

**ANDHRA PRADESH STATE ROAD TRANSPORT CORPORATION**

No.OP2/462(II)/99-MED

Office of the VC & MD,  
MSRD-HYDERABAD-20.  
Dated : 24.01.2000.

**CIRCULAR No-02/2000-MED, Dated 24.01.2000**

**SUB: MAINTENANCE- Introduction of TATA LPO1512/55 TC & LP 1312/ 52 TC Vehicles fitted with Turbo charged Cummins Engine -Instructions issued - Reg.**

**REF: 1. Circular No.27/99-MED, Dt.6.9.99. 2. Lr.No.462(8)/99-MED, Dt. 15.10.99**

TATA LPO 1512/55 & LP 1312/52 TC Vehicles were introduced by M/s TELCO with Cummins Engines which are of environmental friendly and fuel efficient. Detailed instructions were issued vide Circular referred above regarding basic features of Engine maintenance, Clutch system, spare and tools to be stocked.

Serious lapses regarding maintenance of TC Engines are brought to the knowledge of ED(E) by Engineers of M/s TELCO and by the technical audit teams. Therefore the following instructions are issued.

**I. BREAKAGE OF SERVICE INDICATOR:**

Service indicators are provided by the side of dash board to know the condition of the Air Filter. The red band in the service indicator can be seen whenever the cartridges in the Air Cleaner got choked up and the inflow of air become insufficient. The upper cover of the indicator is transparent.

The lapses found in maintaining these indicators and preventive measures to be taken are given below:

- 1) The indicator is painted in some cases at the time of body building. Suitable instructions shall be issued to the Bus Body fabricators not to paint the indicator. By mistake if painted, the paint on the upper portion of the indicator shall be removed with the help of a paint remover.
- 2) Due to mis-handling by the service drivers or during bus body fabrication, breakage of these indicators is occurring. To avoid such breakage of service indicators, the following precautions are to be taken:
  - (i) The bus body fabricators and WM/BBU shall see that proper attention is paid not to damage these indicators at the time of body fabrication. All the employees involved are to be enlightened on the importance of service indicators by the Supervisors of APSRTC.
  - (ii) As drivers are mis-handling the service indicator presuming this as engine off lever, instructions already issued are to be followed scrupulously. At the place of engine off lever and the service indicator, the names shall be written in telugu separately in bold letters. The service drivers shall be educated on this suitably by the Depot Managers and Supervisors at the time of handing over of Vehicle.

3. M/s TELCO was already requested to keep sufficient stocks of service indicators in the ware house at Vijayawada. Dy.CMEs of Region shall take stock of the situation in their Regions about the requirement of these indicators and see that adequate stock of indicators are stocked in Depots and broken indicators of the vehicles are replaced without further loss of time.
4. Operation of Bus without service indicator or broken service indicator is similar to operation of bus without air cleaner and result in entry of unfiltered air in to the Engine leading to rapid ware of Cylinder bore, piston rings consequently reduces the life of Engine, increases the consumption of fuel and lub oil. The concerned has to be taken up suitably for operation of Vehicle without service indicator or broken service indicator.

## **II. TURBO CHARGER - INSTRUCTIONS TO DRIVERS:**

Awareness shall be brought among the Drivers that the Engine shall not be raised as soon as it is started but the Engine shall be kept in idling speed for 3 to 5 minutes. Drivers are also to be advised that the Engine shall not be stopped abruptly and before stopping the engine it should be kept in idling for 3 to 5 minutes. Drivers are also to be advised that whenever Engine is started they shall not keep foot on the accelerator pedal. The following instructions in TELUGU shall be painted in the Driver cabin.

### **III. CLUTCH MAINTENANCE:**

#### **CLUTCH RIDING:**

In TATA LPO 1512/55 & LP 1312/52 TC vehicles, clutch is operated with hydraulic assistance with the help of master and slave cylinder. The clutch riding in these vehicles will cause very serious damages to the clutch driven disc and to the pressure plate in addition to loss of power causing low fuel efficiency. Instructions are to be given to the Drivers to avoid clutch riding. The following instructions in telugu shall also be written on the dash board at a convenient place for the guidance of the Drivers.

#### **CLUTCH ADJUSTMENT:**

The clutch pedal free play shall be between 5 to 10 mm. If-the free play is less, it shall be adjusted at the push rod of Master Cylinder, after loosening the check nuts. The check nut shall be tightened after adjustment of the free play.

The reservoir tank of clutch fluid is located by the side of driver seat and there are instances of damages to these tanks during movement of service driver to the drivers seat. To avoid such breakage, guard with opening on the top to facilitate topping up of brake fluid whenever necessary, has to be provided. This guard has to be properly bolted on the floor of the cabin. Necessary instructions are to be issued to the bus body fabricators by the CME (C&B).

### **IV. DRY TYPE AIR CLEANER:**

The Air cleaner is fixed before front off side wheel. As some of the vehicles were not provided with flap doors at the time of body fabrication, it is becoming difficult to remove the primary and secondary filters of air cleaner whenever either cleaning or replacement of these filters has to be carried. Instructions were given to provide flap doors during bus body fabrication. For the vehicles which were already received by Depots without these flap doors, necessary modifications are to be carried out by providing flap doors at Depots. Dy.CMEs of the regions shall ensure for implementation of these instructions.

## V. CYLINDER HEAD BOLTS TIGHTENING:

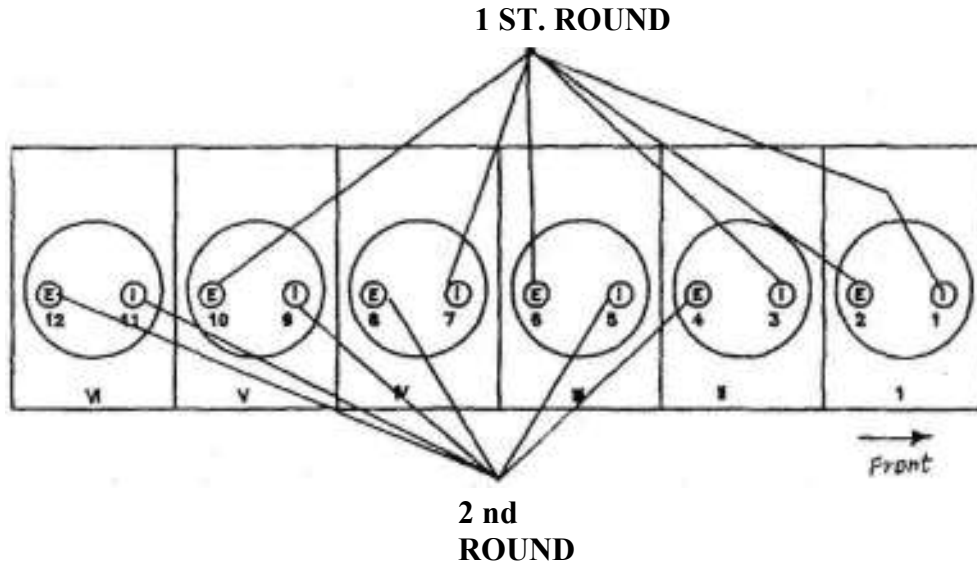
The cylinder head bolts have to be tightened to the specified torque as per the sequence given below, whenever tappet setting is done.

- Step 1:** Follow the numbered sequence & tighten all caps to 7 Mkg torque. Check the torque of all the cap screws.
- Step 2:** Follow the numbered sequence and tighten only the fourteen long cap screws (1, 2, 8, 7, 9, 10, 16, 15, 17, 18, 24, 23, 25 & 26) to 14.5 (105 ft.lb). Once again check the torque on all the cap screws.
- Step 3:** Repeat steps 1 and 2 because of cylinder head relaxation and to obtain proper cylinder head torque requirement.
- Step 4:** Follow the numbered sequence of above figure and turn all cap screws 90 degrees as indicated on the cap screw head.

## VI. PROCEDURE OF TAPPET SETTING:

INLET CLEARANCE	0.25 mm 0.50
OUT LET CLEARANCE	mm 1, 5, 3, 6,
FIRING ORDER	2, 4
TIGHTENING TORQUE FOR VALVE LOCK NUT	2.5 mkg.
TIGHTENING TORQUE FOR VALVE DOOR COVER	2.5 mkg.

The engine shall be rotated with the help of engine barring gear fixed to the fly wheel housing. The TDC shall be located by rotating the engine while pressing the engine timing pin, till the pin engages in the hole in the cam shaft gear. Once the location of the pin in the cam shaft gear is completed, it means the piston in the cylinder No. 1 reached TDC. As there is no mark on the fly wheel, a mark has to be made on the opposite side for identification of TDC for carrying out second round of tappet clearance. The sequence of 1st and 2nd round valve clearance adjustment is given in the illustration shown below.



Sequence of valves to be attended for 1st round:

1,2,3,6, 7,10

Sequence of valves to be attended for 2nd round;

4,5,8,9, 11,12

The tappet clearance has to be done in two rounds duly following the above procedure.

**PROCEDURE FOR REPLACEMENT OF FIP:**

**REMOVAL OF FIP**

The fuel lines to feed pump and to Injectors are to be disconnected.

After locating TDC for Cylinder-1, the TDC pin has to be pushed into hole in cam shaft.

FIP mounting bracket has to be removed. The nut and washer from FIP shaft has to be removed.

The driving gear of the FIP has to be pulled out.

Four mounting bolts of FIP are to be removed. Subsequently the FIP has to be pulled out.

**FITMENT OF FIP**

TDC position of cylinder-1 has to be ensured.

To position the pump cam shaft to correspond with the TDC of cylinder-1, the FIP has to be locked.

The locking pin has to be reversed and stored in housing after installation of FIP to avoid breakage.

Disengage the Engine timing pin after installation of FIP.

## **VII. DRAINING WATER FROM FUEL FILTERS:**

In the fuel filters provided for the TC Engines, spring loaded drain valves were given at the bottom of the filters. This spring loaded drain valve shall be preserved whenever the fuel filters are changed. The drain valve shall be pressed till the water in the filter has completely drained and clear fuel is visible. There is indicator in dash board which will glow if the water accumulation is excessive and the drain valve under the filters shall be pressed. In case of non-working of this indicator the drain plug has to be operated once in a week to drain water. If this draining of water is not done, water will enter the fuel system causing damages to FIP parts and weak pulling of engine.

## **VIII. COOLING SYSTEM:**

### **FAN BELT:**

There is no need to adjust the fan belt since auto-tensioner is provided to maintain correct tension of the fan belt. Visual inspection has to be done for identification of cracks on the belt along the direction of belt length and replace if such cracks are found.

### **WATER PUMP:**

No maintenance is required to the water pump. The complete water pump assembly has to be replaced if found defective. If water leakage is found, the rectangular ring between water pump body and Engine block has to be replaced.

As per the Circular instructions given earlier Dy.CMEs & COS of the Regions/Zones shall ensure supply of special tools and spares required for LPO 1512/55 or LP 1312/52 TC vehicles in the Depots. As per the information received still number of Depots are not yet provided with the required spares and tools. Dy.CMEs and COS of the Regions/Zones shall immediately act and ensure that spares and special tools required for TATA TC vehicles are arranged to the Depots.

Dy.CMEs of Tata area are advised to organise awareness programme about above instructions among the Supervisors, mechanical staff drivers and ensure that these instructions are implemented scrupulously with out any deviations.

Sd/-

**EXECUTIVE DIRECTOR (Engg)**