

AERO - CONTACT News Letter III September, 2003

Advices for engine compressor IDB Check!

As a result of the crash investigation in Duxford/UK, on Friday Sept. 5th 2003 *aero-contact* was asked by the British AAIB to provide instructions for the L-39 operators on how to check the torque on the compressor IDB.

Note:

The current English manual of the L-39 Manufacturer does not include the torque check during the scheduled maintenance.

History:

The IDB ensures together with the bleed air valves Stage III and V of the High Pressure Compressor (HPC) and the twin shaft compressor design the stable compressor work of the AI-25TL engine on the ground and during all flight conditions.

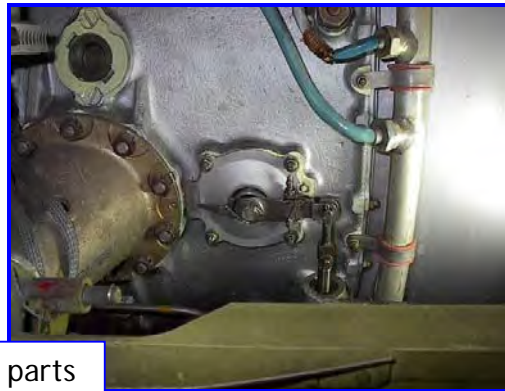
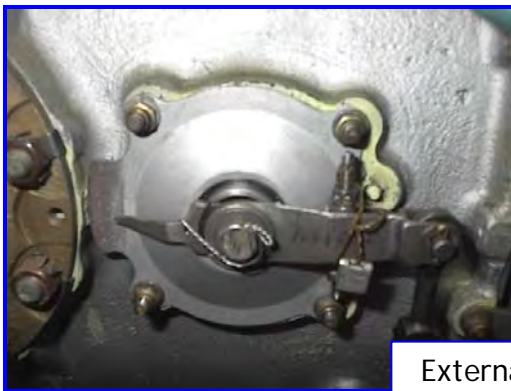
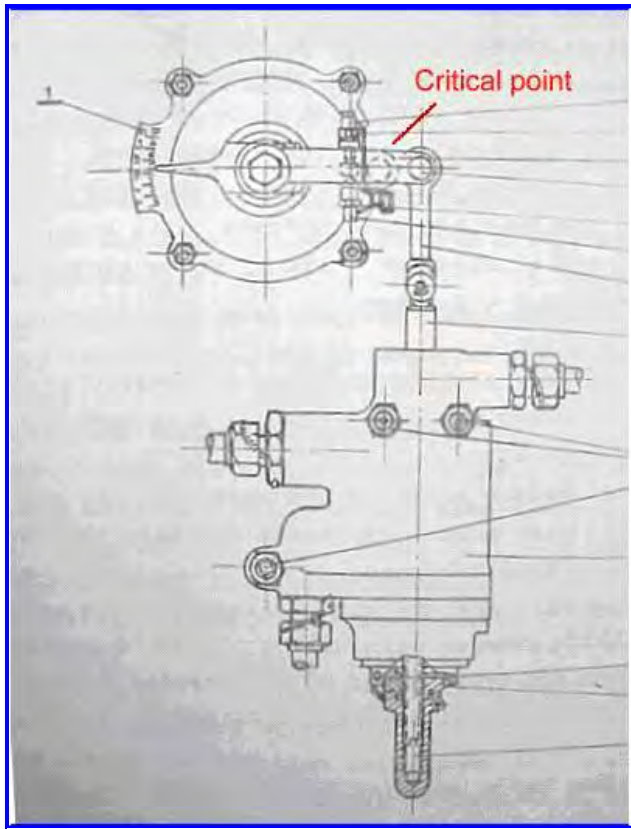
In 1983, a number of problems on the IDB (Inlet Direction Body) of the High Pressure Compressor occurred.

Controlled by the FCU R-4000, a "hydraulic" actuator transfers the necessary force to move the blades of the IDB over a lever (No.8) to the Level-Pointer (No. 6). The level-pointer is sitting in a slotted bushing of the drive shaft (connecting shaft No.3). On some engines the torque of the IDB increases and exceeds the limit. This leads to:

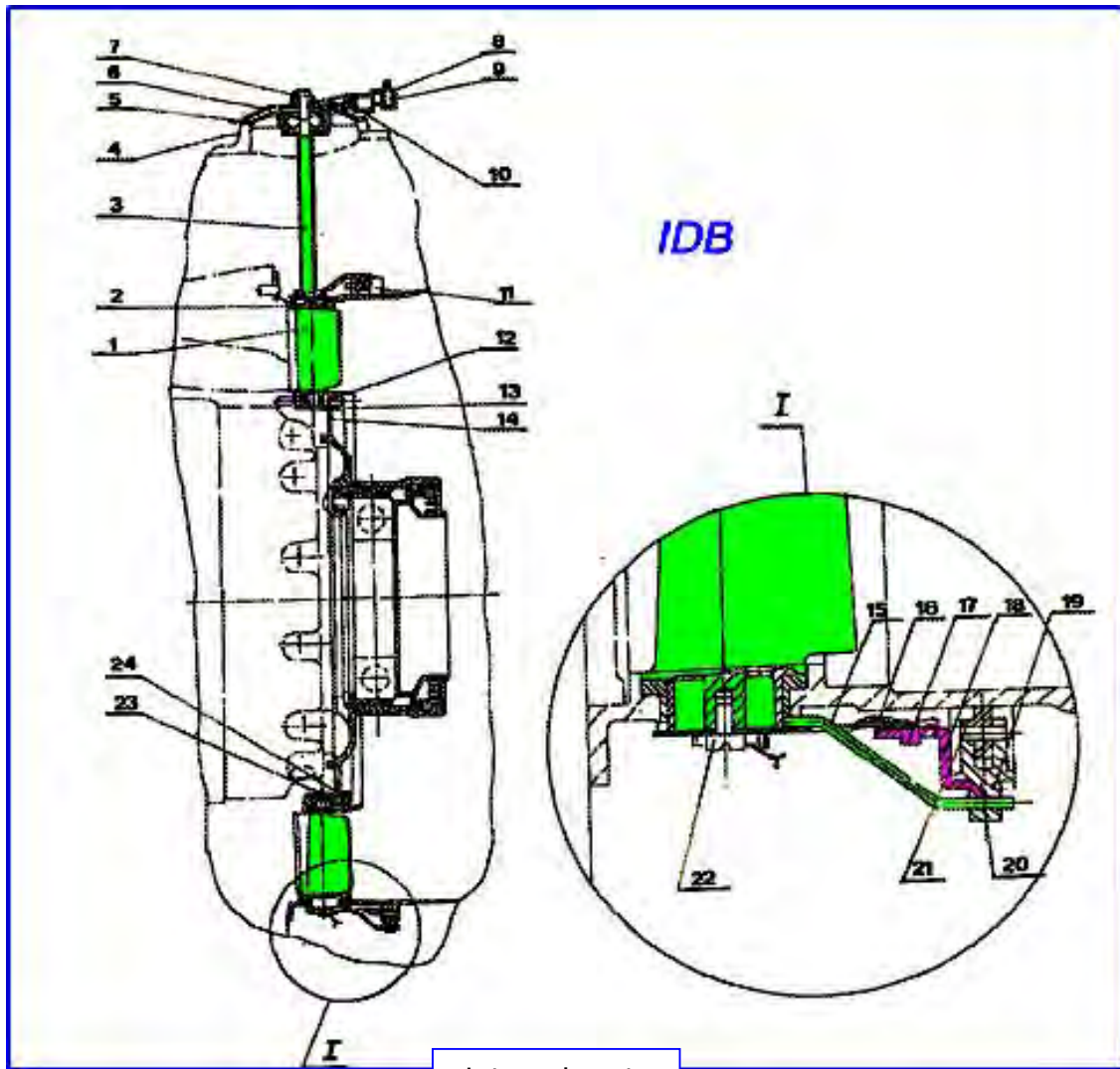
- 1.) A malfunction of the system and to a possible unstable engine compressor work.
- 2.) In the worst case it finally leads to a break of the level pointer.

One such case (2.) occurred in the East Germany Air Force.

(For Pictures and Numbers refer to the Engine Manual Book 5 Part 1, Page 49-53)



External parts



Internal parts



Broken level pointer of GDR L-39ZO No. 149

The Ukrainian engine manufacturer responded immediately:

1. On all engines the level pointers were inspected for production failures and the thickness of the rear metal part on the level pointer was checked. All engines produced or overhauled after 1983 are not critical anymore!

2. For checking the torque and a possible necessary repair, the Service Bulletin **No. 225 000 521 AB** was released by the Mfr. This inspection was performed on all engines. However, the suggested repair included only the area around the drive shaft, especially the check of the distance between the bushing, drive shaft and lid and to adjust this with the adding of washers or the removing of washers. Only 50 % of the engines found with malfunction of the IDB, could be repaired by carrying out the S/B. The other 50 % were scheduled for an overhaul at the Manufacturer in Ukraine.

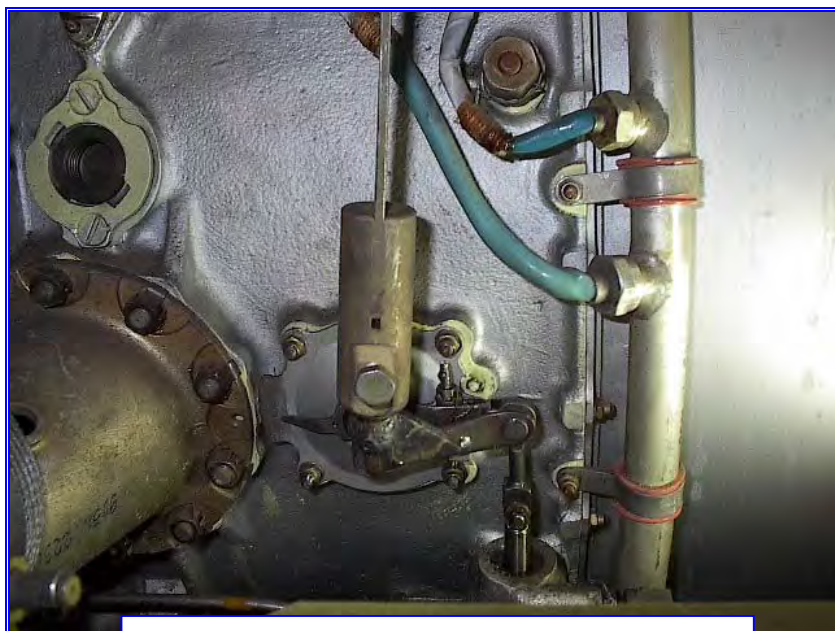
Further investigations by the EGAF had the result that the main problem was not caused by the outside drive shaft assembly. It appears that the bearing assemblies of each stator blade inside of the engine showed high friction. It was caused by environmental problems, dust and influence of the chemical industry located nearby to the airport. At this time, the author of this News Letter developed on March 08,1984 the Repair Instruction Job Card No.192506, which is applicable in the case that the Mfr. S/B was carried out without success. At this time in 1984, all engines that were scheduled for overhaul were successfully repaired according to this technology at the respective operators air bases.

Since 1983, the torque check is part of the work during the installation of **new or overhauled** engines and during the **100 and 200 hrs inspection**. In order to perform the torque check, the torque limiting spanner 25.19.01.140 out of the engine tool kit 25TL.19.00.030 must be used.

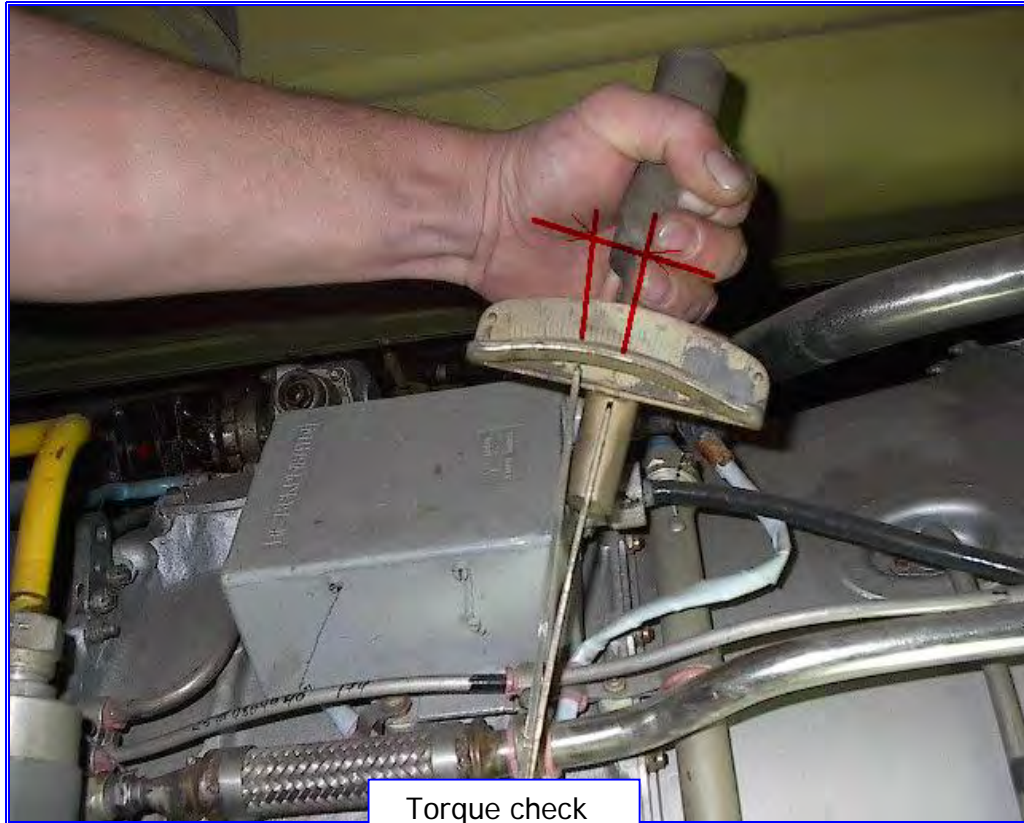




The torque spanner 25.19.01.140



The torque spanner 25.19.01.140 mounted



New or overhauled engine
Engines in operation

Mt \leq 0,8 kpm
Mt \leq 1,1 kpm

The torque at engines in operation is normally between 0,3 and 0,8 kpm.
The torque check is only correct with the original torque wrench and its adapter for the IDB check and with disconnected actuator.
If you can turn the level pointer with both hands from its horizontal (-15°) position down to +5°, the torque is below 1,1 kpm (guaranteed).

Don't forget to turn it back to -15°!!!

An engine start below -15 ° is strictly forbidden!

If you can not turn it by hand, a torque check with the correct equipment is highly recommended. The repair of a frozen IDB is for 95 % successful.

Let's all be careful out there, okay?


Bernd Rehn