DIRECTOR GENERAL BORDER ROADS

GENERAL MAINTENANCE INSTRUCTION NO 231

OF

MINI BUS TATA -709

INTRODUCTION

1. Tata model LP 709/38 (4x2) 32 seater, Wheel base 3800 mm Fitted with Tata 497 TCIC turbocharged 89 HP (66.3 KW @ 2400 rpm BS 11 engine.

2. This GMI gives the technical specifications and know how on the maintenance and repair procedures of aggregates of the model vehicle. Assuming that the technicians in the workshop are fully conversant with the repair and maintenance practices of commercial vehicles in general the repair procedures out lined in this GMI emphasizes the special features of this product. Compliance with procedures given in this GMI will enable you to derive the maximum service from the Tata diesel vehicles.

3. To prolong the life of your vehicle and reduce maintenance cost, the periodic maintenance must be carried out according to the 'periodic maintenance schedule described in this GMI. Periodic maintenance is essential for preventing trouble and accidents to ensure your satisfaction and safety. Daily care and inspection is essential for prolonging the operating life of the vehicle and for safe driving, it also reduce the wear and tear on your vehicle, prolongs its life, give more mileage, failure of the guide lines below can result in personal injury or serious damage to the vehicle. All information and instruction in this GMI is based on the latest Owner's manual and service booklet.

AIM:-

The instruction are issued as guide lines for schedule of preventive maintenance, lubrication of Mini Bus 709 manufactured by Tata motors for regular attention to keep the vehicle in good mechanical condition and it must be strictly followed.

Action by

(a) **User Unit**:

To carry out periodic inspection and monitor regular/periodical maintenance as laid down in this instruction and record the tasks done in the log book.

(b) **Field Wksp (GREF)**

(i) To carry out and monitor, maintenance schedule and oil changes as per periodical maintenance laid down in the maintenance instructions and to check the record of maintenance including lubrication.

(ii) To advise the user unit in respect of any lapses noticed

(c) **Mobile maintenance team** :

To ensure that proper maintenance is carried out and report accordingly to Task Force Commander and OC Fd Wksp for necessary action

4. **Details**: The details of maintenance and lubrication with their periodicity are as under :-

(a)	Special instruction	- Appx 'A'
(b)	Oil & Lubricant	- Appx 'B'
(a)	Special operating system	- Appx 'C'
(b)	Periodic service	- Appx 'D'
(c)	Service schedule	- Appx 'E'
(d)	Tech specifications	- Appx 'F'

5. Please ack receipt.

(VK Sharma)
EE (E&M) NFSG
Joint Director (Technical)
for Dir General Border roads

Distribution
Normal

Appendix'A'

SPECIAL INSTRUCTION

Precautions are to be observed when vehicle is operating at high altitudes and low ambient temperatures. Because of low atmospheric pressure, which reduces the oxygen content at high altitudes, It is necessary to take the special maintenance of vehicle and their engines, Similarly, the lubrication, fuel and cooling system have to be properly attended. The vehicle out put decreases due to reduction in atmospheric pressure and density. To ensure an optimum operation of the vehicle at these conditions, it is necessary to reduce fuel supply to cylinders

FUEL:- High speed diesel confirming to IS 1460 OR DIN 51601 OR equivalent is recommended to be used as fuel. At very low temperature fluidity of diesel may become insufficient due to paraffin separation. It is therefore necessary to mix supplementary fuel with summer or winter grade diesel.

Ambient temp up to Dig C	**Percentage**	
	Summer diesel	**Supplementary fuel**
Above 0	100	0
0 to -10	70	30
-10 to -15	50	50
Winter		
0 to -15	100	-
-15 to -20	70	30
-20 and below	50	50

Care should be taken that diesel and supplementary fuel are thoroughly mixed before filling.

COOLANT:-

Antifreeze must be used in any climate for both freeze and boiling point protection. Don't use more than 50% antifreeze in the mixer.

To be used for	**Grade/specification**	**Brand endorsed by Tata Engineering**	
		Castrol	**Bharat Petroleum**
Cooling system motors	Non-Amino base	Castrol long life coolant	MAK Tata super cool

Appx'B'

OIL &LUBRICANTS

Lubricant	Specification
Engine Oil	SAE 15W-40 APICF4 + and MB 228.1 specification
Rear axle oil	SAE 85W-90 with 7% Anglamol – 6043 by weight and API GL% Specification
Gear box oil	SAE 80W-90 with 7% Anglamol -6097 by weight and APGL 4 Specification
Power steering oil	Dextron IID
Clutch fluid	SAE J 1703 F DOT 3 Plus or DOT 4
Coolant	Non Amino Base
Chassis/wheel bearing grease	Li base grease NLG1 3
Clutch/Clutch release bearing sleeve clutch disc splines	High temp lithium base grease
Brake pneumatic equipment	Multipurpose grease (Consistency No. 2)

Appx 'C'

SPECIAL OPERATING SYSTEM

Precautions are to be observed when the vehicle operating at high altitudes and low abient temp. Because of low atmospheric pressure, which reduces the oxygen content at high altitude, it is necessary to make certain adjustment in the fuel injection pump output to prevent black smoke caused by unburned fuel emitting from the engine.

High altitude operation

Vehicle out put decreases due to reduction in atmospheric pressure and density. To ensure and optimum operation of the engine at these conditions, it is necessary to reduce fuel supply to cylinders and to prevent black smoke caused by unburned fuel emitting from engine.

Cold Starting oil

To permit starting of vehicle at very low out side temps, the vehicle is also provided with a 'start pilot' switch.

Operation in hilly terrains

(1) To ensure steering linkage and brakes are to be kept in Order.

(2) Proper gear should be used during climbing or descending.

(3) Engine should not be disengaged or switched off while descending on the down hill gradients.

(4) Drain air tanks every work to remove condensed water.

(5) Change brake and Clutch fluid in the system every six months.

(6) Drain water from fuel water separators.

(7) Vehicle should be greased at frequent intervals to prevent formation of rust on the exposed surfaces.

Appx 'D'

PERIODIC SERVICE

(1) Wash and clean the vehicle thoroughly.

(2) Check the vehicle pulling LH/RH wobbling self centering, Acceleration etc.

(3) Check abnormal noise in Engine.

(4) Check engine oil level, Top up if necessary.

(5) Check for any leakage from engine side.

(6) Check hose, clamps & pipes at all locations in air intake system.

(7) Check all hose, clamp and pipe at all location in cooling system.

(8) Check for leakage of gear oil.

(9) Check for proper fitment of gear shift lever rubber boots.

(10) Check level of clutch and brake fluid, Top up if necessary.

(11) Check clutch/brake/pedal free play.

(12) Check for leakage in clutch/brake circuit.

(13) Check for fitment of split pins at drag link ball joints, tie rod ball joints & stub axles.

(14) Check for fitment of grease nipple at stub axles, shacle pins, pivot pin, Ball joint etc.

(15) Check for leakage of front axle & rear axle oil.

(16) Check tightness of propeller shaft centre bearing bracket mounting nut & bolts.

(17) Check for any air leakage from the air circuit.

(18) Check fitment of split pins at the mounting bolts of Anchor plants, brake chambers, push rod etc.

(19) Check for fitment of all grease nipples.

(20) Check power steering oil level in reservoir.

(21) C heck for leakage in the hydraulic circuit.

(22) Check for steering wheel free play (axle and radial)

(23) Check for fitment of split pin at steering shaft.

(24) Check any leakage in the fuel system.

(25) Check coolant level in the transparent auxiliary tank.

(26) Check coolant level in the non transparent auxiliary tank, top up if low.

(27) Check for any leakage of coolant.

(28) Check functioning of all bulbs.

(29) Check proper functioning of blinkers, horn, head lamps, parking light, reverse light wiper system, washer system etc.

(30) Check tightness of electrical connection at battery, starter motor, alternator & starter relay.

(31) Check all fuses.

(32) Check all the earth point for looseness.

(33) Check for functioning of all gauges/meters/warning lamps.

(34) Check connectors in all the circuits.

(35) Check for proper opening and closing of doors.

(36) Check functioning of door locks, latches and windows.

(37) Check and tighten hand loose fasteners.

(38) Check for any breakage, bends, and failure of any component/assy/unit.

(39) Lubricate with oil can all linkages and other points.

(40) Grease with grease gun all the grease points.

Appx 'E'

Service Schedule

S.No	Description	Frequency in Km
	General	
01.	Wash vehicle	Every 5000 Km
	Engine	
01.	Check coolant level, top up if necessary	Daily
02.	Check engine oil level in sump	Daily
03.	Check fuel level in tank	Daily
04.	Check and rectify leakage of oil, fuel and coolant	Daily
05.	Change engine oil in sump	Every 15,000 Km
06.	Change of oil filter	Every 15,000 Km
07.	Clean pre-filter at feed pump	Every 5000 Km
08.	Clean strainer in fuel tank	Every 10,000 Km
09.	Check valve clearance and adjust if necessary	Every 10,000 Km
10.	Check and tighten of all nut and bolts	Every 5000 Km
11.	Check condition of fan belt, replace if defective	Every 5000 Km
12.	Change fuel filter element first at	Every 10,000 Km
13.	Change both fuel element	Every 20,000 Km
14.	Clean breather	Every 20,000 Km
15.	Lubricate water pump with grease and lubricate accelerator linkage with oil can	Every 5000 Km
16.	Change coolant	Every 80,000 are two years which ever is earlier
17.	Remove and check thermostat for correct functioning	Every 40,000 Km
18.	Check and replace radiator rubber hoses	Every 80,000 Km
	Clutch	
01.	Check level of brake fluid in plastic container	Every 1000 Km
02.	Lubricant clutch pedal pivot pins	Every 1000 Km
03.	Check and tighten mounting clutch master cylinder and slave cylinder	Every 5,000 Km
04.	Remove clutch release for support bearing apply, tight coat of grease and refit	Every 40,000 Km
05.	Check clutch fluid in clutch system and bleed the system	Every 40,000 Km
06.	Dismantle/clean, inspect and re-assemble clutch master cylinder and slave cylinder of clutch actuation mechanism	Every 80,000 Km
	Gear Box	
01.	Check oil level in gear box, top up if necessary	Every 5,000 Km
02.	Change oil in gear box (First in 10,000 Km) than	Every 72,000 Km
03.	Clean breather in gear box	Every 80,000 Km
04.	Check gear box mounting and tighten up if necessary	Every 5,000 Km

	Suspension	
01.	Grease the king pin, tie rod ball joint, drag link ball joint, front spring pins & rear spring pins	Every 1000 Km
02.	Check condition of shock absorber , bushes, replace if necessary	Every 10,000 Km
03.	Check wheel alignment if necessary	Every 40,000 Km
04.	Check shock absorber, replace if defective	Every 20,000 Km
05.	Dismantle front and rear springs, clean and apply graphite grease, check and if necessary replace eye bushes	Every 40,000 Km
06.	Check and tighten of nuts of spring pins, 'U' bolt of front and rear springs	Every 1000 Km
	Front axle	
01.	Change grease in front hub, adjust bearing play, replace damage/worn out parts	Every 20,000 Km
	Rear Axle	
01.	Check oil level in rear axle, top up if necessary	Every 5,000 Km
02.	Change oil in rear axle (For first 10,000 Km) than	Every 72,000 Km
03.	Change grease in rear hub, adjust bearing play. Replace damage/worn out parts	Every 20,000 Km
	Wheel & Tyre	
01.	Check tyre pressure	Daily
02.	Tyre rotation	Every 5,000 Km
03.	Check wheel mounting nuts and tighten if necessary	Every 1000 Km
	Propeller Shaft	
01.	Grease propeller shaft 'U' joint, sliding yokes and centre bearing	Every 1000 Km
02.	Check and tighten the propeller shaft centre bearing bracket mounting bolt	Every 5,000 Km
	Brakes-'S' Cam full air brakes	
01.	Check air dryer functioning, if there is condensed water/oil in the exhaust , replace the air dryer – desiccant cartridge and filter	Weekly/Every 2,000 Km
02.	Grease slack adjusters and cam shaft buses	Weekly/Every 2,000 Km
03.	Lubricate brake chamber fork and pin, leakage of foot brake, ball joint of exhaust brake linkage	Weekly/Every 2,000 Km
04.	Check brake system for any leakage, rectify if necessary	Weekly/Every 2,000 Km
05.	Check brake lining wear	Every 10,000 Km
06.	Check proper functioning engine exhaust brake and slackness in linkages	Every 10,000 Km
07.	Check brake torque plate mounting bolt and tighten up if necessary	Every 10,000 Km
08.	Check hoses for damage replace if necessary	Every 20,000 Km

09.	Check condition of brake valves, exhaust flap in dual brake valve, nylon breather tube and clip of spring brake actuator	Every 20,000 Km
10.	Check mounting bolt of brake chambers, and other all mounting bolts	Every 20,000 Km
11.	Grease fulcrum pin bushes, cam shaft bushes and roller ends	At the time of replacing linings
12.	Complete over haul of foundation brake	Every second brake shoe relining or as required
	Steering	
01.	Check oil level in steering gear box, top up if necessary	Every 10,000 Km
02.	check and adjust steering wheel free play	Every 40,000 Km
03.	Change oil in steering gear box	Every 80,000 Km
04.	Check and tighten if necessary 'U' joint on steering spindle, steering gear box and its mounting bracket bolts joints of pitman arms, drag link and tie rod	Every 5,000 Km
	Electrical	
01.	Check and tighten mounting bolt of alternator, Starter motor, wiper motor, battery mounting bolt all electrical connections and head lamp mounting screw	Every 5,000 Km
02.	Check battery cell and specific gravity of electrolyte, recondition battery if necessary	Every 40,000 Km
03.	Check head lamps focus, adjust if necessary	Every 5,000 Km
04.	Check electrolyte level in battery and add distilled water if necessary	Every 5,000 Km
05.	Clean battery post and terminals and apply petroleum jelly	Every 1000 Km
06.	Lubricate bushing of starter motor and wiper motor linkages	Every 20,000 Km
	Body and miscellaneous	
01.	Lubricate accelerator linkages, door hinge, door latches, bonnet hinge, bonnet stay rod, bonnet opening cable	Every 1000 Km
02.	Apply grease to door lock inner racket and pawl	Every 40,000 Km
03.	Check door for proper opening and closing if required adjust striker assembly	Every 10,000 Km
04.	Check mounting bolt of driver cabin, driver and co-driver seat	Every 5,000 Km
	Turbo charge and dry type air filter	
01.	Tighten all fasteners on turbo charger, air filter mounting and air duct hose connections	Every 5,000 Km
02.	Check air filter indicator, if found 'Red' clean air filter housing and replace primary cartridge	Daily
03.	Remove and clean dust bowl of dry type air filter	Every 2,000 Km
04.	Check air filter hoses for damage and replace if necessary	Every 5,000 Km

Appx 'F'

Technical Data

Engine	
Model	Tata 497 TCIC (BS-II) fuel efficient
Type	Water cooled direct injection diesel engine with inter cooler
No of cylinder	4 in line
Bore stroke	97 mm x 128 mm
	378cc (LP/LPT)
Max engine out put	66.3 Kw (90Ps) @ 2400rpm
Max torque	325 Nm (31 Kgm) @ 1300-1600 rpm
Compression ratio	17.5:1
Firing order	1-3-4-2
Air filter	Dry type
Oil filter	Full flow paper type
Fuel filter	Two stage pre-and fine filtration
Fuel injection pump	Rotary type
Governor	Mechanical
Capacity of cooling system	17 Ltrs
Crank case oil capacity	Max 9 Ltrs, Min 7 Ltrs
Engine weight	390 Kg(dry)
Radiator frontal area	2414 Sq cm
Engine oil filter cap	01 Ltrs
Clutch	
Type	Single plate dry friction type
Out side diameter of clutch lining	280 mm
Friction area	798 Sq cm/(Appx)
Clutch hydraulic system for vehicle with 'S' cam brakes	0.15 Ltrs

.

GEAR BOX	GBS 27 Synchromesh
No of gears	5 Forward , 1 reverse
Gear ratio First	6.17
2 nd	3.34
3 rd	1.89
4 th	1.33
5th	1
Reverse	5.6
REAR AXLE	
Type	Single reduction, hypoid gears, fully floated axle shafts
Ratio	3.875(31/8)
Rear axle oil cap	2.75 Ltrs
FRONT AXLE	Heavy duty forged 1 beam reverse Elliot type
STEERING	
Type	Variable ratio steering
Steering gear box	Reciprocating ball typa
Ratio	35-40:1
Power assisted	Integral hydraulic power assisted (optional)
Capacity	1 Ltr
FRAME	(a) Ladder type frame with riveted/bolted cross members
	(b) Side member are of channel section Depth : 200 mm (max) Width 60mm
SUSPENSION	
Type	Semi elliptical spring
Spring span	Front 1450 mm Rear 1620 mm
Leaf width	Front 70mm Rear 70mm
Shock absorber	Hydraulic double acting telescopic type at front and rear

WHEEL AND TYRES	
Tyres size	7.50x16-16 PR
Tyre pressure Laden	Front 6.2
	Rear 5.8 (Kgs/sq cm)
Fuel tank capacity	160 Ltrs
CAB	All steel full forward control cowl(LP)
ELECTRICAL SYSTEM	
Voltage	12 V
Alternator	65 Amp
Battery	12 V 120 AH
Wind screen wiper	17 W-2 speed & intermittent wipe
Wind screen washer	Electrically operated
CHASSIS DIMENSION	
Wheel base	3800 mm
Track front	6550 mm
Track rear	1577 mm
Overall length	7125 mm
Max width	2140 mm
Overall height	2550 mm
Grease front hub	140 gms
Rear hub	300 gms
Water pump	80 gms