FLY RENO VACUUM SYSTEM EDUCATION

The vacuum system on your aircraft is NOT designed to keep the carpet clean, it's designed to keep you alive. Imagine being in IMC and suddenly your vacuum system fails. No vacuum gauges are now functioning and you have no Attitude indicator or Directional Gyro!

This article discusses proper care and maintenance of your vacuum system, and what FLY RENO does to help keep you safe.

Let's talk about the system itself. The components are

Vacuum pump

Suction Regulator and Filter

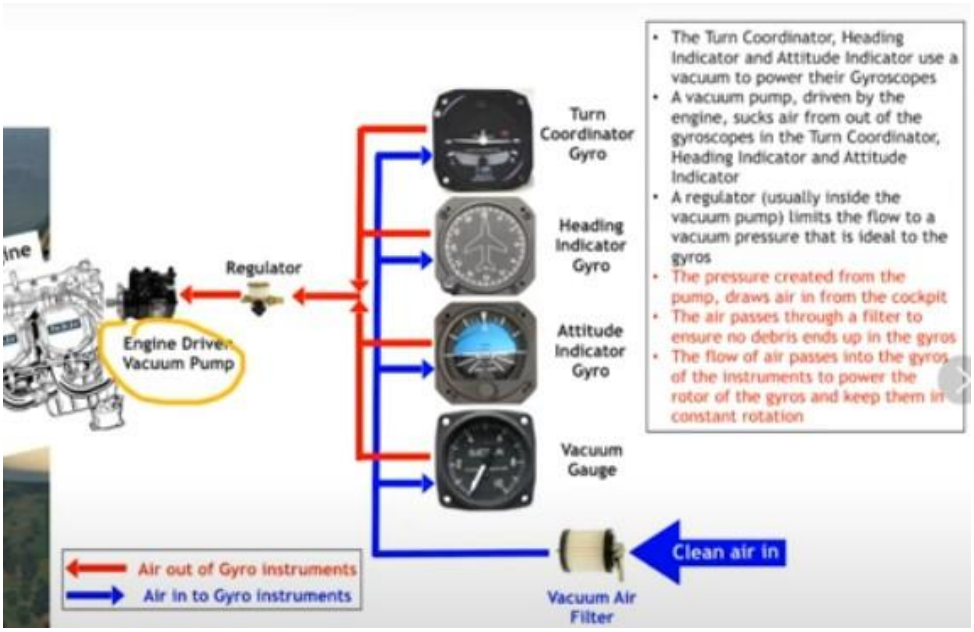
Vacuum Air Filter

Each of these parts are critical to the safety of your flight. The VACUUM PUMP runs off of gears in the engine. As it turns it draws a vacuum through the vacuum instruments from the VACUUM AIR FILTER.

That air flows into your instruments and makes the gyro's in them spin up to cause the instrument to function. No vacuum, no air, no gyro spin, no functioning instrument.

As the air passes through the instruments in enters a VACUUM REGULATOR. This can be adjusted to increase or decrease the amount of vacuum that your pump is pulling.

System in action



FILTERS

Both the GARTER FILTER that is placed on your SUCTION REGULATOR and the VACUUM AIR FILTER should be replaced during annual or 100-hour inspections. BOTH of these filters are critical to the proper care and functioning of your vacuum system. “It doesn’t look dirty” means it doesn’t look dirty. It DOESN’T mean it should not be replaced! A Garter filter runs under $3.00 and the Vacuum Air Filters usually under $25.00. Is not replacing them worth the risk?

THE PUMP ITSELF

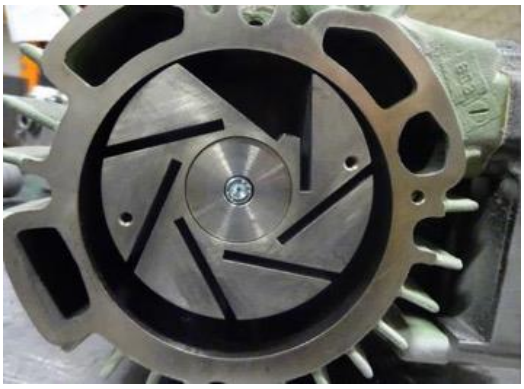
There are many varied types of vacuum pumps. All of them do the same job. Thay can run from around $300.00 for Overhauled pumps to the $2000.00 range for new and wet pumps. If the one being removed is not returnable for core, you will have to pay the core charge as these are consistently rebuilt by professional factory trained technicians and are FINE in your aircraft.

The most common pumps are dry pumps, and depending on your engine turn clockwise or counterclockwise. This is annotated on the pump number as “CW” or “CC”. Your mechanic can assist you in making a decision on which pump to have installed.

WHY DO VACUUM PUMPS FAIL

To be honest, the pump usually failed because you and/or your mechanic did. Vacuum pumps are warranted anywhere from 400 hours and 1 year to 1300 hours and 3 years. Knowing when it was installed is critical, and there should be a log entry in the ***AIRFRAME LOG BOOK*** (not the Engine Logbook) with the Make, Model, Part number and Serial Number of the part removed and the new part installed. That entry MUST also include the following Statement - "FAA-P-8740-52 safety warning given to aircraft owner".

As a pump turns, the vanes inside of it wear. As they wear, they become shorter. Eventually they bind up causing the ROTOR to break. When this happens, a number of bad things happen all at once. You lose vacuum *IMMEDIATELY!* No vacuum operated instruments for you. (If you are in IFR pilot, you NEED to talk to your maintenance facility about back-up vacuum systems!) Once that vane and rotor break, a LOT of dust is no pulled back into your instruments. If you have a failed vacuum pump, you are shortly going to have failed vacuum instruments. In addition, that little gear sticking out of the end snaps off. USUALLY it can be retrieved with no problem. It's plastic for a reason. Particles may fall into the engine. Since they are plastic, this is not normally a huge issue. They get ground to nothing.



PREVENTION

At FLY RENO, whenever possible, we only install vacuum Pumps that have ***INSPECTION PORTS***. These enable us to measure the vanes in your pump and tell you well before failure time, that you need to replace that pump. The ***SERVICE LETTER*** attached to this presentation. The Service Letter defines when and how to perform this test. FLY RENO DOES NOT CHARGE FOR THIS SERVICE if you have a pump with an inspection port! If you think you may be nearing the end of pump life or no one has ever bothered to check, we will do it for free! Give us a call and we'll fit you in. We have the proper tools to check it.

We do not need to remove the Vacuum pump. Simply the top cowling and couple of minutes. If your pump does NOT have an inspection port, talk to us. We can help you make a responsible decision based on the make and model pump, and age/time in service.

At FLY RENO we want you to have a safe flight. Ensuring that you are educated on the proper care and preventative maintenance of this flight critical system is important to us.

RAPCO, inc.

REPLACEMENT AIRCRAFT PARTS CO.

Service Letter

Service letter Number	Issue Date	Revision	Revision Date
RASL-006	6/12/2009	A	12/15/2021

Subject: Pneumatic pump vane inspection with S.M.A.R.T Caliper

Applicability:
This inspection procedure applies to all new and overhauled FAA PMA approved pneumatic pumps manufactured by Rapco, Inc. that are equipped with a vane wear inspection port.

Inspection Compliance:
The inspection procedure listed below should be accomplished after 500 hours time in service on all RAP200 series pumps and after 200 hours time in service on all RAP240 Series and RAP400 series pumps. After the initial inspection, the pump should be re-inspected after 100 hours time in service or annually (which ever occurs first).

This inspection procedure is recommended to be accomplished in conjunction with a 100 hour or annual inspection.

NOTE: No other vane wear measuring devices are approved for use with this inspection procedure.

Procedure:
NOTE: Before accomplishing this inspection it is important to make sure that the Aircraft Engine Magnetos are in the off position.

1. Remove inspection port cap screw and lock washer.
2. Rotate Propeller by hand while looking into the inspection port with a flashlight.
3. Line up a vane slot with the inspection port. **NOTE:** If vane slot to inspection port alignment is incorrect it will result in an incorrect vane wear measurement.
4. Open S.M.A.R.T Caliper to 1" or greater.
5. Holding the body of the S.M.A.R.T caliper, push the tail of the S.M.A.R.T caliper into the inspection port slowly until the body of the S.M.A.R.T caliper comes into contact with the outside of the pneumatic pump. **NOTE:** The S.M.A.R.T caliper slider will slide on the S.M.A.R.T caliper body during this process.
6. Remove the S.M.A.R.T caliper from the inspection port.
7. Read the position of the of the S.M.A.R.T caliper slider relative to the S.M.A.R.T caliper body in accordance with the measurements on the caliper. (See figure 1 below) **Note:** The Maximum wear limit for the pneumatic pump is 11/16" (.687"). Any pneumatic pump wear greater than that should be removed from service.
8. Determine if pump is within serviceable limits. (See figure 1 below)
9. If the pump is determined **not** to be within serviceable limits it should be **removed** from service. If pump is determined to be serviceable, it may be **returned to service** pending that the next inspection is accomplished after 100 hours time in service or at the next annual inspection.
10. Re-install cap screw and washer (MS35338-43) and torque to 14 inch lbs.