

SERVICE BULLETIN 127

SUBJECT: RG Hydraulic System Filters

APPLICATION: All Retractable Landing Gear Glasair Aircraft

DESCRIPTION: Problems such as failure of the pump to produce pressure or the hydraulic system to hold pressure could often be traced to contaminants within the hydraulic lines that eventually found their way into the hydraulic pump. Over the years Stoddard-Hamilton Aircraft's Product Support Department has noticed that the vast majority of retractable landing gear operational difficulties occur during the early functional checks of the gear system.

The Oildyne hydraulic pump has been in use in retractable gear Glasairs for thousands of flight hours and has proven to be a reliable and durable unit. However, its reliable operation depends on clean fluid in the system. Particles, such as aluminum chips, rubber particles, and fiberglass dust (left over from the building process), will eventually find their way into the pump unit. The hydraulic pump has several sensitive valves: adjustable check ball type pressure relief valves and check valves bodies with poppet valves that are unseated by a spool or sliding shuttle during pump operation. The check valves lock pressure in the hydraulic lines when the pump is not running. Contaminants in the fluid can eventually result in one or more of the valves malfunctioning.

The Glasair hydraulic system uses a reversing hydraulic pump motor to supply pressure to either the extension or retraction side of the hydraulic system. The fluid travels in both directions through the lines. If in-line filters are installed, contaminants would remain in the lines and would not be carried to the pump during operation. This system is simple and will help to eliminate pump contamination problems, although it will not actually clean the fluid of contaminants.

RECOMMENDED ACTION: A filter installation has been developed that will prevent contaminants in the lines from entering the hydraulic pump during operation, where they have potential to cause functional problems. Also, a method has been devised to filter the fluid prior to initial gear operation (the method is described later in this service bulletin).

Caution: We do not recommend in-flight usage of the filters for hydraulic systems that have not been retrofitted with the emergency hand pumps. Filter contamination on these systems can result in difficulty extending the gear during normal operation as well as during emergency extension free-fall due to the increased resistance to fluid flow in the lines. Also, the latest Glasair III gear extension system (using pressure switches on the down side to control the operation of the hydraulic pump) may be affected by a loss of proper adjustment of the adjustable flow restrictor as contaminants build up in the filters, though periodic cleaning may prevent such a problem.

A hydraulic filter kit (341-4460-501) is available which can be installed in all Glasair retractable aircraft. The kit consists of two 60 micron filter units, mounting fittings, and installation instructions. The filters are installed in the hydraulic lines as close to the pump as practical. The introductory price \$85.00 (first announced in the fourth quarter 94 Newsletter) will be extended through March 15, 1995.

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We expect significant interest in this Option kit and advise builders that there may be delays in satisfying the initial orders.

Note: A 20 hour inspection and cleaning should be made on a newly installed hydraulic system. If the filters are found to be clean then a 50 hour inspection and cleaning is recommended. If they are again found to be clean they should then be checked and cleaned every 100 hours or annual inspection which ever comes first.

Fluid Cleaning Procedure: One of the most important steps prior to operating the gear system is cleaning of the hydraulic lines. This procedure describes the use of hydraulic filters to clean the fluid lines prior to initial gear operational checks. The use of filters in the hydraulic lines provide an opportunity to use the hydraulic pump to purge the lines of air, dislodge contaminants in the lines, and remove them prior to normal system operation.

Hydraulic Line Purging: Install the hydraulic filters in the hydraulic lines in accordance with the instructions accompanying the filter option kit.

All hydraulic lines should be completed and the aircraft basically ready for landing gear function test.

Disconnect the flexible hydraulic lines from the hydraulic actuators at all gear locations. Use AN806-4D plugs in the lines at two of the three gear locations. At the remaining gear position install an AN815-4D union fitting between the ends of flexible hydraulic hoses. Operate the hydraulic pump in a down mode for approximately 30 seconds (avoid overheating the pump motor). The filter at the outlet of the pump "Down" port will assure clean fluid enters the lines and the filter at the outlet of the "Up" port will capture any contaminants carried back to the pump by fluid flowing through the lines. Repeat the 30 second operation of the pump motor approximately 3 to 4 times.

Open the hydraulic filters to check for any contaminants. If any debris is found repeat the purging operation until no more contaminants are found. Remove the union fitting, install caps on the hydraulic lines, and proceed to use the same purging technique on each of the remaining two actuator locations.

Pre-Filling Hydraulic Cylinders Prior To Installation: Upon completion of the cleaning and purging operation, use clean hydraulic fluid to fill each of the actuators. This also helps prevent air trapped within the hydraulic actuator from entering the hydraulic lines. The easiest way to accomplish this is with the actuator out of the airplane. To remove the actuator from the airplane without changing the up travel adjustment, lightly break loose the jam nut or threaded barrel locking the rod end to the piston rod. **DO NOT BACK OFF THE JAM NUT.** It will be used as a stop point when reinstalling the actuator after prefilling. Masking tape or a dab of hot glue might help keep the jam nut in position. Remove the bolt and nut securing the hydraulic actuator to the gear leg. With the hydraulic lines disconnected the hydraulic actuator can now be rotated and screwed off of the rod end.

With the actuator out of the airplane, extend the piston rod to its fully extended (landing gear retracted) position. Install a 1 ft. section of clear plastic hose over the port nearest the piston rod end. Extend the plastic hose vertically. Use a pumping action oil can or small container filled with clean hydraulic fluid to fill the hose. After filling the tube push the piston rod into the actuator until almost all of the fluid



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plastic hose vertically. Use a pumping action oil can or small container filled with clean hydraulic fluid to fill the hose. After filling the tube push the piston rod into the actuator until almost all of the fluid visible in the plastic tube has been drawn into the actuator. Refill the tube and again draw the fluid into the actuator. Repeat the cycle until the piston rod is fully retracted into the retract actuator. Remove the plastic tube and use an AN929-4D cap to prevent fluid loss. Install the plastic hose on the second fitting on the actuator and fill the plastic hose with a small amount of hydraulic fluid. Since this end of the actuator is compressed very little fluid will be needed to fill the cavity. After filling the second end of the actuator, cap this fitting, and reinstall the hydraulic actuator.

Note: It may be necessary to reinstall the hydraulic hoses to the actuator before the piston rod can be moved in or out to install the bolt holding the actuator to the gear trunnion.

After all actuators have been prefilled, and the hydraulic lines have been reinstalled, gear operational checks can begin.



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