

DIRECTOR GENERAL BORDER ROADS
GENERAL MAINTENANCE INSTRUCTION NO 235
OF
TATA BUS -1510 (4x2)

INTRODUCTION

1. Tata Bus model LP/LPO1510 (4x2) 52 seater, Wheel base 5195 mm Fitted with Tata 697 TCIC turbocharged 129 HP (95 KW @ 2400 rpm for fixed fan and 96 KW @ 2400 rpm for viscous fan) BS II engine, 131 HP (98 KW@ 2400 rpm) BS III 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 Tata Bus LP/LPO 1510 (4x2) 52 seater 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' |
| (c) | Maintenance of Turbocharger | - Appx 'C' |
| (d) | Periodic service | - Appx 'D' |
| (e) | Service schedule | - Appx 'E' |
| (f) | Tech specifications | - Appx 'F' |

5. Please ack receipt.

(Hari Prakash)

SE (E&M) FS

Dir (Tech)

for Dir Gen Border roads

Distribution

Normal

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 Deg°	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

OIL & LUBRICANTS

Lubricant	Specification
Engine Oil	SAE 15W-40 APICF4 + and MB 228.1 specification
Rear axle oil	SAE 85W-140 with 6.5% Anglamol – 99 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)

MAINTENANCE OF TURBO CHARGER:-

As there is no mechanical drive connection between engine and the turbo charger, apart from the engine inspection at regular intervals, no additional or particular maintenance service are required for the turbo charger unit, therefore, no adjustments or repair to be carried out on the turbo charger, in case of doubtful performance from the engine because of malfunctioning of the turbo charger. in that condition take the vehicle in nearest authorized dealer..

However following precautionary measures are to be taken to obtain trouble free performance.

1. During regular engine inspection, look carefully for any oil leakage at the oil banjo connection on the turbo charger bearing housing.
2. Don't stop the engine suddenly as it may damage turbo charger rotor bearings, allow engine to idle for some time before switching it off. Similarly don't increase engine speed suddenly. Run the engine in low idle speed for at least one minute after starting and ensure the engine oil pressure has build up.
3. Since the speed of the turbocharger rotor assy is tremendously high (nearly 1, 00,000 rpm) is requires finest filtered oil which comes from the engine lubrication system. Therefore ensure cleanliness of the engine oil by adhering to regular schedule of engine oil and oil filter cartridge change intervals.
4. As the unfiltered dust particles coming is to the turbocharger/compressor may prove dangerous, make sure that there is no leakage is the air intake system and the air filter element is in good condition and sealing are perfect.
5. Use only recommended grades of E/oil as well as genuine engine oil filter, air filter cartridges.

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, shackle pins, pivot pin, Ball joint
- (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) Check 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.

Service Schedule

S/No.	Description	Frequency in Km
	<u>General</u>	
01.	Wash vehicle	Every 9000 Km
	<u>Engine</u>	
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 36,000 Km
06.	Change of oil filter	Every 36,000 Km
07.	Clean pre-filter at feed pump	Every 9000 Km
08.	Clean strainer in fuel tank	Every 18,000 Km
09.	Check valve clearance and adjust if necessary	Every 9,000 Km
10.	Check and tighten of all nut and bolts	Every 9000 Km
11.	Check condition of fan belt, replace if defective	Every 9000 Km
12.	Change fuel filter element first at	Every 18,000 Km
13.	Change both fuel element	Every 36,000 Km
16.	Change coolant	Every 72,000 are two years which ever is earlier
17.	Remove and check thermostat for correct functioning	Every 72000 Km
18.	Check and replace radiator rubber hoses	Every 72,000 Km
	<u>Clutch</u>	
01.	Check level of clutch fluid level container & top up	Every 9000 Km
02.	Lubricant clutch pedal pivot pins	Every 9000 Km
03.	Check and tighten mounting clutch master cylinder and slave cylinder	Every 9,000 Km
06.	Dismantle/clean, inspect and re-assemble clutch master cylinder and slave cylinder of clutch actuation mechanism	Every 72,000 Km
	<u>Gear Box</u>	
01.	Check oil level in gear box, top up if necessary	Every 9,000 Km
02.	Change oil in gear box (First in 10,000 Km) than	Every 72,000 Km
03.	Clean breather in gear box	Every 72,000 Km
04.	Check gear box mounting and tighten up if necessary	Every 18,000 Km

Suspension

- | | | |
|-----|---|-----------------|
| 01. | Grease the king pin, tie rod ball joint, drag link ball joint, front spring pins & rear spring pins | Every 9000 Km |
| 02. | Check condition of shock absorber , bushes, replace if necessary | Every 18,000 Km |
| 03. | Check wheel alignment if necessary | Every 18,000 Km |
| 04. | Check shock absorber, replace if defective | Every 18,000 Km |
| 05. | Dismantle front and rear springs, & cabin mounting clean and apply graphite grease, check and if necessary replace eye bushes | Every 72,000 Km |
| 06. | Check and tighten of nuts of spring pins, 'U' bolt of front and rear springs | Every 9000 Km |

Front axle

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|-----|--|-----------------|
| 01. | Change grease in front hub, adjust bearing play, replace damage/worn out parts | Every 18,000 Km |
|-----|--|-----------------|

Rear Axle

- | | | |
|-----|---|-----------------|
| 01. | Check oil level in rear axle, top up if necessary | Every 9,000 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 18,000 Km |

Wheel & Tyre

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|-----|---|----------------|
| 01. | Check tyre pressure | Daily |
| 02. | Tyre rotation | Every 9,000 Km |
| 03. | Check spare when carrier and tighten if necessary | Every 18000 Km |

Brakes-'S' Cam full air brakes

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|-----|---|------------------|
| 01. | Check for proper function of brakes | Daily |
| 02. | Drain off condensed water from Air tank | Every 9,000 Km |
| 03. | Check if necessary tighten (1) mounting of air tanks (Air line clamps) | Every 9,000 Km |
| 04. | Check and adjust brake free pedal free play | Every 9,000 Km |
| 05. | Check brake system for leaks and rectify, if necessary | Every 9,000 Km |
| 06. | Check for proper functioning engine exhaust brake, | Every 9,000 Km |
| 07. | Check brake rubber hoses/air pipe for damages/leaks and replace if necessary | Every 18,000 Km |
| 08. | Dismantle pneumatic aggregates of brakes system, clean inspect and replace parts if necessary | Every 72,000 Km |
| 09. | Grease with grease gun brake pedal bushing brake double level slack adjuster and cam shaft bushes | Every 9,000 Km |
| 10. | Check brake plate mounting bolts and tighten if necessary | Every 9,000 Km |
| 11. | Check condition of gaiter in different brake valves, exhaust flap in dual brake valve | Every 18,000 Km |
| 12. | Check mounting bolts of brake chamber, different valve mountings air tank mounting air cylinders mounting | Every 18,000 Kms |
| 13. | Check service brake, parking brake and adjust if necessary | Every 36,000 Kms |

Steering

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|-----|---|-----------------|
| 01. | Check oil level in power steering Hyd tank, top up if necessary | Every 9,000 Km |
| 02. | check and adjust steering wheel free play | Every 9,000 Km |
| 03. | Drain hyd oil of power steering replace filter and cartridge | Every 72,000 Km |

Electrical

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|-----|--|-----------------|
| 01. | Check and tighten mounting bolt of alternator, Starter motor, wiper motor, battery mounting bolt all electrical connections and head lamp mounting screw | Every 9,000 Km |
| 02. | Check battery cell and specific gravity of electrolyte, recondition battery if necessary | Every 18,000 Km |
| 03. | Check head lamps focus, adjust if necessary | Every 9,000 Km |
| 04. | Check electrolyte level in battery and add distilled water if necessary | Every 9,000 Km |
| 05. | Clean battery post and terminals and apply petroleum jelly | Every 9000 Km |

Bus Body and miscellaneous

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|-----|--|----------------|
| 01. | Check all body U-bolts and tighten | Every 9000 Km |
| 02. | Check the space of the U-bolt for dislocation or cracking replace if necessary | Every 9,000 Km |
| 03. | Check and if necessary tighten mounting of body bonnet, hinges, tie member mounting dove tail bottom dove tail bracket stop, door hinges, door locks, dove tail striker plates mounting of the driver seat | Every 9,000 Km |
| 04. | Check doors for proper opening & closing. Adjust striker plate if necessary. | Every 9,000 Km |
| 05. | Check condition of driver seat rubber stops buffers shock absorber & bushes replace if necessary. | Every 9,000 Km |
| 06. | Check proper sliding of window glass | Every 9,000 Km |
| 07. | Grease with grease gun (1) sliding rails of driving seat (2) Jack knife door's bearings | Every 9,000 Km |
| 08. | Lubricate with oil can Pivot of driver's seat | Every 9,000 Km |

Turbo charge and dry type air filter

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|-----|---|----------------|
| 01. | Tighten all fasteners on turbo charger, air filter mounting and air duct hose connections | Every 9,000 Km |
| 02. | Check air filter indicator, if found 'Red' clean air filter housing and replace primary cartridge | Daily |
| 03. | Check air filter hoses for damage and replace if necessary | Every 9,000 Km |

Technical Data**Engine**

Model	Tata 697 TCIC (BS-II) fuel efficient
Type	Water cooled direct injection diesel engine
No of cylinder	6 in line
Bore stroke	97 mm x 128 mm
	5675 cc
Max engine out put	(95 KW @ 2400 rpm for fixed fan and 96 KW @ 2400 rpm for viscous fan BS II engine, 131 HP (98 KW@ 2400 rpm) BS III engine.
Max torque	410 Nm @ 1400-1700 rpm
Compression ratio	17.5:1
Firing order	1-5-3-6-2-4
Air filter	Dry type
Oil filter	Full flow paper type
Fuel filter	Two stage fine filtration
Fuel injection pump	Rotary type MICO
Governor	Centrifugal type variable speed
Capacity of cooling system	20 Ltrs
Crank case oil capacity	Max 14 Ltrs, Min 12 Ltrs
Engine weight	450 Kg(dry)
Radiator frontal area	2760 Sq cm

Clutch

Type	Single plate dry friction type
Out side diameter of clutch lining	310 mm,330 mm
Friction area	1180 Sq cm/(Appx),1030 Sq cm/(Appx)

GEAR BOX

	GBS 40
No of gears	5 Forward , 1 reverse
Type	Synchromesh on all forward gears and constant mesh reverse gear
Gear ratio First	7.51
2 nd	3.99
3 rd	2.50
4 th	1.51
5th	1.00
Reverse	6.93

REAR AXLE

Type Single reduction, hypoid gears, fully floated axle shafts

Ratio 5.285:1(37/7) Standard, 5.8571 (41/7) Optional

FRONT AXLE

Heavy duty forged 1 beam reverse Elliot type

STEERING

Type Power steering

Ratio 20.2:1

FRAME

(a) Ladder type frame with riveted/bolted cross members Side member are of channel section

Depth : 223 mm (max)

Width 60mm

SUSPENSION

Type Semi elliptical leaf spring at front and rear, Optional
Pneumatic suspension

Spring span Front 1450 mm

Rear 1600 mm

Leaf width Front 70mm

Rear 80mm

Shock absorber Hydraulic double acting telescopic type

WHEEL AND TYRES

Tyres size	9.00x20-14PR(LPO),10.00x20 16 PR(LP)
Wheel Rim	7.00x20
No of wheels	Front-2, rear-4 spare-1
Fuel tank capacity	250 Ltrs

CAB

All steel full forward control cowl

ELECTRICAL SYSTEM

Voltage	24V
Alternator	55/60Amp,45 Amp
Battery	2x150Ah, 2x120 Ah
Wind screen	Electrically operated