

ANDHRA PRADESH STATE ROAD TRANSPORT CORPORATION

O/o the VC & MD
MSRD, HYDERABAD-20

No: OP1/812(7)/2006-MED

CIRCULAR No : 17/2007-MED, Dt.26-07-2007

Sub: **MAINTENANCE** – Introduction of 12 mtr Ashok Leyland Vehicles – Salient features and recommended maintenance practices – Communicated – Reg.

Ref : 1. Circular No : 18/2003-MED, Dt.09.06.2003.
2. Circular No: 15/2006-MED, Dt.24.11.2006
3. This office letter No.OP1/812(7)/2006-MED, Dt.20.11.2006.

Consequent upon introduction of Bharat Stage-II compliant vehicles by M/s Ashok Leyland Ltd., the salient features of modifications and detailed guidelines on maintenance of the vehicles with 6DTI2D (with rotary FIP) and 6ETI BS-II (with Inline FIP) engines have been communicated vide circulars 1st and 2nd cited respectively.

Recently, the Corporation has started inducting 12 Mtr Chassis from M/s Ashok Leyland to build new premium class buses called Meghdoot and Meghdoot AC. Some of these Buses have already been put into operation at various depots.

There are certain new features like High powered Engine (HA6DTI2U), VE Type Distributor Fuel injection pump, ZF Gear box with remote gear shifting mechanism, Hydraulically operated Valeo Diaphragm clutch, Rear axle with Hypoid Gears and Electromagnetic retarder provided on these vehicles.

The salient features of 12 mtr chassis are

Chassis Wheelbase	:	244” (6200 mm)
Engine Model	:	HA 6DTI 2U
Bore & Stroke	:	104 x 113 mm
Torque	:	60 Kg-m @ 1600 RPM
Horse Power	:	130 KW (177 PS) @ 2400 RPM
Fuel Injection Pump	:	Distributor FIP VE type (428)
Feed pump	:	Engine mounted
Injection timing	:	1.30mm FIP Plunger Lift at TDC
Injector Opening pressure	:	250 – 260 bar
Fuel Filters	:	1.1 Ltr both MICO Paper filters (Coil)
Cooling Fan	:	Viscous Fan
Clutch	:	380mm (15”) Diaphragm type
Rear Axle	:	RS 145 with 5.83 ratio (35/6) and Hypoid Gears
Front Axle	:	ALFA 60/1 – Oil lubricated
Gear Box	:	ZF S 6-36(Overdrive) with 6.93 Ist Gear ratio.
PP Shafts	:	Rubber mounted (SIL make)
Air Conditioner (Optional)	:	Main Engine Driven
Brake	:	S’cam Full Air with BIL make Electromagnetic Retarder (optional) and Engine Exhaust Brake
Suspension	:	Front Weweller & Rear air suspension

Steering	:	Power Steering with Bevel box arrangement
Other features	:	<ul style="list-style-type: none"> - Turbocharger with manifold pressure Compensator (MPC) and Charge air cooler - Optimised valve events - Modified intake manifold - Unique ALFIN type Piston with bigger Gudgeon pin - Re-entrant type combustion bowl - Compression pressure reduced From 17.9 (E-I) to 17.5 kg/sqcm

The salient features and recommended maintenance practices on BS-II vehicles with respect to **Dry type Air filter, Turbocharger, intercooler, Aluminum Radiator, Viscous Cooling Fan, Polyamide brake pipes, Air Dryer, Relay Valve** etc have already been elaborately described in the circulars cited at reference 1st & 2nd cited.

Added to the above, in 12 meter Chassis, there are certain special features like VE Type Distributor Fuel injection pump, ZF Gear box with remote gear shifting mechanism, Hydraulically operated Valeo Diaphragm clutch, Rear axle with Hypoid Gears and Electromagnetic retarder provided which require greater care and proper maintenance for trouble free operation.

The details of the above features are explained hereunder.

1. FUEL INJECTION SYSTEM ON HINO 6DTI (2U) ENGINES

For higher Injection pressures (750 to 800 bar), VE type Distributor pumps are introduced in place of inline pumps. The following are the salient features of Distributor pump.

- a. Vane type supply pump that supplies fuel to pump cavity at different pressures at different speeds
- b. High pressure pump with distributor, which produces higher injection pressure, moves and distributes fuel to cylinders
- c. Mechanical Governor that control engine speed and accordingly varies fuel deliver over control range
- d. Electromagnetic shutoff valve to interrupt fuel delivery to stop the engine
- e. Injection timing unit which adjusts the beginning of injection according to the engine speed
- f. Manifold pressure compensation – MPC (LDA). This is an add-on module that senses the air pressure in the manifold (generated by turbocharger) and adjusts full load fuel delivery to that pressure
- g. Mechanical cold-start Injection advance (KSB). This is a cold starting device to improve starting by advancing injection timing. The operation of KSB is automatic and accomplished by a temperature – sensitive advance mechanism.

1.01 SPECIFICATIONS

MICO Combination No	:	428 (0 460 426 428- VE6/12F1200R908-8)
Firing order	:	1-4-2-6-3-5
Injection timing (Flywheel Travel)	:	11° ± 1° BTDC No.1 cylinder on compression stroke

Plunger Lift	: 1.30 mm
Injector Type	: Multi-hole type
Injector No	: F 002 C7Z 113
Nozzle No.	: F 002 C40 563 – DSLA 152 P 1323
Nozzle opening pressure	: 250-260 bar
Fuel Feed pump	: Engine driven – Plunger type F 002 A50 026 – FP/KS 22AD 68

Tightening Torques

FIP Drive gear bolts	: 40 +/- 4 N-m
FIP Camshaft slotted Nut	: 92.4 +/- 2.5 N-m
FIP Camlock (while locking)	: 31 N-m
FIP Camlock with interposing plate (after unlocking)	: 12.5 +/- 2.5 Nm

- 1.02 **FIP DRIVE** : The FIP drive is totally new with VE pump calling for wider FIP drive gear (increase in thick ness from current 20mm to 23mm) as the driver torque is more. The connection is through a flange coupling which is mounted through 8 numbers of higher grade (12.9 grade) bolts. A cover timer accommodates the flange coupling through a bush.
- 1.03 **FEED PUMP** : Feed pump (026 type) is mounted on the cover timer & driven by an eccentric on the flange coupling.
- 1.04 **INJECTOR PIPES** : The fuel outlets at Distributor head of the FIP would be identified with alphabets A-B-C-D-E-F as per the firing order 1-4-2-6-3-5. The injector pipes are identified by the cylinder numbers punched at the ends. The high pressure pipes shall be connected between the pump end and injector end in the following sequence for ease of assembly.

Sl.No	Injector end marking in the pipes	Pump end marking
1	5	F
2	1	A
3	3	E
4	6	D
5	4	B
6	2	C

1.05 REMOVAL/ FITMENT OF FIP AND PLUNGER LIFT SETTING

Fitment of FIP and setting of Timing accurately play an important role in the performance of the engine. Any disturbance in timing will adversely affect the fuel efficiency of the engine and leads to heavy smoke and overheating of the engine. Therefore, timing setting shall be done very carefully as detailed hereunder.

1.05.a **REMOVAL OF FIP FROM ENGINE** :

- Remove the Battery cable connections
- Remove high-pressure pipe connection, remove overflow pipe, boost compensator pipe (black color nylon hose) and disconnect the 24V supply connection to Fuel shut off solenoid and KSB (Cold starting device). Remove the FIP support Bracket.

- Loosen the 3 nuts mounting the FIP onto the injection pump drive housing, and remove the FIP. There is no need to remove the injection pump drive housing (cover timer)
- **CAUTION** : AFTER REMOVAL ENSURE THAT THE OVER FLOW BANJO (MARKED AS 'OUT') AND THE MPC (Manifold Pressure Compensator) CONNECTION BANJO IS FITTED BACK TO THE RESPECTIVE FIP. THESE ARE NOT TO BE INTERCHANGED AND WILL BE REQUIRED FOR BENCH CALIBRATION ALSO.

1.05.b CALIBRATION OF FIP ON TEST BENCH

Whenever the FIP is sent for calibration on Test bench, the splined bush will be fixed and tightened to specified torque after completion of FIP calibration.

1.05.c FITMENT ON TO THE ENGINE & FIP PLUNGER LIFT SETTING

- i) Bring the Engine to 1st Cylinder compression TDC (Hint: There is no need to remove the rocker cover. At the first cylinder compression the double groove in the FIP drive coupling, which can be felt with hand from the open end at rear end of the FIP drive housing, will be vertical).
- ii) Check the FIP mounting gasket. If the gasket is torn or peeled off, replace the same.
- iii) Fit the FIP onto the engine aligning the double tooth with the double groove in the FIP drive coupling. (Hint: at the correct timing the double tooth on the splined bush would be vertical)
- iv) Tighten the 3 FIP mounting nuts, by pushing the pump towards cylinder block. (Fig 1)

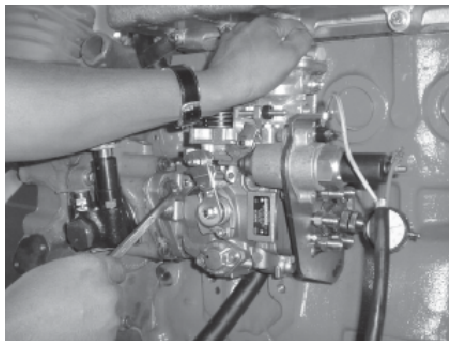


Fig – 1

- v) Remove the dummy plug on the distributor head and fix the dial indicator. (Fig 2 & 3)



Fig - 2



Fig - 3

- vi) Energise the KSB by connecting the 24V supply or Mechanically disengage the KSB
- vii) Rotate the engine in the opposite direction of rotation. Stop the rotation when the pointer of the dial indicator stops moving. (Fig-4)

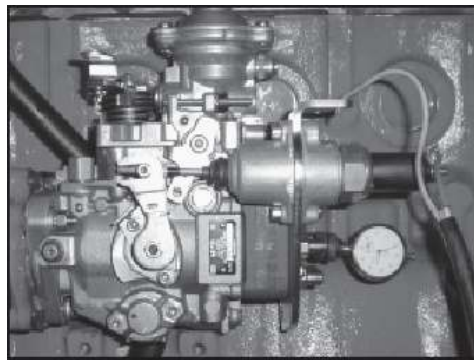


Fig - 4

- viii) Set Zero on the dial.
- ix) Rotate the engine in the direction of rotation and align the 1/6th mark on the engine flywheel to the flywheel housing ref.
- x) The dial indicator should now read pre-stroke specified for the engine type (For 6DTI 2U, it is 1.30 mm)
- xi) If not loosen the three nuts holding the FIP to the Pump drive housing and turn the FIP towards or away from the engine so that the dial reads the required pre-stroke value i.e, 1.30 mm.
- xii) Tighten the three nuts to secure the FIP firmly and uniformly
- xiii) Remove the dial indicator and fit the dummy plug
- xiv) Mechanically engage the KSB if it has been disengaged mechanically in the step vi) above.
- xv) Fit the Overflow pipe, boost compensator pipe and high pressure pipes.

1.05.d FIP TIMING SETTING TOOL

Two types of adaptors for dial indicators are available for measuring the plunger lift. The longer one (at fig.6) for checking the timing by just loosening the high pressure pipes at injector end and the shorter one (at fig.5) for checking the timing by removing the high pressure pipes.

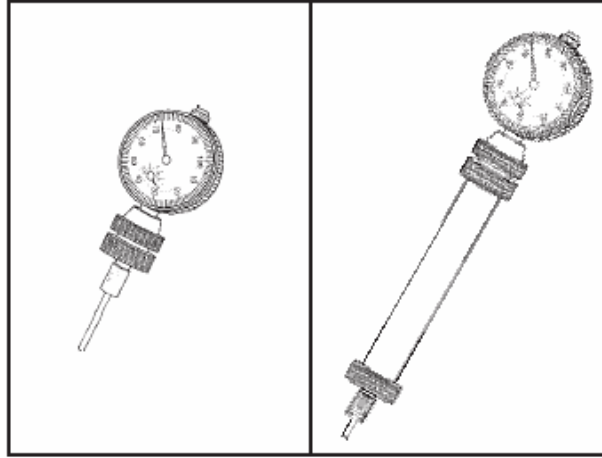


Fig – 5

Fig - 6

FIP rear end dummy plug sizes are M8 and M10.
Use special tool part no.

Small Tool - M8 - Z00WEO203193
M10 - Z00WEO230528

for checking timing without high pressure pipes. **Fig – 5**

Use special tool part no.

Long Tool - M8 - Z00ZZ0031450
M10 - Z00ZZ0031604

for checking timing with just loosening the high pressure pipes at injector end. **Fig -6.**

Supplier Address:
Productive Tool Engineers,
No. 251 1st Main, 7th Cross,
New 3rd Cross, Prakash Nagar,
Bangalore - 560 021.
Ph : 080-3124606.

1.06 PRECAUTIONS TO BE TAKEN IN FUEL SYSTEM

Unlike, an In-line pump, which is partly lubricated by engine oil and partly by diesel, VE Pump is filled fully with Diesel, and lubricated by Diesel only. Hence, cleanliness of Diesel is of prime importance to obtain the best performance from the VE pump. In order to ensure clean diesel, use of Coil type filters (both), strict adherence to the Filters change programme without any delays and draining of water everyday from water separator has to be strictly ensured.

The Depot Managers and Maintenance incharges are advised to educate the maintenance staff on the procedures indicated above for fitment of FIP, Injection timing Setting and need of maintaining the clean fuel supply.

2.00 **ENGINE** :

The important modifications in the Engine are as follows

2.01 **TIMING GEAR TRAIN** : Higher torque requirement of VE pump has necessitated wider gear for FIP drive. Therefore the other timing gears are also widened. The following are the revised width for different timing gears.

- Crank Gear : Width increased from 22mm to 30mm
- Idler Gear : Width increased from 20mm to 27 mm
- FIP Gear : Width increased from 20mm to 23 mm

2.02 **TIMING CASE** : Machining introduced in the boss behind oil seal bore to ensure clearance with the crank gear in view of increased gear widths. The oil seal position is shifted forward by 1mm to ensure minimum wall thickness.

2.03 **DAMPER** : The Damper is provided with 3 groove pulley.

2.04 **TIMING BACK PLATE** : Counter bore is provided on one mounting hole location to ensure clearance with the idler gear. A special bolt with reduced head thickness is to be used for this hole.

2.05 **OIL PUMP COVER** : To ensure adequate clearance with the Idler gear in view of the increased width, cast relief is provided for clearance with idler gear and thickness reduced at faced mounting boss.

2.06 **VALVE TRAIN GROUP** :

a) **CAM SHAFT** : Cam profiles (acceleration & velocity) modified for both intake & exhaust as present BSI cam profile is optimized for Naturally Aspirated engine.

PARAMETER	CURRENT	BS-II	REMARKS
<u>Base Circle Dia</u>			
Intake	42.6mm	43.0mm	
Exhaust	42.6mm	40.0mm	
<u>Cam Lift</u>			
Intake	6.84mm	6.52mm	For Intake reduce
Exhaust	6.89mm	7.24mm	For Exhaust increased
<u>Valve Timing</u>			
IVO	16 ^o BTDC	18 ^o BTDC	Valve timing changed for intake. Consequently Tappet adjusting screw length is increased by 1.5mm
IVC	40 ^o ABDC	30 ^o ABDC	
EVO	55 ^o BBDC	57 ^o BBDC	
EVC	13 ^o ATDC	15 ^o ATDC	

b). **VALVE SPRING** : Constant pitch valve spring in place of progressive spring is introduced to suit the modified cam lift profile

- c). TAPPET ADJUSTING SCREW : Screw length increased by 1.5mm consequent to reduction of base circle dia .
- d). VALVE SPRING SEAT – Inlet & Exhaust : Diameter is increased to avoid valve spring fouling with the same

2.07 PISTON & PISTON RINGS :

- Pistons are having Alfin insert, which will improve resistance to wear and hence better life, and bigger gudgeon pin.
- Reentrant type combustion bowl on the top.
- Modified compression ration (17.5 as against 17.9 of BS-I)

2.06 CYLINDER HEAD :

- Inlet manifold mounting face made larger to accommodate wider inlet manifold
- Cuttering operation introduced on inlet port to remove sharp edges formed after valve bore machining. The operation already in existence for exhaust manifold. This modification improves air flow.
- Valve spring lower seat seating area is machined to a larger dia to improve the clearance with the valve spring.

VALVE SEATS :

- Exhaust valve seat profile is modified for better flow. Current valve seat angle of 45^o and Valve sink retained
- Superior grade sintered material is used
- For inlet valve seat, the material alone is changed to superior grade sintered type.

- 2.09 HEAVY DUTY WATER PUMP : Since the fan clutch is heavier than existing fan, the water pump is made sturdier with 55mm diameter shaft as against 35mm diameter for Hino 6E engines. The Water pump is of integral shaft bearing type. The Fan diameter is bigger (470mm as against 430mm) and hence the Radiator cowl also changes.

3.00 GEAR BOX & GEAR SHIFTING LINKAGES :

ZF Synchronmesh Gear Box (ZF S 6-36 Overdrive) with Remote Gear shifting mechanism has been provided on 12mtr vehicles. Six forward speeds and one reverse speed are available in this gear box. This is totally different in construction & operation compared to the present version of ALGB 13 Gear box. Unlike GB13 Gear box, **the Synchronmesh gear box requires only single de-clutching to engage/ disengage the gears.** It is difficult and also hard to engage the gears in Synchronmesh gear box without depressing the clutch pedal fully. Since all these days, the drivers in Ashok Leyland area are **habituated to using constant mesh gear box (sometimes even without de-clutching), it is essential to educate and train the drivers deployed on the vehicles having synchronmesh gear box.**

4.00 CLUTCH :

380mm dia **Valeo** Diaphragm type Clutch operated hydraulically by Master Cylinder & Slave cylinder arrangement has been provided in 12 mtr buses.

4.01 The specification of the clutch

Clutch disc thickness	-	10mm
Master Cylinder Size	-	1 inch
Slave Cylinder Size	-	1 ½ inch
Slave Cylinder Stroke for Release	-	13.5 mm
Slave Cylinder Stand out on full application	-	168 mm with new disc
Oil Used in the system	-	Brake fluid

Clutch Disc has to be changed when the slave cylinder stand out comes to **153mm**. Push rod length shall not be adjusted under any circumstance. The pedal free play of 5 to 8mm shall be maintained for retraction of master cylinder piston on releasing the pedal. The pedal free play can be adjusted by an adjusting bolt in the clutch pedal frame.

4.02 BLEEDING OF HYDRAULIC SYSTEM :

This is required to remove air from the system. The following system shall be followed to bleed the system.

- Pour clutch fluid in the reservoir upto maximum level
- Remove the dust cap from the bleeding screw in the slave cylinder
- Unscrew bleeding screw by one/two turn after fixing hose on to bleeding screw and keeping the other end of the hose immersed in a jar filled with oil partially.
- Press the clutch pedal and release so that air in the system comes out bubbles in the jar.
- When the clutch is pressed and released oil level in reservoir will come down. Top up the oil when the clutch pedal is in released position.
- Continue this till entrapped air is totally removed
- After ensuring removal of air, take out the hose/ tighten the bleeding screw/ fix the dust cap.
- Check for stroke of slave cylinder when clutch pedal is in fully depressed condition. It should be 13.5mm minimum.

4.03 PRECAUTIONS TO BE TAKEN ON CLUTCH SYSTEM

- As the clutch actuation is achieved through hydraulic system, keeping foot on the clutch pedal will have serious impact on the life of the clutch disc, pressure plate and flywheel. Hence, the **drivers must be educated to avoid clutch riding**.
- **The drivers shall use the clutch compulsorily** for smooth engagement of Gears in Synchronesh Gearbox. Changing the gears without using the clutch will not only make it difficult to engage but also damage the gear components

5.00 ELECTRO MAGNETIC RETARDER :

TVS – Girling Electro Magnetic Retarder is provided to these vehicles for efficient and reliable auxiliary braking system. EMR not only increases the braking efficiency of the vehicle but also improves the life of brake linings, drums and tyres.

EMR is an auxiliary unit assisting the existing braking system. The stator houses the main rotating shaft on which two ventilated steel rotors are mounted on either side of the stator, which itself is firmly mounted through appropriate brackets onto the chassis. Initial depression of the brake pedal causes a complete magnetic path through the discs. (even if the vehicle is at a stand still). Magnetic lines get distorted with the rotation of the disc. Thus the eddy currents are generated to bring back the flux to a straight path. This is the braking action of the rotor. The EMR is capable of coping with almost 80% of the decelerations of the vehicle. The frequency of usage of main brake thus gets drastically reduced.

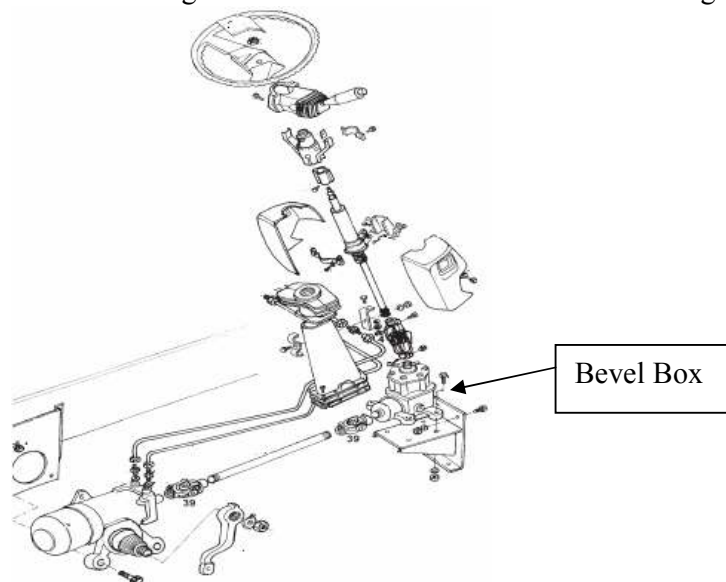
Since, the EMR operation is achieved through electrical energy, high capacity Alternators (75 Amps) and 200A-h Batteries shall be used on the vehicles fitted with EMR system. Separate instructions will be issued on maintenance of Electromagnetic Retarders.

6.00 FRONT AXLE :

FA-60/1 Front Axle is fitted to 12 mtr vehicles. The Kingpins are Oil lubricated. The tie-rod assembly and Steering arms are totally different from the existing models. The I' beam is sturdier and heavier than the AL FA50 & AL FA90 Axles.

7.00 STEERING ARRANGEMENT :

The Steering Box is horizontally mounted on the frame. The Steering column is connected to the Steering box via a Bevel box . The Bevel box has bevel gears with pre-lubricated arrangement which change the direction of rotation from the steering wheel.



8.00 **RECOMMENDED LUBRICANTS FOR 12 MTR BUSES :**

- As per the latest recommendations of Ashok Leyland the Engine oil 15w40 of API **CH4+** grade with drain periodicity of **36,000 kms** shall be used.
- For Synchronesh Gear box, XP90 grade oil (API GL-4 with specified additive) shall be used. The change periodicity is changed to 48,000 kms as against present 32,000 kms for monograde oil. The oil capacity of the Gear box is 6.5 liters
- For Rear axle with Hypoid drive, multigrade oil DB 85W140 (API GL-5 with specified additive) shall be used. The change periodicity is increased to 48,000 kms against present 32,000 kms for monograde oil. The oil capacity is 14 litrs.
- For Clutch, heavy duty brake fluid (FM VSS 116-Dot 3 or IS 8654) like Gulf Super HD, Servo Brake Fluid super HD, TVS-Girling brake fluid etc shall be used.

9.00 **PREVENTIVE MAINTENANCE SCHEDULE FOR 12 MTR BUSES:**

The Sch.III/IV maintenance schedules for 12 mtr Vehicles have been modified as shown below.

Sch-III Maintenance	-	At every 20,000 kms
Sch-IV Maintenance	-	At every 60,000 kms

Necessary changes have to be made in the VEMAS module to get the advance intimation programme as per the above periodicities for 12 mtr vehicles.

All the prescribed works as per the circular guidelines in force have to be carried out during Sch.III/IV maintenance.

In addition to the regular maintenance activities, the following are some of the important works to be carried out for 12 mtr Buses

- Replace the **engine oil (15w40 grade CH4+)** along with **filter** (Pt.No X 4000600) @ 16,000 kms initially and thereafter at every **36,000 kms**.
- Fuel Filters (both are 1.1 ltr coil type paper filters) change @ 1,000 kms initially and thereafter at every 20,000 kms. Fuel filter changes have to be staggered in such a way that both primary & secondary filter elements are not changed at the same time. In order to **stagger the filter changes** carry out primary filter change initially at 10,000 kms and secondary filter element at 20,000 kms and follow 20,000 kms periodicity for both elements thereafter.
- Drain the water from the Water separator **daily**.
- Check the **injector opening pressure** at 1st Sch-III (i.e, at 20,000 kms) initially and during **every Sch.IV** maintenance (at every 60,000 kms) thereafter.
- Check & adjust **Tappet clearance** at 1,000 kms initially and during every **Sch.III** maintenance thereafter.
- Check **Cylinder Head tightness** at 1,000 kms initially and during every **Sch.III** maintenance thereafter.

- **Clean the Primary filter element** of Dry type Air filter immediately on observing **red band appearance** in the restriction indicator. Replace the Primary filter element after two cleanings. **Replace secondary filter element** at the time of **third replacement of primary filter element**.
- Check and adjust the **plunger lift of FIP** during every **Sch.IV maitnenane (60,000 kms)** along with injector testing.
- Check and tighten the **EMR mounting bolts** during every **Sch.II** maintenance.
- The **bi-metallic strip on the Viscous fan shall be cleaned** during every **Sch.II** maintenance for better sensing of heat for effective operation of Viscous fan.
- Check for **Pre-stroke of Pushrod** (Clutch slave cylinder) in every **Sch.III**
- **Replace the clutch master cylinder & Slave cylinder kits** along with **clutch fluid** during **alternate Sch-III** maintenance (i.e,at every **40,000 kms**).

10.00 GENERAL PRECAUTIONS TO BE TAKEN :

- The Drivers shall be properly educated on operation of Air conditioner controls..
- The temperature gauge in the dash board shall always be under working condition.
- The drivers shall be educated to **lift the grill by a lever** provided in the cabin when the vehicle is under operation to avoid overheating of engine.
- It shall be ensured that the **space between the intercooler and radiator is clear** without any dust & dirt to facilitate free flow of air towards radiator.
- The Drivers shall be educated to keep the engine under **idling condition for at least 1 to 2 minutes before racing and stopping** the engine so that the turbocharger bushes do not suffer oil starvation.
- The purge tank shall never be disconnected with Air Dryer, as drying system will not function without purge tank.
- Leak proof connection shall be ensured between the Air intake pipe and Service indicator, otherwise the indicator does not indicate the choking condition besides allowing unfiltered air into the engine.

11.00 IMPORTANT SPARE PARTS TO BE STOCKED AT DEPOTS : The important spare parts required to be stocked at Depots are furnished at the annexure.

The Depot Managers and Maintenance incharges are advised to make note of the above features of 12 MTR Ashok Leyland vehicles and educate all the Maintenance staff about the changes incorporated in the vehicle for proper maintenance. The Drivers shall be trained suitably on handling these vehicles.

The Dy.CMEs are advised to ensure proper maintenance of 12 mtr vehicles as indicated above during their inspection of Depots.

The Controller of Stores' are advised to ensure stocking of the spares at Depots as indicated above duly fixing the limits by the Limits fixation committee.

The Chief Engineer (IT) is requested to incorporate the revised maintenance schedules and drain periods for lubricants applicable for 12 mtr buses in the VEMAS module.

EXECUTIVE DIRECTOR (E& IT)

To
all Depot Managers.

Copy to: Director (Vig. & security), ED (MIS), ED (A), ED (O), FA, CAO & ED (HRD) for information

Copy to: All ED(Zones) for favour of information and necessary action.

Copy to: CCOS, CME(C&B) & CE(IT) for necessary action.

Copy to: All Regional Managers for necessary action.

Copy to: All Dy.CMEs/WMs/COSs for necessary action

Copy to: All Dy.CAOs & AOs for information.

Copy to : Dy.CME(C&B), Dy,CME(IEU), Dy.CME(P) for necessary action.

Copy to: Principal, TA/HPT, & all ZSTCs.

Copy to : Manual section, H.O.

Copy to : All Maintenance incharges for necessary action.

IMPORTANT SPARE PARTS TO BE STOCKED AT DEPOTS

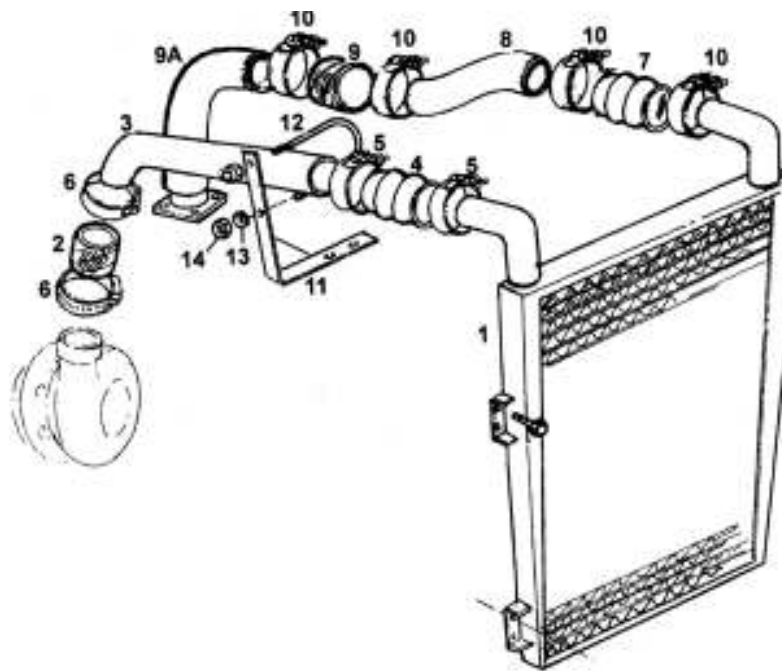
FUEL SYSTEM :

	DESCRIPTION		Part No.	Qty
1	Water Separator		F7856800	E.1
2	Fuel Filter Coil type (MICO)		P1301640	E.2
3	Injectors		X7464000	E.6

AIR INTAKE SYSTEM :

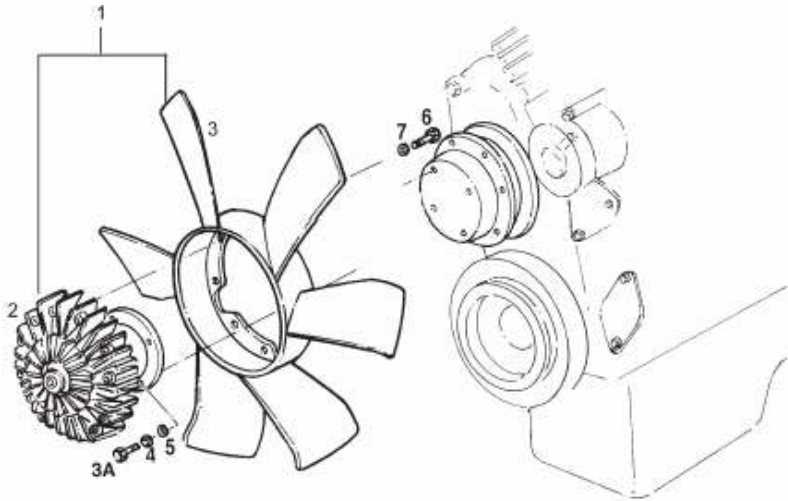
	DESCRIPTION		Part No.	Qty
1	Primary Cartridge – Air Cleaner		F8211200	E.1
2	Inner Element – Air Cleaner		F8211300	E.1
3	Choke up Indicator (Service Indicator)		F8273900	E.1

INTER COOLER



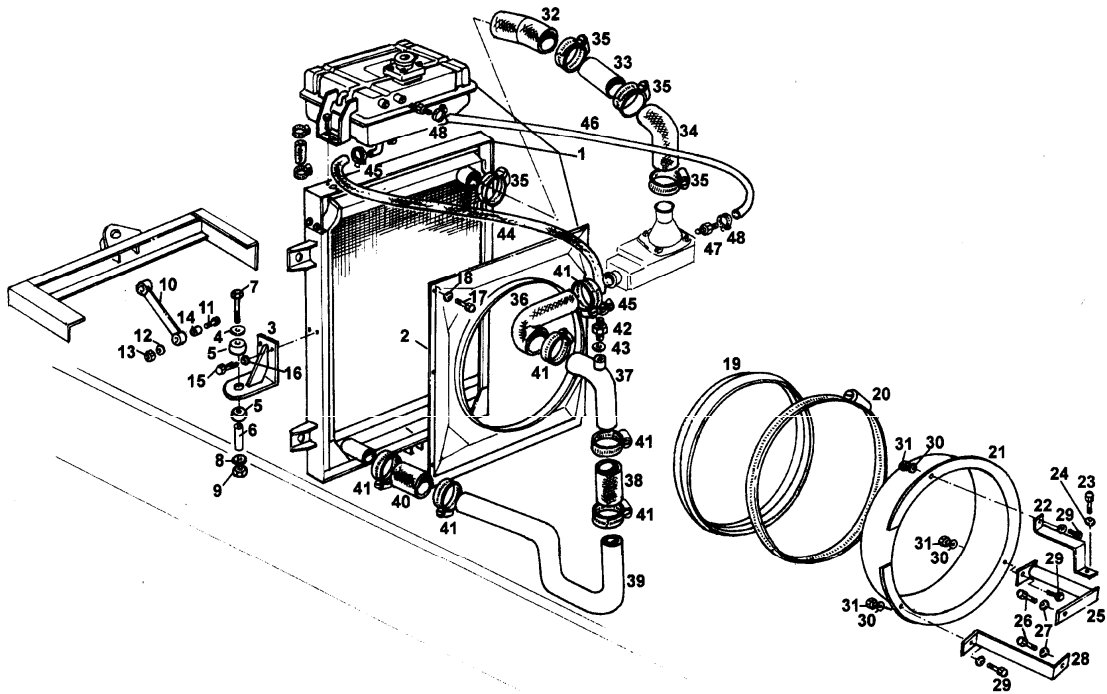
	DESCRIPTION	Illustration	Part No.	Qty
	Straight hose	2	F1915950	E.1
	Straight hose	9	F1912150	E.1
	Bellow Hose for inter cooler pipes	4 & 7	F1919250	E.2

VISCOUS COOLING FAN ASSY



	DESCRIPTION	Illustration	Part No.	Qty
1	Clutch Viscous for 10 blade	2	X7454300	E.1
2	S/Assy Fan cooling 10 blade	3	X7454200	E.1
3	S/Assy Fan clutch	1	B8220404	E.1
4	Fan Belt		F0331250	E.1
5	Fan Belt A/C Compressor Drive BX 63		F0300400	E.2
6	Fan Belt A/C Compressor Drive BX 65		F0300500	E.2
7	Damper 3 groove		X1501000	E.1
8	Key for Crank gear		F0954915	E.1

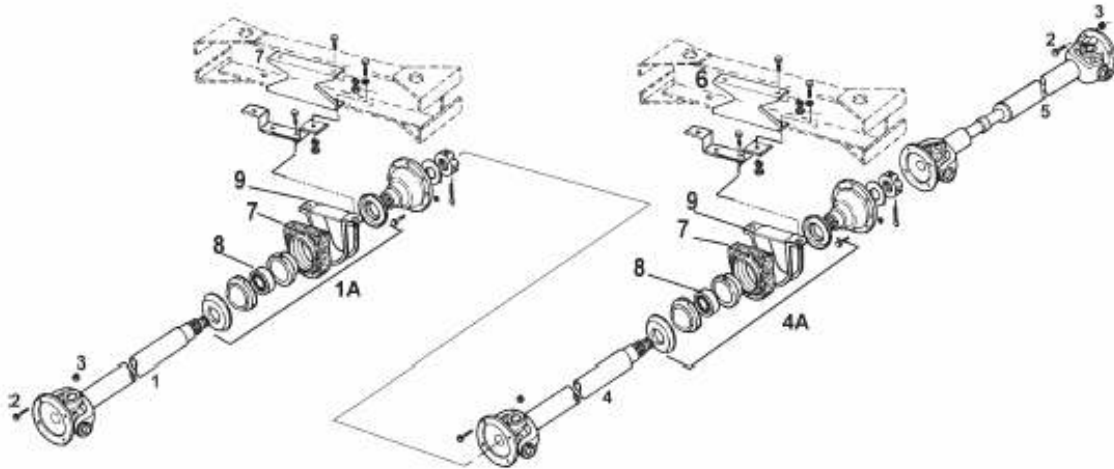
RADIATOR ASSY & PIPING



	DESCRIPTION	Illustration	Part No.	Qty
1	Elbow Hose		F1923250	E.1

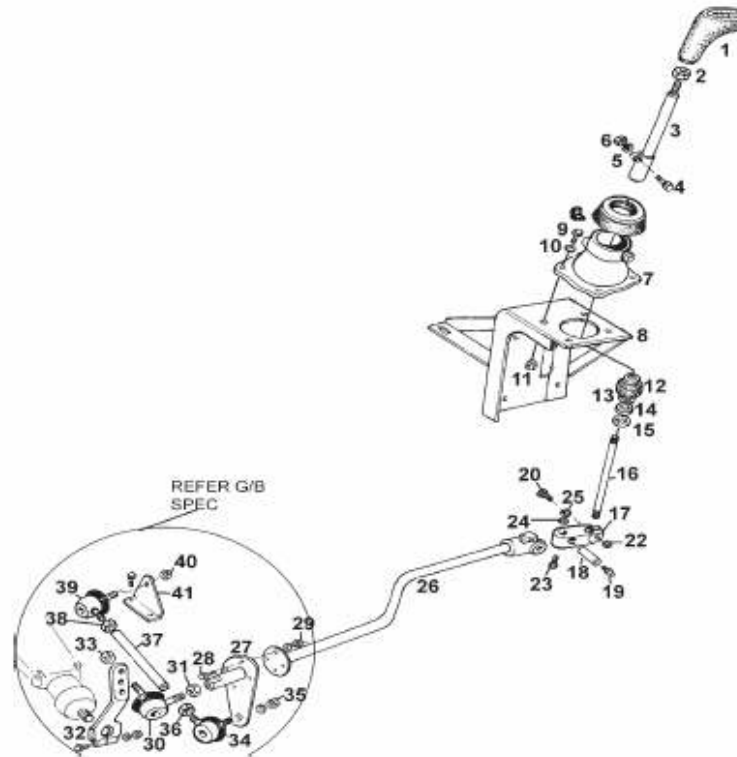
2	Elbow Hose	34 & 36	F1924350	E.2
3	Straight Hose 120 long	40	F1925250	E.1
4	Hose	32	F1973350	E.1
5	Hose	38	F1946250	E.1
6	Hose	46	F1926150	E.1
7	Hose make up line	44	F1925950	E.1
8	Sub Assy Radiator & Charge Air Cooler		B1132401	E.1
9	Sub Assy Radiator & Deaeration tank	1	F8291000	E.1
10	Thermostat		X7468900	E.1
11	Coolant Pump		B8760401	E.1

PROPELLER SHAFT ASSY.



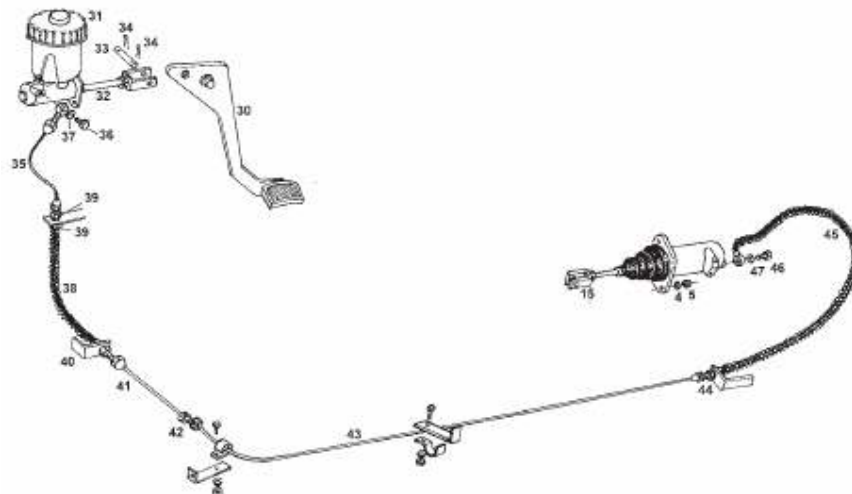
	DESCRIPTION	Illustration	Part No.	Qty
1	Center Bearing Kit	1A & 4A	F0257010	E.2
2	Center Bearing Rubber	7	P4500426	E.2
3	Center Bearing Bracket	8	P4500104	E.2
4	UJ cross Assy		P4500951	E.4
5	Coupling Flange Bolts 3/8" x 1 3/8" long BSF	2	L1050611	E.32
6	Simmonds Nut 3/8" BSF	3	H3650611	E.32
7	Shaft Nut		P4500735	E.2

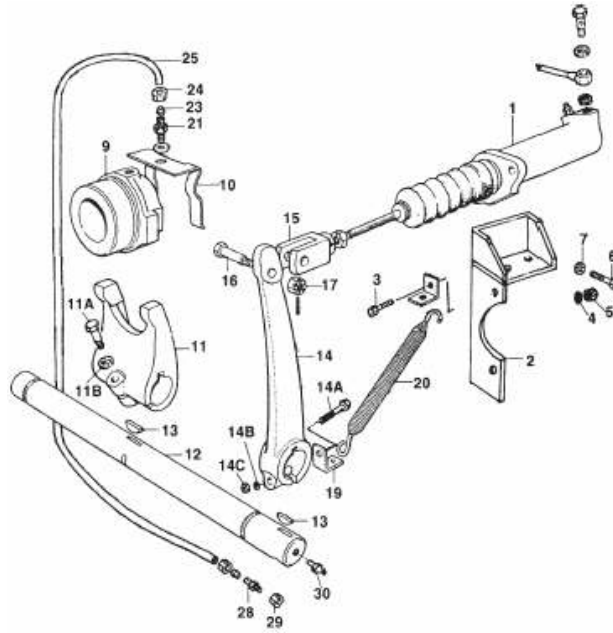
GEAR SHIFTING LINKAGES



	DESCRIPTION	Illustration	Part No.	Qty
1	Knob, Gear shift	1	X4801060	E.1
2	Ball Joint RH	30 & 4	F7406600	E.2
3	Ball Joint LH	39	F7406700	E.1
4	Outer lever Ref: F2413111	32	F2416511	E.1

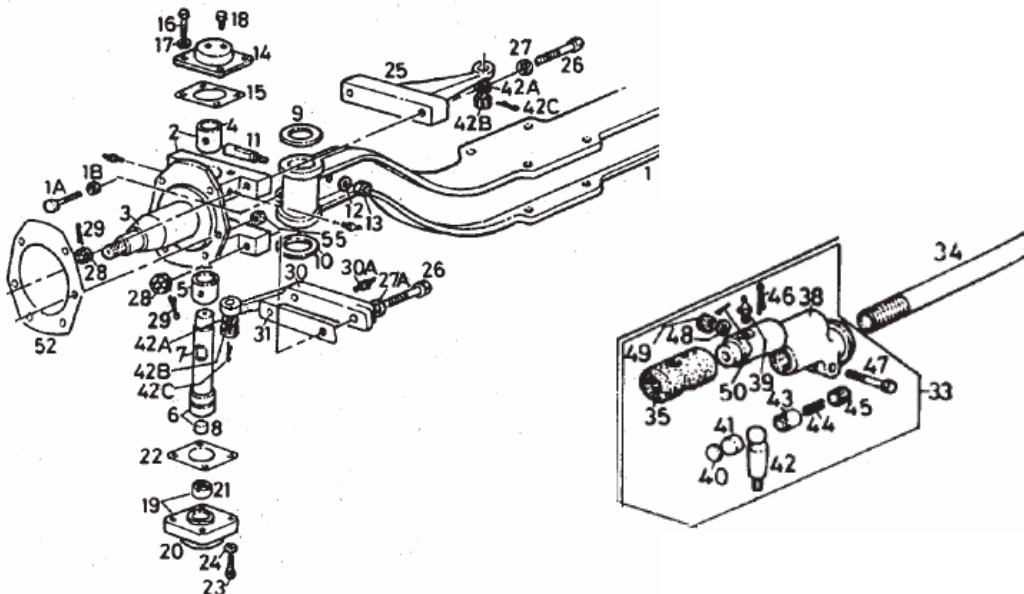
CLUTCH ACTUATION SYSTEM





	DESCRIPTION	Illustration	Part No.	Qty
1	Valeo Clutch Plate 1 1/2" Spline		B1301403	E.1
2	Release Bearing Assy Valeo		X0205310	E.1
3	Cover Assy		B1301401	E.1
4	S/A Master Cylinder	31	X3987900	E.1
5	Major Repair Kit Master Cylinder		P1606151	E.1
6	Minor Repair Kit Master Cylinder		P1606251	E.1
7	S/A Slave Cylinder 1 1/2"	1	F3900107	E.1
8	Major Repair Kit Slave Cylinder		P1605951	E.1
9	Minor Repair Kit Slave Cylinder		P1605651	E.1

FRONT AXLE FA-60 & TRACK ROD ASSY



	DESCRIPTION	Illustration	Part No.	Qty
1	King Pin	7	F 0934915	E.2
2	Kingpin Bush Top	4	F 0501435	E.2
3	Kingpin Bush Bottom	5	F 0501600	E.2
4	Thrust Button Top	8	X 4902915	E.4
5	Thrust Button Bottom	21	X 4931015	E.4
6	Cotter Pin	11	X 0933215	E.4
7	Tie-rod Assy. LH	33	B 2590102	E.1
8	Tie-rod Assy. RH	33	B 2590103	E.1
9	Ball Pin (Tie-rod/ Drag link)	42	F 0940315	E.4
10	Inner Die	41	F 0950132	E.4
11	Outer Die	43	F 0950032	E.4
12	Shim 0.8/1.0mm thick	40	X 4401310	E.2
13	Spring Cup RH	45	F 1034210	E.4
14	Spring Cup LH		F 1034310	E.4
15	Drag link socket RH		F 2151011	E.2
16	Draglink socket LH		F 2151111	E.2

OTHERS

	DESCRIPTION	Part No.	Qty
1	Valve Stem Seal	X2702600	E.12
2	Oil Cooler Element – 5 Plate	F7824900	E.1
3	Long life Filter – Engine oil	P3101540	E.1
4	Engine front mounting	F2630200	E.2
5	Metacone mounting	F2604200	E.2
6	Bolt Cylinder Head	F3585015	
7	Bolt Cylinder Head	F3584915	
8	Bolt Cylinder Head	F3585215	
9	Sub Assy. King pin	B2500305	E.2
10	Front Brake Drum	F1828722	E.2
11	Front Inner Bearing	F0232910	E.2
12	Front Outer Bearing	F0232810	E.2
13	Spigotted Wheel Disc	F3800214	E.4
14	Wheel Nut	F3569510	
15	Front Brake Lining Set STD	P1607954	E.1
16	Front Brake Lining Set RS-I	P1608054	E.1
17	Front Brake Lining Set RS-II	P1608154	E.1
18	Rear Brake Drum	F1860822	E.2

	DESCRIPTION	Part No.	Qty
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19	Rear Inner Bearing	F0214410	E.2
20	Rear Outer Bearing	F0214310	E.2
21	Rear Brake Lining Set STD	P1608354	E.1
22	Rear Brake Lining Set RS-I	P1608454	E.1
23	Rear Brake Lining Set RS-II	P1608554	E.1
24	Main leaf front weweller	P3225345	E.2
25	Weweller Rubber	F0130350	E.4
26	Spring Bracket FSF RH, FSR LH front Weweller	X040382	E.2
27	Spring Bracket FSF LH, FSR RH front Weweller	X0403722	E.2
28	Front Shock absorber	F3950000	E.2
29	Rear Shock absorber	F8223000	E.2
30	Air Spring Assy Conti Tech	F8212800	E.4
31	Rear location link	F4509810	E.2
32	Wabco leveling valve – Air suspension	F8212900	E.2

Consequent upon introduction of Bharat Stage-II compliant vehicles by M/s Ashok Leyland Ltd., the salient features of modifications and detailed guidelines on maintenance of the vehicles with 6DTI2D (with rotary FIP) and 6ETI2D (with Inline FIP) engines have been communicated through circulars, Circular No : 18/2003-MED, Dt.09.06.2003 and. Circular No: 15/2006-MED, Dt.24.11.2006 respectively.

Hitherto, we have been inducting 12 Mtr Chassis from M/s Ashok Leyland to build new premium class buses called Meghdoot and Meghdoot AC. As many as 20 such Buses have already been put into operation at various depots.

There are certain new features like VE Type Distributor Fuel injection pump, ZF Gear box with remote gear shifting mechanism, Hydraulically operated Valeo Diaphragm clutch, Rear axle with Hypoid Gears and Electromagnetic retarder provided on these vehicles and it is felt necessary to communicate the features of the modifications and maintenance of these vehicles to Depots.

Hence, a draft circular is prepared reiterating the salient features of modifications & maintenance procedures and put up for approval please

Dy.CME(O)

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