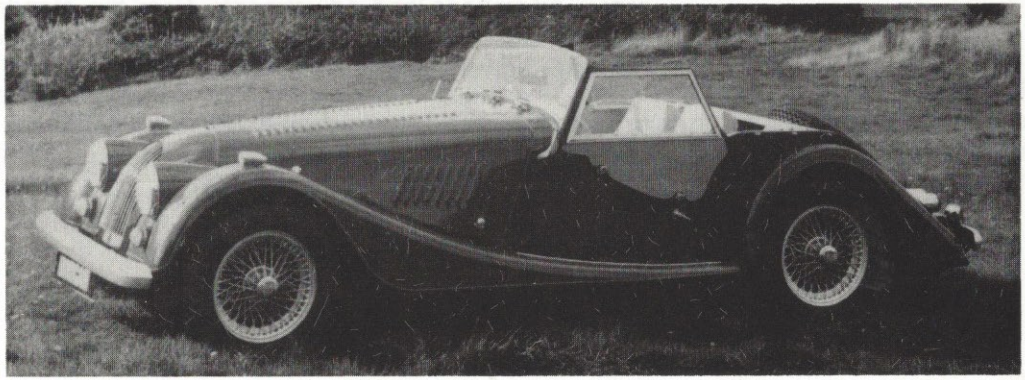
4/4 Morgan Owners Handbook



The Morgan 4/4

MORGAN MOTOR CO. LTD., PICKERSLEIGH ROAD, MALVERN LINK, Worcestershire, England. Tel.: Malvern 3104/5

SECTION ONE

GENERAL SPECIFICATION

	ALL MODELS	
Chassis Number	On offside top of cross member under front seat.	
	Ford Engine	**Fiat Engine**
Engine Number	On nearside upper face of block forward of clutch housing.	On nearside front of engine below distributor above oil filter.
Engine	4 Cylinders Single OHC	4 Cylinders Twin OHC
Bore of Cylinder (mm)	79.96	84
Stroke (mm)	79.52	71.5
Cubic Capacity	1,597cc/97.5 cu ins	1,585cc/96.68 cu ins
Firing Order	1—3—4—2	1—3—4—2
BHP (Din @ rpm)	96 @ 6,000	98 @ 6,000
Torque (Din/ft lbs)	98 @ 4,000	94 @ 3,800
Valve Operation (or Clearances)	Hydraulic Tappets	Inlet: 0.018 in 0.45 mm Exhaust: 0.024 in 0.60 mm
Valve Timing: Inlet	8°BT 36°AB	12°BT 53°AB
Exhaust	34°BB 6°AT	54°BB 11°AT
Oil Capacity: Engine (refill)	6.6 Imp Pts/8.0 US Pts/3.75 lts	7.3 Imp Pts/8.8 US Pts/4.13 lts
Gearbox	2.6 Imp Pts/3.0 US Pts/1.5 lts	3.2 Imp Pts/3.5 US Pts/1.8 lts
Rear Axle	1.75 Imp Pts/2.1 US Pts/1.0 lts	
Water Capacity	13 pts/7.4 lts	
Cooling System	Water pump, radiator, electric fan and thermostat (see page 8 for antifreeze)	
Petrol	97 Octane	
Tank Capacity	2-Seaters: 8.5 Imp Galls/39 Lts/10 US Galls 4-Seaters: 10 Imp Galls/45 Lts/12 US Galls	

General Dimensions		
Wheelbase	8', 244 cm	
Track (front)	3' 11" 119 cm wire wheels 4' 122 cm	
(rear)	4' 122 cm wire wheels 4' 1" 124 cm	
Ground Clearance	6½" 16 cm	
Turning circle	32' 10 metres	
Tyre size	165 x 15 radials	

Overall Dimensions	*2 seater*	*4 seater*
Length	12' 366 cm	12' 366 cm
Width	4' 8" 142 cm	4' 8" 142 cm
Height (hood erected)	4' 3" 129 cm	4' 5" 135 cm

Body Dimensions		*Front seat*	*Rear seat*
Seat to hood	3' 1" 94 cm	3' 2" 96 cm	2'9" 84 cm
Width at elbows	3' 10" 117 cm	3' 10" 117 cm	3' 9" 114 cm
Height of seat from floor	8" 20 cm	10" 25 cm	13" 33 cm
Leg room	23"-25" 58 cm-63 cm		19" 48 cm
Door width at waistline	2' 3" 68 cm		
Luggage space: Length	3' 2" 96 cm	Accommodation for hood,	
Width	1' 4" min 40 cm	tonneau and sidescreens	
Depth	12" 30 cm		

Weights		
Complete with tools and petrol	1,580 lbs 718 kgs	1,660 lbs 750 kgs
Shipping weight	1,484 lbs 670 kgs	1,544 lbs 700 kgs

Ignition System

	Ford	Fiat
Initial Ignition Setting	12° BTDC	10° BTDC
Spark Plug Types	Motorcraft AGP12C/AGPR12C	Champion N9Y/Marelli CW78LP
Spark Plug Gap (in/mm)	0.025/0.60	0.024/0.60-0.70
Contact Breaker Gap (mm)	Electronic Ignition	Electric 0.30/0.40 / C.B. Type 0.37/0.43

Carburettor

Type	Weber Twin Choke Down Draught 32/34 DFT	Weber Twin Choke Down Draugh 32 ADF

Front Wheel Alignment and Suspension

Castor Angle	4°
Camber	2°
King pin inclination	2°
Toe-in	$\frac{1}{8}$"—$\frac{3}{16}$" (3.2 mm to 4.8 mm)

Transmission

Clutch: Diaphragm Spring Mechanical Cable Operation Single Dry Plate

Clutch Release Arm Free Movement: 1/10" (2.54 mm)

Rear Axle: Three-quarter Floating, Hypoid Crown Wheel and Pinion—Ratio 4.1:1

Gearbox: **Ford:** Four Forward Speeds, all Synchromesh. Floor Remote Change.

Fiat: Five Forward Speeds, all Synchromesh. Floor Remote Change. (Do not lift for reverse).

Gear Ratios

	Ford Engine			Fiat Engine	
	Gearbox	*Overall*		*Gearbox*	*Overall*
1st	3.65	14.95	1st	3.61	14.80
2nd	1.97	8.07	2nd	2.05	8.40
3rd	1.37	5.613	3rd	1.36	5.57
Top	1.00	4.10	4th	1.00	4.10
Reverse	3.66	15.00	5th	0.87	3.57
			Reverse	3.24	13.28

Performance Data (165 x 15 Tyres)

Miles per hour per 1,000 rpm

	Ford Engine	Fiat Engine
5th	—	20.2
4th	17.6	17.6
3rd	12.9	13.0
2nd	8.9	8.6
1st	4.8	4.9

Recommended Lubricants

These recommendations apply to temperate climates where operational temperatures may vary between approximately 10°F (–12°C) or 90°F (32°C). Lubricants marked with an asterisk (*) are multigrade oils suitable for all temperature ranges. Information on recommended lubricants for use under extreme winter or tropical conditions can be obtained from the Morgan Motor Co. or your local Distributor.

	SHELL	ESSO	BP	CASTROL	MOBILOIL
Engine	Shell Super Oil 20/50	Superlube	Super Visco Static 20/50 or BPVF7	Castrol GTX	Mobiloil Super 10/50
Gearbox	Spirax 80 EP	Esso Gear Oil GP 80W	BP Gear Oil 80 EP	Castrol Hypoy Light	Mobilube HD 80
Rear axle	Spirax 90 EP	Esso Gear Oil G 90/140	BP Gear Oil 90 EP	Castrol Hypoy	Mobilube HD 90
Steering box	Spirax 90 EP	Esso Gear Oil GX 85W/140	Energol Trans Oil 90 EP	Castrol Hypoy	Mobilube HD 90
Wheel bearings	Retinax A	Esso Pressure Gun Grease	Energrease L2	Castrol LM Grease	Mobil Grease MP or Special
Chassis grease points	Retinax A	Esso Pressure Gun Grease	Energrease L2	Castrol LM Grease	Mobil MP or Special
Oil can	X-100 Motor Oil 20W	Engine Oil	Energol Motor Oil SAE 20W	Castrol GTX	Engine Oil

Antifreeze. A mixture of 20% antifreeze to 80% water will give protection at 35° of frost. This level should be kept up at all times, summer and winter.

INSTRUMENTS AND CONTROLS

Instruments

Speedometer. Indicates the vehicle speed and total mileage and is fitted with a trip which is cancelled by the knob (base of instrument face) and pressed.

Oil pressure gauge. This gauge indicates the engine oil pressure. The oil pressure relief valve is set to return oil to the sump at a pressure of 35 to 40 lb/sq in for the Ford, and 45 to 50 lb/sq in for the Fiat. When the engine is idling and at normal temperature, the pressure will be lower than when running at a higher speed at the same temperature. Depending on the carburretor slow running adjustment, lubricant operating conditions and temperature, the idling pressure may drop to approximately 5 to 7 lb/sq in (0.35 to 0.4 kg/sq cm) at idling speed. If the gauge fails to register at normal running speeds then first check the engine oil level and if this is satisfactory, have the engine lubrication system examined immediately by your authorised dealer.

Voltmeter. This instrument indicates the condition of the battery on a voltmeter principle. A reading above the black sector which continues after 10 minutes running is too high and should be investigated. A reading below the black sector indicates the battery charging system requires attention.

Water temperature gauge. This is electrically operated, acting only when the ignition is switched on. The normal reading is on or just above 90°C.

Fuel gauge. Operates only when ignition is on, tank capacity: 2-seaters 8½ gallons (10 US gallons) 39 litres; 4-seater 10 gallons (12 US gallons) 45 litres.

Revolution counter. Shows engine speed in revolutions per minute and is calibrated in division of 100. It is of the electric impulse type.

Warning light unit placed centrally behind steering wheel.

(1) Direction indicator monitor. The left hand top indicator glows green when the steering column combination switch is moved to signal left hand turn, the right hand indicator operates for a right hand turn.

(2) Hazard warning light (red). Lights up intermittently along with direction indicator warning lights when hazard warning switch is operated.

(3) Ignition warning light (red). This serves the dual purpose of reminding the driver to switch off the ignition before leaving the vehicle and of acting as a no charge indicator. With the ignition switch 'on', the warning light should be illuminated only when the engine is stopped or turning over very slowly. As the engine accelerates the light should dim and eventually go out at a fairly low engine speed. Failure of the light to behave in this fashion will indicate a broken alternator drive belt or other fault in the charging system.

(4) Headlight warning light (blue). Glows when headlights are on main beam, no light when dipped.

(5) Brake warning light (red). When the ignition is switched on with the handbrake applied, the indicator should glow. Should failure of the front or rear brake lines occur or the break fluid level be too low, the indicator will also light up.

Foot operated controls

Accelerator. The pedal is connected by a cable to the carburettor throttle. When starting from cold, depress the pedal fully. To engage the automatic choke, release the pressure and start.

Foot brake pedal. Actuates the brakes on all 4 wheels hydraulically, and also closes the circuit to the rear brake lights. These only operate when the ignition is switched on.

Clutch. Press pedal to disengage drive from engine to gearbox. **Do not rest your foot on pedal when driving** or hold the clutch out to freewheel as this will **CAUSE UNNECESSARY WEAR.**

Foot control lubricator. Front suspension lubrication control. Depress as instructed (see page 29).

Hand operated controls

Handbrake. This is of the 'fly-off' type. To operate the handbrake pull backwards, the lever is fixed in the 'on' position by pressing the cap on top of the lever which engages the pawl in the ratchet. To release brake pull the lever to the rear and allow to go forward to the full extent. Red warning light shows until hand brake is 'off'.

Heater valve control. Is operated by hand control situated to the left of the steering column. Push in for heating. Pull out to close water valve.

Combined direction indicator, horn, headlamp main beam and headlamp flasher control. This antennae control is positioned on the right hand side of the steering column.

(a) Direction indicator control—Press the control downwards for right hand turns and upwards for left hand turns.

(b) Headlamp main beam control—With the headlamps on dipped-beam, push the control directly away from the steering wheel for main beam operation. The direction indicators can still be operated with the headlamp main beam in operation.

(c) Headlamp flasher control—Pull the control towards the steering wheel to flash the headlamps on to main beam. The control is spring-loaded and will return to its original position when released.

(d) Horn control—To operate the horn, press the end of the control towards the steering column.

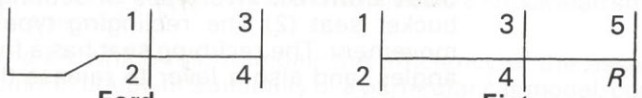
Windscreen wiper and washer control. This control is effective only when the ignition is switched on.

For continuous operation of the two-speed wiper move the control downwards to position '1' for slow speed, or fully downwards to position '2' for high-speed operation. For single wipe action lift the control towards the steering wheel.

To operate the windscreen washers press the knob at the end of the control.

To switch off the wipers return the control to 'O' *Caution:* should the ignition be switched off while the wiper switch remains in its operating position during severe frost conditions, the wiper blades can become frozen to the windscreen. When the ignition is switched on to start the engine, the wiper motor could be damaged by overloading. Be sure to switch off the wiper before switching off the ignition.

Gear lever. Always select neutral position before starting the engine.



(Do not lift for Reverse).

Steering lock, ignition and starter switch. This switch is located on the steering column and has 4 positions. **IMPORTANT: Take note of key number.**

1st position: Steering wheel lock in operation and ignition off, key can be extracted in this position.

2nd position: Moving clockwise 'garage lock'. Ignition off, but steering unlocked which allows the car to be moved and steered by hand.

3rd position: Ignition on.

4th position: Is spring loaded and brings in the starter motor.

To prevent the starter being operated whilst the engine is running a safety device is incorporated whereby it is necessary to switch the key back to 'garage lock' position before the starter can be engaged again.

Never allow the car to move unless ignition lock is released.

Headlight, side and tail light switch. This is a two position switch. First position side and tail lights together with number plate light and instrument light. Second position as above plus headlights.

Rear red fog lamps. These lights will only operate when other lights are switched on. The switch is only lit when the fog lamps are on. DO NOT USE REAR FOG LAMPS IN GOOD WEATHER.

Hazard switch. This switch when depressed operates all direction lights together and should only be used when the vehicle is stationary in an emergency situation.

Fan heater switch. Operates the two speed fan blower motor in the car heater system.

Fog light switch. Operates both fog lights if required in adverse driving conditions (where fitted).

Instrument illumination rheostat. Situated behind facia panel below voltmeter. Turn the knob clock-wise to illuminate the instruments at high intensity and anti-clockwise to reduce the intensity.

Seat control. Two types of seating are available on the 4/4 (1) The fixed back type bucket seat (2) The reclinging type seat. Both seats are adjustable for fore and aft movement. The reclining seat has a fine adjustment knurled knob to give varying seat back angles, and also a lever to release the back so that it may be tilted to the fully forward direction.

Seat belts

Fig. A

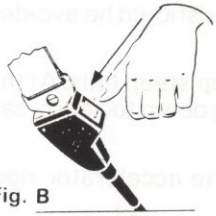


Fig. B

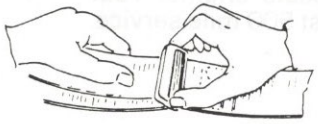


Fig. C

Wearing. Never attempt to wear the belt other than as a complete lap and diagonal assembly. Do not try to use the belt for more than one person at a time, even with small children. Ensure that the belt webbing is not twisted when in use, and that the belt is adjusted to the correct tightness.

Using the harness. Remove the belt from the plastic parking device (integral with the top pillar anchorage on most cars, but supplied as a separate item with Extra-long belts) draw the buckle over the shoulder and across the chest and push it into the buckle unit nearest the wearer until a positive click ensures that the harness is safely locked (See fig. A). To release the harness, press the red button on the buckle unit (See fig. B) and stow away the belt.

Adjusting. Adjustment is provided in the lap portion of the belt near the sill, or lower anchorage point. By tilting the adjuster upwards, the belt is then loosened, and may be lengthened or shortened accordingly (See fig. C). When the belt has been adjusted correctly there should be sufficient room to pass a hand between the chest and the webbing.

Cleaning and webbing. No chemical cleaners should be used on the webbing, If it becomes soiled, sponge with warm water, using a non-detergent soap, and allow to dry naturally, not by artificial heat or direct exposure to the sun.
NEVER ATTEMPT TO EITHER BLEACH OR RE-DYE THE WEBBING.

Warning

1. Never at any time wear the lap belt loosely as this reduces its protection.
2. Periodically inspect the webbing for abrasion, paying particular attention to the anchorage points and adjusting devices.
3. In the event of an accident any safety belt which has been subject to a shock load should, in the interests of safety, be renewed.
4. Alterations or additions to the kit which might impair the efficiency of the assembly should not be carried out. In case of doubt, or suitability of a particular car model, consult the manufacture list.

RUNNING IN

During the first 30 hours or so of their working life, the moving parts of a new car require a 'bedding-in' or polishing process, such as is provided by light, and medium running.

Long trouble-free life, particularly of engine, rear axle and brakes depends on this careful running-in, which can only be achieved by restraint on the part of those who drive the vehicle during this initial time.

The engine may seem to lack power for the first 200 to 300 miles (320—480 km) whilst this process is taking place. The power will then improve as the car is used for the first 2,000 miles (3,200 km), and this will be accompanied by a corresponding improvement in fuel consumption.

It is suggested that for the first 500 miles (800 km) engine speed should not exceed 3,000 rpm.

Both long periods of idling and excessive racing of the engine should be avoided at all times and particularly during warming up from cold.

Do not allow the engine to 'labour' especially when driving up steep hills. At the first sign of this, change down, bearing in mind that changing down too early can result in undesirable racing of the engine.

Vary the rpm occasionally whenever possible. Releasing the accelerator now and again to give the engine a better start in life.

As the machined surfaces approach their optimum condition, it becomes necessary to reset the adjustments to suit the more flexible engine. Your Morgan dealer will attend to this when he carries out the first 500 mile service.

SECTION TWO

ROUTINE MAINTENANCE AND ADJUSTMENTS

NOTES ON GENERAL MAINTENANCE

In this section will be found all the information necessary to maintain your car in good mechanical condition in a temperate climate. Climatic and operating conditions affect maintenance intervals to a large extent; in many cases, therefore, the determination of such intervals must be left to the good judgement of the owner or to advice from a Morgan distributor or dealer, but the recommendations will serve as a firm basis for maintenance work.

Important points

1. Depress the 'one shot' lubricator for a few seconds daily or every 200 miles (550 km) if touring. Lubrication is preferable when the engine oil is cool.

2. Every 500 miles or weekly, whichever comes first, check the engine oil level, the radiator coolant level, windscreen washer reservoir, and battery electrolyte level.

3. Every month check the tyre pressure and inspect tyre treads; when used for competitions or high speed touring check daily. Inspect front wheel tread wear and if uneven have wheel alignment checked. Check brake fluid level.

4. Owners are under a legal obligation to maintain all exterior lights in good working order; this also applies to headlamp beam setting, which should be checked at regular intervals by your garage.

Fuel recommendations. The engine is designed to run on 97 Research octane fuel, 4-star grade in the United Kingdom.

Engine. Under adverse conditions such as driving over dusty roads or where short stop-start runs are made, oil changes, attention to the flame traps and breather filter replacement must be more frequent.

Air cleaner and propeller shaft. When the car is driven over dusty or sandy roads the air cleaner should be changed more frequently and the propeller shaft serviced over shorter intervals to prevent ingress of abrasive materials.

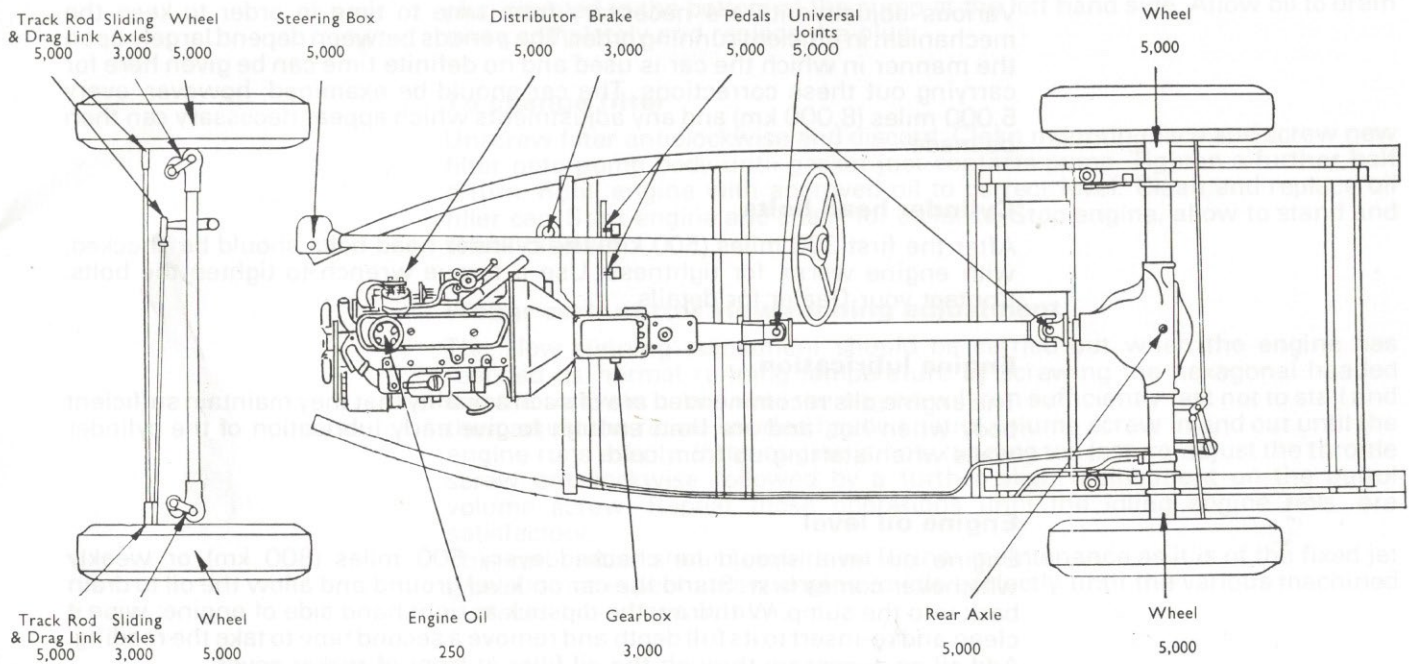
Lubricants. Great importance is attached to the nature of lubricants used, and therefore specific recommendations are shown on page 8. Should for any reason these oils not be available in certain overseas territories, the Morgan distributor or dealer for the area will be able to recommend suitable alternatives.

Windscreen washer

The water level in the windscreen washer should be checked every 500 miles (800 km). This is located on the bulkhead in the engine compartment on the opposite side to the steering column. Top up reservoir to within 1 in. (25 mm) below top of orifice provided. Use Clearalex windscreen washer powder in the container, this will remove mud, flies and road film. In cold weather, to prevent freezing of the water, the reservoir should be mixed one part methylated spirits to 20 parts water.

LUBRICATION CHART

AT MILEAGE SHOWN



SECTION THREE

ENGINE

Engine Maintenance and adjustments

Various adjustments are necessary from time to time in order to keep the mechanism in efficient running order. The periods between depend largely upon the manner in which the car is used and no definite time can be given here for carrying out these corrections. The car should be examined, however, every 5,000 miles (8,000 km) and any adjustments which appear necessary can then be made.

Cylinder head bolts

After the first 300 miles (500 km) the cylinder head bolts should be checked, with engine warm, for tightness. Use a torque wrench to tighten the bolts. Contact your Dealer for details.

Engine lubrication

The engine oils recommended are of such a quality that they maintain sufficient body when hot, and are fluid enough to give early lubrication of the cylinder walls when starting up from cold.

Engine oil level

Engine oil level should be checked every 500 miles (800 km) or weekly whichever comes first. Stand the car on level ground and allow the oil to drain back into the sump. Withdraw the dipstick at right hand side of engine; wipe it clean and re-insert to its full depth and remove a second time to take the reading. Add oil as necessary through the oil filler at front of rocker cover.

Engine oil changes and filter replacements

Engine oil changes and filter replacement should be undertaken every 5,000 miles (8,000 km) or every six months whichever comes first. To change the oil: run the engine to warm up oil and then switch off ignition. Remove the drain plug situated in the bottom of the sump at the left hand side. Allow oil to drain away completely and replace the plug.

To change filter

Unscrew filter anticlockwise and discard. Clean mounting face and screw new filter onto pump body until gasket just contacts pump. Tighten a further half a turn. Refill engine with approved oil to correct level. Clean and replace oil filler cap. Start engine and check for oil leaks. Stop engine, allow to stand and check oil level.

Weber carburettor slow running adjustment

The slow running adjustment should be carried out when the engine has reached its normal running temperature by screwing the hexagonal headed throttle screw in or out until the engine will run sufficiently fast not to stall and then adjust the round knurled headed petrol volume screw in and out until the engine runs evenly. If the engine is now running too fast, re-adjust the throttle screw anticlockwise followed by a further slight adjustment on the petrol volume screw. Repeat these operations until the idling engine revs. are satisfactory.

This carburettor should require no further maintenance as it is of the fixed jet type. Do not expect a new engine to idle perfectly until the various machined surfaces have been 'run in'.

Emission control valve

This is located on the right hand side of the engine to the rear of the carburettor. Every 6,000 miles or 10,000 km, it is necessary to clean out the oily deposits from the inside of the valve housing.
To remove the emission control valve disconnect the hose and pull the valve out of its grommet. Do not run the engine with the hose disconnected as the mixture will be excessively weakened.
Dismantle the valve by removing the circlip and extract the valve seal, valve and spring. Wash in petrol to remove any sludge or lacquer that may be present. Reassemble the components in the reverse order and refit circlip. Push the valve back into grommet and reconnect the hose.

Fuel pump

The fuel pump is located on the left hand side of the engine behind the oil filter or on the left in front of the carburettor. The pump is entirely automatic in action and requires little attention other than cleaning the nylon filter screen in the inverted metal dome on top of the pump every 5,000 miles. Occasionally the fuel line unions should be checked for tightness.

Sparking plugs

The sparking plugs should be cleaned and gaps set (See page 6), although for maximum efficiency it could be an advantage to renew the sparking plugs every 10,000 miles (16,000 km), ensure that the sparking plug insulators are clean to prevent 'HT' tracking.

Distribution contact points

Fiat The contact breaker points gap should be adjusted (See page 6 for gap) by slackening off the locking screw on the fixed contact point and moving the contact point when the fibre arm of the moving contact is on the highest point of the cam. Securely tighten the lock screw and re-check the gap. If the points are worn or pitted, they should be dressed flat with an oil stone. By loosening the pinch clamp bolt at the base of the distributor and the adjusting bolt in the slot the ignition can be either advanced or retarded. Only small deviations from the normal setting are required and it is advisable to test the car on the road. Carefully note with a stop watch the time taken to accelerate from 20 mph (32 km) to 40 mph (64 km) (when 'run in' and subject to legal requirements) in top gear with the throttle fully open the optimum ignition setting is that which gives the shortest time to accelerate.

Ford Electronic ignition with no contact breaker.

Distributor maintenance

Fiat Every 5,000 miles (8,000 km) the cam should be smeared lightly with engine oil. A pronounced squeak occurs when the cam is quite dry. Withdraw the moulded rotor arm from the top of the spindle (care should be taken because this part is made of brittle material), but do not remove the screw exposed to view. Apply, by means of oil-can, a few drops of thin machine oil around the edge of the screw and down the hole provided, to lubricate the cam bearings and distributor spindle respectively. At the same time, place a single drop of clean engine oil on the contact breaker arm pivot.

When replacing the rotar arm make sure that it is pushed on as far as possible. The moving parts of the automatic advance mechanism should be lubricated with winter grade engine oil. This can be squirted through the gap between the cam and the base plate. Take great care not to allow any oil to get on or near the contacts.

Ford No maintenance is required for the Ford type distributor, any problems should be referred to the Dealer.

Alternator drive belt adjustment

Every 10,000 miles (16,000 km) check by thumb pressure between the alternator and crank shaft pulleys at mid point. Movement should be $\frac{7}{16}$ to $\frac{9}{16}$ in. (11 to 14 mm). If necessary adjust as follows:

1. Slacken the bolts securing the alternator to the front cover; also the fixing at the adjustment link.
2. Pivot the alternator inwards or outwards as necessary and adjust until the correct tension is obtained.
3. Tighten alternator adjusting bolts.

Clutch adjustment

The amount of free movement on the clutch operating push rod should be $\frac{1}{10}$ ins. Adjustment is made by slackening the lock nut at the base of the cable on the pedal end. Then turning the large adjusting nut clockwise or anti-clockwise as necessary. Do not forget to re-tighten the lock nut.

Front suspension

Lubrication of the sliding axles is carried out by the 'one shot' lubrication system. The plunger which operates the system is situated in the middle of the metal scuttle and is foot operated. The plunger should be depressed daily or every 200 miles (370 km) whichever comes first, preferably when the engine oil is cold. The plunger should be held down for a few seconds during which time a very small decrease in oil pressure may be noticed on the oil gauge.

The sliding axles are also provided with grease nipples which should be lubricated with grease every 5,000 miles (8,000 k m). The grease helps to retain the oil supplied by the 'one shot' system.

The importance of frequent lubrication to the sliding axles cannot be too highly stressed as comfort is to a large extent dependent on the free working of these parts and neglect will result in tightness which not only makes the springing harsh, but results in excessive wear, necessitating renewal before it should be necessary.

Steering

Check oil level in steering box every 5,000 miles (8,000 km), and top up with one of the recommended lubricants (page 8). Grease nipples are situated one at each end of the track rod and one at each end of the drag link and should be greased every 5,000 miles (8,000 km).
Should the steering become stiff a small amount of lubricating oil or grease on the steering friction dampers may prove beneficial.

Gearbox

The gearbox oil level should be checked every 3,000 miles (4,800 km) and topped up if necessary with the correct lubricant. A heavy oil or grease should not be used as this will spoil the operation of gear-changing.
An oil level and filler plug is situated on the left hand side of the gearbox and is accessible through a hole in the transmission cover forward from the front seat base. Top-up by means of an oil gun or suitable funnel and bring level of oil to the bottom of plug hole.

Rear axle

It is essential to drain and replenish the axle with 'Hypoid' oil every 5,000 miles (8,000 km). A drain plug is provided at the base of the axle.
The hypoid bevel gears fitted in the rear axle require a special lubricant to ensure efficient operation and long life.

This type of gear incorporates a sliding action between the exceptionally sturdy gear teeth, resulting in silent operation. However the rubbing action is too severe for normal oils, so special 'Hypoid' oils have been developed which contain additives that make the oil capable of withstanding pressures many times heavier than normal oils can cope with. A further feature of 'Hypoid' oils is that they are 'lighter'—that is to say, more fluid than normal axle oils. However, the special additives begin to lose their properties in the course of use, and the oil tends to revert to a light gear oil.
Thus it is advisable to completely drain and replenish with a new 'Hypoid' oil every 5,000 miles (8,000 km), and in any event do not exceed a period of 10,000 miles (16,000 km).
It is desirable to have the oil level checked during this period and if the oil level is below the plug on the rear do not 'top up' but drain the oil and refill with new oil, this will overcome the danger of mixing the various grades of oil.
Clean away grit from filler plug and refill until oil reaches the level of the filler plug on the rear of the axle case.

Rear road springs

The rear road springs should be painted or sprayed with engine oil every 5,000 miles (8,000 km).
It is the area around the tips of the blades which most requires the lubricant, as it is at these points that one blade presses upon the next. The spring clip should also be oiled.
Oil should be kept away from the rubber bushes located at each end of each spring.

Other lubricating points

The following items should be oiled at least at each major service, to prevent unnecessary wear:

Rear brake yoke pins, and balance lever pivots.

Door hinges and locks.

Bonnet catches and tape seating.

Accelerator linkage.

Wheel studs (to prevent rusting).

Steering damper blades.

Brake fluid reservoir

The brake fluid reservoir is situated under the bonnet on the bulkhead on the same side of the car as the driver.

Every 5,000 miles (8,000 km) remove the cover and check fluid level in the reservoir. If necessary replenish to within ½ in. (12 mm) of the top with Castrol Girling Crimson Brake and Clutch Fluid (SAE70R3). Replace cover ensuring that the rubber sealing ring is in good condition and that the ventilation hole is unblocked.

If significant topping-up is required check master cylinder, slave cylinders and pipes for leakage; any leakage must be rectified immediately.

After approximately 3 years or 40,000 miles (64,000 km) the seals and cups of the hydraulic system should be inspected and if necessary replaced.

Brakes

The brakes will be inspected regularly during normal servicing but should the car be used for competition work, brake wear will be much more rapid and therefore inspection and perhaps replacement of pads or shoes be necessary during the period in between.
Cleanliness is essential when dealing with brakes, as no method is known of successfully removing grease or oil from brake linings. Always replace with genuine Morgan relined shoes or pads as they will have the correct grade of lining, ground to the correct contour and inspected to conform to the original specification.

Front brake pads

Hydraulic disc brakes are fitted to the front wheels and the correct brake adjustment is automatically maintained, no provision is therefore made for adjustment.
Every 5,000 miles (8,000 km) (more frequently if used in competitions) check the thickness of the brake pads and renew if the minimum thickness is less than $\frac{1}{8}$ in. (3.00 mm). Also check for oil contamination of brake pads and discs.

Front brake pads—*Removal*

1. Jack up front of the car and remove road wheels.
2. Remove hairpin clips and withdraw the pad retaining pins.
3. Withdraw pads complete with anti-rattle springs and damping shims.
4. Measure the linings and if less than $\frac{1}{8}$ in. (3 mm) renew pads. If pads are not to be renewed mark each one in order that it may be fitted in its original position.

Replacement

1. Push in the pistons with an even pressure to the bottom of the cylinder bores. Then slide the pads into position, together with the damping shims. Ensure arrow cut-out in shim points in direction of rotation.
2. Refit the anti-rattle springs if included, one on each pad then replace the pad retaining pins, ensuring that the anti-rattle springs are clipped under the pins. Fit new hairpin clips.
3. Pump the foot pedal until a solid resistance is felt. This repositions the piston and puts the pad in slight frictional contact with the disc.
4. Refit the road wheels, remove car from jack and road test car.

Rear brake drums

Hydraulic brake drums are fitted to the rear wheels and should be inspected and checked every 5,000 miles (8,000 km) or before if the brake pedal had excessive free movement. To adjust proceed as follows:

1. Jack up rear of vehicle and remove rear wheels (the last operation is not essential but makes the task easier).
2. Turn the adjuster nut in a clockwise direction until the shoes contact the drum and release back one or two notches until the drum is free. The single adjuster is placed facing in a forward direction on the backplate.

Rear brake shoe replacement

1. Jack up the car and remove road wheels.
2. Remove the countersunk screw and take off brake drum.
3. Dismantle the brake by prising one shoe out of the groove in the wheel cylinder piston with a large screwdriver. Both shoes and pull off springs can now be removed, leaving the wheel cylinders and pivot pins in position on the backplate. Do not detach these units from the backplate. To prevent loss of brake fluid, place an elastic band over the wheel cylinder pistons to hold these in place.
4. Clean down backplate and check wheel cylinders for leaks and freedom of motion. It is important that the adjuster is turned back (anti-clockwise) to the full 'off' position and is working freely.
5. To fit replacement shoes, first attach shoe springs (new if possible) to shoes. Be sure that the springs are between the shoe webs and backplate, otherwise shoes will not be flat on backplate. Keep all grease off linings and do not handle linings more than necessary. Place shoes with springs attached against backplate. Shoes have half round slots at one end. Fit these slots to the pivot pin, then insert the other end of the shoe in the wheel cylinder piston. Place the screwdriver under the web of the remaining shoe and against the backplate. Ease the shoes into the grooves on the piston.
6. Refit drums; be sure these are clean and free from grease, etc.
7. Tighten up adjusters until the wheel just locks and then slacken off until the wheel spins freely.
8. Refit road wheels, jack down and road test.

The handbrake

Adjustment of the rear brake shoes automatically re-adjusts the handbrake mechanism. The rods are correctly set before leaving the works and only mal-adjustment will result from tampering with the mechanism. Cable adjustment may be made by turning the adjuster at the rear of the handbrake cable. The lever compensating mechanism on the rear axle should be kept free and well oiled.

Bleeding the system

Except for periodical inspection of the fluid level in the reservoir chamber and lubrication of the handbrake cables and connections no attention should be necessary. If, however, a pipe joint is uncoupled at any time, or the wheel cylinder cups are inspected or replaced, the system must be bled in order to expel any air which may have been admitted.

Air is compressible, and its presence in the system will affect the working of the brakes.

1. Wipe clean the bleeder nipple of the brake concerned and fit a piece of rubber tube over it, allowing the tube to hang in a clean container partially filled with fluid, so that the end of the pipe is below the level of the fluid.
2. Unscrew the bleeder nipple one complete turn with a suitable spanner. There is only one bleeder nipple to each wheel.
3. The fluid reservoir of the master cylinder must be topped up before commencing the bleeding operation, and must be kept at least half-filled during the whole operation, otherwise more air will be drawn into the system via the master cylinder. Always clean the area around the screwed cap before removing it, this will lessen the risk of grit falling into the chamber after removal.

4. Depress the brake pedal quickly and allow it to return without assistance. Repeat this pumping operation with a slight pause between each depression of the pedal. Observe the flow of fluid being discharged into the glass jar and when all air bubbles cease to appear, hold the pedal firmly down and securely tighten the bleeder nipple.

Note.—Depending upon the position at which a pipe joint has been uncoupled it will be necessary to bleed the system at either both front or both back wheels. If the pipe was uncoupled at the master cylinder then the system must be bled at all four wheels.

Battery

The battery fitted is a 12 volt 36 amp/hr Lucas QOA9 with negative earthing. Keep the terminals clean and well covered with petroleum jelly. If they are corroded, scrape them clean, assemble and cover with petroleum jelly. Wipe away all dirt and moisture from the top of the battery, and make sure that the connections are clean.

Wheels

In the normal course of wear and tear, or due to minor impacts, the wheels may develop irregularities, or cease to point directly in the direction of motion. A check should be made periodically to ensure that the wheels are in correct alignment or 'track'. Every garage possesses an alignment gauge and can carry out a test in a few moments. Errors in alignment can be corrected by adjustment of the track rod, the ends of which are threaded for this purpose. The 'Toe-in' for the front wheels should be $\frac{1}{8}$"—$\frac{3}{16}$". 'Toe-in', even in the smallest degree, is to be avoided.

To ensure smooth running especially on the front wheels and at high speeds, it is recommended that wheels and tyres are periodically balanced, this can be carried out by most garages, and the trouble in having this done is well repaid by the results obtained.

Tyre pressure

Tyre pressures should be checked weekly and at every maintenance inspection. Maximum tyre life and performance will be obtained only if the tyres are maintained at correct pressures.

	lbs/sq in.	*kg/cm²*
Normal (front and rear)	18	1.26
High speed (front and rear)	24	1.68

Wherever possible check with the tyres cold, as the pressure is about 3 lbs/sq in. (0.2 kg/cm²) higher at running temperature. Always replace the valve caps, as they form a positive seal on the valves.

When high speed touring or taking part in competitions, the tyre pressures should be checked much more frequently, even to the extent of a daily check.

Any unusual pressure loss (in excess of 1 lb/sq in. (0.5 kg/cm²) per week) should be investigated and corrected.

Always check the spare wheel, so that it is ready for use at any time.

At the same time remove embedded flints, etc., from the tyre treads with the aid of a penknife or similar tool.

Wheel and tyre units are accurately balanced if necessary on initial assembly with the aid of clip-on weights secured to the wheel rims.

Wheel balance

When tyres are changed, road wheels should be carefully checked for possible damage.

When replacements are required, the tyres should be as currently specified by the Company. They should be of the same type as those previously fitted.

Headlamp beam setting

This operation should be carried out every 10,000 miles (16,000 km) but is best left in the hands of your garage. They can however be set reasonably accurately as follows:

Place the car 25 feet (7.6 m) away from a blank wall, taking care that the car stands on a level surface, and that the front of the car is parallel to the wall. The car must be unladen. Do this job at night, or pick a spot which is well shaded, so that the light spots thrown by the lamps can be clearly seen.

When correctly set the light spots from the lamps should be 2½ in. (63 mm) below the centre of the headlamps. The beams should also be parallel with each other. If they require adjustment, remove the moulding surrounding the lamp—and the beam adjustment screws will be exposed.

The top screw contols vertical adjustment and the lower screw the horizontal adjustment. It is preferable to start with the screws well in so that the moulding does not interfere with them when replaced.

Headlight

The headlights are of the Halogen type with H4 12 volt clear bulbs (export yellow).

To renew the headlight bulb, remove the moulding surrounding the lamp. Place two fingers in the holes at the bottom of the rim and pull towards the front of the car.

To remove the lamp, grip the lense and reflector firmly on each side and pull with a steady pressure. Remove rubber cover and clip, then bulb.

Fuse box

The fuse box is located under the bonnet on top of the scuttle. The cover is a snap fit and when removed will reveal 4 fuses and two spares.

Fuses

Fuse (35 amp) in holder marked 1 and 2 is for sidelights, rear lights and driving lights.
Fuse (35 amp) in holder marked 3 and 4 is for constant current auxilliaries, ie: horn, head light flasher. The spare fuses are both 35 amp.
Fuse (2 amp) in holder marked 5 and 6 and Fuse (15 amp) in holder marked 7 and 8 are for ignition and auxiliaries, ie: screen wipers, washer, heater, stop lights.

Facia lights

Illuminated facia panel bulbs. Ensure the correct light bulbs are fitted as follows:—
Warning light unit behind steering wheel 12 v 1.5 w.
Light bulbs in switches 14 v 0.56 w.

High tension cables

High tension cables should be renewed if signs of cracking or perishing appear. These can be obtained as a set from your Morgan/Lucas Agent or an individual lead can be replaced.
Only 7 mm PVC or Neoprene covered rubber insulated ignition cable should be used.

Front suspension damper blades

On certain cars which have covered considerable mileage, faults are sometimes noticed in respect of front wheel vibration even though the wheels are correctly balanced. This can be overcome by making sure that the flat spring sheet blade mounted from the stub axle to the chassis side member is secured without any radial movement at the chassis end. This blade should slide inwards and outwards only. Any sideways or radial movement should be reduced to a minimum by adjusting the shims. These shims are locked in place by the two bolts which secure the flat steel clamps to the chassis. It may also be necessary to renew the damper blades if worn edges are apparent. These blades should be greased regularly.

Coach work

To maintain the good appearance of your coachwork it should be washed frequently with cold or luke warm water, with a little car shampoo added to assist in dissolving traffic film. When surplus dirt has been washed off, clean the body with a sponge and plenty of fresh water, then rinse and rub down with a clean chamois leather.

In order to restore the paintwork to its original lustre, a thin application of wax polish is recommended. If the car is kept in a clean condition by subsequent washing leathering, approximately once a week, it will be found that the frequent use of wax polish is unnecessary.

Combined cleaner and silicone polishing liquids are not recommended.

Tar on the body may be removed by dipping a soft cloth into a mixture of $\frac{2}{3}$ petrol and $\frac{1}{3}$ clean engine oil, and using one finger, rubbing the spot gently until it has been removed. Then wash the mixture away with clean water.

The chromium plated parts should be washed in the same way as the paintwork, and then dried thoroughly with a duster. If, due to neglect, rust staining has appeared, it may be removed by rubbing lightly with a mild glass or mirror cleaner, but where parts have been severely stained due to insufficient cleaning in the recommended manner, it may be necessary to use a proprietary brand of chromium cleaner to restore the lustre of the surface. Many such cleaners however are abrasive and continuous use may damage the plated surface. After use, all traces of the cleaner should be removed and the surface washed and polished as previously described. Ordinary metal polish should not be used.

Windscreen wiper blades should be washed frequently with windscreen washer fluid, clean water or soapless detergent to maintain their efficiency.

The interior of the car should be wiped over periodically with a damp sponge and then polished dry with a soft duster. A mild detergent may be used in extreme cases.

Hood

When erecting the hood, always fix the eyelets in the back curtain over the turn-buttons first and then fix snaps across the top of the windscreen, making sure the sealing pipe runs along the back of the screen. If secured at the front first some strain will be necessary to pull the eyelets over the turn-buttons, which in time will pull away from the fabric.
However, it is recommended that if the hood is tight when dismantling it is advisable to release it at the turn-buttons, which avoids straining at the eyelets.
It is not intended that the tonneau cover over the rear compartment should remain in position when the hood is up as the turn-buttons do not allow for the double thickness, and unnecessary strain is placed on the hood fabric and turn-buttons alike.

Side curtains

It should be remembered that Vybak is easily scratched and soiled, spoiling vision at the sides. When not in use, therefore, do not throw the side curtains carelessly into the rear compartment or they may move about and become damaged. A small 'tommy bar' is provided to facilitate the tightening of the knurled knob fixing the sidescreens to the car.

Hydraulic dampers

The telescopic piston type dampers fitted to front and lever type rear respectively should not require any attention such as 'topping-up'. They should however be kept as clean and free from oil and dirt as possible so that heat generated by their normal function will dissipate quickly.

Jacking system

The jack is used in the following manner:

First make sure that the car cannot move backwards or forwards by using the brakes or chocking the car firmly.

The jack may be used for lifting front wheels by placing it under the bottom cross axle tube, care should be taken not to damage the brake pipe.

Rear wheels can be lifted by using the jack directly under the rear chassis box cross member.

Great care must be taken if the car has to be lifted on cambered surfaces. No work other than changing wheels must take place under the vehicle unless the car is standing on chocks that are fully capable of withstanding the full weight. No part of a person's anatomy must be under the car when the jack is used for any purposes.

SERVICE

Our Service Department is especially equipped to take care of customer's requirements, and can at all times undertake anything from adjustments to major repairs and complete overhauls, at reasonable charges consistent with expert workmanship.

Parts sent for repairs must be consigned carriage paid and should be clearly labelled with the sender's name and address, along with chassis and engine number.

Instructions should be sent separately stating whether an estimate is required before putting the work in hand. When it is inconvenient to send repairs to the works an accredited 'Morgan' Dealer should be consulted.

NOTIFICATION OF SALE CARDS

The Morgan Motor Co. Ltd., introduced these cards to enable the Company to deal with claims promptly and it is most important that the cards are completed and returned without delay. Failure to return these cards may jeopardize any future claims being met.

WARRANTY

The goods manufactured by The Morgan Motor Co. Ltd. are supplied with the following express Warranty which excludes all warranties, conditions and liabilities whatsoever implied by Common Law, and is subject to the Supply of Goods Act, 1973.

In the event of any defect being disclosed in any part or parts of the goods and if the part or parts of the goods alleged to be defective are returned to the Company's works carriage paid within 12 months or 12,000 miles, whichever occurs first, from the date when the goods are delivered new to the retail customer, the Company undertakes to examine same and should any fault due to defective materials or workmanship be found on examination by the Company, it will repair the defective part or supply free of charge a new part in place thereof. This Warranty is limited to the delivery to the purchaser free at the Company's works of part or parts whether new or repaired in exchange for those acknowledged by the Company to be defective.

The Company gives no warranty of the goods except as herein stated, but desires and expects that

customers shall make a thorough examination before purchasing. Persons dealing in the Company's goods are in no way the legal Agents of the Company and have no rights or authority to assume any obligations on its behalf expressed or implied or to bind it in any way.

For the purpose of this Warranty the term 'Goods' means and includes new cars or vans or chassis or parts thereof including replacement parts manufactured by the Company.

It does not include Tyres, Speedometers, or Electrical Equipment or other proprietary articles or goods not of the Company's own manufacture although supplied by the Company. Proprietary articles are covered by the warranty (if any) given by separate manufacturers. On secondhand goods no Warranty is given by the Company or is to be implied.

The Company's responsibility is limited to the terms of this warranty and it shall not be answerable for personal injury, or consequential or resulting liability damage or loss arising from any defects.

The Warranty is dependent upon the strict observance by the purchaser of the following provisions:

(a) The purchaser shall send to the Company's works such part or parts as are alleged to be defective promptly on discovery of the claimed defect. Transportation is to be prepaid and the said part or parts to be properly packed for transport and clearly marked for identification with the full name and address of the purchaser and with the car and chassis numbers of the vehicle from which the parts were taken.

(b) The purchaser shall post to the Company on or before despatch of such parts as are alleged to be defective a full and complete description of the claim and the reasons therefor.

(c) The decision of the Company on all claims shall be final and the purchaser agrees to accept its decision on all matters relating to defects and the exchange or replacement of parts.

MORGAN SPORTS CAR CLUB

As you are now the possessor of a Morgan Car, you may care to share your enthusiasm with other current or previous owners of Morgan cars.

To this end, the Club which was founded by a group of enthusiastic owners exists to promote meetings of a social and competitive nature for its Members. It is recognised by the RAC for the promotion of such events, and is associated with the Midland Association of Car Clubs.

The President is Mr. Peter Morgan, and the Club enjoys a favourable degree of Factory encouragement and support.

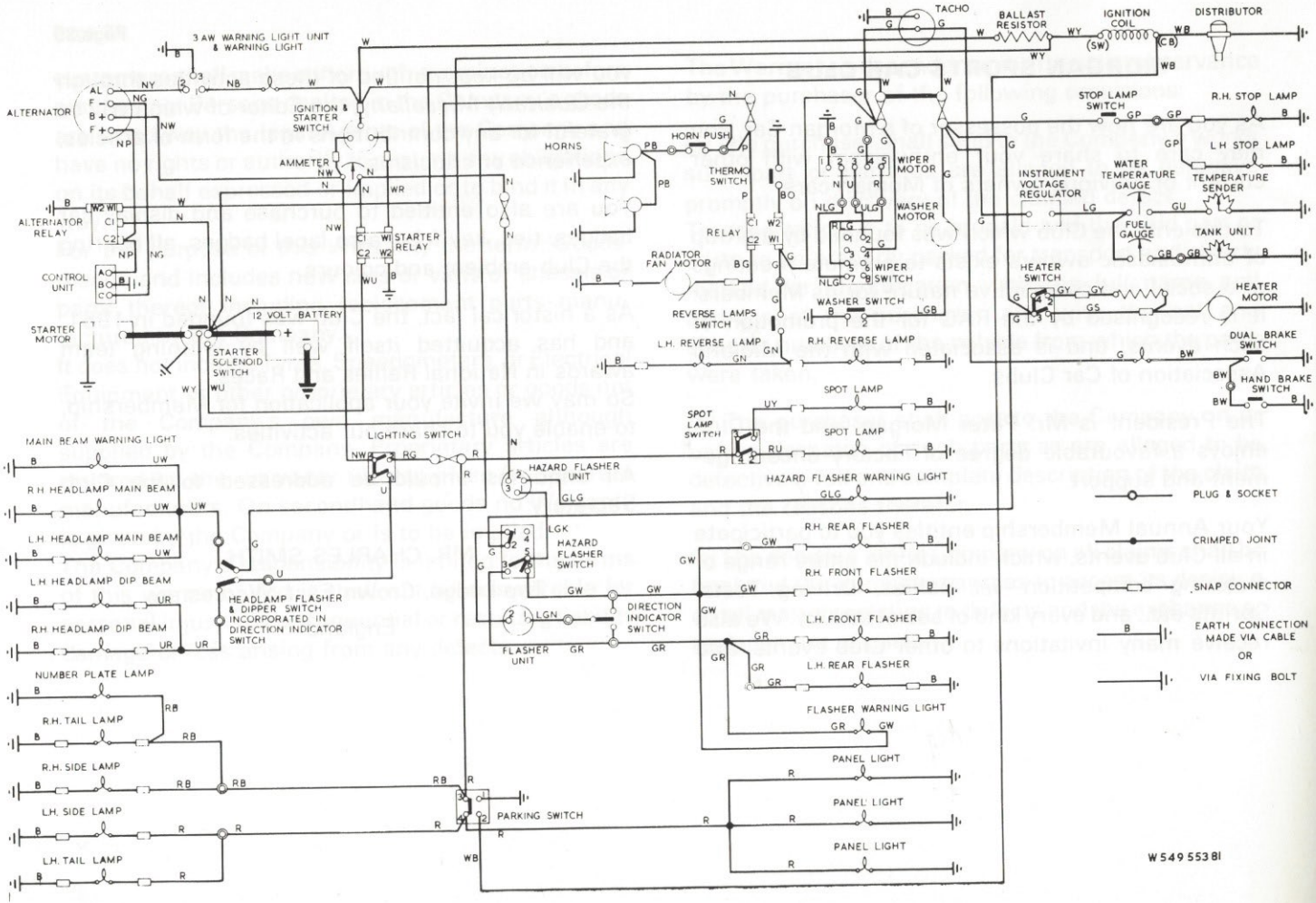
Your Annual Membership entitles you to participate in all Club events, which include the entire range of motoring competition—*ie:* Rallies, Driving Tests, Sprints etc., and every kind of social activity. We also receive many invitations to other Club events, and you will be kept notified of these activities through the *Quarterly Miscellany*, the Editor of which will be grateful for any contributions in the form of articles, experience or criticisms.

You are also entitled to purchase and display car badges, ties, key fobs, also lapel badges, all bearing the Club emblem and colours.

As a historical fact, the Club was founded in 1951, and has acquitted itself well by winning team awards in National Rallies and Races.
So may we invite your application for Membership, to enable you to share our activities.

All enquiries should be addressed to the Club Secretary:

MR. CHARLES SMITH
Top Lodge, Crown East, Worcester
England


3 A.W. WARNING LIGHT UNIT & WARNING LIGHT
ALTERNATOR
IGNITION & STARTER SWITCH
AMMETER
ALTERNATOR RELAY
STARTER RELAY
CONTROL UNIT
STARTER MOTOR
STARTER SOLENOID SWITCH
12 VOLT BATTERY
TACHO
BALLAST RESISTOR
IGNITION COIL
DISTRIBUTOR
HORNS
HORN PUSH
THERMO SWITCH
RELAY
RADIATOR FAN MOTOR
REVERSE LAMPS SWITCH
L.H. REVERSE LAMP
R.H. REVERSE LAMP
WIPER MOTOR
WASHER MOTOR
WIPER SWITCH
WASHER SWITCH
STOP LAMP SWITCH
R.H. STOP LAMP
L.H. STOP LAMP
INSTRUMENT VOLTAGE REGULATOR
WATER TEMPERATURE GAUGE
TEMPERATURE SENDER
FUEL GAUGE
TANK UNIT
HEATER SWITCH
HEATER MOTOR
DUAL BRAKE SWITCH
HAND BRAKE SWITCH
SPOT LAMP SWITCH
SPOT LAMP
SPOT LAMP
HAZARD FLASHER WARNING LIGHT
HAZARD FLASHER UNIT
LIGHTING SWITCH
MAIN BEAM WARNING LIGHT
R.H. HEADLAMP MAIN BEAM
L.H. HEADLAMP MAIN BEAM
L.H. HEADLAMP DIP BEAM
R.H. HEADLAMP DIP BEAM
HEADLAMP FLASHER & DIPPER SWITCH INCORPORATED IN DIRECTION INDICATOR SWITCH
HAZARD FLASHER SWITCH
FLASHER UNIT
DIRECTION INDICATOR SWITCH
R.H. REAR FLASHER
R.H. FRONT FLASHER
L.H. FRONT FLASHER
L.H. REAR FLASHER
FLASHER WARNING LIGHT
NUMBER PLATE LAMP
R.H. TAIL LAMP
R.H. SIDE LAMP
L.H. SIDE LAMP
L.H. TAIL LAMP
PARKING SWITCH
PANEL LIGHT
PANEL LIGHT
PANEL LIGHT
PLUG & SOCKET
CRIMPED JOINT
SNAP CONNECTOR
EARTH CONNECTION MADE VIA CABLE
OR
VIA FIXING BOLT
W 549 553 81

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