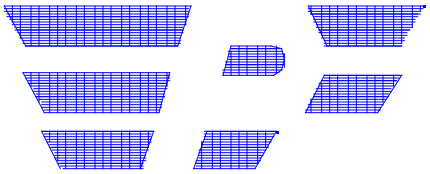
INSTALLATION REPORT NO. 50050
Serial Number



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STANDBY VACUUM SYSTEM
MODEL III

PRECISE FLIGHT, INC.
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SVS III

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SVS III

1. GENERAL INFORMATION

1.1. INTRODUCTION

This manual contains information regarding the physical, as well as the electrical and mechanical installation information pertaining to the Precise Flight **Standby Vacuum System.**

NOTE: THIS DOCUMENT MUST BE KEPT WITH AIRCRAFT RECORDS

1.2. PRODUCT DESCRIPTION

The Standby Vacuum System consists of:

1. Mechanical Check Valve - Shuttle Valve
2. Vacuum Operated Switch
3. Instrument Pump Warning Indicator
4. Control Cable
5. Manual Valve

The Standby Vacuum System connects easily to the aircraft powerplant intake manifold, electrical system and the instrument vacuum supply.

In the event of an engine driven vacuum pump failure, The Precise Flight Standby Vacuum System allows the use of engine intake vacuum, in conjunction with a flight tested operating procedure, to supply vacuum to the primary aircraft instruments. This vacuum supply is limited by the difference between ambient air pressure and intake manifold pressure; **The system is for emergency use only and is most effective below 8000 ft ASL.**

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SVS III

1.3. TECHNICAL CHARACTERISTICS

Weight:	**2.4 pounds** **1.09 kilograms**
Dimensions:	**6.0 in. W, 2.0 in. D, 2.27 in. H** **15.24 cm W, 5.76 cm D, 5.76 cm H**
Operating Voltages	**12 or 28 VDC**

1.4. FACTORY SETTINGS

Vacuum Switch	**3.5 in. Hg.**

1.5. UNITS AND ACCESSORIES SUPPLIED

Standby Vacuum System Kit includes:

a) A Shuttle Valve (2 Way Check Valve)
b) Copy of the Standby Type Certificate
c) Vacuum Tubing
d) Intake Manifold Tap
e) Low Vacuum Instrument Panel Indicator
f) Flight Manual Supplement and Placard
g) Vacuum Switch
h) Manual Valve
i) Control Cable

1.6. INSTALLATION APPROVAL BASIS

The person, who performs or supervises the installation of the Standby Vacuum System, is required to prepare FAA form 337. See Figure 1-1 for a Sample Description of Work Accomplished. Data that can be used as a basis for approval for return to service are:

A. AC 43.13-1A; Acceptable Methods, Techniques and Practices, Aircraft Inspection and Repair.

B. AC 43.13-2A; Acceptable Methods, Techniques and Practices, Aircraft Alterations

C. FAA approved Manufacturer's Installation Instructions.

Equipment installation procedures do not differ significantly among various aircraft. The installation and operation of the Standby Vacuum System does not materially affect the aircraft operation or performance.

SVS III

The Sample Description of Work Accomplished (Figure 1-1) is suggested language provided as a convenience to the installing agency. The information and wording should be modified to correctly describe the particular installation.

Precise Flight Inc. can assume no responsibility for the alteration of the airframe, electrical, or powerplant system. Entries for this installation should be entered in both the aircraft and engine logbook.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

A. The following components were installed:

PRECISE FLIGHT STANDBY VACUUM SYSTEM, MODEL SVS III, P/N 4051

IAW Engine STC (Lycoming SE1799NM or Continental SE1780NM) and STC SA2160NM

B. The Unit was installed in (*position in the aircraft*) according to instructions in the PRECISE FLIGHT INSTALLATION MANUAL STANDBY VACUUM SYSTEM MODEL SVS III, P/N 50050 dated (*insert current revision date of manual*), and guidance in FAA Advisory Circulars 43.13-1A, chapter 11, and 43.13-2A, Chapter 1 & 2.

C. Complete ground and flight operational tests were performed according to the PRECISE FLIGHT STANDBY VACUUM SYSTEM MODEL SVS III INSTALLATION MANUAL P/N 50050 date ____ . The equipment performed satisfactorily and did not adversely affect existing components or systems in the aircraft, as required by FAR 23.1301, FAR 23.1431. The operating placard was filled out and placed on the aircraft instrument panel next to the control cable.

D. The aircraft equipment list was revised to reflect these changes; weight and balance data was revised and placed in the aircraft records. A Precise Flight Inc. Standby Vacuum System Aircraft Flight Manual Supplement dated _____ was placed in the aircraft.

FIGURE 1.1 - FAA FORM 337

1.7. AIRCRAFT CERTIFICATION

The Precise Flight Standby Vacuum System is approved by the following Supplemental Type Certificates:

1. Certification Number: SE1799NM - Lycoming Engine - January 1, 1991*
2. Certification Number: SE1780NM - Continental Engine - January 31, 1991*
3. Certification Number: SA2160NM - Beech Aircraft - December 7, 1984*
4. Certification Number: SA2162NM - Cessna Aircraft - December 7, 1984*
5. Certification Number: SA2167NM - Piper Aircraft - August 17, 1989*
6. Certification Number: SA2168NM - Mooney Aircraft - August 17, 1989*
7. Certification Number: SA2183NM - Misc. Aircraft - July 5, 1991*
8. Certification Basis: Approved Model Listing

* - Or Later Approved Revisions

2. INSTALLATION

2.1. GENERAL

The Precise Flight Standby Vacuum System should be installed according to this manual and AC 43.13-1A and -2A. This section contains interconnect diagrams, mounting dimensions, and other information pertaining to a Standby Vacuum System Installation.

2.2. UNPACKING AND INSPECTION

Exercise care when unpacking the equipment. Make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. The claim should be filed with the Transportation Company. Retain the container and packaging material after the equipment has been removed, should equipment storage or reshipment become necessary.

2.3. MECHANICAL INSTALLATION

Listed below are considerations to be examined before installing the Standby Vacuum System Model SVS III. Close attention to these suggestions will assure optimum performance when completed.

CAUTION: Before you begin installation be absolutely certain that the aircraft that is being modified is equipped with an Engine Driven *Vacuum Pump* and not an Engine Driven *Pressure Pump*.

2.3.1. Installation Tips -Various Aircraft

2.3.1.1. MOONEY

M20C - The suggested location is the lower right corner of the pilot's control panel to the left of the throttle

2.3.1.2. CESSNA

207 - Remove the side panel of the forward luggage compartment and route the SVS control cable in the space between the insulation and the side panel. Avoid a route that would expose the SVS control cable to damage from luggage or freight.

208 - Same as 207.

210 - The suggested location of the control cable is on the Parking Brake mount screw at the instrument panel.

2.3.1.3. PIPER

Cherokee Six - In the Cherokee Six, it is best to avoid any obstructions in the forward luggage compartment. The suggested location of the control cable is installed on the far right side of the pilot's compartment to avoid passing the cable in or under the luggage compartment.

The suggested location of the Shuttle Valve is between the rear of the engine and the aircraft firewall. Use bundle ties to secure hoses to existing cables, brackets, etc.

Remove the side panel of the forward luggage compartment and route the SVS control cable in the space between the insulation and the side panel. Avoid a route that would expose the SVS control cable to damage from luggage or freight.

Turbo Lance - Remove the side panel of the forward luggage compartment and route the SVS control cable in the space between the insulation and the side panel. Avoid a route that would expose the SVS control cable to damage from luggage or freight.

Saratoga - Same as Turbo Lance

2.3.2. Mechanical Installation - Shuttle Valve

A. Locate a suitable position on the powerplant tubular engine mount between the engine driven vacuum pump and the vacuum feedthrough in the engine firewall. Locate the shuttle valve away from aircraft heat sources. If the aircraft is not equipped with a tubular engine mount, find a suitable location on the aircraft firewall near the vacuum line feedthrough.

B. Place a suitable sized Adel clamp around the tubular engine mount See Figure 2-1. If the aircraft is not equipped with a tubular mount, See Step D.

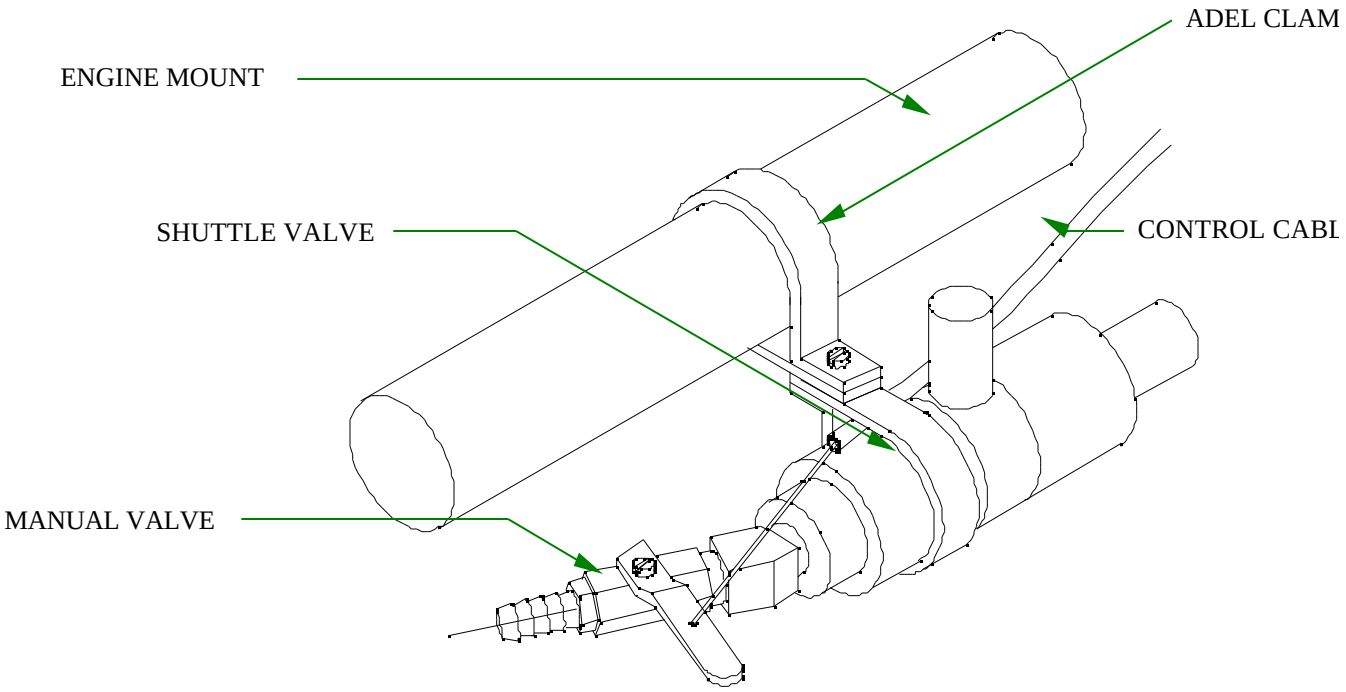


FIGURE 2-1 - SHUTTLE VALVE INSTALLATION

C. Place a large Adel Clamp around the Shuttle valve, and utilizing Screw and Nut provided, align the openings in the Adel Clamps and attach the Shuttle valve to the tubular engine mount. Orient the Shuttle Valve with the engine intake oriented toward the intake manifold connection. The shuttle valve can be positioned at any angle.

D. If the aircraft is not equipped with a tubular engine mount, Attach the Large Adel clamp around the shuttle valve and drill a hole through the aircraft firewall. Insure that before you drill that the area into which you are drilling is clear of wires, aircraft structure or equipment.

E. Remove Shuttle Valve from the clamp and attach the manual valve and cable mount. Orient the plumbing to obtain the straightest path between the Shuttle Valve location and the intake manifold tap.

F. Attach securely the manual valve and fittings to the Shuttle Valve. Attach the Shuttle Valve Assembly to the aircraft.

G. Connect a vacuum hose between the end fitting of the Shuttle Valve and the intake of the Engine Driven Vacuum Pump. Connect the existing Vacuum hose to the center fitting of the shuttle valve. Some trimming of the hose assemblies may be necessary. Inspect and clean all tubing before final installation. If the aircraft vacuum system does not use 5/8" Dia. Vacuum hose. The kit contains a set of 1/2" Hose Bibs (P/N 20020) and 3/8" Hose Bibs (P/N 20030). The Hose Bibs must be bonded to the Shuttle Valve with Locktite Depend Adhesive.

Note: To Insure proper bonding, follow the directions included with the adhesive.

2.3.3. Mechanical Installation - Saddle Fitting (Neoprene Intake Cuff)

A. Refer to Drawing SVS III-4 for proper location on the aircraft powerplant for the Saddle Fitting. Location is dependent on engine type and configuration.

B. Remove the hose clamps on each side of neoprene intake cuff.

C. Use the hole-cutting tool, (P/N 10060) in a 3/8" drill motor, cut a hole in the center of, and through, the side of the neoprene intake cuff.

D. Check the cut hole with a probe to insure that the hole is cut through and not obstructed.

E. Coat Saddle Fitting with gasket cement or Dow RTV and align with the hole in the neoprene intake cuff. **Caution: Do Not Use a Gasket when installing the saddle fitting to a neoprene intake cuff.**

F. Check fitting, gasket and intake hole with a probe, (Drill Bit 0.234 dia.) to insure an unobstructed manifold tap.

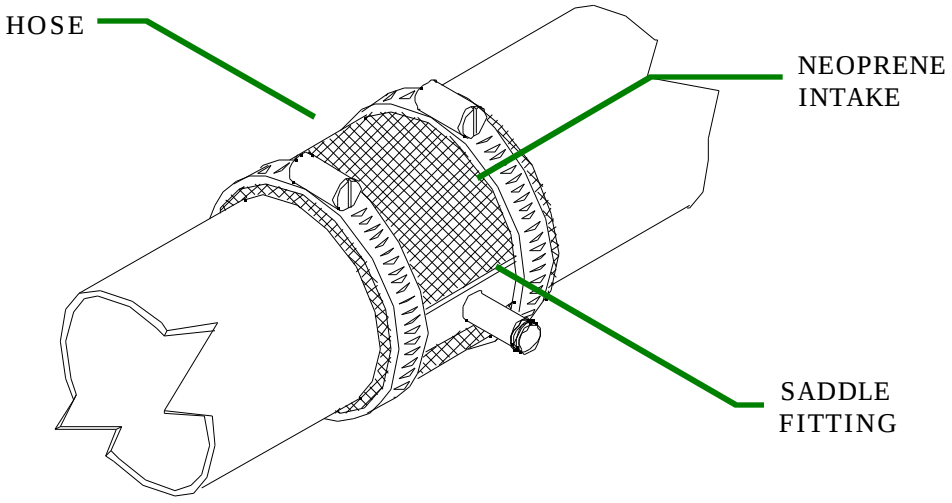


FIGURE 2-2 - SADDLE FITTING INSTALLATION

2.3.4. Mechanical Installation - Saddle Fitting (Lycoming W/O Intake Cuff)

A. Mark the location for the saddle fitting, (on the side of the tube) as close as possible to the oil pan intake tube connection.

B. Remove the intake tube from the engine, per the aircraft maintenance manual.

C. Drill a 0.250 (1/4) in. diameter hole in the intake tube, where marked.

D. Carefully debur, clean and inspect the intake tube to insure all metal chips are removed, and that the 0.250 in. diameter hole is free from burrs.

E. Reinstall the intake tube, per the aircraft maintenance manual.

F. Coat both sides of the supplied Saddle Fitting Gasket (P/N 10050) with gasket cement or Dow RTV

G. Align the hole in the gasket with the hole in the intake tube.

H. Place the Saddle Fitting (P/N 10010) on top of the gasket and secure to the intake tube with two Hose Clamps (P/N 10020)

I. Check fitting, gasket and intake hole with a probe, (Drill Bit 0.234 dia.) to insure an unobstructed manifold tap.

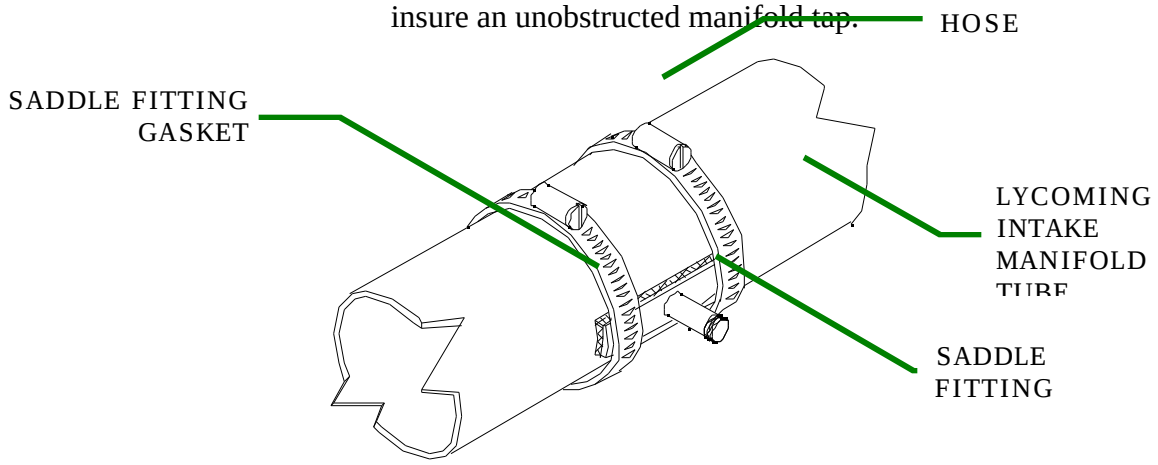


FIGURE 2-3 - SADDLE FITTING INSTALLATION (LYCOMING W/O CUFF)

2.3.5. Mechanical Installation - Vacuum Switch

A. Determine a suitable location on the engine firewall - aircraft interior side to install the Vacuum Switch (P/N 30030).

B. Drill a 0.250 dia. hole through the aircraft firewall and install Bulkhead Fitting (P/N 00687).

C. Remove the hose leading from the Vacuum Pump to the Shuttle Valve. Measure 1" back from the vacuum pump end of the hose and drill a 1/8 Dia. Hole in the hose.

D. Install the Hose Tap (P/N 30070) on the vacuum hose with a small amount of silicone adhesive on the threads and nut of the Hose Tap. Insure that the hose tap has a clear and clean passage. Clean and inspect the large vacuum hose and attach the hose to the Shuttle valve and vacuum pump utilizing the appropriate hose clamps.

E. Attach small dia vacuum hose to Hose Tap and the previously installed Bulkhead Fitting. Use Tywrap or safety wire to secure tubing to fittings.

F. Install vacuum switch to the aircraft engine firewall structure.

G. Connect Small diameter vacuum tubing to the vacuum switch and bulkhead fitting. Use Tywrap or safety wire to secure tubing to fittings.

SVS III

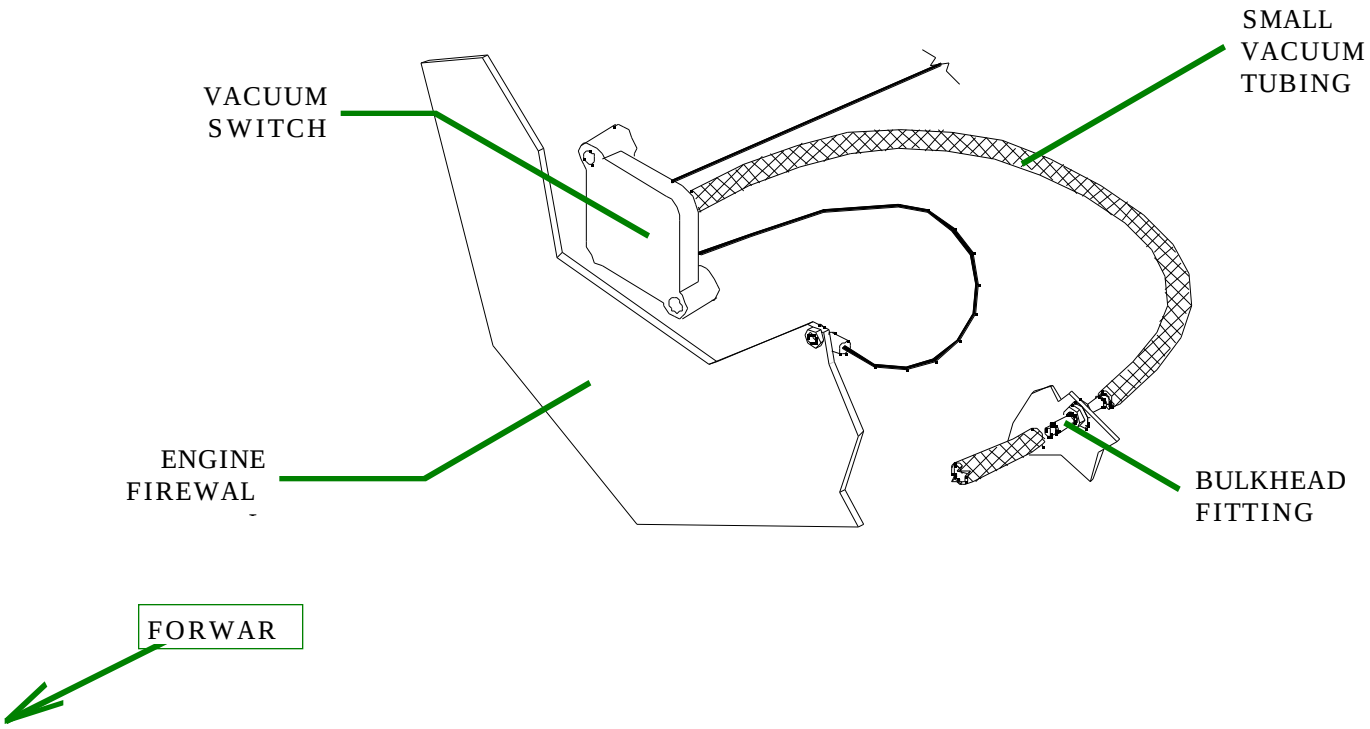


FIGURE 2-4 - VACUUM SWITCH INSTALLATION

2.3.6. Mechanical Installation - Vacuum Hose

A. Cut a suitable length vacuum hose to connect between the Manual valve attached to the shuttle vlave and the saddle fitting. Insure that vacuum line routing is away from exhaust manifolds or any moving components

B. Thouroughly clean the tube and install the tubing on the Saddle Fitting and to the Manual Valve utilizing the appropriate hose clamps.

2.3.7. Mechanical Installation - Control Cable

A. Locate a suitable location for the cable control in the aircraft cockpit. The location should be within easy reach of the pilot and clear of engine controls.

B. Use an existing hole in the aircraft firewall if possible. If a suitable hole does not exist, drill a 0.375 in. diameter hole and install a grommet (P/N 01927).

C. Install control cable to aircraft cockpit structure.

D. Pass the cable and cable housing through the aircraft firewall.

E. Determine the exact length necessary for the cable to smoothly actuate the manual valve. Insure that the proposed cable routing avoids all electrical connections and or all hot engine parts. Avoid sharp and or multiple tight curves with the cable routing

F. Pull the control wire out of the cable housing about 8 inches and cut the cable housing to the proper length.

G. Insure that no burrs remain on the inside of the cable housing after cutting.

H. Lubricate the cable housing with silicone or graphite lubricant and slide the control wire back into the housing

I. Using the Adel Clamp, secure the cable housing to the shuttle valve assembly.

J. Determine the length of the control cable to attain the necessary travel of the manual valve.

K. Cut the control wire and place a “Z", bend on the end and install in hole provided in the end of the control valve handle.

L. Operate the control cable from the cockpit and insure that the valve operates through a full 90-degree range of travel.

M. Apply Placard (P/N 40040) to the Handle of the Control Cable

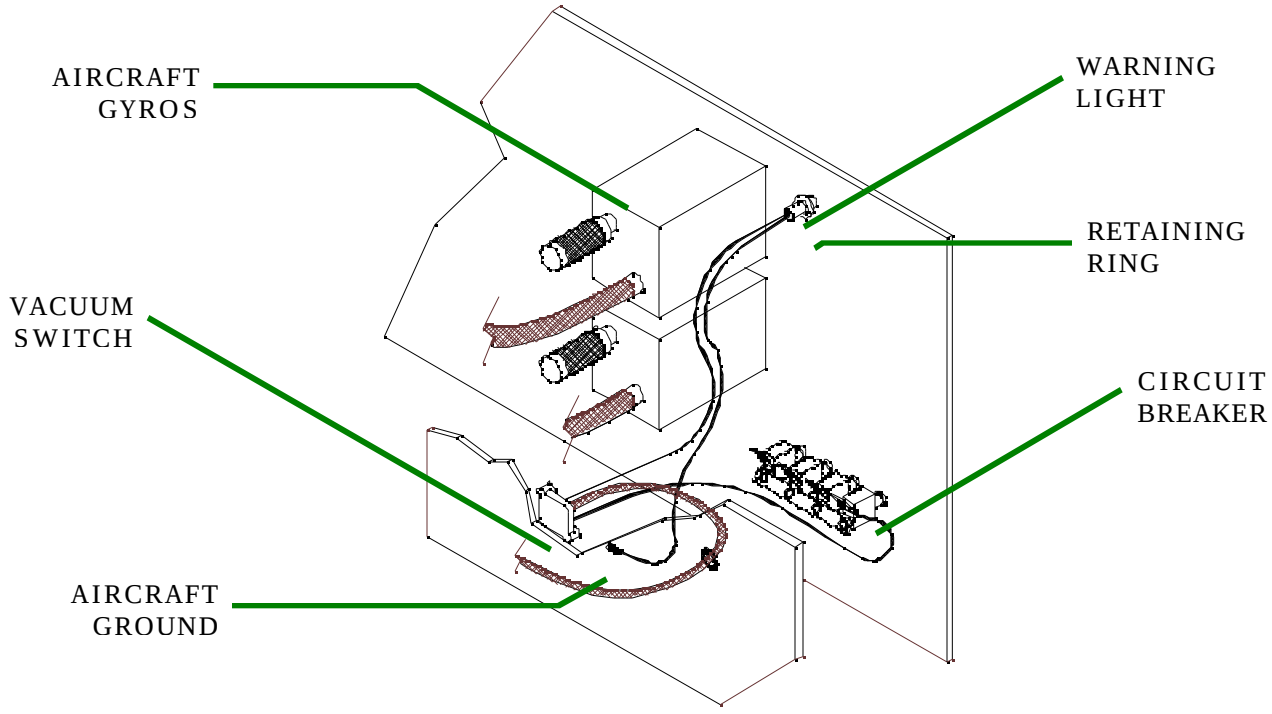
2.3.8. Mechanical Installation - Warning Light

A. Locate a suitable location on the aircraft instrument panel, close to the Gyros and large enough to accommodate the round placard, P/N 30080, ("Instrument Pump Inop. Warning).

B. Check behind the chosen location on the instrument panel for wires, hoses and equipment. Drill a 0.316 dia. hole. in the instrument panel for the warning light.

C. Push light through the placard and instrument panel and into retaining ring.

FIGURE 2-7 - WARNING LIGHT INSTALLATION



2.4. ELECTRICAL INSTALLATION

All wiring should be secured to prevent chafing and faulty connections. Refer to Advisory Circular 43.13-2A. NOTE: Precise Flight recommends that Mil-W-22759 wiring be utilized in the Standby Vacuum System installation.

DO NOT USE ALUMINUM WIRE

NOTE: Wiring precautions.

A. Observe proper cable routing, i.e. avoid tie-wrap joining power lines to antenna leads.

B. Be sure that all connections are sound, i.e. avoid frayed or split conduit ends.

C. Avoid sharp bends or undo strain on cables

2.4.1. Electrical Installation

A. After the Standby Vacuum System has been properly mounted.

B. Connect a single RED wire (P/N 30020) to one terminal of the vacuum switch. Attach the eye end to a non-essential circuit breaker (i.e. cigarette lighter, vent fan, etc.) See Figure 2-9 - Block Diagram

C. Connect a LIGHT wire (P/N 30010 or 01887) to the other terminal of the vacuum switch.

D. Connect the other LIGHT wire to aircraft ground

E. Turn on Master switch - Warning light should illuminate. Run Engine and assure that light extinguishes with proper vacuum.

NOTE: If warning light remains on during normal operation, it will be necessary to adjust the small gold screw on the vacuum switch (P/N 30030)

clockwise. Turn screw slowly until the light remains off during normal operations. MAKE ADJUSTMENTS CAREFULLY (1/16 Turn Max.)

IMPORTANT: LIGHT SHOULD COME ON WHEN VACUUM DROPS BELOW 3.5 in. hg.

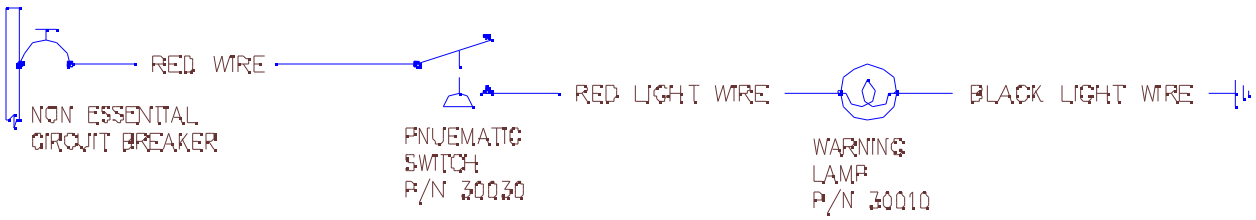


FIGURE 2-9 - BLOCK DIAGRAM ELECTRICAL SCHEMATIC

3. TESTING

3.1. INSTALLATION TESTING

During the first test run up of the aircraft powerplant, check the vacuum system for any leaks, loose hose clamps, or possible chafe points. Secure as needed. Be sure to protect the system neoprene hoses from the engine exhaust system. After completing installation, check engine idle mixture setting

Important: The following flight test shall be performed in VFR conditions only. Flight conditions that do not require the use of the aircraft gyro system for aircraft control.

The following test procedure will evaluate the installation in the aircraft:

1. Disconnect the vacuum pump supply line to the Precise Flight SVS Shuttle Valve. Install an appropriate gyro hose type filter in such a manner to prevent engine driven vacuum pump contamination.
2. Install a clean piece of tape over the exposed hose bib on the Precise Flight Shuttle Valve.
3. Follow SVS III operating instructions; check the operation of the SVS III at each altitude listed on the applicable SVS Placard for the type of engine/propeller combination.
4. If level flight at altitude is difficult to maintain at a power setting consistent with the aircraft instrument requirements, indicate that the Standby Vacuum System is

N/A (Not Available). The SVS Placard should indicate maximum Continuous RPM to maintain the aircraft primary instrument vacuum requirements or 3.5 in.

5. Reassemble
6. Perform a ground engine run-up to check vacuum pump operation and return aircraft to service.

Select appropriate chart (See Example in Appendix A - Altitude Power Chart) and following SVS III testing procedures, record the RPM or manifold pressure that is required to maintain a minimum level of vacuum for each altitude listed to provide adequate instrument operation. Enter these values on the appropriate placard and in the Aircraft Flight Manual Supplement. Attach the placard (P/N 40030) in a conspicuous location on the instrument panel near the control cable.

EXAMPLE: 2000 Ft. 2200 RPM or 19" of manifold pressure, Vacuum 3.5 in. Hg minimum.

3.2. TROUBLESHOOTING

The troubleshooting suggestions described in this guide will be with the engine driven vacuum pump disconnected and the pump protected with an intake filter

Locating a vacuum problem requires using a (step-by step) process of elimination, beginning at the engine intake manifold vacuum source

SVS III

NOTE: A vacuum test gauge of known accuracy is required to check vacuum problems. Aircraft instrument gauges, both manifold pressure and vacuum, have been known to be inaccurate.

3.2.1. Low Vacuum Reading

A. The most common cause of low vacuum readings is due to improper alignment of the SVS Saddle fitting and the engine intake manifold. To Check alignment, carefully push the shank of a 15/64 (0.234") dia. drill through the saddle fitting and into the intake manifold.

NOTE: It may be necessary to leave the drill shank in the saddle fitting & manifold when tightening the hose clamps. This will insure proper alignment between the saddle fitting & manifold. Be sure to remove the drill after tightening the clamps.

B. All vacuum hoses and lines should be as straight as possible. Avoid sharp bends and kinks, since tight bends, especially in hoses, may cause excessive in-line airflow restriction.

C. It may be necessary to establish proper vacuum and airflow. Consult the pressure altitude chart.

D. Faulty aircraft gauges, loose, worn or cracked hoses and fittings, leaking induction system pipe joint coupling hoses, or induction pipe to cylinder gasket are other known causes of low vacuum.

NOTE: To check for this condition, disconnect the instrument vacuum lines from the regulator and cap off.

E. Restrictions between engine induction system and vacuum regulator. Regulator setting too low.

F. Basic engine condition (compression), ignition timing.

G. SVS III manual control valve not fully opened

H. Verify the accuracy of aircraft vacuum and manifold gauges

I. Connect a test gauge to the hose at the vacuum regulator with a tee fitting and one port capped off With the engine at idle (on the ground) there should be 18-20 in. Hg of vacuum available at sea level. Remove the cap on the tee fitting and connect to the regulator valve. With the engine idling the indicated vacuum will be the regulated vacuum. An erratic gauge needle or light will indicate an engine problem or sticky vacuum regulator.

NOTE: It will be necessary to take into consideration the loss of atmospheric pressure at higher altitudes.

3.2.2. Erratic Vacuum Gauge Readings

A. Excessive contamination in the vacuum regulator filter.

B. Malfunction of the vacuum regulator.

C. Engine conditions, such as sticking valves, which will cause erratic vacuum readings.

3.3. CONTINUED AIRWORTHINESS

3.3.1. At ANNUAL Intervals.

3.3.1.1. INSPECTION

A. Inspect Push-pull cable, Apply silicone lubricant over the cable housing. WD-40 may be substituted. It is important to relubricate the cable if the engine compartment is washed and cleaned.

B. Inspect vacuum lines - look for wear, chaffing and deterioration. Replace if required

C. Perform a system check. See 3.3.2.2

D. Inspect Saddle Fitting

1.) Inspect to insure gasket is securely cemented to engine intake tube (Lycoming Engine w/o Intake Cuff)

2.) Inspect gasket for deterioration and replace if required. (Lycoming Engine w/o Intake Cuff)

3.) Check security of Saddle Fitting and insure hose clamps are tight and the Saddle Fitting seated

4.) Check alignment of the Saddle Fitting using an alignment probe (drill 0.234 dia.) to insure an unobstructed vacuum tap.

NOTE:

Disassembly of the Vacuum Lines and adding a Filter for the System Check requires a logbook entry as well as a Return to Service Entry after the test is completed.

3.3.2. At BIANNUAL Intervals

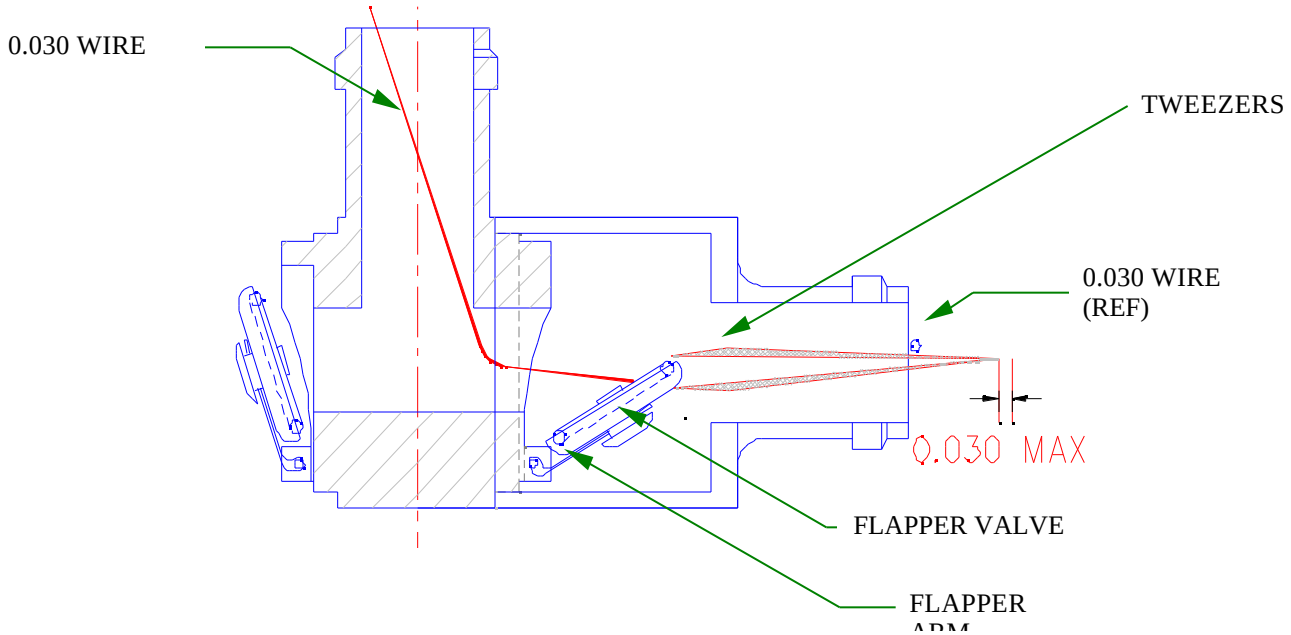
3.3.2.1. SHUTTLE VALVE TEST

A. Remove the Shuttle Valve from the aircraft.

B. On a workbench, utilizing a wire, flashlight, and a tweezers. Check both flapper valves for wear between the flapper arm and the rivet. The valve seat should move no more than 0.030 in. relative to the flapper arm. The valve seat should move freely on the flapper arm. This movement is normal, and allows the valve to self align and fit tightly against the valve body when the valve is closed. See Figure below. Inspect the unit and look for wear between the rivet and the flapper arm utilizing a flashlight.

C. If the valve is worn beyond the limit - contact **Precise Flight Inc.** for a new Shuttle Valve.

D. Reinstall a serviceable Shuttle Valve in the Aircraft.



3.3.2.2. FUNCTION TEST

A. Disconnect the vacuum pump supply line to the Precise Flight SVS Shuttle Valve, Install an appropriate gyro hose type filter in the hose leading to the engine driven vacuum pump. Install a clean piece of tape over the exposed hose bib on the Precise Flight Shuttle Valve.

B. Follow SVS III operating instructions, Flight Check the operation of the SVS III at each altitude listed on the applicable placard. If the engine settings have changed, check for possible discrepancies (i.e. Powerplant degradation, vacuum leaks, etc). Contact Precise Flight Inc. if a new placard is required.

NOTE:
Disassembly of the Vacuum Lines and adding a Filter for the System Check requires a logbook entry as well as a Return to Service Entry after the test is completed.

If you are unfamiliar with the system and its operation or are unable to recognize malfunctioning instruments - contact a suitable CFI/CFII and arrange for flight instruction utilizing the SVS system, partial panel operation and recognizing malfunctioning instruments.

C. If altitude is difficult to maintain at a power setting required for proper SVS III vacuum minimum, Indicate N/A on the SVS Vacuum Chart Space and on the SVS Placard. The SVS Placard (P/N 40030) should indicate maximum Continuous RPM to maintain the aircraft primary instrument vacuum requirements or 3.5 in. hg. Attach the placard in a conspicuous location on the instrument panel near the control cable.

D. After completing the flight test - **CAREFULLY** clean all hose fittings and hose bibs required for vacuum pump reconnection. Reassemble the vacuum system.

E. Perform a ground engine run-up to check vacuum pump operation and return aircraft to service.

4. OPERATION

4.1. NORMALLY ASPIRATED OPERATION

In the event of an engine-driven vacuum pump failure, the Precise Flight Standby Vacuum System (SVS III) will use engine intake manifold vacuum to operate attitude and directional gyro instruments. **The SVS III is not designed, or approved to operate an autopilot.**

The SVS III will operate satisfactorily with a vacuum differential of 3.5 inches between atmospheric pressure and the intake manifold vacuum. A reading of 3.5 in hg on the aircraft vacuum gauge will indicate this differential.. Precise Flight recommends a minimum of 3.5 in. Hg to maintain an emergency supply to the primary gyroscopic instruments. Check aircraft flight manual for manufacturer recommendations.

The SVS III is designed to operate adequately two vacuum powered instruments at a 3.5 in. hg differential. It is designed for Emergency Use Only, and to allow the pilot to land at the first available airport after the failure of the primary vacuum source.

IMPORTANT: THE SVS System is not suitable for autopilot vacuum supply. Per the system Flight Manual Supplement the Autopilot is to be turned off before operating the SVS system.

4.2. TURBOCHARGED ENGINE OPERATION

All turbocharged, single engine aircraft powerplants have vacuum in the intake manifold until the turbocharger begins to supply pressurized air to the engine. When the turbocharger is operating engine intake manifold pressure will exceed ambient air pressure. The engine manifold is pressurized. An example would be the Mooney 231

The Mooney 231 is equipped with a turbocharger and when taking off utilizing a power setting of 40 in Hg., the intake manifold is pressurized to provide additional power to the engine. Once the aircraft is at cruise speed and power at 8000 ft to 10,000 ft altitude the power setting is reduced to 27 in. Hg. and the engine intake manifold is pressurized by the turbocharger. The Precise Flight Standby Vacuum System relies on the difference between the outside ambient air pressure and the intake manifold pressure, power settings on a turbocharged engine will have to be reduced to allow proper Standby Vacuum System operation

Once a turbocharged aircraft is at altitude, and has a vacuum pump failure, a slow and safe descent to landing, using low power settings, will be necessary to effectively operate the SVS system. In the Mooney 231 you can cruise with 18.5 in. Hg. at 8,000 ft. MSL, which will provide the required vacuum to maintain primary gyro instruments. On final approach you will have the best possible vacuum. The aircraft engine, turbocharged or not, is developing more vacuum than the primary gyro instruments need and the vacuum regulator will keep the system within limits.

SVS III

The SVS III is designed to operate adequately two vacuum powered instruments at a 3.5 in. hg differential. It is designed for Emergency Use Only, and to allow the pilot to land at the first available airport after the failure of the primary vacuum source.

IMPORTANT: THE SVS System is not suitable for autopilot vacuum supply. Per the system Flight Manual Supplement the Autopilot is to be turned off before operating the SVS system.

5. DOCUMENTATION

5.1. DOCUMENTATION

To ensure technical updates and notifications, fill **out and return the warranty document** and a copy of the 337, if appropriate.

5.2. RETURN AUTHORIZATION

In order to expedite repair of units; call the factory for a return authorization number before returning equipment for service.

5.3. WARRANTY SERVICE

Precise Flight warrants products in accordance with the warranty statement in effect at the time of equipment registration. All repairs are performed at the factory. Contact Precise Flight Inc. for a warranty / return authorization. Authorized warranty work performed by the dealer will be limited to removal and re-installation of units on an exchange basis. Precise Flight Inc. will bear the cost of warranty returns both ways via **UPS** surface delivery only. Precise Flight reserves the right to use reconditioned parts in repairing the product or to use reconditioned units as warranty replacements.

For technical information and service, call 1-800-547-2558.

6. APPENDIX A

6.1.1. PARTS LIST

6.1.2. INSTALLATION INSTRUCTION DRAWINGS