

DIRECTORATE GENERAL BORDER ROADS
GENERAL MAINTENANCE INSTRUCTION NO.140

ON

BEDFORD J5-167 WB 3TON (330 CU.IN. DISPLACEMENT)

GENERAL

1. This instruction is published to lay down the detailed instructions for the regular and periodic maintenance of Bedford J5 167 Bedford vehicles so as to keep the fleet in a good mechanical condition.

Running –in-instructions

2. Running-in : The working parts of a new vehicle are always made slightly on the tight side, to allow for a perfect fit after an initial running-in period. Long trouble free life, particularly of engine, rear axle and brake, depends on this careful running-in, which can only be achieved by restraint on the part of those who drive the vehicle during the critical period. During the running-in process these working parts gradually develop a highly polished surface which will be extremely resistant to wear and thus ensure long life.

3. By restraint is meant driving gently during the first 1500 Km. Treat the vehicle considerately and avoid full throttle operation, high engine speeds and heavy braking.

4. Precision manufacturing methods used in the production of current vehicles ensure that, so long as high speed or full throttle work is not maintained for appreciable periods during the early life of the engine, no harm will be done by an occasional burst of speed. Of course, the speed must not exceed the statutory limit for the particular vehicle. In fact the running-in period will be lengthened by restricting the vehicle to low speeds for very long periods. Do not maintain high again speeds in any gear and do refrain from “foot hard down” during this period.

Opertaining the Engine

5. Before starting the engine : Before attempting to start the engine see that :

5.1) The cooling system is full. Under cold climate, frost precautions to be adhered strictly as per GMI No.2 and 37.

5.2) The engine oil level is correct.

5.3) The brake warning light is operating correctly (See Para 6 below).

5.4) There is an adequate fuel supply in the fuel tank.

5.5) The gear lever is in neutral position.

6. Before starting the engine, switch on the master switch. Unless the brake warning lamp lights up, depress the footbrake pedal several times to exhaust any air pressure in the reservoir tank. When the reservoir is exhausted the lamp should glow. The vehicle should not be taken on the road until the warning lamp is operating satisfactorily. Finally, when the engine is started the warning lamp should go out, which is the indication that sufficient air pressure has been built up in the brake reservoir.

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7. Starting the engine : The method of starting the engine is dependent on the prevailing temperature and the driver should make sure that he is familiar with the following instructions.

Note : All vehicles are equipped with an engine idling control which, when unscrewed, increases the engine idling speed. It can be used to advantage to prevent stalling of the idling speed should be returned to normal when the engine is warm.

7.1) The following procedure should be observed when starting the engine from cold.

Under Tropical climate condition

- 7.1.1) Switch on the master switch when green generator warning lamp should glow.
- 7.1.2) With the accelerator in semi open position, operate the starter control.
- 7.1.3) If the engine does not start after 15 to 20 Secs, release the starter control for 5 secs, then only repeat the procedure given in Para 7.1.2.
- 7.1.4) As soon as the engine starts, release the starter control.
- 7.1.5) Drive the vehicle away in the normal manner.

Under Extreme cold Climate :

- 7.2.1) Follow procedure given above in Para 7.1.1.

- 7.2.2) Press the cold start knob for 10 Secs. (15 to 20 secs. In extreme cold weather).
- 7.2.3) With the accelerator in the fully open position, the “Cold Start “ Knob still depressed, operate the starter control.
- 7.2.4) follow procedure given above in Para 7.1.3.
- 7.2.5) As soon as the engine starts, release both the starter control and the “Cold start” Knob.

8. **Re-starting a Warm Engine** : When the engine is warm, it can be restarted by switching on the master switch and then operation the starter control. It is important to note that included in the vehicle kit is a tool which looks like a starting handle. In effect, this handle is provided to facilitate turning the engine during certain servicing operations. It is not a starting handle and under no circumstances should any attempt be made to start the engine which this tool.

9. **To stop the engine** : Pull outwards the engine stop control knob and held it out until the engine stops. See that the control goes fully hom when released after the engine has stopped. Turn off the master switch.

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- 9.1) To stop the engine (Vehicles fitted with Mico Bosch fuel Injection Pump)

Push inwards the combined knob for engine idling and stop control all the way in and hold it there until the engine stops. See that the control returns fully when released after the engine has stopped. Turn off the master switch.

- 9.2) To stop the engine (Vehicle fitted with CAV-DPA Fuel injection pump)

Pull outwards the engine stop control knob (Marked stop) and hold it out until the engine stops. See that the control goes fully home when released after the engine has stopped. Turn off the master switch.

AFTER THE FIRST 800 KMs OF RUN OF THE VEHICLE

10. During the early life of the vehicle, the working parts tend to “settle down” with the result that various clearances and adjustments need to be corrected. A

general check over should therefore be carried out as soon as possible after completing 800 Km but before 975 Km.

11. A complete list of the items which need attention during this check over is given below.

11.1) Lubricate all high pressure nipples. The position of HP nipples on the veh are listed in Para 23.6 of this instr.

11.2) Change engine oil. (see Para 13.3)

11.3) Check and adjust, steering box, rear axle and gear box oil levels as explained below :-

11.3.1) Lubricate Steering Box : Remove the square heads filter plug from the steering box and top up if necessary.

11.3.2) Rear Axle : The oil level should be upto the bottom of the filler plug opening Replenish the oil if necessary.

11.3.3) Gear Box : The oil level should be upto the bottom of the filler plug opening. Replenish if necessary.

11.4) Check and adjust level of battery electrolyte : On all models the batteries are accessible after removing two inspection plates from the cab floor. The plates are secured by quick release fasteners. Remove the battery vent plugs and, if necessary, top with distilled water until the tops of the plates are just covered.

11.5) Lubricate throttle, clutch and brake linkage.

11.6) Drain moisture from brake serve. (compressed air system) by unscrewing the drain plug. Securely tighten the drain plug after the water cases to flow.

11.7) Check and adjust all the tyre pressures, including spare. The correct tyres pressures are appended in Para 18.3.

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11.8) Tighten all road wheel nuts. The tightening torques of wheel nuts are 158 Psi.

11.9) Tighten front and rear road spring, U-bolt nuts and spring leaf clips. Torque for tightening front spring U-Bolt nut is 90 to 100 psi and for rear road springs, 140 psi.

11.10) Check and adjust brakes :

11.10.1) **Front brakes Adjustment :** The brakes are provided with cam type adjusters (One for each show) operated from the outside of the brake back plate by a square headed bolt. To adjust, jack up a wheel and turn the cam nuts until both shoes are touching the drum, noting that both the adjusters are truned in a clockwise, direction to expand the brake shoes.

After applying heavy pressure to the footbrake pedal to centralise the shoes in relation to the drum, slacken back both cam nuts until the shoes shop touching the drum. Then turn one of the cam nuts until the shoe rubs the drum when the wheel is revolved. Slacken back sufficiently to ensure that the drum is perfectly free, and repeat the operation with the other cam nut. Repeat the procedure rotate freely without binding.

11.10.2) Rear brake adjustment : Place a “scotch” against the front wheels, release the handbrake and jar up the rear wheels. Remove the large rectangular rubber cover from each brake-backplate to gain access to the brake show adjusting wheels. Turn the adjusting wheels anti-clockwise (Viewed from above) as far as they will go without straining. Apply heavy pressure to the footbreak padal to centralise the shoes in relation to the drums and attempt to turn the adjusting wheels again with the drum. Finally, slacken the adjusting wheels back until the road wheels rotate freely, and replace the rubber covers.

11.10.3) Hand break adjustment : No attempt should be made to adjust the handbrake independently. The adjustment of the rear brake shoes described under “Foot brake adjustment serves for both the footbrake and the handbrake unless any part of the handbrake mechanism has been dismantled.

11.11) Check fan belt tension : The tension can be checked by pressing a thumb on the bolt midway between the fan and generator pulleys (when the engine is not runnings). A deflection of ½ inch (12 mm.) should be obtained with a load of 7.9 ib. (3.2 4.1 Kg). Td adjust, slacken the three bolts securing the generator (there are two bolts at the front of the generator one at the top and the bottom other at the bottom. The one belt at the rear is at the bottom of the generator and pivot the generator bodily away from,

or towards, the engine to tighten or slacken the belt respectively. When the tension is correct tighten the securing bolts and then check the tightness of the bolt securing the slotted brace rod to the engine. Do not overextension the belt as this will impose a heavy load on the water pump and generator bearings.

11.12) Check cooling system for leakage.

11.13) Check oil and fuel pipe unions for leakage.

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11.14) Check and adjust valve clearances. Tighten manifold attachments.

11.14.1) Check Tightness of Rocker Gear and Check valve Clearances. Start removing the valve cover and checking the tightness of the rocker gear attachment to the cylinder head. Now check the clearances between the valve stems and rocker arms. Adjustment for valve clearance is provided by lock nuts and screws on the tappets. The correct clearance when the engine is cold is 0.012 in. for all valves. Insert a 010 inch feeler gauge between the end of the valve stem and the rocker arm. Slacken off the adjustment locknut and turn the adjuster by means of a spanner until it is nipping the gauge; then slacken it off slightly until the gauge can just be withdrawn. Finally, tighten the locknut.

11.15) Check operation of lights, horn, instruments and warning lights.

11.16) Road test the vehicle. In that the veh should be take out for 3-4 Km for road test.

12. **METHOD OF ENGINE OIL AND FILTER ELEMENT CHANGES**

12.1. Engine oil change frequency

The engine oil level should be checked daily and if required it should be topped up. After the first 800 Km, the recommended oil change intervals obtaining in varying working condition are listed below :-

12.1.1 1500 Km Change Interval

The interval should be used in cold weather driving conditions when most of the driving is done in a town with only occasional medium journey work.

12.1.2 3000 KM Change Interval

This interval should be used under average conditions when driving is divided fairly equally between short and medium journey work.

12.1.3 If operating in dusty condition, SO-I (SO-2 EME) may issue necessary instruction to reduce the interval of oil change.

12.1.4 5000 Km Change Interval

This interval should be used where consistently high mileage journey are performed.

Regarding the frequency of engine oil filter element change, it should be appreciated that the condition of the oil dirty affects the useful life of the filter element. We therefore, recommended that the filter element is renewed at every third oil change.

Where an operator fits a washable (Brass-screen) type oil filter element in place of the paper filter element or where the washable type filter element is fitted as on original equipment:

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THESE WASHABLE TYPE OIL FILTER ELEMENTS MUST BE CLEANED WHENEVER THE ENGINE OIL IS CHANGED i.e., EVERY 500 KM. OR MORE FREQUENTLY DEPENDING UPON OPERATING CONDITIONS.

13. The following points concerning the engine oil are however stressed :

13.1 Check the engine oil daily and top up, as explained in the next para, if necessary.

13.2 Check oil level in engine pump. To ensure a correct reading check the level of oil before starting the engine. It is not necessary to keep the oil level up to the 'FULL' mark but it is essential that it is kept above the "ADD OIL" mark. It is good economy to let the oil level approach the "ADD OIL" mark when an oil change is becoming due.

13.3 Change engine oil: The drain plug is at the bottom of the engine sump. Drain when the engine is thoroughly hot after a long run, the oil is warm and fluid, and thoroughly agitated. The impurities will then be in suspension and will be drained out with the oil.

Refill the engine with fresh oil up to the "FULL" mark on the dipstick.

14. Fuel filter elements

Drain Fuel Filters : The fuel filters are mounted on the right hand side of engine. Unscrew the drain plugs and let the dirty fuel drain out, check that the sealing washer is in good condition. When reassembling the filter mark sure that the bowl seats properly on the sealing washer. Finally , air vent the fuel system.

15. Air venting fuel system : Refer GMI No.104.

16. Changing of filter elements :

16.1. Start this job by placing a tray on the floor beneath the filter. Then unscrew the bolt at the top of the filter and remove the casing complete with element, keeping it upright to avoid spilling the oil. Drain the oil from the casing. Remove and discard the element.

16.2 Thoroughly wash the inside of the filter head and casing with paraffin to remove any sludge deposits. Remove the sealing washer from the groove in the underside of the filter head and replace it with the new washer supplied with the element. Make sure that the gasket is located correctly and is free from kinks.

16.3 Position the new element in the filter casing and bolt the assembly to the filter head. Ensure that the casing is located correctly and then tighten the bolt securely.

16.4 Irrespective of whether or not the engine oil has been changed at the same time as the filter element, the engine should now be run for two or three minutes to allow the oil to circulate and fill the filter casing. Then stop the engine. Allow time for the oil to drain back into the sump and then recheck the oil level. Top up as necessary. Finally check for oil leaks.

16.5. The frequency of changing the fuel filter elements is given in GMI No.139 dated 29 Jul 75.

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First parade Halt parade. Last parade

17. Please refer general Maintenance Instruction No.6.

18. PREVENTIVE MAINTENANCE SCHEDULE EVERY 375 CM OR WEEKLY WHICHEVER IS EARLIER

Weekly

- 18.1 Check coolant level in radiator. After raising the bonnet and removing the radiator cap, add coolant only if the level is more than ½ in (12 mm) below the bottom of the filter neck.
- 18.2 Check oil level in engine sump. Refer Para 13.2 above.
- 18.3 Tyres. Check tyre pressures including of the spare tyre. The recommended tyre pressures are given below (Ref Para 11.7)

| Size | TYRE Ply rating | Inflation pressures lbs/sq. in | | | | | | | |
|---------|-----------------------|--------------------------------|------|------|------|------|------|------|------|
| | | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |
| | | Maximum load per tyre in lb. | | | | | | | |
| 8.25x20 | 12 | 2460 | 2570 | 2730 | 2890 | 3040 | 3180 | 3330 | 3460 |
| 7.50x20 | 10 | 2060 | 2210 | 2350 | 2490 | 2620 | 2740 | 2860 | 2980 |

- 18.4 Drain Moisture from Servo Motor. Drain any water from the servo by unscrewing the drain plug. Tighten the drain plug after the water has ceased to flow.

Monthly or every 1400 Km Maintenance

19. Check level of battery electrolyte. On all models the batteries are accessible after removing two inspection plates from the cab floor. The plants are secured by quick release fasteners. Remove the battery vent plugs and, if necessary, top with distilled water until the tops of the plants are just covered. For detailed instruction on battery maintenance refer GMI No.133.

20. Every 3000 Km

Engine

- 20.2 Engine oil change. Please refer Para 13.3 above.

- 20.2 Lubricate conral joints. Using an oil can (filled with engine oil) lubricate the joints of the controls from the accelerator pedal to the venture of pump.

- 20.3 Examine for fuel leaks. Check the pipes and unions from the tank to the injectors. Take care, not to twist the pipers when tightening any unions. Frequency of fuel filter change is given in GMI No 131 and 139.

- 20.4 Examine for oil leaks. Tighten any joints that are leaking. If tightening does not stop the leakage, new gaskets may be required. It is advisable to keep the engine clean so that oil leaks can be detected as soon as they develop.

20.5 Drain fuel filters. Please refer Para 14 and 15 above.

Steering

20.6 Lubricate steering box. Remove the square headed filter plug from the steering box and top-up, if necessary, with the appropriate recommended rear axle oil (Refer GMI No. 133). Clean off all dirt from an around the filter plug before removing it.

20.7 Lubricate steering joints. Apply the lubricating gun filled with chassis grease to the nipples on each steering joint. There are 4 nipples in all at the steering joints.

20.8 Lubricate steering knuckle pivot pins. Apply the lubricant gun filled with chassis grease to the nipples on the pivot pins.

Brakes

20.9 Lubricate footbrake Rod Relay lever . Apply the lubricant gun filled with chassis grease to the nipple on the relay lever.

20.10 Lubricate Handbrake cable guide. Apply the lubricant gun filled with chassis grease to the nipple on the cable guide.

20.11 Lubricate handbrake bell crank lever. Apply the lubricant gun filled with chassis grease to the nipple on the bell crank lever.

20.12 Lubricate controls. With the help of oil can inject a few drops of engine oil into the clutch pedal and footbrake pedal bearings and the handbrake lever pivot bearing. Apply a few drops of oil to the handbrake cable connections and rod joints.

20.13 Check brake fluid level in reservoir. The combined servo and master cylinder is attached to the frame side member behind the cab. Wipe all dirt from the filler plug before removing it. The reservoir is divided into two sections by a cast in baffle which can be seen through the filler plug hole. Top up, if necessary, with Lockheed brake fluid super heavy duty. S. A.M spec. 70 R3 to the bottom of the filler plug orifice skirt. Do not overfill.

20.14 Check brake system for external damage or leaks. Examine all hydraulic oipe lines for damage, deterioration or leaks. Carefully tighten any joints which are leaking.

Suspension

20.15 Front and rear springs. Semi-elliptical leaf springs are shackled at the rear end, and secured to front and rear axles by 'U' bolts. The springs require little routine attention, but it is important to examine the spring clips and U bolts at regular intervals to ensure that they are kept tight. Check the every 800 Km for the first 3000 Km and there after every 10,00 Km. The spring leaves should not be lubricated as correct operation depends on inter leaf friction. They must not be prayed with penetrating oil or other lubricant as this has the effect of making the springs too flexible, resulting in impaired suspension and failure of the spring leaves.

20.16 Lubricate spring shackles. Apply the lubricant gun filled with chassis grease to the nipples. There are 3 grease nipples to each spring.

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20.17 Shock absorbers. The shock absorbers are of the double acting, telescopic hydraulic type. Do not omit to check the tightness of the nuts securing the shock absorbers. The recommended torque for shock absorbers mountings is 72 PSI.

Propeller shaft and Universal joints

20.18 Lubricate universal joints and shaft splines, Apply the lubricant gun filled with chassis grease to the nipples on the universal joint and the shaft spline nipples. There are 4 nipples in all one on each of the universal joints and one on the sliding coupling.

Gearbox

20.19 Check oil level in gearbox. The level should be up to the bottom of the filter plug opening. Top up, if necessary, clean around the filler plug, before removing it. Change Gearbox oil at Km.

Rear Axle

20.20 Check oil level in rear axle. The level should be up to the bottom of the filler plug opening. Replenish, if necessary with correct oil (Refer GMI 136 and 138). Clean the filler plug before removing it.

Chassis and body

20.21 Lubricate cab and body locks and hinges. With the help of oil can inject a few drops of engine oil into every hinge of the cab and body, using an oil can also lubricate the windscreen wiper spindles and operating mechanism and the seat adjusters.

Wheels

20.22 Check road wheel nuts. Check the nuts on all the road wheels for tightness (Torque-158 ft lb). Make sure that the spare wheel is mounted securely.

20.23 Every 6000 Km

On vehicles equipped with CAV- DPA fuel injection equipments, clean the bowl type pro filter and gauge.

21. Every 10,000 Km

21.1 Repeat items listed under the daily weekly and 3000 Km heading plus the following :

Engine

21.2 Change of oil filter elements. Refer para 14 above and GMI No. 139 dated 29 Jul 75.

21.3 Clean air intake cleaner.

21.3.1 Slacken the clamp securing the cleaner to the air intake by turning the handle provided for this purpose and detach the rubber ventilation pipe and also the air intake pipe for the compressor. Lift the cleaner keeping it vertical to avoid spilling the oil.

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21.3.2 Unscrew the finger nut at the top of the cleaner and remove the cover and filter element. Rinse the element in clean paraffin and shake it to remove all traces of the cleaning fluid. Drain the oil from the oil bath and clean out any sediment.

21.3.3 Refill the oil bath up to the indicated level with fresh oil (Viscosity of oil same as used for engine). Replace the filter element and before refitting the top cover, check that the gasket is in good condition. Finally, refit the cleaner by reversing the instructions given for removal.

21.4 Check Tightness of Injector Pip clips. With screw driver check the tightness of the screws securing the clip to the pipes.

21.5 Check fan belt tension . The tension can be checked by pressing a thumb on the belt midway between the fan and generator pulleys (when the engine is not running). A deflection of ½ inch (12 mm) should be obtained with a load of 7-

9 lb (3.2 – 4.1 Kg). To adjust, slacken the three bolts securing the generator (there are two bolts at the front of the generator one at the top and the other at the bottom. The one bolt at the rear is at the bottom of the generator) and pivot the generator bodily away from, or towards, the engine to tighten or slacken the bolt respectively when the tension is correct, tighten the securing bolts and then check the tightness to the torsue of 7 to 10 ft lb of the bolt securing the slotted brace rod to the engine. Do not over tension the bolt as this will impose a heavy load on the water pump and generator bearings.

21.6 Check for water leaks. Examine the cooling system for leak from the radiator, water pump and hoses. Tighten the hose clips if any connections are leaking but do not over tighten. Take post precautions under cold climate. Refer Para 5.1.

21.7 Check engine mounts for tightness. The engines have three mounts, one at the front and two at the rear of the engine.

21.8 Check tightness of radiator mounting. Check and tighter if necessary, the two bolts on each side securing the radiator to the splash panels and under frame.

21.9 Check tightness of exhaust system. Check and tightness if necessary, the nuts securing the exhaust pipe to the manifold, the silencer to its support bracket, and the tail pipe mountings.

Clutch

21.10 Check clutch pedal free travel. The padel shold have one inch (25 mm) of free movement measured at the top of the pedal before the pressure of the clutch springs is felt. As wear takes place, however, this free travel will be reduced and it will become necessary to correct it. Adjustment is provided at the rear and or the clutch pedal connecting rod, immediately in front of the clutch fork lever through which the rod passes. It consists of an adjusting nut and locknut on the rod itself. If the amount of free travel is less than 1 inch slacken the locknut and turn back the adjusting nut until the specified free travel is obtained. Finally, securely tighten the locknut.

Gearbox

21.11 Check gearbox mounting for tightness. Check for tightness the four nuts which retain the gearbox to the engine. They are accessible from beneath the vehicle.

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Propeller shafts and universal joints.

21.11.A Check universal joint and intermediate bearing bolts for tightness. These bolts should be kept as tight as possible. Torque for 16” dia bolts should be 50-60 ft lb and for ½ “ dia bolts 75-80 ft lbs.

Brakes

21.12 Check serve unit mounting and brake pie connections. Check tightness of bolts securing the serve unit to the chassis frame also all the unions on the brake serve pipe lines.

Steering

21.13 Check mounting of steering box for tightness. Tighten the nuts securing the box to the frame if any slackness can be detected. Check also the tightness of the bolts securing the steering column support bracket to the dash. There are three bolts holding the column support bracket to the dash board. Inspect and tighten with a torque of 70-80 ft lbs, if it is less, the attachment of the steering arms to the steering knuckles.

21.13.1 Examine steering joints and box for play. The joints are self adjusting and no play should be present just a slight resistance to twisting movement on the rods.

Suspension

21.14 Check ‘U’ bolts and springs clips for tightness. Make certain that the ‘U’ bolts nuts are tight. Do not lubricate the spring leaves.

21.14.A Shock absorbers. Check the tightness of the nuts securing the shock absorbers to the chassis frame and front rear axle and ensure that there are no oil leaks.

Chassis and Body

21.15 Check chassis frame. Examine the chassis frame side members and cross members for loose rivets or cracks.

21.16 Check all body and chassis nuts. Examine and tighten all bolts, nuts and brackets round the body and chassis, the body holding down bolts and the nuts and bolts securing the wings.

Battery

21.17 Battery terminals. Keep the battery terminals clean. If they are corroded, scrape them clean and smear them with petroleum jelly. Make sure that the terminals are tight and that the to batteries are dry on top and secured in their containers, also refer GMI No.133.

21.18. Check specific gravity of battery. Check the specific gravity of the electrolyte in each cell with a hydrometer.

Specific gravity readings at 80° F (26.7°C)

Fully charged 1.281 - 1.266

Half charged 1.202 – 1.187

Discharged 1.111 - 1.098

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Front and rear hub bearings

21.19. Check adjustment of front and rear hub bearings. Jack up each wheel in turn and check for slack hub bearings by trying to rock the wheel. If excessive movement can be felt, adjust as follows :-

21.19.1 Front hubs. Remove the hub cap and knock back the locking tab securing the outer nut and remove the nut. After removing the locking washer, tighten the inner nut using moderate hand pressure on an 11 in. (279 mm) lever in a box spanner. Now slacker off the nut and gripping the cylindrical surface of the box spanner with the hand retighten the nut. Next slacken back the nut 1/6 of a turn. Place the locking washer in position and than screw up the locking nut tightly. Secure both nuts by turning ever the flange of the lock washer on to one of the flats of each nut. Finally replace the hub cap.

21.19.2 Rear Hubs. Unscrew the nuts securing the flange of the of the axis shaft tooth- hub and remove the shaft. Knock back the locking tab securing the outer nut and remove the nut. After removing the tab washer, tightened the adjustment nut using moderate hand pressure on an 11 in (279 mm). Lever in the spanner at the same time rotating the hub to settle all parts of the bearings Now slacken the nut and using the spanner without the lever retighten the nut as for as possible by hand only. Slacken the nut 1/6 of a turn. Place the tab washer in position again and turn over one of the flat tabs an adjacent a lot. If necessary, alter the position of the nut slightly to bring the tab and slot into line. Screw on the locking nut tightly and secure it by turning over one of the right angled tabs of the washer Before replacing the axle a shaft, clean the old jointing command from the axle shaft flange and the hub matching face. Then coat them matching faces with joining compound and reassemble the axle shaft to the hub, tightening the attaching nuts securely.

21.19.3 Fuel tank. Decant fuel tank, remove from veh and clear the tank for rust and sediments.

The frequency of fuel filter change is given in GMI 131 and 139.

22. Every 20.000 KM

22.1 Repeat items listed under daily, weekly 1500, 3000, 6000 and 10,000 KM headings. Plus the following :

22.2 Lubricate generator bearing – With an oil can inject a few drops of oil into the generator rear bearing cavity.

22.3 Check tightness of rocker gear and check valve colleagues. Start by removing the valve cover and checking the tightness of the rocker gear attachment to the cylinder head. Next check the clearances between the valves stems and rockers. Adjustment for valve clearance is provided by lock nuts and screws on the tappets. For correct clearances see para 11.14.1 above.

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22.4 : Check tighten of inlet and exhaust manifolds. With the engine thoroughly warm, Check the nuts securing the inlet manifold to the cylinder head, and nuts securing the venturi to the manifold. Check all the nuts securing the exhaust manifold to the cylinder head.

22.5 : Check operation of injectors. The mileage at which the injectors require attention depends on so many factors. It is impossible to quote one figure that will be satisfactory for all conditions. In no case should the mileage between checks exceed 20,000 Km. The following symptoms can be taken as evidence of the need for attention to the injectors :-

- a) Black smoke from the exhaust.
- b) Loss of performance.
- c) Increased fuel consumption.

- d) Heavy Diesel knock on one or more cylinders.
- e) Complete or intermittent misfiring.

A quick method for locating a completely operative injector is by slacking off the high pressure pipe union nut of an injector while the engine is running, thus cutting out the injector. If, after slackening the union, the engine revolutions do not vary, it may be assumed that the injector is faulty. This should be done with each injector in turn. This method will enable quick diagnosis to be made but it should not be regarded as a final proof. The only completely satisfactory

means of testing is by removal of the injectors and testing on the injector test bench meant for this purpose. The injector spray pressure should be 2570 psi (175 atmosphere).

Front hub bearings.

22.6 : Lubricants hub bearings. The hub bearings must be lubricated every 20000 KM with bearing grease. While the hubs are removed, for its lubrication, check if the brake linings need replacing. Adjust the bearings afterwards as described in para 21.19 above.

23. Every 40,000 KM

23.1 Repeat items listed under the 1500, 3000, 6000, 10,000 and 20,000 KM headings respectively plus the following :

Engine

23.2 Fuel filters See Para 14 above.

23.3 Fuel Tank. Remove the fuel tank and clean it (Refer Para 21.19.3 above).

23.4 Drain the cooling system. On all models the radiator can be drained by opening the tap located at the bottom of the radiator which is accessible from under the vehicle. This, however, does not empty the cylinder block. For this purpose, another drain tap is provided in the rear left hand side of the cylinder block which is accessible after raising the bonnet.

Note : The radiator filler cap must be removed before the draining cooling system.

23.5 Cleaning the cooling system. The cooling system should be cleaned periodically. In extremely cold climates where antifreeze solution has to be added, the best time for doing this is before adding anti freeze at the onset of cold weather again after draining the anti freeze in the spring.

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The most efficient method of cleaning the cooling system is by reverse flushing. This is a process in which water and compressed air are forced through the cooling system in the opposite direction to that in which the water normally circulates. With this system, sludge and other deposits normally too large to pass through the radiator core are forced out of the tap of the tank. Rust and scale are also removed from the cylinder block and head.

The use of washing soda or proprietary cooling system cleaning compounds is not recommended as these can have harmful effect.

If, however, you cannot avail yourself of the reverse flushing process, as a temporary measure the system can be flushed in the following manner.

Drain and flush with clean water until the water running out of the traps is clear. Then close the tabs. Now fill the cooling system with clean water run the engine for a short while and again drain the system. Finally close both taps and refill with clean water.

Use warm water for flushing of filling the cooling system of a hot engine.

23.6 Number of greases nipples.

| | | | | |
|--|------|------|------|-----|
| a) Steering joints nipples | .... | .... | .... | 4 |
| b) Steering knuckles pivots pins each side | .... | .... | .... | 2 |
| c) Tie rod each side | .... | .... | .... | 1 |
| d) Hand brake cable guide | .... | .... | .... | Two |
| e) Brake and cultch lever control linkage side | .... | .... | .... | Two |
| f) Spring shekels nipples | .... | .... | .... | 12 |
| g) Propeller shaft spins ad universal nipples joint. | .... | .... | .... | 4 |

23.6 Clear oil pump strainer.

24. RECOMMENDED LUBRICANTS

| Unit | G.M Specification | SAF Viscosity No |
|---------|------------------------------------|--|
| ENGINE | MILL-2104A Suppl | Detergent type above 32 ⁰ SAE 30 W 32 ⁰ to 0 ⁰ SAE 30 or 20W 0 ⁰ C to 12 ⁰ SAE 20W -12 ⁰ to -23 ⁰ C SAE 10 Below -23 ⁰ C SAE 5W (for long period) Above 0 ⁰ C 90 Below 0 ⁰ C 80 |
| GEARBOX | 4753-m Lubricant (EP additives) | |

REAR AXLE

4735-M
4734-M

Initial 10,000 miles use
Thio-Hypoid 90 EP
Above – 18⁰ C 90 hypoid
Below – 18⁰ C Hypoid

Engine oils should be to the MIL/DEF level of detergency.
