STC SA12195SE

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TITLE: Installation manual

for PA-28R Gear Warning Upgrade

REVISION: 2

DATED: 4/13/2026

REVISIONS

Revision Level	Revision Date	Reason
IR	7/2/2024	Initial Revision
1	2/2/2026	Updated and consolidated Hardware listed in section 3. Updated SN range in section 2. Updated Figure 3-1.
2	4/13/2026	Updated Hardware listed in Section 3.

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1.0 INTRODUCTION

This document provides the FAA-approved installation instructions for the installation of Absolute Solutions LLC Gear Warning Upgrade in accordance with STC SA12195SE on eligible aircraft models.

The Absolute Solutions Gear warning upgrade is a reliable alternative to the gear warning systems incorporating a throttle position switch system. The system requires removal of the throttle position switch and gear horn and replaces them with a solid-state relay, vacuum switch and a much more reliable gear horn.

The vacuum switch tees into the existing manifold pressure sense line and is rigidly mounted behind the engine firewall. The normally open switch is designed to close at approximately 14" HG as indicated on the manifold pressure gage. Power to the vacuum switch is supplied from the existing throttle position switch wires. The vacuum switch harness incorporates a jumper plug to allow for simple testing of the gear warning horn in conjunction with scheduled inspections. The switch is protected from residual fuel that makes its way into the manifold sense line via an in-line filter.

The existing gear horn and flasher is replaced with much more reliable gear horn. The gear horn emits loud beeps at a frequency of 180/min and does not use the factory gear horn flasher. The gear horn is mounted to the existing mounting holes of the original gear horn holder.

A solid-state relay supplies power to and operates the gear horn when the vacuum switch sends a trigger voltage input.

By utilizing manifold pressure to operate the gear horn during unsafe gear configurations, we can eliminate any mechanical factors that can lead inconsistent gear horn operation.

The Absolute Solutions LLC Gear Warning Upgrade can be installed, adjusted and tested on the ground, which eliminates the need for a check flight.

2.0 APPROVED CONFIGURATIONS

The Absolute Solutions LLC gear warning upgrade is eligible for installation on:

Piper PA-28R-200 SN: 28R-7235193 and up

3.0 GENERAL SPECIFICATIONS

Kit Contents

Main Components

Nomenclature	Part number	Quantity
Gear Horn	AS-GHBA-1	1
Vacuum Switch	AS-MPSBA-1	1
Solid State Relay	DC60S3	1
In-line Filter	AS-IF-1	1

Hardware

Nomenclature	Part number	Quantity
Supplemental Wiring Hardware		
Ring Terminal	36154	8
Spade Terminal	640917-1	2
Connector, Male MATE N LOK	1-480318	3
Connector, Female MATE N LOK	1-480319	2
Pin	60618-1	4
Socket	60617-1	6
Environmental Splice	D-436-37 or HCR-436-37	2
Hardware and Miscellaneous		
3/16” Hose	193-3 (36” section)	1
1/4" Hose	193-4 (8” section)	1
AN tee-fitting	AN826-4D	1
Tee Fitting Cap	AN929-4	1
Tee fitting (hose)	11738	1
Hose clamp	6504	8
1/4” Tube	03-00012-1 (6” section)	1
AN Nut	AN818-4D	1
AN Sleeve	AN819-4D	1
Nut	AN340-8	2
Washer	MS35333-38	2
Screw	MS27039-0807	2
Nut	MS21044N08 or AN365-832A	2
Screw	MS27039-0816	2

Adel Clamp	MS21919-WDG7	1
Terminal nipples	MS25171-1	3
Bolt	AN3-10A	3
Spacer	NAS43HT3-32	5
Nut	MS21042L3	3
Washer	NAS1149F0363P OR AN960-10	10
Cable tie	T18L	20
Wire	M22759/16-22-9	15’
Test plug	AS-GHTP-1	1

4.0 INSTALLATION

The installer is responsible for ensuring modifications made to accommodate this system do not interfere with the operation of any existing original or aftermarket systems.

Special tools required:

Vacuum hand pump/bleeder
Mini tubing cutter
Wire insulation Stripper
Pin/Socket crimper
Terminal crimper
Environmental splice crimper (such as DMC GMT232)
Hose cutter

4.1 AS-MPSBA-1 vacuum switch and DC60S3 relay installation

Note:

The AS-MPSBA-1 vacuum switch and DC60S3 relay must be installed inside the cockpit on the engine firewall. It is recommended to install them close to each other to simplify wiring. The installation figures show the DC60S3 relay, and the AS-MPSBA-1 vacuum switch installed in the pilot-side brake master cylinder area. See Figures 1-1 and 1-2 for location reference.

CAUTION

Use caution when drilling mount holes into firewall, double check fitment to ensure no interference with any existing systems or aircraft structure.

1.) Remove top engine cowling.
2.) On the engine firewall, match drill two 3/16” holes for the DC60S3 relay mounting lugs. Deburr holes after drilling and slightly cut back firewall insulation around holes to accommodate the NAS43HT3-32 spacer installation in next step.

Note:

On engine firewall side, ensure lower mount hole contact surface is clean. It serves as a good ground for post #4 of the DC60S3 relay.

3.) With an assistant, install DC60S3 relay with supplied AN3-10A bolts inserted from engine side of firewall, NAS1149F0363P washers, NAS43HT3-32 spacers and MS21042L3 nuts. Ensure one NAS1149F0363P washer is installed under each bolt head and nut for proper clamp-up on firewall. NAS43HT3-32 spacers are installed in between the firewall and relay.
4.) On the engine firewall, match drill two #19 holes for the AS-MPSBA-1 vacuum switch mounting plate. Deburr holes after drilling and slightly cut back firewall insulation to accommodate the NAS43HT3-32 spacer installation in next step.
5.) With an assistant, install AS-MPSBA-1 vacuum switch with MS27039-0816 screws inserted from engine side of firewall, NAS1149F0363P washers, NAS43HT3-32 spacers and AN365-832A nuts. Ensure one NAS1149F0363P washer is installed under each screw head and nut for proper clamp-up on firewall. NAS43HT3-32 spacers are installed in between the firewall and vacuum switch.
6.) To the extent necessary, disassemble throttle quadrant to gain access to the gear-up/throttle reduced warning switch.
7.) Remove gear up/throttle reduced warning switch. Retain throttle position wires G2N and G2M, noted in wiring diagram Figure 3-1.
8.) Using supplied hardware and wire, wire DC60S3 relay and AS-MPSBA-1 with the existing gear-up/throttle reduced warning switch wires per wiring diagram in Figure 3-1. Use standard installation practices referenced in AC 43.13-1B Ch. 11.

Note:

Near the vacuum switch, ensure to wire in a two-pin jumper plug for the two vacuum switch wires which allows for easy testing of the gear horn during scheduled inspections or troubleshooting.

9.) Install MS25171-1 terminal nipples over DC60S3 relay terminals #1, #2 and #3.
10.) Reassemble throttle quadrant.

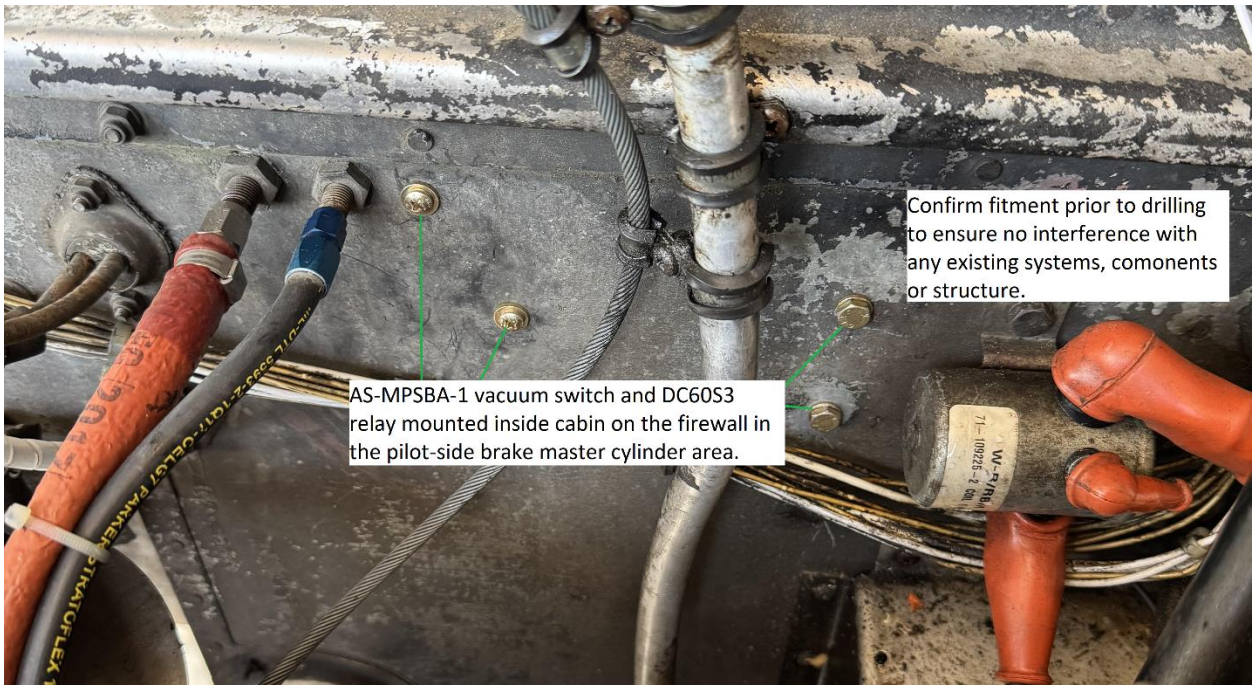

Figure 1-1. Firewall mounted components, engine side.

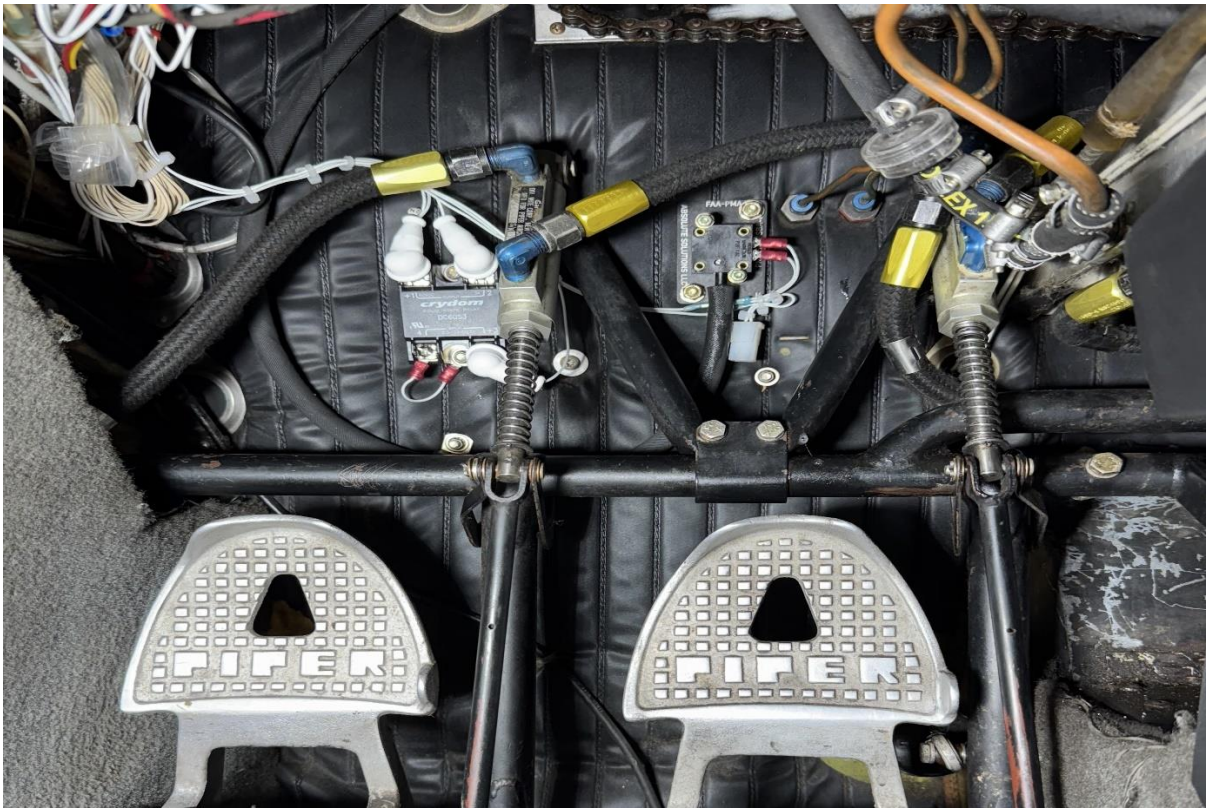

Figure 1-2. Firewall mounted components, cabin side.

4.2 Vacuum system line fabrication and installation

1.) Disconnect all lines from manifold pressure gage.
2.) See Figure 2-1. On the gage, temporarily remove fuel flow AN nipple fitting closest to manifold pressure fitting to give clearance for the new tee-fitting to be installed.
3.) Replace manifold pressure AN fitting on manifold gage with supplied AN826-4D tee fitting. Secure tee-fitting to allow for attachment of vacuum hand pump for future testing. Install AN929-4D cap on lower portion of tee.

Note:

The AN826-4D fitting will now provide simple access to tapping into the manifold pressure system utilizing a vacuum hand pump fitted with a flared -4an tube with AN818-4D nut and AN819-4D sleeve, see Figure 2-2. The lower nipple of the AN826-4D tee must be capped with the supplied AN929-4D cap during normal aircraft operation.

4.) Reinstall fuel flow AN fitting removed in step 2.
5.) See Figure 2-3. Using a mini tube cutter, remove 2.5" inches of manifold pressure line in indicated location, leaving approximately 1" of straight section after the radius bend.
6.) See Figure 2-4. Install 11738 tee into manifold pressure line using two 2" pieces of 193-4 hose, and (x4) 6504 clamps, one at each hose junction.
7.) Install AS-IF-1 in-line filter and 193-3 hose onto 11738 tee-fitting with (x3) 6504 clamps. AS-IF-1 in-line filter should be installed with large diameter away from 11738 tee-fitting.
8.) Route 193-3 hose toward the engine firewall along existing factory vacuum hose located near the 11738 tee-fitting. Secure as required with cable ties.
9.) Route 193-3 hose down and along firewall, toward AS-MPSBA-1 vacuum switch. Squarely trim hose to length, then connect to AS-MPSBA-1 vacuum switch. Hose clamp is not required at this location.

CAUTION

Use care when removing and installing 193-3 vacuum hose from AS-MPSBA-1/AS-IF-1 hose barbs. The hose barbs can be broken if sideloaded, causing manifold pressure leaks and/or faulty operation. It is recommended to carefully cut the 193-3 just below the hose barb if hose cannot be easily removed.

10.) As required, drill 3/16" hole and install one Adel clamp PN MS21919WDG7 securing the length of 193-3 hose to the firewall. Install Adel clamp with AN3-10A bolt inserted from engine side of firewall with NAS1149F0363P washers, NAS43HT3-32 spacers and MS21042L3 nuts. Ensure one NAS1149F0363P washer is installed under each screw head and nut for proper clamp up on firewall. NAS43HT3-32 spacers are installed in between firewall and Adel clamp.

CAUTION

Use caution when drilling, and double check fitment to ensure no interference with any existing systems or aircraft structure.

11.) Ensure all manifold pressure and fuel flow connections that were loose or disconnected from manifold gage are now secure and leak free.

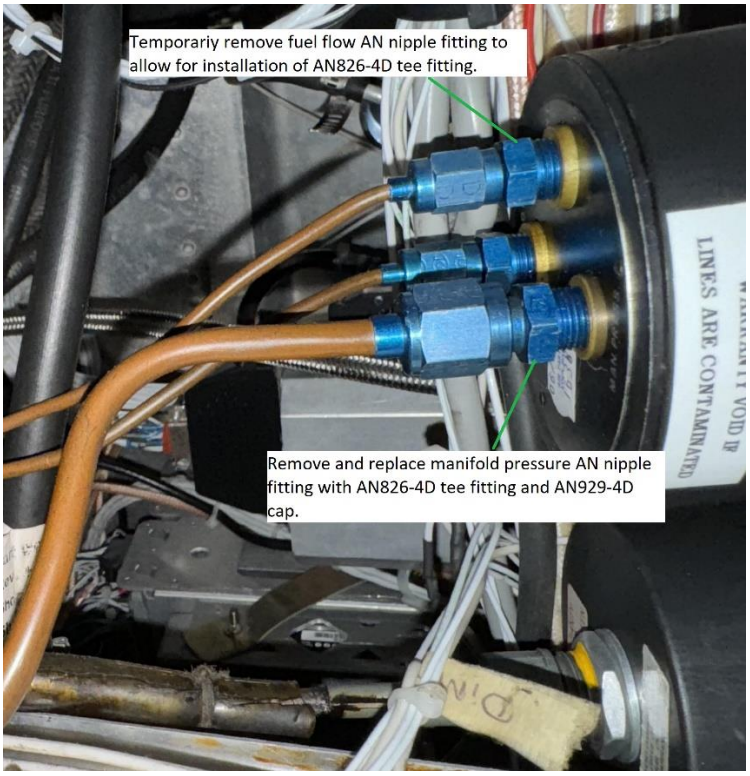

Figure 2-1. Manifold gage fittings.

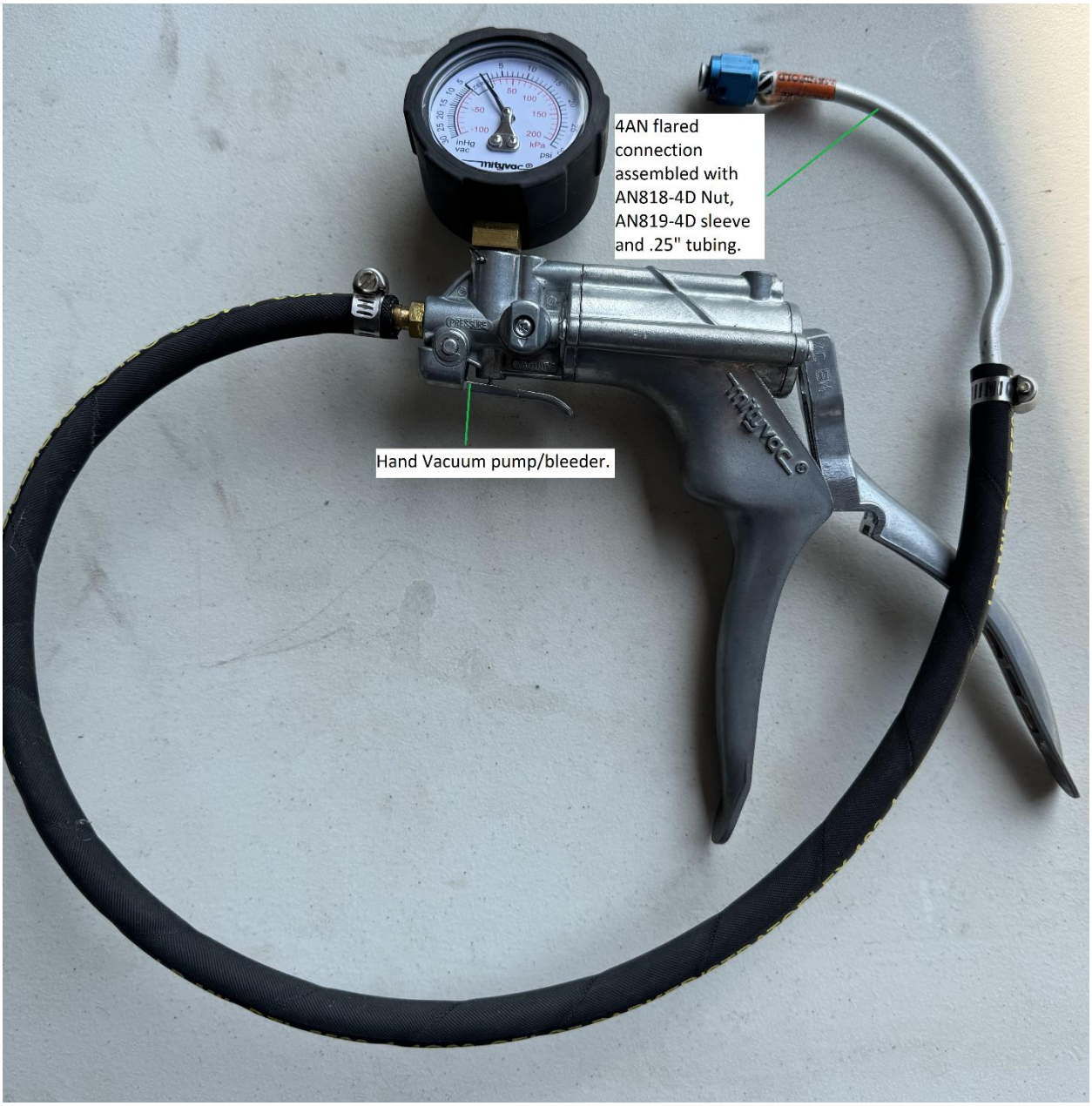

Figure 2-2. Vacuum hand pump with 4AN flared connection for testing.

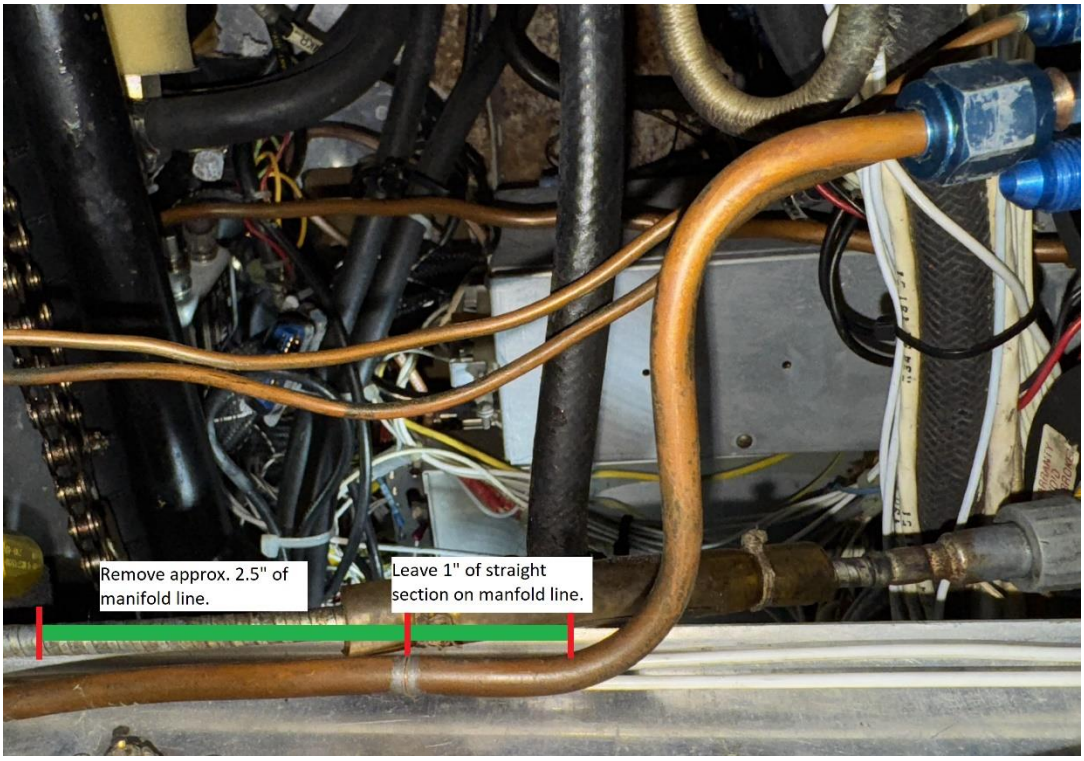

Figure 2-3. Manifold pressure line, location of cut.

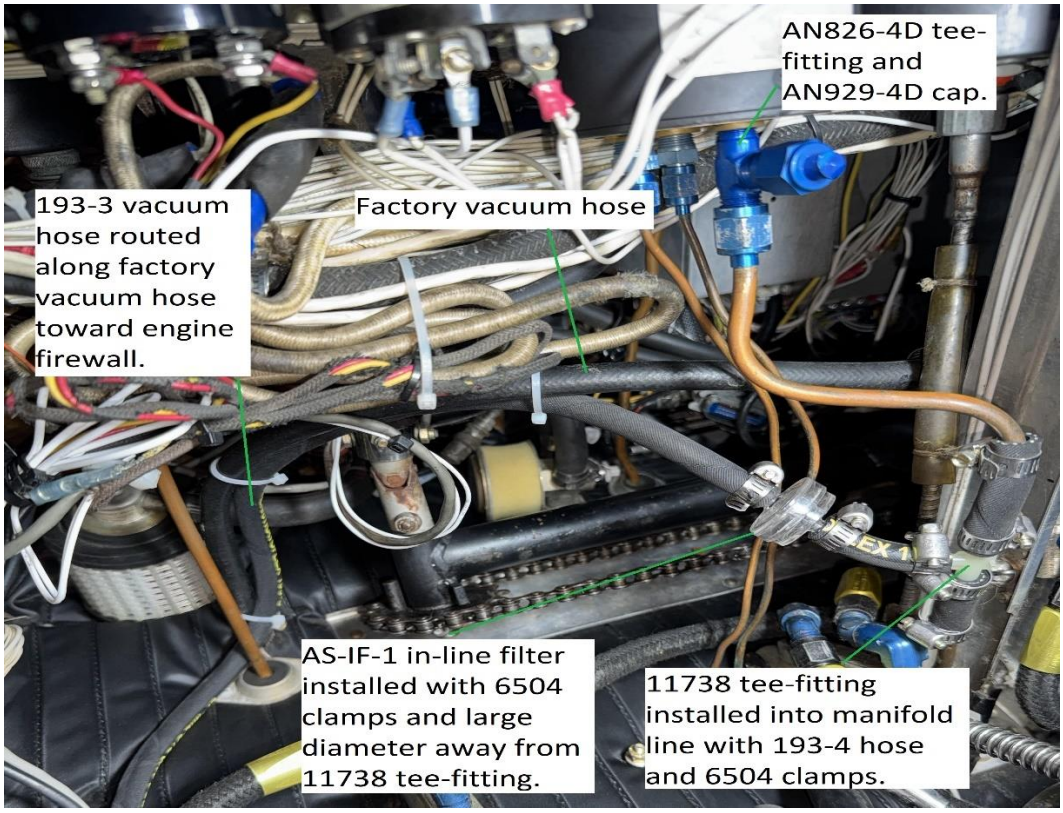

Figure 2-4. 193-3 hose installed on 11738 tee fitting.

4.3 AS-GHBA-1 Gear Horn Installation

Note:

The Gear Horn and supplied bracket will be mounted utilizing supplied hardware to the factory horn holder. Due to various configurations and aftermarket equipment, the gear horn may not be in its factory location.

1. See Figure 3-2. Locate and remove factory gear horn PN 565-288 from factory horn holder. For aircraft SN 28R-7635001 or higher, remove gear horn flasher. Retain factory wires.
2. See Figure 3-3. Install AS-GHBA-1 gear horn with MS20739-0807 screws, MS35333-38 lock washers and AN340-8 nuts. Ensure supplied lock washers are installed under each nut.
3. See wiring diagram in Figure 3-1. Using supplied hardware, wire gear horn to factory gear horn wiring.
4. Use cable ties to secure wiring as required. Use standard installation practices referenced in AC 43.13-1B Ch. 11.

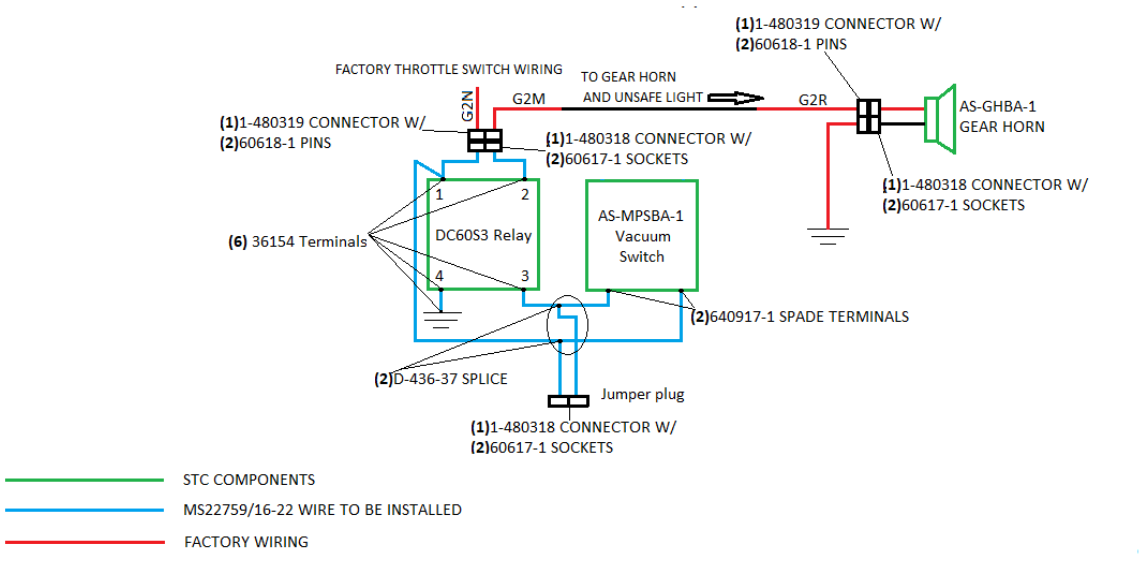

Figure 3-1. PA-28R Wiring Diagram

Figure 3-2. Factory gear horn.

Figure 3-3. AS-GHBA-1 gear horn installed.

4.4 Removal Information

Follow sections 4.1-4.3 in reverse order as required to facilitate component removal.

CAUTION

Use care when removing or installing hoses from AS-IF-1 in-line filter and AS-MPSBA-1 vacuum switch hose barbs. They can easily be broken if sideloaded, causing manifold pressure leaks and/or faulty operation. If hose isn't easily removeable, it is recommended to carefully cut it just below the hose barb to facilitate removal.

5.0 INSTALLATION CHECKS

5.1 System Testing

Special Tools:
Hand vacuum pump/bleeder
Tube flaring tool

See Figure 2-2. Fabricate a 4AN flared connection with supplied 1/4" tubing, AN818-4D nut and AN819-4D sleeve. Connect the non-flared end to the hand vacuum pump/bleeder hose. Remove AN929-4D cap from AN826-4D tee-fitting on MP gage, then connect vacuum pump to tee-fitting to simulate engine vacuum. Calibration of the AS-MPSBA-1 vacuum switch is preset and should not require adjustment. However, adjustments can be made to the AS-MPSBA-1 switch trigger point, see section 5.2.

Test 1

1. See Figure 2-2. Fabricate a 4AN flared connection with supplied 1/4" tubing, AN818-4D nut and AN819-4D sleeve. Connect the non-flared end to the hand vacuum pump/bleeder hose.
2. Place aircraft on jacks for system ops check using the aircraft manufacturer maintenance manual procedures.
3. Remove AN929-4D cap from AN826-4D tee-fitting on manifold gage.
4. Connect vacuum pump/bleeder to AN826-4D tee-fitting.
5. Power on aircraft and retract landing gear.
6. With landing gear retracted, reduce manifold pressure to approximately 14" HG. Ensure gear horn operates. If gear horn does not come on at between 12-16" HG, proceed to section 5.2 Calibration.

Test 2

1. Extend landing gear.
2. Reduce manifold pressure to below 12" HG. Ensure gear horn *does not* operate.
3. Disconnect vacuum pump/ bleeder from AN826-4D fitting and re-install AN929-4D cap.
4. Power off aircraft.

5. Remove aircraft from jacks.

5.2 Adjustment Procedure For AS-MPSBA Vacuum Switch.

See Figure 5-1. The vacuum switch trigger point may be adjusted via the small flat-head adjustment screw located on the face of the AS-MPSBA-1 vacuum switch. The adjustment screw is sensitive, therefore very small adjustments will yield desirable results.

Adjusting screw clockwise decreases the amount of vacuum required to close the switch.

Adjusting screw counterclockwise increases the amount of vacuum required to close the switch.

Adjust screw in or out to achieve a trigger point of 14” HG as indicated on manifold pressure gage.

CAUTION

Ensure AC power is off when turning adjustment screw as it is electrically active.

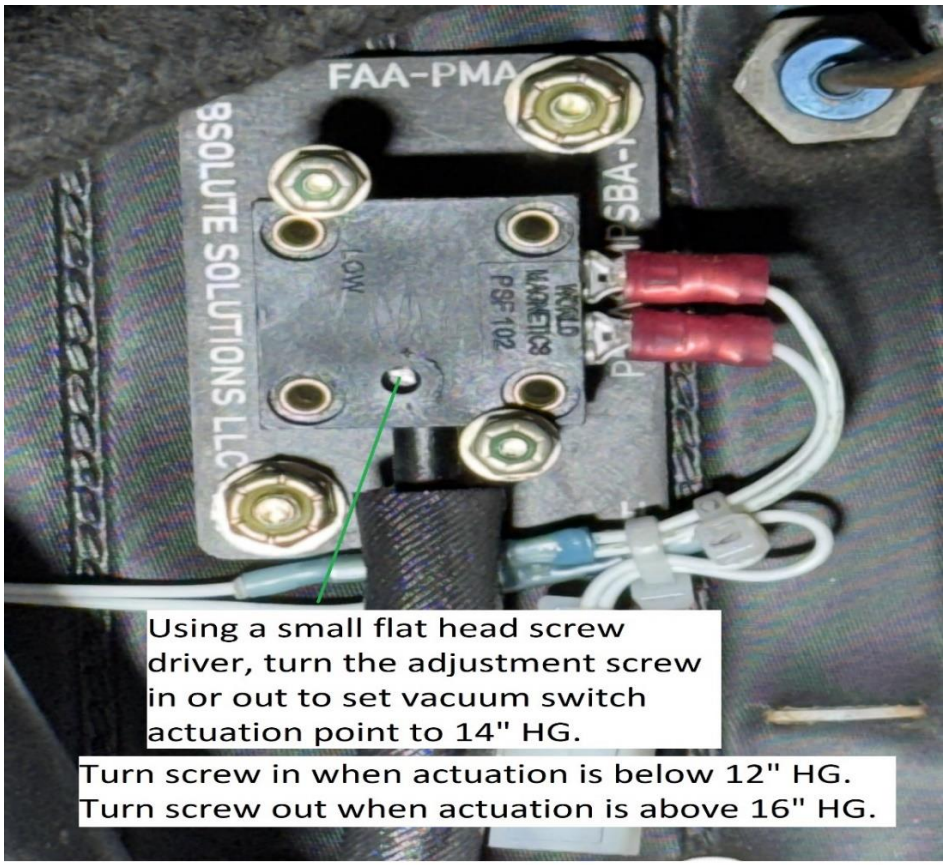

Figure 5-1. AS-MPSBA-1 Adjustment