

INSTALLATION MANUAL

FOR

The

Landing Gear Position Warning System
for
Land Aircraft

For Experimental Category Aircraft Only
Not FAA Approved

P/N 2050-1

SPECIFICATION IM-2050

REV. 0

04-04-04

Approved

Aircraft Components Inc.
1040 Harbor Lake Drive
Safety Harbor, FL. 34695

I. INTRODUCTION

This manual provides information for installing the P/N 2050 Landing Gear Warning System on an Experimental category retractable gear aircraft. All installation work is to be performed in accordance with this manual.

II. SYSTEM OPERATION

The Landing Gear Warning System is an electronic device which provides the pilot of a retractable gear experimental category aircraft with information on the position of the landing gear prior to a runway landing. The system consists of a small electronic module, and a panel mounted switch, and it connects to the aircraft landing gear DOWN position indicating light. The system is activated by airspeed on takeoff. Once the airspeed has exceeded a pre-selected speed, a light in the panel switch will illuminate indicating that the system is active. A delay of 15 sec. is built into the unit to allow for airspeed transients. As the aircraft slows for landing, the system enters the warning mode. The electronics check the gear Down position light to determine if the landing gear is down for a runway landing. If the gear is down, pilot will then hear the message "GEAR OK" in his headset, and through the built in speaker. If the gear is not in the correct position, he will hear the message "CHECK LANDING GEAR, CHECK LANDING GEAR" repeatedly until the gear is placed in the proper position, or the airspeed is increased above the activation speed.

The system incorporates a test function, and the ability to temporarily disengage operation for slow flight. Pushing the panel switch in flight or on the ground will initiate a test sequence. If the electronics are functioning, the voice message "TEST O.K." will be heard. If the panel switch is held for 2 sec., the system will be deactivated. The light in the panel switch will then flash indicating that the system is deactivated. Pushing the switch again, re-engages the system and turns the flashing light off.

The system also has optional inputs that allow the installer to hook up a switch on the flaps and a switch on the throttle. When these options are used, closing the throttle or lowering the flaps with the gear up, will produce the warning message.

The voice messages can be heard through the speaker built into the unit, and directly in the pilots headset. If the aircraft has an audio panel with an un-switched input, the voice message will also play through the cabin speaker.

NOTE: THIS IS AN ADVISORY SYSTEM ONLY. IT SHOULD NOT BE UTILIZED AS THE PRIMARY MEANS OF DETERMINING GEAR POSITION. THE PILOT SHOULD CONTINUE TO UTILIZE THE NORMAL OPERATING PROCEDURES, CHECKLISTS, LIGHTS, INDICATORS, ETC. AS THE PRIMARY INDICATION OF GEAR POSITION.

III APPLICABILITY

This system is not FAA approved. It is intended for installation on Experimental category aircraft only.
The aircraft must have the following minimum requirements for an installation

:

1. 12v or 24v DC power
2. A minimum of one gear down position indicating light, or an electrical switch which activates when the gear is up and when the gear is down.
3. An audio panel with an un-switched audio input or a headset jack for the pilot.

The system is designed to operate with a variety of light and limit switch wiring configurations. See the attached Installation Schematics, or contact the manufacturer for installation information with other wiring schemes.

IV. INSTALLATION INFORMATION

A. Mechanical Installation

1. Locate a place in the aircraft to mount the P/N 2050 electronic module. The unit can be mounted to the aircraft structure, side panels etc. Drill 4 mounting holes as shown on Fig 1, and mount the unit using the hardware provided.
2. Drill a 5/16 dia hole in the instrument panel in a location in front of and in easy reach of the pilot, and install the P/N 2048-4 Switch assembly. Place the panel label over the hole before inserting the switch.
3. Attach the 3/16 inch OD (1/8 inch ID) plastic tube on the electronic module to the pressure line from the pitot tube. Do not use a bend radius less than 1 inch, and do not crush the tube when securing it.

B. Electrical Installation

1. Refer to Fig A, or Fig B, for information on the electrical installation that fits the wiring configuration in your aircraft. Fig A is the wiring configuration for aircraft that have gear position indicating lights wired so that power is always applied to the lights, and the switches then supply a ground to turn the lights on. Fig B is the wiring configuration for aircraft that have gear position indicating lights that are wired so that the switches supply power to the lights to turn them on. The system can also be used with aircraft that do not have indicating lights, but do have up and down limit switches on the gear position. Contact the factory for information on this installation. If you have individual indicator lights, and wish to hook all of them up, this can be done also. Contact the factory for information on this configuration.
2. Hook the RED wire to the aircraft power buss through a 1 amp fuse or circuit breaker. The system works with both 12v and 24v power.
3. Attach the BLACK wire to a good aircraft ground.
4. NOTE: Installations made using Fig B require that a jumper be installed in the cable connector. Remove the gray plastic cover from the cable connector and solder a jumper from pin 2 to pin 3 in the connector. Attach the correct color wire to the gear down lights or switches as shown on the correct figure. Note: The short VIOLET wire is for speed calibration
5. The system incorporates a standard audio output. The audio output must be hooked into the aircraft audio system in a way that the pilot cannot accidentally turn it off. If the aircraft has an audio panel that incorporates an un-switched audio input, the Gear Alert audio output should be hooked to this point. This will provide a voice warning directly into the pilots headset and through the cabin speaker. Hook the WHITE wire to this un-switched audio input. If the aircraft does not have an audio panel with an un-switched input, then the WHITE wire can be hooked directly to the pilots headset jack.
6. The system can be attached to a switch on the flaps that provides a ground when the flaps are fully deflected. This switch closure will provide a second means of activation when landing. This input can be left unused if desired.
7. The system incorporates an airspeed activated switch which can be used to activate an external device like a transponder, a hobbs meter, etc. The system provides a switch closure, (a ground) at an airspeeds above 40 mph, and opens (turns off) at speeds below 40 mph.. NOTE: The switch current must be externally limited to 40 ma.
8. The system can also be attached to a switch on the throttle that provides a ground when the throttle is closed. This switch closure will provide an additional means of activation when landing. This input can be left unused if desired
9. Cut any remaining wires and insulate the ends. Secure all wiring in place.

V. SYSTEM CHECKOUT AND OPERATION

A. Ground Testing

1. Turn on the master switch. The system must not operate. Push the panel switch momentarily and release it. The voice message "TEST OK" must be heard once through the built in speaker and through the pilots headset. The voice message will also be heard through the cabin speaker and all headsets in the aircraft if the audio is attached to an un-switched input in the audio panel. The volume level of the audio through the cabin speaker and the headsets can be adjusted by turning a volume control pot in the electronic module. Clockwise increases volume, CC decreases it. Locate the correct pot in the electronic module, and using a small screwdriver turn the pot to change the volume level.

2. Push the panel switch and hold it for about 2 sec. The voice message “TEST OK” will play. When you release the switch the built in light will flash indicating that the system has been disengaged and will not function when landing. Push the switch again momentarily and release it. The flashing light must go off indicating that the system has reactivated.

B. Setting the Activation Speed

1. The activation airspeed can be adjusted over a wide range (40 MPH to 90 MPH) by a pot in the electronic module. Locate the correct pot in the electronic module, and use a small screwdriver to adjust it.

2. Attach a digital voltmeter between the short VIOLET wire attached to pin 9 of the connector and aircraft ground. Using the table of voltage vs activation speed, adjust the speed control pot to set the desired system activation speed. NOTE: The activation speed should be set lower than the normal climb speed to prevent system activation when climbing. Insulate and secure the short VIOLET wire when finished.

C. Flight Testing

1. Make a normal takeoff. If the external switch is connected to an accessory, it should activate at about 40 mph.

2. Increase the airspeed until the yellow light illuminates indicating that the system is active. Adjust the activation speed if necessary. Note: The airspeed must be above the activation speed for about 15 sec before the system becomes active.

3. Decrease airspeed below the activation airspeed with the landing gear retracted. The voice message “CHECK LANDING GEAR, CHECK LANDING GEAR” must be heard in the pilots headset and through the built in speaker. Lower the landing gear and the voice message “GEAR OK” must be heard, and the amber light must turn off.

4. If the flap switch or the throttle switch options have been hooked up, their operation should be verified by testing as above .

5. When in flight, push the panel switch momentarily and release it. The voice message “TEST OK” will be heard once through the built in speaker and through the pilots headset.

6. Push the panel switch and hold it for about 2 sec. The voice message “TEST OK” will play. When you release the switch the built in light will flash indicating that the system has been disengaged and will not function when landing. Push the switch again momentarily and release it. The flashing light will go off and a steady light will be on, indicating that the system has reactivated.

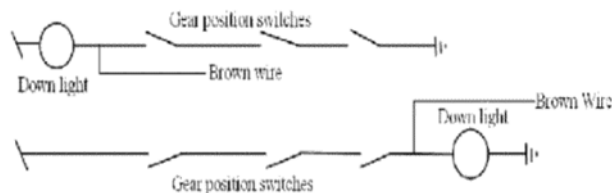
VI. DOCUMENTATION

1. The installer is responsible for all documentation, logbook entries, revising weight and balance, etc.

2. System weight is 0.7 lb.

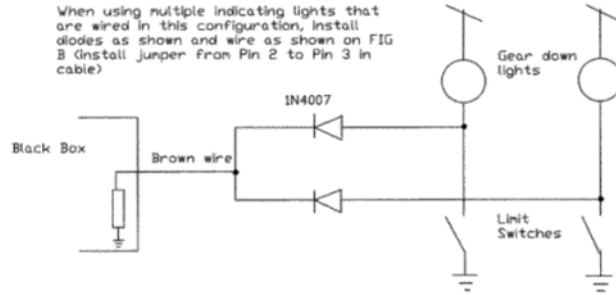
Wiring Landing gear Position Lights

The landing gear position indicating lights can be wired in a variety of ways. We recommend that the switches on the 2 or 3 landing gear that provide the gear down indication be wired with the switches hooked in series. We also recommend that separate circuit breakers be used for the position lights and the gear warning system. This configuration and this redundancy provides the best system. Should the wiring break, the switches fail, or the breaker for the gear position lights open, the pilot will always get a warning alerting him of the unsafe condition and to check the gear position. This fail safe feature is not always available with other wiring configurations. The sketch below shows the 2 configurations. The system can be wired so that the light is always powered and the switches provide a ground, or they can be wired with one side of the light grounded, and the switches then providing power.

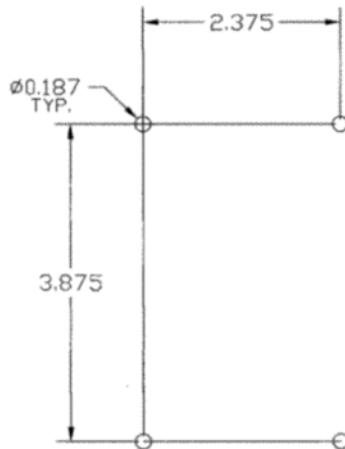
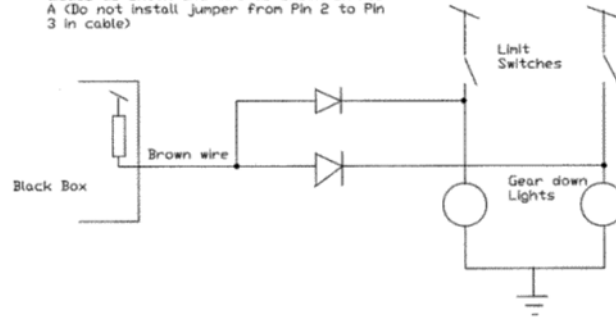


If you have 3 retractable gear with separate indicator lights for each wheel, one way is to only hook up the nose wheel. Another configuration involves installing diodes (P/N 1N4007) in the wiring coming from the individual indicating lights as shown on the attached sketch. The sketches address the wiring configurations where the switches provide either power or ground when they close. Be aware that there is a disadvantage with these configurations. Both of these wiring configurations require that the gear indicating light system provide power on the inputs to the Black Box for correct operation . If the circuit breaker for the position lights opens, or a wire breaks such that no power is applied to the brown wire, there is the possibility that the gear warning system could mal function.

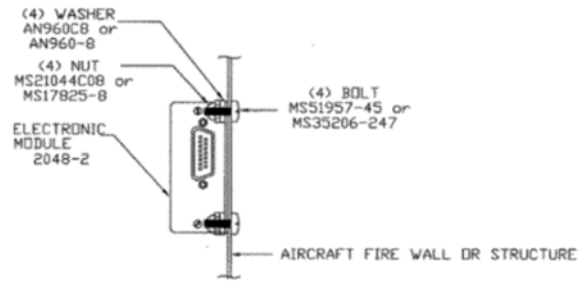
When using multiple indicating lights that are wired in this configuration, install diodes as shown and wire as shown on FIG B (Install jumper from Pin 2 to Pin 3 in cable)



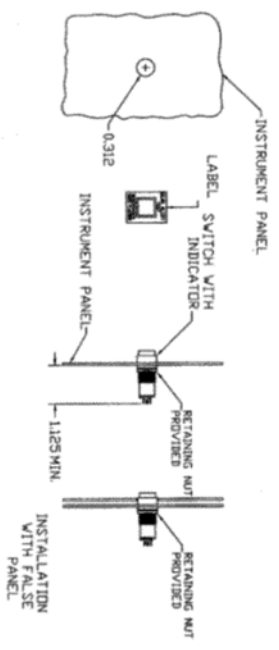
When using multiple indicating lights that are wired in this configuration, install diodes as shown and wire as shown on FIG A (Do not install jumper from Pin 2 to Pin 3 in cable)



ELECTRONIC MODULE TEMPLATE
FIG 1



ELECTRONIC MODULE INSTALLATION
FIG 2



INSTALLATION OF SWITCH WITH AMBER LIGHT
FIGURE 3

