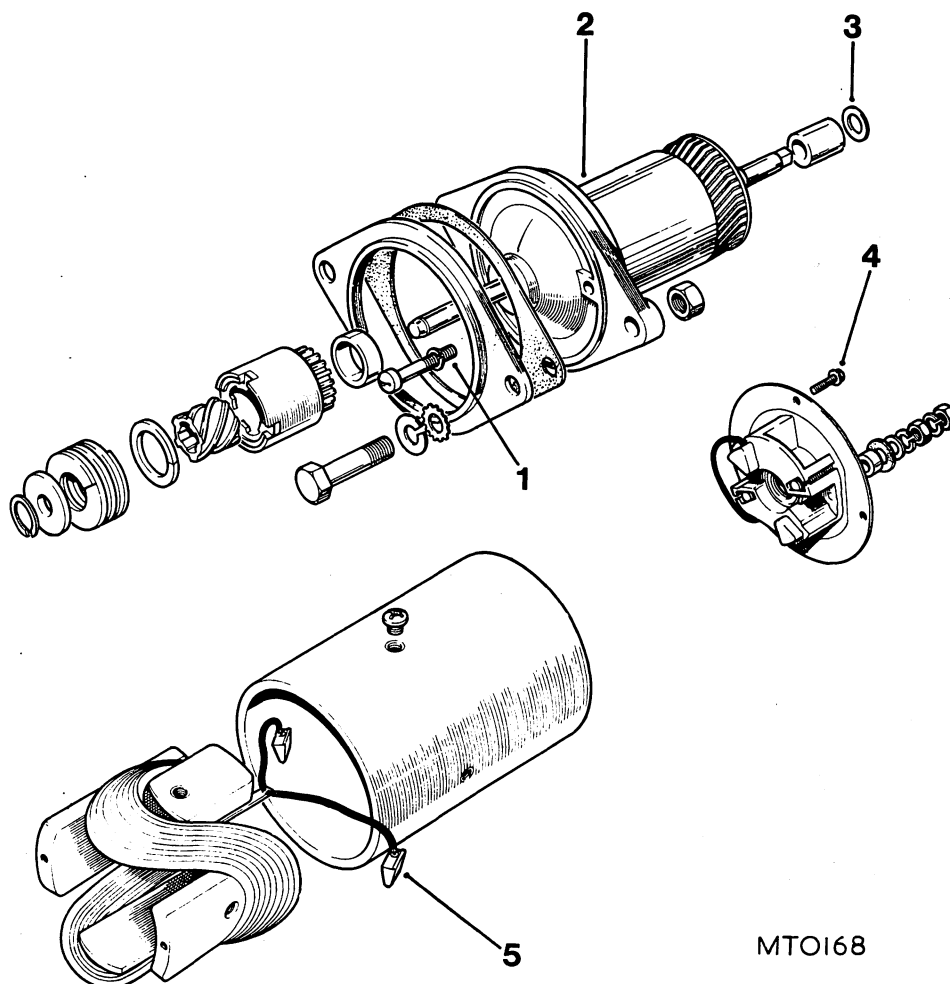
STARTER MOTOR

—Overhaul

86.60.13

Dismantling

1. Remove the two drive end bracket bolts and spring washers.
2. Withdraw the drive end bracket, armature and inertia drive assembly complete from the yoke.
3. Remove the thrust washer.
- 4.**Remove the four bolts and lift aside the commutator end bracket.**
5. Lift out the two field winding brushes from the brush box to separate the commutator end bracket from the yoke.

continued

MTO168

Armature

6. To separate the armature from the drive end bracket and interia drive, perform the following. Remove the interia drive, 86.60.06, and slide the drive end bracket from the shaft.
7. Inspect the laminations for score marks. These may indicate a bent shaft, worn bearings or a loose pole-shoe.
8. Clean the commutator with a petrol-moistened cloth. If the commutator is in good condition it will be smooth and free from pits or burned spots.
9. If necessary, polish the commutator with fine glass-paper.
10. If necessary, skim the commutator. Mount the armature in a lathe and rotate at high speed. Using a very sharp tool, take a light cut. Polish with fine glass-paper. Do not cut below the minimum skimming thickness given in Data. Do not undercut insulators between segments.

Bearings

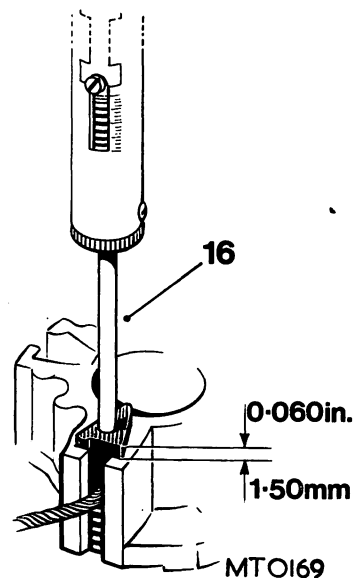
11. Inspect the porous bronze bearing bushes for wear.
12. If necessary, renew the commutator end bracket bush. Drill out the two rivets and discard the plate and felt seal. Screw a $\frac{1}{2}$ in tap squarely into the bush and withdraw. Prepare the porous bronze bush by immersing it in thin engine oil for 24 hours. Using a highly polished, shouldered mandrel suitably dimensioned and a suitable press, fit the bush. Do not ream the bush after fitting or its porosity may be impaired. Assemble the brush box, commutator end bracket, felt seal and plate. Secure with two rivets.
13. If necessary, renew the drive end bracket bush. Remove the interia drive, 86.60.06, and slide the drive end bracket from the shaft. Support the bracket and press out the bush. Prepare the porous bronze bush by immersing it in thin engine oil for 24 hours. Using a highly polished, shouldered mandrel suitably dimensioned and a suitable press, fit the bush. Do not ream the bush after fitting or its porosity may be impaired.

continued



Brushes

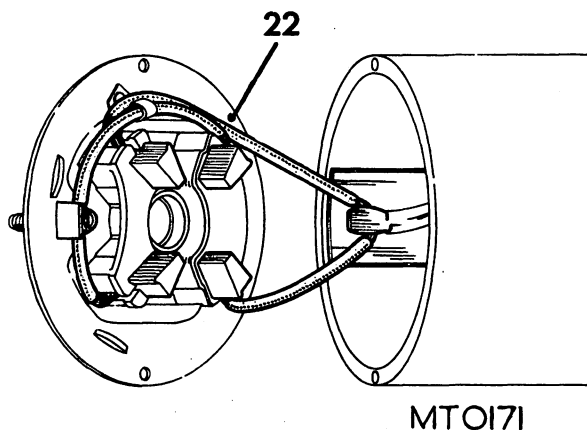
14. Clean the brushes and brush box with a petrol-moistened cloth.
15. Check that the brushes move freely in the brush box.
16. Check the brush spring pressure as shown. Position a new brush so that the top protrudes 0.060 in (1.50 mm) above the brush box. Brush spring pressure should be as given in Data. Repeat for the remaining three springs. If the pressure is low, renew the commutator end bracket assembly.
17. Check the brush length. Renew the brushes if less than the length given in Data.
18. If necessary, renew the commutator end bracket brushes. Brushes are supplied attached to a new terminal post. Withdraw the two brushes from the brush box. Remove the terminal post outer attachments. Withdraw the terminal post and remove the insulation piece. Reverse to assemble. Retain the longer flexible under the clip.
19. If necessary, renew the field winding brushes. Brushes are supplied attached to a common flexible. Cut the old flexibles 0.250 in (6 mm) from the joint. Solder the new flexible to the ends of the old flexible. Do not attempt to solder direct to the field winding strip as the strip may be produced from aluminium.

**Field winding**

20. If necessary, check the field winding insulation from the yoke as follows. Drill out the rivet at the earth connection. Apply the normal 110-volt a.c. test-lamp circuit to the field winding and yoke. Do not attempt to disconnect the flexible from the field winding strip as the strip may be produced from aluminium.
21. If necessary, renew the field winding. Drill out the rivet at the earth connection. Using a wheel-operated screwdriver, slacken the four pole-shoe screws. Remove two diametrically opposite screws and pole-shoes. Slacken the remaining two screws sufficient to allow the field winding to be withdrawn from the yoke. Reverse to assemble.

Reassembling

22. Insert the two field winding brushes into the brush box with the flexibles positioned as shown.
23. Position the commutator end bracket and secure it with four 4 B.A. bolts.
24. Fit the thrust washer.
25. Insert the drive end bracket, armature and interia drive assembly complete into the yoke.
26. Fit the two drive end bracket bolts and spring washers.



ELECTRICAL

SWITCHES—1970 TO 1972 MODELS

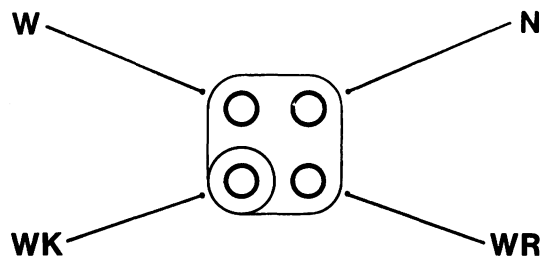
Data

86.65.00

Ignition/starter switch

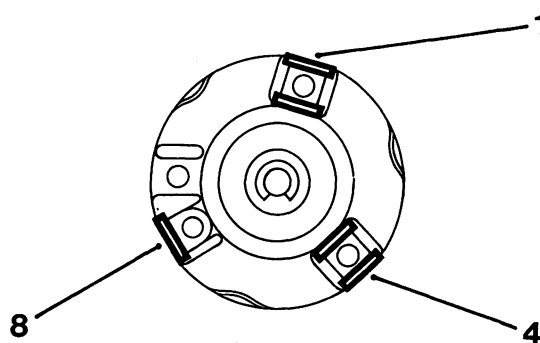
View on switch harness plug:

Position 0	Off	No connections
Position 1	Auxiliary	N to WK
Position 2	Ignition	N to WK to W
Position 3	Start	N to W to WR



Master light switch

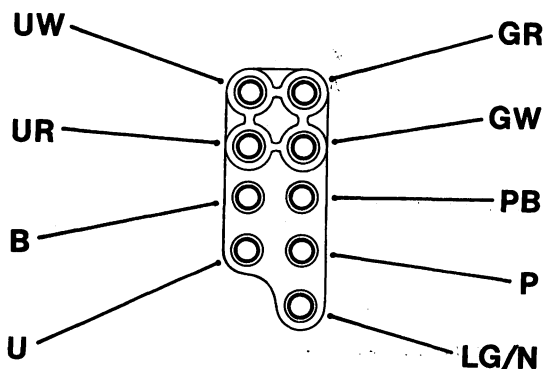
Position	Off	No connections
Position	Side	4 to 1
Position	Head	4 to 1 to 8



Steering-column combination switch

View on switch harness plug:

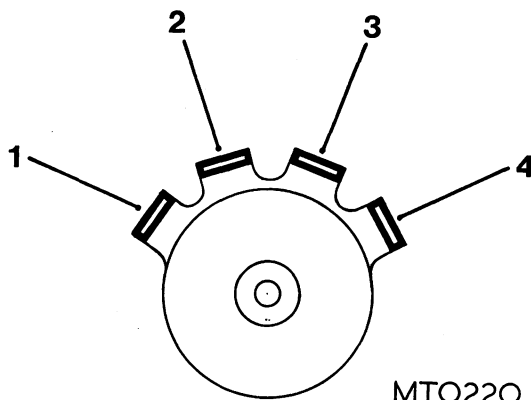
Position	Head main	U to UW
Position	Head dip	U to UR
Position	Head flash	P to UW
Position	L.H. turn signal	LG/N to GR
Position	R.H. turn signal	LG/N to GW
Position	Horn	PB to B



Windscreen wiper switch

Used when single-speed wiper motor is fitted to vehicle.
Terminal 4 is not used.

Position	Park	1 to 2
Position	On	2 to 3

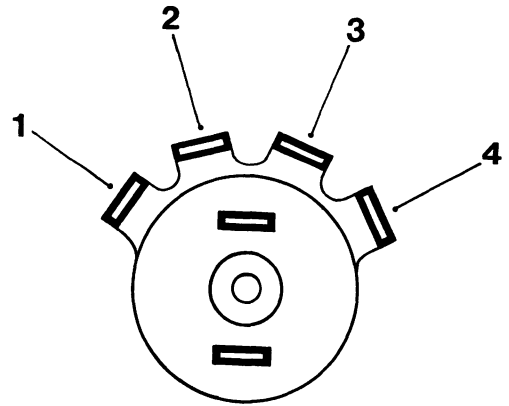


MT0220

Windscreen washer/wiper switch

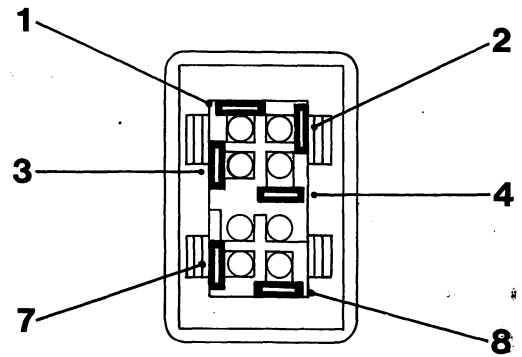
Used when two-speed wiper motor and electric washer pump are fitted to vehicle.

Position	Park	1 to 2
Position	Normal speed	2 to 3
Position	High-speed	3 to 4
Position	Wash	Two centre terminals connected

**Hazard switch**

*Used when hazard warning system is fitted to vehicle.
Terminal 4 is not used:*

Position	Off	7 to 8
Position	Hazard	1 to 2 to 3



MTO562

ELECTRICAL

SWITCHES

—Ignition/starter switch—remove and refit 86.65.02

Removing

1. Isolate the battery.
2. Remove the two screws and lift off nacelle upper half.
3. Remove the single screw and detach nacelle lower half.
4. Prise off the trim board—four clips. 76.67.01, operation 1.
5. Locate the harness plug associated with the ignition/starter switch by reference to colour codes. Disconnect the harness plug.
6. To assist positioning of the Pozidriv screwdriver at operation 7 below, remove the three screws and detach the parcel tray finisher.
7. Remove the two small Pozidriv screws and withdraw the switch from the steering-column lock assembly.
8. Unwind any tape holding the harnesses to the column.
9. Carefully withdraw the switch harness and remove the switch unit from the vehicle.

Refitting

10. Reverse 1 to 9. When inserting the switch to the steering column lock assembly, note the keyway and ensure that the lock shaft and switch are aligned for correct engagement.

SWITCHES

—Master light switch—remove and refit 86.65.09

Removing

1. Isolate the battery.
2. Locate the hole in the underside of the knob. Insert a suitable probe into the hole and, while depressing, pull the knob from the shaft.
3. Use a suitable tool to slacken the bezel. Unscrew the bezel.
4. Withdraw the switch from the fascia and manoeuvre it to a visible position.
5. Note the wire colour codes and positions.
6. Disconnect the three Lucar connectors.

Refitting

7. Reverse 1 to 6.

86.65.02

86.65.09



SWITCHES**—Door switch—remove and refit****86.65.14****Removing**

1. Open the appropriate door.
2. Remove the single screw.
3. Withdraw the switch.
4. Disconnect the terminal end.

Refitting

5. Reverse 1 to 4.

SWITCHES**—Luggage boot illumination switch—remove and refit****86.65.22****Removing**

1. Open the luggage boot lid.
2. Locate the switch mounted on the right-hand hinge assembly.
3. Pull the switch from the bracket.
4. Disconnect the terminal end.

Refitting

5. Reverse 1 to 4. Ensure good electrical contact between the switch and the vehicle body.

ELECTRICAL

SWITCHES

—Oil pressure switch—remove and refit 86.65.30

Removing

1. Disconnect Lucar connector.
2. Using spanner unscrew switch from block.

Refitting

3. Screw switch into block and tighten to 11 to 14 lbf ft (1.5 to 2.0 kg m). Thread is tapered. Do not attempt to seat switch shoulder.
4. Connect Lucar connector.

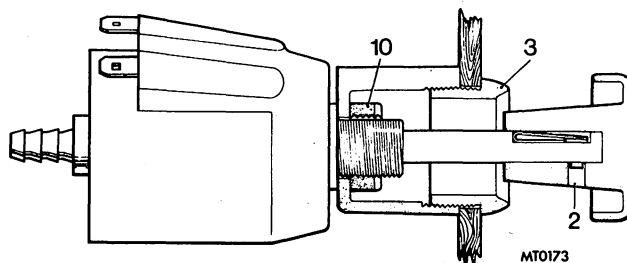
SWITCHES

—Windscreen wiper switch—remove and refit 86.65.38

Used with single-speed wiper motor.

Removing

1. Isolate the battery.
2. Locate the hole in the underside of the knob. Insert a suitable probe into the hole and, while depressing, pull the knob from the shaft.
3. Use a suitable tool to slacken the bezel. Support the switch behind the fascia and unscrew the bezel.
4. Withdraw the switch from the fascia and manoeuvre it to a visible position.
5. Note the wire colour codes and positions.
6. Disconnect the three Lucar connectors.
7. Prepare for minor water spillage.
8. Note the pipe positions by marking one with tape.
9. Pull off the two pipes.



Refitting

10. Ensure that the switch is attached securely to the spacer. If not, tighten the slotted ring.
11. Reverse 1 to 9.

SWITCHES

—Stop lamp switch—remove and refit 86.65.51

Removing

1. Isolate the battery.
2. Locate the switch adjacent to the brake pedal arm above the steering-column.
3. Disconnect the two Lucar connectors.
4. Slacken the large hexagon nut.
5. Unscrew the switch from the nut and remove it from the vehicle. The nut and washer may remain *in situ* retained by the spring-loaded brake pedal arm.

Refitting

6. Reverse 1 to 5. Do not overtighten the nut on the plastic threads or the switch may be damaged.
- **NOTE:** When setting the position of the stop lamp switch, the distance between the face (brake pedal side) of the switch bracket to the brake pedal should be 0.60 in (15.24 mm) with the brake pedal not operated.**
7. Switch on the ignition and perform functional check of the stop lamp circuit.

SWITCHES

—Steering-column combination switch—remove and refit 86.65.55

Removing

1. Isolate the battery.
2. Remove the two screws and lift off nacelle upper half.
3. Remove the single screw and detach nacelle lower half.
4. Prise off the trim board—four clips. 76.67.01, operation 1.
5. Locate the harness plug associated with the steering-column combination switch by reference to colour codes. Disconnect the harness plug.
6. Remove the two screws to release clamp and switch.
7. Unwind any tape holding the harnesses to the column.
8. Carefully withdraw the switch harness and remove the switch unit from the vehicle.

Refitting

9. Reverse 1 to 8.



FUSE CHART

Fuse	Circuits	Amps.	Colour Code	Lucas Part No.	Stanpart No.
BATTERY CONTROL	Horn Headlamp flash Luggage boot lamp Roof lamp	35	White	188218	58465
IGNITION CONTROL	Temperature indication Fuel indication Heater Reverse lamp (optional extra) Windscreen wiper Stop lamp Turn signal	35	White	188218	58465

FUSE SYSTEM**—Fuse—remove and refit****86.70.02****Removing**

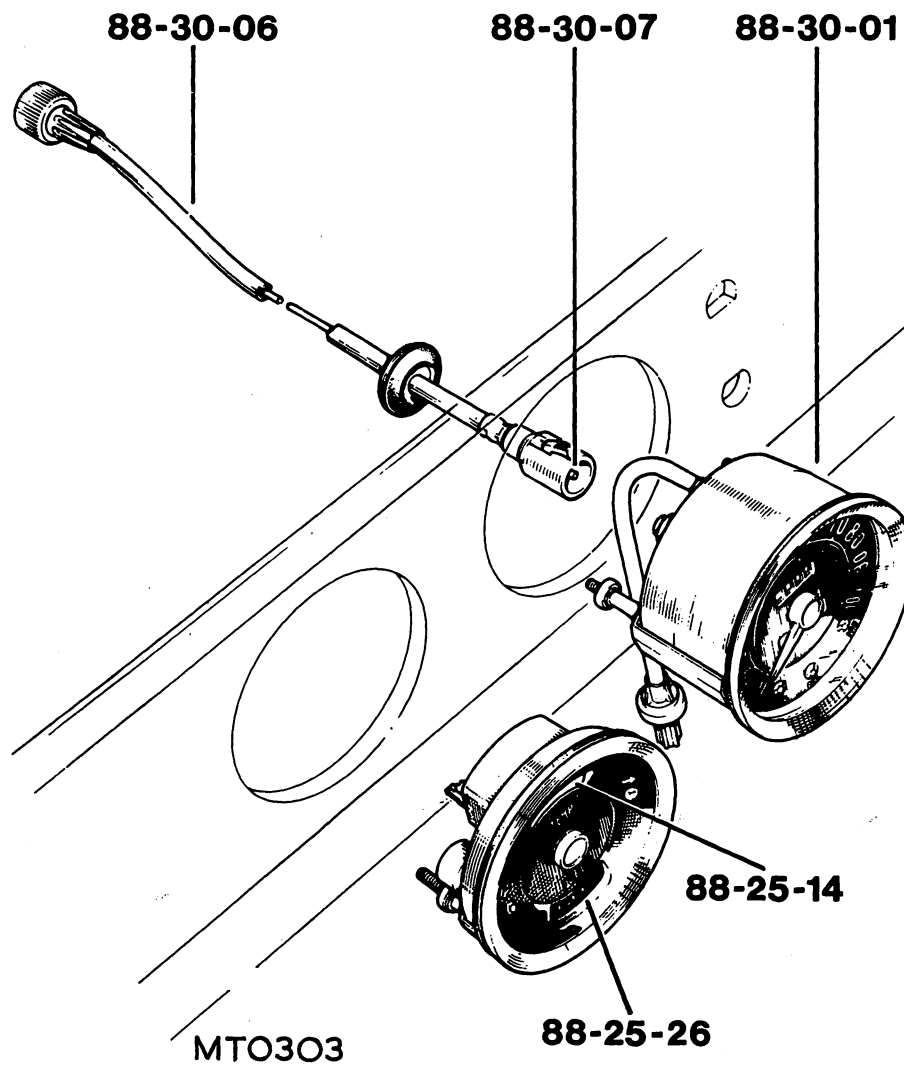
1. Lift the bonnet and locate the fusebox on the bulkhead.
2. Pull off the plastic cover.
3. Identify the defective fuse.
4. Carefully lever the fuse from the contacts.

Refitting

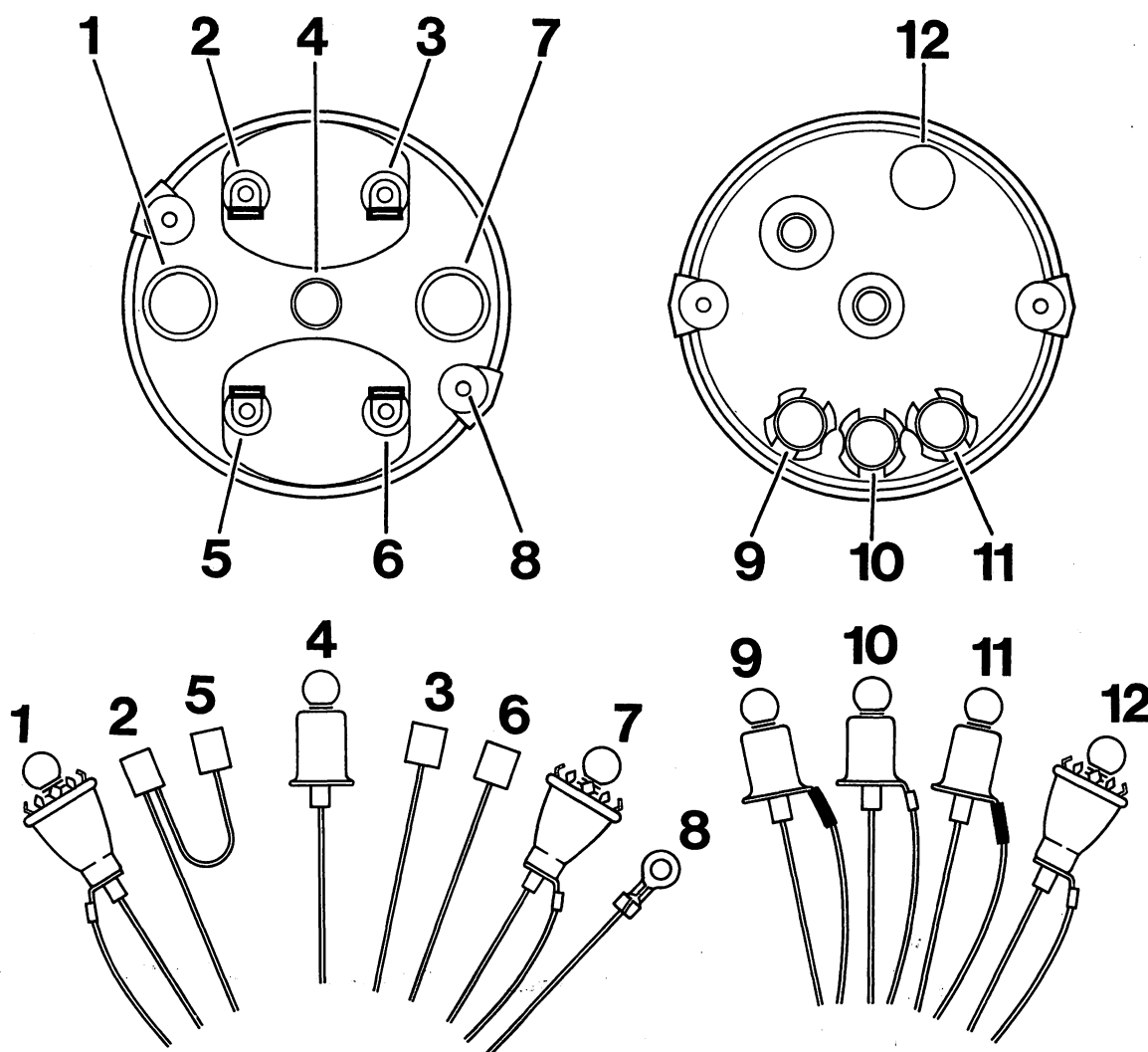
5. Reverse 1 to 4.

INSTRUMENTS OPERATIONS

Fascia connections..	..	..	..	..	..	..	..	..	..	..	88.00.01
Fuel indicator—remove and refit..	..	..	..	..	..	..	..	..	..	..	88.25.26
Fuel tank unit—remove and refit	..	..	..	..	..	..	..	..	..	..	88.25.32
Speedometer—remove and refit ..	..	..	..	..	..	..	..	..	..	..	88.30.01
Speedometer cable—complete—remove and refit	..	..	..	..	..	..	..	..	..	..	88.30.06
Speedometer cable—inner—remove and refit ..	..	..	..	..	..	..	..	..	..	..	88.30.07
Temperature indicator—remove and refit	..	..	..	..	..	..	..	..	..	..	88.25.14
Temperature transmitter—remove and refit	..	..	..	..	..	..	..	..	..	..	88.25.20
Voltage stabilizer—remove and refit	..	..	..	..	..	..	..	..	..	..	88.20.26



FASCIA CONNECTIONS



MTO263

No.	Colour Code	Connection	Component
1	GW and B	Bulb holder	R.H. turn signal warning light
2	LG	Lucar	Temperature indicator
3	GU	Lucar	Temperature indicator
4	R	Bulb holder	Instrument illumination
5	LG	Lucar	Fuel indicator
6	GB	Lucar	Fuel indicator
7	GR and B	Bulb holder	L.H. turn signal warning light
8	B	Eyelet	Earth
9	W and NY	Bulb holder	Ignition warning light
10	W and WN	Bulb holder	Oil pressure warning light
11	UW and B	Bulb holder	Main beam warning light
12	R and B	Bulb holder	Instrument illumination

INSTRUMENTS

VOLTAGE STABILIZER

—Remove and refit

88.20.26

Removing

1. Open the bonnet.
2. Locate the voltage stabilizer on the bulkhead above the fuse box.
3. Disconnect the two Lucar connectors.
4. Remove the screw to release the voltage stabilizer.

Refitting

5. Reverse 1 to 4. Connect the Lucar connectors as follows:
Green wire to terminal B. Light green wire to terminal I.

TEMPERATURE INDICATOR

—Remove and refit

88.25.14

Removing

1. Isolate the battery.
2. Prise off the trim board—four clips. 76.67.01. operation 1.
3. Remove one inboard knurled nut, spring washer and short clamp bracket.
4. Slacken one outboard knurled nut. It is not necessary to remove this second nut.
5. Withdraw the combination instrument until it is possible to obtain access to the rear.
6. Disconnect the four Lucar connectors.
7. Pull out the panel light bulb holder.
8. Pull out the two turn signal warning light bulb holders.
9. Carefully remove the two screws and lift off temperature indicator unit.

Refitting

10. Reverse 1 to 9. Ensure that the three bulb holders and four Lucar connectors are positioned as shown on fascia connections 88.00.01. Include the earth lead eyelet under the spring washer and knurled nut.
11. Switch on the ignition and perform a functional check of the turn signal circuit to ensure that the left-hand and right-hand warning lights give correct side indication.

TEMPERATURE TRANSMITTER

—Remove and refit

88.25.20

Removing

1. Drain part of the coolant. 26.10.01.
2. Locate the transmitter on the water pump body.
3. Disconnect the Lucar connector.
4. Unscrew the transmitter from the water pump.

Refitting

5. Reverse 1 to 4. If available, fit a new sealing washer.



INSTRUMENTS

FUEL INDICATOR

—Remove and refit

88.25.26

Removing

1. Isolate the battery.
2. Prise off the trim board—four clips. 76.67.01, operation 1.
3. Remove one inboard knurled nut, spring washer and short clamp bracket.
4. Slacken one outboard knurled nut. It is not necessary to remove this second nut.
5. Withdraw the combination instrument until it is possible to obtain access to the rear.
6. Disconnect the four Lucar connectors.
7. Pull out the panel light bulb holder.
8. Pull out the two turn signal warning light bulb holders.
9. Carefully remove the two screws and lift off the fuel indicator unit.

Refitting

10. Reverse 1 to 9. Ensure that the three bulb holders and four Lucar connectors are positioned as shown on fascia connections 88.00.01. Include the earth lead eyelet under the spring washer and knurled nut.
11. Switch on the ignition and perform a functional check of the turn signal circuit to ensure that the left-hand and right-hand warning lights give correct side indication.

FUEL TANK UNIT

—Remove and refit

88.25.32

Removing

1. Open the luggage boot lid.
2. Remove the luggage boot floor covering.
3. Release one piece of adhesive tape and swing back the cover board.
4. Disconnect the two Lucar connectors.
5. Release the locking ring by tapping anti-clockwise. Remove the locking ring.
6. Carefully withdraw the tank unit.
7. Remove the sealing washer.

Refitting

8. Reverse 1 to 7.

88.25.26

88.25.32

SPEEDOMETER

—Remove and refit

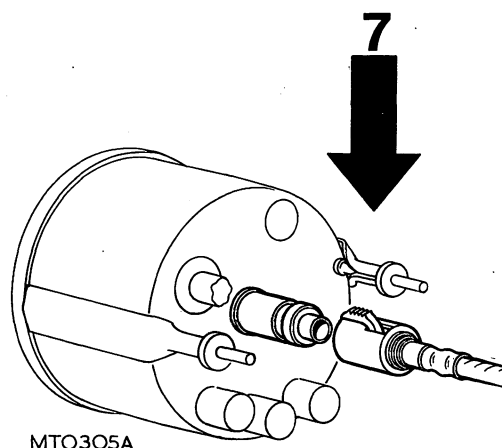
88.30.01

Removing

1. Isolate the battery.
2. Remove the two knurled nuts, spring washers and clamp brackets.
3. Withdraw the speedometer until it is possible to obtain access to the rear.
4. Unscrew the trip reset knurled nut at the attachment to the fascia support rail.
5. Pull out the panel light bulb holder.
6. Pull out the three warning light bulb holders.
7. Depress the lever to release the catch from the annular groove in the boss. Pull the speedometer cable from the instrument.

Refitting

8. Using long-nosed pliers, withdraw the inner cable about 1 in (30 mm).
9. Engage the inner cable to the instrument.
10. Push the outer cable attachment over the boss. Ensure that the catch engages in the annular groove.
11. Reverse 1 to 6. Ensure that the four bulb holders are positioned as shown on fascia connections 88.00.01.



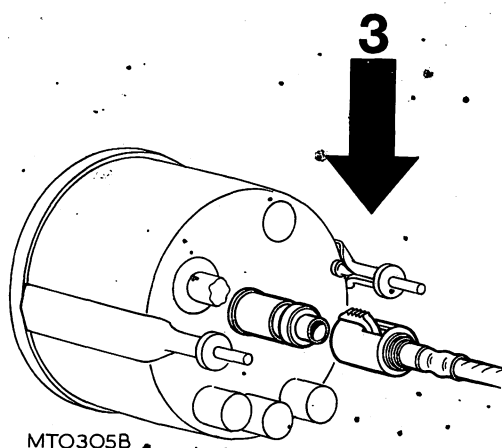
SPEEDOMETER CABLE—COMPLETE

—Remove and refit

88.30.06

Removing

1. Place the vehicle on a ramp.
2. Withdraw the speedometer until it is possible to obtain access to the rear. 88.30.01. operations 1 to 3.
3. Depress the lever to release the catch from the annular groove in the boss. Pull the speedometer cable from the instrument.
4. Working from below the vehicle, unscrew the speedometer cable knurled nut from the gearbox extension.
5. To assist refitting, carefully note the cable run relative to other components from the instrument down to the body panel aperture.
6. Manoeuvre the speedometer cable downwards through the grommet aperture and detach it from the vehicle.

*continued*

Refitting

7. Reverse 4 to 6. Seal the grommet to the body panel with approved sealer to ensure a waterproof joint.
8. Withdraw the inner cable about 1 in (30 mm).
9. Engage the inner cable to the instrument.
10. Push the outer cable attachment over the boss. Ensure that the catch engages in the annular groove.
11. Insert the speedometer into the fascia panel.
12. Fit the two clamp brackets, spring washers and knurled nuts.
13. Connect the battery.

SPEEDOMETER CABLE—INNER

—Remove and refit

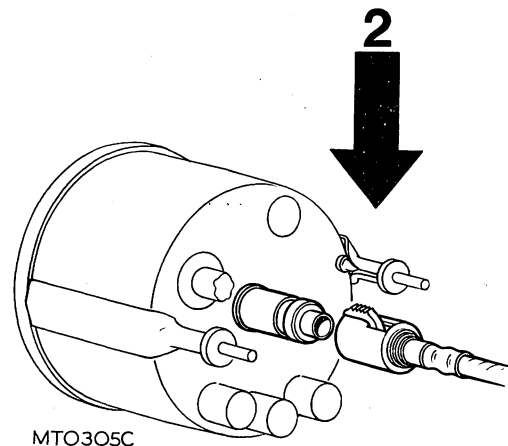
88.30.07

Removing

1. Withdraw the speedometer until it is possible to obtain access to the rear. 88.30.01, operations 1 to 3.
2. Depress the lever to release the catch from the annular groove in the boss. Pull the speedometer cable from the instrument.
3. Using long-nosed pliers, withdraw the inner cable. Take care not to contaminate the upholstery or fittings with grease.

Refitting

4. Sparingly grease the inner cable. Do not use oil.
5. Feed the inner cable into the outer cable. Rotate slightly to assist operation.
6. Withdraw the inner cable about 8 in (200 mm) and wipe off surplus grease. Re-insert the inner cable. Rotate slightly to assist engagement of the squared end to the drive gear.
7. Withdraw the inner cable about 1 in (30 mm).
8. Engage the inner cable to the instrument.
9. Push the outer cable attachment over the boss. Ensure that the catch engages in the annular groove.
10. Insert the speedometer into the fascia panel.
11. Fit the two clamp brackets, spring washers and knurled nuts.
12. Connect the battery.



SERVICE TOOLS

Tool No.	Description	Tool No.	Description
18G 47 BD	Differential carrier bearing remover	335	Connecting rod aligning jig
18G 131 C	Differential case spreader	336	Master arbor
18G 131 E	Adaptor set	S 336-4	Connecting rod arbor adaptor
18G 134 DH	Differential bearing replacer	S 337	Pinion flange holder
18G 191	Pinion height gauge	** RG 421	Flange holder**
18G 191 M	Dummy pinion	550	Driver handle
60 A	Valve guide remover/replacer	S 4221 A	Hand press
S 60 A-2	Adaptor	S 4221 A-5	Coil spring remover/replacer
S 60 A-6	Adaptor	S 4221 A-8C	Differential bearing remover
S 101	Differential case spreader	S 4221 A-17	Pinion bearing remover/replacer
S 108	Pinion height setting gauge	S 4221 A-18	Coil spring compressor
S 109 C	Hub remover	S 4221 A-19	Mainshaft ball race remover/replacer
S 144	Mainshaft circlip remover	4235 A	Slide hammer
S 145	Mainshaft circlip replacer	S 4235 A-1	Axle shaft remover
S 304	Hub ball bearing replacer	** S 4235 A-2**	Constant pinion remover adaptor
S 306	Brake adjusting wrench	6118 B	Valve spring compressor
S 314	Mainshaft ball bearing replacer	S 6118-1	Valve spring compressor adaptor

All Service Tools mentioned in this Manual must be obtained direct from the manufacturers:

Messrs. V. L. Churchill & Co. Ltd.

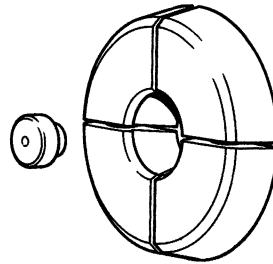
P.O. Box No. 3

London Road

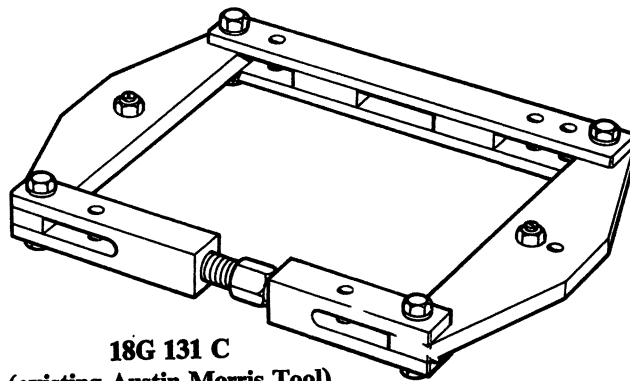
Daventry, Northants



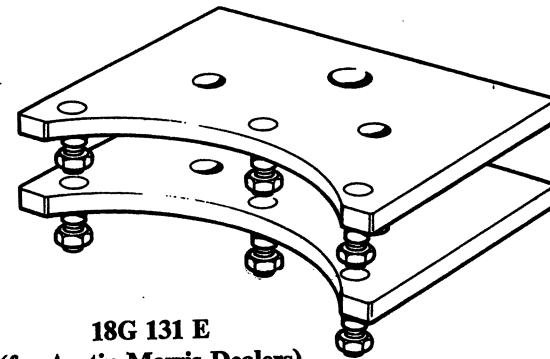
SERVICE TOOLS



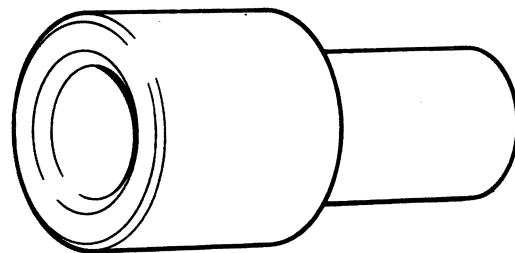
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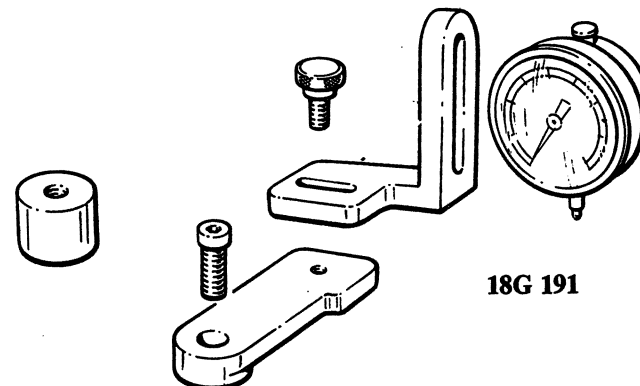
18G 131 C
(existing Austin-Morris Tool)



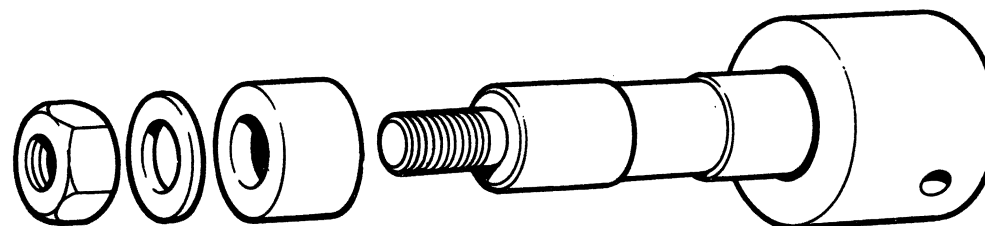
18G 131 E
(for Austin-Morris Dealers)



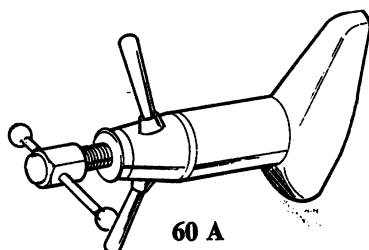
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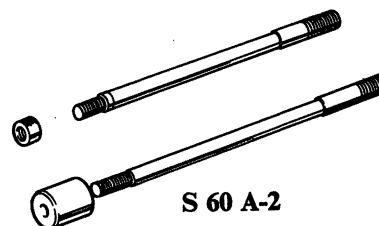
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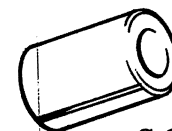
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60 A



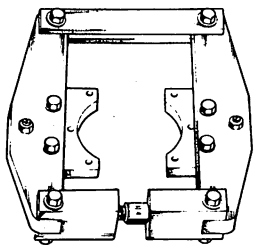
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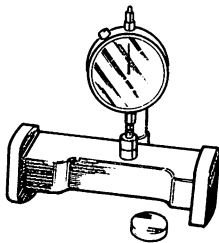
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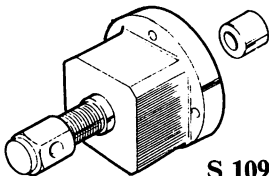
SERVICE TOOLS



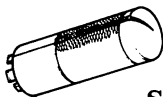
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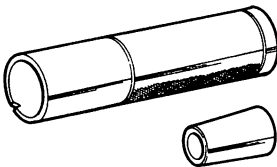
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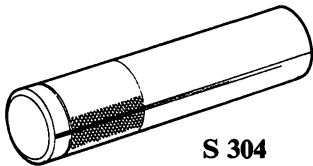
S 109 C



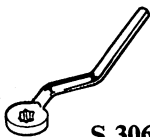
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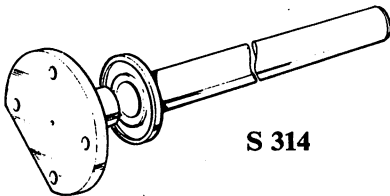
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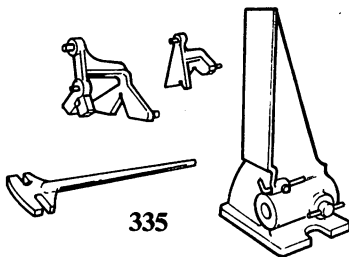
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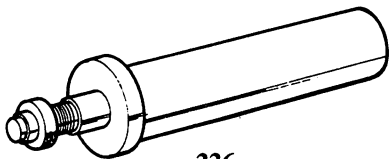
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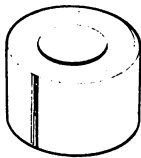
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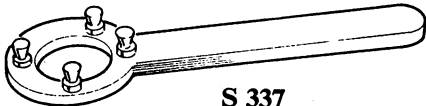


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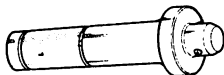
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S 337



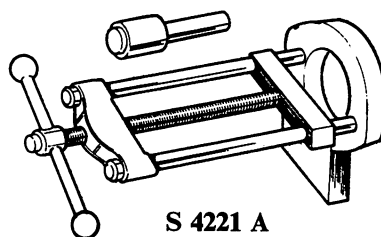
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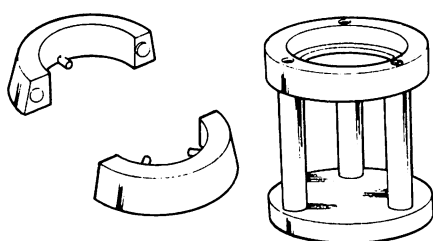
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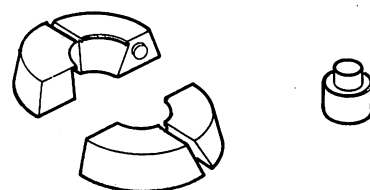




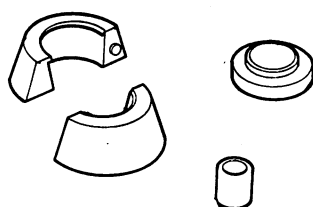
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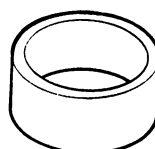
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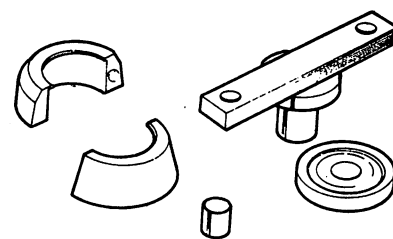
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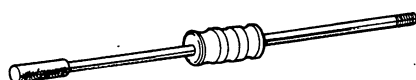
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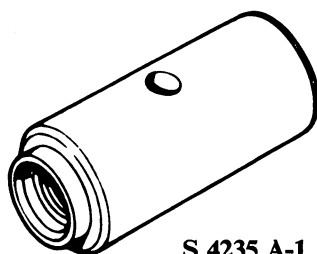
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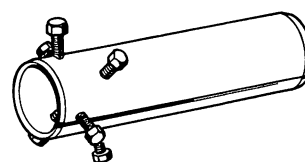
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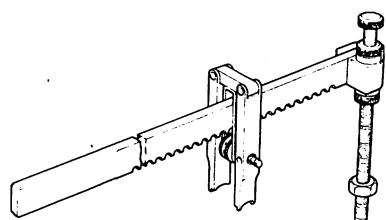
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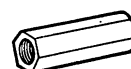
S 4235 A-1



S 4235 A-2



6118 B



S 6118-1