



INSTALLATION

AND

SERVICE MANUAL

INSTALLATION

FUEL VALVE

- 3-3. A fuel shut-off valve should be installed in the airframe fuel system plumbing. This valve usually incorporates the fuel selector valve if multiple fuel tanks are used. The valve should provide free flow to the fuel with no restriction and give zero leak in the off position. This feature is needed to allow service to the components of the fuel system. A high quality ball type valve is desirable for this use. If a fuel return is used in the system, the fuel selector valve should switch the return fuel to the tank from which the fuel is drawn. There are other methods for simple fuel management. A small sump or surge tank can be used to feed the main tanks into via the selector valve. The return fuel can be put into this tank thus eliminating the need to return the fuel to the selected tank. As per section 3-1 insure that the surge tank will provide adequate flow to the pump system, will not air lock and that the main tanks will maintain adequate feed rate to keep the surge tank full under all conditions of power and aircraft attitude.

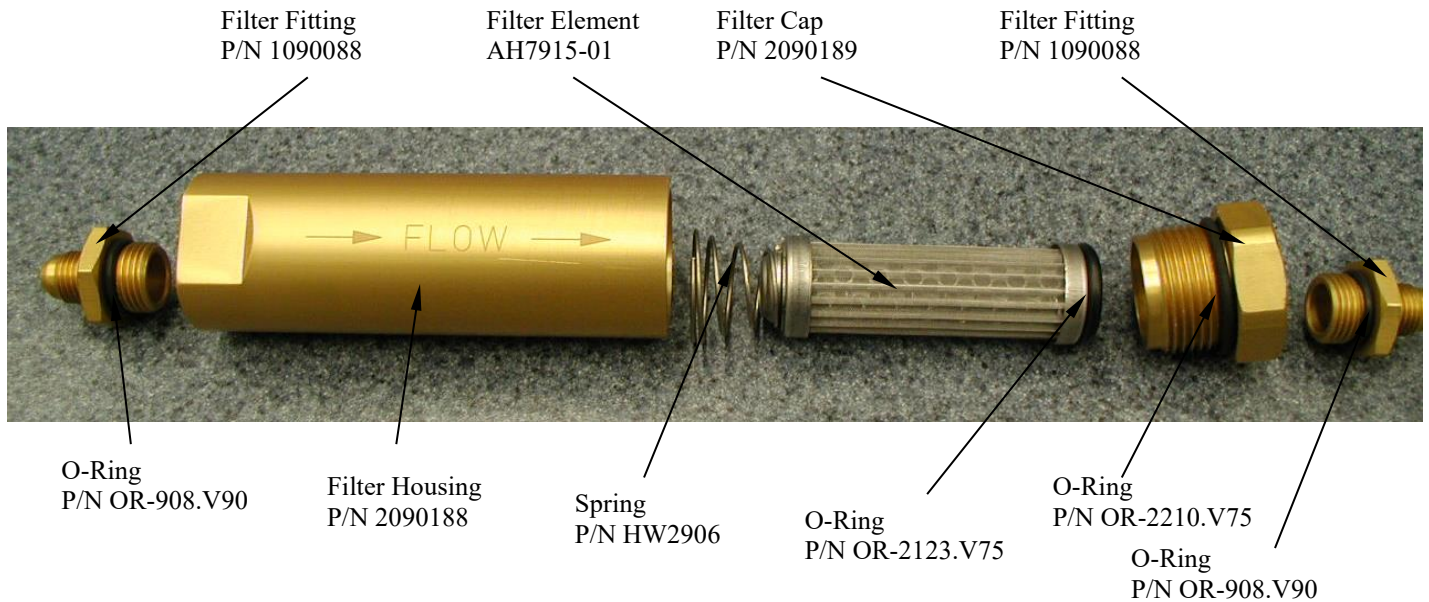
FUEL FILTERS

- 3-4. A fuel filter should be installed in the system before the fuel boost pump, and after the selector valve. The filter may also incorporate a gascolator. If this type of device is used, then the gascolator should be installed at the lowest point in the fuel system. Gascolators are not required for proper operation of the fuel injection system but if used, should not be installed on the engine side of the firewall. Airflow Performance **does not** approve the use of **any** paper element type fuel filter as the primary filter in the aircraft. Paper element filters will restrict the inlet of the fuel pumps due to their fine filtration and their susceptibility to clogging from picking up water. If the inlet of the fuel pumps are restricted, the pressure on the inlet becomes depressed, this will cause the fuel to boil and the vapor will flow into the fuel controller causing it to malfunction. This problem is not as evident when float carburetors are used, since the float chamber will allow the fuel vapor and bubbles to escape. A screen type filter should be used. The filter size must be based on the total fuel flow through it, not just the engine fuel consumption. This again depends upon the type of fuel system in the aircraft, returning or non-returning. The filter Airflow Performance recommends for this application is P/N 1090079. This a maintainable filter incorporating a 125 micron pleated stainless steel filter element with a anodized aluminum housing. The filter should be installed in the aircraft so that periodic cleaning can be performed. It can be clamped by using -26 Adel clamps around the filter body to support it securely to the airframe structure. It is recommended that the filter be installed on the cool side of the firewall. No other filters are necessary in the system. In certain applications specifically with aircraft with composite or fiberglass fuel tanks, additional filtration may be required. In these applications it is recommended that a filter of 10-25 microns be installed after the boost pump to filter out composite debris. The filter must be of adequate size to prevent clogging and is placed down stream of the boost pump so that the boost pump can force fuel through it.



P/N 1090079 Maintainable Fuel Filter

INSTALLATION



The filter can be cleaned periodically by removing the filter from the fuel system, un-screwing the end cap of the filter assembly with a 1 ½" wrench while holding the other side of the housing with a 1 3/8" wrench or vise. The filter should be inspected after 5-10 hours of operation on new installations and then typically every year at the condition inspection after that. Inspect more frequently if known fuel conditions are questionable. The filter element can be removed from the filter cap and cleaned in mineral spirits then blown dry with compressed air. Inspect the seal O-rings. These may be re-used if in satisfactory condition. Re-assemble the filter using some engine oil on the O-rings. Make sure the conical spring is installed as per the picture and the filter assembly is installed back in the fuel system in the correct flow direction as designated by the arrows on the filter housing.



Standard Fuel Inlet



90 Deg. Fuel Inlet



Side Mount Fuel Inlet

The fuel controller incorporates a 75 micron filter in the fuel inlet fitting. If you are unsure of the type of fuel filtration to use for your application, contact Airflow Performance. This is a very important component of the fuel system and will effect the correct operation of the fuel injection system if sized incorrectly. All Airflow Performance fuel filters are non-relieving type.

TROUBLESHOOTING CHART (Continued)

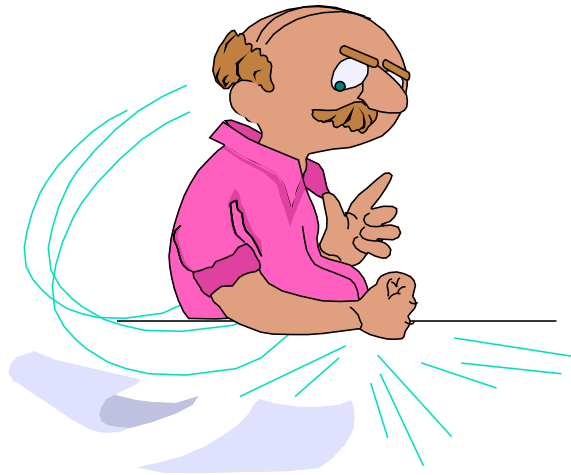
PROBLEM	PROBABLE CAUSE	REMEDY
Engine hangs on first acceleration of the day. (Continued)	Oil or fuel contamination in the air section of the fuel controller.	Normally this is an indication of a turbo-charger seal leak. Return fuel controller for repair.
Engine hangs or is slow to transition off idle	Ignition	Make sure ignition is operating correctly and is timed to the engine manufacture's specs.
	Propeller	Incorrectly pitched prop Low pitch stop incorrectly set.
Engine is slow to transition mid-range to full throttle power and runs rich	Propeller	Low pitch stop incorrectly set. Possible prop governor problem.
	Turbo system	Differential pressure controller, waste gate, or waste gate control malfunction.
Low take-off fuel flow. Lean engine operation.	Insufficient inlet fuel pressure	Confirm fuel pressure requirement for maximum HP.
	Plugged inlet filter fitting or flow divider filter.	Remove filter fitting, clean and reinstall. Remove flow divider cover and diaphragm/valve assy. Back flush screen. See 6-10
	Restricted fuel supply to fuel pump. Problem can sometimes be confirmed by turning on boost pump.	Test for restriction in aircraft fuel system plumbing, filters, valves, fittings, etc. Eliminate 90 degree fittings on the inlet side of pumps.
	Stuck flow divider valve.	Flow divider valve must move freely. DO NOT SAND OR REMOVE METAL FROM VALVE. <u>Lightly</u> polish with 1200 wet/dry or Crocus cloth if necessary. Check for contamination and correct.
	Induction system air leaks	Inspect and repair as necessary. Pressure test induction system. (Disconnect M.A.P. gauge before performing pressure test.)

SECTION EIGHT

MAINTENANCE, LUBRICATION, AND STORAGE

MAINTENANCE

- 8-1. In general, very little attention is required between fuel controller overhauls (2000 hours). It is recommended that the following items be checked during 100 hour inspections and or annual inspections of the engine and airframe. More frequent removal of components and or hoses is discouraged since there is more chance of contamination getting into the system.



"IF IT AIN'T BROKE, DON'T FIX IT!!"

- A. After the first 3 to 5 hours of engine operation after installing the fuel controller on a new installation, remove and clean all fuel filters and strainers in the aircraft fuel system. Repeat after 10 hours of operation, 25 hours of operation and every 50 hours of operation there after. Fuel control inlet filter should be inspected and cleaned (sonic cleaner recommended) at condition inspection.
- B. Check all fuel lines for tightness and evidence of leakage. A slight fuel stain adjacent to the injection nozzles is normal and not cause for concern.
- C. Check tightness and lockwiring of all nuts, screws, and fasteners on the fuel controller and attaching hardware to the engine.
- D. Check the throttle and mixture control rod ends and levers for wear and tightness. Also inspect the idle linkage jam nuts for tightness and rod ends for wear.

SECTION NINE

OVERHAUL PERIOD

Airflow Performance fuel controllers are not field repairable. There are no rebuild kits available and specialized test equipment is required for re calibration of the fuel controller. With the exception of the field maintenance and troubleshooting described in the previous sections, the fuel controller and components must be returned to Airflow Performance for overhaul and or re calibration.

TIME BETWEEN OVERHAUL

- 9-1. The time between overhaul (TBO) for all fuel controllers and fuel system components is the same as the recommended TBO for the engine, not to exceed 2000 hours. Time between overhaul is also dependent upon the type of service and the installation the fuel controller is subjected to. An installation subjected to hard aerobatics may not complete the full TBO due to higher vibration levels that are encountered in this type of service.
- 9-2. Regardless of time in service, overhaul is recommended based on an accumulated calendar time of 12 years for fuel control units and 8 years for flow dividers. This is from the date of manufacture or last overhaul date.
- 9-3. A complete overhaul is required regardless of accumulated time in use when the fuel controller or fuel system component has been subjected to severe environment such as but not limited to:
 1. Engine fire, external or prolonged air intake manifold fire, accident, or when service history of the fuel controller is unknown.
 2. Contaminated fuel such as water, sand, rust, etc.
 3. Fuel that does not meet the engine manufacturer's requirement may be detrimental to engine operation. If a non-specified fuel is inadvertently pumped into the aircraft fuel system and drained, fuel controller overhaul is not required.
 4. If uncertain that the fuel controller or components requires service or overhaul, contact Airflow Performance for consultation.

SECTION 2

INSTALLATION

2.1. FUEL PRESSURE

Typical fuel inlet pressure requirements for normal operation are 20-40 PSI. The fuel control is capable to operate at fuel pressure in the 20-80 PSI range. Maximum inlet pressure is 90 PSI.

2.2. FUEL PRESSURE GAUGE

Fuel pump output pressure is an important parameter to monitor. There are no provisions on the fuel control to pick up inlet fuel pressure. On most installations inlet fuel pressure can be measured at the outlet of the engine driven fuel pump.

2.3. FUEL FILTRATION

These fuel controls incorporate a 70 to 75 micron nominal rated composite fuel filter which can be removed for cleaning by removing the inlet fitting. This is a-relieving filter. The inlet filter fitting can be either a straight (shown) or 90-degree fitting. Cleaning the filter element is best performed in a sonic cleaner with soap and water. Blow dry with compressed air.

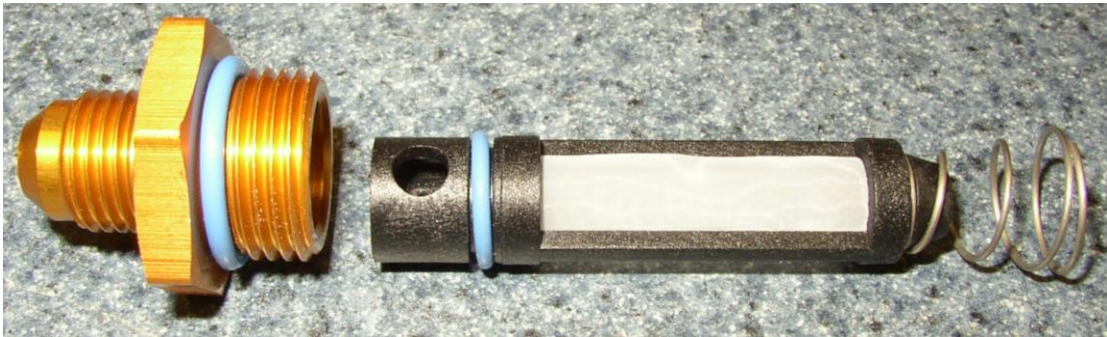


Figure 2.2 Fuel Inlet Filter

2.4. FUEL INLET FITTING

Fuel inlet fittings are -6 AN.

Figure 2.3
Fuel Inlet Fitting



Fuel Inlet Fitting
#6 Hose Connection
Torque hose connection
to 30-40 in.-lbs.