



Andhra Pradesh State Road Transport Corporation
Mechanical Engineering Department
Office of the VC&MD, Bus Bhavan, Hyderabad-624

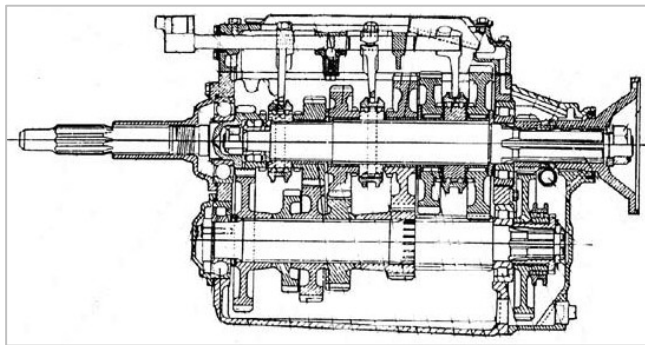
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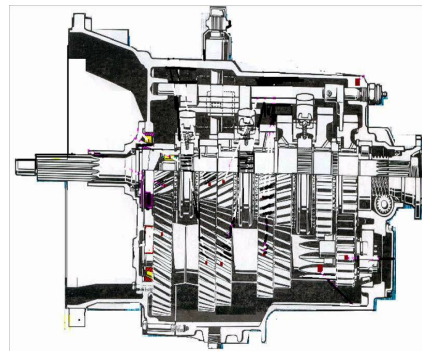
Subject: **MAINTENANCE** - Introduction of Synchromesh Gear Box in Ashok Leyland vehicles - Salient features and instructions on maintenance - Reg

1. For many decades we have been using the Constant-mesh type Gear boxes on Ashok Leyland vehicles. Recently, M/s Ashok Leyland Ltd have introduced Synchromesh Gear box on all their chassis for passenger vehicles. Though the basic principle of operation in both the Gear boxes is one and the same, there are some additional features in Synchromesh Gear box which make it superior over Constantmesh Gear box in operation as well as maintenance. Unlike in Constantmesh Gearbox, the casing of Synchromesh Gearbox is made of Aluminium casting which makes it lighter in weight and scope for better heat dissipation.

Constant-mesh Gear box



Synchromesh Gear Box



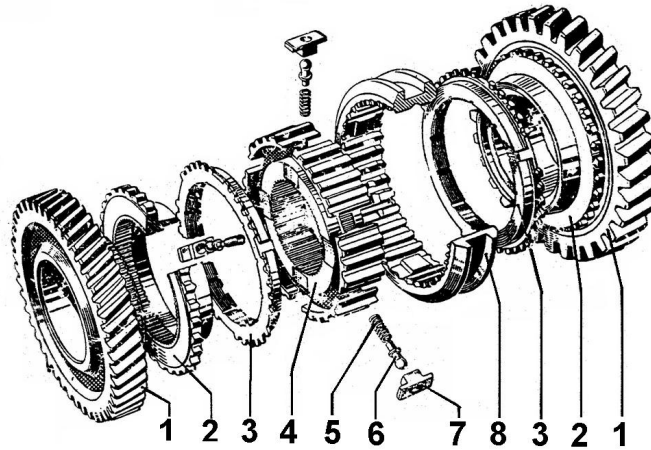
2. Working Principle: In the Constant-mesh type Gear box, the Driver has to synchronize (equalize) the speeds of two different gears manually by pressing the Clutch twice (double de-clutching) before changing the gears. The unique feature of the Synchromesh Gearbox is synchronization (equalization) of motion among the two gears which are running at different speeds without manual intervention thus making the engagement of gears smoother, easier and with single de-clutching only.

During shifting operation, the speeds of the members to be coupled are synchronised by synchro packs. After synchronization, the sliding sleeve engages the main shaft gear and the synchro hub, which is fixed on the mainshaft, thus transmitting power through the output flange.

3. Some of the specific advantages of Synchromesh Gear box are

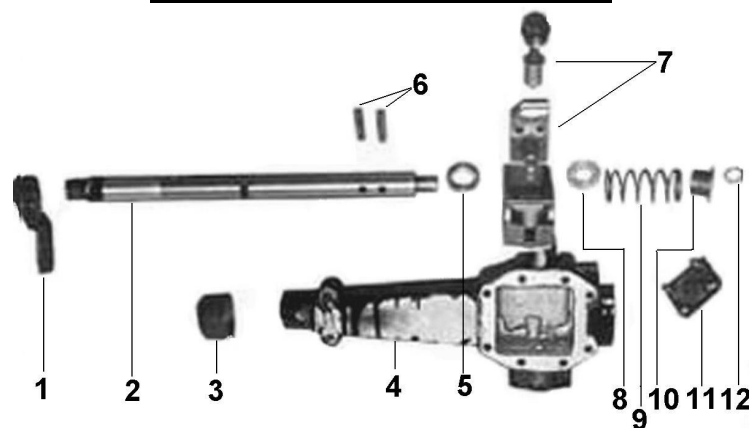
- Positive Drive
- Single De-Clutching
- Reduces Driver Fatigue
- Noise Less Operation
- Higher Durability
- Enhanced Clutch disk life
- Lesser Maintenance Cost
- Reduced Weight
- Lesser transmission losses
- Higher life of Gear linkages

Components in Synchropack



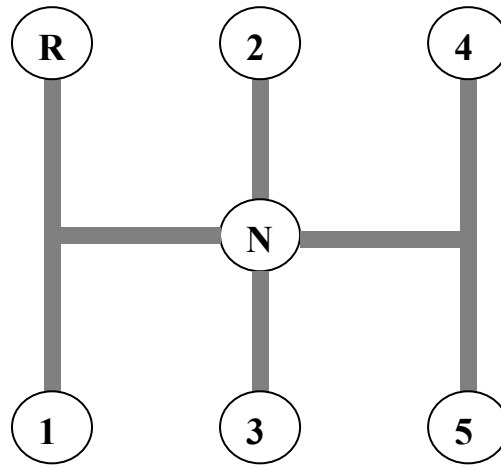
- | | |
|---------------------|------------------|
| 1 Main shaft Gear | 5 Thrust Spring |
| 2 Dog clutch body | 6 Ball Bolts |
| 3 Synchronizer Ring | 7 Plunger |
| 4 Synchronizer body | 8 Sliding Sleeve |

Components of Selector Tower



- | | | |
|--------------------|---------------------------------|--------------|
| 1 S/A Outer finger | 5 Stop tube | 9 Spring |
| 2 Selector Shaft | 6 Roll Pins | 10 Bush |
| 3 Dust Cap | 7 Locking Piece & Change Finger | 11 End Cover |
| 4 Selector Housing | 8 Washer | 12 washer |

Gear shift Arrangement in Synchromesh Gear Box



Comparison of Gear Ratios

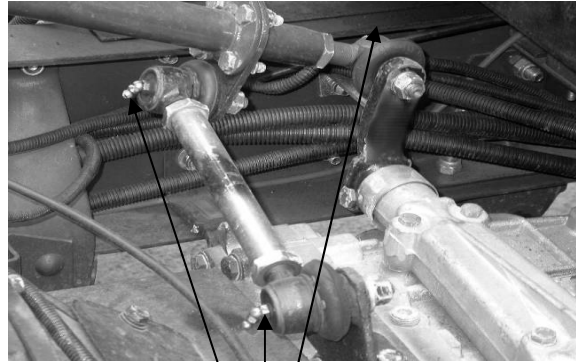
Gears	ALGB	ZFGB
1st	7.013	7.200
2nd	4.304	4.220
3rd	2.544	2.440
4th	1.540	1.520
5th	1.000	1.000
Reverse	6.600	8.050

4. PREVENTIVE MAINTENANCE :

- Oil capacity - 6.5 liters
- Oil grade - SAE-90, API GL 4 with Anglamol 99 additive
- Change interval - 40,000 km
- Breather to be cleaned during every oil change besides Sch-II/III/IV.

S. No	Description of Activity	Sch-I	Sch-II	Sch-III	Sch-IV
1	Check the oil level and replenish if necessary	✓	✓	✓	✓
2	Check tightness of all mounting bolts	✓	✓	✓	✓
3	Lubricate Ball Joints	✓	✓	✓	✓
4	Clean the Breather and re-fit		✓	✓	✓
5	Check the Ball joints for excess wear and replace if necessary		✓	✓	✓
6	Oil change	At every 40,000 kms			

Greasing points for Knuckle joint and at Ball joints



Greasing Points

5. PRECAUTIONS TO BE TAKEN DURING OPERATION :

- Gear shifting shall be done with utmost care. Changing of gears without applying the clutch may cause severe damage to the gear components especially the Synchronizer rings which are made of special coated material.
 - Clutch pedal shall be fully pressed while changing the gears. Changing of gears by partial application of clutch is not advisable
 - Push starting of vehicles shall be strictly avoided.
 - Any abnormal noises from the Gear box shall be immediately brought to the notice of Maintenance Supervisors
6. The Depot Managers and Maintenance incharges are advised to educate the maintenance staff on the features of Synchronesh Gear box and its maintenance. It is also advised to ensure that the drivers are adequately trained on handling the Synchronesh Gear box with the assistance of M/s Ashok Leyland Ltd. Operation of Synchronesh Gear system without proper training may not only leads to confusion among the Drivers but also leads to premature failures.
7. The Dy.CMEs are advised to ensure stocking of required spares (furnished at Annexure) and lubricants for Synchronesh Gear box at Depots, duly fixing the limits in consultation with respective Controllers of Stores.


EXECUTIVE DIRECTOR (E&IT)

To
All Depot Managers of
ASHOK LEYLAND AREA.

Copy to : All Executive Directors, FA, CAO & Director (V&S) for information
Copy to : All HODs for information
Copy to : All Regional Managers for necessary action.
Copy to : All Dy.CMEs for necessary action
Copy to : All COS' & WMs for necessary action
Copy to : All Principals, ZSTCs & Director, TA/HPT for information
Copy to : All Maintenance incharges of Leyland Area for necessary action
Copy to : Manuals section for record.

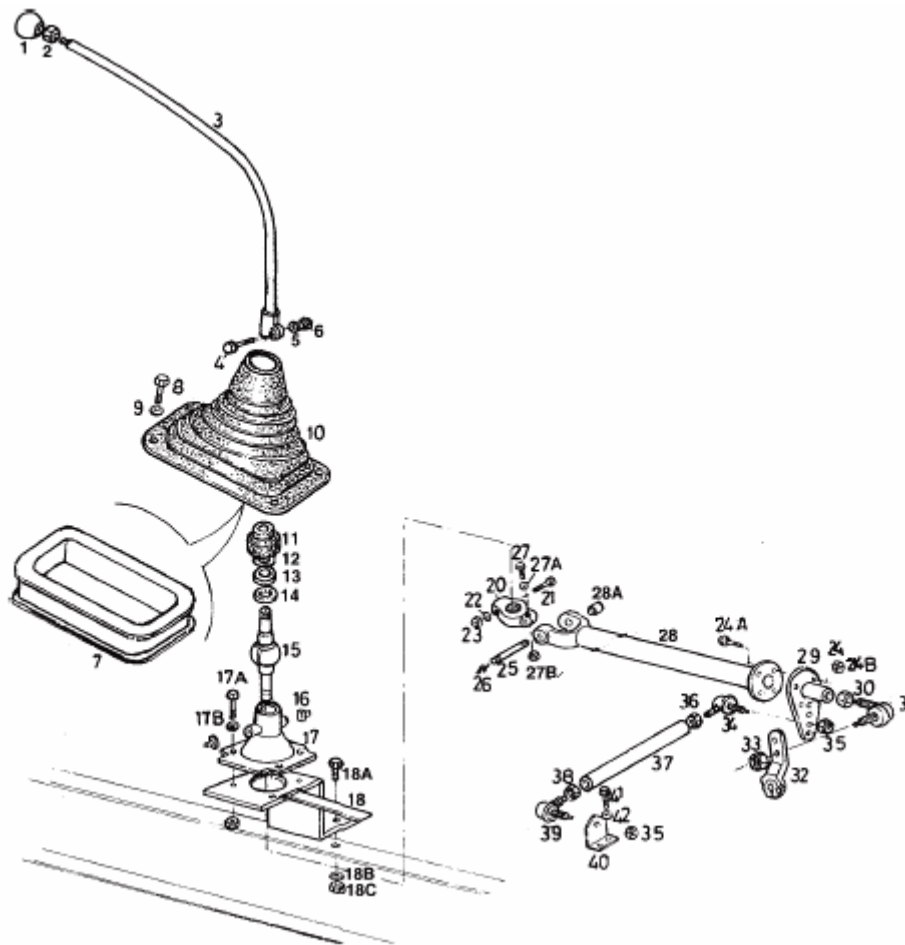
IMPORTANT SPARES TO BE STOCKED AT DEPOT LEVEL

Illustration No	Part Number	Description
1	F4831060	CONTROL KNOB
7	B5504919	MTG BRKT CSO GAITER ZF
11	F1130050	COVER ON LEVER
12	F0730210	CIRCLIP
13	F3630710	SPRING WASHER (BETWEEN SEATING&CIRCLIP)
14	F4930022	SEAT IN HOUSING
15	F2460711	SPEED CHANGE LEVER BOTTOM
16	F0932515	SWIVEL PIN ON LEVER
17	F1831022	HSG FOR SPEED CHANGE LEVER
20	F2132411	KNUCKLE
25	F0915015	FULCRUM PIN
27	L1010808	PINCH BOLT M8X1.25-40 LONG
31 & 39	F7406600	BALL JOINT
32	F2413111	OUTER LEVER
34	F7406700	BALL JOINT

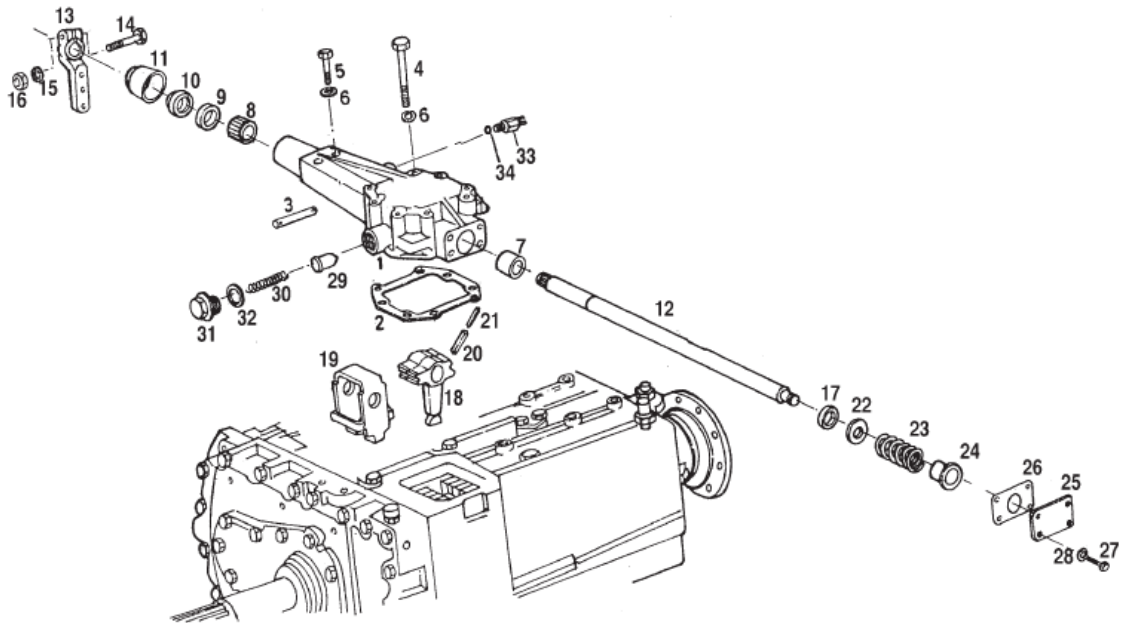


Illustration No	Part Number	Description
2	F1758800	GASKET SEL.HOUSING TO GEAR CASE
14	F3559615	BOLT M10X40 10.9 QUALITY DIN 931 10.9
18	F2452711	GEAR CHANGE FINGER
19	F2430712	LOCKING PIECE
20	F0928115	ROLL PIN
21	F0928215	ROLL PIN
29	F4232015	DETENED PLUNGER
30	F3637910	SPRING
32	F4934630	WASHER A24X29 DIN 7603 CU