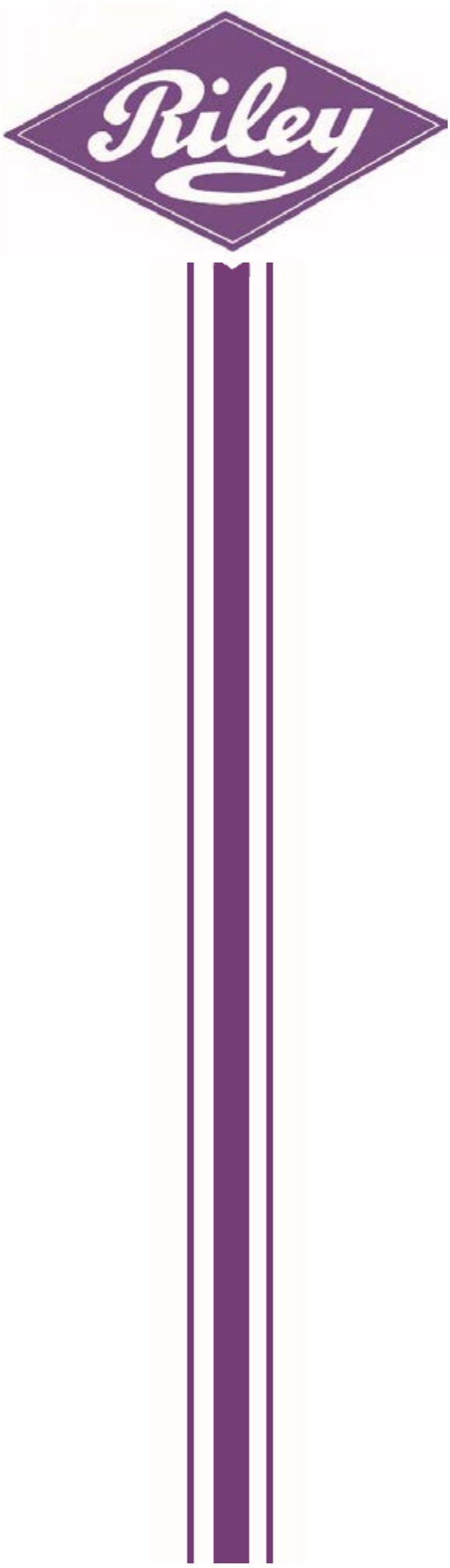

WORKSHOP MANUAL

1½ LITRE
and
2½ LITRE

WORKSHOP MANUAL

1½ LITRE and 2½ LITRE

NOTE

Amendments to the instructions given in this manual are only made by the issue of revised sheets, or by additional sheets for inclusion at the end of each section.

It is therefore of the utmost importance to refer to the end of each of the sections for the latest instructions before carrying out any work on the vehicle.

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AUSTIN-MORRIS DIVISION
BRITISH LEYLAND MOTOR CORPORATION
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THIS EDITION DESIGNED BY J. A. BYRON FOR THE RILEY RM CLUB
AND THE EXCLUSIVE USE OF ITS MEMBERS.

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GENERAL DATA
(1½ LITRE)

ENGINE

Number of cylinders	Four.
Capacity	1496 c.c. (91·28 cu. in.).
B.H.P.	54 at 4,500 r.p.m.
Bore	69 mm. (2·7165 in.).
Stroke	100 mm. (3·937 in.).
Compression ratio	6·8 to 1.
System of cooling	Thermo-siphon, fan and pump.
Radiator hose, top (outlet)	Pre-formed to fit thermostat.
Radiator hose—pump to head	2 in. long × 1½ in. outside diameter (5·08 cm. × 3·81 cm.). Inside diameter to fit tight over 1¼ in. (3·175 cm.) diameter tube.
Radiator hose—radiator to pump	2⅝ in. long × 1⅝ in. outside diameter (6·67 cm. × 4·13 cm.). Inside diameter to be a push fit on 1¼ in. (3·175 cm.) diameter tube.
First oversize bore	+·020 in. (+·5 mm.). Bore 2·7365 in. (69·5 mm.).
Second oversize bore (max.)	+·040 in. (+1·0 mm.). Bore 2·7565 in. (70 mm.).
Firing order	1, 2, 4, 3.
Piston clearance, top	·0024 in. to ·0034 in. (·061 mm. to ·086 mm.).
Piston clearance, bottom	·0012 in. to ·003 in. (·03 mm. to ·076 mm.).
Ring gap	·006 in. to ·010 in. (·152 mm. to ·254 mm.).
Number of compression rings	Three.
Width of compression rings	·079 in. (2 mm.).
Number of oil control rings	One.
Width of oil control rings	$\frac{5}{32}$ in. (3·969 mm.).
Oil pressure release valve	50 lb./sq. in. (3·5 kg./cm.²).
Gudgeon pin type	Floating.
Gudgeon pin diameter	·750 in. (+·000 in. / −·0003 in.) or 19 mm. (+·000 mm. / −·006 mm.)
Fit in piston	Hard push fit at 70° C.
Fit in connecting rod	Push.
Gudgeon pin—oversize	+·002 in. (·051 mm.).
Crankpin diameter—standard	1·875 in. (4·763 cm.).
Crankpin, minimum diameter for regrind	—·040 in. (—1·0 mm.).
Connecting rod centres	8 in. (20·32 cm.).
Connecting rod—type of bearing	White metal direct.
Connecting rod—side clearance	·002 in. to ·004 in. (·05 mm. to ·10 mm.).
Connecting rod—diametrical clearance	·0015 in. (·038 mm.).
Number of crankshaft bearings	Three.
Type of main bearings	Thick white-metal lined.
Standard main journal diameter	Front and rear 1·75 in. (4·445 cm.). Centre 2·75 in. (6·985 cm.).
Main Journals	
First regrind diameter	—·020 in. (—·508 mm.).
Second regrind diameter (minimum)	—·040 in. (—1·1 mm.).
Main bearings—end clearance	·004 in. to ·006 in. (·1 mm. to ·15 mm.).
Main bearings—diametrical clearance	·0025 in. (·060 mm.) centre. ·0015 in. (·040 mm.) front and rear.
Crankshaft end thrust	On rear bearing.
Number of camshaft bearings	Three.
Type of camshaft bearings	Bronze at front and rear. Centre bearing is machined in block.

GENERAL DATA—*continued*

Camshaft bearing clearance			·0025 in. (·060 mm.).
Camshaft end thrust			Taken on front bearing.
Camshaft drive			By duplex roller chain.
Valve timing			Crankshaft keyway vertical. "T"s on chain wheels and bright links on chain.
Exhaust valve throat diameter			1 5/16 in. (33·3 mm.).
Exhaust valve diameter			Head 1 7/16 in. (36·5 mm.). Stem 5/16 in. (7·94 mm.).
Inlet valve throat diameter			1 5/16 in. (33·3 mm.).
Inlet valve diameter			Head 1 7/16 in. (36·5 mm.). Stem 5/16 in. (7·94 mm.).
Valve seat angle			45°.
Tappet type			Mushroom.
Valve lift, inlet			·289 in. (·734 mm.).
Valve lift, exhaust			·289 in. (·734 mm.).

	RME	Early Models
Inlet valve opens	7° before T.D.C.	9° before T.D.C.
Inlet valve closes	48° after B.D.C.	45° after B.D.C.
Exhaust valve opens	48° before B.D.C.	56° before B.D.C.
Exhaust valve closes	20° after T.D.C.	20° after T.D.C.
Valve spring, shut	56 lb. (25·40 kg.).	57·5 lb. (26·082 kg.).
Valve spring, open	74 lb. (33·566 kg.).	73 lb. (33·112 kg.).
Inlet valve opens—piston traverse	·01837 in. (·467 mm.) before T.D.C.	·03014 in. (·76 mm.) before T.D.C.
Inlet valve working clearance	·015 in. (·38 mm.). Hot engine.	·003 in. (·076 mm.). Hot engine.
Exhaust valve working clearance	·015 in. (·38 mm.). Hot engine.	·004 in. (·10 mm.). Hot engine.

Valve guides	Removable.

FUEL SYSTEM

Petrol tank level	Electric gauge on panel.
Fuel delivery	A.C. mechanical pump type "U."
Carburetter	S.U. horizontal H–2.
Carburetter needle	No. 3 Standard. Rich—BY; Weak—V2.

CLUTCH

Type	Borg and Beck 8 in. (20·32 cm.) diameter. A6–G type.
Facing	Ferodo RYZ.

GEARBOX

Synchromesh	Second, third and top.

Ratios :

	RME	Early Models
Overall: Top	5·125 to 1.	4·89 to 1.
Third	7·585 to 1.	7·23 to 1.
Second	11·736 to 1.	11·2 to 1.
First	20·372 to 1.	19·42 to 1.
Reverse	20·372 to 1.	19·42 to 1.

Gearbox	
Top	1 to 1.
Third	1·48 to 1.
Second	2·29 to 1.
First	3·975 to 1.
Reverse	3·975 to 1.

GENERAL DATA—*continued*

FRONT AXLE AND STEERING

Camber	1°.
Castor	3°.
Toe-in	Nil.
King-pin inclination	11°.
Track	4 ft. 4¼ in. (1·327 m.).
Turning circle	30 ft. (9·144 m.).
Wheelbase	9 ft. 4½ in. (2·858 m.).
Tyre size	5·75 × 16.
Tyre pressure	Front, 22 lb./sq. in. (1·6 kg./cm.²). Rear, 24 lb./sq. in. (1·7 kg./cm.²).

REAR AXLE (Early Models)

Type	Semi-floating.
Drive	Spiral bevel.
Ratio	4·89 to 1.
Adjustment	By distance-pieces on pinion. Crown wheel set by screwed sleeves.

REAR AXLE (RME Models)

Type	Semi-floating.
Drive	Hypoid.
Ratio	8/41 = 5·125 to 1.
Adjustment	By distance-pieces on pinion and differential.

BRAKES (Early Models)

Type	Girling hydro-mechanical.
Brake lining size	Front, 8⅜ in. × 1¾ in. × $\frac{3}{16}$ in. (21·27 cm. × 4·45 cm. × ·48 cm.). Rear, 9⅛ in. × 1½ in. × $\frac{3}{16}$ in. (23·18 cm. × 3·81 cm. × ·48 cm.).
Brake lining make	Don BS5.
Brake lining—number of rivets	12.
Brake rivet size	$\frac{3}{16}$ in. diameter × $\frac{3}{8}$ in. long (·48 cm. × ·95 cm.).

BRAKES (RME Models)

Type	Girling hydraulic.
Brake lining size	Front, 9·6 in. × 1¾ in. × $\frac{3}{16}$ in. (24·38 cm. × 4·45 cm. × ·48 cm.). Rear (Leading Shoe), 9·6 in. × 1¾ in. × $\frac{3}{16}$ in. (24·38 cm. × 4·45 cm. × ·48 cm.). Rear (Trailing Shoe), 8·7 in. × 1¾ in. × $\frac{3}{16}$ in. (22·10 cm. × 4·45 cm. × ·48 cm.).
Brake lining make	Mintex M.20.
Brake lining—number of rivets	10.
Brake rivet size	·171 in. to ·175 in. diameter × $\frac{3}{8}$ in. long (·43 cm. to ·44 cm. × ·95 cm.) overall.

DAMPERS

Front	Luvax DA/6/5—No. 9046/356. Up to Chassis No. 40S/18781, when Girling CDR5 were fitted.
Rear	Luvax PR6/56Y—Right-hand. PR6/57X—Left-hand. Ceased at Chassis No. 39S/16222. Luvax PV6/56 SA133/70—Right-hand. PV6/57 SA133/69 Left-hand up to Chassis No. 40S/18780. From Chassis No. 40S/18781 Girling type DAS9 (not handed) were fitted.

GENERAL DATA—*continued*

SPRINGS (Early Type)	
Front	Torsion bars.
Rear	Semi-elliptic.
Working load—torsion bar	708 lb. (321 kg.).
Working load—rear	750 lb. (340 kg.).
Spring, length	45½ in.±$\frac{1}{16}$ in. (115·57 cm.±·16 cm.) eye to eye.
Spring, width	2 in. (5·08 cm.)×$\frac{3}{16}$ in. (4·76 mm.).
Spring, number of leaves	10.
Spring, free camber	4 in. (10·16 cm.) from flat spring.
Spring, working camber	1⅞ in. (4·76 cm.) negative from flat spring.
SPRINGS (RME Models)	
Front	Torsion bars.
Rear	Semi-elliptic.
Working load—torsion bar	708 lb. (321 kg.).
Working load—rear	800 lb. (362·9 kg.).
Spring, length	45½ in.±$\frac{1}{16}$ in. (115·57 cm.±·16 cm.) eye to eye.
Spring, width	2 in. (5·08 cm.)×$\frac{3}{16}$ in. (4·76 mm.).
Spring, number of leaves	11.
Spring, free camber	4 in. (10·16 cm.) from flat spring.
Spring, working camber	1¾ in. (4·45 cm.) negative from flat spring.
ELECTRICAL	
Distributor rotation	Clockwise (viewed from above).
Manual advance	10° to 12° (on crankshaft).
Automatic advance	Centrifugal weights.
Contact breaker gap (early type)	·010 in.—·012 in. (·25 mm. to ·30 mm.).
Contact breaker gap (later type with high-lift cams)	·014 in.—·016 in. (·36 mm. to ·41 mm.).
Sparking plug	Champion L.10S.
Sparking plug gap	·025 in. (·64 mm.).
Ignition timing	8° before T.D.C. full advance.
Charging system	Compensated voltage control.
Battery	Lucas 12-volt, type GTW9A, 51 amp./hrs. at 10 hrs.
Battery earth	Positive.
CAPACITIES	
Sump	10 pints (5·7 litres)
Gearbox	2 pints (1·13 litres).
Rear axle	RME 2½ pints (1·42 litres), early models 2¾ pints.
Cooling system	13 pints (7·4 litres).
Fuel	12½ gallons (56·8 litres).
GENERAL DIMENSIONS	
Overall length	14 ft. 11 in. (4·55 m.).
Overall width	5 ft. 3½ in. (1·613 m.).
Overall height	5 ft. ½ in. (1·54 m.).
Ground clearance	7½ in. (19 cm.).
Weight	24¼ cwt. (1232 kg.).
TORQUE WRENCH READINGS	
Main bearing cap nuts : front and centre	250 in./lbs. (2·87 m./kg.).
rear	780 in./lbs. (8·97 m./kg.).
Connecting rod big-end nuts	420 in./lbs. (4·83 m./kg.).
Cylinder head stop nuts	540 in./lbs. (6·21 m./kg.).
Flywheel bolts	850 in./lbs. (9·77 m./kg.).

GENERAL DATA

(2½ LITRE)

ENGINE

Number of cylinders	Four.
Capacity	2443 c.c. (149 cu. in.).
B.H.P.	100 at 4,400 r.p.m.
Bore	80·5 mm. (3·169 in.).
Stroke	120 mm. (4·724 in.).
Compression ratio	RMF 6·6 to 1. Early models 6·8 to 1.
System of cooling	Pump, thermo-siphon and fan.
Radiator hose top (outlet)	Pre-formed to fit thermostat.
Radiator hose diameter—radiator to pump	1¼ in. (31·7 mm.). Early models.
Radiator hose diameter—pump to head	1¼ in. (31·7 mm.).
Radiator hose top (outlet)	1⅜ in. (34·9 mm.), internal dia. ×6⅝ in. (16·8 cm.) long. RMF models.
Radiator hose (RMF)—radiator to head	1¼ in. (31·7 mm.), internal dia. ×2⅝ in. (66·7 mm.) long.
First oversize bore	+·020 in. (·5 mm.). Bore size 3·189 in. (81 mm.).
Second oversize bore (max.)	+·040 in. (1·0 mm.). Bore size 3·209 in. (81·5 mm.).
Firing order	1, 2, 4, 3.
Piston clearance, top	·002 in. to ·0033 in. (·05 mm. to ·084 mm.).
Piston clearance, bottom	·0018 in. to ·0026 in. (·046 mm. to ·066 mm.).
Ring gap	·008 in.—·012 in. (·2 mm.—·3 mm.).
Number of compression rings	Two.
Width of compression rings	·0927 in. to ·0937 in. (2·35 mm. to 2·38 mm.).
Number of oil control rings	Two.
Width of oil control rings	·1565 in. to ·1575 in. (3·88 mm. to 3·90 mm.).
Oil pressure release valve operates	60 lb./sq. in. (4·2 kg./cm.²). RMF 50 lb./sq. in. (3·5 kg./cm.²).
Gudgeon pin type	Floating.
Gudgeon pin diameter	·866 in. (22 mm.).
Fit in piston	Hard push at 70° C.
Fit in connecting rod	Push.
Gudgeon pin oversizes	+·002 in. (·051 mm.).
Crankpin diameter (standard)	2·362 in. (60 mm.).
Crankpin minimum diameter for regrind	2·322 in. (58·98 mm.) (—·040 in. (1·0 mm.)).
Connecting rod—length between centres	8·625 in. (21·91 cm.).
Connecting rod—type of bearing (engines prior to No. RMB2/945)	White-metal cast direct on rod.
Connecting rod—type of bearing (engines from No. RMB2/945 onwards)	Top half : lead-bronze. Lower half : steel-backed, white-metal lined.
Connecting rod—side clearance	·002 in.—·008 in. (·05 mm.—·2 mm.).
Connecting rod—diametrical clearance	·0015 in. (·038 mm.).
Number of crankshaft bearings	Three.
Type of main bearings	Thick, white-metal lined, bronze shells.
Standard main journal diameter	2·559 in. (65 mm.).
Main journals	
First regrind diameter	·020 in. (·5 mm.).
Second regrind diameter (minimum)	·040 in. (1·1 mm.).
Main bearings—length	1·938 in. (49·25 mm.) front and centre. 2·7559 (70 mm.) rear.
Main bearings—end clearance	Zero to ·004 in. (0 mm. to ·10 mm.).
Main bearings—diametrical clearance	·001 in. to ·003 in. (·025 mm. to ·075 mm.).
Crankshaft—end thrust on	Rear bearing (flanged both sides).
Number of camshaft bearings	Three.

GENERAL DATA—*continued*

Type of camshaft bearings				Bronze bushes.
Camshaft—bearing clearance				·0015 in. to ·004 in. (·0375 mm. to ·10 mm.).
Camshaft—end thrust on				Front face of front bearings.
Camshaft drive				Duplex roller chain.
Valve timing markings				Crankshaft keyway vertical and marks on chain wheels (bright links on chain on RMF).
Exhaust valve throat diameter				1·476 in. (37·49 mm.).
Exhaust valve diameter				Head 1·604 in. (40·7 mm.). Stem $\frac{5}{16}$ in. (7·94 mm.).
Inlet valve throat diameter				1·702 in. (43·15 mm.).
Inlet valve diameter				Head, early models 1·856 (47·14 mm.) ; RMF 1·830 in. (46·48 mm.). Stem $\frac{5}{16}$ in. (7·94 mm.).
Valve seat angle				45°.
Tappet type				Hollow.
Valve lift inlet				·390 in. (9·9 mm.).
Valve lift exhaust				·390 in. (9·9 mm.).

Inlet valve opens	RMF	12° before T.D.C.	Early Models	17° before T.D.C.
Inlet valve closes	RMF	53° after B.D.C.	Early Models	43° after B.D.C.
Exhaust valve opens	RMF	55° before B.D.C.	Early Models	45° before B.D.C.
Exhaust valve closes	RMF	20° after T.D.C.	Early Models	20° after T.D.C.
Valve spring—shut	RMF	68·6 lb. (31·12 kg.).	Early Models	64·5 lb. (29·26 kg.).
Valve spring—open	RMF	111 lb. (50·35 kg.).	Early Models	99·5 lb. (45·13 kg.).
Inlet valve opens—piston traverse	RMF	·0657 in. (1·67 mm.) before T.D.C.	Early Models	·13084 in. (3·3 mm.) before T.D.C.
Inlet valve working clearance	RMF	·011 in. (·28 mm.). Hot engine.	Early Models	·003 in. (·076 mm.). Hot engine.
Exhaust valve working clearance	RMF	·011 in. (·28 mm.). Hot engine.	Early Models	·004 in. (·1 mm.). Hot engine.

Valve guides				Renewable.

FUEL SYSTEM

Fuel tank level				Electric gauge on panel.
Fuel delivery				S.U. electric pump, Type L.
Carburetters				S.U. horizontal, H4 (two).
Carburetter needles				Normal—E.E.; Weak—E.M.; No rich setting is recommended.

CLUTCH

Type				Borg and Beck, 10/73C., 10 in. (25·4 cm.) diameter.
Facing				Ferodo RYZ.

GEARBOX

Synchromesh				Second, third, top.

Ratios :

Overall	RMF	First and reverse	14·949 to 1.	Early Models	15·0 to 1.
	RMF	Second	8·835 to 1.	Early Models	8·86 to 1.
	RMF	Third	5·814 to 1.	Early Models	5·83 to 1.
	RMF	Top	4·1 to 1.	Early Models	4·11 to 1.
Gearbox		First and reverse	3·646 to 1.		
		Second	2·155 to 1.		
		Third	1·418 to 1.		
		Top	1 to 1.		

GENERAL DATA—*continued*

FRONT AXLE AND STEERING

Camber	1°.
Castor angle	3°.
Toe-in	Nil.
Swivel pin inclination	11°.
Tyre size	6·00—16.
Tyre pressures (all wheels)	24 lb./sq. in. (1·7 kg./cm.²).
Wheel size	4·50×16.

REAR AXLE (Early Type)

Type of axle	Semi-floating.
Type of drive	Spiral bevel.
Ratio	37/9.
Adjustment	By distance-pieces for pinion. Crown wheel set by screwed bearing housings.

REAR AXLE (RMF)

Type of axle	Semi-floating.
Type of drive	Hypoid.
Ratio	41/10.
Adjustment	By distance-pieces for pinion and crown wheel.

BRAKES (Early Types)

Type	Girling hydro-mechanical. 12 in. dia. front and rear (30·48 cm.). To Chassis No. 60S/6094. 11 in. dia. front only (27·94 cm.). From Chassis No. 60S/6095 onwards.
Type of lining	Mintex M.14.
Lining size :	
Up to Chassis No. 60S/6094 Front and rear	Length 10½ in. (26·67 cm.). Width 1 21/32 in. (4·21 cm.). Thickness 5/32 in. (3·97 mm.). Number of rivets 12.
From Chassis No. 60S/6095 Front only. Rear as above	Length 9⅞ in. (25·1 cm.). Width 2¼ in. (5·7 cm.). Thickness 3/16 in. (·48 cm.). Number of rivets 12.
Size of rivets	3/16 in. dia.×5/16 in. long (·48 cm.×·79 cm.).

BRAKES (RMF)

Type	Girling hydraulic. 11 in. dia. front and rear (27·94 cm.).
Type of lining	Mintex M.21.
Lining size	Front : 10·43 in.×2¼ in.×3/16 in. (26·49 cm.×5·7 cm.×·48 cm.). Rear (Leading Shoe) : 10·43 in.×2¼ in.×3/16 in. (26·49 cm.×5·7 cm.×·48 cm.). Rear (Trailing Shoe) : 9·6 in.×2¼ in.×3/16 in. (24·38 cm.×5·7 cm.×·48 cm.). Number of rivets : Twelve.
Size of rivets	11/64 in. dia.×23/64 in. long (·44 cm.×·91 cm.) (under head).

GENERAL DATA—*continued*

SPRINGS

Type—front	Torsion bar.
Type—rear	Semi-elliptic.
Working load—front	850 lb. (389 kg.).
Working load—rear	800 lb. (362·9 kg.) at 1⅜ in. (47·6 mm.) negative camber.
Length—rear (flat)	45½ in. (115·57 cm.).
Width—rear	2 in. (50·8 mm.).
Number of leaves	11 (early models) ; 12 (RMF open propeller shaft).
Thickness of leaves	$\frac{3}{16}$ in. (4·76 mm.).
Camber	Free : 4 in. (10·16 cm.). Working : 1¾ in. (44·45 mm.) negative (RMF models). : 1⅞ in. (47·6 mm.) negative (early models).

DAMPERS

Front	Luvax DA/6/5—No. 9046/356. Changed at Chassis No. 60S/7791 to Girling CDR5.
Rear	Luvax PR6/68Y—Right-hand ; PR6/69X—Left-hand. Ceased at Chassis No. 59S/4610. From Chassis Nos. 59S/4611 to 60S/7790. Luvax PV6/68, SA133/72—Right-hand. PV6/69, SA133/71—Left-hand. After Chassis No. 60S/7791 rear dampers were Girling DAS9 (not handed).

ELECTRICAL

Distributor rotation	Anti-clockwise (RMF) ; clockwise (early models).
Manual advance	15°.
Automatic advance	36°.
Contact breaker gap (early type)	·010 in. to ·012 in. (·25 mm. to ·30 mm.).
Contact breaker gap (later type with high-lift cams) (See Section C.13)	·014 in. to ·016 in. (·36 mm. to ·41 mm.).
Sparking plugs	Champion NA8, 14 mm. Gap, ·025 in. (·64 mm.).
Ignition timing	4° B.T.D.C.
Charging system	C.V.C.
Battery	Lucas 12-volt, type GTW11A. 63 amp./hrs. at 10 hrs.
Battery earth	Positive.

CAPACITIES

Sump	14 pints (7·9 litres).
Gearbox	2⅝ pints (1·5 litres).
Rear axle	RMF 2½ pints (1·42 litres) ; early models 4 pints (2·27 litres).
Cooling system	21 pints (11·8 litres).
Fuel	12½ gallons (56 litres).

GENERAL DIMENSIONS

Length	15 ft. 6 in. (4·72 m.).
Width	5 ft. 3½ in. (1·61 m.).
Height	5 ft. 1 in. (1·55 m.).
Ground clearance	7 in. (18 cm.).
Wheelbase	9 ft. 11 in. (3·02 m.).
Track	4 ft. 4¼ in. (1·327 m.).
Turning circle	36 ft. (11 m.).
Weight	29¼ cwt. (1486 kg.).

TORQUE SPANNER READINGS

Main bearing cap nuts	900 in./lbs. (10·35 m./kg.).
Connecting rod big-end nuts	450 in./lbs. (5·17 m./kg.).
Cylinder head nuts	900 in./lbs. (10·35 m./kg.).
Flywheel bolts	850 in./lbs. (9·77 m./kg.).

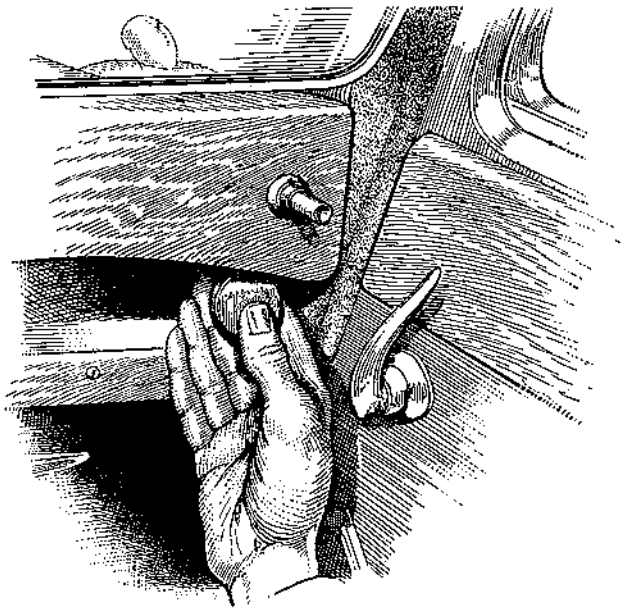
GENERAL INFORMATION

TO OPEN THE BONNET

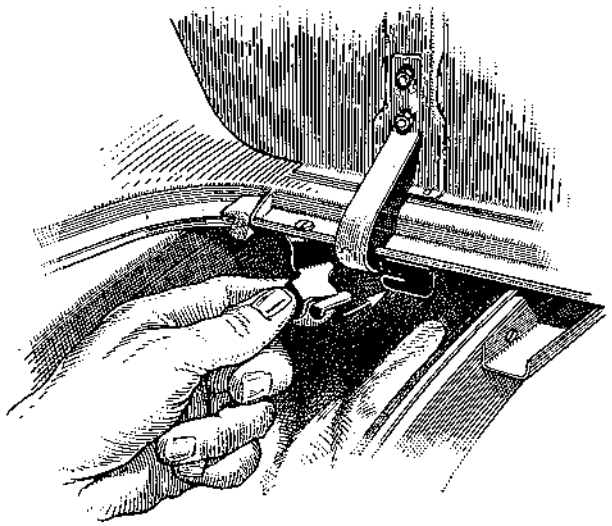
The bonnet is in two halves. To open each half it is necessary to pull the knobs, located at the extreme ends of the glove tray, towards the operator to release the locks.

Each bonnet half is held in the vertical position by means of a small stop latch, which is swung round into a slot.

The bonnet is closed by releasing the latch, lowering the bonnet and pressing on the top to engage the bonnet lock.



One of the bonnet latch release knobs is shown in this illustration.



One of the small stop latches which retain the bonnet halves in a vertical position.

THE CONTROL PANEL

Mixture Control. When starting from cold, pull the knob right out to rich and hold it in that position. Immediately the engine has started to run, allow the control to return to its original position as rapidly as possible. Never let the engine run for long periods with this control in the rich position.

Ignition Switch. Turn the key in a clockwise direction to switch on. Never leave the ignition switched on when the engine is at rest because this will damage the ignition coil and discharge the battery. The ignition key will also lock the driver's door and boot lid.

The Starter Switch. Press the starter switch sharply and release it as soon as the engine fires. Never operate the switch if the motor is still spinning.

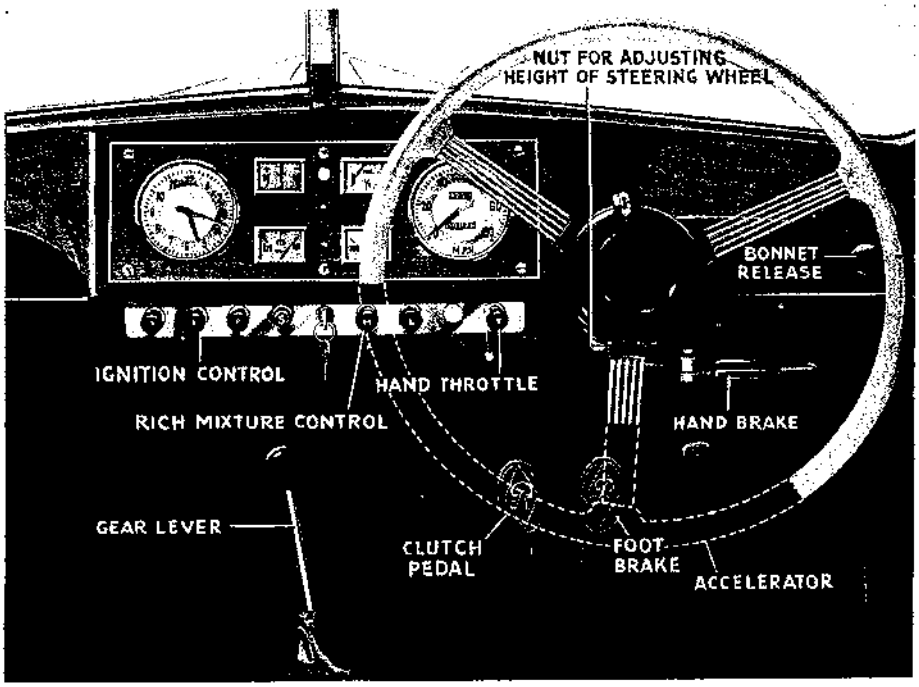
Hand Throttle. This is a slow-running control for use when the engine is cold. In order to increase the engine speed turn the knob in a counter-clockwise direction. The normal slow running of the engine should be set by the carburetter throttle stop.

Ignition Control. To retard the ignition the knob should be pulled out. This hand knob does not give control over the full ignition advance range, only over a portion of it. When the engine is pulling hard, retard the ignition slightly to prevent pinking.

The Lamp Switch. This is a two-position switch. Pull out to the first stop to switch on the sidelamps. Twist clockwise and pull again to the second stop to bring the headlamps into operation.

Foglamp Switch. This is also a two-position switch. Pull out to the first stop to switch on one lamp. Twist clockwise and pull again to bring both lamps into operation.

GENERAL INFORMATION—*continued*

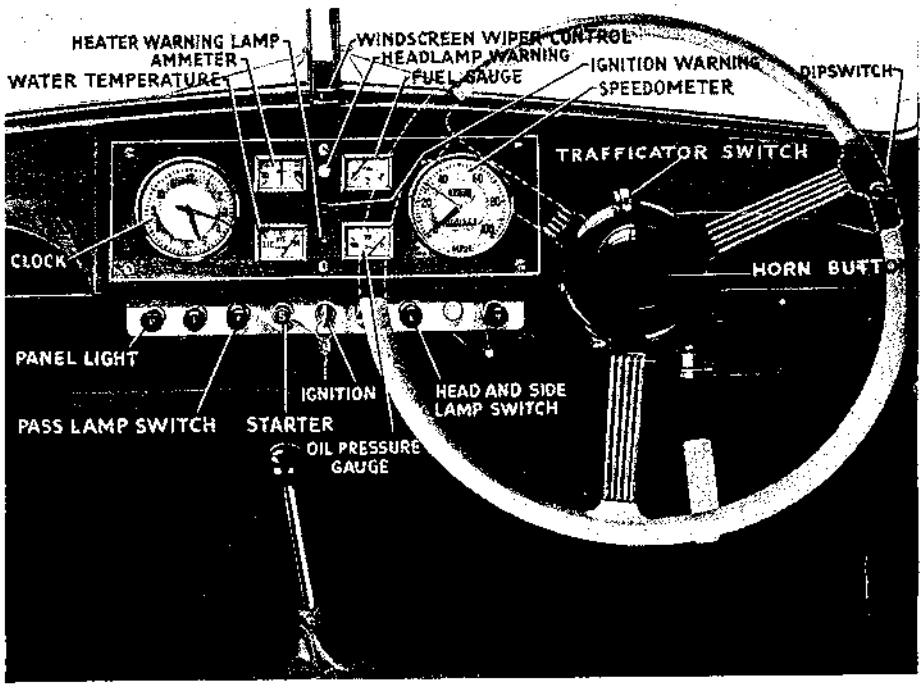


The photograph on the left has been prepared to show the disposition of the engine and driving controls.

The Headlamp Dipswitch. The switch controlling the dipping of the headlamps is hand-operated and located on the facia, adjacent to the steering wheel. It is of the repeating type and switches on the full beams and dipped beam with alternate depressions.

The Panel Light Switch. The knob must be turned clockwise to bring the lamp into operation. Further rotation decreases the intensity of illumination in order to reduce glare.

The Windscreen Wiper Control. The knob must be pulled upwards to bring both wiper blades into automatic action. Depress the knob when the blades are at their extreme travel to stop the operation and park the blades.

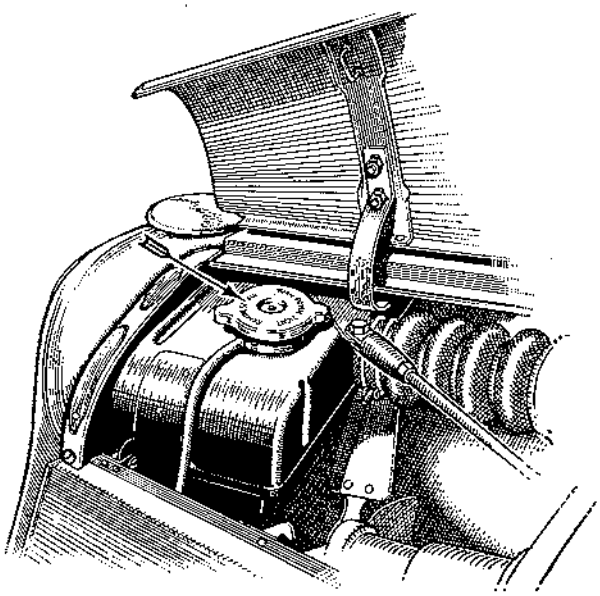


The photograph on the right has been prepared to show the disposition of the instruments and switches.

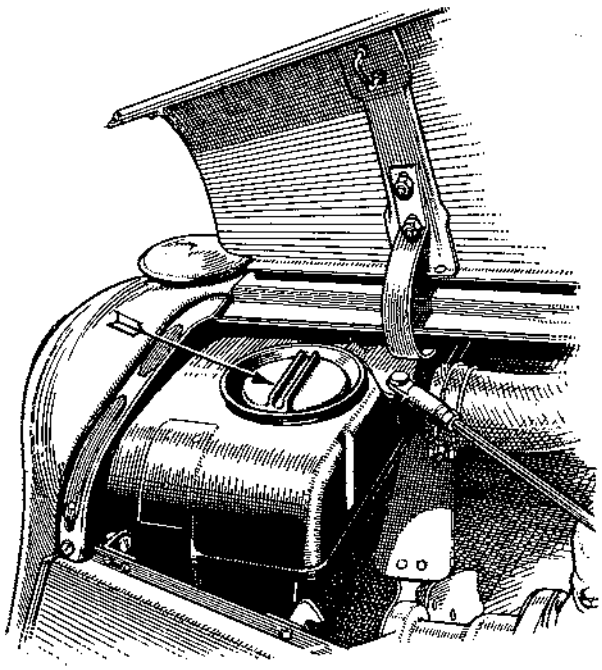
GENERAL INFORMATION—*continued*

FILLING THE COOLING SYSTEM

The radiator should be filled with water to just below the base of the filler neck, which is located underneath the left-hand side bonnet lid. The cap on the radiator shell is a dummy.



The radiator filler is under the left-hand side of the bonnet.



The filler cap fitted to some of the earlier models.

DRAINING THE COOLING SYSTEM

There are three draining points on the 2½ litre. One tap is at the base of the radiator on the right-hand side, another is on the left-hand side of the cylinder block and just above the starter motor. The third tap is on the forward end of the inlet manifold. On the 1½ litre there are two points, one at the base of the radiator and the other just forward of the fuel pump on the side of the cylinder block. See Section D for the positions of the drain taps.

THE TOOL KIT

All the tools are stored in the tool compartment under the bonnet. The starting handle is located in the boot.

WARMING UP THE ENGINE

As soon as the engine has started, let the mixture control spring back. If the engine falters, pull the control out approximately half way. Do not race the engine but let it run at a fast tick-over. This speed should be approximately 1,000 r.p.m., corresponding to 20 m.p.h. (32 k.p.h.) in top gear, until the engine has attained its correct working temperature of approximately 72° C. (162° F.).

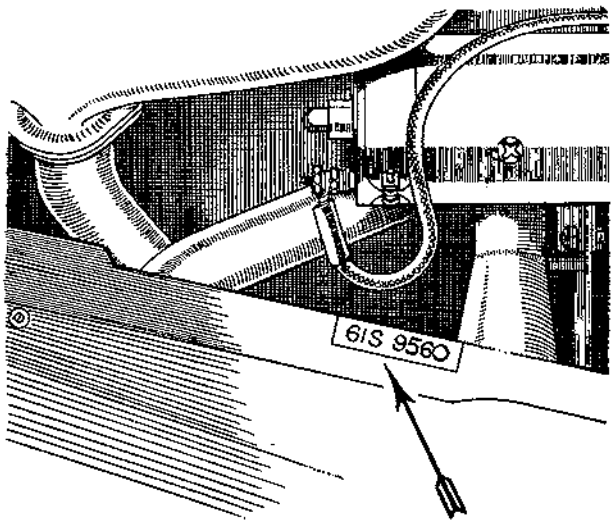
Blanking off the radiator will assist in warming the engine in cold weather, but never run the car with the radiator completely masked.

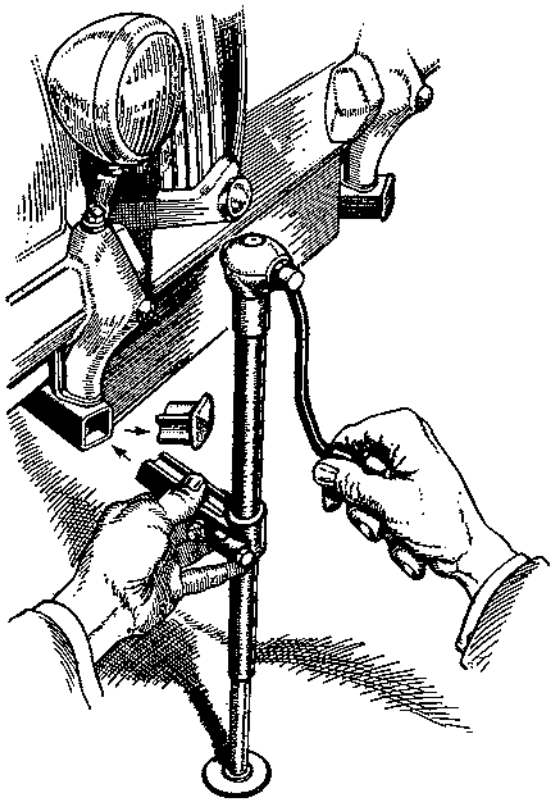
Less damage is done to the engine by taking the car straight onto the road than by letting it idle in the garage, provided it is driven reasonably and the engine is not allowed to race. The quicker the engine is allowed to warm up the better.

GENERAL INFORMATION—*continued*

CHASSIS AND ENGINE NUMBERS

A plate on the left-hand side of the crankcase, just forward of the exhaust manifold carries the engine number and type. The chassis number is stamped on the top of the frame on the left-hand side, near the starter motor. There is a plate on the left-hand side of the engine bulkhead bearing the chassis number.





JACKING THE CAR

The special jack is housed in the toolbox under the bonnet and a wheel is raised by inserting the jack bridge-piece in one of the sockets provided at each corner of the frame, after the rubber protecting plug has been removed.

GENERAL INFORMATION—*continued*

IDENTIFICATION OF "UNIFIED" SCREW THREADS

The general standardisation of "Unified" screw threads makes it necessary to identify all nuts, bolts, and set screws with these threads in order to ensure their correct use with correspondingly threaded components and the fitting of correct replacements.

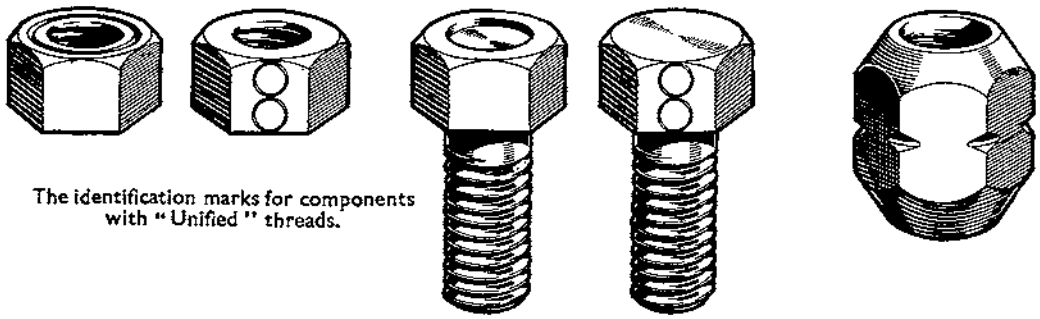
Identification has been standardised and is effected in the following manner :—

Nuts. By a circular groove turned on the end face of the nut or by connected circles stamped on one flat of the hexagon.

Bolts and Set Screws. By a circular depression turned on the head or by connected circles stamped on one flat of the hexagon.

Wheel Stud Nuts. By a notch cut in all the corners of the hexagon.

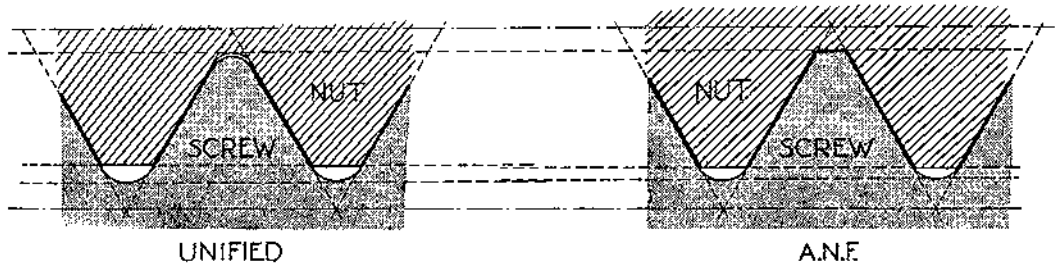
These identification marks are clearly shown in the illustration below and it is obviously of the utmost importance that any nuts, bolts, or set screws so marked are used only in conjunction with their associated components having "Unified" threads and that only replacement



The identification marks for components with "Unified" threads.

parts with "Unified" threads are used, as these are *not* interchangeable with Whitworth, B.S.F. or Metric threads.

The "Unified" thread is, however, interchangeable with the American National Fine (A.N.F.) thread for all practical purposes.



This illustration of the "Unified" thread and A.N.F. thread to the same scale indicates their close relationship.

As an interim measure, prior to the standardisation of the "Unified" thread, certain of the Hypoid axles fitted to Nuffield vehicles have been manufactured with A.N.F. threaded components, and such axles are identifiable from the fact that they are fitted with wheel stud nuts having the notch-type identification on the corners of the hexagon.

Care must be taken, in the case of these axles, to use the correct nuts, bolts and set screws when reassembling or when fitting new components. With the exception of the wheel bolts (which are notched) there is no identification mark on A.N.F. threaded bolts, nuts, and set screws by which they can be identified readily.

GENERAL INFORMATION—*continued*

Components and assemblies which have "Unified" threads or A.N.F. threads will be identifiable by the new part numbers which have been allocated to them.

Certain service parts supplied with B.S.F. threads will bear no part numbers.

Thus—Assemblies with the old part numbers or without part numbers have B.S.F. threads.

Assemblies with the new part numbers have "Unified" threads or A.N.F. threads.

Spanners. It is to be noted that all A.N.F. and "Unified" threaded nuts and hexagon-headed bolts are made to the standard American hexagon sizes and that spanners of the appropriate size must be used when tightening or loosening them.

KEY TO SPANNER SIZES

Nominal widths between jaws

Nuffield Standards	*Diameter of Screw Thread (inches)*									
	$\frac{1}{4}$"	$\frac{5}{16}$"	$\frac{3}{8}$"	$\frac{7}{16}$"	$\frac{1}{2}$"	$\frac{9}{16}$"	$\frac{5}{8}$"	$\frac{3}{4}$"	$\frac{7}{8}$"	1"
For B.S.F. screws and nuts	·448	·529	·604	·705	·825	·925	1·016	1·207	1·309	1·489
For A.N.F. screws and nuts	·440	·504	·566	·629	·755	·880	·944	1·132	1·320	1·508
For "Unified" screws	·440	·504	·566	**·630**	·755	**·817**	·943	1·132	1·321	1·509
For "Unified" nuts (normal)	·440	·504	·566	**·692**	·755	**·880**	·943	1·132	1·321	1·509
For "Unified" nuts (heavy)	—	—	—	—	—	—	**1·069**	**1·258**	**1·446**	—

NOTE:—In the case of some "Unified" threaded components the size of the hexagon for the nut is different from that of the bolt. Where this occurs the spanner size is shown in heavy type in the above table.

IMPORTANT

The nut and bolt sizes given in this manual refer only to the size of spanner required to deal with them. Unless otherwise stated, the standard Whitworth spanner size is given to deal with the B.S.F. threads originally used, in accordance with the usual practice, i.e. a ¼ in. spanner is required to undo a bolt which has a $\frac{5}{16}$ in. B.S.F. thread.

It is to be noted, however, that later models employ A.N.F. or "Unified" threads on certain components with a different size of hexagon, necessitating the use of spanners of a different size. A key to the relative spanner sizes and to the identification of "Unified" threaded components is to be found above.

MAINTENANCE ATTENTION

FIRST 500 MILES (800 KM.) FREE SERVICE ATTENTION

Drain oil from engine, gearbox and rear axle, and refill.
Oil and grease all points of the car.
Tighten cylinder head and manifold nuts to recommended pressures.
Check tightness of valve rocker-shaft brackets to recommended pressures.
Check tappet clearances and reset if necessary.
Tighten fan belt if necessary.
Check all water connections and tighten clips if necessary.
Examine and clean carburetter and reset slow-running adjustment if necessary.
Examine and adjust, if necessary, sparking plug and distributor points.
Check working of automatic ignition controls and, if necessary, reset ignition timing.
Check front wheel alignment and steering connections. Adjust if necessary.
Check tightness of universal joint nuts, wheel nuts, spring clips and wing (fender) bolts.
Check clutch pedal for free movement and adjust if necessary.
Check fluid level in master cylinder and top up if necessary.
Check braking system functionally and bleed lines if necessary.
Check electrical system functionally.

Examine battery and top up to proper level with distilled water or diluted acid as may be required. Clean and tighten terminals.

Inspect shock absorbers for leaks. Examine oil levels and top up if necessary (piston type only).

Test tyres for correct pressures.

Check doors for ease in opening and closing. If necessary lightly smear with a suitable lubricating agent all dovetails and striking plates.

Where the Jackall jacking system is in use, check union nuts to recommended pressures and, if necessary, top up the fluid reservoir.

All materials chargeable to the customer.

PERIODICAL ATTENTION

Every 250 miles (400 km.) : Inspect oil level in engine. Refill if necessary to Ref. A (page P.2).

Every 500 miles (800 km.) : See that wheel nuts are tight.

See that the radiator is full of water. The water level should be ½ in. (12 mm.) below the filler neck and never allowed to sink so low that the cylinder outlet pipe opening is not fully covered.

Test tyre pressures. (See Section O.1.)

Every 1,000 miles (1600 km.) : Inspect oil level in gearbox and rear axle. Refill if necessary.

Attach grease gun filled with grease to Ref. D (page P.2) to the following grease nipple fittings (10 in all) and give the pump two or three strokes :—

4 on swivel pins. 4 on track-rods. 1 on water pump shaft to Ref. C (page P.2), 1 on clutch compensating shaft.

Examine level in Girling brake supply tank and replenish with Girling fluid if necessary. The tank should never be allowed to be less than half-full of fluid nor closer than ½ in. (12 mm.) to the bottom of the filler opening.

Top up battery with distilled water.

Add engine oil to Ref. F (page P.2) to carburetter piston dashpot (later 1½ litre models only).

Apply grease gun filled with grease to Ref. D (page P.2) to transmission sliding joint and universal joint nipples.

Use the oilcan sparingly on the carburetter controls, bonnet locks and operating mechanism, seat adjusters, and brake-rod fork ends.

MAINTENANCE ATTENTION—*continued*

Every 3,000 miles (5000 km.) : Drain engine and refill with fresh oil. (Page P.2.)

Withdraw rotating arm from distributor and add a few drops of engine oil to Ref. F (page P.2) in the aperture. Also lubricate the automatic advance mechanism with engine oil through the hole provided in the contact breaker base plate.

Add a smear of grease to Ref. D (page P.2) to the distributor cam contact breaker pivot and to the face of the cam.

Check contact breaker gap.

Clean and re-oil air cleaner (overseas conditions).

Clean petrol pump contact points (2½ litre).

Check dynamo belt tension.

Lubricate rear spring leaves with oil to Ref. F (page P.2).

Remove dynamo lubricator, half-fill with grease to Ref. C (page P.2) and replace.

Examine the gaps of the sparking plug points and make sure that they are not too wide ; they should be ·025 in. (·64 mm.).

Every 6,000 miles (10000 km.) : Remove the filters from the carburetters and petrol pump, clean and replace. (See Section B.)

Fit new oil filter element (2½ litre).

Clean and re-oil air cleaner (home conditions).

Drain gearbox and rear axle. Refill with fresh oil to Ref. B (pages P.2 or P.3 according to the type of axle).

Oil Trafficators.

Remove wheel hub covers, substitute a grease nipple for each screwed plug, and give one stroke of grease gun to each nipple. Use grease to Ref. C (page P.2). No lubrication attention is required to the rear wheels on later models and the screwed plug is discontinued. The front wheel hub caps on later models should be removed and repacked with grease to Ref. C.

Give one stroke of grease gun (use grease to Ref. C on page P.2) to grease nipple on hand brake cable.

Check valve clearance.

Tighten door-hinge fixing screws.

Tighten spring seat bolts.

Apply grease gun to door hinges.

Every 12,000 miles (20000 km.) : Remove sump, clean and replace. Refill sump with fresh oil.

Change the oil filter complete (1½ litre).

Remove rear dampers (piston-type), clean and replenish if necessary. (Telescopic dampers on the front and those fitted to the rear of later models should be removed, checked and replaced if faulty.)

Replace sparking plugs with new ones.

Adjust dynamo and starter brushes.

Adjust clutch pedal clearances. (See Section E.1.)

Every 30,000 miles (50000 km.) : Re-pack steering gearbox with grease either by dismantling the unit or substituting a grease nipple for the steering stop, and using a grease gun filled with grease to Ref. D (page P.2).

Grease to Ref. D (page P.2) should also be inserted through the damper pad cover at the end of the steering pinion.

FROST PRECAUTIONS

If the car is not stored in a warmed building, steps must be taken to prevent the cooling water from freezing in frosty weather. Water, upon freezing, expands, with the result that there is considerable risk of bursting either the radiator, the cylinder block or the heater unit by the pressure generated.

As there is no provision for draining the heater unit, it is essential to use anti-freeze in the cooling system in severe weather on cars fitted with a heater.

We recommend the use of Smiths "Bluecol", Shell "Snowflake" or Filtrate "Nevafreze" non-corrosive anti-freeze in order to protect the cooling system and reduce corrosion to a minimum.

The recommended quantities of anti-freeze for different degrees of frost resistance are :—

Down to 7° F. (—14° C.) (15 per cent. solution)	Down to 0° F. (—18° C.) (20 per cent. solution)
1½ litre. Quantity 2 pints (1·14 litres)	1½ litre. Quantity 2½ pints (1·42 litres)
2½ litre. Quantity 3¼ pints (1·85 litres)	2½ litre. Quantity 4¼ pints (2·41 litres)

First decide what degree of frost protection is required before adding the anti-freeze to the radiator. If temperatures below 0° F. (—18° C.) are likely to be encountered at least 25 per cent. of anti-freeze should be used. Consult your local dealer for the correct quantity.

Make sure that the cooling system is watertight and examine all joints, replacing any defective rubber hose with new.

Before adding anti-freeze mixture to the radiator, it is advisable to clean out the cooling system thoroughly by draining out the water and swilling out the water passages with a hose inserted in the water filler-cap opening, keeping the drain tap open.

Avoid excessive topping-up, otherwise there is the risk of losing valuable anti-freeze, due to the expansion of the solution. Only top-up when the cooling system is at its normal running temperature.

Generally speaking, anti-freeze is not injurious to cellulose paint, provided it is wiped off in reasonable time. It must not, however, be allowed to remain on the paintwork.