

## Aircraft Mounted Accessory Gear Box (AMAGB)

Aeronautical development Agency (ADA) projected the requirement for the design, development and testing of Aircraft Mounted Accessory Gear Box (AMAGB) for Light Combat Aircraft (LCA) to CVRDE. The AMAGB is a heavy duty, light weight high speed and compact gear-box which is driven by GE-F404-F2J3/IN20 engine through a Power Take Off shaft at speeds up to 16810 rpm and drives the integrated drive generator and hydraulic pumps. The AMAGB was designed to perform the required function taking into consideration the minimum available space and weight. Accessories have been arranged and located in such a manner that they stay within the bay envelop specified by the ADA. The following are the salient features of the AMAGB:

- (a) Light weight (Magnesium Alloy) gear box housing
- (b) Spur gears to eliminate axial forces and requiring ball bearing only for location
- (c) Self contained lubrication system with integrated tank which was designed to operate satisfactorily upto 16 km altitude
- (d) High speed starter gear train with over-running clutch
- (e) Gear train with sufficient strength to accommodate maximum instantaneous torque plus combined torque of remaining drives at any given time
- (f) Gear trains have been tested up to 18000 rpm and can run up to 21000 rpm under service exigencies.

The AMAGB is driven from the power take off flanges on the engine gear box through a PTO shaft, capable of running at input speeds upto 16810 rpm. A Jet Fuel Starter (JFS) is mounted on the AMAGB to provide starter driver to the engine through the AMAGB. The jet fuel starter has the power of 96kW and speed of 9700 rpm. The maximum starting torque is 370 kg-m which is to be transmitted during cold starting. The overrunning clutch engages the PTO shaft to the starter gear train at the beginning of the start sequence. Once the aircraft main engine has attained the self sustaining speed, the centrifugally disengaging clutch allows free spinning of the PTO shaft and starter unit is cut off. The gears are designed to DIN5 standards. The power transmitted is 185 kW. The AMAGB transmits accessory drive from engine to accessories viz., hydraulic pumps (2 Nos.) of 60 kW capacity each at 6000 rpm and Generator ( 1 No.) of 40 kW capacity at 7950 rpm. The weight of the AMAGB is 38 kg. The overall dimensions of the AMAGB is 720 mmx450 mmx120 mm. AMAGB has the power to weight ratio of 4.86 kW/kg and online health monitoring facilities

The AMAGB completed 1000 hours of endurance test and 1000 cycles of Starting Sequence Test. The AMAGB also completed high temperature, low temperature, altitude, and salt fog and sand and dust tests and passed shock and vibration structural integrity tests.

The AMAGB is type approved. It completed successful flight trials on various LCA-TEJAS aircrafts and more than 5900 of cumulative operational hours. Currently the AMAGB has qualified for a TBO life of 750 hrs. Informal ToT to HAL took place in 2001.

