

INSTALLATION MANUAL

FOR

The

Landing Gear Position Warning System

for

Amphibian Aircraft

For Experimental Category Aircraft Only

Not FAA Approved

P/N 2048-1

SPECIFICATION IM-2048

REV. 0

04-15-03

Approved

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I. INTRODUCTION

This manual provides information for installing the P/N 2048 Landing Gear Position Warning System on a home built amphibian aircraft. All installation work is to be performed in accordance with this manual.

II. SYSTEM OPERATION

The Landing Gear Position Warning System is an electronic device which provides the pilot of an amphibian aircraft with information on the position of the landing gear prior to either a water landing, or a runway landing. The system consists of a small electronic module, and a panel mounted switch. The system is activated by airspeed on takeoff. Once the airspeed has exceeded a preselected speed, a light in the panel switch will illuminate indicating that the system is activated. A delay of 15 sec. is built into the system to allow for airspeed transients. As the aircraft slows for landing, or deploys the flaps for landing, the warning system becomes active. The pilot will then hear one of 3 voice messages directly in his headset and through the built in speaker, either A WATER LANDING, WATER LANDING@ in a male voice or A RUNWAY LANDING, RUNWAY LANDING@ in a female voice depending on the present position of the landing gear, or A CHECK LANDING GEAR@ . If the pilot determines that the gear is set in the proper position for the type of landing being made, he then pushes the panel switch which cancels the voice message and turns the light off. If the gear is not correct for the type of landing being made, he can reposition it. When the gear position changes, the voice will change to the other message also. If he accelerates above the activation airspeed, the system resets, and the voice stops. Once he is satisfied that the gear is in the proper position for the type of landing being made, he can cancel the voice by pushing the panel switch. The system incorporates a test function, and the ability to temporarily disengage 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 A 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. Should one of the aircraft

position switches or lights fail or not activate properly, the system senses this and will provide a warning message A CHECK LANDING GEAR@ to alert the pilot. This message will also sound while the gear is in transition between positions. 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 DEFINED IN THE AIRCRAFT FLIGHT MANUAL AS THE PRIMARY INDICATION OF GEAR POSITION.

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III APPLICABILITY

This system is **not FAA approved**. It is intended for installation on Experimental category amphibian 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 up and 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.

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IV. INSTALLATION INFORMATION

A. Mechanical Installation

1. Locate a place in the aircraft to mount the P/N 2048-2 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, Fig B, Fig C or Fig D 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 light 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. Fig C and Fig D show installations in aircraft that have either 3 or 4 gear up and gear down lights. 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.

2. Hook the RED wire to the aircraft 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 or Fig D 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 wires to the gear up and 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. This option should only be used on aircraft that normally make all landings with full flaps.

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 airspeeds above 40 mph, and opens (turns off) at speeds below 40 mph.. NOTE: The switch current must be externally limited to 50 ma.

8. 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 A TEST OK@ will 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 A 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 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 to the short VIOLET wire attached to pin 9 of the connector and to 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. The voice message A WATER LANDING, WATER LANDING@ will be heard if the landing gear is up. Momentarily push the panel switch and release it. The voice message should stop, and the light should turn off. The voice message A RUNWAY LANDING, RUNWAY LANDING@ will be heard if the gear is in the down position. Test the system with the gear in both positions. The system hooks to both the gear up and the gear down lights. It must sense that one set of lights is off, and the other set of lights is on. If this combination does not exist, (both off, both on for example), the voice message A CHECK LANDING GEAR@ will be heard indicating a problem.

5. With the gear in either position and the voice playing, move the gear to the other position. The voice message A CHECK LANDING GEAR@ will be heard while the gear is in transient, and the voice message will then change to correspond to the new gear position.

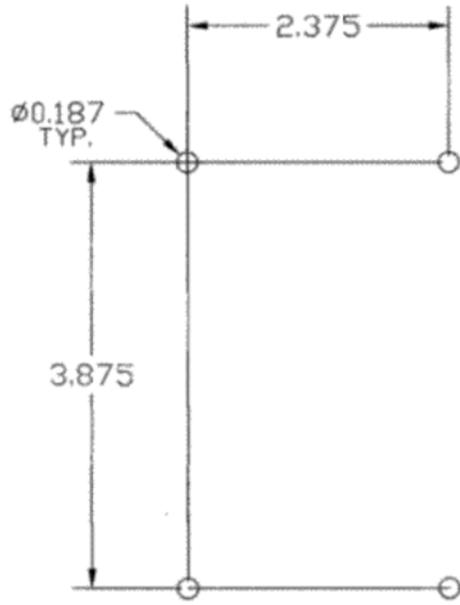
6. When in flight, push the panel switch momentarily and release it. The voice message A TEST OK@ will be heard once through the built in speaker and through the pilots headset.

7. Push the panel switch and hold it for about 2 sec. The voice message A 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.

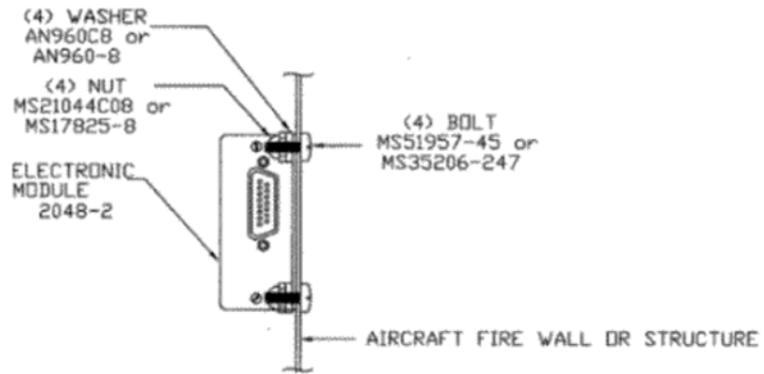
VI. DOCUMENTATION

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

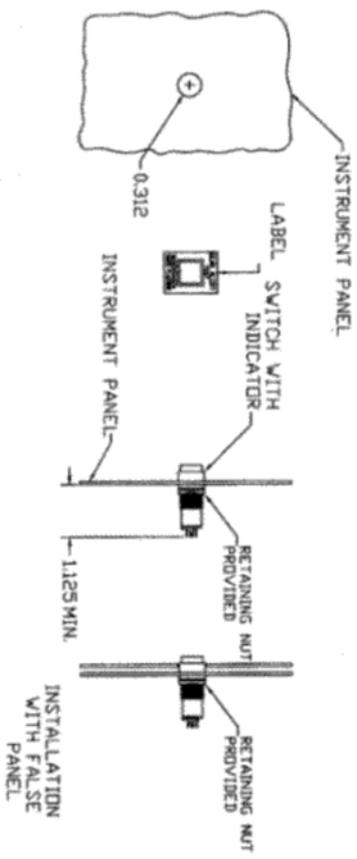
2. System weight is 0.7 lb.



ELECTRONIC MODULE TEMPLATE
FIG 1



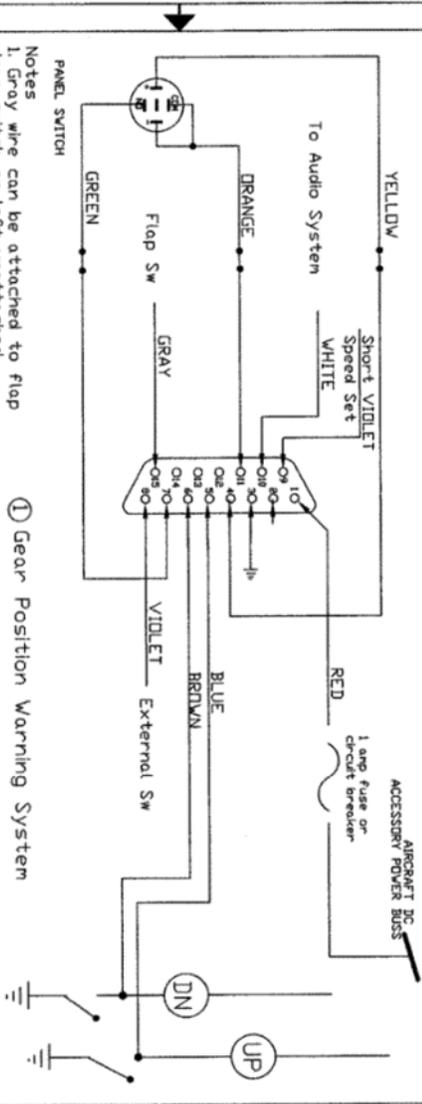
ELECTRONIC MODULE INSTALLATION
FIG 2



INSTALLATION OF SWITCH WITH AMBER LIGHT

FIGURE 3

REVISIONS		
ZONE	REV	DESCRIPTION

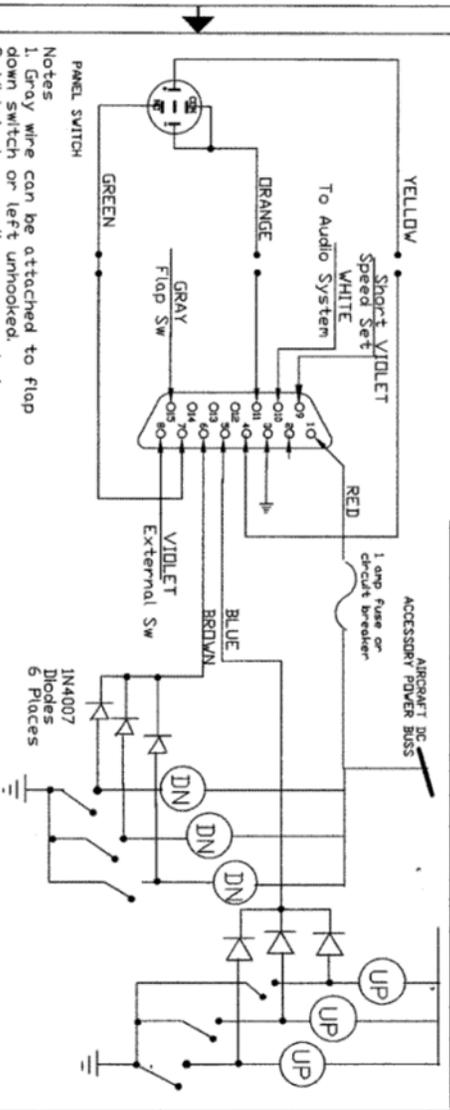


① Gear Position Warning System

- Notes
1. Gray wire can be attached to flap down switch or left unattached.
 2. Violet wire supplies a ground when active; 0.050 amps max.
 3. Hook white wire to un-switched audio input or pilots headset jack.
 4. Input +12V or +24V DC.
 5. Blue & Brown wires attach to Up & Down gear position lights or power system switches as described in the manual.

APPROVED		AIRCRAFT COMPONENTS INC.	
DATE 04-15-03		Gear Position Warning System for Home Built Amphibian Aircraft	
SCALE NONE	DRAWN BY J.D.G.	DWG NO. 2048 FIG A	REV 0
SHEET 1	OF 1		

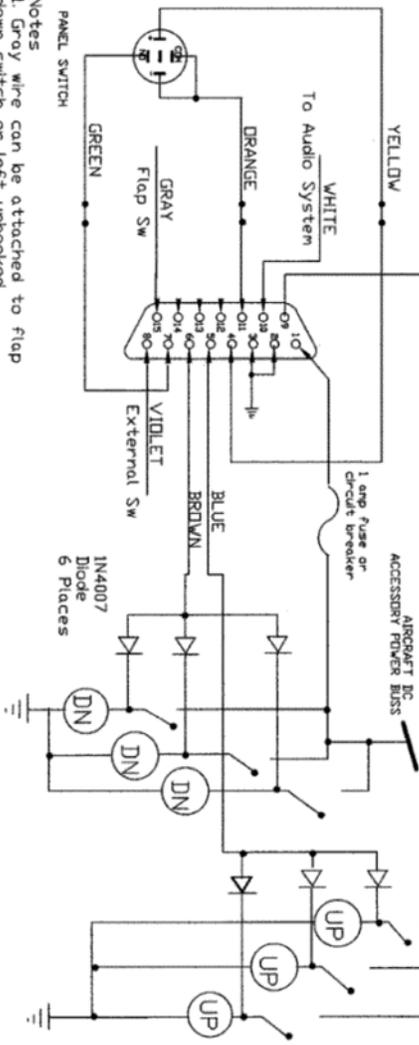
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



- Notes**
1. Gray wire can be attached to flap down switch or left unhooked.
 2. Violet wire supplies a ground when active. Limit current to 0.050 amps max.
 3. Hook white wire to un-switched audio input or pilots headset jack.
 4. Input +12v or +24v DC
 5. Blue & Brown wires attach to Up & Down gear position lights or power system as described in the manual.

APPROVED		DATE 04-15-03	
AIRCRAFT COMPONENTS INC. Gear Position Warning System for Aircraft with 3 Gear Lights			
SIZE	FSC# NO.	DWG NO.	REV
A		2048	0
SCALE	NONE	DRAWN BY	J.D.G.
		CHECKED	SWEET
			1 DF 1

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



- Notes
1. Gray wire can be attached to flap down switch or left unhooked.
 2. Violet wire supplies a ground when active. Limit current to 0.050 amps max.
 3. Hook white wire to un-switched audio input or pilots headset jack.
 4. Input +12V or +24V DC
 5. Blue & Brown wires attach to Up & Down gear position lights or power system as described in the manual.
 6. Add jumper pin 2 to pin 3

AIRCRAFT COMPONENTS INC.					
Gear Position Warning System for Aircraft with 3 Gear Lights					
APPROVED	DATE	SCALE	DRAWN BY	SHEET	REV
	04-15-03	NONE	J.D.G.	1 OF 1	0