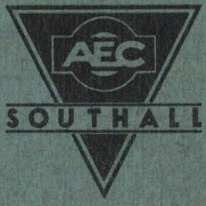
SIMPLE DRIVING AND MAINTENANCE INSTRUCTIONS FOR



MOTOR VEHICLES

IF LOST,
PLEASE RETURN TO:

NAME.....

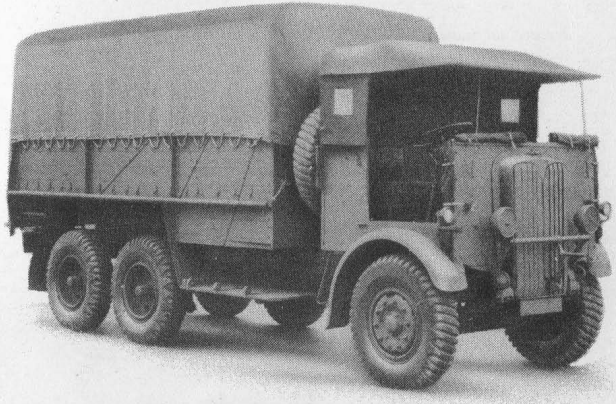
NUMBER.....

UNIT.....

N.B.—Throughout this book where the word "ForWarD" appears as the name of the A.E.C. Model 0853 vehicle, please read

F.W.D. "MATADOR"
(OIL ENGINE CHASSIS)
MODEL NO. 0853.

A.E.C. "ForWarD" Type Lorry.
(Model No. 0853)



A.E.C. "Marshal" Type Lorry.
(Model No. 644)

FOREWORD

This booklet is for drivers, and particularly learner drivers, and gives in concise form important hints on the driving and maintaining of A.E.C. vehicles. The booklet should always be kept handy. It is not intended that it should give the full and complete details contained in the Service and Instruction book, but is to help the person who "comes new" to driving and has not already handled A.E.C. vehicles. If the simple instructions given are carefully followed the beginner should have very little difficulty in mastering the rudiments of good driving, and assimilating a useful knowledge of maintenance.

Index is printed at the rear of booklet.

BEFORE STARTING UP.

See that:—

Radiator is full of water.

Oil in engine sump is up to top mark on dip stick.

There is enough petrol or fuel in the tank.

Tyres are not flat and wheel nuts are tight.

TO START ENGINE.

See that gear lever is in neutral position.

(1) Petrol. In very cold weather close choke and give engine a few turns by hand.

Switch on and press starter button.

When no self-starter is fitted wait a few seconds after turning by hand as above, then switch on and swing engine briskly with choke closed.

Open choke as soon as possible.

Do not race engine to warm it up, but let it run slowly for a few minutes before driving off.

(2) Oil. Press heater button (if fitted) for about half a minute, then, still holding it down, push down accelerator fully and press starter button.

As soon as engine starts, release both buttons.

When starting up a warm engine the heater button need not be used.

If engine does not pick up in a few seconds, release starter button and start all over again as instructed above.

As half a minute seems a long time when holding down the heater button, you are advised to time yourself at first until you are used to it.

TO STOP ENGINE.

Petrol. Switch off ignition.

Oil. Lift accelerator pedal with toe until engine stops. Never stop an oil engine by shutting off the fuel except in an emergency.

TO MOVE OFF.

Press and hold down clutch pedal.

Place gear change lever in 2nd position, as indicated on plate on bonnet—*i.e.*, press sideways away from you and pull back.

Release hand brake.

Allow clutch pedal to come up slowly, and at the same time press down accelerator pedal. (A little practice will soon show how these pedal movements must be made to give a smooth start.)

When the vehicle has reached a speed of about 8 miles per hour (watch speedometer), press down clutch pedal and at the same time release accelerator. Move change speed lever to 3rd position—*i.e.*, move forward half way, pull towards you and again move forward.

Release clutch pedal and press down accelerator as previously.

When 14 m.p.h. is reached, repeat the above operation, pulling change speed lever back to 4th or "top" position.

When starting from rest up hill, instead of starting with the change speed lever in 2nd, place it in 1st position and change to 2nd when the speed reaches 7 m.p.h.

Carry on with other changes as set out above, but change from 2nd to 3rd at 12 m.p.h. and from 3rd to 4th at 18 m.p.h.

CHANGING GEAR ON HILLS.

When the vehicle is climbing a hill in top or 4th gear and its speed drops, it is necessary to change down into 3rd. To do this it is necessary to "double declutch," and although this may sound complicated, it enables the driver, after a little experience, to change quietly. The following movements are required :—

(1) Press down clutch pedal and release accelerator.

(2) Bring change speed lever from 4th to neutral position.

(3) Release clutch pedal and press down again, at the same time pressing down accelerator and releasing it.

(4) Move change speed lever from neutral to 3rd.

(5) Release clutch and press down accelerator.

The best speed at which to carry out these operations will soon be found by experience.

In order to train your feet and hands to automatically make these movements at the right time, and in the right sequence, practise with the engine stopped, starting with slow movements and gradually, as they become natural, increase the speed.

The change from 4th or top gear to 3rd should be made when the vehicle has slowed down to 20 m.p.h., from 3rd to 2nd at 12 m.p.h. and from 2nd to 1st at 7 m.p.h.

AUXILIARY GEARBOX.

Some vehicles are fitted with Auxiliary as well as Main Gear Boxes, and gear changing is modified. There are three types of the boxes:

(1) Standard.

(2) Marshal.

(3) ForWarD.

Standard. A second change speed lever is fitted just ahead of the main one, and when starting off this should just be pushed forward into "low" position. Gears will then be engaged or changed with the main lever in the ordinary way, starting on the level in 2nd and changing to 3rd at 5 m.p.h. and to 4th at 10 m.p.h. Then when 15 m.p.h. is reached the auxiliary lever is pulled back into "high" position.

When starting on a hill follow the same procedure, but start in 1st gear, change to 2nd at 3 m.p.h., to 3rd at 6 m.p.h., to 4th at 12 m.p.h. and to high at 17 m.p.h.

When changing down in climbing a hill drop from "high" to "low" (front lever) at 20 m.p.h., from 4th to 3rd (main lever) at 11 m.p.h., to 2nd at 5 m.p.h. and to 1st at 2 m.p.h.

Marshal and ForWarD.

These types of vehicles are normally driven in "high" gear and only changed down to "low" for cross-country running or in an emergency, and the change either from "high" to "low" or from "low" to "high" must only be made when the vehicle is stationary. Change of gears in the main box is carried out in the normal way, whichever ratio is engaged, but changes in "low" ratio will be made at about one-half the speeds specified for the normal crash box.

On the Marshal chassis the auxiliary lever is ahead of the main one and is pulled back for high ratio and pushed forward for low.

On the ForWarD chassis the auxiliary lever is the outer one of the two on the driver's right and is pushed down for high ratio and pulled up for low.

On this chassis both axles may be driven, though normally only the rear one is. To engage the drive to the front axle the inner lever on the driver's right is pulled up.

On hard roads or hard ground front-wheel drive should only be used in exceptional circumstances, as when it is engaged the steering (due to having no differential between axles) is very hard and at high speeds dangerous.

On soft ground, however, front-wheel drive may be used with either high or low ratio, but it will be found that low ratio cannot be engaged unless front-wheel drive is also used.

BRAKES.

Hand and foot brakes are fitted on all vehicles and the foot brake is "Servo assisted." This means that when the pedal is pressed down the pressure exerted by the driver is increased by a vacuum cylinder and piston connected to the brake gear, and this is so designed that the extra pressure so applied is proportional to the amount the pedal is moved. In this way, if only a slight brake application is required and the pedal only pressed down a little way, a correspondingly small application is given by the Servo.

On the ForWarD chassis air pressure is used instead of vacuum.

Owing to this powerful braking system the "feel" of the brakes should be found out as soon as possible to avoid sudden and violent braking.

At least 20 inches of vacuum should be showing on the instrument board gauge before the vehicle is moved, or the brakes may not be found powerful enough when wanted. On the ForWarD vehicle the air pressure gauge should show 75 lbs. per sq. in. before moving.

The hand brake is not Servo assisted, but is connected direct to the brakes by rods or steel ribbons.

On the foot brake the Servo is connected to the axle brakes either by rods or by a hydraulic system. In this case the Servo is connected to a piston in a "master" cylinder full of oil, and pushes this oil through pipes to other cylinders containing pistons which are connected to the brakes, and by pushing on these pistons apply the pressure to the brake.

When descending long hills the hand brake should be used and the foot brake applied occasionally as required. This will prevent the brake drums from becoming overheated.

The resistance, or compression, of the engine should be used as much as possible to assist in braking by leaving the vehicle in gear and taking your foot off the accelerator so that the road wheels have then to keep the engine turning against the compression.

On long steep hills this help can be increased by using a lower gear and so making the wheels turn the engine over faster, but care must be taken in this case that the vehicle is not allowed to run too fast.

It is, of course, necessary to put the gear in neutral before the vehicle stops.

Before getting out of your seat to leave the vehicle always apply the hand brake.

GENERAL HINTS ON DRIVING.

Do not slip the clutch unnecessarily.

Never drive with your foot resting on the clutch pedal.

Keep the ignition on a petrol engine as far advanced as possible. The higher the engine speed, the more the ignition may be advanced. The best position of the ignition lever can only be found by experience from the "feel" of the engine, and a slight amount of occasional pinking may be ignored.

Use top gear as much as possible and do not change down while the engine has the load well in hand.

When ascending hills do not wait, however, till the engine is labouring before changing down.

Do not race the engine unnecessarily. When going up hill in gear, change up as soon as the speed will allow, as shown on page 5.

ROAD ADJUSTMENTS, etc.

If the starter will not engage it may be due to worn flywheel teeth. Turn flywheel round

about a quarter of a turn by means of a bar, and try to re-engage starter.

If the engine will not start, or stops on the road :—

Petrol. Be sure ignition is switched on and that fuel cock is open and fuel is reaching carburettor. Drop carburettor bottom half and make sure it is clean.

Examine points on magneto or coil. They should be clean and set so that a cigarette card will just pass between them.

Remove one lead from a plug and place it with its end close to, but not touching, the cylinder block. Give engine a smart turn by hand and see if any spark passes from lead to cylinder block. If so, your ignition is all right. Make sure that choke and air intake passages are clear.

Oil. See that fuel is turned on. To check if fuel is reaching the injectors, loosen the union nut on the pipe from pump to injector, at the injector end, and see if fuel oozes out from loosened pipe. Do this separately for all cylinders.

Make sure that air intake passages are clear and that fuel pump shaft turns when accelerator pedal is pressed down.

For both petrol and oil engines examine all fuel pipes for loose connections or cracks, and see that they are clean. Where an Autovac is fitted, examine suction pipes and see that small air holes on top are clear. Clean filters and see that float is not punctured.

Where oil engines are fitted with fuel lift pumps examine all pipes and clean filter, making sure that filter body joint is correctly replaced. Open cock on top left of fuel injection pump and work fuel lift by hand until fuel comes out of cock free of air.

In case of a broken injector pipe on an oil engine, if it cannot be repaired or a new one is not available, never try to block up the broken pipe and run the engine. This will damage the pump. Bend broken pipe over so as to throw clear of engine and let the fuel run to waste.

Small leaks in fuel pipes or radiators may sometimes be repaired temporarily by chewing gum or soap.

Faulty Injectors. A defective injector will cause a heavy irregular detonation, as well as a smoky exhaust when the engine is speeded up, and where the engine is rubber mounted it will "wobble" badly at slow speed.

The irregular running of the engine can be heard by listening at the exhaust tail pipe, or can be felt by placing the hand over the end of the pipe.

To find out which injector is faulty loosen the union nut on No. 1 fuel pipe, at the injector end. If this does not affect the running of the engine, then the injector is faulty. If it does affect the running, tighten up the union nut and try the other injectors in turn until the bad one is found.

To change an injector, take off the fuel pipe, undo the two nuts holding the injector in place, and then prize it off gently. When fitting the new injector be sure, if a copper washer is used with it, that this washer is replaced.

When a fuel pipe is removed see that it is laid in a clean place and not allowed to pick up any dirt.

Gear Slip. If the vehicle does not appear to be pulling properly, and engine speed seems to be too high for the road speed, check up the clutch and see that it is not slipping.

Overheating of Engine.

(1) See if radiator is full of water.
(2) Examine pipes and connections for leaks.
(3) Adjust belts (where used) if slipping.
(4) See whether shutters (where used) are open.
(5) Wash out radiator if dirty.

Brake Failure. Where brakes become gradually worse it is a sign that they need adjustment, but where they suddenly fail:—

Examine all rods and pipes—air, vacuum or oil—and connections for breakages or leaks, and make sure that the exhauster or compressor is working.

If you cannot make an immediate repair, adjust the hand brake up as far as possible and return home, or to repair depot, carefully.

Punctures. If no spare tyre is carried and twin rear tyres are fitted:—

(1) If a front tyre punctures it is sometimes possible to replace it with one of the rear ones.
(2) If a rear tyre punctures, remove it, and never run with a flat tyre as its friction on the road may cause a fire.

Always drive carefully when a tyre has been removed.

When changing a wheel with split rims, be careful to remove by undoing the ten inner nuts, and *not* the twenty outer ones (ForWarD type only).

BEFORE LEAVING THE VEHICLE AT NIGHT.

Apply hand brake.
Place gear in neutral.
Stop engine.
Turn off fuel at tank (petrol engines only).
In cold weather, if the vehicle is left in the open and anti-freeze is not used, drain the radiator and cylinder block.

In cold weather, if the vehicle is left in the open and anti-freeze is not used, drain the radiator and cylinder block.

On ForWarD's drain air reservoir.

Switch off lights and turn off main switch on control box.

WINCH (ForWarD only).

There are two means of engaging and releasing the winch:—

(1) By a lever on the left-hand side of the chassis, just above the frame and about half-way between the wheels. This engages or disengages the actual drive in the auxiliary gear box.

(2) By a lever on the left-hand side of the driver's seat, which operates a dog clutch on the winch drum itself. When disengaged the drum is entirely free of all driving gear.

To pay out the rope the lever on the driver's left should be in the "up" or running position, when the drum is free and the rope may be pulled out by hand, or by attaching the end of it to some fixed object and then driving the vehicle forward. Never drive the winch when paying out the rope. This means reverse must never be used with the winch. See that winch brake is off. This is the shorter of the two forward levers on the driver's right.

After rope has been paid out and is lying on the ground, never allow another vehicle to drive over it. This will cause kinks in the rope which interfere with the proper winding on the drum.

To Pull in the Rope.

(1) Place skotches in correct position under front wheels.

(2) Place auxiliary gear lever in "mid" or neutral position. To do this, front-wheel drive must be engaged.

(3) Engage gear by lever on side of chassis.

(4) Press down lever on driver's left.

NOTE.—If (3) and (4) do not engage easily, place main gear box in first gear and turn slowly until levers move over fully.

(5) Depress clutch pedal, engage 1st gear in main gear box, and take up load on rope gently by releasing clutch pedal and pressing down accelerator. Do not snatch on the rope.

Never drive winch in any higher gear than second.

To hold the load, press down clutch pedal and release accelerator and pull up on winch brake lever.

To take a pull from the front of the vehicle:—

(1) Pay rope round pulley on left hand rear corner of frame, making sure it is fitted into the pulley and inside the retaining plate.

(2) Carry rope forward along frame and over top of protecting bar at front of air reservoir.

(3) Remove outer guide roller from front of frame by withdrawing pin, place rope against inner roller and replace outer roller and pin.

When winding operations are completed, wind up rope, keeping it taut while doing so. Never haul in a slack rope. When rope is fully wound (do not overwind) disengage lever at side of frame, pull up lever on left of driver's seat and apply winch brake.

IMPORTANT.—A safety device is fitted which closes the engine throttle when the pull on the rope reaches danger point. If this happens, apply winch hand brake immediately and skotch the load.

TYRES.

Check pressures daily, and inflate if necessary. At the same time, see that all wheel nuts are tight. The pressures recommended by the tyre manufacturers are as follows:—

36″ x 8″	... ...	105 lbs. per sq. in.
9.00″ x 20″	... ...	65 lbs. per sq. in.
9.00″ x 20″	Bar Tread	65 lbs. per sq. in.*
9.75″ x 20″	... ...	70 lbs. per sq. in.
13.50″ x 20″	Bar Tread	43 lbs. per sq. in.*

* *Cross country vehicles.*

Any stones that become wedged between twin tyres should be removed immediately.

LUBRICATION.

Care must be taken that all parts needing lubrication are attended to at regular intervals, and that only oils and greases recommended by the makers are used.

Most of the smaller points are conveniently grouped in batteries, and after a little experience, and by systematic routine, very little time is needed to carry out the job.

OIL DAILY.

Engine Sump.

OIL WEEKLY.

Steering Box Shaft, Drag Links and Track Rods.
Clutch, Brake and Throttle Shafts.
Hand Lever Shaft.
Change Speed Shaft and Swing Lever (fluid trans. only).
Servo (main and auxiliary where used).
Brake Pivots.
Dumb Irons & all Spring Shackles & Brackets.
Axle Torque Brackets (6 and 8 wheelers).
Rear Spring Trunnion (6 and 8 wheelers).

OIL MONTHLY.

Magneto (Petrol engine only).
Ignition Advance Mechanism (petrol eng. only).
Fuel Pump (oil engine only).
Change Speed Box.
Steering Box.
Gear Box Sump.
Auxiliary Gear Box (where fitted).
Tyre Pump.
Rear Axle Sump.
Front Axle Sump (ForWarD only).

GREASE MONTHLY.

Dynamo.
Exhauster (oil engine only).
Clutch Withdrawal Race.

Cardan Shaft Joints and Centre Bearing.
Front Axle Swivel Bushes (upper and lower).
Brake Camshafts (both axles).
Hubs (front and rear).
Brake Cross Shaft Bearing.

DOCKING.

Once every month, or every 5,000 miles (whichever comes first) vehicles should be docked and the following carefully attended to. New chassis should be docked after the first 2,000 miles. Lubricate all parts as set out under above instruction.

Engine.

Drain sump and take out and clean strainer. Where a felt filter is used, wash it in petrol and leave to drain as long as possible, and immerse in clean oil for a few minutes before replacing. Clean filter chamber also. Replace strainer (and filter) and fill up sump with clean oil to top mark on dip stick. Pour about half-a-pint of clean oil over valve rocker gear.

Remove cylinder head cover and check valve clearances. Reset if necessary. The correct clearances, with cam in correct relation to rocker, are :—

Petrol engines	...	.009″
Oil Engines	...	.012″

Have all fuel injectors tested and fuel pump timing checked.

Clean all petrol or fuel oil filters and tighten up all leaking unions.

Remove drain plug from Autovac and wash out any water or dirt from it. Fill up Autovac tank after replacing plug.

On Petrol Engines :—

Remove and clean sparking plugs and if necessary set the gap to .015″ using the gauge supplied with the magneto spanner. Replace

any defective plugs with new ones and see that all plugs are screwed in tightly.

Examine all ignition leads and replace faulty ones with new. See that all terminal plugs are tight.

Remove and clean carburettor float chamber bowl.

On Oil Engines :—

Take out and inspect all heater plugs (where fitted), and replace any that are burnt out.

Gear Box and Clutch.

Remove and clean magnetic filter (where fitted), and fill box up with oil to filter hole.

Adjust clutch pedal if necessary by means of adjusting nut to give one inch of free upward movement above the "up" position.

Adjust clutch brake (if required) so that outer end has $\frac{1}{8}$" free movement.

Where an auxiliary box is fitted, clean magnetic filter (if used) and fill up with oil.

Propeller Shafts.

Grease all joints and bearings.

See that all nuts are tight.

"Layrub" couplings need no lubrication, but all grease which may have been thrown on them should be removed and the joints carefully cleansed.

Steering.

Examine the clamping bolts on the drag link and track rod and see that they are tight, and all steering arm and ball-end nuts.

See that the drop arm is tight on the shaft and that there is clearance between the cup covering the felt packing and the steering box.

Front Axle.

See that spring bolts are tight.

Check wheel alignments. These should be set between parallel and $\frac{1}{8}$" "toe in" towards the front. The track rod ends are screwed right and left handed for making this adjustment.

Examine hub bearing adjustment. If more than a just perceptible "shake" can be felt by rocking the wheel, consult the instruction book. If you can adjust, do so; if not, have it done at a good garage or report to your employer or officer.

Rear Axle. After 2,000 miles and thereafter every six months drain off all oil and replace with new. Examine for oil leaks and correct same if necessary.

Examine and tighten spring bolts.

The hubs and axle shafts on semi-floating axles need examination and possibly adjustment after 2,000 miles and thereafter every 5,000 miles. Read the instruction book, and if you cannot do this work have it done at a good garage or report to your employer or officer.

NOTE.—Above instructions also apply to the front axle of the ForWarD chassis.

Brakes. If, when pressed right down, the foot pedal plate comes within one inch of the floor board, or if the hand brake lever, when fully on, reaches an uncomfortable position, it is a sign that adjustment is necessary.

Consult the instruction book, and if you are not confident that you can carry out the adjustments yourself have them done at a good garage or report to your employer or officer.

Radiator. Wash out thoroughly and make sure that no mud or sediment is left in, and at the same time the outsides of the tubes should be well washed down with a hose pipe.

Fuel System. Clean all filters, drain dirt, etc., from auxiliary tank and see that all unions are tight.

Electrical Equipment. The following notes are intended as a guide. If you are not *fully* confident that you can correct any troubles, consult a good garage or report to your employer or officer.

The red lamp on top of the control box indicates, when it is alight, that the dynamo is not charging. The lamp should be alight when the engine is idling, and if it is not the bulb should be examined and replaced if necessary.

If the lamp does not go out when the engine is speeded up, examine the main fuse, and if it has blown replace it by the spare one carried in the control box cover.

Spare fuse wire for auxiliary circuits is wound round the fuse holders.

If the trouble cannot be corrected in this way, or if the fuse continues to "blow," consult a good garage or report to your employer or officer.

See that dynamo brushes are free in their holders and are not less than $\frac{3}{8}$" long. If they have worn beyond this they must be replaced. See also that the commutator is clean.

All connections, especially battery terminals, must be kept tight and clean.

The battery should be topped-up regularly with distilled water to bring the acid above the plates. The cell tops should be kept clean and the terminals smeared over with vaseline.

Have the specific gravity of the acid checked occasionally. It should be 1.270 to 1.280.

Bad starting may be caused by:—

(1) Worn or sticking starter brushes.
(2) Broken starter brush springs.
(3) Dirty or greasy starter commutator.
(4) Sticking Solenoid switch.
(5) Burnt Solenoid switch contacts.
(6) Loose or dirty connections.

Where wireless suppressor equipment is fitted see that all earth connections of the condensers and equipment are kept tight and clean.

NOTES

NOTES

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