

Airglas, Inc.

**INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
INCLUDING
INSTALLATION, MAINTENANCE AND SERVICE INSTRUCTIONS**



MANUAL NO. LW2500-105-1 Rev. A

**Model LW2500 Ski Kit
For
Piper PA-12 and PA-14
Cage Code 17564**

MANUAL REVISION (A)

June 19, 2012

THIS MANUAL INCLUDES INFORMATION PROPRIETARY TO ***Airglas, Inc.*** AND SHALL NOT BE USED TO MANUFACTURE OR REPRODUCE ANY PART OR ASSEMBLY WITHOUT THE PRIOR WRITTEN PERMISSION OF ***Airglas, Inc.***

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Airworthiness Limitations

"The Airworthiness Limitations section is FAA approved and specifies maintenance required under Sections 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved."

Limitations:

- *Currently there are no components of the LW2500 Wheel Ski Kit that have a time limited mandatory service interval.*

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1.0 Introduction & Description

Introduction: For more than fifty-five years, *Airglas, Inc.* has designed and manufactured a full line of composite skis that dramatically increases the usefulness of the aircraft by allowing it to operate on snow or frozen surfaces. The installation of the LW2500 wheel ski kit allows the Piper PA-12 and PA-14 aircraft to operate on paved or hard surfaces, and snow. When the airplane is on snow the tire protrudes into the snow and creates a minimal degrading of the takeoff performance (compared to straight or hydraulic wheel skis). The simplicity of this design allows for a low maintenance high performance ski kit. This is a design that *Airglas, Inc.* started in the early 1960's, using the successful LW3600.

Description: The LW2500 ski installation consists of:

- 1. Ski and Rigging** – This includes the ski with all attaching hardware (interface to the gear leg) and the rigging components.
- 2. Landing Gear Modification**– The landing gear must have a welded attach bracket installed inboard of the brake torque plate and an axle stub inserted into the axle. This gear modification is the same as the one used on the *Airglas, Inc.* GLH3000 hydraulic wheel ski.
- 3. Placards and Markings** – This includes operational placards and remarking of the airspeed indicator.

Instructions for installation, removal, inspection, maintenance and Instructions for Continued Airworthiness (ICA) of this kit are detailed within this manual.

Note: *All hardware in this kit shall be installed and torqued IAW AC 43.13-1B Chapter 7, Par 7-40, Table 7-1 and table 7-2 unless specified otherwise.*

2.0 Placards and Markings

PLACARDS

The following information must be displayed in the form of composite or individual placards in addition to those specified in the basic handbook.

- A.) *Markings and Placards:* The airspeed indicator is marked as follows:
 - The red radial line is located at 138 MPH TIAS.(All Models)

2.0 Placards and Markings-Continued

DO NOT EXCEED **138 MPH TIAS**
WITH AIRGLAS LW2500 SKIS INSTALLED

Place Airspeed Restriction Placard on instrument panel immediately adjacent to Airspeed Indicator and **in full view of pilot**. (All Models)

ONLY NORMAL CATEGORY OPERATIONS APPROVED,
SPINS ARE PROHIBITED.

Place Operations Placard on instrument panel **in full view of pilot**. (All Models)

3.0 Initial Installation

A modification to the landing gear must be accomplished at **Airglas, Inc.** for installation of the skis. If the aircraft landing gear has been previously modified for the **Airglas, Inc.** GLH3000 Hydraulic Wheel skis, then no modification is necessary. 8.00 x 6 tires are required.

Refer to drawings:

LW2500PA18 Installation

SKI ATTACHMENT

1. The existing brake caliper torque plate will need to be rotated about 45 degrees upwards to provide clearance for the ski. The torque plate on the caliper may need to have 4 new holes drilled halfway between the exiting holes. Maintain at least 2 diameters edge margin between the hole centerlines.
2. The brake lines may have to be modified or changed to allow for the new position of the caliper.
3. Prior to initial ski installation, the aircraft will need to be hoisted or jacked to attain clearance enough to slide the ski beneath the tire. Once the ski is positioned, the aircraft may be lowered to the ground.
4. The ski attach brackets can next be thru-bolted to the welded tabs. Ensure the ski is free to rotate. (Lubricate with a low temperature grease, tighten nuts to a snug fit only, install cotter pin on nuts)
5. The use of mechanical means to extend the forward bungee/safety cable assy. far enough to attach it to the forward gear bolt will be necessary. Use caution when stretching the bungee.
(If a hoist is used to lift the aircraft, it may be possible to lift it high enough to pivot the ski and attach the bungee assembly without stretching it.)
6. Once the forward bungee/safety cable assy. is attached with the aircraft on the ground, the rear check cable may be attached to the aft gear bolt.

3.0 Initial Installation-Continued

7. Confirm the skis are at +1.5° (+1, -0) tip up in the ski position in flight with the ski in the normal flight position (rear check cable tight). (Measure relative to aircraft horizontal level position) No adjustment is provided in cables. Contact *Airglas, Inc.* if ski position is not within tolerance.
8. Make sure all hardware is installed, torqued, and cotter pinned as necessary.

Placards and Markings

1. Install the placards contained in Section 2.0.
2. Remark the airspeed indicator in accordance with Section 2.0. If the markings are on the glass of the airspeed indicator install a slip mark that will indicate to the pilot that the glass has slipped.
3. Install the flight manual supplement in the aircraft flight manual.

Aircraft Records

1. Revise aircraft weight and balance and equipment list to reflect the ski installation.
2. File FAA Form 337 and make appropriate entries in the aircraft maintenance records.

4.0 Removal Information

1. Prior to ski removal, the aircraft will need to be hoisted or jacked to attain clearance enough to slide the ski from beneath the tire. Remove the rear check cable form the aft main gear attach bolt. Re-install the nut and new cotter pin (if used). Additional NAS1149F0663P washers may need to be installed to fill gap created by removal of cable tabs.
2. The use of mechanical means to extend the forward bungee/safety cable assy. far enough to remove it from the forward gear bolt will be necessary. Use caution when stretching the bungee. Re-install the nut and new cotter pin (if used). Additional NAS1149F0663P washers may need to be installed to fill gap created by removal of cable tabs .
(If a hoist is used to lift the aircraft, it may be possible to lift it high enough to pivot the ski and remove the bungee assembly without stretching it.)
3. Once the forward bungee/safety cable assy. is removed, the ski can be slid forward from beneath the tire, and the aircraft lowered to the ground.
4. Revise aircraft weight and balance and equipment list to reflect ski removal. Record ski removal in the aircraft maintenance records.
5. Avoid storing skis with direct sunlight on the ski bottoms or bungee's.

5.0 Re-installation Information

1. Prior to ski installation, the aircraft will need to be hoisted or jacked to attain clearance enough to slide the ski beneath the tire. Once the ski is positioned, the aircraft may be lowered to the ground.
2. The ski attach brackets can next be thru-bolted to the welded tabs. Ensure the ski is free to rotate. (Lubricate with a low temperature grease, tighten nuts to a snug fit only, install cotter pin on nuts)
3. The use of mechanical means to extend the forward bungee/safety cable assy. far enough to attach it to the forward gear bolt will be necessary. Use caution when stretching the bungee.
(If a hoist is used to lift the aircraft, it may be possible to lift it high enough to pivot the ski and attach the bungee assembly without stretching it.)
4. Once the forward bungee/safety cable assy. is attached with the aircraft on the ground, the rear check cable may be attached to the aft gear bolt.
5. Confirm the skis are at +1.5° (+1, -0) tip up in the ski position in flight with the ski in the normal flight position (rear check cable tight). (Measure relative to aircraft horizontal level position) No adjustment is provided; contact *Airglas, Inc.* if angle is not correct.
6. Make sure all hardware is installed, torqued, and cotter pinned as necessary.
7. Confirm that the placards contained in Section 2.0 are installed in the aircraft.
8. Confirm that the markings on the airspeed indicator conform with Section 2.0. If the markings are on the glass of the airspeed indicator install a slip mark that will indicate to the pilot that the glass has slipped.
9. Confirm that the flight manual supplement is installed in the aircraft flight manual.
10. Confirm that the aircraft weight and balance and equipment list reflect the ski installation.
11. A confirmation of propeller clearance or axle height is required for aircraft utilizing other than Type Certificate Data Sheet propeller installations.
12. Make appropriate entries in the aircraft maintenance records.

6.0 Servicing Information

Mechanical System – The skis themselves are virtually maintenance free with the top of the ski constructed of fiber glass and the bottom of the ski is Ultra High Molecular Weight Polyethylene (UHMW). The ski bottom has two runners that run the full length of the ski and are made out of 3/16" steel. The runners are designed to give tracking stability to the ski and protect the bottom of the ski. When the runners have worn down more than 50%, they will need to be replaced. Waxing the ski bottoms for decreased friction and improved glide is recommended, especially in wet snow.

Ski attach pivots require light greasing (with any low temperature grease) every 100 hours of operation.

6.0 Servicing Information-Continued

The Tail Wheel Bracket Kit (LW2500-18) is made of stainless steel angled brackets with a 5" aluminum wheel with a solid urethane tire. The cartridge wheel bearings are sealed and require no grease. When the rubber on the tire has less than .25" thickness remaining the wheel should be replaced.

The rigging is made up of galvanized steel 5/32 cable for the ice cutter, safety cable, and natural rubber 8020CW cold weather bungee rings for the forward bungee/safety cable assembly and 5/32 cables for the check cable assembly. The bungees should be kept out of direct sunlight and must not come in contact with fuel or other chemicals. Any fraying of the sheathing should be noted and inspected for rubber strand damage or degradation. Cables and swaged ends should be inspected for fraying and slippage. Hardware should be inspected for security. Replace any damaged components. Bungee's should be replaced after 5 years in service or when defects are noted.

7.0 Instructions for Continued Airworthiness

MAINTENANCE AND GROUND HANDLING RESTRICTIONS

1. **DO NOT – Push or Pull on skis to move aircraft.**
2. **DO NOT – Subject skis to flame or high heat.**
3. **DO NOT – Attempt to jack aircraft using the skis for a Jack Point.**
4. **DO NOT – Subject skis to harsh solvents or caustic chemicals.**
5. **DO NOT – Use skis as a tie down for the aircraft.**
6. **DO NOT – Attempt to change a tire with the skis installed.**
7. **DO NOT – Rely on standard wheel chocks with skis installed.**

MAINTENANCE OPERATIONAL CHECKS

Daily Preflight Check (may be performed by appropriately rated pilot)

1. **CHECK –** Bungees, cables, clevis pins, cotter pins, nuts, bolts and attach fittings for security.
2. **CHECK –** LW2500 Ski Kit for cracks, excessive wear, fractures, abrasions, and delamination.

INSPECTION CRITERIA 100/Annual (100 hour or Annual Inspection)

1. **INSPECT –** The LW2500 Ski for:
Cracks, wear, fractures and abrasions. Inspect the bottom for cracks, scratches, delamination, and excess wear. If fibers are exposed or damaged, consult Airglas. If ski shows signs of delamination, contact Airglas.

7.0 Instructions for Continued Airworthiness-Continued

- 2. INSPECT** – The Forward Bungee, Safety Cable Assy. and Rear Check Cable Assy. for integrity, wear, abrasion and fraying. Inspect all associated hardware for security. Replace bungees when frayed or tension is less than 70 pounds in most slack position.
- 2. INSPECT** – The ski attach pivots for bends, cracks, dents and corrosion. Grease the pivots and inspect for wear. Apply low temp grease to the pivot bolts.
- 3. INSPECT** – The main landing gear hardware and ski weldments for cracks, bends, and corrosion.
- 4. INSPECT** – The ski tail wheel (LW2500-18) Tail Wheel Assembly for wear. When the rubber on the tire has less than .25" thickness remaining the wheel should be replaced. Replace cartridge bearings if worn.
- 5. INSPECT** – The Ski Rigging angles to insure a minimum angle of +1.5° (+1, -0) tip up in the ski position in flight. (It may be necessary to lift the aircraft to confirm this)
- 6. INSPECT** – The placards and markings to ensure they are properly placed, conform to the flight manual, and are legible.
- 7. CONFIRM** – The flight manual supplement is installed in the aircraft flight manual. The aircraft weight and balance and equipment list include the LW2500 ski installation in the current aircraft configuration.

8.0 Ski Specifications

LW2500 Ski Specifications are as follows:

Length=	71"
Width=	20"
Height=	8.5" to top of tunnel
Weight=	45 lbs. Each
Center of Gravity=	2.5" forward of axle centerline (includes rigging)
Load Rating=	TSO approved to 5225 lbs.

9.0 Trouble Shooting

Problem: Skis try to dive in flight.

Correction: Skis are rigged at too low angle of attack, or bungees are deteriorated.

— END —