

Gyro's

Are they really like Eggs?

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The following information is provided for reference only:

Most single engine and light twin engined aircraft have at least 1 Gyro System installed that operates from the engine driven Vacuum Pump/s which provide normally 5.0 in Hg (1.5 to 2.5 PSI) of Vacuum with a volume of 2.5 cu. In. per minute. Similar to the volume of air developed by a standard Vacuum Cleaner.

Heavier aircraft are normally equipped with Electric Panel or remote mounted Gyro's or may have both types installed. Become familiar with the systems installed before attempting work with either type.

A standard vacuum type system, normally will have a Vacuum Pump, Vacuum Hoses and related plumbing, Vacuum Pressure Regulator/s, a Vacuum Gage and or a Light controlled by a Low Pressure Switch, an Air Filter and will have at least 1 Gyro.

In a Multi Engined Aircraft this system will normally also have a Vacuum Manifold and 2 Anti Back Flow Valves to prevent loss of vacuum in the event of single engine operation or failure of the vacuum system on one of the engines.

In Pressurized Aircraft, this system would normally be a closed system, whereas the air into and thru the gyros to the vacuum pump would be brought in from outside the aircraft. In Non-Pressurized Aircraft it is not uncommon to find the air inlet ports to the gyros open to the cabin with filter screens installed inside the air inlet ports.

The vacuum lines and related plumbing is the most critical part of the Vacuum Gyro System.

Restrictions, Restrictions, Restrictions, Restrictions!

Kinked and or internally deteriorated vacuum lines are the # 1 cause of Gyro or Gyro System Failures known to man.

Kinked lines restrict Airflow, be it Vacuum or Pressure. A vacuum Gyro needs airflow to rotate the internal rotor to function properly. Just as an electrical component requires certain wire sizes to operate efficiently. You certainly would not attempt to operate the Starter on an aircraft using a # 20 wire would you?

If the vacuum line internal diameter is reduced due to kinking or obstruction from contaminants or an improper internal dimension line is used, the system is doomed to fail.

Pressure indications may be normal or slightly higher but the volume of air required to maintain the proper speed of the Gyro Rotor Assy. will be insufficient and may easily give the Pilot erroneous indications of his Attitude, Rate of Turn and or Direction.

Many cases are on record of pilots reporting that their vacuum gage is indicating high but his gyro or gyros were precessing. What would you look for first?

Do not adjust the regulator as your first option! Check the vacuum and air inlet lines and then check them again for restrictions of some sort.

Check the aircraft maintenance records to see if they have been replaced at least in the previous 10 years of service. **If Not**, replace them.

Gyros normally fully erect to within 2 Degrees of level within 2 minutes of application of vacuum or engine start. Verify before starting any engines that your Attitude Gyro is NOT indicating Level. Once you have your Engine running, time for erection and check your Vacuum Gage for proper indication.

On Multiengine' d aircraft it may be good practice to shut down the engine you had running. Allow time for the Gyro/s to spool down for 15 to 20 minutes and then do the same spool up test with the opposite engine to verify system integrity and proper function of the Anti-Backflow Valves and Vacuum Pumps.

Run down times are normally between 6 to 20 minutes depending on type, condition of gyro and various manufactures.

Average gyro rotor speed is normally 20,000 to 24,000 RPM... **DO NOT** apply direct pressure to back of gyro ports from an air source at any time.

Electric Remote gyros are extremely sensitive. Many remote Gyros have appeared to fail prematurely due to improper aircraft moving.

This has been attributed to the ground crew being very efficient in towing the aircraft into the hangar after a trip, only to find the next time power was applied to the Gyro's, one or both of the Vertical Gyro's would not erect properly.

This is predominantly characteristic in the VG-206 Series JET Gyro mostly used in Lear Jets.

Do not move an Acft for at least 20 minutes after power down due to erection rollover past the internal stops.

Basic Gyro Handling

NEVER remove the Gyro from its shipping container until you are actually at the aircraft and are ready to install the Gyro in its location.

NEVER apply Air Pressure on any Air Driven Gyro to see if it is functioning. Remember these Gyros operate at approximately 24,000 RPM with just 2.0 PSI of pressure.

Many cases have been reported of someone applying standard shop airpressure to the air inlet port resulting in severe damage to the Gyro and in some cases even death to an individual. They will literally explode in your face.

To ensure minimum costs of repairs, always place the removed defective Gyro in the original shipping container before leaving the aircraft to prevent additional damage. Many cases of minor adjustment and or repairs to a Gyro have resulted in requiring full Overhauls or even unacceptable core returns due to careless handling after removal from the aircraft.

If it is under warranty from and OEM or Overhaul Facility they may elect not to provide the customer with any warranty if not returned in the original shipping container.

Lastly, remember that a 1.0 Lb. Object dropped 1” onto a hard surface is the equivalent force of 1g.

Gyro’s are designed to withstand residual vibration of less than .5 g’s and will destroy at any impact force above that.

“YES HANDLE LIKE FRESH EGGS!”

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